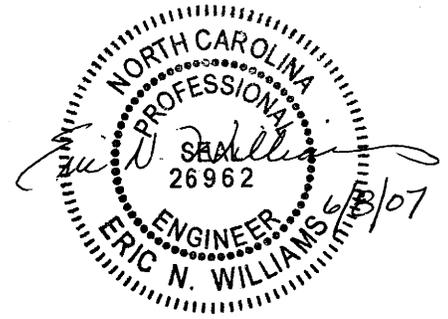


SPECIAL PROVISION

SUNSET BEACH DAM CONSTRUCTION**1.0 Dam Construction Dewatering**

Work under this Section shall consist of removal of surface water and ground water as needed to perform the required work, including:

- Building and maintaining temporary impounding works, channels, and diversions.
- Furnishing, installing, and operating pumps, piping, and other facilities and equipment.
- Removing temporary works and equipment when no longer required.

A dewatering scheme is shown on Drawings for purposes of construction sequencing. The Contractor shall be responsible for:

- Protection of work areas and safely passing stream flow for duration of construction.
- Means and methods for dewatering work areas, including the actual dimensions, configurations, stability, and dewatering capacity of cofferdams and protective works.

The Contractor shall repair, at its expense, any damage to foundations, structures, or other improvements caused by failure of any part of cofferdams or protective works.

Permitting:

Construction of the dam and road embankment, including cutting and filling in the water course for cofferdams and diversions, shall be in accordance with requirements of North Carolina Department of Environment and Natural Resources (NCDENR) and U.S. Army Corps of Engineers (USACE). The Contractor shall comply with applicable Federal and State codes and permit requirements. The Contractor shall apply for NCDENR and USACE permits if required for construction dewatering.

Submittals:

- Dewatering Plan: Submit a written plan and drawings of proposed method for dewatering and diversion of water. Submittal shall include methods of construction and other details left open to Contractor's choice, or not fully shown on Contract Drawings. Cofferdams, diversions, or other temporary structures submitted by contractor shall be designed and sealed by a registered professional engineer licensed in the State of North Carolina. The proposed ditch liner shall be impermeable plastic approved by the Engineer prior to installation.
- Dewatering plan must be consistent with construction sequencing shown on Drawings or described in Specifications.
- Written plan and drawings shall be submitted to Engineer at least 30 days prior to start of construction of cofferdams or dewatering operations.
- Type and clearance of cofferdams, dewatering means and diversion of water, insofar as such details affect character of finished work will be subject to review

by the Engineer, but other details of design will be left to Contractor who shall be responsible for successful construction of work. Acceptance of dewatering plan by Engineer will not relieve the Contractor of responsibility for completing specified work.

General Sequence:

The Contractor shall lower the reservoir initially from its present level at approximately Elevation 9.4 feet to approximately Elevation 6.1 feet by removing existing dam's riser while retaining the existing conduit through the dam to pass water. **The reservoir shall be lowered at a rate not exceeding one foot per day.** Following initial lowering of reservoir, the Contractor shall divert outflow from the upstream dam around the reservoir as shown on Drawings using an approved means. Such means left open to the Contractor may include, but not be limited to, a lined ditch, open conveyance or pipes. Upon completion of water diversion around reservoir, the Contractor shall provide a cofferdam upstream of the work area as shown on Drawings for construction of dam and roadway foundation while in a dewatered condition. The Contractor shall propose the actual type of cofferdam, such as sandbags, sheet piling, Port-a-Dam, AquaDam, etc. The Contractor shall be responsible for determining minimum top elevation of upstream cofferdam and verifying the stability of the cofferdam.

The Contractor shall install upstream cofferdam and dewater the work area before any excavation or filling begins. Reservoir water level upstream of cofferdam may be lowered to any level and maintained at any level below top of upstream cofferdam. The Contractor may remove upstream cofferdam, dewatering measures and diversion means after completion of new conduit and riser, and earthfill reaching a minimum height of Elevation 10.0 feet for both dam and roadway foundation.

Materials:

The Contractor shall furnish all materials for and shall construct and maintain, as it deems necessary, all cofferdams, channels, drains, sumps, and protective works for protection of work area. The Contractor, at its option, may select whatever materials are available at project site for use in cofferdam, subject to permit requirements. The use of materials not specified or other deviations from Drawings and Specifications may require a permit from NCDENR. Contractor shall be responsible for obtaining necessary permits resulting from deviations from Drawings and Specifications.

Diverting Surface Water

Construct, maintain, and operate cofferdams, channels, flumes, sumps, and other temporary diversion and protective works to divert stream flow and other surface water through or around construction site and away from work while construction is in progress. Unless otherwise specified, diversions must discharge into the same natural drainage way in which its headwaters are located.

Surface water diversion procedures shall not create a condition where erosion or deposition of materials occurs in stream. Riprap or other means of protection shall be provided for erosion protection adjacent to all cofferdams where flows could occur. Diversion works which are moved out of position by any cause during installation shall be righted or enlarged so as to provide necessary clearance. As the work area is dewatered, diversion works that are not watertight shall be plugged or sealed as much as practical to reduce infiltration of water into work area. No shoring will be permitted in diversion works which induce stress, shock, or vibration in permanent structure.

Dewatering Excavations and Work Areas

Foundations, cutoff trenches and other parts of construction site shall be dewatered and kept free of standing water or excessively muddy conditions for proper execution of construction work. Furnish, install, operate, and maintain wells, drains, sumps, pumps, well points and other equipment needed to perform dewatering as specified. Dewatering methods that cause loss of fines from foundation materials will not be permitted. Maintain pumping operations to keep work area dry until all materials, equipment, and debris have been removed and diversion works is to be removed.

Removal of Temporary Works

Remove temporary works no longer required; level and grade earth as required to restore appearance and to prevent obstruction to flow or any other interference with operation of or access to permanent works. Unless otherwise noted, pipes and casings shall be removed from temporary wells and wells shall be filled to adjacent ground level with gravel or other approved material. Construction dewatering materials shall be removed from site and properly disposed of. The Contractor shall make its own arrangements for a disposal site and shall pay all costs involved.

2.0 Soil Erosion and Sediment Control for the Dam Site

Soil Erosion and Sediment Control for the Dam Site shall be performed in accordance with the Project Plans, approved Soil Erosion and Sediment Control Permits and applicable NCDOT Specifications including Section 107-13 and materials as Specified in Section 1000.

3.0 Aggregate Base Course (ABC)

The work shall consist of placing Select Fills in the foundation of the proposed dam and extending downstream under the proposed earthfills. ABC stone shall be placed in a maximum lift thickness of 12 inches and compacted to 95% of AASHTO T-180, Method "D" density as modified by the Department of Transportation.

Materials

Material shall meet the requirements for Class IV Select Material as defined in Section 1016 of the Specifications.

Placement of ABC Stone

Following dewatering activities and cofferdam construction, the placement of ABC stone shall be performed to stabilize the foundation of the proposed dam. Placement shall be performed in a manner to minimize sedimentation and to provide compaction of the ABC Stone. ABC stone shall not be placed above elevation +2.0.

4.0 New Principal Spillway Construction

The Contractor shall construct a new principal spillway in the location and to the dimensions indicated on the Project Drawings. The spillway shall consist of a cast-in-place concrete base slab, a precast reinforced concrete manhole to serve as the riser, a new cast iron gate valve, reinforced concrete pipe outlet, trash rack, and riprap outlet protection.

Submittals:

- Concrete mix design, and material supplier, admixtures, for spillway base slab and concrete cradle. Other submittals required by referenced NCDOT Standard Specifications will also be required.
- Steel reinforcing diagrams showing all steel reinforcing, minimum clearances, laps, splices, and other incidental details.
- Precast concrete section details including reinforcing, joints, gaskets, openings, and accessories.
- Trash rack fabrication details
- Cast Iron Gate manufacturer details, installation instructions, and operation and maintenance data.
- Pipe manufacturer data, installation instructions, joint details, and accessories.
- Riprap supplier, and certification that materials meet specified requirements

Materials

The forming, reinforcing steel, and concrete used for the proposed spillway base slab and outlet conduit pipe cradle shall meet the requirements of NCDOT Standard Specification Section 420. Concrete shall be an air entrained mix meeting the requirements of NCDOT Standard Specification 1000 Class AA.

Trash Rack components and fabrication shall meet the requirements of NCDOT Standard Specification Section 1072 Structural Steel and 1074 Miscellaneous Metals and Hardware. The pipe material for the trash rack shall be aluminum alloy corrugated metal pipe.

Reinforced Concrete Pipe shall meet the requirements of NCDOT Standard Specification 1032-9 Reinforced Concrete Culvert Pipe. The size is shown on the applicable project drawings. Precast concrete manhole shall meet the NCDOT Standard Specifications for precast units.

Rock Riprap shall be NCDOT Class B.

Filter fabric under Riprap shall be NCDOT Standard Specification Section 1056, Type 2.

The proposed Cast Iron Gate shall be manufactured by Troy Valve, Penn-Troy Manufacturing, Inc., 800-232-4442, www.troyvalve.com; or Hydro Gate Corp., 800-678-8228, www.hydrogate.com or approved equal. Provide manufactured gates with lifting mechanism, thimble and mounting hardware of the following types and as shown for a 12-inch diameter gate:

Model A-2520 Shear Gate, Troy Valve, (or approved equal)

Model 20-10C Sluice Gate, Hydro Gate (or approved equal)

Ferrous metals on the gate shall be shop painted using manufacturer's recommended paint system for submerged service. Machined surfaces, tapped holes and threads shall receive a protective coat of grease. Surfaces in contact with concrete shall be left bare or shop primed to minimize oxidation

Materials used to construct gates and appurtenances shall be suited for the application and shall conform to the following specifications.

- Disc, Frame & Thimble: Cast iron, ASTM A126, Class B or ASTM A47, Class 30.
- Seating contact surfaces: Bronze, ASTM B98
- Fasteners: Bronze, ASTM B98 or Stainless steel, ASTM A320, Grade B8 or B8F for bolts and ASTM A194, Grade 8 or 8F.
- Bolts and fasteners shall be of ample section to resist forces created by operation of gates under maximum head.

Spillway Construction

The subgrade soils for the precast manhole shall be compacted and approved by the Engineer prior to placing concrete for the base slab. The pipe shall be installed to the lines and grades shown on the drawings. Reinforced concrete pipe shall have a watertight gasket installed at each joint. A concrete cradle shall be provided to the dimensions indicated on the drawings along the full length of the pipe through the dam embankment.

The trash rack shall be fabricated to the dimensions and tolerances provided on the drawings and attached to the precast manhole as indicated. The riprap plunge pool outlet shall be constructed to the lines and grades shown on the drawings. The riprap shall be NCDOT Standard Specifications Section 1042, Class B Rock Riprap with a minimum thickness of 1.5 feet placed over filter fabric.

The precast manhole shall have a pipe stub grouted into the invert with a flange for mounting the proposed cast iron gate. The flange bolt pattern shall be selected to be compatible with the gate manufacturer's bolt pattern. Install gates in accordance with approved shop drawings and manufacturer's recommendations and in a manner that will prevent excessive leakage around seats and binding of gates during operation. Care shall be taken to avoid warping the gate frame and to maintain tolerances between seating faces. All gates, thimbles, stems, and operators shall be plumbed, shimmed and accurately aligned.

Surfaces of metal against which concrete or other cementitious material will be placed shall be free from oil, grease, loose mill scale, loose paint, surface rust, and other debris or objectionable coatings that will prevent a bond between metal and cementitious material. Anchor bolts, thimbles, and frames shall be secured in true position and in forms and held in alignment during placement of grout. Thimbles shall be carefully braced both horizontally and vertically to prevent distortion. Grout shall be carefully placed to provide a good bond to the thimble without voids. Grout shall be forced into the air vent holes. Tapped holes in thimbles shall be plugged for protection during concrete placing and setting.

Concrete surfaces against which rubber seals will bear or against which flat frames or plates are to be installed shall be smooth and uniform. When a gate is attached to a wall thimble, mastic or resilient gasket shall be applied between gate frame and thimble in accordance with recommendations of manufacturer.

After the entire assembly of manually operated gates has been installed, adjusted and properly lubricated, each gate shall be operated for one complete cycle, open-close-open or close-open-close. Adjust as necessary to insure satisfactory operations of gate system.

5.0 Construction of Dam Embankment

Work under this Section shall consist of construction of the new dam embankment, addition of earth fill to raise crest of existing dam embankment, and backfill in conjunction with the road embankment as required by the drawings and specifications.

Conduct operations in such a manner that embankment is brought to final grade in a continuous operation and permanently seeded and mulched in accordance with the requirements of Article 107-13 of the Specifications.

Submittals

- Provide two copies of soil gradation and standard Proctor moisture-density relationship tests in accordance with ASTM D-698 for proposed material to be used as earth fill 15 days prior to construction. Provide Atterberg testing results for proposed fill indicating Plasticity Index (PI).

- Provide two copies of gradation analysis and certification that Filter Diaphragm select fills meet specified requirements.

Materials

Dam Embankment Earth Fills shall be free of organic matter such as sod, brush or roots, debris, frozen soils, ice, and other objectionable materials. Rock particles larger than maximum size specified for each type of fill shall be removed prior to compaction of fill. Fill materials shall be obtained from off-site. Selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the Engineer. Select existing material excavated from site may be used for embankment construction if it meets the specified product requirements and is approved by the Engineer.

Dam Embankment Earth Fills shall consist of select soils complying with ASTM D2487 soil classification groups SM, SC, ML, or CL with a low to moderate plasticity (Plasticity Index between 5 and 25) and a maximum dry density of at least 95 pounds per cubic foot, as determined by a Standard Proctor compaction test (ASTM D 698). In lieu of these materials, AASHTO soil classification groups A-4 or A-6 with a PI between 5 and 25 will be acceptable materials for Earth dam embankment construction.

Filter Diaphragm sand shall consist of natural materials meeting the requirements of NCDOT Specification Section 1005 Fine Aggregate Standard Size 2S. Manufactured sands meeting this specification will not be acceptable.

Foundation Preparation:

Foundations for earth fill shall be prepared with select fill as specified in Section 3.0 of this Special Provision. In areas where select fill is not specified, the natural ground shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified. These earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earth fill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earth fill as specified for subsequent layers of earth fill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such moisture content that the earth fill can be compacted against them to affect a good bond between fill and abutment surface.

Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be free of standing water when fill is placed upon them. Occasional rock outcrops in earth foundations for earth fill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

Foundation and abutment surfaces shall be not steeper than 1 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earth fill conforming to the specifications for earth fill to be placed upon foundation.

Dam Embankment Earth Fill Placement

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by Engineer. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill. Fill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed 9 inches. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed 4 inches.

Adjacent to structures, fill shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Distribute materials throughout each zone uniformly, free from lenses, pockets, streaks or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material. Scarify surface of layers too hard and smooth for proper bond with succeeding layer; scarify parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed. Maintain top surfaces of fills and embankments approximately level during construction, except provide a crown or cross-slope of not less than 2 percent for drainage. If the work requires fill to be placed higher at parts of an embankment, maintain top surface of each part level as specified above.

Place fill in continuous layers from abutment to abutment except where openings to facilitate construction or to allow passage of stream flow during construction are authorized. Route equipment travel approximately parallel to embankment centerline. Construct embankments required to be built at different levels so slopes of bonding surfaces between adjacent levels of embankment are not steeper than 3 feet horizontal to 1 foot vertical. Strip bonding surface of material not meeting specified requirements, and scarify, moisten and re-compact at specified moisture content and density to insure good bond with fill.

Control of Moisture Content

During placement and compaction of fill, maintain moisture content of materials within the optimum range specified for the class of compaction. Sprinkle water to fill materials at borrow areas or after placement on fill if necessary. Obtain uniform moisture distribution by disking, blading or other approved methods prior to compaction of layer. If material is too wet when deposited on the fill, remove or dry it to specified moisture content prior to compaction.

If top surface of preceding layer of compacted fill or a foundation or abutment surface in zone of contact with fill becomes too dry to permit suitable bond, remove it or scarify and moisten it by sprinkling to an acceptable moisture content prior to placement of next layer of fill.

Compaction

Compact each layer of fill according to the following requirements for the class of compaction specified:

- Class A compaction. Each layer of fill shall be compacted as necessary to make the density of the fill matrix not less than the minimum density specified. The fill matrix is defined as the portion of the fill material finer than the maximum particle size used in the compaction test method specified.
- Class B compaction. Each layer of fill shall be compacted to a mass density not less than the minimum density specified.
- Class C compaction. Each layer of fill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified, or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

Compact Dam Embankment Earth Fill to Class A compaction with at least 95% of Standard Proctor Maximum Dry Density, and with the soil moisture between 0 and plus 4 percentage points of the Standard Proctor optimum moisture content at the time of compaction. Compact fill adjacent to structures to a density equivalent to that of surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators. Unless otherwise specified, heavy equipment including backhoe mounted power tampers, or vibrating compactors and manually directed vibrating rollers, shall not be operated within 2 feet of any structure. Towed or self-propelled vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

Passage of heavy equipment will not be allowed over:

- cradled or bedded precast conduits prior to 7 days after placement of concrete cradle or bedding (unless results of compressive strength cylinders tested in accordance with ACI standards indicate that concrete for cradle has reached its design strength).
- Any type of conduit until backfill has been placed above top surface of structure to a height equal to one-half the clear span width of structure or pipe or 2 feet, whichever is greater.

The Contractor shall not start compacting fill adjacent to structures until concrete has attained strength determined by compression testing of test cylinders cast for this purpose and cured at work site in manner specified in ASTM Method C 31 for determining when a structure may be put into service.

When required strength of concrete is not specified as described above, do not start compaction of fill adjacent to structures until the following time intervals have elapsed after placement of concrete.

<u>Structure</u>	<u>Time Interval</u>
Retaining walls, side walls and cast in place walls	14 days
Walls backfilled on both sides simultaneously	7 days
Conduits and spillway risers, cast- in-place	14 days
Conduits, precast, cradled	2 days
Conduits, precast, bedded	1 day

Reworking or Removal and Replacement of Defective Fill

Fill placed at densities lower than specified minimum density, or at moisture contents outside specified acceptable range, or otherwise not conforming to requirements shall be reworked to meet requirements, or removed and replaced by acceptable fill. Replacement fill and foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements for foundation preparation, approval, placement, moisture control and compaction.

Over-excavation

Excavation in earth or rock beyond specified lines and grades by filling resulting voids shall be backfilled with approved compacted earth fill, except that, if fill is to become subgrade for drainfill or concrete, voids shall be filled with material conforming to the specifications for the drainfill or concrete, unless otherwise approved.

Testing

During course of the work, the Engineer will perform such tests as are required to identify materials, to determine compaction characteristics, to determine moisture content, and to determine density of fill in place. These tests will be used to verify that fills conform to specification requirements. Such tests are not intended to provide Contractor with information required for proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

Densities of fill requiring Class A compaction will be determined in accordance with ASTM Method D 1556, D 2167, or D 2937 except that the volume and moist weight of included rock particles larger than those used in the compaction test method specified for type of fill will be determined and deducted from the volume and moist weight of the total sample prior to computation of density. The density so computed will be used to determine the percent compaction of the fill matrix. Unless otherwise specified, ASTM Method D 2216 will be used to determine moisture content.

6.0 Excavation of Emergency Spillway

An emergency spillway shall be constructed in the location and to the dimensions provided on the Project Drawings. The Emergency spillway shall be excavated in natural soils with the upstream and downstream slopes provided on the drawings. A level section with a minimum width of 20 feet (in the direction of flow) shall be provided at the crest elevation indicated. The grading surrounding the emergency spillway shall be performed to convey flow from the emergency spillway away from the dam embankment. Excavated soils from the emergency spillway may be used if they meet specified requirements for Earth fill and are approved by the Engineer for reuse. Otherwise, excavated materials shall become the property of the Contractor and removed from the site and disposed of in an appropriate manner.

7.0 Placement of Asphalt Paving on Dam Crest

A ten foot wide, asphalt paved path shall be provided across the crest of the new dam embankment for golf cart access. For placement of asphalt and subbase, See Roadway Typical.

8.0 Permanent Seeding and Mulching

The limits of disturbed areas that are not covered with pavement, concrete, rock riprap, or the proposed permanent pool of the new reservoir shall be leveled graded, topsoiled, limed, fertilized, seeded and mulched in accordance with NCDOT Standard Specifications Section 1660.

9.0 MEASUREMENT AND PAYMENT FOR SUNSET BEACH DAM CONSTRUCTION

Dam Construction Dewatering

Measurement for payment will be as a complete unit of work acceptably performed. Payment will be made at the contract lump sum price for Pay Item DAM CONSTRUCTION DEWATERING, payable to Contractor as a single Lump Sum payment following removal of all dewatering equipment and devices upon completion of the dam construction.

Payment will constitute full reimbursement for all equipment, labor, and materials necessary to provide a Control of Water plan, lower the existing impoundment, construct the diversion with plastic liner, install a cofferdam, install any pumps, well points, or other equipment necessary to maintain lower water levels throughout construction. Payment will also include removal of all devices following construction of the dam.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Dam Construction Dewatering	Lump Sum

Soil Erosion and Sediment Control - Dam Construction

Measurement and Payment for Soil Erosion and Sediment Control will be in general accordance with the Standard NCDOT Specifications provided in Division 16 and the Project Drawings. In general, work shall include the installation of silt fence as shown; the excavation of the sediment basin, installation of the base slab and riser structure, outlet pipe, diaphragm drain, and outlet protection; silt excavation from the sediment basin during construction, installation of rock check dams; and the use of temporary seeding, fertilizer and mulch as necessary during construction.

Measurement for cast-in place concrete for the sediment basin riser structure base/ballast shall be per cubic yard of concrete placed in accordance with the dimensions shown on the drawings. Payment shall include all materials, labor, and equipment necessary for submittals, formwork, joints, reinforcing steel, finishing, testing, and curing. Work shall include all accessories and admixtures.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Silt Fence	Linear Foot
Silt Excavation (Excavation of sediment basin)	Cubic Yard
Concrete Class AA (Base slab)	Cubic Yard
36" C.S. Pipe Culverts, 0.079" Thick (Riser structure)	Linear Foot
24" C.S. Pipe Culverts, 0.064" Thick	Linear Foot

Fine Aggregate Filter Diaphragm	Cubic Yard
Rip Rap, Class B (Rock rip rap for outlet protection)	Ton
Filter Fabric For Drainage (Under outlet protection)	Square Yard
Silt Excavation (Silt excavation from sediment basin)	Cubic Yard
Seed For Temporary Seeding	Pound
Temporary Mulching	Acre
Fertilizer for Temporary Seeding	Ton

Aggregate Base Course (ABC)

Measurement for ABC Stone placed in accordance with the project drawings and the special provision for dam construction shall be computed for payment in general accordance with the NCDOT Standard Specifications Section 520.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Aggregate Base Course	Ton

New Principal Spillway Construction

The new principal Spillway shall be constructed in accordance with the Project Drawings and the Special Provision for Dam Construction.

Measurement for payment for the Primary Spillway Precast Manhole shall be measured as a single unit (each) and shall include all materials, labor, fabrication, equipment and installation of the Precast Manhole as specified and shown on the Project Drawings.

Measurement for cast-in place concrete for the base slab shall be per cubic yard of concrete placed for the foundation of the precast manhole and the concrete cradle in accordance with the dimensions shown on the drawings. Payment shall include all materials, labor, and equipment necessary for submittals, formwork, joints, reinforcing steel, finishing, testing, and curing. Work shall include all accessories and admixtures.

Measurement and payment for the cast iron gate shall include all submittals, materials, finishes, labor, equipment, shipping and installation of the new gate as indicated on the project drawings and in the Special Provision for Dam Construction.

Measurement for Reinforced Concrete Pipe (RCP) shall include all materials, equipment, and labor used to install pipe in accordance with the Project Drawings and the Special Provision for Dam Construction. Work shall include excavation, layout, alignment, and installation as specified. All joint materials shall be included in the unit price for each type of pipe specified.

Measurement for payment for the Primary Spillway Trash Rack shall be measured as a single unit (each) and shall include all materials, labor, fabrication, equipment and installation of the trash rack as specified and shown on the Project Drawings.

Measurement for payment for the Trash Guard w/ Anti-Vortex Cover shall be measured as a single unit (each) and shall include all materials, labor, fabrication, equipment and installation of the Trash Guard as specified and shown on the Project Drawings.

Measurement for Rock Riprap shall be performed per ton based on the pay limits shown on the drawings. Payment shall include all submittals, materials, labor and equipment to install the riprap to the lines and thicknesses shown and as specified.

Measurement for filter fabric under the riprap shall be made per square yard of material installed in accordance with the Project Drawings and the Special Provision for Dam Construction. Payment shall include all materials, labor and equipment to install the filter fabric including all accessories. Payment will not be made for overlap between adjacent pieces of filter fabric.

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Class AA (Base Slab)	Cubic Yard
Cast Iron Gate	Each
48-inch Precast Manhole	Each
42" RC Pipe Culverts, Class III	Linear Foot
30" RC Pipe Culverts, Class III	Linear Foot
Trash Rack	Each
Trash Guard w/ Anti-Vortex Cover	Each
Rip Rap, Class B (Plunge pool)	Ton
Filter Fabric For Drainage (Under rip rap)	Square Yard

Construction of Dam Embankment

Measurement for Dam Embankment Earthfill shall be calculated to the nearest cubic yard of compacted in place material measured by survey before and after embankment earthfill. Payment will include all labor materials and equipment necessary to haul, place and compact embankment

Fine aggregate for construction of the filter diaphragm shall be measured to the nearest cubic yard of sand installed. Payment shall include all labor, equipment and materials for construction of the filter diaphragm as indicated on the project drawings and as specified in the Special Provision for Dam Construction. The materials and installation of the PVC pipe and accessories shall be included in the price for Fine Aggregate Filter Diaphragm.

<u>Pay Item</u>	<u>Pay Unit</u>
Fine Aggregate Filter Diaphragm	Cubic Yard
Dam Embankment Earthfill	Cubic Yard

Excavation of Emergency Spillway

Measurement and Payment for Unclassified Excavation performed for the Emergency Spillway Construction shall be performed in accordance with the NCDOT Standard Specifications Section 226.

Pay Item
Grading

Pay Unit
Lump Sum

Permanent Seeding and Mulching

Measurement and payment for Seeding and Mulching shall be in accordance with Section 1660 of the Specifications.

Pay Item
Seeding and Mulching

Pay Unit
Acre