

CERTIFIED PROFESSIONAL
in
EROSION & SEDIMENT CONTROL
(CPESC)

Scope of Professional Certification

and

Specific Areas of Practice

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Version 20

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FORWARD

EnviroCert International, Inc. (ECI) administers the Certified Professional in Erosion and Sediment Control (CPESC) certification as one (1) of five (5) professional certifications. All active professionals in good-standing are listed in the International Registry of Certified Professionals in Environmental Specialties.

CPESC initiated in 1977 and was officially established under the sponsorship of the Soil and Water Conservation Society with the goal of identifying individuals qualified to work in the specialized area of erosion and sediment control. The program has grown out of the California area, where it was established and is recognized in over 30 states and 20 countries.

Certified professionals listed on the International Registry (a) meet educational and practical experience standards prescribed by ECI, (b) subscribe to the Code of Ethics and Professional Conduct, (c) qualify for identification of special abilities, and (d) have passed a rigorous qualifying examination. CPESC is a professional certification not a license. A more detailed discussion of the CPESC program is provided on the ECI website at:

<https://www.envirocertintl.org/cpesc/>

The **“Scope of Professional Certification”** provides a description of areas that a CPESC needs to be familiar with and have a working knowledge of before practicing on their own. CPESCs often have expertise in other related areas such as engineering or natural resource management and work in these closely related areas. While not specifically identified as erosion and sediment control, these other work areas can be associated with sites that need the support of a CPESC.

“Specific Areas of Practice” describes the authority to practice delegated to the CPESC. Currently, ECI examines candidates in their erosion and sediment control knowledge related to agriculture, commercial site development, forest site management, linear construction, mining, and residential site development. *Although no candidate is expected to be competent in all these areas, there are basic principles of erosion and sediment control that are common to all of these categories that should be known by all CPESC candidates. In addition, an experienced and knowledgeable candidate should have a wealth of knowledge in at least one of the categories that he/she has worked and will understand a significant amount of knowledge about related work areas, i.e. residential and commercial, agriculture and forestry, linear construction and mining.*

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2019 CPESC Steering Committee

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INTRODUCTION

EnviroCert International, Inc. (ECI) is an International Non-Profit that administers five (5) Professional Certification Programs in the United States and over twenty (20) countries. ECI has certified over 30,000 professionals over the past forty (40) years. This is the only stormwater and environmental organization that has a demonstrated accreditation compliant program that grants individuals with Professional Certifications.

Certified Professional in Erosion and Sediment Control (CPESC) certification represents many disciplines and specialties that work to produce site-specific plans and designs that comprehensively address current and potential erosion and sedimentation issues with practices and measures that are cost effective, understandable and that meet environmental and regulatory requirements. CPESC registrants meet educational and practical experience standards, subscribe to the code of ethics, pass a rigorous qualifying exam, and maintain expertise through a continuing professional development program.

CPESC is the only stormwater certification recognized in the EPA Construction General Permit to perform Stormwater Management Plans and SWPPPs.

DEFINITION OF CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC) PROFESSIONAL CERTIFICATION

A Certified Professional in Erosion and Sediment Control (CPESC) embraces the science of surface erosion and sediment control. This practice also specializes in the study and subsequent reduction of the adverse effects of environmental pollutants, whether natural or manmade, as it relates to soil, water, and air.

GENERAL INDUSTRIES THAT ENGAGE CPESC PROFESSIONAL CERTIFICATIONS

CPESCs are typically engaged in industries which require expertise in erosion and sediment control, including but not limited to:

- Construction and Land Development (e.g. Residential, Commercial, Industrial, etc.)
- Transportation and Linear projects (e.g. highways, above or below ground lines or pipes, etc.);
- Soil and Water Conservation;
- Forestry;
- Agriculture;
- Mining Activities;
- Landfill and Waste Management;
- Oil and Gas;
- Environmental Biology;
- Energy including Geothermal;
- Reclamation and Site Remediation;
- Watershed Management
- Manufacturing; and
- Education

SPECIFIC AREAS OF PRACTICE

The following is a list of “Areas” that a CPESC is entitled to perform under the authority granted by the Professional Certification. This provides a representative list of area of knowledge and practices that a CPESC should possess:

Rules and Regulations

National, regional, local, and other relevant rules and regulations, as pertinent to the individual’s professional practice. Knowledge of the rules and regulations that have been developed to maintain or restore the chemical, physical, and biological integrity of adjacent waterways and waterbodies to protect the beneficial uses of surface water. Communicate and/or provide information about the practices and methods used to comply with specific rules and regulations.

Site Assessment and Resource Inventory

Ability to observe existing site conditions (e.g. soil types, slope lengths and steepness, vegetative cover, etc.), assess limitations and develop an inventory of available resources, as well as resources meriting protection or mitigation.

Perform assessment of subsurface conditions by trenching and drilling to evaluate soil profiles to evaluate soil conditions and limitations, such as seasonal high-water table, soil texture, percent organic matter, depth to bedrock, etc.

Site Planning and Management

Site planning and management that includes the development of a construction Storm Water Pollution Prevention Plans (SWPPPs), local Stormwater Management plans (SMP’s) and/or Erosion and Sediment Control Plans (ESCP).

Develop cost estimates for plan implantation and management. Life cycle analysis, risk/benefit analysis, and/or value assessments, as applicable.

Incorporate the hydrology and drainage designs performed by a Registered Professional into the stormwater reports and plans.

Predicting Soil Loss

The ability to quantify predicted soil loss to determine appropriate “Management Practices” (MP) for anticipated project and site conditions. A thorough knowledge of method and the associated factors that quantify potential soil loss in planning, designing, and implementing systems to reduce the adverse effects of erosion and sediment discharge.

Runoff Management

Based on the hydrology and drainage study for the site, select the appropriate practices to properly intercept run-on, convey all runoff through and discharge from the site in a manner that reduces or eliminates the adverse effects of erosion and sediment discharge.

Please note: measures may incorporate considerations of volume and velocity, but these determinations will require the professional oversight or site-specific designs of a Professional Engineer.

Soil Stabilization

Understanding of appropriate soil stabilization MPs for various scenarios is necessary for the planning and implementation of both temporary and permanent erosion and sediment control measures. Soil stabilization utilized in conjunction with runoff management should keep soil or surface material in place to limit mobilization and offsite discharge.

Assessing Soil Fertility and Soil Amendments

An ability to understand and interpret the agronomic potential of soils or substrates to develop and maximize establishment of sustainable vegetation for effective erosion and sediment control. It is important to know the suitability and the limitations of site soils when recommending vegetation and prescriptive agronomic measures to produce fertile, stable and sustainable sites.

Plant Species Selection

Select the type of vegetation capable of providing erosion control and restoring disturbed lands while consistent with project or site requirements. Regionally appropriate vegetation with regards to climate, soil moisture and chemistry, sunlight, temperature, and slope should be considered for sustainable and effective vegetative cover to provide sufficient erosion and

sediment control. Native plants are already adapted to local conditions and may provide maximum benefits requiring minimal maintenance.

Erosion and Sediment Control

Select the appropriate management practices to reduce or eliminate soil loss. In addition, select measures to control sediment loss and pollutants to reduce or eliminate, as appropriate to the design which should include but not limited to site's physiographic factors, climate, soil type, targeted pollutants, MP effectiveness for pollutant removal, cost and maintenance requirements.

Specification of Pollution Prevention Measures

Provide the requisite specifications for installation to reduce or minimize pollutants of concern.

Observation, Effectiveness Evaluation, and Maintenance Recommendations

Observe and assess performance of the management practices for the given site and weather conditions.

Provide requisite maintenance thresholds and ensure proper techniques for installation to improve performance and reduce maintenance.

Research and Development Related to Erosion and Sediment Control

Possess the necessary experience to research available technologies and recognize the appropriate applications.

Administration of Erosion and Sediment Control Program

Ability to manage and oversee the development of erosion and sediment control policies and procedures.

Education of Erosion and Sediment Control Practitioners and Others

Provide educational information to promote the implementation and to improve the chances of success of the stormwater control plans or program.

Erosion and Sediment Control Products

Continue to develop and improve a basic understanding of erosion and sediment control products and technologies.

COLLABORATIVE PRACTICE AREAS

The practice of CPESC requires interdisciplinary skills in multiple areas of expertise including but not limited to agronomy, engineering, geology, hydrology, landscape architecture, biology, soil mechanics, and soil science. CPESCs shall recognize that designs involving structures, infiltration, groundwater studies and modeling, hydraulics (e.g. pipes, channels, water volume calculations, flowrates, etc.), hydrology (including time of concentrations, time of transports, etc.), gross slope stability (local and global stability whether static or earthquake), temporary or permanent water containment (e.g. ponds, underground chambers) or other engineering plans, reports, and calculations must be reviewed and prepared under the responsible charge of a licensed Professional Engineer in accordance with State statutory rules and regulations requirements. This list is not exhaustive and does not necessarily address other licensed practices (such as wetland delineation) that need to be considered on a case by case basis.

CPESC is a complementary certification to the practice of engineering and other licensed professions. A CPESC shall be responsible to be familiar with State specific laws, regulations, and rules regarding professional practice and shall ensure they do not encroach into those areas.

The practice of Civil Engineering may vary from State to State, but a general definition of areas of practice includes any studies or activities in connection with fixed works for irrigation, drainage, waterpower, water supply, flood control, inland waterways, harbors, municipal improvements, railroads, highways, tunnels, airports and airways, purification of water, sewerage, refuse disposal, foundations, grading, framed and homogeneous structures, buildings, or bridges:

- The economics of, the use and design of, materials of construction and the determination of their physical qualities
- The supervision of the construction of engineering structures
- The investigation of the laws, phenomena and forces of nature
- Appraisals or valuations
- The preparation or submission of designs, plans and specifications and engineering reports
- Coordination of the work of professional, technical, or special consultants
- Creation, preparation, or modification of electronic or computerized data in the performance of the activities described in subdivisions (a) through (f) above

Civil engineering also includes city and regional planning insofar as any of the above features are concerned therein.

SPECIFIC GUIDELINES

Notwithstanding enumerated restrictions above, the following provides limitations in the practice of a CPESC:

- While inspection authority for all sites during construction is delegated to a CPESC, no such authority is delegated to post construction or developed land uses (e.g. municipal or industrial sites)
- CPESCs are delegated the authority to design and operate Advanced Treatments Systems (e.g. active treatment systems, passive systems, etc.) for the removal of sediment and pH adjustments, where the appropriate and demonstrable additional training has been acquired.
- CPESCs are not authorized to perform percolation tests and calculate infiltrate rates for stormwater treatment (unless under the responsible charge of a State Licensed Geologist or Engineer).
- CPESCs are not authorized to design retention or detention systems including biofiltration and bioinfiltration systems (unless under the responsible charge of a State Licensed Engineer). CPESCs may inspect the installation of these systems during construction.
- The assessment and handling of hazardous materials, and/or contaminated soil and water, is expressly excluded from the purview of a CPESC. Such authority, unless where otherwise delegated by law, would be under the purview of a Professional Engineer, Geologist, CPISM, or CPSWQ.
- CPESC authority extends to the full depth of soil profiles or the depth of land disturbances, as necessary for erosion and sediment control. This does not infer responsibility or authority to a CPESC for temporary excavations, slope stability (surficial, gross or seismic), and safety.
- CPESC is delegated the authority to provide surficial erosion and sediment control measures (temporary or permanent) for any slope inclination, whether it is composed of soil, artificial fill, or rock. In most instances, steeper slopes will require highly specialized practices that will generally involve a collaborative effort with other licensed professionals (civil engineer or geologists).

- CPESC is not delegated the authority to design or inspect stream bank restoration and bioengineering practices, but for the erosion and sediment control measures associated with installation.
- CPESC may not be liable to a Code of Ethics or Conduct violations to EnviroCert where reasonable and prudent actions are taken under exigent circumstances. This does not relieve a CPESC from other civil tort or criminal liability actions brought on by others for their actions.

KNOWLEDGE, SKILLS, AND ABILITIES

A CPESC should be able to understand, describe and implement (as appropriate) the following concepts:

Section 1: Soil Erosion and Sedimentation Processes

- Splash, sheet and rill erosion
 - Detachment
 - Transport Mechanisms
- Gully erosion
 - Headcutting
 - Downcutting
 - Widening
- Slope movement
- Channel erosion
 - Channel Stability
- Wind erosion
 - Creep
 - Saltation
 - Suspension
- Sediment transport
 - Soil type assessment
- Impacts of erosion on soil resources
- Impacts on water resources
- Impacts on air and fugitive dust

Section 2: Site Climatic Conditions Rainfall Amounts

- Climatic Conditions
 - Isohyetal Maps and Determinations
 - Snow and Snow Runoff Impacts
 - Rainfall Runoff Erosivity Factor “R”

Section 3: Runoff Management

- Planning considerations for runoff management
 - Drainage patterns
 - Pre-developed conditions
 - Construction/Project phase conditions
 - Post-construction conditions
 - Internal site conditions
 - Perimeter site conditions
 - Run on water
 - Discharge points
- Components of the Hydrologic Cycle
- Factors affecting runoff
 - Precipitation
 - Time parameters
 - Watershed area
 - Ground cover
 - Antecedent moisture condition
 - Storage in the watershed
 - Soil permeability
- Components of precipitation
 - Return period
 - Rainfall distribution, rainfall depth, rainfall intensity
 - Isohyetal map
 - Storm types
 - Risk analysis
- Time parameters
 - Time of concentration
 - Travel time
 - Sheet flow
 - Shallow concentrated flow
 - Channel flow
 - Initial abstraction
- Soil permeability categories
 - Hydrologic soil groups
 - Disturbed soil profiles
- Runoff curve number components
 - Composite curve number or weighted curve number

- Average runoff condition
- Cover description
- Cover type
- Hydrologic condition
- Cropping treatment
- Impervious areas
- Runoff characteristics of the hydrograph
 - Runoff volume
 - Peak discharge
 - Discharge
 - Antecedent flow rate
 - Rising limb
 - Falling limb
 - Runoff depth
- Runoff estimation methods
 - Rational Method
 - Modified Rational Method
 - Unit Hydrograph
 - Soil cover complex method (SCS/NRCS Method, TR 55)

Section 4: Estimating Erosion and Sedimentation Rates

- Soil erosion caused by water
 - Universal Soil Loss Equation (USLE)
 - Revised Universal Soil Loss Equation (RUSLE and RUSLE2)
 - Isoerodent maps, EPA Low Erosivity Waiver Calculator (LEW) or other methods for Calculating the “R” Factor
 - Soil Erodibility Factor “K”
 - Soil series
 - Soil texture
 - Topographic Factor “LS”
 - Slope length “L”
 - Slope steepness “S”
 - Cover Management Factor “C”
 - Practice Factor “P”
 - Partial Year Factor “M”
- Soil erosion caused by wind
 - Total suspended particulates
 - Silt content
 - Wind erosion equation (WEPS or WEQ)

- Soil erosion caused in channels
 - Shear stress
 - Permissible tractive force
 - Unit weight of water
 - Depth of flow
 - Direct volume

- Gross erosion
 - Sheet and rill
 - Ephemeral gullies
 - Classic gullies
 - Channels
 - Slope movement

- Sediment yield
 - Modified Universal Soil Loss Equation (MUSLE)
 - Sediment yield
 - Runoff depth
 - Runoff volume
 - Peak flow rate
 - Soil Erodibility Factor “K”
 - Topographic Factor “LS”
 - Slope length “L”
 - Slope steepness “S”
 - Cover Management Factor “C”
 - Practice Factor “P”
 - Sediment Delivery Ratio

Section 5: Establishing and Managing Vegetation

- Basic soil properties and attributes that affect soil management and plant growth
 - Soil texture
 - Textural triangle
 - USDA / AASHTO / ASTM soil textures
 - Soil structure
 - Soil horizons
 - Permeability, root development, water infiltration and aeration
 - Bulk density
 - restrictive soil layers
 - Soil fertility and Ph
 - Sources of organic matter

- Physical and chemical properties of soil organic matter
- Effects of residue cover
- Site orientation

- Basic plant growth properties of trees, shrubs, grasses and legumes
 - Perennials, bi-annuals and annuals
 - Cool-season and warm-season
 - Evergreen and deciduous
 - Understory, mid-story, overstory plants
 - Basic concepts of plant nutrition
 - Macro and micro elements
 - Difference between fibrous and tap root systems on erosion control
 - Legumes and symbiotic nitrogen fixation

- Concepts related to vegetation establishment and management
 - Pure live seed (PLS)
 - How soil temperature, soil moisture and seed/soil contact affect seed germination
 - Use purity and germination information to calculate a seeding rate
 - Consequences of seeding earlier or later than optimum
 - Nutrient and soil amendments
 - Soil fertility and chemistry testing and report
 - Sources for nutrients and lime
 - Liming potential of various products
 - Nutrient and lime application methods
 - Planting methods
 - How construction operations affect soil structure and compaction
 - Methods to alleviate soil compaction
 - Mulching materials and application principles
 - Management during establishment
 - Management after establishment

Section 6: Measures to Control Erosion

- Measures for soil stabilization for non-concentrated flow
 - Temporary seeding
 - Permanent seeding
 - Sod
 - Mulch
 - Shrub and vine planting
 - Tree planting
 - Top soil application
 - Diversion

- Benching
- Grading
- Soil roughening
- Contouring
- Tracking
- Chemical treatment
- Downdrains
- Rolled Erosion Control Products (RECP)
- Manufactured logs and wattles
- Retaining wall or engineered structures

Section 7: Measures for Concentrated Flows

- Channel protection with vegetation
 - Grassed swales/waterways
 - Sod
 - RECP
 - Turf reinforcement mats
- Measures that provide channel protection with hard armor
 - Rip rap
 - Concrete
 - Articulated concrete blocks
 - Gabions
- Diversion measures
 - Diversions
 - Earth dike
 - Perimeter dike
 - Temporary swale
 - Silt ditch
- Water bar
- Bypass pipe
- Measures used to protect outlets
 - Rip rap
 - Paved flume
 - Level spreader
 - Scour prevention transition mats
 - RECP

Section 8: Measures to Control Wind Erosion

- Measures to control wind erosion
 - Management practices
 - Ridging
 - Soil inversion
 - Stockpile orientation
 - Irrigation
 - Crop residue
 - Vegetation
 - Fabric or poly covers
 - Windscreens
 - Soil binders/dust suppressants
 - Wind fence

Section 9: Measures to Control Sediment

- Common sediment control measures
 - Vegetated filter strip
 - Brush dam
 - Sediment fence
 - Fiber rolls (wattles)
 - Compost berm
 - Sediment basin
 - Outlet design
 - Dewatering filter bags
 - Baffles, turbidity curtains
- Drain inlet protection
 - Products and configurations
- Advanced treatment systems
 - Active
 - Passive

Section 10: Regulations

- Federal Regulations
 - Clean Water Act
 - Purpose
 - Regulating Authority
 - Section 401 (Water Quality)

- Section 402 (NPDES)
- Section 404 (US Army Corp)
- CZARA
- Water Quality Standards
- Enforcement and Penalties
- Waters of the US (Surface Waters)
- Surface Mining Reclamation Act
- USDA Conservation Programs

- State and local regulations

- MS4 programs

- Administrative requirements
 - Permit filing procedures and fees
 - Approval
 - Inspections
 - Enforcement and penalties
 - Project termination

Section 11: Site Planning for Erosion and Sediment Control

- Communications
 - design team (engineers, hydrologists, landscape architect, etc.)
 - Owner/Developer
 - Contractors
 - Agency regulators

- Site assessment and sensitive resources
 - Onsite sensitive resources (wetlands, threatened and endangered species, cultural resources, floodplains)
 - Off-site sensitive resources, (with special attention to downstream resources)
 - Existing land use
 - Existing vegetative/other cover
 - Slopes (steepness and length)
 - Existing drainage conveyances/patterns
 - Contaminated sites
 - Receiving water considerations

- Procedures and tools for site evaluations of a landscape
 - Topographic map
 - Soil Survey
 - Area calculation for specific area

- Slope of a landscape
- Floodplain map
- Wetland map
- Understand unique circumstances of proposed projects
 - Subdivisions and mixed use, commercial/industrial and linear projects (road and utility)
 - Change in vegetative cover
 - Cut and fill slopes
 - Grade changes in other areas
 - Increased storm runoff
 - Increased peak flows
 - Increased soil erosion
 - Increased sediment delivery
 - Increased turbidity
 - Potential for increased flooding
 - Key elements of low impact developments
 - Conservation
 - Small scale controls
 - Customized site design
 - Pollution prevention and education
 - Directing runoff to natural area
 - Drainage changes during development
 - Forests
 - Landing and staging areas
 - Permanent and temporary roads
 - Stream avoidance and crossings
 - Clear cutting
 - Reforestation methods
 - Temporary and permanent seeding
 - Timber stand improvement
 - Prescribed fire
 - Surface mines and landfills
 - Farms and ranches
- Components of a plan
 - Site plan map
 - Written narrative
 - Function concept for MPs
 - Measures to control erosion
 - Measures for concentrated flow
 - Measures to stabilize and protect streams
 - Measures to control wind erosion

- Measures to control sediment

Section 12: Site Management (requirements and strategies)

- Regulatory requirements
 - Amendments to SWPPP
 - Inspections
 - Training
 - Documentation
 - Reporting
- Scheduling of work activities
 - Project schedule and seasonal considerations
 - Coordination among trades
 - Protection of resources
 - Egress points
 - Discharge points and offsite impacts
- Practices for material and waste management
 - Delivery and storage locations
 - Storage area construction
- Stockpile management
- Spill prevention and control
 - Cleanup
 - Disposal
 - Reporting
 - Education
 - Safety
- Management of activities having the potential to release pollutants other than sediment
 - Solid waste
 - Liquid waste
 - Hazardous waste
 - Contaminated soil
 - Cement waste
 - Constructed facilities
 - Services
 - Describe sanitary and septic waste
 - Paving and grinding
 - Illicit connections and illegal dumping

- Vehicle and equipment cleaning, fueling and maintenance
- Management of egress points
- Water conservation strategies
- Dewatering
 - Regulations
 - Plan components and options
 - Equipment
- Potable water use and conservation
- Practices and considerations for sampling
 - Non-visible pollutants
 - Sediment and other visible pollutants
 - Sampling and analysis plan
 - Field equipment
 - Monitoring preparation
 - Sample collection, preservation and delivery
 - Quality assurance and quality control (QA/QC)
 - Laboratory sample preparation and analytical methods
 - Data management and reporting procedures

Section 13: Inspecting Construction Sites

- Regulatory requirements
 - Local
 - State
 - Federal (NPDES)
- Site plans & specifications (including contract requirements)
 - Able to read & understand construction plans and specifications
 - Identify BMPs specified
 - Identify locations specified for BMP installation
- Installation and maintenance of BMPs
 - Plan and specifications
 - Correct location per site maps
 - Installation appears appropriate for site conditions
 - BMPs need maintenance and repair
 - BMP modification/substitution necessary
 - Additional BMPs appear needed

- Non-Stormwater Discharge Management
 - Concrete Washout Containment
 - Masonry Areas (cement/mortar mixes, granular materials)
 - Process Waters
 - Dewatering operations
 - Cleaning operations
 - Other process waters

- Site management
 - Organization (good housekeeping plan)
 - Construction materials management
 - Storage
 - Location
 - Proper Containment
 - Soil stockpile stabilization
 - Usage
 - Equipment Maintenance/Cleanup
 - Disposal
 - Solid waste management
 - Hazardous waste characterization and management
 - Sanitary waste management (portable toilets)
 - Equipment maintenance (including fueling operations)
 - Location
 - Proper containment
 - Spill response and containment
 - List of expected materials on site
 - Safety Data Sheets (SDS)
 - Spill action plan
 - Reportable quantities list (including agency notification phone #s)
 - Spill kits outfitted based on expected materials list

- Documentation requirements
 - Plans and specifications
 - Meet regulatory content requirements
 - Kept up to date
 - Current with construction
 - Dates of BMP installation noted on plans
 - MP design/location changes identified
 - Available on construction site
 - Permits
 - Posted on site
 - Signage
 - Required postings

- Identification/guidance signage
- Inspection records