

NATURE-BASED SOLUTIONS

Leveraging the value of nature to reduce risk
and increase resilience and sustainability

Michael Baker

I N T E R N A T I O N A L



WHO WE ARE

At Michael Baker International, we believe in the power of nature-based solutions to protect people, stabilize infrastructure and safeguard the future.

Nature-based solutions harness the power of natural ecosystems to solve engineering challenges. From green infrastructure for stormwater management, to planning and implementing natural infrastructure solutions at airports, to advising on best practices in cost-effective, low-impact development, we leverage natural features and processes to address our clients' infrastructure challenges.

Our nature-based solutions result in a variety of environmental and social co-benefits, including addressing climate change, improving air and water quality, reducing carbon emissions, providing wildlife habitat, protecting streams and wetlands, minimizing wildfire risk, stabilizing shorelines and roadways and adding recreational spaces that improve quality of life.

LIFE-CYCLE SERVICES

Planning
Stakeholder Engagement
Economics & Public Finance
Environmental & Regulatory Compliance
Requirements Development & Procurement
Engineering & Design
Construction Management
Post-Construction Monitoring

We Make a Difference

Bow Creek Stormwater Park Flood Mitigation Improvements (rendering) / City of Virginia Beach, Virginia



Bow Creek Stormwater Park Flood Mitigation Improvements

City of Virginia Beach, Virginia

To combat flooding in the coastal community, the city is converting a municipal golf course into stormwater storage with recreational amenities and ecological uplift. Once complete, a new living shoreline with wetland plantings and an approximate 30-acre body of water will work in concert with traditional gray infrastructure flood mitigation measures to reduce flooding during extreme events. Michael Baker is providing overall watershed program management, project management, design, engineering and construction support for this multi-phase program.

Boulder County Flood Recovery and Ecosystem Restoration

Boulder County, Colorado

As owner advisor and lead designer, Michael Baker led the effort to rebuild 6 miles of damaged transportation infrastructure, reduce flood risk and enhance the riparian ecosystem along 7 miles of stream in four separate canyons. This green-gray hybrid design included grade control structures to stabilize the stream profile and riffle-pool and step-pool sequences to provide fish habitat and reconnect the adjacent floodplain to support ecological functions, water quality and stream health.

Raritan/Sandy Hook Bay Coastal Resilience Planning Study

Naval Weapons Station Earle,
Monmouth County, New Jersey

This Coastal Resilience Planning and Design Study continues the work of the Joint Land Use Study for Naval Weapons Station Earle. Michael Baker led the planning process, which included community-based, data-driven cooperative and strategic stakeholder engagement with the surrounding Bayshore municipalities to identify potential sites and develop concept plans for nature-based solutions, including living shoreline projects that support new coastal resilience measures to address erosion, enhance ecosystem values and create new public open space.

Wetland Stormwater Design

Morganton, North Carolina

Michael Baker provided engineering and landscape architecture services to design a constructed wetland as a stormwater control measure on Patton High School's campus. The wetland was designed to increase water quality benefits, reduce erosion and provide educational and recreational opportunities for students and staff. This project also included survey, soil testing, permitting, interpretive signage design and invasive species control.

Runway Safety Area Channel Relocation and Mitigation Site Design and Permitting / St. Johns County, Florida



Runway Safety Area Channel Relocation and Mitigation Site Design and Permitting St. Johns County, Florida

Michael Baker designed and permitted the Northeast Florida Regional Airport Runway Safety Area (RSA) channel relocation and mitigation site. This innovative and environmentally responsible approach stabilized the RSA while restoring a 17-acre dredge-spoil island to a saltwater marsh habitat. Using native plant species that already thrive in the adjacent area, the team established a 2,700-linear-foot living shoreline, mitigating past-use impacts to habitat, biotic communities, wildlife and water quality.

Dune Enhancement and Restoration Program Playa Del Rey, California

Michael Baker ecologists provided habitat enhancement, monitoring and management services for the removal of invasive species and re-establishment of native species at Dockweiler RV Park managed by the Los Angeles County Department of Beaches and Harbors. The presence of non-native species prevented natural movement and migration of the coastal ecosystem. The removal of these species and re-establishment of target native species improved natural dune processes, minimized the potential for inland flooding and provided critical habitat to multiple sensitive species.

Malibu Beach Improvements Egg Harbor Township, Atlantic County, New Jersey

Michael Baker provided design services to the New Jersey Department of Transportation for the restoration of beaches within the 28.5-acre New Jersey Department of Environmental Protection Malibu Beach Wildlife Management Area. Restoration efforts included removing rubble to restore salt marsh habitat, wetland expansion and replanting with native vegetation, implementing *Phragmites australis* control, beach nourishment and planting native woody and herbaceous vegetation along the roadway embankment to provide habitat diversity.

French Creek Stream Restoration Project Mount Haggin Wildlife Management Area, Montana

Michael Baker provided construction management and post-construction monitoring support services to restore stream channel function, processes and habitat of a severely degraded 1.4-mile reach of French Creek. The effort established appropriate channel planform and dimensions, implemented a revegetation plan to enhance riparian and wetland recovery, and removed a culvert to eliminate a fish barrier and sediment transportation impediments. This project corrected decades of historic mining activities and successfully achieved post-project performance criteria and funding requirements.

SOLUTIONS

Constructed Wetlands

Dune Rehabilitation & Restoration

Ecosystem Restoration

Green Roofs & Rooftop Gardens

Green Walls

Habitat Preservation & Restoration

Hybrid Green-Gray Solutions

Living Shorelines

Mitigation Offsets & Banking

Phytoremediation

Rainwater Harvesting Systems

Recreational Resources

Riparian Habitat Creation & Restoration

Shoreline Restoration

Stream & Floodplain Restoration

Watershed Restoration

Visit mbakerintl.com/practices for more information about our capabilities and iconic projects.

CONTACT

Elizabeth Bradford, MS, ENV SP
National Resilience and Sustainability Lead
P: 845-392-4053
E: elizabeth.bradford@mbakerintl.com



Niek Veraart, AICP, ASLA, ENV SP
National Practice Lead, Planning
P: 917-509-0468
E: niek.veraart@mbakerintl.com



Denise Laferte
National Practice Lead, Water
P: 781-686-3513
E: denise.laferte@mbakerintl.com



Michael Baker

INTERNATIONAL

Green Roof and Landscape Architecture Design Services (rendering) / Fairfax, Virginia



Green Roof and Landscape Architecture Design Services

Fairfax, Virginia

Michael Baker is providing design services for the Fairfax County Stormwater and Wastewater Consolidation Facility. In addition to a green roof with a rainwater collection cistern, design features include an interior green wall, a rain garden, a pond with aquatic and hydrophilic plants demonstrating biofiltration, recycled water use and context-sensitive native and locally adapted noninvasive trees and plantings. The design provides outdoor plazas with educational opportunities and includes Americans with Disabilities Act-compliant trails.

Westside Creeks Restoration

San Antonio, Texas

Michael Baker developed construction documents and construction phasing plans to restore 14 miles of the San Pedro, Apache, Alazan and Martinez creeks – collectively referred to as the Westside Creeks. The project restores existing channels to sustainable riverine ecosystems and offers habitat for aquatic- and riparian-dependent bird species. The team provided landscape architecture services, natural channel designs, and hydraulic modeling to confirm that the improvements did not increase flood risk.

Design Manual for Hybrid Coastal Protection Strategies

Sacramento, California

Michael Baker developed the Design Manual for Hybrid Coastal Protection Strategies to provide the California Department of Transportation with nature-based design guidance. The manual presents coastal highway infrastructure solutions and protective countermeasures to reduce the severity of transportation system impacts to coastal resources. Solutions consider littoral cell dynamics, vegetation, sediment, sand recycling and recovery, sea level rise, climate cycles, permitting, regulations and cost.

ResilienCity Park

Hoboken, New Jersey

Michael Baker provided construction management, oversaw sustainability certification and supported public engagement for the 6-acre ResilienCity, a former brownfield site remediated and designed as a community park. The reimagined park incorporates an innovative hybrid green-gray stormwater management sewer system capable of capturing up to 2 million gallons of stormwater, including a 1-million-gallon underground tank to collect and store stormwater runoff, several landscaped stormwater collection basins, and a sunken basketball court and a multi-sport athletic field that both collects stormwater and provides active recreation.