

Natural & Cultural Resource Consultants

National Harbor; Wetland Delineation, SAV Surveys and Permitting Services
Prince George's County, MD



TPC

I-95/I-395 Hot Lanes; Permitting, Compliance Inspections, Wetland
Delineation, Endangered & Threatened Species, Archeology,
and GIS Mapping Services - Fairfax County, VA

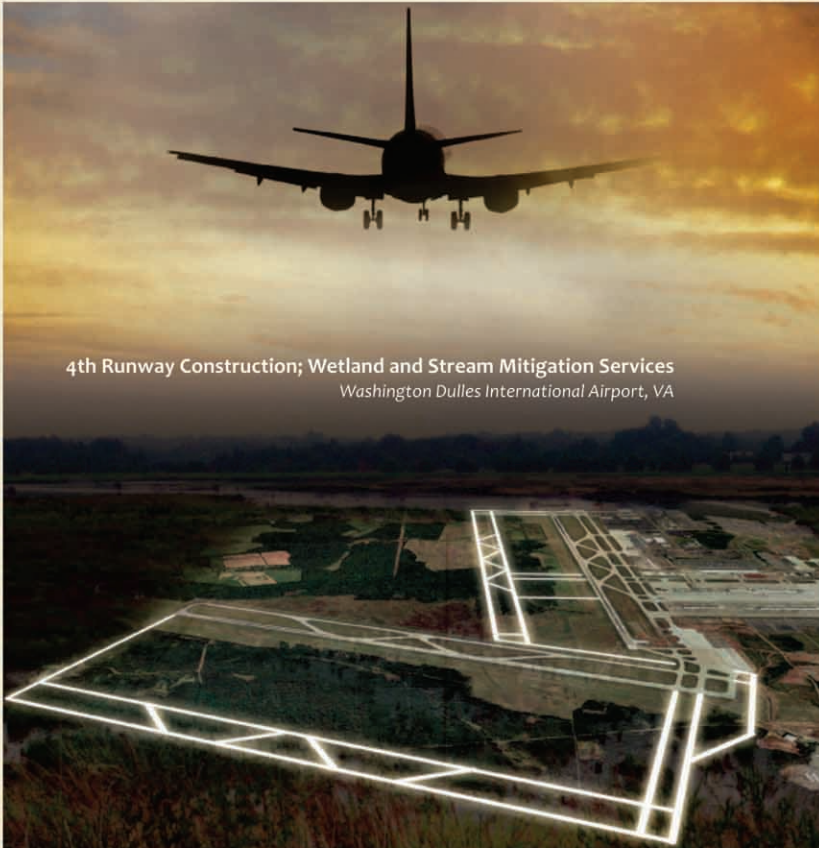


Trevor Wrayton - VDOT

There's No One Better In The Field



4th Runway Construction; Wetland and Stream Mitigation Services
Washington Dulles International Airport, VA



Fort Belvoir Engineer Proving Grounds (EPG); Wetland
Delineation, Survey, Chesapeake Bay Act Compliance,
Environmental Quality Corridor, Endangered & Threatened
Species, and Permitting Services - Fairfax County, VA



Pictometry - 03/2013

Huntley Meadows Park; Wetland Delineation & Survey,
ETS Review, Vegetation Analysis, Tree Survey, Permitting,
Wetland Restoration Design, Construction Oversight,
Trail Construction, Wetland Monitoring - Fairfax County, VA



Cover Photo: BSA Camp Snyder - Haymarket, VA

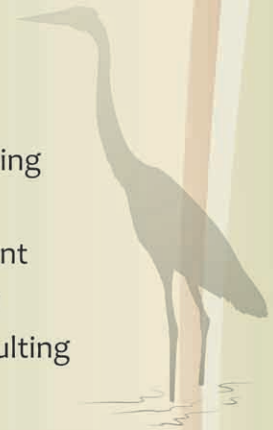
Wetland Studies and Solutions, Inc.

Providing Innovative Solutions That Balance Environmental Protection and Land Use Goals

Established in 1991, Wetland Studies and Solutions, Inc., a Davey Tree Expert Company, is the leading natural and cultural resources consultant serving the Mid-Atlantic region. Our scientists, regulatory specialists, engineers, surveyors, permit compliance specialists, archeologists, tree preservation experts, ecosystem managers, and geographic information specialists provide expertise and experience for public and private sector clients to obtain the environmental approvals needed to create the built environment.

Consulting Services

- Wetlands and Stream Delineations
- Clean Water Act Permitting
- Chesapeake Bay Ordinance Approvals
- Stream and Wetlands Restoration
- Water Resources Engineering
- Endangered Species Studies
- Environmental Permit Compliance
- Archeological Investigations
- Geographic Information Systems Mapping
- Land and Bathymetric Surveying
- Ecosystem and Restoration Management
- Low Impact Development Consultation
- Arboriculture and Urban Forestry Consulting
- NEPA Consultation and Assistance



Dominion Valley (formerly Disney's America); Delineation, Archeology, Permitting, Chesapeake Bay & Mitigation Services
- Prince William County, VA

For over two decades, WSSI has consulted on over 2,700 sites (comprising 215,000 acres). These sites include some of the largest and most complex projects in the Metropolitan Washington, DC region.

WSSI joined The Davey Tree Expert Company on April 1, 2014. Davey was founded in 1880 (employee owned since 1979) and is committed to providing outstanding scientifically-based horticultural & environmental services throughout the U.S. and Canada.



The Green Roof at The WSSI Office Building - Gainesville, VA

Regulatory Services



Reagan National Airport Runway Safety Area Expansion;
Permitting, NEPA Support, GIS Mapping,
Endangered and Threatened Species,
- Arlington, VA

We Help You Wade Through the Swamp of Environmental Regulations

Our mission is to obtain the natural and cultural resource approvals that land developers, builders, and public works agencies need to create the built environment.



Fairfax Corner; Stormwater Wetlands, Permitting and
Wetland Delineation - Fairfax, VA

Regulatory Services

- Clean Water Act (i.e., Wetlands) Permits, Sections 404 & 401
- NEPA Assistance
- Local Wetlands Board Permits
- Subaqueous Land Encroachment Permits
- Chesapeake Bay Preservation Ordinance Approvals
- Local Zoning Approval Support

WSSI's principals are continuously at the forefront of the evolution of wetlands and water quality regulations and compliance requirements by our active participation and leadership roles in legislative and regulatory development at all levels of government.

WSSI provides every service needed to support our regulatory specialists as they guide your project through local, state, and federal agency reviews.



National Harbor; Permitting Services, Wetland Delineation,
Bathymetric and Submerged Aquatic Vegetation Surveys
- Prince George's County, MD



We believe that a healthy environment and a healthy economy are integrally related. Balanced economic development and resource protection are not mutually exclusive.

Village Place; Wetland Delineation, Survey, Permitting and GIS Services
Tyler Elementary School; Wetland Delineation, Survey, Permitting, Endangered and Threatened Species, and Archeology Services - Haymarket, VA

Engineering



Estimating stream bank erosion for TMDL

Design with Sustainability in Mind

WSSI provides a wide spectrum of water resources engineering to public and private sector clients. Our services include watershed assessments and floodplain studies, stream and wetland restoration design, and LID consultation.



Engineering Services

- Wetland Mitigation Design
- Stream and Watershed Assessments
- Stream Restoration and Stabilization Design
- Stormwater Wetland Systems Design
- Low Impact Development (LID) Design
- Environmental Site Design
- LEED Consultation
- Stream and Wetland Construction Management
- Resource Protection Area (RPA) Plans
- Chesapeake Bay Exception Requests
- Water Quality Impact Assessments
- Bio-Retention Design and Consulting
- Floodplain Studies
- FEMA Letters of Map Revision/Amendment



Bio-retention feature (rain garden) designed and constructed by WSSI

Rendering of Huntley Meadows Park Wetland Restoration Outlet Structure and Clemson Water Levelers



WSSI develops effective, practicable, and cost-efficient solutions for our client's water resource issues.



Construction of Huntley Meadows Park Wetland Restoration

Environmental Studies



Wetland Delineation

Wetland Delineations and More

WSSI provides a variety of services to assist our clients in eco-friendly decision making and to ensure compliance with Clean Water Act Regulations.

The scientists at WSSI expand their knowledge base through continual research and training so we are ready to assist on even the most environmentally challenging sites.

Environmental Services

- Wetland Reconnaissance Surveys
- Wetland and Stream Delineations
- Wetland and Stream Mitigation Monitoring
- Resource Protection Area Evaluations
- Wetland Functions and Values Assessments
- Stream Assessments
- Aquatic Habitat Assessments
- Endangered and Threatened Species Habitat Surveys
- Tree Stand Evaluations and Forest Management Plans
- Submerged Aquatic Vegetation Surveys
- Biological Water Quality Assessments
- Biological Inventories
- Tree Preservation Plans
- Benthic Macroinvertebrate Surveys
- Rare Plant Community Assessments
- Local Green Infrastructure Corridor Determinations



Stream Assessment



Tree Stand Evaluation

WSSI Scientists Are Highly Qualified:

- Virginia PWD and SWS PWS Certified Staff
- Approved Mussel Surveyors
- Associate Wildlife Biologists
- Certified Ecologists
- ISA Certified Arborists Including TRAQ Certification
- Licensed Foresters
- MBSS Certified Macroinvertebrate Samplers
- SCUBA Certification – Deep Water
- U.S. Fish and Wildlife Certified Surveyors
- LEED Accredited Professionals
- Society of Freshwater Science Taxonomic Certification

Endangered Species

Flora, Fauna, and More...

WSSI maintains a positive and well known reputation for their experience and knowledge of Virginia's flora and fauna and provides surveys and studies, including the following:

- ETS Habitat Surveys
- ETS Searches and Surveys
- Tree Stand Evaluations
- Forest Management Plans
- Stream Assessments
- Aquatic Habitat Assessments
- Submerged Aquatic Vegetation Surveys
- Mussel Surveys
- Benthic Macroinvertebrate Surveys
- Rare Plant Community Assessments



Conducting a Wood Turtle Survey

Endangered and Threatened Species and Habitat



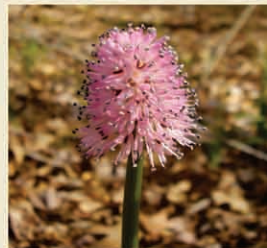
Harperella



Wood Turtle



Henslow's Sparrow



Swamp Pink



Freshwater Mussels



American Bald Eagle



Upland Sandpiper



Small Whorled Pogonia



Loggerhead Shrike



Submerged Aquatic Vegetation



Scuba Certified WSSI scientists performing a freshwater mussel survey and relocation in the Potomac River.

When applying for state or federal wetland permits, governing agencies often require that habitat assessments, surveys, or relocations for protected flora and fauna be performed.

WSSI's environmental science team, made up of biologists, and certified ecologists, have all the necessary certifications and experience to meet these requirements. Our staff members are approved by the U.S. Fish and Wildlife Service to perform habitat evaluations, presence/absence surveys, and relocation actions for a variety of state and federally protected flora and fauna throughout the Mid-Atlantic region.

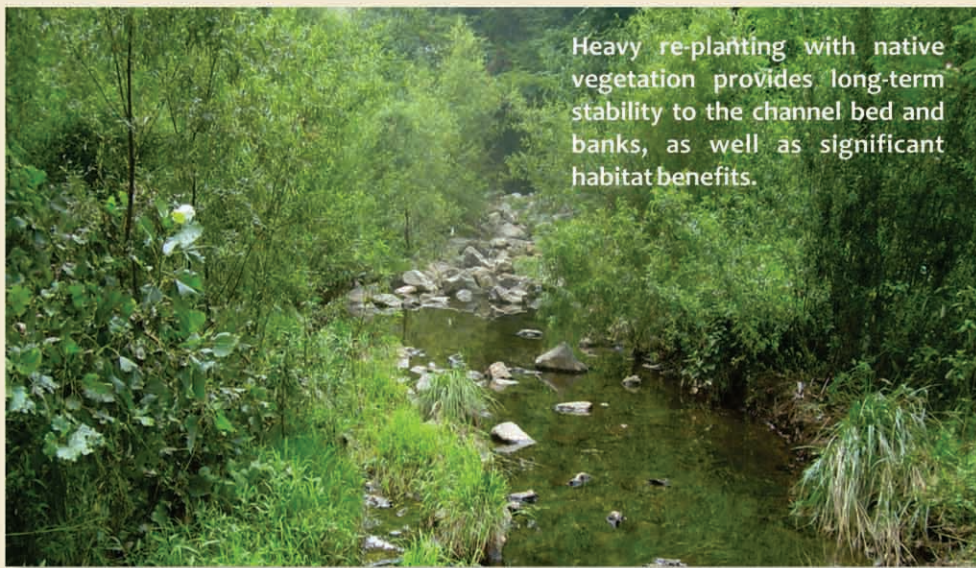
Stream Restoration



Returning Long-Term Stability to Urban Streams Through Natural Channel Design

WSSI uses the Natural Channel Design method for all our stream restoration projects. This concept has proven results in developing stream systems that are both hydrologically and ecologically viable at project completion and remain successful well into the future.

WSSI designed and constructed the first mitigation bank approved to sell stream credits in Virginia (2002) - North Fork Wetlands Bank, and the first stream bank in Virginia - the Northern Virginia Stream Restoration Bank.



Stream restoration projects can help streams achieve a stable condition even under the pressures of urban development and increased run-off from impervious surfaces.



Snakeden Branch - Reston, VA

Before Restoration



Erosion of this urban stream's bed and banks exposed buried utility lines, damaged adjacent walking trails, and exposed tree roots, causing healthy trees to topple.

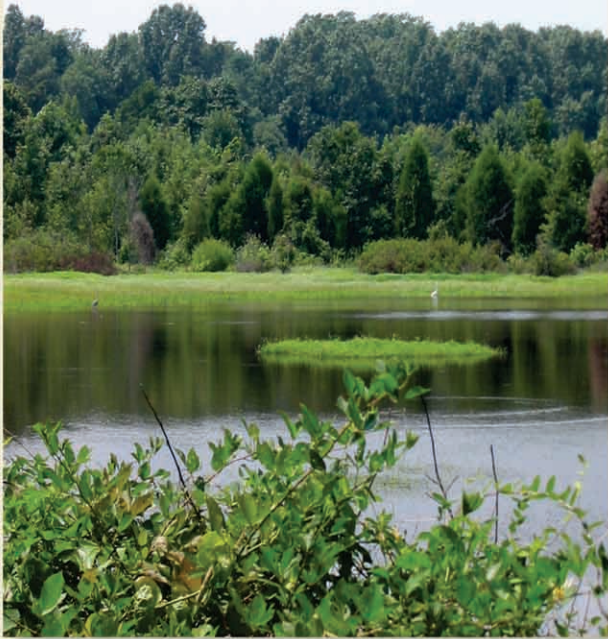
1.5 Years After Restoration Construction



During restoration construction, the stream bed was raised to reconnect with the floodplain. Placement of rock structures directs flow away from channel banks and creates riffles & pools.

Wetland Mitigation

Wetlands Mitigation Site for I-895
James River Bridge Crossing
- Richmond, VA



You Can Bank on WSSI's Success

WSSI has designed, constructed, maintained, and/or monitored over 100 wetland mitigation sites (including stormwater wetlands); required as part of the compensatory mitigation requirement for specific projects in the Mid-Atlantic region.

Broadlands Stormwater Mitigation - Loudoun County, VA



Our wetland mitigation sites typically include a combination of wetland creation, enhancement, restoration, and preservation.

WSSI designed and constructed the first three privately developed wetland mitigation banks in Northern Virginia, including Cedar Run Wetlands Bank where during monitoring studies more than 125 bird species have been recorded.



Julie J. Metz Wetlands Bank - Dumfries, VA
First Approved Wetland Mitigation Bank in Virginia (1994).

North Fork Wetlands Bank is an ecologically diverse 125 acres of wetlands, water, and upland habitat created by WSSI in 2000. North Fork was donated to the Boy Scouts of America and incorporated into Camp Snyder and is used in their environmental education programs and activities.



North Fork Wetlands Bank - Haymarket, VA

Community & Urban Forestry

Enhancing Our Communities with Healthy Trees

Urban trees are important assets that enhance the value and livability of a community, and they require professional management to maximize their benefit potential.

WSSI staff have the advanced skills and the expertise required to assess, develop, and manage urban and community forests.



Performing Street Tree Inventory and Maintenance Planning



Villanova University Campus Wide Landscape Renovation; Tree Preservation, and Large Tree Transplanting Services - Villanova, PA

Urban Forestry Services

- Site Planning, Master Plans, and Development
- Planting and Maintenance Plans
- Tree Benefit Calculations & Tree Valuation
- Invasive Pest Assessment and Management
- Tree Work and Planting Crew Monitoring
- Professional Tree Risk Assessment
- Storm Damage Assessment and Response Planning
- Home Owner Association Forest Resource Management
- Tree Management Software & Technical Support
- GIS Mapping and Data Management
- Tree Preservation and Inventory Tracking
- Management of Specimen and Historic Trees

Our team of ISA certified arborists and highly trained scientists can provide GIS-based tree inventories, management and master plans, or assist with a public education strategy. We also have expertise in the traditional forestry arena.



Fort Belvoir Housing Tree Preservation Planning, Arborist Services, and Monitoring Services - Fairfax County, VA



Community Tree Surveys, Tracking Software, and Inventory Services

Our clients include land owners, developers, community associations, municipalities, businesses, and organizations of all sizes and available budgets.

Forest Conservation Planning

Making Trees a Part of the Plan



Tree protection fencing in place during land clearing activities

WSSI offers our clients expert planning support, advice, and implementation options to guide them to meet their regulatory requirements, minimize their costs, reduce liability, and make their projects a success.

TREE PROTECTION AREA

KEEP OUT!

"Nature at Work"

The following are restricted:

Vehicle Parking
Equipment Access
Staging
Stockpile
Wash-out
Masonry Set-up
Siltation
Excavation
Vehicle Maintenance / Refueling
See construction management for access.
Replace fence if opened.

We appreciate your cooperation.

Planning & Design Phase Services

- Tree Preservation and Protection Plans
- Specifications, Exhibits, & Construction Documents
- Tree Inventories and Assessments
- Site Planning, Master Plans, and Development
- Forest Conservation and Mitigation Plans
- Regulatory and Permitting Support
- Landscape Tree and Timber Appraisals
- Custom Solutions for Specimen & Historic Trees

Pre-Construction Phase Services

- Pre-Construction Meetings
- Arborist Oversight and Inspections
- Tree Protection Fencing
- Root Protection and Aeration
- Tree Health Monitoring and Treatment
- Consultations with Contractors and Land Owners



Coordinating Tree Preservation Plans with a Project Engineer prior to construction activities.



WSSI's highly skilled arborists and scientists performing a tree inventory and assessment.

WSSI helps our clients transform project sites into sustainable green environments and community assets.



A Tree-Save area within a development will provide valuable & often required green space.

GIS and Mapping



Digital GIS Data (parcels, contours, buildings, forest, water) - Sterling, VA

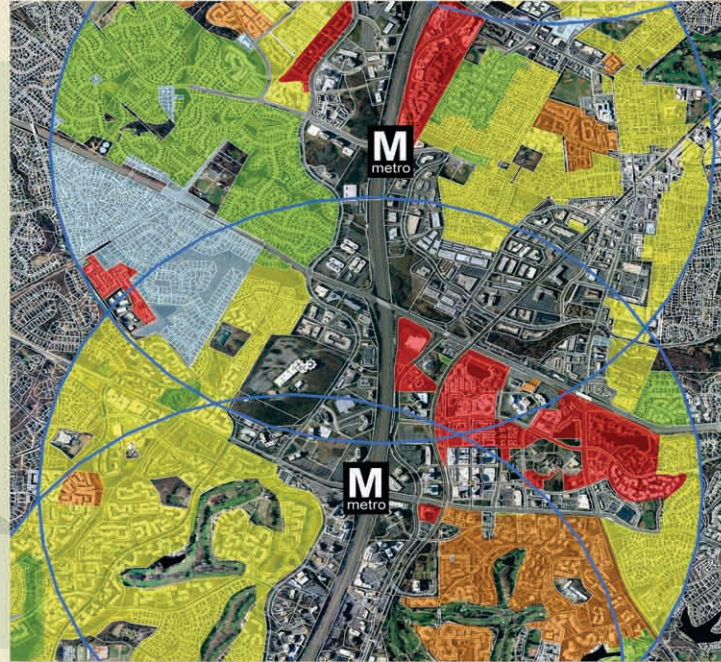
Geographic Information Systems Specialists

The Geographic Information Systems (GIS) department at WSSI assembles and analyzes spatial data to support the science, permitting, archeology, and engineering departments. They also provide custom mapping products directly to clients.

WSSI's GIS professionals specialize in environmental modeling, site feasibility studies, aerial photograph interpretation, and historic map analysis.

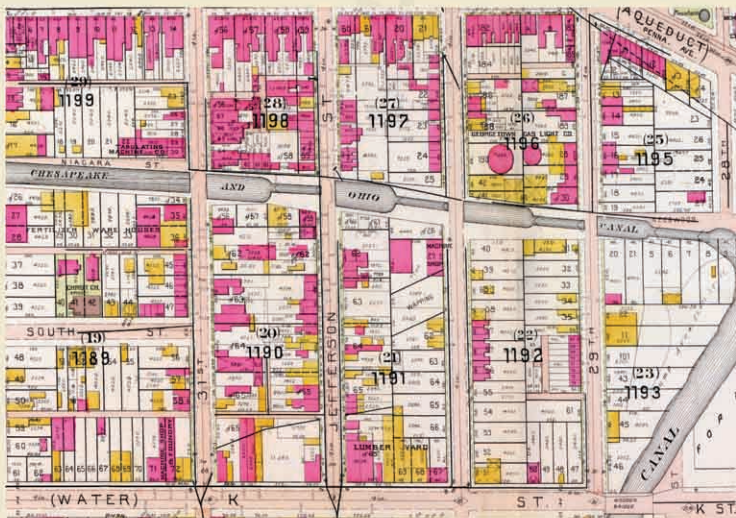
GIS Mapping and Aerial Services

- Site Suitability Analysis and Maps
- Aerial and Spatial Land Data Base Maps
- Desktop Reconnaissance Maps
- Land Cover Mapping
- Line of Sight and View-Shed Profile Maps
- Aerial Photograph Interpretation
- Watershed Delineations
- Current Land Use and Future Zoning Maps
- Project Location and Direction Maps
- Presentation Graphics and Maps
- Watershed Analysis and Mapping
- Environmental Quality Corridor Analysis
- Historic Deed and Plat Overlay Maps



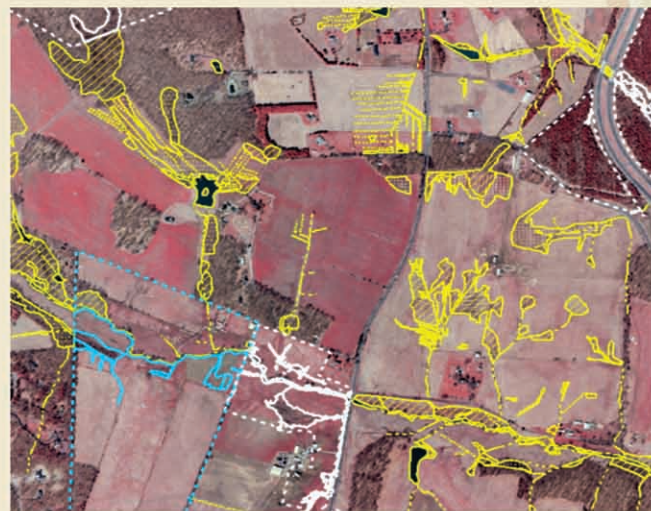
Residential Density and Proximity To Metrorail Analysis

The GIS Department at WSSI provides a wide variety of custom mapping products with rapid turn-around.



1903 Baist Map of Washington, D.C.

WSSI's experienced mapping staff have digitally integrated color infrared (CIR) photo-interpreted wetlands and streams with WSSI surveyed wetland delineations as an illustrative tool to make general assessments before visiting the site.



CIR Imagery with Surveyed and Photo-Interpreted Wetlands

WSSI continuously acquires the most current digital land data and aerial photographs available for Virginia, Maryland, the District of Columbia and West Virginia, and manages an extensive collection of digital aerial photographs dating back to 1937 and hundreds of scanned maps from 1624 to present.

Archeology

**Our Archeologists Dig Into the Past...
So Our Clients Can Create the Future**

Our clients benefit from our in-house expertise and integrated approach, which allows us to streamline the permit and land development approval processes.



Phase I
Archeological
Investigation



Pre-Historic
Projectile Point

Westerwald
(1770-1775)



1808 Liberty
Head One Cent

Archeological Services

- Archeological Assessments
- Phase I Investigations
- Phase II Evaluations
- Phase III Excavations
- Cemetery Investigations
- Historical Studies
- Section 106 Consultation
- Agency Coordination

WSSI has an extensive database containing
hundreds of digitized historic maps



1624 John Smith Map



WSSI archeologists performing a cemetery investigation & exhumation



Urban archeological investigation

Federal, state, and local regulations often require archeological investigations to be performed in order to determine if cultural resources will be affected by a development or redevelopment projects.

WSSI is pro-active in the consultation process for all cultural resource services, initiating early coordination with federal agencies or State Historic Preservation Offices (SHPO) as needed.

Wetland

Studies and Solutions, Inc.®

a DAVEY company

Surveying



As-Built Survey of a Stream Restoration

We Keep Land Planning on Target

Accurate information is the foundation for decision making. Precisely capturing land data ensures that development schedules are maintained and projects stay within budget.

WSSI's surveyors work in concert with our wetland scientists and archeologists to locate and map delineated wetland and other sensitive natural and cultural resource areas.



High-Quality Leica Survey Equipment

Surveying Services

- Wetland Delineation Surveys
- Bathymetric Surveys
- Stream Restoration Stake-Out & Monitoring
- Stream Profiles and Cross-Sections
- Mitigation As-Built Surveys
- Tree ID and Location Surveys
- Rare Species Surveys
- Archeological Surveys
- Topographic Surveys
- Boundary Surveys
- Vegetation Surveys

WSSI uses state of the art Global Positioning Systems (GPS) equipment and subscribes to a high accuracy Real-Time reference network.



Bathymetric Survey using the Echotrac System

Many WSSI Survey staff are cross-trained in wetlands delineation and stream restoration to maximize field productivity.

Surveying practice and the supporting technology are changing and evolving at a fast pace - WSSI takes pride in staying abreast of these technological advances in gathering and applying spatial data.

Landscape Architecture



Development Plans Brought to Life

WSSI's team of landscape architects offers planning and design services for the urban and natural environment.

From green infrastructure to stream restoration, our landscape architects routinely prepare landscape concept plans, graphic renderings, tree preservation plans, and construction document packages for a diverse range of project types with a focus on delivering sustainable and engaging landscapes.

An illustrative rendering & perspective prepared for an improvement project in Washington, D.C.



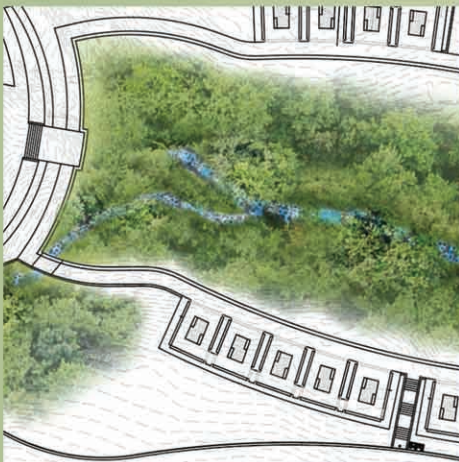
Staff Certifications:

- Professional Landscape Architects (PLA)
- Certified Arborists (ISA)
- ISA Tree Risk Assessment Qualified (TRAQ)
- LEED Accredited Professionals

The three-dimensional perspective renderings WSSI creates are essential visual tools which depict how the future constructed environment integrates natural and engineered solutions into the landscape.

Illustrative renderings and perspective graphics can play an important role in public engagement and outreach for large or small development and restoration projects.

Before Restoration - Design Plan Sketch



Before Restoration - Illustrative Rendering



After Restoration - Site Visit Photograph



A stream restoration project planning aided by a detailed design plan and rendering.

Permit Compliance

The Environmental Compliance Department works closely with clients to provide the services required by National Pollution Discharge System (NPDES) and wetland permits.

Our highly trained staff provide guidance through the permit application process and conduct monitoring and reporting from preconstruction until project completion and permit termination. We take pride in ensuring our client's projects avoid costly delays or violations by remaining in compliance.

Helping Clients Avoid Environmental Permit Violations



Stormwater Pollution Prevention Plan Site Inspections and Photo Documentation



Wetlands Permit Compliance Inspections

Permit Compliance Services

- Wetland Permit Compliance
- Stormwater Management Program Permits and Inspections
- Stormwater Pollution Prevention Plan Preparation and Audits
- Construction Monitoring for Clean Water Act Permit Compliance
- Erosion and Sedimentation Plan Review
- Environmental Compliance Training
- Remediation of Unauthorized Impacts

Our staff are Certified Erosion and Sediment Control Inspectors and Plan Reviewers.



Erosion and Sediment Control Plan Review and Consultations



On-Site Erosion and Sediment Control Inspections

Our technical expertise and knowledge of Best Management Practices (BMPs) and Erosion and Sediment Control (E & S) products save our clients time and money while reducing impacts to the environment.

Ecosystem Management



Our Passion for the Environment Translates Into Successful Stream and Wetland Mitigation Sites

Their environmental background and construction knowledge make our Ecosystem Staff essential assets when overseeing the construction and maintenance phase of environmentally sensitive projects.



Equipment used for restoration projects

WSSI provides soil stabilization measures at project sites using a combination of bio-engineering techniques that include geotextile fabric, rock, and native plants.

WSSI's ecosystem staff are Certified Arborists, as well as Certified Pesticide Applicators for the control of invasive species such as Emerald Ash Borer.



Administering treatments for protection against Emerald Ash Borer

WSSI uses an Integrated Pest Management approach incorporating physical, chemical, and biological means to control a target species.



Site inspections after restoration construction

LEED and LID



Environmental Sustainability by Example

WSSI encourages building in an environmentally-conscious manner. As a natural progression of our business practices, we wanted to develop a "green" building and a site design that was economically feasible.

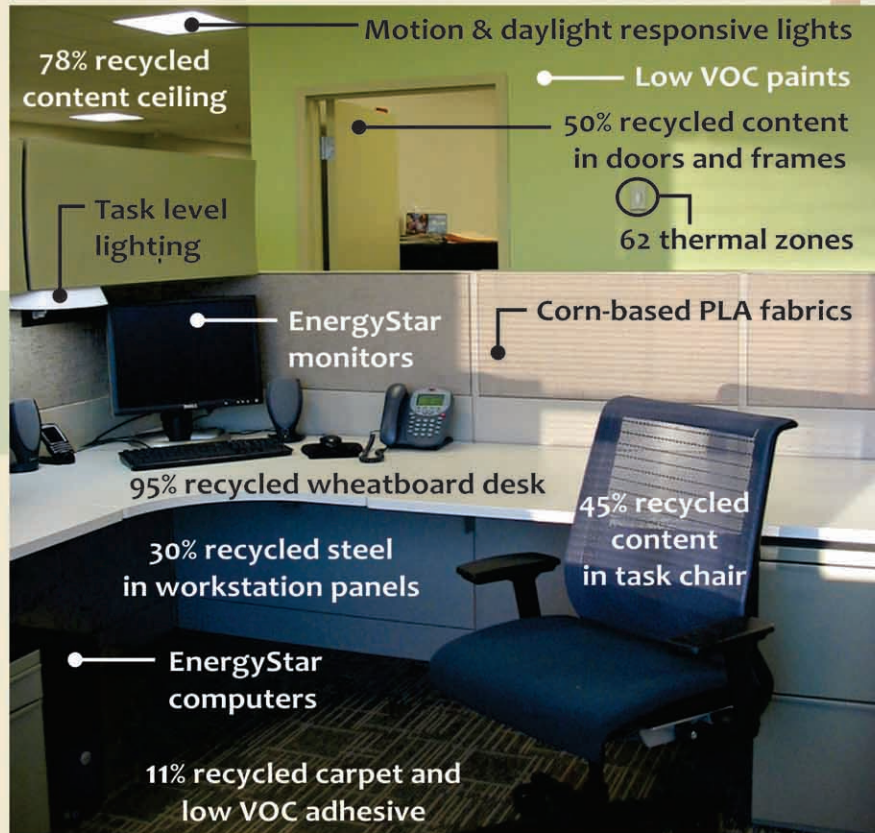
The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a consensus-based, national standard for developing high-performance, environmentally sustainable buildings.

WSSI's office is the first LEED Gold certified facility in Virginia.

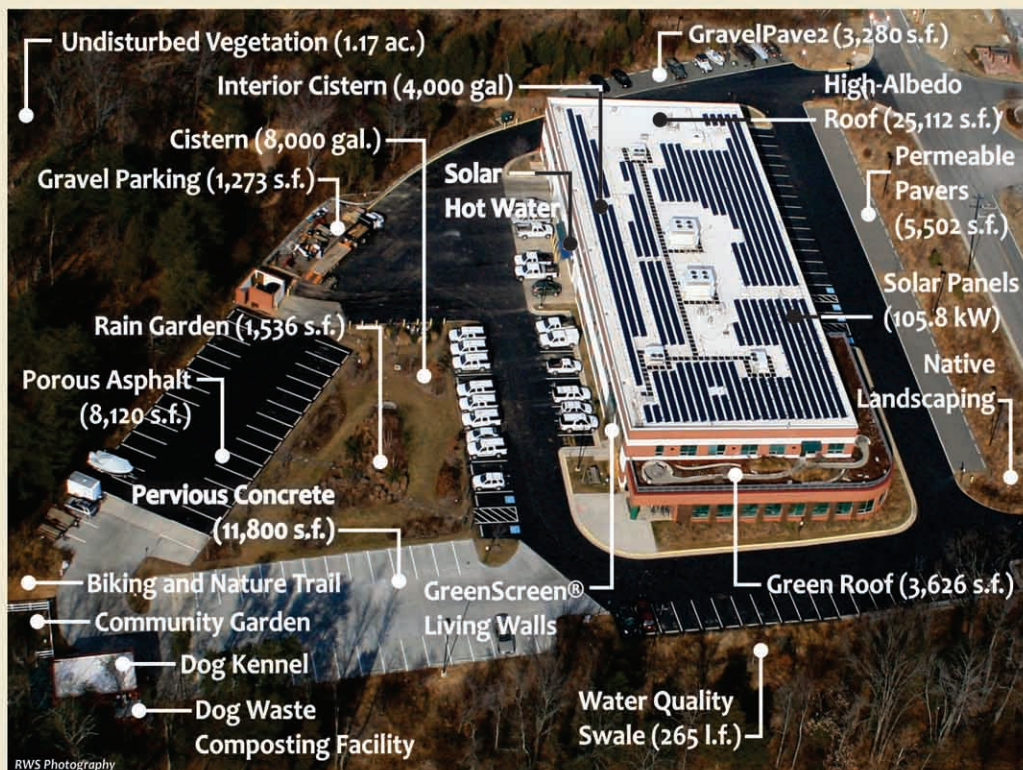


Adhering to these standards enables the WSSI building to not only reduce potable water consumption by 50% and energy consumption by 35%, but also to mimic the hydrology of an undisturbed forest to reduce downstream degradation.

Recycled and renewable materials and high-tech solutions all contribute to create a vibrant workspace for WSSI employees.



A Typical Workstation at WSSI



The WSSI Building and Site - Gainesville, VA

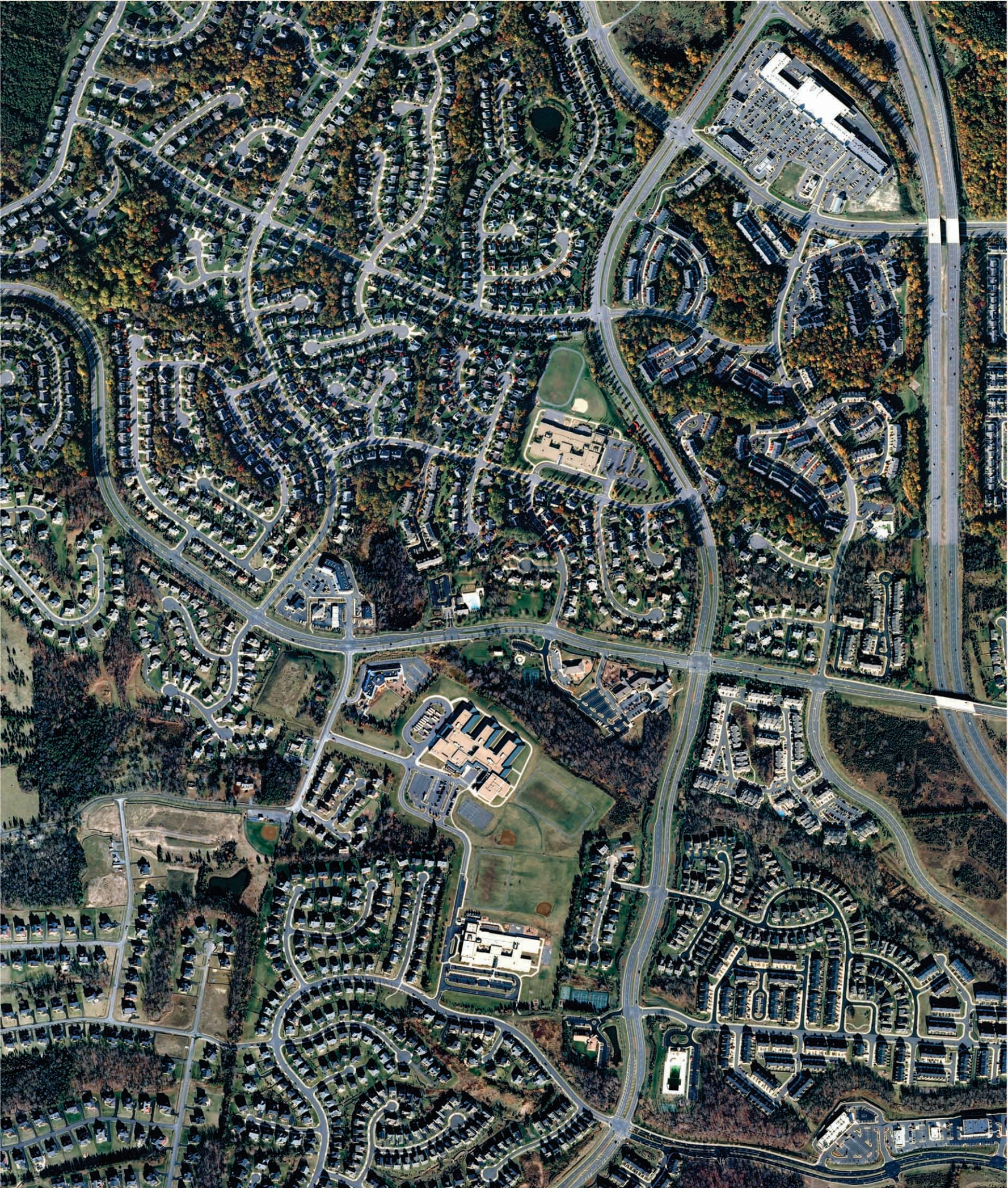
Low Impact Development (LID) is a stormwater strategy that mimics pre-development hydrology.

The main goals of LID are to:

- Conserve existing hydrology
- Minimize impervious surfaces
- Maintain natural water flow
- Prevent pollution
- Provide public education

WSSI continues to retrofit and upgrade the building and grounds with additional green features.

We have learned that proper design, construction and maintenance are the keys to successfully implementing LEED and LID design on a site.



Broadlands; Wetland Delineation, Permitting, Mitigation, Compliance and Archeology Services - Loudoun County, VA



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