

Statement of Qualifications



Crawford & Associates
Engineering & Land Surveying, PC
1 Hudson City Centre, Suite 300 • Hudson, NY 12534
Tel: (518) 828-2700 • Fax: (518) 828-2723
www.crawfordandassociates.com



Crawford & Associates Engineering & Land Surveying, PC

Serving Upstate NY since 1992

FIRM PROFILE



Founded in 1992, Crawford & Associates Engineering & Land Surveying, PC is a certified Woman Owned Small Business (SBA WOSB, NYSWBE) offering an interdisciplinary mix of services from talented engineers, scientists, land surveyors and technicians working in separate, yet closely linked, disciplines. As a result we are able to provide our clients with comprehensive, integrated and timely service. Our clients include public and private entities, nonprofits, institutions and commercial enterprises in a wide range of market sectors including: clean energy, energy efficiency, housing, healthcare, high

end residential, land use planning, water, wastewater, stormwater, and more.

C&A is comprised of multiple sub-groups, each with their own technical specialties, that collaborate as needed in the interest of our clients. Each group is led by a Project Manager who is a professional engineer, environmental scientist, or land surveyor with years of experience in their field. The Project Managers work closely with their staff to define problems and develop thoughtful and feasible solutions that meet our clients' needs. Throughout the course of a project, C&A's consultants are known to strongly advocate on behalf of their clients, ensuring the success of the project.



**Certified
Women-Owned
Business Enterprise**

SBA WOSB
Woman Owned Small Business



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FIRM PHILOSOPHY

C&A is a collaborative, multidisciplinary team of engineers, environmental scientists, and land surveyors who have the training and experience to guide a project from concept to reality.

We pride ourselves on being **problem solvers and innovators** who not only provide clear, concise and cost-effective solutions, but bring our projects to completion on time and on budget. We approach each project without preconceptions. Experience has taught us that there is more than one way to solve a problem. The first step is to clearly understand the ultimate goals, the priorities, the limitations, and the regulatory and political climate. Options and strategies are then explored and analyzed. Working closely with our client we determine the most effective and efficient plan to achieve their specific goal.

At C&A we listen to our clients, understand their needs, recognize their constraints and then create a solution which ensures a successful result.



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SERVICES

Civil Engineering

- Site Planning
- Wastewater Treatment Facility Design
- Water Supply Evaluation
- Construction Support
- Traffic Impact Analyses
- Stormwater Management

Mechanical, Electrical, Plumbing (MEP) Engineering

- HVAC Design
- Plumbing Design
- Electrical and Lighting System Design
- Energy Efficiency Analysis
- Uniform Code Compliance Analysis

Systems Protection Engineering

- Creation or update of relay and control schematics
- Calculation of relay settings
- Substations and transmission line protection up to 345 kV
- SCADA controls

Structural Engineering

- Assessment/Evaluations

Design & Analysis

- Renovation/Reinforcement/Repair
- Investigation Studies & Reports

Environmental Consulting

- Environmental Site Assessments
- Site Remediation Design and Monitoring
- Regulatory Compliance Permitting
- Wetland Delineation
- Ecological Resource Surveys
- Habitat/Ecological Assessments
- Stormwater Management Permitting
- Post-Closure Landfill Monitoring
- Spill Prevention Plans

Land Surveying

- Boundary Surveys
- Construction Surveys
- Topographic Surveys
- Subdivisions
- Lot Line Adjustments
- ALTA/ACSM Surveys
- Aerial Photo Overlays



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CIVIL/SITE PLANNING

The team at **Crawford & Associates** has the experience and expertise to guide development projects from concept to construction. Our civil engineers have with decades of experience navigating the permitting environment and construction codes of New York State. The C&A team combines experience as designers in private industry, as municipal review engineers, and as municipal officials in their hometowns to provide clients constructive solutions with balanced perspective.

Site Design

Due Diligence/Fatal Flaw Analysis

Site Utility Planning

Grading & Drainage Design

Permitting

SEQRA Impact Assessment

Planning/Zoning Board Representation

Municipal Review

NYSDOT/Highway Permitting

Environmental Studies

Environmental Impact Statements

Traffic & Parking Assessments

Habitat Assessment, Wetland Delineation

Visual Impact Assessment



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WATER SYSTEMS

Crawford & Associates has an extremely talented group of engineers and scientists who can provide both thoughtful analysis and innovative solutions for all size civil, sanitary or stormwater problems. Our staff have hands-on experience and advanced training and credentials in water, sanitary and stormwater management.

SANITARY

Wastewater Collection and Treatment Facility Design

Sewer Impact Analysis, Extension Design

Municipal Sewer Climate Adaptation Planning

WATER SUPPLY

Water Supply Evaluation

Water Distribution, Storage and Treatment System Design

STORMWATER

Drainage Analysis and System Design

Hydrology & Hydraulic Impact Analysis

Stormwater Pollution Prevention Plans, Permitting, and Inspections

Sanitary/Storm Sewer Separation Planning & Design



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TRANSPORTATION / TRAFFIC

Parking Studies & Design

Parking Demand Surveys, Generation Studies

Access Design / Circulation Evaluation

Parking Layout and Design

Traffic Engineering

Trip Generation Analysis

Traffic Impact Studies

Accident Analysis/Safety Audits

Traffic Calming Design

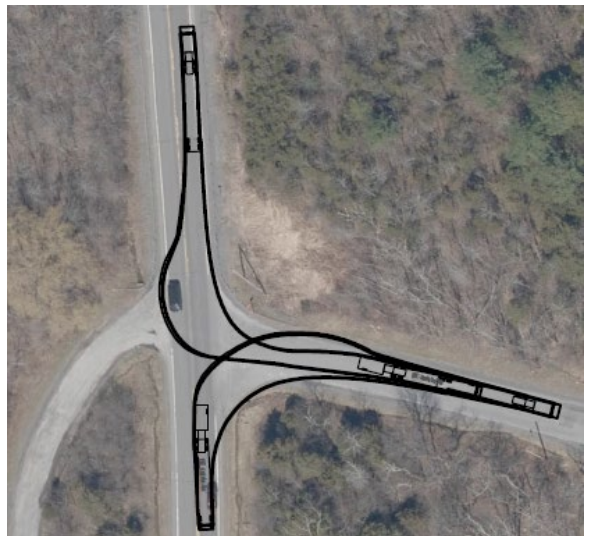
Planning & Permitting Services

Haul Route Studies

Vehicle Tracking Analysis

Roadway design

Highway Work, Entrance, Utility Crossing Permits



81015B - NY90 from END 90/23 CLAP to COLUMBIA ST
 City: Greenport County: Columbia
 Route number: 90
 Functional class: 4U - Minor Arterial (Urban)

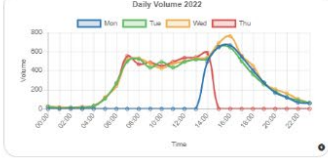
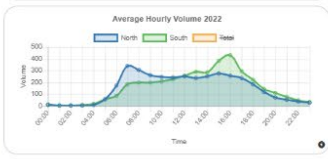
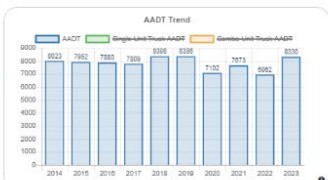
AAADT
 8,330
 W: 4,232
 E: 4,098

Site Data

| Annual Statistics | | | | | | | | | | | |
|------------------------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|--------|-----------|--|
| Data Item | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | |
| Statistics type | Actual | Estimated | Estimated | Estimated | Actual | Estimated | Estimated | Estimated | Actual | Estimated | |
| AAADT | 8,023 | 7,952 | 7,889 | 7,829 | 8,308 | 8,385 | 7,102 | 7,873 | 6,962 | 8,238 | |
| Single-Unit Truck AADT | 311 | 310 | 307 | 304 | 289 | 289 | 245 | 284 | 240 | 387 | |
| Combo-Unit Truck AADT | 80 | 80 | 79 | 78 | 90 | 90 | 82 | 88 | 80 | 95 | |
| K-Factor | 0.094 | 0.094 | 0.094 | 0.094 | 0.097 | 0.097 | 0.097 | 0.097 | 0.092 | 0.096 | |
| D-Factor | 0.587 | 0.587 | 0.587 | 0.587 | 0.587 | 0.587 | 0.587 | 0.587 | 0.626 | 0.606 | |
| Full-year AADT | - | - | - | - | - | - | - | - | - | 19,496 | |
| Speed 85th Percentile | 58.5 | 58.5 | 58.5 | 58.5 | 59.7 | 59.7 | 59.7 | 59.7 | 59.7 | - | |
| DDV | 874 | 868 | 862 | 858 | 731 | 730 | 918 | 868 | 641 | 730 | |
| DDW | 298 | 292 | 289 | 285 | 429 | 423 | 363 | 362 | 401 | 442 | |
| Truck AADT | 391 | 390 | 386 | 382 | 389 | 385 | 327 | 382 | 320 | 382 | |



| Count History | | | | |
|---------------|-----------|------------|------------------|-------------------|
| Year | Month | Count type | Weekend Duration | Workweek Duration |
| 2022 | September | Volume | 0 hours | 73 hours |
| 2018 | July | Class | 0 hours | 99 hours |
| 2014 | July | Class | 48 hours | 103 hours |



| Vehicle Classification | | | |
|---------------------------|--|-------|--------|
| 1. Motorcycles | | 46 | 0.71% |
| 2. Buses, 2 or 3 wheel | | 5,247 | 81.15% |
| 3. Pickups, panels, vans | | 876 | 13.55% |
| 4. Buses | | 6,170 | 95.41% |
| 5. Single-unit trucks | | 154 | 2.39% |
| 6. Single-unit trucks | | 19 | 0.29% |
| 7. Single-unit trucks | | 3 | 0.05% |
| 8. Single-trailer trucks | | 26 | 0.39% |
| 9. Single-trailer trucks | | 45 | 0.70% |
| 10. Single-trailer trucks | | 2 | 0.03% |
| 11. Multi-trailer trucks | | 0 | 0% |
| 12. Multi-trailer trucks | | 0 | 0% |
| 13. Multi-trailer trucks | | 2 | 0.02% |
| Heavy Weight Trucks | | 74 | 1.14% |



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MECHANICAL/ELECTRICAL/PLUMBING (MEP)

At **C&A** our mechanical/electrical/plumbing engineers have been responsible for projects ranging from small system renovations to large rehabilitation projects, as well as new system design. Our innovative solutions include cost-conscious approaches and state-of-the-art technologies. We have hands-on installation experience ranging from traditional gas or oil-fired air and hydronic systems to geothermal heat pump systems. We have a practical understanding of system types and functionality. We provide our clients with all of the following services:

Heating, Ventilation and Cooling System Design

Load Estimating

Equipment Sizing

Energy Recovery

Existing Systems Evaluation

Plumbing Design

Storage, Supply and Waste System

Planning and Sizing

Electrical & Lighting System Design

Load Estimating

Equipment Sizing

Existing System Evaluation

New York State Uniform Code Compliance

Building, Fire, Energy Code Compliance Analysis



Taconic Farms Triple Barrier Unit



Irving Farms Coffee Roasting House



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STRUCTURAL

C&A's Structural Engineering Group has conducted numerous projects throughout the upstate NY area. Project scopes have varied from simple beam sizing to the design of structural supports for complex multi-story buildings. The structural engineering staff has gained a well-balanced understanding of structures with advanced degrees and practical construction experience. Due to the skill of our staff, we are able to take on all phases of a project from structural assessment and conceptual design through construction. A summary of structural engineering services offered by Crawford & Associates is outlined below.

Structural Assessment/Evaluations

- Cursory Visual Inspection
- Structural Component Assessments
- Destructive & Non-Destructive Testing

Structural Design & Analysis

- Residential Wood Framing/Heavy Timber
- NDS
- Steel Detailing/Connection Design
- Cast-in-Place Concrete Foundations
- Pre-cast Concrete Structures - ACI
- Reinforced/Un-reinforced Masonry
- Light Gauge Steel
- Geo-grid Retaining Walls

Structural Renovation/Reinforcement/ Repair Projects

- Historic Structures
- Live/Roof Load Capacity
Analysis/Upgrade
- Structural Component Strengthening
- Foundation Repair

Investigation Studies & Reports

- Failure Analysis
- Expert Witness Testimony
- Pre-purchase Reports/Cursory
Investigations
- Evaluation of Damaged or Collapsed
Structures



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ENVIRONMENTAL SERVICES

C&A takes great pride in our ability to provide our clients with a comprehensive range of services, including Environmental. Our engineers and scientists understand the regulatory process, are sensitive to environmental issues, and possess experience in a multitude of various environmental program areas.

Environmental Consulting

Environmental Site Assessments & Investigations

Petroleum & Chemical Spill Clean-Up / Closure Design

Site Remediation and Monitoring Design

Regulatory Compliance, Auditing & Permitting

Environmental Impact Statement Preparation

Wetland Delineation, Mitigation & Reporting

Ecological Resource Surveys - Habitat/Ecological Assessments

Stormwater Management, Permitting & Reporting – Industrial / Construction / MS4

Post-Closure Landfill Monitoring & Reporting

Spill Prevention Plans/Reports (Petroleum & Chemical)





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LAND SURVEYING

C&A's multiple land surveying crews are led by Daniel J. Russell, PLS, a highly respected professional land surveyor with over 40 years' experience surveying in Columbia County, and Dustin James, PLS, an accomplished surveyor with an eye for precision and quality surveys. Since its addition to the C&A team in 2008, the surveying team has prided itself on delivering a wide array of surveys in a timely manner and at a reasonable price. The team utilizes a suite of advanced land surveying equipment that allow it to provide clients with increased efficiency performing aerial ground control, topographic surveys and construction layouts and increased precision and accuracy in performing large boundary surveys. C&A's library is a veritable museum of decades of Columbia County real property records. Direct access to these records helps us to reduce project time and costs. Through a series of acquisitions, C&A owns the field notes and historic maps of:

[Alvin B. Huehnel Land Surveying](#)

and

[Plass, Rockefeller & Nucci Land Surveyors](#)



Surveying Services:

Boundary Surveys

Subdivisions, Lot Line Adjustments

ALTA/ ACSM Survey

Topographic Surveys

Aerial Photo Overlays

Construction Surveys

Historic Record Production





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SOLAR DEVELOPMENT SERVICES



C&A specializes in engineering support for solar projects throughout New York, the northeast and mid-west. With in-house expertise in civil, electrical, mechanical, structural, environmental, and site planning services, C&A can handle most engineering needs from start to finish of a solar project. Some of our solar development services include:

Site Assessment

- Due Diligence / Fatal Flaw analysis
- Phase 1 Environmental Site Assessment
- Geotechnical soils evaluation
- Boundary and topographical surveying
- Wetland delineation

Design

- Solar layout optimization with topographic grading, shading, pier and collision analysis
- Energy modeling
- Design of medium voltage electrical interconnection & coordination with utilities
- Turnkey design for relay retrofit projects
- Calculation of relay settings
- Substation and transmission line protection
- SCADA controls
- Design of electrical PV array including automated generation of array cabling
- Grading & drainage design and SWPPP preparation

- Development of detailed civil and electrical construction drawings, details, and specs

Permitting

- Overall site planning services and acquisition of local/state permits
- Representation and advocacy at public meetings
- Visibility Simulations and Screening Design
- Glare Analysis

Construction Support

- Automated bill of materials generation
- SWPPP inspections
- Submittal review
- Site inspection
- Preparation of record drawings

Operations & Maintenance Support

- Review of site data
- Performance troubleshooting
- Return on Investment (ROI) analysis
- Supervision of relay commissioning



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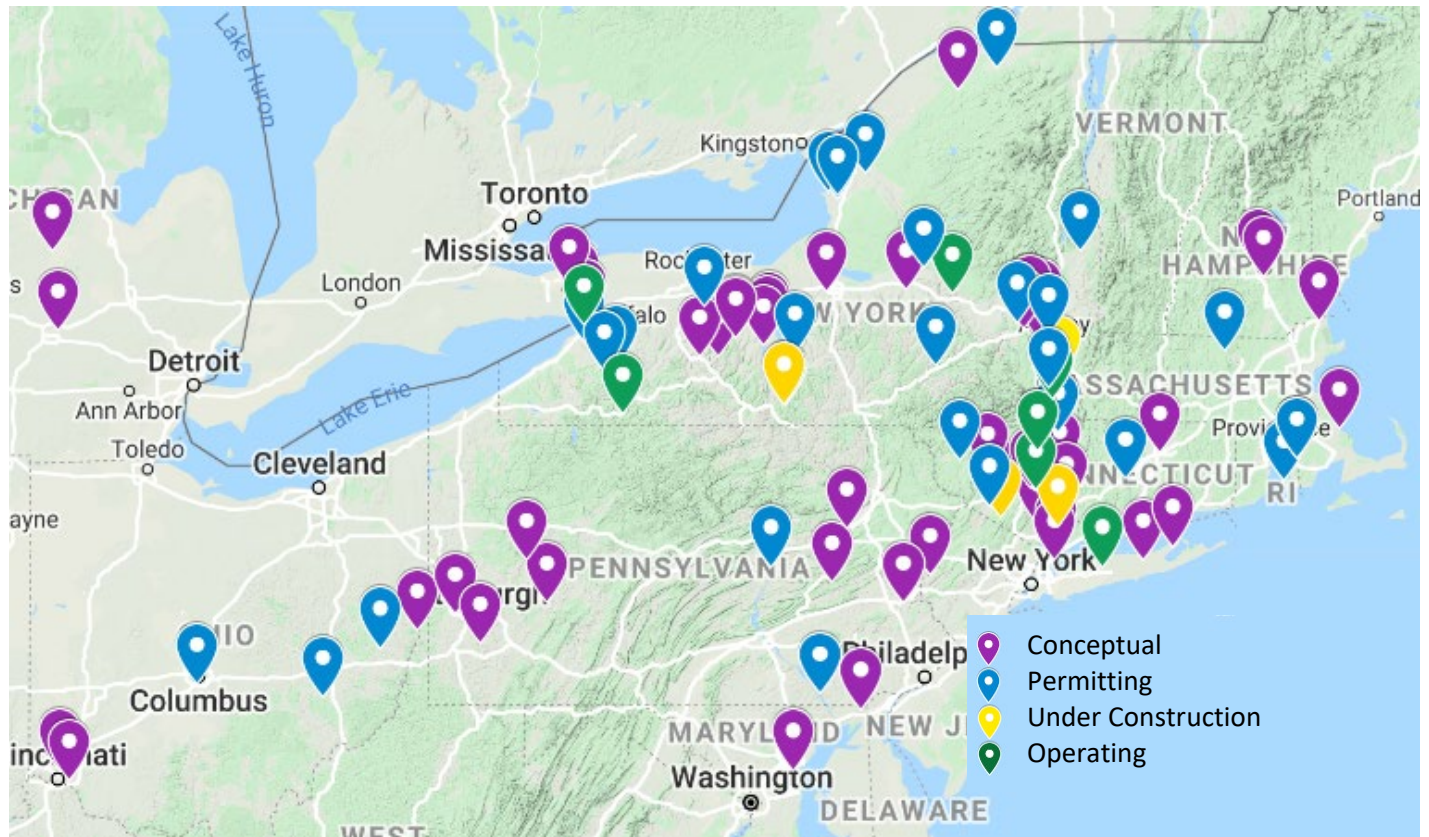


Figure: Map of Crawford & Associates solar development projects as of August 2020

C&A has the skills and experience to lead solar development projects from conception through construction. The team has extensive experience with municipal boards and the SEQR process, as three staff sit on their local Planning Boards. C&A has also managed NYS Article 10 application preparation for a 100MW solar facility and is well versed in the complexities of utility scale solar permitting. Jen has over 15 years' experience in the solar industry, and the company's solar design team has been/is involved with over 80 solar projects for a total of over 1,721 MW. Most of C&A's portfolios have included projects in the 2 to 20 MW range, though the growing firm also supports a few 50 to 100MW solar facilities in development.

C&A's solar engineering team is proficient in a suite of specialty design softwares that facilitate efficient and accurate layout optimization and yield analysis. C&A is a recommended consultant by ForgeSolar for our experience in accurate glare modeling. Our overall PV-specific software capabilities include:

Layout Optimization

- HelioScope (conceptual design)
- PVCASE add-on to AutoCAD Civil 3D (advanced design)
- SpidaCalc/Quick Pole (structural analysis of OH pole)

Analysis

- PVSyst (energy modeling)
- NREL's System Advisor Model (energy modeling)
- ForgeSolar (glare analysis)



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SUSTAINABLE DESIGN

C&A provides sustainable design services aimed at reducing building project's impact on human health and the environment. We take a practical approach to the use of innovative technologies, employing those where our evaluations demonstrate they will deliver results. We seek to improve function, minimize cost and balance each project's environmental sustainability to deliver long term client savings .

Consulting services include:

Energy efficiency building systems modeling

LEED, Passive House, and/or Net-zero building design

Energy code compliance review

Historic renovation consulting

Ground source heat pump design

Clean energy site resource analysis

Green infrastructure stormwater management design



Thompson-Mazzarella Park Rain Garden



Painter Hill Passive House



*Ground Source Heat Exchanger at PS21:
Performance Spaces for the 21st Century*



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MUNICIPAL SERVICES

C&A has a long history of serving the public as problem solvers and plan reviewers. Municipal clients can rely on the expertise of our engineers, environmental scientists, and land surveyors in a variety of ways:

General Municipal Representation

Advisory review for municipal planning and zoning boards

Zoning and subdivision regulation development

Grant application assistance

Building Code review assistance

Water, Wastewater and Stormwater Services

Water, sewer and drainage district formation and extension

Municipal water treatment and distribution system design

Wastewater treatment and collection system design & long term planning

Facilities Engineering Services

Full-service civil, structural, mechanical, electrical and plumbing engineering design

Highway garages salt storage facility design

Fire stations and community shelter design

Energy studies and energy grant assistance

Land Planning and Site Design

Recreational facilities, parks, trailways and bikeways

Downtown and waterfront revitalization and streetscaping

Environmental Services

Phase I environmental site assessment for real property transfer

Brownfield site investigation, planning and remediation

Natural Resource Inventory

Environmental impact statements/assessments

Petroleum bulk storage tank closure investigation and remediation

Industrial permitting and compliance assistance

Transportation Engineering Services

Municipal highway construction specifications

Plan review and construction supervision



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