



A3 Environmental, PLLC
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■ Overview

A3 Environmental, PLLC is a Licensed Professional Design Firm focused on providing quality environmental, ecological and engineering services.

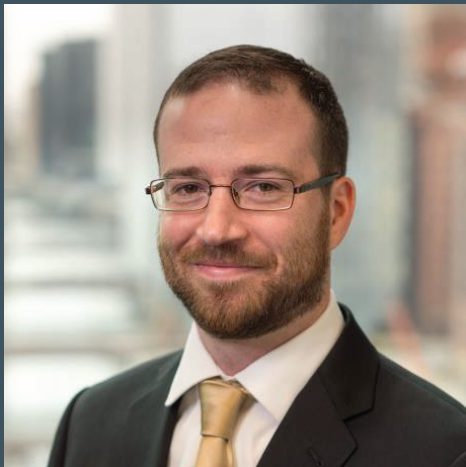
We are a WBE/DBE consultant certified with IDOT, METRA, CTA, MWRD, State of Illinois, City of Chicago, and others.

A3E has staff with experience performing various types of one-off or ad-hoc complex hydraulic analyses.

■ A3E Engineering Services

- Sewer Design & Roadway Drainage
- Stormwater & Sewer Master Planning
- Floodplain Management & Stream Restoration
- Two-Dimensional Urban Flood Modeling
- **Advanced Hydraulic Analysis**

■ Key Staff



NICHOLAS STEPINA, PE, CFM
Senior Project Engineer
nick@a3e.com

Registrations & Training:

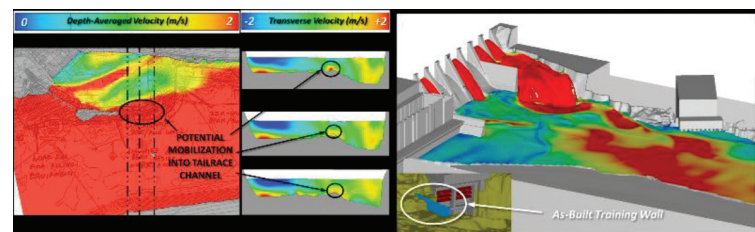
- Professional Engineer (PE) #062.067171 – Illinois
- Certified Floodplain Manager (CFM) #IL-19-00847 – Illinois
- OSHA 40-hour HAZWOPER

ADVANCED HYDRAULIC ANALYSIS

■ A3E Capabilities

A3E has staff with experience performing Computational Fluid Dynamics (CFD) simulations using Flow-3D software. A3E has the capability to support your team on a range of tasks involving CFD and Advanced Hydraulic Analyses.

- Sediment Transport & Scour Potential
- Reservoir Resident Time Analysis
- Conveyance Capacity Analysis for Complex Geometry
- Conceptual Design Review & Optimization



■ Advanced Hydraulic Analysis Project Experience

- CFD model build and testing of an influent channel design to retrofit an existing wet weather wastewater pump station. Flow distribution was tested within the existing influent and equalization chambers, wet and dry weather channels, and suction piping to identify impacts to the proposed design or long-term performance.
- CFD model build and testing of an existing side water depth clarifier to determine efficiency and identify clarifier improvements including baffling configurations and radial perforated collectors to optimize flocculation and settling performance.
- CFD model build and testing to investigate excessive rock and sediment transport through a hydropower station tailrace channel and vertical shock loading in the stoplog storage slot. Two deflection wall options were proposed to minimize turbulence and limit material transport into the draft tubes.
- CFD model build and testing of a dam and spillway for a rehabilitation project. Multiple iterations of spillway and pier geometry were tested to optimize spillway capacity.
- CFD model build and testing of a 110-foot-long concrete ogee-crested weir spillway to develop a new stage-discharge curve confirming existing spillway capacity and addressing permitting requirements.



Clarifier CFD Analysis, Confidential Client, Pennsylvania, USA (2015)

Project Modeler for Computational Fluid Dynamic (CFD) model testing of an existing side water depth clarifier using the Flow-3D computer program. Simulation results were analyzed to determine efficiency and identify clarifier improvements including baffling configurations and radial perforated collectors to optimize flocculation and settling performance.

North Shore Pumping Station - Hydraulic Design Services, City of San Francisco Department of Public Works, San Francisco, CA (2014)

Project Modeler involved in the analysis of the conceptual design of a new wet weather pump station influent channel to be connected to the existing North Shore Pump Station (NSS). The analysis used Flow-3D Computational Fluid Dynamic (CFD) software to evaluate the flow distribution within the existing NSS influent and equalization chambers, wet and dry weather channels, and pump suction piping to identify hydraulic phenomena that may impact the size and location of a new influent channel and/or adversely impact long-term NSS performance.

Brilliant Expansion Tailrace Analysis, Columbia Power Corporation, Castlegar, B.C. (2013)

Lead Modeler responsible for building and analyzing a CFD model to investigate issues at the powerhouse, most notably excessive material transport into the tailrace and damage to the draft tube stop log storage slot resulting from dynamic vertical shock loading. Two solutions were devised, and performance verified, including a shield wall to reduce turbulence within the storage slot and a deflection wall to reduce turbulence and eliminate material transport into the tailrace area.

NIPSCO Norway Spillway Reconstruction/Rehabilitation Design Analysis, Northern Indiana Public Service Company, Norway, IN (2013)

Project Modeler responsible for construction of both the existing condition and proposed design Computational Fluid Dynamic (CFD) models using Flow-3D software. Development of 3-D model geometry required assembly of multiple data sources including several sets of construction drawings and stitching together bathymetric and topographic surveys. Simulation of multiple iterations of spillway and pier geometry were performed to optimize capacity while meeting both spatial and financial constraints.

Los Padres Dam Spillway Study, California American Water, Monterey County, CA (2012)

Project Modeler responsible for building and simulation of a Computational Fluid Dynamic model (CFD) of the Los Padres Dam Spillway to confirm existing capacity and address permitting requirements established by the California Division of Safety of Dams (DSOD). Key elements of the analyses included the review of as-built drawings of the existing spillway, CFD analyses of the 110-foot-long concrete, ogee-crested weir using Flow-3D computer software and development of a new stage-discharge curve for validation of the curve developed by DSOD in the early 1980s.