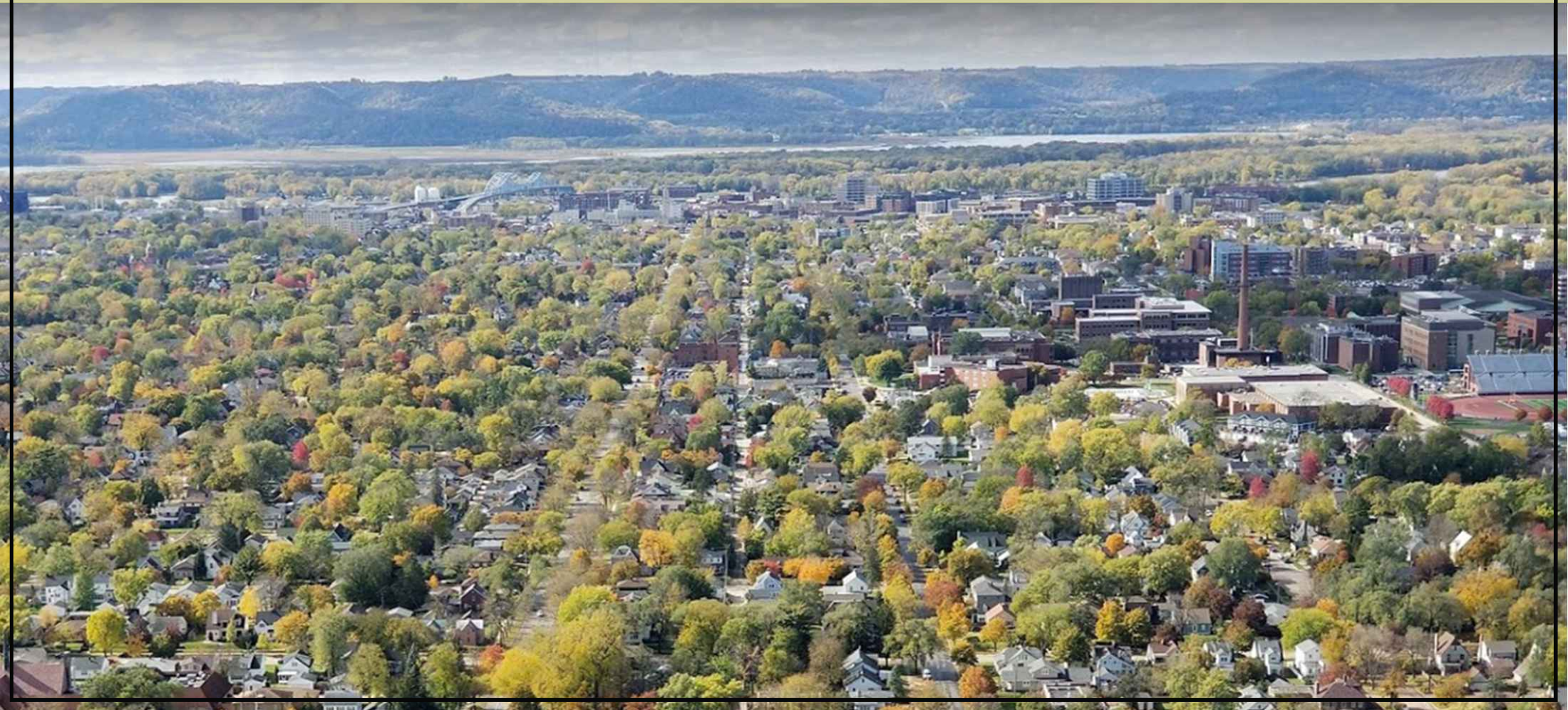


LA CROSSE WISCONSIN

QUALIFICATIONS & COST PROPOSAL - CLIMATE ACTION PLAN



Submitted by GZA GeoEnvironmental, Inc., 17975 West Sarah Lane, Suite 100, Brookfield, WI 43045
Contact: James Drought, P.H. | 414-831-2540 | james.drought@gza.com





Known for excellence.
Built on trust.

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION
MANAGEMENT

17975 West Sarah Lane
Suite 100
Brookfield, WI 53045
T: 262.754.2560
F: 262.923.7758
www.gza.com



Known for excellence.
Built on trust.

June 18, 2021

Mr. Lewis Kuhlman, Environmental Planner
City of La Crosse
400 La Crosse Street
La Crosse, WI 54601
kuhlmanl@cityoflacrosse.org

Re: Climate Action Plan

Dear Mr. Kuhlman:

GZA GeoEnvironmental, Inc. (GZA) recognizes the critical role that consultants play in assisting municipalities like the City of La Crosse in achieving its carbon neutrality goals. Presented in this document is how our unique blend of experience and qualifications can deliver a planning unique solution to the City, and a system for measuring and benchmarking sustainability to help the City achieve its goals.

Throughout this submission, you will get to know GZA and why we are known for excellence and built on trust. You will be introduced with specialists in the field of climate change planning and implementation and will recognize that we too share the same passion and commitment about creating resilient and sustainable communities where a healthy environment, economic prosperity and social equity are considered priorities. If chosen, **GZA will serve as the City's advocate for matters regarding climate change planning and implementation.**

On behalf of the project team, thank you for your consideration. We look forward to the opportunity to meet and present our capabilities with you. Please contact me or Thomas Klotz on any matters regarding this proposal.

Very truly yours,

GZA GEOENVIRONMENTAL INC.

James Drought, P.H.
Principal
414-831-2540
James.Drought@GZA.com

Thomas Klotz
Associate Principal
734-779-2428
Thomas.Klotz@GZA.com



TABLE OF CONTENTS

Section 1.	PROJECT OVERVIEW	1
Section 2.	SCOPE AND TIMELINE	2
Section 3.	COMMUNITY ENGAGEMENT	10
Section 4.	FIRM QUALIFICATIONS	16
Section 5.	COST PROPOSAL	32

APPENDICES

Appendix A | STAFF RESUMES

Appendix B | PROJECT EXPERIENCE



Known for excellence. Built on trust.



SECTION 1 | PROJECT OVERVIEW

SECTION 1 | PROJECT OVERVIEW

PROJECT UNDERSTANDING

Like the City of La Crosse, WI, GZA is committed and passionate about creating resilient and sustainable communities where a healthy environment, economic prosperity and social equity are considered priorities. We have worked with both communities and major corporations to develop customized Climate Action Plans. The City will receive the full complement of professionals offering planning, sustainability, resiliency, design, engineering, environmental science, urban design, community process facilitators, finance, and implementation strategies. GZA has been a reliable source of engineering, science and construction services in Wisconsin for the past 21 years.

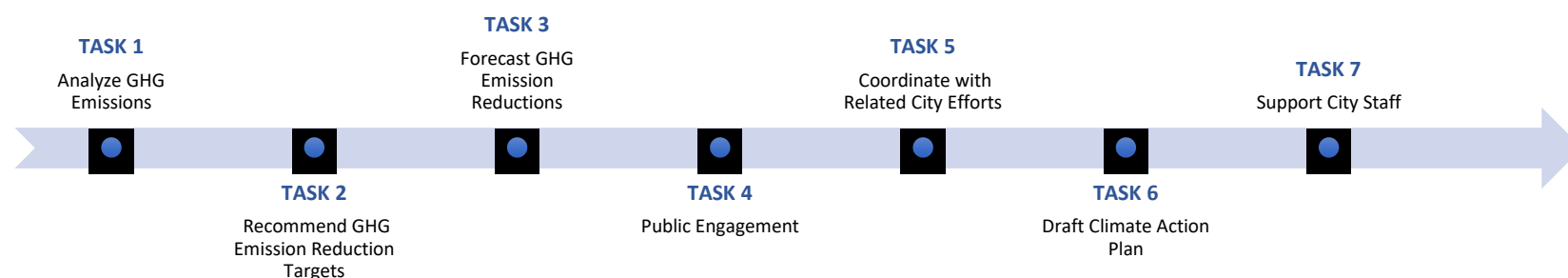
We understand your goals, as described in the RFP for this project. Many of these are addressed in the scope of work which is included in Section 2. We also understand that the City has a history of quality municipal governance, an energized and active citizenry, and strong planning which has enabled La Crosse to become a superb place to live and work. Through this Climate Action Plan, our goal is to elevate the City's position even further.

We feel that communication is of the utmost importance, between GZA and the City, and through engagement with the various stakeholders and community organizations. We understand that with the community's buy-in with the plans offered, implementation will run smoother and more efficiently. Our team members will be there to advocate for you, explain complicated concepts, and provide a forum that is fun and interactive. Moreover, we feel that participation in the workshops be extended to those of whom, without intervention, climate change will impact the most. Focusing on middle and high school level children, we will develop materials, geared toward their age, addressing the various small steps even they can take to affect climate change.

The City's goal to achieve carbon neutrality by 2050 and create a zero-waste economy that prioritizes waste reduction and reuse of resources is inherently about making changes. It will entail identifying the best steps and pathways for La Crosse, as a City and as individuals, businesses, and organizations, to develop a more sustainable future to meet your goal, reduce greenhouse gas emissions and enable a carbon-neutral future.

SUMMARY APPROACH

The graphic below summarizes GZA's proposed approach to the Scope of Work.





SECTION 2 | SCOPE OF WORK AND TIMELINE

SECTION 2 | SCOPE OF WORK AND TIMELINE

INTRODUCTION

The City of La Crosse is seeking proposals that generally reflect the scope of work outlined in the Climate Action Plan (CAP) Request for Proposals (RFP). Consultants are encouraged to suggest refinements and innovative methodologies that ultimately achieve the tasks described below. City staff will work closely with the selected consultant and are prepared to contribute to in-house task assistance. The proposal suggests which tasks would be appropriate and/or desirable for City staff to complete.

The following presents a detailed Scope of Work, based on the RFP. An estimated Project Schedule is presented at the end of this section.

TASK 1 – ANALYZE GHG EMISSIONS

The City has a goal to reduce GHG emissions by 30% from a baseline of 2015 to a target year of 2030, as well as a commitment to carbon neutrality by 2050 for the municipality and community with incremental targets along the way. To support these commitments, GZA's Team will complete a community-wide and government operation GHG Emissions Inventory for calendar year (CY) 2015 and CY 2020. Our experience in developing complex GHG emissions inventories, for small and large global entities alike, is available to complete this task in a timely and efficient manner.

The 2015 and 2020 GHG Emissions Inventories represent an update to the City of La Crosse's 2019 GHG Emissions Inventory and Summary Report. Accordingly, GZA will build upon the approach and results from the 2019 inventory to complete transparent and accurate 2015 and 2020 inventories.

METHODOLOGY



The City has committed to the Global Covenant of Mayors for Climate & Energy (GCoM) alliance and the Mayors for 100% Clean Energy initiative. GZA team members will prepare the GHG Emissions Inventories to conform with these programs, closely following the GCoM's "Common Reporting Framework" released in September 2018 (Version 6.1).

The 2019 inventory applied the "Global Protocol for Community-Scale Greenhouse Gas Emission Inventories" framework, which served as the underlying framework for GCoM's "Common Reporting Framework." Therefore, application of the GCoM's "Common Reporting Framework" will ensure consistency with the 2019 GHG Emissions Inventory.

The GHG Emissions Inventories will be completed using ICLEI's ClearPath software. ICLEI's software produces results that will support submittal to GCoM and other disclosure platforms. It is our understanding the City utilized this software for completion of the 2019 inventory and continues to maintain a subscription to ICLEI which our team would be granted permission to access for completion of the 2015 and 2020 inventories. This will also help maintain consistency with the 2019 inventory and facilitate updates for completion of future inventories.

BOUNDARIES

We will complete two inventories for 2015 and 2020 as part of this assignment. The first inventory will cover government operations while the second inventory will cover community-wide emissions. Consistent with the 2019 inventory, the 2015 and 2020 inventories will address the following Scope 1 and Scope 2 emissions:

GOVERNMENT OPERATIONS SOURCES	COMMUNITY-WIDE SOURCES
Stationary combustion for buildings and facilities (natural gas and propane)	Stationary combustion for residential and commercial buildings (natural gas)
Mobile combustion for vehicles and bus fleet (gasoline, diesel, jet fuel and blended biofuels)	Purchased electricity for residential and commercial buildings (natural gas)
Process and fugitive emissions from water, wastewater, and solid waste	Mobile combustion for transportation, bus fleet and airport (gasoline and diesel)
Purchased electricity for buildings, facilities, streetlights and signals	Water and wastewater purchased electricity and fuel combustion
	Solid Waste emissions from waste generation and landfill gas
	French Island Generating Station for waste incineration

CO₂, CH₄ and N₂O, from each of the aforementioned sources, will be calculated by ClearPath based on the global warming potential (GWP) of each gas. Emissions for other gases, such as SF₆, HFCs and PFCs, may be present but it has been uncommon for communities to account for these emissions given they are not typically material.

The full range of emissions from Scope 3 categories are not addressed within the scope of this proposal as these emissions have not historically been required by commitments to the Compact of Mayors. However, GZA possesses deep and leading-edge experience in calculating Scope 3 emissions and will be available to support the City if Scope 3 should be desired in the future.

DATA COLLECTION

The City currently tracks activity data needed for completion of the inventories, including energy usage, water usage, and government fleet operations. It is our understanding that much of this data is compiled for the City's Annual Sustainability Indicators Report. Data is expected to be provided by officials in the departments of solid waste, airports, wastewater, municipal transit, and environmental planning.

Our team will meet virtually with each department to discuss the state of current data, potential for gaps or inconsistencies, and access to the data. It is also expected that Xcel Energy, the local electricity and gas supplier, will provide energy usage by sector for this assignment similar to the 2019 inventory.

For community-wide transportation, we will reach out to the Wisconsin Department of Transportation (WI DOT) to obtain the latest traffic estimates. Any gaps or missing data will be evaluated on a case-by-case basis and estimated in accordance with the GCoM's Common Reporting Framework.

RESULTS AND DOCUMENTATION

Once data is collected, our team will utilize ClearPath software for entry of data for 2015 and 2020. Emissions will be calculated by ClearPath and results will be analyzed for completion and accuracy.

The emissions inventory results will be summarized and documented through a written summary report similar to what was completed for 2019. Aspects of the report will include the background, approach, methodology, findings, graphical results presentation, and recommendations. The report will be prepared in a format that will satisfy external reporting needs (e.g., GCoM) as well as consumption by the community and beyond.

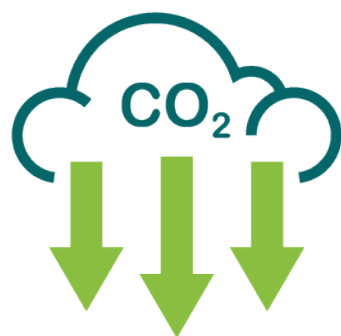
TASK 2. RECOMMEND GHG EMISSION REDUCTION TARGETS

GZA team members will utilize the 2015 and 2020 GHG Emissions Inventory results to assist the City in the setting of new GHG reduction goals and/or targets. We understand that the City is interested in setting new, interim GHG emission reduction targets that will support the City in meeting targets already set, including the 2030 GHG emission reduction target that aligns with the IPCC recommendations and the community-wide carbon neutrality goal by 2050. We will work closely with the City to determine the level of ambition desired taking into account the City's GDP and per-capita emissions.

The City has also developed long-term goals to reduce energy consumption in government facilities, fuel consumption in fleet vehicles and fuel-related emissions, and waste generation by 2025. Before the appropriateness of additional targets is determined, these existing long-term goals will be evaluated



by our team to determine what level of GHG reduction the City is on track to achieve by 2025. We will then determine the gap that remains to achieve the broader 2030 and 2050 GHG reduction targets, and the new interim year goals needed to support those 2030 and 2050 targets.



Ideally, the new interim year targets will be science-based meaning the targets are measurable and actionable that will allow the City to align its actions with societal sustainability goals and the biophysical limits that define the safety and stability of earth systems. These targets are considered science-based if they are in line with the goals of the Paris Agreement and limit global warming to 1.5°C above pre-industrial levels. Science-based targets must be science-driven, equitable and complete. The proposed GHG Emissions Inventory approach will offer data that helps support these tenets.

We will assess future targets using various methodologies including the following science-based methods: Deadline 2020, One Planet City Challenge (OPCC), and Tyndall Centre. We will reference “Science-Based Climate Targets: A Guide for Cities”, a November 2020 publication developed by GCoM, ICLEI and others, to support assessment of future targets and alignment with GCoM.

Upon completion of these target assessments, we will benchmark GHG reduction targets for a wide variety of communities within and outside Wisconsin to determine if the target options represent a leading or lagging approach. This will help to better inform the City of La Crosse when selecting the desired target(s).

We will then offer recommendations of potential GHG emission reduction target options for the City of La Crosse to consider. Ultimately, these target options are expected to serve as interim year targets leading up to the pre-established 2030 and 2050 targets.

TASK 3. FORECAST GHG EMISSION REDUCTIONS

Once the target recommendations are available, GZA team members will evaluate each interim year target option utilizing the ***Climate action for Urban sustainability (CURB) scenario planning tool***. The CURB Tool will help illustrate the level of action needed to meet these target options. This tool is designed specifically for communities and offers the ability to evaluate the impact on emissions and financial performance based on potential actions under multiple scenarios.

First, background information and the GHG Emissions Inventory results will be entered into the CURB Tool to support evaluation of the target options. Next, we will assess the potential for changes to future government and community-wide emissions by considering the following combination of changes and actions:

- ▶ Population projections
- ▶ Energy efficiency improvements including building and appliance electrification
- ▶ Energy supply decarbonization forecasts and increased renewable energy
- ▶ Fuel switching



- ▶ Switch to electric vehicles
- ▶ State and federal policies and programs
- ▶ Emerging technologies

The CURB Tool provides the ability to select actions by sector (e.g., building energy, electricity generation, solid waste, wastewater and water, transportation, etc.). These actions can be customized to enter an implementation timeframe and other assumptions. The CURB Tool will yield emission and energy reduction estimates, cost and payback timeframe, co-benefits for the community, and progress toward the target options. GZA team members will also assess the feasibility of each action.

Actions will be selected based on the City's current plans and level of reduction needed to meet the interim and 2030/2050 targets. Included in these actions will be projects underway or planned that will transition the City toward a zero-waste economy prioritizing waste reduction and reuse of resources. Various scenarios will be considered to evaluate the effect and timing of future changes and actions. The City's engagement with Johnson Controls' Comprehensive Energy Services and Xcel Energy's Partners in Energy program will support identification of a number of actions.

We will also work with City officials to identify other ongoing activities, including the Wastewater Treatment Plant Facility Plan and Airport Solar Feasibility Study.

Ultimately, use of the CURB Tool will support development of emission forecasts based on a variety of future changes and actions. These forecasts can be compared to the target options to identify a pathway to achieve the target(s), and ultimately selection of the most appropriate target(s). Results of the CURB Tool, forecasts by scenario, and recommendations will be presented to the City of La Crosse to facilitate a decision on the desired target selection(s).

TASK 4. COMMUNITY ENGAGEMENT

As listed on page 5 of the RFP, we have addressed the task of community engagement in the following **Section 3 – Community Engagement**.

TASK 5. COORDINATE WITH RELATED CITY EFFORTS

We are aware that the City is currently completing a Comprehensive Plan update and plans to adopt the CAP as an amendment to the existing Comprehensive Plan. During development of the CAP, GZA will coordinate with the City's planning staff to ensure the CAP is developed with the Comprehensive Plan update in mind. This will be important as there are key intersections expected between the two plans, including land use development, multi-modal transportation, public utilities, and more. It is expected the CAP will help inform the Comprehensive Plan.



GZA team members will also coordinate with existing partners, such as Xcel Energy and Johnson Control, to ensure the CAP and the actions addressed under the CAP reflect the latest plans and opportunities.

TASK 6. CLIMATE ACTION PLAN DEVELOPMENT

GZA proposes to deliver a Climate Action Plan (CAP) that will support the City's mission of reducing GHG emissions, assessing climate risks and vulnerabilities, and developing a roadmap for achieving its targets and goals. Ultimately, the CAP will ensure there will be equitable access to the climate mitigation and action processes.

Development of the CAP will take place following completion of the GHG emissions inventories, target setting, and City and community engagement activities. Completion of these tasks will provide the proper level of information needed to develop a clear, action-oriented approach through the CAP.

GZA proposes development using the following CAP framework:

- ▶ **Executive Summary** – An overview of the Plan's major findings, guiding principles, and summary of recommended actions by category.
- ▶ **Message from the City of La Crosse** – This message will be prepared by GZA with the City coming from the Mayor and/or other prominent City official(s) highlighting the purpose and importance of the CAP.
- ▶ **Introduction** – An introduction of climate change, the City's history in addressing climate and environmental matters, and the importance of the community taking action immediately.
- ▶ **Vision Statement and Guiding Principles** – A discussion of the overarching themes guiding the planning process including equity and justice, economics, and community health benefits, among others. GZA will work closely with the City's Climate Action Plan Steering Committee (CAPSC) to examine each of the principles and how the City can advance the principles. The impacts on different communities and groups within the City, and how implementation of the CAP will incorporate equity and empowerment considerations, will be addressed.
- ▶ **Community Engagement** – Results of the community engagement processes, including surveys, communications, public workshops, and other interactions will be documented.
- ▶ **Climate Risks and Vulnerabilities** – A discussion of the Flood Hazard Mitigation Planning process. Based on a review of publicly available flood risk data (e.g., FEMA's Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMS) for the City), GZA team members will collect the relevant data needed to perform a flood vulnerability assessment of City assets. As a part of this effort, we will also prepare a database and map of existing essential facilities, infrastructure, lifeline facilities, natural and recreational resources, vulnerable populations, and social and community assets that may be vulnerable to future flooding and groundwater mounding. GZA will then conduct a vulnerability assessment of City assets and present risk profiles for surface water and groundwater for the areas of City to include but not be limited to:
 1. City Center
 2. Essential Facilities
 3. Transportation Infrastructure (including roadways and bridges)
 4. Water supply and distribution
 5. Lifeline Facilities
 6. Natural Resources and Sensitive Ecological Communities
 7. Vulnerable Populations
 8. Social and Community Assets (including but not limited to public housing)

- ▶ **GHG Emissions** – A summary of the 2015 and 2020 GHG Emissions Inventory results will be presented with a focus on trends.
- ▶ **Climate Goals & Targets** – An overview of the GHG reduction target approach and selection(s) will be provided. Near-term (next 3-5 years) and long-term goals (next 6-8 years) will also be identified to help support those targets.
- ▶ **Climate Actions** – Actions selected during the GHG emissions forecasting and target selection process will be featured. Actions will be categorized and discussed with a focus on how each element will improve the community well-being and mitigate the effects of climate change (and also achieving a zero-waste economy). Recommendations and approaches will be featured for each action along with estimated costs for action and inaction and recommended funding sources (e.g. FEMA mitigation grants, NOAA, DOE, Resiliency and Renewable Energy Grants, etc.). A comprehensive matrix of all actions with a recommended schedule will be included. The schedule will clarify those actions that can be completed in the near-term versus those which may be long-term solutions.
- ▶ **Partnerships** – Collaborative opportunities will be identified to support completion of the identified actions with a focus on initiating stronger climate action through existing and new partnerships.
- ▶ **Implementation** - This section will present a roadmap to help the City develop, track, analyze, and report on indicators for success. The roadmap will focus on the City’s overall implementation period expected to be from the end of the planning process to 2030, but other long-term implementation aspects will be covered out to 2050.

During development of the CAP, we anticipate regular, informal meetings and communications with the City’s CAPSC. GZA will draft completed sections of the CAP and provide to the Committee for review and feedback to ensure an iterative, engaging process. We are also proposing two (2) full-day meetings with the Committee during the CAP development process – one at the beginning of the process and the second upon completion of a draft plan document.

A full draft of the CAP will be provided to the City’s CAPSC, Plan Commission, and Common Council for review and discussion. Revisions will be integrated into a Final Plan using the input received from the City. We will provide the Plan Commission and Common Council a Final Plan for review and feedback to include before finalizing the CAP. We will work with the City to deliver a “final” version to ensure the report meets the City’s expectations in terms of formatting for public release and use.

TASK 7. SUPPORT CITY IN ADOPTION OF THE CLIMATE ACTION PLAN AND GENERAL PLAN AMENDMENTS

GZA’s team will support City staff in preparing reports, presenting, and obtaining approval of the finalized CAP from the CAPSC and obtaining approval of the Comprehensive Plan Amendments from the Plan Commission. We will also support City staff in preparing an Administrative Report to Common Council and presenting the finalized CAP and General Plan Amendments for adoption by Common Council

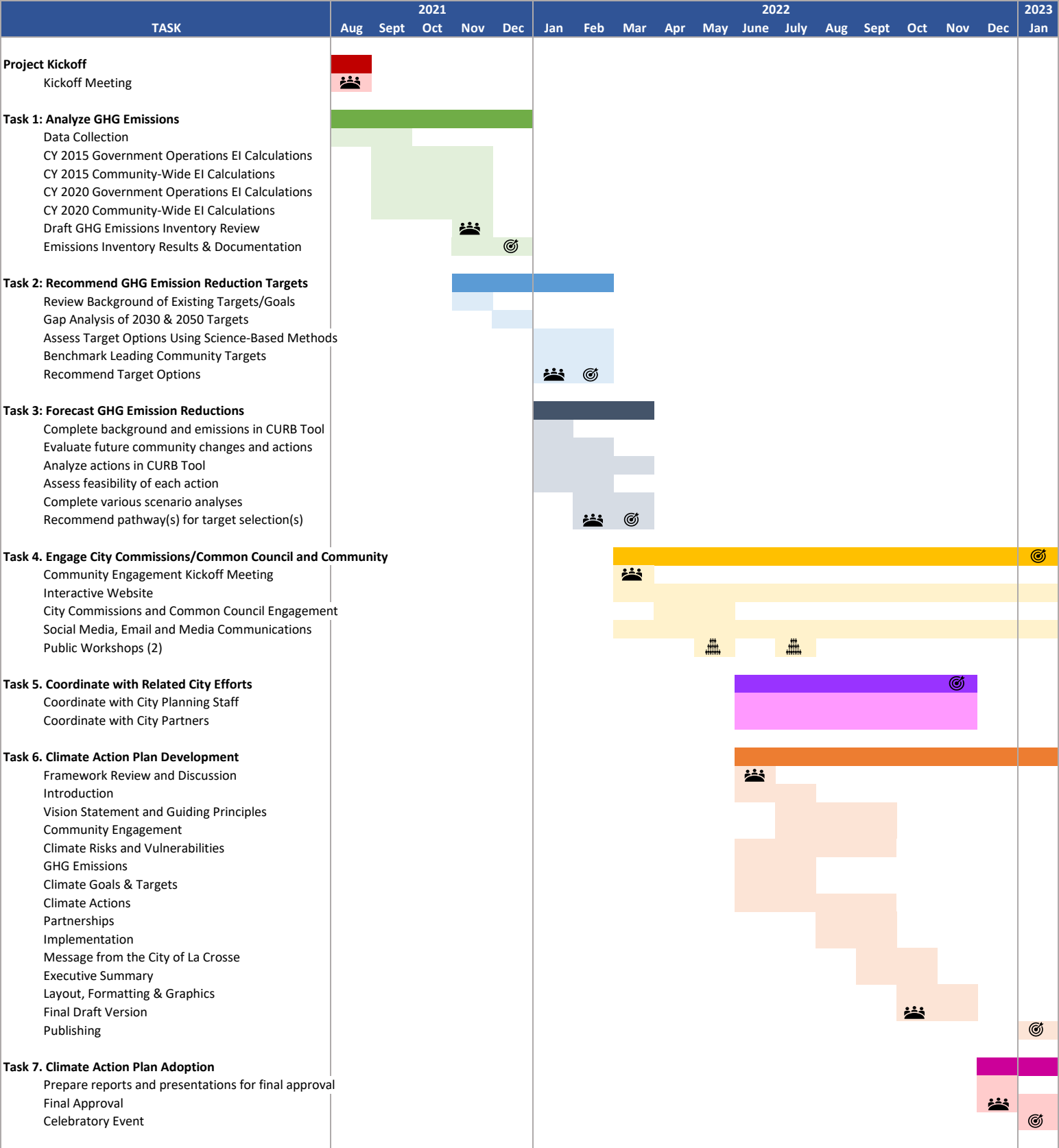
GZA also proposes the City wrap-up the planning process with a special event celebrating completion and adoption of the CAP while also serving as a kickoff for implementation of the Plan elements. This will be an opportunity to thank the community and all stakeholders for their participation and contributions to the planning process. The event will take place following final approvals from the Plan Commission and adoption by the Common Council.

PROJECT SCHEDULE

A proposed schedule to complete the Climate Action Plan for the City of La Crosse is presented on the following page.

GZA Proposed Schedule for City of La Crosse Climate Action Plan

LEGEND:  City/GZA Meeting  Community Workshop  Task Completion





SECTION 3 | COMMUNITY ENGAGEMENT

SECTION 3 | COMMUNITY ENGAGEMENT

Community Engagement is the art of creating partnerships by exchanging information and expertise that will empower and strengthen both the internal and external community. Making a difference starts with people.

DEVELOP AN ENGAGEMENT APPROACH

GZA anticipates developing a comprehensive approach that:

- ▶ Focuses on the impacts on different communities and groups within the City and how the implementation will incorporate equity and empowerment considerations.
- ▶ Reinforces the benefits of climate action and how the plan's elements could improve community wellbeing.
- ▶ Incorporates actions that partners can take and how the community can leverage these partnerships to initiate strong climate action.

Community engagement may include various stakeholders, including:

- ▶ City of La Crosse Climate Action Plan Steering Committee (CAPSC)
- ▶ City of La Crosse Plan Commission
- ▶ City of La Crosse Common Council
- ▶ City of La Crosse Floodplain Advisory Committee
- ▶ City of La Crosse Imagine 2040 La Crosse Downtown Plan Steering Committee
- ▶ Wisconsin Energy Independent Community Partnership
- ▶ Wisconsin Department of Natural Resources
- ▶ Intergovernmental Panel on Climate Change
- ▶ Partners in Energy
- ▶ Global Covenant of Mayors for Climate and Energy
- ▶ Higher Ed Institutions such as the University of Wisconsin-La Crosse, Viterbo University, and Western Technical College
- ▶ Major local businesses such as Kwik Trip, Xcel, Gunderson Health System, Mayo Health System, Trane, Chart, Rottinghaus Co. and Ho-Chunk Nation
- ▶ K-12 School within the City of La Crosse
- ▶ Neighborhood and Cultural Organizations
- ▶ Community residents, and more.

BENEFITS OF COMMUNITY

Creates higher quality solutions.

Better conflict management and resolutions.

Strengthening a sense of community

Creating communities that take greater responsibility for what is happening in their area.

ASSUMPTIONS REGARDING CITY STAFF AND COMMITTEE MEMBERS

We anticipate working closely and collaboratively with both the City staff and Committee members, particularly the CAPSC. We look forward to regular communication, by whatever means and however often you feel comfortable.

We anticipate that the City will share any existing information, including data, plans, reports, maps and GIS file, energy utilization and land use data, as well as data on public facilities and services, as well as other data requests as the need arises, in a timely manner and at no cost. We would also appreciate introductions to key stakeholders, officials, and key people in the City of La Crosse as we look forward to consulting and gathering a range of information and perspectives to inform the CAP. We do recognize that staff time is valuable and limited and inclusion of their input would be at the City's convenience.

As part of the community engagement process, we wish to rely on the City for assistance in posting social media and announcements to the City's web site and social media accounts. We are prepared to draft social media posts and media releases for CAPSC review prior to posting and distribution, including posting on the project's StoryMap website (more about this on page 13).

Our team foresees that City staff will arrange for physical meeting locations when there are face-to-face meetings and events, including community workshops. We assume these meetings will be at City facilities and have not budgeted for any meeting rental fees. Our team is assuming these facilities will be equipped with audio-visual. We are prepared to provide laptops and projectors for on-site meetings. However, sound systems and internet connections are assumed to be available, if needed.

KICK-OFF MEETING

Engagement approaches for each group may vary to ensure we maximize feedback and interest while also initiating excitement for the City's sustainable future. The approaches proposed by GZA will be discussed and agreed upon with the CAPSC and are anticipated to include some combination of virtual meetings, social media communications, online engagement, and surveys as well as in-person workshops as necessary. GZA will produce an outline of the proposed engagement approaches based on the Committee's feedback.

To commence project activities, a kickoff meeting will be held with the City's CAPSC and GZA project members. Ideally, this kickoff meeting will be held in-person, if allowed and desired; otherwise, this meeting will be held virtually using an online meeting platform.

Generally, GZA utilizes Microsoft Teams, Zoom, and GoToMeeting but we are open to using a platform endorsed by the City of La Crosse. The intent of this meeting is to introduce the project team members, agree upon project goals and objectives, discuss roles and responsibilities, identify stakeholders, recognize ongoing and historical community engagement activities, review information availability, and set project milestones and deadlines.



The kickoff meeting will also be utilized to begin pinpointing community outreach plans and events. As much as possible, we will learn from and leverage upcoming community engagement approaches and processes to capitalize on existing channels of communication. Identification of community level nonprofit organizations that may be available to support engagement activities, and overall, inform development of the CAP will also be discussed. Finally, the availability of climate-related information and data will be discussed at this meeting. An approach for sharing this information with GZA will be agreed upon, as well as the overall file and information management approach that will be used throughout the project. It will be important this information is provided as early in the project as possible to ensure subsequent tasks stay on schedule.

Prior to engaging with the various stakeholder groups, the GZA Team will meet again with the CAPSC. At this meeting, stakeholder groups will be confirmed as well as the desired approach to address each group. While in-person town halls, meetings and interviews would normally be preferred, we are proposing to leverage technology as much as possible given the potential for COVID-19 restrictions. We have proposed a variety of virtual engagement approaches given this uncertainty.

CAPSC MEETINGS AT STRATEGIC MILESTONES

GZA team members will conduct a minimum of seven (7) meetings with the City's CAPSC at strategic milestones throughout the project. We propose these meetings take place at the following project milestones:

- ▶ Project Kickoff
- ▶ Final Draft of GHG Emissions Inventories – we will walk the Committee through the inventory development, draft calculations and results.
- ▶ Recommendations of GHG emissions reduction targets – we will explain the emission target options and recommendations to capture any feedback from the Committee.
- ▶ Forecast of GHG emission reductions and finalization of targets – GZA will share the results of emission forecasting and scenario planning with a focus on planned actions.
- ▶ Prior to developing CAP – we will review the framework with the Committee and planning elements.
- ▶ Final Draft of CAP – we will review a final draft of the Plan to gather the Committee's comments and feedback.
- ▶ Adoption of CAP – we will meet with the Committee to discuss a schedule and activities for proper adoption of the Plan.

It is expected these meetings will be conducted virtually using an online meeting platform. However, ***we would prefer the project kickoff and the CAP adoption meetings be conducted in-person, if possible.*** It should be noted that beyond these meetings, our team will routinely keep the City's CAPSC informed of progress and maintain open lines of communication to ensure the Committee is properly engaged.

Beyond meeting with the Committee, we will also conduct meetings with the Plan Commission and Common Council. A meeting with the Plan Commission is anticipated once a final draft of the CAP is prepared. This will ensure the Plan Commission has the opportunity to consider any necessary Comprehensive Plan Amendments and if changes to the CAP are needed to accommodate the Amendments.

We will also meet with the Common Council following our meeting with the Plan Commission to ensure successful adoption of the CAP and Comprehensive Plan Amendments. Our team has planned for conducting these meetings in-person but is available to meet virtually, if desired. Team members are also available to meet virtually with the Plan Commission and/or Common Council during other strategic times during the project.

For each meeting, attending team members will prepare a meeting agenda in advance and will follow-up with meeting minutes after each meeting. To facilitate discussion at each meeting, we will also prepare visual content and documents to promote engagement and dialogue.

INTERACTIVE WEBSITE

GZA will establish a website to enable La Crosse residents, stakeholders, business and property owners to have a one-stop digital portal sharing the development of the CAP using the Esri Story Map platform. We have launched a beta-version of City of La Crosse Climate Action Planning website which can be accessed by copying and pasting the following URL into your browser:

<https://gisweb.gza.com/portal/apps/storymaps/stories/4ec64a2f7b384bce8af5d318a0fc0e10>

The website will contain mixed, engaging content including a La Crosse Climate Action Plan Web Map depicting each of the plan elements in a coherent and visually compelling way, along with easily navigable text, metric tracking graphics for community goals/targets and identified policies, and feedback tools for each element or section. The Story Map website will be developed to be a friendly “digital plan.” Since this will be developed with an underlying ArcGIS Geodatabase to house geospatial data, images and documents, the City will be able to periodically update content including demographic information, figures, illustrations, or other minor changes to ensure that the digital plan is a living document. Preset keyword searches and other features will be incorporated to help educate website users and result in better search functionality than traditional PDF documents.

The Story Map will be augmented with Social Pinpoint or a like web platform, that enables online engagement, commenting and posting with map and plan displays, project announcements and updates continuing throughout the CAP development process.

VIRTUAL MEETINGS

Our project team members are able to facilitate virtual meetings to engage and solicit ideas from the City and/or broader La Crosse community. Creative presentation materials will be prepared by GZA to spark dialogue, facilitate discussion, and to gather ideas and feedback. GZA will provide community members with an update of the GHG emissions inventory process, target setting activities, and CAP development during planned virtual meetings. We will also illustrate potential actions for consideration with the objective of gathering feedback to help toward development of the CAP.

Our team also proposes to present case studies from model communities, particularly those that are similar in community size and ambition, as a way of showing contrast between a “do nothing” approach with the future potential opportunities for the community.

SURVEYS, SOCIAL MEDIA AND ONLINE ENGAGEMENT

We will develop a social media and communications plan for media and communication through the planning process. This plan will be developed for consideration at the project kickoff meeting. We understand that as a public entity it is important for the City to review communications before public release. Our team is skilled at developing key messages, social media posts, news releases, and effective email communications complete with appropriate graphics and can assist with the production of online media engagement via social media platforms, the City’s website, or other online avenues to generate additional enthusiasm and



engagement around the CAP. Included will be occasional postings which provide updates on the Project Team's progress. New content will be published on occasion to maintain continual dialogue and ongoing feedback.

We anticipate social media posting and/or media releases approximately twice a month throughout the project timeframe. We propose to use the interactive City of La Crosse Climate Action Planning story map website discussed on the previous page, the City's social media channels, including Facebook, Twitter, and Instagram, as well as the City's website for communications.

ONLINE COMMUNITY SURVEY/POLLING PLATFORMS

Online platforms are becoming an effective way for government entities to engage with the residents, businesses and other stakeholders within the City. It's a place where surveys and polls can be posted on a reoccurring basis (weekly, monthly, etc.). The outcome helps to provide City leaders with a better understanding of public opinion which can help guide policy and decision-making. Simply put, it is a way to gather input from residents on a variety of topics on a continual basis, thereby engaging them in the process. If an online community platform is the communications method preferred by the City, GZA is able to create web-based surveys to cast a wide net to a variety of stakeholders.

Surveys would be customized to gather relevant input specific to each group of stakeholders and focused on climate change issues relevant to the La Crosse community to further increase our understanding of the community's concerns, prioritize issues, and identify their vision for each aspect of the Plan. The insight gained through these engagement activities and surveys will be used to further enhance development of the CAP.

We understand that the County is open to letting the City of La Crosse use its online platform, publicinput.com, for this project. That platform is currently being used for the Imagine 2040 La Crosse Downtown Plan. We further understand that arrangements will need to be made with the County and that a separate item from the main budget would need to be created if used.



PUBLIC WORKSHOPS

GZA proposes to conduct two (2) public workshops to further engage with the community. A hybrid approach will be utilized for these meetings. We will attend in-person with the CAPSC, but events can be shared virtually using the City's website or an online community platform, as discussed above.

In-person workshops are important as it is our experience face-to-face interaction allows for greater transparency and superior dialogue. The workshops will be focused on sharing information, discussing options, and gathering community input to support development of the CAP.

In advance of these meetings, we will collaborate with key stakeholder groups to maximize outreach among diverse groups with a focus on younger and minority populations.

During the workshops, GZA will team with the City's CAPSC to engage and solicit ideas from the broader community. Creative presentation materials will be prepared by GZA to spark dialogue, facilitate discussion, and to gather ideas and feedback.

At the first public workshop, topics to be covered include the GHG emissions inventory results, analysis of target options, and forecasted emission reductions. This workshop will also focus on the actions considered to achieve the interim and 2030/2050 targets and alternative scenarios.

At the second public workshop, topics to be covered include elements of the CAP to be developed. These topics will include the CAP's guiding principles, climate risks and vulnerabilities, partnerships, and additional discussion of GHG mitigation actions.

GZA would also like to focus on middle and high school level children during our community outreach. As we expect it is possible a meaningful number of children may not attend the workshops, we will develop materials, geared toward their age, that can be shared with the schools for distribution and education opportunities. These materials will focus on the various small steps even they can take to positively impact the community's plans to address climate change.

COMMUNITY ENGAGEMENT OUTCOME

Following the completion of engagement activities, GZA team members will meet with CAPSC to present the results as we begin to embark on CAP development. We will offer recommendations and present options for a vision statement, guiding principles, metrics, performance targets and goals, actions, and partnerships. The community engagement activities will also have a significant influence in addressing equity for different communities and groups within the City. The outcome of communication engagement will help to properly incorporate equity and empowerment considerations during CAP development.

We will utilize the CAPSC's feedback from this meeting to embark upon development of the CAP.





SECTION 4 | FIRM QUALIFICATIONS

SECTION 4 | FIRM QUALIFICATIONS

COLLABORATIVE TEAM APPROACH

GZA GeoEnvironmental, Inc. (GZA) will serve as your prime consultant and will be responsible for all deliverables associated with this project. Working along the Great Lakes in the Midwest in the Atlantic Ocean in New England, we possess a holistic approach to Climate Adaptation and Resilience Planning and Implementation.

GZA has provided GHG emission-related services in 49 states and internationally.

We have in-house staff available to fulfill the various components needed for a successful project completion including complementary services such as funding assistance, community outreach, and environmental permitting, to name a few.

A BRIEF HISTORY

Founded in 1964 as Goldberg-Zoino & Associates, Inc., a geotechnical and foundations specialty consultant, GZA has grown into a full-service company, providing its clients with highly diversified technical services supporting our core practice areas. GZA employs nearly 700 engineers, scientists, planners, and technical specialists in 30 offices. As a mid-size engineering firm, we feel we are large enough to service you, yet small enough so we can get to know you. We like to build relationships with our clients and will work hard to earn your trust and complete satisfaction.

GZA is an employee-owned firm with staff motivated to propel the firm forward, seeking integrated, complex, and interesting projects that underscore a commitment to client satisfaction, environmental stewardship, and best practices, engineering, and construction.





GZA developed a specialized, multi-disciplinary practice in Natural Hazard Risk Management, Resilience and Climate Adaptation. Our 45-person practice group builds on our core service capabilities and applies those skills with a focus on hazard risk management, climate change mitigation, disaster response and recovery, and resilience and climate adaptation planning.

KNOWN FOR EXCELLENCE

GZA's staff, with diverse technical backgrounds, has demonstrated that it has the resources, flexibility and technical and project management expertise needed to manage and complete large and small projects -- regardless of complexity -- within the broad range of services. GZA is recognized for its expertise in geotechnical and coastal environmental engineering design, water infrastructure design, construction management, and environmental compliance.

BUILT ON TRUST

GZA appreciates and understands the need to efficiently and cost effectively deliver both routine and highly sensitive projects. GZA has proven its ability to adjust to municipal needs and provide the appropriate mix of personnel and attention to meet both the technical and granting agency needs. Our team members will hold your needs paramount, acting as your responsible advocate and operating seamlessly as an extension of your own staff. We pride ourselves on being responsive to our clients' concerns and in our proven ability to draw from our broad technical expertise, management skills, and varied project experience.

GZA will seek ways to conduct your project economically and efficiently through innovation, current, and/or sustainable technologies. We also recognize the importance of assigning a stable staff to maintain continuity over the duration of the project. Therefore, once committed, key personnel will be available throughout the lifecycle of the project. GZA is an employee-owned firm with motivated and dedicated staff that propels the firm forward by solving complex issues using innovative approaches on projects while demonstrating a commitment to client satisfaction, environmental stewardship and sustainability, and best practices in science, engineering, and construction.

PROUD CONTRIBUTOR TO THE LOCAL ECONOMY

GZA maintains offices in both Brookfield and downtown Milwaukee, Wisconsin. In 2014, the Milwaukee office opened in the Global Water Center as part of the City's ongoing commitment to be engaged and responsive to the water, social, and environmental needs of State of Wisconsin, Milwaukee County, and local government.

Many of our personnel are long-tenured staff that offer extensive experience with Wisconsin's coastal environment and strong relationships with the WDNR and USACE. ***As an example, GZA meets monthly with Ms. Theresa Alvarez, Water Resources Engineer with the WDNR, to discuss coastal engineering design and permitting projects.***

Through our geographic location and our relationships with regulatory agencies, our team members are knowledgeable of the laws and statutes. We will use this knowledge to help in proposing policies, programs, or projects to the benefit of the City of La Crosse.

ONE-COMPANY, ONE-TEAM PHILOSOPHY

GZA maintains a strong “one-company” philosophy. Personnel and resources are shared among different offices where and when they are needed, ensuring clients access to ***the most qualified team*** to work on their projects. **GZA’s experience in in GHG emissions inventory extends through both the public and private sectors, across 49 states and into the international arena.**

GZA experts are trained across disciplines, which ultimately benefits each client through the knowledge and experience gained from its entire staff. Resources are in-house and available for every project, at any time. With the ability to manage unpredictable situations, remain nimble, and mobilize quickly, GZA responds to client inquiries with urgency, sensitivity, knowledge, and value, while remaining mindful of project costs, schedule, and quality.

Using our intercompany network, projects are seamlessly managed and completed regardless of office location. Technical staff from anywhere in the company with specific experience or technical training can be provided to a project to deliver exceptional technical support.

DIVERSITY

GZA believes in creating a diverse and inclusive business environment in all of its offices. As testimony to this, Margaret Panatera, a member of GZA’s Midwest Team, was recently honored as the 2020 Diversity in Business Award recipient by the **Wisconsin Law Journal and the Daily Reporter.**



PROJECT TEAM ORGANIZATION

GZA's proposed project team draws from our multi-disciplinary practice in Natural Hazard Risk Management, Resilience and Climate Adaptation and includes team personnel with local presence and significant project experience in the Midwest. Our team leaders include staff with extensive experience in stakeholder engagement, workshop facilitation, and program management. Just in the last several years, GZA Project Team members have completed the following resilience and climate adaptation projects:

- ▶ Development of a state-wide Natural Hazard Risk Management web mapping application using Esri ArcGIS technology
- ▶ Numerical wave and circulation modeling
- ▶ Tsunami hazard modeling of eastern Long Island Sound
- ▶ \$1M external flood evaluation for a nuclear power plant
- ▶ Flood hardening of several electrical substations (for utility clients)
- ▶ Resilience and climate adaptation plans for various municipalities
- ▶ FEMA Natural Hazard Mitigation Plans
- ▶ Identification, during planning, of over \$250 million of fundable flood mitigation projects including concept design
- ▶ Design of living shorelines
- ▶ Design of major urban flood control barrier (incorporated into a USACE Feasibility Study for federal funding)

Provided below is GZA’s proposed project team for the City’s Climate Action Planning effort.

PROJECT ORGANIZATION CHART



GZA TEAM OF CLIMATE CHANGE SPECIALISTS

Climate Adaptation Grant & Funding Assistance.....	Wayne W. Cobleigh
Air Quality / GHG Emissions Management Specialist.....	John A. Schneider, P.E.
Senior Transportation Planner, Environmental Justice Specialist.....	Richard O. Ray
Natural Resource, Energy Facility, and Permitting Specialist/Planner.....	Stephen L. Lecco, AICP, CEP
Solar, Geo-Thermal, Net Zero Energy Lead.....	Bruce Fairless, PE, LEED AP
Net Zero Buildings & Renewable Energy Specialist.....	Jay L. Hodkinson, P.E.
Net Zero Building Specialist.....	Mirsad Alihodzic
Waste Management Systems Specialist.....	Christopher J. Shoults
Community Health Specialist.....	Kimberly A. Hoppe Parr, Ph.D
Great Lakes Coastal Protection Specialist.....	Ian J. Mosbrucker, P.E.
Landscape Architect, Ecosystem Specialist.....	Jay Womack, ASLA, LEED AP
GIS, Geospatial, Story Mapping Specialist.....	Daniel Boudreau, GISP

KEY TEAM MEMBER BIOS



JAMES F. DROUGHT, PH – PRINCIPAL, PROFESSIONAL HYDROGEOLOGIST PROJECT ROLE: PRINCIPAL-IN-CHARGE

James Drought is Vice President at GZA, a Licensed Professional Hydrologist, and Office Manager of GZA's Brookfield and Milwaukee, Wisconsin office locations. He has 30 years of professional consulting experience in the development, protection, and management of water and natural resources.

Jim received a Master of Science Degree in Hydrogeology from the University of Wisconsin-Milwaukee, and a Bachelor of Science Degree in Physical Geography and Biology from Carroll College in Waukesha, Wisconsin. Mr. Drought has served as an Adjunct Professor in the Civil Engineering Department at Milwaukee School of Engineering since 2005. Mr. Drought also completed graduate studies on sensitive ecological communities along the lower Wisconsin River in southwestern Wisconsin.



Mr. Drought has been the Director of Keep Greater Milwaukee Beautiful / Greening Milwaukee since 2011. He has also served on the University of Wisconsin Groundwater Advisory Council since 2012.

He was involved in the development of the SEWRPC document entitled *A Lake Michigan Shoreline Erosion Plan for Milwaukee County, Wisconsin* and the Bay-Lake Region Planning Commission (BLRPC) report entitled *A Shoreline Management Plan for Kewaunee County*.

He frequently participates in Wisconsin Department of Natural Resources (WDNR) committees and focus groups. Additionally, he has been Director of Keep Greater Milwaukee Beautiful/Greening Milwaukee since 2011 and a member of the University of Wisconsin Groundwater Research Advisory Council since 2012.

Jim served as the Project Director and Contract Manager for the Milwaukee County Coastal Assets Inventory project and was responsible for all contractual obligations and communications on behalf of GZA and its team. Jim also served as the Project Director for the 30 coastal engineering and design projects completed by GZA in 2020 for properties along Lake Michigan in Southeastern Wisconsin.



THOMAS KLOTZ, GHG-IQ – ASSOCIATE PRINCIPAL PROJECT ROLE: PROJECT MANAGER

Mr. Klotz is an GZA Associate Principal, GZA's Lead for Climate Change/Sustainability Projects and a Certified Greenhouse Gas Inventory Quantifier. He has over 20 years of experience providing sustainability, environmental compliance, and air quality consulting services and routinely manages projects with multi-faceted sustainability initiatives for some of the world's largest organizations. **Tom is looking to integrate**

today's leading practices from Fortune 50-level companies into the City of La Crosse's Climate Action Plan.

Tom has managed hundreds of climate change related planning, development, and implementation of projects throughout the United States and internationally with a focus on reductions in waste generation, water consumption, air emissions and energy use (including GHG emissions).

Tom is an active participant in the City of Detroit's Climate Action Committee and is passionate about addressing today's challenges from climate change. Areas of expertise include management of Greenhouse Gas (GHG) emissions and other environmental sustainability aspects, including assessments, reporting, policy evaluation, strategy development and risk/reduction opportunities. Tom also understands the regulated impacts on communities and businesses through his background in environmental compliance and air quality management. During this project, Tom will provide regular oversight and frequent input to assure a successful plan is delivered.

Areas of competence include management of greenhouse gas (GHG) emissions and other environmental sustainability aspects, including assessments, reporting, planning, policy evaluation, strategy development and risk/reduction opportunities. Areas of specialty also include air quality management for application of federal, state and local environmental regulations related to air pollution control. Regulatory compliance experience includes SARA Title III reporting (including section 312 Tier II and section 313 Form R reports), regulatory compliance audits, and environmental assessments. Tom has managed hundreds of climate change related planning, development and implementation of projects throughout the United States and internationally with a focus on reductions in waste generation, water consumption, air emissions and energy use (including GHG emissions). His clients have routinely reached Zero Waste to Landfill status.



MICHAEL LIPOWICZ, SEA – SUSTAINABILITY ANALYST

PROJECT ROLE: ASSISTANT PROJECT MANAGER, GHG EMISSIONS INVENTORY DEVELOPMENT

Michael Lipowicz will serve as Project Manager for GHG Emissions Inventory Development tasks. Mike is a Mechanical Engineer and a Certified Sustainable Professional / Sustainability Analyst with several years of experience in providing sustainability and climate change services.

As a sustainability analyst at GZA, Michael guides clients with the development of their GHG inventories, assessment of their value chain climate impacts, and improvement of their supplier climate & water sustainability performance. Areas of competence include: Scope 1, 2, & 3 GHG emissions accounting and data management, corporate reporting to CDP and development of response-improvement strategies, science-based target-setting, LEED building standards, and lifecycle assessments.



RACHEL LIBRIANI, SEA, SUSTAINABILITY ANALYST

PROJECT ROLE: ASSISTANT PROJECT MANAGER - CLIMATE ACTION PLAN DEVELOPMENT

Rachel is a Sustainability Analyst and will serve as the Project Manager providing assistance during each step of the climate action planning process. Rachel's outstanding knowledge of the economic, social and environmental aspects of sustainability will ensure a plan that satisfies the entire community will be delivered.

Rachel will also provide Community Engagement Support Services. Her proven ability to communicate concepts in an easy-to-understand manner to audiences with varying levels of knowledge is invaluable. She's experienced in working with clients on their sustainability metrics and programs, identifying opportunities for improvement, and cost reduction.



HEIDI WOELFEL, P.G., PROJECT MANAGER
PROJECT ROLE: COMMUNITY ENGAGEMENT LEAD

Heidi has extensive experience overseeing and conducting complex environmental projects including various City of Milwaukee redevelopment projects. She also has growing project management experience and training to manage a variety of project aspects from inception to completion.

Heidi is well adept at coordinating public outreach events and educational workshops that communicates the community's vulnerabilities and developed a consensus among key stakeholders for the strategies that can be incorporated into short-term and long-term planning. To ensure the strategies are appropriate to the community's needs, and in keeping with their long-term vision and vitality, information is shared with, and input obtained from local officials and the public which is a key element of many projects.



SAMUEL BELL, CFM, SENIOR RESILIENCY MANAGER/
PROJECT ROLE: QA/QC CONSULTANT REVIEWER, TECHNICAL ADVISOR

Mr. Bell is a Senior Resiliency Planner/Manager with over 20 years of leadership and management experience covering natural hazard mitigation and resiliency planning, hazard mitigation assistance, environmental planning and permitting, community education and outreach, and disaster resiliency research. Sam will provide internal quality assurance and quality control review for all deliverables. As a technical advisor, Sam will provide his experience and expertise towards the benefit of the City.

Sam is a member of GZA's Natural Hazard Risk Management Senior Leadership Team assisting in the integration of these services across 30 GZA offices around the United States (U.S). He has extensive experience providing technical assistance to Federal agencies, State agencies, U.S. Territories, Counties, and communities on disaster recovery and climate resiliency projects designed to protect critical facilities, natural resources, public and private infrastructure, and residences. Mr. Bell also has extensive experience leading interdisciplinary teams in the development of numerous coastal resilience, climate adaptation and natural hazard mitigation plans in the Northeast.

From 2007 to 2010 Mr. Bell served as a Hazard Mitigation Grant and Planning Team Lead for the Federal Emergency Management Agency (FEMA). Mr. Bell provided hazard mitigation assistance (HMA) and disaster recovery support throughout the United States (U.S.) for HMA programs and in response to federal disaster declarations. In New Hampshire, Mr. Bell worked with the New Hampshire's Homeland Security and Emergency Management and Office of Energy and Planning, and FEMA to identify strategies and hazard mitigation solutions to protect residences, and commercial and critical facilities from incurring damages from future natural hazards in response to several natural disaster declarations.

CLIMATE CHANGE SPECIALISTS



WAYNE COBLEIGH - CLIMATE ADAPTATION & RESILIENCE FINANCE SPECIALIST

Wayne has been GZA's corporate representative to the US Green Building Council on net zero energy and sustainable and resilient built environment since 2008. He is trained and certified to facilitate Community Resilience Building outreach method developed by The Nature Conservancy and has presented at several workshops and seminar courses on topics, including financing resilience, risk assessment, and redevelopment of environmentally impacted properties and brownfields.

Wayne Cobleigh researched Global Covenant of Mayors Cities partnering with World Bank via the [City Resilience Program](#) in December 2017 to create a [World Bank Resilience Fund](#) to lend \$4.5 Billion U.S. to 150 cities to address the threats of climate change and to implement sustainable initiatives and climate resilience programs.

Additionally, Wayne is a Co-Author of ***Financing Climate Resilience, Mobilizing Resources and Incentives to Protect Boston from Climate Risks***, UMASS Boston Sustainable Solutions Lab, Barr Foundation and Boston Green Ribbon Commission, Boston, Massachusetts. He is contributing author and researcher on an interdisciplinary research team analyzing alternatives for building-scale, neighborhood-scale, district-scale, and harbor protection-scale financing mechanisms that can be adapted for resilience and climate adaptation investments. He has provided analysis of Property Assessed Clean Energy (PACE) financing for Property Assessed Resilience (PAR) by analyzing finance mechanisms in Connecticut, Florida and California. This 54-page research paper was published in April 2018 and cited 124 sources of research on finance and funding of resiliency to climate risks. He researched Global Covenant of Mayors Cities partnering with World Bank via the [City Resilience Program](#) in December 2017 to create a [World Bank Resilience Fund](#) to lend \$4.5 Billion U.S. to 150 cities to address the threats of climate change and to implement sustainable initiatives and climate resilience programs.



JOHN A. SCHNEIDER, P.E. - AIR QUALITY/GHG EMISSIONS MANAGEMENT SPECIALIST

John has over 36 years of experience in the environmental consulting field; 30 of which have been in air quality management and environmental compliance. Areas of specialty in air quality management include New Source Review (NSR) and Title V Renewable Operating Permit applications, compliance certifications, deviation reporting, emissions inventories, and dispersion modeling. Regulatory compliance experience includes regulatory compliance audits, spill prevention planning (SPCC, state spill plans and integrated contingency plans), Superfund Amendments and Reauthorization Act (SARA) Title III reporting (including Section 312 Tier II and Section 313 Form R reports), environmental assessments and hazardous materials management.



RICHARD O. RAY - SENIOR TRANSPORTATION PLANNER, ENVIRONMENTAL JUSTICE SPECIALIST

Richard is a Senior Transportation Planner who specializes in NEPA projects and environmental analysis. Mr. Ray is a pre-qualified EA and EIS lead and is also DOT prequalified for Community Impacts, Public Involvement and Technical Writing. He has 22 years of experience providing environmental impact analyses, analysis and studies for transportation-related projects. As part of these projects, he provides alternative analyses, documentation, third-party review, public involvement and coordination, socioeconomic analysis, technical writing and quality control services



STEVEN L. LECCO, AICP, CEP – NATURAL RESOURCE, ENERGY FACILITY AND PERMITTING SPECIALIST/PLANNER

Stephen has 30 years of experience in planning, permitting and environmental analysis for waterfront, airport, highway, utility, site development, recreation, natural resource management, energy facility and site remediation projects. His role in these projects has been in project management, agency coordination, public participation, report writing, technical analysis, and mapping. He has been involved in numerous large-scale planning efforts throughout the Midwestern and Northeastern United States, California and the Caribbean. His broad knowledge of many technical elements allows him to successfully manage interdisciplinary and complex projects required to comply with NEPA, Section 404/401 Clean Water Act, Coastal Zone Management, National Historic Preservation Act, Endangered Species Act, Magnuson-Stevens Act and other federal, state and

local laws, regulations and policies.



BRUCE FAIRLESS, PE, LEED AP – SOLAR, GEOTHERMAL, NET ZERO ENERGY LEAD

Mr. Fairless has 32 years of experience in geotechnical engineering including design and construction of shallow and deep foundations (including caissons, piles and slurry walls); sheet pile, slurry wall and soldier pile/lagging earth support systems, and bedrock blasting and major earthwork projects. He is a GZA Leader in providing geothermal and solar services. His experience also includes performing explorations and foundation studies for ground-mounted solar arrays (19 sites in the past three years alone). Mr. Fairless will assist the Sustainable Master Plan project on renewable energy issues.



JAY HODKINSON, PE, SENIOR PROJECT MANAGER, NET ZERO BUILDINGS AND RENEWABLE ENERGY

Mr. Hodkinson is a geotechnical engineer with experience in various geotechnical and wind energy and geothermal projects. Mr. Hodkinson's present responsibilities include managing geotechnical projects, performing geotechnical engineering studies, executing geotechnical investigation programs, conducting engineering analyses, preparation of design reports, and vapor intrusion design. Mr. Hodkinson is also an International Ground Source Heat Pump Association Accredited Geothermal Installer.



MIRSAD ALIHODZIC, PROJECT MANAGER, NET ZERO BUILDINGS

Mr. Alihodzic is a geotechnical engineer with 14 years of experience in various geotechnical and geothermal project and serves as a Project Manager in the Bedford, New Hampshire office. Mr. Alihodzic possesses strong interpersonal communication and technical skills. Mr. Alihodzic is also one of three geothermal practitioners in northern New England, responsible for execution of geothermal feasibility studies and construction oversight. Mr. Alihodzic is an International Ground Source Heat Pump Association (IGSHPA) Accredited Geothermal Installer.



CHRISTOPHER J. SHOUTS – WASTE MANAGEMENT SYSTEMS SPECIALIST

Chris is an Environmental Scientist in the EH&S Regulatory Compliance group. Quite simply, Chris knows waste. He has industrial experience related to total waste management, project management, health and safety, and environmental management systems. He has served as waste management program lead for one of the largest industrial sites in the United States. Through this role, he directed waste management program activities related to the disposal of hazardous, non-hazardous, and TSCA-regulated waste. He has support facilities with their achievement of zero waste-to-landfill and has developed recycling and waste reduction programs for various clientele.



IAN J. MOSBRUCKER, P.E. – GREAT LAKES COASTAL PROTECTION SPECIALIST

Mr. Mosbrucker is a Geotechnical Engineer with over five years of industry experience. His experience has been distributed between coastal engineering, construction quality assurance/quality control (QA/QC), and geotechnical engineering projects. Mr. Mosbrucker has been involved in the design, management, oversight, and permitting of multiple residential coastal engineering projects along the western shore of Lake Michigan. Projects have ranged in size from 100 to over 800 linear feet of shoreline with issues involving bluff instability, toe erosion, overtopping of existing protection systems, and flooding.



KIMBERLY A. HOPPE PARR, PHD - COMMUNITY HEALTH SPECIALIST

Dr. Kimberly Parr obtained her doctorate in Occupational and Environmental Health from the University of Iowa following her undergraduate degrees in Microbiology and Cell and Molecular Biology at the University of Wisconsin-Oshkosh. Dr. Parr's project work at GZA includes toxicology evaluation, exposure assessments, industrial hygiene, quantitative exposure reconstruction, environmental microbial contamination assessments and data analysis and interpretation of environmental and toxicological information for GZA's toxicology, occupational and environmental health and safety support practices. Dr. Parr also serves as the Health and Safety Coordinator for GZA's Wisconsin, Colorado and Ohio office locations.



JAY WOMACK, ASLA, LEED AP - LANDSCAPE ARCHITECT, ECOSYSTEM SPECIALIST

Jay's design philosophy is rooted in a lifelong affinity for the ecosystems of the Midwest and in the belief that people need to be connected to the environment, a philosophy closely aligned with Aldo Leopold's Land Ethic and E.O. Wilson's Biophilic theory. By recognizing that the places where we live, work, and play contain a unique and ever-changing part of the global system, Jay helps achieve a balance between the built environment and nature through design strategies that embrace ecology and incorporate ecosystem functions into everyday life.



DANIEL BOUDREAU, GISP – GIS, GEOSPATIAL, STORYMAP TECHNICAL SPECIALIST

Dan Boudreau will provide GIS, geospatial analysis and Story Mapping. Dan has extensive experience in all aspects of geospatial technology. As a certified GIS Professional, he brings over 30 years of combined CAD and GIS experience in data management, data development/conversion, spatial analysis, cartographic design and production as well as field data collection for asset management, water resources and environmental assessment.

As a member GZA's Enterprise IT Group, he serves as the Geospatial Systems Lead and heads the Geospatial Solutions Practice. Additionally, he is the administrator of GZA's ArcGIS Enterprise deployment and oversees the management of the central data repository, as well as the development/deployment of GIS web applications developed with Esri's Story Map and Web AppBuilder for ArcGIS. He co-developed the GZA GeoTool web mapping platform, which is central to several of GZA's Technical Practices such as Natural Resources, Water Resources, Stormwater Management, Asset Management and Natural Hazards Mitigation and Resilience practices.

Resumes for all team members can be found in Appendix A.

SERVICE-SPECIFIC QUALIFICATIONS

CLIMATE CHANGE & GHG EMISSIONS MANAGEMENT

Climate change and carbon management are posing ever-growing challenges to communities across the nation. GZA's roots in environmental sustainability stem from our deep experience in assessing and managing GHG emissions. We continue to advance these services by seeking aggressive approaches to further the reduction of GHG emissions, such as value chain assessments and science-based target setting. As a company, GZA can combine these accounting and mitigation services with our climate adaptation and resilience services to offer a comprehensive suite of skills to meet the challenges posed by a changing climate.

- ▶ Climate Change GHG Emission Management Services
- ▶ Emissions Inventories, Analysis & Management Planning
- ▶ Scope 3 Evaluation and Disclosure
- ▶ Science-Based Target Setting
- ▶ Data Management Systems and Analytics
- ▶ Carbon Sequestration
- ▶ Third-Party Verification Support
- ▶ Climate Adaptation and Resilience Strategies

ENVIRONMENTAL FOOTPRINT REDUCTIONS

GZA's clients, both public and private, are moving beyond regulation as they strive to achieve a net zero impact on the environment from their operations. We have successfully implemented, and managed initiatives designed to achieve reductions in water consumption, waste generation and landfill disposal, energy consumption, GHG emissions and air pollution. Through these initiatives, our clients have not only reduced their footprint but have also cut costs and generated new business opportunities. We also utilize our data management capabilities to provide our clients with greater automation and access to real-time data. Our clients are better positioned to manage their resources and identify reduction opportunities sooner. Environmental footprint reductions can be made through:

- ▶ Program Development
- ▶ Facility and Process Water Surveys
- ▶ Energy Modeling and Conservation

- ▶ Waste Management Solutions
- ▶ Air Emissions Analysis and Planning
- ▶ Renewable Energy Assessment and Engineering Services

STRATEGY DEVELOPMENT

We understand our client's sustainability vision and values. We work diligently to identify cross-functional solutions, leveraging our experience to develop strategic action plans addressing environmental initiatives. Our programs strive to improve your triple bottom line (people, plant, profit) while achieving your sustainability objectives. Strategy Development services are gained through:

- ▶ Competitor Benchmarking
- ▶ Corporate Communications
- ▶ Planning and Program Management
- ▶ Policy Evaluation and Support
- ▶ Target Setting and Scenario Planning

NATURAL HAZARD RISK MITIGATION

We help our clients protect property, avoid loss, maintain operational continuity and safety by identifying natural hazard risks that exist today, and helping them prepare for an uncertain climate future by implementing innovative, practical and sustainable risk management strategies and solutions. We assist state and local governments throughout the emergency management cycle of preparedness, response, recovery and redevelopment. Natural Hazard Mitigation Plans are the first step in the process. Our Natural Hazard Mitigation Plans meet FEMA's plan requirements and are also designed to be actionable and are integrated with dedicated user-focused web-mapping applications. Services provided include:

- ▶ Hazard Identification
- ▶ Hazard Vulnerability Assessment
- ▶ Climate Change Forecasting
- ▶ Loss Estimation, including FEMA HASUS-MH Analysis
- ▶ Mitigation Strategies and Actions
- ▶ Hazard Communication and Stakeholder Outreach
- ▶ Mitigation and Resilience Feature Design and Construction
- ▶ Plan Review and Adoption
- ▶ Geospatial Information Management and Web Development

COASTAL RESILIENCE AND CLIMATE ADAPTATION

Coastal communities are increasingly vulnerable to the effects of coastal flooding, climate change and sea level rises. This vulnerability can affect the social, environmental and economic sustainability of the community. GZA provides comprehensive coastal resilience and climate adaptation planning and design services to assess and mitigate those risks. The following are part of our Coastal Resilience and Climate Adaptation services:

- ▶ Coastal Flood Hazard Vulnerability Assessment
- ▶ Natural Hazard Mitigation Plans
- ▶ Coastal Resilience and Climate Adaptation Plans
- ▶ Emergency Response Plans
- ▶ Resilience Feature Design Including Seawalls, Floodwalls and Natural & Nature-Based Features including Living Shorelines
- ▶ Stormwater Infrastructure Engineering and Design

- ▶ Plan Implementation Consulting and Training
- ▶ Financial and Cost Recovery Planning
- ▶ Grant Application Preparation
- ▶ Geospatial Information Management and Web Development

ADDITIONAL SERVICES

GZA also provides additional services related to climate change planning and their impacts to communities.

- ▶ Emergency Response Planning
- ▶ Disaster Recovery Support
- ▶ FEMA Hazard Map Services
- ▶ Property Asset Management
- ▶ Site and Structure Design
- ▶ Critical Infrastructure Hazard Mitigation & Resilience
- ▶ Carbon Management
- ▶ Grant & Funding Assistance
- ▶ Community Engagement

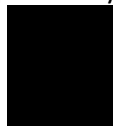
GEOHAZARD MAPPING AND ANALYTICS



Geospatial data and technology provide the “backbone” for components of GZA projects, including data collection, sharing, management, analysis, and visualization (mapping and 3D modeling). Our goal is to organize complex geospatial data, processes, and concepts into a coherent visual display that can be readily understood. GZA’s scientists, engineers, analysts, and designers are experts at the production of GIS and CAD-based thematic mapping, 3D modeling, and visualization, as well as statistical visualization of facility and asset management data, natural resources, environmental, geologic, and natural hazard data. GZA leverages these large and complex datasets by combining them with our own internal data libraries for engineering and design.

GZA has assisted municipalities and state agencies with asset management since 1995, including completion of coastal/marine structure inventories, condition assessments, and repair/replacement budgeting. We have established GIS capabilities and currently utilize ESRI ArcGIS web mapping applications to create, maintain, and access asset inventory databases. GZA is highly experienced in coastal resilience planning, engineering, and design, including asset management, having completed similar asset inventory, assessment, and vulnerability analyses for waterfront assets for municipalities and State agencies.

Vulnerability assessment of waterfront assets requires an understanding of lake water levels and wave energy in terms of probability. GZA’s Metocean Data Analysis Team will characterize the water level and wave environment for the purpose of assessing waterfront structure vulnerabilities. GZA has previously completed extensive metocean analyses and numerical storm surge and wave and sediment modeling (ADCIRC + SWAN) within Lake Michigan.



RELEVANT EXPERIENCE

GZA has been a leader providing climate change and sustainability planning initiatives and strategic solutions related to issues most important to communities throughout the Midwest, Mid-Atlantic and New England regions. We recognize that climate change is a continuously evolving challenge that requires both incremental changes and large-scale commitments. Every day, we help our clients find solutions which allow their communities or organizations and the environment to thrive.

We enhance our team of dedicated climate change specialists by surrounding them with a collection of practitioners, including engineers and scientists, who possess a diverse range of skills. This integrated approach leads to innovative, customized solutions to meet the sustainable development challenges our clients face today and into the future. These solutions have been proven through our project accomplishments with some of the world's leading communities, businesses, and institutions.

We have provided a suite of representative projects demonstrating GZA's capabilities in **Appendix B**. Provided below and onto the following page, we have included just a sampling of specific project experience of completed work, workshop materials, and press releases available on the internet for review. In many cases, our work is not publicly available as it has been performed for private-sector entities, confidential clients, or for other reasons.

1. City of Milwaukee, Wisconsin, Environmental Collaboration Office, Cream City Farm's Sustainability Focus: Stormwater Management, Solar and the Cistern's Remote Monitoring and Operation
<https://city.milwaukee.gov/homegrownmilwaukee/Cream-City-Farms.htm>
2. City of Milwaukee, Wisconsin, Alice's Garden Project
https://docs.google.com/presentation/d/e/2PACX-1vSAd6CPCYbWAmfJEU9OBQL_gCPFmVvmkjMvblKWijLqSK7nV973bAIPQI8XpNRKvA/pub?delayms=3000&loop=false&start=false&slide=id.p1
3. Town of Stratford, Connecticut – Coastal Community Resilience Plan
https://swcssnec.org/wp-content/uploads/Stratford_Coastal_Resiliency_Plan_-_Final_Report_12-21-2016_Electronic_-_optimized.pdf
http://www.newea.org/wp-content/uploads/2018/02/AC18_DStapleton_27.pdf
4. Long Wharf Flood Protection Final Report
https://portal.ct.gov/-/media/DOH/Sandy_Relief_Docs/Planning_Docs/T-1-LongWharfFloodProtectionFinalReport.pdf
<https://ctgbc.org/blog/id/41>
5. Municipal Vulnerability Plan Public Listening Session
<https://www.cityofmalden.org/DocumentCenter/View/2296/Malden-Public-Listening-Session-held-on-January-7th-2020-PDF>

6. Town of Old Saybrook, Connecticut – Hepburne Dune Living Shorelines
<https://www.documentcloud.org/documents/6406020-Hepburn-CIRCA-Final-Report-8-30-2019-Final.html>
<https://ctmirror.org/2019/09/23/cts-small-solutions-to-climate-change-saving-the-hepburn-dune-with-a-living-shoreline/>
7. Fairfield Coastal Resiliency Meeting, GZA Natural Hazard Mitigation, Resilience and Climate Adaptation Services
https://www.fairfieldct.org/filestorage/10736/12067/17055/26401/48812/GZA_Presentation_of_12_12_18.pdf
8. Westport Remedial Action Plan
<https://www.westportct.gov/home/showdocument?id=17570>
https://westportnow.com/index.php?v3/comments/meetings_to_examine_findings_of_flooding_resiliency_recovery_study/

REFERENCES

There is no better testimony than that of a recommendation from a satisfied client. As requested, GZA is pleased to provide the following list of projects with their associated client contact information for your use. Please feel free to contact those listed as they will attest to our firm's professionalism, technical expertise, and responsiveness.

Reference: Mr. Stevan Keith, P.E., Environmental Services Unit Leader ☎ 414-278-4355

Client: Milwaukee County, 633 West Wisconsin Avenue, Suite 1003, Milwaukee, WI 53203

DEVELOPMENT OF A COMMUNITY COASTAL RESILIENCE PLAN: Assets Inventory; Risk and Vulnerability Assessment; Coastal Flood Hydro-dynamic modeling; Benefit-Cost-Analysis, Resiliency Planning; See also project description included in Section 3.

Reference: John Casey, Town Engineer ☎ 203-385-4013

Client: Town of Stratford, 2725 Main Street, Stratford, CT 06115

DEVELOPMENT OF A COMMUNITY COASTAL RESILIENCE PLAN: Assets Inventory; Risk and Vulnerability Assessment; Coastal Flood Hydro-dynamic modeling; Benefit-Cost-Analysis, Resiliency Planning; See also project description included in Section 3.

Reference: Peter Ratkiewicz, P.E., Town Engineer ☎ 203-341-1131

Client: Town of Westport, 110 Myrtle Avenue, Westport, CT 06880

ENGINEERING SERVICES FOR TOWN-WIDE DRAINAGE EVALUATION, COMPREHENSIVE STREAM IMPROVEMENT PLAN, AND DOWNTOWN RESILIENCY AND RECOVERY PLAN: Assets Inventory; Risk and Vulnerability Assessment; Adaptation Options Analysis; Coastal Flood Hydro-dynamic modeling; Stormwater Surface – Drainage Interaction; Resiliency Planning; See also project description included in west.



We also believe it is invaluable to capitalize upon the leading sustainability planning practices taking place in the private sector. As such, we are also including a list of ongoing and recently completed sustainability-related projects for businesses completed by the GZA Team.

Reference: Julia Guernsey, Senior Engineer – Global Environmental Policy 313-815-7516

Client: Ford Motor Company, Environmental Quality Office; 290 Town Center Drive, Dearborn, MI 48126

SUSTAINABILITY STRATEGY SUPPORT: Designed program and system to drive operational sustainability and create a common global process for environmental improvements across all global facilities.

Reference: Rebbecca Bergkamp, Supply Chain Sustainability Manager; Eaton Corporation 405-695-1503

Client: Eaton Corporation, 1000 Eaton Blvd, Mail Code 4S, Cleveland, OH 44122

CLIMATE CHANGE MANAGEMENT: Data Solicitation and Collection; Strategic Supplier Engagement; Technical Support and Training; Review and Analysis of Climate Disclosures; Customized Database Development; and Reporting on Risks and Opportunities.



Known for excellence. Built on trust.



SECTION 5 | COST PROPOSAL

SECTION 5 | COST PROPOSAL

INTRODUCTION

GZA is please to provide our offering to complete the services requested in the RFP for a Climate Action Plan on behalf of the City of La Crosse, WI. A cost breakdown by task and key personnel is summarized by task in the table below. It should be noted that GZA has discounted its traditional hourly rates to accommodate a manageable budget for the City of La Crosse.

Task	Consultant Hours					Consultant Fee	Expenses	Total Fee
	Principal / Project Manager	Assistant Project Manager	Sustainability Specialists	Communication Specialists	Total			
Task 1. Analyze GHG Emissions	48	180	80	-	308	\$33,600.00	\$3,310.00	\$36,910.00
Task 2. GHG Emission Reduction Targets	32	60	20	-	112	\$13,340.00	\$400.00	\$13,740.00
Task 3. GHG Emission Reduction Forecasts	40	120	40	-	200	\$22,520.00	\$2,610.00	\$25,130.00
Task 4. Community Engagement	80	80	60	120	340	\$36,540.00	\$5,710.00	\$42,250.00
Task 5. Coordinate with Related City Efforts	16	8	8	-	32	\$4,290.00	\$130.00	\$4,420.00
Task 6. Climate Action Plan Development	96	120	120	60	396	\$44,100.00	\$7,280.00	\$51,380.00
Task 7. Climate Action Plan Adoption	16	16	4	-	36	\$4,730.00	\$140.00	\$4,870.00
Total	328	584	332	180	1,424	\$159,120.00	\$19,580.00	\$178,700.00

GZA is proposing a cost not to exceed \$178,700 based on our estimated budget.



Known for excellence. Built on trust.



APPENDIX A | STAFF RESUMES

**James F. Drought, P.H.****PRINCIPAL HYDROGEOLOGIST/VICE PRESIDENT****SUMMARY OF EXPERIENCE**

As Vice President and Principal Hydrogeologist at GZA GeoEnvironmental, Inc. (GZA), Mr. Drought is responsible for the development, management and execution of the following services for the oil and gas, utility, manufacturing, retail, local and state government, and legal sectors throughout the United States:

- Hydrogeological Evaluation and Well Design;
- Surface Water and Groundwater Evaluations;
- Regulatory Affairs and Environmental Advocacy;
- Soil and Groundwater Investigation and Remediation;
- Brownfield Redevelopment and Financing;
- Fixed-price Contracting, Liability Transfer and 468B Environmental Trust; and
- Litigation Support and Expert Testimony.

RELEVANT PROJECT EXPERIENCE

Former Metal Technology (Briggs and Stratton) Foundry - West Allis, Wisconsin. Project Director (2013-2016). This work included investigation, remediation, closure and light-manufacturing redevelopment of the former Briggs and Stratton and Metal Technology foundry. Services performed included support in the sale and redevelopment of the facility to Midwest Rail and Demolition, which was facilitated with the innovative Remedial Action Plan (RAP), and subsequently to the City of West Allis for redevelopment. The site was featured in the December 2013 issue of WDNR's *RR Report*.

Wisconsin Potato and Vegetable Growers Association (WPVGA), Antigo, Wisconsin. Project Director (2015-Present). GZA was retained in 2015 by WPVGA to provide hydrogeologic support and validation of the MODFLOW groundwater modeling underway by the Wisconsin Geologic and Natural History Survey (WGNHS) of the Little Plover River Watershed, and also to provide environmental advocacy of the WPVGA with local, state and federal units and agencies of government. Given the existing and pending economic and regulatory uncertainty, GZA has provided the following value and certainty to WPVGA: understanding of and alternatives to reduce the cumulative impacts of pumping on drawdown, nearby wells and connected surface water features; facilitating the permitting and optimization of high-capacity wells; developing water stewardship practices and sustainable irrigation methods; evaluating the potential application of groundwater management districts for the management of surface water and groundwater; and serving as technical advocacy and representation of member interest on groundwater resources, environmental compliance and permitting.

Titletown Site Engineering and Development, Green Bay, Wisconsin. Project Director (2014-Present). The work consisted of developing and executing comprehensive environmental, geotechnical and site civil engineering services for the Green Bay Packers for the redevelopment of the 24-acre Titletown Development located west of Lambeau Field. The theme of the proposed development plan is to create a year-round destination for visitors and residents of Green Bay and will consist of retail and commercial structures. The conceptual design consists of phases of development. Phase I began in 2015 and

Education

B.S., 1982, Physical Geography and Biology, Carroll College

M.S., 1999, Contaminant Hydrogeology and Geosciences, University of Wisconsin-Milwaukee

Registrations & Certificates

Professional Hydrologist, No. 45-111
PECFA Consultant, No. 41557

Areas of Specialization

- Aquifer Characterization
- Surface and Groundwater Interactions
- Fate, Transport and Remediation of Chlorinated and Petroleum Hydrocarbons
- Fixed-Price, Liability Transfer, Environmental Trusts and Insured Remediation Services
- Brownfield Remediation, Redevelopment and Financing
- Litigation Support and Testimony
- Real Property Due Diligence
- State and Federal Regulatory Compliance



James F. Drought, P.H.
PRINCIPAL HYDROGEOLOGIST/VICE PRESIDENT

includes construction of a six- or seven-story, five-star hotel, health spa, health and sport center, micro-brewery and multi-level parking garage on the northeastern portion of the Site. Parking and seasonal kiosks will exist on the northern portion of the Site, adjacent to Lombardi Avenue. A central plaza (esplanade) and public area will offer seasonal recreational amenities to visitors.

Groundwater Modeling Evaluation, Waukesha Water Supply Alternatives, Waukesha, Wisconsin. Project Director (2014-Present). The City of Waukesha ("City") submitted an Application for Lake Michigan Supply to the Wisconsin Department of Natural Resources (WDNR) in May 2010, proposing to use Lake Michigan water with return flow to meet its long range water supply planning needs. The Application was based on the City's eligibility for a new Great Lakes diversion with return flow in accordance with the Great Lakes-St. Lawrence River Basin Water Resources Compact ("Compact"). The Application assumed an average water demand of 10.1 million gallons per day (mgd), and a peak water demand of 16.7 mgd.

GZA was retained to perform performed modeling scenarios using the United States Geological Survey (USGS) Fox River model (Feinstein et al, 2012), which was implemented in USGS's MODFLOW-NWT with the use of Environmental Simulations Inc.'s software, Groundwater Vista Version 6, to evaluate the drawdown and base flow reduction in the shallow aquifer for Alternatives 1A and 1B, as presented below:

Alternatives	Water Sources	Average Water Demand (mgd)	Supply Facilities
1A (Average 10.1 mgd)	Deep Confined Aquifer	6.2	Existing 7 Wells
	Shallow Aquifer	1.4	Existing 3 Wells (Well Nos. 11-13)
	Fox River Alluvium	2.5	10 New Riverbank Inducement (RBI) Wells
1B (Average 8.5 mgd)	Deep Confined Aquifer	5.7	Existing 7 Wells
	Shallow Aquifer	1.0	Existing 3 Wells (Well Nos. 11-13)
	Fox River Alluvium	1.8	10 New RBI Wells

Royster Clark Agricultural Processing Brownfield Site - Madison, Wisconsin. Project Director (2013-2014). This work included investigation, remediation and mixed-use redevelopment of the site. The investigation activities consisted of the advancement and sampling of deep piezometers in the sandstone bedrock above the confining Eau Claire shale unit using dual-tube drilling methods to define the extent of ammonia and nitrates. The NR 726 closure included modeling of retarded flow and multivariate statistics and regression analyses. The site was also featured in the December 2013 issue of WDNR's *RR Report*.

Prior to GZA GeoEnvironmental, Inc.

Prior to joining GZA, Mr. Drought served as Vice President and Director of Remediation for Shaw Environmental, Inc., a CBI Company, from September 2004 to October 2014. Mr. Drought served as a Vice President and Principal Hydrogeologist for ARCADIS, a national and international engineering firm, from January 1995 to September 2004. Mr. Drought also served as the Assistant Environmental Department Manager at a national environmental and geotechnical consulting firm from 1989 through 1994, and was responsible for the supervision of professional and technical staff and the coordination of an analytical laboratory certified under Chapter NR 149 of the Wisconsin Administrative Code.

Mr. Drought served as an Assistant Environmental Planner at the Bay-Lake Regional Planning Commission (BLRPC) and the Southeastern Wisconsin Regional Planning Commission (SEWRPC) from 1985 through 1988. Mr. Drought's responsibilities included the preparation of resource management and environmental planning reports, and serving as a regulatory agency liaison between federal, state, county and local units and agencies of government.

Former Entergy, Inc. Facility, Baton Rouge, Louisiana. Project Director (2013-2014). The work included soil and groundwater investigation and interim actions to facilitate preparation of an amended Voluntary Remedial Action Plan (VRAP) for submittal to the Louisiana Department of Environmental Quality (LDEQ) under the RECAP program. The 6-acre site was utilized as a lumber and coal



James F. Drought, P.H.

PRINCIPAL HYDROGEOLOGIST/VICE PRESIDENT

yard in the early 1900s, an electrical generating facility from 1916 until the 1940s, and an electrical substation from the 1940s to the 1960s. The VRAP facilitated the acquisition and development of the site by the East Baton Rouge Redevelopment Authority.

190-Acre Parcel - Lake Charles, Louisiana. Project Director (2012-2014). This work included the investigation, remediation, construction and industrial redevelopment for acquisition and development by G2X Energy, Inc. for use as an E-85 gasoline production facility. The site historically had been used for the deposition of maintenance-dredged materials from a turning basin created from the Calcasieu River. The investigation and remediation activities were conducted under the RECAP and Voluntary Party remediation requirements of LDEQ. The NFA letter issued by the LDEQ in October 2013, facilitated wetland mitigation, earthwork and remedial construction services. The construction services included air permitting, natural resources and earthwork services.

Tilot Oil, LLC v BP Products North America, Inc., Case No. 09-CV-210-JPS. Retained as an expert for the plaintiff in 2007, for the investigation and remediation of separate-phase product emanating from an adjacent and upgradient bulk petroleum facility in Green Bay, Wisconsin. Services included soil, groundwater, soil-gas and ambient air sampling, evaluation of barrier wall remedial technologies, preparation of expert reports, depositions, mediation and trial support, and meetings with the regulatory agency and responsible party. The case settled in 2012, and lead to a settlement for the plaintiff which was used, in part, to complete an extensive soil and groundwater remediation project.

16-Acre Property Owned by Kaukauna Utilities Adjacent to the Fox River - Appleton, Wisconsin. Project Director for the fixed price remediation and liability transfer of chromium (III and VI) and sulfate-affected soils, bedrock and groundwater on the property. The RAP was submitted to and approved by the WDNR in February 2007, approximately 60 days following contract completion. The active remediation activities were completed in November and December 2008, following WDNR approval of the Remedial Strategy in October 2008. The closure documents were submitted to the WDNR in March 2009. Site closure and the Certificate of Completion were issued by the WDNR in September and October 2009, respectively, approximately two years ahead of schedule. The expedited remediation and closure facilitated the \$75MM mixed-use redevelopment of the site.

35-Acre Tower Automotive West Plant Project (former A.O. Smith Facility) - City of Milwaukee, Wisconsin. Project Director (2004-2008). Performed the investigation, remedial design, and fixed-price remediation of the site. Approximately 25 acres of the 80-year-old facility was acquired and redeveloped as the City of Milwaukee Department of Public Works (DPW) facility. The site investigation identified the presence of petroleum- and chlorinated hydrocarbon-affected soils and groundwater. The remedial strategy included source removal, enhanced biodegradation and use of the new development to improve remedial performance. The RAP was submitted to the WDNR on October 11 and approved on October 25, 2004. Supplemental investigation and remediation activities were completed in 2005, and the closure letters were issued by the WDNR on January 24, 2006, and May 15, 2008. The expedited remediation and closure facilitated the \$100MM construction of the Harley Davidson museum at the location of the former City of Milwaukee DPW facility.

UNIVERSITY TEACHING

Since 2006, Mr. Drought has served as an Associate Faculty Member in the Civil Engineering Department at Milwaukee School of Engineering in Milwaukee, Wisconsin, and has served as a graduate student advisor and taught the following courses:

- Solid Waste Engineering and Design (CV-430);
- Solid and Hazardous Waste Minimization (CV-730); and
- Soil Science and Remediation Technologies (CV-754).

SIGNIFICANT APPOINTMENTS

WDNR NR 169 Committee (DERP)

WDNR NR 700 Focus Group

WDNR Brownfields Committee

COMM 47 Advisory Committee

GZA. Known for excellence. Built on trust.



James F. Drought, P.H.
PRINCIPAL HYDROGEOLOGIST/VICE PRESIDENT

WGWA – Director and Past President (since 2010)

Keep Greater Milwaukee Beautiful/Greening Milwaukee – Director (since 2011)

University of Wisconsin Groundwater Research Advisory Council (since 2012)

AFFILIATIONS

Federation of Environmental Technologies

National Brownfield Association

National Ground Water Association

Wisconsin Fabricare Institute

Wisconsin Ground Water Association

University of Wisconsin-Milwaukee Geosciences Environmental Science Exchange

Associate Faculty Member

Civil Engineering Department

Milwaukee School of Engineering, 2006-Present

SELECTED PUBLICATIONS

A Case Study of a Natural Attenuation of a Mixed Hydrocarbon Plume, M.S. Thesis, University of Wisconsin-Milwaukee, June 1999.

Fate of Tetrachloroethene and Benzene at a Dry Cleaning Facility, Proceedings of the In-Situ and On-Site Bioremediation - The Fifth International Symposium, Sheraton San Diego Hotel and Marina, San Diego, California; April, 1999.

SELECTED TRAINING

NGWA Summit, May 2014

SIPP (Health and Safety) Training for Supervisors, February 2014

FranklinCovey Management Training, December 2008

NGWA Summit, April 2008

RevenueStorm Sales Training, January 2003

Leadership Development Training, December 2002

Senn-Delaney Leadership Training, November 2002

Advanced Management Training, 2000-2001

VISIBILITY AND SELECTED PRESENTATIONS

Advancing Water Management Strategies Using Groundwater Flow Models, Invited Speaker – Opening Session, University of Wisconsin Extension and Wisconsin Potato and Vegetable Growers Conference, Stevens Point, Wisconsin, February 2, 2016.

Remediation Revisited: A Historical and Futuristic Perspective, Invited Speaker, University of Wisconsin – Milwaukee Environmental Science Exchange, Water Institute, Milwaukee, Wisconsin, September 17, 2014.

Using Performance-Based Contracting for Brownfield Redevelopment, Invited Speaker, Breakout Session – Recovering from our Industrial Past, Oklahoma Brownfield's Conference, Oklahoma City, Oklahoma, May 22, 2012.



James F. Drought, P.H.

PRINCIPAL HYDROGEOLOGIST/VICE PRESIDENT

A Celebration of Hydrogeology in Wisconsin - Recognition of Dr. Mary P. Anderson (University of Wisconsin) and Douglas Cherkauer (University of Wisconsin – Milwaukee), Organizer and Moderator, Wisconsin Ground Water Association Annual Meeting, Pewaukee, Wisconsin, April 27, 2011.

The NR 700 Administrative Code: Existing Regulations and Proposed Revisions, Organizer and Moderator, Wisconsin Ground Water Association Lecture Series, Pewaukee, Wisconsin, November 8, 2011.

Remediation and Redevelopment of a Former Drilling Mud Facility, Wisconsin Ground Water Association Annual Meeting, Waukesha, Wisconsin, April 8, 2011.

Using Performance-Based Contracting for Brownfield Redevelopment, Workshop Sponsored by the Environmental Law Institute Entitled: Overcoming Barriers to the Redevelopment of Petroleum Brownfield's and Other Vacant Properties: The Wisconsin Approach, Ambassador Hotel, Milwaukee, Wisconsin, May 18, 2010

Performance-Based Contracting to Facilitate Brownfield Redevelopment, Panel Participant at the Brownfield's 2009 Conference, New Orleans, Louisiana, November 17, 2009.

RiverHeath: Remediation and Redevelopment of Historic Riverine Industrial Site in Appleton, Wisconsin, Presentation at the Brownfield's 2009 Conference, New Orleans, Louisiana, November 17, 2009.

The Wisconsin Closure Protocol Study, Organizer and Moderator, Wisconsin Ground Water Association Lecture Series, Pewaukee, Wisconsin, November 12, 2009.

The Glacial and Bedrock Geology of Southeastern Wisconsin, Organizer and Facilitator, Wisconsin Ground Water Association Fall Field Trip, Waukesha County, Wisconsin, September 19, 2009.



Thomas C. Klotz, GHG-IQ

Associate Principal

Education

B.S., Civil Engineering (Concentration in Environmental Engineering), Purdue University, 1999

Certifications

Greenhouse Gas Inventory Quantifier (GHG-IQ)

Affiliations

- Air & Waste Management Association
- Automotive Industry Action Group
- Detroit Climate Action Committee
- Industrial Minerals Association
- Michigan Manufacturers Association

Areas of Specialization

- Air Quality Management
- Climate Change Management
- Corporate Social Responsibility
- Environmental Regulatory Compliance
- GHG Accounting
- Supply Chain Management
- Sustainability Planning

Summary of Experience

Mr. Klotz is an Environmental Engineer with over 20 years of experience providing sustainability, environmental compliance, and air quality consulting services. Areas of competence include management of Greenhouse Gas (GHG) emissions and other environmental sustainability aspects, including assessments, reporting, planning, policy evaluation, strategy development and risk/reduction opportunities. Areas of specialty also include air quality management for application of federal, state and local environmental regulations related to air pollution control. Regulatory compliance experience includes SARA Title III reporting (including section 312 Tier II and section 313 Form R reports), regulatory compliance audits, and environmental assessments.

Relevant Project Experience

Principal-in-Charge, Confidential Client, Global Locations. Managed a key environmental sustainability program for a Fortune 50 company. Goal was to assist the client with implementation of a common global process to drive environmental sustainability improvements across nearly 70 manufacturing facilities. The program focused on reductions in waste generation, water consumption, air emissions and energy use (including GHG emissions). Several facilities have achieved Zero Waste to Landfill status through the program.

Principal-in-Charge, Multiple Clients, North America. Assisted multiple global corporations with supply chain engagement activities including the collection of environmental sustainability data (GHG emissions and water management data) through the CDP Supply Chain program. Program scope included management of reporting activities from over 3,000 suppliers over the 2010-2019 timeframe. For one client, an add-on program was developed and implemented to facilitate environmental impact reductions to the air, land and water from suppliers through the implementation of new projects.

Project Manager, Ford Motor Company, North America. Completed mandatory and voluntary GHG emissions reports for multiple facilities since 2010. Mandatory reports have been submitted to various state/provincial, regional and federal programs in North America, including over 100 reports prepared under the USEPA Greenhouse Gas Reporting Program (GHGRP). On a voluntary basis, assistance has included preparation of external reports using leading reporting frameworks (e.g., GRI, CDP, DJSI, etc.) allowing the client to maximize their scores and ratings under these programs. Prepared and submitted reports annually to The Climate Registry which entailed GHG emissions accounting and reporting for hundreds of its facilities located throughout North America.

Project Manager, Toyota Motor North American, Inc., North America. Completed a corporate greenhouse gas (GHG) emissions inventory protocol which provided formal guidance and instructions to assist the North American facilities and subsidiaries of an international manufacturer with completion of annual emissions inventories. As a supplement to the protocol, a GHG data management system which provides tools to assist the company's entities with estimating and managing GHG emissions consistently across the company was prepared.



Thomas C. Klotz

Associate Principal

Project Manager, Multiple Clients, North America. Provided strategic environmental sustainability consulting support through benchmarking, planning, target setting, and tracking for multiple organizations. Benchmarking services included gap analyses of current sustainability programs while considering actions of key competitors and sustainability leaders. Strategic planning has involved an environmental footprint analysis of key features (i.e., energy, carbon, water, waste, materials, biodiversity, etc. occasionally using Life Cycle Assessment results), materiality assessments and identification of risks and opportunities. Utilized these results to set targets for select key performance indicators (KPIs) through scenario planning and alignment with business plans and objectives. Systems for tracking KPIs were also developed that helped clients achieve their targets and objectives.

Project Manager, Confidential Client, North America. Prepared a corporate-wide GHG emissions inventory for a major automobile manufacturer. The inventory was developed to assist the company with estimating, managing, and reporting GHG emissions. Aspects of the inventory included defining the reporting entity, establishing boundaries, collecting activity data, quantifying emissions based on various methodologies, and auditing inventory results. During this process, cost effective reduction opportunities were identified. An evaluation of potential emission credit trading opportunities under various regional, national and global programs was conducted, as well as internal assessments for participation in various GHG programs (mandatory, voluntary, or cap-and-trade programs).

Project Manager, Alliance of Automobile Manufacturers, United States. Provided assistance to a leading trade association and its members on U.S. policies related to climate change. The trade association was advised on the impacts of GHG policy on its members. Comments and position papers were prepared for review of state, national and international GHG policy and reporting programs. This involved coordination of input from multiple member companies as well as interaction with the EPA, DOE and other stakeholders.

Project Manager, Toyota Motor North American, Inc., North America. Prepared a study of North American climate change initiatives. The study evaluated various reporting alternatives including registries, trading schemes, certification programs, reporting guidance, and voluntary programs. An evaluation of the cost, burden, resources, benefits, political implications, and participation was conducted for each initiative. The study also included a benchmark of other leading companies in the industry and their participation in various GHG initiatives. Advised the client of the best available reporting alternatives which support its climate change strategy.

Project Manager, Chrysler Corporation, United States. Provided on-site air quality management services to the corporate environmental department. Responsible for maintaining continuous compliance with corporate-wide air quality permits (NSR and Title V) for over 30 independent facilities located throughout the United States.

Project Manager, Multiple Clients, North America. Completed and assisted with the preparation of multiple construction/installation air permit applications for various new and/or modified sources of air emissions. Application elements included criteria pollutant emission calculations, material usage estimates, air toxics evaluations and regulatory analyses. Project examples include surface coating of plastic and metal parts, auto and light duty truck surface coating, machining of metal parts, engine testing operations, Portland cement manufacturing, and industrial sand processing and mining. These projects involved frequent interface with USEPA and state regulatory agencies.

Project Manager, Multiple Clients, United States. Prepared SARA Title III Toxic Release Inventory (TRI) reports for the years 1996-2016 for several major automotive manufacturing facilities. Successful completion included data acquisition, release calculations, and preparation and submittal of Form R and Form A chemical reports to the USEPA. Documentation reports were also prepared for each facility.

Project Manager, Multiple Clients, United States. Participated in comprehensive, internal environmental compliance audits for facilities in the automobile manufacturing and industrial sand and mining industries to evaluate potential non-compliance issues, identify possible environmental hazards, and provide recommendations.

Project Manager, Multiple Clients, United States. Assisted with preparation of air quality reports for a variety of states respective to emissions from process operations at numerous facilities, including Portland cement manufacturing, ethanol production, automobile manufacturing, surface coating, and industrial sand production.



Samuel J. Bell, CFM

Senior Resiliency Planner/Disaster Recovery Manager

Summary of Experience

Mr. Bell is a Senior Planner with GZA with 18 years of leadership and management experience covering natural hazard mitigation and resiliency planning, hazard mitigation assistance, environmental planning and permitting, community education and outreach, and disaster resiliency research. Sam is a member of the Natural Hazard Risk Management Senior Leadership Team assisting in the integration of these services across 30 GZA offices around the United States (U.S). He has extensive experience providing technical assistance to Federal agencies, State agencies, U.S. Territories, Counties, and communities on disaster recovery and resiliency projects designed to protect critical facilities, public and private infrastructure, and residences.

From 2007 to 2011 Mr. Bell served as a Hazard Mitigation Grant and Planning Team Lead for the Federal Emergency Management Agency (FEMA) providing disaster recovery support to states throughout the Northeast in response to the adverse impacts caused by various types of natural disasters. Mr. Bell worked with multiple State Emergency Management Agencies and Departments of Environmental Protection to identify strategies and natural hazard mitigation solutions to protect residences and critical facilities from incurring damages from future natural hazards.

From 2011 to early 2014, Mr. Bell assisted FEMA with revising risk evaluation and program effectiveness tools that FEMA, States, local, tribal and US territories use to evaluate the effectiveness of all eligible flood mitigation projects including critical facilities and infrastructure. These tools included the FEMA Benefit-Cost Analysis (BCA) Tool Version 5.0 used to evaluate project cost-effectiveness, and a pioneering streamlined riverine flood loss avoidance study methodology used to evaluate the effectiveness of flood mitigation after completion. To assist stakeholders with using FEMA's BCA Tool, Mr. Bell provided trainings throughout the U.S.

Relevant Project Experience

Project Manager, Public Assistance COVID-19 Disaster Recovery, Providence, Rhode Island. (2020) GZA is assisting the City of Providence with disaster recovery services resulting from the COVID-19 pandemic. Mr. Bell is one of the lead representatives authorized by Providence to act on the City's behalf with the Rhode Island Emergency Management Agency (RIEMA) and FEMA in matters related to post disaster recovery. The services include: 1) managing the City's FEMA Public Assistance Grants regarding COVID-19; 2) recovering emergency protection administrative costs to the greatest extent under Section 324 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act; 3) coordinating with state and federal agencies on the City's behalf in support of overall disaster recovery efforts; and 4) evaluating additional potential grant opportunities outside of FEMA PA for the City.

Project Manager, Disaster Recovery Administrative Services, Cranston, Rhode Island. (2019-2020) GZA serves as the City of Cranston's disaster recovery consultant. Mr. Bell leads a team of disaster recovery experts to assist the City in managing state and federal disaster recovery grant management processes to ensure rapid recovery and to expedite post-disaster redevelopment for the City. The services include but are not limited to 1) technical assistance for the FEMA Public Assistance; 2) Inspection/Damage Assessments; 3) Financial management and Tracking; 4) FEMA 404 and 406 Hazard Mitigation Services;

Education

B.S., Environmental Design, 1998,
Urban and Regional Planning,
University of Colorado- Boulder
M.A., 2006, Urban and Environmental
Policy and Planning, Tufts University

Certifications

Municipal Vulnerability Preparedness
(MVP) Certified in Massachusetts
Certified Floodplain Manager (CFM)

Areas of Specialization

- FEMA and HUD Disaster Response and Recovery Programs
- FEMA, HUD, and NOAA Hazard Mitigation Programs
- Resiliency and Climate Adaptation
- Municipal Vulnerability Preparedness
- Natural Hazard Mitigation Planning
- Community Education and Outreach
- Cost-Benefit Analysis
- Environmental Permitting and Planning

Publications and Presentations

Bell, S.J. "Integrating Natural Hazard Risk Management into Site Selection, Due Diligence, Supply Chain Management and Existing Asset Management." Industrial Asset Management Council (IAMC) Fall Forum (2018)

Bell, S.J., Winslow, D.M., and Hudock, M. "Reducing Risk Associated with Development of Distressed Waterfronts." Urban Land Institute (ULI) Northern New Jersey Suburban Marketplace (2016).

Bell, S.J. and Boudreau, D.J. "Mapping the Vulnerability of Critical Infrastructure and Facilities." Proceedings of the ASCE COPRI National Conference, Boston (2015).



Samuel J. Bell, CFM

Senior Resiliency Planner/Disaster Recovery Manager

5) Grant Close-out and Audit; 6) HUD Community Development Block Grant Disaster Recovery (CDBG-DR) Support Services.

Project Manager, Public Assistance COVID-19 Disaster Recovery, Cumberland, Rhode Island. (2020) GZA is assisting the City of Cranston with disaster recovery services resulting from the COVID-19 pandemic. Mr. Bell is one of the lead representatives authorized by Cranston to act on the City's behalf with the RIEMA and FEMA in matters related to post disaster recovery. The services include: 1) managing the City's FEMA Public Assistance Grants regarding COVID-19; 2) recovering emergency protection administrative costs to the greatest extent under Section 324 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act; 3) coordinating with state and federal agencies on the City's behalf in support of overall disaster recovery efforts; and 4) evaluating additional potential grant opportunities outside of FEMA PA for the City.

Project Manager, Western Gateway Climate Vulnerability Assessment and Adaptation Strategies, Glen Cove, New York. (2019-2020) GZA is assisting the City of Glen in developing the Western Gateway Climate Vulnerability Assessment and Adaptation Strategies Plan. The Plan will include: 1) a vulnerability assessment to the project area to climate change hazards including flooding from sea-level-rise and increased precipitation intensity and higher average temperatures; 2) public outreach to solicit input from stakeholders, residents and concerned citizens during plan development; and 3) development of adaptation strategies and measures to address climate change hazards and to reduce greenhouse gas emissions.

Project Manager, Flood Vulnerability Assessment and Flood Mitigation Recommendations, City of Boston (City Hall), Massachusetts. (2018-2019) The City of Boston engaged GZA to work with the Facilities Department and property insurer to 1) conduct a flood vulnerability assessment; and 2) prepare flood mitigation recommendations for making City Hall more flood resilient. The purpose of the project is to reduce the risks that flooding at the site would result in property damage and/or business continuity loss. GZA assessed the facility, two below grade parking garages, and identified critical entry points which might be subject to flooding. GZA conducted a limited survey to verify elevations and compared them to flood elevations for the 1 percent and the 0.2 percent annual exceedance probability floods.

Prior Experience

Mitigation Section Chief, FEMA Disaster Recovery Support, Boston, Massachusetts. (2008-2010) Mr. Bell led teams of hazard mitigation planners, grants managers and NFIP specialists at multiple Joint Field Offices (JFO). Mr. Bell led these teams in providing federal disaster recovery assistance to States throughout the Northeast. Mr. Bell assisted states and communities in developing mitigation strategies designed to reduce the impacts from future natural hazards that best meet the needs of each agency and community.

Flood Mitigation and HMA Program Manager, FEMA Region 1 – Boston, Massachusetts. (2007-2010) Mr. Bell provided technical assistance (TA) in New England and directly to MEMA and DCR for making communities more disaster resilient through HMA and NFIP programs. He conducted these efforts through community education and outreach and State risk reduction priorities in collaboration with local governments and regional planning commissions. This TA included guidance on meeting application requirements including BCA,

Senior Instructor, FEMA Benefit Cost Analysis (BCA) and Unified Hazard Mitigation Assistance (HMA) Class Instruction. (2011-2014) Under numerous Hazard Mitigation Technical Assistance Program (HMTAP) task orders, Mr. Bell delivered trainings to FEMA staff, State, tribal and local mitigation officials on best practices for developing and managing HMA mitigation planning and project grants.

National Technical Review (NTR) Team Member, FEMA's Grants Implementation (GM) Branch – Washington, DC. (2008, 2010-2011) Mr. Bell was a part of a panel of experts that analyzed over \$750 million in hazard mitigation grants. applications for cost-effectiveness and engineering feasibility. These reviews included the evaluation of complex flood reduction projects focused on protecting critical facilities in coastal and riverine areas throughout the country.

Team Leader, FEMA Hazard Mitigation Assistance (HMA) Grant Programs Requirements Verification and Validation. (2011-2012) Under a task order assignment with FEMA, Mr. Bell had direct oversight of the team that verified and validated all FEMA Hazard Mitigation Assistance (HMA) Grant Programs Compliance Requirements. Mr. Bell assisted FEMA HQ in the facilitation of workshops with 9 FEMA regional offices that elicited feedback from 50(+) FEMA staff from throughout the United States.



Michael Lipowicz

Sustainability Analyst

Summary of Experience

Mr. Lipowicz is a Mechanical Engineer with several years of experience in providing sustainability and climate change services for corporate clients across a diverse set of industries. As a sustainability analyst at GZA GeoEnvironmental, Mr. Lipowicz guides corporate clients with the development of their GHG inventories, assessment of their value chain climate impacts, and improvement of their suppliers' climate & water sustainability performance.

Areas of competence include: Scope 1, 2, & 3 GHG emissions accounting and data management, corporate reporting to CDP and development of response-improvement strategies, science-based target-setting, LEED building standards, and life cycle assessments.

Relevant Project Experience

Sustainability Analyst, Corporate Environmental Strategy and Target-Tracking Database Development, Global. Developed a custom-designed environmental data tracking system and target-setting tool to support a Fortune 50 client's global environmental impact reduction strategies for water, hydrocarbons, greenhouse gases, waste, volatile organic compounds, and other safety-based metrics. Conducted several training sessions and recorded video tutorials to ensure end users could seamlessly transition their tasks to the new system.

Sustainability Analyst, Supply Chain Sustainability, Various Locations. Assisted multi-national corporate clients with conducting their CDP Climate and Water Supply Chain programs, while leading efforts to drive continuous improvement in supplier responses. Drafted supplier communications to share greenhouse gas and water impact assessment resources, created targeted recommendation guides to improve low-scoring supplier responses, and assisted select suppliers with their corporate greenhouse gas emissions quantification efforts.

Sustainability Analyst, Climate Change Impact Assessment and Disclosure, Global. Analyzed supplier climate change survey reporting for a major automobile manufacturer, developed a custom supply chain greenhouse gas emissions calculation and data improvement methodology, assisted with preparing relevant responses to the CDP Climate survey, and highlighted future actions to improve supplier greenhouse gas emissions data quality and reduce Scope 3 climate change impacts.

Sustainability Analyst, Corporate Greenhouse Gas Inventory Development, Global. Managed the complete development of a Scope 1 & Scope 2 global GHG emissions inventory for a Fortune 50 corporate client. In collaboration with the client's environmental department, assembled global site and energy data and developed a GHG calculation system that summarized annual GHG impacts, supported carbon accounting verification efforts and external reporting programs, and produced detailed electricity-based GHG impacts to inform future carbon reduction strategies.

Education

M.S. Mechanical Engineering,
Environmental Sustainability
Specialization, University of
Michigan – Ann Arbor, 2016
B.S. Mechanical Engineering,
Sustainable Engineering
Specialization,
University of Michigan – Ann Arbor,
2015

Affiliations

- Environmental Defense Fund,
Climate Corps Alumnus, 2017
- Automotive Industry Action
Group, Member, 2018

Areas of Specialization

- Climate Change Management
- GHG Emissions Accounting
- Science Based Targets
- Life cycle Assessments
- Corporate Sustainability
Strategy

Personal Carbon Footprint

- 2,500 lb. CO₂e Housing
- 1,000 lb. CO₂e Driving
- 3,500 lb. CO₂e Diet



Michael Lipowicz

Sustainability Analyst

Sustainability Analyst, Multi-Use Development Energy and GHG Modeling, Massachusetts. Conducted a GHG emissions assessment for a proposed 750,000-square-foot, multi-use development in Massachusetts. Modeled the energy consumption of numerous commercial and residential buildings and proposed energy efficiency design elements to be implemented across the site that would lower energy and greenhouse gas emissions in alignment with Massachusetts state building regulation. Calculated the greenhouse gas emissions impact of new traffic generated by the proposed site under several traffic mitigation scenarios. In addition, evaluated the costs and carbon emissions reduction for potential rooftop-mounted photovoltaic panel installations across all proposed buildings.

Sustainability Analyst, Scope 3 Thought Leadership, Michigan. Provided expertise to a leading trade association and its members on science-based target-setting and Scope 3 quantification methodologies. Conducted in-person and virtual lectures on greenhouse gas quantification to a global audience. Designed a custom Excel-based tool which allows industries to learn about and calculate the emissions impact throughout their supply chains.

Experience Prior to GZA

Sustainability Specialist at Amgen, Greenhouse Gas Strategy Development, California. Developed a complete Scope 3 greenhouse gas assessment strategy at Amgen to improve visibility into their corporate value chain emissions. Led collaboration efforts within supply chain, strategic sourcing, global travel, and engineering departments to evaluate internal data quality, develop sustainability business insights, increase operations transparency, and improve employee engagement. Created several calculation methodologies to track value chain emissions, communicated with external parties to design environmental impact accounting software, and developed guidelines to ensure repeatable and effective carbon reporting.

Sustainability Engineering Intern at Radio Flyer, Corporate Sustainability Strategy Development, Illinois. Pioneered the carbon footprinting and chemical tracking for Radio Flyer's entire product line through the creation of an extensive material information database and a standardized chemical transparency procedure. Engaged directly with manufacturers, material suppliers, and other companies to organize test trails of new materials, collect chemical composition information, improve battery product stewardship, and plan a renewable energy project. Communicated frequently with consultants to enact the most effective assessment of environmental impacts, employ the highest value-adding sustainability brand improvements, and plan a feasible sustainability strategy.

Sustainability Researcher at University of Michigan, Data Driven Climate Change Awareness, Michigan. Authored several infographics on green energy purchase programs, air travel emissions, and personal science-based greenhouse gas targets. Founded a student-led climate change education program designated for residents of the City of Ann Arbor.



Rachel L. Libriani, SEA

Sustainability Analyst

Summary of Experience

Ms. Libriani is a Sustainability Analyst in GZA's Livonia, Michigan office. She has several years of experience working with clients on their sustainability metrics and programs, identifying opportunities for improvement and cost reduction. Proven ability to communicate concepts in an easy to understand manner to audiences with varying levels of technical knowledge.

Relevant Project Experience

Assisted the management of two large corporate clients sustainable supply chain efforts with respect to the CDP Climate Change and CDP Water Supply Chain program. Efforts include drafting communication for supplier outreach, providing low-scoring suppliers with recommendations to improve internal sustainability and disclosure, development of a customized dashboard, and identified opportunities to improve disclosure rates and supplier outreach for climate and water reporting.

Updated sustainability tracking database for a major automotive manufacturer regarding waste generated, waste to landfill, water, hydrocarbon and plant specific data. This enabled individual plants to track and measure initiatives and project reductions to meet corporate sustainability goals.

Research and analyzed risks and opportunities relative to the effects of climate change for a Consumer Goods client. Assisted in the drafting of their corporate response regarding their organizational strategy for climate change, risks, and management processes for CDP's Climate Change Supply Chain.

Advised over 10 multi-facility healthcare customers with 58 hospitals and medical office buildings on ways to promote sustainability and measure quantitative and qualitative sustainability goals for complex waste streams. Liaised with customers on a day-to-day basis and presented recommendations and findings to healthcare professionals.

Analyzed five years of historical sustainability data from 3 healthcare facilities. Validated data from 141 vendors and collaborated with Sustainability Director to create 50-page report on energy, waste, food, and purchasing for customer.

Performed an exemption analysis for a large automotive client. This consisted of calculating potential VOC emissions from new installation equipment to demonstrate that emissions are de minimis and therefore do not require a Permit to Install. Assisted in the data entry and transition of a corporate client's paint emissions database system format. Essential components of this process included trouble shooting the new format, providing the client with feedback relative to technical issues and recommendations for improvement and usability, as well as ensuring the quality of data. Wrote over 10 quarterly blogs and press releases highlighting best practices in sustainability as well as company news.

Education

B.A., 2012, French, Albion College

M.A., 2014, Sustainable Business, Aquinas College

Licenses & Registrations

Certified Sustainable Professional,
International Society of Sustainability Professionals

Affiliations

- Automotive Industry Action Group, Member, 2018 and 2019
- West Michigan Sustainable Business Forum, Member, 2017

Areas of Specialization

- Corporate Social Responsibility
- Supply Chain Disclosure and Communication
- Sustainability in Healthcare
- Sustainability Metrics and Reporting



Heidi Woelfel, P.G.

Project Manager

Summary of Experience

Ms. Woelfel has extensive experience overseeing and conducting Phase I Environmental Site Assessments (ESAs), site investigations, data reductions, remedial activities, and project management for various City of Milwaukee redevelopment projects as well as for industrial, commercial, and private clients. She has provided geological review of subsurface investigations across the county utilizing various boring and drilling technologies. Ms. Woelfel is able to provide an in-depth review of vapor, soil and groundwater data in support of regulatory reporting and communications. She also has growing project management experience and training to manage a variety of environmental projects from inception to completion. Ms. Woelfel has managed projects including Phase I ESAs, subsurface site investigations, vapor assessments, and remedial alternative reviews and implementations. She has also provided support to litigation matters and risk transfer projects. She has provided input to regulatory agencies for ongoing projects and interacted and developed client relationships. Ms. Woelfel has also worked in the southeastern United States providing environmental oversight to the chemical, oil, and gas industries.

Relevant Project Experience

Project Geologist, Phase I Assessments, Various Sites, Wisconsin. Ms. Woelfel has conducted Phase I ESAs at industrial, commercial, and residential sites in Wisconsin in support of real estate transfers. She has also conducted Phase I ESAs for numerous City of Milwaukee sites identified for redevelopment. The Sites assessed include chemical facilities, manufacturing facilities, historic and active dry cleaner facilities, multi-tenant residential buildings, and commercial buildings. Ms. Woelfel also reviewed environmental compliance reports for a number of the sites to determine if environmental compliance reporting was required. Ms. Woelfel has also provided historical research for various City of Milwaukee Phase I ESAs, including Sanborn Maps, City Directories, and aerial photos within the City of Milwaukee Library system.

Project Manager/Geologist, Chlorinated Solvent Site Assessment, Various Sites, Wisconsin. Ms. Woelfel has managed site investigations, data reductions, and statistical evaluations of sites impacted with chlorinated solvents. The site work has been completed for industrial, real estate, dry cleaners, and historical due diligence projects. Ms. Woelfel has also provided expertise on the remedial remedy approaches for each individual site, considering stakeholder concerns and site-specific conditions. She has also worked with the Wisconsin Department of Natural Resources (WDNR) on site-specific needs to ensure regulatory closure. Remedies have included reductive dechlorinations, soil excavations, and in-situ chemical oxidation.

Project Manager/Geologist, Petroleum Site Assessment, Various Site, Wisconsin. Ms. Woelfel has conducted geological oversight in the drilling and sampling activities at numerous sites around Milwaukee to assess historic uses and spills in support of redevelopment. Ms. Woelfel has conducted Site investigation at 3500 West Burleigh Street in Milwaukee with drilling and groundwater studies and most recently with regulatory closure documentation. Ms. Woelfel has also conducted work at various

Education

B.S., Geology and Geophysics,
University of Wisconsin - Madison, 1997

Registrations

Professional Geologist – Texas, #4650

Areas of Specialization

- Site Investigation
- Due Diligence
- Environmental Compliance
- Groundwater Assessments
- Remedial Assessments
- Regulatory Communications
- Project Management



Heidi Woelfel

Project Manager

City of Milwaukee sites located along Fond du Lac Avenue, which have included ground penetrating radar (GPR) to locate underground storage tanks (USTs).

Project/Manager Geologist, Fill Material Assessment and Historic Landfill Evaluations, Various Site, Wisconsin. Ms. Woelfel has managed and provided oversight for numerous projects with historic fill material or unlicensed landfills throughout the City of Milwaukee and the State of Wisconsin. She has conducted drilling and soil sampling activities to determine the extent and degree of impaired fill material. Ms. Woelfel has also worked with the WDNR to obtain exemptions for building on historic fill and for low hazard waste exemptions. Ms. Woelfel has worked on City of Milwaukee historic fill material sites on South 6th Street, Fond du Lac Avenue, and North Avenue properties.

Project Manager, Brownfield Redevelopment, Appleton, Wisconsin. Ms. Woelfel has worked to assist a major Brownfield Redevelopment of a former paper mill and drilling fluid additives facility in Appleton, Wisconsin. She has assisted the developer and stakeholder navigate the WDNR VPLE program in order to obtain a Certificate of Completion. Ms. Woelfel conducted data reviews of soil lithologies, groundwater conditions, and analytical reports to determine the degree and extent of contamination at the site to assist on how the final development can be used as part of the remediation and barrier. Ms. Woelfel has worked closely with the developer to assist in the financial lender requirements for each phase of the redevelopment.

Experience Prior to GZA

Phase I Assessor – Ms. Woelfel has conducted Phase I ESAs, as well as desktop reviews of Phase Is for both individual sites and project portfolios. She has conducted historic research for the sites, communicated with regulatory and municipal authorities in order to gather additional site data pertinent to the assessments. Her review of Phase I portfolios were utilized by clients in the real estate transactions for multi-state investments and divestitures.

Project Manager – Petroleum Storage Facility Litigation, Green Bay, Wisconsin. Ms. Woelfel provided oversight for site investigation for a petroleum litigation project for soil and groundwater delineation. Data was also collected on the location, thickness, and make-up of free phase petroleum. Ms. Woelfel worked with petroleum experts to determine the mobility and viscosity of the free phase with respect to on-site and off-site migration. Ms. Woelfel also conducted vapor monitoring in support of the litigation, as well as providing expert witness deposition. Site delineation and vapor monitoring were used to provide evidence of on-site migration from a neighboring petroleum storage facility.

Project Manager – Various Sites, Class I and Shortline Railroads, Wisconsin, Illinois, and Michigan. Ms. Woelfel has worked with Class I and Shortline rail clients to assess environmental issues with former leased facilities and existing operational yards. Ms. Woelfel has also provided environmental assessment and management to rail equipment repair and maintenance yards. She has conducted drilling and sampling oversight in support of regulatory investigations and closure requests for sites impacted with various degrees of volatile organic compound (VOC), metals, and polycyclic aromatic hydrocarbons (PAH) that have migrated off-site.

Environmental Compliance – Kohl's Corporate, Various US Locations. Ms. Woelfel worked as an in-house consultant at Kohl's Corporate office to provide waste management for its stores and distribution centers throughout the United States. She worked with responsible units and counties for the quarterly reporting of recycled wastes for the stores. She also provided Kohls with recommendations of the reporting and permitting requirements for new and existing stores. Ms. Woelfel also assisted in the preparation of informational posters presenting guidelines on the disposal of various universal, hazardous, and solid waste streams that was sent out to each facility.

Project Manager – Koch Industries, Wisconsin, Kansas, and Illinois. Ms. Woelfel provided project management and geological expertise for the divestiture of former Koch Coal sites in the upper Midwest. Ms. Woelfel performed reviews of existing and potential environmental impacts, both on- and off-site of the facilities and identified on-going obligations and liabilities for the sites.



Heidi Woelfel

Project Manager

Project Manager – Subsurface Investigations, Various Clients. Ms. Woelfel has conducted soil, groundwater, and vapor investigations for rail clients, institutional clients, telecommunication clients, industrial client, oil and gas clients, and real estate clients. She has overseen and managed investigations of petroleum impacts, chlorinated solvent impacts, metals, PAH, and semi-VOC (SVOC) impacts. Ms. Woelfel has worked with clients with portfolios of projects across the country and has worked with numerous regulators in support of the site investigations and remediations.

Project Manager – Brownfield Redevelopments, Wisconsin. Ms. Woelfel has worked with developers on Brownfield sites to redevelop the sites for mixed-used end design. She has provided oversight for subsurface investigations for metals, petroleum, PAHs impacts under the VPLE Program of the WDNR. Ms. Woelfel has also provided data reduction and reporting in support of a site-specific remedial plan and capping which incorporated the final site use. Following the VPLE closure, Ms. Woelfel worked with the developer and construction crews to ensure the soil management for each phase of the development was followed, as well as providing construction documentation. Ms. Woelfel has also provided geological and hydrogeological support for the closure and redevelopment of a former coal barge offloading facility in Chicago.

Project Manager – Creosote Facility, Texas. Ms. Woelfel provided geological review of site data, including fault lines traversing the project facility for support of site investigation and remedial objectives. The facility was heavily impacted with creosote in soil and groundwater with dissolved plume migrating off-site into a residential area. Ms. Woelfel worked with stakeholders on the site issues and concerns, as well as the requirements and budgets for achieving site regulatory closure.

Additional Training

- 40-Hour OSHA Health and Safety Training
- 40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Certification
- 8-Hour OSHA Hazwoper Supervisor Training
- 8-Hour OSHA Refresher

Presentations

Woelfel, Heidi and James Drought (April 2011). *RiverHeath Brownfield Redevelopment*. Wisconsin Ground Water Association (WGWA) Annual Seminar. Brookfield, Wisconsin.

Affiliations

- Wisconsin Council on Recycling, Secretary
- Parks Commission Member Richfield, Wisconsin



Wayne W. Cobleigh

Associate Principal- Resilience Finance Consultant

Summary of Experience

Mr. Cobleigh has provided consulting services on environmental issues since 1982 and he has been GZA's corporate representative to the USGBC since 2008. He has actively participated in the Connecticut Green Building Council and is in his second term as Vice Chair on the Board of Directors. He presented at several workshops and seminar courses on topics, including financing resilience, risk assessment, and redevelopment of environmentally impacted properties and brownfields. In 2013, he initiated a voluntary effort with the Connecticut Department of Energy and Environmental Protection and several other government stakeholders from Connecticut and New York City involved with property & casualty insurance, property assessed finance of clean energy and long-term disaster recovery and rebuilding to evaluate methods for financing flood loss reduction measures of existing structures to improve resiliency and affordability of NFIP premiums. The US Army Corp. of Engineers recognized this innovative financial initiative in response to disaster recovery and mitigation after Superstorm Sandy in their report to Congress. He presented the progress of this resilience finance initiative at the May 2017 National Conference for the Association of State Floodplain Managers.

Relevant Project Experience

Co-Author, *Financing Climate Resilience, Mobilizing Resources and Incentives to Protect Boston from Climate Risks*, UMASS Boston Sustainable Solutions Lab, Barr Foundation and Boston Green Ribbon Commission, Boston, Massachusetts.

Contributing author and researcher on an interdisciplinary research team analyzing alternatives for building-scale, neighborhood-scale, district-scale, and harbor protection-scale financing mechanisms that can be adapted for resilience and climate adaptation investments for the City of Boston. Provided analysis of Property Assessed Clean Energy (PACE) financing for Property Assessed Resilience (PAR) by analyzing finance mechanisms in Connecticut, Florida and California. This 54-page research paper was published in April 2018 and cited 124 sources of research on finance and funding of resiliency to climate risks. Researched Global Covenant of Mayors Cities partnering with World Bank via the [City Resilience Program](#) in December 2017 to create a [World Bank Resilience Fund](#) to lend \$4.5 Billion U.S. to 150 cities to address the threats of climate change and to implement sustainable initiatives and climate resilience programs.

Project Coordinator, Property Assessed Resilience Finance Task Force, State of Connecticut, Hartford, Connecticut. Since 2013, Mr. Cobleigh coordinated with Connecticut Department of Energy and Environmental Protection (DEEP), the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) at the University of Connecticut and a multi-disciplinary team of architects, engineers, regulators, financial lenders, trade association leaders, risk managers and insurance professionals sharing a common interest in solving the problem of escalating NFIP and property casualty insurance premiums. Property Assessed Resiliency (PAR) emerged from these discussions as an innovative financing model for the design, renovation and construction of resilient buildings and infrastructure. He has provided testimony to the Connecticut Legislature on a bill enabling the Connecticut Green Bank to provide PAR

Education

B.A., Biology and Environmental Science, Colby College
M.B.A., Marketing, University of Phoenix Online

Professional Affiliations

- Boston Harbor Now Climate Change Task Force Co-Chair
- Past State Director, CT and Program Planning Committee Director New England Conference and Deal Making International Council of Shopping Centers, Boston, MA
- Chairman, Vice-Chairman, Board of Directors, CT Green Building Council, 2014-present
- Member Association of State Floodplain Managers, 2012 to present
- Environmental Business Council of New England Resilience Finance Program Speaker 2016, 2017

Areas of Specialization

- Financial Resilience and Climate Preparedness
- Siting and Permitting Support
- Hazardous Materials Management
- Real Estate Development and Brownfields Redevelopment
- Supply Chain Management
- Contract Administration
- Voluntary Resilience Standards
- MA MVP Vendor Stakeholder Engagement Training (July 2018) on Community Resilience Building



Wayne W. Cobleigh

Associate Principal- Resilience Finance Consultant

financing for residential properties in the 2016 and 2017 legislative sessions. He provided similar testimony supporting proposed PAR legislation to the Massachusetts Legislature in 2017.

In 2016 and 2017, Mr. Cobleigh co-authored ***Financing Resilience in Connecticut: Current Programs, National Models, and New Opportunities***. The publication in the online Sea Grant Law & Policy Journal is co-authored by Rebecca French, Ph.D., CIRCA, Jessica LeClair, and Yi Shi. This publication is one the first research products in that area that was supported in part by the grant from the Department of Energy and Environmental Protection that created CIRCA. ***CIRCA released a [Fact Sheet: Resilience Financing Options in Connecticut](#)***.

Peer Reviewer, Feasibility of Harbor-wide Barrier Systems, Preliminary Analysis for Boston Harbor, UMASS Boston Sustainable Solutions Lab, Barr Foundation and Boston Green Ribbon Commission, Boston, Massachusetts. [Click to Review Feasibility Study](#)

Selected Publications and Presentations

Financing Resilience in Connecticut - Current Programs, National Models, and New Opportunities, French, Cobleigh, Shi and LeClair, August 2017. *Sea Grant Law & Policy Journal*, Volume 8:1. [Click to View Online](#).

Financing Resilience in Connecticut - Current Programs, National Models, and New Opportunities, Presentation French, Cobleigh, Shi and LeClair, 2014, 2015 and May 3, 2017. Association of State Floodplain Managers, Kansas City, MO National Conference and Connecticut Green Building Council Presentation, Hartford, CT March 28, 2017.

Rethinking Construction Design and Finance for Climate Resilience, *Revitalization News*, Online Issue #63, November 15, 2017, Wayne Cobleigh [Click to View Article](#).

Viewpoint Resilience in Boston, Small Fixes are Best, Wayne Cobleigh's guest article published in *Engineering News Record*, October 8, 2018.



John A. Schneider, P.E.

Associate Principal

Summary of Experience

John Schneider has over 36 years of experience in the environmental consulting field; 30 of which have been in air quality management and environmental compliance. Areas of specialty in air quality management include New Source Review (NSR) and Title V Renewable Operating Permit applications, compliance certifications, deviation reporting, emissions inventories, and dispersion modeling. Regulatory compliance experience includes regulatory compliance audits, spill prevention planning (SPCC, state spill plans and integrated contingency plans), Superfund Amendments and Reauthorization Act (SARA) Title III reporting (including Section 312 Tier II and Section 313 Form R reports), environmental assessments and hazardous materials management.

Relevant Project Experience

Completed and assisted in preparation of multiple permit-to-install applications for various new and/or modified sources of air emissions. Examples include auto and light duty truck surface coating operations (i.e., automotive assembly plants), a natural gas fired turbine CHP facility, industrial sand processing and coating operations, corn based ethanol plant, gasoline/diesel internal combustion engine testing facilities, Portland cement manufacturing, plastics injection molding, vinyl stretch and windshield laminating, surface coating of plastic and metal parts, grey iron foundries, machining of metal parts, aluminum die cast operations, and research and development operations.

Assisted with the air quality permitting for the construction of new natural gas-fired turbines for electrical and steam production. The PSD permit application included estimating potential GHG emissions and associated best available control technology analysis. Negotiated terms and conditions with the Michigan Department of Environmental Quality - Air Quality Division (MDEQ-AQD)

Assisted a large automobile manufacturer with management and analysis of the Section 112 Clean Air Act requirements applicable to automotive manufacturing facilities. This assignment included analyzing the current status of facilities with respect to proposed MACT standards, developing emission profiles of current facilities with respect to major source status for hazardous air pollutants, development and submittal of Part I applications pursuant to the 112 (j) "hammer" provisions and development of recordkeeping and reporting strategies for applicable categorical 112(d) MACT standards.

Provided expert witness services related to an air quality permit application associated with a crematory. Investigated potential emissions from the process and evaluated conformance with state permit requirements including air toxics regulations and air dispersion modeling requirements. Case was settled in clients favor based upon GZA's involvement.

Project Manager for Toxic Release Inventory/National Pollutant Release Inventory (TRI/NPRI) reports which included SIC Code applicability determinations, data acquisition, release calculations and Form R/NPRI form preparation for approximately 45 facilities operated by a large automobile manufacturing company for the 1990 to 1993, 1997 to 2004, and 2006 to 2011 reporting years. Documentation reports were prepared for each facility and up to 250 Form Rs/NPRI Forms were compiled for submittal each reporting year. Personally visited up to 6 facilities and prepared up to three documentation reports

Education

B.S., Pulp and Paper Science, Michigan Technological University, 1980
M.S., Chemical Engineering, Michigan Technological University, 1984

Licenses & Registrations

Professional Engineer:
Michigan #39200, 1993

Areas of Specialization

- Air Quality Management
- Regulatory Compliance
- Environmental Compliance & Auditing



John A. Schneider, P.E.

Associate Principal

per year, including automotive assembly plants. Beginning with the 1997 reporting year, implemented use of direct connection to client's database for threshold determinations by process, calculation of releases by process and completion of Form R submittals.

Conducted and/or participated in environmental compliance audits at various manufacturing facilities including sites in Canada. The objectives of these projects were to identify any potential non-compliance issues which may exist and recommend the type of actions that could be taken by the owner/manager to bring the facility into compliance in the most cost-effective manner possible.

Participated in twelve comprehensive compliance audits of hazardous waste treatment, storage and disposal (TSD) facilities. Audits were conducted on behalf of a consortium of Fortune 500 companies (WSIG) for purposes of evaluating risks associated with the use of such facilities. Principal auditor and author for seven of the audits.

Provided air quality permitting and other environmental permitting services to be utilized in the design and construction of a new biogas digestion and electrical generation facility. The bioenergy project was proposed to process sewage sludge and additional organic waste streams including fats, oils and greases (FOG), cellulosic lawn and garden materials, and industrial food processor waste streams for conversion to methane and fertilizer via anaerobic digestion. Prepared the air quality permit application and negotiated terms and conditions with the Michigan Department of Environmental Quality - Air Quality Division (MDEQ-AQD)

On behalf of a large manufacturing association, prepared and presented a pilot study/analysis of the current recordkeeping systems and intricacies related to compliance with recordkeeping and reporting requirements for a Section 112(d) maximum achievable control technology (MACT) standard applicable to a large automobile manufacturing facility.

Calculated and analyzed criteria (e.g., volatile organic compounds [VOCs], particulate matter [PM]) emissions to determine applicability of non-attainment provisions (i.e., lowest achievable emission rate [LAER]), and attainment provisions (i.e., prevention of significant deterioration [PSD]). Evaluated recent permits and data in the (RBLC) to assess LAER for VOC and nitrous oxide (NOx) at automotive assembly plants. Conducted best available control technology (BACT) analysis of emission sources to determine if controls are technically and economically feasible, non-criteria air pollutant reviews under Michigan's and Ohio's Air Toxics Rules, and negotiation with regulatory agencies. Determined ambient concentrations using a screening matrix and computer dispersion modeling (e.g., ISCST). Evaluated new source performance standards (NSPS) applicability.

Participated in a corporate "Title V Committee" that tracks the Title V status of facilities, reviews Title V applications, reviews and comments on pre-draft and draft Title V permits, reviews and responds to agency responses to comments.

Reviewed and prepared comments on various pre-draft Title V permits and draft Title V permits issued for public comment.

Assisted facilities in resolving Notices of Violation (NOV).

Assisted with development of a request for a "Clean Unit" designation made as part of a Title V application in accordance with NSR Reforms. The request was related to a VOC emission source that had been recently permitted under the federal NSR program and had implemented the requirements of the resultant BACT determination.

Experienced with data entry into and utilization of the HAZMIN and MACT database systems and knowledgeable in the use of HASCON system. Proficient in the use of Microsoft Office products, including MS Word, MS Excel and MS Access.

Conducted five transfer efficiency and three capture efficiency studies of automotive parts coating systems. Determined the experimental design of the transfer and capture efficiency studies, which included interaction with regulatory personnel.

Performed an emissions inventory related to VOCs, using mass balance techniques in conjunction with direct measurements, to document releases from a cabinet manufacturing and finishing facility.

Team member for a corporate level, business process redesign of a major automobile manufacturer's environmental database utilized for various environmental reporting activities, including TRI (SARA Title III) Form Rs and air emission reports.

Team member of corporate audit team responsible for review of air quality issues.

Prepared documentation reports and Form Rs for various, large manufacturing facilities. Facilities included chemical production facilities, automotive assembly plant, and a major automotive manufacturer's parts and sub-assembly facility.



John A. Schneider, P.E.

Associate Principal

Developed and conducted several workshops on TRI Reporting.

Managed as well as personally completed Tier II submittals for various operations including large manufacturing facilities. Set up data management procedures to manage written records of material composition and inventory data.

Managed as well as personally completed annual emission statements for facilities in various states, e.g., Illinois, Michigan, and Indiana.

Performed over 60 comprehensive Phase I environmental site assessments for purchasers, sellers, attorneys, or financial institutions to identify potential environmental liabilities pursuant to commercial real estate transactions in numerous states.



Richard O. Ray

Senior Transportation Planner/Environmental Justice Specialist

Summary of Experience

Richard Ray is a Senior Transportation Planner who specializes in NEPA projects and environmental analysis. Mr. Ray is a pre-qualified EA and EIS lead and is also IDOT prequalified for Community Impacts, Public Involvement and Technical Writing. He has 22 years of experience in National Environmental Policy Act (NEPA) analysis. He has worked on 12 Environmental Impact Statements (EISs) and 20 Environmental Assessments (EAs). He has conducted NEPA studies in numerous states including Illinois, Michigan, Indiana, Florida, Kentucky, Missouri, and Ohio.

Relevant Project Experience

- IDOT prequalified as EIS lead, Community Impacts (EIS), Public Involvement, and Technical Writing
- US 51 Environmental Impact Statement (EIS), South Central Illinois
- East Side Highway Environmental Assessment (EA), Bloomington-Normal, IL
- IL 47 Environmental Assessment, Grundy and Kendall Counties, IL
- Willow Road Environmental Assessment, Cook County, IL
- IL 173 Environmental Assessment and Section 4(f) documentation, Lake County, IL
- I-55 at IL 126 and Airport Road Environmental Assessment, Will County, IL
- Weber Road at I-55 Categorical Exclusion, Will County, IL
- I-290 Environmental Impact Statement (EIS), Cook County, IL
- Illiana Corridor Project Environmental Impact Statement, Will and Kankakee Counties, IL and Lake County, IN
- IL 53 NEPA documentation and environmental analysis, Will County, IL
- Laraway Road NEPA documentation and environmental analysis, Will County, IL
- US 20 NEPA and Section 4(f) documentation, Kane and Cook Counties, IL
- I-80 Environmental Assessment and environmental analysis, Will County, IL
- Lemont Road NEPA documentation and environmental analysis, DuPage County, IL
- Channahon-Minooka Road NEPA documentation and environmental analysis, Will County, IL
- High Speed Rail Environmental Impact Statement review, Chicago, Illinois to St. Louis, MO
- High Speed Rail Environmental Assessment and Categorical Exclusion reviews, Chicago, Illinois to St. Louis, MO
- Intercity Passenger Rail Environmental Study, Elgin to Rockford, IL
- Fox River Metra Bridge Environmental Assessment, Elgin, IL
- Houbolt Road Environmental Analysis, Joliet, IL
- Elgin O'Hare Western Access (EOWA) Environmental Analysis, DuPage County, IL
- I-294 Environmental Evaluation Document (EED), Cook County, IL
- I-90 Environmental Evaluation Document (EED), Winnebago, Boone, McHenry, and Kane Counties
- Illinois Tollway Environmental Studies Inventory Sheets (ESIS) for several projects

Education

M.S., Urban and Regional Planning
(Transportation and Economic Development double major), University of Iowa, 1996
B.A., Political Science and History
Double Major, University of Iowa, 1994

Licenses & Registrations

Transportation Studies Certificate, 1996,
University of Iowa

Areas of Specialization

- NEPA Documentation EIS/EA
- Section 4(f) Documentation
- Section 106 Documentation
- Corridor Studies
- Environmental Justice
- Socioeconomics



Richard O. Ray

Senior Transportation Planner/Environmental Specialist

Experience Prior to GZA

The Corradino Group - 1996 to 2010

NEPA DOCUMENTATION EIS/EA

Environmental Lead and NEPA Documentation of the Section 3 I-69 EIS in Indiana. Managed the EIS and prepared the Community Impact Assessment and the Record of Decision (ROD). The project covers 26 miles of new interstate from US 50 to US 231. Part of the project area is near a large Amish population and extensive coordination was conducted to minimize impacts. The project was highly controversial and involved extensive public and agency involvement. The DEIS received a ranking of LO (Lack of Objections) from the EPA which is the best ranking possible for an EIS.

Project Manager and Environmental Lead for the SR 23 EA in South Bend, Indiana. The project involved the widening of a two-lane road into a four-lane road. The project resulted in the relocation of 45 homes in an environmental justice area. Extensive public involvement was conducted and context sensitive solutions were developed.

Environmental Lead for the SR 62 (Lloyd Expressway) EA in Indiana. which included a 4(f) statement for the demolition of a property listed on the National Register of Historic Places and the use of a public park. The \$230 million project will convert 5.5 miles of SR 62 into a freeway with three new interchanges replacing all existing signalized intersections.

Environmental Lead for the I-465 EA in Indianapolis. The project includes the widening of 11 miles of interstate and the replacement of the existing interchanges on the beltway around Indianapolis's west side.

Environmental Lead for the Oak Hill Road EA in Evansville, Indiana. The project included road widening and the addition of bike lanes and sidewalks.

Environmental Lead for the Boonville SR 61 Bypass EA in southern Indiana. The project includes a combination of new roadway and improvements to existing roadways to create a bypass of Boonville. The project impacts areas of farmland, former coal mines, forests, wetlands, and floodplains.

Environmental lead for cultural and recreational resources, and Section 4(f) documentation for the Detroit Intermodal Freight Terminal (DIFT) EIS. Assisted with the purpose and need, alternatives analysis, socioeconomic analysis, public involvement, and QA/QC review of the EIS. This \$650 million project will combine the intermodal terminals of three Class I railroads at one location and make improvements to the local road and interstate network in the area of the terminal.

Environmental lead for cultural and recreational resources, and Section 4(f) documentation for the Detroit River International Crossing (DRIC) EIS. Assisted with the purpose and need, socioeconomic analysis, public involvement, agency coordination, and provided QA/QC review of the EIS. The \$1.8 billion project includes a new international bridge between Detroit, Michigan and Windsor, Canada along with a new interchange at I-75. The project is expected to have 257 residential and 43 business displacements.

Managed analysis of cultural and recreational resources, and Section 4(f) documentation for the 20 mile M-15 EIS. Assisted with the development of the purpose and need, alternatives analysis, socioeconomic analysis, public involvement, agency coordination, and provided QA/QC review of the EIS.

Managed analysis of cultural and recreational resources, and Section 4(f) documentation for the I-75 EIS. Assisted with the development of the purpose and need, alternatives analysis, socioeconomic analysis, public involvement, agency coordination, and QA/QC review of the EIS. The \$572 million project will result in the widening of 18 miles of I-75 with one lane dedicated to HOV use during peak hours.

Co-author of the US 231 EIS in Southern Indiana. The project includes a new 22 mile four-lane divided highway linking a new Ohio River bridge to I-64. In addition to co-authoring the EIS conducted socioeconomic analysis and public and agency coordination.

Co-author of the SR 641 (Terre Haute Bypass) EIS. The project includes a new 6.2 mile freeway southeast of Terre Haute, Indiana that will connect with US 41 and I-70. In addition to co-authoring the EIS conducted socioeconomic analysis and public coordination.



Richard O. Ray

Senior Transportation Planner/Environmental Specialist

Environmental lead for the on-call statewide NEPA contract for INDOT. The projects involved preparing or reviewing over 20 CEs, an EA, and an EIS reevaluation for NEPA projects throughout all parts on Indiana.

Environmental lead for cultural/historic resources, recreation facilities, and the 4(f) evaluation for the Ft. Lauderdale-Hollywood Int. Airport EIS. The project involves the expansion of Runway 9R/27L and other airport projects.

Environmental lead for the East Side Transit Center EA for the Cleveland RTA. The project involves a new intermodal transit center at Prospect and East 21st Street along the Euclid Corridor Transportation Project bus rapid transit (BRT) line.

SECTION 4(F) DOCUMENTATION

- 4(f) evaluation for the use of forest preserves for the IL 173 EA in Lake County, IL.
- 4(f) evaluations for the use of a park and a trail for the US 20 project in Elgin, IL.
- 4(f) evaluation for the use of a historic resource for the SR 23 EA in South Bend, Ind.
- 4(f) evaluation for the demolition of a National Register listed building and the use of a public park for the SR 62 (Lloyd Expressway) EA.
- 4(f) evaluation for the use of multiple historic resources for the Detroit Intermodal Freight Terminal (DIFT) EIS.
- 4(f) evaluation for the use of multiple historic resources and a public park for the Detroit River International Crossing (DRIC) EIS.
- 4(f) evaluation for the use of multiple historic resources for the M-15 EIS in Oakland and Genessee Counties, MI.
- 4(f) evaluation for the use of a recreational area for the SR 67 CE in Delaware County, Ind.
- 4(f) evaluation for the use of a historic bridge for SR 39 in Martinsville, IN.

SECTION 106 DOCUMENTATION

- Prepared the Section 106 documentation for several EAs and CEs throughout Indiana.
- Managed Section 106 consultants for several EIS, EA, and CE projects in Indiana and Michigan.

CORRIDOR/FEASIBILITY STUDIES

- US 231 Environmental Assessment/Corridor Study (INDOT).
- SR 62 Environmental Assessment/Corridor Study (INDOT).
- I-75 Corridor Study (MDOT)
- I-73 Corridor Study (MDOT)
- Detroit River International Crossing (DRIC) Feasibility Study (MDOT).
- Detroit Intermodal Freight Terminal (DIFT) Feasibility Study (MDOT).

INTERCHANGE JUSTIFICATION STUDIES

- Prepared the IJS for US 231 at I-64 in southern Indiana.
- Prepared the IJS for SR 641 at I-70 in Terre Haute, Ind.

ENVIRONMENTAL SITE ASSESSMENTS

- Conducted environmental audits for several Kentucky Transportation Cabinet maintenance sites.
- Conducted phase I environmental assessments for several private clients.
- PESAs, PESA Validations, and PESA Responses for the Chicago to St. Louis High Speed Rail project.

Certifications/Training

- NEPA and the Transportation Decision Making Process, FHWA/INDOT (2002, 2005, 2007, 2009, 2011, 2013, 2015, 2016, 2017, 2018)
- ACEC-Illinois/IDOT Phase II Training, IDOT (2017)



Richard O. Ray

Senior Transportation Planner/Environmental Specialist

- ACEC-Illinois/IDOT Illinois Technical Series, Beyond the Norm Training, IDOT (2017)
- ACEC-Illinois/IDOT Phase I Training, IDOT/FHWA (2016)
- NAEP National Conference, presented on sustainability measures of the East Side Highway EA (2016)
- INVEST Sustainability Workshop, Illinois Tollway (2014)
- NEPA Workshop, IAEP and WTS (2014)
- Northern Long-Eared Bat seminar USFWS and IAEP (2013)
- Technology of Participation ToP Facilitation Methods, Institute of Cultural Affairs (2013)
- Understanding the Local Roads Process from Agreements through Construction, IDOT and ACEC (2013)
- Environmental Issues that Affect Tollway Projects, Illinois Tollway and ACEC (2012)
- NEPA – Categorical Exclusion Training, FHWA and INDOT (2006, 2008)
- Cultural Resources Workshop for Qualified Professionals, FHWA and INDOT (2008)
- Community Impact Assessment and Context Sensitive Solutions/Design, FHWA, INDOT, and KYTC (2003)
- Introduction to Section 106 Review, Advisory Council on Historic Preservation/the University of Nevada, Reno (2002)
- FHWA/KYTC Joint Procedures for Implementing Section 106 (2001)
- EPE Analysis and Documentation Process, FHWA and MDOT (2001)



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

Summary of Experience

Mr. Lecco is an Associate Principal with 30 years of experience in planning, permitting and environmental analysis for waterfront, airport, highway, utility, site development, recreation, natural resource management, energy facility and site remediation projects. His role in these projects has been in project management, agency coordination, public participation, report writing, technical analysis and mapping. He has been involved in numerous large-scale planning efforts throughout the Northeastern United States, Illinois, California and the Caribbean. His broad knowledge of many technical elements allows him to successfully manage large-scale interdisciplinary and complex projects that are required to comply with NEPA, Section 404/401 Clean Water Act, Coastal Zone Management, National Historic Preservation Act, Endangered Species Act, Magnuson-Stevens Act and other federal, state and local laws, regulations and policies.

Relevant Project Experience

Project Manager, Various Eversource Projects in Connecticut. Managed and/or co-managed environmental permitting aspects of several transmission line upgrades, distribution line replacement and substation projects for Eversource in Connecticut. Managed resource delineation/mapping, cultural resource studies, permit applications and Connecticut Siting Council Petitions for the following projects:

- Towantic Line Upgrades/Switching Station, Oxford/Middlebury/Waterbury
- 1710/1730 Line Upgrades, Milford, Stratford and Trumbull
- 1622/1770 Transmission Line Replacement, Southbury
- 1975 Line Upgrade, Middletown & Durham
- 1655/1537 Line Split, Branford
- 11Y3-11Y7 ROW Distribution Rebuild, Old Lyme
- Right-of-Way Vegetation Management, Branford to Wallingford
- 1256 Line Structure Replacements, Canton & Simsbury

Project Manager, U.S. Coast Guard Academy Waterfront Improvements, New London, Connecticut. Managed preparation of State and Federal environmental permit applications for demolition and construction of Jacob's Rock Causeway and Main Pier as well as improvements to shoreline road and revetment structures as part of Design-Build team. Prepared Essential Fish Habitat Analysis and coordinated with NMFS, CT DEEP, USACE and other agencies.

Project Manager, U.S. Coast Guard New London Station Waterfront Improvements, New London, Connecticut. Managed preparation of State and Federal environmental permit applications for demolition of existing pier, construction of a floating wave attenuator, extension of floating docks and shoreline protection as part of Design-Build team. Prepared Essential Fish Habitat Analysis and coordinated with NMFS, CT DEEP, USACE and other agencies.

Project Manager, Charles River Dredging, Brighton, Massachusetts. Managed feasibility study, design and permitting for removal of 7,500 cy of accumulated sediment along the southern shoreline of the river for the MA Department of

Education

M.S. Environmental Science, University of New Haven
B.A. Geography/Urban & Regional Planning, Central Connecticut State University (cum Laude)

Licenses & Registrations

Certified Planner, American Institute of Certified Planners
Certified Environmental Professional, National Association of Environmental Professionals
Transportation Worker Identity Certification (TWIC)
OSHA 10-HR Safety Training

Areas of Specialization

- Environmental Impact Evaluation
- Federal/State/Local Permitting
- Wetland Assessment
- Trail Assessment & Planning
- Sediment Assessment
- Land Use Planning



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

Conservation and Recreation. Project includes bathymetry survey, sediment sampling, disposal alternatives analysis, permitting and dredge design.

Project Scientist, Seawolf Homeporting EIS, Groton/New London, Connecticut. Technical manager of \$2 million EIS for 1.1 million cubic yard dredging project for U.S. Navy Northern Division. Analyzed environmental and socioeconomic impacts of dredging and disposal impacts in Groton/New London, CT, Norfolk, VA and Kings Bay, GA. Provided technical information to the Navy in successful legal defense of the project in federal court.

Project Scientist, Pier 17 Environmental Assessment, Groton/New London, Connecticut. Project manager and principal author for U.S. Navy project involving reconstruction of pier to accommodate submarine floating dry dock. Designed sampling and testing plan for testing of sediments.

Project Planner, Bulkhead Repair at Joseph Seymour Power Plant, Brooklyn, New York. Prepared City, State and Federal permit applications for 140 feet of bulkhead repair in Gowanus Bay. Coordinated with NYDOS, NYDEC, Army Corps of Engineers and City Planning Department to develop a preferred plan. Assisted in the preparation of an alternative analysis to support the preferred plan.

Environmental Planner, Columbia East Dock Replacement, Manhattan, New York. Currently preparing local, state and federal permit applications (DEC, USACE, DOS, DCP, SBS, DPR) for recreational dock replacement owned by the New York City Department of Parks and Recreation but used by Columbia University for their crew team. Replacement dock would be situated above tidal flats to avoid impacts.

Project Planner, Retaining Wall Reconstruction, Arthur Kill, Staten Island, New York. Prepared NYS DEC Tidal Wetlands/Article 25/Article 15/Water Quality Certificate applications and Section 404 Jurisdictional Determination information to support reconstruction of a storm-damaged retaining wall for private residences along the Kill van Kull.

Project Planner, Bulkhead Replacement along Gowanus Canal, Brooklyn, New York. In process of coordinating permitting efforts for a proposed 600-foot steel bulkhead along the shore of the Gowanus Canal, an EPA Superfund Site. The bulkhead and associated upland NAPL recovery will be designed to impede groundwater contamination from further degradation of the canal in this area. This project is part of the overall proposed remedy for the canal cleanup which will also include a major sediment dredging, treatment and capping effort.

Project Manager, Consue Springs Dredging and Stormwater Improvements, Nantucket, Massachusetts. Mr. Lecco is managing this project which involves the dredging of Goose Pond, a tidally influenced pond in the Consue Springs section of Nantucket. The project involves restoration of full tidal flow to the pond via changes to the existing culvert that connects the pond to The Creek. Stormwater improvements along the perimeter of the pond are also being evaluated and designed.

Environmental Scientist, Shoreline Erosion Repair, New London, Connecticut. Prepared permit applications for repair of severely eroded shoreline that affected an existing sewage pump station. Local Planning and Zoning approval was attained and coordination with DEEP Office of Long Island Sound was carried out to avoid impacts below the Coastal Jurisdiction Line (CJL).

Project Manager, Woods Hole Ferry Terminal Reconstruction, Falmouth, Massachusetts. For the Steamship Authority, prepared local, state and federal permit applications for reconstruction of a 3-slip ferry terminal in Woods Hole. Work includes new piers, platforms, bulkheads, transfer bridges, terminal building and parking lot reconfiguration. Interfaced with CZM, Conservation Commission, DEP, USACE and NMFS during permitting process to develop BMPs and mitigation measures.

Project Manager, Milford Pond Aquatic Habitat Restoration, Milford, Massachusetts. Assisted in the preparation of an EIR that addressed impacts of restoring (dredging) Milford Pond for recreational and ecological benefit. Project involves the dredging of 250,000 cy of sediment from the middle/lower pond and hydraulically pumping sediments to a 30-acre containment area to be constructed and managed as Atlantic White Cedar swamp and cattail marsh habitat. Prepared MA DEP and Town of Milford permit



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

applications in close coordination with the project sponsor, the USACE. Coordination with MA Natural Heritage Endangered Species Program regarding potential project impacts and benefits.

Project Scientist, New London Disposal Site Monitoring Plan, Long Island Sound, Connecticut/New York. For the U.S. Navy and the U.S. Army Corps of Engineers, developed a comprehensive disposal monitoring plan for proposed disposal of sediments at the New London Disposal Site, a designated open water site under the Corps' Disposal Area Monitoring System. Developed plan for hydrographic survey, benthic sampling, side-scan sonar and sediment profile imaging.

Project Planner, Waterfront Improvements at PSEG Bridgeport Harbor Station, Bridgeport, Connecticut. Evaluated permitting requirements associated with proposed repair/replacement of fuel dock and shoreline protection structures damaged by Superstorm Sandy.

Environmental Scientist, Proposed Sediment Disposal Policy Changes for the Historic Area Remediation Site (HARS), New York Harbor. As part of an international marine sediment team, Mr. Lecco prepared a detailed response to the USACE/EPA proposal to limit sediment disposal at the HARS. The proposal called for a modification to the subaqueous capping procedure being proposed by the agencies.

Project Scientist, Maintenance Dredging at Piers 2 & 3, Naval Weapons Station Earle, New Jersey. Developed and implemented sediment sampling and testing plan for proposed maintenance dredging to support Naval surface ship homeporting. Testing included chemical and biological tissue analysis of PCBs, dioxins and furans to determine suitability for disposal at the HARS.

Great Cove Boat Club Dredging, Eliot, Maine. Managed hydrographic survey and dredging feasibility study for proposed maintenance dredging of boat slips in the Piscataqua River.

Project Scientist, Dredged Material Management Plan/Environmental Impact Reports for Gloucester, Salem, Fall River, New Bedford, Massachusetts. For the Massachusetts Office of Coastal Zone Management, Mr. Lecco developed and managed a 167-station sediment sampling and testing program for state and federal projects within Salem, Gloucester, New Bedford and Fall River harbors. He assessed impacts to submerged aquatic vegetation, lobsters and fisheries from various disposal alternatives in each of the harbors. He also participated in the development of new Dredging Regulations for the Commonwealth, particularly the adoption of new sediment quality guidelines. He prepared and presented sediment quality workshops in all four harbors.

Project Scientist, Enighed Pond Marine Terminal, St. John, U.S. Virgin Islands. Managed environmental studies and permitting for a proposed new marine terminal within an existing salt pond. Studies included sediment transport analysis, wetland and coral impacts and development of a mangrove sediment forebay

Environmental Scientist, Biological Assessment for the Shortnose Sturgeon, Connecticut River, Massachusetts. Assisted in the preparation of a Biological Assessment as required under the Endangered Species Act for U.S. EPA Region I in support of a basin-wide program for renewal of NPDES permits for discharges to the CT River in MA.

Project Manager, Pine Creek Dredging Feasibility Study, Fairfield, Connecticut. Managed feasibility study for dredging and disposal of sediments from a 2-mile section of lower Pine Creek. Managed bathymetric and sediment sampling surveys, compared test results to open water and upland disposal criteria and identified/evaluated disposal options.

Project Scientist, Bass Creek Restoration Project, Marshfield, Massachusetts. Developed a 5-year post-construction monitoring program involving the removal of phragmites and accumulated sediments within a 4,600 segment of Bass Creek, a tributary to Green Harbor in Marshfield, MA. The project was designed to improve tidal flow to the creek to improve anadromous fish habitat and reduce inland flooding. Preliminary results indicate a significant increase in tidal exchange throughout the project area. Results will be coordinated with MA CZM monitoring efforts downstream.

Windsor Locks Canal Dredging Feasibility Study, Windsor Locks, Connecticut. Managed hydrographic survey and evaluated



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

permit needs for proposed dredging of historic canal. Several shoal areas were identified as hydraulic barriers to flow needed for downstream industrial processing facility. Total length of the study area was approximately 2 miles.

Project Scientist, Ash Creek Pedestrian Bridge Feasibility Study, Bridgeport/Fairfield, Connecticut. Managed environmental portions of the study to determine natural resource issues associated with crossing over a tidal stream that includes an extensive mud flat and upland coastal meadow habitat. Evaluated the potential for constructing the bridge within an ELUR and Conservation Easement associated with the remediation of the Fairfield Metro Center.

Project Manager, Naval Training Center Great Lakes Boat Basin Dredging EA, North Chicago, Illinois. Managed a federal Environmental Assessment for the proposed dredging of the boat basin at the Navy's largest Naval Training Center in the Midwestern U.S. Evaluated sediment results and impacts to aquatic biota. Compared sediment data to applicable upland disposal criteria.

Project Manager, Marina Dredging, Westbrook, Connecticut. Secured permits for a proposed 2,000 cubic yard maintenance dredging project at Bill's Marina in Westbrook, CT. Coordinated sediment sampling and testing plan.

Environmental Planner, Shoreline Protection at DeMarco Park, Queens, New York Prepared City, State and Federal permit applications for repair of 1,500 linear feet of revetment damaged by Superstorm Sandy.

Project Scientist, South Branch Park River Maintenance, Hartford/W. Hartford/Newington, Connecticut. For the CT DEEP, developed sampling and testing plan for sedimentation areas along 7 miles of river including Park River, Trout Brook and tributaries. Delineated wetlands in and near proposed work areas.

Project Scientist, Dredging Time-of-Year Study, Connecticut. For CTDEEP, evaluated permit applications for all dredging projects in and near Long Island Sound to catalog TOY restrictions imposed by DEEP and USACE for protection of marine/estuarine fish and shellfish.

Project Planner, Henry Hudson Bridge Skewback, Concrete Piers and Northern Abutment Repairs, Bronx and Manhattan, New York. Managed all permits associated with design-build project with work occurring within New York City park property. Including NYC Parks, Department of City Planning, USACE, NYDEC and SEQR documentation. Also prepared Noise Mitigation Plan due to proximal sensitive receptors.

Project Planner, Breakwater Repair EA, North Chicago, Illinois. Principal author of a federal Environmental Assessment for the repair of a breakwater at the Naval Training Center Great Lakes harbor on Lake Michigan. The existing stone breakwater was undermined in several locations and required repair to protect the Navy's boat basin.

Project Planner, Power Plant Upgrade, Queens, New York. Identified and evaluated permit requirements for proposed expansion of major power plant facility on a tidal river in Queens. Principal author of comprehensive permitting guidance document that evaluated the requirements and time frames for local, state and federal permit requirements including SEQR and Article IX.

Project Scientist, Marginal Wharf Design, Tiltonsville, Ohio. Developed and implemented sediment sampling and testing plan along portion of Ohio River shoreline for the purpose of constructing a marginal wharf for off-loading of sand to a sand processing facility. Managed preparation of environmental permits to Corps of Engineers and Ohio EPA.

Environmental Planner, Waterfront Improvements at Hess Marine Terminal, Perth Amboy, New Jersey. Assisted in preparing permit applications for proposed bulkhead, pier and floating dock improvements at oil terminal facility on the Raritan River in NJ. Permits included Waterfront Development Permit from NJDEP and Nationwide Section 404 Permit from the USACE.

Environmental Impact Assessment Project Manager, Quinebaug Regional Technical Park EIE, Putnam, Connecticut. Managed preparation of EIE that evaluated environmental impacts of construction a new vehicular bridge to access 267 acres of land for development of a regional technical park including a regional YMCA. Project involved endangered species surveys for



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

herpetiles and Phase I/II archaeological surveys as required by SHPO. Project set-aside 92 acres along the Quinebaug River for conservation. Project was sponsored by the Connecticut Department of Economic and Community Development, the Town of Putnam and the Greater Hartford YMCA.

Project Manager, Marshfield Airport Master Plan EA/EIR, Marshfield, Massachusetts. Managed the natural resource section of the document that addressed impacts to rare species (eastern box turtle), wetlands, water quality and coastal zone consistency associated with the Airport Master Plan Update that included runway extensions and new Part 77/TERPS surfaces. Managed the development of an updated Vegetation Management Plan (VMP) that was customized to minimize impacts to eastern box turtle habitat and wetlands.

Project Planner, Marshfield Airport Perimeter Fence, Marshfield, Massachusetts. Responsible for preparing NEPA/MEPA, Chapter 91, NOI, CZM and Section 404 permits associated with proposed perimeter fence/bridge crossing over Green Harbor River.

Harbor Brook Flood Control and Linear Trail Project EIE, Meriden, Connecticut. Managed Environmental Impact Evaluation (EIE) for proposed flood improvement master plan along 4 miles of stream that cuts through the City's Central Business District under contract to the Connecticut Department of Energy and Environmental Protection (DEEP). Project involves a host of flood mitigation activities including: upstream detention, creation of floodplain shelves, stream profile modifications, daylighting of culverts, property acquisitions and floodproofing. Evaluated several other alternatives including an alternate design event, upstream and underground detention and mass property acquisitions and floodproofing. The project also involved a third-party review of hydrologic & hydraulic analyses performed by others.

Project Planner, AST Construction at Windham Airport, Windham, Connecticut. For the Connecticut Airport Authority, prepared environmental review to determine if construction of two above-ground fuel storage tanks would trigger the need for an Environmental Impact Evaluation. Site is proximal to endangered species habitat, floodplain and public water supply watershed land.

Project Manager, DESPP Firearms Training Facility Siting Study, Connecticut. Managed siting analysis that involved a geodatabase analysis of over 4,000 potential sites in CT to support the construction of a new outdoor Firearms Training Center for the State Department of Emergency Services and Public Protection (DESPP, a.k.a. State Police). The existing facility is frequently flooded and inadequate to support current firearms training programs. Developed a scoring system used to develop a shortlist of sites including parcels greater than 100-acres, Brownfield sites, quarries, existing shooting ranges, underutilized/vacant airports and other land uses potentially compatible with the proposed use. Managed on-line ArcGIS system that was used by DESPP, CT DCS and CT DAS to evaluate and select alternatives for further evaluation during the Connecticut Environmental Policy Act process.

Project Manager, Infrastructure Improvements/Rentschler Field Development EIE, East Hartford, Connecticut. Managed a \$1 million EIE involving transportation and land development impacts associated with a \$5 billion Master Plan for the former United Technologies Corporation 750-acre airfield. He managed technical studies on the economic impacts, endangered species impacts/mitigation and property impacts of the project including a REMI model analysis of local and regional economic impacts of the project. Assisted in the evaluating a proposed elementary magnet school's impact on local town budget.

Project Manager, Interstate 84 Expansion EIS, Waterbury to Danbury, Connecticut. Managed natural resource sections of EIS involving construction of additional lanes and interchange configuration modifications for 32-mile section of I-84. Evaluated impacts to wetlands, state/federally-protected species, water resources, prime farmlands and contaminated sites. Coordinating with regulatory agencies and prepared draft Section 404 permit applications.

Project Manager, New Engineering & Science Building EIE, University of Connecticut, Storrs, Connecticut. Managed preparation of an EIE for the construction of a 115,000 SF building within the engineering/science quad on campus. Project included demolition of an existing warehouse. Site is within a historic floodplain that was not updated on FEMA maps. Shadow and groundwater contamination were key issues on the project.



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

Project Manager, Digital Airport Surveillance Radar System EA, NASJRB Willow Grove, Pennsylvania. Principal author of EA prepared for the U.S. Navy for a new radar system at the Naval Air Station Joint Reserve Base in Willow Grove, PA. The key issue for the project was the evaluation of potential electromagnetic fields on a nearby hotel.

Project Planner, Pocasset River Flood Control EIS, Johnston/Cranston, Rhode Island. Assisted in preparation of EIS for flood control improvements proposed by the U.S. Department of Agriculture. Improvements involved construction of flood walls and property buyouts. Evaluated impacts to wetlands, wildlife, land use and aesthetics.

Project Manager, Downtown Mansfield Master Plan and UConn Graduate Student Housing EIE, Storrs, Connecticut. Deputy Project Manager for the preparation of EIE for joint usage of property on the fringe of UConn's main campus. Project involved commercial development and 400 units of student housing. Key issues included housing, traffic, water supply, vernal pools, and stormwater runoff.

Project Manager, Eastern Connecticut State University Parking Garage EIE, Willimantic, Connecticut. Mr. Lecco managed the EIE for a new 950-space parking garage on the main campus and a new NCAA Women's Softball Field at the University's Athletic Complex. Key issues included traffic, stormwater management and wetlands.

Project Planner, Repair/Improvements to BayPark One and Two Apartments, Coney Island, New York. Prepared NEPA environmental review for major repair of two large residential apartments damaged by Hurricane Sandy. Prepared NEPA review in accordance with federal HUD regulations to support the determination of a Categorical Exclusion.

Environmental Scientist, Wickford Junction Station EA, Wickford, Rhode Island. Conducted a mobile source air quality analysis using MOBILE and CAL3QHC software to evaluate impacts of increased motor vehicle track on roadways and intersections surrounding the proposed AMTRAK station south of Providence, RI.

Project Manager Western Connecticut State University Master Plan EIE, Danbury, Connecticut. Managed an Environmental Impact Evaluation, Stormwater Master Plan and State Traffic Commission Certificate application for the proposed 15-year Master Plans at the Midtown and Westside Campuses.

Project Manager, Army Training Readiness Center EA/EIE, Windsor Locks, Connecticut. Managed a federal EA and state EIE for the proposed ATRC at the Army Aviation Support Facility near Bradley International Airport.

Project Planner, Power Plant Expansion, New Haven, Connecticut. Prepared Land Use and Environmental Information Report and permit applications for the proposed expansion of an existing power plant along New Haven Harbor.

Project Manager, Litchfield Judicial District Courthouse at Torrington EIE, Torrington, Connecticut. For the CT Department of Public Works, Mr. Lecco managed an EIE that evaluated 9 potential courthouse sites in Torrington. He evaluated impacts at the three shortlisted sites and assisted in preparing concept plans for each of the candidate sites. Evaluated EMF impacts from electrical substation near one of the proposed sites.

Project Plan, Bacon Street and Intervale Road MBTA Rail Crossings, Wellesley and Weston, Massachusetts. Prepared Categorical Exclusion documentation for proposed rail bridge replacements along the Framingham Line.

Planner, Route 101A Bypass Study/Environmental Impact Statement, Nashua, New Hampshire. Planned and managed transportation Origin & Destination surveys at 7 locations in the Nashua area to determine travel patterns in support of a proposed bypass of Route 101A.

Project Manager, Steele Brook Flood Control EIE, Watertown, Connecticut. Mr. Lecco is the Project Manager for this DEP-sponsored project involving 3,000 linear feet of stream restoration to control flooding in a commercial/industrial area of Watertown, CT. Key issues include utility and recreation impacts and the creation of an improved riparian habitat with collateral flood protection features.



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

Project Manager, Osborn Correctional Facility Expansion EIE, Somers, Connecticut. Managed controversial prison expansion project for CT Department of Correction and CT Department of Public Works. Managed supplemental comprehensive water and sewage flow monitoring study to determine system leakages and cross connections. Recommended corrective measures that have resulted in significant reductions in water usage and sewage discharge.

Project Manager, Seaside State Park Master Plan EIE, Waterford, Connecticut. Managed CEPA document for proposed redevelopment of new State park. Evaluated several alternatives including reuse of existing National Register structures for lodging with a public/private partnership. Key issues included historic resources, traffic, economic feasibility, coastal erosion and flooding and state-protected species. Significant public input was provided during the CEPA process.

Project Manager, Integrated Natural Resources Management Plan, MCRC, Syracuse, New York. Managed an INRMP at the Marine Corps Reserve Center in Syracuse NY. Delineated federal wetlands for 300-acre property, conducted bird surveys and developed a long-term management plan for the natural resources on the property. Evaluated impacts of implementing the INRMP to comply with NEPA.

Project Planner, Sperry Street Rehabilitation, New Haven, Connecticut. Prepared Categorical Exclusion documentation in accordance with Department of Housing NEPA guidelines for proposed demolition of commercial/industrial structures in downtown New Haven.

Environmental Scientist, Reed Putnam Urban Redevelopment EA, Norwalk, Connecticut. Conducted microscale air quality analysis at intersections affected by large-scale urban redevelopment project in downtown Norwalk.

Environmental Scientist, Route 66 EA and permits, Middlefield, Connecticut. Delineated wetlands along a 2-mile corridor within a public water supply watershed, Higby Reservoir. Designed wetland mitigation plan to replace 1.7 acres of freshwater wetland lost due to highway construction. Prepared state and federal wetland permit applications.

Environmental Scientist, Route 82/85/11 EIS, Southeastern Connecticut. Evaluated energy impacts associated with the proposed extension of Route 11. Analysis included construction and vehicular energy consumption for various new alignment and roadway upgrades over a 20-year span.

Project Planner, Fire Training/Hull Repair Training EA, North Chicago, Illinois. Principal author of EA that evaluated impacts of constructing a new fire training and hull repair facility at the Great Lakes Naval Training Center.

Project Planner, Pettibone Creek Environmental Assessment, North Chicago, Illinois. Evaluated the impacts of erosion and slope stabilization measures along Pettibone Creek at the Great Lakes Naval Training Center. Evaluated sediment and water quality data to determine if erosion control measures would exacerbate water and sediment quality.

Project Planner, Community Health Center EAs, Massachusetts, Vermont and New Hampshire. Prepared and reviewed NEPA EAs for several community health center capital improvement projects in New England as part of the Health Resources and Services Administration (HRSA) stimulus package.

Environmental Planner, Bank Stabilization Project, Staten Island, New York. Prepared permit applications and jurisdictional determination submissions in support of shoreline bank stabilization needed because of Superstorm Sandy damage.

WETLAND / LAND USE PERMITTING

Project Planner, Plainridge Park Casino, Plainville, Massachusetts. Primary facilitator and organizer of RFA-2 application to the Massachusetts Gaming Commission for the construction of a new all-slots casino at the existing Plainridge Park Raceway. Applicant was successfully awarded a license to operate, one of four licensed casinos in the Commonwealth. The key issue was site access and traffic.



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

Project Scientist, Various Dam Repair Projects, Connecticut. Prepared state and federal wetland applications and performed wetland delineations for several dam repair projects in Connecticut including: Grupes Pond Dam, Norwalk; Bogues Brook Dam, Norwich; and Bristol Reservoirs 2,3 and 4 in Harwinton, CT.

Project Scientist, Bogue Brook Reservoir Dam Reconstruction, Montville, Connecticut. Prepared DEEP Dam Construction and USACE permit applications for reconstruction of an existing concrete dam for the New London Water Department. Project included wetland delineation and a field survey for two state-protected species (one fish and one bird) within the project area.

Project Scientist, Grupes Reservoir Dam, New Canaan, Connecticut. Delineated and assessed wetlands associated with dam and spillway repairs. Assisted in preparation of DEEP Dam Construction Permit.

Project Manager, Camp Hartell Master Plan STC Certificate, Windsor Locks, Connecticut. Managed preparation of a CT State Traffic Commission Certificate application and conceptual drainage analysis/design for the proposed Master Plan at this CT National Guard facility.

Project Scientist, Algonquin Power Plant Improvements, Windsor Locks, Connecticut. Prepared local inland wetland permit application for the installation of a crane pad along the top of slope of the Connecticut River. The pad was needed to support a large crane needed to place a new boiler inside the power plant which is located adjacent to the river.

Project Manager, Proposed Retail Development, East Hartford, Connecticut. Project Manager for assessing stream habitat to assess the feasibility of constructing a big box retail store.

Project Manager, Wetland Mitigation Design, East Hartford, Connecticut. In response to a Section 404 violation, Mr. Lecco designed a 1/2-acre wetland to replace wetlands filled for a residential subdivision project. Prepared local and federal wetland applications.

Project Manager, Residential Subdivision, Longmeadow, Massachusetts. Managed design and permitting for controversial 4-lot subdivision in Longmeadow, MA. Critical issues included Riverfront, wetland, stormwater and neighborhood impacts. Assisted developer in successfully challenging the Planning and Zoning Commission's initial denial ruling.

Environmental Scientist, Shaws Supermarket Retail Development, Wallingford, Connecticut. Responsible for local and state permitting for redevelopment of retail site involving stream relocation and mitigation.

Planner, Plan of Development Updates for Enfield and Monroe, Connecticut. As part of their Plan of Development updates, evaluated existing socioeconomic data and forecasted future build-out scenarios for these two municipalities.

Planner, Water Supply Plans for Various Connecticut Water Companies. Conducted population and land use analysis of existing and future service areas for water utility companies in Norwich, Middletown, Meriden and Watertown, CT. Developed emergency contingency plans for various drought scenarios.

Residential Development Planning & Environmental Review, Hopkinton, Rhode Island. Provided third party review of proposed major residential subdivision project for the Town Planning Department. Project proposed over 300 residential units including affordable housing on property containing wetlands and steep slopes within the sensitive Wood River watershed. Presented and defended findings at public hearings.

I-95 Stormwater Improvements, Southern Rhode Island. Evaluated the adequacy of stormwater outfalls along 10-mile stretch of I-95 in support of proposed highway improvements. Designated BMP measures to be implemented for each outfall during maintenance process.

TRAIL ASSESSMENT

Project Manager, CT DEEP Trails Study, Connecticut. Managed the assessment of trail conditions along 150 miles of trail within Shenipsit, Nipmuck, Cockaponsett and Pachaug State Forests. Developed a geodatabase for use by the CT Trails Manager for use



Stephen L. Lecco, A.I.C.P., C.E.P.

Associate Principal

in future permitting of Off-Highway Vehicle events. Also prepared an analysis of potential new ATV sites within DEP property.

Project Manager, ATV Trail Siting Study, Connecticut. Managed siting study for a proposed ATV trail system on State DEP land. Developed exclusionary and discretionary siting criteria that incorporates user needs, physical and environmental impact characteristics. Conducted screening level GIS analysis of all DEP lands in the State and ranked potential ATV trail locations in the State.

Project Manager, DCR Trail System Condition Assessment and Restoration Plan, Massachusetts. Managed project involving the analysis of trail condition assessment data contained within an ArcView geodatabase for all DCR property within the Commonwealth, 150± properties. Developed trail restoration plans for Pittsfield State Forest, Wendell State Forest and the Holyoke Range that included a strategic plan for implementing repairs based on a variety of factors including: damage severity, cost and trail usage. Recommended alternative permitting approaches to DCR for securing permits at the State and local level. Recommended rerouting of trail segments based upon trail damage and the availability of suitable soils, topography and rare/endangered species habitat presence.

Ecological Risk Assessment, Project Scientist, Ecological Risk Assessment, Plainville, Connecticut. Prepared a Screening Level Ecological Risk Assessment at a plating facility with historic discharges of metals and PAHs to wetlands and waterbodies in the Pequabuck River watershed.

Project Scientist, Ecological Risk Assessment, Naugatuck, Connecticut. Prepared Screening Level Ecological Risk Assessment at a chromium plating facility with discharges to Fulling Mill Brook. Performed a 7Q10 analysis to estimate contaminant concentrations in receiving waterbody.

Project Scientist, Ecological Risk Assessment, Thompson, Connecticut. Prepared Scoping and Screening Level Ecological Risk Assessment for former manufacturing facility with historic discharges of metals and PAHs to a tributary of the French River. Also developed a Work Plan for conducting a Baseline Ecological Risk Assessment to directly assess ecological risk to aquatic and avian species.

Publications and Presentations

"Under the Gun – The Search for a New Firearms Training Facility in Connecticut". GZA Technical Conference Practice Excellence Award, 2013.

"An Assessment of Trail Conditions Along Off-Highway Motorcycle Routes within Connecticut State Forests". GZA Technical Conference Practice Excellence Award, 2009.

"New Dredged Material Disposal Techniques in the Northeastern United States" In *Proceedings of the 25th Annual National Association of Environmental Professionals Conference*, June 2000.

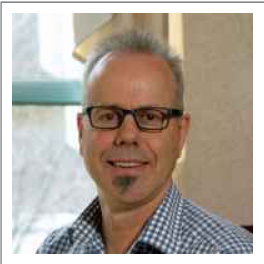
"Utilizing Salt Pond Sediments in a Marine Terminal Project in St. John, USVI". In *Proceedings of the Fifteenth World Dredging Congress*, July 1998.

"Massachusetts Dredged Material Management Plan: Twenty Year Forecast of Dredging Needs, Sediment Characterization and Reuse/Disposal Options". International Workshop on Dredged Material Beneficial Uses, July 1997, Baltimore MD.

"NEPA at Work – Seawolf Homeporting on the East Coast of the United States". In *NAEP 21st Annual Conference Proceedings – Practical Environmental Directions: A Changing Agenda*. National Association of Environmental Professionals, Washington, D.C., 1996. pp. 360-374.

Affiliations/Memberships

- National Association of Environmental Professionals
- American Planning Association/American Institute of Certified Planners
- Visiting Lecture – University of New Haven Environmental Reports & Impact Assessment Class

**Bruce W. Fairless, P.E., LEED AP**

Principal / GZA Geothermal Practice Lead

Summary of Experience

Mr. Fairless has over 30 years of experience in a variety of civil engineering disciplines, but mainly as a geotechnical professional on urban multi-story projects with environmental issues. He also leads GZA's geothermal services team in this burgeoning market. His experience in the renewable energy field also includes geotechnical studies at 18 solar sites for a combined 400 acres of ground-mounted solar arrays in New England states. His geotechnical experience includes design and construction of shallow and deep foundations (including caissons, piles and slurry walls), sheet pile and soldier pile and lagging earth support systems, and bedrock blasting. Other experience includes design, installation, monitoring, and interpretation of geotechnical instrumentation and coordination and performance of subsurface geotechnical investigations.

Relevant Project Experience**Principal in Charge, North Shore Community College, Danvers, Massachusetts.**

GZA provided geothermal services for this first state-owned zero net energy new academic building. GZA's services included a geothermal feasibility study, a test well for a closed loop system and geothermal design services for the project with a specialist closed loop Certified Geothermal Designer subconsultant. During construction, we observed and documented installation of the fifty 500-foot-deep closed loop wells to address the 100-ton heating /cooling load.

Technical Lead, U.S. Army Corps of Engineers, Geothermal Pathfinder Wells, New England Region (Massachusetts and New Hampshire). GZA is assessed geothermal feasibility and developed geothermal design approaches for four sites: Devens, MA USARC; Ayer, MA AFRC; Brockton, MA USARC; and Londonderry, NH AFRC. The project consisted of a phased approach that included a preliminary assessment of each site to evaluate and recommend a design approach, installation and testing of a single ground source heat pump test well, and preparation of a report presenting the findings of the test well and recommendations for design of a geothermal system at each site.

Technical Consultant, New Mathematics and Science Building, St. Paul's School, Concord, New Hampshire. GZA performed a feasibility study for the proposed Math and Science Building. Peak cooling loads of 200 tons were anticipated with an additional 100 tons of cooling desired for future use. Geothermal system types evaluated included open loop systems, standing column wells, closed loop vertical wells, closed loop horizontal systems, and surface water systems. GZA reviewed available hydrogeologic information, applicable regulations and permitting requirements, and published estimates of thermal capacity to prepare estimates for the well field-related system installation and operations and maintenance costs (O&M) for the two feasible system types: standing column wells and closed loop vertical wells.

Principal in Charge, New Bedford Custom House, New Bedford, Massachusetts.

GZA prepared a feasibility study for a HVAC renovation for this historic building with the end client being the Federal GSA. Estimated thermal load was 14 tons. GZA recommended a closed loop system based on cost and regulatory risk and proceeded

Education

B.E., 1983, Civil Engineering,
University of Canterbury,
Christchurch, New Zealand
M.S., 1985, Geotechnical Engineering,
University of Colorado at Boulder

Registrations & Certificates

Professional Engineer—Massachusetts,
#35833
Professional Engineer—Connecticut,
#28542
Professional Engineer—New York,
#094703-1
Professional Engineer—Rhode Island,
#11386
2009, LEED™ Accredited Professional,
U.S. Green Building Council

Affiliations

- American Society of Civil Engineers
- Boston Society of Civil Engineers
- Urban Land Institute Member
- NAIOP MA Member
- Boston Groundwater Trust Technical Advisory Group Member

Areas of Specialization

- Geothermal Design and Construction
- Ground-Mount Solar Foundations
- Geotechnical Engineering
- Foundation Engineering
- Site Characterization
- Soil Disposal per MCP

**Bruce W. Fairless, P.E., LEED AP**

Principal / GZA Geothermal Practice Lead

with a test well installation, testing and report. Preliminary geothermal design was performed by GZA with a specialist geothermal MEP designer.

Principal in Charge, Proposed IKEA, Somerville, Massachusetts. GZA completed a feasibility study for a new 370,000 SF retail facility with about 800 tons of heating/cooling. Study included details on financial incentives offered by state and federal agencies and discussion on payback. GZA recommended a closed loop system based on cost and regulatory risk.

Principal in Charge, Various New England Private High Schools, Massachusetts, and New Hampshire. GZA provided comprehensive geothermal services for Phillips Academy Andover, Phillips Exeter Academy, and The Groton School on ___ projects over 3 years. Our services included a feasibility studies, test wells and working with a specialist designer, and then documenting installation.

GEOTECHNICAL- SOLAR

Principal in Charge, 19 sites over 3 years in Massachusetts, New Hampshire, and New York, Geotechnical Studies for Borrego Solar. GZA performed explorations and foundation studies for ground mounted solar arrays. Typical preferred systems were short driven piles or a proprietary ground screw system. Based on GZA test boring, test pits and laboratory data GZA prepared a geotechnical report for each site. GZA prepared a pile design based on load combinations provided by Borrego on some sites.

GEOTECHNICAL EXPERIENCE- AFRICA

Principal in Charge, Mallam Junction Mall, Accra, Ghana for BGI Properties. GZA provided geotechnical consulting services for this new mall to be built over new fill an estuary just south of the George W. Bush Highway Mallam Interchange. Two phases of test boings cone penetrometer tests had been performed, with laboratory testing and a geotechnical report prepared by a Ghanaian engineer. GZA review the borings and reports and provided comments. Another round of borings was planned to be performed with GZA observation before the Ebola crisis stopped project planning. GZA prepared a 166-page summary report with our findings, conclusions and recommendations, including the project data.

Principal in Charge, Kumasi Nature Park and Mall, Ahodwo, near Accra, Ghana for BGI Properties. GZA reviewed a project geotechnical report prepared by a Ghanaian engineer based on borings performed at the site.

GZA provided comments on the report in a technical memorandum.

SELECTED BOSTON GEOTECHNICAL EXPERIENCE

Principal in Charge, W Hotel, Corner of Stuart and Tremont Streets, Boston, Massachusetts. Explorations and foundation studies for a 26-story building on a confined urban site surrounded by historic multi-story buildings. Two-level basement parking garage with mat foundation bearing on stiff clay/fine sand/silt about 35 feet below grade. Slurry wall with internal bracing. Precharacterization of site soils for offsite disposal. Excavation instrumented and monitored by GZA.

Principal in Charge, Hilton Garden Inn, Boardman Street, East Boston, Massachusetts. Geotechnical and environmental studies for 5-story hotel. Geotechnical report recommended aggregate pier ground improvement for up to 30 feet of fill and estuarine peat and organic, over clay. Before aggregate piers were installed, a 5-foot raise in grade with a 5-foot surcharge program was installed for 3 months over the building footprint to mitigate post construction settlement of the clay. GZA reviewed contractor submittals and documented foundation construction.

Principal in Charge, 16 Miner Street, Boston, Massachusetts. Explorations and foundation studies for a 7-story residential building near the Fenway Park area of downtown Boston. MBTA subway tunnel running within easement across site to be protected during construction. Building spans subway tunnel. Two-level basement parking garage with mat foundation bearing on sand over clay about 25 feet below street grade. Sheet pile wall with internal bracing provided excavation support and groundwater cutoff. Precharacterization of site soils for offsite disposal. Excavation instrumented and monitored by GZA. Geotechnical construction documented by GZA.

Principal in Charge, 165 Captains Row, Chelsea, Massachusetts. GZA performed foundation studies for 6-story Chelsea Jewish Nursing Home addition. The building location was a former wetland area replicated elsewhere on site. GZA recommended spread footing foundations with underslab and perimeter drainage. Site retaining walls up to 16 feet in height with mechanically stabilized earth (MSE) walls.

Principal in Charge, 45 Province Street Condominiums, Boston, Massachusetts. Explorations and chemical precharacterization testing of soil and groundwater to be

**Bruce W. Fairless, P.E., LEED AP**

Principal / GZA Geothermal Practice Lead

removed from proposed 3-level basement; 31-story building. GZA provided comprehensive environmental services related to the disposal of soil and groundwater off-site. The existing fill triggered notification to the DEP under the Massachusetts environmental regulations. GZA provided disposal oversight and submitted required DEP documents, including a Release Abatement Measure (RAM) Plan, Bills of Lading, and Response Action Outcome (RAO) report. In addition, GZA prepared a construction dewatering discharge permit application to the MWRA for discharge to the combined sewer. Periodic testing and reporting of groundwater quality was also performed.

Principal in Charge, Hostelling International Renovation of 25 Stuart Street, Boston, Massachusetts. Developed geotechnical explorations and report, recommended spread footings, slab-on-grade, water-proofed mat foundation, pit underpinning, groundwater recharge. Underpinning submittal reviews and geotechnical construction observation.

Principal in Charge, The Marquis, 242 Tremont Street, Boston, Massachusetts. 14-story mixed use building with ground floor retail and/or restaurant in Theatre District of downtown Boston. One basement level. Foundation proposed to be high-capacity drilled mini-piles into bedrock at 100 feet depth. GZA designed excavation support wall and prepared geotechnical report. Environmental precharacterization for offsite soil disposal.

Principal in Charge, North Shore Community College, Danvers, Massachusetts. GZA provided geothermal and geotechnical services for the Allied Health building, the state's first Zero Net Building. GZA's geotechnical services included test pit and boring explorations, analyses and design report, recommending spread footing foundations. GZA also geothermal services for 50x500' closed loop wells. GZA observed/documented both geotechnical and geothermal construction.

Project Manager, 120 Mountfort Street, Boston, Massachusetts. Explorations and foundation studies for a 6-story residential building near Boston University in downtown Boston. Six-foot-diameter MWRA sewer running within easement across site to be protected during construction. One level basement parking garage. Building supported on driven concrete-filled pipe piles due to deep fill and organics. Cantilevered soldier pile and lagging temporary wall with internal bracing provided excavation support. Precharacterization of site soils for offsite disposal. Excavation instrumented and monitored by GZA.

Project Manager, 200 Newbury Street, Niketown, Boston, Massachusetts. Responsible for planning and coordination of exploration program, development of foundation options and design parameters, chemical characterization of excavated soil and identifying potential construction impacts in this urban retail/residential neighborhood adjacent to multistory masonry buildings founded on wood piles built last century. The three-story building with one level of basement parking is supported on a structural mat foundation bearing on the organic silt. Groundwater cutoff was achieved during construction with sheet piles driven into the clay stratum.

Project Manager, Hampton Inn, O'Brien Highway, Cambridge, Massachusetts. Responsible for planning and coordinating explorations, soil and groundwater characterization and providing geotechnical recommendations for 7-story urban hotel near downtown Boston. GZA provided LSP services. Remediation consisted of removing contaminated soils from 20 feet excavation for two levels of underground parking. Spread footing foundation. Soldier Piles and Lagging excavation support.

Project Manager, Marlow Hotel at CambridgeSide Galleria, Cambridge, Massachusetts. Explorations and foundation studies for 7-story, 22,000 SF footprint building. Coordinated and supervised report recommending driven piles supported in glacial till about 100 feet below ground surface, with structural slab.

Principal in Charge, Sunrise Development, Various Locations. Responsible for due-diligence environmental and geotechnical site evaluations at 13 New England sites. Performed subsurface explorations and prepared preliminary geotechnical report for proposed 3- to 4-story senior living buildings. In addition, performed environmental site assessments.

Principal in Charge, Wayside Road Office Expansion, Burlington, Massachusetts. Explorations and geotechnical report for 4-story office building expansion. Recommended and observed construction of spread footing foundations after excavation/replacement of existing fill.

Principal-in-Charge, Library Addition, UMASS Dartmouth, Dartmouth, Massachusetts. Project consisted of a basement addition to an existing structure supported on large concrete columns with deep isolated spread footings. Coordinated a subsurface exploration program consisting of borings and test pits. Project challenges included design constraints imposed by the presence of the existing structure. Prepared a



Bruce W. Fairless, P.E., LEED AP

Principal / GZA Geothermal Practice Lead

geotechnical report for the proposed building addition. Underpinning of existing foundations was completed using a transfer frame and staged excavation.



Christopher J. Shoults

Environmental Scientist I

Summary of Experience

Mr. Shoults is an Environmental Scientist in the EH&S Regulatory Compliance group at GZA, working in the Livonia, MI office. He brings his industrial-related experience specifically involving total waste management, project management, health and safety, and environmental management systems.

Relevant Work Experience

Total Waste Management Programs. Acted as site lead at the Ford Rouge Center supervising a five-member team. Directed facility waste management program activities related to the disposal of hazardous, non-hazardous, and TSCA-Regulated waste. Administered waste shipment logistics, including negotiating pricing and optimal waste profiling. Ensured comprehensive document management related to waste streams, waste characterization, and manifest records. Interfaced with vendors and government agencies.

Waste Reduction. Helped to achieve Landfill-Free policy at the entire Ford Rouge Center. Developed recycling and waste reduction programs for Ford Motor Company, General Motors, and FCA.

Wastewater Operator. Licensed wastewater operator in Michigan. Supports FCA facility with monthly reporting of water monitoring data.

Project Management in Automotive Setting. Supported environmental compliance operations at Ford Chicago Stamping plant, performing day-to-day operations as acting Plant Environmental Control Engineer (PECE). Participated in quarterly environmental management system compliance audits. Maintained ISO 14001 and ISO 9001 standards for certain customer accounts and facilities. Provided training and mentorship in best practices, managing financials, and RCRA compliance.

Air Emission Data Tracking. Assisted in performing regulatory compliance reporting for Dearborn Truck Plant using Ford systems (PERS, GEM, etc.)

Health and Safety. Excellent safety record helping to ensure adherence to environmental and safety standards for employees associated with managed accounts.

Education

B.S., Environmental Science, Madonna University, 2011

Registrations & Certificates

- OSHA 40-Hour HAZWOPER Training
- RCRA Certified
- DOT Certified
- Michigan Wastewater Operator I #A-1d

Areas of Specialization

- Solid Waste
- EH&S Regulatory Compliance
- Waste Reduction
- Database Management
- Wastewater Operator
- ISO 14001, 9001
- Field Training / Supervisor
- Air Emissions Permitting/Management
- Environmental Management System & Process
- SPCC
- Emergency Response Training



Kimberly A. Hoppe Parr, Ph.D.

Senior Project Manager

Toxicologist / Occupational and Environmental Health Scientist

Summary of Experience

Dr. Kimberly Parr obtained her doctorate in Occupational and Environmental Health from the University of Iowa following her undergraduate degrees in Microbiology and Cell and Molecular Biology at the University of Wisconsin-Oshkosh. At the University of Iowa, she was employed as a research assistant in the Pulmonary Toxicology Facility within the Environmental Health Science Research Center.

Dr. Parr's project work at GZA includes toxicology evaluation, exposure assessments, industrial hygiene, quantitative exposure reconstruction, environmental microbial contamination assessments and data analysis and interpretation of environmental and toxicological information for GZA's toxicology, occupational and environmental health and safety support practices. Dr. Parr also serves as the Health and Safety Coordinator for GZA's Waukesha, Boulder and Cincinnati offices.

Relevant Project Experience

HUMAN HEALTH EXPOSURE AND RISK ASSESSMENT

Dr. Parr has been retained as an expert witness in toxic tort litigation regarding occupational and environmental asbestos exposures including the review of case materials, performing a dose reconstruction, and submitting expert reports.

Assessed potential medical student airborne formaldehyde exposures and risk associated with learning activities performed in an anatomy laboratory.

Conducted an ultraviolet (UV) and blue light hazard assessment in several research laboratories at a research university. Worked closely with the University's Office of Research Safety to develop guidelines and implement controls.

Reviewed case materials, regulatory and consensus standards, and performed an exposure assessment regarding carbon monoxide exposure. Dr. Parr prepared an expert report and developed questions during witness depositions.

Developed action plans and standard operating procedures for an active quarry site related to potential employee exposures to infiltrate of combined sewer overflow contaminated water. Conducted several training sessions with the Metropolitan Water Reclamation District of Greater Chicago to the Client and their employees.

Constructed risk assessment matrices for an international Client to assist in evaluating their current chemical review and approval process; chemical handling, receiving, storage and disposal; and chemical inventory and reporting processes.

Reviewed and advised Client on proposed Safety Data Sheets and hazard warning labels to be utilized on products distributed in the U.S., Canada, and Mexico.

Provided product evaluation in accordance with Consumer Product Safety requirements and applicable standards and further evaluated potential occupational and end-user exposures to phthalates and flame retardants. Advised on product compliance with California Proposition 65 for various chemicals of concern.

Education

Ph.D., Occupational and Environmental Health, University of Iowa, Iowa City, 2013

Graduate Certificate in Geoinformatics, University of Iowa, Iowa City, 2013

B.S., Major: Microbiology and Cell/Molecular Biology, College of Letters and Science, University of Wisconsin-Oshkosh, 2008

Areas of Specialization

- Toxicology
- Environmental and Occupational Health and Safety
- Exposure Assessment
- Microbial Matter Assessment, Identification and Abatement
- Industrial Hygiene



Kimberly A. Hoppe Parr, Ph.D.

Senior Project Manager

Toxicologist / Occupational and Environmental Health Scientist

Investigated adverse health effects in residents of flooded homes during and after renovation. Designed and administered an IRB-approved health questionnaire to all study participants. Conducted field sampling and lab analysis addressing several indoor air quality parameters, including lead and asbestos. Utilized ArcGIS 9.3.1 to geocode homes, perform spatial statistics and proximity to river function. Notified study participants on measured indoor air quality concentrations and presented to data and information at several community and academic forums.

OCCUPATIONAL AND ENVIRONMENTAL HEALTH AND SAFETY

Dr. Parr is the Health and Safety Coordinator of GZA's Waukesha and Cincinnati offices. She routinely provides Clients with Industrial Hygiene consulting services including sampling and training.

Performed Industrial Hygiene at printing facility operations in the U.S. including the evaluation of workplace exposures, applicable occupational exposure limits and ventilation systems.

Designed and supervised sampling plan for personal and area clearance sampling for asbestos during abatement of a building.

Evaluated occupational exposures to diacetyl and 2,3-pentanedione at a large-scale commercial coffee roasting, blending and grinding facility. Facilitated an informational meeting with employees and upper management to address concerns and questions regarding workplace exposures.

Supervised, trained and assessed compliance with respirable crystalline silica regulations at a historic building undergoing façade rehabilitation.

Supervised the site sampling for respirable crystalline silica, noise and real-time dust concentrations at a construction job site. Evaluated sampling results and provided control recommendations to the Client.

Conducted a focused Indoor Air Quality evaluation of Operating Rooms at a Medical Center in Milwaukee, Wisconsin.

Conducted a due diligence review of selected historical safety documents to identify potential material issues prior to the Client's acquisition of multiple food processing facilities.

Performed Indoor Air Quality sampling, analysis, and, if necessary, remediation recommendations at several residential, commercial, and governmental structures.

Conducted the annual Industrial Hygiene audit for the past 4 years at an industrial facility by evaluating potential exposures to silica, welding fumes, dust, industrial solvents, isocyanates, metals, and noise. On-site awareness training was offered to Client employees.

Dr. Parr investigated worker exposure to dust containing heavy metal contaminants in a water treatment facility. Additionally, consulted and advised on settled combustible dust and proper housekeeping procedures.

Dr. Parr provided air monitoring services and clearance verification for a complex mercury spill and subsequent cleanup in an industrial facility. Dr. Parr consulted with the client on cleanup strategies, performed air clearance sampling and provided oversight of the remediation contractor.

Conducted water monitoring at Iowa State Park beaches following federal and state environmental sampling and compliance guidelines. Measured and analyzed water samples following strict sampling protocol for *E. coli*, total coliforms, cyanotoxins and various parameters. Trained student employees on sampling and laboratory techniques. Updated databases that posted results and warnings onto the IDNR's website to notify the public.



Kimberly A. Hoppe Parr, Ph.D.

Senior Project Manager

Toxicologist / Occupational and Environmental Health Scientist

TOXICOLOGY RESEARCH

Dr. Parr worked in the Pulmonary Toxicology Facility in the Environmental Health Science Research Center at the University of Iowa. Specific research tasks included the evaluation of pulmonary responses and inflammatory pathways to environmental contaminants.

Utilized ¹⁴C-labelled endotoxin in three forms of presentation: purified aggregates, membrane blebs and whole bacteria as our gold standard to quantify the total endotoxin load in aqueous samples. Evaluated differences in the biological response *in vivo*, *in vitro* and whether these responses mimicked the detection ability of the LAL assay. Further, evaluated novel extraction methods to improve the assays effectiveness.

Exposed wild-type mice to varying doses of eritoran alone, as a pre-treatment, or as co-treatment to an exposure of endotoxin. Assessed pro-inflammatory mediators' post-exposure. Collaborated with the Inflammation Program at University of Iowa.

TEACHING AND TRAINING

Dr. Parr has provided Clients with regulatory and site-specific training on the following topics: HAZWOPER training, Hazard Communication, Personal Protective Equipment, Department of Transportation Pipeline and Hazardous Materials Administration Hazardous Materials Training Program, and Chemical Awareness for various chemicals.

KAH Parr. National Business Institute Continuing Education Video Webcast, Toxic Mold: Litigating Insurance Coverage Claims.

Publications

Barlow CA, Kemp MJ, Boyd CA, Parr KAH. PFAS Toxicology – The science behind the variations in drinking water standards. The Journal of the New England Water Works Association. December 2019. Volume 133, No. 6.

McCoy MJ, Parr KAH, Anderson KE, Cornish J, Haapala M, Grievell J. Diacetyl and 2,3-pentanedione in breathing zone and area air during large-scale commercial coffee roasting, blending and grinding process. Toxicology Reports. 2017. Volume 4, p 113-122.

Parr KAH, Hadina S, Kilburg-Basnyat, Wang Y, Chavez D, Thorne PS, Weiss JP. Modification of sample processing for the Limulus amebocyte lysate assay enhances detection of inflammogenic endotoxin in intact bacteria and organic dust. Innate Immunity. 2017. Volume 23, Issue 3, p 307-318.

Anderson KE, Parr KAH, Boyd CA. A Review: Ambient Air Asbestos Concentrations. Journal of Safety, Health and Environmental Research. 2015. Volume 11, No. 1, p 211-222.

Sigsgaard T, Thorne PS, Schlunssen V, Bonlokke J, Riddervold IS, Hoppe KA, Anderson NT, Mackenzie NM. The Change in Nasal Inflammatory Markers After Intranasal Challenges with Particulate Chitin and Lipopolysaccharide: a Randomized, Double-Blind, Placebo-Controlled, Crossover Study with a Positive Control. International Forum of Allergy & Rhinology. 2015. Volume 5, Issue 8, p 716-723.

Hoppe KA, Metwali N, Perry SS, Hart T, Kostle PA, Thorne PS. Assessment of Airborne Exposures and Health in Flooded Homes Undergoing Renovation. Indoor Air. 2012. Volume 22, No. 6, p 446-456.

Conferences and Presentations

KA Hoppe Parr. Federation of Environmental Technologists, Inc. Essentials of Hazardous Materials Management Training Workshop (July 2015, 2016, 2017, 2018). Presentations: Toxicology & Industrial Hygiene.

KA Hoppe Parr. Association of State Floodplain Managers (June 2016). Presentation: Adverse Health Effects Associated with the Indoor Air Quality of Flood-Damaged Structures.

KA Hoppe Parr. Federation of Environmental Technologists, Inc. HazWoper Refresher Seminar (March 2014, 2016, 2018). Presentation: Physical & Ergonomic Hazards.

KA Hoppe Parr. Industrial Minerals Technology Workshop (March 2014). Presentation: Task Based Industrial Hygiene Monitoring.

Kimberly A. Hoppe Parr, Ph.D.

Senior Project Manager

Toxicologist / Occupational and Environmental Health Scientist

KA Hoppe, JP Weiss, PS Thorne. American Thoracic Society Annual Conference (May 2013). Poster: Techniques to improve the LAL assay's ability at detecting endotoxin in whole bacteria form.

KA Hoppe, S Hadina, A Adamcakova-Dodd, JP Weiss, PS Thorne. American Thoracic Society Annual Conference (May 2011) and University of Iowa Jakobsen Conference (March 2011). Poster: Effect of variables in endotoxin presentation on endotoxin reactivity in the *Limulus* Amoebocyte Lysate Assay.

National Academies Report: "Disaster Resilience: A National Imperative" (March 2011). Participated in a Panel Discussion to be included in the Report

KA Hoppe, N Metwali, S Perry, T Hart, PA Kastle, PS Thorne. American Thoracic Society Annual Conference (May 2010). Poster: Exposure Assessment of Families Re-occupying Flooded Homes Poster: Evaluation of a Low-Cost Electrostatic Dustfall Collector for Indoor Air Samples. KA Hoppe, N Metwali, TT Perry, EL Avol, PS Thorne.

KA Hoppe. Iowa Air Coalition Meeting and Mold and Your Health Conference for participants of the Children's Home Asthma Management Program (May 2009). Oral Presentation and Discussion: Cedar Rapids Post Flood Indoor Air and Health Assessment.

Updated: March 27, 2020



Ian J. Mosbrucker, P.E.

Geotechnical Engineer/Assistant Project Manager

Summary of Experience

Mr. Mosbrucker is a Geotechnical Engineer with over five years of industry experience. His experience has been distributed between coastal engineering, construction quality assurance/quality control (QA/QC), and geotechnical engineering projects.

Relevant Project Experience

COASTAL ENGINEERING

Mr. Mosbrucker has been involved in the design, management, oversight, and permitting of multiple residential coastal engineering projects along the western shore of Lake Michigan. Projects have ranged in size from 100 to over 800 linear feet of shoreline with issues involving bluff instability, toe erosion, overtopping of existing protection systems, and flooding.

Fox Point Revetment and Seawall, Fox Point, Wisconsin. Mr. Mosbrucker designed and oversaw the construction of a revetment built in front of an existing, overtopped seawall. In addition to the revetment, an overtopping and storm water drainage system was designed by Mr. Mosbrucker to handle a 100-year storm event. Designing a coastal protection system to work with existing seawall saved the client money and allowed the client to maintain useable yard space.

Pleasant Prairie Flood Bank, Revetment, and Drainage System, Pleasant Prairie, Wisconsin. This low-lying site required a coastal protection system consisting of a flood bank, revetment, and drainage system combination to protect a house that had been hit by waves during multiple storms the prior winter. Mr. Mosbrucker designed the site protection system, regularly coordinates with the contractor, and is currently assisting the owner with local and state level permitting requirements.

Mt. Pleasant Revetment, Mt. Pleasant, Wisconsin. Mr. Mosbrucker managed and coordinated this project from the initial site investigation to the final site inspection upon completion of work. Mr. Mosbrucker's revetment design was determined to be exempt from state permitting by DNR officials and thus allowed for a quick turnaround. From the initial signing of contract with GZA to the completion of construction, this project took under four months to complete.

Whitefish Bay Bluff Regrade and Revetment, Whitefish Bay, Wisconsin. After conducting a full site investigation, including a bathymetry study and geotechnical borings, Mr. Mosbrucker designed a regraded bluff slope and revetment for this 730-foot long site. The regraded bluff slope required a detailed slope stability analysis to account for the failing bluff toe and large quantity of heterogeneous fill soils at the site. The revetment was designed to minimize the quantity of imported materials by working in tandem with the existing concrete fill revetment present at the site.

CONSTRUCTION OVERSIGHT AND QA/QC

Mr. Mosbrucker has conducted fieldwork consisting of in-situ soil testing and assessment of site conditions to ensure that quality and design criteria are being satisfied. Hand testing equipment such as Static Cone Penetrometers, Dynamic Cone Penetrometers, and

Education

B.S., Geological Engineering, University of Wisconsin-Madison, 2014

B.S., Geology and Geophysics, University of Wisconsin-Madison, 2014

Licenses & Registrations

Professional Engineer, WI #47165-6

Certifications/Training

- OSHA 40-Hour Hazardous Waste Operations & Emergency Response
- Nuclear Gauge Safety Operations
- Confined Space Training
- MSHA Training
- Slope Access Technician – Level 1

Affiliations/Memberships

- Association of Environmental and Engineering Geologists
- American Society of Civil Engineers

Areas of Specialization

- Coastal Protection Design
- Coastal Site Investigation
- Slope Stability Analysis
- Seepage Analysis
- Construction QA/QC
- Façade Restoration Inspection
- Ropes Access
- Subsurface Characterization
- Shallow and Deep Foundation Analysis
- Settlement Analysis
- Geotechnical Instrumentation Installation and Monitoring
- Soils Technician
- Pressuremeter Testing
- Soils Laboratory Testing
- GROUP Pile Analysis



Ian J. Mosbrucker, P.E.

Geotechnical Engineer/Assistant Project Manager

Nuclear Density Gauges are normally required. He has also reported testing results and field notes to the client in memorandum or report formats.

Milwaukee Federal Building Restoration, Milwaukee, Wisconsin. From April to November in 2018 and 2019, Mr. Mosbrucker was appointed project on-site engineer for a multimillion-dollar façade restoration project in downtown Milwaukee. Tasks charged to him varied from inspection of work quality, additional work inspections, coordinating with site superintendents, documenting work progress, and performing noise monitoring. Work was conducted between the times of 4:00 p.m. and 3:00 a.m. on scaffolding, swing stages, and on rope rappel.

Titletown Development, Green Bay, Wisconsin. Mr. Mosbrucker spent three months on-site in 2016, providing a variety of QA/QC services to the client. Services included 15+ proof rolls; 200+ nuclear density tests; auger cast pile inspection; grout quality control; pipe pile installation observations; and utility installation observation. Mr. Mosbrucker organized and reported test results to the client on a biweekly basis.

BMO Harris Vibration Monitoring Program, Milwaukee, Wisconsin. Mr. Mosbrucker was tasked with installing, regularly monitoring, and maintaining five vibration monitors at a sensitive downtown demolition site. Regular exceedances of the vibration limits at the beginning of the project led to Mr. Mosbrucker coordinating with the demolition contractor to resolve the high amplitude vibration issues.

GEOTECHNICAL ENGINEERING

Mr. Mosbrucker's work consists of performing geotechnical borings by classifying soils and writing reports to provide recommendations for foundation design and settlement.

Silica Mine Processing Plant, Kermit, Texas. Mr. Mosbrucker traveled to southwest Texas to oversee geotechnical drilling for a silica mine processing plant. Mr. Mosbrucker managed two sonic drill rigs while classifying soil samples and successfully dealing with difficult site conditions. Multiple subcontractors were coordinated through Mr. Mosbrucker during the two-week project.

Power Plant Expansion, Elwood, Illinois. Mr. Mosbrucker classified soil and rock core samples while in charge of monitoring the geotechnical drilling process. In addition to Standard Penetration Testing, 30+ Shelby tube samples were taken and used to create a detailed Geotechnical Data Report, which was provided to the design engineering firm.

Jones Island, Milwaukee, Wisconsin. This project was conducted at the Milwaukee Metropolitan Sewage District's (MMSD) treatment facility and consisted of multiple geotechnical soil borings and the installation of vibrating wire piezometers, thermistors, and SONDEX settlement systems. Instrumentation was installed to investigate ongoing settlement and sinkhole issues in a roadway on the MMSD campus. Mr. Mosbrucker monitored the geotechnical instrumentation over several months and contributed to the calculations package and final project report.

Titletown Development, Green Bay, Wisconsin. Mr. Mosbrucker was responsible for logging the majority of the 50+ geotechnical soil borings across the approximately 35-acre site. Information collected from the geotechnical borings was used by Mr. Mosbrucker and other GZA engineers to calculate settlement potential and bearing capacities across the site. Mr. Mosbrucker also performed multiple Atterberg tests and sieve analyses on soil samples collected at the site.



Jay Womack, ASLA, LEED AP

Senior Landscape Architect, Ecological Design

Summary of Experience

Mr. Womack's design philosophy is rooted in a lifelong affinity for the ecosystems of the Midwest and in the belief that people need to be connected to the environment, a philosophy closely aligned with Aldo Leopold's Land Ethic and E.O. Wilson's Biophilic theory. By recognizing that the places where we live, work, and play contain a unique and ever-changing part of the global system, Jay helps achieve a balance between the built environment and nature through design strategies that embrace ecology and incorporate ecosystem functions into everyday life.

Relevant Project Experience

- Ecological designer for the Village of Brookfield Comprehensive Plan. Identified and portrayed various green infrastructure, open space, and natural resources that exist within Village limits. This information will be used to formulate future opportunities to spur development, attract visitors to downtown Brookfield, and protect and enhance current resources such as Salt Creek (2016 - 2018).
- Landscape Architect for the Fondy Food Market. Worked with the City of Milwaukee and several stakeholders to envision a vacant green space next to the food market that will now become a community open space asset. The new park will infiltrate water from market roof tops, incorporate native landscapes, host music on a new stage, educate the public about sustainable initiatives, and monitor runoff in order to quantify the effectiveness of green infrastructure (2017 - 2017).
- Landscape Architect for the Eco-Arts Learning Center. Arts@Large is leading the way, with support of multiple partners, to artistically transform the .52-acre city-owned park known as Paliafito Park into an Eco-Arts Learning Center. The park will feature an amphitheater and seating for social events, a below-ground 1,700-gallon cistern that will collect on-site generated run-off for vegetable irrigation, and educational signs about the new amenities (2017 - 2017).
- Landscape Architect for Innovation Park. Currently, the property is considered a Brownfield Site and contains contamination in soil and groundwater. Due to limited potential uses of the property, the City of Milwaukee is looking to transform the site into a demonstration park that will display innovations in sustainable stormwater management, advanced soil and water remediation, renewable energy techniques, innovative materials, and urban ecology (2017 -).
- Landscape Architect for Laraway School. Worked closely with School District 70, Legat Architects and Ruettiger, Tonelli & Associates, to envision the entire school's property to be a Living Laboratory. Courtyards within and adjacent to the school will be Learning Landscapes with descriptive titles such as: the Riverine Atrium, the Solar System Court, the Prairie Court, and two Nature-based Play Courts. Outside the building a series of rain gardens will receive water that falls on the school roof. As rain fills the rain gardens, water will overtop into depressed areas planted with prairie landscapes that serve as learning landscapes for curriculum with boardwalks, trails, and seating areas (2017 - 2018).

Education

B.S. 1988, Landscape Architecture,
University of Illinois, Champaign/Urbana

Licenses & Registrations

Landscape Architecture - Illinois
#157-000270
LEED AP, 2006

Affiliations/Memberships

- American Society of Landscape Architects
- American Society of Landscape Architects – Illinois Chapter Past President
- Site Steward at Fabian Preserve East
- Chairperson for the Natural Resources Committee of Geneva
- Member of the Geneva Park District Foundation
- Member of the Kane County Advisory Committee to The Conservation Foundation

Areas of Specialization

- Landscape Architecture
- Ecological Design
- Sustainability
- Green Infrastructure
- Grant Writing



Jay Womack, ASLA, LEED AP

Senior Landscape Architect, Ecological Design

- Ecological Designer for On-Call Landscape Architectural Services for the DuPage County Government Campus. As part of the RATIO Architecture team, H&H will provide ecological oversight for various projects identified by County of DuPage Department of Facilities Management for the DuPage County Complex in Wheaton, IL (2017 -).
- Landscape Architect for Pilcher Park Natural Areas and Soil Erosion Assessment. After securing a grant for Pilcher Park Nature Center, worked closely with the Nature Center to conduct a natural areas assessment, which will help formulate restoration efforts to be completed by volunteers within the woodlands (2018 -).
- Landscape Architect for On-Call Services for the Illinois State Toll Highway Authority. Working closely with ISHTA staff, H&H will provide review for landscape design projects, input for revisions to current landscape lists used by design consultants, construction oversight, and development of a new Bridge Aesthetics Manual (2017 -).
- Project Manager for Lytle Park Master Plan - A Vision for the Next 100 Years*. Worked closely with the Park Superintendent and Board to identify a series of sustainable initiatives – Natural Cleansing, Nature-based Play, New Active Green Environment, Sustainable Operations, and Access and Circulation, that will set the stage for the next 100 years of the park (2011 – 2013).
- Project Manager for Lytle Park OSLAD Grant Documents. After completing the Lytle Park Master Plan, the Park Board was awarded an OSLAD Grant to implement three of their five sustainable initiatives - Nature-based Play Area, New Active Green Environment, and a Picnic Pavilion with new restrooms that incorporate solar panels, rainwater harvesting to flush toilets, and energy conservation techniques (2013-2017).
- Landscape Architect for the Coffee Creek Watershed Conservancy Stewardship Plans. Over time the ornamental plants within many of the Preserves amenities are in much need of an overhaul and will be replaced with a simple matrix of native plants. At The Water Plaza, The Amphitheatre, The Weir bridge, and Pathway Islands, existing landscapes have been overrun by cool season grasses and aggressive ornamental plants that will be replaced with native plants (2018).
- Landscape architect for Happy Turtle Farm in Galien, MI. Working closely with the Owner and State Forester, H&H created a sustainable tree farm plan that identified opportunities to infiltrate water coming off adjacent properties, improve existing wetland and woodland habitat, incorporate boardwalks and trails for nature exploration, and install a matrix of native sedges and grasses in the cornfields where the tree farm will be planted. The grass matrix will establish a permanent native groundcover that will eliminate erosion and protect soils for long-term health of the farm (2016).
- Project Manager for Clarke at Garden Avenue. Worked closely with Serena Sturm Architects to create a landscape that embodies the major ecosystems of the Midwest – Prairie, Savanna, and Wetland. The ecosystems will also function as rain water management tools and educational opportunities for staff and visitors (2015-2018).
- Project Manager for the Geneva Park District's permeable paver plaza at Peck Farm Park*. Designed and oversaw the removal of the existing brick plaza at Peck Farm Park, which was rebuilt with permeable pavers. Included in the design were a number of rain gardens that collected runoff from barn roofs and incorporated the excess water into infiltration trenches out into the adjacent prairie landscape (2014 - 2015).
- Project Manager for Heritage Park*. Led a multi-disciplinary design team, The Lumpkin Family Foundation, City of Mattoon, and multiple stakeholders through an interactive process that has turned a parking lot into a park that will showcase numerous Regenerative Design Principles such as rain-water harvesting, a solar carport and charging station, ecosystem development, energy conservation, and a history wall, all within downtown Mattoon. The project is pursuing Sustainable SITES Initiative and is currently at Gold status (2014 – 2016).
- Project Manager for The Chautauqua Institute in New York*. Developed a series of sustainable initiatives that include native landscapes to engage local residents and city officials in conversations about their positive attributes; reduced direct discharge of stormwater runoff into Lake Chautauqua where algal blooms are becoming a serious summer nuisance; green infrastructure

Jay Womack, ASLA, LEED AP

Senior Landscape Architect, Ecological Design

such as rain gardens, permeable pavers, and bioswales on a residential scale not seen before in this area of New York (2012 – 2014).

- Project Manager for the Helen Plum Library Shade Study*. Worked closely with Engberg Anderson Architects, the Helen Plum Library, the Lombard park District, and key stakeholders to identify and document impacts from shade and construction on Lilacia Park, their lilac's, and other vegetation within twenty feet of the building envelope (2016).
- Landscape Architect for Park 580 (Read-Dunning)*. Created revisions to the overall site plan and layout for the recreational fields, parking, walkways, concession building and plaza, restrooms, and landscape around the property (2015 – 2016).
- Landscape Architect for McKinkley Woods Forest Preserve*. Led a team of design professionals to improve handicap accessibility to a Civilian Conservation Corps camp and the Frederick's Grove Shelter. Work also included a new handicap accessible canoe launch onto the I&M Canal, updated restrooms, trails, and restoration initiatives (2010).
- Landscape Architect for The Queens Botanical Garden Master Plan in Queens, NY*. Worked closely with the Owner, Architect, Stakeholders, and public to develop a Master Plan that honored the legacy of the botanical garden while identifying Regenerative Design Principles that could be implemented within various garden spaces. The Master Plan also had to speak to the 122 language dialects of Queens. Water was identified as the one unifying element to all of the dialects (2008).
- Project Manager for the St. Charles Park Districts Parking Expansion at Hickory Knolls Discovery Center*. Working with park district staff, envisioned several scenarios to expand parking while not interrupting outdoor spaces nor native habitat created around the center (2014).
- Developed guidelines and information for the Cook County Forest Preserve District-wide Gateway Master Plan*. Working with a diverse team of professionals, helped develop the Gateway Master Plan and Design Guidelines that will inform how gateway sites throughout the District can be designed with better wayfinding capabilities and incorporate ecology into the entries (2014-2015).
- Project Manager for the ecological component of the Route 53-120 Corridor Plan* through Lake County, IL. Created Existing Condition Assessments for the 17-square mile corridor with detailed analysis of environmental assets. Identified 'Cool Spots' - areas where environmental protection and enhancement should be focused so that development would not create a negative impact. Created "Open Space and Natural Resources Best Practices" to help strengthen municipal and county ordinances. (2013-2015).
- Project Manager for the Kickapoo Woods Forest Preserve Forest and Gully Restoration* through the Friends of the Chicago River. Used GIS in combination with field reconnaissance to understand existing conditions such as vegetation, storm infrastructure, and topography that have had a negative impact on the gullies. Prepared restoration and revegetation guidelines for a 280+acre study area. Provided prioritized strategies specifically geared for Friend's volunteers to help stabilize onsite gullies and riparian corridors (2014).
- Project Manager for the Village of Mettawa Open Lands Management Recommendations*. Develop "Open Lands Management Recommendations" to guide future planning and stewardship of the Village owned properties, a bike trail system, and right-of-way's. During the process, created awareness for the need to protect various properties with permanent conservation easements, Open Space Zoning, or Illinois Nature Preserve status (2014 – 2015).
- Project Manager for the North Shore Water Reclamation District (NSWRD) Conservation and Stormwater Study*. Identified and mapped areas for natural landscape improvements including green roofs, naturalized open spaces, bioinfiltration zones and permeable pavements. Recommended methods to realize environmental, ecological and financial benefits at the three locations reviewed. Prepared cost estimates and return on investments (ROI) for the suggested sustainable improvements to help guide capital budget process (2014).



Jay Womack, ASLA, LEED AP

Senior Landscape Architect, Ecological Design

- Landscape Architect for Hidden Oaks Nature Center*. Worked closely with the Owner, Design Team, and stakeholders to develop a LEED Platinum nature center in Bolingbrook. Because the center was located within an oak/hickory woodland, the roads and trails were laid out in the field, following natural topography and fitting into the site. A green roof, rain gardens, 100% permeable roadway, and infiltration trenches were used for detention in lieu of conventional detention (2010-2011).
- Landscape Architect and Ecological Designer for The American Institute of Architects Regional/Urban Design Assistance Teams (R/UDAT) for Petersburg, VA*. This highly flexible program works for communities of all sizes, from small towns to districts in major metropolitan regions. Teamed with architects, urban planners, engineers, and local city staff and students, the design team matches solutions for the communities needs and struggles such as affordable housing, vacant storefronts, unfocused growth and neighborhood decline. Through a series of community activities and evaluation, the design team creates and presents an action plan with phased, implementable recommendations for the future (2012).
- Landscape Architect for The American Institute of Architects Sustainable Design Assessment Team (SDAT) for Oxford, MS*. The design team focuses on sustainability of a community's ecological, economic and cultural survival. The design teams assessed current conditions and helped the community envision future possibilities for sustainable growth. After a focused team visit, the design team provided an initial presentation of findings at a community open house with a subsequent final report outlining and describing in-depth analysis and recommendations for sustainable growth (2014).
- Landscape Architect for the Cermak Road Sustainable Streetscape*. Worked with CDOT and a multi-disciplinary team to create a streetscape design for a 2-mile long streetscape that met LEED Platinum criteria, which led to the project being dubbed the 'Greenest Street in America' (2008-2011).
- Landscape Architect for the Irving Park Road, Phase 2* project. Worked closely with CDOT to develop a streetscape design that incorporated numerous green infrastructure techniques (2010-2011).
- Landscape Architect for the Federal Street Improvements, 31st to 33rd Street on the Illinois Institute of Technology Campus*. Created a series of sketches to show street improvements, pedestrian circulation, parking alignments, and sustainable techniques applicable to roadway design (2008-2009).
- Developed the Green Campus Initiatives for Woodridge Community SD 68*. Working closely with school district personnel, helped create plans for three of their seven schools to transition every impermeable surface possible to permeable pavements, this included all parking lots, sidewalks, school entries, and even play surfaces that did not hold playground equipment. Rain gardens and infiltration techniques were used at every downspout or roof edge where rain sheets off from the top. Reading gardens were implemented at the entrance to each school to facilitate nature-based school curriculum opportunities (2010-2015).
- Project Manager for Hammerschmidt Elementary Learn+Play Gardens*. Working closely with school staff, helped develop a nature-based playground and green schoolyard vision that encourages active and passive play, community gatherings, and appreciation of the arts such as outdoor music, sculpture and interpretive signage. Designed sustainable stormwater management features including porous concrete sidewalks, native plantings, rain gardens, and infiltration pits tied to the root zone of poplar trees (2014 – 2016).
- Project manager for City of Chicago Department of Housing and Economic Development's (DHED) Learning Landscapes* at three schools in Englewood Community. The projects took vacant land that was seen as problematic around the schools and turned them into community garden spaces where students and residents can gather (2008-2011).
- Project Manager for the Carmel Catholic High School Courtyard*. An antiquated courtyard inside the school was converted into two separate but united spaces through commonalities of texture, color, and water. A water harvesting system collects roof runoff for a series of water features that move water through the terrace, providing an interaction between students and rain while a bench that utilizes reclaimed white oak tells the story of our State tree (2010 – 2012).



Jay Womack, ASLA, LEED AP

Senior Landscape Architect, Ecological Design

- Landscape Architect for West Hall at Elmhurst College*. Working closely with the design team and university personnel, helped create a project that incorporated sustainable stormwater management into almost every facet of the project – bioswales, rain gardens, permeable pavers, rainwater harvesting for irrigation, and native landscapes (2018-2010).
- Project Manager for University of Chicago Cultural Landscape and Sculpture Assessment*. Collected, reviewed, and documented existing landscape conditions and historic data on fifty-five (55) garden sites throughout the campus as well as twenty-six (26) sculptures throughout the campus. This led to the development of individual Resource Data Sheets for all sites documented (2011-2012).
- Project Manager for the Columbarium at Elmhurst College*. Working directly with the University, developed a series of sketches for a columbarium on University-owned property that holds burials of past Presidents and University personnel (2010).
- Project Manager for Ball Horticultural Company's Sustainable Streetscape & Premier Lab*. Created a multi-phased master plan with sustainable features including bioswales, rain gardens, native landscape establishment, and infiltration zones associated with their existing parking lots. The new landscape identity for the headquarters reflects Ball's evolving brand to showcase the naturalistic side of natives and perennials combined with annuals (2010-2012).
- Project Manager for Clarke Corporate Headquarters. Created a Campus Master Plan that outlined sustainable initiatives for stormwater run-off reductions, increased landscape biodiversity, opportunities for staff to interact with edible garden spaces, and education of adjacent property owners about sustainable land management (2013-2014).

Activities / Education

Adjunct Professor – Illinois Institute of Technology. Mr. Womack is an Adjunct Professor at the Illinois Institute of Technology where he teaches a course in the Landscape Architecture Department. The class focuses on the integration of ecology into design.

Experience Prior to GZA

- WRD Environmental – Director, Landscape and Ecological Design (2010 – 2016)
- Wight & Company – Director, Sustainable Design (2005 – 2010)
- Illinois Institute of Technology of Adjunct Professor (2008 – present)
- Conservation Design Forum – Senior Landscape Architect (1998 – 2005)
- HGOR/Wolff Associates – Associate Landscape Architect (1995 – 1998)

Publications and Presentations

- *Resilient cities* | What would an entirely flood-proof city look like? The Guardian, 2017
- *Reconnecting People to Nature*; USGBC / CNU, 2016
- *Sustainable Pavement Systems*; ASLA Convention, 2012
- *The Greenest Street in Chicago*; Public Works, 2010
- *Hidden Meaning – Best Practices in Stormwater Management*; Parks and Rec Business, 2010
- *Go Green, Think Blue*; College Planning and Management, 2009
- *Going Green Begins by Thinking Blue*; School Planning and Management, 2009

Certifications/Training

- Landscape Architecture - Illinois #157-000270
- LEED AP, 2006



Known for excellence. Built on trust.

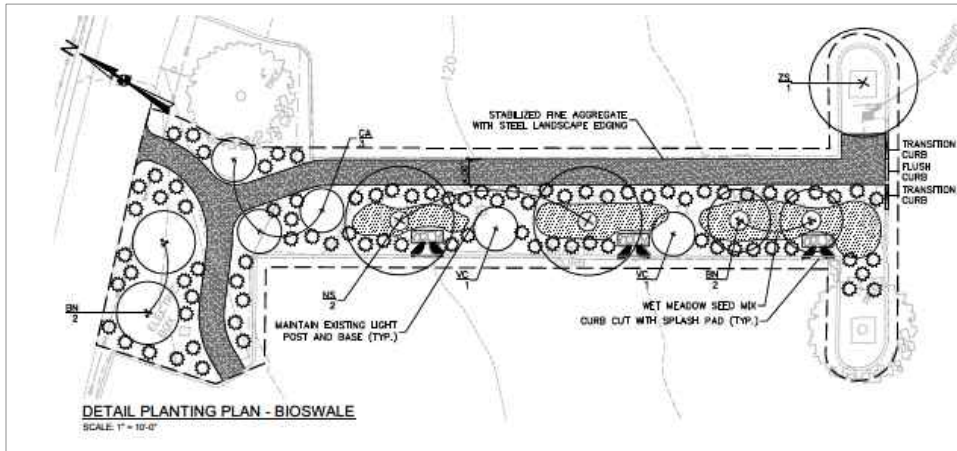


APPENDIX B | PROJECT EXPERIENCE



Northampton Designs with Nature for Climate Resiliency

Northampton, MA



Bioswale Design for Municipal Parking Lot Island

Challenge: GZA was selected to advance the City of Northampton's Climate Resiliency and Regeneration Plan by providing conceptual to final construction-ready design of green infrastructure solutions to improve flood control and stormwater management during extreme weather events.

Solution: GZA is collaborating with the City of Northampton's Office of Planning & Sustainability and Department of Public Works on this project, funded in part with a grant from the Commonwealth of Massachusetts Municipal Vulnerability Preparedness (MVP) Action Grant Program. At each of 10 locations, GZA performed a feasibility assessment to identify potential nature-based solutions providing benefits such as improved stormwater quality, reduction in potential flooding and storm damage, ecological enhancement, and educational opportunities. Potential challenges (including maintenance, permitting, subsurface conditions, and access) were also identified.

In keeping with the City's goal to use nature-based solutions for climate resiliency, green infrastructure elements, such as bioswales, bioretention (rain gardens), subsurface systems, and pervious pavement surfaces were incorporated into GZA's designs to detain and retain stormwater runoff. The City has prioritized the projects based on feasibility, cost, and effectiveness in mitigating flood hazards and property damage to nearby roads, homes, and businesses. Conceptual designs selected by the City are being advanced to 100% construction-ready design plans. These projects include green stormwater infrastructure at two public schools, a municipal parking lot, and within a rotary circle, stormwater outfall repair and stream channel restoration, and upgrades to existing flood mitigation infrastructure.

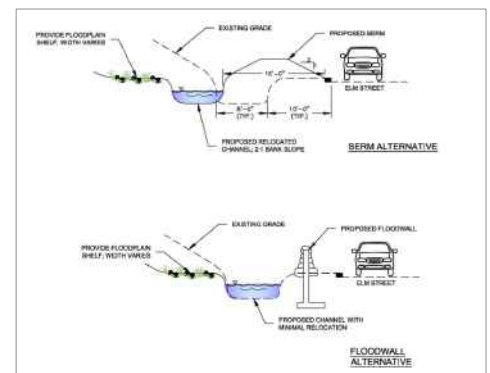
Benefit: GZA's analysis and designs will not only improve the City's stormwater quality and reduce flooding but will provide educational demonstration projects and other co-benefits such as wildlife habitat, urban tree canopy, and increased public safety.

Project Highlights

- Climate resiliency planning & design
- Nature-based solutions
- Stormwater green infrastructure
- Hydrologic & hydraulic analysis
- Engineering design
- Construction cost opinions
- Wetland delineation & permitting
- Community outreach
- Massachusetts Municipal Vulnerability Preparedness (MVP) Program
- Grant applications



Recurrent flooding along Elm Street currently interrupts traffic and floods residential properties



Floodplain and flood barrier alternatives proposed for Elm Street site



Northampton Designs with Nature to Reduce Storm Damage MVP Action Grant

Northampton, MA

Project Highlights

- Nature-based solutions
- Stormwater green infrastructure
- Hydrologic & hydraulic analysis
- Engineering design
- Wetland delineation & permitting
- Community outreach

To view a YouTube webinar on this project, recorded on 02/12/20, visit: https://www.youtube.com/watch?v=1aoLakFqxhA&feature=emb_title



Barrett Street Marsh

GZA has been selected by the City of Northampton to advance the City's Climate Resiliency and Regeneration Plan by assessing 10 locations for the feasibility of designing green infrastructure for flood control and stormwater management.

The project is being funded in part with a \$330,000 grant from the Commonwealth of Massachusetts' Municipal Vulnerability Preparedness (MVP) Action Grant Program and a \$70,000 match from the City as part of the broader and associated Climate Resiliency and Regeneration Plan work.

GZA will collaborate with the City of Northampton's Office of Planning & Sustainability and Department of Public Works to examine using nature-based solutions for climate resiliency. Green infrastructure, such as berms, swales, rain gardens and pervious surfaces on properties identified by the City, will be designed by GZA to detain and retain stormwater runoff from heavy precipitation and extreme weather events to reduce storm damages caused by flooding.

The green infrastructure projects to be constructed will be prioritized and approved by the City based on their feasibility, cost-effectiveness, and ability to mitigate flooding hazards and reduce property damages to nearby roads, homes and businesses.

Conceptual designs selected by the City will be advanced to 100% construction-ready design plans.



Mary Brown's Dingle



The Terrace Trails

Ford Motor Company Greenhouse Gas Emissions Management North America and Global



Project Highlights

- Development and management of corporate Scope 1 and 2 GHG emissions inventory for global operations.
- Preparation of 14 facility-level mandatory GHG reports submitted to USEPA and Ontario Ministry of the Environment.
- Preparation of corporate-level voluntary GHG responses for global operations.
- Additional assistance provided to support third party verification, training, planning, and database management.

Challenge: GZA was selected by Ford Motor Company to assist in the management and reporting of their Scope 1 and 2 Greenhouse (GHG) emissions. This encompassed the development of a company-wide Inventory system to support global voluntary disclosure initiatives, as well as regulatory reporting for 14 facilities through the USEPA and the Ontario Ministry to the Environment, Conservation and Parks GHG emissions reporting programs.

Solution: GZA developed a customized Inventory system to evaluate Ford's global Scope 1 and 2 Greenhouse Gas (GHG) emissions. The GHG Inventory processes operations data, fuel combustion, purchased electricity, purchased steam, and other energy consumption data from over 450 manufacturing operations, research and test facilities, offices, and parts distribution centers.

GZA also assisted Ford with the preparation of mandatory GHG reports on behalf of 14 manufacturing facilities within Ford's Vehicle Operations and Powertrain Operations divisions. GZA supported the completion of emission calculations, electronic reporting forms, training sessions, monitoring plans, database management and documentation reports.

GZA also supported third party verification activities for global GHG emissions disclosure and for mandatory facility-level reports where required.

Benefit: GZA improved upon Ford's previous inventory by increasing the transparency of the calculation methodologies and supporting resources, integrating user-focused functionality, and producing data summaries aligned with internal and external GHG metrics pertinent to Ford. The Inventory also produces data outputs which have directly supported verification under ISO 14064. As a result, Ford is able to produce GHG emissions results more efficiently while maintaining flexibility to report emissions to satisfy various internal and external initiatives.



Ford Motor Company Supply Chain Sustainability Programs Worldwide



Project Highlights

- Annual support for several hundred suppliers disclosing climate change and water information to Ford through the CDP Supply Chain program.
- Development of PACE program offering best practices and monitoring tools to help suppliers track and achieve their own sustainability goals.
- Ford's suppliers have achieved significant reductions in waste generation, energy and water use, and GHG and air emissions.

Challenge: Ford's supply base is a complex network with thousands of global suppliers impacting the environment. On an annual basis, GZA has been asked by Ford to engage with several hundred key suppliers using the CDP Supply Chain program and PACE program to better understand how suppliers are addressing climate change, water, waste, and air-related issues.

Solution: GZA works strategically with Ford suppliers during the CDP disclosure cycle to assist with data solicitation and collection, strategic engagement and communication with suppliers, technical support and training, as well as targeted outreach to assist suppliers looking to improve their disclosure. Following the disclosure period, GZA summarizes and analyzes supplier responses on Ford's behalf. This facilitates greater transparency on supplier environmental efforts and allows Ford to consider the risks and opportunities presented by their suppliers.

GZA has also worked closely with Ford to develop the Partnership for A Cleaner Environment (PACE) program. This program is provided as a tool for suppliers allowing them to record baseline environmental data, set reduction targets, evaluate the impacts of reduction initiatives, and create multi-year roadmaps for improving environmental performance. As part of this program, Ford shares best practices with their suppliers to support them in identifying opportunities to reduce waste generation, energy and water use, and GHG and air emissions.

Benefit: Through GZA's contributions to Ford's CDP Supply Chain program, Ford has achieved a high supplier response rate and improved supplier disclosure performance. This could be partially attributed to GZA's support in developing the PACE program, which according to Ford has impacted more than 1,100 sites in over 40 countries. As a result, Ford's suppliers are on track to reduce their environmental impacts.



Source: Ford Motor Company

Sharon Gallery GHG Analysis

Sharon, MA



A conceptual image of the Sharon Gallery project.

Challenge: GZA was retained by the owner and developer of Sharon Gallery, a 750,000 square foot commercial and residential development, to perform a Greenhouse Gas (GHG) emissions analysis. As part of the State of Massachusetts' aggressive environmental protection policies, planned developments requiring state permitting must undergo a thorough analysis of environmental impacts and demonstrate feasible measures to avoid, minimize, and mitigate damage to the environment. The Massachusetts Environmental Policy Act (MEPA) office requested a GHG emissions analysis be performed as part of their review process.

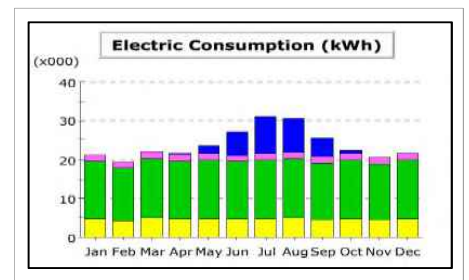
Solution: GZA quantified direct CO₂ emissions from onsite stationary source fuel combustion, indirect CO₂ emissions from purchased electricity, and transportation-related CO₂ emissions associated with the planned development. This entailed a three-step process: 1) identify a project baseline, 2) calculate estimated GHG emissions from project baseline, and 3) calculate estimated emissions reductions based on mitigation measures by comparing project alternatives.

By working directly with the developer to identify energy efficiency and emission reduction opportunities, GZA was able to successfully demonstrate that each building structure satisfied the necessary level of performance. This involved energy utilization modeling using several software options for a variety of commercial and residential buildings. Opportunities for solar panel installation were also evaluated for each planned building. GZA also completed transportation modeling to obtain CO₂ emissions for various scenarios which included an evaluation of the impacts from potential transportation demand management (TDM) strategies.

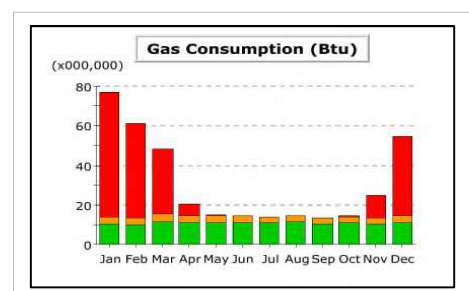
Benefit: GZA proficiently completed the analysis, providing our client with design elements that will help Sharon Gallery satisfy GHG mitigation obligations under MEPA. Following review of the GHG analysis, our client successfully obtained approval from MEPA allowing them to move forward with construction activities.

Project Highlights

- Completed energy modeling for 10 buildings comprising 750,000 square feet of commercial and residential use.
- Evaluated energy efficiency and emission mitigation measures including an analysis of solar installations for each building.
- Modeled transportation emissions including an analysis of the impacts of potential transportation demand management strategies.



Modeled data showing electric consumption for one of the proposed building.



Modeled data showing fuel consumption for one of the proposed buildings.



Coastal Assets Inventory

Milwaukee County, WI



GZA provided a Coastal Assets Inventory on behalf of Milwaukee County's Environmental Services Unit (Project No. 5741-19805) through a WCMP grant titled "Milwaukee County Coastal Resources Inventory).

Milwaukee County holds extensive property holdings along the Lake Michigan Shoreline, including natural and recreational features such as sand beaches, vegetated bluffs, marinas, boat launches and waterfront parks. In addition, there are various types of infrastructure that support those activities such as paved walks, park roads, stormwater management features, and shoreline protection devices.

Extreme weather has damaged Milwaukee County's coastal resources and it is anticipated that damaging events will continue to occur in the future, with the possibility that the severity will be greater due to the effects of climate change. Milwaukee County had previously performed a coastal resilience self-assessment and rated the probability of the occurrence of coastal hazards.

In the Fall of 2018, Wisconsin Coastal Management Program (WCMP) applied for and was awarded a grant to perform an inventory of its coastal resources. Milwaukee County's Environmental Services Unit initiated work, on the project but wanted the benefit of a third-party with expertise in assessing the condition of infrastructure, and /or assigning costs to coastal assets, and/or assessing vulnerability of such assets to complete the project, verifying data already completed and filling in data gaps for coastal assets not yet assessed.

GZA provided all the services requested including field inspections for each asset, submitting a draft and final report. In addition to submitting a final report, GZA incorporated data collected into a GIS database.

Project Highlights

- Coastal Asset Inventory
- GIS Database Services
- Cost-Estimating
- Vulnerability Assessment to Climate Changes



Coastal Assessment & Engineering Design Services

Various Locations, Southeastern WI



In 2020, GZA completed approximately 30 coastal engineering and design projects for residential and commercial properties along Lake Michigan in Southeastern Wisconsin, including several along the north and south reaches of North Beach Drive. Each project included a site reconnaissance to observe erosional scour and bluff recession, topographic and bathymetric surveys, wave runup analyses to confirm wave elevations during different storm events, and preparation and regulatory permitting of alternative designs for shoreline protection.

We meet monthly with representatives from WDNR to discuss coastal engineering design and permitting projects. Several of the projects also included geotechnical explorations and slope stability analyses for bluff stabilization in addition to shoreline protection.

Our team of coastal and geotechnical engineers, through extensive experience, has developed a deep and thoughtful understanding of the soil profile and engineering properties of the soils along the shoreline of Lake Michigan and, importantly, understand what shoreline protective alternative represents the most cost-effective solution to specific locations.

Project Highlights

- 30 Coastal engineering/design projects
- Site reconnaissance services
- Topographic and bathymetric surveys
- Wave runup analyses
- Regulatory permitting

Wisconsin Emergency Management Coastal Support

Various Locations, Southeastern WI



GZA has been retained by SEWRPC to perform coastal evaluations of structures on Lake Michigan at the request of the WEM to evaluate bluff recession and the life projections

Our team of coastal and geotechnical engineers, through extensive experience, has developed a deep and thoughtful understanding of the soil profile and engineering properties of the soils along the shoreline of Lake Michigan and, importantly, understand what shoreline protective alternative represents the most cost-effective solution to specific locations.

Project Highlights

- Coastline structural evaluation services
- Bluff recession life projection estimations



Town of Stratford Community Coastal Resilience Plan

Stratford, CT

Project Highlights

- Vulnerability and Risk Assessment
- Adaptation Options Analysis
- Public Information Meetings and Charrettes
- Sandy-Impacted Neighborhoods
- Living Shoreline Plan
- Public Infrastructure Plan
- Implementation Plan and Process
- Conceptual Designs



Town of Stratford Special Flood Hazard area in blue and Climate Adaptation Action Locations

GZA developed a Community Coastal Resilience Plan for the Town of Stratford. The Plan provides a road map for creating social, economic, and ecological resilience in relation to future sea level rise impacts, including anticipated increases in the frequency and severity of storm surge, coastal flooding, and erosion. GZA developed the plan in coordination with the South Central Regional Council of Governments (SCRCOG) and the Greater Bridgeport Regional Council (GBRC) Regional Framework for Resiliency to limit redundancies, but more importantly to make the entire region more resilient by working with neighboring and nearby communities. GZA's project team included The Cecil Group (now Harriman) and Jamie Caplan Consulting, LLC.

Public Outreach

Public outreach was conducted in close collaboration with the efforts of the Project Team, Town staff, and the general public. Outreach included a series of three public information meetings and charrettes, as well as updates to Town's website and the StormSmart™ Coasts network. The public meetings and charrettes were facilitated, with presentations, to inform the public and receive feedback throughout the planning process. From these experiences we learned that it is vital the public outreach be community driven and led by community members from the start based on a well developed and tested community resilience outreach framework. This was particularly the case for Stratford, which identified numerous at-risk areas with an equal number of potential resilience and protection projects to pursue in the future. The outreach process was critical in obtaining public buy-in and assisted in the prioritization of projects for conceptual design.

Vulnerability and Risk Assessment

GZA performed a HAZUS-MH Level 2/3 Hazard Vulnerability Risk to identify asset impacts associated with multiple time horizons, sea level rise scenarios and flood risk levels (e.g., 100-year and 500-year recurrence interval floods).



Wastewater Treatment Facility – Town of Stratford 2014

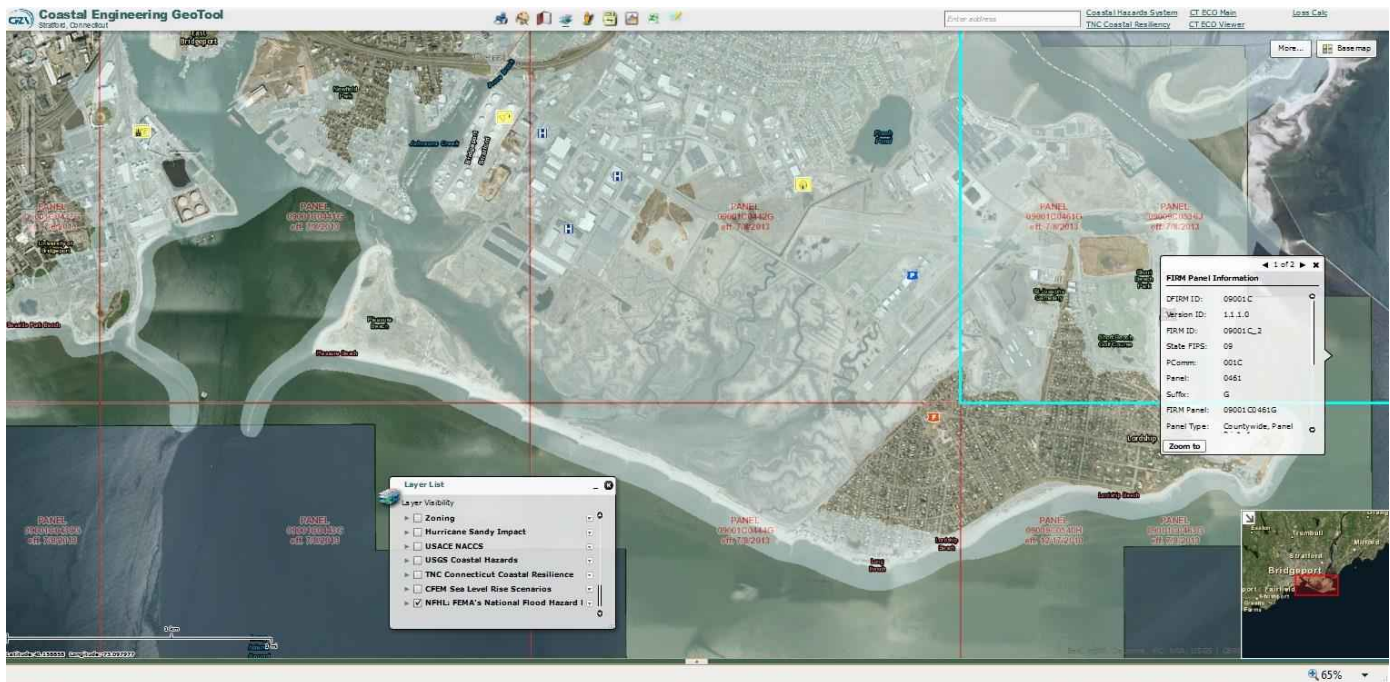


Short Beach

Town of Stratford Community Coastal Resilience Plan

Stratford, CT

Below: Town of Stratford Vulnerability and Risk Assessment Preliminary Assets Inventory



GZA conducted the assessment using site-specific flood hazard data developed by GZA's computer storm surge and wave models. In addition to critical infrastructure and other key assets, the vulnerability assessment focused on low and moderate income neighborhoods to evaluate the impacts to these neighborhoods associated with climate change and to ensure that these neighborhoods are represented in Town planning. We used the results of the hazard assessment to: 1) identify key resiliency projects; 2) understand future costs and needs; and 3) support implementation of coastal resiliency measures.

Project Design

The Town coastal resiliency projects range from structures to natural and nature-based (aka green infrastructure) features. Examples include barrier beaches, primary dune development and maintenance and tidal wetlands, all incorporating a "Living Shorelines" design approach. GZA's team of coastal engineers and ecologists applied a comprehensive, holistic approach to project design. The project designs utilized design input developed in GZA's site-specific storm surge and wave models.



Eaton Corporation CDP Supply Chain Support Cleveland, OH

Project Highlights

- Eaton demonstrates corporate leadership through participation in the CDP Supply Chain program.
- Since 2015, GZA has provided an assortment of technical services to assist Eaton and its suppliers throughout the reporting cycle.
- In 2018, Eaton achieved a high supplier response rate and above average disclosure and scoring results.
- Eaton's suppliers improved across nearly all reporting categories and KPIs.
- Eaton achieved its project objectives and is better positioned to build upon its supply chain sustainability initiatives.

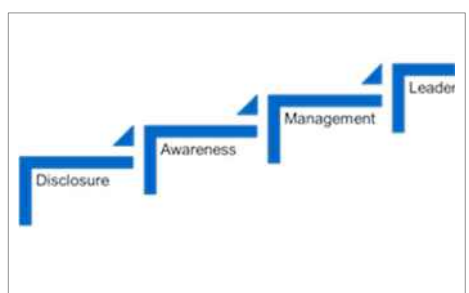


Eaton Corporation headquarters in Cleveland, Ohio

Challenge: Eaton Corporation is a leader in the power management sector with diverse markets ranging from aerospace to food and beverage. The complexities and geographic scope of their supply chain makes engaging and managing their supply chain risks and opportunities associated with climate change an undertaking. Eaton has selected GZA to assist with their supply chain program since 2015 to better engage, manage, and report on their supply chain environmental progress.

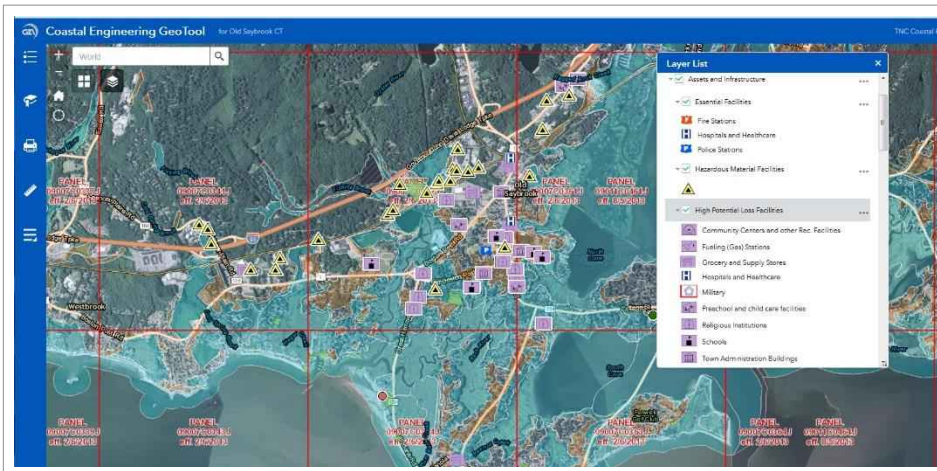
Solution: Eaton has selected the CDP Supply Chain program as the method for engaging with its suppliers. Accordingly, GZA developed a CDP supply chain program for Eaton which included the following aspects: support for data solicitation and collection; strategic supplier engagement, supplier technical support and training; review and analysis of supplier responses; and, reporting on supplier opportunities and risks. Notably, GZA strategically engaged with a subset of suppliers to provide individualized guidance and recommendations for improved disclosure and corporate environmental progress. GZA's support has helped improve the responsiveness of Eaton's suppliers while also providing technical assistance allowing those suppliers to improve the quality of their disclosure and performance.

Benefit: Eaton has consistently demonstrated a leadership position within the CDP Supply Chain program based on the level of supplier responsiveness and quality of responses received on an annual basis. In 2018, 85% of requested suppliers voluntarily responded to Eaton's request which outperformed its corporate peers who achieved an average response rate of 47%. Eaton is also utilizing the collected data as inputs in their calculation of relevant Scope 3 emissions categories. GZA has also evaluated the information reported by suppliers and determined that suppliers improved their disclosure and performance across nearly all categories and Key Performance Indicators (KPIs).





Town of Old Saybrook Community Coastal Resilience Study & Infrastructure Evaluation



Saybrook Breakwater Lighthouse located in Old Saybrook, Connecticut

GZA is in the process of conducting a Community Coastal Resilience Study and Infrastructure Evaluation for the Town of Old Saybrook, CT. GZA's overall approach is to: 1) use "state-of-the-science" methodologies, including numerical models, for characterizing flood hazards and sea level rise; 2) calibrate our hazard analyses to those developed by the US Army Corps of Engineers (USACE) North Atlantic Coast Comprehensive Study (used for federal projects); 3) utilize HAZUS-MH for estimating losses; 4) present a blend of resiliency recommendations ranging from physical mitigation projects to change to Old Saybrook's plans, policies and regulations; 5) take an integrated approach for physical mitigation projects including both structures and natural and nature-based features; and 6) use ARCGIS for all information management, including our web-based GIS GZA GeoTool©.

Focus on Public Outreach

GZA's Community Resiliency outreach for this project centers principally on the integration and use of the Community Resilience Building (CRB) Workshop Process. The CRB Workshop generates a great deal of information from the community on hazards, vulnerability, strengths, and priority actions to improve resilience in Old Saybrook. Our first workshop at the beginning of the process helped to build greater awareness and support for the process and the ultimate development of the Coastal Resilience Plan for Old Saybrook.

GZA evaluated public participation results, population density and characteristics, critical facilities, and the results of the vulnerability and risk assessment for risk profiles to inform neighborhood selection based on the data points available from the Coastal Resilience Study Document. This evaluation resulted in the selection of up to two neighborhoods for recovery and adaptation conceptual design.

GZA used interactive exercises and dialogue during five (5) Neighborhood and Community Outreach Workshops to assess community goals regarding necessary tradeoffs, including flood-proofing versus relocation. GZA's team documented input for evaluation of preliminary and final conceptual designs. After the meetings, GZA circulated meeting results memo(s) to the Town and other stakeholders to solicit additional consideration.

Project Highlights

- Risk Vulnerability and Risk Assessment
- Inundation Mapping Using Innovative Geospatial Management Tools
- Resiliency Adaptation Options Analysis
- Public Involvement Process Meetings and Charrettes
- Implementation Plan and Process
- Sandy-Impacted Neighborhoods Land Use and Development Analysis
- Neighborhood Conceptual Designs
- Living Shoreline Plan
- Physical and Infrastructure Feasibility Study



Marshlands in Old Saybrook



Public Outreach Meeting in process



PROJECT PROFILE

30th Street Cream City Farms Green Infrastructure Design and Environmental Remediation Milwaukee, WI

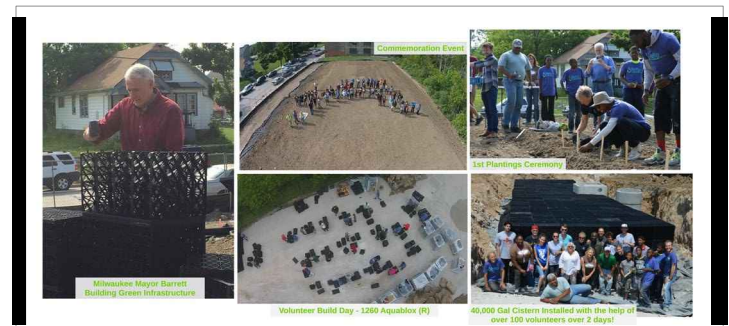


Project Highlights

- Designed and installed a 40,000-gallon underground cistern to collect and reuse stormwater for irrigation
- Creatively redeveloped a blighted environmentally impacted site into a model for brownfield redevelopment
- Engaged a diverse stakeholder group and invited many non-traditional partners to participate in the site's redevelopment
- MMSD Green Luminary Award – February 2017

The Redevelopment Authority of the City of Milwaukee (RACM) approached GZA to help utilize an EPA brownfield redevelopment grant to transform a 1.5-acre former industrial facility within the 30th Street Industrial Corridor into an urban farm. In light of the intended end-use, GZA prepared a remedial and green infrastructure stormwater design that disposed of low level polycyclic aromatic hydrocarbons (PAHs) and non-hazardous volatile organic compound (VOC)-impacted soil, capped existing soils, and managed stormwater runoff to be harvested in a 40,000-gallon underground cistern. The site's infrastructure was designed to easily monitor stormwater runoff from the site's green infrastructure and separated farm fields; a topic of high interest for state and local authorities interested in future regulations regarding agricultural stormwater runoff as well as green infrastructure flow monitoring and management systems.

The plan incorporated a significant amount of collaborative design, diverse stakeholder input, and permitting that resulted in a project that could be a model for environmental remediation, brownfield redevelopment, community engagement, and green infrastructure. The site began farming operations in June 2015, with a collaborative community and local



government commemorative first planting and green infrastructure installation event.



Green Tech Station

Green Infrastructure Design and Environmental Remediation

Milwaukee, WI



GZA collaborated with the Redevelopment Authority of the City of Milwaukee (RACM) and others to utilize an EPA Brownfield redevelopment grant to transform a 3-acre, former bulk petroleum storage facility within the Milwaukee's 30th Street Industrial Corridor into an educational green infrastructure destination with public outreach, skills training, and educational programming. The Brownfield restoration and redevelopment design for the Site included removal of the existing surficial debris, excavation and relocation of petroleum-affected soils, placement of an engineered cap to prevent direct contact with the petroleum-affected soils, and the construction of approximately 400 linear feet of bioswales, a 20,000-gallon underground cistern for rainwater storage, walking paths, native prairies and a permeable paver demonstration area.

The plan incorporated a significant amount of collaborative design, diverse stakeholder input, and permitting that resulted in a project that could be a model for environmental remediation, brownfield redevelopment, community engagement, and green infrastructure. The Site is still active with bioswale plantings, native prairie plantings, tree plantings, irrigation lines and pumping system, an educational pavilion, and power planned for 2019.

Project Highlights

- Designed and installed a 20,000-gallon underground cistern to collect and reuse stormwater for irrigation.
- Sustainable stormwater management, including a unique stormwater diversion from street.
- ½ acre of native prairie designed for pollinator habitat within an urban setting.
- Connections to nature through native landscapes.





Alice's Garden Urban Farm, Sustainable Stormwater Management Milwaukee, WI

Project Highlights

- Green infrastructure
- Rainwater harvesting
- Bioswale and underground cistern
- Off-site stormwater source
- Academic collaboration
- Hydraulic modeling
- Water quality risk assessment
- Community engagement
- Solar energy
- NGO client
- Pro-bono services



Over 150 volunteers constructed the 625 Aquablox® used to assemble the underground cistern

Challenge: Alice's Garden Urban Farm, one of Milwaukee's largest community gardens, sought a sustainable, safe water source that would reduce the reliance on municipally supplied water for irrigation. GZA designed a rainwater harvesting system and worked with the non-profit garden operator, the local non-profit Reflo, and the community to build it within the organization's limited budget. Water quality was paramount for the crop irrigation and ultimately human consumption.

Solution: GZA's design diverts stormwater runoff from an adjacent asphalt schoolyard into a bioswale for infiltration, which then discharges to an underground cistern with a capacity exceeding 20,000 gallons. A solar-panel-powered pump allows gardeners to access the harvested rainwater, which is routed through a filtration and disinfection system before use. A GZA engineer helped stretch the project budget by providing supportive design analysis and research via an independent study project as part of her master's degree. She conducted a water quality risk assessment to affirm that the proposed treatment system would sufficiently mitigate human contact with potential pollutants typically found in urban stormwater runoff. A hydraulic model was also developed to help optimize the water treatment and distribution system. Other project considerations which GZA addressed included protecting existing underground irrigation lines, minimizing disruption to active garden plots, and securing off-site easements for stormwater diversion and collection. To construct the underground cistern, 150+ volunteers assembled over 625 Aquablox®, a geosynthetic, interlocking tank system product.

Benefit: GZA engineers were integral to the creative problem solving, deliberate engineering design, and community engagement which maximized the project budget, not only in the rainwater harvesting system's construction, but in ongoing water utility bills. The combined effect of projects such as this sustainably manage stormwater and help improve water quality city-wide.



The Aquablox® cistern, with a capacity of more than 20,000 gallons, before it was wrapped in an impermeable liner and buried



The bioswale, pictured above after just being seeded, has a 9,000 gallon capacity and provides the initial stage of filtration for the rainwater harvesting system.



Western Gateway Climate Adaptation and Resiliency Plan

Glen Cove, Nassau County, NY



Challenge: As one of only two cities on Long Island, the City of Glen Cove is focused on sustainability, continuing a path of responsible economic vitality, and improving life for its residents. As part of this initiative, the City is planning the Western Gateway project, along the shores of Glen Cove Creek. The project area currently includes a number of recreational fields, industrial use buildings, Nassau County and Glen Cove Public Works facilities, and commercial facilities such as auto repair shops and restaurants. This area is located just west of the City's downtown, making it a potentially prime means of connecting people visiting or returning home to the City from the West. This includes proactively assessing the area's vulnerability to climate change and focusing on the development of climate adaptation strategies to provide resilience and reduce greenhouse gas emissions.

Solution: GZA's work plan includes:

1. Understanding and assessing the vulnerability of the project area to climate change hazards such as flooding from sea level rise and increased precipitation intensity, and higher average temperatures.
2. Performing public outreach to solicit input from stakeholders, residents, and concerned citizens.
3. Developing climate adaptation strategies and strategies to reduce greenhouse gas emissions. This includes development of recommendations for coastal resiliency improvements, relocating non-water-dependent uses to areas less prone to flooding, green infrastructure techniques for stormwater management, opportunities for renewable energy sources, and identification of non-motorized potential connections within the project area to downtown Glen Cove and nearby Long Island Rail Road stations.

Benefit: The Plan will include resiliency planning including an implementation plan that prioritize actions based on a systematic ranking. GZA is developing recommendations in coordination with the Project Team. We will organize the results in a priority matrix which ranks sites / actions based on risk (i.e., vulnerability x consequence) and importance to the City. This will allow for concrete actions to improve the resilience of the area under our changing climate.

Project Highlights

- Defined flood hazard risk and other climate change risks such as increased temperatures for mixed use area based on the latest available information.
- Perform public outreach and closely coordinate with the City to proactively incorporate public input and identify pressing needs
- Develop guidance for improved resiliency and reduced emissions for various future land uses planned for the area
- Establish an actionable plan to prioritize practical actions the City can take to improve the area's resiliency and adapt to the changing climate



The Western Gateway area consists of various land uses, focusing on recreational areas and industrial facilities, with some residential/commercial.

Dollar Value: \$50,000

Period: October 2019 - Present

Reference:

Jocelyn Wenk, AICP

Grant Writer and Administrator

Glen Cove Community Development Agency

City Hall – 9 Glen Street

Glen Cove, NY 11542

T: (516) 676-1625 Ext. 100 | F: (516) 759-8389

E: jwenk@glencovecda.org

Long Wharf Flood Protection Study and Living Shoreline Design

New Haven, CT



Conceptual design of proposed flood protection and living shoreline along Long Wharf Drive in New Haven, CT (rendering by Utile)

Project Highlights

- Review of Existing Plans
- Vulnerability and Risk Assessment
- Adaptation Options Analysis
- Stakeholder Identification and Engagement
- Public Information Meetings
- Living Shoreline Design
- Cost/Benefit Analysis
- Feasibility Analysis of Flood Mitigation Strategies

Challenge: The Long Wharf area of New Haven, located within FEMA VE and AE high risk flood hazard zones, is highly vulnerable to coastal flooding. It has historically experienced severe flooding and flood damage from hurricanes and extreme weather events dating to the Hurricane of 1938 and more recently during Hurricane Irene and Superstorm Sandy. Improved resilience to coastal flooding is imperative to the social, economic and ecological resilience of the City of New Haven and the region.

Solution: GZA was retained by the City of New Haven Plan Department to implement a flood protection study of the Long Wharf district to facilitate the district's resilience to the impacts of sea level rise (SLR), coastal flooding, and erosion. The district includes two distinct areas in their character and use: the waterfront shoreline and the commercial/industrial district.

The Long Wharf Flood Protection Study included planning and design of coastal flooding mitigation and shoreline protection measures for the area located northwest of the Long Wharf shoreline to Union Avenue. An inter-disciplinary team led by GZA completed a detailed flood vulnerability analysis in the project area. Based on the results of the vulnerability analysis, the team identified flood control strategies that not only addressed economic concerns related to business disruption after flooding but also identified ways in which the flood mitigation alternatives benefit the general public by creating a visionary plan for the City to improve social, economic, and ecological resilience to sea level rise, local intense precipitation, storm surge, and erosion. GZA's project team includes Utile, Biohabitats and Cambridge Systematics.

GZA's project approach was multidisciplinary, and the team:

- Incorporated industry-accepted science for sea level rise and coastal flooding;
- Performed statistical analysis on historical storm surge flood level data from relevant water level stations, such as those from National Oceanic and Atmospheric Administration (NOAA);
- Used high resolution terrain data (post-Sandy);
- Completed high resolution, hydrodynamic computer flood modeling to characterize coastal flooding and its effect on structures and natural features;
- Created scenario-based flood maps to evaluate the vulnerability of the area to tides and storm surges;
- Managed all information using ESRI ArcGIS geographic information system (GIS) software;

- Used a “risk-based” approach, defining coastal flood hazards in terms of probability, consistent with methods currently being used by state and federal agencies; and
- Identified resiliency strategies and alternatives that are consistent with City of New Haven’s current vision and plans for development.

The design includes an integrated approach to flood protection, shore protection, and environmental and ecological benefits, including a seawall, a buried revetment, timber walkway, beach nourishment and wetland enhancement, tidal flats, and oyster reef submerged breakwaters. This plan also creates a new level of access and usability of the shoreline by the public.

Benefit: GZA’s permit-level design for the proposed Long Wharf Flood and Shoreline Protection project enables the City of New Haven to move forward quickly with final design and construction as funding is secured. The comprehensive analysis and design acknowledges that a resilient New Haven is critical to Connecticut and creates the resiliency features necessary to foster social, economic, and ecological health of the area.



Conceptual design of proposed flood protection and living shoreline along Long Wharf Drive in New Haven, CT (rendering by Utile)



GZA numerical hydrodynamic modeling of New Haven’s Long Wharf area



Firmenich Fragrance Manufacturer, Ecological Restoration and Conservation Management

Newark, NJ

Project Highlights

- Long-time GZA client
- Baseline inventory of Flora and Fauna
- T&E species assessment
- Conservation management
- Collaboration with City of Newark and U.S. Fish and Wildlife Service
- Created nesting conditions favorable to target Species of Concern
- Ecological restoration of macrosites to Northeast Atlantic coastal conditions
- Coastal resilience project to offset future climate change effects

2019 Environmental Leader Award
CIANJ/Commerce

CIANJ What's Good for Business.
Firmenich Commissioner's Continued Excellence Award for 235,096 Consecutive Hours of Work without Lost Time Due to Work-Related Injury of Illness, 2012-2016



Great crested flycatcher

Challenge: Firmenich retained GZA to complete a large-scale ecological restoration project on its active industrial property adjacent to Newark Bay, an area impacted by a long history of industrial use. The fragrance manufacturer was eager to re-establish a robust ecosystem supporting pollinators, migrating songbirds, raptors, small mammals and northern diamondback terrapins into the sterile waterfront.

Solution: GZA's conservation management recommendations were to:

- Install natural materials to stabilize wetland areas and create micro-niche habitat
- Create an aquascape settling pond with benthic construction and floristic enhancements
- Eliminate non-native vegetation, create a 25' x 75' brushpile, and revegetate with native materials designed to attract obligate estuary pollinators, neotropical migrating birds of concern, and estuary dependent species of concern
- Create favorable nesting site conditions for the northern diamondback terrapin, identified as a target species of concern
- Build a walking path and gazebo for employees' enjoyment
- Empower employees to care for the project through annual Community Day involvement and exposure to GZA ecologists
- Install signage about the natural history of the site and species targeted by the conservation management plan

GZA collaborated closely with the City of Newark, conservation groups, and the U.S. Fish and Wildlife Service on the project.

Benefit: GZA recognized the site's great potential for ecological restoration, and Firmenich was eager to implement the project—which it considers to be a highlight of the company's global sustainability initiatives.



Spot Winged Glider (Pantala hymenaea) captured over lower settling pond



Native plants in bloom soon after restoration