BSC GROUP

STATEMENT OF QUALIFICATIONS

Vulnerability Assessment and Climate Action and Adaptation Plan

Bangor Area Comprehensive Transportation System (BACTS)

BSC GROUP

BUILD | SUPPORT | CONNECT

Engineers
Environmental Scientists
Software Developers
Landscape Architects
Planners
Surveyors

www.bscgroup.com

FEBRUARY 11, 2022

Sara Devlin
Executive Director
Bangor Area Comprehensive Transportation System (BACTS)

RE: Vulnerability Assessment and Climate Action and Adaptation Plan

Dear Ms. Devlin:

It is evident that the Bangor Area Comprehensive Transportation System (BACTS) recognizes that the effects of human-caused global warming are happening now, and that we must move with urgency to take action, prioritize resources, and develop metrics to track progress. We commend BACTS for taking steps to put the BACTS metropolitan planning area on a trajectory to decrease greenhouse gas emissions, and ultimately achieve carbon neutrality, by commencing a regional climate action planning process. To best serve BACTS, BSC Group is partnering with Linnean Solutions, Integral Group, and Scouter Design to bring comprehensive and complementary expertise to the project. Our proposed team offers several advantages to BACTS in support of this project, including:

- Experience working on One Climate Future. Linnean Solutions and Integral Group worked together on Portland and South Portland's One Climate Future project, which brought together the many climate initiatives occurring across the two cities to develop a roadmap for collective climate action and adaptation. This experience helping the two communities develop a plan similar to the one proposed by BACTS gives our team a foundation of local knowledge to begin with, as well as a proven plan framework, which can be adopted for this project and customized to meet BACTS' needs.
- Understanding of Local Government. Many of our team members have worked in local government and understand what is needed to move initiatives forward within communities. We strive to provide the tools and resources needed to engage diverse stakeholder groups and move from planning to action.
- **Cohesive Team Experience.** Our team firms have experience working together on other similar climate action planning initiatives. Notably, BSC and Linnean Solutions have teamed on multiple regional climate vulnerability and adaptation planning processes. They are currently leading a robust, equity-centered planning process to redesign and relaunch the Massachusetts Municipal Vulnerability Preparedness grant program for the MA Executive Office of Energy and Environmental Affairs. Linnean Solutions and Integral Group worked together on Portland and South Portland's One Climate Future project. Scouter Design has worked with BSC across many projects providing graphic design and branding services. This experience provides us with smooth and well-established lines of communication among firms, as well as an aligned approach to conducting a vulnerability assessment and developing an effective Climate Action and Adaptation Plan.
- **Ability to Customize Report to Meet BACTS' Unique Needs.** While we have experience working on similar projects, we are committed to working with BACTS to understand specific community needs to set BACTS up for success by developing a Climate Adaptation and Action Plan that can be used as a tool for years to come.

We acknowledge receipt of the responses to the request for clarification dated Friday, January 28, 2022. We look forward to the opportunity to apply our expertise to this exciting project, and assist the BACTS metropolitan planning area in becoming increasingly thriving, prosperous, equitable, low-carbon, and resilient. Please contact me at jaudi@bscgroup.com or 617.896.4435 if you have any questions about our proposal or would like to further discuss our qualifications in relation to your needs.

Sincerely,

BSC Group
John Audi, PhD, CCM
Principal-In-Charge

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Qualifications

The success of this project requires effective teamwork and access to the right expertise. With this in mind, we have carefully selected a trusted team whose commitment, experience, and skill will help you to realize your goals.

To assist BACTS in designing, executing, and managing a vulnerability assessment and climate action and adaptation plan, BSC Group has put together a team of technical experts who have experience working together and collaborating across disciplines to provide custom solutions to unique project challenges.

BSC Group is partnering with Linnean Solutions, Integral Group, and Scouter Design to bring comprehensive and complementary expertise to the project. BSC has broad experience conducting climate vulnerability assessments and planning projects for a variety of public and private clients.

The breadth of BSC's team, including experts in environmental science, GIS, civil and transportation engineering, and planning allow BSC to be responsive to project needs.

Linnean Solutions and Integral Group have extensive experience leading climate action and adaptation planning processes for local governments across the country – both as external consultants and in City staff roles. Scouter Design has provided design services for municipal climate action plans and tools. The team has a proven track record for successful collaboration to serve client needs.

BSC and Linnean Solutions have teamed on multiple regional climate vulnerability and adaptation planning processes. They are currently leading a robust, equity-centered planning process to redesign and relaunch the Massachusetts Municipal Vulnerability Preparedness grant program for the MA Executive Office of Energy and Environmental Affairs. Linnean Solutions and Integral Group worked together on Portland and South Portland's One Climate Future project. Scouter Design has worked with BSC across many projects providing graphic design and branding services.

Brief descriptions of each team firm are provided on the following page, followed by the team organization chart and brief descriptions of key personnel roles.

PRIME CONSULTANT: BSC GROUP

BSC GROUP

At BSC, we partner with our clients to deliver creative and practical, climate-resilient transportation, land development, and environmental solutions.

Our diverse team of planners, engineers, landscape architects, and environmental scientists apply current tools and methodologies to provide decision-makers with climate adaptation and mitigation solutions that are cost-effective, resilient, and socially just.

Through this lens, our team of industry experts works collaboratively to assure considerations of climate resilience remain a key feature of project implementation. Our focus on co-benefits also seeks to address the source of climate change through applied solutions that draw upon natural and built carbon mitigation strategies.

TEAM FIRM: LINNEAN SOLUTIONS

LINNEAN SOLUTIONS

Linnean helps communities and organizations reach sustainability and resilience goals.

We are a mission-driven firm that guides local governments, organizations, property owners, and communities in reaching ambitious resilience and sustainability goals. Through working at the building, campus, neighborhood, city, state, and systems scales, we help communities chart a path to a vibrant future.

We believe that all of our work can capture co-benefits. As specialists in regenerative development, we work with project and community stakeholders to not only mitigate environmental harm, but to create opportunity to advance health, equity, and ecological vitality.

TEAM FIRM: INTEGRAL GROUP

INTEGRAL

Integral Group is a global network of engineering, architecture, and planning professionals collaborating under a single deep green strategic services umbrella. We are a mission-driven corporation that seeks out clients interested in pushing the boundaries of sustainability, resilience, and regenerative design.

Integral Group's Climate Policy and Planning group provides cutting-edge, strategic climate solutions for local governments in the United States and Canada. Our team has worked with municipalities across North America, both large and small, to develop climate plans that address both adaptation and mitigation. Our government clients appreciate our focus on ensuring that the plans and strategies that we develop are both ambitious and implementable, commensurate with the resources and political economy of local and regional governments. Our planning expertise is backed by a set of engineering experts in low-carbon energy systems and new and existing buildings and campuses.

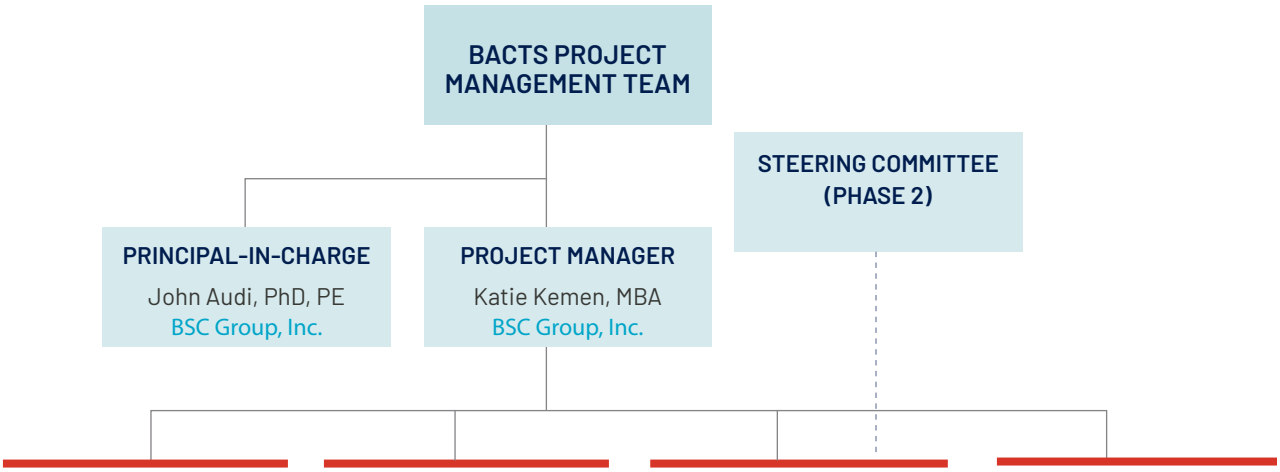
TEAM FIRM: SCOUTER DESIGN

SCOUTER DESIGN

Transforming ideas into visual stories that resonate with your target audience is our passion and the hallmark of Scouter Design's work. Our collaborative approach, along with listening and communicating throughout the process, allows us to create the most effective solution for your project, while creating a positive experience for everyone.

Scouter Design works with clients to create new brands and refresh existing ones. This includes designing a range of products that are visually consistent, engaging for the reader, functional for the user, and accessible for the audience. Some examples include templates, marketing collateral, and proposal and report design.

Project Team



INTEGRAL GROUP

Lisa Westerhoff, PhD, MA, BA, EcoDistricts AP

Marshall Duer-Balkind, MEM

Robin Hawker, MScPl, RPP

Harriet Lilley, Meng

Madi Kennedy, MPP, BA

Vladimir Mikler, PEng, LEED AP, MSc

BSC GROUP

Jeff Malloy, PhD, CFM

Lindsay Carle

George Andrews, GISP

Gillian Davies, PWS, SSSSNE, NHCWS, CESSWI

Samuel Offei-Addo, PE, PTOE

LINNEAN SOLUTIONS

Jim Newman, LEED AP, O+M; Eco District AP

Holly Jacobson, LEED Green Associate

Peyton Siler Jones

Lauren de la Parra, LEED Green Associate

SCOUTER DESIGN

Terri Courtemarche

> Our project team is comprised of missions driven firms and individuals with the expertise and passion to serve BACTS on this project.

a heads up!

Katie Kemen, our proposed project manager is expected to be on maternity leave through mid-May 2022. Jeff Malloy, BSC Climate Adaptation Service Leader and Senior Adaptation Planner, will serve as Interim Project Manager until Katie's return. Both are experienced project managers and frequently collaborate on BSC's climate resilience projects. Jeff and Katie will work with the project team to manage a smooth project management hand-off.

TEAM FIRM RESPONSIBILITIES

	BSC Group	Linnean	Integral Group	Scouter Design
Phase 1: Baseline Assessments				
Task 1: GHG Emissions Inventory	Support		LEAD	Support
Task 2: Climate Vulnerability Assessment	LEAD	Support	Support	Support
Task 3: Meetings & Presentation of Results	LEAD	Support	Support	Support
Task 4: Public Engagement Foundation		LEAD		
Phase 2: Regional Climate Action Planning				
Task 1: Public Engagement	Support	LEAD		
Task 2: Mitigation and Adaptation Strategies	Support	LEAD	Support	
Buildings		Support	LEAD	
Energy		Support	LEAD	
Waste		Support	LEAD	
Transportation	Support	LEAD	Support	
Resilience	Support	LEAD	Support	
Sequestration	Support	LEAD	Support	
Task 3: Final Report	Support	LEAD	Support	Support
Task 4: Meetings and Presentation of Results	Support	LEAD		Support
Task 5: Basic Level of Service for "Tier 2" Communities	Support	LEAD	Support	

KATIE KEMEN, MBA

Project Manager
BSC GROUP

Katie brings experience in the field of emergency management and business continuity to support clients' physical and operational resilience needs. Much of her work has focused on regional or systems-level projects to understand risk and vulnerabilities and develop mitigation and response plans to address future risk. She is skilled at facilitating diverse stakeholder groups across professional disciplines, levels of government, and from the community through analysis, planning, and implementation. Katie draws upon academic training in public health and business administration to drive toward climate solutions that are socially just and fiscally responsible. Katie's experience includes climate vulnerability analysis for the MBTA, leading municipal climate vulnerability preparedness planning, education, and engagement for the Town of Stockbridge, and supporting the Apple Country Natural Climate Solutions project. Prior to joining BSC, Katie was project manager for a variety of climate and emergency management initiatives at Mass General Brigham, Massachusetts' largest healthcare system.

JOHN AUDI, PhD, CCM

Principal-in-Charge
BSC GROUP

John is an experienced executive leader dedicated to organization-wide greenhouse gas reduction initiatives, including formulating comprehensive strategies, developing guidelines and tools for tracking, analyzing and monitoring progress. Prior to joining BSC, John oversaw Massport's Greenhouse Gas Reduction efforts. He also co-chaired Harvard University's Greenhouse Gas reduction strategy team. As Principal-in-Charge, John will provide contractual authority for this project, while assuring that adequate staff resources are made available to ensure high quality client deliverables.

JEFFREY MALLOY, PHD, CFM

Senior Climate Adaptation Planner
BSC GROUP

Jeff supports clients' efforts to incorporate climate resilient solutions into project planning and design. His specialized expertise in environmental science, planning, and policy brings unique perspective to complex environmental issues. His academic expertise in climate change governance and adaptation, public policy, and social justice contributes to well rounded, implementable approaches to climate adaptation planning. Notably, Jeff's experience includes guiding many Massachusetts communities through the Municipal Vulnerability Preparedness (MVP) designation process using the Community Resilience Building (CRB) framework including Amesbury, Athol, Beverly, Burlington, Clinton, Everett, Hudson, New Marlborough, Sheffield, and Stockbridge. BSC's custom approach to this process led to a stakeholder-driven vulnerability assessment that includes a decision-making framework to enhance the municipality's opportunity for future grant funding.

GILLIAN DAVIES, PWS. SSSSME. CESSWI

Senior Ecologist / Natural Climate Solutions Specialist
BSC GROUP

Gillian Davies, a Senior Ecologist and Natural Climate Solutions Specialist, provides expertise and innovative solutions including wetland restoration/mitigation planning, design and monitoring, ecosystem-based climate change resiliency and mitigation assessment and planning, state and federal permitting, wetland delineation, impact analysis, , expert witness testimony, and environmental construction/post-construction inspection. A well-respected leader in the field of wetland sciences, Gillian currently serves as the President of the Society of Wetland Scientists (SWS) Professional Certification Program, as well as Chair of the SWS WOTUS ad hoc Committee and Co-Lead of the SWS Climate Change and Wetlands Initiative. She is also a Visiting Scholar at the Tufts University Global Development and Environment Institute. Gillian will serve as a resource to project team members, providing her technical expertise on environmental impacts of climate change, nature-based and natural-climate solutions.

LINDSEY CARLE

Senior GIS Analyst
BSC GROUP

Lindsey assists the Climate Resilience group for clients in the transportation and public sectors. She is extremely resourceful, motivated, and embodies a tenacious work ethic motivated by her passion for sustainability of the natural environment. She brings a strong environmental background through her environmental compliance field work and a Master's Degree in Natural Resources with a focus on Sustainability.

GEORGE ANDREWS, GISP

Senior GIS Analyst
BSC GROUP

George supports projects with geospatial analyses, digital mapping, modeling, database development, and data digitization. He collaborates with clients to bring new technology solutions which support their goals for continuous improvement to processes and operations. George is integral to the growth of the GIS practice at BSC and is responsible for GIS and GIS web applications for many discipline areas. George is constantly undertaking R&D challenges, striving to innovate both for clients and within BSC. George is a BSC Subject Matter Expert (SME), a go-to for GIS, sUAS, and technology implementation and use company-wide. Importantly, George led and coordinated the GIS effort between all municipalities and organizations for the duration of the MVP Apple Country Natural Climate Solutions project. In that effort, he designed and developed mapping documents highlighting dozens of ecological and climate-oriented datasets and their impacts to stakeholders. He also performed resiliency, wetland, and landcover analyses for each municipality using a diverse variety of public and private datasets and produced an Apple Country web application hosting all project related geospatial features for public viewership and input.

SAMUEL OFFEI-ADDO, PE, PTOE

Transportation Planner
BSC GROUP

Sam brings extensive experience in transportation engineering, providing highway/roadway engineering, as well as traffic planning, peer review services and design. His expertise in roadway engineering encompasses maintenance and management programs, design of geometric and drainage improvements, condition inspection, resident engineering, and pavement/sub base design. For traffic projects, he provides intersection, signalization and pavement marking design, as well as transportation systems analysis/planning, travel demand forecasting, and development of plans to maintain traffic during construction.

Sam also has computer application experience for traffic/transportation analyses includes: SYNCHRO, CORSIM, SIMTRAFFIC, HCS, TRANSYT-7F. His experience with hardware and software for engineering purposes includes: AutoCAD Softdesk programs, optimization modules, and image processing applications.

JIM NEWMAN, LEED AP, O+M; ECO DISTRICT AP

Climate Mitigation and Adaptation Planner
LINNEAN SOLUTIONS

Jim is the founder and Principal at Linnean Solutions, a mission-driven firm that helps local and state governments, institutions, projects, and communities reach resilience and sustainability goals. Jim's twenty years of experience includes climate mitigation and adaptation planning; the development of sustainability and resilience frameworks, manuals, and certification programs; carbon and life cycle analyses for rethinking building construction and waste; resilience assessments at the building and urban scales; and stakeholder engagement processes to strengthen communities. As a Living Environments in Natural, Social, and Economic Systems (LENSES) Facilitator and Trainer, Jim regularly leads community planning workshops, and trains others in becoming effective facilitators. He is a member of the RELi/USGBC Steering Committee, where he has worked to bring a social equity lens to the development of the new certification standard for resilient buildings. Jim is a key author of several influential resilience reports and tools—including the Enterprise Community Partners' Ready to Respond: Strategies for Multifamily Building Resilience manual.

HOLLY JACOBSON, LEED GREEN ASSOCIATE

Climate Planner

LINNEAN SOLUTIONS

Holly works with local governments, organizations, and communities in developing policy, plans, and collaborative approaches for mitigating and adapting to climate change. She recently led the development of “One Climate Future,” the regional Climate Action and Adaptation Plan for Portland and South Portland, ME, and the Climate Action and Adaptation Plan for Medford, MA. Projects have included design and facilitation of community and stakeholder processes, ranging from multilingual working groups, to storytelling dinners, to technical steering committees. Holly has worked with local governments and communities on ways to expand renewable energy, strengthen food systems, grow circular economies, and foster more connected neighborhoods, in each case focusing on the system change to collectively create more resilient communities, just processes, and pathways to a carbon neutral future. Prior to Linnean, Holly supported ecological and community planning processes in Salt Lake City, Utah. Holly has a master’s degree in City Planning with certification in Environmental Policy and Planning from Massachusetts Institute of Technology, and a Bachelor of Arts degree from Bowdoin College.

PEYTON SILER JONES

Climate Planner

LINNEAN SOLUTIONS

Peyton has more than 7 years of experience in urban sustainability planning, climate oriented communications and community engagement, and environmental policy. Her recent project work focuses on climate resilient land use planning and equitable public participation. Prior to joining Linnean Solutions, Peyton worked for the City of Boston’s Climate Ready Boston and Greenovate programs where she served as a Climate Resilience Project Manager and Communiations Manager. She holds a Bachelor of Arts in Environmental Policy from Green Mountain College and is currently pursing a Master of Arts in Urban Planning and Environmental Policy at Tufts University.

LAUREN DE LA PARRA

Climate and Sustainability Planner
LINNEAN SOLUTIONS

Lauren is a Portland-based climate and sustainability planning consultant. Working at the intersection of climate action and creative engagement, she collaborates across sectors to empower communities to drive change in ways that align with and further their unique values and aims. With a background in the cultural sector, and extensive experience in municipal climate resilience planning, Lauren brings a unique lens to the work of tackling the climate crisis. Through her interdisciplinary work, she aspires to transform systems and mindsets, creating a more equitable and just future for all in the process.

LISA WESTERHOFF, PHD, MA, BA, ECODISTRICTS AP

Research and Planning Lead / Senior Advisor
INTEGRAL GROUP

With over 10 years of industry experience, Lisa leads the Sustainability Policy and Planning team at Integral Group in Vancouver. Lisa holds a Masters in climate resilience and adaptation from the University of Guelph and a PhD in urban sustainability from UBC. She now brings her expertise in climate change, sustainability and resilience planning to a range of clients. She has designed and led several stakeholder and community engagement processes in planning for climate, energy, and sustainability policies and strategies. Lisa is the author of several academic publications on strategies for increasing climate change resilience and energy and emissions reductions. She was named CaGBCs Green Building Champion in 2019.

MARSHALL DUER-BALKIND

Advanced Energy and Climate Planning
INTEGRAL GROUP

Marshall is an international expert in carbon neutrality planning and modelling, energy analytics, and building performance, with a decade of experience working in the for-profit, non-profit, and government sectors. He has advised over a dozen cities and institutions across North American on advanced energy and climate planning—including developing energy & emissions models, managing complex public engagement processes, and developing numerous ground-breaking policies. He holds a Master of Environmental Management degree from Yale University. Marshall has served as a technical advisor to the U.S. Department of Energy, the U.S. Environmental Protection Agency, and multiple National Labs. He is experienced at applying a wide range of quantitative techniques to energy and climate data analysis, coupled with a critical eye for quality and reliability.

ROBIN HAWKER, MsCPI, RPP

Buildings Low-Carbon Resilience Expert Advisor

INTEGRAL GROUP

Robin specializes in climate change adaptation, risk and vulnerability assessment for community infrastructure and buildings. She has led the development of comprehensive climate adaptation and resilience plans for communities across Metro Vancouver and has delivered annual climate change and infrastructure resilience training workshops to over 160 municipalities and Indigenous communities across BC and Alberta. These projects have incorporated low-carbon resilience and nature-based approaches to leverage co-benefits for community and ecological health.

Robin is a fully certified engagement specialist under the International Association for Public Participation (IAP2), is a certified PIEVC Protocol professional, and is pursuing Canadian Risk Management (CRM). She regularly designs interactive stakeholder and community engagement initiatives to support collaborative planning processes.

HARRIET LILLEY, MENG

Inventory and Modeling Support

INTEGRAL GROUP

Harriet brings over seven years of engineering design consulting experience to Integral Group's Sustainability Policy and Planning team and the field of energy and climate change policy. She brings both a broad understanding of climate and energy issues and a strong technical background in mechanical systems and low carbon solutions. Her thoughtful and detail-orientated approach help deliver on a range of projects supporting organizations in their efforts to reduce energy use and emissions. Harriet is experienced in energy and thermal modelling, as well as applying quantitative techniques to analyze energy and emissions data and financial metrics.

MADI KENNEDY, MPP, BA

Policy Support

INTEGRAL GROUP

Madi has five years' experience working on climate and energy policy. Her work addresses complex issues through research, analysis, policy development, engagement, and communications. She brings broad experience working on climate mitigation, resilience, energy efficiency, renewable energy, and environmental justice. Having worked in government, private and non-profit sectors, Madi can balance diverse perspectives, anticipate challenges, and communicate effectively across stakeholder groups.

VLADIMIR MIKLER, PENG, LEED AP, MSC

District Energy Expert Advisor

INTEGRAL GROUP

With over 30 years of experience, Vladimir is an internationally regarded expert in renewable and low-carbon, low-temperature energy systems coupled with low-grade energy sources including heat recovery, geo-exchange, solar, sewer heat recovery, etc. He leads the Integral Group's District Energy services team.

TERRI COURTEMARCHE

Graphic Designer

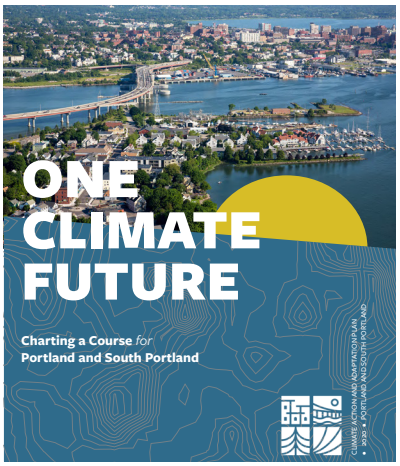
SCOUTER DESIGN

Terri brings over 25 years of graphic design experience designing brand identities, marketing collateral for companies and public outreach efforts, templates, and report design for her clients. Her prior experience leading an in-house team of designers at an engineering firm exposed her to a range of clients that included state transportation agencies, municipalities, airports, and federal agencies. Currently, she works with her clients to create a visual brand identity that aligns with their corporate mission and culture, designs templates and provides training and best practices, and designs reports that include climate action plans for communities. Using her design skills to benefit others, Terri also volunteers with non-profit organizations to help them promote their work.

Experience

CLIMATE ACTION AND ADAPTATION PLANNING EXPERTISE OVERVIEW

BSC and our proposed teaming partner firms have supported local governments of all sizes across the region with planning and preparing for climate change. Of particular note, BSC has guided numerous communities through the Massachusetts Municipal Vulnerability Preparedness (MVP) designation process using the Community Resilience Building Framework, including Amesbury, Athol, Beverly, Burlington, Clinton, Everett, Hudson, New Marlborough, Sheffield, and Stockbridge. Team firms Linnean Solutions and Integral Group worked together to develop the joint climate change mitigation and adaptation plan for the cities of Portland and South Portland, Maine. Linnean Solutions and BSC Group worked together on the Apple Country Apple Country Ecological Climate Resiliency and Carbon Planning and Assessment project in Bolton, Harvard, and Devens in Massachusetts. Scouter Design, our graphic designer for the project, has provided graphic design support on climate action and resiliency plans for Weston, Beverly, and Salem, Massachusetts. This experience allows us to anticipate the challenges of introducing new plans, policies and processes within local government and across communities.



Linnean Solutions and Integral Group worked together to develop the joint climate change mitigation and adaptation plan for the cities of Portland and South Portland, Maine.

In the following paragraphs, we present our expertise in key areas that we believe to be imperative for a successful project.

GHG Inventorying and Carbon Mitigation Planning

Integral Group brings considerable experience in municipal carbon inventory analysis, community-wide net zero carbon emissions planning, and municipal energy transformation. Integral's Sustainability Research and Planning team specializes in the development of strategic plans and polices for cities, districts, towns, neighborhoods, and campuses to achieve regenerative sustainability outcomes. Through this work, they have acquired experience in

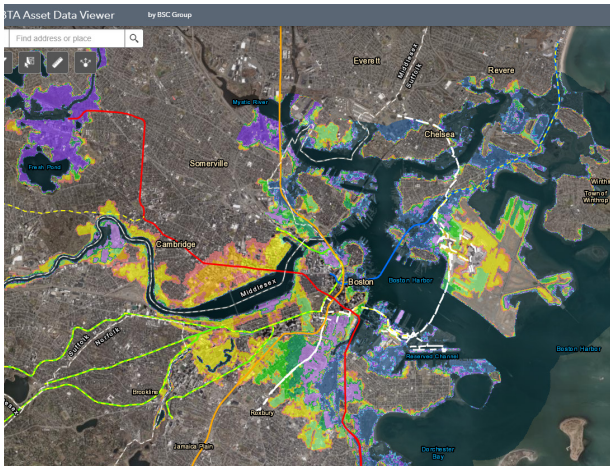
all aspects of climate action and sustainability planning, from transportation solutions to waste and materials recovery programs, urban ecology, water, energy, and carbon. Integral Group has also conducted multiple greenhouse gas inventories for local governments, including Portland and South Portland, Maine. We also know what it takes achieve net zero carbon-as a leading deep green engineering firm, Integral Group has designed over 100 Net Zero Energy buildings and is an international leader on low carbon district energy systems.

Climate Vulnerability Assessments and Resilience Planning

Linnean Solutions and BSC Group have helped communities at the forefront of resilience planning develop roadmaps for climate adaptation. BSC led the evaluation of existing climate change data and reports for applicability to MBTA assets and integration with regional resiliency initiatives. The project involved developing a vulnerability assessment methodology specific to these assets and ranked assets most vulnerable to climate change including extreme heat, inland and coastal flooding, extreme precipitation, and wind. Likewise, Linnean has conducted hundreds of site-specific vulnerability analyses, community needs assessments, and resilience planning processes, including national-level resilience planning for the public housing sector. Linnean is a key author on several influential resilience reports and tools, including Building Resilience in Boston and Enterprise Community Partners' Ready to Respond: Strategies for Multifamily Building Resilience manual. Integral Group brings additional planning and engineering expertise on resilient design for the building sector.

GIS Support

BSC's climate resilience experts are supported by GIS and spatial data experts whose expertise includes geospatial analyses of a range of complex datasets, digital mapping/computer cartography for site assessment, georeferencing and digitization of large and multifaceted projects, permit applications and various types



As part of an on-call contract with the MBTA for providing Climate Change and Vulnerability Assessment and Adaptation services , BSC developed a GIS Database and Prioritization and Indexing Methodology that includes an inventory of critical power, signaling, and communication system assets at risk to climate change extremes.

of management plans (i.e., utility management plans, conservation management plans, open space and recreation plans, municipal master plans, urban renewal plans). Utilizing such technology as the ESRI ArcGIS 10.4 suite (ArcMap, ArcCatalog, ArcScene), ArcGIS Online, IDRISI Taiga, and Trimble GPS Pathfinder Office, our GIS specialists are adept at preparing informative graphic mapping applications, documents, and databases.

Ecological Planning and Design

BSC's interdisciplinary staff of engineers, planners and ecologists are well positioned to provide a diverse set of methods and practices to prepare and support community resilience planning and implementation. We have vast experience working across the public and private sectors to assure participatory inclusion and citizen engagement within urban and rural project planning efforts. Our innovative approach to climate resilience planning balances short and long-term considerations, and we understand the inherent challenges associated with the application of sustainable solutions within complex interdependent human and natural systems.

Transportation Planning and Design

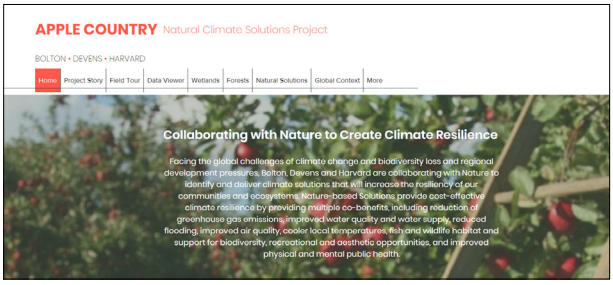
BSC Group's transportation services apply resilient planning and design elements that meet today's transportation needs while also considering potential impacts of climate change. BSC emphasizes the importance of safety, reliability, and sustainability within our transportation planning and design services. Our collaborative approach is well-suited to the interdependent nature of modern transportation system networks. BSC's diverse staff of civil, transportation, traffic, and structural engineers, work with state transportation departments, local municipalities, and non-profit organizations to promote regional transportation systems capable of withstanding the effects of a changing climate. BSC Group uses a "Complete Streets" approach to provide context sensitive transportation engineering solutions.

Stakeholder / Steering Committee Engagement

Through climate planning work across the region, Linnean, BSC, and Integral have facilitated mixed groups of local government, private, and nonprofit representatives to develop shared visions and methodologies for meeting climate action and adaptation goals. Linnean team members, in particular are trained facilitators under the Living Environments in Natural, Social, and Economic Systems (LENSES) framework, which uses facilitated stakeholder workshops to identify shared goals and actions for building thriving communities. As the process facilitator for the Kendall Square EcoDistrict, Linnean guided a group of local constituents—including the City of Cambridge, academic institutions, the local business association, nonprofits, and major developers—to develop and implement sustainability and resilience projects at a district scale. Along with guiding conversations with prepared research and data, Linnean produced a series of graphic tools that enabled the group to work through project options and converge on project goals.

Leading Engaging, Responsive Public Participation Processes

Essential to the success of community climate action is the meaningful incorporation of community and municipal goals. Linnean leads public meetings and visioning workshops to invite the community and municipal groups to participate directly in the co-creation of goals and actions. One hallmark of our approach is our focus on equity, giving community members the opportunity participate on equal footing. We also ensure that the fair and meaningful involvement of all people is emphasized in every aspect of our projects.



To encourage engagement in the public participation process for the Apple Country Apple Country Ecological Climate Resiliency and Carbon Planning and Assessment project, a collaborative effort between BSC Group and Linnean Solutions, the team implemented a project website with interactive data-viewer mapping, survey, storymap, educational materials, and project documents.

Also central to our success is our ability to communicate with the public and other key stakeholders without the use of technical jargon that many people may find to be off-putting. We endeavor to communicate in everyday language.

Public participation has become increasingly important in the development of climate action and adaptation plans. Specifically, because we now know that it will take everyone, everywhere, doing everything possible to reduce greenhouse gas (GHG) emissions to the levels that climate scientists say are necessary to avoid catastrophic climate disruption. To spark this level of change, we cannot rely on the same old engagement tactics of planning processes of the past. We must innovate and provide effective ongoing

engagement in a way that will grab and keep the attention of your community members.

Key services provided by BSC include:

- Preparation for public meetings and presentation materials
- Creation of websites and social media presence, including sites such as Facebook, Instagram, Twitter, CoUrbanize
- Coordination of fun and innovative programs to encourage participation.
- Preparation of exciting and colorful graphics to help participants envision future improvements and to serve as the inspiration for their own suggestions
- Development of project specific branding, including logos to build recognition

EXPERIENCE

To demonstrate our experience, on the following pages we have provided recent examples of past projects involving services that are similar to those required for BACTS' Vulnerability Assessment and Climate Action and Adaptation Plan.

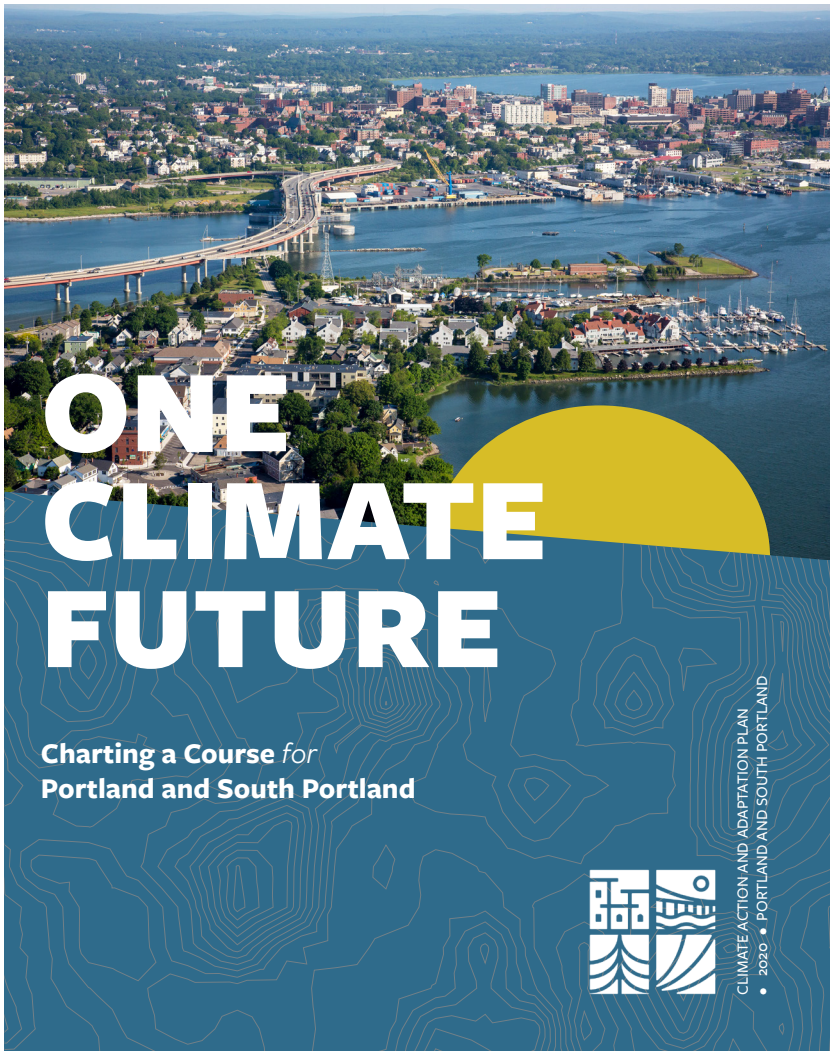
LINNEAN SOLUTIONS

One Climate Future: Climate Action and Adaptation Plan

Portland, ME and South Portland, ME | Jan. 2019 - Sep. 2020

"One Climate Future" is a unique (and at the time, unprecedented!) planning effort by two cities—Portland and South Portland, Maine—to address climate change in coordination. Linnean led this two-city project, working with **Integral Group** and others, to bring together community groups, businesses, institutions, and city departments to chart a course for a thriving future in the face of climate change. The process included assessing climate vulnerability across infrastructural, social, environmental, and economic systems; inventorying greenhouse gas emissions; modeling future emissions under a variety of policy scenarios; launching a wide range of online and in-person engagement activities designed around inclusivity and equity; facilitating stakeholder workshops; developing a set of strategies related to buildings, energy, transportation, waste, and community resilience; and producing the One Climate Future Plan in tandem with sowing the seeds for ongoing plan implementation, climate conversations, and community action. For more information see: oneclimatefuture.org

Reference:
Troy Moon
Sustainability Coordinator
City of Portland
Phone: (207) 756-8362
Email: thm@portlandmaine.gov



MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

VARIOUS LOCATIONS, MASSACHUSETTS

CLIENT

Massachusetts Municipalities

SERVICES

Grant Preparation

Climate Vulnerability Assessment

Community Resilience Building

Stakeholder Engagement

Workshop Facilitation

Climate Education Infographics

In-Person and Virtual Workshops

REFERENCE

Eric R. Smith, AICP
Town of Athol
584 Main Street, Athol, MA 01331
(978) 721-8500 ext. 517
esmith@townofathol.org

PROJECT DURATION

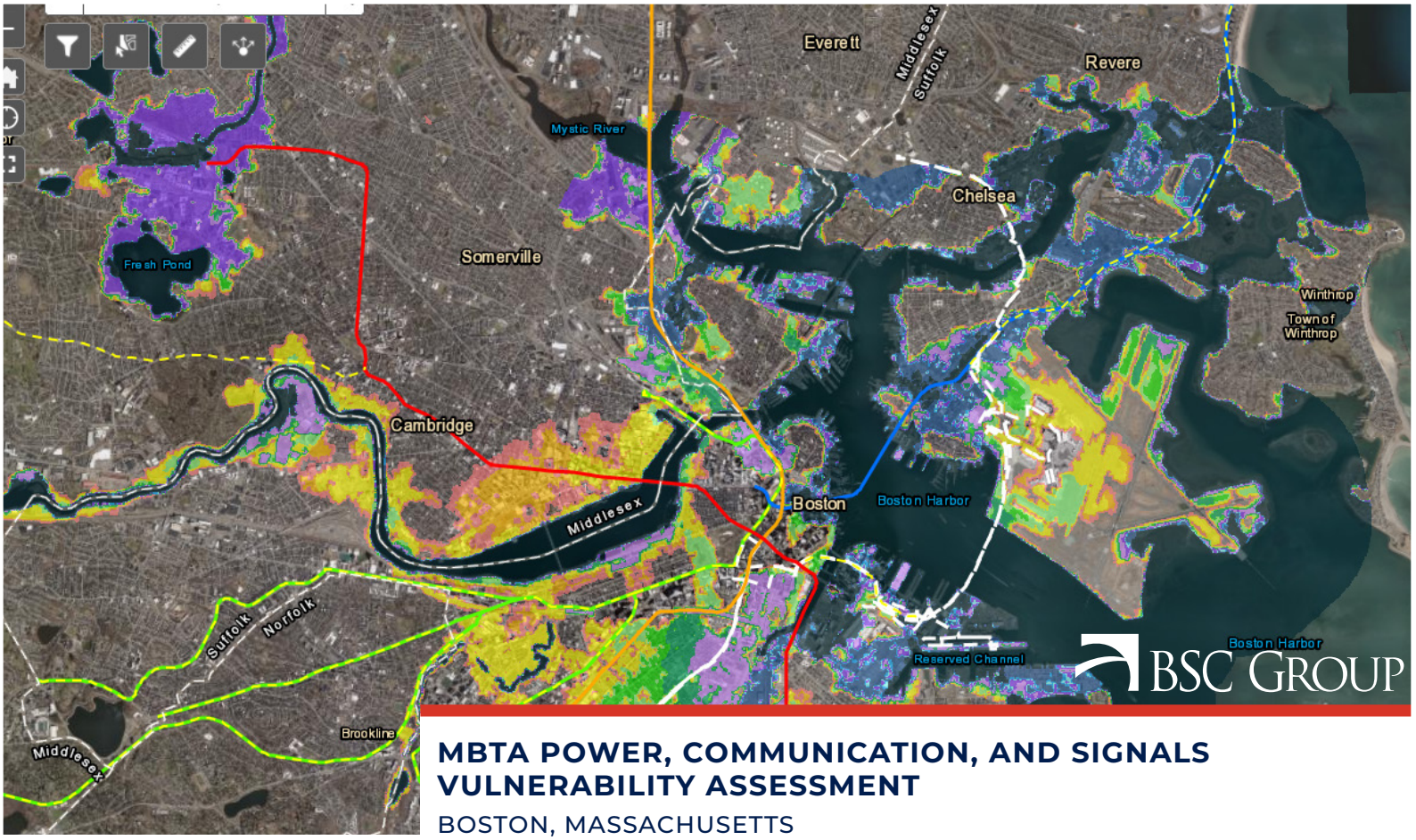
2017 - present

The Municipal Vulnerability Preparedness grant program (MVP) provides support for cities and towns in Massachusetts to begin the process of planning for climate change resiliency and implementing priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. Communities who complete the MVP program become certified as an MVP community and are eligible for MVP Action Grant funding and other opportunities.

BSC has been actively engaged with the MVP program as a certified MVP provider assisting municipalities with grant application preparation and program implementation. To date, BSC has assisted municipalities receive over $500,000 in MVP funding to achieve their climate resilience goals. Municipalities supported include:

- Amesbury (Planning and Action Grants)
- Athol (Planning Grant)
- Beverly (Planning Grant)
- Bolton (Planning and Action Grant)
- Burlington (Planning and Action Grants)
- Clinton (Planning Grant)
- Everett (Planning Grant)
- Georgetown (Planning Grant)
- Hudson (Planning Grant)
- New Marlborough (Planning and Action Grants)
- Sheffield (Planning and Action Grants)
- Stockbridge (Planning Grant)

Our team of five certified MVP providers, in concert with a technically diverse staff of planners, engineers, and ecologists, worked to guide these communities through the climate community designation process.



MBTA POWER, COMMUNICATION, AND SIGNALS VULNERABILITY ASSESSMENT

BOSTON, MASSACHUSETTS

CLIENT

Massachusetts Bay Transportation Authority

SERVICES

Climate Change Vulnerability Assessment

GIS Mapping and Modeling

Asset Prioritization Indexing

Stakeholder Coordination

REFERENCE

Hannah Lyons-Galante
MBTA Department of Environmental Affairs
(617)366-6020
hlyonsgalante@mbta.com

PROJECT DURATION

2020 - present

BSC Group was chosen to be part of the team on the MBTA Climate Change and Vulnerability Assessment and Adaptation on-call contract.

BSC is leading the evaluation of existing climate change data and reports for applicability to MBTA assets and integration with regional resiliency initiatives. The firm is also developing a vulnerability assessment methodology specific to these assets and will assist in ranking assets most vulnerable to climate change including extreme heat, inland and coastal flooding, extreme precipitation, and wind.

The firm is developing GIS Database and Prioritization and Indexing Methodology that includes an inventory of critical power, signaling, and communication system assets at risk to climate change extremes. Database information will allow the client to view assets overlayed with elements including climate exposure, climate sensitivity, and adaptive capacity. It will also link the asset to other climate data or planning reports giving the viewer a one-stop-shop for the asset's climate information.

APPLE COUNTRY ECOLOGICAL CLIMATE RESILIENCY AND CARBON PLANNING AND ASSESSMENT

BOSTON, MASSACHUSETTS

CLIENT

Towns of Bolton, Harvard, and Devens Regional Enterprise Zone (Devens)

SERVICES

Climate Vulnerability Assessment

Climate Resilience Planning

Identification of Nature-based Solutions

Community Stakeholder Engagement

Development of Educational Resources

Grant Proposal Preparation

REFERENCE

Rebecca Longvall
Town of Bolton
663 Main Street
Bolton, MA 01740
(978) 779-3304

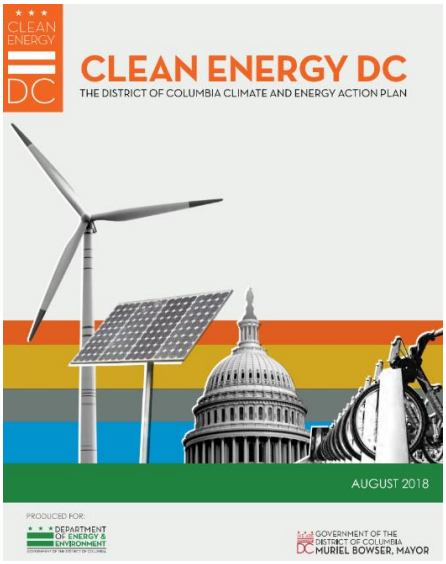
concom@townofbolton.com

PROJECT DURATION

2020 - 2021

As part of a regional approach to climate resiliency planning, BSC Group worked with the Towns of Bolton and Harvard, and the Devens Regional Enterprise Zone (Devens) and led a multi-disciplinary consulting team that includes healthy soils experts (Linnean Solutions and Regenerative Design Group) and a forest ecologist/ forest carbon expert (Woodwell Climate Research Center) to provide climate resiliency and carbon planning assessment services. The project was funded by an MVP Action Grant that was awarded to the communities following a BSC-supported application process.

Apple Country's vast landscape of forests, farmland, wetlands, and active floodplains plays an essential role in the area's ecological functioning, carbon functioning, and regional community and environmental resiliency. BSC's team of ecologists, landscape architects, climate resilience specialists, designers, engineers, and GIS specialists analyzed local ecological resources, conducted community outreach and engagement, and developed GIS mapping to produce predicative climate-focused documents and maps that identified and prioritized Nature-based Solutions (NbS), best management practices, and policies. The project report highlights opportunities for resiliency using NbS, and by implementing climate-smart best management practices and polices. The resulting report provides a regional perspective, analysis and recommendations as well as town-specific assessment and recommendations.



CLEAN ENERGY DC COMPREHENSIVE ENERGY PLAN

Washington, DC

Client
District of Columbia Department of Energy & Environment

Services
Climate Change Action Planning
Community Emissions Modelling
Stakeholder Engagement
Policy Implementation Support

Project Duration
2015-2018

Integral Group was retained to develop a Comprehensive Energy Plan for the District of Columbia Department of Energy and Environment (DOEE), which was branded as Clean Energy DC (CEDC). The plan provides a path to reducing greenhouse gas (GHG) emissions by 50% by 2032. Integral accounted for all energy use within the city as well as the District's energy supply, including buildings, transportation, renewable energy, and grid modernization. Working with D.C. staff, Integral developed a methodology to forecast energy and emissions use over time using Integral's Community Energy and Emissions Planning (CEEP) Tool, which city staff have continued to use beyond the project. The CEEP tool simulates energy and emissions from buildings, transportation, and energy supply out to 2032 based on various policy and energy infrastructure decisions. The Integral team led the development of engagement materials and structured workshops to effectively communicate the objectives and strategies of Clean Energy DC, and get meaningful feedback from peer reviewers, key stakeholders, and the general public to incorporate into the plan. Integral's role was also expanded to develop a framework for equity-based climate planning to identify benefits and risks of plan actions, to develop a net-zero energy compliance path for the DC energy code, and to develop an interactive online dashboard for the plan. CEDC was finalized in 2018 and incorporated into laws adopted in 2019.

Read more at www.cleanenergydc.org

NYC GRID READY REPORT

New York City, NY

In collaboration with Urban Green, a research and advocacy organization in New York City, Integral led the modeling team for a landmark analysis of electrification in NYC, focusing specifically on the capabilities of the grid to absorb increased demand from electric building systems. The report, "Grid Ready: Powering NYC's All-Electric Buildings", along with an interactive data exploration platform, was released in December 2021. The report demonstrates how heat pumps will impact electrical demand, and how the city can manage demand increases through smart electrification strategies. As part of this analysis, Integral worked with Urban Green to characterize the existing building stock into relevant typologies, developed calibrated energy models for each typology, analyzed smart electrification scenarios, and evaluated the geospatial distribution of results across all five boroughs. The team also worked with partners at the New York State Energy Research and Development Authority (NYSERDA) and Con Edison

INTEGRAL

Client
Urban Green

Services
Energy Modeling
Grid Analysis and Modeling
Policy Analysis

Project Duration
2021

to integrate the demand models with utility capacity data to identify which areas of the city would experience capacity constraints at varying levels of market penetration for electric systems.

City of Richmond RVAgreen 2050

Client
City of Richmond, Virginia

Services
Climate Change Action Planning
Community Emissions Modelling
Stakeholder Engagement

Project Duration
2018-2020

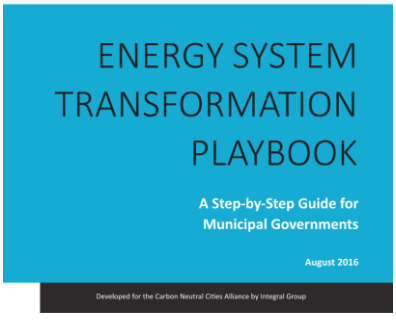
Contact:
Alicia Zatcoff, 804-646-3055,
alicia.zatcof@richmondgov.com

RVAgreen2050 Climate Action Strategy

Richmond, Virginia

Integral Group was retained by the City of Richmond, Virginia, under a grant from the Energy Foundation, to develop a Climate Action Plan (CAP) for the City of Richmond, branded as "RVAgreen2050." Integral Group developed a dynamic energy and climate model that the city can use to actively and continuously monitor its efforts. The model simulates energy and emissions from the buildings, transportation, energy supply, and waste sectors out to 2050 based on various policy and energy infrastructure decisions. Integral Group developed a set of climate strategies the City could take based on the results of the model and used the "Spheres of Influence" framework to carefully consider where the City could act relative to political and legal limitations. Integral also evaluated the potential equity, health, and financial impacts of plan actions, and prepared a decision matrix for the city to use in developing a full climate plan.

CNCA
CARBON NEUTRAL CITIES ALLIANCE



Client
Carbon Neutral Cities Alliance

Services
Climate Change Action Planning

Energy System Transformation Playbook

Boulder, CO, Minneapolis, MN, & Seattle, WA

Working with the cities of Boulder, Minneapolis and Seattle, Integral developed the Energy System Transformation Playbook. The project was supported by a grant from the Carbon Neutral Cities Alliance, a collaboration of cities committed to achieving aggressive long-termcarbon reduction goals. The Playbook is a tool that can be used by any city striving to transform to a low-carbon future. The strategies in the Playbook were tested on a different type of neighborhood in each of the three cities (Boulder, Seattle, and Minneapolis). To test the strategies, Integral collected baseline energy use data for each neighbourhood and modeled the energy and GHG impacts of transitioning from fossil fuel based energy to clean energy, noting where cities have varying levels of influence of the key aspects of their energy system. The Playbook includes guidance on policy, planning, programs and infrastructure investment to support energy system transitions in cities.

INTEGRAL

Strategic Visioning

Project Duration
2016

Contact:
Brett KenCairn, 303-441-3272,
kencairnb@bouldercolorado.gov

Client
City of Richmond, Virginia

Services
Greenhouse Gas Inventory
Climate Vulnerability Assessment
Climate Change Mitigation & Adaptation Action Planning
Community Emissions Modelling
Stakeholder Engagement

Project Duration
2019-2021

Contact:
Tess Rouse, 604.532.7339, trouse@tol.ca

Township of Langley Climate Action Strategy

Langley, British Columbia, Canada

Having declared a Climate Emergency, the Township of Langley worked with Integral Group to develop a comprehensive climate action strategy, combining both adaptation and mitigation. In a first phase of work, Integral Group was tasked with the stakeholder engagement, GHG emissions inventory, energy and emissions modelling, and public engagement necessary to craft a comprehensive set of emissions reduction actions. Climate adaptation planning was founded on an understanding local climate projections and identified targeted strategies to build resilience through community infrastructure, buildings, emergency management and nature-based solutions. Altogether, engagement involved the design and facilitation of a public survey and pop-up boards, an open house event, two large format workshops and 6 focused staff engagement sessions. Together with the results of the modelling. Integral developed actions in the areas of energy, buildings, transportation, land use, agriculture, and water. In a second phase of work, Integral integrated mitigation actions with those intended to address the impacts of a changing climate into a single Climate Action Strategy. Following an in-depth public engagement period, the consulting team refined actions and developed a detailed implementation plan.

INTEGRAL

Client
Amherst College

Services
District Energy Engineering Analysis
Implementation Planning
Lifecycle Cost Analysis
Stakeholder Engagement

Project Duration
2018

Amherst College Zero Carbon Campus Energy System Study, Amherst, Massachusetts

Amherst College has the goal to become a carbon neutral campus by 2035. To help them reach their ambitious goal, the college contracted with Integral Group to evaluate decarbonization strategies and develop an implementation plan that will lead to the campus meeting their target.

The project considered a multitude of technical, economic, environmental, and logistical factors, opportunities, and limitations in the specific context of Amherst College's existing energy infrastructure and its ultimate goals.

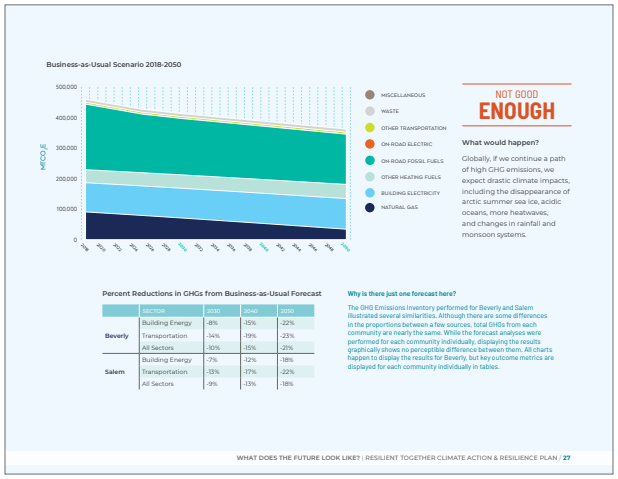
In Phase 1, Integral developed and described the fundamental approaches to low- and zero-carbon energy conversion, reviewed energy efficiency opportunities and all available and applicable zero-carbon energy sources and technologies, and developed decarbonization options for the specific context of the College.

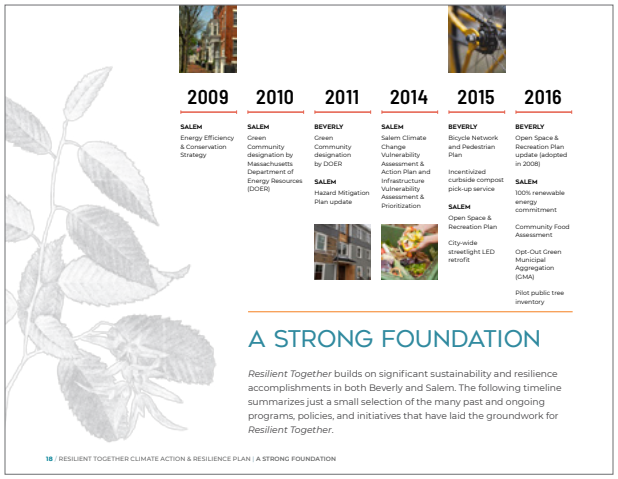
In Phase 2, Integral developed a detailed implantation plan, and worked with diverse stakeholders and key interest groups to refine the plan and data-driven implementation strategy for the recommended scenario. The final plan proposed an advanced carbon-free district energy system using geothermal heat pumps.

SCOUTER DESIGN

Client Reference: Kim Lundgren
KLA
(617) 820-8038
kim@kimlundgrenassociates.com

BEVERLY & SALEM CLIMATE ACTION & RESILIENCY PLAN / MASSACHUSETTS
SPRING/SUMMER 2021





BACKGROUND

Beverly and Salem worked with KLA to assess climate change within their communities and create a plan and target goals that they can achieve to address climate change.

EXPLORE

The clients wanted to highlight the inclusive process that they used to hear from and inform their communities. For this reason, it was important to show how they achieved that by using various methods such as social media, surveys, and focus groups.

CREATE

We chose to support the story by using public engagement infographics, quotes, local community stories, and photos of the community working to protect our environment.

CONNECT

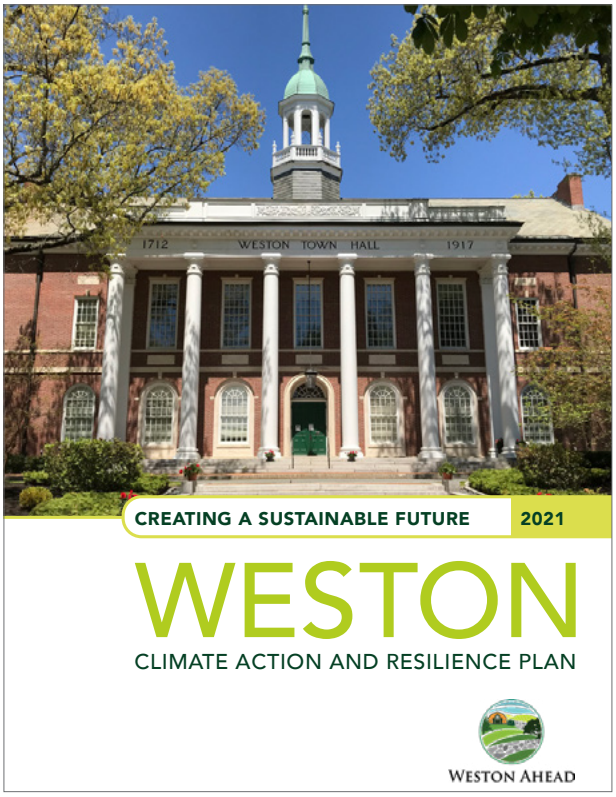
The interactive report was posted online for the community to review. It was also made ADA compliant so it was accessible to everyone.

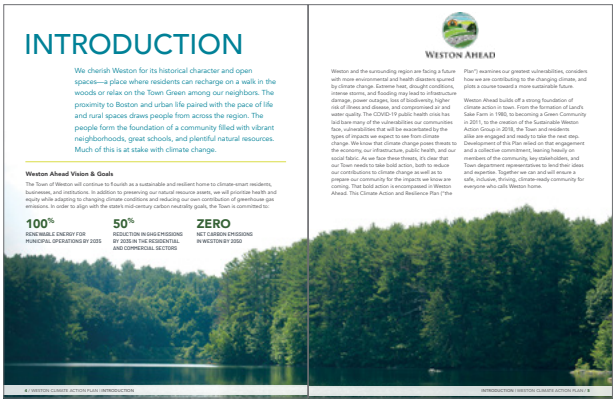
© Scouter Design

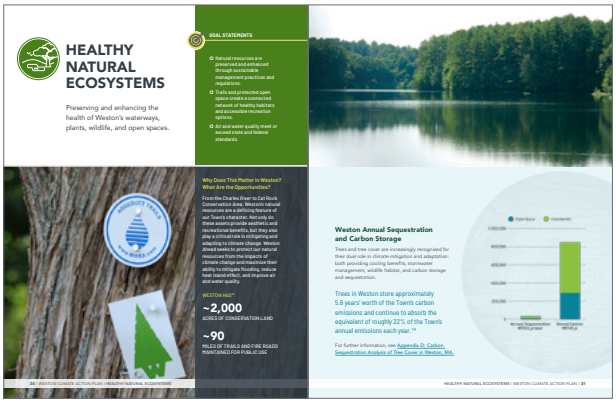
SCOUTER DESIGN

Client Reference: Kim Lundgren
KLA
(617) 820-8038
kim@kimlundgrenassociates.com

WESTON CLIMATE ACTION & RESILIENCY PLAN / MASSACHUSETTS
SPRING/SUMMER 2020







BACKGROUND

The Town of Weston underwent the process of defining their goals for addressing climate change within their community with KLA. This report is the result of their findings.

EXPLORE

We explored different ways to tell their story in a visual way while also using their brand and logo. Creating smaller pieces of information helped make complex and technical information understandable for all readers.

CREATE

Each section used call out boxes to highlight important aspects of the plan; charts and infographics to easily grasp complex data; and imagery to add visual interest. These attributes helped deliver the overall goals of the plan in a visual and legible way.

CONNECT

This interactive report was posted on-line for the community to read and included attributes such as hyperlinks and bookmarks to make it easy to navigate and read.

Client Reference: Kim Lundgren
KLA
(617) 820-8038
kim@kimlundgrenassociates.com

BEVERLY & SALEM CAP SKILL SHEETS / MASSACHUSETTS
SPRING/SUMMER 2021

BACKGROUND

In conjunction with the Climate Action Plan, Beverly and Salem used skill sheets early in the process to inform the community about the different areas that most affect climate change and our environment.

EXPLORE

The information needed to be concise and easy to understand. Under these topics, the clients were able to create an awareness as to how our every day habits can impact our environment as well as how we can help.

CREATE

Local examples of where climate change was being addressed, whether large or small, were incorporated. Infographics and imagery made a compelling visual narrative and the brand created a consistent and cohesive message.

CONNECT

The skill sheets were designed in multiple languages because of the diversity in the communities. They were also ADA compliant so that the information was accessible to all readers.

References

Town of Bolton, MA

Rebecca Longvall, Conservation Agent
663 Main Street, Bolton, MA 01740

978-779- 3304
concom@townofbolton.com

Summary: BSC, Linnean Solutions, and other project partners delivered a regional project to assets and vulnerabilities and develop prioritized Nature-based Solutions to address community climate resilience and ecological carbon storage.

Dates: 2020 - 2021

Massachusetts Bay Transportation Authority (MBTA) Department of Environmental Affairs

Andrew Brennan, Senior Director of Energy & Environment
10 Park Plaza, Suite 6720, Boston, MA 02116

617-222-3126
abrennan@mbta.com

Summary: BSC developed a Vulnerability Assessment relative to MBTA power, signals, and communication assets within its metro-Boston service region.

Dates: 2020 - present

City of Portland, ME

Troy Moon, Sustainability Coordinator
389 Congress Street, Portland, ME 04101

207-756-8362
thm@portlandmaine.gov

Summary: Integral Group and Linnean Solutions, along with another consultant, developed a joint climate change mitigation and adaptation plan for the cities of Portland and South Portland, Maine.

Dates: 2019-2020

Project Understanding

Transforming Systems

Think at the whole-system level.

Our efforts to mitigate or adapt to climate change will not be effective with only piecemeal interventions. Strategies and actions must be implemented in ways that deepen community understanding and transform broader local and regional systems, whether in climate, energy, transportation, water, or economy. Including forested and wetland areas in greenhouse gas inventories, projections, and planning is an example of working at the Whole System level.

Recognize emergent patterns.

Emergent patterns are derived from the effects of many different influences acting at once, making them inherently hard to predict or model in isolation. Working with community members to understand the emergent patterns that they see and experience, and how those patterns might interact with and influence the potential for climate action and resilience, is key to designing effective plans.

Start with potential, not problems.

All too often planning efforts start by identifying problems, a formula which then leads to one-dimensional, "stop-gap" solutions. Similarly, narrow framings of problems and solutions can lead to predetermined outcomes to the detriment of impacted parties. By starting with potential—i.e., the potential for Bangor, Orono, and the surrounding communities to lead in holistic climate planning—the solutions derived will be equally as targeted and implementable, but with more far-reaching impact.

While these principles may appear conceptual, they present a level of thinking that is essential when assessing and planning for climate change. We look forward to working with the BACTS communities to aim towards their highest potential within the context of a changing economy, landscape, and climate.

TEAM ORGANIZATION AND ROLES

BSC Group will serve as the overall Project Manager, will lead the Climate Vulnerability Assessment, and baseline assessment meetings and presentation of results. BSC will support the GHG inventory with an assessment of land-based emissions and removals, and will collaborate with the rest of the project team on the development of Climate Mitigation and Adaptation Strategies focusing on low-carbon transportation, natural

climate solutions, and adaptation strategies.

Linnean Solutions will lead public engagement, including steering committee facilitation, and development of the final Climate Adaptation & Action Plan. Linnean will facilitate development of Mitigation and Adaptation Strategies which are anticipated to be collaboratively developed by project consultants with input from the project management team, steering committee, and the public.

Integral Group will bring energy policy and carbon mitigation expertise, leading the greenhouse gas emissions inventory and collaborating on the development of mitigation and adaptation strategies focusing on energy modeling, mitigation policy, district energy, and climate resilient buildings.

Scouter Design will support the delivery of unified and engaging project deliverables across all phases and tasks by developing a project brand (logo, color palette, type, icons) to be used in reports. Supported by the technical leads, Scouter Design will also lead development of visually appealing graphics and other materials intended for broad public consumption.

The team anticipates collaboration with the University of Maine Climate Change Institute and the Maine State Climatologist to provide advisement on identification and interpretation of relevant climate data. As part of an existing company initiative that supports student activities in the field of climate resilience, BSC will contribute up to $5,000 for supplemental climate data analysis or modeling by UMaine Climate Change Institute students, as needed to support specific needs of this project.

Phase 1: Baseline Assessments

TASK 1: GREENHOUSE GAS EMISSIONS INVENTORIES

Key Operating Principle

A recent Greenhouse Gas Inventory is a critical prerequisite to data-driven climate mitigation planning. The inventory will provide a new perspective on emissions from Bangor, Orono, and the BACTS region, and will be compliant with global protocols and disclosure requirements. As part of this task, we will also develop a future projection of business-as-usual emissions. Information will be assessed and presented in a way that it can be used to develop actionable mitigation strategies in the Climate Action and Adaptation Plan and be usable by BACTS region communities on an ongoing basis.

Approach

Quantitative analysis will begin with a GHG inventory for the BACTS region and its member communities. As this inventory will form the baseline for all modelling, it is important the inventory reflect typical conditions; therefore, we propose the inventory be based on 2019 data. A 2019 inventory may appear “dated,” but it will provide a much stronger foundation for future planning than relying on data impacted by the global pandemic. We expect that BACTS and city staff will collect and provide primary/raw data as requested by the team, to the greatest extent possible in order to control costs. We have worked in local governments and are conscious of the challenges therein and are experienced in guiding staff in data collection. Where data cannot be gathered, estimates will be made using established protocols and best practices. (For example, we know that heating fuel oil is a critical source of emissions, but very difficult to gather accurate data on. For our inventories of GHG emissions in Portland and South Portland, we developed a rigorous analytical approach for

estimating fuel oil use that can be applied to the BACTS region.)

The inventory will comply with the requirements of the Carbon Disclosure Project and the Global Protocol of Community-Scale Greenhouse Gas Emission Inventories (GPC). This protocol is aligned with the Southern Maine Planning and Development Corporation GHG Protocol, and also includes standardized protocols for estimating emissions from Agriculture, Forestry, and Other Land Use (AFOLU). Our initial proposal is to use the City Inventory Reporting and Information System (CIRIS) tool from C40 cities to assemble the inventory, as it is compliant with the Global Covenant of Mayors' "Common Reporting Framework" (CRF) and the CDP-ICLEI Unified Reporting System. (This is the tool we used for Portland and South Portland Maine.) However, we could use a sufficiently similar tool, such as ICLEI ClearPath; final tool selection will be made in collaboration with the client. As a large portion of land in the region is covered with trees, the impact that this tree cover could have on meeting net zero targets indicates that exploring the inclusion of AFOLU emissions and removals using the ICLEI Land Emissions and Removals Navigator "LEARN" will be important for baselining sequestration potential. Depending on the data available on solid waste emissions, we may also explore using the EPA's Waste Reduction Model (WARM) to develop GHG estimates that reflect the waste stream characterization.

In addition to the inventory baseline, we propose to develop a "business-as-usual" (BAU) projection for community-wide emissions that projects future emissions without any local policy action, and without further action than what is already set in Federal and State policy. The main drivers of emissions growth are population growth, building construction, and increases in vehicle miles traveled (VMT). Against this worst-case scenario, we will model projected impacts of existing state policy such as the Renewable Portfolio Standard (RPS). The impacts of these policies will help BACTS achieve its goals, and quantifying them shows the emissions gap that the climate plan must close.

We will ensure that the inventories are well-documented and provided in spreadsheet format that is compliant with the CDP and easy to update going forward. Data will be collected and analyzed at the municipal level to the extent available. Inventory reporting will present information at the regional and town levels. Data at the town level will be provided—in cases where data is not available at that level, data will be prorated by an appropriate metric, such as population, building floor area, or land area. We will also provide benchmark comparisons with other peer cities. Data on the BAU trajectory will be presented in a wedge chart and table formats. High-level summary results and graphics will be developed at the regional level, and a detailed regional methodology document will be created. (For comparison, see the methodology document we developed for Portland and South Portland, Maine.)

TASK 2: CLIMATE VULNERABILITY ASSESSMENT

Key Operating Principle

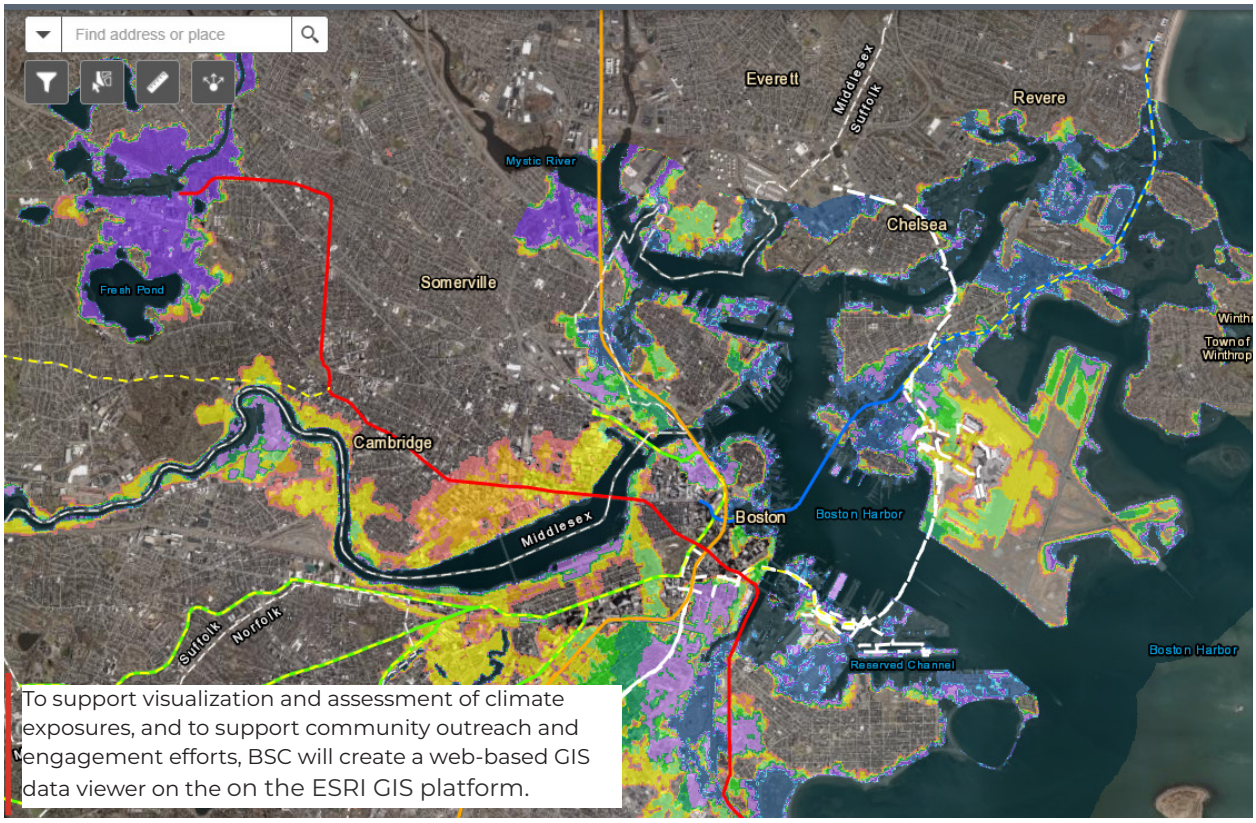
The Climate Vulnerability Assessment (CVA) serves to provide a picture of the risks Bangor, Orono, and the BACTS region are likely to face now and as the impacts of climate change become more severe. The CVA process will prioritize assets and systems that require adaptations and on what likely time scale those priorities need to occur. Information will be assessed and presented in a way that it can be utilized to develop actionable adaptation strategies in the Climate Action and Adaptation Plan and be usable by BACTS region communities on an ongoing basis.

Approach

The project team understands the interdependencies of climate impacts on infrastructural, environmental, and socioeconomic systems and seeks to identify co-beneficial adaptation solutions through data and participation-driven processes. The CVA will begin with a comprehensive data collection effort relative to different types of climate hazards (e.g.,

flooding due to sea level rise, storm surge, and increased precipitation; extreme temperatures; severe weather events) within the project limits. Data sources such as the Maine Geological Survey, UMaine Climate Futures Plausible Scenario Framework, Maine's Climate Future 2020 Update, and Coastal Maine Climate Futures will be utilized and will be supplemented by regional, national, or international data sets. This effort will also include development of a list of infrastructural, environmental, and socioeconomic issues of importance to the region whose vulnerability should be assessed. BSC will identify critical assets or issues of importance through the use of existing datasets (e.g., GIS infrastructure data layers), a review of local and regional planning documents, and project management team input. Because the assessment will provide necessary information from which to base adaptation strategies in the Climate Action and Adaptation Plan (CAAP), Linnean Solutions will support this subtask by working with the project management team and the initial steering committee meeting to develop CAAP objectives to ensure data and hazards assessed as part of the CVA provide information that will be necessary to meet CAAP objectives. This activity will result in preliminary CAAP objectives, a list of climate hazards and assets to be assessed in the CVA and the data sources to be used, and identification of an appropriate sea level rise scenario for the BACTS region.

To support visualization and assessment of climate exposures, and to support community outreach and engagement efforts led by Linnean Solutions, BSC will create a web-based GIS data viewer. The data viewer will be built on the ESRI GIS platform and allow exploration of all geospatial vulnerability information by the project team, project management team, all stakeholders, and the public. This tool will support both phases of the project including solicitation of stakeholder feedback, analysis and development of the CVA and mitigation and adaptation strategies, and can be used in presentations and public engagement activities. Geospatial data from other tasks in the project can be added to the data viewer as available or as additional information is gathered from stakeholder engagement. BSC has found

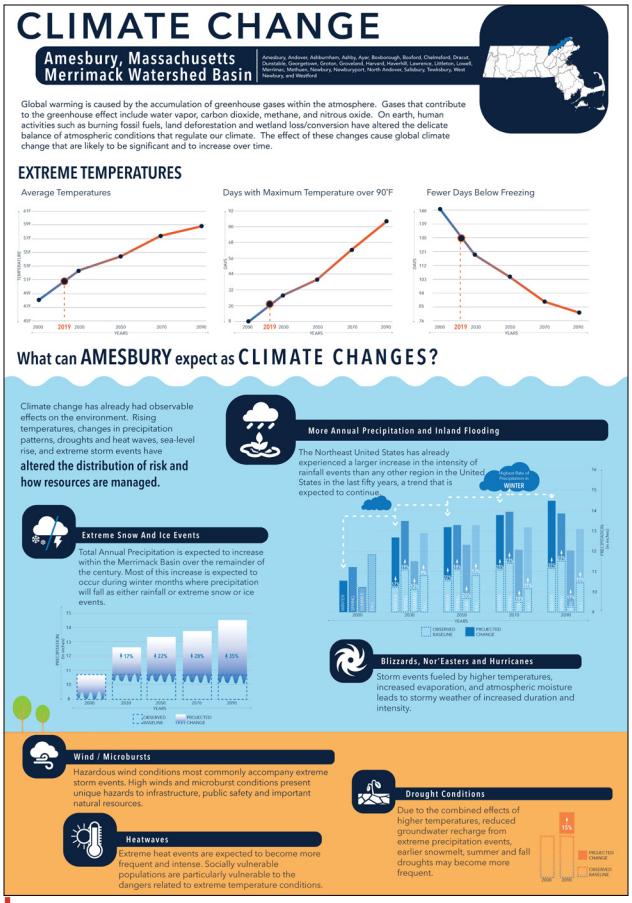


To support visualization and assessment of climate exposures, and to support community outreach and engagement efforts, BSC will create a web-based GIS data viewer on the on the ESRI GIS platform.

project data viewers provide additional value to clients serving as interactive references for clients to use beyond the initial project for which they were developed.

The team will begin to characterize vulnerability and risk once data has been collected and organized. Vulnerability across infrastructural, environmental, and socioeconomic systems is assessed by considering exposure as well as sensitivity to and the ability to adapt to projected climate impacts. Overall risk will be estimated by combining the vulnerability of the asset with the consequence of failure. In developing this Risk Index, BSC will work cooperatively with the project management team to understand the relative importance of the assets and impacts related to social and environmental health and well-being, safety, and economics. Integral Group will support this task by providing input on key climate vulnerabilities and risks facing buildings, critical facilities, and housing. Once developed, the Risk Index will be applied to each vulnerable asset/system to develop an overall ranking of risk now and in the future. This is useful to compare/rank vulnerabilities and prioritize resilience strategies. As such, this exercise should provide the project management team with a prioritization of assets that may need to adapt, and when these adaptations may need to occur.

The Climate Vulnerability Assessment Report will serve as a baseline to provide a summary of projected climate impacts to the region and relative vulnerability to guide future project decision-making efforts. The report is anticipated to include a summary of climate hazards for the region, a review of the data collection process and methodology used to assess vulnerability, and summaries of exposure, risk, and vulnerability across infrastructural, environmental, and socioeconomic assets and systems. Scouter Design will work with BSC on the development of a high-level, visual summary with stand-alone components that can provide bite-sized information to stakeholders and the public on social media and other communication channels.



Infographic developed to support community outreach for the City of Amesbury's Municipal Vulnerability Preparedness project.

TASK 3: MEETINGS AND PRESENTATION OF RESULTS

Key Operating Principle: Successful assessments of climate vulnerability, climate action planning, and adaptation planning require an explicit focus on communication strategies that distill complex information into a project narrative that promotes collaborative and inclusive decision-making. A communication strategy that utilizes interactive tools and formats supports project team goals of creating inclusive and participatory decision-making processes that draw upon community needs, interests, and priorities.

Approach

We propose 1 hour, monthly, virtual meetings for the consultants and project team to guide the process and discuss relevant issues for current

or upcoming tasks to minimize the need for additional, ad-hoc planning meetings. Agendas and routine updates will be provided in writing in advance of meetings in order to maximize time for collaborative discussion that integrates thinking across all team members from different disciplines, experiences, and backgrounds. If there are no relevant discussion items, BSC and the project management team can mutually agree to cancel the meeting.

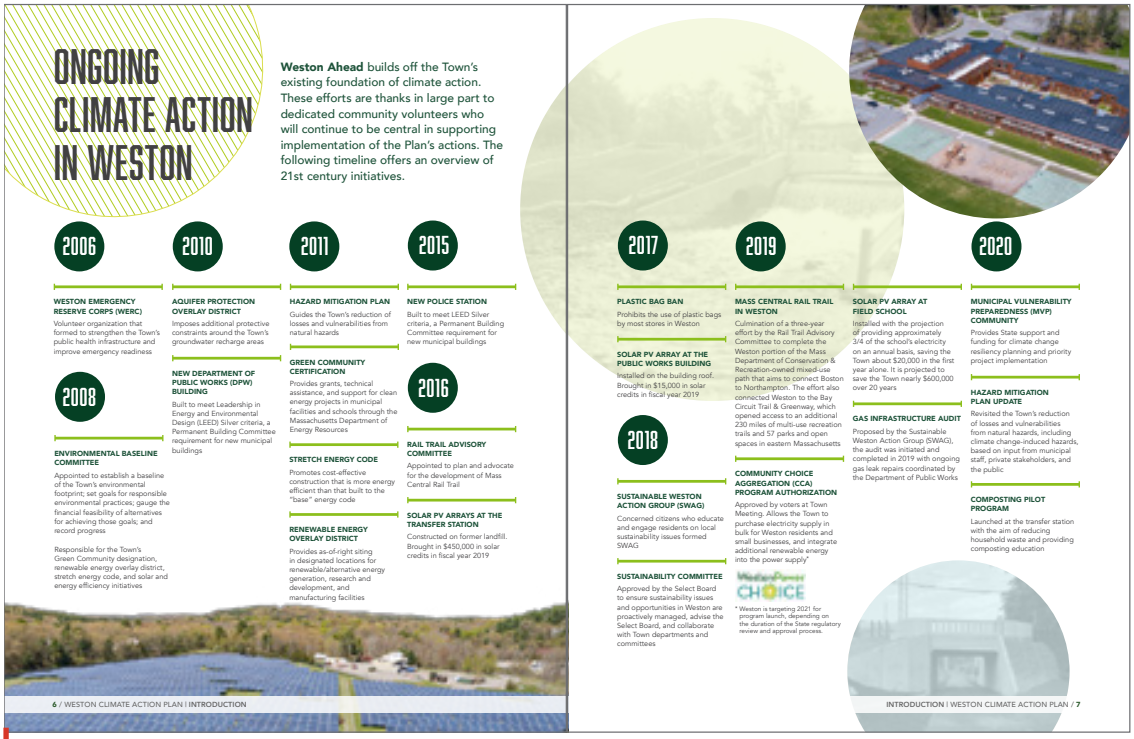
Presentation of results from the baseline assessments will serve as a project kickoff for engaging a broader stakeholder group and the general public. The team anticipates that the overlap between the end of Phase 1 and the beginning of Phase 2 will utilize public meetings not only to present baseline assessment results but discuss them in the context of planning for climate action and starting a community oriented vision for the plan. We propose virtual public meetings and will incorporate interactive tools and formats to maximize participation and engagement during the meetings. Baseline assessments will be considered drafts at the time of the public meetings to allow for adjustments based on public input.

To further support communication of the project purpose and findings, and to build community participation and support for climate action, we propose development of a basic project website. This website would host project deliverables, data, and progress updates. It will be hosted on an easy to manage platform so that it could be turned over to Bangor, Orono, BACTS, or another project partner determined by BACTS, to continue to use for this regional initiative as it develops over time. Anticipated website pages include: Home, About, Reports & Resources, Initiatives, and Events. The website may also be used as a location to host surveys, feedback forms, or similar tools to collect public input throughout the project.

Written and visual deliverables will be a part of all projects tasks. Branding a project creates a unified look for all deliverables at every touchpoint, making it easily recognizable to the public and stakeholders. A brand identity can include a project logo, color palette, type, icons, and imagery that closely aligns to the goals of the project and its audience. At the start of the project, we will design a brand identity and document these guidelines along with developing a set of templates for reports, presentations, and social media posts that visually relate to each other. These items will become part of the toolbox to create consistency across all mediums and streamline the production process for each deliverable. We will document and share these tools with all team members to use. Designing with BACTS regional audiences in mind and making the information accessible to all by using multiple mediums will play a large role in keeping communities engaged throughout the project.

We anticipate that baseline assessment reports will utilize the brand identity but will focus less on design and more on providing relevant

In conjunction with the Climate Action Plan, Beverly and Salem used skill sheets, designed by Scouter Design, early in the process to inform the community about the different areas that most affect climate change and our environment.



To help the public understand this sometimes-complex information, materials targeted to the public will use various design elements to highlight major themes and ideas; charts and infographics to convey complex data; and figures, diagrams, and photography to further support the narrative. . Pictured above, an exceprt from the Weston Climate Action Resilience Plan Report, designed by Scouter Design.

information in straightforward and usable formats so they provide the level of detail necessary to be utilized by key regional staff. Alternative formats, such as interactive presentations, spreadsheet dashboards, tear sheets, or similar may be utilized. This approach also supports a more efficient project budget and timeline. These technical documents will be accompanied by more visual summary results and graphics intended for a broader audience.

We want to tell the BACTS region's story in a visual way so that results are interesting, engaging, and easy to navigate. To help the public understand this sometimes-complex information, materials targeted to the public will use various design elements to highlight major themes and ideas; charts and infographics to convey complex data; and figures, diagrams, and photography to further support the narrative. These graphics and design elements can be used in presentations and social media posts. The reader's experience should be an enjoyable one, so since the reports will primarily live online, we will use hyperlinks and bookmarks to make navigation easy and a clear hierarchy to find information quickly.

TASK 4: PUBLIC ENGAGEMENT FOUNDATION

The BSC team proposes initiating community outreach during Phase 1 work. The goal of this outreach is to identify community leaders and resident participants with whom to build relationships for later in the project. We have found that it takes time to create the trust and understanding to support robust community participation in climate planning, especially for underserved or marginalized communities within the project area. In order to ensure that people who have been traditionally excluded or not yet involved in community planning processes can participate effectively in the planning process, we suggest beginning communications and relationship-building during Phase 1. This relationship-building will also support community input into the vulnerability assessment.

Phase 2: Regional Climate Action Planning – Engagement, Vision and Framework Development, Strategy Development and Report Production

TASK 1: COMMUNITY AND STEERING COMMITTEE ENGAGEMENT

Key Operating Principles

In our experience, building a strong base of relationships, focusing on building understanding and capacity for action, and building a shared vision and community goals are all key to successful transformation to low-carbon and resilient communities.

Approach

Public engagement will be foundational to every aspect of visioning and strategy development. We believe that stakeholder participation and ownership over the plan and process will build regional capacity for implementation of the ensuing climate actions. Our team recognizes that current systems have not served all people equitability, and as such our engagement process will be centered in principles and values of social and environmental justice. In the BACTS region, these focus populations may include Indigenous, low income, BIPOC, youth, immigrant, unhoused, and senior residents. By ensuring that planning centers people and starts from community needs, priorities, and lived experience, as well as data developed during Phase 1 of the project, the climate action strategies developed through this process will advance equity and generate relevant co-benefits.

At the launch of phase 1, the consultant team will develop a detailed climate communications and community engagement strategy. This approach will prioritize having breadth by casting a wide net and depth by focusing on building and maintaining meaningful relationships throughout the process. Our approach to community engagement dovetails with BACTS Public Participation Policy and will have four core waves: (1) Relationship building and knowledge sharing, (2) Community needs assessment, (3) Mitigation and adaptation solution co-creation, and (4) Implementation capacity building. Our communications strategy will include creation and promotion of a regional brand for the plan and developing a digital content strategy (i.e. project website, social media, email marketing listserv). Targeted communications will support relationship oriented engagement including a community-wide digital survey available on the project website. The majority of the engagement for the project will be conducted virtually, leveraging the extensive experience of Linnean's team in building and maintaining relationships for virtual climate action planning.

Wave 1: Relationship Building and Knowledge Sharing (ongoing)

Wave 1 will begin during the first phase of the project and be ongoing throughout the process. It focuses on convening key perspectives and building community relationships in order to share knowledge that will support the development of the plan and ongoing community climate action. Linnean's Maine based staff will be available for early in-person engagement activities if applicable and as public health guidelines allow. The first wave of task 1 will dovetail with task 2.1 by working with the Steering Committee, Community Advisors, and residents to set a vision and frameworks for decision making.

Community Advisors

This team has experienced the time it takes to build strong relationships with community

members who can bring important diverse perspectives to a project. We also know that implementation of actions to reduce GHG emissions and create more resilient communities takes direct and ongoing community leadership, especially in smaller communities. As part of fostering community leadership, the Linnean team will be identifying individuals and organizations who will play a significant role throughout the process, including but not limited to serving on the Steering Commitee. These Community Advisors will be compensated for their expertise and will be supported in building community ownership of the process and outcomes. We have built time and effort into our plan to work with several groups over the course of the planning process to build supporting strategies into the plan and to seed future implementation actions.

Steering Commitee

A foundational element of this wave will be the convening and facilitation of the steering committee. Engagement with the Steering Committee and community will start during Phase I and be ongoing throughout the project. We envision and recommend that this committee will be comprised of municipal and technical experts as well as several Community Advisors. The Steering Committee will help set and share the climate action planning vision (described in task 2) and evaluate the approach for the BACTS region's pathway to decrease greenhouse gas emissions by 45% by 2030, carbon neutrality by 2045, and 80% reduction by 2050. The Steering Committee will be convened in collaboration with both core and regional partner participating municipalities (see task 5). We see an opportunity for Steering Committee members to take a leadership role in outreach and information sharing.

Steering Committee Meetings

Meeting 1. Project kick off & Setting the vision

Linnean will facilitate a conversation with the Steering Committee that will focus on transformative outcomes, regenerative thinking and setting a shared vision for the project to align municipal staff, the Steering Committee, and the project team on a shared understanding of the project, the vision, and desired outcomes.

Meeting 2: Review findings of Phase I and Largest levers for change

Linnean will facilitate the Steering Committee looking at the results of the Energy and Emissions Model and the contribution of all quantifiable strategies to the overall mitigation targets. The workshops will be facilitated using exercises to align on ways to address risks in a holistic and integrated way, which will directly feed into the refinement of adaptation strategies.

Meeting 3: Community needs assessment

Linnean will facilitate a meeting to discuss the findings from the community needs assessment. This will include the results of the first survey, qualitative data analysis from focus groups and community conversations.

Meeting 4: Early strategy development

The project team will facilitate a meeting to review and provide feedback on the mitigation and adaptation strategies that have been developed for the BACTS region. This will be an opportunity to adapt strategies based on equity concerns and to achieve greater co-benefits based on the findings of the community needs assessment.

Meeting 5: Implementation Roadmaps

The project team will review the roadmap template with steering committee members and the top prioritized strategies that were elevated utilizing the framework co-created in meeting four.

Meeting 6: Setting our sights on action

The sixth and final steering committee meeting will be facilitated by Linnean Solutions and serve as a workshop for steering committee members to develop their capability to share the process and final materials with their respective networks (see task 4).

Wave 2: Community Needs Assessment

Emerging from relationships established during the first wave, Wave 2 focuses on convening community members to envision climate action plan potential by identifying top community priories.

Our team has found through experience that starting with people and their stories fundamentally reorients the process of defining climate action strategies by connecting participants to a greater sense of purpose and enabling a more nuanced understanding of how the plans being made can directly benefit people's daily lives, support equity and enhance livelihoods, and improve health and well-being. The team will build on relationships developed during Phase 1 to elevate key community voices in defining what issues are important to emphasize, what risks are most important to address, and what community infrastructure has the most meaningful potential to enhance local and regional resilience.

This wave of engagement will have several components. First, the team will host a series of five focus groups, with each one centered around a different key priority area in the BACTS Region. These priority focus areas may include housing, food security, job availability, transit reliability, and other subjects identified by Community Advisors and the Steering Committee. Additionally, the second community-wide forum will focus on community priorities more broadly.

Wave 3: Solution Co-Creation

Wave 3 of the stakeholder engagement will be focused on the identification, development, and prioritization of climate action strategies that stem from community needs and priorities identified within the first two waves of engagement. Having created more space for relationship-, trust-, and coalition-building, our team will begin to develop climate solutions that center community priorities. This wave of the engagement will be iterative. The purpose will be to focus on identifying data-driven climate adaptation and mitigation strategies that meet the regions climate goals while also addressing the potential co-benefits identified in the second wave of engagement.

Mirroring the second wave, this wave will have several basic components. One, the team will host two rounds of five focus groups (10 in total). These focus groups will likely align with the focus areas of climate adaptation and mitigation (buildings and energy, transportation and land use, waste, resilience, and sequestration and green space). Second, the team will host a third community-wide forum in between the two cycles of focus groups where residents of all communities in the BACTS region will have the opportunity to provide early feedback on potential climate mitigation and adaptation strategies.

Wave 4: Implementation Capacity Building

The fourth and final wave of engagement will be oriented towards future climate action in the community. This will be accomplished through three consultant led workshops focused on building shared capacities for implementation within the municipalities and community at large. Utilizing frameworks like "train-the-trainer" and the "house party" model of community organizing, workshop participants will have the opportunity to deeply understand and take ownership over relevant strategies within the plan to move directly into implementation after the consultant scope is complete. Each participant will leave the workshop equipped with the materials and skills to lead their own training, thus empowering and reaching more people than the project team could on their own. This unique approach is designed to build community capacity to take ownership and lead various aspects of the plan's implementation, while also using consultant time and budget most efficiently. The fourth and final community-wide forum will serve as an opportunity to kick off the public comment period for the summary reports and implementation roadmaps as well as a celebration of the process and all the input and leadership in the region.

TASK 2: MITIGATION & ADAPTATION STRATEGIES

Key Operating Principle

Building resilient communities and reaching aggressive carbon mitigation goals takes bold leadership, deep community participation, and alignment around shared goals. Strong community participation is the foundation upon which an equitable and sustainable action plan is built, where everyone has a stake in the outcomes and everyone can play a role.

Approach

Linnean Solutions will lead the development of mitigation and adaptation strategies with support from Integral and BSC. Our approach will be rooted in Phase I data and fed through ground up community participation (see Phase 2, Task 1). Our team's process will open up new possibilities and enhance existing strategies, focusing on transforming systems and centering environmental and social justice. There are three main components to this task. The first component is to work with community groups and residents to set a vision and frameworks for decision making. The second component will be to develop a set of potential strategies alongside the Steering Committee, staff, and community partners, using decision-making frameworks and Phase I data to prioritize actions. The final component will be a technical analysis of the suite of strategies to further refine, prioritize, and develop roadmaps for implementation.

Vision, Metrics, and Frameworks Development

Building a shared a vision for the future along with targets to guide action are important steps in the climate action planning process. The team will work with the Steering Committe, Community Advisors, and residents to develop a vision for the project. This effort will take place primarily through the first and second wave of engagement. This process will serve to confirm climate adaptation and mitigation goals, set interim goals based on data collected during phase 1, as well as identify principles that drive action and co-benefits that drive value. The project team will develop a framework for decision-making that will hold the range of community values and help the steering committee and community participants to prioritize actions and value co-benefits. This framework will prioritize strategies that build on and leverage existing local capacity and have funding and partnership opportunities.

Strategy Development

Stemming from the community needs assessment developed in the second wave of stakeholder engagement, the consultant team will work with the Steering Committee and community members during the third wave of engagement to identify climate adaptation and mitigation strategies that meet community climate goals as well as deeper community needs.

Our focus areas will be buildings and energy, transportation and land use, waste, resilience and sequestration and open space. This matrix builds on the approach taken for One Climate Future, while adding a greater focus on sequestration and open space, as the BACTS region has geographic opportunities that were not available in Portland and South Portland. In general, leadership of policy development will be divided by these focus areas, with Integral Group leading buildings, energy, and waste, and Linnean leading transportation and land use, resilience, and sequestration and open space. BSC will provide critical support on strategies for transportation and sequestration. However, expertise in all areas is found within all firms, and we will collaborate on strategy development to ensure the best ideas come to the forefront. Our team will emphasize efficiencies across solutions and work at the nexus of mitigation, adaptation, and equity.

Development of climate mitigation strategies will directly respond to the conditions identified in the baseline GHG inventory and BAU forecast developed in Phase I.

Development of climate adaptation strategies will respond directly to the technical vulnerabilities identified in the Climate Vulnerability Assessment as well as through the community needs assessment. The vulnerability assessment and community engagement will combine to facilitate the prioritization of strategies across risk, exposure and vulnerability. The team will focus on both near term strategies (i.e. low-cost, feasible, widely supported) as well as long term investments that may take years of planning, fundraising, and awareness-building but that will be essential to the resilience of the region.

Buildings & Energy

Integral's integrated team of buildings specialists will work together to identify community-scale policy and planning strategies to help buildings across the region adapt to climate risks and vulnerabilities. The Integral team takes a low-carbon lens to building resilience, prioritizing risk management strategies that have lower operational and embodied emissions, such as those that leverage passive or nature-based approaches. Low-carbon resilience approaches will include guidance for tailoring strategies to different building typologies ranging from institutional, critical facilities (e.g. healthcare, emergency response, infrastructure), commercial and residential. Low-carbon resilience strategies will take into account the interconnectedness of buildings with broader community infrastructure services and their implication for community health, safety and wellbeing through an equity lens.

To model and analyze savings potential in the building sector, we will build on our analysis of building energy benchmarking data from Portland and South Portland, combining it with advanced analytics, national and regional data sources, and high level energy models. We also propose to use the outcomes of the climate impacts and vulnerability assessment to weather-shift the data to account for projected performance under various climate change scenarios. Our team has worked across North America on the implementation of building policies, including retrofit programs, energy stretch codes, building performance standards—and we know how these policies play out on the ground, in real buildings we have designed and built.

For energy supply, we will focus on a range of strategies that can decarbonize buildings through beneficial electrification, renewable energy, and innovative low-carbon energy systems. We have extensive experience working with utility companies and other players in the energy supply system—including Integral's in-house renewable energy engineering team. While the state's renewable portfolio standard has created a strong foundation for clean energy growth in Maine, the BACTS region presents unique opportunities, including the University of Maine District Energy System (DES). Integral Group has international-leading expertise in decarbonizing university district energy systems, including work at Amherst, Williams, and Princeton. While any detailed study of the opportunities at UMaine is beyond the scope of this project, we can facilitate conversations with relevant parties and include low carbon DES scenarios in our modeling.

Transportation & Land Use

Our team will use the data collected and analyzed within the phase 1 GHG inventory, national and regional datasets, and other additional data available. Considerations for more complete streets elements, improved access to non-vehicular modes of transportation, and proper placement of public transit are among transportation planning strategies to reduce greenhouse gas emissions and provide additional well-being and environmental co-benefits. It will also be important to look at the data for existing hybrid and electric vehicle utilization in the region, and forecasts for the transition to these modes, which emit less or no GHGs. Policies and programs that support expanding access and increasing affordability of electric vehicles and infrastructure will be critical to supporting the adoption of electric vehicles in the BACTS region Likewise, the model will consider the fact that BACTS has existing transit services, defining future potential for these services.

Using this data, we will then develop a business-as-usual scenario using city data and regional data on building stock and land use change, population growth, transportation demand changes, and existing federal and state policies. Our team will propose a set of GHG mitigation and adaptation measures and build them into the model to quantify the GHG impact of each measure, where possible. Actions will be grouped into broad categories, with a mix of hard-hitting, quantifiable actions, and foundational or supporting efforts that are necessary to achieve the GHG reduction goal, but do not themselves reduce emissions.

Land use and transportation scenarios that reduce trips or shift single occupancy automotive trips to more efficient modes are important to consider. The development of actions will reflect and build upon BACTS transit planning including the Metropolitan Transporation Plan, the Transportation Improvement Plan, and ongoing programs and BACTS committee priorities.

Resilience

Utilizing the Climate Vulnerability Assessment and the Community Needs Assessment developed in the second wave of engagement as a baseline, the team will develop a suite of adaptation and resilience strategies that will help the region not only prepare for the impacts of climate change but also thrive in these future conditions. Adaptation strategies will include regulatory, infrastructure, and social programmatic approaches. The assessments, community engagement, and evaluation criteria framework will facilitate a process of prioritization that generates equitable co-benefits. In addition to developing robust strategies for stormwater management, we will develop sea level rise Scenarios for tidal riverine flooding along the Penobscot River and propose solutions. Our team has experience and expertise in municipal climate resilience planning including interagency green infrastructure stormwater management coordination, community led coastal resilience planning, and equity-centered heat resilience strategy development.

Waste

Our analysis of the waste sector will include solid waste and wastewater, with strong overlaps with both stormwater and low-carbon energy system analysis. For solid waste, we propose to use the Waste Reduction Model (WARM) model to account for the GHGs created by different waste streams. This will allow for us to better capture the true emissions benefits, as well as general economic benefits, of recycling, composting, and source reduction activities, as we move toward a Zero Waste society. We will also analyze the emissions impact of the wastewater system and options to improve the energy and emissions performance of water/wastewater processing. This analysis will be tightly integrated with the resilience analysis, due to the common exposure of wastewater plants to flooding and sea level rise, and overflow risks from the Municipal Separate Storm Sewer System (MS4).

Green Space & Sequestration

Current work by Linnean and BSC Group has focused on the role of forested areas and wetlands in storing and sequestering carbon over time. We feel that accounting for both the natural carbon pools and continued natural sequestration of carbon will provide important insights to land management and development patterns in the BACTS region. Because the region is characterized by a mix of more urban and more rural communities, a regional approach to maintaining and enhancing land-based carbon sequestration rates may be important to all of the communities in the BACTS region for reaching their carbon goals. Maintaining and enhancing the health of forests and wetlands also promotes valuable co-benefits such as flood management and enhanced public health. The team proposes including land-based carbon pools and sequestration rates in the GHG inventory and mitigation strategy modeling.

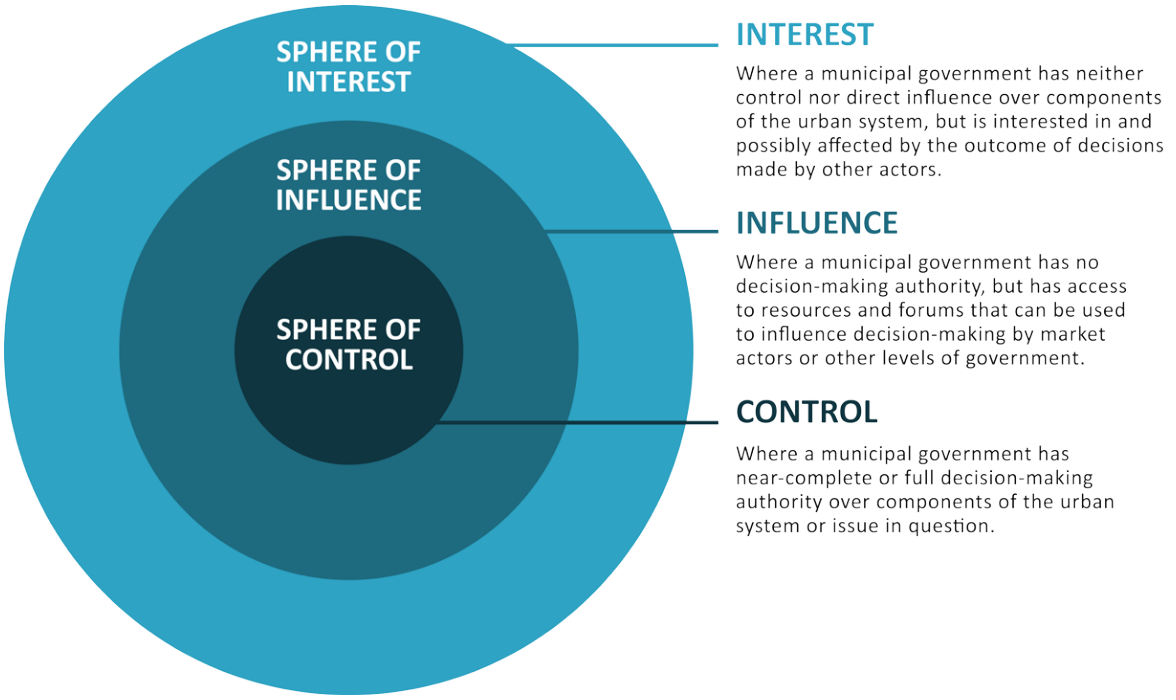


Figure 1 The "Sphere of Influence" heuristic can be used to evaluate the ability of BACTS and the local municipalities to affect change in different aspects of the economic, energy, and natural systems.

GHG Impact Modeling

The impact of strategies will be modeled and workshopped using Integral Group's Community Energy and Emissions model. This advanced spreadsheet-based modeling tool was adapted to the Maine context for Portland and South Portland, and will be further adapted in this project to the needs of the BACTS communities. At a high level, the tool builds a bottom-up model of energy use in the jurisdictions which is then aligned with the top-down results from the inventory, and projects a business-as-usual scenario using real data. We then apply carbon mitigation strategies to various sectors of the model, informed by our on-the-ground experience and data from other relevant communities, along with our own expert knowledge. Many strategies serve both mitigation and adaptation goals. In fact, the team strives to develop strategies that serve a wide number of goals, with multiple co-benefits.

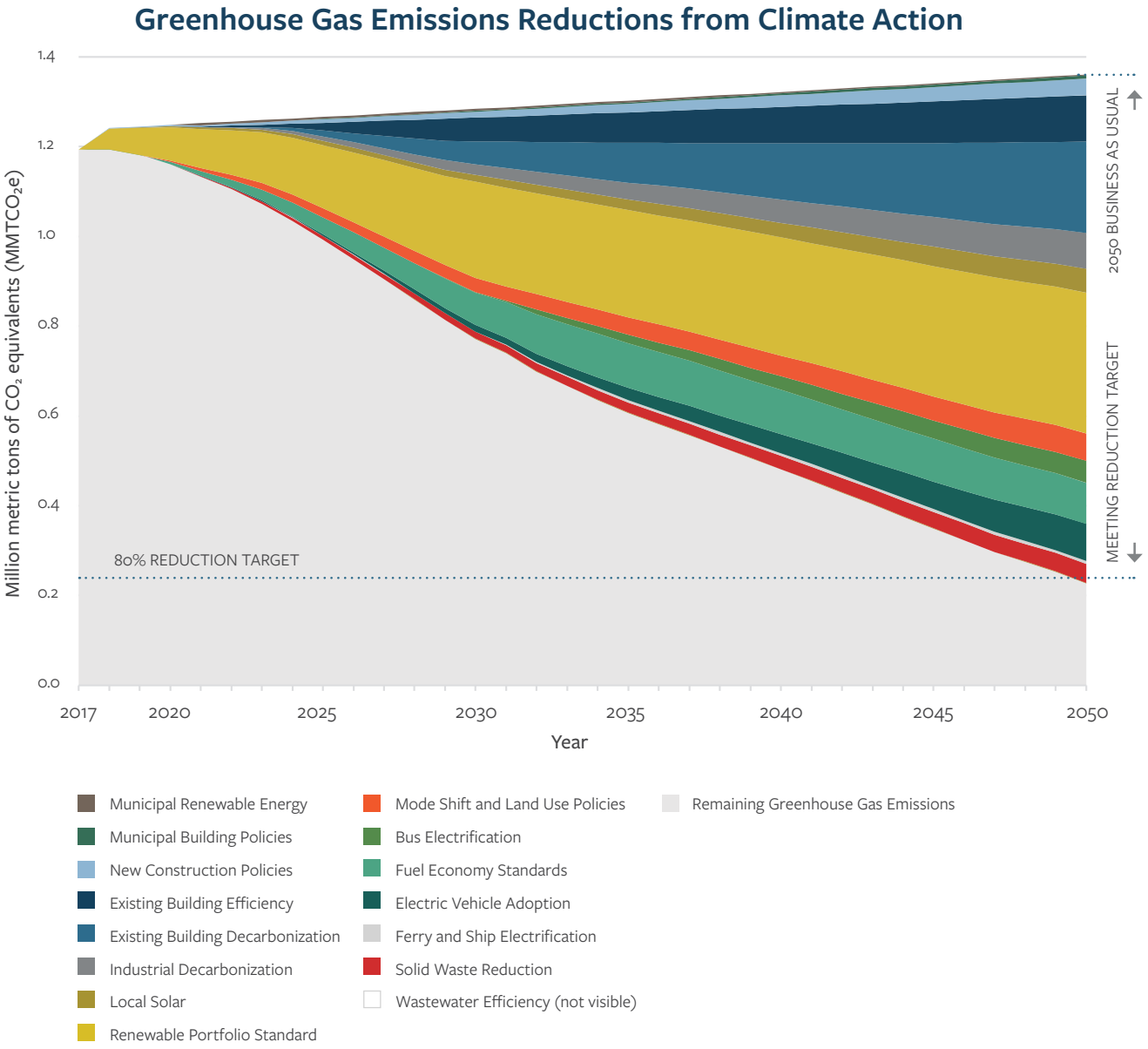
We then apply GHG emission reduction strategies to various sectors of the model to run policy simulations to determine the scale, timeline, and focal points of action necessary to set and achieve a set of interim targets for 2025, 2030, 2040, and 2050. Our focus will be on developing a clear understanding of the factors that will support and/or limit policy simulation assumptions (e.g. how many buildings can be retrofitted per year in the short- and medium-terms, how many vehicles can be replaced by EVs). Our modeling will concentrate on actions that the region can take to achieve significant emissions reductions in the long term, including a final carbon neutral target that minimizes the need for offsets.

The results of the model will be visualized for the cities in a wedge analysis to allow stakeholders to understand the contribution of all quantifiable strategies to the overall mitigation targets (see figure below for example). We will hold a workshop with City staff, Steering Committee members, and other individuals as selected by City staff, to test and refine the model using on-the-ground knowledge. Following the workshop, the model and mitigation strategies will be

Based on the energy and emissions modeling, the One Climate Future actions can reduce our cities' emissions by over 81% by 2050, relative to 2017.

Accelerating emissions reductions

Recognizing the scale of the global climate crisis and the need to take aggressive action, many actions have been front-loaded. The plan's implementation timeline considers municipal staff and funding capacities, and prioritizes the early and aggressive implementation of strategies that will have the most significant emissions savings. Almost half of the plan's actions are fully implemented in the next decade. As such, Portland and South Portland are projected to achieve a 33% reduction in greenhouse gas emissions by 2030, and a 50% reduction by 2036, relative to 2017.



Example wedge chart from the One Climate Future Plan by Linnean and Integral. The chart shows how each major climate mitigation action contributes to reducing GHG emissions by over 80% by 2050. Adding in sequestration, as we propose to do for BACTS, will be key to a path to carbon neutrality.

refined, and a gap analysis will be conducted to ensure that the strategies are meeting the Cities' goals.

Cost/Benefit Analysis, Feasibility, Co-Benefits

Feasibility, impact, and co-benefits will be foundational to the prioritization of climate action solutions. As part of the prioritization process for which strategies to make roadmaps (see task 3) we will create a matrix that evaluates the technical and practical feasibility and risks of each action and identify co-benefits, including jobs, human health, well-being, air quality, equity and resilience for each action. One of the criteria that we anticipate using to evaluate feasibility is the availability of local, state, and federal funding for implementation. Pathways to funding will be a significant component of the final implementation roadmaps.

Our team proposes to conduct a high-level cost-benefit analysis on the proposed actions. Many of our clients find it essential to develop climate action plans that explore and quantify the economic costs and benefits resulting from policies and programs. Municipal leaders and residents need to know what key economic and workforce outcomes would occur through climate action, and the full scope of benefits that climate action can provide. The team will

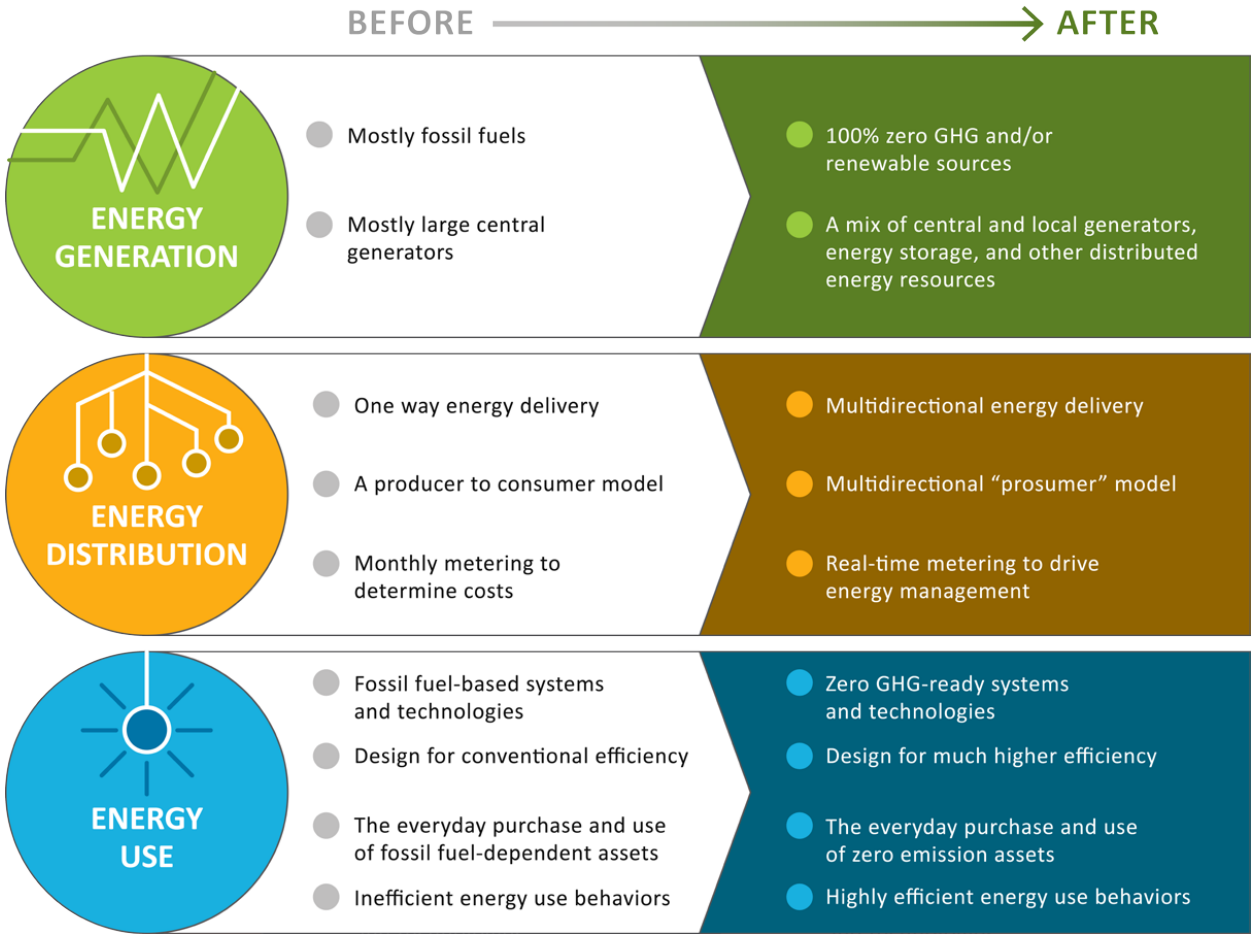


Figure 2 The "Energy System Transformation Playbook," developed by Integral Group for the Carbon Neutral Cities Alliance, shows the overall transformation needed to move our energy systems to a zero emissions future. This infographic captures some main transitions that can be examined.

provide a strategy-by-strategy breakdown of the costs and/or benefits of various actions in the proposed climate action and adaptation plan. Noting that not all costs or potential benefits have a direct or measurable monetary outcome, the analysis in some areas may be limited or reference qualitative rather than quantitative opportunities. Where data and sound research already exists, we will perform a 'desktop' analysis based on best practices to source potential economic outcomes.

Our team recognizes that if we solve the worst causes and impacts of climate change, but fail to find equitable ways to do so, then in the end we would have still failed as a society. The proposed public engagement process will aim to address procedural equity; our team will also provide an analysis of the distributional and structural equity implications of various climate action and adaptation strategies.

We have developed an equity framework to support scenario analysis related to the impacts and opportunities of climate planning on equity outcomes. The framework helps to answer questions about the consequences and benefits of various climate mitigation and adaptation choices in terms of whether the strategy addresses injustice, expands access, creates inclusive processes, builds community ownership, and builds community wealth. Our analysis would use the cost/benefit analysis discussed above to define how the potential impacts and benefits of climate action could be structured to maximize outcomes for low- to moderate-income residents, communities of color, people who speak English as a second language, and people with disabilities, among other vulnerable populations. All proposals would be referenced back the proposed climate action plan with specific recommendations on how they could be integrated. We will also examine how each action increases regeneration, and supports resiliency.

TASK 3: FINAL REPORT

Key Operating Principle

A successful process will produce products that support the ongoing development of municipal capacity.

Approach

The report production will be led by Linnean Solutions with support from BSC and Scouter Design. Our team is proposing a unique and transformational approach to the final "plan." This approach is rooted in our team's extensive experience in developing and implementing climate action plans in and across municipalities and is designed to efficiently and successfully support action. Our approach shifts away from one comprehensive plan to three highly practical core elements: (1) public facing summary reports, (2) near-term implementation oriented roadmaps and (3) appendices (including a stakeholder engagement memo and phase 1 methodologies). These three core written elements will be underpinned by the Implementations Workshops outlined in the fourth wave and task four.

From our experience working with municipalities, we anticipate that the process of drafting and completing the final reports and roadmaps will be deeply collaborative and iterative. We have built this into our process and will have a first and second draft of both the summary reports and implementation reports. The third iteration will be the final version. The first draft will be for internal project team and steering committee review and the second draft will be available for public comment.

3A: Production of Summary Reports

The executive summary report and infographic sheets will be highly digestible, designed, and accessible public-facing overviews of the findings from phase 1 and the strategies for mitigation and adaptation developed through phase 2. Our team will be focused on developing materials that will help the public and local organizations to advocate, engage, and lead on climate action

in their communities alongside supporting the towns in policy, program, and project implementation. The executive summary report will highlight the project vision; goals around social equity, carbon mitigation, resilience, and co-benefits; planning principles that guided the process; and a breakdown of near-term and long-term mitigation and adaptation strategies identified during the process, including long-term strategies for getting from 45% to 80% reduction between 2030 and 2050.

3B: Develop Detailed Implementation Roadmaps

For "catalytic" or near-term actions, which our team defines as actions that will ensure the region meets its goals of 45% reduction by 2030, we will develop a set of detailed implementation roadmaps that will support the implementation of critical actions in the near term. We anticipate selecting approximately 15 actions that the towns can achieve in the coming decade, and outlining steps for implementation, critical background information, precedents from similar communities, analysis of costs and benefits, relevant funding avenues, recommended partnerships, and other recommended steps for building capacity. We anticipate creating several tailored versions of the roadmaps that can meet the needs of both core communities and regional partner communities, recognizing differences in municipal capacity, demographics, and other community characteristics. A portion of the roadmaps may take a regional approach, and additional roadmaps may be developed for partner and community groups. We see this approach as a key way to help communities zero in on a key set of priorities, and overcome persistent barriers in going from planning to implementation. We also see it as a way to both develop a coordinated regional approach while still providing the level of detail necessary to tailor climate strategies to meet the needs of communities with different needs—and therefore ultimately more useful in this context than a traditional climate action and adaptation plan.

3C: Appendices

The team will package report appendices on the stakeholder engagement process and the methodologies for phase I technical assessments for the municipal staff and community members.

TASK 4: MEETINGS AND PRESENTATION OF RESULTS

Key Operating Principle

By empowering members of the steering committee and community to deeply understand their unique role in the implementation of the BACTS regional climate action plan, our approach to presenting the results will be community driven and continue to be focused on building capacity for implementation.

Approach

Our approach to task four will align with the fourth wave of engagement by supporting community ownership over the final plan and supporting community members to take leadership on sharing them with their communities. This approach will be developed in partnership with the steering committee, UMaine students, and other local stakeholders and geared towards building sustained capacity within the region to implement the findings of the process. Led by Linnean Solutions, the consultants will host four engagement touch points falling within the scope of this task. The first touch point will be a consultant-supported presentation on the process, findings, and ways to get involved (third full community forum). The third community forum and process celebration will also be an opportunity to solicit participation from community members in sharing out the findings within their communities. While solicitation to participate in the workshops will be open to all, the team will ensure that at least two representatives from each of the towns attend the "train-the-trainer" workshops and each provide a presentation within their municipality to their community – friends, family, colleagues.

Additionally, we will host three "train-the-

trainer" workshops. One workshop will be geared towards municipal staff across all communities in the BACTS region and will focus on the implementation of the roadmaps. The second "train-the-trainer" workshop will be public-facing and will focus on the local impacts of climate change found in phase 1, the high level vision for local and regional climate action, and the strategies identified through the community-led planning process. The third workshop will align with final (sixth) steering committee meeting (see task 1), and will serve as a workshop for steering committee members to develop their capability to share the process and materials with their respective networks.

TASK 5: CORE COMMUNITIES AND REGIONAL PARTNERS

Key Operating Principle

People, communities, and municipalities are all coming from different starting points with different levels of capacity to engage. Our approach focuses on meeting community needs, building partnerships and capacity, and equitably creating pathways for a carbon neutral and resilient future, regardless of community size, resources, or starting point.

Approach

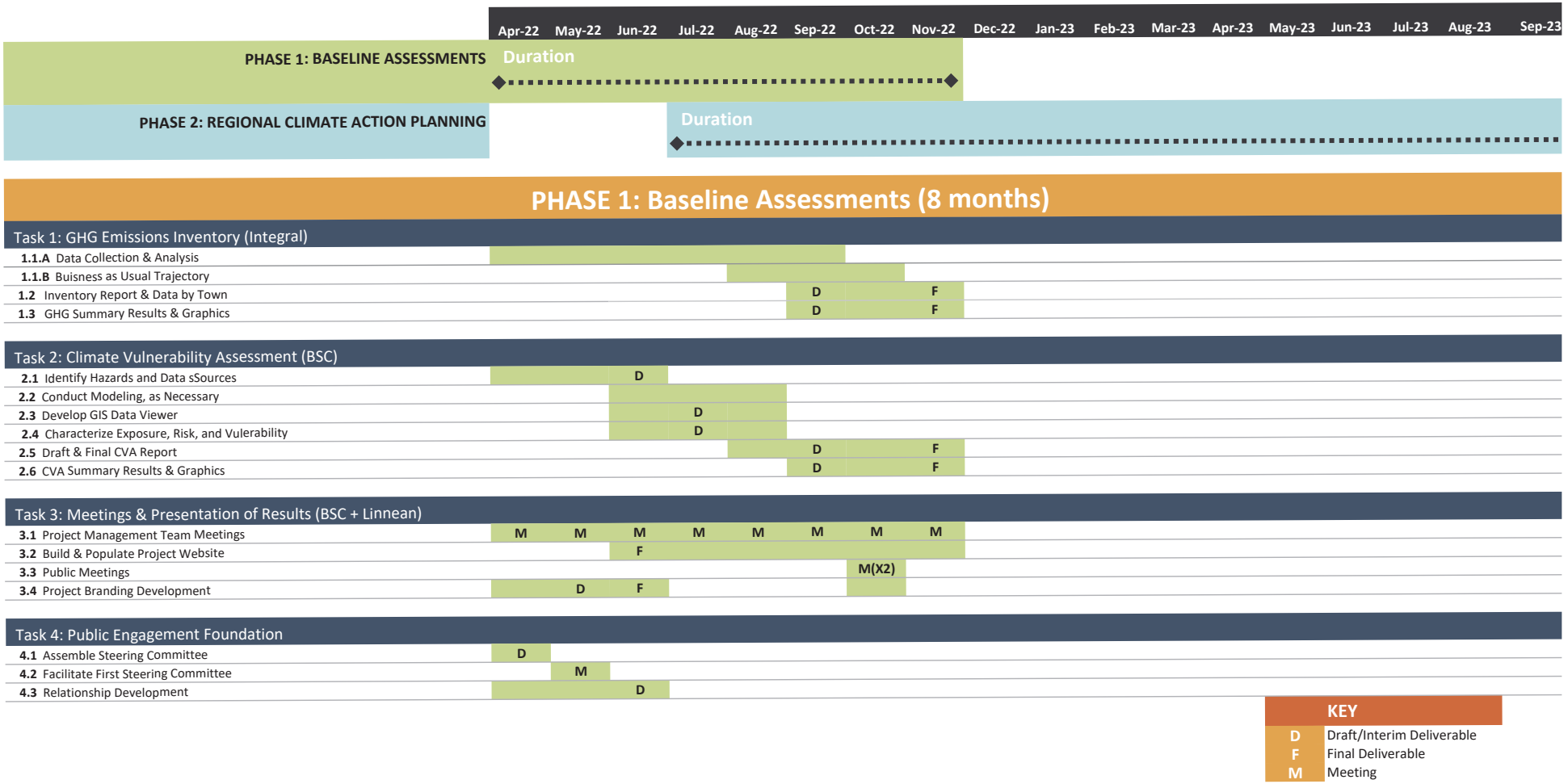
Our team understands that towns in the BACTS region have varying levels of resources and staff capacity, and that this requires a flexible approach for climate planning that tailors participation and actions according to capacity and community needs. We recommend structuring the process based on "core communities," who are able to contribute funding and staff to the process, and "regional partners," who are committed to supporting the region's climate vision through more contained participation and/or involvement in regional approaches. Regional partners will be invited to participate in essential project touchpoints. These touchpoints include participation in Phase 1 activities, specific stakeholder engagement inputs, resources on the project website, community needs surveys, and specific focus groups. The proposed structure for the final "plan"—including an executive summary and infographics with a set of in-depth action roadmaps—is specifically structured to recognize variations in how communities will approach climate action, and to meet needs at various scales.

PUBLIC ENGAGEMENT CHART

ACTIVITY	QUANTITY	TIMEFRAME	PURPOSE
Project Management Team Meetings (Phase I & 2)	18	Ongoing	Coordinate across project team.
Steering Committee Meetings (Phase I & 2)	6	Ongoing	Setting a vision for the process, prioritizing solutions, and providing oversight on project and process.
Focus Groups	10	October 2022 and February 2023	Identify community priorities and exploring climate adaption and mitigation strategies that meet climate goals and provide co-benefits.
Community Forums (Phase I & 2)	5	October 2022, December 2022, April 2023, and July 2023	*Phase I*: Present findings from GHG inventory and vulnerability assessments and begin to create a shared community vision. *Phase II*: Understand community needs and co-create climate actions.
Implementation Workshops	3	August and September 2023	Build community capacity to take ownership and lead various aspects of the plan's implementation.

Schedule

On the following pages, we have provided a schedule outlining project deliverables and relevant milestones.


Apr-22
May-22
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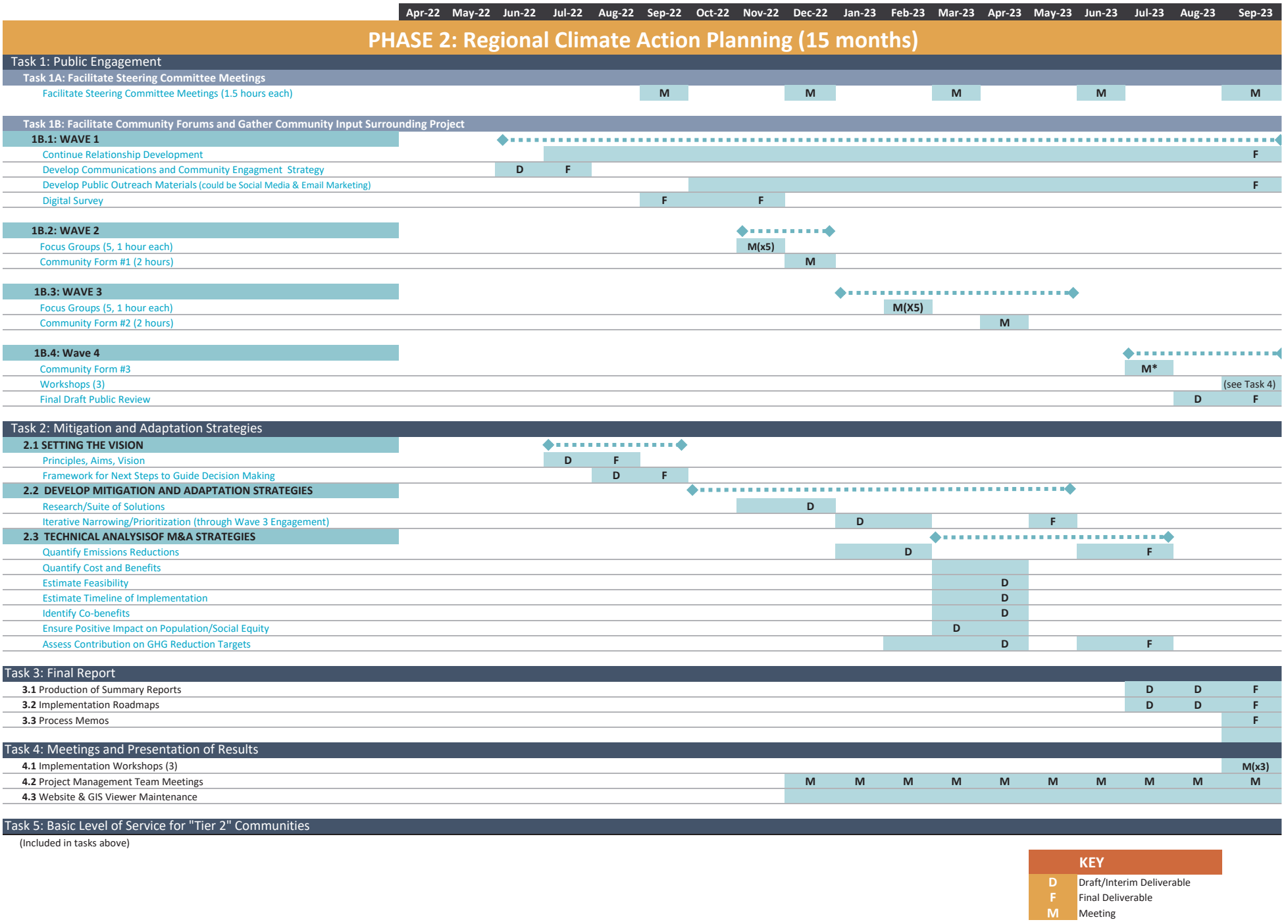
PHASE 1: BASELINE ASSESSMENTS
Duration
PHASE 2: REGIONAL CLIMATE ACTION PLANNING
Duration
PHASE 1: Baseline Assessments (8 months)
Task 1: GHG Emissions Inventory (Integral)
1.1.A Data Collection & Analysis
1.1.B Buisness as Usual Trajectory
1.2 Inventory Report & Data by Town
1.3 GHG Summary Results & Graphics
Task 2: Climate Vulnerability Assessment (BSC)
2.1 Identify Hazards and Data sSources
2.2 Conduct Modeling, as Necessary
2.3 Develop GIS Data Viewer
2.4 Characterize Exposure, Risk, and Vulerability
2.5 Draft & Final CVA Report
2.6 CVA Summary Results & Graphics
Task 3: Meetings & Presentation of Results (BSC + Linnean)
3.1 Project Management Team Meetings
3.2 Build & Populate Project Website
3.3 Public Meetings
3.4 Project Branding Development
Task 4: Public Engagement Foundation
4.1 Assemble Steering Committee
4.2 Facilitate First Steering Committee
4.3 Relationship Development
KEY
D Draft/Interim Deliverable
F Final Deliverable
M Meeting


Apr-22 May-22 Jun-22 Jul-22 Aug-22 Sep-22 Oct-22 Nov-22 Dec-22 Jan-23 Feb-23 Mar-23 Apr-23 May-23 Jun-23 Jul-23 Aug-23 Sep-23
PHASE 2: Regional Climate Action Planning (15 months)
Task 1: Public Engagement
Task 1A: Facilitate Steering Committee Meetings
Facilitate Steering Committee Meetings (1.5 hours each)
Task 1B: Facilitate Community Forums and Gather Community Input Surrounding Project
1B.1: WAVE 1
Continue Relationship Development
Develop Communications and Community Engagment Strategy
Develop Public Outreach Materials (could be Social Media & Email Marketing)
Digital Survey
1B.2: WAVE 2
Focus Groups (5, 1 hour each)
Community Form #1 (2 hours)
1B.3: WAVE 3
Focus Groups (5, 1 hour each)
Community Form #2 (2 hours)
1B.4: Wave 4
Community Form #3
Workshops (3)
Final Draft Public Review
Task 2: Mitigation and Adaptation Strategies
2.1 SETTING THE VISION
Principles, Aims, Vision
Framework for Next Steps to Guide Decision Making
2.2 DEVELOP MITIGATION AND ADAPTATION STRATEGIES
Research/Suite of Solutions
Iterative Narrowing/Prioritization (through Wave 3 Engagement)
2.3 TECHNICAL ANALYSISOF M&A STRATEGIES
Quantify Emissions Reductions
Quantify Cost and Benefits
Estimate Feasibility
Estimate Timeline of Implementation
Identify Co-benefits
Ensure Positive Impact on Population/Social Equity
Assess Contribution on GHG Reduction Targets
Task 3: Final Report
3.1 Production of Summary Reports
3.2 Implementation Roadmaps
3.3 Process Memos
Task 4: Meetings and Presentation of Results
4.1 Implementation Workshops (3)
4.2 Project Management Team Meetings
4.3 Website & GIS Viewer Maintenance
Task 5: Basic Level of Service for "Tier 2" Communities
(Included in tasks above)
KEY
D Draft/Interim Deliverable
F Final Deliverable
M Meeting

Task 1: GHG Emissions Inventory (Integral)	
1.1.A Data Collection & Analysis	
1.1.B Buisness as Usual Trajectory	
1.2 Inventory Report & Data by Town	Draft & Final GHG Inventory Report
1.3 GHG Summary Results & Graphics	Draft & Final Summary Results and Graphics
Task 2: Climate Vulnerability Assessment (BSC)	
2.1 Identify Hazards and Data sSources	CAAP Objectives, List of Climate Hazards/Data Sources, Sea Level Rise Scenario
2.2 Conduct Modeling, as Necessary	
2.3 Develop GIS Data Viewer	GIS Data Viewer Published; Updates Ongoing
2.4 Characterize Exposure, Risk, and Vulerability	Risk Index Methodology
2.5 Draft & Final CVA Report	Draft & Final CVA Report
2.6 CVA Summary Results & Graphics	Draft & Final Summary Results and Graphics
Task 3: Meetings & Presentation of Results (BSC + Linnean)	
3.1 Project Management Team Meetings	Agendas, Meeting Materials, and Meeting Faciliation
3.2 Build & Populate Project Website	Project website published; Updates Ongoing
3.3 Public Meetings	Present Baseline Assessment & Conduct CAP visioning
3.4 Project Branding Development	Draft and Final Project Branding
Task 4: Public Engagement Foundation	
4.1 Assemble Steering Committee	
4.2 Facilitate First Steering Committee	Agenda, Meeting Materials, Meeting Faciliation, and Report Outs
4.3 Relationship Development	Partner Development and Identifying Highly Motivated Individuals
PHASE 2: Regional Climate Action Planning	
Task 1: Public Engagement	
Task 1A: Facilitate Steering Committee Meetings	
Facilitate Steering Committee Meetings (1.5 hours each)	Agendas, Meeting Materials, Meeting Faciliation, and Report Outs
Task 1B: Facilitate Community Forums and Gather Community Input Surrounding Project	
1B.1: WAVE 1	
Continue Relationship Development	Quantiative Data for Community Engagement Memo (see task 3)
Develop Communications and Community Engagment Strategy	Draft & Final Engagement Strategy
Develop Public Outreach Materials (could be Social Media & Email Marketing)	Outreach Materials (ongoing)
Digital Survey	Digital Survey Questions and Data/Findings
1B.2: WAVE 2	
Focus Groups (5, 1 hour each)	Meeting Agenda and Findings Report Outs
Community Form #1 (2 hours)	Public Materials for Engagement, Post Event Memo (internal)
1B.3: WAVE 3	
Focus Groups (5, 1 hour each)	Meeting Agenda and Findings Report Outs
Community Form #2 (2 hours)	Public Materials for Engagement, Post Event Memo (internal)
1B.4: Wave 4	
Community Form #3	Meeting Materials, Second Draft of Task 3 Deliverables for Community Review.
	Comment Period. Meeting will Kick Off the One Month Public
Workshops (3)	
Final Draft Public Review	Website Content Orienting Public on How to Give feedback (e.g., digital survey)
Task 2: Mitigation and Adaptation Strategies	
2.1 SETTING THE VISION	
Principles, Aims, Vision	Agendas, Meeting Materials, Meeting Faciliation, and Report Outs
Framework for Next Steps to Guide Decision Making	Draft and Final Framework/Criteria
2.2 DEVELOP MITIGATION AND ADAPTATION STRATEGIES	
Research/Suite of Solutions	Options Toolkit (Suite of Potential Solutions based on Phase I and Community Engagment)
Iterative Narrowing/Prioritization (through Wave 3 Engagement)	Draft and Final Adapation and Mitigation Strategies for BACTS Region
2.3 TECHNICAL ANALYSISOF M&A STRATEGIES	
Quantify Emissions Reductions	Findings from Technical Analysis
Quantify Cost and Benefits	
Estimate Feasibility	
Estimate Timeline of Implementation	
Identify Co-benefits	
Ensure Positive Impact on Population/Social Equity	
Assess Contribution on GHG Reduction Targets	
Task 3: Final Report	
3.1 Production of Summary Reports	First Draft (for internal review, not formatted), Second Draft (for public comment, formatted); Final Plan
3.2 Implementation Roadmaps	First Draft (for internal review, not formatted), Second Draft (for public comment, formatted); Final Roadmaps
3.3 Process Memos	Process Memos for Commuity Engagement (Task 1) community engagment
Task 4: Meetings and Presentation of Results	
4.1 Implementation Workshops (3)	Train the Trainer Content for Municipal Staff and Broader Public
4.2 Project Management Team Meetings	Agendas, Meeting Materials, and Meeting Faciliation
4.3 Website & GIS Viewer Maintenance	Ongoing, as needed
Task 5: Basic Level of Service for "Tier 2" Communities	
(Included in tasks above)	

Ability to Control Schedule and Cost

The BSC team recognizes the importance and value of project controls as a key element for successful project delivery. For the BACTS Region Vulnerability Assessment and Climate Action and Adaptation Plan, we intend to pay special attention to the following four areas:

1. Project Time Management
2. Project Cost Management
3. Project Quality Management
4. Project Communications Management

> For project deliverables requiring a high-level of collaboration among the project team, we propose using pull plans to streamline expertise and maximize efficiency.

PROJECT TIME MANAGEMENT

The BSC team has developed a comprehensive baseline schedule grouped by phases, tasks, and subtasks for the scope of this project identifying dependencies and responsible parties. The schedule will serve as a key management tool to assure stakeholders are abreast of their responsibilities. At the outset of each phase, we will confirm the project schedule with the project management team and incorporate any necessary changes into a final schedule. We will assess the schedule monthly against the baseline so we can quickly identify slippages and take remedial actions as necessary.

For certain project deliverables that require a high-level of collaboration among the project team, such as development of the climate adaptation and mitigation strategies, we will propose utilizing pull plans. This practice begins with all key stakeholders collectively identifying the end goal and working backwards milestone by milestone toward the start date. This method meshes together everyone's expertise to identify problems and cut down on time spent. Once the pull plan is complete, we will assess percent complete regularly to help involved team members better manage the task and keep all informed of progress.

PROJECT COST MANAGEMENT

The BSC team has developed a detailed budget grouped by phases, tasks, and subtasks for the scope of this project. Expenditures and forecasts against the various budget levels will be tracked on a monthly basis. We also plan to compare schedule and cost percent completed to assure we have enough budget to complete the scope. Part of cost management is to assure we identify and not proceed with out-of-scope work until authorized in writing by BACTS.

PROJECT QUALITY MANAGEMENT

The BSC team's QA/QC plan assures all our deliverables are presented in the highest of standards. All team members will adhere to this plan which includes:

- Development and use of project-specific branding (logo, color palette, type, icons) for all project reports to ensure unified and visually appealing deliverables;
- Internal review of materials for consistency with other project tasks, adherence to deliverable requirements, and proofreading;
- Provision of outline-level, draft, and final project reports to the project management team for review; and
- Inclusion of review periods in final project schedule.

At the outset of the project, we will solicit and document input from the project management team (and steering committee in Phase 2) regarding key goals, conditions that must be met to consider the project a success, and any additional quality management requirements. These will be used by the project team as a basis to measure and focus performance and quality.

The BSC Team's QA/QC Plan

- Development and use of project-specific branding (logo, color palette, type, icons) for all project reports to ensure unified and visually appealing deliverables;
- Internal review of materials for consistency with other project tasks, adherence to deliverable requirements, and proofreading;
- Provision of outline-level, draft, and final project reports to the project management team for review; and
- Inclusion of review periods in final project schedule.

PROJECT COMMUNICATIONS MANAGEMENT

The BSC team will utilize multiple, complementary tools to support effective project communications among the project team and with the project management team:

- Monthly project meetings will form the basis of interaction between the BSC team and project management team. These meetings will be used to solicit input on upcoming tasks/subtasks, discuss feedback on deliverables provided for review, and discuss any identified project issues. Agendas will be provided to the project management team in advance. Additional communication plans for the Steering Committee in Phase 2 are discussed under the Project Understanding section.
- A written status report will be provided to the project management team monthly. This succinct update will include relevant updates or concerns related to schedule, progress, and budget and will serve to keep stakeholders informed without utilizing valuable meeting time. However, any issues requiring project management team discussion or decisions will be added to a monthly project management team agenda.

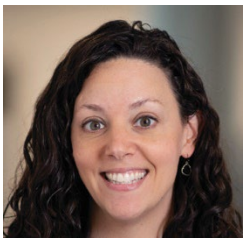
- The project team will utilize a project management system to promote collaboration, document decisions, and serve as a repository of important documents.
- A project website is proposed to support information sharing and virtual engagement with a broader stakeholder base including the steering committee, municipal representatives from across the BACTS region, and the public at large. More detail on the website is provided in the Project Understanding section.
- BSC uses the Zoom videoconferencing platform for virtual meetings. Zoom supports multiple formats including meetings, webinars, and breakout rooms and features include participant polling, mobile participation, and meeting recording. This tool allows for flexibility to meet the needs of various virtual participation types, sizes, and stakeholder groups.
- Although we anticipate a collaborative approach with project team members engaging with BACTS and the project team, BSC has assigned a project manager to serve as a primary point of contact for BACTS and the project team to address questions or other issues that arise throughout the course of the project. If needed, issues can be escalated to the BSC's principal in charge. Each subconsultant has similarly identified a team lead and principal in charge with whom the BSC project manager can coordinate [see project team organization chart in Qualifications section].

Throughout the duration of the project, the BSC team will utilize multiple, complementary tools to support effective project communications among the project team and with the project management team.

Appendix A

RESUMES

BSC GROUP



Katie
Kemen, MBA
Director of Climate Resilience Services

YEARS OF EXPERIENCE
12

EDUCATION
Master of Business Administration
Simmons University

B.Sc. Public Health
The George Washington University

Project-level GHG Accounting
The Greenhouse Gas Management Institute

AFFILIATIONS
Environmental Business Council-New England, Climate Change and Air Committee

MEET KATIE
Katie is the Director of Climate Resilience Services and brings experience in the field of emergency management and business continuity with a focus on resilient public health and healthcare systems. Much of her work has focused on regional or systems-level projects to understand risk and vulnerabilities and develop mitigation and response plans to address future risk. She is skilled at engaging diverse stakeholder groups across professional disciplines, levels of government, and from the community through analysis, planning, and implementation.

PROJECT EXPERIENCE HIGHLIGHTS

MVP Apple Country Natural Climate Solutions Project: Bolton, Devens, Harvard, MA
Climate Adaptation & Resilience Specialist

Involved In multi-consultant regional project to holistically assess natural resource assets and vulnerabilities and develop prioritized Nature-based Solutions to address community climate resilience and ecological carbon storage. Natural resources assessed included soils, forests, wetlands, agricultural lands, and turf/ornamental lands. Project included extensive community education and outreach, including core team, stakeholder and community-wide meetings, site walks, website with interactive data viewer mapping, ESRI StoryMaps, focused wetlands and climate change materials, and a COVID19-safe self-guided tour of natural resources throughout project area. The project and report identify site-specific NbS as well as management and regulatory strategies to improve infrastructure, social and environmental community climate resilience.

WITH A BACKGROUND IN PUBLIC HEALTH AND HEALTHCARE, KATIE CONNECTS THE DOTS BETWEEN BUSINESS OPERATIONS AND THEIR IMPACT ON HUMAN HEALTH AND WELL-BEING.

MBTA Climate Change Vulnerability Assessment, MBTA Service Region, MA
Senior Climate Adaptation Planner

Responsible for the development of a Vulnerability Assessment relative to MBTA power, signals, and communication assets within its metro-Boston service region. The project involved a robust data collection and organization effort, the development of a GIS asset mapping database, a first-order prioritization index for identified assets, and an initial vulnerability asset screening report. Katie helped develop the methodology for assessing vulnerability of MBTA's power, signal, and communications assets.

Cape Cod Canal Roadway Improvement Project, MassDOT, Bourne, MA
Climate Adaptation & Resilience Specialist

Conducted climate data analysis for the proposed Bourne and Sagamore Bridge replacement project. Early project climate assessments include the preparation of technical memorandum to support early project decision-making relative to the effects of sea level rise on proposed project design.

Municipal Vulnerability Preparedness (MVP) Planning, Stockbridge, MA
Project Manager

Responsible for leading the MVP designation planning process for the Town of Stockbridge. BSC Group is preparing a Massachusetts Vulnerability Preparedness Summary of Findings Report as well as an expanded scope project focused on resilient housing solutions for the Town's senior residents. Katie will lead the team that is facilitating the planning, community education, and engagement efforts, including two working sessions and a community workshop identifying local vulnerabilities. The team will prepare a Summary of Findings Report, identifying Town risks and priorities as well as a Resilient Housing Initiative Assessment and Recommendations Report that will provide community-driven actionable steps toward resilience. The project is made possible through grant funding; BSC Group assisted the Town with the application process.

Substation Flood Resilience, National Grid, MA
Resilience Task Manager

Led project staff in conducting a detailed site survey, flood modeling and flood pathway analysis. Working with engineers and permitting specialists to develop a range of flood mitigation options to meet client and regulatory requirements for critical infrastructure flood resilience.

MA Local Rapid Recovery Plans, MA Department of Housing and Community Development
Senior Planner

Served as a senior planner, supporting more than 10 municipalities develop local rapid recovery plans focused on revitalization efforts, responding to the effects of COVID-19 on local businesses, and prioritizing actions and strategies. Conducted COVID-19 impact analysis, community outreach and engage, and facilitated the development of actionable, project-based recovery plans tailored to the unique economic challenges and COVID-19 related impacts to downtowns, town centers, and commercial corridors for numerous communities.

Lower Mystic Regional Climate Assessment, Resilient Mystic Collaborative, Somerville, MA
Climate Adaptation & Resilience Specialist

As part of the infrastructure assessment, Katie designed, facilitated, and evaluated a virtual tabletop exercise that examined the cascading effects among critical infrastructure failures. The Resilient Mystic Collaborative includes 7 municipalities and 15 critical infrastructure agencies ranging from energy, transportation, food distribution and healthcare working together to solve for climate resilience at a district-level – focusing on both the resilience of the underpinning infrastructure, and the impact of infrastructure failures on the resilience of vulnerable populations in the area.

KATIE BRINGS EXTENSIVE KNOWLEDGE OF CRITICAL INFRASTRUCTURE CAPABILITIES AND CONSTRAINTS FROM HER WORK IN THE MASSACHUSETTS STATEWIDE EMERGENCY OPERATIONS CENTER DURING NUMEROUS LARGE-SCALE DISASTERS.

PRIOR TO JOINING BSC GROUP, KATIE WAS INVOLVED WITH THE FOLLOWING PROJECTS:

Strategic Resilience Initiative, Mass General Brigham, Boston, MA
Project Manager

Responsible for co-managing the project focusing on the predicted impacts to healthcare operations and ways to merge facility improvements with emergency plans to create a more resilient healthcare system. She led the vulnerability assessment work across all 30 properties engaging executive leadership, facility managers, clinicians, researchers, and emergency managers to obtain a comprehensive understanding of vulnerabilities given near and mid-term climate predictions. Mass General Brigham sought to understand the climate vulnerabilities across 30 critical properties including hospitals, outpatient centers, and biomedical research facilities. The project included modeling climate impacts at the 2030- and 2070-time horizons, conducting a facility and operational vulnerability assessment given climate predictions, developing, and prioritizing a set of capital improvements to increase resilience.

BSC GROUP

John
Audi, Ph.D., CCM
Senior Sustainability Advisor

YEARS OF EXPERIENCE
Over 25

EDUCATION
PhD, Civil Engineering, NYU Poly

MS, Civil Engineering, Northeastern University

BS, Civil Engineering, Northeastern University

CERTIFICATIONS
- Certified Construction Manager

AFFILIATIONS
- American Society of Civil Engineers (ASCE)
- Boston Society of Civil Engineers (BSCE)
- Construction Management Association of America (CMAA)
- Women's Transportation Seminar (WTS)
- Project Management Institute (PMI)

MEET JOHN
John is an experienced executive leader dedicated to implementing and integrating strategic planning visions through financing techniques, real estate initiatives, and capital projects. A large focus of his work has been leading organization-wide greenhouse gas reduction initiatives, including formulating comprehensive strategies, developing guidelines and tools for tracking, analyzing and monitoring progress. Prior to joining BSC, John oversaw Massport's Greenhouse Gas Reduction efforts. He also co-chaired Harvard University's Greenhouse Gas reduction strategy team.

PROJECT EXPERIENCE HIGHLIGHTS

Greenhouse Gas Reduction, MassPort, Boston, MA
Assistant Director

Oversaw Massport's GHG Reduction effort. In charge of formulating a comprehensive strategy, and developing guidelines and tools for tracking, analyzing and monitoring progress. Revamped the Capital Planning process to capture projected MTCDE impacts to assist with projecting goals and tracking progress. Coordinated ASHRAE level II and III audits. Oversaw the development of Massport's Energy Modeling Guidelines and implemented an internal process to assure these models are constantly being updated.

Greenhouse Gas Reduction Initiatives, Harvard University, Cambridge, MA
Chair and Co-Chair

Co-chaired Harvard's Greenhouse Gas reduction strategy team and chaired Harvard's energy supply group subcommittee. Coordinated with all schools and units to capture their carbon footprint, identify ECM projects by conducting ASHRAE level III audits to help them understand the impact of projected MTCDE amounts from their capital projects. Developed LCCA tracking tools and guidelines to prioritize projects based on certain KPIs. Oversaw the publishing of monthly dashboards highlighting and ranking GHG reduction progress by school. Promoted and implemented renewable energy solutions including photovoltaic, geothermal, heat extraction, among others. Developed a multi-year plan with HU Engineering & Utility to replace the aged boilers in the Central Heating Plant to allow for Co-generation.

John Audi, Ph.D., CCM

Publications

Authored “Technology and Project Delivery Methods: Facts and Myths”, Advisor, spring 2017.

Authored “Managing Boston’s $482 Million Terminal A Redevelopment Project”, The Punch List, August 2002.

Co-Authored, “Innovative Project Management Techniques on Central Artery (CA/T) Design Contract”, Project Management Institute Annual Seminar, Chicago, Illinois, October 1997.

Co-Authored, “Construction Delay Analysis System Computer Program”, ASCE Proceedings Construct/on Congress ‘95, San Diego, California, October 1995.

Co-Authored, “Construction Delay Communication Computer Program’, Project Management Institute Annual Seminar, New Orleans, Louisiana, October 1995.

Co-Authored, “Construction Delay Analysis System’, Transactions of the International Association of Cost Engineers Annual Conference, St. Louis, Missouri, June 1995.

Presentations

Technology and Project Delivery Methods: Facts and Myths from an Owner Perspective, CMAA National Conference, San Diego, October 2016

State of the Art Tools for Managing CM @ Risk Projects at MassPort, CMAA Emerging Technology Conference, Long Beach, May 2015

The Owner’s Perspective: Why Harvard’s Multi-Billion-Dollar Allston Initiative Program is Requiring Primavera, Vela Systems and Tablet PCs, Primavera User Conference, Las Vegas, November 2008

PMBOK Principles on a $500 Million Terminal Project, Primavera User Conference New Orleans, October 2004

Managing Boston’s $482 Million Terminal ‘A’ Redevelopment Project - Boston Society of Civil Engineers (BSCES) Presentation, and Massachusetts Building Congress November 18-20, 2003

Claims Management with Expedition and P3 on the $482 Million Terminal ‘A’ Redevelopment Project, Primavera User Conference, Orlando October 2003

Terminal A Project - Primavera User Conference, San Diego October 2002 Manchester Airport

Improvement Program, Primavera User Conference, Orlando, November 2000

BSC GROUP

Jeffrey T.
Malloy, PhD, CFM

Senior Climate Adaptation Planner
Climate Adaptation Services Lead

YEARS OF EXPERIENCE

18

EDUCATION

PhD, University of New Hampshire

MPA, University of New Hampshire

BS, Water and Soil Science, University of Rhode Island

CERTIFICATIONS

- Certified Floodplain Manager (CFM)
- Certified Soil Scientist, Soil Science Society of Southern New England
- Certified Provider, Municipal Vulnerability Preparedness (MVP) Program
- Electrical Safety Training
- OSHA 10-hour Construction Certificate

AFFILIATIONS

- Association of State Floodplain Managers
- APTA, Sustainability Committee
- Boston Chamber of Commerce, Climate Leadership Committee
- Environmental Business Council, New England, Diversity, Equity, and Inclusion Committee

MEET JEFF

Jeff supports clients' efforts to incorporate climate resilient solutions into project planning and design. His specialized expertise in environmental science, planning, and policy brings unique perspective to complex environmental issues. Jeff facilitates consensus building and conflict resolution to achieve collaborative project outcomes within community engagement settings. His academic expertise in climate change governance and adaptation, public policy, and social justice contributes to well rounded, implementable approaches to climate adaptation planning.

PROJECT EXPERIENCE HIGHLIGHTS

Municipal Vulnerability Preparedness (MVP) Support, Municipal Clients, MA

Project Manager/Climate Adaptation Planner, Certified MVP Provider

Guided 10 communities through the MVP designation process using the Community Resilience Building (CRB) framework. BSC's custom approach to this process led to a stakeholder-driven vulnerability assessment that includes a decision-making framework to enhance the municipality's opportunity for future grant funding. Communities include: Amesbury, Athol, Beverly, Burlington, Clinton, Everett, Hudson, New Marlborough, Sheffield, and Stockbridge.

JEFF'S FOCUS ON BUILDING BSC'S CLIMATE ADAPTATION PRACTICE HAS LED THE FIRM TO ADOPT INTERDISCIPLINARY APPROACHES TO CLIMATE RESILIENT PLANNING AND DESIGN INCLUDING NATURE-BASED SOLUTIONS, PUBLIC HEALTH, AND SOCIAL JUSTICE

Greening Lord Pond Plaza, Athol, MA

Project Manager/Climate Adaptation Planner

Successfully coordinated efforts to achieve downtown revitalization goals and become more resilient to climate change. Worked with the community to secure MVP Action Grant funding for the development of a feasibility study to identify climate resilient solutions. Solutions address urban heat island effect and inland flooding and diminish social, environmental, and infrastructure vulnerabilities. Under a subsequent MVP Action Grant award, Jeff continues to work with the community through project implementation, which involves site design and enginnering, project permitting, and ongoing community engagement initiatives through 2023.

Rural Dirt Road Vulnerability Assessment Sheffield, New Marlborough, and Sandisfield, MA
Project Manager/Senior Climate Adaptation Planner

This project resulted in the development of a novel assessment methodology—transferable to other locations that face similar challenges—related to the adverse impacts of climate change on rural dirt roads. The vulnerability and recommendations report involved robust public outreach and field data collection to identify sources of impacts to rural dirt roads in Western MA and led to a prioritized list of vulnerable dirt roads in the three case study communities.

Vine Brook Watershed Inland Flood and Urban Heat Island Assessment, Burlington, MA
Project Manager/Senior Climate Adaptation Planner

Conducted a vulnerability assessment within a highly developed watershed in the Burlington Mall business and transportation corridor. This assessment identified and developed a novel prioritization system for opportunities to implement nature-based solutions to address anticipated impacts due to climate change. This project included a robust community engagement approach that involved a stakeholder assessment and photovoice initiative.

Urban Heat Island Vulnerability Assessment and Mitigation Plan, Everett, MA
Senior Climate Adaptation Planner

Technical assessment to identify significant sources of urban heat island effect, funded through the MVP program, used a combination of community engagement and GIS technology to identify areas of vulnerability throughout the city and to prioritize locations for shade tree plantings. The project focused on educational opportunities and collaborative design planning and solutions including events held at a community-wide Spring Cleanup Day, a presentation at the Council on Aging, and a "Living with Heat" charette.

Community Plan for Social Resilience, Athol, MA
Project Manager/Senior Climate Adaptation Planner

To address Athol's need to recognize the effects of climate change on socially vulnerable groups, developed a planning framework in conjunction with MVP program efforts. The planning report, *Athol Helping Athol, Community Plan for Social Resilience: AHA 2020,* drew upon the considerations of socially vulnerable groups in the community, notably elderly residents, teens, and transition-age youth. The report's framework was rooted academic research supported by community-driven decision-making.

Climate Change Vulnerability Assessment, MBTA Metro-Boston Service Region, MA
Senior Climate Adaptation Planner

Developed a climate change vulnerability assessment for MBTA power, signals, and communication assets to support their need to prioritize asset infrastructure for repair and/or replacement. Employed a robust data collection and organization effort; developed a GIS asset mapping database, a first-order prioritization index for identified assets, and an initial vulnerability asset screening report so that the MBTA could identify needs for future vulnerability assessments and funding priorities.

Massachusetts Climate Change Data Clearinghouse, ResilientMA.org, Boston, MA
Senior Climate Adaptation Planner

Provided technical guidance for the development of a statewide climate data clearinghouse website to support Massachusetts' climate resilience goals. Worked closely with Geonetics (BSC's sister firm) technology designers to produce a climate data resource that meets the needs of a growing base of climate data planning and implementation practitioners.

Vulnerability Assessment and Coastal Resiliency Plan, Beverly, MA
Senior Resiliency Planner

Developed coastal resilience themes and modeled storm surge scenarios to Beverly's coastline to address current and future risks related to sea level rise and climate impacts. This assessment and coastal resilience plan, funded under the Massachusetts Coastal Zone Management Coastal Resilience Program, involved technical modeling paired with robust community outreach to identify environmental, cultural, infrastructure, and economic vulnerabilities and strengths in the community.

East Boston Greenway Deployable Floodwall, Climate Ready Boston, East Boston, MA
Senior Climate Adaptation Planner

As part of the Boston's *Climate Ready Boston* efforts, this first implementation project required vulnerability assessment, resilience planning, and technical engineering review and design for a deployable flood wall along East Boston's Greenway. This coastal flood resilience solution provides protection for 4,300 residents, 70 businesses, and critical MassDOT and MBTA infrastructure.

BSC GROUP

Gillian

Davies, PWS, SSSSNE, NHCWS, CESSWI

Senior Ecologist/Natural Climate Solutions Specialist
Project Manager, Senior Associate

YEARS OF EXPERIENCE

30

EDUCATION

MES, Ecosystem Ecology
Yale University School of the Environment

BA, Psychology
Williams College

Certificate of Completion in the New England Regional Soil Science Certificate Program
University of Massachusetts

AFFILIATIONS

Global Development and Environment Institute, Tufts University, Visiting Scholar (2018-present)

Society of Wetland Scientists - Chair WOTUS ad hoc Committee, Co-Lead Climate Change & Wetlands Initiative; 2016-2017 President, Past President, President Elect

MEET GILLIAN

Gillian provides expertise and innovative solutions encompassing peer-review for Conservation Commissions, ecosystem-based climate change resiliency and mitigation assessment and planning, state and federal permitting, wetland delineation, impact analysis, wetland restoration/mitigation planning, design and monitoring, expert witness testimony, and environmental construction/post-construction inspection.

A well-respected leader in the field of wetland sciences, Gillian holds many prestigious titles at industry organizations dedicated to promoting the understanding, conservation, protection, restoration, science-based management, and sustainability of wetlands. She currently serves as the President of the Society of Wetland Scientists (SWS) Professional Certification Program, as well as Chair of the SWS WOTUS *ad hoc* Committee and Co-Lead of the SWS Climate Change and Wetlands Initiative. She is also a Visiting Scholar at the Tufts University Global Development and Environment Institute. In the past she has held such titles as SWS President, President of the SWS New England Chapter, and President of the Association of Massachusetts Wetlands Scientists.

Gillian has worked extensively with Massachusetts Conservation Commissions as a peer-reviewer and previously as an education/outreach specialist for the MassDEP and has provided numerous workshops and presentations to Conservation Commissions and other members of the wetlands professional community in Massachusetts, and internationally.

AFFILIATIONS (CONT.)

Society of Wetland Scientists Professional Certification Program, 2021-2022 President; President Elect

Society of Wetland Scientists New England Chapter; 2014-2015 President, Vice President

INTECOL (International Association for Ecology) Wetlands Working Group, Member (2021-present)

Association of Massachusetts Wetlands Scientists; 2002-2003 President, Vice President

REGISTRATIONS

Registered Soil Scientist, Society of Soil Scientists of Southern New England

CERTIFICATIONS

Professional Wetland Scientist, Society of Wetland Scientists #2181 (2011)

Certified Wetland Scientist – NH #071 (1999)

Certified Erosion, Sediment, and Storm Water Inspector, Envirocert International, Inc.

Certified Municipal Vulnerabilities Preparedness Provider – MA

GOVERNMENT SERVICE

MA Executive Office of Energy and Environmental Affairs & Commission for Conservation of Soil, Water & Related Resources Healthy Soils Action Plan Work Group (2019–2020)

GOVERNMENT SERVICE (CONT.)

MA Department of Transportation Wetland Mitigation Banking Group (2018)

MA Executive Office of Energy and Environmental Affairs Natural Resources and Habitat Subcommittee to the Climate Change Adaptation Advisory Committee (2009)

MA DEP Wetlands & Waterways Circuit Rider (1999-2003)

OTHER VOLUNTEER

National Academy of Sciences, Engineering, and Medicine Transportation Research Board Panelist (2018–present)

Apple Country Natural Climate Solutions Project: Bolton, Harvard and Devens Regional Enterprise Zone

Project Manager & Senior Ecologist

Coordinated team of consultants and 3 communities to identify Nature-based Solutions to climate change and biodiversity loss. Project identified opportunities for wetlands, floodplains, forests and other ecosystems to support broader resilience planning efforts, and expanded communities' capacity to protect, restore and enhance carbon sequestration and other ecosystem services by providing a model for community-driven assessment of NbS; providing recommendations to improve regulations; and developing and providing educational materials and opportunities.

Municipal Vulnerability Preparedness Planning Projects: Amesbury, Bolton, Georgetown, MA

Project Manager & Senior Ecologist

Responsible for projects in each municipality to work with municipal staff, stakeholders and community members to identify existing climate vulnerabilities and community strengths, future opportunities for building community climate resilience, and prioritization of those opportunities. This work provides the community with the basis for specific, action-oriented projects to improve infrastructure, social and environmental community climate resilience, and prioritization of actions. The Georgetown MVP Planning Project included integration of the Georgetown Hazard Mitigation Plan Update.

Natural Resource Infrastructure Assessment Projects: Amesbury and Georgetown, MA

Project Manager & Senior Ecologist

These projects support the Municipal Vulnerabilities Preparedness Planning Projects by assessing opportunities for increasing community climate resiliency through protection, restoration, or creation of natural resource assets within the city. Using web-based ecological climate resiliency mapping tools, BSC provides ecological climate resiliency mapping of town natural resources, and then conducts site-specific assessment of nature-based solution opportunities. This detailed assessment is used in Municipal Vulnerability Preparedness community meetings for community members to understand and prioritize nature-based solutions for climate resiliency, and in support of future nature-based solution grant applications.

MVP Climate-Resilient Open Space and Recreation Plan Update Project: Amesbury, MA

Senior Project Advisor & Senior Ecologist

This project integrates climate resiliency into Amesbury's Open Space and Recreation Plan Update. By integrating climate resiliency information and nature-based solutions into the OSRP Update, the City of Amesbury improves ecological, community and infrastructural climate resiliency.

Mystic River Watershed Association Climate-Resilient Riverbank and Ecological Restoration Planning Project, Medford, Somerville and Arlington, MA

Project Manager & Senior Ecologist

Responsible for project to identify large and small-scale upland, wetland, riverbank and in-stream climate-resilient restoration opportunities along a four-mile segment of the Mystic River. Managed climate resiliency and ecological restoration planning team. Project documents provide watershed-scale mapping that identifies existing ecologically resilient landscape features, and, within the four-mile project focus area, identify potential "game-changer" process-based ecological restoration projects, as well as smaller-scale riverbank and/or habitat restoration projects, and factors impacting implementation of potential projects. Project funded through MyRWA's National Fish and Wildlife Foundation (NFWF) grant.

Massachusetts Association of Conservation Commissions Wetland Buffer Zone Guidebook Project, Belmont, MA

Project Manager & Lead Author

Responsible for project to research and write comprehensive guidebook on the science and regulation of wetland resource area buffer zones and Riverfront Areas under the Massachusetts Wetlands Protection Act and local bylaws and ordinances. Preparation of a guidebook provides a discussion of wetland, buffer zone and Riverfront Area regulation in the context of climate change, outlining how buffer zones contribute to protection of carbon in wetlands, support climate adaptation and climate resiliency ecosystem services that wetlands provide, and protect wetlands from the impacts of climate change.

Open Space and Land Trust Alliance Resilient Landscapes Initiative, Northern New England

Project Manager & Circuit Rider

Provided climate resiliency technical outreach for northern New England land trusts. Outreach efforts provided climate science expertise to guide land trusts as they worked to incorporate climate resiliency into their strategic conservation plans, using recently developed terrestrial and aquatic ecological climate resiliency GIS software and mapping. Technical outreach on ecosystem carbon cycle/carbon conservation and storage was also provided. Webinar shared climate resiliency planning process with other interested land trusts.

BSC GROUP

George
Andrews, GISP

Senior GIS Analyst
Associate

YEARS OF EXPERIENCE

7

EDUCATION

BS, Geography

BA, Communications, Worcester State University

CERTIFICATIONS

- Certified GIS Professional (GISP)
- NOAA Coastal Inundation Mapping
- OSHA 10-Hour Construction
- FAA Certified Remote Pilot
- MVP Certified

MEET GEORGE

George supports projects with geospatial analyses, digital mapping, modeling, database development, and data digitization. He collaborates with clients to bring new technology solutions which support their goals for continuous improvement to processes and operations. George is integral to the growth of the GIS practice at BSC and is responsible for GIS and GIS web applications for many discipline areas. George is constantly undertaking R&D challenges, striving to innovate both for clients and within BSC. George is a BSC Subject Matter Expert (SME), a go-to for GIS, sUAS, and technology implementation and use company-wide

PROJECT EXPERIENCE HIGHLIGHTS

Apple Country Natural Climate Solutions Project, Bolton, Harvard, & Devens, MA
Senior GIS Analyst

Led and coordinated the GIS effort between all municipalities and organizations for the duration of the Apple Country project. Designed and developed mapping documents highlighting dozens of ecological and climate-oriented datasets and their impacts to stakeholders. Performed resiliency, wetland, and landcover analyses for each municipality using a diverse variety of public and private datasets. Produced an Apple Country web application hosting all project related geospatial features for public viewership and input.

GEORGE IS INSTRUMENTAL TO THE GROWTH OF BSC'S GIS PRACTICE TO SERVE ALL BSC DISCIPLINES AND PROVIDE MORE EFFECTIVE SERVICE TO CLIENTS

Massachusetts Vulnerability Preparedness (MVP) GIS Mapping and Analysis, Various Locations, MA
GIS Analyst

Developed web applications and mapping figures for public outreach throughout the MVP planning process. Performed analysis of potential climate change vulnerabilities using public and private datasets, including heat, sea level rise, flood hazards, earthquakes, tornadoes, and snowfall. Provided MVP program support for the municipalities of Amesbury, Bolton, Athol, New Marlborough, and Sheffield.

Coastal Resiliency Project, Beverly, MA
GIS Analyst

Produced inundation maps and datasets for the Beverly coastal vulnerability analysis. Using the latest Boston Harbor Flood Risk Model data, modeled future climate change scenarios by geoprocessing USGS LiDAR data in conjunction with local tidal data and the latest accredited scientific projections to calculate probable areas of inundation. Performed vulnerability analyses of critical locations in Beverly and laid the groundwork for continued mapping, modeling, and in-depth analyses of the Beverly Waterfront.

Rural Dirt Roadway Vulnerability Assessment, Sheffield, New Marlborough, and Sandisfield, MA
GIS Analyst

Designed the mobile GIS survey application, online web application, and geodatabase for rural dirt road field surveys in MA. Performed an initial roadway assessment assigning surface classifications using remote sensing. Prioritized roadways potentially susceptible to climate change vulnerabilities to guide field survey efforts.

Due Diligence and Master Planning, Athol, MA
GIS Analyst

Responsible for preparing a series of parcel, demographic, and environmental justice maps and analyses to aid planning decision making for downtown development parcels.

Worcester Urban Renewal Plan, Theater District, Worcester, MA
GIS Analyst

In support of the city's bold urban renewal and development plan, including the construction of a downtown professional baseball stadium, delivered multiple municipal and demographic datasets, mapped proposed roadways and easements, proposed parcel boundaries for buildings to be constructed and demolished. Created a mobile, web-based property inspection application for field use that allowed for standardized data input and geotagged photographs, then automatically generated parcel inspection forms.

Comprehensive Master Plan, Millbury, MA
GIS Analyst

Responsible for creating town-wide maps, organizing town parcel data, and classifying land-use data, to support the zoning regulation changes. Created a vacant parcel, open space and land use map, and a zone amendment map. Produced a series of open space and recreation, flood hazard, historical resource, and environmental justice maps as part of the planning process.

Department of Conservation and Recreation, Invasive Species Management Plan, Statewide, MA
GIS Analyst

Designed and developed an invasive species geodatabase for BSC field surveys spanning major DCR parks and open space in Massachusetts. Generated standardized maps for each surveyed park displaying invasive species distribution and survey results. Updated, refined, and organized existing DCR geospatial data, and conducted GIS analyses to assist producing prioritization matrices for the inventoried parks.

National Grid, Project Feasibility Analyses and Planning, Various Locations, MA
GIS Analyst

Analyzed modeling and mapping of sea level rise and hurricane storm surge coastal inundation scenarios to aid decision making for multiple National Grid utility projects. Developed inundation modeling from the latest IPCC climate change projections and USGS LiDAR datasets. The modeling results were analyzed alongside multiple publicly available environmental and ecological datasets available from MassGIS.

National Grid, Substation Short-Term Flood Protection Measures, Various Locations, MA and RI
GIS Technician

Supported GIS analyses of NOAA's Sea Lakes and Overland Surges from Hurricanes (SLOSH) and FEMA's Limit of Moderate Wave Action (LiMWA) datasets to map possible flood inundation and sea level rise scenarios for vulnerable electrical substations. As a result, approximately 22 substations have been chosen for upgrades to address potential future climate change impacts.

Resiliency Planning, Everett, MA
GIS Analyst

Mapped and analyzed various levels of sea level rise to reflect possible future climate change scenarios. Mapped impervious surface areas and vegetative cover to gain insight of the city's vulnerability to heat. Combined climate change projections, land use, and city ward boundaries to quantify the scale of vulnerabilities for each area of the city.

BSC GROUP

Samuel
Offei-Addo, PE, PTOE

Senior Transportation Engineer
Senior Associate

YEARS OF EXPERIENCE

35

EDUCATION

MS, Transportation Engineering
University of Massachusetts

BS, Civil Engineering
University of Science and Technology, Ghana

REGISTRATIONS

Professional Engineer

- CT #27864
- MA #41558 (2000)

Professional Traffic Operations Engineer

AFFILIATIONS

- Institute of Transportation Engineers

MEET SAM

Sam brings extensive experience in transportation engineering, providing highway/roadway engineering, as well as traffic planning, peer review services and design. His expertise in roadway engineering encompasses maintenance and management programs, design of geometric and drainage improvements, condition inspection, resident engineering, and pavement/subbase design. For traffic projects, he provides intersection, signalization and pavement marking design, as well as transportation systems analysis/planning, travel demand forecasting, and development of plans to maintain traffic during construction.

Sam also has computer application experience for traffic/transportation analyses includes: SYNCHRO, CORSIM, SIMTRAFFIC, HCS, TRANSYT-7F. His experience with hardware and software for engineering purposes includes: AutoCAD Softdesk programs, optimization modules, and image processing applications.

PROJECT EXPERIENCE HIGHLIGHTS

Town-Wide Traffic Study, Belmont, MA

Project Manager

Responsible for the development of a town-wide traffic study to alleviate increased traffic volumes and gridlocking that occurs on the main roads of Belmont during peak commute hours. For this study, Sam is leading BSC's traffic planning and engineering services to identify prevailing town-wide traffic flow patterns that will ultimately provide the Town with options for eliminating, reducing, and mitigating cut-through traffic. Also part of this effort is his participation in public meetings to incorporate stakeholder and resident feedback into the final plan.

Quincy Center Redevelopment, Quincy, MA

Senior Transportation Engineer

Responsible for the preparation of a traffic evaluation for the redevelopment of Quincy Center. The evaluation provided a revised analysis of a Draft Environmental Impact Report based on a new development program. BSC estimated trips to be generated by the project, distributed the project trips onto the roadway network, and performed capacity analyses at the nineteen (19) study area intersections. BSC evaluated future traffic conditions under a 10-year planning horizon.

Boulder Lane Feasibility Study, Beverly and Wenham, MA

Senior Transportation Engineer

Performed an evaluation of the Boulder Lane property's capacity to accommodate an economically and environmentally sustainable mixed-use development that is consistent with the community and economic development goals and objectives of the Town of Wenham and the City of Beverly. The study evaluated the characteristics of the site and examined potential development concepts to achieve the community's current vision and economic development objectives. The process involved an assessment of the market conditions and included a development pro forma to evaluate the economic feasibility of development.

Shirley Growth District, Devens, MA

Senior Transportation Engineer

Provided engineering services for a Feasibility Study for a mixed-use Commercial/ Business/Residential development. The potential development site encompassed a 33 +/- acre area north of Hospital Road in the Town of Devens. The study included the assessment of existing conditions, access, and utilities. A key component of the development was the integration of Smart Growth Principles, which promoted site development in a manner that complemented the environment, development objectives, quality of life, and a sense of place. An iterative conceptual planning process testing various combinations of desired uses resulted in a preferred development concept plan.

Martignetti Corporation Headquarters, Taunton, MA

Senior Transportation Engineer

Provided engineering services for the relocation of the Martignetti Corporate headquarters. BSC was retained to perform conceptual site planning, building test fit, site/civil engineering, permitting, landscaping design, permitting, and preparation of construction drawings for the project. The proposed project is located in the Myles Standish Industrial Park Expansion and consists of corporate offices and a warehouse distribution facility containing 727,785 square-feet of gross floor area. The project is located on a 117.20-acre parcel that was formed by combining lots from the early phase subdivisions previously approved by the Planning Board. The project also involved the abandonment of an accepted public way and the design of a roundabout for traffic control.

Transportation Planning /MEPA filing for the Expansion of Myles Standish Industrial Park, Taunton, MA

Senior Transportation Engineer

Provided traffic engineering services in conjunction with the planning, permitting, and design of the150-acre expansion to Myles Standish Industrial Park (MSIP). Another 70 acres were planned for the development of a life science center, to be accessed from the Bay Street entrance. Transportation issues addressed included pedestrian and bicycle amenities, truck routes, traffic impacts, and transportation demand management (TDM). BSC performed comprehensive traffic impact analysis using Synchro software for the full build-out of MSIP and prepared conceptual improvement plans and cost estimates, for submission to MEPA/MassDOT. Additionally, in coordination with GATRA, the bus route service through the Industrial Park was expanded.

Route 68 / Timpany Boulevard Complete Streets Study, Gardner, MA

Traffic Engineer

Responsible for traffic engineering efforts for the performance of a corridor study along a portion of Route 68, also referred to as Timpany Boulevard, between Route 2A and a newly constructed Walmart to expand available travel options along this growth corridor which abuts an Urban Renewal Area. The study included a quantitative and qualitative analysis of the existing conditions and travel patterns. The planning included the preparation of a complete streets plan that introduced public realm improvements that included sidewalks, lighting, landscaping and bike lanes. Additionally, the planning included the preparation and feasibility assessment of a roundabout as an alternative to the signalized intersection of Route 68 and Route 2A.

Transportation Planning for the Redevelopment of Northwest Park, Nordblom Companies, Burlington, MA

Senior Transportation Engineer

Responsible for providing traffic engineering services for the redevelopment of the Northwest Park, a 245-acre area, located right off of the Middlesex Turnpike, made up of second class office space dating back to the 60's now being redeveloped into a mixed use property consisting of office, retail and restaurant space. BSC prepared conceptual improvement plans and cost estimates, and updated trip generation analysis for submission to the Planning Board.

BSC GROUP

Lindsey
Carle, MNR
Climate Adaptation and Resilience Specialist

YEARS OF EXPERIENCE
5

EDUCATION
MS, Natural Resources, Leadership in Global Sustainability, Virginia Polytechnic Institute and State University

BS, Aquaculture and Aquarium Science, University of New England

CERTIFICATIONS
- United States Dept. Of Interior -NSC Defensive Driving Course 9th Edition
- SSI Open Water Diver
- All-Terrain Vehicle (ATV)
- 40-Hour OSHA Hazwoper

AFFILIATIONS
- AMWS

MEET LINDSEY
Lindsey assists the Climate Resilience group for clients in the transportation and public sector. She brings a strong environmental background through her environmental compliance field work and a master's degree in National Resources with a focus on Sustainability. Lindsey is motivated, resourceful and possesses a tenacious work ethic as well as a passion for preserving the natural environment.

PROJECT EXPERIENCE HIGHLIGHTS

MassDOT Tunnels, MassDOT, MA
Project Scientist

This project Is Intended to address the vulnerability of the Central Artery Tunnels to sea level rise, storm surge, and extreme precipitation events.

Lindsey Is assisting with the research on what other cities, counties, states, and countries are doing to protect tunnel Infrastructure from this type of flooding.

Greening Lord Pond Plaza, Town of Athol, Athol, MA
Project Scientist

The project Is Intended to Identify opportunities to incorporate nature-based solutions and green infrastructure Into the Lord Pond Plaza parking lot area, such as stream daylighting, shade trees for cooling, green space for stormwater/flooding mitigation and open space Improvements.

Lindsey is assisting with the permitting efforts for this project.

Vine Brook Watershed and Urban Heat Island Assessment, Town of Burlington, Burlington, MA
Project Scientist

The project Is Intended to address climate change and extreme weather Impacts in Burlington related to Inland flooding and urban head Island effect.
Lindsey performed field assessments of climate vulnerability in the Vine Brook Watershed to better understand how to incorporate green infrastructure, nature-based solutions, and storm/flood mitigation measures.

LINNEAN SOLUTIONS

Jim Newman, LEED AP, O+M; EcoDistrict AP
Founder and Principal

Jim is the founder and Principal at Linnean Solutions, a mission-driven firm that helps local and state governments, institutions, projects, and communities reach resilience and sustainability goals. Jim's twenty years of experience includes climate mitigation and adaptation planning; the development of sustainability and resilience frameworks, manuals, and certification programs; carbon and life cycle analyses for rethinking building construction and waste; resilience assessments at the building and urban scales; and stakeholder engagement processes to strengthen communities. As a Living Environments in Natural, Social, and Economic Systems (LENSES) Facilitator and Trainer, Jim regularly leads community planning workshops, and trains others in becoming effective facilitators. He is a member of the RELi/USGBC Steering Committee, where he has worked to bring a social equity lens to the development of the new certification standard for resilient buildings. Jim is a key author of several influential resilience reports and tools—including the Enterprise Community Partners' *Ready to Respond: Strategies for Multifamily Building Resilience* manual.

Previous to Linnean, Jim worked with BuildingGreen as the Director of Strategy, where he led the development and introduction of most of BuildingGreen's online products including LEEDuser.com, BuildingGreen Suite, and the High Performance Buildings Database.

DISCIPLINES

Regenerative systems thinking; Carbon mitigation planning and life cycle assessment; Resilience and vulnerability analysis; Climate mitigation and adaptation planning; Building performance monitoring; LEED certification project management; Process facilitation and community engagement

ACCREDITATIONS

LENSES Practitioner, CLEAR;
Regenerative Practitioner, Regenisis Group;
LEED Accredited Professional with specialty (O+M);
EcoDistrict Accredited Professional;
Certified Municipal Vulnerability Preparedness (MVP) Technical Service Provider

EDUCATION

MS in Management Science, Lehigh University;
BS in Architectural Design, Massachusetts Institute of Technology

ACTIVITIES

Member, Cambridge Resilience Zoning Task Force
Co-Facilitator, New England Living Future Collaborative
Member, USGBC Resilience Working Group
Member, USGBC RELi Steering Committee
Member, Board of Directors, Resilient Design Institute
Member, Board of Directors USGBC MA Chapter
Member, Board of Directors, CLEAR

SELECTED PROJECT EXPERIENCE

- Portfolio Resilience Assessment, Newport Restoration Foundation, Newport, RI (2019), *Co-Project Director*
- Climate Action and Adaptation Plan, City of Medford, MA (2019-2021), *Project Director*
- Apple Country Ecological Climate Resiliency and Carbon Planning and Assessment, Bolton, MA, Harvard, MA, Devens, MA (2020-2021), *Engagement and Soil Health Consultant*

LINNEAN SOLUTIONS

DISCIPLINES

Climate action and adaptation policy and planning; Resilience and sustainability planning; Vulnerability assessments; Process facilitation and community engagement; Regenerative systems thinking

ACCREDITATIONS

Certified Municipal Vulnerability Preparedness (MVP) Technical Service Provider;
LEED Green Associate;
LENSES Facilitator, CLEAR;
Certificate in Environmental Policy and Planning, Massachusetts Institute of Technology

EDUCATION

MA in City Planning, Massachusetts Institute of Technology;
BA in Biology and Environmental Science, Bowdoin College

EXPERIENCE

8 Years

Holly Jacobson, LEED Green Associate

Climate Planner

Holly works with local governments, organizations, and communities in developing policy, plans, and collaborative approaches for mitigating and adapting to climate change. She recently led the development of "One Climate Future," the regional Climate Action and Adaptation Plan for Portland and South Portland, ME, and the Climate Action and Adaptation Plan for Medford, MA. Projects have included design and facilitation of community and stakeholder processes, ranging from multilingual working groups, to storytelling dinners, to technical steering committees. Holly has worked with local governments and communities on ways to expand renewable energy, strengthen food systems, grow circular economies, and foster more connected neighborhoods, in each case focusing on the system change to collectively create more resilient communities, just processes, and pathways to a carbon neutral future. Prior to Linnean, Holly supported ecological and community planning processes in Salt Lake City, Utah. Holly has a master's degree in City Planning with certification in Environmental Policy and Planning from Massachusetts Institute of Technology, and a Bachelor of Arts degree from Bowdoin College.

SELECTED PROJECT EXPERIENCE

Linnean Solutions, Cambridge, MA and Portland, ME
Climate Planner | 2016 - Present

- MVP 2.0 - Development of the updated Municipal Vulnerability Preparedness Planning process, Commonwealth of Massachusetts (2021 - 2022)
- Climate Action and Adaptation Plan, Equity Workshop, and Community Dinners, City of Medford, MA (2019-2022)
- Campus Resiliency Plan, University of Massachusetts Amherst (2019 - 2022)
- Apple Country Ecological Climate Resiliency and Carbon Planning and Assessment, Bolton, MA, Harvard, MA, Devens, MA (2020-2021)
- "One Climate Future" Climate Action and Adaptation Plan and Vulnerability Assessment, Cities of Portland and South Portland, ME (2019 - 2020)
- Municipal Vulnerability Preparedness Community Resilience Building Process, Town of Amherst, MA (2019)
- Climate Change Vulnerability Assessment; Stakeholder Workshops and Public Engagement Strategy, City of Medford, MA (2018 - 2019)
- Climate Resilience and Regeneration Plan and Municipal Vulnerability Preparedness Workshops, City of Northampton, MA (2018 - 2019)
- Resilience-based Hazard Mitigation Plan Update and Vulnerable Populations Assessment, City of Medford, MA (2018)
- Organizational Resilience Report and Training Workshops, Philadelphia Housing Authority (2016 - 2017)
- Strategies to integrate equity into municipal Climate Action Plan, City of Providence, RI (2017)
- Integrative Design Process Facilitation and Sustainability Consulting, San Luis Potosi, Mexico mixed-use development (2017)

LINNEAN SOLUTIONS

Peyton Siler Jones

Climate Resilience Planner

Peyton has more than 7 years of experience in urban sustainability planning, climate oriented communications and community engagement, and environmental policy. Her recent project work focuses on climate resilient land use planning and equitable public participation. Prior to joining Linnean Solutions, Peyton worked for the City of Boston's Climate Ready Boston and Greenovate programs where she served as a Climate Resilience Project Manager and Communiations Manager. She holds a Bachelor of Arts in Environmental Policy from Green Mountain College and is currently pursing a Master of Arts in Urban Planning and Environmental Policy at Tufts Univeristy.

DISCIPLINES

Climate resilient land use planning; strategic climate communicaitons; equitable community participation; data visualization; project management; faciliation and public speaking.

ACCREDIDATIONS

USDN Equity Foundations Training, Community Based Social Marketing (Beginner and Advanced Trainings)

EDUCATION

MA in Urban Planning and Environmental Policy, Tufts University (Present, summer 2022 expected graduation)
BA Enviromental Policy, Green Mountain College

EXPERIENCE

7 Years

SELECTED PROJECT EXPERIENCE

Linnean Solutions, Portland, ME

Climate Resilience Planner (June 2021 - Present)

- One Climate Future Sustainable Buildings Working Group, Portland and South Portland (September 2021 - present)
- Nashua River Communities Resilient Land Management, Clinton, MA, Bolton, MA (July 2021 - present)
- Newport Restoration Foundation Climate Resilience Study, City of Newport, RI
- Apple Country Ecological Climate Resiliency and Carbon Planning and Assessment, Bolton, MA, Harvard, MA, Devens, MA
- Climate Action, Adaptation, and Resiliency Plan, Town of Amherst, MA

Tufts University, Medford, MA

- Urban Sustainablity Directors Network, Northeast Project Coordinator, Applying the Nexus Framework for Racial Equity in Climate Planning (present)
- Sonoma County Land Trust, Lead Researcher developing model rolling easement for coastal reslience and ecological restoration (present)
- Boston Neighborhood Community Land Trust, Student Researcher measuring impact of Land Trusts in Boston through a climate lens (January 2021-May 2021)

Other Relevant Experience

- Project Manager, Coastal Resilience Solutions for East Boston and Charlestown Phase II (January 2020 - May 2021)
- Project Manager, Coastal Resilience Solutions for Dorchester (November 2019 - October 2021)
- Project Manager, Coastal Resilience Solutions for Downtown and North End (November 2019 - October 2021)

LINNEAN SOLUTIONS

Lauren de la Parra

Climate and Sustainability Planner

Lauren is a Portland-based climate and sustainability planning consultant. Working at the intersection of climate action and creative engagement, she collaborates across sectors to empower communities to drive change in ways that align with and further their unique values and aims. With a background in the cultural sector, and extensive experience in municipal climate resilience planning, Lauren brings a unique lens to the work of tackling the climate crisis. Through her interdisciplinary work, she aspires to transform systems and mindsets, creating a more equitable and just future for all in the process.

DISCIPLINES

Community planning outreach and engagement; Climate action and adaptation planning; Resilience and sustainability policy and strategy; Green infrastructure and nature-based solutions planning; Biophilic planning and design; Facilitative leadership for social change.

ACCREDITATIONS

Certified Municipal Vulnerability Preparedness (MVP) Technical Service Provider;
Trained Facilitator, Interaction Institute for Social Change;
Biophilic Cities Network Member;
Climate Reality Leader;
Certified Permaculture Designer, Sowing Solutions

EDUCATION

MS in Sustainability Science, University of Massachusetts Amherst;
Graduate Certificate in Climate Change, Hazards, and Green Infrastructure, University of Massachusetts Amherst;
Graduate Diploma in Business Administration, John Molson School of Business, Concordia University;
BS in Cognitive Science with a minor in Psychology, McGill University

EXPERIENCE

8 Years

SELECTED PROJECT EXPERIENCE

Linnean Solutions, Cambridge, MA and Portland, ME

Climate and Sustainability Planner | 2020 - Present

- Project Manager, Nashua River Communities Resilient Lands Management Project. Bolton and Clinton, MA (2021-ongoing)
- Project Support, Municipal Vulnerability Preparedness (MVP) 2.0 Planning Process Development. Massachusetts Executive Office of Energy and Environmental Affairs (2022-ongoing)
- Team Lead, Apple Country Ecological Climate Resiliency and Carbon Planning and Assessment. Bolton, Harvard, and Devens, MA (2020-2021)
- Project Manager, Climate Action, Adaptation, and Resiliency Plan, Town of Amherst, MA (2020 - 2021)
- Facilitator, Climate Action and Adaptation Plan, Equity Workshop, and Community Dinners, City of Medford, MA (2019 - 2021)

Other Relevant Experience

- Co-author and project manager for the sixth edition of Mass Audubon's *Losing Ground* Series, *Nature's Value in a Changing Climate* (2019)
- Massachusetts Vulnerability Preparedness facilitator and report author for Rochester, Lakeville, and Freetown, MA (2019)
- Conference organizer for Massachusetts Ecosystems Climate Adaptation Network (2019)
- Contributor to Northampton Climate Resilience and Regeneration Plan soil carbon sequestration research (2018)
- Community carbon footprint analysis and Climate Outreach Fellow for UNH Sustainability Institute/City of Somerville (2017)
- Greenhouse gas emissions inventory updates (LGO and community-wide) for the City of Somerville, MA (2017)

Lisa Westerhoff

Principal / Team Lead, Research & Planning

PhD, MA, BA, EcoDistricts AP

With over 10 years of industry experience, Lisa leads the Sustainability Policy and Planning team at Integral Group in Vancouver, where she works with local governments, universities, developers, and industry organizations to create policies and strategies for a low-carbon built environment. Lisa holds a PhD in urban sustainability from UBC, during which time she evaluated the success of Vancouver's Olympic Village as a sustainable urban neighborhood.

She now brings her expertise in climate change, sustainability, and resilience planning in coordinating projects ranging from zero-emissions buildings plans to post-occupancy evaluations, energy, and carbon disclosure policies, and city-wide climate and energy strategies. She has designed and led several stakeholder and community engagement processes in planning for climate, energy, and sustainability policy. Lisa is the author of several academic publications on strategies for increasing climate change resilience and energy and emissions reductions, and an EcoDistricts Accredited Professional. Lisa also holds a Master's degree in climate change resilience and adaptation and was the winner of the Canada Green Building Council's Green Building Champion Award in 2019.

Education

- PhD, Resource Management & Environmental Studies, University of British Columbia, 2015
- MA, Geography, University of Guelph, 2008
- BA, Geography, University of Guelph, 2006

Professional Affiliations

- CaGBC
- EcoDistricts

Experience

SITE + DISTRICT SUSTAINABILITY PLANS

Jericho Lands Master Plan and Design Vision
Vancouver, ON
Ongoing
Principal

Woodland Park Redevelopment
Vancouver, BC
Associate

North Shore Innovative District
North Vancouver, BC
Associate/ Project Manager

Granville Island 2040: Bridging Past & Future
Vancouver, BC
Senior Planner

Britannia Community Centre
Vancouver, BC
Senior Planner

RESILIENCE + ADAPTATION

City of Vernon Climate Adaptation Plan
Vernon, BC
Principal in Charge

Capilano University Resilience Assessment
North Vancouver, BC
Associate/Project Manager

BC Housing Mobilizing Building Adaptation and Resilience
Vancouver, BC
Principal in Charge

100 Resilient Cities
Toronto, ON & Louisville, KY
Senior Planner

ENERGY + SUSTAINABILITY PLANNING

Correctional Services Canada National Carbon Neutral Portfolio Plan
Various location across Canada
Associate / Project Manager

*Resume encompasses experience prior to joining Integral Group

Department of Fisheries and Oceans Canada Carbon Neutral Portfolio Plan
Various location across Canada
Associate / Project Manager

Metro Vancouver Building Performance Standard
Vancouver, BC
Principal in Charge

BC Housing Climate Resilience Guidelines for Housing
Provincial
Principal in Charge

Living Future Vancouver Project Visioning & Sustainable Design Charrettes
Provincial
Principal in Charge

GHGI Buildings Study MHMA
Victoria, BC
Associate/Project Manager

Metro Vancouver Sustainable Infrastructure & Buildings Design Guide
Regional
Principal in Charge

Capilano University - Implementing the BC Energy Step Code
North Vancouver, BC
Associate/Project Manager

District of North Vancouver Community Energy & Emissions Plan
North Vancouver, BC
Associate/Project Manager

City of Toronto Zero Emissions Existing Building Framework
Toronto, ON
Principal in Charge

Township of Langley Electric Vehicle Strategy
Langley, BC
Associate/Project Manager

Township of Langley Climate Action Plan
Langley, BC
Principal in Charge

University of Victoria Campus Decarbonization Master Plan
Victoria, BC
Associate / Project Manager

Heat Pump/Electrification Roadmap - City of Richmond
Richmond, BC
Associate/Project Manager

City of Vernon Climate Adaptation Plan Phase 1
Vernon, BC
Principal in Charge

Town of Okotoks Climate Action Plan
Okotoks, AB
Principal in Charge

New Westminster Environmental Strategy & Action Plan
New Westminster, BC
Senior Planner/Project Manager

Clean Energy District of Columbia
Washington, DC
Senior Planner

BC Energy Step Code Implementation
New Westminster, BC
Associate/Project Manager

BC Energy Step Code Metrics Research Report
Vancouver, BC
Associate

City of Medicine Hat Sustainability Framework
Medicine Hat, AB
Associate

Jericho Lands Master Plan
Vancouver, BC
Principal

District Energy Bylaw
New Westminster, BC
Intermediate Planner

BC Housing Overheating & Indoor Air Quality Design Guide
Provincial
Principal in Charge

Capilano University Climate Change Resilience Assessment
North Vancouver, BC
Principal in Charge

Capilano University Wildfire Risk Workplan
North Vancouver, BC
Principal in Charge

EllisDon Climate Vulnerability & Risk Assessment for Royal Columbian Hospital Redevelopment
New Westminster, BC
Principal in Charge

City of Nanaimo Climate Change Resilience Strategy
Nanaimo, BC
Principal in Charge

Provincial Health Services Authority Climate Resilience Guidelines for Health Facility Planning & Design
Provincial
Principal in Charge

Simon Fraser University Climate Change Risk Assessment
Burnaby, BC
Principal in Charge

Alberta Infrastructure Net Zero Portfolio
Provincial
Principal in Charge

Building Benchmarking BC Pilot
Provincial
Principal in Charge

City of Mississauga Corporate Green Building Standard
Mississauga, ON
Principal in Charge

GREEN BUILDING STANDARDS

City of Edmonton Emissions-Neutral Building Framework
Edmonton, AB
Principal in Charge

City of Toronto Zero Emissions Existing Building Framework
Toronto, ON
Principal in Charge

Better Buildings BC
Province of British Columbia
Associate/ Project Manager

CaGBC Zero Carbon Building Standard
Ottawa, ON
Senior Planner

Zero Emissions Building Framework
Toronto, ON
Senior Planner/Project Manager

Marshall Duer-Balkind

Associate

Marshall is an international expert in carbon neutrality planning and modeling, energy analytics, campus sustainability, and building performance standards. He has over a decade of analytical and policy experience in the government, non-profit, and for-profit sectors. In addition to working for Integral Group, Marshall has worked for the District of Columbia Department of Energy & Environment, the Institute for Market Transformation, and as an independent consultant.

He has advised over a dozen cities and institutions across North America on advanced energy and climate planning and policy development. He currently co-chairs the Mayoral Task Force developing Building Energy Performance Standards for Washington, DC, and serves on the District of Columbia Sustainable Energy Utility Advisory Board.

He brings to his work deep passion, a thirst for innovation, sensitivity to politics, skill in communicating complex topics, and a critical eye for quality.

Experience

City of Vancouver GHG Regulations for Existing Buildings
Vancouver, BC
Technical Lead

Port Coquitlam Climate Action Plan
Port Coquitlam, BC
Mitigation and Modelling Lead

USGBC Massachusetts Net Zero Energy Buildings Study
Boston, MA
Policy Analysis

Capital Region Residential Energy Retrofit Strategy
Victoria, BC
Technical Lead

University of Victoria Carbon Reduction Plan
Victoria, BC
Sustainability Lead

Department of Fisheries and Oceans Canada Carbon Neutral Portfolio Plan
Various location across Canada
Technical review

City of Toronto Zero Emissions Existing Building Framework
Toronto, ON
Policy Analysis

Metro Vancouver Building Performance Standards
Vancouver, BC
Lead Technical Expert

DC Carbon Neutrality Strategy
Washington, DC
Lead, Project Manager

Integral Corporate Social & Environmental Responsibility Report
Oakland, CA
Lead Global Technical Reviewer

Fannie Mae Green Building Analysis
Washington, DC
Researcher and Analyst

City of Alexandria Green Building Policy
Alexandria, VA
Technical Lead

Education

- Master of Environmental Management, Yale School of the Environment, New Haven CT, 2011
- B.A., Political Science and Computer Science, Oberlin College, Oberlin OH, 2006

Professional Affiliations

- Senior Fellow, Environmental Leadership Program
- Member, U.S. Green Building Council—National Capital Region

Recent Publications

- "Making Data-Driven Policy Decisions for the Nation's First Building Energy Performance Standards." Proceedings of ACEEE Summer Study, 2020
- "Ranking and Rewarding Certifications for Energy-Efficient and Healthy Multifamily Buildings to Drive Market Transformation." Proceedings of ACEEE Summer Study, 2020
- "A Framework for Equitable City Energy Planning." Proceedings of ACEEE Summer Study, 2018
- "Fast Feedback Evaluation; a Combination of Riding Shotgun and Speed Dating." IEPEC, 2017
- "DataIQ – A Machine Learning Approach to Anomaly Detection for Energy Performance Data Quality and Reliability." Proceedings of ACEEE Summer Study, 2016

*Resume encompasses experience prior to joining Integral Group

Richmond 80x50 Climate Planning
Richmond, VA
Project Manager and Modeler

NBI Municipal Portfolio Performance Study
Portland, OR
Project Manager

Amherst College Zero Carbon Campus
Amherst, MA
Analyst

Clean Energy DC: The District of Columbia Climate and Energy Plan
Washington, DC
*Lead Technical Oversight**

DC Sustainable Energy Utility Evaluation, Measurement, & Verification
Washington, DC
*Lead Technical Oversight**

DC Energy Benchmarking program
Washington, DC
*Program Manager**

Williams College Net Zero Carbon Strategic Plan
Williamstown, MA
Zero Carbon Target
Project Manager, Financial Analysis

University of British Columbia Neighborhood Low Carbon Energy Strategy
Vancouver, BC
Energy, Emissions, & Financial Modeling

One Climate Future Plan
Portland and South Portland, ME
Inventory, Modeling, Policy

Oakland Equitable Climate Action Plan
Oakland, CA
Energy & Emissions Modeling

University of Michigan Zero Carbon Plan
Ann Arbor, MI
Emissions and Financial Analysis

Swarthmore College "Roadmap to Zero" Energy Master Plan
Swarthmore, PA
Project Management & Analysis

Robin Hawker

Associate
Climate Resilience
MCIP, RPP

Robin is a Climate Resilience Associate and professional planner who is driven to develop strategies that build low carbon resilience through innovative, tailored, and equitable solutions. She specializes in climate change risk assessment and resilience planning at the building, campus, master plan, and community scale. Robin works closely with clients to translate climate change complexities into real and impactful actions for change.

Most notably, Robin led risk assessment work for the award-winning North Shore Sea Level Rise Strategy developed in partnership with municipalities, First Nations, non-profits and industrial partners on the North Shore of Metro Vancouver. She worked in partnership with Tsleil-Waututh Nation to develop their Climate Change Resilience Plan that interweaves traditional knowledge with climate science to define realistic and measurable actions for a more resilient future.

Education

- MSC in Planning, Environmental Collaborative program, University of Toronto, 2015
- BA (Honours), Queens Univeristy, 2007

Professional Affiliations

- Registered Professional Planner (member of the Planning Institute of BC and Canadian Institute of Planners)
- Planning Institute of BC Climate Action Committee Member
- Canadian Water and Wastewater Climate Advisory Committee Member
- Certified Engagement Specialist (International Association of Public Participation)
- Certified PIEVC Protocol Professional

Experience

CLIMATE RESILIENCE PLANNING

Climate Resilience Guidelines for Public Sector Organizations
In Progress
Engagement & Resilience Planner

University of California JEDI-Centered Climate Resilience Workshops
In Progress
Resilience Planner & Engagement

Port Coquitlam Climate Action Plan
In Progress
Project Manager & Resilience Lead

Glenbow Museum Revitalization Project
In Progress
Resilience Lead

Vancouver Coastal Health Hilltop House Long Term Care Expansion
In Progress
Resilience Lead

New St. Paul's Resilience Compliance Audit
In Progress
Project Manager & Resilience Lead

Cowichan District Hospital Replacement Project
In Progress
Project Manager & Resilience Lead

Comox Valley Regional District Coastal Mapping Project
Planner

North Shore Sea Level Rise Risk Assessment and Adaptive Management Strategy
Risk Assessment Lead

Tsleil-Waututh Nation Climate Change Resilience Plan
Project Manager, Resilience Lead

Toquaht Nation Coastal Adaptation Plan
Project Manager, Resilience Lead

Marine Plan Partnership Evaluation of Existing Climate Change Impact Analyses, Adaptation and Mitigation Plans in the North Vancouver Island Marine Plan Area
Senior Climate Change Advisor

Tsleil-Waututh Nation Climate Vulnerability and GHG Assessment
Project Manager, Resilience Lead

Indigenous Services Canada Climate Change Resilience Workshops for over 40 BC First Nations
Engagement Lead

Climate Change Adaptation Gap Analysis for the Federation of BC Municipalities
Planner

INTEGRATED WATER SYSTEMS PLANNING

District of West Vancouver Coastal Marine Management Plan
Project Manager & Resilience Lead

Regional District of Nanaimo Flood Mapping
Risk Assessment Lead & Engagement Lead

Fraser Basin Council Flood Planning Study Development
Planner

Sicamous Narrows Flood Protection Plan
Engagement Lead

Technical review of Metro Vancouver Water Shortage Response Plan
Planner, Engagement Lead

Northern Rockies Regional Municipality Water and Sewer Rates & Regulation Bylaws
Planner

City of Richmond Integrated Rainwater Resource Management Strategy
Planner, Engagement Lead

Updates to the Water and Wastewater DCC Bylaw for the Saanich Peninsula (CRD)
Planner

Sicamous Narrow Flood Protection Plan
Environmental Planner

Lumby Flood Protection Plan
Environmental Planner

Water Systems Risk Management Plan workshops led by the Ministry of Health and Engineers and Geoscientists of BC
Planner, Engagement Lead

Drainage Management Roadmap for Fraser Valley Regional District
Planner, Engagement Lead

Inglis Drive Dyke Development Project
Engagement Lead

ASSET MANAGEMENT & LAND USE PLANNING

Asset Management Guide for BC First Nations
Planner

Asset Management Plan and Policy Templates and Guide for the Government of the Northwest Territories
Planner

Sustainable Infrastructure Workshops with over 100 First Nations across BC and Alberta
Engagement Lead

Northern Rockies Regional Municipality Asset Management System
Planner, Engagement Lead

Port Coquitlam Asset Management Program – Phase 1
Planner

Land Use Plan for Tla-o-qui-aht First Nation
Project Manager, Planner

Chestermere Comprehensive Utilities Master Plan
Engagement Lead

City of Trail Asset Management Program
Engagement Lead

Blood Alley and Square Solid Waste Management Study
Planner

Lax Kw'alaams Recycling Program
Engagement Lead

Doig First Nation Land Development
Planner

Servicing Strategy for Abbotsford UDistrict Development Plan
Engagement Lead

Utility Servicing Study for the University of Fraser Valley Campus Master Plan
Engagement Lead

Development finance options for Town of Gibsons
Planner

City of Prince Rupert Housing Assessment
Environmental Planner

Harriet Lilley

Senior Sustainability Planner
MEng

Harriet brings over eight years of engineering design consulting experience to Integral Group's Sustainability Policy and Planning team and the field of energy and climate change policy.

Harriet brings both a broad understanding of climate and energy issues and a strong technical background in mechanical systems and low carbon solutions. Her thoughtful and detail-orientated approach help deliver on a range of projects supporting organizations in their efforts to reduce energy use and emissions. Harriet is experienced in energy and thermal modeling, as well as applying quantitative techniques to analyze energy and emissions data and financial metrics.

Education

- MEng (Hons), Master of Engineering in Civil Engineering (1st Class)

Professional Affiliations

- Member of CIBSE (Chartered Institution of Building Services Engineers)

Experience

DES

TIGER Princeton University Central Utilities Building
Princeton, New Jersey
Mechanical Designer

Swarthmore College Road Map to Zero
Mechanical Designer

Swarthmore Central Plant SD Services
Pennsylvania
Mechanical Project Manager

UBC Ponderosa DES Connection Feasibility Study
Vancouver, BC
Lead Mechanical Designer

YVR CORE Low-Carbon DES
Richmond, BC
Mechanical Designer

Department of Fisheries & Oceans Canada National Carbon Neutral Portfolio Strategy (NCNPS)
Senior Sustainability Planner

CSC Carbon Neutral Portfolio Plan (CNPP)
Senior Sustainability Planner

North Saanich OCP
North Saanich, BC
Energy & Emission Analyst

Toronto Existing Building Strategy
Toronto, ON
Senior Sustainability Planner

EDUCATION

University of Victoria Student Residences & Dining Hall
Victoria, BC
Thermal Energy Modeler

UBC SUB Swing Renovations
Vancouver, BC
Assistant Mechanical Engineer construction stage

Reading School Science Block
Reading, England
*Mechanical Designer, Lighting Designer, Energy modeling**

Alperton Community School Science Block
London, UK
Assistant Mechanical Engineer

*Resume encompasses experience prior to joining Integral Group

Madi Kennedy

Senior Sustainability Planner
MPP, BA

Madi has five years' experience working on climate and energy policy. Her work addresses complex issues through research, analysis, policy development, engagement, and communications. She brings broad experience working on climate mitigation, resilience, energy efficiency, renewable energy, and environmental justice. Having worked in government, private and non-profit sectors, Madi can balance diverse perspectives, anticipate challenges, and communicate effectively across stakeholder groups.

Education

- MPP, Master of Public Policy, Simon Fraser University, 2017
- BA, Bachelor of Arts (Political Science), Simon Fraser University, 2014

Experience

ENERGY + SUSTAINABILITY PLANNING

SEA Change: Strata Energy Advisor Program
Senior Sustainability Planner

QuadReal Tenant & Landlord Transparency Challenge
Senior Sustainability Planner

BC Hydro Building Performance Standards Summary Memo
Senior Sustainability Planner

Port Moody Zero Emissions Climate Resilient Buildings Plan
Port Moody, BC
Project Manager and Senior Sustainability Planner

Property Assessed Clean Energy: Design considerations for Canadian PACE programs and enabling legislation for BC*
Lead Author and Analyst

Building Safety Standards Branch Existing Building Renewal Strategy Engagement
Senior Sustainability Planner

Tools for Building Energy Labelling: Options for universal labelling policy in B.C.*
Lead Author and Analyst

Existing Building Commissioning: A scan of programs and policies implemented by Canadian Provinces*
Supporting Author and Analyst

City of Vancouver Housing Retrofit Strategy Support
Vancouver, BC
Project Manager and Senior Sustainability Planner

ENERGY + SUSTAINABILITY POLICY

Canada's Renovation Wave: A plan for jobs and climate*
Lead Author and Analyst

*Resume encompasses experience prior to joining Integral Group

Accelerating B.C.'s Economic Recovery through building retrofits*
Lead Author and Analyst

KEY PRESENTATIONS

"The Role of Deep Retrofits in Meeting Calgary's Climate and Resilience Goals"
2021 Calgary Climate Symposium

"Affordable Housing Renewal — Energiesprong for B.C."
2019 Housing Central Conference

Vladimir Mikler

Principal
Innovation Director
PEng, LEED AP, MSc

With over 30 years of experience, Vladimir is an internationally regarded expert in renewable and low-carbon, low-temperature energy systems coupled with low-grade energy sources including heat recovery, geo-exchange, solar, sewer heat recovery, and more. He currently leads Integral's District Energy design team. His experience extends from university research through practical design and project management, both in consulting engineering and design-build environments, to "hands-on" construction management and system installations.

During the mid 90's, Vlad pioneered applications of low-intensity radiant slab heating and cooling systems in North America. In the early 2000's he coined the "Ambient Temperature" and "Low-Exergy" District Energy System concepts. As part of these, he has been championing the application of low-carbon heat pump technologies on both building and district energy scales.

Vlad has completed several studies informing local government policies related to building energy efficiency and carbon emissions reduction, including City of Vancouver's first Passive Design Toolkit and City of Vancouver Zero Emission Building Plan (ZBEP).

Experience

YVR & Sea Island DES Concept
Richmond, BC
Principal in Charge

YVR CORE Central Utility Plant
Richmond, BC
District Energy Lead

University of Michigan Zero Carbon Energy Transition Study
Michigan, USA
District Energy Lead

Swarthmore College
Roadmap to Zero Carbon Plan
Swarthmore, PA
Zero Carbon Campus Target
District Energy Lead

Evergreen State College Master Plan + Pre-Design
Olympia, WA
District Energy Lead

Princeton University TIGER CUB
Princeton, NJ
District Energy Lead

Smith College Campus Energy Decarbonization Study
Northampton, MA
Principal in Charge

Amherst College Zero Carbon Campus Energy System Study
Amherst, MA
Principal in Charge

Oregon State University
Cascades Campus
Energy Feasibility Analysis and Design
Bend, OR
Zero Net Energy Campus Target
Principal in Charge, District Energy Lead

Confidential Corporate Campus
Silicon Valley, CA
LEED-NC v4 Platinum + Living Building Challenge (Water Petal) Targets; All-Electric Design
1.1 million ft²
District Energy Lead

Education

- MSc in Arch.Eng, Penn State University, 1993 (Fulbright Scholarship)
- BSc (Hons) Dipl Eng, Slovak Technical University, 1988

Professional Affiliations

- Engineers and Geoscientists BC
- CaGBC
- USGBC
- ASHRAE
- Geo-Exchange BC
- Canadian Geo-Exchange Technical Advisory Committee
- Former Adjunct Professor, UBC School of Architecture
- Former Board of Directors, Lighthouse Sustainable Building Center
- Former Member, City of Vancouver Urban Design Panel
- Former Member - Engineers and Geoscientists BC Climate Change and Adaptation Advisory Group

University of Victoria Integrated Sustainable Energy Master Plan
Victoria, BC
Principal in Charge

Vancouver Island University Sustainable Energy Master Plan Mine Water Campus-Scale District Geo-Exchange
Nanaimo, BC
Principal in Charge

Confidential Tech Campus Geo-Energy Piles and CUP
United States
District Energy Lead

Seylynn Village District Geo-Exchange System Design
North Vancouver, BC
Principal in Charge

District of West Vancouver Integrated Ocean Loop DES Feasibility Analysis
West Vancouver, BC
Principal in Charge

PARC Agassiz "Aquifer Thermal Energy Storage" (ATES) System Retrofit
Agassiz, BC
Principal in Charge

Whistler Village District Earth Energy System Feasibility Study and Ambient Loop Concept Design
Whistler, BC
Principal in Charge

Vanderbilt University BlueSky Energy Vision
Nashville, TN
Zero Emissions Campus Target
District Energy Lead

Minoru Park DES Strategy
Richmond, BC
Principal in Charge

Vancouver House Low Carbon Energy Supply Feasibility Screening
Principal in Charge

Oakridge Redevelopment Low Carbon Energy Supply Feasibility Screening
Vancouver, BC
Principal in Charge

Larco Arbutus Centre District Geo-Exchange System Design
Vancouver, BC
Principal in Charge

Simon Fraser University Central District Heating Plant Review Study
Burnaby, BC
Supporting Principal in Charge

Millennium Water (South East False Creek) Systems Design & Integration
Vancouver, BC
Neighbourhood Energy Utility Mechanical Systems Integration Lead

Pearson College UWC SMP
Victoria, BC
Principal in Charge

University of British Columbia Okanagan Campus Open Loop Geo-Exchange DES
Kelowna, BC
Principal in Charge

Colorado Ski Resort SMP and District Solar and Geo-Exchange Systems
Vail, Colorado
Engineer of Record

Al Ain Wildlife Park and Resort Sustainable Energy Master Plan
Abu Dhabi, UAE
Principal in Charge

Ayala Center Mall/ Hotel/Residential Redevelopment SMP and Schematic Design
Manila, Philippines
Principal in Charge

Glorietta Mall 1-4 Hotel and Retail Redevelopment - Sustainable Master Plan and Schematic Design, District Solar Absorption & Desiccant Cooling
Makati City, Philippines
Principal in Charge

Nuvali SMP
Canlubang, Laguna, Philippines
Principal in Charge

NALI Nature Observatory Lodge SMP
Lanzarote, Canary Islands
Principal in Charge

CORPORATE OFFICE

Arts Phase II Studio and Motion-Capture Studio
Burnaby, BC
LEED Silver
Engineer of Record

Electronic Arts Phase II Studio and Motion-Capture Studio
Burnaby, BC
LEED Silver
Engineer of Record

The Exchange Office Tower Heritage Renewal and Expansion
Vancouver, BC
Construction Budget: $111M
Principal in Charge

RESIDENTIAL

Millennium Water (SEFC)
Vancouver, BC
Construction Budget: $1B
LEED ND Platinum
Canada House Engineer of Record

Flatiron
Vancouver, BC
Construction Budget: approx. $35M
Engineer of Record

HOSPITALITY

Starlight Casino (Queensborough)
New Westminster
Engineer of Record

Casino Resort
Richmond, BC
Engineer of Record

INDUSTRIAL

Airport Expansion
Cranbrook, BC
Construction Budget: $8.4M
Engineer of Record

Geothermal System Design, Pacific Agriculture Research Centre
Agassiz, BC
Engineer of Record

British Columbia Transmission Corporation Control Centers
Vancouver, BC and Interior, BC
Engineer of Record

SCOUTER DESIGN

Terri Courtemarche

PRINCIPAL/GRAPHIC DESIGNER

978.235.0339 / terric@scoutergraphicdesign.com

PORTFOLIO: www.scoutergraphicdesign.com

EDUCATION

BFA, University of North Florida / 1992

IDEO: Design for Change 2019 / Unlocking Creativity 2019 / From Superpowers to Great Teams 2018

EXPERIENCE

Scouter Design / Chelmsford, MA / Jan. 2020-present

Explore. Create. Connect.
Smart design that connects your story to your audience.

- Design brand identity systems, reports, collateral, and templates for small to mid-size businesses
- Provide clients with training on templates developed for their business
- Create 508c accessible documents in Indesign

VHB / Watertown, MA / Nov. 1993- Dec. 2019
Graphic Design Manager

- Art direct, mentor, train, and inspire an in-house team of designers
- Design included project branding, branded collateral for public outreach efforts, report design, infographics, presentations, email marketing, and signage/interpretive panels
- Develop templates and provide training to colleagues
- Create 508c accessible documents in Indesign
- Use brainstorming and conceptualizing exercises to push the boundaries of design

AIGA Mentorship Program / 2018

- Mentored a new graphic design graduate for six months
- Reviewed portfolio and provided support during job search

PRO BONO

Reach out and Read, MN / Infographic design
San Jose Library, CA / Infographic design
Tennessee Commission on Children & Youth / Logo design
Nashoba Neighbors / Logo design

AFFILIATIONS

AIGA Boston

certified WBENC WOMEN'S BUSINESS ENTERPRISE

Appendix B

SIGNATURE PAGE

BSC GROUP

BUILD | SUPPORT | CONNECT

Engineers
Environmental Scientists
Software Developers
Landscape Architects
Planners
Surveyors

www.bscgroup.com

FEBRUARY 11, 2022

Sara Devlin
Executive Director
Bangor Area Comprehensive Transportation System (BACTS)

RE: Vulnerability Assessment and Climate Action and Adaptation Plan
RFP# BACTS-2201

Dear Ms. Devlin:

I certify that all of the information contained in this Technical/Price Proposal to be true and accurate.

Sincerely,

BSC Group
John Audi, Ph.D., CCM
Senior Sustainability Advisor and Principal-In-Charge

BSC GROUP

WWW.BSCGROUP.COM