



# “Less Waste, Better Lives”

## Proposal for Developing Baltimore City’s Recycling and Solid Waste Management Master Plan

10 May 2018



Prepared by



10211 Wincopin Circle, 4<sup>th</sup> Floor  
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In collaboration with



NEXIGHT GROUP

Prepared for



Tower II, Suite 402  
100 S. Charles Street  
Baltimore, Maryland 21201-2705



10 May 2018

Northeast Maryland Waste Disposal Authority  
Tower II – Suite 402  
100 South Charles Street  
Baltimore, Maryland 21201-2705

Attention: Mr. Christopher Skaggs  
Executive Director

**Subject: Proposal for Developing Baltimore City's Recycling and Solid Waste Management Master Plan**

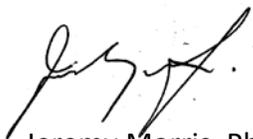
Dear Mr. Skaggs,

Geosyntec appreciates the opportunity to present this proposal to provide consulting services to the Northeast Maryland Waste Disposal Authority (Authority) in support of Baltimore City's Master Planning effort. This proposal was prepared in response to the 6 March 2018 Request for Proposal (RFP) issued by the Authority and the subsequent scope clarifications issued on 13 and 20 April 2018 and due date extension emailed on 23 April 2018.

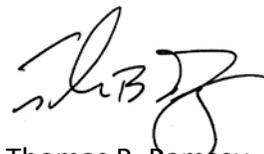
As described in the attached proposal, Geosyntec has assembled an experienced and capable team to address the complex and inter-related issues associated with the comprehensive scope of services outlined in the RFP. Our in-house team of solid waste advisors includes experts in benchmarking, planning, financial analysis, and operations assessment. Our team partners include Nexight Group, who bring expertise in stakeholder engagement, public communication, and website content management; Deltaway Energy International, who are industry leaders in assessment of waste-to-energy facility performance and operation; and Second Chance, a Baltimore City based 501(c)(3) non-profit organization that retrains and creates employment for displaced and unemployed workers by creating "green collar jobs" from deconstructing buildings and salvaging usable materials that would otherwise be disposed of.

We look forward to the review of our proposal by the Authority and City. If you have any questions regarding our proposal, please do not hesitate to contact us at (410) 381-4333.

Sincerely,



Jeremy Morris, Ph.D., P.E.  
Principal  
Project Manager



Thomas B. Ramsey, P.E.  
Principal  
Project Director



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## **APPENDICES**

APPENDIX 1: Company Brochures and Project Descriptions

APPENDIX 2: Resumes for Key Personnel

APPENDIX 3: Recent Publications

## **ATTACHMENT**

Budget Estimate Calculations (see separate MS Excel spreadsheet)



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### **1. INTRODUCTION**

#### **1.1 Overview and Terms of Reference**

This document presents Geosyntec Consultants' proposal for providing professional services to conduct a Master Planning study for Baltimore City, Maryland (the City). The working title for the planning effort is "Less Waste, Better Lives." This proposal presents Geosyntec's approach to perform the services required to support the project, with emphasis on the issues that will be critical to the successful completion of the final Master Plan within a relatively short timeframe. This proposal was prepared in response to the 6 March 2018 Request for Proposal (RFP) issued by the Northeast Maryland Waste Disposal Authority (Authority) and the Authority's subsequent scope clarifications issued on 13 April 2018 and 20 April 2018.

This proposal was prepared by Jeremy Morris, Ph.D., P.E. and was reviewed by Thomas Ramsey, P.E. in accordance with the firm's review policy. Geosyntec's proposed study team is uniquely qualified to deliver the required scope of services, which will be provided through Geosyntec's on-call contract with the Authority. Our proposal is based on information presented in the RFP as well as our considerable experience and understanding of issues associated with solid waste planning, recycling, and sustainable materials management, including for recent projects completed in Maryland. This proposal is organized as follows:

- Geosyntec's understanding of the RFP scope and goals for the Master Plan along with a summary of our value proposition based on identification of key issues for the planning effort are presented in the remainder of Section 1.
- The experience and specialized capabilities of key personnel within Geosyntec and our team partners is summarized in Section 2.
- The qualifications and representative project experience of Geosyntec and our team partners are presented in Section 3.
- The proposed approach to completing the scope of services is described in Section 4.
- Geosyntec's staffing plan with emphasis on our project management capabilities and the resource allocation necessary for timely completion of the scope of services is presented in Section 5.
- The proposed schedule for completion of the final Master Plan in accordance with the timeline and milestones indicated in the RFP is provided in Section 6.
- Geosyntec's price proposal is presented in Section 7.



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Finally, descriptions of representative projects are provided Appendix 1, resumes for key personnel are provided in Appendix 2, and recent relevant publications are reproduced in Appendix 3. Details regarding Geosyntec's budget calculations are provided in a separate MS Excel spreadsheet included as an attachment to this proposal.

## **1.2 Project Understanding and Goals**

From review of the RFP and our knowledge of issues surrounding solid waste management and recycling in Baltimore, Geosyntec understands that the City needs the Master Plan to be completed as soon as reasonably possible. This urgency is driven in large part by questions surrounding the City's future reliance on the Baltimore Refuse Energy Systems Co. (BRESKO) waste-to-energy (WTE) plant, which was constructed in the mid-1980s and is privately operated by Wheelabrator Technologies, Inc. Currently, BRESKO incinerates about 200,000 tons of City-sourced solid waste annually. However, the City's contract with BRESKO expires in 2021 and several advocacy groups have repeatedly called for the contract not to be renewed and for closure of the facility to be prioritized. BRESKO is not fitted with the state-of-the-art control systems necessary to meet strict air pollution control standards. Many state legislators also support removing subsidies for WTE facilities as a Tier 1 source of renewable energy under the state's Renewable Portfolio Standard. The City needs to carefully consider the practical implications and potential financial risk of relying on an aging facility, particularly given that Quarantine Road Landfill is nearing capacity and is not a suitable long-term alternative.

Another critical issue for this planning effort is that existing recycling rates in the City are amongst the lowest in Maryland. The City Council has taken the initiative of adopting a Zero Waste goal for Baltimore to move away from landfill disposal and incineration. However, this requires significant improvements to recycling and waste diversion in the City. Any improvements made need to be financially sustainable over the long term. Geosyntec has worked with several public solid waste agencies that – like DPW – are increasingly dealing with issues such as implementation of new regulations, escalating labor and operating costs, and uncertainty in recycling commodity markets. Layered onto these are calls from political decision-makers to do more with less while an increasingly engaged public continually demands more recycling and implementation of zero waste goals. Without comprehensive evaluation of their current organizational, financial, and operational activities, many agencies end up pursuing well-intentioned new activities without understanding the unintended consequences upon their existing systems and finances.

Against this backdrop, Geosyntec understands that the key goals for the City's Master Planning effort are to:



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- Develop a clear and realistic future vision of the City's solid waste recycling program and operations over both the near- and long-term with the goal of maximizing waste reduction, reuse/repair, recycling, and sustainable management of materials through 2040 and beyond;
- Develop actionable strategies with projected costs, timelines, and outcomes to achieve this vision;
- Encourage meaningful discussion and input to the planning effort from stakeholders through a facilitated stakeholder engagement program;
- Establish clear lines of communication to inform the public on project goals and progress via a website hosting key documents, schedules, and an easy-access mechanism for City residents to provide input; and
- Identify potential impacts on existing solid waste management programs, facilities, and operations, including new investments, initiatives, changes in methods of operations, and retiring or replacement of existing facilities.

The City's goals for the Master Plan are far-sighted, as illustrated by the multi-phased approach identified in the RFP in which the scope of services is divided into eleven closely-detailed and broadly sequential tasks. We are pleased to see clear intent in the RFP for the City's Department of Public Works (DPW) to provide a strong leadership role and a commitment to assign an internal project manager to coordinate City efforts and guide the input and involvement of other City Government departments. Strong client leadership will be essential for helping to guide this complex and multi-faceted project to completion in a timely manner.

### **1.3 Geosyntec's Value Proposition**

To meet the key objectives for the Master Plan within the aggressive timeframe identified in the RFP, Geosyntec has identified several key issues that we believe will be critical drivers for success. Based on review of the RFP and understanding of the City's project objectives and the solid waste and recycling issues they face, we offer what we hope is a compelling value proposition for selection of the Geosyntec team, as summarized below.

#### **1. Availability and depth of professional resources allocated to the project amongst the proposed partner firms (see Section 2)**

The team of professionals assembled by Geosyntec for this project have the insight, resources, and experience to provide objective answers based on strong independent analysis. Our team includes Geosyntec as the prime consultant supported by three specialty subconsultant firms,



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brought together to provide the comprehensive range of services needed for a successful project outcome for the City.

- **Geosyntec's** team members includes experts in recycling practices and operations, planning and strategy consulting for waste processing and recycling systems, financial and economic feasibility evaluations, and waste characterization studies and interpretation/review of data.
- **Deltaway** brings industry-leading expertise WTE plant performance, operation, and maintenance management.
- **Nexight** brings expert facilitators in stakeholder outreach and engagement as well as graphical communication and website content management specialists.
- **Second Chance** retrains and creates employment for displaced and unemployed workers in Baltimore by creating "green collar jobs" from deconstructing buildings and homes and salvaging usable materials that would otherwise be disposed of in a landfill.

### **2. Practice leadership and expertise (see Section 3)**

Geosyntec's Dr. Marc Rogoff is one of the nation's top experts with over 35 years of experience during which he has completed well over 200 solid waste planning and advisory assignments. He is the former Director of the Collection and Transfer Technical Division with the Solid Waste Association of North America (SWANA) and was awarded SWANA's 2018 Distinguished Individual Achievement Award in March 2018. He also currently serves on SWANA's Executive Board.

In the past two years, Geosyntec professionals have published more than 70 peer-reviewed technical publications in various professional journals and conference proceedings. These publications demonstrate the firm's commitment to industry leadership and technical innovation. Geosyntec personnel routinely support and provide leadership for industry associations such as SWANA and the Global Waste Management Symposium organized by the Environmental Research and Education Foundation (EREF).

### **3. Measurement and benchmarking (see Section 3.8)**

The adage that "you can't manage what you can't measure" never rang truer. Geosyntec's senior team has unrivaled expertise in objectively reviewing, analyzing, and measuring operational outcomes and key performance indicators and comparing them to industry benchmarks via data and models that we have developed over the course of our careers. Dr. Rogoff is actively involved in current industry standardization efforts. He is helping to develop SWANA's Technical Policy T-12 "Measuring Recycling," due to be published later this year, to provide standardized and



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transparent methodologies for calculating recycling rates across different organizations, program types, and specific materials.

**4. Experience with engagement of public stakeholders (see Section 3.12)**

Geosyntec recognizes the importance of stakeholder engagement in highly visible planning projects conducted by organizations such as DPW charged with protecting the public good. We also recognize that traditional engineering firms can sometimes be perceived as "tone deaf" by the public, needlessly using technical jargon or projecting themselves as ivory tower experts when leading stakeholder engagement activities. Our partner Nexight offers globally recognized expertise in stakeholder and expert engagement, communications, and outreach that can bridge the gap between policy makers, agencies, engineers and experts, and the public.

**5. Transparency and clarity of communication (see Section 3.13)**

Providing online access to project materials during the planning process creates transparency from the start, meaning that key audiences and stakeholders are more likely to support the plan and its implementation once it is approved. Nexight's communications team offers in-house award-winning writing and editing, graphic design, and multimedia expertise, and specializes in developing and tailoring technical communication materials for non-technical audiences.

**6. Project management and ability to meet aggressive schedule (see Section 5.3)**

We understand that time is of the essence on this project. Geosyntec will implement a robust program management program in the areas of budget and schedule control, quality control, and communications management. Geosyntec's team is very experienced working on complex projects with aggressive schedules.

**7. Understanding of solid waste and recycling regulations in Maryland (see Section 3.10)**

Through our extensive project work at solid waste facilities in Maryland, Geosyntec has developed and maintained excellent reputations with the Maryland Department of the Environment for successful delivery of high-quality projects and planning documents. In the fast-changing field of solid waste planning and recycling, we have relevant, up-to-date experience in several Maryland counties, including Caroline, Cecil, Dorchester, Frederick, Queen Anne's, and Wicomico.



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**8. Local offices and availability of support staff (see Sections 2.1 and 5.2)**

Geosyntec's proposing office on this study is in Columbia, Maryland, less than 20 miles from Baltimore. Our partner Second Chance is based in Baltimore City while Nexight's office is in Silver Spring. Several senior members of the proposed project team, including Geosyntec's Project Manager Jeremy Morris and Nexight's Director of Communications Lindsay Pack, are Baltimore City homeowners with a personally vested interest in a practical, sustainable, and cost-effective outcome from this planning effort. Our engineering group in Columbia comprises 19 professionals, including 12 junior- and mid-level engineers and three CAD designers. These staff resources will be available to support work on this project as necessary to ensure completion within the compressed timeframe.

**9. Experience with successful similar project in Maryland completed under contract with the Authority (see Section 3 and Appendix 1)**

In 2017, Geosyntec and Nexight successfully completed a study for Frederick County titled "Solid Waste Management and Recycling Options" to investigate potential methods for achieving incremental improvements in countywide waste diversion and recycling rates between 2020 and 2040 in accordance with the updated Maryland Recycling Act and other existing/proposed Maryland legislation.



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## **2. INTRODUCTION TO THE PROPOSED PROJECT TEAM**

### **2.1 Partner Firms**

The team assembled for this project includes Geosyntec as the prime consultant supported by three specialty subconsultant firms. A brief introduction to each of the partner firms is provided below, followed by additional information regarding each team member's roles and qualifications as well as the partner companies' relevant project experience. Additional details are provided in Appendix 1.

#### **2.1.1 Geosyntec Consultants, Inc.**

Founded in 1983, Geosyntec ([www.geosyntec.com](http://www.geosyntec.com)) is a specialized technical advisory and consulting engineering firm that works with private and public-sector clients in the built and natural environment.

**Geosyntec**  
consultants

engineers | scientists | innovators

An employee-owned firm with a staff of nearly 1,300, Geosyntec serves clients from more than 80 offices in the United States, Canada, Europe, and Australia. Most of Geosyntec's staff hold advanced degrees and have significant experience implementing complex technical, commercial, and financial solutions in the field. Our vision of success builds on our internal culture of technical excellence and the outstanding qualities of our staff and their common commitment to exceptional client service. Our goals are not only to provide cost-effective and innovative solutions, but also to invest in understanding our clients' challenges and opportunities so we can help them achieve success. We are proud of the significant volume of repeat business that we earn from existing clients as being representative of the trust they place in our continued ability to deliver.

**Geosyntec's proposing office on this study is in Columbia, only 20 miles from Baltimore City. Our team, led by Jeremy Morris and Tom Ramsey and drawing on the vast experience of Marc Rogoff, offers nationally recognized expertise in the solid waste industry and deep experience providing services to local government clients.** With over 30 years of service, our professionals have been involved in more than 1,000 solid waste management projects for private clients as well as municipalities, local and state governments, regional authorities, and national governmental agencies. The range of professional services provided by Geosyntec that are of relevance to this proposal includes:

1. Solid waste minimization, diversion, and recycling studies;
2. Waste flow analysis (collection and hauling), composition, and generation studies;
3. Strategic planning and transactional advice;



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4. Financial modeling, due diligence, and cost/benefit analyses for solid waste facilities;
5. Optimization of financial and operations management; and
6. Design, permitting, construction, repair/maintenance, and decommissioning/closure of transfer stations, materials recovery facilities (MRFs), composting facilities, and landfills.

Unique amongst our peer firms, in addition to technical services **Geosyntec provides due diligence and financial advisory specialists such as Bill Gaffigan, former Vice President of Mergers and Acquisitions with a large public waste company, who offers a wealth of experience evaluating solid waste systems and infrastructure assets under a variety of project delivery and contracting mechanisms.** Our clients are increasingly driven to improve performance, secure value for money, and optimize use of assets. To assist their understanding of market drivers and operational issues, our advisory specialists translate technical and commercial issues into financial analyses and support for financial models with clear recommendations made without bias or allegiance to any vendor, service, or product. Geosyntec’s exceptional advisory capabilities are made possible by our practice leaders’ unique understanding of the symbiotic relationship between the technical aspects and the financial performance of solid waste projects. Additional information on our capital, assets, and transactions (CAT) advisory services is available at [www.geosyntec-cat.com](http://www.geosyntec-cat.com).

### **2.1.2 Nexight Group, LLC**

Nexight ([www.nexightgroup.com](http://www.nexightgroup.com)) is a small business based in Silver Spring with globally recognized expertise in stakeholder and expert engagement, facilitation and strategic planning, program management, and communications and outreach. **NEXIGHT GROUP**  
**Nexight’s trained facilitators and award-winning communications team have extensive experience engaging a variety of stakeholders through carefully planned facilitated meetings and supporting outreach and communications efforts through the writing and design of technical reports, fact sheets, graphics, and presentations that resonate with target audiences.** Nexight staff have facilitated more than 350 stakeholder sessions on six continents and developed more than 100 strategic plans and technical roadmaps for government programs and large industries. Nexight has established an outstanding reputation with U.S. Government agencies and elsewhere in developing forward-looking and measurable strategies, identifying and mitigating program risk, and expertly engaging stakeholders within and across organizations to ensure long-term visions become reality. Nexight has successfully completed more than 200 contracts for eight Federal agencies—including prime contracts with Departments of Homeland Security, Labor, and Agriculture, and the National Science Foundation—and more than 35 commercial customers. These contracts



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range in size from \$10,000 to nearly \$10 million, with periods of performance that range from one month to nearly four years.

**2.1.3 Deltaway Energy International, Inc.**

Founded in 2003, Deltaway ([www.deltaway.com](http://www.deltaway.com)) is a U.S.-based company that deploys design, construction, operation, and maintenance experts to WTE and biomass



power plants. The Deltaway team consists of more than 35 mechanical, structural, electrical, and civil engineers and other specialists who can be deployed worldwide to meet the specific requirements of a project. With hands-on experience gained on more than 100 projects in over 20 countries in North and South America, Europe, and Asia, Deltaway staffs projects with results-oriented experts who work closely with facility owner/operator teams to operate, maintain, and optimize plants on a long-term basis. Deltaway’s professional staff also provide plant general design and targeted upgrades and modifications to improve performance. **Deltaway brings industry leadership in traditional and next-generation WTE technologies, applying industry best practices and proven performance improvement tools – many developed in-house – to develop solutions to help clients understand their facility’s operation, increase income, and reduce costs.** By offering an integrated suite of services and experts, Deltaway customizes their services to the specific needs of a job, big or small, to deliver measurable results.

**2.1.4 Second Chance, Inc.**

**Second Chance, Inc. is a 501(c)(3) nonprofit corporation in Baltimore City** that provides people, materials, and the environment with a second chance ([www.secondchanceinc.org](http://www.secondchanceinc.org)). Second Chance was founded in 2001 to develop solutions to sustainable employment and environmental issues. **Their core**



**mission is to retrain and create employment for displaced and unemployed workers by creating “green collar jobs” from deconstructing buildings and homes and salvaging usable materials that would otherwise be disposed of in a landfill.** Second Chance repurposes reclaimed materials and offers them and other donated goods to the public at a discount, helping fund their job training and workforce development programs that primarily serve those who face employment obstacles in the Baltimore region. Mark Foster, the organization’s founder, helped launch the Deconstruction Training Program in collaboration with the Mayor’s Office of Employment Development. Since their inception in 2001, Second Chance has diverted over 4.8 million pounds of material from disposal and has generated over 65,000 labor hours. Today, the organization trains and hires unemployed individuals in deconstruction, salvage, warehousing,



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retail, operations, transportation, and customer service, and works with local architects, builders, developers, and property owners to identify residential and commercial buildings entering the demolition phase and remove all reusable elements through deconstruction for waste diversion and resale to consumers.

## **2.2 Project Team Capabilities, Experience, and Proposed Role**

Geosyntec proposes to staff this project with professionals from the partner firms that offer extensive and relevant experience to support the City and Authority in the master planning effort. Brief biographies are provided below; resumes are provided in Appendix 2.

### **2.2.1 Geosyntec Project Manager and Project Director**

#### ***Project Manager – Jeremy Morris, Ph.D., P.E. (Principal)***

Dr. Morris is an internationally recognized subject matter expert with over 18 years of experience in solid waste management. He provides strategic advisory services on solid waste planning, including market valuations and feasibility analyses of alternative waste conversion technologies, and options for meeting waste diversion and recycling goals. Beyond design and permitting of new disposal facilities, his Maryland project experience extends to preparation of Solid Waste Management Plans, performing operational reviews and advising on implementing best practices, and evaluating options for future solid waste management, including waste transfer/processing and composting. Dr. Morris is an accomplished technical writer, having published over 55 conference and peer-review journal articles, and has served as lead author on several U.S. EPA research reports and guidance documents.

A proactive and experienced Project Manager who has worked in Geosyntec's Maryland office since 2001, Dr. Morris offers directly relevant technical experience and a demonstrated capacity for managing and implementing technically challenging project assignments. In this role, he will coordinate the work of the project team and be responsible for all deliverables in accordance with requisite levels of quality. He will also ensure that schedules and budgets are met and will serve as the primary day-to-day contact for the Authority and City. **Dr. Morris is a resident of Baltimore City**, which will enable easy scheduling of meetings with the City, including *ad hoc* meetings on short notice.

#### ***Project Director – Thomas Ramsey, P.E. (Principal)***

Mr. Ramsey is an environmental engineer with over 25 years of experience in landfill, transfer station, and MRF operations, engineering, and construction. Prior to joining Geosyntec in 2002,



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Mr. Ramsey worked with a major private solid waste company and for 12 years was responsible for the management of 20 landfills and 20 transfer stations in the Southeast, including several regional facilities that disposed over 3,000 tons per day. As part of this work, he regularly reviewed operating practices to reduce costs and improve performance. This specifically included review of operating practices, heavy equipment maintenance, capital project planning and budgeting, and staffing. Mr. Ramsey offers a unique understanding of how facility design and construction has a direct impact on ongoing and future costs associated with solid waste operations. This experience from both an engineer's and owner's perspective is rare among professional consultants and enables him to better identify simple, robust, and effective means for reducing capital and operational costs.

In addition to providing technical input on solid waste and recycling operations, Mr. Ramsey will serve as Project Director. In this role, he will supervise peer and senior review of all work products, verify compliance with the contract terms, schedule, and budget, and ensure the requisite level of quality is provided on all work products. The Project Director is also responsible for customer service and problem resolution. Tom's experience in this role with Geosyntec extends back over 15 years.

### **2.2.2 Geosyntec Task Leaders and Support Professionals**

#### ***Task Leader – Marc Rogoff, Ph.D. (Senior Consultant)***

With over 35 years of experience, Dr. Rogoff is one of the nation's top experts in solid waste collection, the evaluation of rates, cost allocation studies, system valuations, and the development of master plans for solid waste agencies. He has held executive management positions in both local government and in the private sector. His efforts have included the development of innovative collection and recycling programs, provided guidance on public education and outreach programs, and assisted in grant programs. He has conducted more than 50 solid waste collection studies enabling his clients to improve efficiencies. He has also developed and led engagement strategies with stakeholder groups and regulators under a variety of state, Federal and international regulatory programs. Dr. Rogoff is the **former Director of the Collection and Transfer Technical Division with SWANA and was awarded their 2018 Distinguished Individual Achievement Award in March 2018.**





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He currently serves on SWANA’s Executive Board. He has authored more than 150 articles published in solid waste industry trade journals (recent examples are reproduced in Appendix 3). Marc is also the author of eight textbooks, including APWA’s guidance on [“Solid Waste Rate Setting and Financing.”](#) Working closely with Jeremy Morris and Bill Gaffigan, Marc Rogoff will serve a task leadership role in Tasks 4, 5, and 7.

***Task Leader – William Gaffigan, MBA, CVA (Principal)***

Mr. Gaffigan is a financial professional with more than 25 years of experience as an executive and consultant in the solid waste industry. In his solid waste industry career prior to joining Geosyntec in 2013, he served as a regional controller over 22 operations for a large public waste company, and Vice President of Mergers and Acquisitions. He has provided financial and operational consulting for municipalities and other public entities, investors, and private waste companies. He has valued over 100 hauling businesses and contracts, transfer station and MRF operations, and landfills, and has brought over 60 transactions to financial close. He has been called upon and qualified as an expert witness on several occasions to value solid waste operations and has extensive experience in cost and pricing structures associated with solid waste systems. He has also conducted multiple reserve analyses under Statement No. 18 of Governmental Accounting Standards Board Accounting for Municipal Solid Waste Landfill Closure and Post Closure Care Costs (GASB 18). Working closely with Jeremy Morris and Marc Rogoff, Bill Gaffigan will serve a task leadership role in Tasks 3 and 4.

***Task Leader – Michael Hansen, BCES, CHMM (Senior Professional)***

Mr. Hansen will serve as Task Leader for the four-season waste sorts in Task 0. He is a Board Certified Environmental Scientist and a Certified Hazardous Materials Manager with 14 years of experience in performing emergency planning, disaster and emergency response, environmental site characterization, and waste characterization and management. He has served as project and site manager for large-scale field projects lasting months and involving multiple staff and concurrent activities. Mr. Hansen has led the design and execution of multiple remediation projects involving soil excavation, waste characterization, and off-site transport and disposal. Mr. Hansen has also participated in multiple specialized RCRA training courses relating to remediation and production waste generation, characterization, management, and recordkeeping. He is experienced in managing multiple media including waste, soil, bedrock, groundwater, surface water, and sediment.

Mr. Hansen also serves as the Health and Safety Manager for the Columbia, Maryland and Pittsburgh, Pennsylvania offices of Geosyntec. In that capacity, he has delivered OSHA



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HAZWOPER refresher training for the past seven years, including modules on waste characterization and management, selection and use of personal protective equipment (PPE), and facility safety.

***Technical Support – Jennifer Padgett, P.E. (Project Engineer)***

A chemical engineer by training, Ms. Padgett is a Project Engineer with Geosyntec. Her academic background includes a project to quantify carbon sequestration and greenhouse gas (GHG) emission control, she measured the maximum extent of wood biodegradability under bioreactor landfill conditions, both at laboratory and field scale. Since joining Geosyntec in 2009, she has also been involved in the planning and design of several solid waste projects in Maryland and the mid-Atlantic for which her experience includes: performing engineering analyses for landfill liner and closure system designs, landfill gas control systems, stormwater management systems, and preparation of construction bid documents, including technical specifications and cost estimates. She has also been involved in several studies to characterize various waste and recycling stream at MRFs and transfer stations as well as projects to develop integrated solid waste services.

***Technical Support – Sean O'Donnell, Ph.D., E.I.T. (Senior Staff Engineer)***

Dr. O'Donnell, a civil/environmental engineer with Geosyntec, has a strong background in performing analytical computations at the intersection of engineering and economics. He has practical experience in solid waste management and has contributed to several waste planning and alternatives studies in Maryland. For our recent recycling study in Frederick County, Maryland, he led evaluation of options for separate collection and composting of organics from single family and multifamily residences, restaurants, and schools. He was also involved in preparing a waste options study for the Midshore counties on the Eastern Shore. As part of that study, he analyzed multiple options for the development of a new solid waste facility, including constructing a traditional landfill, building a gasification facility, building a composting facility, and/or constructing a WTE facility.

### **2.2.3 Nexight Task Leaders and Support Professionals**

***Task Leader – Ross Brindle (Nexight Founder and CEO, Expert Facilitator)***

Ross Brindle will lead the stakeholder engagement process in Task 1. He manages Nexight's strategic planning, technology roadmapping, energy and environmental analysis, stakeholder engagement, and technical communications practices, serving a variety of public- and private-sector clients. He has facilitated more than 350 roadmapping workshops, strategic and program planning meetings, industry working groups, and peer reviews on six continents over the last 20



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years. He is an expert in all phases of the facilitated workshop process and has worked extensively with clients to conceptualize the desired product and outcome and to develop an appropriate workshop design and facilitation approach. His diverse facilitation and roadmapping experience spans dozens of topics in the energy, infrastructure protection, manufacturing, basic science, and global health areas. Through this experience, Mr. Brindle has honed his ability to understand and facilitate highly technical discussions in areas outside his immediate experience, enabling him to serve a broad range of clients.

### ***Task Leader – Lindsay Pack (Nexight Director of Communications)***

Lindsay Pack has led writing and editing, graphic design, and branded outreach efforts for the past 12 years, and will lead the project team's effort on Task 2. She specializes in crafting strategic communications that combine sharp writing and functional design to accurately convey complex technical information in the energy, materials and manufacturing, health, and security sectors. Ms. Pack has written, designed, and managed the review process for more than 160 technical communications pieces, including roadmaps, strategic plans, reports, fact sheets, and web content for government programs, professional societies, academia, commercial, and non-profit organizations. Her experience includes implementing client style guides and coordinating reviews with appropriate technical experts, writers/editors, and senior staff. Ms. Pack has developed more than 75 original infographics to express complex processes and concepts for use in roadmaps, strategic plans, standalone print or web pieces, and other communications materials, and regularly designs logos, templates, and communications materials to incorporate modern visual branding that aligns with client style, messaging, and objectives. She also regularly develops outreach and engagement strategies to effectively launch strategic plans and roadmaps to a wide range of stakeholders. This includes conducting audience analyses to characterize target audiences and their preferences and to identify relevant channels and messaging, and crafting suites of branded communications materials to accompany these strategies. **Ms. Pack is a resident of Baltimore City**, which will enable easy scheduling of meetings with the City, including potential *ad hoc* meetings on short notice.

### ***Stakeholder Engagement Support – Sarah Lichtner (Nexight Project Manager, Facilitator)***

Sarah Lichtner manages large, time-intensive projects with precision and produces polished, well-researched products on a variety of technical topics, including energy, climate change, materials science, manufacturing, and biological science, that effectively communicate to and persuade target audiences to act. Ms. Lichtner has supported facilitation of more than 60 client meetings and has conducted hundreds of telephone interviews to gather perspectives from researchers, academics, government agencies, industry, technology end users, and the public. She specializes



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in organizing and presenting vast amounts of technical information (including interview, survey, and meeting results) to convey key messages clearly and accurately. She has structured and written more than 100 strategic plans, roadmaps, and technical reports and has supported project management, stakeholder engagement and facilitation, and technical communications for a variety of clients from the commercial sector, government, academia, and nonprofit organizations.

***Website Content Management – Julianne Puckett (Nexight Senior Consultant)***

Julianne Puckett has more than 20 years’ experience planning, designing, and developing web sites, software applications, and other digital products. Her extensive career experiences as a writer, editor, designer, and blogger give her the unique ability to identify and reach the right audiences with the right messages to deliver meaningful interactive experiences. Ms. Puckett is a passionate advocate for the end user and believes that all digital content should not just be created but carefully structured, designed, and disseminated to ensure that it is findable, usable, and compelling. Her diverse experience has included developing patient information portals for clinical trials at the Duke Clinical Research Institute, designing on-device mobile storefronts for AT&T, writing consumer education content and instructional video scripts for GE Appliances, optimizing trip booking engines and crafting an online travel information strategy for AAA, and designing data security dashboards for an international banking group. She has diverse experience with stakeholder engagement, including for the U.S. Department of Defense, U.S. Department of Energy, U.S. Department of Homeland Security, NASA, and ASTM International.

**2.2.4 Deltaway Technical Experts**

***Technical Lead and Project Manager – Francois Screve (President and Founder)***

Deltaway will provide expert, objective evaluation of BRESKO to help understand its potential long-term performance and costs of operation, which will be critical to making a final recommendation for continued/discontinued use of the facility for disposal of “what’s left” in Task 7. Deltaway’s team will be led by Mr. Screve, who offers extensive experience in the development, optimization, and management of WTE and biomass projects, from initial feasibility to general design, commissioning, and commercial operations. With 30 years of hands-on work on solid-fuel power plants in Asia, North America, and Europe, Francois offers balanced expertise in design, operations, and financial performance. He is a results-oriented leader with a strong record of performance.



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***Facility Performance Review – Fred Caillard (Vice President of Performance and Engineering)***

Mr. Caillard’s areas of expertise are steam cycle efficiency, WTE boilers and air pollution control operations, performance modeling, and project economics. He has performed numerous plant-wide or equipment-specific heat and mass balances and has created results-oriented monitoring tools and services for several facilities. His strong problem solving and data analysis skills have enabled him to lead more than 20 performance improvement projects in Europe and North America.

***O&M Assessments and Cost Estimations – Craig Durr (Plant Management Consultant)***

Mr. Durr is a seasoned power plant manager turned consultant with more than 30 years of operational and maintenance (O&M) management experience. He has a proven track record of producing exceptional results, with significant hands-on experience operating and maintaining various types of power plants. Over the last 25 years he has led senior managers, front line supervisors, and guided hourly employees. He is a turnaround specialist who set every performance record in facility history in the first three years at the Covanta Warren facility in New Jersey after taking over as Facility Manager, where he attained OSHA Voluntary Protection Programs (VPP) Star Certification for promoting effective worksite-based safety management systems.

**2.2.5 Second Chance Team Leadership**

Through their connections to job training and employment programs for displaced and unemployed workers aimed at creating “green collar jobs” from deconstructing buildings and homes and salvaging usable materials that would otherwise be disposed of in a landfill, Second Chance will be responsible for staffing the four-season waste sorts conducted in Task 0. In addition, Second Chance’s leadership team will play a pivotal role in:

- Helping to develop the Waste Sort Work Plan to provide guidance on identifying materials with reuse/repurpose value;
- Providing a representative to take part in the stakeholder engagement process in Task 1 to provide their unique perspective on waste diversion and resource recovery in the context of “green collar job” creation; implementation of ordinances, policies, and/or incentives to increase recycling from demolition projects; and the potential role of non-profits in addressing waste and recycling issues in the City;
- Assist in consideration of options for improving the City’s current diversion/recycling rates in Task 5; and



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- Attend the "town hall" style meeting in support of Geosyntec in Task 8.

***Team Leader – Mark Foster (President and CEO)***

Personnel to be employed on the project will be detailed later if Geosyntec's team is successful at being awarded the work; however, the participation of Second Chance will be managed by Mark Foster, the founder of Second Chance. Mr. Foster has served as President and Chief Executive Officer from the organization's inception in 2001. He opened the organization's original 15,000 ft<sup>2</sup> warehouse on Warner Street in February 2003 and in October 2003, launched the Deconstruction Training Program in collaboration with the Mayor's Office of Employment Development. He has since overseen the successful relocation and expansion of Second Chance to its current 250,000 ft<sup>2</sup> warehouse on Ridgely Street. Second Chance has gone from four employees in 2003 to over 200 and has experienced double digit growth every year. Mark continues to serve in a managerial capacity internally, as well as extending his expertise in external advising and community outreach on behalf of the organization's core mission values of providing sustainable employment opportunities to disadvantaged people in Baltimore. **He was raised in Baltimore where he remains a resident and advocate for the city, its people, and its opportunities.**



### **3. QUALIFICATIONS AND REPRESENTATIVE EXPERIENCE**

As introduced in Section 2, Geosyntec has assembled a multi-disciplinary team of highly qualified professionals to provide the services described in the RFP. Geosyntec’s team members includes experts in recycling practices and operations, planning and strategy consulting for waste processing and recycling systems, financial and economic feasibility evaluations, and waste characterization studies and interpretation/review of data. Deltaway brings industry-leading expertise in WTE plant performance, operation, and maintenance management. Nexight brings expert facilitators in stakeholder outreach and engagement, as well as graphical communication specialists and website content designers. Although not elaborated in this section, Second Chance retrains and creates employment for displaced and unemployed workers in Baltimore by creating “green collar jobs” from deconstructing buildings and homes and salvaging usable materials that would otherwise be disposed of in a landfill. More detailed descriptions of the partner firms and/or representative projects are provided Appendix 1.

#### **3.1 Strategic Planning and Decision-Making Support**

Geosyntec offers deep experience and knowledge of solid waste planning in accordance with state and local goals for waste diversion and recycling while considering dynamic market conditions. Our expertise is built upon a legacy of being recognized leaders in helping our clients implement environmental solutions in a safe, efficient, and cost-effective manner. We are emerging as national leaders in sustainable materials management, specializing in identifying strategies to accomplish financial and environmental goals established with stakeholders and preparing action plans to detail how the strategy will be implemented. These plans serve to identify and quantify materials that could be diverted for recycling or serve as feedstock for recovery and conversion facilities. Once a strategy has been identified and agreed upon, we develop tools and training materials to educate managers and stakeholders about the strategy. We also develop performance metrics against which to measure the success of new strategies and identify where improvements can be made.

As an example, Geosyntec recently reassessed the Master Plan for Cecil County, Maryland to incorporate lifecycle revenue and expense costs associated with construction and operation of alternative waste processing facilities (e.g., composting, MRFs) into the financial schedule for sequential development of their solid waste facility. The updated Master Plan enables critical assessment of proposed on- or off-site waste processing and transfer facilities and changes in operations to evaluate whether they represent optimal use of resources or whether alternative approaches would better serve the County’s current and future needs. The Master Plan gives the County the flexibility to modify plans in response to various timelines for implementing new



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Maryland regulations, such as the proposed Zero Waste goals. The main deliverable was a flexible and interactive MS Excel decision tool for assessing the optimal timing of major capital improvement projects under a holistic waste management strategy.

**Dr. Marc Rogoff, who recently joined Geosyntec's growing solid waste advisory team, is a national leader in sustainable materials management. He has completed over 200 solid waste planning, collection assessments, and financial advisory assignments during his 35-year career.** Recent examples of planning studies completed for public clients include Orange County FL, City of Waco TX, Oklahoma City OK, City of West Palm Beach FL, City of Killeen TX, City of Springfield MA, Southeastern Public Service Authority (SPSA) in Chesapeake VA, and the City of Kirkwood, MO, an inner-ring suburb of St. Louis. In the latter study, Marc led a team that investigated ways to streamline costs and improve services to residents. He completed an analysis of alternatives to assist the City as they dealt with challenges, including providing cost-effective solid waste services and future management options. Additional details on this project are provided in his March 2017 article for Waste Advantage Magazine reproduced in Appendix 3.

### **3.2 Analysis of Integrated Solid Waste Management and Recycling Programs**

Geosyntec has extensive experience performing watershed analyses of integrated waste management and recycling systems that allow us to identify where materials are going, how they are being managed, and what the market rates are for services. We have designed waste sorting protocols and conducted waste characterization studies for specific processing technologies for recovery of recyclables and organics for composting. We have experience helping our clients understand the highly variable revenue streams that can come from recyclable commodity sales and have expertise at identifying and valuing alternative revenue sources (tax credits, renewable fuels credits, commodity revenue sharing, franchise royalties, asset valuations, etc.) to maximize financial benefits. Of potential interest to this RFP is our knowledge of emerging technologies. Historically, many start-up technologies and companies in the waste management industry have touted their services as "revolutionary" or "game-changing," yet ended as failures because they overlooked fundamental economic or technical issues. Geosyntec has helped guide public-sector clients to objectively and scientifically review and select new technologies.

Currently, Geosyntec is assisting Maryland Environmental Service (MES) plan for cost-effective approaches for a potential greenfield landfill development on the Eastern Shore. State policies and regulations aimed at reducing dependency on landfilling, such as Governor O'Malley's landfill moratorium and 2014 Zero Waste Plan, while not currently in force, are indicative of future challenges that may be expected when permitting new disposal facilities. Geosyntec performed a cost/benefit analysis of five different facility development scenarios, including options for



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developing a gasifier or composting plant, which will require sorting of suitable feedstock into three streams: recyclables (for sale), organics (for further processing at a gasifier or compost facility), and rejects (for disposal along with organic process residues in a smaller on-site landfill). Although still at the preliminary stage, Geosyntec has provided MES with comparative performance metrics from the analysis in terms of unit costs (i.e., \$/ton), capital budgets for project development in NPV terms, and overall system performance (e.g., increased level of waste diversion expected).

### **3.3 Operational and Organizational Assessments**

Geosyntec assists its clients in ensuring that their operations are cost-effective, achieve waste reduction goals, and meet long-term community needs. For many clients, we have provided analysis and guidance in planning and designing the administrative structure for the effective management of solid waste systems. This includes organizational analysis, development of performance measures to gauge efficiency of programs and services, and evaluation of administration of personnel, physical, and financial resources, and benchmarking. We make certain that new or modified planning strategies and objectives are appropriate, financially sound, and viable. We provide operation evaluations that accurately determine the effectiveness, efficiency, and safety of services provided by contract operators. We identify causes of performance shortfalls, offer proven recommendations to reduce costs and improve productivity and services, and assist with monitoring program results. As part of these efforts, we have prepared organizational audits, conducted regulatory compliance assessments, provided cost estimations for operation, maintenance, and equipment replacement, designed management information systems, and assisted in reorganizational planning and selection of personnel to fill key positions. We have identified the organizational strategy and then planned the structure of resources needed to implement effective system management to achieve the goals of the organization. Our efforts have resulted in improved allocation of resources, expanded and more-reliable services, enhanced worker training and safety, reduced customer complaints, and lower costs.

As an example of our services, in 2014 the Solid Waste Authority of Central Ohio (SWACO) retained Geosyntec to provide an independent assessment of their operations, capital planning, and maintenance challenges. SWACO manages over a million tons of solid waste annually through an integrated regional network of waste processing, transfer, and disposal assets. **Geosyntec's approach was to review and separate operations that were generally well-run and efficient from those needing improvements. For the latter, we develop prioritized, actionable recommendations for improving operational efficiency and financial performance based on implementation of Best Management Practices (BMPs) where these were lacking.** We also



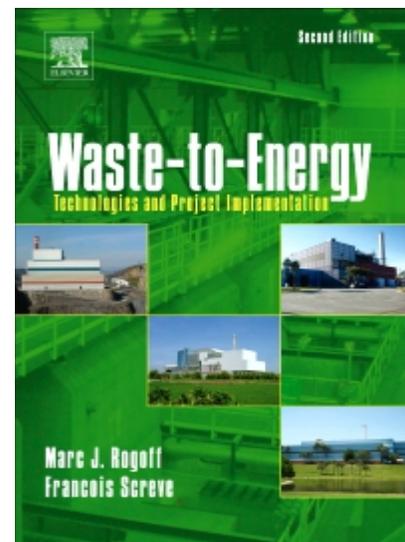
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provided recommendations on improving organizational structure, overhauling budgeting procedures and cash flow tracking systems, and improving data collection and management systems, and provided SWACO with a revised capital planning model and risk management approach.

In another example, Geosyntec is providing a Programmatic, Operational, and Financial Assessment for the Augusta-Richmond consolidated government (Augusta), Georgia’s second largest city. Their services include managing waste and recycling collection services for 65,000 households and businesses, programs for their downtown district, operation of a landfill and public drop-off centers, and maintenance of public education programs. Through a franchise collection agreement and their internal operations, the city manages over one million customers “touches” monthly. The scope of services for Geosyntec’s engagement entailed an assessment of over 20 specific tasks and questions related to these programs, operations, and financial position. Geosyntec deployed a multi-disciplinary senior team of experts to conduct data collection, analysis, on-site visits, and interviews. **Through our comprehensive assessment, Geosyntec was able to diagnose and communicate where Augusta was performing at or above industry standards and where improvement could be made. To date, we have made over 85 specific recommendations to improve efficiency, compliance, safety, and cash flow, many of which were immediately actionable and have been implemented.** Other recommendations are under review or are the subject of ongoing analyses.

**3.4 Operation and Performance of Waste-to-Energy Facilities**

Together, Deltaway’s team led by Francois Screve and Geosyntec’s Marc Rogoff have unrivaled experience nationally and internationally on WTE facilities such as BRESCO. Deltaway has worked on more than 100 projects in over 20 countries in North and South America, Europe, and Asia. **Marc Rogoff and Francois Screve have collaborated on over 10 projects and co-authored a key reference textbook on [WTE Technologies and Project Implementation](#).** With 30 years of hands-on experience in Asia, North America, and Europe, Francois offers balanced expertise in design, operation, and financial performance of WTE plants. Marc has worked on over a dozen WTE projects ranging from initial feasibility and bonding studies to commercial operations monitoring, operations assessments, and procurement issues. For example, under a multi-year consulting contract with Pinellas County, Florida for their 3,200 tons/day mass burn facility, he renegotiated their 30-year energy





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supply contract with Florida Power for increased revenues, provided a system expansion report, implemented an electrical power plant siting permit application related with the facility's Clean Air Act retrofit, prepared engineering reports that resulted in issuance of \$200 million in bond financing, and performed annual inspections and audits for bondholders.

### **3.5 Waste Characterization Studies and Data Review**

Geosyntec has significant experience designing wasteshed analyses and conducting waste characterization studies for specific processing technologies for recovery of recyclables and organics. Our experience is based on actual facility design and facility operating requirements. Professionals in Geosyntec's Maryland office have directly managed and performed dozens of waste characteristics studies using ASTM D 5231-92 (2008) to develop work plans for evaluating the bulk waste stream as well as properties of specific waste streams of interest for separation and processing. We have experience developing "hands-on" field investigation methodologies that are tailored to provide actionable information at substantially less cost than traditional waste sorts. For example:

- Recognizing an opportunity to recover recyclables from their mixed waste streams, a private client turned to Geosyntec to better understand the volume and types of materials that could be recovered at their existing transfer station and MRF facilities prior to making a high cost investment in new equipment. We quickly developed a work plan to perform a targeted waste composition analysis at three facilities in the Mid-Atlantic region. Knowing the five to eight recyclable materials that are targeted by automated recovery equipment and coupling this information with the fact that wastes are typically collected using regular, repeated routes, Geosyntec performed a rapid initial screening of our client's customers to identify wet, commingled waste sources that would have little recoverable material, and instead focus on sources dominated by dry wastes with significant recyclable content.
- Geosyntec was retained to perform a field study of the composition of residential and commercial wastes received at selected transfer stations in terms of calorific value (primarily plastic and paper content). The data were used in support of developing waste-to-energy pelletizing plants. Studies were completed at two sites in California, one site in Maryland, three sites in Illinois, and one site in Pennsylvania. Geosyntec evaluated the collected data to estimate the average heat content of the waste stream received at each facility and assess the value of the waste received as bulk feedstock to the proposed pelletizing program, which intends to refine the waste to produce a high-value, process engineered fuel with predictable and uniform heat content.



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Recently, Geosyntec's team member Bill Gaffigan managed a waste characterization study based on the updated ASTM D 5231-92 (2016). In that study, which was performed for Santa Rosa County, Florida in 2017, Geosyntec analyzed the composition of recyclable materials resulting from residential single-stream curbside collection routes operated by three commercial recycling vendors within the County's three franchise zones over a three-day period. The composition of recyclable materials was determined by physically sorting a representative volume of mixed recyclables into one of 13 predetermined categories of interest to the County. Results were statistically contrasted with a 2016 reference study performed for the City of Pensacola, which represented a similar composition study performed on recyclables from a community in the same geographic region. Geosyntec is currently scoping a follow-up study.

### **3.6 Financial Assessments**

Geosyntec is regularly engaged to provide valuation services for solid waste assets and has provided financial analysis for long-term and annual budgeting of integrated waste management systems, cost-of-service estimates, and closure and post-closure reserves. We have performed valuation studies and cost-benefit analyses for internal and third-party collection, diversion, and disposal alternatives. We have also assisted solid waste facility operators in optimizing fee pricing as well as helped waste producers and haulers in their fee negotiations for waste disposal.

### **3.7 Contracts Review and Management**

Waste services can involve a remarkable number of specialized contracts, including host agreements, franchise agreements, long-term maintenance contracts, and capital projects contracting. The professionals proposed by Geosyntec have experience in negotiating and managing these contracts and can help the City understand the current contractual commitments it must work within as well as how to potentially restructure future contracts in a manner that reduces risk and improves performance.

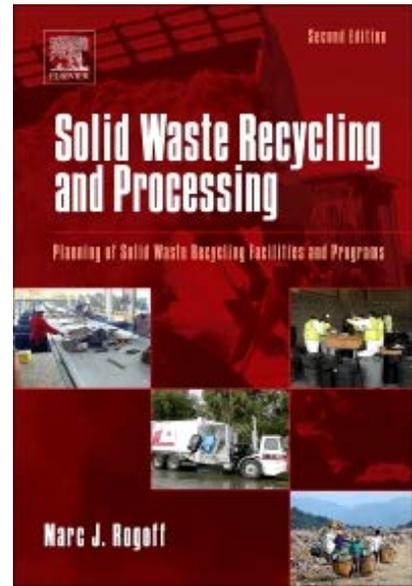
### **3.8 Measurement and Benchmarking**

For a wide variety of solid waste clients, Geosyntec's Bill Gaffigan and Marc Rogoff have led dozens of benchmarking surveys of solid waste collection, landfill operations, and transfer station and MRF operations. These assignments have included developing metrics on staffing numbers, equipment usage, and various financial metrics. The aim of these studies was to benchmark operations with well-run operations of a similar size to those of the client to determine relative efficiency and operations for operational improvements.



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Geosyntec's senior team also has unrivaled expertise in objectively reviewing, analyzing, and measuring operational outcomes and key performance indicators and comparing them to industry benchmarks via data and models we have developed over the course of our careers. Most notably, Marc Rogoff – a 35-year veteran of the business – literally wrote the book on [Solid Waste Recycling and Processing](#) and has devoted a large part of his career to addressing benchmarking and other issues in the fields of collection, recycling, disposal, and ratemaking. **As an active member of SWANA's Executive Board, Dr. Rogoff is closely involved in developing their Technical Policy T-12 "Measuring Recycling," which is due to be published later this year.** The policy objectives are to encourage entities that measure recycling to disclose and provide transparency regarding the numbers utilized to calculate a recycling rate and recommend a consistent methodology for measuring recycling across organizations, program types, and specific materials.



### **3.9 Emergency Preparedness/Response Planning and Disaster Debris Management**

Geosyntec has significant experience developing emergency response plans (ERPs) for a variety of industrial and manufacturing facilities. ERPs provide an overall framework for preparation actions and response operations modeled on the incident command system (ICS) from the Federal Emergency Management Agency's (FEMA) National Incident Management System (NIMS). The use of ICS in the ERPs allows facility workers to have a response structure that will be familiar to public emergency response agencies if they are activated. Geosyntec recognizes the importance for both our private- and public-sector clients to be NIMS compatible. Our ERPs use plain language that is easily understood by anyone who uses the document, providing guidance and initial considerations to transition clean-up operations from an emergency response phase to a project phase providing improved cost and project management controls.

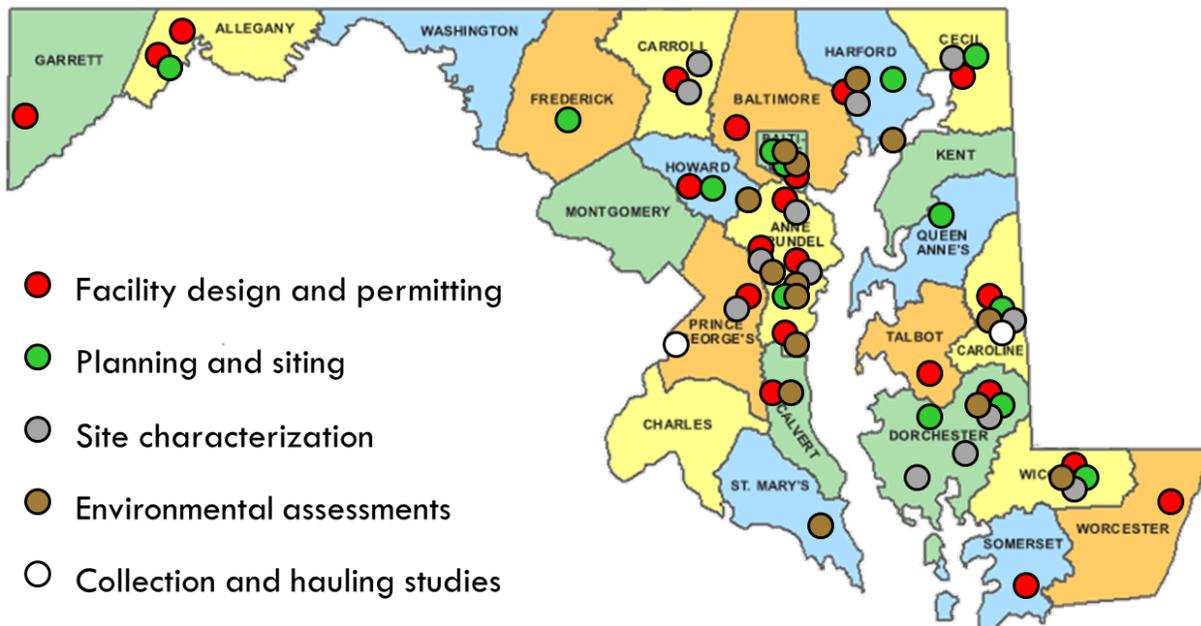
In addition to helping clients prepare for emergencies, Geosyntec also has significant experience with providing and managing response actions. We can provide responder coordination when there are multiple groups working together to return the site to normal operating conditions. We also work with our clients to help them gain control of a situation and advance rapidly toward recovery. Geosyntec has experience working at multiple levels within the incident command structure. Operationally, we help our clients with environmental management including implementing clean up and waste segregation tactics, air, water and soil sampling and analysis,



and response documentation. On the planning and logistics side, we help our clients with incident action planning including developing strategies to address environmental, waste, and structural concerns and source responders, equipment, services, and materials. We support finance and administrative assessors by performing cost projections and tracking and liability estimates as well as providing daily reports summarizing the work of responders. Finally, as part of the ICS staff we develop incident action plans and interface with stakeholders, often serving as liaisons with FEMA and regulators on behalf of our clients.

### **3.10 Experience with Maryland Solid Waste Regulations and Planning**

Through our extensive project work at solid waste facilities in Maryland (see Figure 3-1), Geosyntec has developed and maintained excellent reputations with local officials and senior solid waste regulators at the Maryland Department of the Environment (MDE). We would urge the Authority and City to contact Mr. Kassa Kebede (410-537-3340), Ms. Martha Hynson (410-537-3318), or Mr. Tariq Masood (410-537-3326) at MDE regarding Geosyntec’s reputation and ability to successfully deliver high-quality projects and planning documents.



**Figure 3-1: Geosyntec’s Solid Waste Project Experience in Maryland**

In the fast-changing field of solid waste planning and recycling within the regulatory framework in Maryland, we have relevant, up-to-date experience in several counties, including:



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- **Dorchester County**, for whom we helped incorporate several recent updates to the Maryland Recycling Act (MRA) into their Solid Waste Management Plan (SWMP) between 2010 and 2016, and prepared a new SWMP to cover the period 2017-2026 (approved by MDE);
- **Frederick County**, for whom we helped proactively develop strategies for implementing the proposed 2014 Maryland Zero Waste Plan, which targets 80% overall recycling and 90% composting of food scraps and yard waste by 2040 (completed in 2017); and
- **Wicomico County**, for whom we updated their Solid Waste Management Plan in 2018 to implement changes to their solid waste operations (submitted and under review by MDE).

### **3.11 Ability to Offer Solutions Based on Industry Best Practices**

Geosyntec's professionals are committed to staying ahead of the curve on the latest developments in solid waste and recycling technologies. Identifying viable and reasonable next generation waste diversion practices helps us to guide clients in implementing best practices from international, national, and regional efforts. An important component of our strategy in this regard is our partnerships with leading universities and research institutions, U.S. EPA, and many regional solid waste authorities, including Delaware Solid Waste Authority (DSWA), the Solid Waste Authority of Central Ohio (SWACO), Maryland Environmental Service (MES), and the Dalton Whitfield Solid Waste Authority (Georgia), among others. Geosyntec's solid waste practitioners in Maryland foster strong connections with several technical and regulatory groups within the solid waste industry, including:

- SWANA (Solid Waste Association of North America: [www.swana.org](http://www.swana.org))
- APWA (American Public Works Association: [www.apwa.net](http://www.apwa.net))
- NWRA (National Waste and Recycling Association: [www.wasterecycling.org](http://www.wasterecycling.org))
- EREF (Environmental Research and Education Foundation: [www.erefdn.org](http://www.erefdn.org))
- ITRC (Interstate Technical and Regulatory Council: [www.itrcweb.org](http://www.itrcweb.org))
- ISWA (International Solid Waste Association: [www.iswa.org](http://www.iswa.org))

Dr. Marc Rogoff is the former Director of SWANA's Collection and Transfer Technical Division and currently serves on the National Executive Board. Our other Maryland-based professionals routinely serve as officers with the Mid-Atlantic Chapter of SWANA and have made technical contributions at local Chapter meetings, the Maryland Recycling Network (MRN)/SWANA joint annual conference, and workshop events hosted by EREF.



### **3.12 Stakeholder Outreach and Engagement**

Geosyntec recognizes the importance of stakeholder engagement in highly visible planning projects conducted by organizations such as DPW who are charged with protecting the public good. While traditionally a provider of “hard” engineering services, we know the value that “soft” services bring and have learned from experience that win-win outcomes are best obtained when professional facilitators work alongside technical experts to engage the public and other stakeholders. By working with Nexight’s trained facilitators and communications team, we offer extensive experience engaging a variety of stakeholders through carefully planned and facilitated meetings. Nexight’s professionals offer globally recognized expertise in stakeholder and expert engagement, facilitation and strategic planning, program management, and communications and outreach. Nexight has established an outstanding reputation with U.S. Government agencies and elsewhere in developing forward-looking and measurable strategies, identifying and mitigating program risk, and expertly engaging stakeholders within and across organizations to ensure long-term visions become reality. The firm has successfully completed more than 200 contracts for eight Federal agencies, including prime contracts with Departments of Homeland Security, Labor, and Agriculture, and the National Science Foundation, as well as more than 35 commercial customers. These contracts range in size from \$10,000 to nearly \$10 million, with periods of performance that range from one month to nearly four years.

Geosyntec and Nexight recently collaborated on a project to develop a long-term strategy for solid waste management and recycling in Frederick County, Maryland that involved extensive stakeholder and public outreach. **In what was branded the “[Solid Waste – What’s Next?](#)” program, Nexight facilitated a series of five brainstorming workshops and public forums in**



**which citizens were informed of the County’s current operations and waste stream data, and asked to provide their opinions, goals, and suggested criteria for evaluating improvements in recycling and waste diversion within the County.** The workshops were designed to focus discussions, optimize the use of time, and permit the lively exchange of ideas among participants.

### **3.13 Website Content and Graphical Representations**

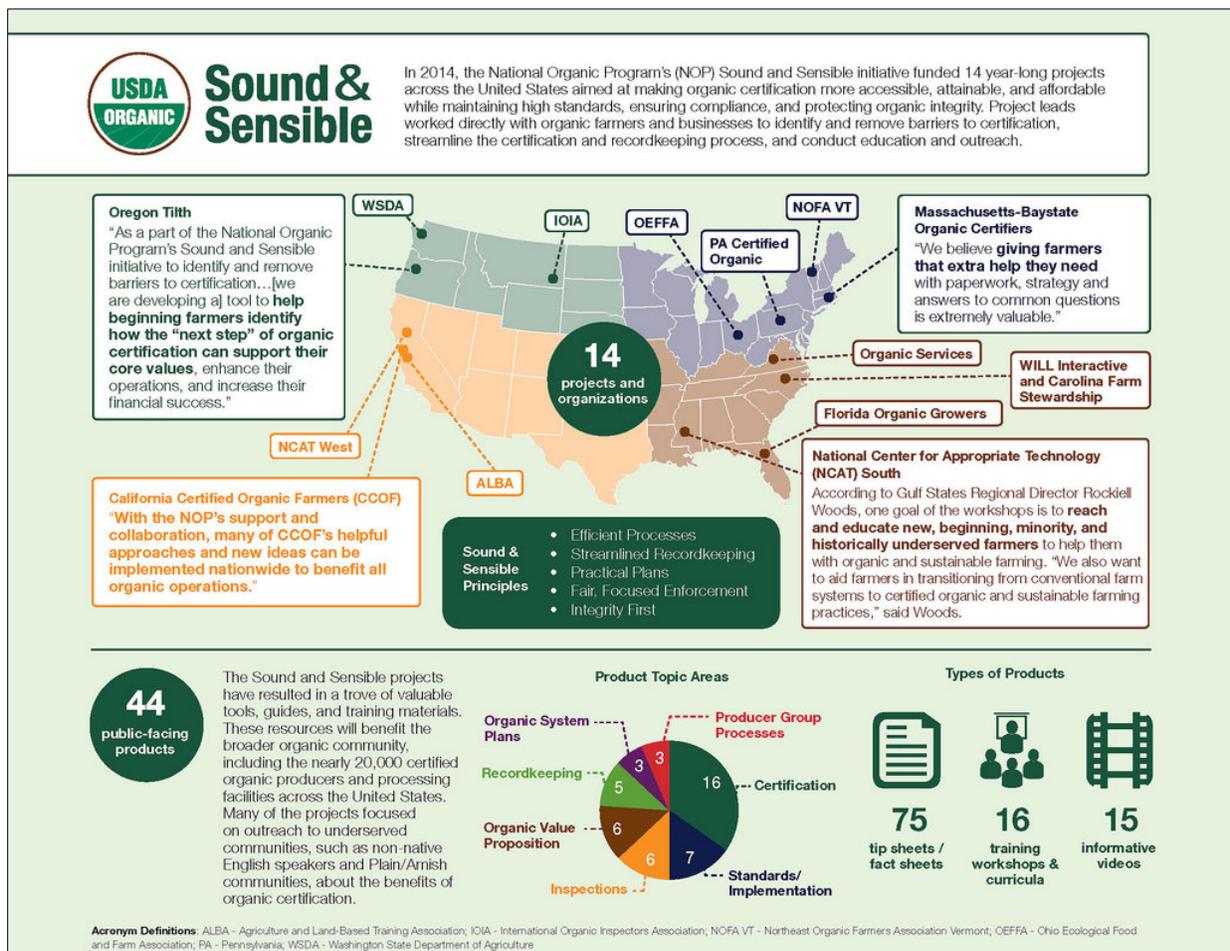
Nexight’s professionals have experience planning, designing, and developing websites, software applications, and other digital products. Their varied backgrounds as technical writers, editors, designers, and bloggers offer unique perspectives and ability to identify and reach the right audiences with the right messages to deliver meaningful interactive experiences. Nexight’s award-winning graphic designers are communicators first who believe that design is useless if it



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is not grounded in a clear understanding of audience, purpose, and message. With extensive experience in stakeholder engagement and communications strategy development, Nexight efficiently develops modern designs that use cutting-edge techniques to make smart design choices that are not just visually appealing but also purposeful. Rather than forcing audiences to hear what a client or the team of consultants want to say, Nexight finds that it is most effective to focus on saying what target audiences want to hear in the way they prefer to hear it and build messages into that context. Nexight's dedicated graphic designers are proficient in Adobe Creative Suite, particularly InDesign, Illustrator, and Photoshop, and use these tools to design high-impact, 508-compliant graphics and documents. As an example, Nexight developed the slogan and branding for the [U.S. Department of Agriculture's National Organic Program's Sound and Sensible](#) initiative and has developed a number of infographics for that effort, including the one reproduced overleaf.





## **4. SCOPE OF SERVICES**

From review of the RFP, the City and Authority have clearly spent considerable time and effort assessing the scope of services for this project, as evidenced by the detailed description of each scope item as laid out in the RFP. Considerable effort appears to have been allocated to researching and understanding the high-level programmatic and processing needs of the City over both the near and long term. Given this far-sighted level of detail in scoping the RFP, sufficient detail has already been provided in the RFP on the specific scope of services required under each task; therefore, in the interests of brevity and efficiency we have not reproduced the text of the RFP *verbatim* and include only such paraphrasing as necessary to support discussion of our proposed approach. Notwithstanding, Geosyntec states categorically that our proposal and price are inclusive of completing the scope of each work item laid out for Tasks 0 through 10 on pages 1-11 of the RFP dated 6 March 2018 as well as the scope clarifications issued by the Authority on 13 April and 20 April 2018, subject to the assumptions provided in this document.

### **4.1 Task 0: Four-Season Waste Sort**

The goal of Task 0 is to provide reliable and up-to-date data on waste characteristics and quantities currently generated within the City's wasteshed. This data will be used to inform the planning effort. From review of the City's 2013-2023 Solid Waste Management Plan, Geosyntec understands that waste and recycling services are provided weekly to households, certain businesses, and public schools. Notwithstanding several special services and programs, DPW's collection services are generally divided into four quadrants (northwest, northeast, southwest, and southeast). Depending on collection routing, waste is delivered to BRESKO, Quarantine Road Landfill (QRL), or Northwest Transfer Station (NWTS). BRESKO is privately operated while QRL and NWTS are operated by DPW. City residents may also drop off waste and recycling at QRL or NWTS as well as three other full-service convenience centers. In addition, DPW operates two additional convenience centers that only accept recyclables. Construction and Demolition (C&D) waste generated in the City may be delivered to QRL; however, Geosyntec understands that the bulk of C&D waste is delivered to private recycling or disposal facilities. Commercial small haulers collecting waste from within the City are permitted to deliver waste to NWTS.

To perform the four-season waste sort, Geosyntec proposes a four-step process which includes pre-planning, training, conducting on-site waste sorts, and data analysis and reporting. A description of the activities that will be performed in each step is presented below.

**Step 1 – Pre-Planning (Develop Work Plan):** In this step, Geosyntec will complete necessary pre-planning for effective execution of the project. This will include discussions with DPW to



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understand potential differences in the material composition due to geography or routing; however, based on the summary of collection and disposal services above, Geosyntec anticipates the following:

1. Waste sorts will be conducted on materials delivered to the two main City-owned facilities: QRL and NWTS<sup>1</sup>. These should provide adequate citywide data on the residential and commercial waste streams as well as materials disposed of by small haulers. Information on the origin of vehicles will be used to obtain representative sampling across different collection routes and geography. It is anticipated that a 4-day waste sort<sup>2</sup> will be conducted at each of the two sites over a 2-week period, with each waste sort requiring two laborers and one supervisor.
2. Targeted sorting of recycling loads will be conducted at the five City-owned convenience centers. It is anticipated that a 1-day sort will be conducted at three sites following completion of the waste sorts at NWTS and QRL<sup>3</sup>. Again, each sort will require two laborers and one supervisor.
3. Visual inspection and assessment of bulk waste loads delivered to QRL, NWTS, or a convenience center will be performed by the sort team supervisor and/or Geosyntec personnel at each site on days that on-site sorts are being conducted.
4. Sorting of C&D debris loads will not be conducted; however, a cursory visual inspection of C&D loads delivered to QRL as well as brief driver interviews will be conducted by the sort team supervisor and/or Geosyntec personnel on days that waste or recycling sorts are being conducted.

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<sup>1</sup> Geosyntec has assumed that waste sorts will only be conducted at City-owned facilities; however, given the prominent role played by BRESKO and the fact that City collection vehicles deliver waste directly to that facility, conducting a waste sort at BRESKO would be beneficial to the Project. This could be discussed and added to the scope of Task 0 during development of the Work Plan if this is of interest to DPW and considered practical by Wheelabrator.

<sup>2</sup> Generally, transfer and disposal operations have routine patterns of busy and slow days. Geosyntec will work with DPW to identify the four days of the week that are typically busiest at NWTS and QRL and conduct waste sorts on those days.

<sup>3</sup> Recycling loads are easier to sort and classify than waste. Rather than conducting sorts at all facilities, Geosyntec will work with DPW to select the three busiest sites or those considered to be of most interest to the Project. It is assumed that load manifests from DPW’s curbside recycling collection program can be obtained from the facilities to which materials are delivered; if not, a selection of collection vehicles should be diverted to a sort site for inspection and sorting of their loads as part of the targeted recycling sort effort.



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As shown in Section 6, Geosyntec's tentative schedule for the Project assumes the first (summer) waste sort will be conducted in the July/August 2018 timeframe, with the second (fall) sort in October 2018, the third (winter) sort in January/February 2019, and the final (spring) sort in April/May 2019.

Through their connections to job training and employment programs for displaced and unemployed workers aimed at creating "green collar jobs" in Baltimore, Second Chance will be responsible for staffing all the field teams for waste sorts. During the waste sorts, Geosyntec's Task Manager (Mike Hansen) and/or his designated Project/Staff Professional will be "at large," in constant communication with the sort team supervisor and traveling to sites to assist the sorting teams as necessary. In our price proposal, we have budgeted for Geosyntec to be on site about two-thirds of the time (i.e., 60 hours total over an 11-day work period).

The Work Plan will outline the sorting procedures, equipment needed, roles and responsibilities of field personnel, and criteria for material classification based on collection of representative samples in accordance with the ASTM D 5231-92 (2016) methodology with additional tests for statistical normality in the distribution of the data. It is assumed that in addition to scale house records, the facilities at which waste sorts are to be conducted will have some availability of information regarding their most important sources of residential and commercial wastes. For example, DPW's curbside collection program should gather data on the number of households served, number of trucks used, truck routing, collection frequencies, etc. Contracts for provision of dumpsters to commercial premises generally track dumpster collection/replacement schedules. Therefore, it should be possible to preview these data to get an understanding of what quantity and composition of waste to expect from the major sources of waste received at each facility. Using this data, we can move "upstream" in development of waste classification strategies, for example by targeting loads for sorting so that at least one load per major source is assessed (instead of just randomly selecting loads, which may fail to capture a major source).

As part of pre-planning process, we will coordinate with DPW regarding the schedule and physical setup of the sorting area, process, health and safety plan, and equipment/labor support required for the on-site sorts. We will also research composition studies from other Maryland counties for comparison purposes. A key focus of Task 0 is to help the City understand to what extent materials with secondary reuse/recycle value or that can be repurposed – particularly bulk wastes – are being collected and disposed of as waste. Second Chance has unique experience and skillset in this regard, and their leadership team will assist in developing the Work Plan to provide guidance on identify materials with reuse/repurpose value.



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Step 2 – Training: After the draft and final Work Plan has been reviewed and agreed by DPW, Geosyntec will develop a location-specific hazard awareness and safety training program to be completed by all field personnel prior to conducting a waste sort. The goal of the training will be to protect worker health and safety, ensure correct use of sampling/sorting equipment and personal protection equipment (PPE), and ensure that the goals of waste sort and procedures outlined in the Work Plan are understood. Second Chance's leadership will also provide training on identifying waste material with potential recycle or secondary resale/reuse value. Given that the same workers are unlikely to be available for each of the four sorts over a 12-month period, the training will be structured to be completed in less than two hours and will be provided at the start of the first day's sorting to all personnel, regardless of whether they previously attended a training. Geosyntec's Task Manager will provide the training, which is included in Geosyntec's price proposal. We assume that the training to take place at NWTS or QRL.

Step 3 – Execute Work Plan (Perform Waste Sorts): In this step, three field staff (two laborers plus one supervisor) will work at each sorting location over the specified period for 8 hours/day. Due to the nature of the work, at least two people must work together such that at least one observer is always available to provide a "buddy system" for safety during waste sorting. A pre-sort meeting will be held with DPW staff on the first day and a short planning and safety briefing will be held at the start of work each day. Details will be presented in the Work Plan; however, it is expected that the field work will include a visual assessment of the types of waste on each truck which unloads at the facility followed by a manual separation of selected waste loads. The visual assessment will include a qualitative volumetric assessment of the waste composition while the labor-intensive manual separation of selected waste loads will be performed to make a quantitative gravimetric assessment of waste composition, which will serve to verify and calibrate the previous visual assessments. Each load will be weighed before sorting and the load will be tipped on an isolated portion of the facility. As materials are sorted, they will be placed into roll-off boxes or totes. Following sorting, each roll-off box/toter will be weighed. Geosyntec's assigned supervisor will use procedural checklists and field logs to track raw data during the sorting and weighing process which will be included as attachments to the report on each waste sort.

Based on our experience, Geosyntec assumes that the field work can be completed using modified Level D PPE, which will include hard hat, safety glasses, steel-toed boots, ANSI high-visibility vest, Tyvek coveralls, and heavy-duty cut-resistant gloves. Personnel will have dust masks available as well in case of dusty conditions. The need for additional major equipment or higher-level PPE will be considered to represent additional scope. If heavy materials are identified within loads being sorted, they will be left on the ground until additional help from



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DPW can be obtained to move them. In this regard, we advise DPW that a dedicated backhoe/bucket loader or bobcat operator will greatly facilitate progress during waste sorting. Geosyntec's budget for Task 0 includes PPE for field staff but does not include any mechanical equipment, roll-off boxes/toters, or scales as it is assumed that these will be provided by DPW.

Finally, it is noted that involvement by City Councilors and/or other City representatives in photo-opportunities during a waste sort is envisioned in the RFP to help publicize and support the master planning effort. If such an event takes place, Geosyntec will work with DPW to ensure the safety of all persons on site. We will also help DPW to coordinate the publicity of such events for direct link to the website to be maintained for the project by Nexight (Task 2).

Step 4 – Data Management, Analysis, and Reporting: Following completion of field work at each facility for each waste sort, Geosyntec will analyze the data, including conducting tests for statistical significance, and then prepare a facility-specific interim report (briefing document) with a one-page executive summary followed by brief descriptions of the major sources of waste received by the facility, work performed, the materials sorted, the overall observations of the waste, and the procedures and findings from the analysis. Detailed data spreadsheets, field logs, and a photo log will also be provided in appendices.

Interim and Final Deliverables: Geosyntec's Task Manager for Task 0 will be Mike Hansen. The first deliverable for Task 0 will be the Work Plan, which will be submitted to the Authority/City in MS Word for review and comment prior to commencement of the first waste sort. One round of consolidated comments is assumed; thereafter, Geosyntec will finalize the Work Plan. Following completion of each waste sort, Geosyntec will collate, review, and analyze the data. After the first three waste sorts, Geosyntec will provide the Authority/City with an interim briefing document summarizing results. Each briefing document (three documents in total<sup>4</sup>) will provide tables and graphical summaries of results and will be provided in MS PowerPoint format. The final deliverable for Task 0 will be a comprehensive summary report detailing the results and analysis of all four waste sorts. The report will be submitted in MS Word format and will include an executive summary, results section, and graphical representations suitable for review by elected officials and the public.

Meetings: Geosyntec has allowed for multiple rounds of meetings with the Authority/City:

1. Kickoff Meeting and Site Visits: A kickoff meeting will be held to review the scope and complete site visits prior to developing the Work Plan. It is assumed the kickoff meeting

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<sup>4</sup> An interim briefing document is not required after the fourth waste sort, as data from that sort will be incorporated into the final summary report for Task 0.



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will be a 2-hour in-person meeting at DPW's offices and will be held directly prior to the visits to each sorting location. The site visits are anticipated to take no more than 4 hours in total.

2. **Work Plan Review:** Following submission of the draft Work Plan, we anticipate that a 2-hour online meeting (audio/visual teleconference) facilitated by Geosyntec will be held to review the submission, after which Geosyntec will address comments received from the Authority/City and finalize the Work Plan.
3. **Summary Report:** As required in the RFP, Geosyntec has allowed for two rounds of meetings to review comments from the Authority/City prior to generation of the final report. It is anticipated the first meeting will be a 2-hour online meeting (audio/visual teleconference) facilitated by Geosyntec while the second meeting will be a 2-hour in-person meeting at DPW's offices. It is assumed that the Authority will combine all comments into one set of comments for each round of review.

Meetings will be attended by Mike Hansen and Jeremy Morris from Geosyntec, as well as Mark Foster from Second Chance.

#### **4.2 Task 1: Stakeholder Engagement Plan and Execution**

The goal of this task is to work with the City to develop a plan for engaging stakeholders (e.g., businesses, residents, civic and community organizations and groups, local schools and universities, elected officials, environmental groups, hospitals and health care institutions, industry and outside experts, and local waste collection, disposal, and treatment companies) to provide input to the Master Plan. The plan will serve to guide the process of enabling stakeholders to provide constructive ideas/concepts for review in Tasks 5, 6, and 7 and feedback on the overall planning effort. To expedite the project schedule, Task 1 will commence broadly concurrent with Task 3 and will continue in parallel with other tasks through completion of the draft Master Plan in Task 8. **Geosyntec's specialty sub-consultant Nexight will lead our efforts on Task 1. We have found that few organizations know how to harness the collective expertise and insights of diverse stakeholders, citizens, and experts to discern fresh solutions. Nexight uses a multi-disciplinary approach based in collaborative planning and partnership development to convene the right experts in the right ways to solve complex problems.** Nexight's proven methods are based on more than 20 years of experience facilitating collaborative training and exercises with public-private partners, conducting original research through expert interviews and roundtables, and creating web-based and face-to-face interactions that encourage information exchange. Nexight's Ross Brindle will lead Task 1 with



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support from Sarah Lichtner. The stakeholder engagement approach will include the steps outlined below.

Develop a Stakeholder Engagement Plan (SEP): Each of the potential stakeholder groups listed above comes to the project with their own diverse perspectives, needs, and interests. To most effectively engage with these diverse stakeholders, Geosyntec and Nexight will work collaboratively with DPW to develop a SEP that identifies key stakeholders who have valuable perspectives and insights that can inform improvements to the existing system (Task 5). We understand from the clarification issued on 20 April that the City has a Sanitation Committee and Sustainability Commission, both of which may work with DPW as part of the engagement process. The SEP will identify the preferred and optimal mechanisms of engagement for each stakeholder group and the key information and messages that must be communicated. The distinguishing factors for the engagement of these diverse stakeholder groups will be conveyed through clear and scannable graphics and tables.

SEP Deliverables and Meetings: Nexight’s effort on Task 1 will be led by Ross Brindle with support from Sarah Lichtner. To expedite the process and leverage the expertise of the Authority and City, at the outset of Task 1 we will facilitate a 1-hour meeting (either in-person or via AV teleconference) identify stakeholders that should be consulted during the information-gathering phase of SEP development. Once a draft SEP is completed, we will present and review it with the Authority/City via a 1-hour AV teleconference, revising the plan based on discussion and initial consolidated written comments and edits. Following revision, we will resubmit the draft SEP to the Authority/City for any final comments and edits. After this second round of review, we will deliver the finalized SEP, which will include an executive summary and graphical representations suitable for review by elected officials and the public. It is assumed that the Authority will combine all comments into one set of comments for each round of review. Meetings/teleconferences will be attended by Ross Brindle or Sarah Lichtner as well as Nexight’s Communications Director (Lindsay Pack) and Geosyntec’s Project Manager (Jeremy Morris). Deliverables will be provided in MS Word format.

Execute Stakeholder Engagement Plan: Based on our current understanding of the City’s goals for the stakeholder outreach effort and our previous experience engaging residents and stakeholders as part of the recent [Frederick County Solid Waste Management Options Study](#), our proposed mechanisms for engagement are as follows.

1. Plan and Facilitate Community Meetings: In-person meetings are the best mechanism for stakeholder engagement because they allow participants to build on the ideas of others and highlight areas of participant agreement and dissenting opinions. Making the most



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of these meetings and the time of meeting participants demands expert facilitation that keeps the discussion focused and productive, produces actionable results, and leaves participants feeling heard and vested in the outcomes. Our facilitators can deliver such experiences and are adept at managing participants with strong views and personalities and expert at keeping participants engaged and focused on providing high-quality input. We propose facilitating two phases of meetings to gather stakeholder perspectives:

- a. Phase 1: Introduce the planning process, provide relevant background information, and solicit input on current challenges and potential improvements to current diversion/recycling systems for assessment in Task 5 (September/October 2018 timeframe); and
- b. Phase 2: Present more detailed information and solicit more targeted feedback on the proposed improvements to the current diversion/recycling system made in Task 5 and solicit input on options for disposing of "what's left" for assessment in Task 7 (January 2019 timeframe).

*Number of Meetings and Venues:* Nexight will facilitate two meetings during each phase at different times and locations in the City (times/locations will be selected in consultation with the Authority/City). We recommend these meetings be held on weekday evenings to increase opportunities for attendance. It is assumed that the City will secure an appropriate meeting venue at a government building, school, firehouse, or other suitable public space. Nexight will coordinate with DPW staff regarding any facility requirements (e.g., AV equipment). All other facilitation supplies (e.g., poster boards, flip charts, storyboards, fliers, handouts, and electronic recording equipment) will be provided by Nexight.

*Planning:* Effective facilitated meetings start with careful planning. Nexight will work closely with the Authority/City to clearly define desired meeting outputs and outcomes and to design meetings that will deliver those outcomes while ensuring maximum engagement and buy-in from participants. We carefully plan sessions with timed agendas, detailed focus questions, and contingency plans that allow facilitators to balance the need for flexibility with the requirement to deliver meeting outcomes. During the planning phase, Nexight will work closely with DPW and the Authority to identify and invite meeting participants, including developing public notices to announce the purpose and location of the meetings. This combination of targeted and open invitations will help ensure sufficient meeting attendance and a more balanced mix of participants and perspectives. In accordance with the RFP, we understand that responsibility for preparing



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public notices and advertisements on the City’s website and in local media resides with our team, but that the City will pay for media postings.

*Communication Materials:* To ensure that the most meaningful and relevant information is communicated during each meeting, Nexight will develop handouts, graphics, and presentations that are clear, concise, and scannable. At least one week prior to each meeting, we will also develop a briefing document (4-6 pages) that will be made available on the City’s website. The briefing document will include essential pre-reading material, including links to relevant background information about the Master Planning effort, the meeting purpose and scope, a detailed meeting agenda, tips for maximizing the value of participation, and directions to the venue. The briefing document is intended to provide everything participants need to arrive prepared and ready to contribute productively to the discussions.

Based on our experience facilitating meetings and workshops, participants benefit from a balance of on-screen materials and printed materials that meeting participants can take with them after the meeting. Nexight will prepare a printed one-page factsheet to provide meeting attendees with a high-level overview of the meeting purpose and website links where participants can find more information. Comment cards will also be used to collect participant ideas and priorities in real time. Participants will have limited time to review printed materials during the meeting itself, so in addition to lowering the waste footprint of the meeting, limiting the amount of printed material can keep participants more focused on the on-screen presentation and discussion.

*Facilitating:* For each meeting, Nexight will provide a lead and assistant facilitator. Up to 100 participants per meeting are anticipated. The lead facilitator will actively lead all group discussions, monitor time, and ask probing questions to ensure expected session outputs are produced. The assistant facilitator supports the lead facilitator and helps maximize participant engagement, while also recording the discussion using a combination of physical (e.g., storyboards, flipcharts) and electronic (e.g., “on-screen” and “off-screen”) methods to help participants remain informed and engaged while documenting session results. Geosyntec’s Project Director (Tom Ramsey) or Project Manager (Jeremy Morris) will also attend the meetings to field technical questions. Mark Foster of Second Chance will also take part in meetings to provide his practical perspectives on material reuse and the role of non-profits in addressing waste and recycling issues and “green collar job” creation in the City.

Nexight employs a modified version of Compression Planning® facilitation that uses highly visual, structured techniques to brainstorm, analyze, and prioritize information to create



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actionable plans. We will take care to allow significant debate while engaging all viewpoints, allowing us to identify areas of consensus without driving participants to "groupthink" results. Throughout each meeting, we will use brainstorming methods to encourage creative thinking followed by careful analysis of results to add logic, structure, and rigor to outputs. We will also use a variety of prioritization methods from simple voting to more complex pair-wise comparisons to define top priorities while also documenting minority views. Additional information on Compression Planning methods is available at [www.mcnellis.com](http://www.mcnellis.com).

2. Online Survey: Nexight will develop a baseline web survey (about 20 questions) to raise awareness and inform the public of the planning process and obtain input on types of programs that would be supported by the public. The survey questions will be developed by Geosyntec and Nexight in consultation with DPW. Survey questions will go through two review cycles with the City/Authority prior to the survey going live. Nexight will be responsible for survey development, management, and analytics.

Nexight uses the online survey platform *QuestionPro* to "geo-code" input (i.e., collect and analyze the physical location of participants completing online surveys). In addition to the built-in survey capability to identify the location of survey participants, the first survey question will ask participants for their city and zip code. User response to this question will be structured in such a way that it cannot be directly entered by a bot (e.g., by including a [Google reCAPTCHA](#) step). In addition to improving security, this location data will help provide a better understanding of the distribution of survey participants around Baltimore. Additionally, Nexight will screen survey responses for suspicious inputs, including multiple submissions from the same IP address, IP addresses from locations outside the City, surveys with identical responses, and multiple surveys with similar answers submitted in a short time period. If any data provided is suspicious or duplicative, Nexight will notify the City and Authority to establish a dialogue and/or recommend excluding the survey input. These safeguards will help ensure the accuracy and representativeness of survey results.

Track and Summarize Stakeholder Engagement Efforts: Meetings and stakeholder engagement efforts are only as good as the future actions they stimulate. Documenting stakeholder engagement efforts in an action-oriented manner is essential to creating lasting value. Our approach to this documentation will avoid lengthy transcripts that nobody wants to read; rather, we will focus on providing complete, thoughtful, organized findings that focus on new insights and actions that can create real impact.



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1. Engagement Tracker: To maximize the effectiveness of stakeholder engagement, it is critical to track engagements to ensure that communication with key stakeholder groups is adequate and soliciting desired responses. To enable regular reporting on stakeholder engagement efforts, Nexight will develop a stakeholder engagement spreadsheet that tracks activities, including the mechanism of engagement, the number of participants involved, and the key outcomes of the engagement efforts. Examples of logged activity will include web hits, completed surveys, meeting attendance, and other comments provided by stakeholders. The tracking spreadsheet will be updated monthly to provide a high-level, scannable synopsis of monthly progress. These engagement updates will ultimately help the Geosyntec team and the Authority/City to more effectively direct stakeholder engagement efforts related to the Master Plan effort.
2. Letter Reports on Stakeholder Meetings: Within 5 business days of each stakeholder engagement meeting, Nexight will draft a letter report for submission to the Authority/City. Each will include a summary of the discussion, input received from stakeholders, any relevant recommendations or next steps, and a list of participants. There will be one opportunity for the Authority/City to review the draft letter reports to identify any needed clarification; thereafter, Nexight will finalize the letter reports. It is not anticipated that any AV teleconferences will be needed for this review process. All final letter reports will be developed and distributed in MS Word suitable for redistribution and reuse by the City.
3. Summary Report on Online Surveys: Given the ongoing nature of the online surveys, Nexight will maintain a “rolling” summary of the interview and survey results that will be updated monthly during the engagement process. This rolling update will be available for review by the Authority/City. At the end of the engagement process, Nexight will complete a draft summary report for submission to the Authority/City. There will be one opportunity for the Authority/City to review the draft summary report before it is finalized. Again, it is not anticipated that any AV teleconferences will be needed. The final summary report will be developed and distributed in MS Word.

As culmination of the stakeholder engagement process, Geosyntec anticipates that a “town hall” style meeting will be held at the end of Task 8 to present results from the planning effort to the public in an open, interactive forum that allows for constructive feedback. The town hall meeting will be facilitated by Geosyntec rather than Nexight as it is primarily intended as an information “push” rather than “pull” event. As such, the town hall meeting does not constitute effort under Task 1 but is described for Task 8 in Section 4.9.



#### **4.3 Task 2: Develop/Maintain Website Contents and Branding Assistance**

Providing a clear line of sight into steps taken to create the Master Plan and the stakeholders who have contributed to its development helps secure buy-in from the public as well as the City staff and contractors that will be implementing the plan. Developing and releasing updates and resources in



an easily accessible way reassures these key audiences that the process is thorough and deliberate and has considered inputs from the “right mix” of experts as well as those who will potentially be affected. During the planning process, it can also serve as a tool to keep stakeholders informed and up-to-date on progress and milestones achieved. By creating transparency in the process from the start, key audiences and stakeholders are more likely to support the plan and its implementation once it is approved.

Based on information in the RFP, we understand that the website will have the ability to share reports, pictures, graphics, videos, meeting agendas, meeting minutes, and other information. The Geosyntec team will be responsible for developing web-ready content for the City, but we will have no responsibility for the maintenance or performance of the website itself. Due to their expertise and qualifications in public communications, Geosyntec’s specialty sub-consultant Nexight will lead our team’s efforts on Task 2, which is directly parallel to Task 1. **Nexight’s communications team offers in-house award-winning writing and editing, graphic design, and multimedia expertise. They specialize in developing and tailoring technical communication materials for a variety of non-technical audiences, with past clients including business executives, U.S. Congress, senior government leaders, and Presidential advisory councils. Between them, Nexight’s proposed team members for this project have won 28 regional and international awards from the Society for Technical Communication ([www.stc.org](http://www.stc.org)).**

Nexight’s effort on Task 2 will be led by Lindsay Pack, the firm’s Director of Communications, with support from Julianne Puckett, a senior consultant on content strategy. For ease of reference, Task 2 has been divided into two separate subtasks.

**Task 2a – Develop Web-Ready Content:** This will include the following work items:

1. **Consult with Appropriate City IT Staff:** At the outset of Task 2, Nexight will work closely with IT staff to gain a better understanding of the website, historical content, and preferred format for providing materials. We will also work closely with IT staff to develop



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a schedule and ensure clear expectations of when and what materials will be provided. Ten hours of conference calls have been budgeted.

2. Identify Website Content: Based on our Stakeholder Engagement Plan (Task 1), we will identify the content that must be developed and updated during the Master Planning effort to convey key messages to relevant stakeholders. Based on our experience, we anticipate generating the following content, along with other communications materials needs identified during the execution of the project:
  - a. Factsheet: At the onset of the project, it will be critical to develop a concise and scannable factsheet that provides an overview of the Master Plan's purpose and a graphic that clearly conveys the steps involved and the stakeholders who will be consulted.
  - b. Monthly Blog Posts: Regular updates are critical for keeping stakeholders involved. We will write and post a blog post each month that provides a summary of the past month's stakeholder engagements, Master Plan progress, specific requests for input (via online surveys or email responses), and notifications of upcoming tasks within the planning effort or community meetings.
  - c. Social Media Content: To provide high-level updates of project progress and opportunities for engagement, we will develop scannable and compelling social media content for posting to Twitter, Facebook, Instagram, and/or others as directed (it is assumed that the City/DPW already has an account with each platform for which content is to be provided; our scope of services does not include developing, maintaining, or monitoring performance of any social media account on behalf of the City).
  - d. Videos of Community Meetings: Nexight will record community meetings for posting to the City's website.

We will also leverage and refine content developed in other project tasks (e.g., community meeting agendas and reports from Task 1) for posting to the website.

3. Develop and Manage Website Content (Deliverables for Task 2a): Nexight plans to host two 2-hour AV teleconferences to discuss development of website contents with the City. In addition to applicable Nexight personnel, the calls will be attended by Geosyntec's Project Manager (Jeremy Morris). Once the content has been agreed, Nexight will develop a comprehensive suite of communications materials that make the most sense for the target audiences identified. We will ensure that all communications pieces employ concise, compelling, and accurate writing as well as meaningful and scannable graphics



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and document layout. We will provide web-ready content to the City related to the progress of the planning effort at least monthly, but also as task reports or other milestones are met. Prior to submitting any content to IT staff for posting to the website, we will submit drafts to the Authority/City for review and approval, allowing at least one full week for review. Nexight will also manage website content derived from other tasks, including submittals issued for public comment, meeting dates and agendas for public meetings, and informational articles/reports that will be useful to the public as background for the Master Plan. Updates to the website content will be provided to the City at least monthly throughout the planning effort.

**Task 2b: Design Logo/Slogan for the Master Planning Process:** An effective logo and slogan does more than just capture an audience's attention – it must also accurately convey the key messages that an organization wants to get across to the audience while eliciting emotions in the audience that create the right impression of the organization and its objectives. **Before developing logo and slogan options for any client, Nexight takes the time to clearly define the priority messages and impacts that the logo and slogan must have on target audiences. These inputs are then used to carefully select design elements and language that conveys these messages and elicits the right impression for the brand.**

To develop logo and slogan options for this project, Nexight will take the following actions:

1. **Gather Input on Branding Objectives:** Nexight will host a conference call with the Authority/City to define the branding objectives and requirements for the logo and slogan before design begins. During this conference call, Nexight will ask pointed questions and guide the discussion to gather the following input:
  - a. The characteristics and qualities of the project that are most important to convey as a brand (e.g., is it a novel or tried-and-tested approach, should its collaborative nature be emphasized, should it read more as a green initiative or technological innovation?);
  - b. The most important message(s) about the project that the key stakeholders and public should take away when they see the logo or slogan; and
  - c. The actions these audiences should feel inspired to take when they see the logo or slogan.
2. **Brainstorm/Whiteboard Concepts:** Using the input gathered from the conference call, Nexight will sketch out logo and slogan ideas that convey the key messages and impressions identified. Nexight's team members work together to brainstorm logo



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elements (e.g., colors, shapes, icons, typography) and word combinations in real time to generate fresh ideas and cohesive brand concepts. With at least two expert communicators participating in this process, ideas undergo active back-and-forth critique that efficiently helps to shape and refine the options.

3. Develop Logo Options: Nexight's in-house design team will then take the whiteboard sketches of the logos and build them out using Adobe Creative Suite software. Often, logos will involve custom illustration using vector design in Adobe Illustrator as well as carefully selected typography and color schemes. In developing logos and infographics, Nexight has learned to deploy the common elements of a strong message: simple, memorable, and versatile across a range of sizes and media, from large format in print publications to smaller online formats. Nexight's designers will explore logo options that have these characteristics and effectively convey the project's priority messages.
4. Develop Slogan Options: At the same time, the team will build out slogan options that complement the logos and highlight the right messages. Writers and designers work hand-in-hand to ensure that the logos and slogans work as a cohesive unit, defining the brand and leaving audiences with the right impression. Nexight will apply its knowledge of the target audiences and the project's priorities to develop five sharp and compelling slogans that inspire audience buy-in to the project and the plan development process.
5. Finalize Logo and Slogan Selection (Task 2b Deliverables): We will submit three logo options and three slogan options to City/DPW for initial feedback, with encouragement for reviewers to prioritize their preferred logo/slogan combinations and offer suggestions on revisions they would like to see in the final versions. Nexight will use this feedback to revise as many of the logo and slogan options that the City/DPW would like to move forward with and submit the final options for their ultimate decision on the project's final logo and slogan. We will incorporate the selected logo and slogan into the materials we develop for the other project tasks. As requested in the RFP, Nexight plans to attend at least one 2-hour in-person meeting at DPW's offices and will host one 2-hour AV teleconference to discuss logos/slogans. In addition to applicable Nexight personnel, the calls will be attended by Geosyntec's Project Manager.

Developing a logo/slogan for the Master Planning effort is a priority action to ensure consistent branding that will help make the project recognizable in the development stage and beyond. Therefore, Task 2b will take place and be completed as early as practical during the project schedule – preferably in the August/September 2018 timeframe. Once the City has selected the



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logo/slogan, the Geosyntec team will use this logo/slogan throughout the remainder of the planning effort.

#### **4.4 Task 3: Comprehensive Description of Existing System**

The primary goal of this task is to gain an understanding of the existing waste and recycling streams in the City and the systems for processing and management of these streams. Geosyntec will review the City’s existing system, which includes the multifaceted solid waste and recycling programs, services, facilities, and datasets as well as regulations, City population and employment projections, governance, finance, and contracting items listed on pages 3-5 of the RFP. In addition, from review of the clarification for Task 3 issued by the Authority on 13 April 2018, Geosyntec understands that the scope for Task 3 includes a cursory review of private infrastructure and facilities in the local region, as defined by a 3-hour truck travel distance from the City. Geosyntec works actively with private-sector facilities across the mid-Atlantic and maintains a comprehensive database of permitted facilities in the region; therefore, we can complete this review efficiently. We have also briefly reviewed the City’s existing 2013-2023 Solid Waste Management Plan (SWMP) to better understand the existing system and dynamics of material recycling and disposal in and around Baltimore. Geosyntec understands the information compiled for these facilities should be restricted to their location and potential cost, capacity, and availability for processing/disposing of materials. A detailed list of equipment and description of operational factors is not required.

Site Visits: Geosyntec anticipates that two days of meetings/tours in the City will be needed to fully understand the City’s operations. As an investment in better understanding the City’s needs and constraints for the project, if selected Geosyntec will commit the Project Manager (Jeremy Morris) and Project Director (Tom Ramsey) to a pro-bono site visit upon commencement. This visit will provide our team’s leaders with the opportunity to meet key City personnel that will be involved in the project, as well as to review and be educated on the existing waste/recycling programs, plans, operations, and associated infrastructure in the City. Information and insight gained from this visit will be critical in informing the other team members and efficiently and cost-effectively proceeding with the project. It is assumed that this visit will take up to six hours for which all labor and expenses incurred will be contributed by Geosyntec. Subsequently, Geosyntec has only budgeted for a follow-up visit by Jeremy Morris and one Staff Professional. Again, it is assumed that this visit will take up to six hours. Although not a City-owned facility, it is assumed that BRESKO will be visited during one of the site visits.

Information/Data Transfer and Storage: Geosyntec understands that the information needed for completion of Task 3 will come primarily from the City’s existing SWMP, supplemented by



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additional reports and plans to be provided by the City. In the latter regard, it is assumed that Geosyntec will receive electronic copies of tonnage/recycling reports, relevant datasets, current contracts, and the City's rate/funding model as well as electronic and/or hard copies of other relevant reports previously generated by the City in relation to study of their system. Geosyntec will work directly with DPW's appointed staff member(s) to ensure efficient review and cataloging of this information. Due to the proximity of our Columbia office to the City, Geosyntec staff can readily spend time onsite with DPW staff to facilitate document assembly/transfer as necessary. All electronic files received will be securely stored in a dedicated data room hosted on Geosyntec's main server, which is backed up daily. Documents provided as hard copy will be scanned as PDFs and added to the data room. All hard copy materials will then be returned to DPW (no shipping cost is included in our price proposal as it is assumed Geosyntec's proposed Project Manager will deliver materials back to DPW during an on-site meeting). At the end of the project, a copy of all project documents will be provided to DPW on a CD or thumb drive. Thereafter, depending on DPW's instruction, electronic files related to the project will be stored on Geosyntec's server (for up to three years) or deleted.

Database and Inventory Table/Map: In addition to time spent reviewing and distilling information into a summary report providing a detailed description of the existing City-owned and private infrastructure, Geosyntec understands that a database inventory of facilities is required. The inventory will be presented in a table structured in accordance with the specifications listed on page 2 of the clarification for Task 3 issued by the Authority on 13 April 2018 and will be accompanied by a map. The inventory table/map will be linked to facility data in an MS Access database.

Deliverables and Meetings: Geosyntec's effort on Task 3 will be led by Jeremy Morris with support from Bill Gaffigan. The output from Task 3 will be a summary report (MS Word with calculations in MS Excel), inventory table and map (MS Excel-based), and database (MS Access), which together will serve as the basis for future discussions on the Master Plan, both internally and with stakeholders. The report will include an executive summary and graphical representations suitable for review by elected officials and the public. As required in the RFP, Geosyntec has allowed for two rounds of meetings and review comments from the Authority/City prior to generation of the final report. It is anticipated the first meeting will be a 2-hour in-person meeting at DPW's offices, while the second will be a 2-hour online meeting (audio/visual teleconference) facilitated by Geosyntec. Meetings will be attended by Jeremy Morris, Bill Gaffigan, and one Project Professional. It is assumed that the Authority will combine all comments into one set of comments for each round of review.



#### **4.5 Task 4: Benchmarking**

Completion of Task 3 will provide an up-to-date understanding of the existing infrastructure around the City as well as the likely influence of future regulations and population dynamics on expected long-term waste diversion and recycling programs and practices. In Task 4, Geosyntec will provide benchmarking of the current City programs and best practices in comparison to other jurisdictions with similar demographics. This benchmarking effort will compare five jurisdictions and will, at a minimum, include the categories for comparison identified on page 6 of the RFP. Geosyntec has reviewed the scope clarification for this task and understands that the five comparable jurisdictions will be mutually selected by the County and Geosyntec.

The RFP requires that benchmarking includes a brief discussion of “counting methodologies” that are used in other high diversion jurisdictions relative to the Maryland Recycling Act (MRA) to ensure a true comparison of program metrics is accomplished. Recognition by the City that how and what is counted towards recycling is critical in this regard. Geosyntec will objectively review and analyze operational outcomes and key performance indicators and compare them to industry benchmarks using custom models. We will rely on professional experience as well as the SWANA guidance “The Benchmarking of Residential Solid Waste” to establish an objective framework for identifying, shortlisting, and selecting representative jurisdictions for benchmarking. Our focus will be on selecting and characterizing jurisdictions with challenges, opportunities, and goals/aspirations that align with those of the City. Typically, selection criteria are grouped to include:

- Service area size and demographics (e.g., wastered volumes and characteristics; population size and growth rate);
- Infrastructure (e.g., types of programs/facilities employed for collection, processing, recycling, and disposal; ownership levels and type of contract operators); and
- Focus and aspirations (e.g., disposal vs. diversion centric operations; strategic goals; recognition for best practices and/or adoption of new technology).

Jurisdictions currently reliant on WTE for disposal of unrecovered waste are of most interest. In addition, Geosyntec’s familiarity with solid waste management and recycling programs within a jurisdiction is a positive attribute that will likely improve the efficiency of the outreach process and data collection/analysis. Based on the above, a preliminary list of suggestions includes: (1) Tampa FL, (2) City of Spokane WA, (3) Kent County MI; (4) Lee County FL; (5) City of Minneapolis MN; (6) Union County NJ; and (7) City of Indianapolis IN. It is noted that these jurisdictions are preliminary suggestions only and are proffered prior to obtaining a deeper understanding of the



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City's existing system and waste streams. Therefore, in consultation with the City, Geosyntec may make alternative recommendations prior to execution of this task.

Deliverables and Meetings: Geosyntec's effort on Task 4 will be led by Bill Gaffigan and Marc Rogoff. Prior to commencing with the analysis, Geosyntec will provide a shortlist of candidate jurisdictions for review and approval by the City. A 1-hour conference call will be facilitated by Geosyntec to discuss the rationale for shortlisting candidates. The output from Task 4 will be a benchmarking report, the results of which will be used to help determine the programs that should be investigated in Task 5. The report will include an executive summary and graphical representations suitable for review by elected officials and the public. As required in the RFP, Geosyntec has allowed for two rounds of meetings and review comments from the Authority/City prior to generation of the final report. Both meetings will be 2-hour audio/visual (AV) teleconferences facilitated by Geosyntec and attended by Jeremy Morris, Marc Rogoff, and Bill Gaffigan. Deliverables will be provided in electronic format (MS Word with calculations in MS Excel). It is assumed that the Authority will combine all comments into one set of comments for each round of review.

Optional Pricing: Geosyntec understands that additional jurisdictions for benchmarking may be added by the City. Therefore, we have included optional pricing for additional benchmarking on a per-jurisdiction basis at 1/5 of our budget for this scope item (rounded up). This optional pricing assumes that the additional benchmarking effort will be incurred reasonably concurrent with ongoing work on Task 4.

### **4.6 Task 5: Improvements to Current Diversion/Recycling System**

Following completion of Tasks 3 and 4, Geosyntec will review methods/ideas for increasing waste diversion and recycling in the City in accordance with the scope of services and suggestions outlined on pages 6-8 of the RFP as well as the clarifications listed on pages 2-3 of the scope clarification issued on 13 April 2018. Geosyntec understands that the City requires review of methods/ideas for increasing diversion and recycling to specifically consider sustainable materials management (SMM) concepts in accordance with U.S. EPA protocols. Input from the stakeholder engagement process in Task 1 will also be used to help inform the review. Data from the first two waste sorts in Task 0 should also be available, with data from the final two waste sorts serving to confirm/refine the analysis prior to completion of Task 9. The review will include an estimate of the quantity and timing of additional waste diversion/recycling that may be achieved, as well as expected costs and benefits (e.g., private/public sector jobs, environmental quality) if each recommendation were to be enacted under typical as well as optimistic/pessimistic scenarios. The review will also establish expectations for "what's left,"



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that is the quality of unrecovered waste that still requires processing or disposal (for evaluation in Task 7). All analyses in Task 5 will be conducted relative to a baseline represented by the existing system, waste stream characteristics, and ordinances/regulations as defined in Task 3. If the need for new or replacement facilities is identified, Geosyntec will also identify high-level siting requirements.

In investigating options for improving waste diversion and recycling, Geosyntec understands that the City requires consideration of target programs that may affect only certain generators or business sectors. In addition, new or changed programs or operations may be decentralized and serve parts of the City only (i.e., a “one size fits all” approach is not required). Such targeted efforts can go a long way to improving overall recycling rates. While all recycling is beneficial, we can help the City avoid programs with low return on investment (tons recycled per dollar invested). We are also intimately familiar with Maryland legislation and can help the City focus on programs that boost recycling of MRA rather than non-MRA materials.

Geosyntec has recent relevant experience with completing a review of this nature. **In 2015-2017, Jeremy Morris led a study for Frederick County, Maryland titled [Solid Waste Management and Recycling Options](#), Phase 1 of which investigated 20 potential methods for achieving incremental improvements in countywide waste diversion and recycling rates between 2020 and 2040 in accordance with the MRA and other existing/proposed Maryland legislation. Options investigated included pay-as-you-throw, composting of source separated organics, expanded recycling programs for businesses, beverage container recycling programs, Styrofoam bans, and food donation programs. Significant stakeholder outreach was included to solicit public input on selection of options for inclusion in the study, which was conducted under Geosyntec’s previous on-call services contract with the Authority.**

In conjunction with the stakeholder outreach program in Task 1, Mark Foster from Second Chance will help Geosyntec identify ways to improve education programs, citizen access to recycling, and “green collar job” creation, including through potential implementation of ordinances, policies, and/or incentives to increase recycling, particularly from demolition projects. He will also advise on the potential role of nonprofits in addressing waste and recycling issues in the City (e.g., through the design and operation of resource recovery parks or “swap centers”).

An important consideration for the analysis in Task 5 is the effect of China’s waste import ban on many categories of recyclable materials recovered from solid waste streams and proposed tariffs on scrap metals, which has negatively impacted the market for secondary materials. Improvements to a recycling program incur additional costs, which – unless they can be offset



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through other funding sources – will need to be recovered over the program’s lifecycle for it to be financially sustainable. This is an issue of national concern, and **Marc Rogoff currently serves on SWANA’s Recycling Task Force with the specific aim of supporting strategies and tactics for sustainable growth of recycling programs in the United States and Canada** with an immediate focus on how to respond and adapt to China’s actions. A copy of a recent article on this topic by Dr. Rogoff is provided in Appendix 3. His experience will be key in establishing realistic expectations for the future economic performance of recycling efforts.

Finally, the RFP requires that estimates of environmental benefits include a detailed discussion on lifecycle greenhouse gas (GHG) emission reductions as well as pollution creation throughout the cycle of collection and recycling/disposal. Several potential GHG estimation models exist and Geosyntec understands that DPW will review and approve the model used prior to use in Task 5. However, in the interests of objectivity (particularly regarding potential benchmark comparisons to other jurisdictions) and ensuring credibility with stakeholders, Geosyntec proposes using the U.S. EPA’s WARM ([Waste Reduction Model](#)). This straightforward model serves to track GHG emissions reductions from different waste management practices, including source reduction, recycling, anaerobic digestion, combustion, composting and landfilling. To capture environmental benefits of different options in more detail, WARM analysis may be supplemented with use of the lifecycle assessment model SWOLF ([Solid Waste Optimization Life-Cycle Framework](#)), which was developed by researchers at North Carolina State University (NCSSU). Geosyntec’s Jeremy Morris has a long-standing track-record of collaboration with Dr. Morton Barlaz, the supervising professor behind SWOLF, on several projects looking at long-term performance of solid waste facilities.

Deliverables and Meetings: Geosyntec’s effort on Task 5 will be led by Marc Rogoff and Jeremy Morris. The output from the task will be a report detailing potential improvements to the City’s system as detailed above. The report will include an executive summary and graphical representations suitable for review by elected officials and the public. As required in the RFP, Geosyntec has allowed for two rounds of meetings and review comments from the Authority/City prior to generation of the final report. It is assumed that the Authority will combine all comments into one set of comments for each round of review. Both meetings will be 2-hour AV teleconferences facilitated by Geosyntec and attended by Jeremy Morris and Marc Rogoff. All iterations of the report will be provided in electronic format (MS Word and PDF). The GHG calculations will be provided in MS Excel.



#### **4.7 Task 6: Report on Previous Tasks**

Task 6 represents an important interim milestone in the project in which the results achieved to date are collated and presented to the Authority/City for detailed discussion and consideration of the approach to completing the Master Plan. Geosyntec will develop a presentation that concisely summarizes the information obtained from previous tasks. The presentation will be used during meetings with the Authority/City to solicit feedback prior to moving on to investigating options for "what's left" in Task 7.

Deliverables and Meetings: Geosyntec's effort on Task 6 will be led by Jeremy Morris. The output from Task 6 will be a presentation as detailed above. As required in the RFP, Geosyntec will prepare a draft presentation, which will be presented at a 3-hour in-person meeting at DPW's or the Authority's offices. After addressing comments from the Authority/City, Geosyntec will prepare a final presentation, which will again be presented at a 3-hour in-person meeting. After addressing comments from the Authority/City, Geosyntec will submit a revised final presentation for review. Additional comments will then be addressed prior to providing the final presentation (no meeting is anticipated, although a brief teleconference may be required). Meetings will be attended by Tom Ramsey and Jeremy Morris. Geosyntec will provide all iterations of the presentation in MS PowerPoint format to ease review by all parties, with calculations provided in MS Excel format. It is assumed that the Authority will combine all comments into one set of comments for each round of review.

#### **4.8 Task 7: Develop Options for "What's Left"**

Task 7 serves to close the loop on the reviews and analyses completed in previous tasks. Increasing waste diversion and recycling will reduce the quantity of unrecovered material (i.e., "what's left") relative to the existing system; however, some material will always require additional management. The goal of this task is to recommend an optimal approach for continued collection and disposal of "what's left" over the long term. Geosyntec will provide budgetary planning projections and NPV cost comparisons through 2040 for different disposal options as well as lifecycle GHG emission estimates using the U.S. EPA's Waste Reduction Model (WARM) and/or NCSU's Solid Waste Optimization Lifecycle Framework (SWOLF) as previously described in Task 5.

At a minimum, the scope of services for Task 7 will include the options and analyses listed on pages 8-9 of the RFP. In reviewing the clarified scope for this task, Geosyntec also understands that the County specifically requires the analysis of disposal options for "what's left" to include discontinued use of BRESKO in lieu of other realistic in- or out-of-City disposal alternatives.



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Specific reasons for continued/discontinued use of BRESCO will be clearly identified in the report to provide an objective comparative discussion of the future of BRESCO relative to other options.

Critical Evaluation of BRESCO: As implied in the RFP, fully understanding the practicalities, reliability, costs, environmental performance, and other potential performance issues surrounding the continued use of BRESCO will be critical to informing the City's decision-making process for long-term solid waste management and is a key objective of this project. Given its importance, therefore, Geosyntec proposes to subcontract the services of Deltaway ([www.deltaway.com](http://www.deltaway.com)), a firm that specializes in the operation and performance of WTE and biomass plants. In this capacity, Deltaway will:

- Collect and review information regarding the BRESCO facility, including:
  - Key plant design specifications (including original heat and mass balance);
  - Historical production data;
  - Historical operation and maintenance (O&M) costs;
  - Historical capital expenses (CAPEX)
  - Existing long-term CAPEX plan(s) that have been prepared by Wheelabrator for next 5 to 10 years;
- Visit the BRESCO facility, spending 8 hours on-site to inspect the facility and validate the above information;
- Review current performance and identify current and potential future challenges;
- Review characteristics of "what's left" waste as future feedstock to the facility (based on Geosyntec's findings from Task 0 and recommendations in Task 5) and anticipate potential impacts on facility performance and O&M costs; and
- Prepare next 20-years performance forecast, O&M cost, and long-term CAPEX estimates that will be required to extend the operating life of BRESCO.

The BRESCO visit is assumed to take place in January 2019 according to the tentative schedule for Task 7 shown in Section 6. This coincides with the winter waste sort, which can be tailored as necessary to target materials of interest for Deltaway's assessment of BRESCO. Deltaway will present findings from their assessment in MS PowerPoint format to Geosyntec for incorporation into the Task 7 report deliverable.

Deliverables and Meetings: Geosyntec's effort on Task 7 will be led by Marc Rogoff. The output from Task 7 will be a report on disposal options with associated costs and GHG calculations and



recommendations to proceed. The report will include an executive summary and graphical representations suitable for review by elected officials and the public. As required in the RFP, Geosyntec has allowed for two rounds of meetings and review comments from the Authority/City prior to generation of the final report. It is assumed that the Authority will combine all comments into one set of comments for each round of review. Both meetings will be 2-hour AV teleconferences facilitated by Geosyntec and attended by Marc Rogoff and Jeremy Morris of Geosyntec and Francois Screve of Deltaway. All iterations of the report will be provided in electronic format (MS Word). Cost and GHG calculations will be provided in MS Excel 2010 or later and be primarily formula driven.

#### **4.9 Task 8: Draft Master Plan for Public Review**

After meeting with DPW, Geosyntec will revise the results from Tasks 6 and 7 to incorporate feedback received and update the planning process with new ideas. This is the point in the planning process at which the City will determine the direction of recycling and disposal options to move forward with. Therefore, effort in this task will include developing a recommended hierarchy of programs/options for the City to pursue, including estimated costs, projected outcomes, and potential funding sources (which will include discussion of grant opportunities and revenue sources other than projected recyclables profits and offsets from disposal avoidance). A key focus of the funding discussion will be addressing changes in costs if a recommendation is for use of BRESKO to be discontinued in the short or longer term. The Master Plan will identify potential roles for the private sector as well as state and local government agencies and departments, non-profits, universities, institutions, and residents. The Master Plan will also identify major events and their expected outcomes that would trigger the need for contingency operations under a comprehensive Disaster Debris/Facility Closure Management Plan, which is to be developed separately outside the scope of this project.

Deliverables and Meetings with DPW: Geosyntec's effort on Task 8 will be led by Jeremy Morris with support from Bill Gaffigan and Mike Hansen. The output from this task will be a report documenting the recommended hierarchy as detailed above. Public input and comments from the stakeholder engagement process completed in Task 1 will also be incorporated in the report; as such, preparation of the report will be supported by Nexight. The report will include an executive summary and graphical representations suitable for review by elected officials and the public. As required in the RFP, Geosyntec has allowed for two rounds of meetings and review comments from the Authority/City prior to generation of the final report. Both meetings will be 2-hour AV teleconferences facilitated by Geosyntec and attended by Tom Ramsey, Jeremy Morris, and Bill Gaffigan. Deliverables will be provided in MS Word format. It is assumed that the Authority will combine all comments into one set of comments for each round of review.



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Town Hall Meeting: As noted in Task 1, the Stakeholder Engagement plan calls for presentation of the Master Planning effort to the public following completion of Task 8. Geosyntec assumes that the presentation approved in Task 6 will be used for this purpose, subject to minor modifications (e.g., to reduce the length/complexity as appropriate). Therefore, Geosyntec anticipates that only *de minimis* effort will be required to make any such modifications and has not budgeted any time for this. It is assumed that the Task 8 report will be made available for public review ahead of the town hall meeting. The meeting should be held in an open, interactive forum that allows for public input and comment on the Master Planning process up to this point in the project. Geosyntec's Tom Ramsey and Jeremy Morris will make the presentation, which Mark Foster from Second Chance will also attend. We assume that a 2-hour duration for the meeting will suffice. The meeting should be held on a weekday evening to increase opportunities for attendance. It is assumed that DPW will secure an appropriate venue and that the meeting will be advertised on the City's website. Geosyntec will be responsible for preparing an advertisement for the event, for which the city will incur the costs of posting to their selected media outlets. Geosyntec will coordinate with DPW staff regarding any facility requirements (e.g., AV equipment). The City will be responsible for all materials to be printed and handed out.

### **4.10 Task 9: Final Master Plan**

In Task 9, Geosyntec will develop the Final Master Plan incorporating the results from all prior tasks. At a minimum, the Master Plan will include a stand-alone executive summary, summary of previous tasks, conceptual drawings of facilities, sample legislative language for recommended changes in legislation, and back-up support as needed. Graphical representations suitable for review by elected officials and the public will be included. The Final Master Plan will incorporate feedback received from the stakeholder engagement process, including from the Town Hall Meeting held in Task 8. A separate comment response document will be prepared to record feedback that was not incorporated along with an explanation as to why comments were or were not incorporated.

Deliverables and Meetings: The Final Master Plan and comment response document will be prepared by Jeremy Morris with support from other Geosyntec professionals and input from Nexight. As required in the RFP, Geosyntec has allowed for two rounds of meetings and review comments from the Authority/City prior to generation of the final deliverable. It is assumed that the Authority will combine all comments into one set of comments for each round of review. Both meetings will be 2-hour AV teleconferences facilitated by Geosyntec and attended by Jeremy Morris and one other senior professional. All iterations of the final deliverable will be provided in electronic format (MS Word and PDF). Budget-related files will be provided in MS Excel 2010 or later and be primarily formula driven.



#### **4.11 Task 10: Presentation of the Master Plan**

The goal of this task is to develop an abbreviated presentation of the Master Plan for presentation to the Mayor, City Council, and the public. The presentation will highlight the planned programs that have been developed through this project to fully bring home the theme of "Less Waste, Better Lives," as modified/updated following the branding exercise in Task 2.

Deliverables and Meetings: Geosyntec's effort on Task 10 will be led by Jeremy Morris and Tom Ramsey. The output from this task will be a presentation as detailed above. Specific deliverables and meetings required under this task are as outlined below, with Geosyntec's assumptions identified. Each iteration of the presentation will be provided in MS PowerPoint to ease review by all parties.

1. Draft Presentation for Review by Authority/City: Geosyntec will first prepare a draft presentation for review by the Authority/City. As required in the RFP, Geosyntec has allowed for two rounds of meetings and review comments from the Authority/City prior to generation of the final presentation. It is assumed that the Authority will combine all comments into one set of comments for each round of review. Both meetings will be 2-hour AV teleconferences facilitated by Geosyntec and attended by Jeremy Morris and Tom Ramsey.
2. Presentation to the Mayor: Following completion of the review process above, Geosyntec (Jeremy Morris and Tom Ramsey) will meet with the Authority/City for a 4-hour in-person session to review and practice the presentation. After making on-the-spot revisions based on comments received during this session, Geosyntec will present the final presentation to the Mayor (it is assumed a 2-hour in-person meeting will be required).
3. Final Presentation to the City Council: As required in the RFP, Geosyntec has allowed for one additional round of review comments following presentation to the Mayor. It is assumed that the Authority will combine all comments into one set of comments. Addressing these comments will culminate in preparation of the final presentation, which will be presented to the City Council. It is assumed that a 2-hour in-person meeting will be required to make this presentation.



## **5. PROJECT MANAGEMENT AND ORGANIZATION**

### **5.1 Organization of the Project Team**

Geosyntec recognizes that successful execution of any multi-faceted project depends to a significant degree on a strong management approach. As illustrated on Figure 5-1 overleaf, Geosyntec will manage the study at three main levels:

- An experienced Project Director (**Mr. Thomas Ramsey, P.E.**) with a solid record of successful completion of projects, including several projects completed under the on-call contract with the Authority;
- A strong, proactive, and experienced Project Manager (**Mr. Jeremy Morris, Ph.D., P.E.**) with highly credentialed and directly relevant technical experience and a demonstrated capacity for managing and implementing multiple assignments simultaneously;
- Task Leaders (subject matter experts) specifically selected for their professional skills and well-qualified and experienced to lead specific project assignments; and
- Technical Leads, coordinating input from specialist subcontractors within specific tasks.

The objective of this organizational approach is to use the capabilities and experience of each team member to their greatest advantage. By structuring the effort around several strong task leaders, multiple tasks can be undertaken simultaneously or in quick succession without the risk of downtime due to individual overload/burnout or other issues.

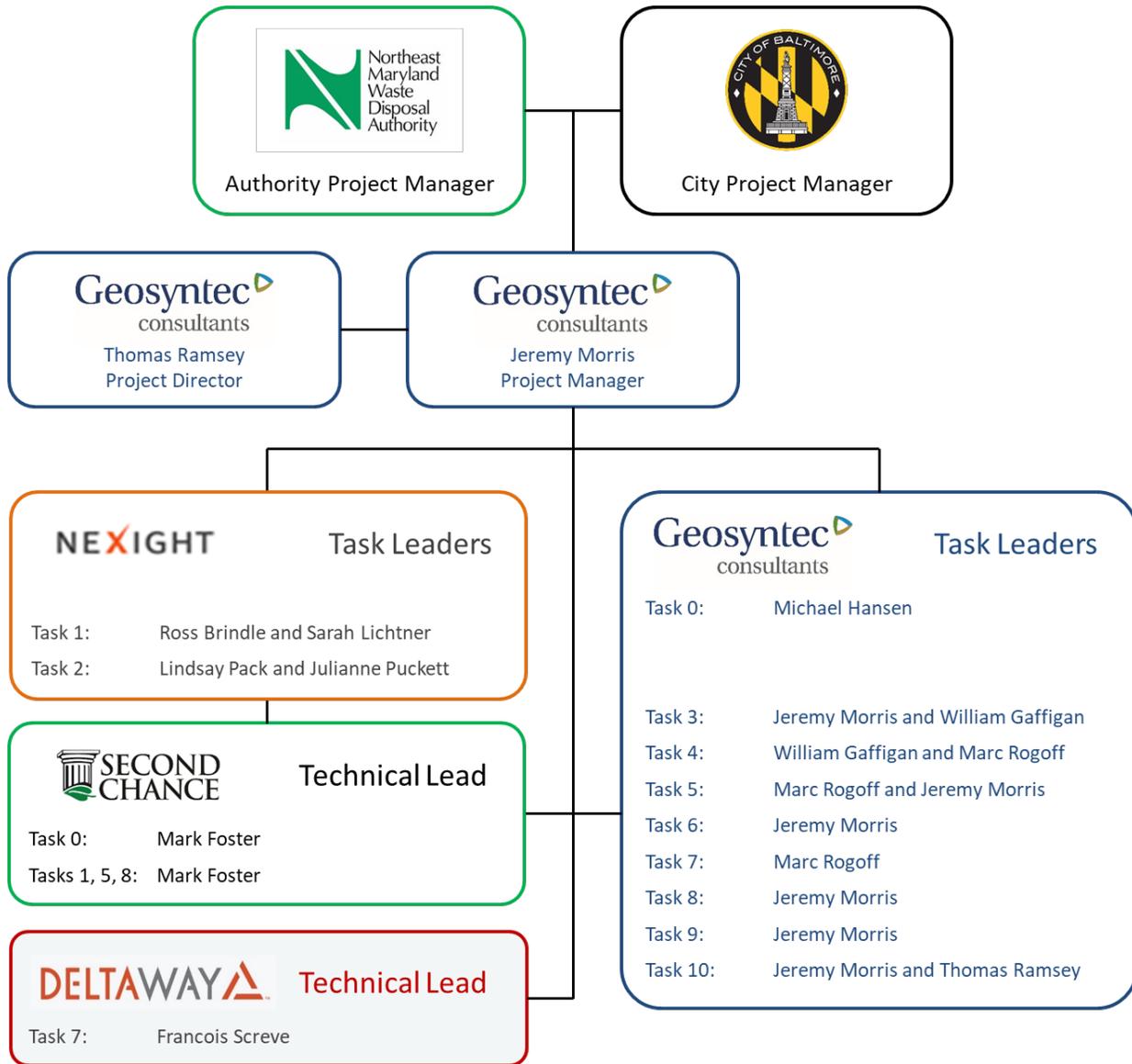
### **5.2 Staffing Commitment and Resources**

If Geosyntec is successful in being awarded the contract, the entire project effort will be performed by the professionals identified in Section 2.2, all of whom are direct employees of our Maryland operation. All professionals assigned to this project by our partner firms are direct employees of their respective firms. No key team member will be replaced without prior notification to, and approval by, the Authority and City.

Mr. Ramsey has overall responsibility for the engineering group within Geosyntec's Maryland office. The engineering group comprises 19 professionals, including five junior-level (staff) engineers, seven mid-level (project) engineers, and three CAD designers. These staff resources report directly or indirectly to Mr. Ramsey and will be available to work on this project within the timeframe outlined in Section 6.



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**Figure 5-1: Geosyntec’s Proposed Organization Chart**



### **5.3 Project Management**

Geosyntec's Project Manager will manage the planning effort to ensure that the schedule is met, the website content is updated on a consistent basis, and that all portions of the scope are completed to the satisfaction of the Authority/City. Nexight will be responsible for managing website content and tracking and summarizing inputs from stakeholder engagement efforts, including community meetings and the online survey as described previously in Tasks 1 and 2. Nexight will work with City IT staff to obtain regular updates on website analytics, including number of site visits and downloads, and will regularly analyze and summarize these updates. Nexight will provide updates to the website content at least every month throughout the planning effort.

Cognizant of the fast-paced schedule and multi-disciplinary approach to this project in which several different tasks will be underway concurrently, Geosyntec will implement a robust program management program in the areas of budget and schedule control, quality control, and communications management. Geosyntec uses well-established project management procedures and tools to successfully plan and execute our project work. Our project management approach is an important contributing factor to our service level reputation with our clients. The key elements of our project management approach to successfully complete projects include:

- Task-specific schedule and budget assignment and management to provide for detailed cost control and project administration during execution of the work;
- Quality assurance and control provided through an institutional Quality Management Program (QMP);
- Philosophy of working in a team-oriented, cooperative manner across all tasks in each capacity associated with different project assignments; and
- Active communication and engagement, both internally and with our clients and other project stakeholders.

Geosyntec's team is very experienced working on projects with aggressive schedules, often driven by hard deadlines for investment/divestment decisions, mergers and acquisitions, consent decrees, or looming regulatory changes, litigation, or negotiated agreements. We also understand the importance of communication in studies such as these in which stakeholder input is key. Our team members fully respect that the true measure of success is not only technical quality and cost effectiveness of the solution provided but also meeting schedule commitments throughout the project work effort.



## **6. PROPOSED SCHEDULE**

Based on the draft target schedule on page 11 of the RFP, Geosyntec understands that the City plans to review proposals and award the project in June 2018 and have the work completed by July/August 2019, a relatively compressed timeframe. A simplified chart illustrating Geosyntec's proposed schedule to comply with this 15-month timeframe is provided as Figure 6-1 overleaf.

The schedule incorporates the milestones identified on page 11 of the RFP and includes necessary meetings and comment periods by the Authority/City as well as stakeholder meetings and outreach events. Although Geosyntec concurs with the proposed schedule and milestones laid out in the RFP, because of the multiple opportunities afforded for stakeholder engagement and to solicit input from the public and outside experts, it is stressed that this schedule can be met only if strong leadership and support for maintaining the schedule is committed to by DPW.

For ease of review, a formal Gantt chart has not been prepared at this proposal stage. In developing a schedule, we have focused on ensuring that project deliverables can be produced, meetings held, and milestones met within a two-week window within the overall schedule (for this reason, each individual cell in the schedule chart corresponds to a two-week period). If selected for this project, Geosyntec expects that the Authority/City will provide feedback on the proposed schedule prior to project kick-off, after which Geosyntec will submit a more-detailed schedule with clearly defined critical path activities for approval. If requested, Geosyntec will provide and maintain a Gantt chart schedule using MS Project from that point forward.



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	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19
	6/5 - NTP														
Task 0	◇ I	I	◆◆◆	II		◆◆◆		◆◆◆	IV			◆◆◆	VI	VI	
Task 1			I	I		◆◆		◆◆	IV	V			VI		
Task 2a			I		II										
Task 2b					I										
Task 3	◇◇	I													
Task 4															
Task 5															
Task 6															
Task 7									◇						
Task 8															
Task 9															
Task 10															

**Key:**  Task Effort in Progress  Draft Deliverable and Meeting/Teleconference  Draft Deliverable, No Meeting  Final Deliverable and Meeting/Teleconference  Final Deliverable, No Meeting  Kick Off Meeting  Waste Sorting Event  Public Meeting/Outreach Event  Site Visit

**Notes:** Task 0: (I). Draft and Final Work Plan; (II). Briefing Document on Summer 2018 Waste Sort (to inform Task 3); (III). Briefing Document on Fall 2018 Waste Sort (to inform Task 5); (IV). Briefing Document on Winter 2019 Waste Sort (to inform Tasks 7 and 8); (V). Briefing Document on Spring 2019 Waste Sort; (VI). Draft and Final Summary Report (to inform Task 9).  
 Task 1: (I). Draft and Final Stakeholder Engagement Plan; (II). Letter reports on Phase 1 stakeholder meetings (to inform Task 5); (III). Summary of rolling monthly updates to date (to inform Task 6); (IV). Letter reports on Phase 2 stakeholder meetings (to inform Task 7); (V). Summary of rolling monthly updates to date (to inform Task 8); (VI). Final summary report on entire stakeholder engagement process for inclusion in Task 9.  
 Task 2a: (I). Identify suite of communications materials for website content, define approach for website content management and monthly updates; (II). Start of website content management.  
 Task 2b: (I). Select logo/slogan combination for use in remainder of project.  
 Task 3: (I). Data/information transfer and cataloging, initial review.  
 Task 7: Site visit is Deltaway’s inspection/assessment of BRESCO.  
 Task 9: (I). Comment response document to record feedback and actions taken following public meeting in Task 8.  
 Task 10: (I). Draft presentation for review by Authority/City, followed within one week by presentation to Mayor; (II). Final presentation to City Council.

**Figure 6-1: Geosyntec’s Proposed Schedule for the Project**



**7. PRICE PROPOSAL**

Geosyntec’s proposed budget for the project is summarized in Table 7-1 below. A detailed breakdown of budget calculations with pricing detailed by task-hour per team member is provided in the attached MS Excel spreadsheet. The budget was prepared in accordance with Geosyntec’s approved fee schedule for Year 1 included in our existing 2017-2019 service agreement with the Authority. Assumptions affecting costs shown were provided where appropriate in the discussion on scope in Section 4.

In the budget breakdown, Geosyntec accounts for approximately 63% of the effort, with about 15% allocated to Nexight, 9% to Deltaway, and 14% to Second Chance. The total budget indicated in Table 7-1 includes all labor and expenses for each task.

**Table 7-1: Proposed Budget for the Project**

<b>Task</b>	<b>Description</b>	<b>Budget</b>
0	Four-Season Waste Sort	\$110,691
1	Stakeholder Engagement Plan and Execution	\$38,675
2	Develop/Maintain Website Contents and Branding Assistance	\$35,060
3	Comprehensive Description of the Existing System	\$37,944
4	Benchmarking	\$37,708
5	Improvements to Current Diversion/Recycling System	\$40,887
6	Report on Previous Tasks	\$14,775
7	Develop Options for "What's Left"	\$68,860
8	Draft Master Plan for Public Review	\$25,697
9	Final Master Plan	\$16,020
10	Presentation of the Master Plan	\$13,192
<b>TOTAL</b>		<b>\$439,508</b>



***"Less Waste, Better Lives"***  
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Solid Waste Management Master Plan***

## **APPENDIX 1**

Company Brochures and Project Descriptions



*Geosyntec applied its first-hand knowledge of solid waste operations, planning, and financial oversight help SWACO reduce their operating costs*

**Client:** Solid Waste Authority of Central Ohio

**Services Provided:**

- ✓ Capital planning review
- ✓ Financial analysis and modeling
- ✓ Operations review
- ✓ Organizational review
- ✓ Risk management

### Project Objective

The Solid Waste Authority of Central Ohio (SWACO) manages over a million tons of solid waste annually through an integrated regional network of waste processing, transfer, and disposal facilities in the Columbus, Ohio region. Following a major turnover in executive management, SWACO was interested in a top-to-bottom review of their organization so that they could assure their stakeholders that the organization could continue its mission well into the future. In support of this goal, SWACO retained Geosyntec to provide an independent assessment of their solid waste operations, financial planning, staff organization and maintenance operations. This included a review of their landfill and transfer station operations, landfill gas (LFG) system operations, heavy equipment maintenance, capital projects planning, financial reporting, in-house engineering support, and overall organization of their operations.

### Geosyntec's Scope of Services

Geosyntec conducted a records review and on-site review and assessment, including personnel interviews and surveys, of SWACO's operations. Facilities reviewed included SWACO's operating and closed landfills, LFG systems at both landfills, and two transfer stations. Issues of focus included: landfill and transfer station operational procedures, landfill gas collection system operation, equipment procurement and maintenance, personnel organization, financial planning, financial reporting, and capital projects procedures. To execute the work, Geosyntec brought in a team of senior professionals with decades of experience in all of the review areas. Based on our extensive experience with landfill finances and operations, as this work was completed, we were able to quickly gain a high-level understanding of the organization, identifying both strengths and weaknesses of operational and financial practices and procedures versus typical industry standards and benchmarks. With this information, we made several presentations to SWACO management to help them identify a plan and schedule for implementing changes to their organizational structure, overhauling budgeting procedures and cash flow tracking systems, and improving data collection and management systems. We also provided SWACO with a revised capital planning model and risk management approach.

### Notable Accomplishments

Geosyntec's review was used by our client to effectively gain an understanding of where their operations were generally well-run as well as identify areas where improvements could be made. The experience and understanding of our professionals with "real-world" solid waste operations and financing allowed Geosyntec to develop prioritized, actionable recommendations to our client for improving operational efficiency and long-term planning with the ultimate goal of achieving an optimized operation that will remain strong well into the future.



Geosyntec provided guidance to our client to develop an annual budget for their integrated solid waste management and recycling system

**Client:** Dalton-Whitfield Solid Waste Authority

**Services Provided:**

- ✓ Financial analysis for development of annual budget
- ✓ Cost of services for landfill, MRF, transfer facilities, and other operating components
- ✓ Market and disposal fee pricing study
- ✓ Analysis of flow control related issues
- ✓ Analysis of closure and post closure reserves

## Project Objective

The Dalton Whitfield Solid Waste Authority (Authority) in Dalton County, Georgia, engaged Geosyntec to provide financial analysis and strategic consulting related to their annual budgeting and planning cycle. The Authority owns and operates highly integrated solid waste infrastructure that includes a MSW landfill, an industrial landfill, a materials recovery facility (MRF), a commercial landfill gas-to-energy project, public drop-off centers and transfer facilities, and a countywide recycling program. They operate this system within the flow-control environment. As with other municipal entities, they were encountering challenges and opportunities resulting from changing financial conditions in the general economy coupled with changing costs of waste management services, increased demand for services, increased recycling mandates, and the need to justify fees assessed for services within the jurisdictions they serve. Because the issues confronting the Authority were complex and interrelated, their advisor needed to understand the various components of their system and how they fit within the larger marketplace.

## Geosyntec's Scope of Services

Geosyntec performed financial analyses of the multiple components of the Authority, providing strategic consulting on a range of issues. Major goals included completing their annual budget cycle and establishing pricing for the services performed by the Authority. In order to address these goals, we reviewed detailed revenue and cost inputs including tonnage by waste stream and source and operating costs for each of the waste management systems. We analyzed trends and finer details related to such items as volumes and equipment maintenance. Long-term financial planning support included development of a model that estimates the timing and cost of major capital projects based on waste volumes, assumed consumption, volume provided by each cell, and timing of capital construction expenditures. Finally, Geosyntec has provided consulting support to help the Authority understand the greater marketplace in the region and how to factually respond to assertions that services provided by the Authority are not cost competitive. Analysis was done for each revenue and expense line item. Multiple reports were prepared and multiple presentations were made to the Solid Waste Authority Board.

## Notable Accomplishments

Geosyntec's expertise in analyzing integrated waste systems provided perspective and a factual basis that allowed our client to complete annual budgeting in a timely fashion, identify long-term financial trends, identify needed changes to fee structures, and estimate accruals needed for long-term reserve requirements.



Geosyntec facilitated five participatory workshops to solicit input from the public and provide regular feedback, which significantly helped the process

**Client:** Frederick County Government, Maryland

**Services Provided:**

- ✓ Public Outreach
- ✓ Organizational Review
- ✓ Review of Hard and Soft Infrastructure Programs and Technologies for Increasing Waste Diversion and Recycling in the County
- ✓ Lifecycle Assessment of Shortlisted Options
- ✓ Strategic Planning for Phased Implementation of Countywide Composting Program

### Project Objective

Frederick County, Maryland operates an integrated solid waste management system that manages over 175,000 tons of solid waste annually within the County, with operations that include single stream recycling, organics composting, solid waste transfer, and disposal facilities. Over the past 15 years the State of Maryland has enacted a series of legislative goals that systematically raise requirements to increase recycling, energy recovery, and diversion of waste from landfilling. The State's Zero Waste Plan targets incremental increases in waste diversion and recycling from 35% to over 80% by 2040. The target for organics diversion rises to 90% over this period. The County currently achieves an overall waste diversion rate of over 50%; however, in an effort to stay ahead of State requirements, they retained Geosyntec to support their efforts to identify and review potential options for increasing recycling and waste diversion rates over both the near- and long-term horizons.

### Geosyntec's Scope of Services

Geosyntec provided a comprehensive suite of services to assist the County with long-term planning. Because solid waste management and associated services can become lightning rods for public opinion, the County Executive wanted to ensure high levels of public participation in the decision-making process. Geosyntec assembled an experienced team to facilitate a series of workshops (Solid Waste Public Forums) in which citizens were informed of the County's current operations and waste stream data, and asked to provide their opinions, goals, and suggested criteria for evaluating improvements in recycling and waste diversion within the County. Information from the workshops was synthesized into a usable format and paired with Geosyntec's knowledge of proven waste diversion and processing technologies to guide selection of and investment in future waste management activities.

Geosyntec's evaluation of different solid waste management options and technologies includes cost-benefit analysis, lifecycle cost and environmental footprint assessment, review of operational complexity, and ease of integration into existing County programs. Based on this, Geosyntec helped the County develop a strategic plan for phased implementation of selected systems to meet incremental recycling and diversion goals through 2040, initially focusing on composting of food scraps from residences, restaurants, and public schools.

### Notable Accomplishments

Geosyntec's support enabled our client to identify potential paths for increasing waste diversion and recycling to meet their goals for sustainable waste management. Our professional's experience and understanding of advanced yet workable solid waste management systems and technologies allowed us to develop prioritized, actionable recommendations, providing critical input to guide future steps toward higher waste recycling and diversion while avoiding potential costly mistakes associated with unproven or speculative concepts and technologies.



Geosyntec recommended phased implementation of a three-bin curbside collection system based on successful programs such as in San Francisco, CA

**Client:** Frederick County Government, Maryland

**Services Provided:**

- ✓ Strategic planning for phased implementation of countywide composting program
- ✓ Screening and benchmarking of options
- ✓ Public communication and outreach
- ✓ Conceptual design
- ✓ Review of financing and project delivery mechanisms
- ✓ Detailed financial modeling and sensitivity analysis

## Project Objective

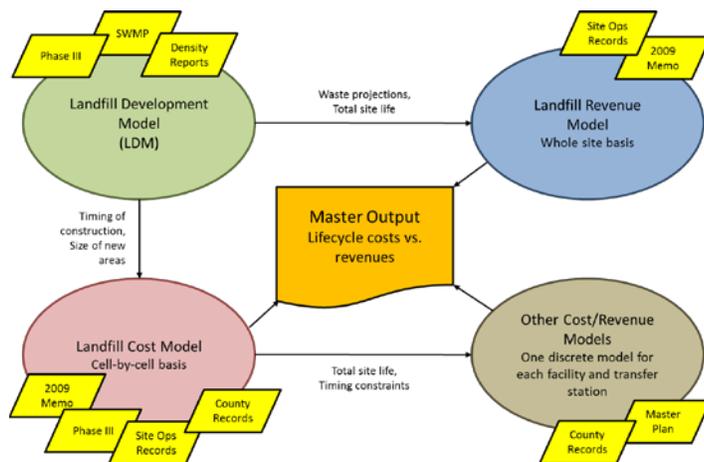
Frederick County, Maryland operates an integrated solid waste management system that manages over 175,000 tons of solid waste annually. Although the County achieved an overall waste diversion rate of over 50% by 2014, they retained Geosyntec to support their efforts to identify and review potential options for increasing recycling and waste diversion over both the near- and long-term horizons.

## Geosyntec's Scope of Services

To meet the County's goals, Geosyntec first developed a strategic plan for increasing their overall waste recycling and diversion rate through 2040. Extensive public input was sought to gauge the level of support for various options, from which composting of food scraps from residences, restaurants, and public schools ranked highest. The County already provides extensive curbside recycling (2-bin collection); therefore, expanding curbside collection to include source-separated organics (SSO) under a 3-bin program is practical. Based on this, we performed a financial and operational feasibility assessment and developed a conceptual design for a countywide SSO composting program. Several public meetings and a 'town hall' were provided in which residents were asked to provide their opinions, concerns, and suggested improvements to the proposed program. To distribute capital expenses and minimize the risk and consequences of failure, we recommended incremental rollout starting at pilot scale with program expansion in six incremental phases only once progressive thresholds for success have been demonstrated and appropriate experience gained by the public and service providers. In the analysis, we assumed that covered aerated static piles will be used since these represent the predominant technology for composting food waste without odor issues. To reduce permitting and operational complexity, individual facilities will be limited to feedstock of 12,000 tons/year. Various mechanisms for financing and project delivery were investigated, including public-private partnerships (P3s), from which private financing for composting facilities and separate bidding for collection routes under franchise agreements appeared optimal.

## Notable Accomplishments

Geosyntec helped the County to define a practical path for increasing waste diversion and recycling to meet their goals for sustainable waste management. Our professionals' experience and understanding of solid waste collection and composting systems allowed us to develop prioritized, actionable recommendations for phased implementation. Pro-forma models suggest that the County can increase their total and SSO recycling rates to about 55% and 30% in 2025, respectively, growing to 65% and 90% by 2040, respectively, at an average monthly cost of less than \$7.50 per household. Additional gains in the overall recycling rate are expected as a result of reducing contamination of single-stream recyclables. In January 2018, the first pilot program for composting food scraps collected from the cafeteria at Urbana High School was initiated in conjunction with a small local composting business.



Geosyntec developed an interactive, easy-to-use lifecycle planning tool to enable Cecil County to assess long-term development of solid waste facilities

**Client:** Cecil County Department of Public Works

**Services Provided:**

- ✓ Master plan revision and update to meet Zero Waste objectives
- ✓ Development of interactive planning tool
- ✓ Scenario analysis for recycling and waste diversion mandates
- ✓ Training manual
- ✓ Public communication materials

**Project Objective**

Geosyntec was retained by Cecil County, Maryland to provide guidance on updating the County’s existing Solid Waste Management Plan (SWMP), which called for future development of alternative solid waste management facilities and recycling as well as increasing disposal capacity at their Central Landfill. The County needed to comprehensively update their SWMP and assess several hard-to-predict factors potentially affecting long-term development of their solid waste assets, including demographics (e.g., quantities and types of waste generated in the facility’s watershed), economics (e.g., markets for recyclables and renewable energy), and policy (e.g., mandates for recycling and diversion of organics) to meet the State of Maryland’s proposed Zero Waste objectives of phasing out disposal of “unprocessed” solid waste to landfill and increasing overall recycling rates to 85%.

**Geosyntec’s Scope of Services**

Geosyntec developed an interactive lifecycle assessment planning tool to evaluate lifecycle effects on costs and revenues associated with developing the facility over a 50-year period. Built on a user-friendly MS Excel® Visual Basic platform, the planning tool allows interactive comparison between different facility development scenarios and predicts future cash flows associated with modifying certain sequences of landfill disposal capacity, installation of a waste processing and materials recovery facility (MRF), and other waste acceptance and operational factors. The tool comprises several modules, including a Landfill Development Model (LDM), Facility Revenue Model (FRM), and Facility Cost Model (FCM). The LDM predicts the timing of new landfill cell construction and the total service life of the landfill, allowing users to change key input parameters (e.g., annual waste intake and growth rate, waste composition and diversion rates, and airspace consumption factor) while providing graphical output depicting necessary site development milestones. The modeled timing of cell development and waste placement serves as primary input control to the FCM and FRM and establishes their boundary conditions. Costs in the FCM (construction, operation and maintenance, administration, financing and bonding, post-closure care, and/or decommissioning) are computed based on this timeline. The FRM includes a comprehensive approach to estimating waste tipping fees and potential revenues from recyclables and renewable energy sales based on market projections and waste compositions.

**Notable Accomplishments**

Geosyntec’s tool provides a cash flow sensitivity analysis to ensure that revenues will be sufficient over the facility lifetime. The tool provides the County with a timeline and anticipated costs for major Capital Investment Project (CIP) events, allowing timely forecasting of major capital outlays. Based on this, the County can establish contingencies for waste handling, disposal capacity, and financial measures. In the latter regard, the County can reduce bonding by optimizing the timing of construction events, in particular closure construction of completed landfill cells.



Geosyntec provides ongoing operational and financial guidance to this private landfill owner/operator, which helps optimize timing of new cell development

**Client:** Green Mountain Management, LLC

**Services Provided:**

- ✓ Long-term Financial Planning
- ✓ Asset and Liability Valuations
- ✓ Benchmarking Performance
- ✓ Operational Assessments and Expense Modeling
- ✓ Planning for Capital Budgets
- ✓ Market Valuation and Strategic Advice

## Project Objective

Green Mountain Management (GMM), the owner/operator of the Green Mountain Flat Top Landfill in Jefferson County, Alabama, has engaged Geosyntec on multiple occasions to provide financial analysis, strategic consulting, and valuation services. The facility is the largest private landfill in the Birmingham market area. It sits on 1,500 acres and has a permit to receive up to 5,000 tons per day.

## Geosyntec's Scope of Services

Geosyntec has established a long-standing relationship with GMM for go-to solid waste advisory support. We have provided wide-ranging services to GMM, including valuation of the landfill asset, review of financial tracking and reporting, accruals for capital purchases and environmental liabilities, and capital project planning. Our initial landfill valuation provided a starting point for our client to understand the overall assets and liabilities associated with the facility. From this starting point, Geosyntec has provided financial planning support that required a detailed analysis of revenue, costs, and capital for long-term planning period extending beyond 10 years. We reviewed operational inputs including tonnage by waste stream and source and compared these versus labor and operating costs based on landfill volumes and other conditions. In addition, we supported GMM in efforts to model equipment operating and replacement costs for their landfill and construction equipment. Longer-term financial planning support included development of a model that estimates the timing and cost of cell and closure construction based on waste volumes, assumed compaction, volume provided by each cell, and timing of capital construction expenditures. We have also provided consulting support to help GMM understand pricing and their competitive position within the marketplace.

## Notable Accomplishments

Geosyntec's expertise in analyzing integrated waste systems provided our client valuable insight perspective and a factual basis for completing multiple projects, during which we have:

- Created models to benchmark performance of landfill;
- Supported the sourcing of financing options during the development of the landfill;
- Identified long term financial trends; and
- Provided recommendations on pursuing or disengaging from potential strategic alliances.



The County's sparse population mostly resides in unincorporated communities, few major roads exist, groundwater is shallow, and over half the land area is federally protected salt marshes, including the 28,000-ac Blackwater National Wildlife Refuge

**Client:** Dorchester County Council,  
Maryland

**Services Provided:**

- ✓ Comprehensive Solid Waste Management Plans
  - 10-Year Plan, 2006-2016
  - 10-Year Plan, 2017-2026
- ✓ Updates and Revisions to Existing Plans
- ✓ Public Communication and Outreach
- ✓ Regulatory Liaison
- ✓ Solid Waste Advisory Services

### Project Objective

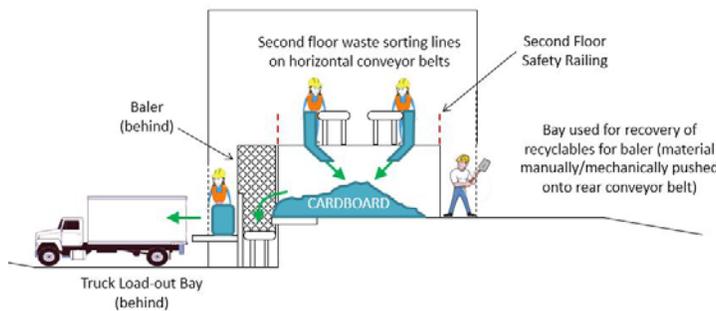
In 2005, Dorchester County, Maryland was faced with severe cash flow problems and probable landfill closure resulting from regulatory compliance issues and looming consent orders. Central to the County's problems were an outdated Solid Waste Management Plan (SWMP) that had manifested most pressing in a lack of remaining permitted disposal airspace. To help resolve their problems, the County retained Geosyntec to provide comprehensive engineering services to help turn the outlook for their physical and operational assets around. Since that time, Geosyntec has also provided ongoing solid waste planning and advisory services to help keep the County ahead their regulatory and public service obligations for solid waste management against a backdrop of fiscal pressures, changing waste disposal needs and demands from residents, evolving technologies, and increasingly stringent statutes for waste diversion and recycling promulgated by the Maryland Legislature. The County's rural setting on the eastern shore of the Chesapeake Bay also poses several unique challenges to providing modern solid waste management and recycling services.

### Geosyntec's Scope of Services

State of Maryland regulations require that counties conduct a comprehensive review and update of their SWMP every ten years. In 2005, the County had not updated their SWMP since 1993; therefore, Geosyntec's first service was to develop a completely revised and updated 10-year SWMP for the period 2006-2016, which brought the County into compliance and established a roadmap for providing solid waste and recycling services. To comply with new Maryland statutes and to update information on countywide solid waste facilities and needs, Geosyntec updated the 2006-2016 SWMP on five separate occasions through 2016. These updates included adoption of a recycling program for public schools (2010), a minor update to address new requirements for recycling fluorescent lights containing mercury (2011); recycling plans for apartment buildings and condominiums (2014); an increase in the baseline recycling target under the Maryland Recycling Act from 20% to 35% (2014); and a plan to require recycling at special events held on county-owned land (2015). For each update, Geosyntec incorporated steps for the County to monitor and report compliance and provided advice on the costs of providing additional services. We also coordinated meetings and hearings to inform the public of upcoming changes and solicit input and ideas on proposed changes to the SWMP. We also liaised with the Maryland Department of the Environment (MDE) to streamline the adoption and approval process. Subsequently, Geosyntec was awarded the contract to completely revise the SWMP to cover the 10-year period from 2017-2026, work on which started in September 2016 and was approved by MDE in December 2017.

### Notable Accomplishments

In the face of difficult budgetary and time constraints, Geosyntec has helped the County avoid closure of their disposal assets or being forced into privatization by focusing capital expenditure on creation of revenue-generating operations while still meeting their regulatory obligations. Now over 12 years since first providing our services, the County is in a strong financial position with regard to its solid waste services, is fully in compliance, and is well-placed to provide cost-effective solid waste management as a public service to county residents and businesses for the long-term future. We have remained the County's go-to provider of dependable planning and advisory services through this period, which has included reporting to four successive Directors of Public Works and two County Managers.



Geosyntec developed a workable and sustainable solution for improving waste diversion and recycling and provided easy-to-understand concept illustrations to city decision-makers and stakeholders.

**Client:** Inter-American Development Bank (IDB), Washington, DC

**Services Provided:**

- ✓ Operations and Cost of Service Assessment
- ✓ Preliminary Site Characterization and Environmental Impact Assessment
- ✓ Review of Institutional Capacity and Mechanisms for Service Delivery
- ✓ Conceptual Technical Design
- ✓ Financial Analysis and Recommendations

**Project Background and Objective**

The City of Quetzaltenango, Guatemala has been experiencing serious deficiencies in its public solid waste management (SWM) services. While the percentage of the population with regular collection of waste is relatively high, the service is not mechanized, collection and transportation is inefficient, rates of recycling are low, and urban sanitary conditions are generally poor. The city sends its waste to a disposal site that does not meet minimum environmental, health, and social standards. The dumpsite lacks leachate collection and treatment, gas capture, or monitoring systems. The operation does not provide daily coverage of waste or adequate levels of compaction to achieve efficient use of the allocated area. Waste is picked over by informal groups of “pepenadores” (pickers) and open fires are common. Geosyntec was retained by the IDB to design improvements in the integrated SWM services at the stages of collection, separation, treatment and recycling, and disposal. Importantly, the project will be structured such that SWM services are provided under a Public-Private Partnership (PPP) or similar concession.

**Geosyntec’s Scope of Services**

Phase I of the project focused on the technical and commercial feasibility of delivering the project under various institutional mechanisms. A workable project needs to be technically, environmentally, socially, and financially viable. Geosyntec analyzed the following components necessary for an effective SWM system: waste collection and transportation; street cleaning; processing waste (separation) for treatment and recycling; and construction and operation of a modern landfill. Key to the long-term success of the project is maximizing waste diversion, which prevents unnecessary consumption of expensive disposal capacity in new landfill cells. This is best achieved through community engagement and participation in waste collection and recycling. Adopting the principle of appropriate technology, Geosyntec designed a simple and robust waste separation plant with manual waste picking lines to be staffed by former pepenadores, who are skilled in materials recognition. Recovered food waste and other organics will be composted and used locally as a soil amendment. Overall waste diversion is expected to exceed 75%.

During Phase II, Geosyntec prepared a more detailed site characterization, engineering design, and environmental impact assessment; developed operations and maintenance (O&M) manuals and environmental monitoring requirements for the waste separation plant, composting facility, and landfill; recommended the PPP concession structure and terms; established performance standards for milestone payments; and developed the model contract and procurement documents to conduct an open and transparent bidding process.

**Notable Accomplishments**

Geosyntec’s unique blend of technical expertise facilitated a thorough understanding and appreciation of the numerous environmental and social sensitivities surrounding this project. We helped the IDB apply appropriate yet cost-effective environmental guidelines according to international best practices. This will be the first solid waste concession for the IDB and a bellwether for such projects in Latin America.



Geosyntec provided a cost-effective field analysis of waste composition to help our client determine the feasibility of materials recovery.

**Client:** Waste Management, Inc.

**Services Provided:**

- ✓ Waste composition analysis
- ✓ Economics of waste processing
- ✓ Waste recycling analysis
- ✓ Feasibility of organics recovery

## Project Objective

Geosyntec provides a wide range of technical services associated with determining the feasibility of emerging technologies, including field studies, literature reviews, and financial feasibility reviews associated with materials recovery from waste streams.

Historically, the recovery of recyclables from bulk waste in the United States was expensive and labor intensive, yet still resulted in poor quality end-products with little market value. Over the past five years, however, our client identified that rising commodity values in conjunction with improvements in automated sorting technologies were creating an opportunity to recover recyclables (and other materials such as organics) from bulk waste streams. The development of newer, automated systems have greatly reduced the operating costs of such systems, increased the number and types of materials that can be recovered, and improved the consistency and quality of the recovered materials. Prior to making a high-cost investment in automated machinery, our client turned to Geosyntec to better understand the volume and types of materials that could be recovered from existing waste streams at some of their facilities.

## Geosyntec's Scope of Services

Geosyntec's services included performing targeted waste composition analyses at waste transfer and disposal facilities in Delaware, Maryland, and Virginia. Recognizing that traditional waste composition analyses are exhaustive and expensive, Geosyntec developed an alternative waste composition investigation that would provide actionable information at substantially less cost. Geosyntec's knowledge that five to eight recyclable materials are targeted by automated recovery equipment coupled with the fact that wastes are typically collected using regular, repeated collection routes (thereby generating consistent wastes on each route) allowed us to perform a rapid initial screening of our client's customers. This identified collection routes with wet, commingled wastes (containing little recoverable material but potentially high organic loads), which allowed field efforts in support of recovering recyclables to be focused on routes dominated by dry wastes that tended to have fewer contaminants and are more readily separated by modern equipment. Using a three-day field investigation, Geosyntec was able to perform an efficient analysis of the composition and volumes of recoverable wastes received at each facility, broken down by collection vehicle, material type, and volume. With this information, Geosyntec was able to identify the anticipated volume and value of specific recyclables or organics received at the facility, thereby allowing our client to perform financial cost-benefit analyses for the proposed material recovery equipment.

## Notable Accomplishments

Using a focused investigation guided by our understanding of waste collection systems, Geosyntec was able to quickly and cost-effectively help our client identify major recoverable components and volumes within the waste streams collected at its facilities. This information was vital to providing our client with the data needed to make informed "go, no-go" decisions regarding installation of multi-million dollar materials recovery equipment.



Geosyntec provided advisory and strategic consulting on the identification of programmatic policies and other factors impacting composition of recycling materials.

**Client:** Santa Rosa County Environmental Department

**Services Provided:**

- ✓ Advisory and strategic consulting
- ✓ Recycling material characterization
- ✓ Analysis of commodity value recovery
- ✓ Geographic analysis of composition

### Project Objective

The Santa Rosa County Environmental Department (SRCED) in Milton, Florida provides its residents with comprehensive waste and material services including curbside recycling services. Recycling is a component of their franchise hauling agreement with three regional collection service providers. Due to market changes resulting from the volatility of the recycling commodity market, SRCED changed recycling processors. SRCED entered into an interlocal recycling processing agreement with Emerald Coast Utility Authority (ECUA) to deliver recyclables to ECUA's new Material Recovery Facility (MRF), in Escambia County. Their processing agreement requires that a composition study be performed on a regular basis by SRCED. To comply with its agreement and determine a baseline, SRCED engaged Geosyntec to provide an analysis of the composition of recycling materials that it delivers to ECUA.

### Geosyntec's Scope of Services

Geosyntec conducted a short-term, targeted recycling composition study on representative samples of collected recyclable materials. Using this data, we compared the results of the targeted study with available data from other composition studies to determine if the composition of SRCED materials is consistent with typical recyclable materials. The work conducted included project design and implementation, data analysis and report development.

### Notable Accomplishments

This was the first composition study completed on SRCED recyclables, and as such, provided SRCED with a baseline and feedback on the volume of nonprogram materials in the county. Geosyntec's role extended beyond the compilation and analysis of the data to include advisory and strategic consulting on the identification of programmatic policies and other factors impacting composition of recycling materials.

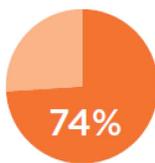
## ABOUT

Nexight Group is a management and technical consulting firm formed in 2010 that specializes in energy, materials and manufacturing innovations, infrastructure security and resilience, cyber security, climate change, and health and development.

### 27 full-time professional staff

Bachelors degrees

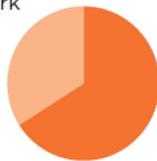
Advanced degrees



- Business
- Communications
- Information systems
- Engineering
- Materials science

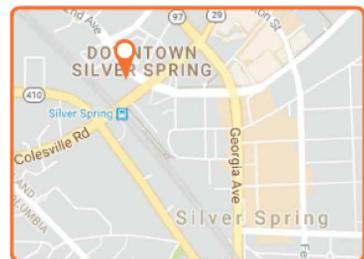
### Mix of commercial and government clients

34%  
Commercial work



66%  
Government work

### Offices located in downtown Silver Spring, MD



## SELECTED CLIENTS

### COMMERCIAL

- American Chemistry Council
- ASTM International
- Bill and Melinda Gates Foundation
- Clean Energy Smart Manufacturing Innovation Institute (CESMII)
- Georgia Research Alliance
- Global Environment Facility
- Institute for Advanced Composites Manufacturing Innovation (IACMI)
- Standards Coordinating Body for Gene, Cell, and Regenerative Medicines and Cell-Based Drug Discovery

### GOVERNMENT

- Centers for Medicare and Medicaid Services
- National Aeronautics and Space Administration
- National Institute of Standards and Technology
- National Institutes of Health
- National Science Foundation
- U.S. Food and Drug Administration

### ACADEMIC

- Johns Hopkins University
- Georgia Institute of Technology
- NC State University
- Pennsylvania State University
- Texas A&M University

## KEY SERVICES

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### TECHNOLOGY ROADMAPPING

- More than 100 roadmaps developed
  - 40 years combined experience; 18 countries on 6 continents
  - Selected topics: cell manufacturing, fuel systems, climate and sustainability, industrial energy efficiency, materials science R&D, infrastructure and cybersecurity, global health
- 

### STRATEGIC PLANNING

- Developed more than 30 strategic plans for programs and entire organizations, frequently working with senior leaders at the highest organizational levels
  - Led more than 70 government-industry planning sessions for sector partnership councils in 16 sectors
  - Developed 6 Sector-Specific Plans to guide coordinated infrastructure security and resilience improvements
- 

### WORKSHOP FACILITATION

- Facilitated more than 500 workshops on six continents, ranging from 10 to 300+ participants
  - Specialize in facilitating multi-disciplinary and cross-sector experts to uncover new solutions to complex problems
- 

### R&D PROGRAM DEVELOPMENT AND SUPPORT

- Supported annual program planning and progress tracking for the DOE OE Advanced Grid Integration and cybersecurity programs
  - Prepared Congressional testimony, briefing, talking points, reports, journal articles, and fact sheets on project results
- 

### DATA ANALYSIS

- Analyzed nearly 3,000 data sets from more than 1,000 early adopters of alternate fueled equipment in residential, commercial, agricultural, and vehicle applications
  - Technical analysis of five mass reduction studies to assess the soundness of assumptions and methods regarding the use of plastics and polymer composites for reducing vehicle weight
  - Conducted lifecycle greenhouse gas emissions analysis of alternate and traditional fuels in more than 15 applications
- 

### TECHNICAL PEER REVIEWS

- Supported 10 NETL peer reviews of 200+ projects, \$2 billion+ in federal funding
  - Selected topics: carbon capture and storage, gasification, advanced combustion, solid oxide fuel cells, hydrogen turbines, hydrogen fuel
- 

### COMMUNICATIONS

- Awarded more than 25 communications and graphic design awards from the Society for Technical Communications (5 in international competition)
  - Specialties: graphical executive summaries, fact sheets, case studies, infographics, press and trade journal articles, blog posts and websites, briefings, and talking points
- 

### PROJECT/ PROGRAM MANAGEMENT

- Specialize in applying the right project management approach (PMBOK, Agile, Lean) to help clients plan, execute, and monitor performance
- Develop change management plans to support transformation initiatives
- Provide project management training and mentoring to clients

## COMMUNICATIONS OVERVIEW

Our communications team develops materials that make target audiences take notice. We work alongside Nexight's technical experts to craft meaningful content and high-impact graphics that clearly convey concepts and policies. Combined with our targeted marketing and outreach strategies, we ensure that your results not only reach and inform your audiences, but inspire them to act.

### PROVEN EXPERIENCE

We've crafted communications materials in a wide variety of formats, working with our clients to determine what medium will best serve their strategy and deliver their message.

- Technical roadmaps
- Data-driven infographics
- Interactive dashboards
- Web-based content
- Brochures and posters
- One-pagers and fact sheets
- PowerPoint presentations
- Reports
- Strategic plans

### AWARD-WINNING

Nexight's communications work has been recognized with more than 25 awards from the Society for Technical Communications.



### DIVERSE SKILLS

Our experts bring a diversity of skillsets to the table to provide a full complement of communications services.

-  Writing and editing
-  Front-end web design and strategy
-  Graphic design and layout
-  Communications and targeted outreach strategies
-  Infographics and data visualization

## SAMPLE PROJECTS: COMMUNICATIONS & OUTREACH



### THERMAL MANUFACTURING INDUSTRIES ADVANCED TECHNOLOGY CONSORTIUM ROADMAP COMMUNICATIONS STRATEGY

*Moving advanced manufacturing technology forward through bringing together key stakeholders*

- Developed a roadmap that identifies activities and actions to accelerate the development, adaptation, and implementation of advanced technologies in the next five years.
- Created a communications strategy and outreach materials—including [press releases](#), [web content](#), [fact sheets](#), executive summary, and PowerPoint presentations—to inform the industries who rely on thermal manufacturing about the cross-sector roadmap and encourage consortium participation.



### NIST ADVANCED MANUFACTURING TECHNOLOGY ROADMAPS

*Facilitating national initiatives to develop and deploy advanced manufacturing technologies*

- Conducted roadmapping workshops with cross-sector representatives from the [thermal manufacturing](#), [cell manufacturing](#), additive manufacturing materials, [functional glass](#), and atomization communities
- Developed five roadmaps that identify common barriers constraining the use of advanced technologies in these critical manufacturing areas and outline actions to develop, adapt, and implement these technologies in the next five to ten years

## ABOUT DELTAWAY ENERGY INTERNATIONAL, INC.

Deltaway Energy International, Inc. is a USA-based company that deploys its design, and operation and maintenance experts to waste-to-energy and biomass power plants worldwide. With experience gained on more than 30 plants since we were founded in 2003, we have current knowledge and expertise in all waste-to-energy technologies in operation or planned.

Our experts apply industry best practices and our own proven performance improvement tools and design solutions to help clients increase income and reduce operation costs.

## OUR SERVICES

Deltaway Energy offers an integrated suite of services that we customize for waste-to-energy facility owners worldwide. Whatever the job, large or small, Deltaway is focused on results that we can deliver — and that customers can measure.

### Facility Operations and Maintenance Management

Deltaway fields results-oriented experts who work closely with owners and operations teams to operate, maintain, and optimize entire facilities on a long-term basis.

### Engineering

We provide general plant design, as well as design services for upgrades and modifications to improve performance. We will also engineer and implement long-term performance improvement recommendations.

### Consulting

Our experts analyze early-stage new facility designs and retrofits to ensure their optimal performance, reliability, and income. We also address specific short-term plant optimization assignments with a mix of proven technology and best practices.



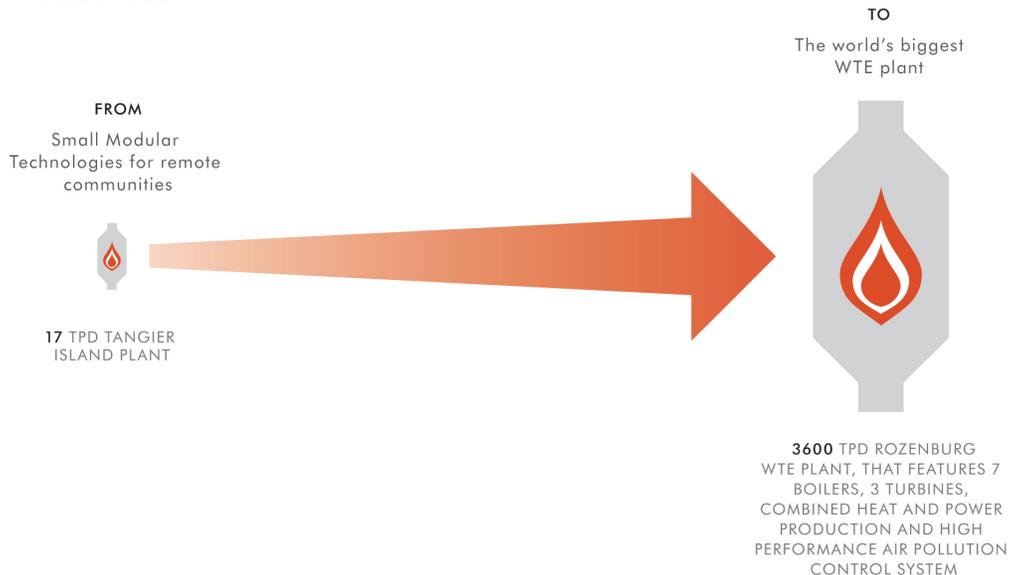
**DELTAWAY TEAM**

The Deltaway Energy team consists of a talented group of managers and associates, along with more than 35 mechanical, structural, electrical, and civil engineers and other specialists who can be deployed worldwide to meet the specific requirements of our clients' projects.

WE HAVE DIRECT EXPERIENCE IN NUMEROUS TECHNOLOGIES.

 MASS BURN	 REFUSE DERIVED FUEL	 SPECIAL TECHNOLOGIES	 BIOMASS
Martin	Zurn	Plasma Arc	Standard Kessel
Seghers	Combustion Engineering	Rotary Kiln	Fluid Bed
Detroit Stocker	Gotaverken	Biogas	Detroit Stocker
DBA	Detroit Stocker	Fluid Bed	Combustion Engineering
Inor		Modular Incinerator	
Takuma		Tire Burner	
B&S		Rotary (O'Connor)	
Barlow		Sludge Incineration	
Volund			
Von Roll			
Steinmuller			

RANGE OF PROJECT SIZE



## DELTAWAY TEAM RESUME

Collectively, team members have accumulated working experience in the 101 projects listed below:

### NORTH AMERICA

Project name	Location	TPD	Technology
Huntsville	AL	590	Massburn, Martin
Burnaby, Vancouver	BC	800	Massburn, Martin
Commerce	CA	400	Massburn, Detroit Stoker
ChowChilla	CA	12 MW	Biomass, Fluidized bed
El Nido	CA	12 MW	Biomass, Fluidized bed
SERRF, Long Beach	CA	1,380	Massburn, Steinmuller
Hartford	CT	2,000	Rdf, Combustion Engineering
Preston	CT	690	Massburn, DBA
Sterling	CT	31 MW	Tire incinerator
Okeelanta	FL	77 MW	Biomass, grate
Hillsborough County	FL	1,800	Massburn, Martin
Lake County	FL	528	Massburn, Martin
Lee County	FL	1,836	Massburn, Martin
Pasco County	FL	1,050	Massburn, Martin
Pinellas	FL	3,000	Massburn, Martin
Bay County	FL	490	Rotary, O'Connor
No Broward Co, Pompano Beach	FL	2,250	Massburn, Von Roll
Miami Dade County	FL	4,200	Rdf, Zurn
Savannah	GA	500	Massburn, Seghers
H-Power, Honolulu	HA	2,160	Rdf, Detroit Stoker
Marion County	IA	600	Plasma
Indianapolis, IN	IN	2,175	Massburn, Martin
SEMASS, Wareham, MA	MA	3,000	Rdf, Combustion Engineering
Montgomery Co, Dickerson	MD	1,800	Massburn, Martin
Baltimore	MD	2,250	Massburn, Von Roll
Auburn	ME	400	Modular, Consumat
MainEnergy, Biddeford	ME	600	Rdf, Detroit Stoker
Detroit	MI	3,000	Rdf, Detroit Stoker
Kent County	MI	590	Massburn, Martin
Pope Douglas	MN	60	Massburn, Barlow
Essex County, Newark	NJ	2,800	Massburn, DBA
Camden	NJ	1,050	Massburn, Detroit Stoker
Gloucester Co, Westville	NJ	500	Massburn, Von Roll
Hempstead, Long Island	NY	2,800	Massburn, DBA
Niagara Falls	NY	2,250	Massburn, DBA
Babylon, NY	NY	750	Massburn, Martin
Dutchess	NY	456	Rotary, O'Connor
Islip	NY	485	Rotary, O'Connor
Tulsa	OK	1,125	Massburn, Martin
Harrisburg, Pa	PA	800	Massburn, Barlow
Lancaster	PA	1,200	Massburn, Martin
Chester Delaware Valley	PA	3,350	Rotary, O'Connor
York, PA	PA	1,344	Rotary, O'Connor
Montgomery Falls Township	PA	1,380	Massburn, Steinmuller
Alma	PA	1,500	Massburn, Von Roll
Quebec	Quebec	200	Modular, Feasibility Study
Quebec	Quebec	1,000	Massburn, Von Roll
Harrisonburg	VA	200	Massburn, Barlow
SPSA, Norfolk	VA	2,000	Rdf, Combustion Engineering
Tangier Island	VA	17	Modular, Consutech
Alexandria	VA	975	Massburn, Martin
Fairfax Co, Lorton	VA	3,000	Massburn, Martin
Portsmouth	VA	2,250	Massburn, Von Roll
<b>Total North America</b>		<b>53</b>	

### EUROPE

Project name	Location	TPD	Technology
Brussel	Belgium	2,160	Massburn, Martin
B & S project	Denmark	1	Massburn, B&S
Sequedin, North	France	720	Incinerator, CEC Seghers
Cofely Limoges	France	13 MW	Biomass, Detroit Stoker
Arras	France	120	Incinerator, Inor
Rouen	France	1,000	Massburn, Inor
Jonzac	France	100	Rotary, Laurent Bouillet
Henin Beaumont	France	250	Massburn, Martin
Lens	France	400	Massburn, Martin
Nice	France	1,300	Massburn, Martin
Wasquehal	France	720	Massburn, Martin
Halluin	France	1,020	Massburn, Stein
Maubeuge	France	250	Massburn, Stein
Le Havre	France	500	Massburn
Orleans	France	300	Massburn, Volund
Gilbratar	Gilbratar	5 MW	Massburn, B&S
Madeira	Portugal	500	Massburn, Martin
AVR, Duiven	Netherlands	1,100	Massburn, DBA
AVR, Rozenburg	Netherlands	3,500	Massburn, DBA
AVR, BEC	Netherlands	22 MW	Biomass, grate
AVR, Rotterdam	Netherlands	1,200	Massburn, Martin
Sande CFB Energy	Norway	1	Rdf, Gotaverken
Cracow	Poland	750	Massburn
Warsaw	Poland	750	Massburn
Porto	Portugal	1,300	Massburn, Martin
Nis	Serbia	480	Feasibility Study
Bilbao	Spain	720	Massburn, Martin
Birmingham	UK	1	Massburn, Steinmuller
<b>Total Europe</b>		<b>28</b>	

### ASIA

Project name	Location	TPD	Technology
American Samoa	American Samoa	75	Modular, Consumat
Macau	China	1,728	Massburn, Martin
Tsing Yi, Hong Kong	China	100	Rotary Kiln
Puxi	China	1,500	Massburn, Steinmuller
Huadu	China	1,500	Massburn, Volund
Nowon	Korea	800	Massburn, DBA
Karachi	Pakistan	750	Feasibility Study
Singapore	Singapore	3,000	Massburn, Seghers
Papeete	Tahiti	100	Biogas
ChangHwa	Taiwan	900	Massburn, Martin
Ren-Wu	Taiwan	1,350	Massburn, Martin
Shulin	Taiwan	1,350	Massburn, Martin
Lutsao	Taiwan	900	Massburn, Takuma
Chiayi	Taiwan	300	Massburn, Volund
Taichung	Taiwan	900	Massburn, Volund
Taitung	Taiwan	300	Massburn, Von Roll
Yunlin	Taiwan	600	Massburn, Von Roll
Phuket	Thailand	250	Massburn, Martin
Koh Samui	Thailand	140	Incinerator, NKK
<b>Total Asia</b>		<b>19</b>	

### SOUTH AMERICA

Project name	Location	TPD	Technology
Sao Paulo	Brazil	2,800	Massburn, Martin
<b>Total South America</b>		<b>1</b>	

### TOTAL WORLDWIDE

North America	Europe	Asia	South America	Total
53	28	19	1	101

## DELTAWAY PROJECTS REFERENCES

As a company, Deltaway has experience on more than 30 waste-to-energy plants worldwide.

### NORTH AMERICA



**Tangier Island, Virginia**  
17 TPD Consutech  
Modular – Incineration



**Okeelanta Biomass Plant**  
77 MW, Grate Technology



**El Nido Biomass Plant**  
12.5 MW, fluidized bed



**Chowchilla Biomass Plant**  
12.5 MW, fluidized bed



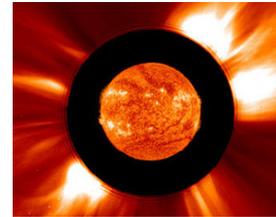
**City of Commerce WTE Facility**  
400 TPD Detroit Stoker  
Massburn – WTE



**Quebec City, Canada**  
1,000 TPD Von-Roll Massburn –  
WTE



**Long Beach, California**  
1,380 TPD Steinmuller  
Massburn – WTE



**Marion Plasma Arc Plant, Iowa**  
600 TPD Plasma Arc  
Technology



**SPSA, Virginia**  
2,000 TPD Combustion  
Engineering RDF – WTE



**Miami-Dade Resources Recovery Facility, Florida**  
4,200 TPD Zurn  
RDF – WTE



**Pinellas, Florida**  
3,000 TPD Martin  
Massburn – WTE



**Bay, Florida**  
490 TPD O'Connor Rotary  
Combustor – WTE



**Islip, New York**  
485 TPD O'Connor Rotary  
Combustor – WTE



**Montgomery, Pennsylvania**  
1,380 TPD Steinmuller  
Massburn – WTE



**Dutchess, New York**  
456 TPD O'Connor Rotary  
Combustor – WTE



**York, Pennsylvania**  
1,344 TPD O'Connor  
Rotary Combustor – WTE

Please see next page for Europe and Asia

EUROPE



**Rozenburg WTE Plant, The Netherlands**  
3,500 TPD DBA Roller Grate  
Massburn - WTE



**Duiven, The Netherlands**  
1,100 TPD DBA Roller Grate  
Massburn - WTE



**Rozenburg Biomass Plant, The Netherlands**  
22.5 MW, Grate Technology



**Rotterdam WTE Facility, The Netherlands**  
1,200 TPD Martin  
Massburn - WTE



**Bilbao, Spain**  
720 TPD CNIM - Martin  
Massburn - WTE



**Nice WTE Facility, France**  
1,300 TPD CNIM - Martin  
Massburn - WTE

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ASIA



**Huadu WTE Plant, China**  
1,500 TPD Volund  
Massburn - WTE



**Ren-Wu WTE Plant, Taiwan**  
1,350 TPD MHI - Martin  
Massburn - WTE



**Karachi, Pakistan**  
750 TPD Massburn, biogas



**Macau, China**  
1,730 TPD MHI - Martin  
Massburn - WTE



**Puxi, Shanghai, China**  
1,500 TPD Steinmuller  
Massburn - WTE



**Lutsao, Taiwan**  
900 TPD Takuma  
Massburn - WTE

## DELTAWAY CASE STUDIES

### Rozenburg WTE Plant

#### ROTTERDAM, NETHERLANDS

- Deltaway Services: Facility management, engineering
- Rated Plant Capacity: 3,500 tpd, 7 units
- Technology: Incineration technology by DBA, Germany
- Owner: AVR; and KKR Capstone, London; and CVC Capital Partners
- Fourth quarter 2009 to fourth quarter 2014



In 2005, several investment funds joined together to acquire the Rozenburg plant. Over each of the following four years, the plant's performance progressively deteriorated. Several plant managers were brought in to remedy the problems, but none was able to make a significant impact. In late 2009, at the invitation of one of an owner firm, Deltaway conducted a global plant performance audit followed by an implementation plan and associated technical assistance. We also assigned a full-time Deltaway plant manager and a technical team to oversee the plan's implementation.

The result was a comprehensive facility makeover that reorganized Rozenburg's boiler outage management, implemented a new boiler inspection program, and launched a maintenance reliability program for less downtime. The makeover also optimized the plant's steam cycle for increased power production and modified the combustion control logic to stabilize combustion and reduce emissions and equipment wear.

In just two years, Rozenburg's steam cycle efficiency increased by 30 percent and unscheduled downtime declined from 9.2 percent to 3.4 percent. As a result, calendar year 2012 waste throughput and MWh output were the highest in 10 years.



## We are **SECOND CHANCE**

We take apart the old to  
create new opportunities  
for the community

### What We Do

Founded in Baltimore in 2001, our mission is to provide people, materials and the environment with a second chance. We deconstruct buildings and homes, recycle and salvage usable materials and make them available to the public through our 200,000 square feet of retail space. With the revenue generated, we provide job training and workforce development for those with obstacles to employment.

### By the Numbers

**65,520**

labor hours generated  
by Second Chance  
jobs and projects

**1,397,604**

dollars saved by  
consumers who shopped  
at our retail store

**4,804,488**

pounds of landfill  
diverted by our  
deconstruction efforts



## RETRAIN

Putting people to work, we provide training, mentorship and employment

*“Second Chance gives you the opportunity to come in, build the skills ... management, receiving, warehouse work, forklift driving. So in the long run this is just your stepping stone to get out into this world and say, I’m here. Here are my credentials. I’ve been at Second Chance. I’ve been taught a lot and this is where I’d like to go.”*

## RECLAIM

Our teams deconstruct houses and buildings so we can rescue useable items and recycle materials

*“You all have done a wonderful job with minimal disruption ... Our neighbors have all been commenting on what an interesting process it has been to observe your team and how delicately and neatly you have deconstructed the house in order to reuse the materials. We are very pleased with the outcome and appreciate all of your efforts.”*



## RENEW

Salvaged items are offered for sale in our 200,000 sq. foot retail store with proceeds supporting our programs

*“Wandering around the massive warehouse with some coffee in hand is always a pleasant experience walking from one section to the next and seeing all the intriguing wares. I’ve seen everything from an intact spiral staircase, a church’s stained glass to an early 20th century freezer.”*



***"Less Waste, Better Lives"***  
***Proposal for Developing Baltimore City's Recycling and  
Solid Waste Management Master Plan***

## **APPENDIX 2**

Resumes

## Jeremy W.F. Morris, Ph.D., P.E.

### Education

Ph.D., Engineering, University of the Witwatersrand, Johannesburg, South Africa, 2001

M.Sc. and D.I.C. in Environmental Engineering, Imperial College of Science, Technology and Medicine, London, 1995

B.Eng., Civil Engineering, Imperial College of Science, Technology and Medicine, London, 1993

### Registrations

Professional Engineer, Maryland and Virginia

Dr. Morris is an internationally recognized subject matter expert with over 18 years of experience in the waste management and renewable energy sectors. While primarily engaged on North American projects, his international experience extends to Latin America, Europe, and Africa. He provides strategic advisory services on solid waste planning, including market valuations and feasibility analyses of alternative waste conversion technologies, and options for meeting waste diversion and recycling goals. He specializes in feasibility analyses for project development, research reports, guidance manuals, planning, and public communication. He has helped dozens of private and public clients navigate the project development lifecycle for new and expanded waste management facilities, providing services from pre-development planning and impact assessment through engineering design and permitting, bidding and procurement, construction, operation, compliance, closure, and post-closure. Jeremy's technical background extends to the field of sustainable landfill management, liability management, and post-closure care, for which he has published widely and served as lead investigator on several U.S. EPA research studies on long-term performance and regulation of waste management facilities.

A growing component of Jeremy's work is redevelopment of former landfills and brownfield sites as platforms for renewable energy (including solar, wind, and geothermal) for which he has performed many technical/financial feasibility studies and conceptual designs for project development. Jeremy has consulted on several projects related to biogas utilization for electricity generation and production of biofuels (renewable natural gas). He has helped municipalities develop greenhouse gas inventories and emission reduction plans, as well as quantify, register, and trade carbon offsets earned through emission control measures.

The author of over 55 technical papers and a regular participant at national and international symposia, Dr. Morris is also actively engaged in teaching and speaking at meetings and workshops for regulatory and professional associations. For the last several years, he has served on the Task Group on Sustainable Landfill Management for the International Waste Working Group (IWWG), which aims to provide definitions and criteria for landfill completion and the operational controls necessary to achieve a sustainable landfill.

List of Publications (via Google Scholar): [http://scholar.google.com/citations?user=3ZXE\\_2AAAAAJ](http://scholar.google.com/citations?user=3ZXE_2AAAAAJ)

### Relevant Experience

**Solid Waste Management and Recycling Study, Frederick County, Maryland.** Review of hard and soft infrastructure programs for increasing countywide waste diversion and recycling rate. Designed outreach forums to ensure high levels of public participation in the decision-making process. Evaluated options and technologies, including cost-benefit analysis, lifecycle cost and environmental footprint assessment, review of operational complexity, and ease of integration into existing County programs. Long-term strategic planning study for phased implementation of composting programs.

**Strategic Planning for Long-Term Solid Waste Management under Regional Agreement, Confidential Client, Maryland.** Used financial and environmental indicators in scenario analyses to optimize future waste disposal and recycling operations under a regional multi-jurisdictional agreement with a combined population of 150,000. Options considered included source separation for MRF operation, mixed waste processing, composting, anaerobic digestion, gasification, and waste-to-energy, with disposal of unrecovered residuals in an existing or new landfill facility.

**Structuring and Design of a PPP Concession for Solid Waste Management Services, Quetzaltenango, Guatemala (Inter-American Development Bank, Washington, D.C.).** Conceptual design and financial analysis of project components, comprising waste collection and transportation, street cleaning, processing waste (separation) for treatment, manually-operated materials recovery facility, composting, recycling, and landfill construction and operation. Developed terms of reference for 20-year service under PPP structure for population of about 200,000.

**Comprehensive Solid Waste Management Plans, Dorchester County, Maryland.** Revised and updated the last two 10-year Solid Waste Management Plan (SWMP) for the County in accordance with Code of Maryland Regulations. Provided five major updates to 2006-2016 SWMP to meet new Maryland statutes and recycling mandates under the Maryland Recycling Act and address other changes to solid waste management needs. Represented the County at several public hearings.

**Update to Waste Handling and Disposal Master Plan, Cecil County, Maryland.** Reassessed the master plan to incorporate lifecycle revenue and expense costs associated with construction and operation of alternative waste processing facilities (e.g., composting, anaerobic digestion, materials recovery) into the financial schedule for sequential development of the County landfill. Critical assessment of proposed facilities based on optimal use of resources to serve current and future needs. Flexibility for implementing the Maryland Zero Waste Plan. Deliverable was MS Excel® decision tool.

**Market Valuation for Construction and Demolition Debris Landfill Facility, Virginia.** Lifecycle financial analysis for the proposed facility to assess multiple scenarios for landfill development, the expected revenue stream, and the timing of the expected major expenditures. Detailed audit of the regional waste stream, population dynamics, volume of construction activity, and existing competing facilities in the proposed area of service to forecast expected market share versus tipping fee.

**Assessment of Closure and Post-Closure Costs, Midshore II Landfill, Maryland Environmental Service.** Provided technical/financial due diligence of closure costs and GASB 18 accruals under various closure scenarios.

**Feasibility Study for Renewable Energy Park, EnviroSolutions, Inc., Virginia.** Phased implementation of solar, wind, biogas, and geothermal at renewable energy park with combined output of 10MW. Investigated supply and demand side opportunities and constraints, projected capital expenditure and revenues, and identified optimal timing for deployment of renewables. Represented client at planning and zoning board hearings.

**Waste Characterization Studies, Various Clients and Locations (Maryland, Virginia, Pennsylvania, Delaware, California, Illinois).** Project Manager for multi-site assessments of waste calorific value as feedstock for fuel pelletizing facilities and multi-site assessment of recovery of recyclables and compostable organics from commercial and residential mixed waste streams.

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## Thomas B. Ramsey, P.E.

### Education

M.S., Civil Engineering, Duke University, 1991

B.Eng., Civil Engineering, Thayer School of Engineering, Dartmouth College 1988

B.A., Engineering, Dartmouth College 1987

### Registrations

Professional Engineer, Maryland and 11 other states

Mr. Ramsey has more than 25 years' experience in design, technical and operational aspects of the solid waste management industry. Mr. Ramsey has extensive professional experience in the following areas:

**Economic Review of Solid Waste Facilities and Development:** Prepare siting studies and needs analyses for greenfield landfill developments and existing landfill expansions. Perform operations analyses for solid waste collection and disposal facilities including long-haul options, heavy equipment maintenance, construction budgeting and planning, and operations staffing. Experience includes extensive experience in solid waste-related service and construction contracts, including host-community agreements.

**Economics of Waste Processing Technologies:** Assess economic factors influencing viability of waste processing and disposal technologies including composting, MRFs, liquids solidification, bioreactors, landfill mining, and long-haul disposal. Compare and contrast capital and operational costs, reliability, and ability to permit particular technologies versus competing methods and technologies within the marketplace.

**Solid Waste Market Analysis:** Review local market conditions to identify waste types, volume, pricing, and service providers. Common market review issues include identification of waste volumes and disposal destinations, competitors, comparison of competing waste management technologies, economic and political barriers to entry, and logistics.

### Selected Relevant Experience

**Solid Waste Management and Recycling Study, Frederick County, Maryland.** Review of hard and soft infrastructure programs for increasing countywide waste diversion and recycling rate. Designed outreach forums to ensure high levels of public participation in the decision-making process. Evaluated options and technologies, including cost-benefit analysis, lifecycle cost and environmental footprint assessment, review of operational complexity, and ease of integration into existing County programs. Long-term strategic planning study for phased implementation of composting programs.

**Condition and Needs Assessment, Roanoke Valley Resource Authority, Virginia.** Perform review and capital budgeting for two waste processing facilities owned and operated by RVRA. Work included review of existing 20-year old infrastructure to identify needed repairs and their urgency, perform operational review and advice on improving operations, and prepare engineering cost estimates for capital planning.

**Solid Waste Authority of Central Ohio (SWACO), Columbus, Ohio.** Technical expert for Efficiency and Effectiveness Study of the SWACO solid waste operations, which includes a 1 M tpy MSW landfill, two transfer facilities, and drop box system. Work included an overall operations and financial review of the client's facilities, as well as the development of long-term financial tools for capital planning.

**Operations Assessment, Midshore II Landfill, Maryland Environmental Service.** Provided operational assessment to improve efficiency and operational costs related to equipment and cover use and airspace utilization. Work included specific, actionable recommendations for organizing and assigning equipment and operations.

**Materials Recovery Feasibility Study, Waste Management, Inc., Maryland.** Perform waste characterization at commercial transfer facility to determine feasibility for diversion of specific loads for recyclable materials recovery. Work included two days of waste sampling from commercial front load, roll-off, and residential waste routes.

**Contract Negotiation Support during Bid Process for Landfill Gas to Energy Project, Augusta County Solid Waste Authority, Virginia.** Provided expert guidance to the Authority for selection of a private contractor to develop a landfill gas collection system and beneficial use project. The project involved the review of 13 proposals based on technical and financial criteria, providing guidance on selection of four finalists and giving a final recommendation for favorable contract terms on a 20-year contract.

**Operational Assessment to Address Regulatory Enforcement, Confidential Landfill Operator.** Consulting support to a confidential client regarding responses to Notices of Violation from state regulators for poor operating practices and odor issues at a rail unloading and disposal facility in the mid-south. Specific issues included helping the site operator and a third-party LFG operator identify the causes of specific problems and identifying objective and constructive actions to move forward and resolve the issues causing the regulatory enforcement.

**Host Agreement and Contract Support for Landfill Privatization, Tennessee.** Expert guidance for developing a request for proposal and contract terms for privatization and host-agreement for Loudon County, Tennessee. Reviewed draft request for proposal to provide insight on contract terms and conditions which would best serve the County's interests while maximizing interest by private waste services companies.

**Market Review for Greenfield C&D Landfill Development, Norfolk, Virginia.** The work included determination of future market volumes, pricing, and competitors to determine the best and highest use of property that was under negotiations for potential condemnation proceedings.

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## William Gaffigan, MBA, CVA

### Education

MBA, Finance, West Virginia University, 1984

B.A., Economics, Indiana University of Pennsylvania, 1982

### Registrations

Certified Valuation Analyst, National Association of Certified Valuation Analysts; Member of SWANA and AACE,

Mr. Gaffigan has more than 25 years of experience in solid waste as an executive and advisor, with specialized capabilities in contract negotiations, bid analysis, financial analysis, valuation, business transactions, and strategic business consulting. He has been qualified as an expert witness in valuation and solid waste matters and has provided testimony in state, federal tax, and bankruptcy courts as well as in arbitration and mediation settings. He has broad experience analyzing operations, projects, and programs for public and private sector solid waste clients. He has worked in the solid waste industry since 1990 and as Director of Geosyntec's Environmental Finance and Economic Consulting Practice since 2013. He has daily involvement with regional and national solid waste projects, involving landfills, transfer stations, MRF's, and new technology.

Mr. Gaffigan has served as a director of financial planning and regional controller for over 22 operations providing hauling, disposal and recycling services and as Vice President of Mergers and Acquisitions for a large publicly traded waste company. He has significant experience evaluating and negotiating contracts and has closed over 60 transactions involving collection, disposal, and recycling operations. He has also conducted multiple Statement No. 18 of the Governmental Accounting Standards Board Accounting for Municipal Solid Waste Landfill Closure and Post Closure Care Costs (GASB 18) reserve analyses.

Mr. Gaffigan has developed many financial tools through his broad conceptual and hands-on industry experiences. He recently presented on "Recycling and Zero Waste Initiatives: A 2017 Update" and "Recession, Recovery, and Reconsidering your Solid Waste System" at the Georgia Chapter of SWANA conference and presented on "Alternative Landfill Closure and Climate Change Mitigation" at the Air and Waste Management Association's 2017 national conference in Pittsburgh, PA.

### Selected Solid Waste Advisory Experience

**Dalton-Whitfield Regional Solid Waste Authority, Georgia.** Project Manager for advisory engagement to provide a cost of services and financial analysis in support of annual budgeting and planning cycle for a highly-integrated solid waste and recycling system operating within a flow control environment. Provided recommendations on multiple issues including pricing as well as closure/post-closure reserves.

**Solid Waste Authority of Central Ohio.** Provided financial advisory services for projects encompassing long-term planning, operations analysis, financial analysis, and policy recommendations to improve the performance of an integrated waste transfer, disposal, and recycling system which handles approximately one million tons a year. Subsequently engaged for additional phases to develop benchmarking criteria for long-term financial tools, provide input to strategic planning, and conduct a rate study.

**Santa Rosa County Environmental Department, Florida.** Project Manager for a recycling composition study of residential curbside single-stream material collected from the County's three private waste collection franchisees.

**Mecklenburg County, North Carolina.** Project Manager for operations assessment and cost study for the "Metrolina" MRF, an 80,000 tons/year single-stream processing facility. Advisory components included determination of current and long-term cost of operations as well as short and long-term financial planning recommendations related to the renegotiation of the operations contract with a third party and future infrastructure investment.

**Polk County, Florida.** Served as solid waste expert witness for the County and conducted a market study (among other evaluations) in a litigation matter involving a proposed solid waste facilities development project.

**Confidential Private Owner, Pennsylvania.** Technical lead in valuation of a 1,000 tons/day C&D recycling operation for management planning purposes, including add-on alternative energy project (biomass gasification).

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## Marc J. Rogoff, Ph.D.

### Education

M.B.A., Finance, University of Tampa, 1986

Ph.D., Resource Development, Michigan State University, 1979

M.S., Soil Science, Cornell University, 1975

B.S., Environmental Science, Cornell University, 1973

### Registrations

Certified Environmental Professional and Qualified Environmental Professionals;  
Member of SWANA and APWA

Dr. Rogoff has 38 years of experience in solid waste management as a public agency manager and consultant. He has managed more than 350 consulting assignments across the United States on all facets of solid waste management including waste collection studies, recycling feasibility, facility feasibility assessments, facility site selection, property acquisition, environmental permitting, operation plan development, solid waste facility benchmarking; ordinance development, solid waste plans, financial assessments, rate studies/audits, development of construction procurement documents, bid and RFP evaluation, contract negotiation, and bond financings.

Dr. Rogoff's Florida solid waste experience began in 1982 when he served as Deputy Solid Waste Director for Hillsborough County. He was responsible for building the County's solid waste system into an award-winning program. Dr. Rogoff currently serves on the Executive Board of the Solid Waste Association of North America. He has written more than 150 articles for the solid waste trade press as well as eight solid waste textbooks. Dr. Rogoff is the former Director of the Collection and Transfer Technical Division with the Solid Waste Association of North America (SWANA) and was awarded the 2018 Distinguished Individual Achievement Award at SWANApalooza in March of 2018. He also currently serves on SWANA's Executive Board.

### Selected Relevant Experience

**City of Killeen, Texas, Solid Waste Master Plan.** Project Manager for development of a 20-year solid waste master plan which included development of estimates of waste disposal needs, future goals and objectives of the community in solid waste management, and identification of infrastructure needs. Principal efforts considered review of a single-stream recycling program and overall economics and rate analysis.

**Heart of Texas Council of Governments, Texas, Solid Waste Plan Update.** Project Manager for development of a 20-year five-county solid waste management plan which included development of estimates of waste disposal needs, future goals and objectives of the community in solid waste management, and identification of infrastructure needs. Included an extensive public outreach program with a series of public town hall meetings to elicit comments from the public on the draft plan.

**City of Chapel Hill, North Carolina, Solid Waste Master Plan.** Task Manager for assessment of alternative waste conversion options for disposal of solid waste generated by residences, businesses, and public institutions.

**City of Springfield, Massachusetts, Solid Waste Collection Master Plan.** Task Manager for assessment of solid waste collection system improvements and completion of a rate analysis.

**Municipality of Skagway, Arkansas, Solid Waste and Recycling Plan.** Project Manager for development of overall borough plan for integrated management of solid waste collection, waste reduction and recycling, and disposal. Plan provided a roadmap for the borough and implementation steps.

**City of West Palm Beach, Florida, Solid Waste Operations Assessment.** Project Manager for evaluation of operations of City's solid waste services, including recommendations on future improvements.

**WASTECH, British Columbia, Canada, Landfill Benchmarking Study.** Project Manager to benchmark existing landfill operations against best-in-class landfill operations across the United States and Canada.

**City of Lakeland, Florida, Solid Waste Consulting Services.** Project Manager for comprehensive solid waste consulting services. Included solid waste planning efforts to analyze the City's existing solid waste collection program. Assisted in

implementing a pilot automated collection program, evaluating the feasibility of developing a roll off service program, street sweeping disposal facility, and assisting City employees in preparing an employee bid for recycling services.

**Cook County, Georgia, MSW Recycling Management Plan Development.** Project Manager for development of MSW Recycling Management Plan Cook County Recycling Program for Cook County, Georgia.

**Hardee County, Florida, Feasibility Study of Solid Waste Infrastructure Needs.** Project Manager for development of strategic business plan to address solid waste infrastructure needs. Study determined technical and economic feasibility of several major alternatives, e.g., development of a new landfill infrastructure, transfer solid waste out of county, and expansion of existing landfill footprint. A Pro Forma model was constructed to analyze feasibility of these options.

**City of Killeen, Texas, Privatization of Solid Waste Collection System.** Task Manager for development of RFP for sale and privatization of solid waste collection system. Principal efforts considered development of overall set of goals and objectives, specifications, and award criteria.

**Placer County, California, Pro Forma Model Organics Alternatives.** Task Manager for development of Pro Forma Model to help assist the County in evaluating its options for organics collection and processing.

**Indian River County, Florida, Household Hazardous Waste and E-Waste RFP.** Project Manager for development of request for bids of a HHW and E-Waste provider.

**City of Lawton, Oklahoma, Feasibility of a Solid Waste Recycling Program.** Project Manager to assess feasibility of a citywide solid waste recycling collection system including curbside collection, development of a materials processing facility, and/or privatized processing and transportation of recyclables.

**DeKalb County, Georgia, Development of New Solid Waste Ordinance.** Project Manager for development of a comprehensive revision of the County's solid waste ordinance.

**City of Lakeland, Florida, Residential Automated Collection and Alley Collection Alternatives Study.** Project Manager for citywide program to assess feasibility of a residential (43,000 customers) automated collection program.

**Escambia County, Florida, Modification of Commercial Franchise Collection Program.** Project Manager for comprehensive examination of existing franchise agreement, stakeholder meetings, and working with County Attorney to draft amended agreements.

**Escambia County, Florida, Commercial Franchise.** Project Manager for analysis of existing commercial franchise agreement. Worked with County staff to re-draft new commercial franchise agreement based on current industry requirements.

**Pinellas County, Florida, Waste Composition Sampling Study.** Project Manager for comprehensive four-season, waste composition sampling study.

**City of Lakewood, California, "Evergreen" Solid Waste Collection Review.** Task Manager for review of an "evergreen" solid waste collection contract.

**Osceola County, Florida, Solid Waste Collection Franchise Program.** Project Manager for solid waste collection franchise program, which included a feasibility study and collection ordinance development.

**Orange County, Florida, Alternative Solid Waste Collection Services.** Project Manager of RFPs for alternative solid waste collection services by franchise haulers.

**City of Inverness, Florida, Sanitation System Analysis.** Project Manager for analysis of sanitation and yard waste system.

**City of Killeen, Texas, Materials Recovery Facility Pro Forma Model.** Task Manager for development of Pro forma model for analysis of a multi-community materials recovery facility.

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## Michael A. Hansen, BCES, CHMM

### Education

B.S., Towson University,  
Environmental Science and  
Studies, Towson, Maryland, 2004

### Registrations

Board Certified Environmental  
Scientist, American Academy of  
Environmental Engineers and  
Scientists

Certified Hazardous Materials  
Manager, Institute of Hazardous  
Materials Management, Credential  
Number 16359

Mr. Hansen is a Certified Hazardous Materials Manager and a Board Certified Environmental Scientist, with 13 years of experience in performing environmental site characterization waste characterization and management at Superfund and landfill sites. He has led the design and execution of multiple remediation projects involving soil excavation, waste characterization, and off-site transport and disposal. Mr. Hansen has also participated in multiple specialized RCRA training courses relating to remediation and production waste generation, characterization, management, and recordkeeping.

Mr. Hansen has participated in a variety of domestic and international projects involving the design and implementation of waste management plans, site characterization plans, remediation pilot tests, and remediation system installation. He is experienced in managing multiple media including soil, bedrock, groundwater, surface water, and sediment. He has served as project and site manager for large-scale field projects lasting months and involving multiple staff and concurrent activities.

Mr. Hansen serves as the Health and Safety coordinator for the Columbia, Maryland and Pittsburgh, Pennsylvania offices of Geosyntec. In that capacity, he has delivered OSHA HAZWOPER refresher training for the past six years including modules on waste characterization and management.

### Relevant Experience

**Emergency Response Plans – Coal Combustion Residue Facilities, Pennsylvania and Maryland.** Developed all-hazards emergency response plans for closed coal combustion residue landfills. Each plan included preparedness actions for storms with potential to cause damage to the landfills including risk of failure. In the event of a failure, emergency response plans implemented a response system based on the National Incident Management System – Incident Command System (ICS). The ICS system incorporated stakeholders, contractors and consultants into the response, and provided guidance for the first operational period. Emergency response plans and a quick reference poster were developed for a total of 12 facilities.

**Integrated Contingency Plan – Coal Fired Power Plant, Maryland.** Led the recertification effort of the facility's existing Integrated Contingency Plan (ICP) and associated documents. Recertification effort required verification of existing documentation, further organization and harmonizing of information throughout the document, and preparation of figures. Responded to agency comments after submittal.

**Hurricane Sandy Response, New York City.** Developed and implemented program to screen waste from vacuum trucks prior to offloading into barge for disposal. Waste from each truck was supposed to contain oily water recovered from building basements. Waste was screened in the field for RCRA hazardous waste characteristics and for consistency with oily water. This screening was to avoid the potential of mixing a RCRA hazardous waste into water collected in the barge and subsequently disposing of all water in the barge as a hazardous waste. Developed and managed a schedule of 24-hour support providing this service for three weeks.

***Class 1 Freight Railroad Derailment, Maryland.*** Led team of scientists and engineers in assisting client with response to coal train derailment, partially within a wetland. Assessed the position of derailed cars and spilled coal to specify the installation of erosion and sediment controls to prevent entry of coal into adjacent waterways. Worked with other consulting firms assigned to the incident as a team to ensure personnel safety during response operations. Led team of scientists to develop and implement a surface water quality monitoring program in concert with response operations to document effectiveness of erosion and sediment controls. Assisted client representative with reporting incident status to managers. Assisted client representative with interactions to report incident and status updates to state environmental regulatory authority.

***Coal Combustion Residue Spill, Maryland.*** Served as site manager for clean-up operations of a coal combustion residues release from a landfill to an adjacent stream system and flood plain. Material deposition measured 7,000 feet by 70 feet wide with varying thickness. Oversaw contractor operations utilizing a combination of mechanical equipment and a hand labor force of 40 persons to recover deposited material to return to the landfill. Interfaced with regulators to develop visual cleanliness standard for this project. Once operations were concluded, implemented a three-year biological and chemical monitoring plan to monitor for lasting ecological impairment. Monitoring includes benthic macroinvertebrates, fish, surface water, and sediment.

***Newland Park Landfill, Maryland.*** Project manager for environmental compliance at the landfill including landfill gas migration monitoring, groundwater monitoring, permit compliance reporting, and emissions reporting. Also coordinated reporting efforts with regulatory authorities.

***Cherry Island Landfill, Delaware.*** Conducted quarterly monitoring of geotechnical instrumentation including inclinometers, piezometers, pneumatic instruments, and vibrating wire piezometers and settlement plates. Performed support and oversight during the installation of geotechnical remote monitoring instrumentation through waste. Conducted groundwater sampling in support of a groundwater tracer study.

***Marine Shipping Port, Maryland.*** Managed and conducted field operations to characterize extent of and sample contamination, including chromium ore processing residue (COPR). Utilized mapping grade GPS system to mark proposed sampling locations and adjusted these locations in the field as necessary. Provided oversight during hollow stem auger drilling operations. Oversight included logging geologic samples, screening and collecting samples from split spoons, and collecting relatively undisturbed samples from a pitcher sampler. Provided oversight during cone penetrometer testing (CPT). Managed general site and field operations and provided GIS support. Performed routine inclinometer and settlement probe monitoring.

***Former Manufacturing Facility, West Virginia.*** Served as site manager for supplemental RCRA facility investigation lasting four months and including up to 15 staff and subcontractors. Former facility operations included a chlor-alkali process plant and specialty semi-volatile organic compound plant. Field investigation activities generated several waste streams that included elemental mercury. Managed all investigative derived waste including containerizing, inventory, labeling, manifesting and recordkeeping for multiple solid and aqueous waste streams in accordance with 40 CFR 261.

### ***Other Certifications***

OSHA Hazardous Waste Site Worker (40-Hour Certification), Hazardous Waste Supervisor (8-Hour Certification)

DOT/Hazmat Employee with Packaging (49 CFR 172.704 and HM-232 Security Awareness)

Federal Emergency Management Agency ICS-100, 200, 300, and 400, IS-700 and 800

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## Jennifer M. Padgett, P.E.

### Education

M.S., Environmental Engineering,  
North Carolina State University,  
Raleigh, North Carolina, 2009

B.S., Chemical Engineering, Bucknell  
University, Lewisburg, Pennsylvania,  
2007

### Registrations

Professional Engineer, Maryland,  
40367

Ms. Padgett is a Project Engineer with Geosyntec. Her academic background included investigating the long-term fate and degradation of slowly degradable organic waste materials in landfills. In a project to quantify carbon sequestration and greenhouse gas (GHG) emission control, she measured the maximum extent of wood biodegradability under bioreactor landfill conditions, both at laboratory and field scale. Since joining Geosyntec in 2009, she has also been involved in the planning and design of several projects related to solid waste landfills for which her experience includes: performing engineering analyses for landfill liner and closure system designs, landfill gas control systems, stormwater management systems, and preparation of construction bid documents, including technical specifications and cost estimates. She has also been involved in studies to characterize various waste and recycling stream at transfer stations and projects to develop integrated solid waste services.

### Selected Relevant Experience

**Structuring and Design of an Integrated Solid Waste Management Service, Quetzaltenango, Guatemala (Inter-American Development Bank, Washington DC, 2015-16).** Ms. Padgett was a task leader for this project. She reviewed the existing solid waste management system in Quetzaltenango by reviewing documents and interviewing public officials and private entities responsible for waste collection and transportation, street cleaning, processing and separating waste for composting and recycling, and landfill construction and operation. Ms. Padgett also aided in the report preparation, conceptual design for improvements of solid waste management operations, and bidding documents for replacement of existing municipal services by the private sector under a private-public partnership.

**Waste Characterization Studies, Multiple Sites in California, Maryland, and Virginia (Various Clients, 2010-13).** Ms. Padgett was a field team leader for several waste characterization studies at several transfer stations and landfill sites. These projects involved assessment of vehicle manifests to understand collection of residential vs. commercial customers, visual inspection of the incoming waste to the sites, and performance of manual waste sort of several loads to assess waste stream characteristics and recyclable content, including bulk densities of different waste categories. Key aspects of the project consisted of characterizing trucks entering the site (i.e., front end loaders, roll off boxes), the waste type (i.e., commercial, municipal), and waste quantities for target materials (i.e., % content of cardboard, metals, organics).

**Solid Waste Sampling Plan and Research and Development Permitting, Columbia Ridge Landfill and Recycling Center, Arlington, Oregon (2015).** Ms. Padgett managed and led development of a solid waste sampling plan. This project involved describing the collection of solid waste samples for moisture content determination. In addition, Ms. Padgett was a project team member in preparing the Bioreactor Research, Development and Demonstration (RDD) Program Annual Report, which summarizes the annual data for the RDD permit which was aimed at reducing the stabilization period of waste and increases the rate of landfill gas production. Key components of the report included analysis of data collected at the landfill to establish quantitative relationships between liquid addition and environmental benefits.

**SWPPPs and Stormwater BMPs for Transfer Stations, Various Facilities (2014-16).** Ms. Padgett was a design team member for the preparation of a Stormwater Pollution Prevention Plan (SWPPP) for the AmeriWaste Processing Facility and Transfer Station in Elkridge, Maryland. In addition to writing the SWPPP, she developed several forms such as monthly field inspection forms, spill report forms, and comprehensive annual compliance forms. Ms. Padgett was also a design team member for the preparation of the E&S control plan and maintaining control of stormwater runoff from the site through best management practices (BMPs) for an expansion design for the Annapolis Junction Transfer Station in Jessop, Maryland.

## Sean O'Donnell, Ph.D., E.I.T.

### Education

Ph.D., Geotechnical Engineering,  
Arizona State University, 2016

M.S., Geomechanics, Stanford  
University, 2012

B.S., Civil and Environmental  
Engineering, Bucknell University,  
2011

B.A., Economics, Bucknell University,  
2011

### Registrations

Engineer in Training (E.I.T.),  
Pennsylvania, 12-772-87

Sean O'Donnell is a Senior Staff Engineer at Geosyntec's Columbia, Maryland office with a background in civil/environmental engineering and economics. He joined Geosyntec after graduating with his Ph.D. and serving as a postdoctoral researcher at Arizona State University. Dr. O'Donnell's practical experience includes geotechnical design, analysis, and monitoring of waste containment structures as well as evaluation of solid waste and recycling systems.

Dr. O'Donnell's research background involves the study of biologically-mediated ground improvement techniques through both laboratory-based studies and the development and analysis of computer simulations. His Ph.D. dissertation focused on the use of denitrifying microorganisms for the mitigation of earthquake-induced soil liquefaction as a two-stage process through desaturation and microbially induced carbonate precipitation.

### Relevant Experience

**Solid Waste Management and Recycling Options Study, Frederick County, Maryland (2016-2017).** Contributed to the second phase of a waste options study for Frederick County, Maryland, which focused on developing a

financially sound method to meet Maryland recycling goals for total recyclables and organics. The most appropriate options for waste reduction in Frederick County were considered, specifically focusing on the separate collection and composting of organic waste. Phase 2 of the study considered the recycling potential for organic waste generated by various sources within the county, including single family and multifamily residences, restaurants, and schools. Dr. O'Donnell's primary role was to research composting systems and develop detailed economic analyses of expected costs and performance of Geosyntec's recommended strategy for incremental rollout of a decentralized organics collection and composting program under a franchising mechanism.

**Scenario Analyses for Site Development, Midshore III Regional Landfill, Maryland Environmental Service (2017).**

Contributed to the preparation of a scenario analyses for the Midshore counties. Multiple options were analyzed for the development of the proposed greenfield facility, including disposal-centric options (constructing a traditional landfill or waste-to energy facility) and process-centric options (building a materials recovery facility with separate processing of diverted materials via a gasification facility, composting facility, or anaerobic digester). The financial and environmental performance of each option were compared to provide recommendations.

**Assessment of Closure and Post-Closure Costs, Midshore II Landfill, Maryland Environmental Service (2017).** Assisted with economic analysis of closure costs and GASB18 accruals under various closure scenarios.

**Beulah Landfill Facility, Dorchester County Department of Public Works, Dorchester County, Maryland (ongoing).**

Contributed to the application for a new landfill permit for the proposed vertical expansion of the Beulah Landfill Facility in Dorchester County, Maryland, which was approved 2017. Synthesized and interpreted groundwater monitoring data, generated groundwater contour plots for the site, updated designs for the proposed landfill gas collection system at the site, and reviewed settlement calculations for the facility.

Currently leading several technical tasks associated with the application for a new landfill permit for the proposed Dorchester County Municipal Landfill, to be located adjacent to the Beulah Landfill Facility. Duties include junior engineering/CAD staff management, data collection, and design of various landfill components.

## Ross Brindle

Founder and CEO

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### PROFESSIONAL QUALIFICATIONS

- Experience** 20 years of professional experience in management consulting services, 12 years in senior management positions
- Expertise** Strategic planning, meeting facilitation, roadmapping, public-private partnerships, stakeholder engagement, training, energy and economic benefits analysis, and peer reviews
- Education** **M.B.A.**, University of Maryland, 2007 (global strategy concentration)  
**B.S., Chemical Engineering**, Pennsylvania State University, 1997 (honors)
- Work** Founder and CEO, Nexight Group LLC, 2016 – present
- History** Founder and Executive Vice President, Nexight Group LLC, 2010 – 2015  
Vice President, Energetics Incorporated, 2010  
Program Director, Energetics Incorporated, 2005 – 2010  
Engineer, Energetics Incorporated, 1997 – 2005

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### RELEVANT EXPERIENCE

#### Stakeholder Engagement

- Facilitated more than 350 vision and technology roadmapping workshops, strategic and program planning meetings, public-private partnership meetings, and executive seminars on six continents.
- Expert in all phases of the facilitated workshop process and has worked extensively with clients to conceptualize the desired product and outcome and develop an appropriate workshop design and facilitation approach; his diverse facilitation and roadmapping experience spans dozens of topics in the energy, infrastructure protection, manufacturing, basic science, and global health areas.
- Trained more than 100 colleagues in facilitation and workshop design techniques.
- Planned, facilitated, and documented five public forum workshops with Frederick County, Maryland residents focused on brainstorming solid waste management options and identifying and ranking criteria for assessing these options.
- Worked with ASM International and the American Society of Mechanical Engineers (ASME) since 2008 to conduct more than a dozen Peer Reviews of significant R&D programs for the National Energy Technology Laboratory (NETL) totaling more than \$2 billion in DOE investment, helping to maximize the value of federal funds while also allowing NETL to respond to Office of Management and Budget (OMB) requirements for independent, third-party peer reviews.

#### Technical Communications and Outreach

- Lead or contributing author to more than 100 technology roadmaps and similar planning documents.
- Co-authored *Building Energy Efficiency R&D Roadmap* for Singapore, working closely with partners at the Energy Research Institute at Nanyang Technological University (ERI@N). Designed the overall roadmapping process, facilitated a series of stakeholder workshops in Singapore, drafted roadmap sections, and provided technical review of the roadmap. The roadmap sets a path forward for the country to improve the energy efficiency of its buildings and contains sections addressing building envelope and façade systems, integrated design, air conditioning and mechanical ventilation, and building management and information systems.
- Developed *Functional Glass Manufacturing Technology Roadmap* in partnership with the American Ceramic Society (ACerS) and the National Institute of Standards and Technology (NIST) Advanced Manufacturing Technology (AMTech) program. The roadmap process engaged more than 50 glass experts from around the world to identify 10-year R&D priorities for advancing manufacturing techniques for functional glass, including goals for improving building energy efficiency.
- Co-authored *Linking Transformational Materials and Processing for an Energy-Efficient and Low-Carbon Economy*. This report series, prepared in partnership with TMS at the request of the U.S. Department of

Energy (DOE) Advanced Manufacturing Office, builds a materials science and engineering R&D portfolio that will encourage breakthroughs that enable an energy-efficient and low-carbon U.S. economy.

- Partnered with the International Energy Agency (IEA) to develop *Energy Technology Roadmaps: A Guide to Development and Implementation*, a “how-to” guide intended to inform national government stakeholders seeking to develop energy technology roadmaps, particularly from developing economies.

## Lindsay Pack

Director of Communications

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### PROFESSIONAL QUALIFICATIONS

- Experience** 12 years of professional experience in communications and outreach strategy development, graphic design, and facilitation and strategic planning
- Expertise** Writing, editing, and designing a wide range of communications materials for government, academia, industry, and non-profit audiences; meeting facilitation and design; strategic planning; development and implementation of outreach and branding strategies; layout and infographic design
- Education** **M.A., Publications Design**, University of Baltimore, 2008  
**B.A., English and Economics (summa cum laude)**, St. Mary's College of Maryland, 2005
- Work History** Nexight Group LLC, Silver Spring, MD, 2010 – present  
 Energetics Incorporated, Columbia, MD, 2006–2010  
 Geogeson Shareholder Analytics, Rockville, MD, 2005–2006

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### RELEVANT EXPERIENCE

#### Stakeholder Engagement

- Regularly develop outreach and engagement strategies to effectively launch strategic plans and roadmaps to a wide range of stakeholders. This includes conducting audience analyses to characterize target audiences and their preferences, and to identify relevant channels and messaging.
- Led the development and implementation of an outreach plan leveraging industry events and channels to encourage participation in the Thermal Manufacturing Industry Advanced Technologies Consortium. Crafted and disseminated materials to support the outreach plan, including press releases, fact sheets, and web content.
- Worked with PATH's Advocacy and Public Policy (APP) department to develop their 2015 and 2016 communications work plans aimed at engaging donors, policymakers, and other global health advocates in securing funding and support for global health R&D and the improved health of women, newborns, and children; facilitated five workshops with APP subdivisions to identify and define their priority communications needs, and synthesized the results to select high-impact actions for inclusion in the plan.
- Implemented and manage Nexight's marketing strategy, including creation of a suite of marketing materials for use in regular business development efforts, establishment of branding guidelines, oversight of website content and blog post development, and implementation of the company's social media strategy.
- Developed a media outreach campaign to publicize the release of the *Innovation Impact Report* of the TMS project, Linking Transformational Materials and Processing for an Energy Efficiency, working directly with TMS to organize a webinar for the media and other stakeholders that involved key contributors to the report as speakers, and worked to publicize the event through targeted press releases and outreach; also followed up with media outlets after the webinar to gain additional coverage for the report and developed a draft op-ed for webinar speakers to send to their local news outlets.

#### Communication Materials Development and Design

- Wrote, designed, and managed the review process more than 160 technical communications pieces, including roadmaps, strategic plans, reports, fact sheets, and web content for government programs, professional societies, academia, commercial, and non-profit organizations. This includes implementing client style guides and coordinating reviews with appropriate technical experts and senior staff.
- Developed more than 75 original infographics to express complex processes and concepts for use in roadmaps, strategic plans, and communications materials, as well as standalone print or web pieces. This includes synthesizing hundreds of data sets and technical research into compelling and accurate visual representations, such as an award-winning, two-page infographic for the Engineering for Change initiative

that visually represented more than 60 pages of research results on existing fit-for-service technology solutions for use in developing countries.

- Crafted suites of branded communications materials to accompany outreach strategies, such as the development of a launch kit in to help publicize the American Chemistry Council (ACC) *Plastics and Polymer Composites Technology Roadmap*. This kit included an Executive Summary brochure, PowerPoint slides and talking points for industry audiences, a general press release, and a one-page infographic that was used to advocate ACC's position on the Hill.

#### Branding and Identity

- Developed audience profiles characterizing target audiences and their preferences to craft effective outreach strategies, visual brands, and messaging that resonate most with priority audiences for a given campaign, such as the launch and implementation for the NIST Advanced Manufacturing Technology Consortia Program roadmaps and the ACC Plastics and Polymer Composites Technology Roadmap for Automotive Markets.
- Regularly design logos, templates, and communications materials to incorporate modern visual branding that aligns with client style, messaging, and objectives. Examples include developing a logo and accompanying infographic to raise awareness about the USDA National Organic Program's Sound & Sensible program, as well as the content, design elements, and organization of the PATH APP website.
- Develop templates and branding guidelines to help clients strengthen their brand by maintaining visual cohesion and consistent purpose/function across their communication materials, including the development of PATH APP's content guidelines and templates.

#### Web Content, Structure, and Design

Developed the underlying structure, content, and visual components for global health non-profit PATH's Advocacy and Public Policy department website to better explain what it does and outline its successes; integrated all content into WordPress platform, adding html-based structural elements where needed.

- Used ASM International WordPress templates to develop the organization, structure, and content of the Computational Materials Data Network, Thermal Manufacturing Industries Advanced Technology Consortium, and Atomization Technology Innovation Consortium websites, including the development of a PowerPoint-based strawman, and graphics and visual elements in line with each organization's branding.
- Provided design direction and co-developed organization, structure, and content for Nexight website; regularly design and implement new content, images, and graphical elements in WordPress.
- Conducted an analysis of the Propane Education & Research Council's R&D website and proposed a content reorganization, including the development of a strawman and content templates to convey reorganization and new content to clients and developers.

## Sarah Lichtner

Project Manager and Senior Editor

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### PROFESSIONAL QUALIFICATIONS

- Experience** 10 years of professional experience in technical and management consulting
- Expertise** Stakeholder engagement; communications strategies; meeting facilitation; technical writing and editing; technical research and documentation; strategic planning and roadmapping; data collection and analysis
- Education** **M.A., Writing**, Johns Hopkins University, 2013 (science and medical writing concentration)  
**B.A., English Literature**, University of Maryland, Baltimore County, 2008, minor in Professional Writing (summa cum laude)
- Work History** Project Manager and Senior Editor, Nexight Group LLC, 2017 – present  
 Technical Writer and Editor, Nexight Group LLC, 2010 – 2016  
 Technical Writer and Editor, Energetics Incorporated, 2008 – 2010  
 Co-Editor, UMBC Review: Journal of Undergraduate Research, 2006 – 2008

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### RELEVANT EXPERIENCE

#### Stakeholder Engagement

- Supported facilitation of more than 60 client meetings and conducted hundreds of telephone interviews with diverse stakeholders from manufacturing industries, academia, and government agencies.
- Planned, facilitated, and documented five public forum workshops with Frederick County, Maryland residents focused on brainstorming solid waste management options and identifying and ranking criteria for assessing these options.
- Facilitated 8 virtual roadmapping workshops with more than 100 stakeholders from 4 different committees and 5 working groups to gather insights and develop a roadmap for the Clean Energy Smart Manufacturing Innovation Institute (CESMII)—a \$140 million public-private partnership focused on accelerating the development and adoption of smart manufacturing technologies (e.g., sensors, controls, data analytics) in U.S. manufacturing operations.
- Facilitated and documented results from virtual meetings with four working groups focused on manufacturing information technology, regulations and standards, modeling, and workforce education as input to *Achieving Large-Scale, Cost-Effective, Reproducible Manufacturing of High-Quality Cells: A Technology Roadmap to 2025*.
- Facilitated peer review panels during a one-week review of Solid Oxide Fuel Cells and Advanced Turbine National Energy Technology Laboratory (NETL) Clean Coal Research Programs in identifying strengths, weaknesses, and recommendations for improving projects that together have received more than \$28 million in federal funding.

#### Technical Communications and Outreach

- Has coordinated the research and writing of hundreds of technical documents, including proposals, fact sheets, roadmaps, strategic plans, workshop reports, case studies, stakeholder briefings, and website content.
- Led the development and writing of *Achieving Large-Scale, Cost-Effective, Reproducible Manufacturing of High-Quality Cells: A Technology Roadmap to 2025* for the National Cell Manufacturing Consortium (NCMC)—led by Georgia Tech and the Georgia Research Alliance, funded by the National Institute of Standard and Technology (NIST) Advanced Manufacturing Technologies (AMTech) program—which was highlighted at the 2016 White House Organ Summit and featured in a White House fact sheet.
- Led writing of three roadmaps through the NIST AMTech Consortia Program for the Functional Glass Manufacturing Innovation Consortium (FGMIC), National Cell Manufacturing Consortium (NCMC), and Thermal Manufacturing Industries Advanced Technology Consortium (TMI ATC). Each roadmap aligns with

each consortia's mission and tailors compelling messaging to a variety of target audiences, including academic researchers, technology and manufacturing companies, physicians, government agencies, law makers, and standards organizations.

- Helped develop a communications strategy and outreach materials for TMI ATC—including press releases, web content, fact sheets, an executive summary, and PowerPoint presentations—to inform the industries who rely on thermal manufacturing about the cross-sector roadmap and encourage consortium participation.
- Helped develop a strategic outreach plan and materials—including a presentation and talking points for a briefing with Secretary of Energy Steven Chu, a webinar, and a press kit—for the launch and dissemination of the *Innovation Impact Report* for The Minerals, Metals & Materials Society.
- Leads the editing, management, and design improvement (working with a web developer) of the Nexight Group website. Regularly implement new content, images, and graphical elements in WordPress.

#### Program Management

- Managed the CESMII roadmapping project in an accelerated time frame of under three months; effectively coordinated with Institute leads, four committees, and five working groups, including providing weekly status updates to participants on project progress and action items.
- Managed the data collection, analysis, and documentation of thousands of sets of quantitative and qualitative data for several Propane Education & Research Council (PERC) technology demonstration programs; documentation of these programs includes data analysis and data visualization to develop scannable, compelling, and accurate summaries, including more than 50 technical reports, interactive dashboards, extended infographics, and PowerPoint Briefings.

## Julianne Puckett

Senior Consultant, Content Strategy

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### PROFESSIONAL QUALIFICATIONS

**Experience** 20 years of professional experience in content strategy, design, and development

**Expertise** Traditional and digital content strategy, including information analysis and organization, stakeholder engagement, user experience design, creative direction, writing and editing, and project coordination. Unique ability to transform complex issues and information into compelling content and experiences, using design thinking, data analysis, and marketing insight.

**Education** **M.A., English**, University of South Carolina, 1994

**B.A., English**, Mount Holyoke College, 1991

**Work** Senior Consultant, Content Strategy, Nexight Group LLC, Silver Spring, MD, 2017 – present

**History** Content Strategist, Freelance, 2010 – 2017

Senior User Experience Designer, RSA, Raleigh, NC, 2009 – 2010

User Experience Designer, Blue Cross Blue Shield of NC, Durham, NC, 2008 – 2009

Senior User Experience Designer, Motricity, Inc., Durham, NC, 2005 – 2008

Senior Web Designer & Developer, Auto Club of So. Calif., Costa Mesa, CA, 2000 – 2004

Publications Specialist, Energetics, Inc., Columbia, MD, 1998 – 2000

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### RELEVANT EXPERIENCE

#### Web Design and Digital Content Strategy

- Translated project requirements into designs through annotated interaction flows and wireframes for use by both technical development and marketing teams (web and mobile).
- Developed information architecture diagrams, paper prototypes, and content templates to support mobile and web site design and development, with an emphasis on usability.
- Wrote and optimized audience-targeted content (e.g., blog posts, social media updates, feature articles, long- and short-form web content).
- Provided targeted digital content marketing (analysis of site metrics, search engine optimization, content refinement strategies) designed to increase visitor and social media engagement.
- Conducted content audits, gap analyses, and stakeholder interviews to gather data to optimize the design and development of both digital and traditional communications materials.
- Conducted user research, competitive analyses, heuristic evaluations, and user experience validation tests; analyzed findings and drafted reports to support content and design improvement roadmaps.
- Analyzed usage metrics, behavior analytics, and marketing research data to identify key stakeholder groups to drive search engine optimization, improve user experience, and increase targeted audience engagement.
- Led facilitated working groups of clients, project stakeholders, and SMEs to develop web site optimization and software product roadmaps.
- Researched and developed a post-9/11 travel information content strategy for senior decision-makers at a national non-profit.
- Created a phased web site technical and content development redesign strategy for senior leadership at a state university.

### Communications and Engagement

- Organized and facilitated requirements discussions, mock-up sessions, and design reviews with clients, project leaders, and SMEs.
- Conducted on-line surveys, stakeholder interviews, and facilitated meetings to gather inputs and diverse perspectives; synthesized survey results, workshop input, and other technical materials into key messages and actionable strategies for technology roadmaps and reports.
- Assisted in facilitating diverse groups of expert stakeholders to build partnerships and reach community consensus decisions while developing future technology strategies.
- Led document coordination and provided creative direction and editorial support to the *Vision 2040: A Roadmap for Integrated, Multiscale Materials and Systems Modeling and Simulation*, a 170-page community-consensus report of findings and strategic recommendations from a multi-year study, sponsored by NASA.
- Jointly led development of a roadmap for the REMADE Institute, a public-private partnership focused on enabling applied R&D technologies to reduce embodied energy and carbon emissions associated with industrial-scale U.S. manufacturing operations. Included regular engagement with 5 diverse working groups to gather insights, synthesis of data and observations into actionable timelines, and presentation of the comprehensive plan in a visually compelling report.
- Researched, wrote, edited, and produced a variety of technical documents and communications materials, in both traditional and digital media, for both government and industry clients.

## FRANÇOIS SCREVE

Mr. Screve has extensive experience in the development, optimization, and management of waste-to-energy (WTE) and biomass projects, from initial feasibility to general design, commissioning, and commercial operations. With 30 years of hands-on work on solid-fuel power plants in North America, Asia, and Europe, Mr. Screve offers balanced expertise in design, operations, and financial performance. He is a results-oriented leader with record of building high-performance organizations. Mr. Screve holds a Bachelor of Science degree in Mechanical Engineering from Ecole Nationale Supérieure des Arts et Métiers and a Master of Business Administration degree from the University of Lille, both in France.

As President and founder of Deltaway Energy International, Inc., Mr. Screve is responsible for providing solutions based on best practices in the solid fuel power industry to achieve peak performance and increase revenues while lowering operating costs. With his Deltaway Energy ([www.deltawayenergy.com](http://www.deltawayenergy.com)) team, he has provided engineering and management services to more than 40 facilities worldwide since 2003. Representative projects include:

- Miami-Dade, Florida 4,200 TPD, Zurn RDF / WTE
- Bay, Florida 490 TPD, O'Connor Rotary Combustor – WTE
- Pinellas, Florida 3,000 TPD, Martin Massburn – WTE
- Long Beach, California 1,380 TPD, Steinmuller Massburn – WTE
- Montgomery, Pennsylvania 1,380 TPD, Steinmuller Massburn – WTE
- York, Pennsylvania 1,344 TPD, O'Connor Rotary Combustor – WTE
- Dutchess, New York 456 TPD, O'Connor Rotary Combustor – WTE
- Islip, New York 485 TPD, O'Connor Rotary Combustor – WTE
- Savannah, Georgia 500 TPD, Seghers Massburn – WTE
- Quebec City, Canada 1,000 TPD, Von-Roll Massburn – WTE
- Chowchilla II, California, 12.5 MW Fluidized Bed – Biomass
- El Nido, 12.5 MW Fluidized Bed – Biomass
- SPSA, Virginia 2,000 TPD, Combustion Engineering – WTE
- Commerce, California 400 TPD, Detroit Stoker – WTE
- Ren-Wu, Taiwan 1,350 TPD, MHI – Martin Massburn – WTE
- Lutsao, Taiwan 900 TPD, Takuma Massburn – WTE
- Puxi, Shanghai, China 1,500 TPD, Steinmuller Massburn – WTE
- Macau, China 1,600 TPD, MHI - Martin Massburn – WTE
- Bilbao, Spain 720 TPD, CNIM – Martin Massburn – WTE
- Nice, France 1,300 TPD, CNIM – Martin Massburn – WTE
- Toulon, France 800 TPD, CNIM – Martin Massburn - WTE
- Rozenburg The Netherlands 3,500 TPD, DBA Roller Grate Massburn WTE

## FRED CAILLARD

Mr. Caillard is Vice President of Performance and Engineering at Deltaway. His areas of expertise include steam cycle efficiency, WTE boilers and air pollution control operations, performance modeling and global project economics. He has performed numerous plant-wide or equipment-specific heat and mass balances and has created results-oriented monitoring tools and services for several facilities. He is involved in overseeing maintenance and operations contracts at the Chowchilla and Merced green waste projects in Central California. Mr. Caillard's problem-solving and data analysis skills have enabled him to lead more than 20 Performance Improvement Projects in Europe and in North America for Deltaway. Mr. Caillard holds a master's degree in Mechanical Engineering, with a major in Thermodynamics and in Industrial Energy Processes. He is the author of ASME papers on condenser and steam turbine performance.

Mr. Caillard has extensive experience in the optimization of waste-to-energy and biomass projects from the initial feasibility to commercial operations. He has been the project manager for the performance analysis and optimization of more than 23 facilities worldwide since 2003 including the following facilities. Representative projects include:

- Miami-Dade, Florida 4,200 TPD, Zurn RDF / WTE
- Bay, Florida 490 TPD, O'Connor Rotary Combustor – WTE
- Long Beach, California 1,380 TPD, Steinmuller Massburn – WTE
- Montgomery, Pennsylvania 1,380 TPD, Steinmuller Massburn – WTE
- York, Pennsylvania 1,344 TPD, O'Connor Rotary Combustor – WTE
- Dutchess, New York 456 TPD, O'Connor Rotary Combustor – WTE
- Islip, New York 485 TPD, O'Connor Rotary Combustor – WTE
- Savannah, Georgia 500 TPD, Seghers Massburn – WTE
- Quebec City, Canada 1,000 TPD, Von-Roll Massburn – WTE
- Ren-Wu, Taiwan 1,350 TPD, MHI – Martin Massburn – WTE
- Lutsao, Taiwan 900 TPD, Takuma Massburn – WTE
- Macau, China 1,600 TPD, MHI - Martin Massburn – WTE
- Bilbao, Spain 720 TPD, CNIM – Martin Massburn – WTE
- Nice, France 1,300 TPD, CNIM – Martin Massburn – WTE
- Rozenburg The Netherlands 3,500 TPD, DBA Roller Grate Massburn – WTE
- Rozenburg The Netherlands, 22 MW – Biomass Plant
- Rotterdam The Netherlands 1,200 TPD, Martin Massburn – WTE
- Duiven Netherlands 1,100 TPD, DBA Roller Grate Massburn – WTE
- Saales, France 1.1 MW – Wind turbines

## CRAIG E. DURR

Craig Durr is a seasoned power plant manager with more than 30 years of operational and maintenance management experience. He has a proven track record producing exceptional results with significant hands-on experience operating and maintaining various types of power plants. He is a goal-oriented administrator with excellent personnel management skills. Over the last 25 years under his leadership, he has led senior managers, front line supervisors, and guided hourly employees.

He is considered a turnaround specialist who set every performance record in facility history in the first three years at Covanta Warren after taking over as Facility Manager. He was responsible for attaining OSHA VPP Star Certification upon taking over the helm at the Covanta Warren Facility. He was also responsible for obtaining recertification to OSHA VPP Star in year six, as the Facility Manager at Covanta Warren. He is a skilled problem solver and an excellent motivator of team members who has built complete teams of people to manage, operate, and maintain various types of plants under his control.

**Assistant Plant Manager – Wijster and Moerdijk.** Responsible for process improvement with an eye towards optimizing areas identified by company and client to improve the clients bottom line. Areas of improvement included: steam cycle optimization; combustion, boiler cleaning solutions; MSW-RDF pre-treatment performance optimization; and bunker management. Additional responsibilities included providing training and coaching to Operations and other key employees. Also conducted performance assessments for other waste-to-energy companies worldwide.

**Facility Manager – Covanta Energy, Morristown, New Jersey/Covanta Warren, Oxford, New Jersey.** Responsible for operation and maintenance, environmental compliance, and financial reporting of a publicly-owned, and later privatized, 600 ton-per-day energy-from-waste facility. Facility generated 13.5 MWH of electricity for sale to Jersey Central Power and Light, utilizing Witmer and Ernst (W+E) stoker technology for combustion and state-of-the-art air pollution control (semi-dry scrubber and pulsejet baghouse with carbon injection) and continuous emission monitoring equipment. Upon assuming operation of the Warren facility in 2007, the facility was identified as a turnaround project due to troubled performance and environmental compliance. As such, several programs and projects were implemented to improve performance and profitability. These included, but were not limited to, creating a culture that yielded no lost-time accidents and won the most prestigious safety award in the state of New Jersey, the Governor's Award, for five consecutive years. Achieved OSHA VPP Star status in 2007 and recertification to VPP Star status in 2013. Responsible for implementation of plant upgrades and changes to plant processes to significantly improve environmental performance. The facility received environmental stewardship awards from NJDEP for many of these changes.

**Chief Engineer – Covanta Energy, Morristown, New Jersey/Covanta Hennepin, Minneapolis, Minnesota.** Developed very effective outage planning and scheduling, working closely with the facility manager and maintenance supervisor, at a 1,212 ton-per-day Waste to Energy facility employing the Witmer and Ernst (W+E) stoker technology and a Westinghouse 35 MWH steam turbine; utilizing safe, efficient, and environmentally sound decision making.

## **MARK S. FOSTER**

### **EDUCATION**

B.S., Hotel Administration, Cornell University School of Hotel Administration, Ithaca, New York, 1979

### **CAREER SUMMARY**

Mark Foster, the founder of Second Chance, has served as President and Chief Executive Officer since the organization's inception in 2001. He opened the organization's original 15,000 ft<sup>2</sup> warehouse on Warner Street in Baltimore in February 2003, and in October 2003, launched the Deconstruction Training Program in collaboration with the Mayor's Office of Employment Development. He has since overseen the successful relocation and expansion of Second Chance to its current 250,000 ft<sup>2</sup> warehouse on Ridgely Street. Second Chance has grown from four employees in 2003 to over 200 currently and has experienced double-digit growth every year. Mark continues to serve in a managerial capacity internally, as well as extending his expertise in external advising and community outreach on behalf of the organization's core mission values of providing sustainable employment opportunities to disadvantaged people in Baltimore. He was raised in Baltimore where he remains a resident and advocate for the City, its people, and its opportunities. He currently serves as a Board Member for Baltimore Heritage, and also for the Baltimore Workforce Investment Board.

Prior to his founding of Section Chance, Mark served as President of Foster Restaurant Group in Baltimore for 13 years. In this position, he developed proprietary restaurants and provided consulting services to the restaurant industry. As Operations Manager for the Harbor Court Hotel in Baltimore, he was responsible for hotel operations with annual revenue of \$12 million. Prior to this, as President of NorMar Associates in Baltimore, he provided consulting services to hotel and restaurant industries.



***"Less Waste, Better Lives"***  
***Proposal for Developing Baltimore City's Recycling and  
Solid Waste Management Master Plan***

## **APPENDIX 3**

Recent Relevant Publications

# China and Recycled Commodities: The Perfect Storm?

In July 2017, the Chinese government filed a notification with the World Trade Organization indicating the government’s proposal to ban the import of 24 solid waste materials. What does this currently mean for the U.S. and in the months to come?

■ By Marc J. Rogoff, Ph.D.

Back in 2000, a movie starring George Clooney, “The Perfect Storm”, told the story of an October 1991 tempest off of New England that may happen only once in a century. It was a nor’easter created by so rare a combination of factors that it could not possibly have been worse. Creating waves 10 stories high and winds of 120 miles an hour, the storm whipped the sea to inconceivable levels few people on Earth have ever witnessed.

When I view the recent Chinese government actions this past year with regard to recycled commodities and contamination of imported bales, I see unprecedented factors in play as “The Perfect Storm”—the banning of solid waste materials and imposing an almost unreachable contamination standard on bales entering China. In essence—a ban.

## The World Trade Organization

In July 2017, the Chinese government filed a notification with the World Trade Organization (WTO) indicating the government’s proposal to ban the import of 24 solid waste materials, namely certain types of mixed papers and plastics. Further, the government said in November that it would impose a 0.3 percent contamination standard

on bales. Both actions were planned for the implementation on March 15, 2018. Additional comments are due to the WTO on December 15. It is expected that stakeholders will ask for a lower contamination rate and a longer lead time.

Currently, the Chinese recyclables market represents about 25 percent of U.S. recycled paper exports and anywhere from 20 to 33 percent of recycled plastics, depending the type of plastic. ISRI estimates that this is a \$5.6 billion export market for the U.S.

The objective of this import ban and contamination limit was to minimize “foreign garbage” entering the country and to promote new environmental standards. Pursuant to this “ban” import licenses from China have not been renewed. The result has been a drop in commodity prices worldwide, especially in the U.S. because the flow of commodities into China, one of the largest importers of recyclables, has been disrupted.

## Solid Waste Industry Association Actions

As soon as news events unfolded about the import ban and the contamination standard, various solid waste industry groups (Institute

**Figure 1:** Exports to China.  
Figure courtesy of CalRecycle, 2017.

## Exports to China



of Scrap and Recycling Industries [ISRI], National Waste and Recycling Association [NWRA], and the Solid Waste Association of North America [SWANA]) issued industry blogs, press releases, presentations at national/international conferences and letters to state solid waste agencies.

For example, SWANA met with stakeholders and the U.S. Department of Commerce. The Department raised recycling market issues with their Chinese counterparts in Beijing in September and in bilateral trade meetings in September and October. Further, SWANA met with the U.S. Environmental Protection Agency (EPA) in October as the import ban was beginning to ripple throughout municipal solid waste programs. A letter was sent on October 11 to all 50 state environmental agencies providing an information update and potential description on potential impacts of these Chinese actions on municipal recycling programs.

### West Coast Impacts

States and municipalities on the West Coast (e.g., Portland, Seattle) have enacted significant zero waste/diversion goals as part of their environmental and cultural ethic. These communities have implemented single-stream collection systems. Unfortunately, many of these programs have exhibited high contamination rates in the range of 20 to 25 percent. Given the proximity of the west coast to Asian markets like China, the amount of recycled commodities has spiraled in recent years. Some have estimated that recyclables represent nearly a quarter of all exports to China—the largest single export (see **Figure 1, page 29**). This is hard for even me to believe.

So the reliance of the West Coast on exporting recyclables to China during these “Perfect Storm” conditions has resulted in commodities being stockpiled at some ports. To minimize this economic dilemma, some municipalities, namely the City of Portland, have petitioned the Oregon Department of Environmental Quality for waivers to landfill these stockpiled recycled commodities at nearby landfills.

### Midwest Impacts

Impacts, as of December 2017, to Midwest solid waste programs appear somewhat muted as compared to the West Coast. However, some of the major national hauling firms with market power have been able to diversify their export markets and ship increasing quantities to India and Southeast Asia. Some increased labor at their MRFs to ship higher quality bales. Nonetheless, the prices for mixed paper have taken a haircut.

### United Kingdom Impacts

Much of the attention in the U.S. press has been on the impact of the Chinese import ban on local recyclables markets. However, truth be told, the ban has had worldwide impacts. In Europe, where recent efforts have moved towards zero waste and reduction in landfilling, recycling has been impacted mightily. For example, the United Kingdom exports about two thirds of its recyclables to China, roughly 2.7 million tons to Hong Kong since 2012. The impact will be significant by most observers in the European Union. “Now that China has decided they’ve had enough of our waste, it’s obvious that the UK’s recycling system simply can’t cope with the mountain of plastic waste we generate,” says Elena Polisano, oceans campaigner for Greenpeace UK.

### The Future

To date, most trade organizations suggest that the impacts to local recycling programs from the Chinese actions depends on three basic site-specific issues:

1. Depends on whether you export—and where
2. Depends on your contract (force majeure?)
3. Depends on your contamination level

Some have argued that reducing contamination is the answer through efforts of education of customers to reduce contamination curbside, adding more workers and robotics at materials recovery facilities (MRFs) to clean up the bales leaving the these facilities, and to find other Asian markets such as India and Vietnam to sell U.S. recyclables. While education is clearly a reasonable answer, and one that municipalities should be doing as a matter of course, investment in U.S. facilities that would use these recycled materials is the only long-term answer. But this will take time.

In my opinion, we, as well as our European allies, have looked to Asian markets to dump our “unwanted materials”. While we talk about entering the closed loop of materials management, we have done little, if anything to facilitate the development of this new paradigm. Our Federal and state tax codes continue to encourage the use of virgin materials rather than recyclable products. Even the new tax code changes eliminate the use of private activity bonds for investment in recycling facilities.

Another answer is changing the way many municipalities fund their solid waste programs. Typically, many fund them out of landfill tipping fees that oftentimes do not take into account the cyclical changes in recycling markets. Funding appropriate operational fund reserves or rainy day funds is a way to insulate solid waste programs from the ups and downs in recycling. Also looking at a lifecycle cost of solid waste programs.

The Chinese import ban and contamination requirements will impact recycling programs both in the U.S. and Europe. In the short term, many programs may consider elimination of mixed paper and plastics from their curbside programs. There may be calls to landfill these materials in other programs. In my opinion, the long-term solution is to develop viable local and regional recyclables markets. This will take time. | **WA**

### References

- David Bidderman, “China and Recycling”, SWANA Presentation, December 5, 2017.
- Zoe Heller, “China’s Ever-Shrinking Markets for U.S. Discards”, Presentation by CalRecycle, December 5, 2017.
- Shafi Musaddique and Josh Gabbatiss, “Chinese Ban on Imported Plastic Leading to Impending Crisis for UK Recycling”, *Independent*, December 7, 2017.
- Leone Young, “The China Conundrum”, *Waste 360*, December 6, 2017.

# Year in Review: Driving Efficiency and Production

As major changes begin to take place and smart technologies are becoming more prominent, 2017 saw a year of impacts that has changed the way in which the industry views collection, recycling and beyond.

### Looking back on 2017, what are the significant changes you have seen over the past year in the waste and recycling industry?

**David Biderman:** Clearly, the most significant development affecting the waste industry in 2017 was China's imposition of import restrictions on waste, scrap and recyclables. The combination of reduced import quotas, lower prices, tougher inspections at Chinese ports and North American recycling facilities, bans on certain categories of materials, and the impending March 1, 2018 carried waste (contamination) standard is affecting recycling operations from coast to coast in the U.S. and Canada. What was once sent to China is being placed in landfills (Oregon), disposed in waste-to-energy facilities (Massachusetts) and stockpiled in a number of locations. Many recycling operators have taken steps to improve the quality of their material to meet the more stringent standards. These include hiring more workers, slowing down the line and accelerating investments in new processing equipment (e.g., optical sorters) that reduce contamination. In addition, some companies and local governments who were reliant on China are sending recyclables in increasing quantities to other Asian countries, including Indonesia, Vietnam and India. SWANA has played a leadership role on this important issue, advising state agencies, municipal officials, companies, and other stakeholders on developments and urging that the quality of material improve. SWANA has filed two sets of comments on China's proposals, urging a longer transition period for implementation of more stringent requirements. Finally, we are in close and frequent contact with the three federal agencies in the U.S (Department of Commerce, EPA, U.S. Trade Representative) involved in the China/recycling issue, and have had several conference calls with Canadian government officials.

**Marc Rogoff:** In July 2017, the Chinese government filed a notification with the World Trade Organization indicating the government's proposal to ban the import of 24 solid waste materials. Further, the government said in November that it would impose a 0.3 percent contamination standard on bales. These two unprecedented factors are expected to impact many sellers and solid waste agencies dependent on the Chinese market. We are already seeing impacts on the west coast with communities' petitioning their environmental agencies to landfill collected recyclables. Our firm has negotiated one recycling processing contract that specifically addressed this phenomena to provide sufficient protection to the material processing facility contractor to keep them afloat during these depressed market conditions.

**Will Flower:** Every aspect of recycling continues to evolve, including markets, technology, equipment and economics. Globally, the biggest impact to recycling has come in the wake of China's National Sword program. The biggest challenge that recyclers are facing is the cost of recycling, which has been escalating over the past two years. Customers, including municipalities, business owners, homeowners and everyone else who wants to recycle, are going to be paying more for the service in 2018 and beyond.

**Michael Paglia:** The materials commodities market for pre-sorted clean material is now a much more stable environment. There has been some upward movement, most recently in November and December, where we saw some of the largest gains in commodities prices. Florida Express Environmental does not do any single-stream recycling, rather we do all clean recycling and the markets on fiber and metal commodities have been rising in price. As far as garbage markets go, we are not seeing price cuts and competition is strong, but it seems like everyone is able to push through increases because everyone has been experiencing significant increases in labor.

**Larry Wyluda:** I see a lot of changes with regards to continuing to move towards zero waste. There are more improved technologies for this out there. I also see the move toward electric and hybrid-type vehicles and the move away from CNG. The technology is evolving and companies want to get away from the diesel engines. California is a big driver for it. They pushed for years towards CNG and now they are focusing on electric trucks. These will be more prominent in late 2018 and into 2019. Cities are not requesting it quite yet, but I do see that some private trash haulers are pricing it out in order to get a leg up on the competition.

### Is there a particular type of technology that really stood out in 2017 with regards to moving the waste and recycling industry forward?

**DB:** We are seeing increased investments in new technology platforms and an increased use of data across the industry. Waste Management hired a chief digital officer in 2017, and I strongly suspect others in the industry will do so in future years. Self-driving vehicles are being tested and if they work in the challenging operational environment that is solid waste collection, it could be a game changer for the industry.

**MR:** Not unlike other industries, the solid waste industry has in recent years embarked on a quest to include "smart technologies" in everyday processes and programs. The objective for most municipalities and private haulers is fulfill the mantra: providing services, cheaper, quicker and better to their customers. I see a variety

of new software products to improve collection routing, back office accounting and electronics (cameras, onboard computers) to improve safety. To improve the quality of the products recovered from the recyclables stream, MRFs have become more highly automated as well as increasing in design throughput capacity. Recent surveys of the recycling industry have shown more reported application of optical scanners, drum and eddy current separators, and air classifiers, as well as increasing retrofits of dual-stream systems to handle single-stream recyclables. This application of technology has resulted in a reduction of manual sorting labor on the picking lines, although manual sorters appear necessary in many facilities to ensure quality control over the recovered products. Industrial robots have increasingly taken on routine tasks of many operations in a variety of manufacturing situations as well as in surgical settings. More advanced robots are gaining sensors and software, allowing them to perform non-routine manual, repetitive tasks such as welding, cutting and suturing. Most MRFs already use a combination of advanced sorting technologies followed by hand separation. Further, we are involved with an interesting mixed waste processing facility in the Northeast that is innovative and has a particularly firm financial structure, secure waste delivery agreements and negotiated tipping fee with the host communities. The mixed waste material process is relatively simple. Most of the standard two-dimensional recyclables materials like paper, cardboard, plastics, and metals are removed and sold, but the remaining materials are washed and processed through a pulper to recover the remaining cellulose materials. The organics in wash water are processed in an anaerobic digester generating biogas. Screened residuals are either disposed of at a landfill or used as alternative daily cover. In all, about 80 percent diversion is projected at a competitive tip fee.

**WF:** The growth and development of processing systems that liberate recyclables from the municipal waste stream are noteworthy. Dirty MRF technology is advancing rapidly because despite the industry's best efforts to educate citizens and make recycling easy, consumers still place a significant amount of recyclable material into the trash that ends up being disposed of at incinerators and landfills. Over the next several years, I think there will be more investment in systems that process MSW for the purposes of recovering recyclables that were either mistakenly or erroneously placed in the garbage can.

**MP:** GPS has been coming on for awhile and it has really become perfected. It is much more

affordable than what it was. We installed it in all of our trucks and it has been a great thing—it helps our dispatch, it helps in accountability and it helps in routing. All size companies now can afford that. The next thing is the DVRs and cameras in the trucks. We are now investigating companies that specialize in those offerings and we anticipate over the next 12 months that we will be

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**LW:** There are still some issues with infrastructure on the electric side but then again there is still issues with CNG infrastructure in parts of the country. In certain states that have embraced CNG, the stations are not only for the haulers, but they are also for taxi cabs, utility vehicles, etc.—it is a regional, local thing where they have embraced that technology. However, in some of the more remote areas, not so much. Infrastructure is easier for CNG because it has been promoted for so long. However, I see big infrastructure changes coming to the industry. Berkshire Hathaway just bought into Flying J, one of the largest truck stops in the country. They are going to own 80 percent of them by 2024. Love's is transforming all of their filling stations to repair facilities. I think part of that has to do with the fact that there are new technologies around. Some of these truck stops are going to turn into filling stations for electric vehicles. I expect to see more of that taking place. Creating your own infrastructure is a tough nut to crack. So, what is the next best thing? Buy the existing infrastructure and convert it. We also have to be concerned with the fact that we can't just have a repair facility to service a diesel truck and then throw in a CNG or electric truck in there—each process is different; the mechanics are different. There is a whole other level of certification and infrastructure that they have to do for that as well. Plus, until they improve the electric battery storage, you are only going to see these trucks on a local basis, rather than a long-haul route.

### **There have been many mergers and acquisitions taking place over the last few years. Do you see this trend continuing?**

**DB:** The stronger economy over the past few years, combined with lower borrowing costs and a rising stock market, is helping to spur mergers and acquisitions in the waste sector. The recently enacted

tax bill, which reduces tax rates, will likely be a catalyst for increased transactional activity in 2018 and 2019.

**MR:** The principles of consolidation in the solid waste industry have remained the same. The goal of most waste companies is to be vertically integrated so that it can control the flow of waste to the disposal facilities and provide sufficient return of investment to the investment groups. Consolidation allows for that to occur. Many investment groups have three to five year windows for recovery of investments, after which they sometimes look for an exit from the investment, which provides opportunities for further consolidation.

**WF:** Startup businesses thrive during a robust economy and over the past several years we have seen the development and growth of some strong local and regional companies. As these companies evolve, the potential for greater acquisition activity increases. Other economic drivers that are fueling acquisition activity include low-interest rates for borrowers and readily available capital from private equity investors.

**MP:** I see it continuing for a couple of reasons that may have not been as prevalent in the past and that is, number one, to obtain good management. The scarcity to obtain good people in our business is common so I think that some of the larger companies are looking to expand in a way to increase their profitability and their footprint, but also to the management that might be in place with that experience that they are not being able to pull out of college or off the streets. For every two companies that are selling, there is one new startup (a reversal from 20 years ago). It is more difficult to get into the business than in years past; it is much more capital intensive, you can't fund operational losses, so at some point this trend will slow down because there won't be a lot of companies to acquire. I think that acquisitions will continue in the near term.

**LW:** You are always going to see mergers and acquisitions, but I think it is going to be at a slower pace this year and next year. All the companies that needed and wanted to be acquired have done so in the last two years. As the population grows, the small hauler who may have only wanted two trucks now all of a sudden has 10 trucks. As the economy grows and there is more waste, these companies grow and become a target for mergers in larger hauling organizations. It will be interesting to see what will happen with the new tax laws and some of the regulations and de-regulations that Trump has put into place.

### **Are there particular U.S. regulations that have been implemented or updated that you think have really affected the industry already or will in the coming year(s)?**

**DB:** The tax bill contains provisions that will allow purchasers to fully expense certain capital investments and increases the cap on such expenditures to \$1 million. This will likely result in an increase in equipment and vehicle sales in the industry, which will benefit manufacturers, distributors and suppliers.

**MR:** The regulations in California and New England states regarding organics diversion have or will have some of the greatest impacts on the industry, in terms of the types of materials being disposed of at traditional facilities like landfills and waste-to-energy facilities. In my opinion, the constraints are sufficiently sized and priced organics processing facilities and generating product that can

be sold. Contamination both in the incoming materials and outgoing product is an issue that the industry will need to resolve.

**WF:** Laws affecting the transportation industry will affect the waste industry as we rely on over-the-road truckers to move waste and recyclables. Recent regulations that mandate the use of electronic logging devices (ELD) cost truckers and could result in higher transportation rates.

**MP:** There are some relaxing of DOT rules. For example, during the previous administration, there was talk that if commercial drivers had certain medical conditions, they would take them off the road, but now it has been put on the backburner. With the new tax bill increasing the bonus depreciation will spur asset purchases. This administration has relaxed some things that have benefitted us on a business level. This trend will continue into the coming year, especially if an infrastructure bill is passed. An infrastructure bill will put more pressure on labor and with that there will need to be some easing of Department of Labor or environmental laws. They want to fast track infrastructure improvements. On a state level, we are seeing the artificial intelligence legislation being passed to encourage that; we see that as a big benefit. I see all of that leading to a very aggressive business cycle over the upcoming years.

**LW:** The Obama Administration was a big proponent of zero waste, waste diversion, windmills, electric trucks, etc. The Trump Administration has gone back to good old-fashioned oil and gas. I think the push towards the environmental regulations, laws and technologies are going to slow because of that. You don't see the big tax subsidies or tax breaks that you've seen in the past. Then, you have states like California that are still pushing it, that still want zero waste. The California market is going to be quite a bit different from all the others. They've come up with some newer technologies for cleaner diesel fuel, and engines and engine components have evolved. If you look back at 2010 when they had the new aftertreatment components for diesel engines, they broke down frequently and had issues; it took several years for that technology to evolve. Once you started hitting 2014 to 2016, the same trucks that were breaking down frequently had been fixed. With the new Administration, there is not nearly as big of a push for new technologies, alternative fuels, etc.

### **Since the Chinese ban on recycling material has officially begun to take place, how have you seen the industry deal with this change so far?**

**DB:** I expect that if the China waste import restrictions are maintained and enforced, we will see increased interest in siting new facilities for recycled paper and plastics in the U.S. and Canada.

**MR:** To date, most trade organizations suggest that the impacts to local recycling programs from the Chinese actions depends on three basic site-specific issues:

1. Depends on whether you export—and where
2. Depends on your contract (force majeure?)
3. Depends on your contamination level

Some have argued that reducing contamination is the answer through efforts of education of customers to reduce contamination curbside, adding more workers and robotics at MRFs to clean up the

bales leaving the MRFs, and to find other Asian markets such as India and Vietnam to sell U.S. recyclables. While education is clearly a reasonable answer, and one that municipalities should be doing as a matter of course, investment in U.S. facilities that would use these recycled materials is the only long-term answer. But this will take time. In my opinion, we, as well as our European allies, have looked to Asian markets to dump our “unwanted materials”. While we talk about entering the closed loop of materials management, we have done little, if anything, to facilitate the development of this new paradigm. Our Federal and state tax codes continue to encourage the use of virgin materials rather than recyclable products. Even the new tax code changes eliminate the use of private activity bonds for investment in recycling facilities. Another answer is changing the way many municipalities fund their solid waste programs. Typically, many fund them out of landfill tipping fees that oftentimes don't take into account the cyclical changes in recycling markets. Funding appropriate operational fund reserves or rainy day funds is a way to insulate solid waste programs from the ups and downs in recycling; also looking at life cycle costing of solid waste programs could help. The Chinese import ban and contamination requirements will impact recycling programs both in the U.S. and Europe. In the short term, many programs may consider elimination of mixed paper and plastics from their curbside programs. There may be calls to landfill these materials in other programs. In my opinion, the long-term solution is to develop viable local and regional recyclables markets. This will take time.

**WF:** Paper mills, aluminum smelters and plastic recyclers have long complained about quality issues because it costs money to clean up recyclables at the mill. As recycling grew, and Asian markets were rapidly expanding, there seemed to be a wide open outlet for recyclable materials and some recyclers took advantage of the situation by egregiously shipping substandard materials to overseas markets. But let's be honest ... National Sword is as much about economics as it is about the environment. Economically, China found a way to help its manufacturers lower their costs at the expense of worldwide recyclers. To combat the challenges, owners and managers of recycling centers have changed processes, added Quality Control stations and developed plans to upgrade recycling centers to improve the quality of recyclables.

**MP:** It was destined to happen. We were putting together a poor package and then shipping it off to China where they have cheaper labor. It was only a matter of time when it did not make sense anymore—that business model has to change. Single-stream recycling, while conceptually is good, cutting back on the driver and truck times out on the routes, it continually makes a bad product for resale and it really works against the concept of circular economy because what we are doing is taking good stuff that could be pre-sorted by the consumer, telling them throw it into one place for convenience purposes, putting these good resources all into a truck that packs it all up together, and really diminishes its value by doing so, and then say we'll take it as a resource. It continually works against itself. There has to be a change in the single stream approach—the consumer has to be aware that it is costly to recycle; we have to be prepared to pay more to have the resource recovery benefit from

recycling and in doing so we have to be able to put a better asset out there to retrieve this pre-sorted material. The mentality is going to have to change right down to the consumer. The state of Florida Legislature is working on legislation that will penalize consumers for contamination in single stream. All of the big companies need to make the first move in saying to municipalities we have to change this single-stream concept around. Once that happens, it will follow suit right on down the line and people will take notice of this. We have to look at another way of doing things and single stream is not going to be the answer. Single-stream packaging was a Band-Aid and, unfortunately, it helped to promote bad habits, so reversing that will be a major national culture change.

**LW:** This change is huge. It has affected our industry adversely, especially on the recycling side with metals companies going out of business. They had those Asian markets requiring and demanding a certain tonnage every month, but now it is different. A lot of it has to do with the federal government. You see in the news every day how Trump is re-negotiating a lot of the agreements with different countries. I think this Administration is really changing how we negotiate with other countries. There is a huge benefit to the U.S. overall, but in smaller niche markets like recycling, there is not as much of an outlet as there has been in the past. He's promoting more mining, more coal, more U.S. products. The spec has changed quite a bit—there are a lot of rules and regulations in place when it comes to trading commodities.

**There seems to be a growing trend to move from the term “solid waste management” to “resource management” and the “circular economy”. What is the difference between these terms and why is this an important change?**

**MR:** The concept has been in place since the formation of the “resource” conservation and recovery act (RCRA). In my mind “resource management” is the process of handling discards to minimize disposal or minimizing the generation of discards in the first place. “Circular economy” refers to a larger concept, which involves a combination of regulatory and business initiatives to purposely maximize the reuse of discarded materials for beneficial purposes. This will ultimately require a transformation of the way we approach materials and perhaps require a transformation of many of our manufacturing processes.

**MP:** I think that it needs to be promoted on a larger scale so people understand that what they are putting at the curb is no longer considered trash; it is not a throwaway item anymore. Let's get that mentality trickled into the average Joe so it becomes more resource management and it truly becomes a circular economy—treat it as a resource it is. Perhaps with that, people will take some ownership of guarding the environment by doing their part and putting a little extra effort into recycling. Sometimes changing the term alone helps promote a different attitude amongst people and how they participate in the whole effect of recycling. The information that has been delivered to a vast majority of people has changed dramatically over the last couple of years. The industry leadership, association, members and large companies all have a role to play here. We have to

do public service announcements and media advertisements. All this brings exposure to our industry. We don't do enough of that as an industry. There has to be a broader buy in by everyone in the industry to contribute to a national effort to promote it and get these terms out there in common practice.

**LW:** Waste is now looked upon as a resource. Technology has advanced so much. Years ago, a traditional trash hauler, collected garbage from the front of a house and took it directly to a landfill—no MRFs, no transfer stations. Those trash haulers had to become recyclers. Now there is automation involved—your recycling can be curbside, MRFs are now more prominent, transfer stations are in place, there is source separating. Eventually, haulers are going to evolve into power companies. Trash is a valuable commodity. Technology is going to advance so much in the coming years that they will literally become a source of power. Now waste management has transitioned into resource management because trash has become a resource. On top of that comes the circular economy as well. We are going to see more of those terms changing over the years as the technology improves. We are looking for ways to take trash and convert it into energy or reusable products.

**Waste collection continues to stay in the top five most dangerous jobs in the U.S. according to the BLS. What more can the industry do to help improve these statistics?**

**DB:** The continued ranking of waste collection workers as having the 5th highest fatality rate in the U.S. is something that frustrates me deeply. It's an issue I've been working on for more than a decade. Unfortunately, there is not a simple solution to this complex problem. Workers in the industry are killed, on nearly a weekly basis, for a wide variety of reasons: the truck turned over; the truck backed into the helper; the helper fell off the riding step or was struck by the driver of another vehicle, who may have been distracted at the time; the MRF employee was struck by a falling bale or didn't disconnect the power before doing maintenance on a baler or compactor. In addition to industry employees, our trucks are involved in up to 80 fatal incidents annually in which another driver, a pedestrian, bicyclist or motorcyclist is killed. In just the first week of January 2018, there were four more fatalities. The status quo is simply not acceptable, and nothing we do at SWANA is more important. SWANA's review of the industry's safety data suggests a disproportionate percentage of the fatal incidents in the industry involve smaller companies who are not members of SWANA or other national waste associations. These companies may lack access to relevant safety resources, and potentially place a greater emphasis on productivity than safety. SWANA will be rolling out a major new safety initiative in 2018—through its chapters and Safety Ambassadors—to reach the owners and workers at these companies. SWANA is collaborating with other organizations who share our view that the status quo regarding safety is not acceptable (e.g., Environmental Research & Education Foundation, also known as EREF), and will continue to work with others who can help us get the waste collection industry off the list of 10 most dangerous occupations.

**MR:** In my view, it is a matter of statistical probability. Solid waste collection has so many “touch” points with potential harm, whether the number of miles driven, the number of times heavy materials are lifted or the exposure to other hazardous conditions. There is always more that can and should be done to improve worker health and safety. I believe the industry is committed to that end in terms of improved training and the use of smart technologies. Ultimately, we may have to transition to “driverless” solid waste collection vehicles and robots in MRFs.

**WF:** The collection and management of society’s waste is a risky business. We work with heavy machinery, drive large vehicles, perform in all types of weather conditions and lift tons of waste every day. Given our working environment, a strong safety program is a necessity. Most importantly, every safety program must begin with the personal commitment of every employee, supervisor, manager and executive to keep safety top of mind. Remember, the only acceptable number of accidents and injuries is zero.

**MP:** This is a challenge. Every day I wake up and look at all those things that continue to make this such a dangerous occupation. Unfortunately, there is no getting around that when you put employees on a road with other vehicles, there is going to be an increase in possibilities of accidents, mishaps, etc. In order to help minimize this, we need to try to bring more awareness to it and try to work with governments to eliminate distracted driving incidents. We have a lot of trucks that hit the streets every day. Fifty percent of the mishaps we’ve had out in the field were as a result of distracted drivers around our trucks. This is a main contributing factor to that statistic. We also need to continue to improve on the technology, embracing automated pickup. In the retirement communities here, they don’t want to have anything to do with pushing the carts down to their curb. Anytime you can integrate and automate a system and pull those guys off the streets from dumping garbage, it is a good thing. On a national level we have to do a better job of training our drivers. This year, Florida Express Environmental is adopting much more aggressive training for defensive driving for any potential mishap that may occur.

**LW:** I don’t see how we can get away from it unless we have automation and robotics to separate the trash. There are a lot of technologies moving in that direction, however you don’t see any of those technologies on a large scale in the U.S.; they are mostly in Europe. It is always going to be a dangerous job, especially any time you have manual labor doing the work, such as sorting lines, picking up trash, moving it around, etc. I’m surprised there are not more safety and training programs around on smaller scale. You see a lot of them implemented at large companies, but I think some of the smaller ones need to take more advantage of these programs and use them. Even the insurance companies support and promote it. Especially now with new technology, people have to be re-trained on it. Machines that were being used 10 and 20 years ago, don’t operate the same way. Educating the public would definitely help. I don’t think that the majority of the public has any idea how the whole waste industry works. They see it from a distance. A truck stops in front of their house and puts out an automated arm and dumps the

trash and they really don’t know what happens from there. I know of several trash companies that work with the local schools bringing kids into a facility with a safe barrier and showing them how they process the trash, pull out recyclables, etc. Any kind of consumer education we can do is good. We need to start out at the school level so as kids grow up they are familiar with it.

### **An ongoing industry concern among waste and recycling companies and organizations is the difficulty in finding employees and retaining them. What advice can you give to address this problem now and in the future?**

**DB:** The driver and mechanic shortage continues to be a problem for many solid waste companies. This issue exists in much of the transportation sector, as well as in other sectors that employ blue-collar workers (e.g., construction). Some companies are focusing on recruiting military personnel, who often have a background in operating heavy equipment. Others are using social media to attract younger workers, and a few are offering to pay employees to get a commercial drivers license (CDL) if they will work for them. Driving a garbage truck is a challenging, and potentially dangerous job. It faces a lot of competition from other companies that hire drivers, whose trucks are not quite as fragrant. It would be helpful if there were not weekly fatal accidents in the industry, and I suspect driver (and mechanic) recruitment and retention rates would improve if they were paid a bit more money.

**MR:** As the unemployment rate further declines, it will become more difficult to find a pool of experienced staff members in many parts of our industry. It will be critical to find ways to value your employees. Further, pay people a salary they can live and thrive on, and you can retain them.

**WF:** A battle is raging as employers compete against each other to find, hire and keep qualified employees. Hiring qualified people can be a challenge. To ensure an adequate number of qualified workers, managers must have a strategy to find, recruit, select, train and keep good employees. Managers and supervisors have to be diligent in working to retain employees who are dependable, talented and dedicated at the workplace. The hiring and on-boarding of new employees is a time-consuming and expensive process. But an employee relations program should not stop after the employee’s first day on the job. Instead, supervisors and managers have an ongoing responsibility to keep employees motivated, focused and happy.

**MP:** Labor is our biggest challenge. Everything revolves around the impact of lack of drivers and the labor market and how tight it is for our business. It includes climbing wages (grown 15 – 18 percent) in the last year and added benefits—we are contributing a lot more to their insurance; we are contributing more for their family coverage such as providing all kinds of different medical tools like Teledoc, where they can actually call at home using a specific device to get a common cold taken care of. In order to attract the younger generations, their biggest concern is experiences, which translates to more time off. In addition, they like new equipment with nice radios and the creature comforts. It is a change of culture that needs to happen. All of that goes into not only trying to just recruit drivers

and employees, but also helping to keep the ones you have. That is our challenge. One of the things that we are examining now is how to market all we do for our employees using a mix of old media and new media. The DOT has also updated its rules where healthy drivers will be advocated in the near future. In response to that, we have provided gym memberships to our employees and we are trying to do driver pooling and flex time.

**LW:** I think that the Trump Administration needs to promote more of the technology. We have all these kids going through college and coming out with a good education, but no place to go. Years ago, in high school, we had shop—learning how to build things and working on engines. I think that starting at a young age and having classes like that would go a long way. In colleges today, there are a lot more environmental classes than there has been in the past. I think many of these kids who are looking the green aspect of the industry, want to learn more about it and how they can help.

### What are the current challenges for the industry?

**DB:** China, China, China. If China does not modify its waste import restrictions, many recycling operations will either need to make major investments in their operations, identify alternative markets that are already flooded by recyclables, or else a lot of paper and plastic will end up in a landfill or a waste-to-energy facility. Last year, in my response to *Waste Advantage Magazine's* Year in Review questions for 2016, I stated that if China shuts the door on exported recyclables, “it would make Operation Green Fence seem like a low impact event by comparison.” Unfortunately, I was correct. At the same time that the industry faces the challenge posed by China, lawmakers continue to expand recycling programs and establish new and increase waste diversion objectives, including Zero Waste goals. Reconciling those aspirations with the changing waste stream, the operational and financial realities of the waste and recycling infrastructure, and China, will be a major challenge in 2018, and beyond. Persuading customers and politicians that recycling and waste diversion isn't free, and that the trucks, personnel and infrastructure associated with anaerobic digestion, composting, recycling, etc., cost money is also a challenge. We need residents and businesses to support funding and rate structures that make those programs sustainable. A second issue to keep a close eye on is franchising. Los Angeles' implementation of waste collection franchises in 2017 has not been without a few hiccups, and New York City's Department of Sanitation is developing proposed structures for what commercial waste franchises might look like. This complicated and controversial issue, which has economic, environmental and safety components, will continue to be a major issue in Los Angeles, New York City, and other communities in 2018.

**MR:** We unnecessarily get wrapped up with the technologies used to process waste, whether that is composting, waste-to-energy, recycling or landfilling. EPA's “priority pyramid” which shows the preference for resource recovery versus disposal is still valid and should continue as a fundamental guiding principle. With that being said, you must superimpose financial and other factors in the decision as to the most cost-effective and environmentally sound approach.

**WF:** Safety is always the #1 issue that demands ongoing attention. Another challenge affecting the industry is the lack of stability in

the markets for recyclables. Big swings in commodity prices and the lack of markets for certain material will result in rising costs. One interesting trend over the past few years has been municipalities eliminating glass from their curbside recycling programs. This was a bold move but completely understandable given the challenge that many recyclers face in finding outlets for recovered glass. While everyone wants to see glass recycled, there are some market realities that need to be addressed.

**MP:** The most important challenge in our industry is labor and drivers. Without this we can't continue to deliver our service. We also have to step up training on the safety side. I am very optimistic when different states are recognizing it and looking to really push hard on artificial intelligence, etc.

**LW:** Adapting to new technologies and zero waste is still a big term. How do we get there? Even though the current Administration is not pushing it, I still think that some of these companies have already invested so much going in that direction that they are not going to stop. Privatization is a big undertaking, like what is happening in the Los Angeles; other cities are looking at that to see how it is going to work out. It is a huge change—not only in picking up the trash, but also from a cost standpoint.

### What do you think that 2018 will hold for the industry?

**DB:** I think artificial intelligence will be deployed more widely in 2018 in the waste sector.

**WF:** The waste and recycling industry is continually evolving and each year brings new challenges and opportunities. While regulations tend to stifle growth, advancements in technological can drive efficiency and production. On the collection side, I think 2018 is going to be more of the same. If fuel prices spike we will see renewed interest in natural gas vehicles. On the processing side, we are going to see the industry strive to make higher quality products. Better engineering and advancements in technology, such as optical sorters, will aid in the effort to improve the quality of the commodities.

**MP:** The AI driving is going to be big as it continues to develop, improvements to the actual vehicles and the way of hybrid vehicles. The camera integration and DVR—all those are going to be important changes. On the regulations side, they really need to think hard about how much they are going to strip out DOT. While looking at the drivers' conditions may be bad for us in the short term (lessening the pool of drivers) in the long term it is safeguarding the general public. Finally, we need to try to redefine single stream recycling to dual stream recycling; maybe the standards need to change and the governments will step up and create a template.

**LW:** Because there is so much going on, it is hard to pick any one thing. Everything is going at a fast pace with new technologies and improving efficiencies—not only from a processing standpoint, but also with the use of the resources. I think that since so many companies have spent so much money on these technologies, that they will continue in that direction. Realistically, that is how it should be going. Yes, there is cleaner diesel now, there are better ways to process material, but at the end of the day we need to find a way to use the waste stream and make it a resource. | **WA**

# Thank You

## TO OUR YEAR IN REVIEW PARTICIPANTS



**David Biderman** is the Executive Director and CEO of the Solid Waste Association of North America (SWANA). David joined SWANA in April 2015 after 18 years with the National Waste

& Recycling Association, where he was their General Counsel, Vice President for Government Affairs, and Safety Director. He has litigated cases before the Supreme Court; testified before federal agencies, state legislatures and city councils; and provided safety and compliance training to thousands of workers throughout the U.S. Prior to entering the waste industry, David was an attorney at the Washington, DC law firm Steptoe & Johnson, where he specialized in environmental and transportation law.



**Will Flower** is a Vice President with Winters Bros. Waste Systems on Long Island, NY. Winters Bros. is a recycling and solid waste firm with operations in New York and Connecticut. Will

has 34 years of experience in the area of solid waste management and environmental protection. Prior to his work at Winters Bros., Will served as the President of Green Stream Recycling. He has also worked in the Director's Office of the Illinois Environmental Protection Agency, for Waste Management, Inc. and later, for Republic Services, Inc. He has held a variety of operational and executive leadership positions.



**Michael Pagliais** is the Chief Operating Officer of Florida Express Environmental (Ocala, FL). Following in his father and grandfather's footsteps, he has been involved in the recycling

and environmental waste services since a young age. Beginning as a part time summer employee for his father's garbage collection company in Rockland County, NY, Michael soon realized that his future was in Environmental Services. Since 1974, Michael, alongside his brother, John Paglia Jr., have owned and operated recycling, solid and liquid waste companies throughout the Southeastern U.S. At age 23, Michael served as Regional Sales Manager for Waste Management of Florida, where he held that post for three years. After selling their recycling company to Commercial Metals Company, he stayed on board and became one of the youngest managers in Commercial Metals. For three years, Michael spearheaded projects in South Florida such as assisting Miami and the City of Homestead with the cleanup of Hurricane Andrew, worked overseas in Russia, Ukraine and the Caribbean as a metals trader. After four years with Commercial Metals, Michael and his brother, John, formed United Sanitation, a regional recycling, solid and liquid waste Company in North Central Florida. In 1996, United Sanitation merged with GeoWaste, a public company, providing solid waste services in North Florida and Southern Georgia. Soon after, Michael became Vice President and served on their Board of Directors for three years when it was merged into Superior Services. In 2000, Michael and John started SunStar Transport and Florida Express Environmental. Florida Express has grown into a regional solid and liquid waste company with a fleet of 40 trucks, two landfills and a recycling facility.



**Larry Wyluda** is currently the CEO of Newport Environmental Technologies. Newport is the Master Distributor for SuperNova's "green" technologies and is responsible for all sales,

branding and distribution in North America. Larry has spent 33 years in the commercial finance industry focused primarily in the transportation and environmental markets. His experience ranges from sales and marketing to operations with P&L responsibilities. He managed the Southern California Branch of Associates Commercial Corp. and grew their net receivable portfolio from \$250 million to nearly \$500 million in less than five years. The Branch, through a network of direct sales representatives, sourced volume from end users, dealers and OEMs. Subsequent to Associates, Larry opened an office for Financial Federal Credit to service the West Coast transportation and environmental industries. He also developed the West Coast markets for the Equipment Finance Group of ORIX out of Kennesaw, GA. Since 2004, Larry has owned and operated The Stephens Company (TSC). TSC provides a range of financial services to end-users nationally. Financial products include: equipment financing, project financing, M&A, lines of credit, private label financing and real estate financing. Deal size ranges from \$50,000 to \$100 million.



**Marc Rogoff** is a Senior Consultant with Geosyntec Consultants and serves as a leading practitioner in their Solid Waste Advisory Service. Based in Tampa, Florida, he also serves on the

Executive Committee of the Solid Waste Association of North America (SWANA). Marc can be reached at (813) 810-5547 or via e-mail at [mrogoff@geosyntec.com](mailto:mrogoff@geosyntec.com).

# Developing a Master Plan for the City of Kirkwood, MO

The City of Kirkwood is always looking at ways to streamline costs and improve services for residents. SCS Engineers was commissioned in 2016 to complete an alternatives analysis to assist the City as they dealt with challenges, including providing cost-effective solid waste services and future management options.

■ By Marc J. Rogoff, Ph.D., William E. Bensing and Anastasia Welsh, P.E.

Kirkwood is an inner-ring suburb of St. Louis. Founded in 1853, the City was the first planned suburb located west of the Mississippi River. Kirkwood was also the first St. Louis-area municipality to provide sanitation services to its residents in 1953 with the purchase of three 13-cubic yard, rear-loader trash trucks. The City has one of the longest running recycling drop-off centers in the State of Missouri: the Francis Scheidegger Recycling Depository, which was constructed in 1971.

SCS Engineers was commissioned in 2016 to complete an alternatives analysis to assist the City as they dealt with challenges, including providing cost-effective solid waste services and future management options.

### Solid Waste System

Residential solid waste collection services are provided by the City for approximately 9,100 single-family residences one day per week, throughout the City. Regular household solid waste is picked up by the City in plastic bags with a limit of five bags per week per residence. Disposal of waste occurs at a privately-owned St. Louis-area landfill.

Curbside, single-stream recycling was implemented City-wide in January 2011. The City has provided one 65-gallon rolling cart to each single-family residence and multiple carts to institutions and businesses to encourage access to recycling. Some customers have been provided with a larger 96-gallon cart upon request. The Division's automated side loaders deposit single-stream recyclables into a

“transfer station” where they are compacted into 30-yard compactor boxes. The compactor boxes are then delivered to a private materials recovery facility.

In Missouri, municipalities are prohibited from disposing of yard waste in landfills. Yard waste includes garden residues, plant debris, grass, leaves, trees or brush clippings. Yard waste is collected in Kraft paper bags, which can be purchased from the City or other retailers. A charge of \$9.25 for five bags or stickers covers the City's cost of both collection and disposal.

The City currently charges residential households \$17.06 per month for solid waste services, inclusive of waste, recycling and yard waste. The fee is charged to cover the costs of collecting, handling, and disposing of the City's solid waste and debris. This fee, initiated April 1, 2005, is included with the combined utility service statement, which also includes charges for water and electric.

Efficiency in operations has allowed the City to continue operation within the \$17.06 rate since 2005 with the use of existing City revenue balances. At the outset of the study, the City expressed an interest in evaluating six future solid waste options and programs to improve overall efficiency and estimate the future residential household fee necessary to cover the costs of the City's solid waste programs. The options or programs that were evaluated are discussed below. A Pro Forma Rate Model was developed in conjunction with the options/programs to determine the direct result on solid waste fees to be charged in order to implement a given option.

### Options and Programs Evaluated

#### *Automated Residential Solid Waste Collection*

The City currently has a manual residential solid waste collection system that includes rear-load trucks. Automated collection using rolling carts would be one of the major options to improve cost efficiency. While the capital costs are generally high, the increased productivity and cost savings in most communities from implementing an automated collection program will generally offset the differences in capital costs between rear-loader and automated programs over time. Savings are also produced from labor-related costs, including lower worker's compensation costs, reduced health insurance rates and lower staff turnover. Ancillary benefits that are often difficult to quantify include reduced wear and tear on streets and reduced air emissions due to shorter truck operation times.



Kirkwood encourages recycling through public education.

## Developing a Master Plan for the City of Kirkwood, MO

Kirkwood was one of the first cities in St Louis to offer recycling services.  
Photos courtesy of SCS Engineers.

SCS was asked to conduct a financial analysis of automated residential solid waste collection. The Pro-Forma model estimated that the City could reduce costs by an estimated \$3.76 per month. Cost savings are gained in labor, benefits, equipment and supplies. Full conversion to an automated collection program is projected to result in a cumulative savings for the Department of \$453,502 annually in 2016.

### *Elimination of Commercial Solid Waste Collection*

The Division currently competes with the private sector in providing commercial solid waste collection services within the City. In 2015, the Council passed an ordinance requiring all residential and commercial solid waste customers to use the Division's services. However, the Council has since modified the ordinance to eliminate mandatory commercial waste service. Based on SCS's "windshield survey" at the beginning of the project, it appears the Division provides services to about 40 to 50 percent of the potential commercial customer base. Private waste haulers annually submit a license fee to the City, with the \$200 fee being the only revenues received by the City from commercial haulers.

While most municipalities operate commercial waste collection programs with the objective of providing a subsidy for residential collection programs and other solid waste related services, the opposite is currently in effect in Kirkwood. The City services commercial accounts with rear-loaders rather than more efficient front-loader vehicles, which are the industry standard for commercial waste collection. Furthermore, there is a lack of economy of scale since only a limited number of commercial accounts are currently held by the City.

It was determined that these operational inefficiencies, combined with the uncompensated wear and tear on City street pavements by private commercial haulers, essentially resulted in a subsidy from residential customers to the less efficient commercial solid waste collection services.

### *Recycling and Transfer Station Operations*

The City currently delivers residential recyclables into a transfer station where a Bobcat is used, along with two employees, to feed recyclables into a compactor. This requires a "double handling" of the recyclable materials and increases the costs of the recycling program. SCS determined that the simple incorporation of a hopper and conveying system could eliminate double handling, increase efficiency of the system and potentially reduce City labor costs.

### *Recycling Incentives*

Because recycling rates have been fairly flat over the past five years, a variety of options were evaluated to increase diversion. These include the following:

- Opportunities to minimize contamination in the recycling waste stream.
- Improvements that could be made to public outreach.
- Offering route-based incentives such as those offered by Recycle Bank.
- SCS provided background to the City regarding different strategies for increasing diversion in a market with established recycling programs. The City will use this information in the future to make decisions about outreach, education and recycling program changes.



### *Route Optimization and Advanced Electronics*

Routing software is used by both private and municipal operations to optimize solid waste collection routing and assist managers in monitoring the performance of their solid waste collection fleets and personnel. The decision to purchase or use a routing software application must be carefully considered. Since equipment costs, labor and fuel are significant operating expenses for waste collection operations, reducing the number of routes, labor hours and mileage through route optimization is a critical and straightforward approach to increasing efficiency and reducing costs. However, waste routing software is typically complex to implement and has a high rate of failed implementations by municipalities. Typical complaints we have heard include that the software is too complicated to be adopted into daily operations, it is too expensive to purchase outright or procure through a monthly service fee, or the system maintenance requirements are too extensive.

Point-to-point routing software is an alternative that is used when the daily delivery locations, or in the case of solid waste, daily collection of bulky waste, might vary. No one application on the market can handle all types of waste routing effectively. Each program uses various routing techniques and algorithms, graphical information system (GIS) applications, automatic vehicle location technologies, and on-route mapping and monitoring. Multiple applications sometimes need to be implemented to service all types of waste collection routing required of a given solid waste system.

The use of enhanced electronics is another emerging trend for solid waste collection. In recent years, many agencies have installed cameras on the outside of the residential collection vehicles to help improve safety. DVD recorders have also been installed to track backup and potential safety issues. This equipment provides an additional pair of eyes for drivers and has proven beneficial in improving safety. SCS provided background to the City regarding route optimization and emerging technologies for potential future evaluation.

### *Incentive Pay*

To increase efficiencies, many local governments have implemented programs to improve crew productivity through development of special pay structures and "gainsharing" initiatives. Most public collection systems use an incentive or "task pay" system, whereby each crew is assigned to a specific route with a fixed number of stops each day. Under this type of program, the crew is given the incentive to complete the route as quickly as possible, while at the same time ensuring that all stops are collected for that route.

Increasingly, the public sector is moving away from the incentive or task pay system towards work strategies that require more work from each crew to keep collection costs more in line with that of private haulers. To overcome the challenges of working quicker and faster, local governments are providing gain-sharing bonuses, absenteeism and safety incentives, and route/vehicle selection initiatives to individual employees or crews based on achieving a defined budget or efficiency goal. SCS evaluated the City's incentive pay strategy and recommended alternatives, taking into account financial impacts of the incentive options.

### **Construction and Demolition Debris Hauling**

Roll-off service is generally viewed as a revenue producer for waste collection programs in the solid waste industry. With significant revenue potential, many public agencies have entered this private sector marketplace in recent years as a way to shore up revenue base and provide extra income for supplemental environmental programs such as household hazardous waste collection and public education.

The City offers roll-off service for C&D waste to some customers, albeit limited at this time. The City only operates one roll-off vehicle and owns eight large (2, 4, 6 and 30 cubic yards) roll-offs for residential and commercial accounts. Many of the larger commercial generators of solid waste in the City use larger roll-off containers (10, 20 and 40 cubic yards) to dispose of their C&D debris. These commercial accounts have been historically serviced by private solid waste haulers. SCS evaluated the City's roll-off service and how to improve its operations and financial performance in light of the private solid waste hauler competition.

### **Pro Forma Rate Model**

A Pro Forma Rate Model was developed with the above options/programs incorporated into it to determine the direct result on solid waste fees to be charged in order to implement a given option. City staff provided background data and information concerning residential collection revenues and operating expenses.

The Pro Forma Model is a Microsoft Excel™ spreadsheet-based model that includes the following facets:

- An analysis of operational expenditures (personnel, contract and purchased services, materials and supplies, transfers).
- Analysis of capital outlays (equipment replacement and capital projects).
- Revenue sufficiency analysis (annual revenue projections and rate plan to provide sufficient revenues).
- Funds analysis (reserve requirements, transfers to general fund, administrative costs, beginning and ending fund balances).

Individual spreadsheets containing the data and information provided by the City were linked to develop an overall model to conduct the rate and assessment analysis. The following methodology was used by SCS to conduct the initial phase of the cost of service analysis:

- Collect Historical Actual Expenses and Revenues for the City System—Gather available historical actual revenue and cost data to input into financial database.
- Develop the “Test Year”—Develop an annual revenue requirement for a “Test Year”. The revenue requirement represents the total revenue necessary for the solid waste system to recover during a year to fund all

system costs. SCS worked with City staff to select a period that reflected a typical year for the System. Actual expenses for FY 16/17 were used as the basis of the Test Year for the Study.

- Develop a Revenue Requirement Projection—After developing the revenue requirement for the Test Year, SCS worked with City staff to project changes in anticipated costs due to inflation, labor increases, facility and vehicle maintenance, planning costs, etc. This resulted in a five-year revenue requirement forecast for the entire sanitation program including collection, recycling and disposal of solid waste.
- Develop Revenue Offsets—SCS worked with City staff to develop estimates of the sales of recyclables, and additional revenues from yard waste and bulky waste collection.
- Determine Number of Customer Units—SCS worked with City staff to determine the number of customers being serviced by the City.
- Calculate Monthly Customer Service Fee—SCS then distributed the revenue needs across the proper billing units to estimate the necessary monthly customer fee to cover the cost of service.

The resulting Test Year model was used as the basis for forecasting expenses for FY 16/17 through FY 20/21. In order to develop the forecast, SCS projected how costs would change over the forecast period due to factors such as inflation. The assumptions used to develop the forecast include a 2.3 percent annual increase for general, salary, medical insurance and other benefits, and fuel, while solid waste and customer growth were assumed to be zero percent. A solid waste tipping fee of \$44 a ton was used. In addition to forecasting cost increases due to inflation, etc., SCS accounted for capital improvements, customer account growth and solid waste generation changes over the five-year forecast period.

### **Rate Scenarios**

A total of six Rate Model scenarios were developed to evaluate the impact of changes to the Solid Waste System. This information was used when presenting potential changes or programs for consideration.

### **Current Status**

The City of Kirkwood is always looking at ways to streamline costs and improve services for residents. Recently the City discontinued commercial sanitation services in an effort to maintain a viable residential solid waste collection program. The City continues to assess the residential sanitation program with the goal of ensuring sustainable service to residents. This could mean a rate increase, which would be the first increase in more than 10 years, or it could mean automation, service reduction, or outsourcing sanitation services. The City will be looking at all options in the effort to continue to provide excellent sanitation service to residents at a reasonable rate. | **WA**

*Marc J. Rogoff is a Project Director with SCS Engineers and is the firm's National Expert in Solid Waste Rate Analysis. He can be reached at (813) 804-6729 or via e-mail at mrogoff@scsengineers.com;*

*William Bensing is Director of Public Services for the City of Kirkwood, MO. He can be reached at (314) 822-5846 or via e-mail at bensinwe@kirkwood.org.*

*Anastasia Welch is a Vice President with SCS Engineers. She is the manager of the firm's Central Division solid waste practice. She can be reached at (913) 681-0030 or via e-mail at awelch@scsengineers.com.*



***"Less Waste, Better Lives"***  
***Proposal for Developing Baltimore City's Recycling and  
Solid Waste Management Master Plan***

## **ATTACHMENT**

Budget Estimate Calculations

(see separate MS Excel spreadsheet)

**BUDGET ESTIMATE**

**Recycling and Solid Waste Management Master Plan  
Baltimore City, Maryland  
Northeast Maryland Waste Disposal Authority**

Description		Cost
<b>Task 0</b>	<b>Four-Season Waste Sort</b>	<b>\$ 110,691</b>
<b>Task 1</b>	<b>Stakeholder Engagement Plan and Execution</b>	<b>\$ 38,675</b>
<b>Task 2</b>	<b>Develop/Maintain Website Contents and Branding Assistance</b>	<b>\$ 35,060</b>
<b>Task 3</b>	<b>Comprehensive Description of the Existing System</b>	<b>\$ 37,944</b>
<b>Task 4</b>	<b>Benchmarking</b>	<b>\$ 37,708</b>
<b>Task 5</b>	<b>Improvements to Current Diversion/Recycling System</b>	<b>\$ 40,887</b>
<b>Task 6</b>	<b>Report on Previous Tasks</b>	<b>\$ 14,775</b>
<b>Task 7</b>	<b>Develop Options for "What's Left"</b>	<b>\$ 68,860</b>
<b>Task 8</b>	<b>Draft Master Plan for Public Review</b>	<b>\$ 25,697</b>
<b>Task 9</b>	<b>Final Master Plan</b>	<b>\$ 16,020</b>
<b>Task 10</b>	<b>Presentation of the Master Plan</b>	<b>\$ 13,192</b>
	<b>TOTAL</b>	<b>\$ 439,508</b>

**Rates**

Professional Category	Hourly Rate
Principal	\$ 205
Project Manager	\$ 190
Senior Professional	\$ 170
Project Professional	\$ 142
Staff Professional	\$ 105
Clerical	\$ 64
Senior Technician	\$ 95
Staff Technician	\$ 87

**Fees**

Mark-up on Direct Costs	0%
Mark-up on Subcontractor Costs	0%
Mileage (2018 IRS Rate)	\$ 0.545
Photocopies (per page)	\$ 0.08

Note: Rates are consistent with first year of the 2017-2019 on-call services agreement with the Northeast Maryland Waste Disposal Authority

**Task 0**  
**Four-Season Waste Sort**  
**Recycling and Solid Waste Management Master Plan**  
**Baltimore City, Maryland**  
**Northeast Maryland Waste Disposal Authority**

**Cost Breakdown:**

Labor	Rate	Units	Hours	Fee	Expenses	Rate	Units	Quantity	Fee
Principal	\$ 205	Hrs.	0	\$ -	Sub: 2nd Chance Staff	\$ 50	hour	1100	\$ 55,000
Project Manager	\$ 190	Hrs.	36	\$ 6,840	Sub: Mark Foster (2nd Chance)	\$ 1,000	LS		\$ 1,000
Senior Professional	\$ 170	Hrs.	76	\$ 12,920					
Project Professional	\$ 142	Hrs.	56	\$ 7,952	Mileage	\$ 0.545	mile	2200	\$ 1,199
Staff Professional	\$ 105	Hrs.	236	\$ 24,780	PPE	\$ 1,000	LS		\$ 1,000
Clerical	\$ 64	Hrs.	0	\$ -					
Senior Technician	\$ 95	Hrs.	0	\$ -					
Staff Technician	\$ 87	Hrs.	0	\$ -					
<b>Total Direct Labor</b>				<b>\$ 52,492</b>				<b>Direct Expenses</b>	<b>\$ 58,199</b>

**TOTAL TASK \$ 110,691**

**Labor Breakdown:**

Subtasks	PRINC.	PM	SR PROF	PR PROF	ST PROF	CLERIC	SR TECH	ST TECH	TOTAL
KO Meeting and Site Visits		6	6						12
Develop Work Plan		2	8		24				34
Meeting to Review and Finalize Work Plan		2	2	4					8
Conduct 1st Waste Sort (Summer 2018)			10	10	40				60
Conduct 2nd Waste Sort (Fall 2018)			10	10	40				60
Conduct 3rd Waste Sort (Winter 2018/2019)			10	10	40				60
Conduct 4th Waste Sort (Spring 2019)			10	10	40				60
Statistical Analysis of Data		2		4	24				30
Summary Report - Draft 1		4	8	8	20				40
Meeting and Response to Comments 1		2	2						4
Summary Report - Draft 2			4		4				8
Conf. Call and Response to Comments 2		2	2						4
Final Summary Report			4		4				
Project Management		16							16
<b>Total Hours</b>	<b>0</b>	<b>36</b>	<b>76</b>	<b>56</b>	<b>236</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>396</b>

**Senior Personnel (from Org Chart):**

Jeremy Morris		36	
Tom Ramsey			
Marc Rogoff			
Bill Gaffigan			
Mike Hansen			76

<b>Total</b>	<b>0</b>	<b>36</b>	<b>76</b>
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**Task 1**  
**Stakeholder Engagement Plan and Execution**  
**Recycling and Solid Waste Management Master Plan**  
**Baltimore City, Maryland**  
**Northeast Maryland Waste Disposal Authority**

**Cost Breakdown:**

Labor	Rate	Units	Hours	Fee		Expenses	Rate*	Units	Quantity	Fee
Principal	\$ 205	Hrs.	8	\$ 1,640		Sub: Nexight Group	\$ 106	hour	300	\$ 31,800
Project Manager	\$ 190	Hrs.	22	\$ 4,180		Sub: Mark Foster (2nd Chance)	\$ 1,000	LS		\$ 1,000
Senior Professional	\$ 170	Hrs.	0	\$ -						
Project Professional	\$ 142	Hrs.	0	\$ -		Mileage	\$ 0.545	mile	100	\$ 55
Staff Professional	\$ 105	Hrs.	0	\$ -						
Clerical	\$ 64	Hrs.	0	\$ -						
Senior Technician	\$ 95	Hrs.	0	\$ -						
Staff Technician	\$ 87	Hrs.	0	\$ -						
<b>Total Direct Labor</b>				<b>\$ 5,820</b>					<b>Direct Expenses</b>	<b>\$ 32,855</b>

\* Nexight rate is average billing rate across all professional labor categories

**TOTAL TASK \$ 38,675**

**Labor Breakdown:**

Subtasks	PRINC.	PM	SR PROF	PR PROF	ST PROF	CLERIC	SR TECH	ST TECH	TOTAL
Develop SEP (incl. Meetings/Calls)		4							4
Attend Stakeholder Meetings	8	8							16
Project Management		10							
<b>Total Hours</b>	<b>8</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>

**Senior Personnel (from Org Chart):**

Jeremy Morris		22
Tom Ramsey	8	
Marc Rogoff		
Bill Gaffigan		
<b>Total</b>	<b>8</b>	<b>22</b>

**Task 2  
Develop/Maintain Website Contents and Branding Assistance**

**Recycling and Solid Waste Management Master Plan  
Baltimore City, Maryland  
Northeast Maryland Waste Disposal Authority**

**Cost Breakdown:**

Labor	Rate	Units	Hours	Fee		Expenses	Rate*	Units	Quantity	Fee
Principal	\$ 205	Hrs.	0	\$ -		Sub: Nexight Group	\$ 106	hour	320	\$ 33,920
Project Manager	\$ 190	Hrs.	6	\$ 1,140						
Senior Professional	\$ 170	Hrs.	0	\$ -						
Project Professional	\$ 142	Hrs.	0	\$ -		Mileage	\$ 0.545	mile		\$ -
Staff Professional	\$ 105	Hrs.	0	\$ -						
Clerical	\$ 64	Hrs.	0	\$ -						
Senior Technician	\$ 95	Hrs.	0	\$ -						
Staff Technician	\$ 87	Hrs.	0	\$ -						
<b>Total Direct Labor</b>				<b>\$ 1,140</b>		<b>Direct Expenses</b>				<b>\$ 33,920</b>

\* Nexight rate is average billing rate across all professional labor categories

**TOTAL TASK \$ 35,060**

**Labor Breakdown:**

Subtasks	PRINC.	PM	SR PROF	PR PROF	ST PROF	CLERIC	SR TECH	ST TECH	TOTAL
Attend conference calls - Task 2a		4							4
Attend conference calls - Task 2b		2							2
<b>Total Hours</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>

**Senior Personnel (from Org Chart):**

Jeremy Morris		6
Tom Ramsey		
Marc Rogoff		
Bill Gaffigan		
<b>Total</b>	<b>0</b>	<b>6</b>



**Task 4  
Benchmarking**

**Recycling and Solid Waste Management Master Plan  
Baltimore City, Maryland  
Northeast Maryland Waste Disposal Authority**

**Cost Breakdown:**

Labor	Rate	Units	Hours	Fee	Expenses	Rate	Units	Quantity	Fee
Principal	\$ 205	Hrs.	76	\$ 15,580	Sub: None				\$ -
Project Manager	\$ 190	Hrs.	30	\$ 5,700					
Senior Professional	\$ 170	Hrs.	0	\$ -					
Project Professional	\$ 142	Hrs.	24	\$ 3,408	Mileage	\$ 0.545	mile		\$ -
Staff Professional	\$ 105	Hrs.	124	\$ 13,020					
Clerical	\$ 64	Hrs.	0	\$ -					
Senior Technician	\$ 95	Hrs.	0	\$ -					
Staff Technician	\$ 87	Hrs.	0	\$ -					
<b>Total Direct Labor</b>				<b>\$ 37,708</b>				<b>Direct Expenses</b>	<b>\$ -</b>

**TOTAL TASK \$ 37,708**

**Labor Breakdown:**

Subtasks	PRINC.	PM	SR PROF	PR PROF	ST PROF	CLERIC	SR TECH	ST TECH	TOTAL
Benchmarking Study (5 jurisdictions)	36			24	60				120
Summary Report - Draft 1	16	8			16				40
Conf. Call and Response to Comments 1	8	4			12				24
Summary Report - Draft 2	8	2			16				26
Conf. Call and Response to Comments 2	4	2			8				14
Final Summary Report	4	2			12				18
Project Management		12							12
<b>Total Hours</b>	<b>76</b>	<b>30</b>	<b>0</b>	<b>24</b>	<b>124</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>254</b>

**OPTIONAL ADDITIONAL BENCHMARKING**

Subtasks	PRINC.	PM	SR PROF	PR PROF	ST PROF	CLERIC	SR TECH	ST TECH	HOURS	TOTAL
Benchmarking Study (per jurisdiction; optional)	8	1		4	12				25	\$ 3,658

**Senior Personnel (from Org Chart):**

Jeremy Morris		30
Tom Ramsey		
Marc Rogoff	38	
Bill Gaffigan	38	
<b>Total</b>	<b>76</b>	<b>30</b>









**Task 9**  
**Final Master Plan**  
**Recycling and Solid Waste Management Master Plan**  
**Baltimore City, Maryland**  
**Northeast Maryland Waste Disposal Authority**

**Cost Breakdown:**

Labor	Rate	Units	Hours	Fee	Expenses	Rate	Units	Quantity	Fee
Principal	\$ 205	Hrs.	12	\$ 2,460	Sub: None				\$ -
Project Manager	\$ 190	Hrs.	36	\$ 6,840					
Senior Professional	\$ 170	Hrs.	0	\$ -					
Project Professional	\$ 142	Hrs.	0	\$ -	Mileage	\$ 0.545	mile		\$ -
Staff Professional	\$ 105	Hrs.	64	\$ 6,720					
Clerical	\$ 64	Hrs.	0	\$ -					
Senior Technician	\$ 95	Hrs.	0	\$ -					
Staff Technician	\$ 87	Hrs.	0	\$ -					
<b>Total Direct Labor</b>				<b>\$ 16,020</b>	<b>Direct Expenses</b>				<b>\$ -</b>

**TOTAL TASK \$ 16,020**

**Labor Breakdown:**

Subtasks	PRINC.	PM	SR PROF	PR PROF	ST PROF	CLERIC	SR TECH	ST TECH	TOTAL
Prepare Draft Master Plan	4	16			40				60
Conf. Call and Response to Comments 1	2	2							4
Prepare Final Master Plan	2	8			16				26
Conf. Call and Response to Comments 2	2	2							4
Submit Final Master Plan	2	4			8				14
Project Management		4							4
<b>Total Hours</b>	<b>12</b>	<b>36</b>	<b>0</b>	<b>0</b>	<b>64</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>112</b>

**Senior Personnel (from Org Chart):**

Jeremy Morris		36
Tom Ramsey	4	
Marc Rogoff	4	
Bill Gaffigan	4	
<b>Total</b>	<b>12</b>	<b>36</b>

**Task 10**  
**Presentation of the Master Plan**  
**Recycling and Solid Waste Management Master Plan**  
**Baltimore City, Maryland**  
**Northeast Maryland Waste Disposal Authority**

**Cost Breakdown:**

Labor	Rate	Units	Hours	Fee	Expenses	Rate	Units	Quantity	Fee
Principal	\$ 205	Hrs.	14	\$ 2,870	Sub: None				\$ -
Project Manager	\$ 190	Hrs.	34	\$ 6,460					
Senior Professional	\$ 170	Hrs.	0	\$ -					
Project Professional	\$ 142	Hrs.	0	\$ -	Mileage	\$ 0.545	mile	150	\$ 82
Staff Professional	\$ 105	Hrs.	36	\$ 3,780					
Clerical	\$ 64	Hrs.	0	\$ -					
Senior Technician	\$ 95	Hrs.	0	\$ -					
Staff Technician	\$ 87	Hrs.	0	\$ -					
<b>Total Direct Labor</b>				<b>\$ 13,110</b>	<b>Direct Expenses</b>				<b>\$ 82</b>

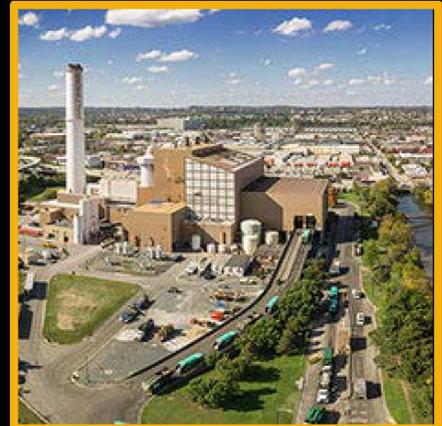
**TOTAL TASK \$ 13,192**

**Labor Breakdown:**

Subtasks	PRINC.	PM	SR PROF	PR PROF	ST PROF	CLERIC	SR TECH	ST TECH	TOTAL
Prepare Draft Presentation		12			20				32
Review 1, Revise Presentation	2	4			8				14
Review 2, Revise Presentation	2	4			8				14
Presentation to Mayor (incl. Practice)	6	6							12
Review 3, Finalize Presentation		4							4
Final Presentation to City Council	4	4							8
<b>Total Hours</b>	<b>14</b>	<b>34</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>84</b>

**Senior Personnel (from Org Chart):**

Jeremy Morris		34
Tom Ramsey	14	
Marc Rogoff		
Bill Gaffigan		
<b>Total</b>	<b>14</b>	<b>34</b>



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