Proposal for

WASTE CHARACTERIZATION STUDY

November 1, 2024

Submitted by:

MSW CONSULTANTS

This proposal was delivered electronically. If it is necessary to print a hard copy,
please use recycled-content/FSC-certified paper and recycle when no longer needed.

November 1, 2024

Ms. Jordan Lane, Deputy Director
San Luis Obispo County IWMA
870 Osos Street
San Luis Obispo, CA 93401

Subject: Proposal for Waste Characterization Study

Dear Ms. Lane:

MidAtlantic Solid Waste Consultants is pleased to submit a proposal to the San Luis Obispo County Integrated Waste Management Authority to quantify and characterize municipal solid waste (MSW), delivered to the selected County landfill & transfer station sites by participating municipalities and private haulers.

MidAtlantic Solid Waste Consultants is a national leader in planning and conducting statistically robust, technically accurate waste stream analyses for cities, counties, and state agencies. In the past five years alone, MSW Consultants has performed numerous waste characterization studies across the country, including California, Colorado, Florida, Georgia, Kentucky, Maryland, Massachusetts, Missouri, Nebraska, New York, Ohio, Pennsylvania, Texas, and Vermont. Projects are currently underway in New Hampshire, South Carolina, and Utah as well. In California, we have been on teams for completing statewide waste characterization studies and the MRF recycling study as well as completing studies smaller in focus.

We achieve high efficiency through deployment of experienced professional field operations teams who use our proprietary, customized mobile data collection system with built-in QA/QC capabilities. Our staffing approach and data management technology also increase the accuracy of our field data collection efforts and allow field data to be uploaded to the cloud for added protection against loss of data. We are the only consultant offering our clients online access to their waste characterization results, pictures, and recommendations through our the *WasteInsight*™ online portal, in addition to a customary project report.

Full details are contained in our proposal. Please do not hesitate to contact me at (407) 380-8951 or jculbertson@mswconsultants.com if you have any questions. Thank you for your consideration.

Sincerely,

MIDATLANTIC SOLID WASTE CONSULTANTS, LLC (MSW Consultants)

John Culbertson
Principal

This page is intentionally left blank.

Waste Characterization Study

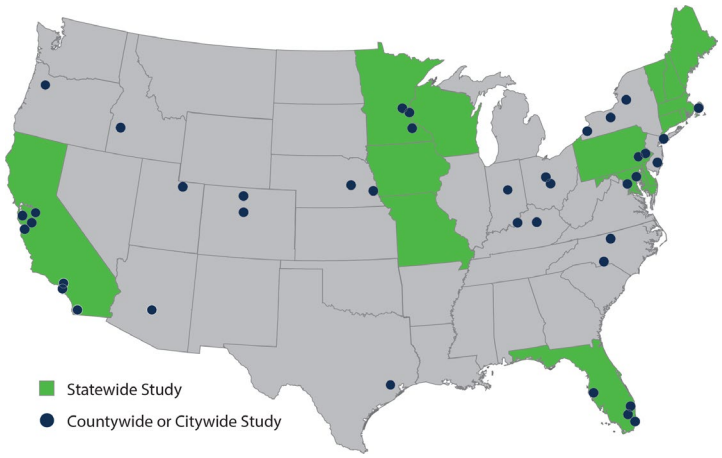
Table of Contents

This page is intentionally left blank.

INTRODUCTION

MSW Consultants is a leading national provider of large-scale, multi-season, multi-stream waste characterization services for state agencies, counties, cities, and large institutional and commercial waste generators. MSW Consultants has participated in the majority of the statewide waste characterization studies performed in the U.S. over the past ten years and has assisted major U.S. cities and counties to characterize their waste and recycling streams in the pursuit of increased diversion and an assessment of current recycling program effectiveness. We are increasingly assisting recycling processors, facility developers, and specialty equipment manufacturers to design sampling and sorting methodologies needed to answer increasingly complex questions about materials streams in the pursuit of zero waste. The map shown below presents MSW Consultants' extensive experience in designing and implementing waste characterization studies.

MSW Consultants provides an unparalleled value in the performance of waste characterization studies. Our experience offers clients a host of benefits, including:



An understanding of the reasons why local governments opts to perform waste stream analyses. The County's proposed study will quantify the characteristics of the disposed wastes throughout the county. In so doing, the results of the study will inform all facets of waste diversion planning, including how to influence and improve diversion behaviors, as well as how to take advantage of emerging energy recovery and mechanical processing technologies for back-end recovery.

A commitment to health and safety. MSW Consultants maintains a customized, written Safety and Health Plan specifically to govern our operational practices and PPE requirements for the performance of waste characterization studies and waste audits. Our health and safety program for waste characterization studies at landfills, waste-to-energy plants, transfer stations and MRFs has been independently certified through ISNetworld.

A detailed understanding of the markets and specifications for recycled fibers, containers, and other materials that can be recovered from the waste stream. This leads to a keen understanding of the basis for material category definitions that achieve the desired specifications.

Accurate and efficient sorting procedures with professional sorting support. MSW Consultants has developed the industry's most transparent and verifiable system for achieving highly accurate results. We typically deploy professional sorters in conjunction with our professional management staff, supplementing with locally recruited staff where necessary. Our protocol trains sorters to place materials into clearly labeled bins, which are monitored by our crew chiefs for accuracy throughout the study.

Real-Time app-based data management: MSW Consultants has developed the industry's leading apps for waste characterization data entry and management. Armed with rugged tablet computers,

our field operation staff have the benefit of a suite of data entry tools that provide real-time QA/QC for both manually sorted and visually surveyed samples.

Specialized data management. MSW Consultants has developed its *WasteInsight™* online resource to provide user-friendly, organized access to material stream characterization data, including sample weights and photographs. It also allows clients to generate and download composition results filtered by location, date, material stream, and other attributes. The exhibit below portrays the workflow when using *WasteInsight™* to track material quality and value on an ongoing basis.

ABOUT THE FIRM

MSW Consultants is a specialized management consulting company with waste and recycling expertise. Our key staff have over 100 years combined experience providing solid waste management and planning services, recycling assessments, collection system assessments, productivity/route analysis, cost-of-service/rates development, waste composition and diversion studies, procurement services, and program implementation for public and private clients across the Nation. MSW Consultants is headquartered in Orlando, Florida. The firm's client base includes over 125 city, county, state, federal and private organizations. We have 12 full-time and 7 part-time staff and an extended network of technical specialists. MSW Consultants' technical areas of expertise are summarized below:

Program Collection System Optimization

- Refuse, recycling, yard waste & bulky waste productivity analysis and improvement
- Automated & single-stream collection conversion
- Front-load & roll-off efficiency analysis & rates
- GPS, event tracking, RFID, onboard data collection
- Route development/balancing & area/path re-routing
- Regional materials management assessment & program development to increase capture rates

Collection, Disposal & Recycling Procurement Service

- Curbside/drop-off waste, recycling, yard waste service
- Special collections: tires, scrap, HHW, C&D
- Contract/franchise system analysis
- Disposal and facility operations procurement assistance
- Managed competition/contract leverage
- Contract negotiation assistance

Plans: Waste/Recycling/Strategic/Sustainability

- SWMPs
- Zero Waste and Waste Diversion Plans
- Action Plans
- Strategic Plans
- Education/Outreach Plans
- Materials Management Implementation Plans

Financial Analysis

- Solid waste system full-cost-of-service studies
- Enterprise fund development
- Lifecycle costs
- Grant funding strategy, application & risk
- Facility processing/tip fee analysis
- User fee and non-ad valorem assessment rate

GIS Capabilities

- Store, visualize, analyze, and interpret geographic data & display them as interactive maps
- Data capture with *WasteInsight*™ can be exported & integrated to display in GIS

Waste Characterization & Quality Measurement

- Disposed Waste Audits
- Recyclables Composition/Contamination/Valuation
- Curbside recycling cart/bin monitoring
- Visual contamination assessments
- Bale composition testing
- Specialized Audits: Organics, fines, plastic resins, etc.
- Feedstock testing

Fleet Management

- Fleet replacement planning
- Solid waste vehicle inspections
- Fleet maintenance & fleet procurement
- Per-trip and post-trip program assessment

Recycling/Composting/Organics

- Recycling & Organics system planning
- Residential recycling program implementation
- Single-stream recycling analysis
- Volume-based pricing (Pay-As-You-Throw)
- Yard waste, food collection, diversion, operations & processing

Waste & Recycling Audits

- LEED Certification
- Recycling program improvement
- Capture rate/recycling potential analysis
- Organics diversion programs
- Material and workflow audits
- Recycling, compost & building operations assessments

Florida – Pennsylvania (800) 679-9220 | mswconsultants.com

MATERIAL CHARACTERIZATION EXPERIENCE

The following table itemizes recent waste characterization projects. As shown, we offer extensive experience in assisting cities and counties to perform cost-effective, accurate, statistically representative analyses of their material streams.

MSW Consultants Waste Characterization Project Experience

Client/Year/Project	Client/Year/Project
New Hampshire Department of Environmental Service (Ongoing) Statewide Waste Characterization Study	**Maine Department of Environmental Protection (Ongoing)** Statewide Waste Audit
Utah Department of Environmental Quality (Ongoing) Statewide Waste Characterization Study	**South Carolina Department of Environmental Services (Ongoing)** Statewide Waste Characterization Study
Maryland Department of Environment (Ongoing) Statewide Waste Characterization Study	**Atlantic County Utilities Auhtority (ACUA), NJ** Waste Characterization Study
Vermont Department of Environmental Conservation (2012 , 2024) Statewide Waste Characterization Study Update	**CalRecycle (2024)** Material Recovery Facility Recyclable Material Study
Hamilton County, OH (2024) Residential Waste Characterization Study	**Baltimore County, MD (2023)** Winter Waste Audit
Sims Recycling/New York City Department of Sanitation, NY (2023) Residential Waste Characterization Study	**Prince George's County, MD (2022)** Waste Characterization and Capture Rate Study
City of Minneapolis, MN (2022) Residential Capture Rate Study	**Cleveland Heights & Broadview Heights, OH (2022)** Residential Capture Rate Study
Ontario County, NY (2022) Waste Composition Study	**Big Bend National Park, TX (2021)** Waste Characterization Study
Pennsylvania Department of Environmental Protection (2021) Statewide Waste Characterization Study and MRF Composition Audits	**Delaware Solid Waste Authority/DSM Environmental Services (2021)** Single Stream Recycling Composition Audits
Orange County, FL (Ongoing) Recycling Quality Improv. Program (Cart Monitoring, Material Audits)	**City of Reading, PA (2020)** Residential Waste/Recycling Composition Analysis and Procurement Support
City of Philadelphia, PA (2021) Recycling Container Monitoring Pilot Program	**Ada County, ID (2020)** Landfill Waste Stream Analysis
Sevier Solid Waste, Inc., TN (2020) MSW Feedstock and Compost Composition Study	**Solid Waste Authority of Central Ohio (SWACO), (2019)** Seasonal Waste Characterization Study
Chittenden Solid Waste District, VT (2020) Residential Waste Composition Study	**Summit County, UT (2019)** County Waste and Recycling Composition Study
Boulder County, CO (2019) Waste Characterization Study (MSW and C&D)	

RELATED PROJECT EXPERIENCE & REFERENCES

We offer the following project profiles and references that describe our work in more detail.

Glenwood Springs, CO – Waste Composition Study (2024)

MSW Consultants was retained by the City of Glenwood Springs, Colorado to conduct a waste composition study at the City owned and operated landfill in 2024. This study served as a follow-up to a larger study Glenwood Springs participated in during 2018, in which rural counties were evaluated for their waste diversion potential. The City was interested in repeating this study to gain a better understanding of the inbound composition at their landfill to further improve diversion efforts through their recycling, organics and special waste programs. MSW Consultants sampled from both City and County waste loads to gain a snapshot of the total inbound waste profile at the landfill and provided an analysis of both commercial and residential data.

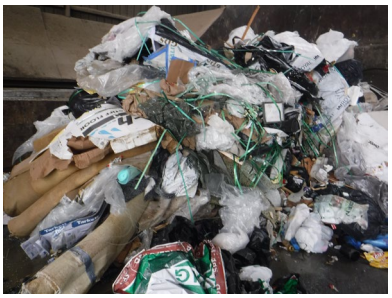
Reference:
Liz Mauro, Landfill Manager
(970) 945-5375| elizabeth.mauro@cogs.us

Key Staff: John Culbertson, Natalee Mannion, Veronica Lenhart, Nick O'Callaghan, David Mann

Vermont Department of Environmental Conservation – Statewide Waste Characterization Study Update (2012, 2018, 2024)

The Vermont Department of Environmental Conservation (DEC) has performed statewide waste composition studies in 2012, 2018 and most recently in 2023. MSW Consultants served as a subcontractor in 2012 and 2018, and primed the 2023 update. Since the 2018 study, Vermont's Universal Recycling law fully banned food scraps from disposal in the trash and the Single-Use Products law banned the use and sale of expanded polystyrene food and beverage containers and regulated the use of plastic carry-out bags, straws, and stirrers. The 2023 Waste Characterization Study incorporated extensive field data collection with results applied to 2022 statewide tonnage data. The study characterized the composition (types and amount) of materials that are generated by Vermonters and destined for disposal in landfills or waste to energy facilities, and generated estimates of hard-to-track diversion of recycling and food scraps from the waste stream and was intended to be comparable to the 2018 Study to maintain comparability in the State's waste composition time series. The 2023 Study included two seasons of MSW hand sorts and C&D visual characterization, residential food scrap and direct-to-broker recycling research and integrated new research objectives including characterization of MRF residue and food scrap transportation management research.

Report link: https://tinyurl.com/VT-WasteComp23



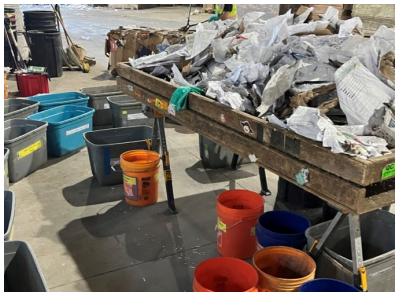
Reference:
Josh Kelly, Solid Waste Program Manager
(802) 522-5897 | josh.kelly@vermont.gov

Key Staff: John Culbertson, Joe Vetrano, Natalee Mannion, David Mann, Cynthia Mormile

CalRecycle, CA – Material Recovery Facility Recyclable Material Study (2023)

MSW Consultants is a project partner on the ongoing California Department of Resources Recycling and Recovery (CalRecycle) project to conduct material characterization studies at material recovery facilities (MRFs) across the state of California. The study was commissioned by CalRecycle as required by Senate Bill (SB) 343 to evaluate how traditional recyclables are collected and processed. In season one of the study, MSW Consultants conducted 10 site visits at MRFs selected by CalRecycle to develop site specific plans for how to collect and sort samples from each processed material outflow and end-of-line residual ejection point.

MSW Consultants then deployed a traveling crew across northern and southern California to conduct a two-day manual sort at each facility. MSW Consultants worked closely with CalRecycle and each facility's staff to collect, photo document and sort samples from the various outflows at each facility. Twenty samples per facility were sorted into 91 material categories to meet the 200-count sample target for season one.



Reference:
Roberta Jetter, Senior Environmental Scientist
(916) 341-6332 | Roberta.Jetter@calrecycle.ca.gov

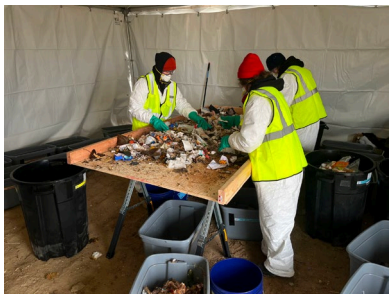
Key Staff: John Culbertson, Natalee Mannion, Carl Muth, Veronica Lenhart, David Mann

City of Greeley, CO – Waste Characterization Study (2023)

Located an hour North of Denver, the City of Greeley is one of the fastest growing communities in the State of Colorado. Currently, the City has no set policy or goals related to waste diversion activities and features an open-market solid waste collection system.

Facing rapid growth in the coming years, the City applied for and received a Front Range Waste Diversion grant to evaluate policy options related to waste diversion within the City. To this end, MSW Consultants was retained to develop and execute a comprehensive waste characterization study to baseline the City's residential waste stream and quantify opportunities for future enhancements to recycling and diversion programs.

MSW Consultants and the City coordinated with local haulers and landfill operations staff to collect and sort samples of residential refuse collected throughout the City. These samples were sorted into 51 material categories. Field operations for this study were divided into two one-week seasons, one taking place in the winter, and the second taking place in the summer. As of this date, the winter season of field operations is complete, with the summer season scheduled for June. Results from both seasons will be compiled in a detailed report analyzing the findings and providing observations. This study will assist in the development of data-backed solid waste policies, goals, and objectives for the City moving forward.



Reference:
Will Jones, Public Works Deputy Director
(970) 350-9751 | will.jones@greeleygov.com

Key Staff: John Culbertson, Carl Muth, Veronica Lenhart, David Mann

Ontario County, NY – Waste Characterization Study (2022)

As part of its Local Solid Waste Management Plan (LSWMP) Ontario County contracted with MSW Consultants to perform a waste characterization study to analyze the waste generated within the County to provide baseline data to guide the diversion, education, and enforcement efforts of the LSWMP. The primary material streams included in the study were refuse collected from Residential Private Haulers, Residential Municipal Haulers, Residential Convenience Centers (Self-Haul) and Industrial/Commercial/Institutional Haulers.

MSW Consultants performed the study over five days at the County's landfill located in the Town of Seneca, New York. MSW Consultants worked with County staff and the landfill's private operator to develop a sampling plan based on tonnage data provided and LSWMP goals. MSW exceeded the 50-sample count target, collecting and sorting 57 refuse samples into 50 material categories. A report detailing the sampling methodology, data analysis of the waste stream composition, and recommendations for program enhancements were provided to the County.

Report Link: https://tinyurl.com/WasteCS



Reference:
Regina Sousa, Ontario County Senior Planner
(585) 396-4453 | Regina.Sousa@ontariocountyny.gov

Key Staff: John Culbertson, Joe Vetrano, Natalee Mannion, David Mann

KEY STAFF QUALIFICATIONS

MSW Consultants offers an experienced team for conducting waste characterization studies made up of waste and recycling industry managers, economists, financial analysts, operations specialists, procurement specialists, and senior planning professionals with background in both the public and private sectors. We are pleased to introduce the following MSW Consultants key staff members who will lead and perform this project. Estimated hours may include proposed time for optional tasks. Full resumes can be provided upon request.

John Culbertson, Principal

Principal-in-Charge

John Culbertson is a Principal of MSW Consultants with a background in solid waste management and recycling planning, financial analysis, procurement, and program optimization. John has 28 years of experience providing waste management consulting services to federal, state, county and city organizations across the nation. He specializes in helping municipalities implement integrated waste management strategies that align policy, education, revenue mechanisms, service contracts, and programs for effective diversion and environmentally sound waste management. A graduate of Yale University, John is a long-time member of the Solid Waste Association of North America (SWANA) and several state recycling associations and is a frequent speaker at national waste management and recycling conferences.

Natalee Mannion, Project Manager

Project Manager/Waste Characterization Specialist

Natalee Mannion has been in the industry for sixteen years, specializing in recycling and diversion program development and implementation; solid waste and zero waste planning; waste characterization analyses; and stormwater management. Having previously worked on the West Coast for both municipal government and private consulting firms, Natalee now works out of the Philadelphia area on behalf of MSW Consultants. She has worked with MSW Consultants for over nine years as an accomplished analyst, working on a large variety of projects related to planning, operational, and financial analysis while specializing in leading the firm's waste characterization studies across the U.S.

Veronica Lenhart, Field Operations Manager

Assistant Project Manager/Waste Characterization Specialist

Veronica is a hardworking professional with 6 years of experience in the waste sector and a proven knowledge of waste diversion that's accompanied by a passion for efficiency improvement, environmental health, and resource allocation. Frequently praised as quality-oriented by peers, she can help your company achieve its sustainability goals. As a field supervisor for MSW Consultants, she is relied upon to execute all studies in the field with an eye for detail that ensures quality data collection for all project needs.

Nick O'Callaghan, Analyst

Data Analysis

Nick provides a wide range of analytics in support of the firm's operational analyses, market research, and system optimization work. Since joining the firm in 2020, he has developed a map-based inventory of the waste market for a northeast state to derive transportation and disposal prices to certain material streams and is currently evaluating collection market opportunities for a large U.S. city. Nick has a Bachelor of Finance degree and will provide financial and data analytics for the project.

David Mann, Director of IT

Data Management

David Mann is the architect of *WasteInsight*™, MSW Consultants' proprietary waste market database, and the Grading and Purity (GAP) System for cloud-based management of material characterization data. He is an expert researcher and manager of data driven solid waste management analysis. As head of the company's Research Division, David manages the *WasteInsight*™ portal with collection and disposal data from the Northeastern states and Florida. A multi-talented information technologist for over 20 years, David is also building cloud-based analytical tools for other MSW Consultants lines of business.

MSW Consultants Supplemental Field Operations Personnel for Waste Characterization Projects

Team Member	Years of Consulting Experience	Prior Waste Characterization Experience	Notes
Nick O'Callaghan Analyst	4	• Waste audit support technician for local field work	• Data analyst with experience in waste composition analysis since joining MSW Consultants in 2021
Carl Muth Project Manager I	7	• Large scale waste characterization experience for New York City and CalRecycle • Assisted on waste audit for large restaurant serving Orlando tourist center on International Drive	• Experience with field data collection and data analysis • Field logistics coordinator for MidAtlantic and Northeast regions

Team Member	Years of Consulting Experience	Prior Waste Characterization Experience	Notes
Zack Griffin Analyst	11	• Operations specialist for four season statewide waste characterization study in Pennsylvania • Lead Crew Chief and sort trainer	• California, Pennsylvania, and Canadian waste sort experience • Sampling manager for New York City residential waste composition study in 2017
Shelly Wilson Crew Chief	2	• Crew chief experience for waste characterization studies in Maryland, Delaware, and Ohio • 1+ year of professional sorting experience	• Served on the mobile sorting team for a Pennsylvania statewide study spanning 12 landfills and 9 MRFs • Performed multiple sorts as crew lead in various states
Charles Wilson Field Technician	2	• Assistant crew chief experience • 1+ year of professional sorting experience	• Served on the mobile sorting team for a Pennsylvania statewide study spanning 12 landfills and 9 MRFs • Performed multiple sorts as crew lead in various states
Steve Deasy Sr. Project Manager	25	• Supported CalRecycle statewide sort in 2018 • Waste characterization lead for firms' National Park Service projects • PA Statewide Waste Composition Volunteer	• Career recycling professional with diverse experience • Recycling technical assistance provider for over 200 Pennsylvania municipalities

TECHNICAL WORK PLAN

Background & Understanding

MSW Consultants has reviewed the RFP and the responses to questions. We understand that the County has a keen interest in monitoring the waste composition for the purposes of tracking the progress of County programs and to understand the impact of State requirements. Such data is critical on multiple levels, and allows the County to:

- Measure the degree to which targeted recyclables are being thrown away and identify the opportunities available through recycling program improvements.
- Measure the prevalence of compostable organic materials in the waste stream and determine how much can be potentially diverted through food donation programs.
- Compare results from the 2021 CalRecycle Waste Characterization Study as a means to track progress in the County's waste reduction goals.

MSW Consultants crafted a baseline approach for data collection and resulting technical memorandum within the stated budget. Additionally, MSW Consultants provides an alternative

approach which would more closely follow the ASTM method of approach which provides greater accuracy of data, at a greater cost.

Project Approach

The RFP provides a detailed, two-season enumeration of the sampling targets for single-family residential, multi-family residential, commercial, and self-haul generator sectors. factoring in the specifications of this RFP along with the county-provided budget constraints, MSW Consultants has developed this approach that seeks to provide the county with the greatest possible utility for the provided budget. MSW Consultants feels this study approach will be sufficient in providing the County with the data it needs to meet its objectives.

Table 1 summarizes our proposed sampling targets: two four-day seasons of waste sort work collecting a total of 80 samples across the key generator sectors.

Table 1 – Potential Sampling Targets

Generator Sector	Season 1	Season 2	Total
Single Family Residential	14	14	28
Multi-Family Residential	5	5	10
Institutional, Commercial, Industrial	18	18	36
Self-Haul	3	3	6
Total	40	40	80

MSW Consultants is prepared to conduct field operations at two different solid waste facilities per season (up to four facilities over the course of the study). As Multi-Family Residential properties are typically collected with commercial property accounts, it will be necessary for the County to coordinate for the collection of specialty routes which only collects from such properties.

If the County desires a greater level of accuracy in its results, MSW Consultants offers a scaled-up option which will collect 100 samples in total, collected over two five-day seasons of waste sort work.

Task 1 – Project Initiation & Study Design

There are multiple tasks that must be accomplished in the planning and initiation phase. In this task, MSW Consultants will:

Participate in a Kick-Off Meeting & Review County Data: MSW Consultants will conduct a kick-off conference call with County staff to initiate the project. We will further submit a request for information needed to develop the sampling plan and review/compile responses.

Waste Generation Research: MSW Consultants will review available data to understand the volumes and delivery schedule of materials generated in San Luis Obispo County and delivered to the landfill. This may entail a review of scale records (if available) as well as municipal facility reports which are in the possession of the County. This research will confirm the sampling targets and distribution of samples across inbound generator types and will also identify which facilities would be best to select for field data collection. At first glance, MSW Consultants considers the following to be possible options:

- Cold Canyon Landfill
- Chicago Grade Landfill

- Paso Robles Landfill
- North County Transfer Station

It will be the responsibility of the County to secure the cooperation of facility management to allow MSW Consultants to perform this study at their site.

Sampling Plan: MSW Consultants will finalize the sampling plan based on input from the County. Our proposed sample targets are shown in the introduction above.

Logistical Coordination: It will be critical to make appropriate arrangements for the personnel and equipment needed to execute the field data collection portion of this project. MSW Consultants will arrange for the experienced staff and provide all sorting equipment (table, bins, carry cans, scales, small tools, and personal protective equipment) needed for the project.

Validate/Refine Material Categories: MSW Consultants offers a similar, though somewhat simplified list which still provides the County with the crucial datapoints (key points of interest such as the food waste categories have been retained). This allows fewer staff to be employed in the sorting of material. MSW Consultants remains open to refining this list to be of the greatest value to the County. This list is still robust enough to allow for comparisons with the previous 2021 CalRecycle Characterization Study.

Table 2 – Potential Material Category List

Group	Material Description
Paper	Corrugated Cardboard/Kraft Paper
	Newspapers/Newspaper Inserts
	White Office-type Paper and Mail
	Magazines and Catalogs
	Aseptic/Gable Top Containers
	Paper/Fiber Food Service Ware
	Mixed Recyclable Paper
	Other Compostable Paper
	Remainder/Composite Paper
Plastic	PETE Beverage Containers - CRV
	PETE Bottles and Jars - Non-CRV
	HDPE Beverage Containers - CRV
	HDPE Bottles and Jars - Non-CRV
	Expanded Polystyrene Packaging
	Plastic Trash Bags
	Plastic Grocery and Other Merchandise Bags
	Other Plastic Film Bags/Wrappers
	Commercial and Industrial Packaging Film
	Rigid Plastic Food Service Ware
	Other Plastic Packaging
	Durable Plastic Items
	Remainder/Composite Plastic
Glass	Glass Bottles and Containers - CRV
	Glass Bottles and Containers - Non-CRV
	Remainder/Composite Glass
Metal	Tin/Steel Cans
	Aluminum Cans - CRV
Organics	Food - Potentially Donatable - Vegetative
	Food - Potentially Donatable - Eggs, Dairy,
	Food - Potentially Donatable - Meat
	Food - Potentially Donatable - Cooked/Baked
	Food - Potentially Donatable - Packaged Non-perishable
	Food - Not Donatable - Meat
	Food - Not Donatable - Non-meat
	Food - Inedible
	Leaves and Grass
	Prunings and Trimmings
	Remainder/Composite Organic
C&D	Clean Dimensional Lumber
	Clean Engineered Wood
	Clean Pallets and Crates
	Treated/Painted/Stained Wood
	Concrete
	Asphalt Roofing
	Gypsum Board
	Carpet
	Rock, Soil and Fines
	Remainder/Composite Inerts and Other
Other	Paint
	Used Oil
	Lead-acid (automotive) batteries
	Other batteries
	Pharmaceuticals
	Remainder/Composite Household Hazardous

Group	Material Description	Group	Material Description
	Aluminum Cans - Non-CRV		Tires
	Major Appliances		Mattresses and Foundations
	Other Ferrous		Bulky Items
	Other Non-Ferrous		Remainder/Composite Special Waste
	Remainder/Composite Metal		Textiles - Cloth and Clothing
	Consumer Electronics and Equipment		Textiles - Shoes, Purses, Belts
			Diapers & Sanitary Products
			Miscellaneous Inorganics
			Mixed Residue

Task 2 – Field Data Collection

STAFFING: MSW Consultants proposes to use its professional staff to manage and supervise all sample retrieval and sorting activities, supported by a combination of professional sorters and local light industrial laborers to conduct actual sorting. The MSW Consultants field data collection team will include the following individuals:

Field Supervisor: MSW Consultants will provide a dedicated Field Supervisor. The Field Supervisor will have lead responsibility for planning each sampling and sorting event, and for the collection of samples. The Field Supervisor will generally lead the sampling selection process and will oversee the physical taking of samples. The Field Supervisor is ultimately responsible for the successful completion of the project.

Sorting Operations Manager: The Sorting Manager will be the second professional staff person. The Sort Manager is responsible for managing the manual sorting area, including crew management, sorting productivity and accuracy, data recording, work site health and safety, and cleaning up at the end of the day.

Professional Sorters: MSW Consultants has cultivated a traveling team of sorters who are deployed to projects when available. We supplement our sorting team with locally recruited personnel. As a last resort, we will team with a local staffing firm to supply the remaining labor. Training and oversight will be provided by the MSW Consultants field operations management staff above. MSW Consultants has proven experience in training and retaining temporary labor in the conduct of waste composition analysis. Our budget assumes that training takes place on the first day of the sort.

FIELD DATA COLLECTION: Accurate characterization of solid waste is a complex and demanding undertaking, which requires precise coordination and planning among team members and rigorous adherence to standards of quality. Our Team's approach to sampling is provided below:

Sample Selection: As stated above, MSW Consultants will request detailed scale data and material quantity data from the County to determine the haulers, truck types, and sources of waste deliveries. The Field Supervisor will ask incoming drivers for basic information which is noted to identify the load. Information from the weight ticket for each vehicle will be obtained for every incoming truck either from the driver, or through communication with the scale house. Once the interview is complete, the Field Supervisor will direct the vehicle to the sampling area.

Taking Samples from Selected Loads: Selected loads of waste designated for sorting will be tipped in the designated area at the landfill (or other facility). MSW Consultants expects that the tipping area will be designated nearby the tipping face, and that it will be possible to erect a tent over the sort

area, if necessary. It is assumed a loader and operator will be dedicated at the landfill to assist with the sampling.[1]

From each selected load, one sample of waste will be selected based on systematic "grabs" from the perimeter of the load. For example, if the tipped pile is viewed from the top as a clock face with 12:00 being the part of the load closest to the front of the truck, the first samples will be taken from 3, 6, 9, and 12 o'clock, and then from 1, 4, 7, and 10 o'clock, and so-on.

Both refuse and recycling samples will be loaded into 35-gallon barrels, pre-weighed to achieve target weight for each sample, and for storage prior to sorting. Each refuse and recycling sample will be labeled by its unique identifying number and digitally photographed.

Sorting: MSW Consultants will provide the sorting equipment, which includes a sorting table, 5-gallon buckets, 18-gallon bins, and 35-gallon barrels for the most prevalent materials (such as Mixed Paper and Contaminated Film/Bags). Sorters are asked to specialize in certain material groups, with someone handling the paper categories, another the plastics, another the glass and metals, and so on. In this way, sorters become highly knowledgeable in a short period of time as to the definitions of individual material categories. The Crew Chief will monitor the bins as each sample is sorted, resorting materials that may be improperly classified. Open bins allow the Crew Chief to see the material at all times. A picture of the sorting table and bins is shown below.

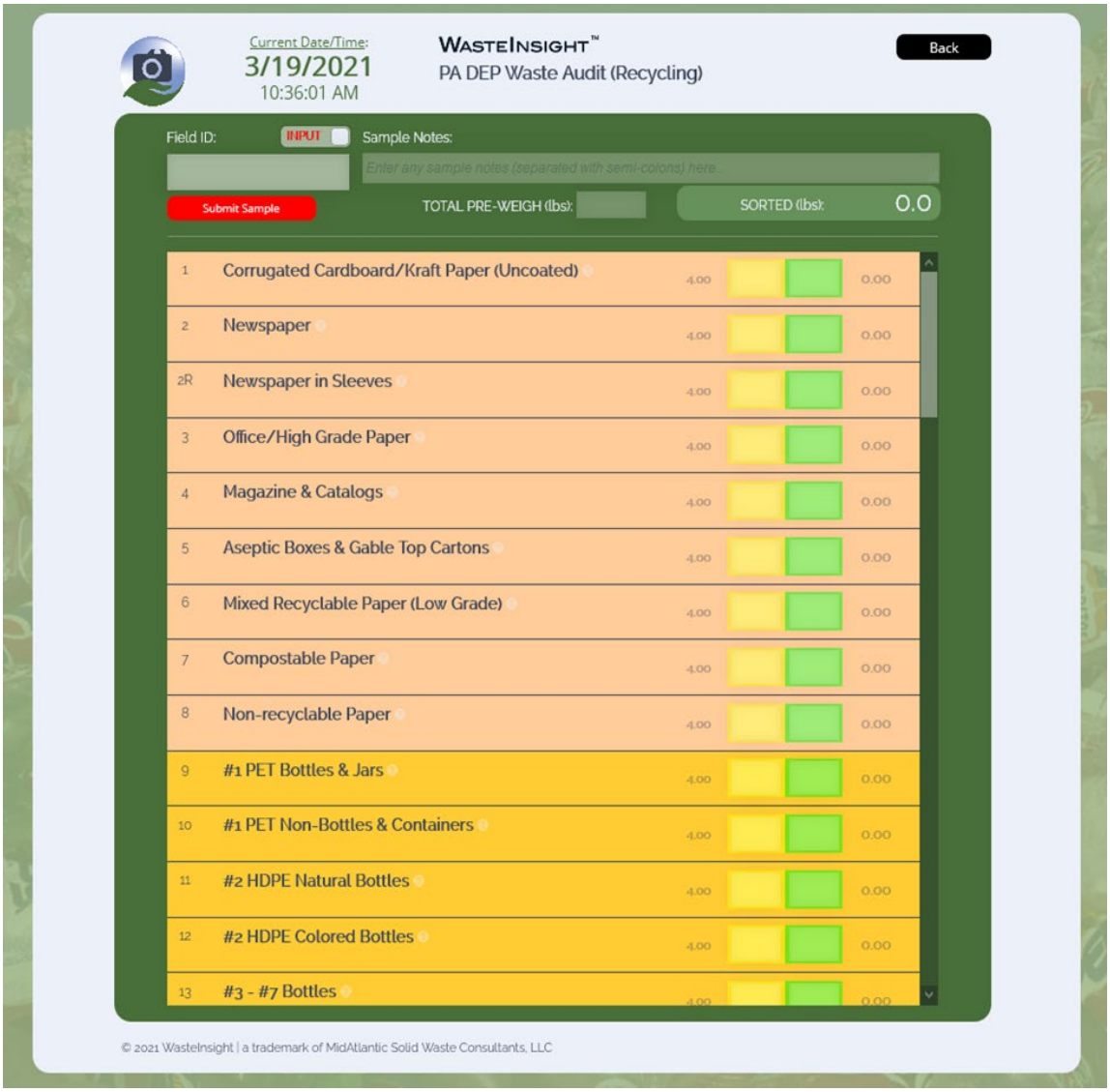
Data Recording: The Crew Chief will use a rugged tablet computer synched to the cloud via cellular service to record composition weights. Each sample will be cross-referenced against the Field Supervisor's sample sheet to assure accurate tracking of the samples each day. The real-time data entry offers several important advantages:

- The template contains built-in logic and error checking to prevent erroneous entries.
- The template sums sample weights in real time so the Crew Chief can confirm achievement of weight targets for each and every sample.
- The data files are synced routinely while in the field, provided cell service is available. In the least, the data is synced each evening and can be accessed and checked by MSW QA/QC staff back at the office.

A screen shot of the electronic weigh-out form is provided in the exhibit below.

[1] Over the course of a typical day, MSW Consultants typically needs assistance from a loader from 8 to 12 loads. For each load, the loader will be asked to grab wastes from a pre-selected location. This process takes less than 5 minutes on average, and MSW Consultants strives to minimize the impact on facility operations personnel.

Screenshot of MSW Weigh-Out Form



Task 3 – Data Analysis & Reporting

DATA ANALYSIS: The following statistical measures will be calculated to determine the overall composition of each waste generator sector.

Sample Mean: The sample mean, or average, composition is considered the "most likely" fraction for each material category in the waste stream.

Standard Deviation: The standard deviation measures how widely values within the data set are dispersed from the sample mean. A higher standard deviation denotes higher variation in the underlying samples for each material, while a lower standard deviation reflects lower variation among the individual samples.

Confidence Intervals: A confidence interval is a statistical concept that attempts to indicate the likely range within which the true value lies. The confidence intervals reflect the upper and lower range within which the population means can be expected to fall. Confidence intervals are customarily

calculated at a 90 percent level of confidence, meaning that we can be 90 percent sure that the mean falls within the upper and lower confidence intervals shown. However, prior studies have used a 95 percent level of confidence. We will discuss the advantages and disadvantages of different confidence levels with the County. In general, the higher the level of confidence chosen, the wider the confidence intervals.

REPORTING: MSW Consultants will prepare a technical memorandum that describes the purpose, study methodology, and sampling plan, and that summarizes the essential composition findings for each waste sector. Specifically, the report will include:

- Introduction and background for the study, including objectives,
- A summary of the methodology used in the study and details of the sampling and sorting plan,
- A summary of findings, conclusions, and supporting documentation including composition of each generator type,
- A summary of the numbers of samples characterized; and
- Raw data in an approved format

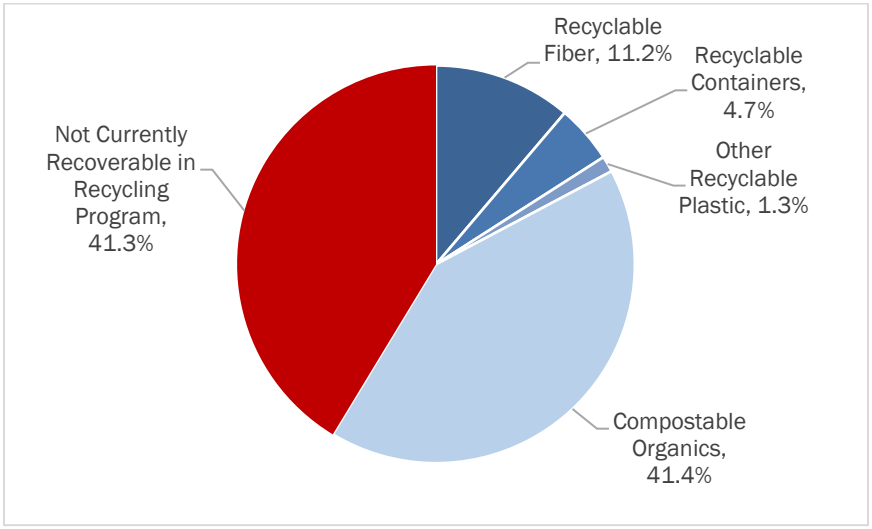
MSW Consultants will provide a draft report for review and comment by the County. We will integrate comments into the final report. MSW Consultants specializes in the tabular and graphical presentation of waste characterization data. Sample tabular and graphical results presented are below.

Sample Waste Composition Tabular Results

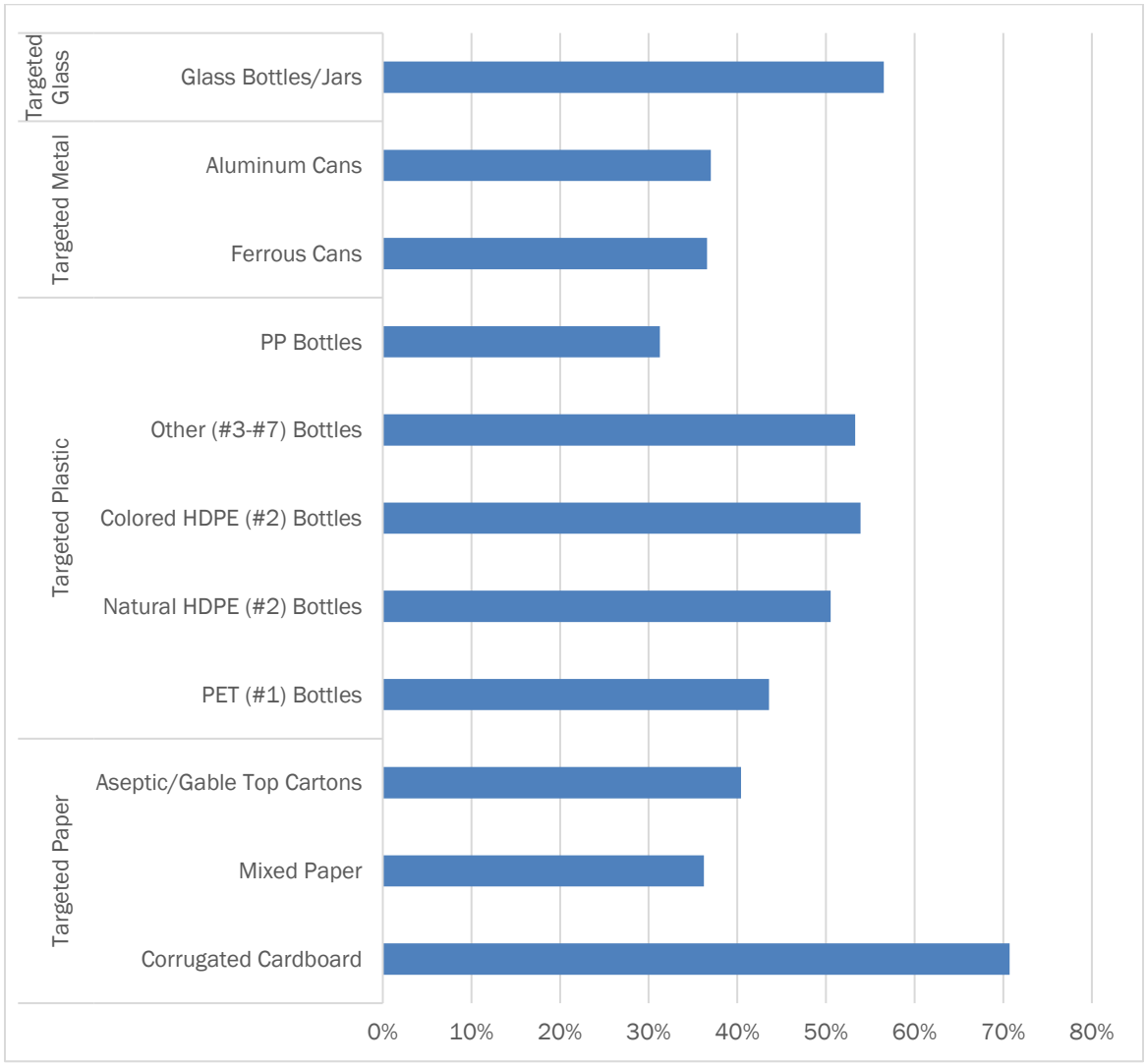
Material Category	Est. Percent	Conf. Int (+/-)	Tonnage	Material Category	Est. Percent	Conf. Int (+/-)	Tonnage
Paper	**26.0%**	**1.4%**	**1,001,551**	**Plastic**	**15.3%**	**2.8%**	**590,979**
OCC/Kraft	8.5%	1.1%	326,094	PET (#1) Bottles/Jars	1.4%	0.1%	54,764
Newsprint	1.5%	0.5%	56,588	PET (#1) Non-Bottle Containers	0.2%	0.1%	8,321
Magazines	0.9%	0.2%	35,327	HDPE (#2) Natural Containers	0.4%	0.0%	15,399
High Grade Office Paper	1.3%	0.3%	51,027	HDPE (#2) Colored Containers	0.5%	0.1%	19,462
Mixed Recyclable Paper	4.0%	0.4%	155,827	Clean Film Bags	0.3%	0.1%	11,948
Compostable Paper	8.1%	0.5%	312,127	Clean Ind'l/Com'l Film	0.7%	0.3%	26,524
Remainder/Composite Paper	1.7%	0.6%	64,562	Contaminated Film/Other Film	5.9%	0.8%	229,256
Glass	**2.8%**	**0.3%**	**108,996**	Plastic Containers #3 thru #7	1.0%	0.1%	38,140
Clear Glass Containers	1.4%	0.2%	53,206	Expanded Polystyrene #6	0.7%	0.1%	27,908
Brown Glass Containers	0.8%	0.2%	32,428	Bulky Durable Plastic Products	1.9%	0.3%	72,746
Green Glass Containers	0.2%	0.0%	8,310	Remainder/Composite Plastic	2.2%	0.4%	86,510
Remainder/Composite Glass	0.4%	0.1%	15,052	**Textiles**	**4.8%**	**1.2%**	**186,773**
Metal	**4.4%**	**0.5%**	**168,079**	Textiles - Clothing	2.3%	0.4%	87,347
Aluminum Cans & Containers	0.6%	0.1%	24,498	Textiles - Non-Clothing	1.9%	0.3%	73,652
Other Aluminum	0.3%	0.0%	11,985	Shoes/Belts/Leather	0.7%	0.1%	25,775
Tin/Steel Containers	1.0%	0.1%	39,365	**Inorganics**	**12.7%**	**0.9%**	**491,013**
Other Ferrous	1.8%	0.4%	70,018	Fines	1.7%	0.2%	65,106
Other Non-Ferrous	0.5%	0.2%	20,802	Drywall/Gypsum Board	0.6%	0.3%	23,013
Oil Filters	0.0%	0.0%	1,411	Asphalt, Brick, Concrete & Rocks	0.5%	0.2%	18,639
Organics	**32.4%**	**0.6%**	**1,248,872**	Carpet & Carpet Padding	2.6%	0.7%	100,713
Food Waste	15.0%	1.3%	578,315	Other Construction & Demolition	1.6%	0.5%	60,431
Wood - Clean/Untreated	3.7%	1.2%	141,024	Bulky Items/Furniture	3.1%	0.6%	121,343
Wood - Painted/Stained/Treated	4.5%	1.0%	173,266	Mattresses/Boxsprings	0.7%	0.3%	26,118
Disposable Diapers & Sanitary Prod.	3.1%	0.4%	118,429	Tires	0.8%	0.4%	31,399
Yard Waste	2.6%	0.7%	101,921	Other/Not Classified	1.1%	0.9%	44,249
Remainder/Composite Organic	3.5%	0.6%	135,918	**HHW**	**0.4%**	**0.1%**	**15,974**
Electronics	**1.2%**	**0.4%**	**46,216**	Household Hazardous Waste	0.4%	0.1%	15,974
Electronic Waste	1.2%	0.4%	46,216				
				Grand Total	**100%**		**3,858,452**
				No. of Samples	***254***		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

Sample Divertibility Assessment



Sample Capture Rates



BUDGET, RETAINER & RATES

Budget

The table below provides the cost per tasks and an additional day of sorting on both seasons if the County chooses to do so.

Tasks	Hours	Labor	Expenses	Total
1 - Project Initiation & Planning	**37**	**$4,700**	**$0**	**$4,700**
1.1 - Kick Off Meeting	3	$500	$0	$500
1.2 - Data Requests & Organization	15	$1,900	$0	$1,900
1.3 - Logistics & Planning	19	$2,300	$0	$2,300
2 - Field Operations	**412**	**$29,900**	**$9,600**	**$39,500**
2.1 - Mobilization	12	$1,400	$0	$1,400
2.2 - Sorting - Season 1	192	$13,300	$5,300	$18,600
2.3 - Sorting - Season 2	192	$13,300	$4,300	$17,600
2.4 - Demobilization	16	$1,900	$0	$1,900
3 - Data Analysis & Reporting	**43**	**$5,700**	**$0**	**$5,700**
3.1 - DataEntry/QAQC	8	$1,000	$0	$1,000
3.2 - Draft Report	25	$3,300	$0	$3,300
3.3 - Final Report	10	$1,400	$0	$1,400
Grand Total	**492**	**$40,300**	**$9,600**	**$49,900**
Optional: Additional Sort Day, Both Seasons				*$58,800*

Service Rates

The following tables present MidAtlantic Solid Waste Consultants' hourly labor rates and other service fees and billing policies. Please alert us if you are in need of a particular expertise that is not shown below and allow us to provide you with additional options.

Class	Position	Class	Hourly Rate
Management	Principal		$237
	Project Director		$210
	IT Director		$169
Professional	Consultant	III (Executive)	$190
		II (Senior)	$149
		I	$126
	Project Manager	III (Senior)	$146
		II	$134
		I (Junior)	$125
	Analyst	III (Senior)	$128
		Financial	$123
		Data	$113
		II	$103
		I (Junior)	$92
	Research Assistant		$56
Field Operations	Facility Services Operations Manager		$108
	Crew Chief		$103
	Neighborhood Services Manager		$72
	Sort Labor		$40-$50
	Neighborhood Services Monitor		$37-$45
	3rd Party Support		$50-$85
Administrative	Graphical Design		$90
	Clerical Support		$71

Expense	Charge
Personal/Company Car	Prevailing Federal mileage reimbursement rate
Local Travel Expenses (tolls, parking)	As Incurred
Hotel	As Incurred, 3 to 3.5 star
Meals	$62 per diem
Airfare	As Incurred, Coach
Car Rental	As Incurred, Midsize or smaller
Specialty Vehicle Rental	As Incurred
Duplicating	$.10/$.50 per bw/color copy
Graphics and Art	As Incurred
Shipping and Delivery Service	As Incurred
Subcontractors	As Incurred + 10%

MidAtlantic Solid Waste Consultants' rates are subject to adjustment annually.

SCHEDULE

The Below Gantt Chart provides MSW Consultant's tentative proposed schedule for performing this work. The viewer should note the three months jump between the "February-25" and "June-25" months.

Task No.	Task Name	January-25				February-25				June-25				July-25			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Project Initiation & Study Design																
2A	Field Data Collection - Season 1																
2B	Field Data Collection - Season 2																
3	Data Analysis & Reporting																

mswconsultants.com | 800.679.9220

11875 High Tech Avenue, Ste. 150
Orlando, FL 32817