



**Solid Waste
Management
Consulting Services**

Technical Proposal

Solicitation Doc97300

April 4, 2013





Adele Smith
Government of the District of Columbia - Office of Contracting and Procurement
441 4th Street, NW, Suite 700 South
Washington, DC 20001

ARCADIS U.S., Inc.
3101 Wilson Blvd.
Suite 550
Arlington
Virginia 22201
Tel 703 351 9100
Fax 703 351 1305
www.arcadis-us.com

Subject:
Proposal to Provide Solid Waste Management Consulting Services,
Solicitation Doc97300

WATER

Dear Selection Committee:

The lead-turn sustainability goals of Mayor Gray for the District of Columbia, including “Zero Waste” by 2032, demand collaboration, process innovation and management paradigms that think outside the project. As reflected in our proposal for “Solid Waste Management Services,” the ARCADIS team already views this opportunity as a more than a project—we view it in the larger context of value management paradigms that will achieve District sustainability goals; in particular, redefining solid waste from a burden that just needs to disappear to a resource with economic, environmental and social value.

Date:
April 4, 2013

Contact:
Biff Corning

Phone:
703.465.4235

To identify, understand and manage this value, ARCADIS will create an analytic framework and strategy for DCDPW that not only meets stringent environmental requirements, but also serves as a model for successful sustainable development. The ARCADIS *Capacity to Capability Program* will enable the District to use quantified data that optimizes natural and financial capital capacity to assure capability to meet sustainability goals. ARCADIS can—and will—add profound value to the community whether we live in DC, work in DC, use DC services or are invaluable visitors. We foresee not only a systematic approach that will work efficiently and effectively to enable future DCDPW choices in managing their solid waste, we see an initiative that is potentially transformational for DC and the region.

Email:
Bruce.corning@arcadis-us.com
Our ref:
66006078.0012

Our team, including Nspiregreen, Koetz and Duncan, and RKE Enterprises, provides the DCDPW with uniquely credentialed, technically astute and nationally proven expertise proud of its local experience and local roots. We have worked with DCDPW for the past four years analyzing, planning and implementing the street sweeping program from capital investments to logistics.

Our project delivery team will expedite the development and implementation of a useable and reproducible analytic framework where all stakeholders can understand the information used and results generated. Doug Sawyers is the technical lead of our team and, together, we will create with DCDPW a process that will resonate with stakeholders.

Imagine the result

We appreciate the opportunity to submit on this very important project and are extremely excited at the potential to continue to work with DCDPW.

Sincerely,

ARCADIS U.S., Inc.



Bruce (Biff) Corning
Project Manager



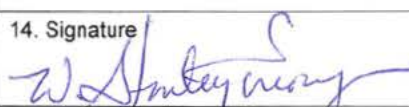


Doug Sawyers, PE, BCEE
Vice President

Attachments:

RFP Cover Page signed
Amendments 1 – 4 signed
Technical Proposal

Under Separate Cover:

Price Proposal
Subcontracting Plan
EEO Form
First Source Document
Tax Affidavit
Bidder/Offeror Certification
ARCADIS District of Columbia, PC W9

SOLICITATION, OFFER, AND AWARD			1. Caption: Solid Waste Management Consulting Services			Page of Pages 1 39	
2. Contract Number N/A		3. Solicitation Number Doc97300		4. Type of Solicitation <input type="checkbox"/> Sealed Bid (IFB) <input checked="" type="checkbox"/> Sealed Proposals (RFP) <input type="checkbox"/> Sole Source <input type="checkbox"/> Human Care Agreements <input type="checkbox"/> Emergency		5. Date Issued 2/28/13	
						6. Type of Market <input checked="" type="checkbox"/> Open <input type="checkbox"/> Set Aside <input type="checkbox"/> Open with Sub-Contracting Set Aside	
7. Issued By: Office of Contracting and Procurement (OCP) Transportation and Specialty Equipment Commodity Group 2000 14 th Street, NW, 6 th Floor Washington, DC 20009				8. Address Offer to: Submit electronically through OCP E-Sourcing Process			
NOTE: In sealed bid solicitations "offer" and offeror" means "bid" and "bidder"							
SOLICITATION							
9. Offers must be received in the E-Sourcing system prior to the event closing date and time.							
CAUTION: Late Submissions, Modifications and Withdrawals: See 27 DCMR chapters 15 & 16 as applicable. All offers are subject to all terms & conditions contained in this solicitation.							
10. For Information Contact		A. Name		B. Telephone			C. E-mail Address
		Adele Smith		(Area Code) 202	(Number) 671-2389	(Ext)	Adele.Smith@dc.gov
OFFER							
11. Acknowledgement of Amendments (The offeror acknowledges receipt of amendments to the SOLICITATION):		Amendment Number	Date	Amendment Number	Date		
		1	3/11/13	4	3/22/13		
		2	3/15/13				
		3	3/18/13				
12A. Name and Address of Offeror		ARCADIS District of Columbia, P.C. 9861 Broken Land Parkway, Suite 254 Columbia, MD 21046			13. Name and Title of Person Authorized to Sign Offer/Contract W. Stanley Emory, PE, President		
12B. Telephone		12C. Check if remittance address is different from above - Refer to Section G		14. Signature		18. Offer Date	
(Area Code) 410	(Number) 381-1990	(Ext)	<input type="checkbox"/>			April 4, 2013	
AWARD (TO BE COMPLETED BY GOVERNMENT)							
19. Accepted as to Items Numbered			20. Amount		21. Accounting and Appropriation		
22. Name of Contracting Officer (Type or Print) Gena Johnson			23. Signature of Contracting Officer (District of Columbia)			24. Award Date	
 Government of the District of Columbia				Office of Contracting & Procurement			

AMENDMENT OF SOLICITATION / MODIFICATION OF CONTRACT			1. Contract Number	Page of Pages	
				1	3
2. Amendment/Modification Number Doc97300-001	3. Effective Date 3/11/13	4. Requisition/Purchase Request No.	5. Solicitation Caption - Solid Waste Management Consulting Services		
6. Issued by: Office of Contracting and Procurement Transportation and Specialty Equipment Commodity Group 2000 14th Street, NW, 6th Floor Washington, DC 20001		Code	7. Administered by (If other than line 6)		
8. Name and Address of Contractor (No. street, city, county, state and zip code) Potential Offerors		Code	Facility	9A. Amendment of Solicitation No. Doc97300	
				9B. Dated (See Item 11) February 28, 2013	
				10A. Modification of Contract/Order No.	
				10B. Dated (See Item 13)	
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS					
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input checked="" type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) BY separate letter or fax which includes a reference to the solicitation and amendment number. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such may be made by letter or fax, provided each letter or telegram makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.					
12. Accounting and Appropriation Data (If Required)					
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14					
A. This change order is issued pursuant to (Specify Authority): The changes set forth in Item 14 are made in the contract/order no. in item 10A.					
B. The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data etc.) set forth in item 14, pursuant to the authority of 27 DCMR, Chapter 36, Section 3601.2.					
C. This supplemental agreement is entered into pursuant to authority of:					
D. Other (Specify type of modification and authority)					
E. IMPORTANT: Contractor <input type="checkbox"/> is not <input checked="" type="checkbox"/> is required to sign this document and return 1 copy to the issuing office.					
14. Description of Amendment/Modification (Organized by UCF Section headings, including solicitation/contract subject matter where feasible.) Solicitation Doc97300 is hereby amended as outlined on pages 2-3 of this amendment.					
Except as provided herein, all terms and conditions of the document is referenced in Item 9A or 10A remain unchanged and in full force and effect.					
15A. Name and Title of Signer (Type or print) W. Stanley Emory, PE, President			16A. Name of Contracting Officer Ciera Johnson		
15B. Name of Contractor ARCADIS District of Columbia, P.C.		15C. Date Signed 3/21/2013	16B. District of Columbia 		16C. Date Signed 3/11/13

AMENDMENT OF SOLICITATION / MODIFICATION OF CONTRACT			1. Contract Number	Page of Pages	
2. Amendment/Modification Number Doc97300-001			3. Effective Date 3/11/13	4. Requisition/Purchase Request No.	2 3
5. Solicitation Caption Solid Waste Management Consulting Services					

- A. Section B.3 – See Attached Revised Price Schedule**
B. Section M.3.2 Price Criteria (25 Points) – Revised to read as follows:

The price evaluation will be objective. The offeror with the lowest price (determined on the basis of the calculation below) will receive the maximum price points. All other proposals will receive a proportionately lower total score.

For evaluation purposes, the District will calculate the offeror's price by using a weighted average of the labor rates as shown in the examples below. The District will then use the following formula to determine each offeror's evaluated price score:

Lowest weighted average labor rate proposal
 ----- x 25 = Evaluated price score Weighted
 average labor rate of proposal being evaluated

Example:

Contract Line Item Number (CLIN)	Description	Unit Price/hour	Estimated Number of hours	% of Total Number of Hours
0001AA	Labor Category 1 - Sr. Consultant	\$100	1000	45%
0001AB	Labor Category 2 - Consultant	\$90	500	23%
0001AC	Labor Category 3- Consultant	\$90	500	23%
0001AD	Labor Category 4 – Administrative Assistant	\$50	200	9%
	Total Estimated Project Hours		2200	

Weighted Average Labor Rate:

$$(\$100 \times .45 + \$90 \times .23 + \$90 \times .23 + \$50 \times .09) = \$90.90$$

AMENDMENT OF SOLICITATION / MODIFICATION OF CONTRACT		1. Contract Number	Page of Pages
2. Amendment/Modification Number	3. Effective Date	4. Requisition/Purchase Request No.	3 3
Doc97300-001	3/11/13		5. Solicitation Caption Solid Waste Management Consulting Services

Vendor 2- Price Proposal:

Contract Line Item Number (CLIN)	Description	Unit Price/hour	Estimated Number of hours	% of Total Number of Hours
0001AA	Labor Category 1 - Project Manager	\$200	600	18%
0001AB	Labor Category 2 - Senior Consultant/Analyst III	\$150	1200	36%
0001AC	Labor Category 3- Senior Consultant/Analyst II	\$120	1200	36%
0001AD	Labor Category 4 - Administrative Assistant	\$60	300	9%
Total Estimated Project Hours			3300	

Weighted Average Labor Rate:

$$(\$200 \times .18 + \$150 \times .36 + \$120 \times .36 + \$60 \times .09) = \$138.60$$

In this example, Vendor 1 would receive the maximum number of price points (25 points) and Vendor 2 would get a proportionately lower total score (16.40 points) using the evaluation formula above $(90.90/138.60) \times 25 = 16.40$.

C. Responses to offeror's questions presented in the Pre-Proposal Conference are provided below:

1. Question: Will subcontractors have to provide labor category?
Answer: No, the subcontractor does not need to submit cost and pricing data.
2. Question: What subcontracting plan form should be used?
Answer: The offeror shall use the form referenced in section 3.3 of the eSourcing event.
3. Question: What is the approximate time period for the project?
Answer: The due date for the final report is nine (9) months after contract award.
4. Question: What is the expectation for public meetings?
Answer: For the purposes of developing a price proposal, the offeror shall assume it will facilitate and participate in 3-5 public meetings.

SECTION B: CONTRACT TYPE, SUPPLIES OR SERVICES AND PRICE/COST

- B.1** The District of Columbia Office of Contracting and Procurement, on behalf of the Department of Public Works, Solid Waste Management Administration (SWMA), (the "District") is seeking a contractor to provide solid waste management consulting services.
- B.2** The District contemplates award of a labor-hour contract.
- B.3** The prices stated shall include all items necessary to effectively conduct and complete the required service described in Section C – Work Statement. This includes, but is not limited to, the cost of labor, travel, overhead, administrative charges, taxes, profit, insurance and other expenses.

B.3.1 BASE YEAR

CLIN	Item Description	Unit Price/hour	Estimated Number of hours	% of Total Number of Hours
0001	Labor Category 1:			
0002	Labor Category 2:			
0003	Labor Category 3:			
0004	Labor Category 4:			
Total Estimated Project Hours				
Total Not to Exceed Amount			\$300,000	

B.3.2 OPTION YEAR 1

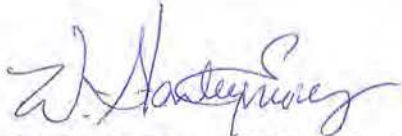
CLIN	Item Description	Unit Price/hour	Estimated Number of hours	% of Total Number of Hours
1001	Labor Category 1:			
1002	Labor Category 2:			
1003	Labor Category 3:			
1004	Labor Category 4:			
Total Estimated Project Hours				
Total Not to Exceed Amount			\$300,000	

- B.4** An offeror responding to this solicitation must submit with its proposal, a notarized statement detailing any subcontracting plan required by law. Proposals responding to this RFP shall be deemed nonresponsive and shall be rejected if the offeror fails to submit a subcontracting plan that is required by law. For contracts in excess of \$250,000, at least 35% of the dollar volume of the contract shall be subcontracted in accordance with section H.9.1.

View Message

Id: MSG39760
From: Government of the District of Columbia - Office of Contracting and Procurement (Gena Johnson) Sent: 15-Mar-13 10:22 PM
To: Participants; Project Team
Subject: Amendment #2 - Doc97300 - Request For Proposals - Solid Waste Management or Engineering Consulting Services

The closing date has been extended to March 27, 2013 at 2:00 pm.



W. Stanley Emory, PE, President
ARCADIS District of Columbia, P.C.


3/27/2013

Date

View Message

[Done](#) [Reply](#)

Id: MSG39777
From: Government of the District of Columbia - Office of Contracting and Procurement (Adele Smith) Sent: 18-Mar-13 10:23 AM
To: Participants; Project Team
Subject: Doc97300 - Request For Proposals - Solid Waste Management or Engineering Consulting Services

Attachment:  Pre Bid Sign In Sheet.pdf

Amendment #3 Solicitation Doc97300 is hereby amended to provide bidder's a copy of the pre-proposal conference meeting attendees.

[Done](#) [Reply](#)



W. Stanley Emory, PE, President
ARCADIS District of Columbia, P.C.

3/27/2013

Date

AMENDMENT OF SOLICITATION / MODIFICATION OF CONTRACT				1. Contract Number		Page of Pages	
						1 3	
2. Amendment/Modification Number		3. Effective Date		4. Requisition/Purchase Request No.		5. Solicitation Caption -	
Doc97300-004		3/22/13				Solid Waste Management Consulting Services	
6. Issued by:			Code	7. Administered by (If other than line 6)			
Office of Contracting and Procurement Transportation and Specialty Equipment Commodity Group 2000 14th Street, NW, 6th Floor Washington, DC 20001							
8. Name and Address of Contractor (No. street, city, county, state and zip code)				X	9A. Amendment of Solicitation No. Doc97300		
Potential Offerors					9B. Dated (See Item 11) February 28, 2013		
					10A. Modification of Contract/Order No.		
Code		Facility			10B. Dated (See Item 13)		
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended. <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning <u>1</u> copy of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) BY separate letter or fax which includes a reference to the solicitation and amendment number. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such may be made by letter or fax, provided each letter or telegram makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. Accounting and Appropriation Data (If Required)							
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14							
A. This change order is issued pursuant to (Specify Authority): The changes set forth in Item 14 are made in the contract/order no. in item 10A.							
B. The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data etc.) set forth in item 14, pursuant to the authority of 27 DCMR, Chapter 36, Section 3601.2.							
C. This supplemental agreement is entered into pursuant to authority of:							
D. Other (Specify type of modification and authority)							
E. IMPORTANT: Contractor <input type="checkbox"/> is not <input checked="" type="checkbox"/> is required to sign this document and return 1 copy to the issuing office.							
14. Description of Amendment/Modification (Organized by UCF Section headings, including solicitation/contract subject matter where feasible.)							
Solicitation Doc97300 is hereby amended as outlined on pages 2-3							
Except as provided herein, all terms and conditions of the document is referenced in Item 9A or 10A remain unchanged and in full force and effect.							
15A. Name and Title of Signer (Type or print)				16A. Name of Contracting Officer			
W. Stanley Emory, President				Gena Johnson			
15B. Name of Contractor		15C. Date Signed		16B. District of Columbia		16C. Date Signed	
ARCADIS District of Columbia, PC		3/25/2013		[Signature]		3/22/13	

AMENDMENT OF SOLICITATION / MODIFICATION OF CONTRACT

2

3

2. Amendment/Modification Number
Doc97300-0043. Effective Date
3/11/13

4. Requisition/Purchase Request No.

5. Solicitation Caption
Solid Waste Management
Consulting Services**A. Section C.1 SCOPE: Delete in its entirety and replace to read:**

Mayor Gray's Sustainable DC goal for waste management is to achieve zero waste in 2032 first by producing less waste through reuse, recycling, and composting and then with what waste that remains capturing value from energy production. To achieve this goal the District will rethink its solid waste management program to craft an integrated system that redefines solid waste from a burden that just needs to disappear to a resource with economic, environmental and social value. To determine those values, the District needs to understand exactly what natural and financial capital investments need to be made to sustain the designed system and quantify the benefits that will be realized from its implementation.

The Department of Public Works (DPW) is seeking a solid waste management or engineering consulting firm to develop an evaluation strategy and framework to quantitatively compare the natural and financial capital investments required by three to five alternative integrated solid waste management scenarios (including the current state) that are crafted by the contractor in conjunction with DPW. Each scenario will be designed to meet the zero waste goal and then to capture the energy and imbedded value of the managed material streams. Each scenario and must include waste reduction, recycling, reuse, organics composting and residuals processing components. The contractor will also be required to run each scenario through the designed framework and to comparatively evaluate the results. By quantifying and comparing investments needed for current baseline operations and alternatives, the District will be in a better position to identify impact mitigation, cost savings, value creation and positive environmental justice outcomes

B. Section C.2 BACKGROUND: Delete the last paragraph and insert:

The objectives to be achieved from the project are:

- Meet the zero waste goals of the Mayor's Sustainable DC plan
- Identify how to economically increase the District's recycling diversion rate
- Determine how DC can best capture the economic value and embedded energy of the waste stream that remains until the zero waste goals are achieved
- Identify the optimal set of components to maximize the value of the waste stream while providing economic sustainability over the long term
- Identify whether the District should seek jurisdictional partners for the solid waste management system.

C. Section C.3 REQUIREMENTS – Revised C.3.1(A) to read as follows:

The contractor shall define three to five alternative integrated solid waste management scenarios (including the current state) that capture the energy and imbedded value of the managed material streams. Each of these scenarios must include waste reduction, recycling, reuse, organics composting and residuals processing components.

AMENDMENT OF SOLICITATION / MODIFICATION OF CONTRACT			1. Contract Number	Page of Pages	
				3	3
2. Amendment/Modification Number Doc97300-004	3. Effective Date 3/11/13	4. Requisition/Purchase Request No.		5. Solicitation Caption Solid Waste Management Consulting Services	

D. Section F.3 DELIVERABLES – C.3.1A Revise to read: Three to five alternative integrated solid waste management scenarios that are consistent with the Mayor's zero waste goals.

E. Section L.2.4.1 Technical Approach – Revise the first bullet to read:

- Description of the offeror's approach to developing (1) alternatives for managing the District's solid waste that captures the energy and imbedded value of the managed material streams that are consistent with the Mayor's zero waste goal (2) an evaluation strategy and framework that will quantitatively compare the natural and financial capital required of each alternative, (3) the process to identify siting, regulatory, institutional and legal requirements for each alternative, and (4) the framework of a public participation process and staff and facilitate stakeholder technical workgroup(s) to provide review and input on the project progress and deliverables.

F. Section M.3.1.1 Technical Approach – Revise the first bullet to read:

- The Offeror has demonstrated its approach to (1) crafting alternatives for managing the District's solid waste that maximizes the energy and imbedded value of the managed material streams that are consistent with the Mayor's zero waste goals, (2) developing an evaluation strategy and framework that will quantitatively compare the natural and financial capital required of each alternative (3) identifying siting, regulatory, institutional and legal requirements for each alternative, and (4) designing the framework of a public participation process and staff and facilitate stakeholder technical workgroup(s) to provide review and input on the project progress and deliverables.

G. Bid due date has been extended from March 27, 2013 to April 4, 2013.

Table of Contents

Executive Summary	1
Project Understanding (Background)	2
Path to Zero Waste	2
Technical Approach / Evaluation Strategy	4
Activity 1: Prepare and Submit Project Plan	6
Activity 2: System Inventory Framework and Capacity Baseline Development	6
Activity 4: <i>Capacity to Capability</i> Framework Construction and Alternatives Development	9
Activity 5: Evaluation of Alternative Scenarios	10
Activity 6: Evaluation of Results and Final Report	12
Activity 7: Additional As Requested Consulting Services	12
Evaluation Strategies Comparing Natural and Financial Capital Required of Each Alternative	12
Siting, Regulatory, Institutional and Legal Requirements for Each Alternative	14
Public Participation	16
Project Management Approach	16
Technical Expertise	22
Similar Project Experience by Firm	22
Team Resumes	26
Past Performance	29
Letters of Recommendation	29
Successful Recommendation Strategies	29
Appendix A - Project Experience	
Appendix B - Team Resumes	

Why Choose ARCADIS?

We demonstrated our solid waste experience and knowledge by contributing to the Mayor's Sustainability working group. DPW has relied on us for best solutions for solid waste programs. We have proven to be a trustworthy and reliable consultant who provides you with...

*Real Alternatives for
an Optimal Solution*

Our Solid Waste Experience at a Glance...

- ✓ In the past 10 years, **50** major solid waste projects, more than **20** solid waste management plans and solid waste construction totaling more than **\$2 billion**.
- ✓ Conducted a successful **waste characterization study** to begin the process of evaluating options for solid waste management for District of Columbia in 2011.
- ✓ Developed numerous comprehensive, integrated waste management studies and program designs to address the **lifecycle of waste, maximize recoverable resources and minimize impact to the environment**.
- ✓ Completed collection studies for areas ranging from **several thousand acres** to **hundreds of square miles** and ranging in population from **10,000 to nearly a million**.
- ✓ For the Solid Waste Authority of Palm Beach County, FL, implementing a new mass burn waste-to-energy facility with a processing capacity of 3,000 tpd, **the first of its kind in the U.S. in almost 20 years**.

Executive Summary

About ARCADIS

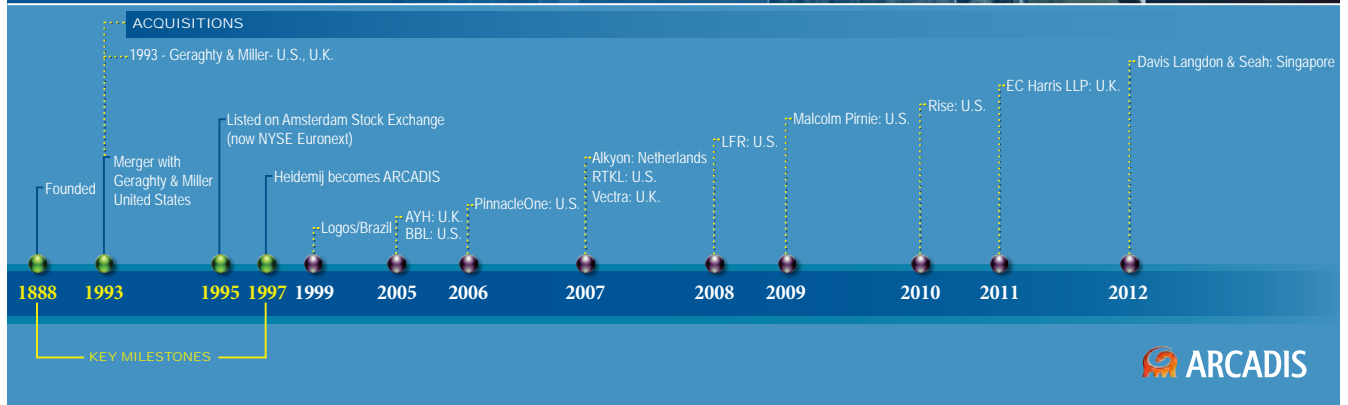
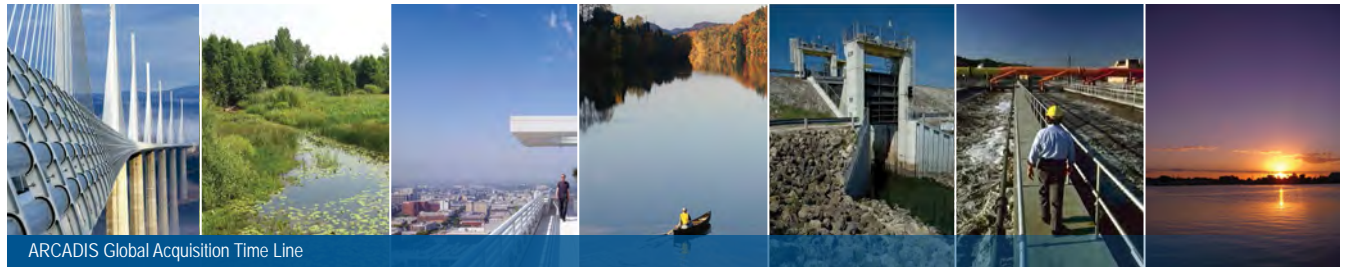


ARCADIS is ranked #9 among Top Design Firms by Engineering News-Record (July 2012). Our top ranking means delivering superior design alternatives and innovation while communicating openly with you.

ARCADIS provides consultancy, design, engineering and management services in infrastructure, water, environment and buildings. We enhance mobility, sustainability and quality of life by creating balance in the built and natural environments. ARCADIS develops, designs, implements, maintains and operates projects for companies and governments. With 22,000 employees and more than \$3.3 billion in annual revenues, the company has an extensive international network supported by strong local market positions.

Company History

ARCADIS was established in the United States in Delaware as Geraghty & Miller in 1957. The firm expanded in 1964 in response to water supply problems created by a major drought in the Northeast. The first public offering occurred in 1988. In 1993, Geraghty & Miller was acquired by ARCADIS. In 1998, Geraghty & Miller was renamed ARCADIS. Malcolm Pirnie, Inc. was acquired in 2009 to form one of the nation's leading engineering consulting firms.



Project Understanding (Background)



The Mayor's Sustainable DC Plan advocates zero solid waste to landfills, total waste generation reduced by 15%, 20% reuse of construction and demolition waste, and waste diversion rate increased to 80%. The plan also calls for a 50% reduction in greenhouse gas emissions.

Path to Zero Waste

Under the leadership of Mayor Vincent C. Gray, the District of Columbia has drafted an ambitious, yet achievable, vision that creates the framework to become healthier, cleaner, greener and most sustainable city in the country. The goals of this plan include increasing by five times the number of jobs providing green goods and services, and attracting and retaining 250,000 new and existing residents. At the same time, Sustainable DC is looking to achieve “Zero Waste” in 2032 using policies and practices that first reduce waste generation and then capture value from remaining residual materials through reuse, recycling, composting and energy production. To achieve this last goal the District will develop an integrated management system that redefines residual materials from a solid waste burden made to disappear, into an asset management system generating economic, environmental, and social value. Specifically, the Mayor’s Sustainable DC Plan advocates zero solid waste to landfills, total waste generation reduced by 15 percent, 20 percent reuse of construction and demolition waste, and waste diversion rate increased to 80 percent. The plan also calls for a 50 percent reduction in greenhouse gas emissions. Ultimately, the District of Columbia is seeking a goal of zero waste.

To develop this asset management system capability for a cleaner growing DC, the Department of Public Works plans to evaluate the physical, financial, and natural capital asset capacity available to current residual management programs, as well as the capital allocations and investments needed to implement a residual asset management system capable of meeting DC Sustainability goals. The objectives of the evaluation are to:

- A. Meet the goals of the Mayor’s Sustainable DC plan to reach “Zero Waste” in 2032
- B. Identify how to economically increase the District’s recycling diversion rate
- C. Determine how DC can best capture the embedded energy and economic value of its waste stream
- D. Identify the optimal set of components to maximize the value of the waste stream while providing economic sustainability over the long term
- E. Identify whether the District should seek jurisdictional partners for the solid waste management system.

Accordingly, the Department of Public Works (DCDPW) is requesting proposals to design an evaluation strategy and framework to quantitatively compare the natural and financial capital investments required by three to five alternative integrated solid waste

management scenarios (including the current state) that are crafted by the contractor in conjunction with DCDPW. Each scenario is to be designed to capture the embedded energy and other value of the avoided and managed material streams, and must include recycling, composting and residuals processing components. Each scenario will be run through the designed framework, generating comparative results that quantify capacity investments needed for current baseline operations and alternatives, allowing the DCDPW to identify impact mitigation, cost savings, value creation and positive environmental justice outcomes.



Currently, approximately 900,000 tons of solid wastes are managed annually in the District: DCDPW collects 135,000 tons of residential solid waste, including 25,000 tons of recyclables and 8,000 tons of leaves, and 50,000 tons from street and alley cleaning program and citizen drop-off services; other District government agencies and contractors servicing government building collect an additional 42,000 tons; commercial haulers which use DCDPW's two transfer stations collect an additional 240,000 tons; commercial haulers using private sector transfer stations collect approximately 300,000 tons; and approximately 100,000 additional tons are reported as recycled by commercial haulers.

Our analysis will capture those assets over which the District has control and then include in scenario development the use of additional resources available in the District as well as the region.

The District's current strategy relies on contracting for all residual management, recycling, and composting services. The District exports residual assets as fuel for the Fairfax County Energy Resource Recovery Facility in Lorton, VA. DCDPW collected recyclables and organics go to Maryland and Virginia facilities for processing. The total annual cost, including transfer station operations, is approximately \$20 million. The District's agreement with Fairfax County currently expires on December 31, 2015.

Technical Approach / Evaluation Strategy

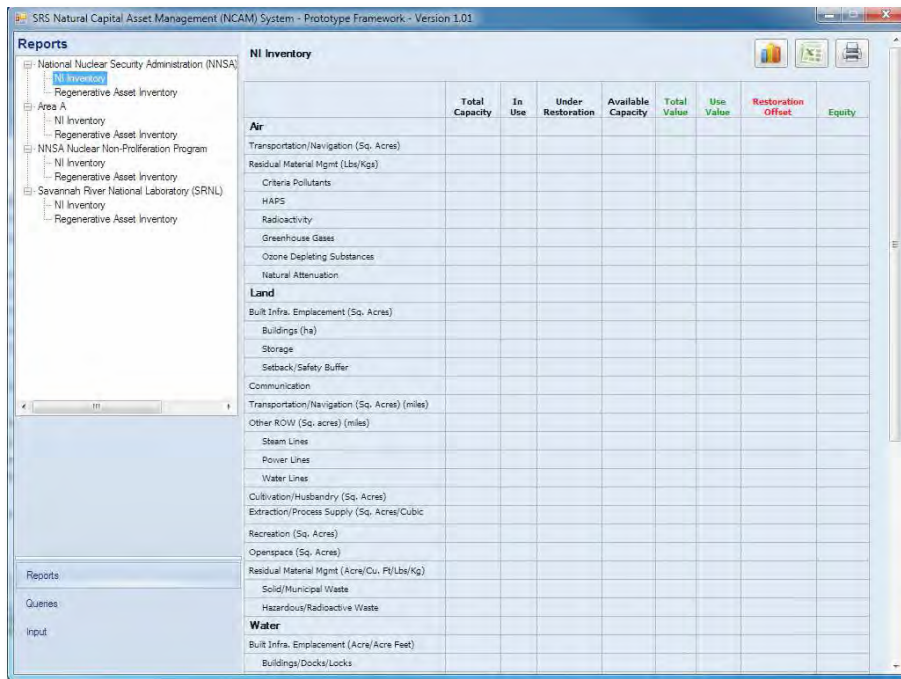
The District of Columbia intends for its material management system to be capable of accomplishing the following: meeting the Mayor’s Sustainable DC “Zero Waste” plan goals, achieving an economical increase in the District’s recycling diversion rate, capturing embedded waste stream energy and economic value; effective jurisdictional partner inclusion; and optimized system component choices to maximize the value of the waste stream while providing economic sustainability over the long term. To meet such Future State/System Capability goals, DCDPW must structure program, process, and technology options that sustainably use natural and financial asset capacity as essential elements of a materials management system with these capabilities. Natural infrastructure capacity includes air, land, and water assets that remain available and accessible under regulatory and supply restrictions for use in such a system. Another major element of DC Sustainability “Zero Waste” goals includes achieving material management capabilities with reduced or eliminated use of natural infrastructure.

We will provide the requested project evaluation by comparatively profiling a set of operational scenarios able to sustainably provide future solid waste (or residual material asset) load management capability as defined by the project’s Future State/System Capability goals. The ARCADIS *Capacity to Capability* analytic method allows client decision-makers to build capability-based, sustainable system design strategies by first identifying and measuring capital asset capacity needed to meet capability goals, then developing scenario options that efficiently reduce or minimize capacity needed to generate the highest levels of system performance at the lowest capital use rates. The analysis captures reduced asset capacity use as equity value that can be made available to other system capability needs, economic development, or recorded as credits for future use.

Developed with public participation and input, each scenario will assess various technology and process elements whose natural, physical, and financial infrastructure capacity is sustainably available, accessible, and affordable to operate a system capable of attaining the project goals.

Each scenario element is inventoried for its use levels of natural, physical and financial capital assets, whether available to the system or necessary to acquire. The evaluation process addresses overall governance requirements, including siting, regulatory, legal, institutional and other requirements applicable or contingent to each scenario alternative. In addition, project analytics include jurisdictional and operational partnering opportunities within the residual asset management system region-wide. Facilitated public participation activities included at key steps provide review and input on the project progress and deliverables.

By focusing on the measurable volumes of natural, physical, and financial capital that are, or might be used to avoid, reduce, or handle materials managed by the residuals/waste system, this evaluation quantitatively identifies needed technology and processes capable of providing system-wide capability for handling residual materials at the lowest asset capacity use levels.



As part of the analysis, we use Natural Capital Asset Management™ (NCAM™), shown at left, to provide the framework for completing this work. NCAM™ is a relational database tool developed to allow for the comparison of alternative solutions to complex problems and give decision-makers information they need to select solutions which uses the lowest amount of capital to achieve the greatest system capability performance, as well as consider other key capital factors. NCAM™ evaluates quantification-based parameters and modalities whose interaction and computation generate capacity, capability, and value analysis for usable air,

land, and water capital asset infrastructure in an enterprise portfolio. NCAM™ measures deeds, leases, permits, and other natural element access rights as natural infrastructure, an additive category of working capital to physical, financial, and workforce assets, whose usable and affordable capacity generally define the upper limits of operational capability for enterprise activities. NCAM™ records inventory levels, utilization rates, and cost/value elements for natural assets using analytic modalities comparable to these other enterprise capital elements.

Operational alternatives under consideration by an enterprise system are measured and compared for the total amount of capital assets used in key categories indexed against the units of productivity achieved. Project and operational activities are thus evaluated for their sustainability, allowing decision-makers to optimize enterprise capability and output by selecting alternatives with the lowest capital use for greatest output.

The two main components of the NCAM™ system are (1) the configuration framework, which structures the database Input, Report and Query functions using key features

and characteristics of the client's enterprise activities and goals and (2) configuration-controlled data that can be integrated as needed or desired with external databases according to the information and knowledge required. The data elements are based on algorithmically or arithmetically derived units of affected air, land and water elements and sub elements that are used or conserved by the client enterprise for economic or social goals both internal and external to its operations. Standard and client-specific configuration protocols are developed and used during later phases to evaluate data source, availability, consistency, time and spatial factors, units of measure, and other data parameters needed for quality control and assurance in both design and operation phases.

Activity 1: Prepare and Submit Project Plan

We will prepare and submit within one week of contract award a draft project plan which includes a schedule and milestone dates. Our project plan details how we and our subconsultants manage the project outlined in this proposal. Our project plan includes:

1. A detailed approach and methodology for performance of key tasks
2. A schedule based upon the requirements of the RFP
3. A project management section, including task leaders and quality assurance procedures
4. A project team organizational chart, including subconsultants by task
5. A sample monthly progress report

Upon receipt of comments from the Contract Administrator, we will revise and submit a finalized project plan and schedule within one week. Status is reported monthly to the Contract Administrator along with a revised project plan and schedule as needed during the project.

Deliverable: Project Plan

Completion: 7 Days After Contract Award

Activity 2: System Inventory Framework and Capacity Baseline Development

The foundation activity for the *Capacity to Capability* evaluation is an inventory of all defined system components and controls comprising the current residual material handling system. We compile key data related to the existing system component capacity to include infrastructure, workforce and other capital components used in various technologies and processes required to handle residual materials (e.g., recovery, reuse,

recycle, landfill, etc.). Current inventory assets and components are catalogued to serve both as the system capacity baseline and as a foundation for the required scenario development. Research and analysis identifies any additional handling capacity and capability unused by the current system. System inventory/capacity baseline categories include the following:

A. System Structure Elements and Requirements

1. Organizational structure and purpose
2. Key history and development factors
3. System governance factors, including regulatory, institutional and legal Requirements, including laws, regulations, siting controls, permits, contracts, and regional agreements
4. System goals and intended future capability (material flow levels, customer base levels)
5. User/resident load management handling capacity and capability

B. System Design and Components Inventory

1. Physical infrastructure assets
 - a. Access method (owned, leased, permitted)
 - b. Current capacity (volume, throughput, utilization rate)
 - c. Anticipated unit of measure (tons per square foot)
2. Natural infrastructure assets
 - a. Access Method (owned, leased, permitted)
 - b. Current capacity (volume, throughput, utilization rate)
 - c. Anticipated unit of measure (tons per unit)
3. Equipment
 - a. Process methods
 - b. Access method (owned, leased, permitted)
 - c. Current capacity (volume, throughput, utilization rate)
 - d. Anticipated unit of measure (tons per unit)
4. Workforce assets
 - a. Access method (employed, contracted, volunteered)
 - b. Current capacity (volume, throughput, utilization rate)
 - c. Anticipated unit of measure (tons per hour)

5. Financial assets
 - a. Access method (taxes, appropriation, fees)
 - b. Current capacity (budget)
 - c. Anticipated unit of measure (tons per dollar)

C. The inventory also includes all discoverable available or potentially accessible financial and natural capital assets in the Section B categories that are currently unused or underutilized across the spectrum of residual material management options. This would include unused air permit capacity, water supply, appropriately zoned land areas or other natural infrastructure assets in the District of Columbia, in adjacent jurisdictions, or owned or controlled by current or future parties to the residual materials handling process that may enable or affect scenario development.

We have extensive knowledge of solid waste management in the Washington Metropolitan Area and surrounding states, technical expertise in the full range of technical solutions, and experience in solving complex problems from concept, through implementation, and into operation. This experience allows us to efficiently, effectively and successfully complete this Activity 2: System Inventory Framework and Capacity Baseline Development. The team member firm, Koetz and Duncan, will be involved in both designing and completing work tasks for this Activity. Our “hands on” knowledge will provide a basis for a reality check on what actually happens on the ground.

Deliverable: System Inventory

Completion: 30 Days After Contract Award

Activity 3: Scoping Process for Goal/Objective Prioritization

We will facilitate public meetings among key parties in DC Government, all system users, potential jurisdictional partners, and interested organizations as part of its evaluation. Facilitated meetings will collect public and affected party inputs regarding categories in the System Inventory/Capacity Baseline; components of a residual management system that meet user/resident needs; Sustainable DC goals; natural, physical and financial asset availability and future allocation; and opportunities for economic opportunity through recycling or energy production proceeds.

Public participation and input will also be used to identify other possible Future State/System Capability Goals in addition to those outlined in the RFP, by compiling public views on the applicability and priority of the Mayor’s sustainability goals, Sustainable DC

planning and programming, and key community needs and preferences for evaluation and redesign of the existing capacity and capability for residual material management.

ARCADIS and team member firms, Nspiregreen and RKE Enterprises, design and execute public participation processes for complex environmentally sensitive projects such as this one.

Deliverable: Public Goal, Technology and Asset Use Input Report
Completion: 90 Days After Contract Award

Activity 4: *Capacity to Capability* Framework Construction and Alternatives Development

The ARCADIS *Capacity to Capability* analytic method identifies sustainable system design strategies by first identifying and measuring capital asset capacity needed to meet Future State/System Capability goals, then developing scenario options that efficiently reduce or minimize capacity needed to generate the highest levels of system performance at the lowest capital use rates. Steps in the process include the following:

- A. Using the System Design and Components Inventory Framework developed in Activity 2, expand the Inventory Framework into a Comparative Capacity Framework that enables comparison of the natural and financial capital of multiple materials management technology and process options. .
- B. Using the expanded framework, perform a capacity crosscheck between components of the current System Inventory/Capacity Baseline and estimated capacity requirements for the following DC sustainability goals incorporated into the Future State/System Capability Goals to generate a gap analysis (project process and technology goals identified in public scoping will also be included in the Comparative Framework capacity crosscheck and resulting gap analysis):
 1. Zero solid waste sent to landfills by 2032
 2. Total waste reduced by 15 percent
 3. Reuse 20 percent of construction and demolition waste
 4. Increase waste diversion rate to 80 percent
 5. Cut city-wide energy use by 50 percent and increase renewable energy use by 50 percent
 6. Add 250,000 residents
 7. Reduce greenhouse gas emissions by 50 percent
 8. Jurisdictional partner requirements and goals

- C. Identify scenario process options and components that remain viable options based on the initial inventory compilation and gap analysis indicators for availability/accessibility of natural and financial capital capacity. Schedule review teams with DCDPW client to assess inclusion/exclusion choices on process options used in scenario development.
- D. Design three to five scenarios (to include the current baseline) using component technologies and processes that are within available or operational asset capacity, and meet capability requirements as defined by the project goals, specifically, the Mayor's Sustainable DC "Zero Waste" plan goals; economical increase in the District's recycling diversion rate; embedded waste stream energy and economic value capture; effective jurisdictional partner inclusion; and optimized system component choices to maximize the value of the waste stream while providing economic sustainability over the long term.

Our analytical team member firm, Koetz and Duncan, will be involved both design and completion of work tasks required to complete this Activity. Day-to-day logistics professionals provide valuable, practical experience and, as appropriate, engage DCDPW operational personnel to review and comment as well as eliminate any gaps between analytical and practical realities.

**Deliverable: Comparative Analysis Framework with Scenario Development
Completion: 120 Days After Contract Award**

Activity 5: Evaluation of Alternative Scenarios

Building on the results of the public scoping process, capacity gap analysis outcomes, and client reviews, the Materials Management Scenarios will be modeled so as to determine the optimized levels of handling capability using the most efficient volumes of natural and financial capacity requirements.

- A. Expanding on the Capacity Comparison Framework using the ARCADIS capital estimating processes, craft a full-scale analytic model that compares the quantified natural and financial asset inventory capacity for each scenario to each other and to the current baseline based on required capacity levels.
- B. Populate the model for each scenario using data developed in Activities 2, 3 and 4, as well as additional capital asset inventory values as needed. Run calculations to determine the required levels of natural and financial capital needed to achieve the Future State/System Capability demonstrated by the comparative scenarios.

C. Evaluate, compare and potentially rank scenarios and process sub-elements for optimized use and conservation of system infrastructure, financial, and natural asset capacity that will be needed to avoid, handle, and/or process residual materials in accordance with the Future State/System Capability goals. The analytic results will demonstrate the technology and process options that provide the highest levels of operational capability per unit of natural and financial capacity required.

Specific capability elements to be evaluated will be based on public input, scoped with DCDPW, and will generate use indices that provide quantified, numeric comparison for use in system design decisions. Some examples include the following:

- Financial capacity used per ton avoided or managed (cost)
- Specific units of capital capacity used per customer served (greenhouse gas absorption, water supply, or industrial land)
- Specific units of capital capacity used per job created or maintained
- Specific units of capital capacity saved (and/or bankable)

Analysis data, information, and knowledge as well as the indices developed can also be used in the following decision matrices to support DC Sustainability organization and structure of future DCDPW force planning, sustainability-based asset optimization, recapitalization and investment programs, and provide a positive and informative customer, stakeholder, and general public communication platform.

Our analytical team member firm, Koetz and Duncan, will be involved both design and completion of work tasks required to complete this Activity.

Deliverable: *Capacity to Capability Analysis Draft Report*
Completion: 180 Days After Contract Award

Activity 6: Evaluation of Results and Final Report

At the completion of the project and within 270 days from contract award, we will prepare and submit a final report summarizing the work performed and results of the evaluation of each alternative scenario with all identified implementation siting, regulatory, institutional and legal requirements. The report will include an executive summary, discussion of activities undertaken, evaluation of each alternative scenario, conclusions and recommendations and appendices with detailed inventory data and outcome results of analysis for each scenario.

Deliverable: Final Report

Completion: 270 Days After Contract Award

Activity 7: Additional As Requested Consulting Services

On an “as requested” basis, we will provide DCDPW additional consulting services, such as participation in public or stakeholder meeting, after submission of the final report.

Evaluation Strategies Comparing Natural and Financial Capital Required of Each Alternative

We will use our extensive experience in the many areas of solid waste management to carry out the Activities described in this proposal. In the last 10 years, we have provided services for solid waste projects with a construction value of more than \$2 billion. These projects have included collection and routing studies, recycling programs and facilities, composting, transfer stations, landfills and waste-to-energy (WTE) facilities. We have also provided comprehensive planning services to public clients ranging from small municipalities to large metropolitan cities generating anywhere from 30 to 12,000 tons per day (tpd). The following describes the types of non-traditional services we can provide for this procurement.

Recycling Planning



At least half the states in the U.S. have long-term recycling goals ranging from 20 to 50 percent of the waste stream.

Recycling has become a household word in the United States and most states have established grant and loan programs to help communities and businesses plan and implement recycling programs. Professional, trade and environmental organizations, along with government agencies, have organized, planned, discussed and supported a wide range of recycling activities.

Waste collection studies typically are composed of a review and assessment of past solid waste management practices and planning efforts. This data is then used to analyze both current and goal-based municipal and/or private collection needs and solid waste management practices, thereby ensuring proper implementation in the future. We have completed collection studies for many municipal and private clients. These studies have been for service areas ranging from several thousand acres to hundreds of square miles and ranging in population from approximately 10,000 to over one million people.

While there is no shortage of public interest in recycling, communities and businesses planning recycling programs face numerous challenges in executing these plans:

- How do we meet goals and guidelines within existing budgets, and political and institutional constraints?
- How do we identify the best companies, equipment, designs and schedules to make recycling really work efficiently and for the long-term?
- How do we gain the cooperation and assistance of the public and regulatory agencies?
- Is recycling the most cost-effective, goal-effective use of public capital assets to achieve residual materials management?

ARCADIS assists communities in planning and implementing recycling programs as part of an integrated waste management system. We conduct waste composition studies, analyze materials markets, prepare feasibility studies, recommend citizen education techniques, provide public relations materials, plan collection schemes and routing schedules, design recycling programs and facilities, perform site evaluations, conduct contract negotiations, and work with community groups and public officials in implementing source separation programs. Our recycling plans typically include an evaluation of the following issues:

- Recyclable material quantities
- Available markets and cost/revenues
- Collection strategies
- Processing technology alternatives
- Existing built and natural infrastructure
- Facility ownership and access scenarios
- Siting issues
- Built and natural infrastructure requirements
- Capital and operating costs
- Available financing arrangements

These projects typically require the development of a working database to contain and analyze the information acquired throughout the planning process. Our solid waste planners are well versed in developing and managing databases for solid waste and recycling projects.

Routing Studies

Routing studies — the evaluation of existing collection routes and the development of recommendations to make these routes more efficient — are essential to communities seeking to lower collection costs. ARCADIS has assisted a number of municipalities, as well as private clients, in the assessment of existing collection routing and in the development of more capital efficient routes. We supported DCDPW in re-thinking the street sweeping routes and improved the usefulness of RouteSmart in doing so.

Financial Consulting/Engineer Feasibility Study

ARCADIS is dedicated to providing assistance to solid waste utilities in forming and implementing comprehensive strategies. Our approach is to provide high-level management policy consulting while identifying and analyzing strategic opportunity areas. In today's competitive utility environment, utilities need assistance in both traditional financial areas, as well as the development of strategic utility finance and management plans. We recognize that providing these expanded consulting services to our clients requires the following:

- Strong financial analysis, modeling, and rate/charge development and capital planning capabilities
- A detailed knowledge of all aspects of utility operations
- A clear understanding of the current and future operating pressures on utilities, including natural capital availability
- Detailed expertise in a number of support areas, including design engineering, operations, information technology, and utility management and organization
- A thorough knowledge of public and private utility industry practices and experience in implementing effective change management programs

We provide strategic management consulting and strategic capital management planning as a routine service to many of its clients.

Siting, Regulatory, Institutional and Legal Requirements for Each Alternative

Infrastructure Analysis

For public and private enterprises, usable air, land and water assets are in increasingly limited supply. In today's climate of intense scrutiny by regulatory agencies and concerned citizens, natural capital analysis has become an essential element in the

process of implementing material management projects. ARCADIS has comprehensive in-house capabilities in the field of infrastructure assessment and emphasizes close cooperation between engineers and environmental scientists on all of our projects. Our staff includes specialists in geology, hydrogeology, soils and agronomy, water resources, aquatic and terrestrial biology, air quality, load capacity, resource allocation, asset management using specialists in toxicology, and land use and socioeconomic planning. **We have prepared environmental impact assessments and statements for projects ranging in land area from a few acres to more than 450 square miles and in population from sparsely settled rural areas to highly developed urban centers.** These projects have been extremely diverse and have included urban and industrial development, solid waste planning, water supply and sewage facilities, wetland evaluation, power generating plants, and waterway dredging. Our staff assesses baseline natural capital, identifies capacity and evaluates capability available for the anticipated enterprise activity.

Health Risk Assessment

Regulatory agencies are increasingly requiring health risk assessments as part of the permitting procedure for waste disposal facilities. A health risk assessment provides a detailed evaluation of the potential human health requirements of a proposed facility. This evaluation is based on assumptions formed through literature reviews and knowledge of the environmental behavior of certain contaminants. The methodology used to complete a health risk assessment involves:

- Identifying potential hazards (routes of exposure)
- Analyzing and summarizing toxicity data
- Examining environmental fate and transport
- Estimating exposure to human or environmental receptors
- Characterizing risks

ARCADIS' experience has shown that the specific methodology used for a health risk assessment depends on applicable state guidelines and the concurrence of the reviewing agencies. This approach verifies that the protocol used for assessment is acceptable prior to its inclusion in an environmental impact statement.

Using EPA-approved methodology, ARCADIS toxicologists have conducted health risk assessments for several waste incineration projects as well as for landfills, hazardous waste remediation projects, and construction projects on inactive landfills. Routes of exposure that we have investigated include direct inhalation, skin contact with contaminants in dust and soil, and consumption of contaminants in local produce. These assessments have been subjected to peer review by independent technical committees and have received favorable comments from state agencies.

Regulatory Analysis

Securing regulatory approval within a reasonable time frame is crucial to successful project implementation. One key to obtaining timely approvals is meticulous coordination of the environmental review and permit application process. ARCADIS uses a computer based critical path method (CPM) so that all regulatory procedures are adhered to and are completed on schedule. This approach has proven to be particularly successful with complex projects such as our coordination of more than **25 solid waste and environmental permits for a Bergen County, New Jersey, resource recovery project**; however, smaller projects also benefit from use of the CPM to clearly delineate the regulatory process.

Another key to obtaining regulatory approval is knowledge of the local regulatory framework, which often requires the involvement of many multi-jurisdictional agencies and governmental bodies in order to be successful. ARCADIS has demonstrated the ability to deal successfully with multiple agencies/bodies involving critical project issues such as siting, environmental concerns, waste control, etc.



To find the optimal solution, we engage the your customers and your staff through workshops to solicit ideas and input.

Public Participation

We know the importance of public participation in managing change, particularly for a government enterprise. We develop the framework of a public participation process and staff and facilitate stakeholder technical workgroup(s) to provide review and input on the project progress and deliverables.

Project Management Approach

Mr. Biff Corning will be the Project Manager for executing our Solid Waste Management Consulting Services for the District of Columbia's Department of Public Works. He has the full authority of the ARCADIS team to commit and direct all the resources needed to successfully meet and exceed the expectations of the District of Columbia. Biff has worked with the Department of Public Works over the last four years as Project Manager for the Street Sweeping Program (several phases from evaluations to implementation) and, most recently, the Waste Characterization Study for the District of Columbia.



He has developed strong working relationships with leaders and staff to create results oriented and innovative results. As well, he has long-term working relationships with the principals from Nspiregreen and Koetz and Duncan.

Our project management process and quality assurance and quality control (QA/QC) procedures are applied and documented through the development of a project-specific

project management plan. In the planning process we customize standard processes to accommodate each project’s unique technical, environmental, regulatory, and stakeholder considerations so that value is embedded into every aspect of our project deliverables.

Effective project management relies on the ability of the project manager to guide and unify a team to deliver a project that meets the client’s expectations. Our project managers are trained in consulting industry practices and have demonstrated excellence in the key factors of project management success:

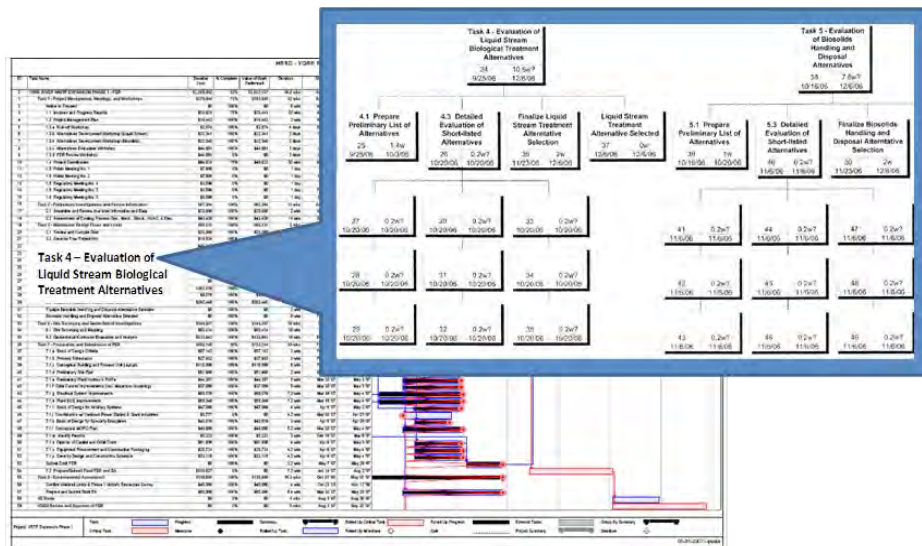
- Identifying and anticipating potential issues before they become critical
- Evaluating competing alternatives and approaches to identify appropriate solutions to resolve an issue
- Prioritizing activities and resources to maintain project schedule, scope, and budget on track
- Providing clear leadership to the project team through the decision-making process in light of competing project goals and priorities
- Communicating effectively with the client throughout the project

Our project managers use the project management plan as a “living” document that is monitored and updated continuously to achieve the ultimate project goals. If required, on very large and complex projects, our project managers are assisted in the development

and execution of their work by specialists in the areas of cost/schedule, risk management, and subconsultant management. Our team member firms typically are selected based on their relevant skills, historical insights, and experience likely to contribute significantly to project success.

Our project management approach consists of five interrelated management activities:

1. Stakeholder Engagement. While optimal technical solutions are critical to project success, technical creativity on a given project has the best chance

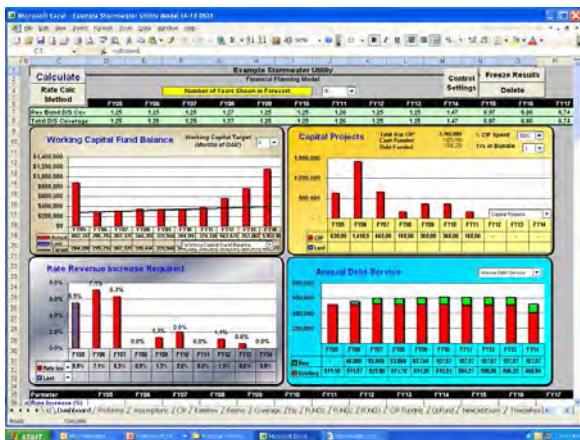


Mitigation measures for high risks are implemented into the project’s work breakdown structure (WBS) schedule and budget.

Real Alternatives for an Optimal Solution

for successful implementation if accepted by all key stakeholders. Since most projects involve multiple key stakeholders, our project management approach requires that project planning begin with a stakeholder analysis. Key stakeholders involved in the project are identified and their objectives and concerns are outlined. As necessary, specific activities are planned into the project to address stakeholders' needs. Our approach reflects our view that stakeholder outreach is a "foundation" activity and unifying theme that should be connected to every technical aspect of the project.

2. Risk Management. All projects involve risk to the client and to ARCADIS. Without early identification, monitoring and control, these risks have the potential to lead to projects being delivered over budget, behind schedule, or without critical stakeholder support. Our risk management process includes risk planning (identification, analysis and mitigation) and risk monitoring and control. The development of a risk register — a database in which potential risks and opportunities are identified and qualitatively or quantitatively ranked by the likelihood that they may occur and their likely impact on project scope, schedule, budget, or quality — is one feature of our project management approach. Once risks have been identified and ranked, mitigation measures are developed to address high and medium risks.



Project control encompasses a wide range of financial (scope and cost), human resource and scheduling activities.

3. Communications. ARCADIS believes that a specific and detailed communications plan is critical to project quality. The communications plan helps avoid confusion and potential missteps that might undermine the stakeholders' understanding of project issues and cause delays in project progress. The basis for the communications plan is established by the identification of the stakeholders' information needs in the project management plan. Formal project performance reports and other specific information needs identified during the WBS and project schedule development are included in the communications plan. Information distribution is a constant priority for ARCADIS project managers because communicating with the client, internal project staff, and subconsultants is critical to meeting the proposed technical requirements and schedule milestones. Our project managers and teams have convenient access to tools and processes that facilitate focused, timely and effective communications.

4. Project Control. Critical project control areas that are addressed through our project management approach are:

- **Cost Management.** Project cost management includes initial cost estimating and baseline budget development as the project scope and schedule are defined, followed by continued cost monitoring and control during project execution.

- **Scope Management.** A primary management responsibility on all ARCADIS projects is constantly monitoring whether we are “doing the right job” for our clients. We define the right job through strict project scope management that involves identifying all of the elements that are required to achieve an individual client’s vision of a successful project while excluding elements that are not relevant to or hinder the accomplishment of the client’s stated goals.
 - **Time Management.** After the activities required to complete the project have been defined, they must be properly sequenced and resource-loaded and their durations must be estimated to develop an overall project schedule.
 - **Human Resource Management.** ARCADIS assembles organizational charts for projects and defines major functional areas for key team members. The project manager oversees the development of a complementary Responsibility Assignment Matrix (RAM) that clearly identifies the project team member responsible for each activity, as well as the team member who will provide support, input, or review/ approval of the activity. Using integrated project management and resource management tools, we are able to proactively determine workload, identify potential overloads, and shift activities and priorities as necessary to maintain the overall schedule and cost of the project as planned.
5. **Quality.** ARCADIS defines quality as understanding, planning for, and meeting clients’ needs and expectations while consistently conforming to the applicable standards of professional practice. Our quality management process integrates our firm’s quality policies, procedures and activities into our projects. The process involves clear definition of project roles and responsibilities, project-specific planning to incorporate quality in every aspect of the project, and identification of appropriate quality assurance and control procedures for each project.

Subconsultant/Subcontractor Management

Our approach to managing the efforts of our subconsultants is based on a high level of understanding developed via a partnering process with each subconsultant. Our commitment to close working partnerships with our subconsultants enhances our team’s productivity and value to client. Nevertheless, we understand the need as prime consultant to maintain vigilance regarding technical or business-related matters. We are ultimately responsible to our clients and will use all appropriate means to provide proper performance of the work by all of our team members.

The multiple project controls instituted on our projects are designed in part to provide the necessary level of management of our subconsultants. We routinely review subconsultants’ work products for technical quality, coordinating our review frequency and timing to allow any needed revisions to be accomplished within the established project schedule.

Nspiregreen is our primary subconsultant. They have asked two small businesses to assist them in the execution of this project. Though Nspiregreen will enter into subcontracting agreements with Koetz and Duncan and RKE Enterprises, ARCADIS will provide support and coordination as necessary to the entire team.

Nspiregreen LLC

Nspiregreen is an environmental consulting firm based on Washington, DC. Though founded a little more than three years ago, they are currently working on two of the city's major planning efforts: the long-range multimodal plan and the comprehensive energy plan.

Nspiregreen delivers technical and community-driven solutions. With engineering and urban planning backgrounds, they specialize in public involvement and outreach for environmental planning and compliance; environmental justice, facility planning and facility environmental program management; and master planning.

Through the creation of their Listen, Engage, Analyze, Feedback (L.E.A.F) model, they translate technical data to communities in a sustainable and meaningful way. The approach helps cultivate “grass seeds”—empowering people to take (and track) actions to affect the outcomes of sustainability that’s relevant to their everyday lives.

Koetz and Duncan LLC

Koetz and Duncan LLC is a capital asset management consultancy for complex technology, manufacture, and government services systems requiring significant physical and natural infrastructure components. As principal, Maureen T. Koetz works with industry and government enterprises whose ongoing investment and operational enhancements have created natural capital and sustainability value that remains unrecognized, unrecorded, and underutilized in system-wide enterprise decision-making.

Ms. Koetz has served in key positions as both decision maker and analyst for public and private enterprise throughout her career in the legal, legislative, and managerial fields related to capital and logistics management. Focusing on operational optimization that achieves triple bottom line goals and meets mission and enterprise performance parameters, Koetz and Duncan’s service offerings in the fields of Natural Capital Asset Management™, Sustainability Profiles™ and Sage Tags™ are a direct result of more than 25 years of executive, analytic and advisor experience to enterprises whose operational goals require significant, ongoing and affordable access to scarce air, land and water assets in shrinking natural capital pools.

RKE Enterprises, LLC (RKE)

RKE is a hands-on, entrepreneurial-based consulting firm that provides services in three main focus areas:

- 1) Strategic consulting functions for municipalities and waste management companies regarding waste logistics optimization and cost reduction; alternative disposal strategies, including maximizing recycling and composting functions and waste derived fuel generation; and assistance with privatization and strategic partnership initiatives.

2) Public private partnerships serving as the owner's representative or advisory services, on either side of the table. Tasks include shaping strategic vision; negotiating deal structure and reviewing resulting contract documents; negotiating public financial incentives and initiatives; managing public relations and community involvement initiatives; managing political relationships and lobbying efforts; managing legal team; managing other consultants; managing economic inclusion initiatives, goal setting, and outreach; tracking data and documenting results; providing comprehensive reporting as required to stakeholders; overseeing and/or implementing project close out; and assisting with long term planning, maintenance, and follow up. Specialty areas are mixed development, affordable housing, and large infrastructure projects.

3) Employee leasing and contingent worker services for large corporations using alternative work force approaches to managing labor and labor related expenses.

RKE takes on diverse assignments requiring in-depth negotiations, complex logistics and creative yet common sense solutions. RKE personnel have negotiated an unprecedented 20-year disposal agreement between the District of Columbia and the waste industry that was implemented in 2003 and required complete renovation of the two DC-owned and operated transfer stations and shut down of private sector transfer stations, while simultaneously providing the framework for the promulgation of a final set of waste transfer regulations, and resolution of numerous ongoing related lawsuits.

Technical Expertise

Similar Project Experience by Firm

ARCADIS provides full-service materials management consulting services — including strategic planning, design, permitting, commissioning, operations monitoring, rate consulting, and financial advisory services. We have more than 60 years of experience developing all types of solid waste management facilities, including materials recovery facilities, transfer stations, landfills, composting and WTE facilities.

By keeping abreast of legislative and market dynamics, we can help DCDPW deal effectively with new regulatory requirements, changes in regional collection and disposal practices, and aging facilities. This will provide both substance and process markers for the scenarios that will be developed.

In the past 10 years, ARCADIS has completed approximately 50 major solid waste projects and prepared more than 20 solid waste management plans. During that period, we provided services for solid waste projects with a construction value of more than \$2 billion. We have completed projects to quantify and characterize municipal solid wastes, evaluate existing facilities, plan transfer stations, develop source separation/recycling programs, evaluate site and technology alternatives, perform environmental assessments, and review regulatory requirements and implementation considerations. Our planning process is typically a multidisciplinary effort, with engineers, economists, and environmental scientists all contributing to the technical, economic, and environmental assessments.

ARCADIS Value Approach to Materials Management

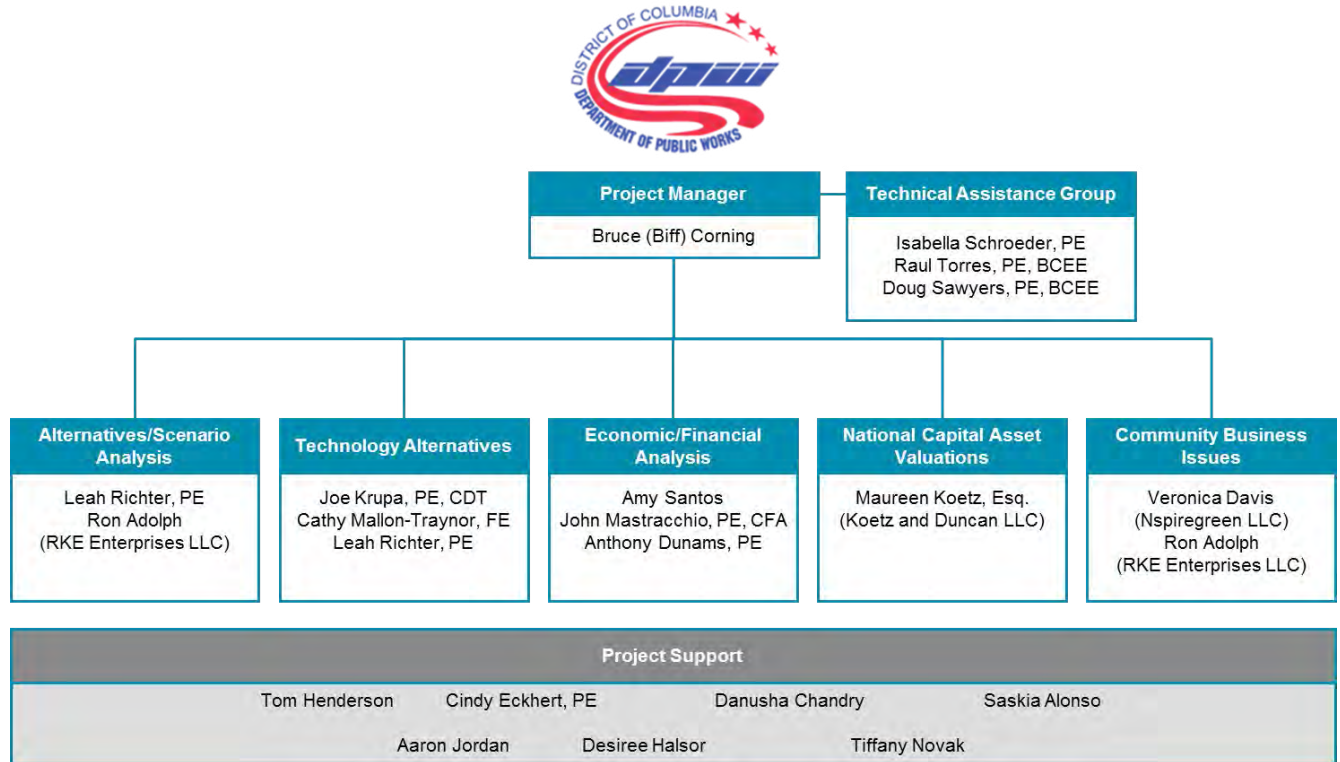
Planning and implementing a materials management program can create multiple value streams for the customer and program operator in the form of meeting both sanitation and asset recovery goals. Assembling the right combination of technological, institutional, legal, economic and capital components to develop an optimized system creates value for both the citizen user and the operator's triple bottom line. As local governments pursue solutions to the ever-increasing problem of solid waste disposal, they often discover that a single method or technology is not likely to offer a complete solution.

The following project matrix summarizes our experience with Solid Waste Management services. Project details are provided in Appendix A.

Client	Solid Waste								Recycling		Financial Services				
	Franchise Systems	Solid Waste O&M	Collection Systems Evaluation	Economic Flow Control	Solid Waste Transportation Systems	Solid Waste Management Plans & Feasibility Studies	Solid Waste Market Analysis	Waste-to-Energy Services	Landfill Operation & Administration	Recycling Marketing	Recycling Planning & Implementation	Policies & Procedures	Strategic Planning	Financial Services	Budgetary & Control Processes
Arlington County and City of Alexandria, VA															
Bangkok Metropolitan Administration, Thailand															
Bay County Utility Services Department, FL															
Bergen County Utilities Authority, NJ															
Borough of Westwood, NJ															
Borough of Woodbine, NJ															
Bristol Resource Recovery Facility Operating Committee, CT															
Broward County, FL															
Bucks County, PA															
City of Albany, NY															
City of Bristol, CT															
City of Buffalo, NY															
City of Camden, NJ															
City of Charlotte, NC															
City of Citrus Heights, CA															
City of Johnstown, NY															
City of Key West, FL															
City of Miamisburg, OH															
City of New Haven, CT															
City of Newark, NJ															
City of Oakley, CA															
City of Orlando, FL															
City of Oxnard, CA															
City of Pleasanton, CA															
City of Sarasota, FL															
City of Tampa, FL															
Coastal Regional Solid Waste Authority, NC															
Collier County, FL															
Connecticut Resource Recovery Authority, CT															
Cornell University, NY															

Client	Solid Waste								Recycling		Financial Services				
	Franchise Systems	Solid Waste O&M	Collection Systems Evaluation	Economic Flow Control	Solid Waste Transportation Systems	Solid Waste Management Plans & Feasibility Studies	Solid Waste Market Analysis	Waste-to-Energy Services	Landfill Operation & Administration	Recycling Marketing	Recycling Planning & Implementation	Policies & Procedures	Strategic Planning	Financial Services	Budgetary & Control Processes
Counties of Raleigh, Fayette & Wyoming, WV			●			●				○	○				
Danbury, CT		●	●			●	●			○	○		●	●	
Dutchess County, NY				●				●				●			
Eden Wood Realty, NJ									●				●	●	
Erie County Industrial Development Agency, NY						●									
Fairfax County, VA		●		●		●	●	●	●		○	●	●	●	
Fort Pierce Solid Waste Management, FL	●	●	●			●		●			○				
Greenwich, CT		●				●				○	○		●	●	
Hudson County Improvements Authority, NJ						●									
Indian River County, FL	●		●			●								●	
Lake County, FL		●					●	●						●	
Lee County, FL	●	●		●	●	●	●			○	○		●	●	○
Miami-Dade Department of Solid Waste Management, FL		●		●			●	●	●			●	●	●	○
Mid-American Waste Systems, Inc., OH									●		○				
Middlesex County, NJ						●							●		
Monroe County, NY		●	●								○				
Nassau County, NY						●							●		
New Haven Solid Waste and Recycling Authority, CT						●							●		
New Jersey DEP, NJ									●						
New Jersey Sports and Exposition Authority, NJ										○	○				
New Jersey Turnpike Authority, NJ									●						
Northwest Solid Waste Management Board, NY						●									
Norwalk, CT	●	●	●		●	●	●					●	●	●	
NYC Department of Sanitation, NY									●				●		
Oakland County, MI			●					●			○				
Onondaga County Resource Recovery Agency, NY				●	●			●							
Passaic County, NJ										○	○	●		●	
Prince George's County, MD	●	●	●			●		●	●	○	○		●	●	

Client	Solid Waste								Recycling		Financial Services				
	Franchise Systems	Solid Waste O&M	Collection Systems Evaluation	Economic Flow Control	Solid Waste Transportation Systems	Solid Waste Management Plans & Feasibility Studies	Solid Waste Market Analysis	Waste-to-Energy Services	Landfill Operation & Administration	Recycling Marketing	Recycling Planning & Implementation	Policies & Procedures	Strategic Planning	Financial Services	Budgetary & Control Processes
Sarasota County, FL		●	●			●				○	○	●			
Saratoga City Solid Waste Agency, NY						●							●		
Solid Waste Authority of Central Ohio, OH					●	●									
Solid Waste Authority of Palm Beach County, FL		●	●				●	●							
Solid Waste Authority of Puerto Rico, PR	●									○		●			
State of Rhode Island, RI						●				○		●	●		
Sullivan County, NY						●			●						
Tompkins County, NY					●	●			●	○		●		●	
Tompkins County, NY									●						
Town of Larchmont-Mamaroneck, NY		●	●												
Town of Southampton, NY		●	●			●	●		●	○					
Township of Montgomery, NJ									●						
U.S. Pipe Foundry Co., NJ									●						
Ulster County, NY	●	●	●			●		●		○	○		●	●	
Union County Utilities Authority, NJ		●			●	●		●		○		●		●	
Virginia Peninsulas Public Service Authority, VA		●				●	●		●	○		●	●		
Warren County Pollution Control Financing Authority, NJ						●	●							●	●
Westchester County, NY		●				●	●	●		○	○		●		
York County Solid Waste Authority, PA		●		●		●	●	●	●	○	○	●	●	●	●



Resumes for team members are provided in Appendix B.

Team Resumes

Mr. Corning will be leading a team that is knowledgeable with the planning, design, procurement, implementation, construction management, and operations and monitoring of all types of solid waste facilities, including WTE facilities, transfer stations, materials recovery facilities, bulk waste processing facilities, and evaluation of emerging waste processing facilities. They will be working with our consulting team members in developing the analytic framework to provide the technical expertise in evaluating technologies and options. This team and others at ARCADIS have provided many of our clients with the full suite of services from plan development through implementation. The following is a list of selected key ARCADIS staff that will be supporting this project. Other staff and specialists, many of whom are on the project organizational chart, will be used on as-needed basis.

Biff Corning - Project Manager

Mr. Corning implements transformational management and operations in municipalities and utilities to create measurable, practical and value generating sustainable programs and practices. He creates knowledge management practices that integrate the natural and built infrastructure as a total asset management program. He has experience in

large-scale program and project management, line and task management, technical support, fieldwork and has managed numerous environmental and compliance-related programs. He has worked with many federal, state and local agencies to develop strategies for implementing programs that reflect new policy directions and or new strategic thinking.

Mr. Corning has worked both at the headquarter level, as well as in the field, so he understands the impact of policy decision to the field and the importance of creating action plans that are practical and responsive. He has managed and implemented new program activities throughout government organizations related to science, environment, transportation, engineering and energy. He has taught university courses in Policy Analysis, Normative Policy, Policy Implementation, Statistics and Probabilistic Modeling.

Tom Henderson – Project Support

Mr. Henderson has more than 30 years of experience in developing and managing large WTE facilities and integrated solid waste management systems. He has served as project manager on WTE facilities with more than 7,500 tpd of waste and 211 megawatts (MW) of electrical generating capacity. These facilities have successfully combusted more than 51 million tons of municipal solid waste over a combined 61 years of operation. Mr. Henderson was also a Senior Public Works Executive with a record of re-engineering and operating solid waste management programs for large urban governments with a diverse, changing, and unionized work force. His experience includes the planning, design, permitting, financing, construction, startup, and operation of projects, including transfer stations, landfills, material recovery facilities and WTE facilities costing more than \$1 billion. He is a specialist in all aspects of solid waste management, including facility development, financing, operation, and maintenance; structuring of project-backed taxable and tax-exempt debt; intergovernmental relations; budget making; renewal and replacement (R&R) improvement funds; and managed competition.

Joseph Krupa, PE – Technology Alternatives

Mr. Krupa has 14 years of experience specializing in solid waste projects involving WTE, material recovery, and biosolids management facilities. His experience includes conducting maintenance and outage inspections, performing market studies, evaluating demonstration and acceptance test results, preparing procurement documents, evaluating contract compliance, and preparing and presenting operations monitoring and feasibility engineering reports. He has assessed the efficiency of various types of solid waste and wastewater management programs, conducted pro forma analyses, transportation analysis, provided litigation support services for expert witnesses, and provided technical support during vendor negotiations.

Doug Sawyers, PE, BCEE - Technical Assistance

As regional solid waste market sector leader, Mr. Sawyers brings a broad understanding of solid waste management issues to the contract, including planning and implementation of recycling, waste collection/transfer and disposal systems, including WTE.

Catherine Mallon-Traynor, FE - Technology Alternatives

Ms. Mallon-Traynor has broad solid waste program management experience dealing with planning and financial assessment of various kinds of infrastructure. Her unique combination of engineering and management experience has been beneficial in the evaluation of processing technologies and in participation of negotiations with private sector vendors. Her specialized experience includes regulatory review, economic analyses, organization and implementation of recycling programs, technology assessments, preparation of procurement documents, preparation of performance guarantees, evaluation of private sector proposals and contract negotiation.

Tiffany Novak - Project Support

Ms. Novak has 8 years of experience working on water resources, transportation projects, and currently a WTE project, and specializes in regulatory compliance, permitting, facility planning, NEPA (and mini-NEPA) Environmental Assessments (EA) and property and real estate issues. She has experience in coordinating projects for regulatory compliance under both the State Environmental Quality Review Act (SEQRA) for New York State and the City Environmental Quality Review (CEQR) for New York City. She is responsible for the preparation of EA forms and statements and the preparation of Categorical Exclusion (CE) documents for the NEPA process, as well as environmental permit applications for federal, state and local agencies and municipalities. Her experience has enabled the thorough research and analysis of categories addressed in the NEPA documentation, including socioeconomics, land use, zoning, visual and aesthetic impacts, community disruption, environmental justice, historic and archaeological resources, traffic and parking, noise and vibration, park lands, public health, and consistency with the local master plan.

She has also managed, coordinated and implemented community outreach efforts by preparing and conducting Public Participation Plans, organizing public meetings, and obtaining legal access agreements with industrial and private residential property owners. She also has experience with reviewing and evaluating property ownership and easement issues and auditing design and construction activities associated with electrical and gas transmission project work for compliance with issued regulatory requirements.

Past Performance

Letters of Recommendation

Three letters of reference from municipal clients for whom we have provided similar solid waste consulting services are provided at the end of this section.

Successful Recommendation Strategies

ARCADIS and the team members presented in this proposal have been responsible for dozens of projects where they assisted a jurisdiction in implementing a solid waste management plan whether developed as a result of a project that began with that planning effort or implementing plans adopted but developed elsewhere. In each case, ARCADIS:

- Brought in technical experts with experience for a successful implementation
- Developed best practices and solutions from strategy to plan to implementation
- Recommended solutions were implemented
- Met Jurisdiction's goals

The following are summaries of notable projects where ARCADIS or our team members implemented a decision made by a jurisdiction.

DC Government

Members of the current ARCADIS team worked from January 2000 to November 2003 to develop a strategy, a plan and then implement what ultimately became a formal, comprehensive, 20-year solid waste transfer and disposal agreement between the DC Government and the private sector, regarding all aspects of transfer and disposal, and resolution of numerous outstanding legal cases and regulatory matters. This historic agreement was ratified by then Mayor Anthony Williams under Emergency Legislative Authority granted by the DC Council. The agreement determined how 800,000 tons or close to 90 percent of the total waste stream passing through DC would be handled. Getting this deal done involved, in part, the following:

- Physical review of all existing solid waste transfer stations and current operational logistics and recommendation for a final, comprehensive transfer and disposal scheme handling all MSW, C&D, recycling, leaves, citizen drop-off and electronic recycling
- Creation and review of numerous siting and technical proposals to determine which of the six transfer stations would stay open, which would be renovated, and which would be proposed to shut down; costs and timeframe to accomplish

- Complete re-design and multi-million dollar restoration of the two District-owned transfer stations and the closure of two private sector facilities
- Review of the existing regulatory structure and proposal of required revisions and additions to the regulations the DC Council had adopted
- Review of all outstanding legal matters and work with DC Government and private sector attorneys to propose acceptable legal settlements to all parties
- Analysis of regional economics of waste and determination of a methodology for DC Government to annually gain feedback from the private sector as the District reviews and sets tip fees and other annual cost escalators
- Extensive negotiations between all parties and stakeholders involved

Recommendations from ARCADIS team members, including subconsultants, had to be reviewed, approved and implemented by the DC Department of Public Works, and, in some cases, senior members of the Administration and also required legislative action of the DC City Council. The project was completed several years later and the achievement eased tensions between the public and private sector, dramatically improved throughput and overall operational waste transfer efficiencies, and reconstruction and modernization of the District's two transfer stations which provided the District with capacity for the foreseeable future.

Palm Beach County, FL

The Solid Waste Authority of Palm Beach County (Authority) is responsible for processing and disposal of all solid waste and recyclables generated in the County. In the late 1980s and early 1990s the Authority developed an integrated solid waste management system which included two materials recovery facilities (MRF), a sanitary landfill, a construction debris landfill and 2,000 tpd refuse derived fuel (RDF) WTE facility. In the early 2000s with the Authority's facilities approaching 20 years of operation, it was faced with the need to renew, expand or replace all of these facilities within the next decade.

ARCADIS helped the Authority evaluate various options which led to a plan to invest more than a billion dollars in replacement, refurbished, expanded and new processing and disposal facilities. This included the siting and development of a new and larger replacement MRF which allowed for the expansion of both residential and commercial recycling programs, a decision to refurbish but not expand its existing RDF WTE facility, and development of a new 3,000 tpd mass burn WTE. These projects, along with construction of additional cells at the existing sanitary landfill and closure of the existing construction debris landfill, allowed the Authority to stretch the life of its existing landfill by more than 40 years to beyond the year 2050. This resulted in plans for construction of a controversial new sanitary landfill in the county to be delayed indefinitely while

providing the ability of the Authority to continue meeting its processing and disposal responsibilities.

Fairfax County, VA

Fairfax County is facing a decision point in which they have to decide on what disposal alternatives work best for managing their solid waste over the next 20 years. An initial step in this process was to develop a Decision Model for evaluating alternatives to assure that the solid waste management needs of County constituents are met while minimizing negative environmental and economic impacts and meeting other requirements. (Fairfax County's overarching requirements include the County's vision and environmental commitment established in the Board's Environmental Agenda, legislative requirements. *Fairfax County Code: Section 109.1-1-1(a)*), and the *2004 County Solid Waste Management Plan*.) The County's planning process will consider a number of alternatives for accessing existing or potentially new disposal markets, as well as other approaches for the long-term management of MSW and recyclables generated within the County. ARCADIS developed the decision model which has been implemented by the County to evaluate their various alternatives for managing solid waste into the future.



CITY OF NEW HAVEN
OFFICE OF MANAGEMENT & BUDGET

165 Church Street, New Haven, CT 06510
Phone: (203) 946-6413, Fax: (203) 946-7924



JOHN DeStefano, Jr.
MAYOR

LAWRENCE D. RUSCONI
BUDGET DIRECTOR

Columbia County Board of Commissioners
P. O. Box 1529
Room 203
Lake City, FL 32056-1529

Dear Commissioners,

This letter is to serve as a positive reference for Malcolm Pirnie regarding their knowledge in solid waste management and related services.

Malcolm Pirnie has assisted the City of New Haven in a wide range of services over the past decade. They have successfully and consistently demonstrated their expertise, professionalism, and ability to meet budget and schedule goals. With respect to solid waste management they have provided landfill closure and permitting assistance, solid waste system review and financial planning services, transfer station operation, recycling and solid waste disposal procurement services, contract negotiations, and waste flow control and compliance. Malcolm Pirnie was instrumental in assisting us in developing a solid waste authority that is best positioned to meet the current and future needs of the City.

I strongly affirm our trust in Malcolm Pirnie and would encourage you to select them for your consulting needs. Please feel free to contact me if you require any further information.

Sincerely,

CITY OF NEW HAVEN

Lawrence Rusconi
Budget Director



Collier County
Public Utilities Division
Solid Waste

January 20, 2011

To Whom It May Concern:

The Collier County Solid Waste Management Department (SWMD) would like to take this opportunity to acknowledge Malcolm Pirnie, Water Division of ARCADIS for exceeding our expectations in the management of our projects, their hard work and dedication to the successful completion of our contract negotiations.

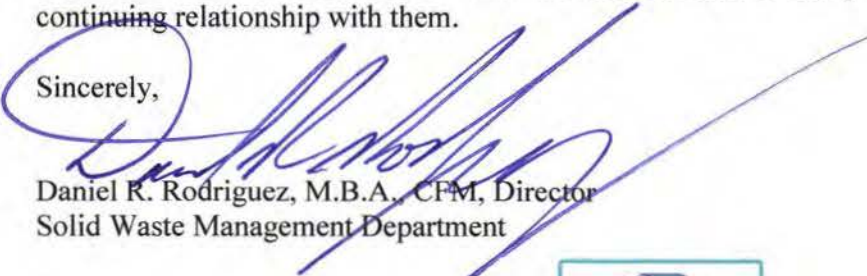
Malcolm Pirnie has provided valuable assistance to SWMD during the development of the Integrated Solid Waste Management Strategy (ISWMS) and subsequent Workshop with the Board of County Commissioner; the ISWMS is the foundation of our solid waste program providing a "way forward" to decrease our dependency on our landfill and move to recycling initiatives. As a result of Malcolm Pirnie's project management expertise, we added 20 years of life to the landfill, we achieved the highest recycling rate in the State of Florida (80%) and won a National Award: SWANA 2009 Gold Special Waste Award.

In 2007-2008 Malcolm Pirnie again, provided expert assistance on the Landfill Gas to Energy project with Waste Management Inc. of Florida (WMIF). Through their expansive knowledge in the solid waste industry Collier County was able to negotiate an exceptional opportunity for the County in partnership with WMIF to fully utilize the methane gas produced at the landfill to create an alternative energy source.

Malcolm Pirnie was also an integral component of the project delivery team for the Alternative Daily Cover project. The end result being the use of PosiShell being utilized at the Landfill for daily cover, saving the County thousands of dollars annually in soil costs. Through these highlighted projects and numerous smaller projects, the analysis conducted by Malcolm Pirnie allowed us to bring best value strategy to our negotiations and their project management skills led us to meet our objectives with deliberate execution. Over the years, we have come to rely on their knowledge and industry expertise. Their initiative has made a difference in our future and our impact on the environment.

The Solid Waste Management Department would highly recommend Malcolm Pirnie to other municipalities and organizations wanting to have comprehensive negotiations and environmental services at a fair and reasonable cost. We look forward to many more years of cooperation and a continuing relationship with them.

Sincerely,



Daniel R. Rodriguez, M.B.A., CFM, Director
Solid Waste Management Department





THE PRINCE GEORGE'S COUNTY GOVERNMENT
DEPARTMENT OF ENVIRONMENTAL RESOURCES
Waste Management Division



January 21, 2011

Mr. Steve R. Nesbitt
Principal Engineer
ARCADIS U.S., Inc
701 Town Center Drive, Suite 600
Newport News, VA 23606

Dear Mr. Nesbitt:

Since 1988 Malcolm Pirnie Inc (now part of ARCADIS US) has made continuous uninterrupted provision of broad based solid waste management engineering services to Prince George's County Department of Environmental Resources.

Your efforts have assisted the County through providing professional independent assessment and monitoring of solid waste infrastructure including regulatory permitting, design, construction oversight, compliance monitoring, as well as establishment of a system benefit charge used to generate Department revenues.

The County has found your services to be of high-quality and provided in a responsive manner, which has no doubt contributed to our long-lasting professional relationship. We look forward to your continued commitment in serving the County.

Sincerely,

A handwritten signature in cursive script that reads "Elizabeth Smolen".

Elizabeth Smolen
Administrative Specialist

Brown Station Road Sanitary Landfill
3500 Brown Station Road, Upper Marlboro, Maryland 20774
TDD (301) 985-3894



Appendix A – Project Experience

**Solid Waste Management
Consulting Services
Technical Proposal**

We are proud of our record of providing quality client service and have been rewarded with long-term relationships, many of which have been ongoing for more than 20 years. The following project summaries represent our work and services that are related to WTE projects.

Miami-Dade Department of Solid Waste Management, FL

Since 2007, ARCADIS has been the bond engineer for the Miami-Dade Department of Solid Waste Management (DSWM) for the 3,000 ton per day refuse derived fuel (RDF) Resources Recovery Facility (RRF) as well as providing other general solid waste management services. Recent projects completed for the County include the following:

- Assistance in evaluating Montenay-Dade, Inc. and Covanta Energy Corporation Share Purchase Agreement. With the acquisition in 2009 of most of Veolia Environmental Services North American waste to energy business by Covanta Energy Corporation and the potential assignment of the Resources Recovery Facility (RRF) operating agreements from Montenay-Dade, Inc. to Covanta, ARCADIS conducted an analysis evaluating the impact of such assignment and the options available. As part of this effort, ARCADIS provided DSWM with a Financial Impact Review, an O&M Impact Review, a Review of Other Potential Impacts, a Summary of Potential Agreement Amendments, and provided Recommendations. The result of ARCADIS's review was a recommendation to approve the assignment of the agreements to Covanta contingent on several conditions. ARCADIS concluded the assignment would result in a stable financial position and improved operation of the RRF facility.
- Appropriateness of Rates and Charges. ARCADIS prepares an annual financial assessment of the appropriateness of rates and charges and the renewal and replacement budget amount for each Fiscal Year. The scope of services complies with requirements of the Bond Ordinance, Section 508. As part of these efforts, ARCADIS conducts the following activities: Rates and Charges Assessment, Update and Confirmation of the Fiscal Year Data in the Financial Model, Data Collection and Financial Model Update, Review of Budgeted Amount for Renewal and Replacement Needs, Capital Improvements Program Overview, revenue Assessment and Draft and Final Reports.
- Resource Recovery Facility Operations Monitoring. ARCADIS provides monitoring services for the Resources Recovery Facility (RRF). The monitoring program includes the RRF's operational efficiency, physical condition, and operation and maintenance practices for conformance with the appropriate Service Agreement, Bond Covenants, and generally accepted industry standards. As part of these efforts, ARCADIS conducts the following activities: Facility Monitoring, Monthly Observations and Reports, Biweekly Meeting attendance, Outage Inspections, and Stack and RATA test monitoring.
- Annual Reporting for Resources Recovery Facility. ARCADIS performs annual inspections of the RDF Resources Recovery Facility (RRF). The inspections report the physical condition and operating efficiency of the RRF. ARCADIS also conducts annual Document Reviews and Interviews, in addition to facility inspections, to evaluate Performance, Operations and Maintenance and Environmental Compliance for each operating year. The results of our evaluation are presented in an Annual Report in accordance with Bond Covenants.
- Annual System Reporting. As required by Bond Ordinances 05-27 and 96-168, ARCADIS prepares each Fiscal Year's Annual System Report to document the physical condition of system assets, and conformance with the terms, conditions, and covenants of the Bonds: four Landfills, three Transfer Stations, 13 Trash and Recycling Centers and two Maintenance/Truck Wash Facilities. As part of this effort, ARCADIS conducts the following activities: Data Gathering and Analysis of the Solid Waste System, Waste Transfer Operation and Disposal System; review and inspection of the Facilities owned/operated by the DSWM; a review of the proposed Capital Improvement Program; and a review of the Financials (Revenues, Expenses and Debt Service Coverage). ARCADIS also provides calculations to determine the remaining capacity at the three active landfill sites owned by DSWM. These sites include the North Dade Landfill (NDLF), South Dade Landfill (SDLF), and the Resource Recovery Ashfill (Ash Monofill). The determination of the remaining capacity of each landfill is used to meet reporting requirements to the State and assists DSWM in monitoring the goals of their solid waste management plan, monitoring the efficiency of the operations of the landfills, and help with future planning for the solid waste management system.



Westchester County Department of Environmental Facilities, NY

ARCADIS assisted Westchester County in procuring long-term solid waste disposal capacity for its solid waste district municipalities. Westchester County's long-term solid waste disposal agreement with Wheelabrator for the disposal of County municipal waste was scheduled to expire in October 2009. In addition, Wheelabrator has the option to purchase the RESCO solid waste disposal, resource recovery and electric generating facility located in Peekskill, NY at the expiration of their agreement.

As part of this effort, ARCADIS participated in the development of the overall procurement strategy for disposal of the County solid waste. Based on the procurement strategy developed with the County, ARCADIS prepared the draft and final Request for Proposals for Disposal of Municipal Solid Waste in accordance with the New York State General Municipal Law 120-w.

ARCADIS conducted a technical and financial evaluation of the proposal information received including conducting due diligence reference checks. Other tasks performed under this project included conducting a marketing analysis for other disposal alternatives such as in and out of state landfills and transfer stations for comparison with the price proposal information received; developing meeting minutes; and participating in client and legal counsel meetings. We are assisted in contract negotiations on an as-needed basis for the development of their new solid waste disposal agreement between Wheelabrator and the County. During contract negotiations, we have provided technical support regarding such items as change-in-law, force majeure, energy and metals recovery revenue sharing, environmental pass through costs, fuel surcharges, payment in lieu of taxes (PILOT) agreement review, etc.

Solid Waste Management History with the County

Our firm has been providing solid waste management assistance to Westchester County since 1959, when our "Report on Refuse Disposal" first called attention to the impending exhaustion of landfill capacity in the county. In 1966, we prepared a "Report on Refuse Incineration," which recommended a countywide system of incinerators and transfer stations, including a 1,500-tpd incinerator adjacent to the county landfill at Croton Point.



We thereafter provided the administrative, management, environmental, and engineering services necessary to implement a countywide resource recovery program. Our firm's services were divided into the following three phases:

- Overall management, administration, and preliminary engineering for the entire solid waste management project.
- Environmental assessment, review and evaluation services.
- Specific design and implementation tasks including development of requests for proposals and response evaluation, construction and operation cost estimating, feasibility reports for transfer stations, preparation of contract documents, and specifications and design of facilities as required.

Highlights of our solid waste management projects for the county include the following:

- Planning. Development of a countywide plan for resource recovery, including market assessment, environmental evaluation, site selection, resource recovery facility technical evaluation and conceptual design, and transfer station siting and conceptual design.

- Grasslands Resource Recovery Facility. Preparation of request for qualification (RFQ) and request for proposal (RFP) documents for a 1,400 tpd facility, evaluation of responses, recommendation of a finalist contractor, and assistance to the county in extensive negotiations with the recommended contractor.
- Thruway Resource Recovery Facility. Preparation of an RFP for a 1,200 tpd refuse-derived fuel (RDF) facility, evaluation of responses, and recommendation of a preferred system.
- Peekskill Resource Recovery Facility. Preparation of the environmental portion of the RFP documents for the 2,250 tpd facility and evaluation of that portion of the proposals.
- Sprout Brook Residue Disposal Site. Design of a landfill for residues from the Peekskill Resource Recovery Facility, construction administration, and resident services.
- Provided full design documents for a 350 tpd materials recovery facility (MRF). The firm prepared bidding documents and assisted the county in selecting and negotiating four separate contracts to supply processing lines and construct the facility. Special design techniques were required to make the MRF functional on an existing site with design/construction constraints. This precedent-setting project received 1993 awards for engineering design excellence by the New York Association of Consulting Engineers and the Consulting Engineers Council of New York, and the 1996 Solid Waste Technologies MRF of the Year Award.

We also assisted the county in preparing its solid waste management plan updates to the state, including a report on its recycling program implementation progress.

Solid Waste Authority of Palm Beach County, FL

ARCADIS has served as the Solid Waste Authority's Consulting Engineer for the 2,000-tpd refuse-derived fuel (RDF) waste-to-energy facility, the North County Resource Recovery Facility (NCRRF), for more than 15 years. We recently completed oversight for the refurbishment of the existing facility while the facility continued to operate. In addition, we are assisting the Authority with the implementation of a new mass burn waste-to-energy facility with a processing capacity of 3,000 tpd, the first of its kind in the United States in almost 20 years. The following presents a brief summary of our key activities for the Authority.



Rendering of new facility to the left of the existing facility

New Waste-to-Energy Facility Implementation

ARCADIS has provided professional engineering services to the Solid Waste Authority of Palm Beach County (Authority) and assisted with the planning and implementation of its Integrated Solid Waste Management Plan. After evaluating future solid waste and population growth trends and projections, the Authority Board authorized moving forward with the development of a new 3,000 ton per day mass burn waste to energy facility in order to meet the disposal needs of Palm Beach County residents as well as keep with the Authority's commitment to waste reduction and resource recovery. ARCADIS initiated the development of this landmark project, the first new waste to energy facility to be constructed in the United States in almost 20 years, by performing a constraints and limitations study on the proposed site for the new facility to identify any fatal flaws that may prevent the development of the project. Once the site was determined to be feasible, ARCADIS developed a master project schedule and commenced working on the numerous concurrent activities necessary for the successful implementation of this project.

ARCADIS has been responsible for the planning, conceptual design, permitting, financial support, procurement, and construction oversight of the new facility, which is being completed on an accelerated schedule. The project is being implemented utilizing a full service design, build, and operate approach. Currently under construction, completion of this landmark project is anticipated in 2015. Our services have included:

- Overall program management
- Planning and study services, including review of Alternative Technologies
- Preliminary Design and Detailed design review
- Probable Engineering Cost Estimating
- Permitting, including preparation of all required environmental permit application necessary for the regulatory approval to construct the facility
- Air Quality and Dispersion Modeling
- Human Health and Environmental Risk Assessment Modeling
- Public outreach program development and implementation
- Vendor Procurement, including development of request for qualifications, request for proposals, and evaluation support
- Construction Monitoring, which will include Acceptance Testing

Since its inception, significant progress has been made in the implementation of this landmark project including the completion of the preliminary design, securing environmental permits, procuring a full service vendor, issuance of nearly \$600 million revenue bonds for signing an electrical sales contract, and ongoing extensive public outreach efforts.

NCRRF Refurbishment Implementation and Construction Services

ARCADIS assisted the Authority in developing and negotiating contract terms with the operator of the Authority facility for the facility's retrofit, service terms for an interim operating agreement and new long-term operating agreement upon expiration of the original 20 year operating agreement. Based on the negotiations, the Authority signed an agreement with the existing operator to continue operations for another 20-year term. In addition, the Authority under took the chute-to-stack refurbishment project while the operator continued to operate the facility during the refurbishment. ARCADIS developed the Request for Expressions of Interest (RFEI) and the Request for Qualifications (RFQ) to identify a design-build contractor to construct and install the equipment for refurbishing and upgrading the facility for continued operation over the next 20 years.



ARCADIS provided construction support for what became the Authority's \$200 Million NCRRF Refurbishment Project and assisted the Authority in monitoring construction progress, work quality and conformance with the Contract.

York County Solid Waste Authority, PA

Resource Recovery and Solid Waste Engineering Services

In 2004, the York County Solid Waste Authority (Authority) initiated efforts to study and plan for future waste disposal capacity needs. Our services on this project began with the study of waste management alternatives consistent with the Authority's guiding principles, including increased recycling/recovery, disposal alternatives, and existing and emerging thermal and chemical/biological treatment technologies. These activities included a tour of European WTE facilities to observe and discuss recent advances in WTE designs, technologies and operations. Ultimately, the decision was made to move forward with implementing additional waste processing capacity at either the current site of the existing 1,344 ton per day (tpd) York County Resource Recovery Center (YCRRC) or an alternate site. With this primary decision, we

performed an expansion processing capacity analysis, which determined that a 600-tpd single unit expansion at the YCRRC was the preferred approach.

Over the past two years, we have been providing ongoing consulting services to the Authority which includes:

- Technical consulting services related to the planning, design and contracting for the expanded processing. These activities included financial analyses, waste generation projections, and pollution control technology reviews.
- Preparation of necessary solid waste and air compliance permitting, including a comprehensive solid waste facility permit modification, a pre-construction air plan approval application, air modeling, and a multi-pathway human health and ecological risk assessment. Permitting support throughout the public review and public hearing processes.
- Coordination of design and operating requirements in service agreement negotiations with the operations vendor (formerly Veolia Environmental Services and currently Covanta) for the construction, acceptance operations of the expanded YCRRC.

Due to reduced waste generation over the past two years, the expansion project has been delayed. Efforts have since changed to focus on the development and completion of a facility life extension study (LES). The LES is comprised of detailed testing and inspections of the plant, generally by major component. The LES will provide important information on the current condition of the facility, from which life extension projects will be planned and implemented to successfully extend the useful life of the existing units at acceptable operating and performance standards through 2035.



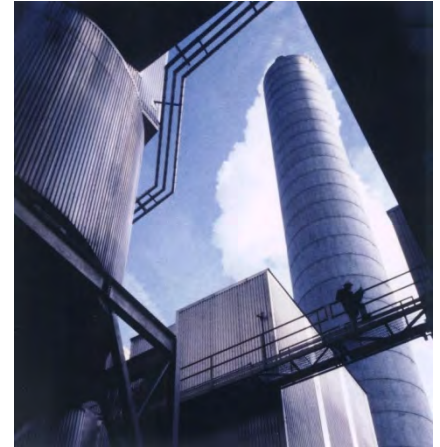
Previous Work

In the mid-1990s, CBS, Inc. acquired Westinghouse, Inc., the initial operator of the York County Solid Waste and Refuse Authority's RRF, and decided that it would exit the waste-to-energy business. ARCADIS was the independent engineer for the development of the facility and supported the negotiations of both the Westinghouse Service Agreement (with amendments) and the electrical sales agreement between the Authority and Metropolitan Edison.

With CBS' planned exit from the business, the Authority requested ARCADIS' services in support of the negotiation of a new service agreement with a new vendor, Montenay. The new service agreement was developed based on the Authority's knowledge of the facility's conditions (a fitness assessment was performed) and operational history. The new service agreement, executed in 1998, is based on a straight forward operating fee arrangement in which Montenay is responsible for facility operations and maintenance for a fixed annual fee (with a minimum processing guarantee). In the new service agreement, the Authority was able to secure greater input on facility operations, particularly related to ongoing maintenance and repair. The Montenay service agreement is a win-win for both the Authority and Montenay. Montenay is compensated for what they do best – facility operations and maintenance and the Authority is maintained its ability to control waste deliveries to the RRF while providing for additional long-term disposal capacity for the County at the Authority's RRF and allowing for Authority input related to facility maintenance and repair.

ARCADIS provided planning and implementation of a resource recovery facility for the Authority. In a relationship dating from 1983, we have assisted York County with all facets of its solid waste management and planning activities, including the resource recovery project, landfill design and mining, and medical waste, residual, and ash residue management planning.

- **Feasibility Studies.** Conducted initial feasibility study of replacing the County landfill with a waste-to-energy facility and compared this option to several others.
- **Vendor Procurement.** Prepared the request for qualifications (RFQ), evaluated vendors, assisted in vendor selection, and negotiated vendor contracts. After the Authority selected Westinghouse Electric Corporation (WEC) as the full-service vendor, in response to an offer by WEC of a no-cost facility expansion with an opportunity for sharing any profits from the expanded capacity, the Service Agreement was renegotiated. ARCADIS served as the technical advisor on the Authority's project team for negotiating an expansion of the waste-to-energy facility from 1,000-tpd to 1,344-tpd. This renegotiation included (a) new sizing of facility components (b) appropriate redefinition of (1) facility throughput guarantee, (2) energy guarantee and (3) residue quality and disposal requirements and responsibilities, (c) maintenance of all environmental guarantees and (d) maintenance of the full parental guarantee. Other major issues which were successfully resolved included waste supply and flow control issues related to the larger plant, additional financing complexity, and the terms of the "sharing of profit" mode on the utilization of the plant's excess capacity (i.e., capacity above 1,000 tpd).
- **Financing.** ARCADIS prepared the consulting engineer's feasibility report for a \$130 million bond financing for the construction of the YCRRC.
- **Environmental Studies.** As part of the air permit application process, conducted a multiple-pathway health risk assessment of stack emissions. Conducted air quality dispersion and deposition modeling to estimate the distribution of emitted contaminants in air, soil, indoor dust, home-grown produce, vegetable and forage agricultural crops, and surface water. ARCAIDS also provided expert testimony at a hearing before an administrative law judge regarding the issuance of permits for the facility, and prepared applications for the following permits: state and federal air permits (includes PSD), Corps of Engineers dredge-and-fill permit, erosion control plan, municipal approvals (zoning), state solid waste permit, residue handling permit, FAA approval, industrial waste discharge, and Susquehanna River Basin Commission water consumption permit.
- **Construction Phase Services.** Reviewed vendor construction drawings and submittals, monitored construction progress of vendor, reviewed and approved vendor's construction progress payment requests, performed periodic, independent field tests, monitored equipment installation and field testing, provided inspections by specialty groups, provided full-time resident engineering services, assisted with change orders/claims and arbitration, conducted checkout of completed subsystems, developed acceptance testing protocol and witnessed acceptance testing, reviewed and provided final verification of acceptance test results. The facility is operational.
- **Other Services.** ARCADIS is Engineer-of-Record for the Authority's Hopewell Township Landfill. In addition, ARCADIS has provided, when requested, evaluation of RRF performance, has performed a feasibility study for landfill mining to recover valuable landfill capacity, and prepared a medical waste management study to assess treatment/ disposal alternatives for the medical waste generated at the County's hospitals, medical center, and doctors' offices. ARCADIS is also assisting the Authority in evaluating beneficial reuse alternative for ash residue and developing a long-term ash residue management plan.



Broward County Waste and Recycling Services, FL

Operations Monitoring and Solid Waste Management Program

ARCADIS has served as the Consulting Engineer for the Broward County Solid Waste and Resource Recovery program for more than 30 years, which consists of an integrated solid waste management program utilizing waste-to-energy, materials recycling, and landfilling. For the last 20 years, ARCADIS monitors operations of both Broward resource recovery facilities, materials recycling facility, and ash disposal landfills, which includes the following activities:

- Review of facility operating data including daily tonnage/performance reports, scale-house summaries, CEMS data, and outage reports.
- Review of environmental testing results including stack testing, groundwater monitoring, and ash analyses.
- Inspection of major equipment during outages.

- Preparation of operations monitoring reports to summarize observation made during monthly inspections.
- Preparation of semi-annual and annual reports documenting the observations made during the previous reporting period with respect to equipment condition, adherence to contractual requirements and industry standards, permit compliance, and general operating trends.
- Attendance at monthly operations meetings.
- Review and assessment of the potential technical impact of changes in federal, state, and local laws and regulations.
- Representation of the County with respect to any change orders/claims and arbitration.
- Review of all plans and drawings provided by vendors in reference to planned modifications at the facilities or to any County-owned solid waste management facility.

ARCADIS also provides a wide variety of other solid waste management program support, including landfill design services, wetland mitigation monitoring, miscellaneous permitting support, and construction phase services.



Previous Activities

ARCADIS headed the project team in a 10-year program to develop a solid waste management program for Broward County. This complex project – which was awarded the Grand Conceptor Award for Engineering Excellence in 1992 by the Florida Institute of Consulting Engineers – includes the world’s largest resource recovery project: two mass burn resource recovery facilities, ash residue and contingency landfills, and precedent-setting wetland mitigation efforts.

The \$700 million project marks the first simultaneous construction of two resource recovery facilities, with a combined capacity of 4,500 tons per day (tpd), expandable to 6,000 tpd. The generated electricity – enough to power 125,000 area homes – is sold to Florida Power & Light, offsetting a portion of the operating costs. ARCADIS developed and negotiated plant performance specifications, including oversized tipping floors and waste storage pits with an unusual six days’ waste capacity, readily allowing for equipment maintenance and repair.

Other notable project elements include a 20-acre ash monofill, the first in the state with sophisticated double-synthetic/synthetic clay liner systems and leachate control/ collection/ detection systems to prevent contamination of underlying groundwater. A contingency landfill was also built. Resource recovery and landfilling are complemented by recycling programs in the County’s 28 municipalities. Despite the complexities of simultaneous construction, the South facility was completed six months ahead of schedule, while the North plant opened on schedule. Tasks included the following:

- Analysis/quantification of solid waste generation.
- Evaluation/selection of resource recovery technologies.
- Evaluation of more than 100 potential sites, and implementation of the three most appropriate.
- Assistance in obtaining environmental permits, including preparing conceptual designs, operating plans, and environmental impacts.
- Evaluation/selection of program alternatives, including energy markets, financing approach, institutional arrangements, and cost/benefit analyses.
- RFQ/RFP development, proposal evaluation, and vendor contract negotiation, including technical specifications and performance guarantees.

- Energy purchasing and waste supply arrangements.
- Engineer's feasibility report.
- Environmental analyses, including air, water, noise, odor, and traffic impacts.
- Technical and economic feasibility studies.
- Development/construction monitoring of wetland mitigation.
- Construction monitoring and acceptance testing.
- Ongoing operations monitoring since commencement of operations at each facility.

Solid Waste Visioning Process. Broward County, like many communities, is approaching a critical turning point in which the management of their solid waste – currently handled through a dependent district structure where municipal solid waste is sent to two 2,250-tpd Waste Management Resource Recovery Facilities – will require stakeholder alignment and business/financial analyses to determine the next generation of solid waste management. In support of the County, ARCADIS facilitated a “Trash Summit” which was held in June of 2006 to bring city managers, mayors, and other key stakeholders together to review the past, present, and potential future scenarios for the District. The program developed a commonality of purpose among stakeholders, and a structure for communication with scheduled milestones to serve as the ultimate deadlines of existing facility operations and permits. ARCADIS is currently supporting the County as they continue to evaluate and develop the future governance structure for the management of their solid waste, including the negotiations with the existing operator of the County's two resource recovery facilities to provide continued disposal capacity for the next 20 years and beyond.

Hudson County Improvements Authority, NJ

Resource Recovery Facility Implementation

ARCADIS is providing technical, environmental and financial support to the Hudson County Improvement Authority (Authority) in the development of procurement documents to establish a resource recovery facility to dispose of the municipal solid waste generated in Hudson County, New Jersey. The procurement will be open to any proposed waste processing. If the short listed vendors do not demonstrate the full size capability requested but demonstrate pilot scale experience, the Authority may elect to pursue pilot scale facility prior to full scale development to determine the feasibility of using innovative technologies for solid waste management.

Our scope of services for the first phase of this project includes the following activities:

- Review Waste Quantities and Current Disposal Practices in Hudson County
- Identify and Evaluate Waste Conversion Technologies
- Review and Compile Data and Information on Prospective Site
- Procurement Strategy Development
- RFQ Development
- Statement of Qualifications (SOQ) Evaluation

Future as-requested services will include, at a minimum the following:

- RFP Development
- Proposal Evaluation

- Economic Analysis of Vendor Proposals
- Evaluation Report Preparation
- Pilot Program Monitoring
- Full-scale Facility Implementation Assistance

ARCADIS reviewed the previous studies prepared for and data compiled by the Authority relative to the waste quantities and disposal practices within the Authority's jurisdiction. We will prepare a tipping fee analysis for the Authority that involves waste quantities and tipping fee charges for many of the communities surrounding Hudson County in New Jersey and New York. We will also explore project financing alternatives.

Technology Evaluation

ARCADIS will identify and evaluate potential waste processing technologies. The evaluation of technologies will be based on three main areas of consideration: (1) technological; (2) financial; and (3) regulatory. Criteria will typically include track record, reliability, capital cost, operations and maintenance costs, economics, environmental benefits, and vendor strength. We will present detailed evaluation criteria to the Authority for review and comment. The preliminary evaluation will consist of the review of vendor data and available operational evaluations. We will contact vendors and suppliers as necessary to obtain and confirm our understanding of available data and information regarding technologies. We will provide a technical report summarizing the information obtained and analyzed. Schematics of select technologies will be included as available from vendor information or in-house database. Meetings with vendors, detailed cost estimates or the development of facility layouts will not be included as part of this scope of services.

Site Investigation

ARCADIS will conduct a limited preliminary assessment study of the prospective site by reviewing and compiling data obtained during our review of available records and other information. This task does not include any intrusive activities. The study will consist of gathering pertinent information necessary to assess the feasibility of locating a RRF and assess the remediation that may be necessary for such development. The components of the study include a background information search and a site reconnaissance.

RFQ and RFP Development

ARCADIS will assist in the development of the RFQ, review the statement of qualifications (SOQ) for completeness and responsiveness, and develop an evaluation report. The SOQ evaluation report will detail the findings of the review to facilitate the Authority's ultimate short listing of the vendors as qualified to respond to the subsequent RFP.

ARCADIS will prepare the RFP based on the qualified respondents identified during the SOQ evaluation. During the RFP process, ARCADIS will support the Authority and its legal counsel in the development of the design/build and operation and maintenance agreements, or alternative forms of contracts, for inclusion in the RFP. These documents will be used in an iterative procurement process to afford the qualified vendors an opportunity to discuss draft portions of the RFP with the Authority before it is finalized and issued. This provides the Authority with valuable input from the qualified vendors, both from the technical and the contractual perspective, as well as identifies and resolves any key negotiation issues in a competitive environment. The RFP will address the requirements for all technical and contractual obligations of the selected firm.

Proposal Evaluation

The proposal technical/non-cost evaluations will focus on the proposers' approaches for carrying out all work contemplated by the RFP. ARCADIS will use the performance specifications in the RFP as the criteria for such evaluations, including the following:

- Proposed Pilot Program
- Proposed construction (technical specifications) plan
- Feasibility of vendors' technical approaches to complete the project
- Proposed management plan for performance of the required services
- Proposed Operations and Maintenance Plan
- Feasibility of operating and maintaining the unit processes using the approach outlined in the proposals
- Compatibility with the Authority's policies for quality service and reliability
- Proposed energy efficiency techniques
- Adaptability of the proposed approach to technological advancements, regulatory changes, and waste variability

Economic Analysis of Proposals

ARCADIS will assist the Authority's financial team in the evaluation of business and financial submissions, which will be conducted after the technical evaluations to assist with the selection of the most viable approach, the greatest financial security, and the most responsive bid. ARCADIS will work closely with the Authority's financial team in structuring and implementing a project financial and life-cycle cost model. The financial model will be used to determine the life-cycle cost and net-present value of the proposals. The model will also facilitate evaluation of various combinations of contractual arrangements and provide continued consistency between stated policy goals and project objectives. The model will include variables for Authority costs affected by each vendor and for assumptions such as interest rates, cost of living indices, energy costs, labor costs, and utility costs. The model can be used to adjust assumptions and to assess the ultimate rates to be borne by the Authority's ratepayers. ARCADIS will review the cost risk and allocation of proposed terms and conditions, as well as assess a proposer's level of financial commitment. Finally, the Authority will assess the level and quality of financial guarantees supplied by the vendors.

City of Tampa, FL

McKay Bay Operations Monitoring and Retrofit Services

ARCADIS oversees the McKay Bay Refuse-to-Energy Facility, a 1,000 ton per day (tpd) mass burn waste-to-energy facility, operations and performing inspections on a routine basis, particularly during scheduled maintenance, to assess the performance of the facility operator with regard to the service agreement. Operations are also monitored with respect to compliance with federal, state, and local regulations and permits. ARCADIS reviews the facility's environmental testing results and performs audits of annual air emission testing procedures as they are conducted by independent contractors. We also attend monthly coordination meetings with the facility staff and operator to discuss and resolve issues regarding facility operations. ARCADIS prepares the minutes of the meetings and summarizes the findings of our operations monitoring activities in an annual report to the City.

After a competitive selection process, the City of Tampa recently reselected ARCADIS to provide continued operations monitoring services.

Metals Recovery System. ARCADIS also provided design and construction support during the recent installation of a non-ferrous recovery system at the facility. ARCADIS performed design review, construction monitoring, and start-up/acceptance testing oversight.

Previous Activities

ARCADIS was responsible for a broad range of services related to the retrofit of the McKay Bay Refuse-to-Energy Facility, a 1,000-tpd mass-burn waste-to-energy plant. The retrofit represents the first comprehensive "chute-to-stack" retrofit of a waste-to-energy facility constructed in the U.S. The project involved replacement of the furnace system technology as well as the air pollution control equipment to meet emission requirements of the 1990 Clean Air Act Amendments. Other systems at the plant were upgraded or replaced as needed to allow operation over an additional 20-year period.



ARCADIS prepared an initial opinion of probable costs for retrofitting the system for input into a detailed financial analysis. When ARCADIS' financial analysis showed that a complete retrofit of the existing facility made sense economically, we helped the city move the project forward through an innovative procurement process to obtain a design-build contractor who would design, build, and operate the facility. After completing preliminary design and cost estimates, we managed a prequalification process to shortlist qualified firms, who then contributed to the development of the request for proposals (RFP) and contract documents. The process saved the city over \$20 million in capital costs.

ARCADIS managed the project, coordinating all subconsultants' activities and providing construction oversight for replacement of the existing rotary kiln with modern mass-burn furnace system and state-of-the-art air pollution control equipment. Plant operation continued without interruption: Two of the four combustion units were "taken down" at a time for construction, leaving two units in continuous operation. The retrofit consisted of:

- Replacing the existing four air-cooled furnaces/rotary kilns/water-walled boilers with a modified mass-burn, grate-fired furnace system and water-walled boilers.
- Replacing existing air pollution control equipment with a spray dryer absorber, mercury/dioxin control (carbon injection) system, NOx control system, baghouse, and single-shell multiflued stack.
- Replacing the existing bottom ash drag chain conveyor and trommel system and furnishing and installing new motor control centers to serve all equipment furnished.
- Evaluating and upgrading as-needed plant auxiliaries to sustain a 20-year minimum operating life.

ARCADIS' responsibilities encompassed oversight of all technical and environmental issues dealing with the handling, processing, treatment, and disposal of ash residue; development and performance of a dioxin testing program; development of a solid waste management plan; and technical advisory and review services throughout the procurement process.

We also provided support on environmental and regulatory issues, where appropriate, and were responsible for the procurement process, including investigations, request for qualifications (RFQ) and RFP development, vendor response evaluations and negotiations, construction and service agreement development, and all technical and performance specifications.

In addition, ARCADIS was responsible for overseeing construction and reviewing vendor performance from the effective date of the agreement through the second full fiscal year of full operation of the facility after it had been retrofitted/constructed.

Demonstration and Acceptance Testing. ARCADIS monitored the demonstration testing and acceptance testing of the retrofitted waste-to-energy facility after the first two sets of 250-tpd units had been retrofitted and then after all four units had been retrofitted. We monitored the operator's staff as they conducted various performance tests to demonstrate that the retrofitted facility complied with the contractual requirements. We performed independent calculations to verify that the test results confirmed compliance with the contractual requirements. ARCADIS evaluated the demonstration test and acceptance test results and reports provided by the contractor and developed a separate report describing the review of the operator's reports. We participated in negotiation sessions and test results evaluation meetings to complete the acceptance process.

Financing. As Engineer-of-Record for the city, we were responsible for the engineer's feasibility report to the official statement for securing the financing for the retrofit project. The facility originally was financed through solid waste revenue bonds. In 1999, the city financed the retrofit of the facility by issuing tax-exempt solid waste system revenue bonds. The procurement process and extensive preconstruction effort resulted in a competitive construction price for the retrofit, which consequently reduced long-term debt. The refunding of existing debt and issuance of new debt was completed in a creative manner that received favorable ratings from rating agencies, resulting in low interest and stabilized costs to the ratepayer.

As part of ARCADIS' work on the retrofit of the McKay Bay Waste-to-Energy Facility, we completed a comprehensive facility assessment that involved itemizing every operating system, support system, and piece of equipment in the facility. The purpose of the assessment was twofold. The first objective was to document the condition of all facility equipment including spare parts to determine its current operating capacity, projected life, and replacement value. Second, the information was used to determine the current value of the facility based on expected operating life, with and without a retrofit plan.

ARCADIS dispatched a team of engineers, facility operators, and financial personnel to "walk-down" each operating system (waste process, combustion, steam generation, power production, pollution control, etc.) The team analyzed each piece of equipment in terms of its current operating condition, physical characteristics, long-term utility, and efficiency. We also obtained data on date purchased, date installed, operating history, purchase price, and depreciated value. We then conducted an analysis to determine if the equipment required replacement or if new and more advanced equipment was available. We compared the replacement cost to the expected increase in production and efficiency if the equipment were replaced. We used this information to develop the technical specifications for the overall retrofit of the facility and to develop an estimate of the capital cost of the retrofit.

Lake County, FL

Solid Waste Engineering and Operations Monitoring Services

ARCADIS provides a wide range of services including operations monitoring, permit compliance monitoring, vendor negotiations, litigation support, and general engineering consulting to the Department of Solid Waste Management Services. We are monitoring a 528-tpd resource recovery facility designed, built, owned, and operated by Covanta Energy.

As Lake County's Consulting Engineer, ARCADIS provides:

- Independent assessment of the operational efficiency and maintenance of the facility, as well as compliance with the terms and conditions of the service agreement
- Recommendations to improve the operations and maintenance of the facility by performing on-site inspections, analyzing solid waste deliveries, facility throughput, energy production efficiency, and environmental compliance, and monitoring outage inspections and emissions tests.
- Financial review and pro-forma updates relative to operations and maintenance and service fees associated with the facility
- Design review, negotiations assistance, and construction monitoring of Selective Non-Catalytic Reduction ("SNCR") System implemented to address nitrogen oxides emissions control requirements of Emission Guidelines
- General engineering services as required, including evaluation of issues relating to waste composition, permitting, utilities, and electrical production.

ARCADIS summarizes the findings of these activities in an annual report submitted to the Department of Solid Waste Management of Lake County.



Litigation Support Services

As Lake County's Consulting Engineer since 1998, ARCADIS has acquired extensive experience with the county's resource recovery facility, and was therefore asked to provide litigation support services in a dispute between the county and the facility's operator, Covanta Lake, Inc. (Covanta Lake Inc. v. Lake County). We reviewed historical project documents (proposals, agreements, permits, plans, specifications, correspondence, etc.); prepared an expert witness summary report focusing on technical issues, as well as the contractual adequacy and financial position of the project; and made preparations for potential expert testimony. Specifically, ARCADIS' review focused on the following elements of the dispute:

- **Operations and Maintenance Fee Escalation.** ARCADIS conducted research into the reasonableness of the escalation of the annual operations and maintenance charge as set forth in the service agreement and escalated pursuant to Schedule 1 of the service agreement. This research included investigation into the practices of similar facilities around the United States as related to O&M escalation. ARCADIS focused this research primarily on facilities in Florida, particularly those owned and/or operated by Covanta. As part of the task, ARCADIS provided a summary of representative service fees of similar facilities around the United States in order to demonstrate where Lake County falls in the range of current typical industry wide fees.
- **NOX/SNCR Retrofit Overhead Charges.** As ARCADIS had previously performed a preliminary investigation related to these charges, we provided Gray Harris with all relevant documentation. We will provide an opinion as to the reasonableness of the following:
 - Covanta's overhead rate
 - The O&M costs related to the retrofit
 - The retrofit construction costs
- **Cost of Obtaining and Maintaining Outside Waste.** ARCADIS conducted research into the typical activities necessary to obtain and maintain outside waste contracts. Our research included the following:
 - Review of Covanta expenditures related to this item in contract year 2003 to date and contract year 2002
 - Review of outside waste tonnages in contract year 2003 to date and contract year 2002
 - Summary of the practices of similar facilities around the United States as related to marketing expenses for obtaining outside waste, as well as typical expenditures for maintaining outside waste contracts
 - Opinion as to the reasonableness of the actual hours billed to date based on the level of effort typically expected to be required for such activities and the tipping fee charged for outside waste at the time

Dolomitic Lime System

ARCADIS conducted research into the issues surrounding ash residue at the facility, including Covanta's claim that installation of an ash-conditioning system (using dolomitic lime) is required by a change in law, and the county's repeated requests for supporting documentation.

- **Additional Waste Service Fee.** ARCADIS conducted research into the calculation of the additional waste service fee. The research included a mathematical analysis to evaluate the overall monetary impacts the fee may have on Lake County based on several general waste delivery scenarios. Factors considered in the analysis included electrical revenues and ARMA calculations (provided to ARCADIS by Lake County).
- **Property Taxes - Assessed Value of the Facility.** ARCADIS conducted research into the reasonableness of the property tax pass-through as set forth in the service agreement. The research included an investigation into the practices of similar facilities around the United States, as related to property tax pass-throughs and the assessed value of the facilities. ARCADIS focused the research primarily on facilities in Florida, particularly those owned and/or operated by Covanta.

Because the property tax is based on the assessed value of the facility, ARCADIS also provided an opinion as to the reasonableness of the assessed value of the facility. Our opinion included an estimate of the actual plant worth based on:

- Current market value.
- Estimate of cost to construct such a facility in 2003.
- Actual construction costs (to be provided to ARCADIS by Lake County) less depreciation.

Our opinion also assessed the reasonableness of the construction cost of \$60,000,000 in 1988 for a facility of such size and power generation capability.

General Service Agreement Issues

ARCADIS conducted research in order to provide an opinion as to the reasonableness of certain questionable provisions of the service agreement, which included:

- Uncapped change-in-law pass-throughs.
- O&M fee for such a facility.
- Lack of vendor risk (e.g., no risk assumed related to any uncontrolled expenditures).

Union County Utilities Authority, NJ

Resource Recovery Facility

ARCADIS is currently serving as the Authority's special engineer for the 1,540 ton per day (tpd) Union County Resource Recovery Facility to assure that the Covanta Energy Corporation operates and maintains the facility in accordance with the requirements contained in lease and disposal service agreements between the County and Covanta. ARCADIS has been annually awarded the provision of operations and/or maintenance monitoring services since the facility began commercial operations in 1994.

As part of ongoing maintenance monitoring and general condition assessment, ARCADIS currently reviews maintenance records for all major equipment and conducts periodic inspections of the facility during non-outage periods.

In addition, during scheduled outages of major equipment such as boilers, turbine condensers, air cooled condenser, and ash recovery systems, ARCADIS conducts inspections of the facility. The observations and findings from these inspections are incorporated into technical memorandums and an annual general condition assessment report.

ARCADIS also conducted the post-operational environmental assessment to monitor soil, surface water, and sediment, produced in accordance with the revised requirements of the Union County Resource Recovery Facility's PSD Permit. We also prepared the first and second annual waste separation report for compliance with facility permit conditions.

Previous Activities

ARCADIS provided construction monitoring and project administration services to the Union County Utilities Authority for a new 1,540-tpd resource recovery facility. The 40-MW plant was built by Ogden Martin Systems of Union, Inc. under a full-service contract. The facility has three boilers, each generating approximately 120,000 lb/hr of superheated steam. ARCADIS has been assisting Union County on this project since 1986. We reviewed as-built drawings and have been monitoring operations since the plant began commercial operation in February 1994. Preconstruction services included preparation of the required environmental health and impact statement (EHIS) and permit applications. We prepared bid documents, assisted the County with its vendor negotiations (e.g., change order requests), and certified all payments on the project. ARCADIS was also responsible for the startup and acceptance testing of the facility.



Permitting. ARCADIS secured the majority of the environmental permits for the resource recovery facility. We prepared the application for the landfill disruption permit for the project site. We also negotiated terms and conditions of the permits with the issuing agencies.

Construction Phase Services. ARCADIS administered and monitored the construction of the mechanical processing and major electrical equipment included in the Union County facility. These services were provided during a 27-month construction schedule from January 1992 through April 1994. Specifically, our overall responsibilities included file maintenance for all applicable correspondence, shop drawings, schedules, meeting minutes, observation logs, and reports. We reviewed equipment design specifications and drawings for conformance with the design criteria in the construction agreement. We also reviewed price change submittals to determine if there was sufficient justification for the requested change and provided an opinion as to whether the modification was reimbursable in accordance with the construction agreement.

ARCADIS was instrumental with respect to contractor claims and change order negotiations. Because of our experience at other Ogden Martin facilities, we were able to provide comparative construction and operating data in support of claims and change order negotiations. This enabled the Authority to exercise sound judgment from a position of knowledge and strength.

ARCADIS was responsible for keeping a manifest of delivered equipment, testing, and inspection reports, and equipment installation dates for determining milestone achievements and recommendations concerning release of payments to Ogden Martin. This task included monitoring the installation of equipment procured and the installation

methods for compliance with the construction agreement and applicable codes and standards. With respect to payment applications, ARCADIS reviewed and provided certifications concerning the items contained in the requisitions for payments submitted by Ogden Martin. We also conducted the final facility inspection to determine substantial completion. Prior to, during, and as a direct result of the final facility inspection, ARCADIS developed a punchlist showing all items that were incomplete or needed correction.

ARCADIS worked closely with Ogden Martin, the NJDEP, and DCA to establish a policy and procedure for submittal of drawings to these agencies. Originally, they requested a review of every drawing where there had been change from the permit drawings. Following several meetings and presentations by ARCADIS, the agencies agreed that a review would be required of only those drawings where a major modification to the design or equipment specifications had occurred.

During the last year of construction, ARCADIS monitored all related project activities and submittals. This included engineering and environmental requirements necessary for the NJDEP to accept the facility. ARCADIS developed a detailed project schedule and updated it every two weeks. During the last 120 days of construction, the NJDEP was invited to attend the monthly meetings to ensure that they agreed with the scheduling of activities and required submittals.

Punch List. The punch list was divided into three categories. The first category included those items that violated codes, posed health and safety issues, and were mechanically incomplete. These items were required to be completed or corrected prior to startup of the units. The second category included those items that were identified as having a potential impact on Ogden Martin's ability to perform the acceptance test. The third category included incidental items on which retainage was withheld until the items were either corrected or completed.

Acceptance Testing. ARCADIS conducted a review and worked with Ogden Martin Systems to develop an acceptable acceptance test protocol. The protocol was developed in compliance with the construction agreement, specifications, applicable regulatory requirements, and the requirements of all governing codes and testing standards, (e.g., ASME, ASTM). ARCADIS provided a team of engineers and environmental specialists to monitor the acceptance tests throughout the 7-day test period. Subsequent to the acceptance test, ARCADIS conducted an independent review of Ogden Martin's acceptance test report to identify components of the facility that were in full compliance, minimum compliance, or not in compliance with the construction agreements.

Air Pollution Controls. Employing Best Available Control Technology, the facility incorporates state-of-the-art air pollution controls such as a spray dryer absorber for acid gas removal, dry scrubber bags for particulate removal, and ammonia injection for NOX control. Aqueous ammonia is injected through multiple-level wall injectors into the upper section of the boiler by means of air as a carrier gas. NOX in the flue gas combines with ammonia to produce nitrogen and water, reducing NOX emissions by 50 to 70 percent. We also reviewed the design for compliance with technical specifications and OSHA requirements for a risk management program for storage and transport of aqueous ammonia. The system includes an on-site storage tank, piping, valves, appurtenances, and compressed air piping.

Operations Monitoring. Prior to the signing of the lease agreement between the Authority and Covanta in 1998 and as a part of operations monitoring services, ARCADIS provided an analysis of facility operations and performance as compared to the contractual guarantees agreed to by Ogden Martin in the service agreement. ARCADIS monitored solid waste deliveries, and throughput and processing efficiency, and analyzed the contractor's methodology for determining the higher heating value of the waste. Energy production efficiency was assessed in order to maximize energy

production. Continuous emission monitoring data was reviewed on a monthly basis, as were all facility performance data. We also review monthly invoices submitted by the contractor to the Authority.

Every two months ARCADIS summarized the operation of the facility and made recommendations to alleviate any problems occurring. These bimonthly reports were compiled into an annual report summarizing facility performance for determining compliance in meeting annual guarantees.

Other Services. We assisted the Authority in the development and implementation of its battery management program and continue to collaborate with the Authority and applicable regulatory boards in the development of a long-term ash reuse/disposal program.

City of Norwalk, CT

Procurement of Solid Waste Disposal Services

With the expiration of the City's current agreement with the Connecticut Resource Recovery Agency (CRRA) for municipal solid waste disposal, ARCADIS was retained to develop a disposal strategy for the City for the procurement of solid waste disposal capacity. We reviewed and compiled existing information and reviewed options for the utilization of the Norwalk Transfer Station, which will be reverted back to the City's ownership upon expiration of the CRRA agreement. Given that the transfer station is a regional facility, we assisted the City in soliciting regional interest, leading to the inclusion of 6 other communities in a waste disposal consortium for solid waste procurement, namely the communities of Greenwich, Darien, New Canaan, East Haven, Weston and Wilton. Subsequently, we developed and issued a Request for Proposal on behalf of the participating communities. We are currently evaluating the vendor proposals. Services include reviewing technical information and structuring and implementing a project financial and life cycle cost model to evaluate the proposed costs of alternatives, contract negotiation and procurement assistance, and assistance in developing a communication and/or public relation plan to solicit stakeholder support internally within the City and externally for implementing solid waste disposal solutions.

System-wide Residential Waste Collection Study

The City is contemplating a system-wide residential waste collection by several private haulers. ARCADIS conducted a study to determine the viability of dividing the City area into two to three franchise areas to be handled by each private hauler. Our analysis a) identified the advantages and disadvantages (technical, environmental, legal and financial) of available alternatives for expanding refuse collection services City wide and b) provide next steps for implementation of the recommendations. In addition, we identified performance metrics of current in-house refuse collection operations and metrics specific to the Town route, and impacts and opportunities for enhancing current services. We also used a financial model of current and projected collection costs to develop cost projections for expanding services City-wide. Subsequently, we conducted a detailed refuse routing study for the existing collection routes and provided assistance to the City in assessing privatizing the current in-house operations. The City has since privatized the existing operations.

Town of Greenwich, CT

Recyclable Materials Management Services

ARCADIS assisted the Town of Greenwich (Town) to prepare request for proposal (RFP) documents for the operation and management of the residential recycling drop-off center area at the Town's Recycling Center and collection, transportation and

marketing of the recyclables materials. ARCADIS assisted the Town with organizing a pre-proposal meeting for the RFP and attended to answer potential vendor inquiries. ARCADIS conducted a comparative evaluation of the responsive proposals based on the technical, business, and economic evaluation criteria as defined in the RFP. This included preparing a financial cost spreadsheet that took into account any proposed financial/economic assumptions (e.g., cost inflators, revenue share and pass through costs) to evaluate the proposed life cycle costs.

Bergen County Utilities Authority, NJ

Solid Waste Transport and Disposal Contract

We prepared bid documents for a solid waste transport and disposal contract, evaluated proposals, and performed regulatory verification and field due diligence investigation checks on potential landfills.

Borough of Westwood, NJ

Landfill Closure

ARCADIS prepared a feasibility study and a closure plan for a 20-acre landfill. The closure plan contains a preliminary capping design, gas venting and monitoring, drainage design, and several recreational reuse activities. Our approach will involve permitting of future activities as a part of the present closure plan, thus saving the additional permitting expense for future uses.

City of Newark, NJ

Solid Waste Action Plan

ARCADIS undertook a Solid Waste Action Plan for the City of Newark to examine the City's existing solid waste management system, to identify alternatives for minimizing impacts of solid waste transport, determine if host fees received by the city were fair and reasonable, and identify potential improvements to the collection program. The overall intent of the Action Plan was to define the status of the current solid waste system, and identify means by which the City might be able to save money while improving the solid waste services provided to the residential and commercial sectors. The plan was to serve as the framework for solid waste program initiatives, encompassing both the internal and external flows of solid waste. To compare services and costs, we examined collection programs in a number of other major cities in New Jersey. As a result, a number of potential cost cutting strategies were identified. We also examined other means of enhancing revenues into the system and made recommendations for minimizing impacts due to solid waste flows through the City from outside generators.

City of Miamisburg, OH

Refuse Division Operational Study

The City of Miamisburg's Refuse Division is responsible for the collection and disposal of regular refuse, bulk refuse, commingled recyclables, newspapers, and yard waste for approximately 8,000 residential customers. ARCADIS performed an evaluation of the efficiency and effectiveness of the solid waste collection program to identify the needs, options, and opportunities for future collection operations and management, and to develop a comprehensive strategy for the program's long-term improvement. Services included the following:

Compilation and review of available data to evaluate workers' compensation and ergonomic issues regarding current collection operations, customer growth and historic and projected waste generation and disposal quantities, historic and projected rates and charges, and city ordinances and management practices.

Review of system finances and capital requirements, development of unit costs for collection of refuse and recyclables and their disposal and processing, and administration.

Surveying and benchmarking of city services and rates in comparison with practices at similar communities and with industry standards.

Evaluation of the following collection alternatives and consideration of the advantages and disadvantages of each with respect to economic, environmental, and community impacts:

- Semiautomated collection
- Fully automated collection
- Private contracted collection
- Reallocation of staffing requirements
- Modification of level of service

Preparation of report documenting current operations and costs and providing recommendations for improving collection operations to meet the current and long-term needs of the community.

Town of Larchmont-Mamaroneck, NY

Joint Garbage Disposal Commission

ARCADIS evaluated the current operations of the Larchmont-Mamaroneck Joint Garbage Disposal Commission (Commission) to contemplate the possibility of creating a separate collection route for commercial and institutional customers. In addition, we evaluated consolidating the remaining residential collection routes. ARCADIS reviewed the Commission disposal quantities, customers and collection costs. To compare alternatives, we developed performance metrics for the current operations. ARCADIS conducted refuse collection route studies by following around the Commission staff for four out of five of their municipal solid waste disposal routes. We evaluated the advantages of establishing a collection route exclusively for commercial and institutional customers and the potential for consolidating the remaining residential collection routes and reallocating staff. The results of the studies save the commission more than \$300,000.

Middlesex County, NJ

County/Regional Solid Waste Plan

ARCADIS developed a county/regional solid waste plan with a program and organization to manage collection, processing, recovery and recycle, and final residue disposal. Considering site availability, waste quantity, environmental factors, and economics, a multistage program was proposed which included RDF production and sale in the initial phase. The plan called for development of large regional landfills by the county to be redeveloped later as parkland as part of the open space program. As a result of this plan, Middlesex County instituted a Department of Solid Waste.

Passaic County Utilities Authority, Department of Solid Waste, NJ

Waste Composition Study

We performed a waste composition and quantification study which included a two-week waste sampling program to estimate the quantities of waste materials (paper, glass, etc.) present in the waste stream, a three-week weighing program to determine the total quantity of waste generated in the county, a one-week visual inspection of all refuse collection vehicles, and a two-week survey of County waste haulers. The results were a key source of data in the development of the County's recycling/resource recovery project.

Borough of Woodbine, NJ

Landfill Closure

We provided engineering services for activities related to the closure of a 45-acre landfill. We fulfilled requirements in accordance with the NJDEP and the Pinelands Commission using alternative materials.

City of Camden, NJ

Demolition Debris Landfill

ARCADIS investigated the feasibility of developing a landfill for demolition debris on a 20-acre site located adjacent to the Pennsauken River and being used as a wellfield for the City's water supply system. The feasibility study involved the following:

- Compilation of data on subsurface conditions and a hydrogeologic analysis
- Review of regulatory requirements, including meetings with regulatory personnel
- Evaluation of current and projected waste quantities and composition
- Investigation of available waste disposal alternatives
- Preparation of a conceptual design plan for the landfill
- Estimation of projected landfill costs and preparation of a cost estimate comparing waste disposal alternatives.

Based on the economic analysis and recommendations presented in the study, the City used the 20-acre site to landfill a portion of the demolition debris and transported the remaining wastes to a nearby private landfill.

Union County Utilities Authority, NJ

Elizabeth Landfill

The need for an ash residue landfill developed in conjunction with plans to construct the resource recovery facility in Union County. A potential site for the landfill was identified in Elizabeth, New Jersey, adjacent to Newark Bay. To assess the environmental conditions on the Elizabeth site, we implemented a two-phased investigative approach. The purpose of Phase 1 was to evaluate the past use and current environmental conditions of the site based on available data, to define the extent to which a field investigation was required, and to identify "fatal flaws" with respect to engineering or permitting feasibility, which could influence the Authority's decision to purchase the site. Key elements included the possible presence of contamination, the feasibility of relocating a large wetland area and drainage channel which bisected the site, and the presence of a gas main within the site boundaries. Phase 2 involved a field investigation, consisting of soil and groundwater sampling and analyses in

order to confirm and characterize the presence or absence of contamination on the site. A feasibility analysis was also included in Phase 2, with respect to site remediation, impacts of site-specific conditions and effects of existing utilities on landfill design.

Township of Montgomery, NJ

Ash Residue Landfill

ARCADIS reviewed a siting study for a countywide ash residue landfill prepared by another consultant. We also prepared a report on the adequacy of screening methodology and criteria, data used, and weighting and ranking procedure.

Middlesex County Utilities Authority, NJ

Edgeboro Landfill

As consultant to the Authority since 1986, ARCADIS developed a \$180 million project to expand the landfill, adding 20 years of capacity and averting a solid waste crisis which faced the county's 600,000 residents. The project has overcome numerous technical and regulatory challenges and the successful solution required a multidisciplinary effort, drawing on the expertise of 11 different specialty groups within the firm. The landfill has been permitted to expand both horizontally and vertically (the first vertical expansion in New Jersey) and accepts up to 2,000 tpd of refuse. A 55-acre horizontal expansion was recently completed. The Middlesex Landfill project was awarded the 1993 Honor Award in Engineering Excellence by the Consulting Engineers Council of New Jersey.

New Jersey Turnpike Authority, NJ

Avon Landfill Closure

ARCADIS was retained by the New Jersey Turnpike Authority (NJTA) to conduct field investigations and prepare a closure design at the Avon Landfill. The landfill is the site selected by the NJTA for construction of a new interchange. At the conclusion of the landfilling, a cover was placed over the landfill and gas vents were installed; however, the NJDEP closure requirements were not met. Our services conducted at the Avon Landfill consisted of site reconnaissance, and Phase I and Phase II investigations and closure design. The conceptual closure design has been prepared.

U.S. Pipe & Foundry Co., NJ

Landfill Closure

ARCADIS was responsible for site investigations, surveys and the preparation of a closure and post-closure plan. The plans featured a modified clay cap for an industrial landfill containing foundry waste and other inert production wastes.

Warren County Pollution Control Financing Authority, NJ

Landfill Services

ARCADIS is providing construction services for the expansion of a 10-acre landfill. We are responsible for administering contract documents, coordinating project work among field personnel, the owner, and the contractor, and addressing questions

and clarification requests. Other tasks include budget management, negotiating with regulatory agencies, and developing construction specifications for maintenance of the leachate collection system. As resident engineer for the expansion, we are providing QA/QC for the installation of liner materials, conducting nuclear moisture density tests for soils used in the liner installation, coordinating and participating in project meetings, reviewing shop drawings and as-builts, and preparing the final construction certification report.

Debt Restructuring for Resource Recovery Facility

The Pollution Control Financing Authority planned to restructure the county's outstanding debt associated with a 448-tpd resource recovery facility. We prepared the independent engineer's feasibility report for the debt restructuring. In preparing the report we:

- Conducted inspections and performed a technical evaluation of the facility
- Reviewed operation and maintenance records
- Reviewed existing contracts
- Analyzed waste generation and disposal trends
- Conducted a market analysis of tipping fees under the restructuring
- Developed life cycle cost analyses
- Conducted an extensive pro-forma-based financial review of expenses and revenues
- Participated in contract negotiations with the contract operator for purchase of the facility

Eden Wood Realty, NJ

Whippany Landfill Redevelopment and Landfill Mining Plan

ARCADIS was retained by a subsidiary of Eden Wood Realty (River Park Business Center) to prepare a closure plan for the redevelopment of a 16-acre municipal solid waste landfill. The redevelopment plan included the construction of a 272,000-square-foot warehouse and distribution center supported on deep pile foundations within the footprint of the landfill. Six months later an agreement was made to modify the closure plan and address their specific site development activities. The modification includes constructing a smaller, single warehouse facility (262,000 square feet) with an accompanying smaller parking lot. In addition, the modification includes consolidating the waste pile into a single landscaped mound by relocating material within 50 feet of the proposed building location.

New Jersey Department of Environmental Protection, NJ

Remediation Design and Interim Plan for GEMS Landfill Superfund Site

ARCADIS designed an air stripping facility for treatment of contaminated groundwater at a facility which had received many types of toxic solvents and other organic compounds. The vapor phase is treated by granular activated carbon adsorption to remove VOCs from the air stream.

Northwest Solid Waste Management Board, NY

Feasibility Study for Regional Yard Waste Compost Facility

ARCADIS performed feasibility studies for expanding the existing compost facility to incorporate the five other municipal members of the Northwest Solid Waste Management Board. Options explored included expansion of the existing site, development of a new regional facility, or the addition of a yard waste transfer station. The feasibility studies involved economic cost analyses and engineering assessments of potential sites for expansion or relocation.

Saratoga City Solid Waste Agency, NY

Resource Recovery Project

We prepared a solid waste management/resource recovery feasibility study and generic EIS for a 300-tpd modular mass-burn facility in conjunction with a residual/bypass landfill and five transfer stations.

City of Buffalo, NY

Squaw Island Landfill Closure

For decades, the 60-acre municipal Squaw Island Landfill was a disposal site for incinerator ash, municipal solid waste, demolition debris, and dredged lake sediment. In a partnership, ARCADIS was responsible for various closure investigations, development of closure plans and park development plans, and design of habitat and site enhancements. Additionally, we also prepared closure plans for the municipal incinerator. Awards: 2002 New York Association of Consulting Engineers - Diamond Award; American Consulting Engineers Council - 2002 National Recognition Award.

City of Johnstown, NY

Landfill Closure and Remediation

ARCADIS designed the closure of a 35-acre former municipal landfill that had received municipal and industrial wastes, as well as wastewater treatment plant sludges. We also provided bid phase services, construction oversight, and QA/QC services.

New York City Department of Sanitation, Bureau of Waste Disposal, NY

Fresh Kills Landfill

As part of the closure design for New York City's Fresh Kills Landfill on Staten Island, we designed an automated access control and data collection system. In response to New York City Department of Sanitation (NYCDOS) concerns about securing the landfill, we developed a site security system plan that identified key issues for site security and the various methods by which different security issues could be addressed. The NYCDOS' main security objectives were to secure the landfill, to account for all vehicles entering and leaving the site, and to be able to track the vehicles at a future time, if necessary. We also proposed a visitors' center to be integrated into the security system. The NYCDOS used the site security system plan to determine which types of security equipment, systems, and configurations best met their needs at the Fresh Kills site. On the basis of these decisions, ARCADIS then developed preliminary design plans for vehicle control, roadways,

security control equipment, and ancillary facilities at the site's entrance and exit points. We also prepared preliminary performance-based specifications, construction cost estimates, and construction schedules for security system implementation, and we developed a preliminary field test protocol for evaluating the use of the vehicle identification and tracking system that was to be installed at the site.

Tompkins County, NY

Caswell Road Landfill Leachate Operation

The Caswell Road Landfill was officially closed in 1988. The Tompkins County Department of Public Works continues to maintain the landfill's leachate collection system. Periodically, springtime flow rates generate leachate volumes in excess of the collection system's storage capacity, resulting in overflow discharge to the surrounding area. In response to concerns over the untreated leachate discharges, Tompkins County retained ARCADIS to evaluate leachate treatment and disposal options. ARCADIS conducted a feasibility study that identified potential discharge points for treated leachate and compared historical leachate volumes and quality to stream and groundwater discharge standards. Based on the discharge standards, we developed basis-of-design criteria to evaluate various leachate treatment technologies, including lagoon treatment, constructed wetland treatment, membrane filtration, conventional precipitation, intermittent sand filtration, and biotreatment systems. Seasonal discharge alternatives, including evaporation, recirculation, and landfill cap irrigation, were also considered. We conducted technical and economic evaluations of each technology and recommended a leachate management alternative.

City of Albany, NY

Solid Waste Management Services

ARCADIS developed a long-term solid waste management plan and a generic environmental impact statement for the Planning Unit in a one-volume solid waste management plan/generic EIS document.

Erie County Industrial Development Agency, NY

Solid Waste and Resource Recovery Study

ARCADIS conducted site evaluations, identified potential energy users, evaluated implementation alternatives, and assisted in assessing legal factors and developing a financing plan.

Nassau County, NY

Solid Waste Consolidation Analysis and Implementation Plan

ARCADIS prepared a consolidation analysis for Nassau County (with more than 120 solid waste districts, villages, etc.) to develop a strategic program for consolidating government and providing more efficient services to its tax payers. ARCADIS worked with the County and designated entities to gather and compile existing information, including developing and distributing of questionnaires to solicit information from stakeholders regarding business/financial, technical, institutional and legal aspects. As part the consolidation analysis, ARCADIS performed the following:

- Analyzed and determine best practices for solid waste operations throughout the County.

- Identified current and future solid waste practices, identify efficiency and effectiveness improvements, and examine the impact various consolidated solutions will have on service delivery.
- Identified sustainable intergovernmental relationships that will support the goals of the County in reducing the tax burden while maintaining a high level of service.
- Completed a financial impact analysis to estimate the potential net cost savings for Nassau County residents (by municipality) that could be realized from consolidation.
- Assisted in identifying the legal and legislative requirements, policies and procedures that are needed to consolidated services in conjunction with the County's legal counsel.
- Identified the barriers to consolidation that may limit the ability of the County to implement the recommendations of this study and propose solutions to the barriers.

City of New Haven, CT

Assistance in Creating an Independent Solid Waste Authority

ARCADIS was retained by the City of New Haven to create an independent authority for long-term solid waste management, including increasing recycling rates. ARCADIS provided the following services to the City:

- Developed transaction documents, including conducting a cost of service study, developing a plan of operations for the new authority, reviewing the City of New Haven waste flow control ordinance and ordinance creating the independent authority, and providing assistance in developing an asset lease agreement.
- Reviewed the technical and financial feasibility of bringing a rail connection to the City of New Haven Transfer Station site by identifying potential interest and benefits of bringing rail access to the transfer station site, subcontracting a rail expert to identify potential access alternatives, and developing transportation and disposal cost scenarios for waste-by-rail options.
- Developed a financing plan for the new authority in conjunction with the City's legal counsel.
- Developed public information support materials for communication to the public.

In 2008, the New Haven Solid Waste and Recycling Authority was successfully formed under existing Connecticut statutes.

New Haven Solid Waste and Recycling Authority, CT

Transfer Station Operations and Hauling and Disposal Services

ARCADIS conducted an engineer's feasibility study to assist the New Haven Solid Waste and Recycling Authority (Authority) in the acquisition of the transfer station assets from the City of New Haven through the issuance of over \$10 million revenue bonds. In addition, ARCADIS assisted with the procurement of transfer station operations and hauling and disposal services by performing the following services:

- Developed and issued a Request for Proposal for transfer station operations and hauling and disposal services.
- Developed technical schedules and performance specifications to the Service Agreement containing desired contractual provisions and risk allocation in alignment with more advanced agreement structures from the industry.
- Worked with the Authority and its legal counsel to develop the Service Agreement.
- Conducted technical and business evaluation of the proposals from vendors, including issuing request for clarifications to solicit comments from vendors on the draft Service Agreement.
- Participated in vendor contract negotiations in conjunction with the Authority, its legal counsel and highest two ranked contract operators.
- Held discussions with the Authority and its legal counsel to review comments to the draft Service Agreement proposed by the vendors.

- Conducted technical due diligence review of the closing documents for the Service Agreement and finalized the Service Agreement with the Authority's legal counsel to allow execution by the Authority and the Contractor.
- Prepared an overview of the new Service Agreement scope and key benefits for press release purposes.

Confidential Client

ARCADIS was retained by the client to assist in its efforts to acquire seized solid waste facilities that are to be auctioned by the Federal Government, including a transfer station. The client intended to create an independent authority, which would partner with a private entity to submit a bid for the transfer station to acquire the assets.

ARCADIS provided the following services:

- Conducted a Phase I Environmental Site Assessment of the transfer station site based on permit review, historical records, and site inspection.
- Delineated the physical boundaries of two pieces of properties of interest to the client and the lease arrangements and rights assignments for the use of such properties.
- Investigated competing transfer stations, bulky waste processing and waste-to-energy facilities within 50 miles of the transfer station.
- Developed a valuation models to project the value of net income from projected revenues and expenses to assess available acquisition options and costs.
- Identified and estimated the costs of capital improvements needs for continued permit compliance and possible transfer station capacity expansion. Used such information to develop additional ranges in acquisition costs.
- Developed a draft Request for Qualifications for partnership to acquire and operate the transfer station and related assets to solicit interest for a public-private partnership.



Appendix B – Team Resumes

**Solid Waste Management
Consulting Services
Technical Proposal**



Education

BA Social Science American University, Washington DC 1976

MA Policy Studies Washington University 1979

Years of Experience

Total – 33

With ARCADIS – 11

Bruce C. Corning

Project Manager

Mr. Corning is experienced in line and task management, technical support, fieldwork, and business development and client relations for DOE, DoD, EPA, NASA, NOAA and NIH projects and programs. He has been responsible for the implementation of new program activities throughout government organizations related to the areas of science, environment, transportation, engineering and energy. Mr. Corning has also taught university courses in Policy Analysis, Normative Policy, Policy Implementation, Statistics and Probabilistic Modeling.

Detailed Experience

Alexandria Sanitation Authority: Value Engineering Workshops / Alexandria VA.

Managed four value engineering workshops involving review of several design packages that in part, make up the State of the Art Nitrogen Upgrade Program. Facilitated the VE workshops using a systematic application of recognized techniques by multi-disciplined teams that identified the functions proposed, established a worth for that function, generated alternatives through the use of creative thinking with ASA's goals and mission in mind, and provided the needed functions and reliability at the lowest overall cost. Workshop yielded potential savings to ASA of over \$6 million.

Alexandria Sanitation Authority: Sustainability Workshops / Alexandria VA. Worked to implement culture change and develop change management system to initiate an organization wide sustainability program. Facilitated workshops to incorporate sustainability in the mission and vision of ASA as well as develop strategies that integrates with their Strategic Plan. Worked with leadership and senior staff to incorporate sustainability as a performance objective within their continuous improvement strategy for executives and staff at all levels.

Alexandria Sanitation Authority: Water Reuse Support / Alexandria VA. Currently managing multiple efforts to expand ASA's mission to implement an effective long-term outreach plan to inform the public and promote the use of recycled water, transform the role and image of ASA to the community, develop a robust brand of the water, and re-introduce ASA to the community as an active and integral partner in the continued growth of Alexandria.

District of Columbia Department of Public Works, Solid Waste Management

Administration: Street Sweeping Program Overhaul / Washington DC. Managed a multi-phased program over three years to completely rework DPW's street sweeping program. Assisted in establishment of the selection criteria and evaluation of purchasing new street

sweeping equipment, developed new standards with which the program should comply with respect to the newly proposed Municipal Separate Storm Sewer Systems (MS4) rules, developed a completely new routing system that provided efficiencies allowing an additional day and a half of sweeping in environmentally sensitive areas near waterways, trained staff on new routes, and managed the DCDPW staff in changing the 20,000 street sweeping sign parking enforcement signs city-wide.

Medical University of South Carolina: Administrative, Programmatic and Technical Support / SC. Managed a team contributing to the University's "High Level Waste and Foreign Spent Fuel Options Study." The Medical University of South Carolina, under a grant from the Department of Energy, had the challenge to develop suitable options that would ensure that South Carolina citizens' health and environment would be continued to be protected. EG&G's assistance used the NEPA model as a process to take a "fresh look" at the critical issues and developed a range of storage options that made sense for the state, providing technical presentations to public meetings, and prepared reports for the Department of Energy.

Medical University of South Carolina: Administrative, Programmatic and Technical Support / SC. Managed a team contributing to the University's "High Level Waste and Foreign Spent Fuel Options Study." The Medical University of South Carolina, under a grant from the Department of Energy, had the challenge to develop suitable options that would ensure that South Carolina citizens' health and environment would continue to be protected. The project team's assistance involved using the NEPA model as a process to take a fresh look at the critical issues and develop a range of storage options that made sense for the state, providing technical presentations to public meetings, and preparing reports for the Department of Energy.

Publications

Davis, V.O., Corning, B.C., Nesbitt, S.R., "**Sustainable Communities**," presented at the 94th Annual Conference of the International City/County Management Association (ICMA), Richmond VA, September 21-24, 2008.



Education

BS Chemical Engineering
Manhattan College 1986
MS Environmental
Engineering Manhattan
College 1988

Years of Experience

Total – 27
With ARCADIS – 27

Professional Affiliations

New York State Association
for Solid Waste
Management
Water Environment
Federation

Isabella S. Schroeder

Technical Assistance

Ms. Schroeder has experience in environmental engineering projects, specializing in solid waste management. Her experience includes researching, writing, and managing solid waste management plans and programs, engineering evaluations on project design and construction costs, technology assessments, site evaluation studies, permit applications, and interacting with regulatory agencies. Supplementing this experience is her conduct of environmental and economic assessments, establishing user fees, and securing bond funding.

Detailed Experience

Bergen County Utilities Authority: Resource Recovery Facility and Solid Waste Management Program / Little Ferry NJ.

Project Leader for the planning and implementation of a 3,000-tpd resource recovery facility and countywide waste reduction programs.

- Performance of waste characterization analysis and determination of project disposal requirements taking into account population, economics, and waste reduction efforts.
- Assistance in final contract negotiations with the selected vendor.
- Environmental assessment and subsurface investigations of the selected RRF site.
- Technical assistance on preparing local, state, and federal permits.
- Siting and capacity evaluations of potential ash residue landfill sites.
- Economic feasibility analyses and assistance in writing the official statement.
- Evaluation of regionalizing disposal capacity with other counties.
- Assistance in developing a countywide recycling program, siting and development of a regional leaf composting facility, waste composition study, and recycling directory and commercial recycling guides.
- Permitting, design, and operations and maintenance manual for a regional leaf composting facility constructed on top of an existing landfill.

Broward County: Engineer Feasibility Report / Broward County FL. Provided computer analysis of the economic feasibility of the North and South Broward resource recovery facilities for permanent project financing and of alternative landfill designs to evaluate efficiency and to compare associated construction costs.

Broward County: Financial Modeling / Broward County FL. Developing a financial model of the existing solid waste disposal system for use in evaluating the impact of various contractual arrangements on the operations of the North and South WTE facilities and the tipping fee charges for solid waste services.

City of Danbury: Creation of Danbury Solid Waste Authority / Danbury CT. Assisting the City and the Housatonic Resource Recovery Authority in creating the Danbury Solid Waste Authority for the purposes of purchasing the regional White Street Transfer Station and related assets seized and to be auctioned by the Federal Government.

City of Miamisburg: Refuse Division Operational Study / Miamisburg OH. Conducted a review of the division collection system operations, including bulky waste, recyclables, special waste and trash to identify cost effective alternatives for provision of services, including optimizing existing in-house program, semi and full automation of collection and privatization of services.

City of New Haven: Solid Waste System Planning / New Haven CT. Conducted a review of solid waste collection, transfer, haul and disposal systems to address a) the City's immediate solid waste system needs and b) to evaluate options and cost saving opportunities for the future management of the City's solid waste system c) identify existing contract renegotiation positions and strategies.

City of Norwalk: Solid Waste Strategic Planning / Norwalk CT. Managing a project with the City to develop a solid waste system strategic plan from collection through disposal to address the expiration of its long-term disposal contract with the CRRRA in 2008 and the transfer of the ownership and operations of the Norwalk Transfer Station from the CRRRA back to the City. A key component is the preparation and issuance of procurement documents to secure long-term disposal capacity.

City of Tampa: Collection Services / Tampa FL. Assisted the client in preparing cost estimates to provide residential and commercial collection services to designated areas of the city and provide expanded citywide recycling collection services for comparison to recently received bids for provision of these services. On the basis of the analysis, the city agreed to award the residential and commercial collection services to a private contractor for a five-year period and to pursue the provision of citywide recycling services by city employees.

City of Tampa: McKay Bay WTE Facility / Tampa FL. Manager for the procurement of a full-service vendor for the \$100 million retrofit of the city's 1,000-tpd WTE facility and long-term operation of the retrofitted facility. As part of the project, prepared the engineer's feasibility report for project financing including a systemwide financial model of the city's solid waste facilities. This model was also used to assess project economics, evaluate economic flow control, evaluate joint county/city disposal options, evaluate vendor proposals for the retrofit and operation of the facility, support bond financing, and develop long-term financial management plans.

Counties of Raleigh, Fayette, and Wyoming: Solid Waste Management Plan / Counties of Raleigh, Fayette, and Wyoming WV. Prepared a comprehensive tri-county plan that included an assessment of current recycling and solid waste disposal methods, a waste quantification and characterization analysis, evaluation of newly promulgated regulatory requirements, evaluation of disposal alternatives, development and evaluation of siting criteria, evaluation of developing regional and individual county facilities and programs, and recommendation for implementation of a long-term disposal strategy and recycling programs.

Lake County: Feasibility Analysis / Tavares FL. Prepared an economic model of the county's solid waste system which incorporated all of the financial provisions contained in the county's agreement with the operator of its WTE facility. The economic model was then used to evaluate current and future tip fees and the net-present-value of the solid waste disposal system under various scenarios. The scenarios included changes in population, waste disposal quantities and recycling rates, and assessment of contract renegotiation options with the operator of the WTE facility, including facility closure, expansion, regionalization, refinancing and other options.

Lee County: Ash Residue Landfill / Lee County FL. Prepared the engineer's feasibility report for the bond financing of the Lee County Ash Residue Landfill. Developed the financial model and performed the sensitivity and financial analysis of the Lee County Solid Waste Management System, which included the ash landfill, a 1,200-tpd resource recovery facility, and a 100-tpd materials recovery facility. Continuing to prepare the Engineer's Report on an annual basis to the trustees for these bonds.

Lee County: Solid Waste Management Plan Update and Facility Expansion Analysis / Lee County FL. Assisted in the development and preparation of the County's SWMP update including preparation of the decision documents used by the County in approving the proposed expansion of the County's WTE facility from 1,200-tpd to 1,800-tpd.

Palm Beach County: Resource Recovery Facility Negotiations / West Palm Beach FL. The County's agreement with the existing facility operator is scheduled to expire. Developed a financial model of the County's solid waste system and existing agreement structures and currently assisting the County in evaluating alternatives for refurbishment and continued operation of the facility and negotiating terms for the refurbishment, interim operations and long-term operations of the refurbished facility.

Pollution Control Financing Authority of Warren County: Resource Recovery Facility - Engineer's Feasibility Study / Oxford Township NJ. Assisted in the preparation of the Engineer's Feasibility Report for debt restructuring of the authority's resource recovery facility with activities focused on preparing financial projections and life cycle cost analysis of vendor proposals and proposed counter proposals.

Solid Waste Authority of Puerto Rico: Solid Waste Authority / PR. Assisted the Authority in preparing the Island's Long-term Solid Waste Management Plan. Provided technical

support and developed the financial model and capital plan and scenario analysis for the next 20 years.

Town of Mamaroneck: Solid Waste Collection Study / Mamaroneck NY. Conducting review of the regional solid waste consortium's solid waste collections operations and truck routing to identify the need for separate residential and commercial routes and opportunities in increase effectiveness and efficiency of operations.

Town of North Hempstead: Material Recovery / North Hempstead NY. Assisted in the evaluation of recycling proposals for a 120-tpd intermediate processing center.

U.S. Pipe and Foundry Company: Closure of Industrial Waste Landfill / Burlington NJ. Prepared the Solid Waste Facility Financial Plan and update to the NJDEP for the closure of the landfill in accordance with the state's regulations. Work included development of capital costs for the closure of the landfill, operation and maintenance costs for the 30-year post-closure care period, and a schedule for the distribution of funds.

Union County Utilities Authority: Resource Recovery Facility / Rahway NJ. Prepared the annual report to the trustees of the solid waste system revenue bonds for the UCRRF prior to the financial restructuring and long-term lease of the facility to the operator. Serving as the Authority's monitoring engineer for the resource recovery facility to assure that vendor operates and maintains the facility in accordance with the requirements contained in lease and disposal service agreements.

Village of Ridgewood: Siting of a Municipal Recycling Center / Ridgewood NJ. Responsible for the day-to-day activities associated with the siting and design of a municipal recycling center. Provision of technical assistance on recycling program development and implementation.

Westchester County: Environmental Impact Statement for Long-Term Solid Waste Management and Planning / Westchester County NY. Managing procurement of long-term solid waste disposal capacity under various procurement options.

Westchester County: Materials Recovery Facility / Yonkers NY. Coordinated the design of enhancements to the Materials Recovery Facility to increase its ability to accept and process additional materials (i.e., aseptic and gable-top containers, junk mail, kraft paper, box board, telephone books, and textiles) and to continue to improve overall processing efficiency.

Westchester County: Mixed Cullet Market Development Plan / Westchester County NY. Managed a research study being performed with grant assistance from the New York Energy Research and Development Authority for the development of markets for mixed broken glass generated by the county's material recovery facility.

York County Solid Waste and Refuse Authority: Resource Recovery Project / York County PA. Prepared the preliminary Engineer's Feasibility Report which included sensitivity and financial analysis of the project, calculation of population and growth rates, evaluation of permit requirements, and the research and coordination of project information.



Education
BS Mechanical Engineering
Syracuse University 1980

Years of Experience
Total – 31
With ARCADIS – 29

Professional Registrations
Professional Engineer
Board Certified Environmental
Engineer (BCEE)

Professional Affiliations
American Society of
Mechanical Engineers,
Member
American Water Works
Association
National Society of
Professional Engineers
New York State Society of
Professional Engineers,
Member
Solid Waste Association of
North America, Former
Director

Raul A. Torres, PE, BCEE

Technical Assistance

Mr. Torres is a specialist in materials handling and construction and project management, primarily for municipal solid waste disposal facilities. His background includes siting, permitting, financing, contract negotiation, planning, design, and resident engineering of sanitary landfills, transfer stations, and composting and recycling facilities.

Detailed Experience

Indian River County: Evaluation of Solid Waste Disposal Assessment Program / Indian River County FL. Managed a detailed statistical and financial analysis of the county's in-place waste assessment program to determine the acceptability of the system. Study included the determination of waste generation per square foot of each commercial and industrial establishment. Developed a modified user fee program in lieu of a tipping-fee approach at the facilities. Guaranteed revenues via waste assessments for this \$10 million per year utilities program are essential for complying with the bond covenants of the county.

Lawrence Hospital: Medical Waste Incinerator / Bronxville NY. Managed the preparation of a feasibility report for constructing a new incinerator in compliance with New York State regulations. Included an assessment of waste generation throughout the hospital.

Leonard Hospital: Hospital Waste Incineration / Troy NY. Provided technical assistance for negotiating with a full-service contractor to build a regional hospital waste incinerator. Reviewed permit applications related to the revised New York State regulations.

Modern Landfills, Inc.: Environmental Impact Statement for Landfill Expansion / Model City NY. Managed the development of an environmental impact statement for the expansion of the Model City landfill. Work performed included the analysis of potential air, traffic, groundwater, and other environmental impacts.

Monroe County Division of Solid Waste: Solid Waste Composting / Monroe County NY. Managed the development (design-build-operate) and procurement documents for a 200-tpd municipal solid waste composting facility. W.

Monroe County Division of Solid Waste: Transfer Station/Composting Facility/Landfill / Monroe County NY. Managed the development of privatization contracts for the county's transfer station/composting facility and Mill Seat Landfill. Proposal evaluations and contract development, which were conducted together with legal and financial advisors, considered technical performance requirements, payment formulas and incentive fees, and "put or pay" arrangements for private financing. The Mill Seat Landfill operations and maintenance

privatization bid documents enabled county employees to compete with the private sector for the operations and maintenance contract.

New York City Department of Sanitation: Value Engineering Study for Fresh Kills Landfill / Staten Island NY. Participated in value engineering team for the proposed barge unloading facility (transfer station) at the landfill.

Ontario County Department of Solid Waste Management: Integrated Recycling Facility / Canandaigua NY. Managed the development of the county's mixed-waste composting and recycling facility.

Puerto Rico Aqueduct and Sewer Authority: Comprehensive Energy Management / San Juan US Islands. Project Officer for comprehensive island-wide energy initiative to improve energy efficiency, reduce energy costs, and minimize pricing volatility associated with PRASA's operation of over 125 water treatment plants, 60 wastewater treatment plants, 1,500 pump stations, 300 water wells and 70 buildings. These facilities currently consume 640,000,000 kWh/year at an annual cost of over \$135M.

Scott Paper Company: Siting of Residuals Disposal Landfill / Chester PA. Managed the siting study for a residuals disposal landfill for residue from Scott's proposed recycled fibers plant. The siting study encompassed a multicounty region within 100 miles from the facility. Also managed the development of life-cycle cost analyses for Scott's use in estimating the economics of the entire project.

Solid Waste Authority of Puerto Rico: Solid Waste Plan and Waste-to-Energy Facilities / San Juan PR. Project Director for the development of a Dynamic Itinerary Plan for Puerto Rico's 13,000-tpd of solid waste. Evaluated useful life of 31 landfills and development of waste processing technologies including waste-to-energy, recycling, and composting technologies. Also directed the procurement of two 1,500-tpd waste-to-energy facilities.

The Select Commission on Solid Waste Management: Development of a Statewide Solid Waste Management Plan / Rhode Island RI. Directed the development of a solid waste management strategy report for this blue-ribbon panel established by the Governor's office. The report reviewed in-state and out-of-state options for long-term waste management, including technological and contractual arrangements, with outsourcing options. Also responsible for the performance of extensive financial analyses and feasibility studies, and the development and presentation of materials during eight weekly workshops of the Select Commission. The Commission included the Rhode Island Department of Environmental Management Commissioner, the Chairman of the Rhode Island Solid Waste Management Commission, state legislators, environmental groups, municipal representatives, and other interested parties assigned by the Governor.

Tompkins County: Recycling and Solid Waste Center / Tompkins County NY. Managed the development (design-build-operate) of a 350-tpd combined transfer station and recycling facility. Work included the preparation of pro forma with numerous sensitivity analyses in order to select the preferred contractor. Evaluation and negotiation approaches resulted in the

reduction of privatized capital and operating costs by about 40 percent. Also managed the development of a statewide solid waste report to determine tipping fees and funding mechanisms for solid waste program.

Town of Islip: Evaluation of Off-Long Island Solid Waste Disposal Alternatives / Islip NY. Prepared feasibility, cost, and economic impact reports for solid waste handling and disposal alternatives for the town, including barging and long-distance truck and rail transport. Reviewed the existing recycling program for effect on solid waste disposal alternatives. Was part of the project team that testified on Islip's behalf for the expansion of the town's landfill, demonstrating the infeasibility of long-distance solid waste disposal as a reliable solid waste management solution.

Town of North Hempstead: Development of Solid Waste Management Facilities / North Hempstead NY. Managed the development (design-build-operate) of several waste management facilities, including a 990-tpd, \$135 million waste-to-energy facility, a source-separated recycling facility, and a leaf-and-yard-waste composting facility. Work included the development of procurement documents, technical performance specifications, service fee payment formulas, and technical performance guarantees. Served as part of an evaluation, selection, and negotiation team with legal and financial advisors. Also prepared tipping fee and financial information for a \$71 million refinancing of facilities.

Town of Southampton: Solid Waste Management Plan / Southampton NY. Managed the development and implementation of the town's long-term solid waste management program, including the development of procurement documents for a 200-tpd recycling and composting facility. Efforts included the preparation of a solid waste management plan in the form of a generic environmental impact statement. Also managed the design and construction monitoring of new landfill Cell #3 and the closure of existing Cells #1 and #2, in compliance with 6NYCRR Part 360.

Ulster County Resource Recovery Agency: Recycling Plan / Ulster County NY. Administered a field sampling program of solid waste for the county, including the determination of commercial, residential, and industrial portions of the waste with focus on recyclable quantities.

York County Solid Waste and Refuse Authority: Medical Waste Management Plan / York County PA. Managed the development of a countywide medical waste management program. Activities included surveying numerous hospitals, clinics, nursing homes, funeral parlors, and private practices to determine waste quantities and existing disposal practices. Survey results and technology studies provided basis for development of the recommended plan in compliance with Pennsylvania and U.S. EPA regulations.



Education

BCE Civil Engineering
University of Delaware 1988
MCE Civil Engineering
University of Delaware 1990

Years of Experience

Total – 22
With ARCADIS – 22

Professional Registrations

Professional Engineer
Board Certified Environmental
Engineer (BCEE)

Health & Safety Training

24-Hr Supervised Field
Training
Construction Safety
Awareness
Ergonomics
Initial 40 Hour Hazardous
Waste Operations Safety
Training
Specialized Lead Training
6014
Health & Safety Training for
Project Management
Respiratory Protection
Hazardous Waste Operations
Site Supervisor
Troxler Nuclear Gauge Safety
Training
Unexploded Ordnance (UXO)
remediation site training

Professional Affiliations

American Society of Civil
Engineers
Society of American Military
Engineers
Solid Waste Association of
North America, Old
Dominion and Mid-Atlantic
Chapters

Douglas E. Sawyers, PE, BCEE

Technical Assistance

Mr. Sawyers is experienced in design and project administration activities on a wide range of projects. His experience includes the review and evaluation of solid waste treatment technologies, development of site management and redevelopment plans, site assessments, development of project work plans, and various field activities, including oversight of contractor activities and the construction and implementation of remedial activities. He has also performed financial and life-cycle cost analyses, prepared monthly progress and final project reports, and coordinated public meetings and community interaction.

Detailed Experience

Broward County Resource Recovery Office: Resource Recovery Project / Broward County FL.

Prepared a feasibility study for the long-term management of ash residue. Alternatives included beneficial use (asphalt and concrete aggregate, landfill construction material) and landfill disposal.

Centre County Solid Waste Authority: Waste Disposal/Transfer Studies / Centre County PA.

Reviewed vendor proposals for long-term solid waste disposal options. Activities included the economic evaluation of vendor proposals based on proposed tipping fees and transportation costs projected over a 20-year planning period.

Chester County Solid Waste Authority: Ash Residue Reuse Demonstration Project /

Honey Brook PA. Led the investigation of reuse opportunities for municipal waste combustor ash as a landfill gas venting medium at the Lanchester Landfill. Activities include the design of a horizontal landfill gas collections system using ash as the collection medium, development of design and performance specifications for construction materials, and development of test protocols for quality assurance/ quality control. Responsibilities also include public meetings.

Chester County Solid Waste Authority: Leachate Treatment System / Chester County

PA. Provided Resident Engineering services for the construction of a leachate treatment facility for the Lanchester Landfill.

City of Albany: Solid Waste Management Services / Albany Area NY. Led tasks related to the preparation of an environmental impact statement/solid waste management (EIS/SWM) plan. Activities included support of the public review process.

Dakota County: Resource Recovery / Dakota County MN. Provided technical assistance in the review and evaluation of facility operating contracts (service agreement) for the start-up and acceptance testing and initiation of normal operations at the Dakota County WTE facility.

Delaware Solid Waste Authority (DSWA): Evaluation of Alternative Landfill

Construction Materials / Delaware County PA. Developed a beneficial use program for waste materials disposed of at the Colebrookdale Landfill. Activities include the review and evaluation (based on regulatory, technical, and economic factors) of potential alternate landfill construction materials, including reuse of ash as daily/intermediate cover, gas venting material and on-site structural fill. Developed an economic evaluation model for the Authority's overall waste management system, including waste collections, transfer station operations, resource recovery, and landfill operations and disposal.

DSWA: Transfer Stations / Lewes & Milford DE. Led site investigation and permitting activities related to the design, permitting, and construction of two solid waste transfer stations. Developed concurrently, these two state-of-the-art waste management facilities are designed to provide flexibility to the DSWA's overall integrated waste management system. Facility components include aesthetic design, segregated residential, commercial, and facility traffic routes and operational areas, and fully-integrated data management and IT systems. Led public outreach efforts.

Fairfax County: Solid Waste Consulting Services / Fairfax County VA. Project director for consulting services related to the County's post-2016 long-term planning. Project manager for technical support at the I-95 energy/resource recovery facility (E/RRF). Services to date include permitting evaluations and activities associated with the I-95 E/RRF, the I-66 Transfer Station and the I-66 Landfill. Additional services provided include air permitting and compliance reporting for the I-95 Landfill.

Harford County, Division of Environmental Affairs: Landfill Expansion / Harford County MD. Project manager for design, permitting and construction of the expansion of the County's primary MSW landfill.

Harrisburg Authority: Retrofit Alternatives for WTE Facility / Harrisburg PA. Reviewed technical and economic feasibility of employing alternative waste management technologies at an existing resource recovery facility. Activities included a design review and life-cycle cost analyses of RRF retrofit alternatives and alternative waste management systems, including public and/or private sector development of transfer stations and landfills.

Naval Facilities Engineering Command, Northern Division: Environmental Management Planning / Willow Grove PA. Prepared solid waste, hazardous waste and residual waste management plans for the Willow Grove Naval Air Station. Prepared environmental emergency response plans for SPCC planning and PADEP requirements for PPC planning, as well as DOD requirements at the Willow Grove and NAVICP Mechanicsburg.

U.S. Pipe and Foundry Company: Closure of Industrial Waste Landfill / Burlington NJ. Managed construction administration services for the construction of closure system for the on-site landfill at the client's facility.

Union County Utilities Authority: Ash Management Program / Union County NJ. Developed County's MSW ash management program. Activities included the completion of a

feasibility study to evaluate the beneficial use of municipal solid waste ash residue from the facility including the review and analysis of technologies, markets, economics, public and private sector involvement, and regulatory issues.

Union County Utilities Authority: Monitoring Engineer / Rahway NJ. Provided technical support related to the operations monitoring of the WTE facility.

York County Solid Waste and Refuse Authority: Ash Management Planning / York PA. Developed the County's updated ash management program. Activities included the review and evaluation of available ash treatment technologies, beneficial use markets, and vendor services. Also evaluated institutional issues that could impact the decision-making process, including liabilities associated with public or private ownership, financing, impacts to tipping fees, and operations. This study resulted in the privatization of the County's ash management program through full-service vendor operations.

York County Solid Waste and Refuse Authority: Resource Recovery Project / York County PA. Leading efforts for the Authority in support of the planned expansion of the YCRRRC. Related to the addition of a 600-tpd mass burn unit, our services include technical consulting on design and operations, solid waste and air quality permitting, multi-pathway human health and ecological risk assessment, and regulatory and public meetings on the expansion and permit applications.

York County Solid Waste and Refuse Authority: Solid Waste Management System / York County PA. Developed updated life-cycle cost analyses for the Authority's resource recovery facility, landfill, recycling and household hazardous waste programs, assisted in the preparation of monthly reports on the operations of the resource recovery center, prepared financial analyses in support of the Authority's annual budget review, and prepared an engineer's report in support of a revenue bond issue.

York County Solid Waste and Refuse Authority: Wetlands Assessment / York PA. Managed the assessment of wetland habitats as part of the County's Consent Decree with the USEPA for its Hopewell Township Landfill to determine current functional quality of wetland habitats at the site, as well as the impact of site operations on wetland habitats. Project activities included the delineation of wetlands, determination of the functional value of the wetland habitat, the impact of groundwater pumping on the wetland environment, and the preparation of a wetland delineation report for the U.S. Army Corps of Engineers.

Publications

Sawyers, D.E., Chattopadhyay, A., Cohn, J.S., "**New Sources, New Requirements, New Challenges - Air Quality & New Waste-to-Energy Capacity,**" *Proceedings*, 17th Annual North American Waste-to-Energy Conference (NAWTEC 17), Chantilly VA, May 18-20, 2009.



Education
BS Environmental
Engineering University of
Florida 1997
M.Sc. Civil Engineering
Florida Atlantic University
2002

Years of Experience
Total – 16
With ARCADIS – 16

Professional Registrations
Professional Engineer

Professional Affiliations
American Public Works
Association
American Water Works
Association
Solid Waste Association of
North America

Leah K. Richter, PE

Alternatives/Scenario Analysis and Technology Alternatives

Ms. Richter has a diverse background in environmental and civil engineering. She specializes in solid waste projects involving waste-to-energy, materials recovery, recycling, and landfilling. She is primarily responsible for assisting municipal clients in South Florida with managing their solid waste management planning, operational, and capital program needs. Her experience includes project management and delivery, vendor procurement, contract compliance, regulatory permitting, annual reporting to bondholders/trustees, litigation support services, solid waste advisory committee support, environmental compliance, debris management oversight, and operation and maintenance evaluation.

Detailed Experience

Broward County Waste and Recycling Services: Ash Monofill Cell 1B Expansion - Design and Construction Oversight / Fort Lauderdale FL. Project manager for the development of bid documents, bid phase support and construction oversight for the 13-acre expansion effort. Design components included double geosynthetic liner system with leachate collection and removal systems with tie-in to existing cell.

Broward County Waste and Recycling Services: Interim Contingency Landfill Side Slope Reclamation / Ft. Lauderdale FL. Project manager for the feasibility analysis and bid document preparation related to evaluating the condition of the landfill's side slopes and determining the extent of the filling in excess of permit requirements. Elements also include development of bid documents for procurement of a contractor to perform the reclamation efforts and design of the stormwater management system.

Broward County Waste and Recycling Services: Solid Waste / Ft. Lauderdale FL. Project engineer for the development of improvement alternatives for the county's Household Hazardous Waste Facility. The facility is one of the few elements of the county's solid waste system that is used directly by the residents. Its appearance is therefore a reflection on the county itself; thus this project was highly visible. Prepared several conceptual design alternatives focusing on: streamlining materials receiving; consolidating facility operations; providing increased storage and containment capacity; and providing dedicated office/work space and accommodations for staff members.

Broward County Waste and Recycling Services: County Landfill - Miscellaneous Improvements / Fort Lauderdale FL. Project Manager for the development of bid documents related to miscellaneous improvements to the county's Interim Contingency Landfill. Elements included design of improvements to the landfill's leachate management system, public drop-off area, haul road, site security, and scale house. Additional project

activities included development of bid documents related to a new household hazardous waste public drop-off area, support of the county with its bidding process, and construction management/oversight services.

Broward County: South Broward County Resource Recovery Ash Monofill / Broward County FL. Assisted with overseeing the construction of \$7.8 Million expansion to ensure compliance with project design/specifications. The construction involved the installation of collection systems for leachate and stormwater management and control. Duties included conducting daily inspections of site activities and performing quality assurance testing in various project phases.

Collier County: Contract Operations at County Landfill / Naples FL. Performed site inspections to identify operations or site conditions that were not in compliance with the county's operating agreement. Inspections included the active and closed Class I landfill cells, gas collection systems, site operations, storm water controls, leachate controls, C&D recycling, and contract issues.

Lake County Department of Solid Waste Management Services: Resource Recovery Facility / Lake County FL. Deputy project manager for the operations monitoring program consisting of an assessment of the operational efficiency and maintenance of the waste-to-energy facility, and the compliance of Covanta Lake, Inc., the operator, with the service agreement. Activities included project management, on-site inspections, and preparation of annual performance reports.

Solid Waste Authority of Palm Beach County: Debris Management / West Palm Beach FL. Deputy project manager for the \$50 million debris management program in the wake of Hurricanes Frances and Jeanne in 2004 and Operations Manager following Hurricane Wilma in 2005. Responsible for the on-site coordination with the Authority, debris management contractors, and local/federal regulatory agencies. Coordinating the efforts of 100+ staff to collect approximately 6 million cubic yards of hurricane debris. Activities included load ticket database analysis/reconciliation; equipment certification/audit; load and debris site monitoring; customer complaint tracking; and gated communities claim tracking.

Solid Waste Authority of Palm Beach County: Materials Recycling Facility (MRF) Relocation Design, Permitting, and Procurement Support / West Palm Beach FL. Deputy project manager for a fatal flaw analysis related to the authority's relocation of its residential MRF. This project was a follow-up to our preliminary conceptual design and consisted of conducting a constraints and limitations analysis to assess the feasibility of site development as related to permitting, geotechnical, environmental, scheduling and cost considerations.

Solid Waste Authority of Palm Beach County: New 3,000-tpd Waste-to-Energy (WTE) Facility / West Palm Beach FL. Project manager for the planning, permitting, procurement, financing, public outreach and conceptual design for the overall implementation of a new 3,000-tpd WTE facility adjacent to the authority's existing North County Resource Recovery Facility. Key activities include development of a request for qualifications and request for proposals of a design-build-operator, development of application documents required under

the Power Plant Siting Act, development of a design criteria package to be utilized during the procurement process, and overall program management activities to support the development of this estimated \$700M capital project, the first of its kind in more than 15 years.

Solid Waste Authority of Palm Beach County: North County Resource Recovery Facility Phase I / West Palm Beach FL. Deputy project manager for the performance of a comprehensive, independent physical assessment of the WTE facility in anticipation of the expiration of the operations maintenance agreement between the authority and Palm Beach Resource Recovery Corporation, the operator.

Solid Waste Authority of Palm Beach County: North County Resource Recovery Facility Refurbishment Design-Build Procurement and Permitting / West Palm Beach FL. Served as Project Manager for the procurement of a design-build contractor to perform the \$150M refurbishment of the authority's 2,000-tpd North County Resource Recovery Facility, which consisted of engineering, procurement, demolition, and reconstruction of two 1,000-tpd WTE process units, including boilers, air pollution control equipment and control systems. Key activities included preparing the request for qualifications documents and supporting the authority in the evaluation, selection, and negotiations of the engineering, procurement, and construction services agreement with the selected vendor. Providing technical oversight and management as part of the design-build effort. Project manager for the regulatory approval process which included development of the Power Plant Siting Act documentation as well as the Air Construction Permit application.

Solid Waste Authority of Palm Beach County: Plant Inspections / West Palm Beach FL. Project manager for the operations monitoring program for the refuse-derived fuel WTE facility and MRF. Responsible for overall project management and assists with performing facility inspections of the North County Resource Recovery Facility and residential MRF. This includes assessing the operation of facilities, addressing safety concerns, maintenance issues, environmental compliance and adherence to service agreements.

Publications

Schauer, R., Richter, L.K., "**Breaking Ground for a New 3,000 tpd Waste to Energy Facility,**" *Proceedings*, 20th North American Waste-to-Energy Conference (NAWTEC 20), American Society of Mechanical Engineers, Portland ME, April 23-25, 2012.

Henderson, T.M., Richter, L.K., "**Palm Beach County WTE Expansion Model,**" *Proceedings*, 18th North American Waste-to-Energy Conference (NAWTEC 18), American Society of Mechanical Engineers, Orlando FL, May 11-13, 2010.

Schauer, R., Richter, L.K., "**Storm Debris Management: Surviving the Storm...Now What?,**" presented at the Fifteenth Annual Key West Recycling Seminar, Solid Waste Authority of Palm Beach County, Key West FL, June 2-5, 2005.

Schwarz, S.C., Richter, L.K., "**Brightstar Solid Waste and Energy Recycling Facility: An Innovative Waste to Energy Technology,**" *Proceedings*, 10th North American Waste to Energy Conference (NAWTEC 10), American Society of Mechanical Engineers, Philadelphia PA, May 6-8, 2002.



Education

BS Mechanical Engineering
North Carolina State
University 1993
ME Environmental
Engineering Manhattan
College 1996

Years of Experience

Total – 20
With ARCADIS – 18

Professional Registrations

Professional Engineer
Certified Construction
Documents Technologist
(CDT)

Health & Safety Training

Construction Safety
Awareness
Construction Safety 10 Hr
Initial 40 Hour Hazardous
Waste Operations Safety
Training
Lookout/Tagout
Health & Safety Training for
Project Management
Health and Safety Orientation
Unexploded Ordnance (UXO)
remediation site training

Professional Affiliations

American Society of
Mechanical Engineers
Water Environment
Federation

Joseph J. Krupa, PE, CDT

Technology Alternatives

Mr. Krupa has 14 years of experience specializing in solid waste projects involving waste-to-energy (WTE), material recovery, and biosolids management facilities. His experience includes conducting maintenance and outage inspections, performing market studies, evaluating demonstration and acceptance test results, preparing procurement documents, evaluating contract compliance, and preparing and presenting operations monitoring and feasibility engineering reports. He has assessed the efficiency of various types of solid waste and wastewater management programs, conducted pro forma analyses, transportation analysis, provided litigation support services for expert witnesses, and provided technical support during vendor negotiations.

Detailed Experience

Broward County: Operations Monitoring and MRF Relocation / Broward County FL.

Prepared and provided quality control review services for the annual, semi-annual, quarterly operations monitoring reports for the two 2,250-ton per day (tpd) WTE facilities in the County. Prepared and provided quality control review services for the 14th and 15th year annual trend reports that compare the current fiscal year operating data to the historical data for the two facilities in the County. Reviewed technical submittal for relocating recycling operations from the dual stream MRF to a retrofitted single stream MRF.

Broward County: Professional Engineering and Consulting Services / Broward County FL.

Provided quality assurance and control services. Prepared the quarterly, semi-annual, and annual O&M monitoring reports for two 2,250-tpd WTE facilities.

City of Erie: Comprehensive Solids Handling Study / Erie PA. Compiled the multiple-hearth incinerator evaluation and capital improvement recommendations for use as part of the engineer's report. Analyzed costs associated with increasing the biosolids solids content produced at the 40-mgd wastewater treatment plant and transferred to the incinerators.

City of Tampa: McKay Bay Retrofit/Reconstruction / Tampa FL. Provided technical assistance for the retrofit of 1,000-tpd WTE facility. Responsibilities included evaluating demonstration test and acceptance results after the completion of retrofitting (initially two sets of two 250-tpd units and then all four units, respectively), reviewing previous reports regarding cost estimates to retrofit/reconstruct the facility, and preparing an updated cost estimate.

Dutchess County Resource Recovery Agency: WTE Facility Retrofit / Poughkeepsie NY.

Prepared an operation-enhancement-study report of a resource recovery facility. The purpose of the study was to recommend operation enhancements to continuously operate at

500 tpd. Activities included flue gas pressure, temperature and flow measurement field testing; developing recommendations; developing cost estimates for recommendations; and reviewing energy optimization strategies.

Larchmont Mamaroneck Joint Garbage Disposal Commission: Refuse Collection Route Study / Mamaroneck NY. Reviewed feasibility of consolidating the commercial establishment refuse collection into one commercial route for the Commission. Conducted refuse collection route review inspections to develop performance metrics. Analyzed data for consolidating the remaining routes into residential only or a mix of residential and commercial customers. Prepared a summary report and presented results during meetings.

Lee County: Operations Monitoring at Resource Recovery Facility / Lee County FL. Provided technical assistance with operations monitoring of a 1,200-tpd WTE facility. Responsibilities included evaluation of contract compliance, invoice review, and operations monitoring report preparation. Also assisted in verifying commercial waste generation rates used in previous studies, preparing a report on the updated waste generation rates, analyzing effects of daily load variations on electrical revenues and steam production, and preparing a cost estimate for an additional boiler unit.

Northeast Maryland Waste Disposal Authority: Montgomery County Single Stream Recycling Feasibility Study / Derwood MD. Prepared the feasibility study for converting the existing dual stream processing materials recovery facility to a single stream operation by the addition of single stream screening and processing equipment. The study included preparation of a cost estimate to compare potential alternatives, and developing a recycling quantity projection for future recyclable product quantities.

Onondaga County Resource Recovery Agency: Solid Waste Generation Rate Study / North Syracuse NY. Assisted in the preparation of the determination of solid waste generation rates for the development of a solid waste user fee for the county. Prepared an extensive database to determine the residential and commercial solid waste generation rates. Prepared a summary of the commercial solid waste generation rates from the county and other communities. Established solid waste generation rates and classifications for the commercial properties. Conducted a commercial solid waste generation rate validation of select commercial properties.

Pollution Control Financing Authority of Warren County: Resource Recovery Facility Assistance / Warren County NJ. Prepared the 1999 and 2003 Independent Engineer's Feasibility Reports for restructuring the county's outstanding debt associated with its 448-tpd resource recovery facility. For both reports, project activities included a technical evaluation and inspection of the facility's operations and maintenance, review of relevant contracts, analysis of countywide waste generation, performance of a market assessment for a competitive tip fee under the restructuring, analysis of the current and forecasted energy market, and preparation of an extensive pro-forma-based financial review of facility expenses and revenues.

Solid Waste Authority of Palm Beach County: New WTE Facility / West Palm Beach FL.

As part of the constraints and limitations analysis for siting a new proposed 3,000-tpd WTE facility adjacent to the Authority's North County Resource Recovery Facility (NCRRF), determined potable, well and reuse water demand for the proposed WTE facility, assisted in the development of the conceptual site layouts, and developed a planning level schedule for the construction of the proposed WTE facility.

Solid Waste Authority of Puerto Rico: Dynamic Itinerary for Solid Waste Infrastructure /

PR. Managed the project to prepare the Dynamic Infrastructure Plan for solid waste management. Developed three transfer station and one materials recovery facility (MRF)/compost facility preliminary engineering reports. Analyzed different waste management technologies and assessed their feasibility of implementation. Prepared guidelines for evaluating proposals from project sponsors of facilities using WTE technology.

Solid Waste Authority of Puerto Rico: Transfer Station, Compost and MRF Preliminary Engineer Report Development / San Juan PR.

Prepared preliminary engineering report for the development of a combined materials recovery and compost facility. Developed the basis of the design and preliminary capital and operation and maintenance cost estimates. Review and coordinated the development of three transfer station preliminary engineering reports.

Solid Waste Authority of Puerto Rico: WTE Preliminary Strategy / San Juan PR.

Managed the development of the preliminary procurement strategy and Request for Qualifications (RFQ) for implementation of up to two 1,500-tpd municipal solid WTE facilities in Puerto Rico. Developed an update of the current status of the WTE facility procurements in the U.S. and internationally.

Union County Utilities Authority: Resource Recovery Facility: Operations and Maintenance Monitoring / Union County NJ.

Provided engineering services for the O&M monitoring of a 1,540-tpd WTE facility. Responsibilities included database preparation and facility data manipulation with respect to waste processed and received, steam production, electric generation and equipment downtime.

Village of Port Chester: Waste Management Evaluation / Village of Port Chester NY.

Managed and prepared the report that evaluated the waste management services and operations for the Department of Public Works (DPW). Reviewed and evaluated available data related to the existing waste management collection program. Developed collection performance metrics for use in benchmarking MSW, bulky waste, yard waste and recycling collection performance. Conducted route observation study for the bulky waste, MSW, yard waste and commercial waste collection. Performed an in-depth economic analysis and summarized the costs and revenues to perform the current solid waste management services.

Westchester County: Solid Waste Procurement / White Plains NY.

Managed the development of the RFP for the disposal of the County's municipal solid waste. Prepared the draft and final RFPs in accordance with New York State General Municipal Law 120-w.



Education
BE Mechanical Engineering
Manhattan College 1988
MBA Management Fordham
University 1995

Years of Experience
Total – 25
With ARCADIS –

Professional Registrations
Fundamentals of Engineering

Professional Affiliations
Association of Environmental
Authorities
New Jersey Water
Environment Association
Solid Waste Association of
North America
Water Environment
Federation

Catherine Mallon-Traynor

Technology Alternatives

Ms. Mallon has a broad range of experience in solid waste, medical waste, and sludge management projects. Her project experience includes regulatory review, economic analyses, organization and implementation of recycling programs, technology assessments, facility design evaluations, preparation of procurement documents, and development of resource recovery projects.

Detailed Experience

Bergen County Utilities Authority: Recycling Program / Bergen County NJ. Evaluated recycling programs and markets; assisted in developing the County's Recycling/Waste Composition Study, the Bergen County Utilities Authority 1987 Recycling Directory, and the Bergen County Commercial Recycling Handbooks; and preparing a preliminary site layout for the Bergen County Leaf Composting Facility.

Bergen County Utilities Authority: Recycling/Waste Composition Study / Bergen County NJ. Managed the solid waste quantification and composition study that consisted of four 2-week waste sampling periods over a year. As a solid waste facility permit requirement for the Union County resource recovery facility, the study was conducted simultaneously with the Union County waste composition study. The county used the results of the study for future solid waste management planning to achieve the 60% state recycling goal. Other activities included the development of the waste sampling protocol, analysis of the demographic and waste disposal data, visual characterization of the commercial and industrial waste loads, waste sampling, evaluation of field data, and report preparation.

Bergen County Utilities Authority: Resource Recovery Program / Bergen County NJ. Assisted in the preparation of numerous engineering documents for the development of the 3,000-tpd resource recovery facility. Analyzed and developed documents for utility services for the resource recovery facility. Prepared contract specifications for the construction of a regional leaf composting facility. Also prepared draft Consulting Engineer's Feasibility Report for financing the resource recovery project, including development of a drawdown schedule to determine funding requirements for the project.

Bergen County Utilities Authority: Solid Waste Transfer Station Study / Bergen County NJ. Managed the project to restructure BCUA's solid waste system to offset the impacts of the loss of waste flow control in New Jersey, including the evaluation of alternatives for the operation and management of the BCUA's 5,000 tpd solid waste transfer station and the transport and disposal services of solid waste generated within the County. Under New Jersey procurement requirements, conducted simultaneous development of bid documents

and RFQ/RFP documents for soliciting services, including long-term lease arrangements with a private partner. Also, assisted BCUA with implementing a competitive solid waste system and assessing alternatives to offset the facility's debt service. Developed procurement strategies for soliciting out-of-county waste to maximize utilization of the BCUA transfer station's capacity and provide the most cost efficient disposal option for County municipalities.

Broward County: Resource Recovery Project / Broward County FL. Involved in the preparation of the Engineer's Feasibility Report for the financing of North and South resource recovery projects (2250 tpd each).

City of Norwalk: Solid Waste Planning / Norwalk CT. Ms. Mallon directed services to assist the City to develop a plan for comprehensive management to address the expiration of its long-term disposal contract with the CRRA at the Bridgeport waste-to-energy facility in 2008 and the transfer of the ownership and operations of the Norwalk Transfer Station from the CRRA back to the City. Prepared and issued procurement documents to secure long-term capacity and address transfer station operational requirements.

Greater Bridgeport Regional Solid Waste Advisory Board: Source Separation/Recycling Projects / Bridgeport CT. Project leader for an evaluation of the existing solid waste management system. Project activities entailed identification and compilation of existing data on solid waste quantity and composition, population and housing patterns, and existing collection practices (municipal, private, private/contract). Analyzed waste collection services by sector and generated estimates of the number of households receiving waste collection services. Identified the location of existing and planned transfer stations.

Lee County Department of Utilities: Solid Waste Management - Resource Recovery / Lee County FL. Worked with the county's financial consultants to develop a computer model for the sensitivity analysis of the systemwide costs for the solid waste management system. Analyses included the costs associated with the resource recovery facility, bypass waste and residue disposal facility, and recycling services.

Passaic County Utilities Authority: Waste Composition Study / Passaic County NJ. Involved in quantification and characterization of municipal solid waste generated and assisted in the preparation of the waste composition study protocol for the County.

Union County Utilities Authority: Battery Management Program / Union County NJ. Assisted in development and implementation of a countywide battery management program geared toward the recovery of consumer batteries to the maximum extent feasible. The program included the identification of the types of batteries found in the MSW stream, processing and disposal requirements by battery type, an estimate of the types and quantities of batteries generated in the county, a description of various collection alternatives, a cost and program logistic analysis for each collection alternative, and a recommendation for program plan implementation. The plan also provided a recommendation for the implementation of a publicity and education program.

Union County Utilities Authority: Resource Recovery Facility / Union County NJ.

Managed the solid waste quantification and composition study as required for a resource recovery facility permit condition. Results of this study were used by the county in planning efforts to achieve state recycling goal of 60% and evaluated to assess the impacts on the county's resource recovery facility. Responsibilities included the development of the waste sampling protocol, analysis of the demographic and waste disposal data, evaluation of field data, and report preparation.

Village of Ridgewood: Recycling Program / Ridgewood NJ. Evaluated alternative design solutions for the storage areas of recyclable materials; involved in preparing the preliminary design concept for the Glen Avenue Recycling Center.

Warren County Pollution Control Financing Authority: Resource Recovery/Engineer's Feasibility Study / Oxford NJ. Managed the preparation of the Independent Engineer's Feasibility Report for debt restructuring of the authority's resource recovery facility and determine the asset value for the potential sale. Project activities included assessment of the resource recovery facility, review of operation and maintenance records, review of existing contracts, analysis of waste generation and disposal trends, conduct of a market analysis of solid waste tip fees, and development of life cycle cost analyses. Also, prepared for and participated in contract negotiations for potential asset purchase by Ogden.

Westchester County District Attorney's Office: Litigation Support / White Plains NY.

Managed project activities to support the District Attorney's litigation efforts against a private commercial hauler in a municipality. Activities included review of the disputed private hauler's waste disposal records, conduct of an analysis of projected condominium disposal rates, and preparation of documentation for expert testimony.

Westchester County: Mixed-Cullet Market Development Plan / Westchester County NY.

Currently managing a research study being performed with grant assistance from the New York State Energy Research and Development Authority for the development of markets for the mixed broken glass generated from the county's materials recovery facility. Services included solicitation, demonstration and evaluation of glass beneficiation equipment, and development of nontraditional markets for the sale of the processed cullet.

York County Solid Waste and Refuse Authority: Regional Medical Waste Management Plan / York County PA.

Prepared an infectious and chemotherapeutic waste management plan. For the development of the plan, examined collection and disposal practices, reviewed regulatory requirements, assessed county's infectious and chemotherapeutic waste stream, and evaluated infectious waste management technologies and associated costs. Also, developed a recommended long-term waste management option.



Education
BA Political Science Boston
University 1997
MPA Financial Management
Syracuse University 2002

Years of Experience
Total – 12
With ARCADIS – 7

Professional Affiliations
American Water Works
Association
New Jersey Water
Environment Association
New York Water Environment
Association
Water Environment
Federation

Amy Santos

Economic/Financial Analysis

Ms. Santos is a financial analyst with experience in consulting services, primarily for water and wastewater utilities. She has extensive experience working with local governments and specializes in program development, utility management and financial planning. She has provided consulting services to municipalities on a range of issues related to asset management, capital financing, rate development, regionalization/consolidation, utility valuation and public communication strategy.

Detailed Experience

Fairfax County: Energy/Resource Recovery Facility Purchase Support / Fairfax VA.

Developed a customized financial model to support the client's evaluation of various operating scenarios including Energy/Resource Recovery Facility purchase, lease extension and landfill disposal options. The model provides an independent review of the aggregated work of multiple sub-consultants, and builds on projected capacity, purchase/debt financing assumptions and other key inputs to project the impact on tipping fees and other financial variables.

City of Hopewell: Financial Feasibility Study / Hopewell VA. Completed a wastewater rate evaluation and bond feasibility study for the City of Hopewell, in support of the City issuing \$21.2 million in Series 2011 Sewer System Revenue and Refunding Bonds.

City of Syracuse: US EPA Brownfield Pilot Project / Syracuse NY. Implemented EPA brownfields pilot demonstration project with the City of Syracuse. Conducted public outreach process consisting of multiple stakeholder focus groups and public information meetings. Developed an informational brochure for public dissemination which explained the redevelopment project and process. Assisted in preparation of grant proposals ranging from \$10,000 to \$1 million.

Erie County: Capital Improvement Alternatives Analysis / Buffalo NY. Completed financial analysis to support the client's evaluation of multiple capital improvement alternatives. A nonproprietary financial planning and rate model was developed to assist in identifying the financial impacts of each alternative on the County's overall financial condition and customer rates.

Monroe County: Monroe County Asset Ownership Evaluation / Rochester NY. Evaluated ownership and joint use alternatives of wastewater system assets servicing the Rochester Pure Waters District. Developed a summary report documenting anticipated financial, managerial and operational impacts for the client's use in ownership/contract negotiations.

Nassau County Dept. of Public Works: Consolidation Analysis / Mineola NY. Assisted in the completion of a consolidation study and rate impact assessment for the Nassau County Executive to assess the potential benefits and challenges of consolidating and optimizing water service within the County, and to development of a blueprint for such optimization. The study addressed the manner in which regional optimization could affect the cost of water service to County residents and the potential impacts on water service within the County. The study included a financial evaluation of existing water systems, including an evaluation of water rate structures utilized throughout the County, and the assessment of rate impacts associated with combining the water systems into one or more regional water utilities, including the development of water rate projections.

New York State Energy Research & Development Authority: American Recovery and Reinvestment (ARRA) Program Support / Statewide NY. Project Manager responsible for implementing a state-wide initiative to increase municipal awareness of the availability of ARRA funding opportunities and managing the multi-year project implementation process for successful applicants. The outreach component of the project included on-demand municipal application support assistance and general marketing of multiple funding opportunities to eligible NYSERDA customers. Responsible for the development and implementation of outreach plans, training and management of staff from multiple offices, development of outreach materials, and responding to requests for information relative to the RFPs. The ongoing Case Management component requires oversight and management of staff from multiple offices providing Case Management services for over 200 projects.

New York State Energy Research & Development Authority: Energy Smart Focus Program for Local Government Sustainability / Statewide NY. Project Manager responsible for the development and implementation of a multi-year statewide campaign to achieve greater participation in NYSERDA programs and greater awareness of issues relating to sustainability and energy efficiency among local governments serviced by NYSERDA. Researched similar state and national programs to identify best practices for customized implementation in New York State; developed and implemented a statewide survey to further tailor the outreach approach to this sector. Use of the multi-agency "Infrastructure Alliance", developed through the NYSERDA Focus on Water and Wastewater Program, has facilitated outreach efforts to targeted groups. Responsible for the training and activities of regional field staff, interaction with local government representatives, development of outreach materials, active promotion of NYSERDA programs, coordination with multiple agencies, and alignment of program messaging with NYSERDA marketing protocols.

New York State Energy Research & Development Authority: Energy Smart Focus Program for Municipal Water and Wastewater Facilities / Statewide NY. Project Manager responsible for the development and implementation of a state-wide campaign to achieve greater participation in NYSERDA programs and greater energy efficiency awareness and energy efficiency penetration among eligible NYSERDA customers. Instituted a unique collaborative approach through the formation of a multi-agency "Infrastructure Alliance" which has facilitated outreach to targeted groups. Developed a systemic approach targeting

outreach efforts to the largest energy consuming facilities within SBC territory for direct assistance, while engaging the sector at large through a variety of outreach activities, including multiple presentations and training events for technical and non-technical audiences as well as tools and materials tailored for this sector. Researched similar state and national programs to identify best practices for customized implementation in New York State.

Newark Watershed Conservation and Development Corporation: Asset Condition Assessment and Valuation / Newark NJ. Completed a condition assessment and asset valuation of the City of Newark's wastewater (sanitary, combined and storm sewers) infrastructure in support of the potential formation of a Municipal Utilities Authority.

U.S. Environmental Protection Agency, Region 2 Environmental Finance Center (EFC): Associate Director / Statewide NY. Planned, directed and implemented all EFC project initiatives. Developed multiple long-term collaborative projects to bring new organizations into partnership with the EFC. Developed, coordinated and provided integrated training in water infrastructure development and financing for government officials and technical assistance providers; conducted rate analyses. Coordinated and facilitated community problem-solving forums, focus groups and stakeholder outreach meetings; analyzed and interpreted resulting data. Marketed program successes and services to diverse audiences through presentations at numerous professional association conferences and public agency events. Increased state and local recognition of EFC programs, resulting in additional clients and partnering organizations, through professionally published articles and targeted marketing.

York County Solid Waste Authority: Capital Planning Financial Model / York PA. Developed a customized financial model to support the client's capital planning process and evaluation of alternative capital scenarios. The model builds on projected capacity, waste generation and electrical generation rates to clearly demonstrate the impact of capital projects on tipping fees and spot market rates.

Publications

Santos,A., "**Financial Planning for Sustainable Infrastructure**," presented at the 83rd Annual Meeting and Exhibition of the New York Water Environment Association (NYWEA), New York NY, February 7, 2011.

Pesek, S., Santos,A., "**Asset Management: A Plan for First Rate Infrastructure**," presented at the Annual Meeting of the Association of Towns of the State of New York, New York NY, February 16, 2010.

Santos,A., "**Organizational Succession Planning**," presented at Association of Environmental Authorities (AEA) Conference, Eatontown NJ, September 23, 2009.

Santos, A., "**Strategic Public Communication Methods**," presented at the 80th Annual Meeting and Exhibition of the New York Water Environment Association (NYWEA), New York NY, February 4-6, 2008.

Santos,A., "**Sustainable Infrastructure: An Overview of Asset Management for Water and Wastewater Systems**," presented at the 2007 Joint Water Resources Symposium, Syracuse NY, November 15, 2007.



Education

BA Physics State University of
New York at Geneseo 1993
MS Civil and Environmental
Engineering Clarkson
University 1994
MBA Finance Cornell
University 2001

Years of Experience

Total – 19
With ARCADIS – 11

Professional Registrations

Professional Engineer
Chartered Financial Analyst

Professional Affiliations

American Water Works
Association, Finance,
Accounting & Management
Controls Committee
Chartered Financial Analyst
Society of Rochester
Government Financial
Officers Association
Water Environment
Federation

John M. Mastracchio, PE, CFA

Economic/Financial Analysis

Mr. Mastracchio's experience includes financial planning, revenue and cost studies, rate setting, utility valuations and regionalization. He has testified before several state public service commissions in rate setting and valuation matters and is a contributing author of industry publications pertaining to capital financing and utility management. Mr. Mastracchio routinely speaks at national and regional utility conferences on the topics of financial management and rate setting, has earned the Chartered Financial Analyst (CFA) designation, and is also a professional engineer.

Detailed Experience

City of Grand Forks: Rate Study and Cost-of-Service Evaluation / Grand Forks ND.

Completed a financial evaluation of the city's water, wastewater, solid waste and stormwater utilities. The evaluations were conducted to ensure that the costs associated with planned capital infrastructure investment and the operations of each utility were allocated equitably to each customer, class-based on its service requirements. Evaluated the financial affordability of capital improvement plans. Developed cost allocation methodologies using sound engineering, financial, and rate-making practice. Developed nonproprietary revenue adequacy models to provide the city with a basis for the evaluation of alternative rate structures and to ensure that all of the appropriate costs of operating the utility were reflected in the rates. Completed a financial evaluation of the city's water, wastewater, solid waste, and stormwater utilities. The evaluations were conducted to ensure that the costs associated with planned capital infrastructure investment and the operations of each utility were allocated equitably to each customer, class-based on its service requirements. Evaluated the financial affordability of capital improvement plans. Developed cost allocation methodologies using sound engineering, financial, and rate-making practice. Developed nonproprietary revenue adequacy models to provide the city with a basis for the evaluation of alternative rate structures and to ensure that all of the appropriate costs of operating the utility were reflected in the rates.

Virgin Islands Public Services Commission: Wastewater and Solid Waste Expert

Testimony / St. Thomas VI. Served as financial and rate expert for the U.S Virgin Islands PSC regarding Waste Management Authority's solid waste and wastewater utility rate cases. Reviewed financial and rate aspects of the Authority's filings, prepared written testimony, and presented oral testimony before the Public Services Commission. Application involved establishment of new Authority Environmental User Fees and Wastewater User Fees. Technical issues reviewed involved reasonableness of the rate revenue requirements, fairness and equitability of the rate structure, and affordability issues.

Air Force Center for Environmental Excellence: Bioremediation Demonstration Project / Northeastern United States. Task manager for the completion of bioventing, soil vapor extraction, and bioslurping pilot studies to demonstrate the effectiveness of innovative in-situ remediation technologies for the Air Force. Managed pilot testing of in-situ remediation technologies at Pease, Hanscom, Griffiss, Plattsburg, Westover, and McGuire Air Force Bases, and Fort Drum. Coordinated field testing, analysis and reporting.

Buffalo Sewer Authority: Energy Procurement / Buffalo NY. Procured electricity and natural gas contracts for BSA. Project involved identifying suppliers, soliciting RFPs, analyzing bids, and selecting the most responsive and cost-competitive suppliers.

City of Virginia Beach: Financial Services / Virginia Beach VA. Project Manager for a multi-year financial services contract for the City of Virginia Beach that included true-up evaluation, developing an interactive financial planning model, and completing a cost of service evaluation. The true-up evaluation consisted of reviewing the City of Norfolk's cost allocation model for allocating operation and maintenance expenses, reviewing the rate model for allocation of fixed assets, and the rate of return on rate base for reasonableness. This effort saved Virginia Beach more than \$1 million in payments to the City of Norfolk. The cost of service evaluation consisted of assessing future capital funding needs for the water and sewer utilities due to aging infrastructure, system expansion, and new regulations, determining revenue requirements over a five to ten year period, and developing rates, fees and charges to meet revenue requirements and other City rate-setting goals and objectives.

Greater New Haven WPCA: Financial Services / New Haven CT. Following the creation of the Greater New Haven Water Pollution Control Authority, provided wastewater rate and financial consulting services. Assisted in financial planning and analysis, completed an impact fee evaluation to ensure that growth pays for itself, and assisted in the Authority in analyzing and negotiating modifications to its operations contract.

Greene County: Capital Planning Study / Dayton OH. Provided capital investment decision-making support and planning assistance for county municipality in Dayton, Ohio. Developed an affordable financial plan for paying for the capital infrastructure investments that were identified in the study. Developed an interactive financial model that was used during the project to assess the impact various capital improvement programs and financing alternatives on the County's wastewater rates. Conducted an in-depth evaluation of the parameters that impacted affordability, developed a financial plan that identified the most cost effective project financing alternatives, and presented 20-year pro forma financial projections for the County under several different scenarios and assumptions.

Henrico County: Henrico Rate Study / Richmond VA. Completed a cost of service evaluation and rate, fee, and charge study to assist Henrico County develop a sustainable financial management plan, determine revenue requirements over the next ten years, and ensure equitable recovery of costs. The study also consisted of completing an impact fee evaluation to ensure that growth pays for itself over the planning period. The financial management plan was developed using an interactive forecast model that allowed alternative

scenarios to be easily evaluated. Connection fees, fire protection charges, and local facility fees were established by determining the costs of providing these services and developing fees to equitably recover these costs from customers utilizing the services. Rate, fee, and charge formulas were developed for the County's \$80 million operating budget.

Metropolitan Water Reclamation District of Greater Chicago: Affordability and Financial Impact Assessment / Chicago IL. Expert witness in the Matter of Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and the Lower Des Plaines River. Completed an evaluation of the potential affordability and financial impact of implementing disinfection processes at the District's water reclamation plants that would be necessary to meet the standards proposed by the Illinois Environmental Protection Agency. The results of the study were presented in hearings before the Illinois Pollution Control Board regarding water quality standards, R08-9.

Milwaukee Metropolitan Sewerage District: MMSD O&M Options / Milwaukee WI. The Milwaukee Metropolitan Sewerage District provides wastewater collection, conveyance and treatment system services to 28 communities. The District undertook a competitive procurement process for the management, operation, and maintenance of the wastewater collection, conveyance and treatment system. Mr. Mastracchio participated in the preparation of procurement documentation and the financial evaluation of contract and public operations alternatives.

Summit County: Comprehensive Rate and Charge Study / Akron OH. Completed a cost of service evaluation and rate, fee, and charge assessment to assist the County to generate sufficient revenues to pay for upcoming sewer capital improvement and operation and maintenance programs. The project included completing a cost of service evaluation to determine the cost responsibility of the County customers, and a rate structure evaluation to identify sewer rate structures that were closely aligned with the cost of providing service, and developing rate formulas for the County's future use.

The Harrisburg Authority: Financial Assessment / Harrisburg PA. Completed a Financial Capability Assessment to measure the impact that the Authority's Long-Term Control Plan will have on both the current and future financial health of the service area. Determined the service area's average wastewater treatment and CSO implementation cost per household, and evaluated debt, socioeconomic, and financial management indicators of financial capability. Recommended a capital improvement implementation schedule that would minimize the financial impact to customers, based on the results of the assessment.

The Metropolitan District: Valuation Assessments / Hartford CT. Completed valuations of publicly-owned and investor-owned water utilities regulated by the Department of Public Utility Control to assist our client in making utility acquisition decisions. The target utilities provide water service to more than 200,000 people in the northeastern US.



Education

BS/Civil Engineering, Minor in Environmental Policy Analysis, University of California, Davis, 1992

MS/Environmental Engineering (Engineering Management emphasis), University of Cincinnati (Yates Fellow), 1997

MBA/Business Administration (Management, Finance and Marketing emphasis), University of Oregon, 2004

Years of Experience

Total - 20

With ARCADIS – 1

Professional Registrations

Professional Engineer, CA

Licensed Associate Value Specialist, Society of Value Engineers

Change Management

Advanced Practitioner, Georgetown University, 2010

Professional Qualifications

Secret Clearance (in effect to 2017)

President of the National Capital Chapter of SAVE International (The Society of Value Engineers)

Member of AWWA and WEF;

Asset Management Committee Member for AWWA

Yates Fellow of Environmental Engineering at the University of Cincinnati

Anthony W. Dunams, PE

Economic/Financial Analysis

Mr. Dunams is an asset management professional with more than 20 years of experience in capital asset management (infrastructure and utilities), cost engineering, value management, infrastructure planning and component renewal forecasting, project capture and delivery, and strategy and change management. His expertise has enabled large commercial, institutional, governmental and municipal organizations to realize their fiscal goals focused on addressing sustainment and modernization planning, environmental and sustainability concerns, infrastructure life-cycle cost management, business/process re-engineering, and rate setting.

Utility Asset Management

City of Olathe: Utility Asset Management / Olathe KS. Provided utility asset management services that involved cataloging and addressing nearly \$900M of water and wastewater infrastructure. Developed budget targets for reinvestment in existing infrastructure to supplement other cost-side drivers including operations and maintenance expenditures, contractual treatment retail expenditures, existing debt service and proposed debt service.

City of Fredericksburg: Organizational Change Management Study / Fredericksburg VA. Performed an organizational change management study that addressed the City of Fredericksburg's provision of utility services to its customers. The study resulted in the recommendation of a dedicated utility arm within public works to address revenue-funded water and wastewater services versus tax-funded services.

National Parks Service: Utility Asset Management. Led a group of National Park Service subject matter experts in improving the management of a diverse portfolio of utility assets. Developed a utility rate model to update the current utility rate structure that includes fixed capital components in addition to operations and maintenance costs. Rate model development streamlined the determination of life-cycle utility costs and provided a standard approach for over 70 parks that provide utilities to non-NPS users to set water, wastewater and solid waste rates. Leadership and expertise led to creation of other work streams and tasks. Also participated in the crafting of Director's Order 35B addressing the inclusion of capital costs within the rate structure.

Presidio Trust of San Francisco, CA: Integrated Utility Strategy Study / San Francisco CA. Performed an integrated utility strategy study to ascertain future capital and operations and maintenance expenditures associated with water and wastewater systems. Management

alternatives analysis provided insight on whether the Trust should continue to maintain the infrastructure or outsource utility operations to a private partner.

New York City Department of Environmental Protection: Utility Asset Management / New York NY. Provided benchmarking and evaluated expenditures, revenue sources and alternative rate structures for NYCDEP, the largest public water, wastewater, and stormwater utility in the nation, with a service population of 9 million people.

King County: Cost and Risk Evaluations. Under the auspices of King County's Major Capital Productivity Initiative, managed a team of consultants in the performance of cost and risk evaluations for the development of an independent cost target and validation of the \$1.48B Brightwater Regional Wastewater Treatment System project. Created value for the client by providing visibility of cost drivers inherent in the internal management of public-sector projects.

Clackamas County: Facilities Consolidation Study / Clackamas County, OR. Provided financial and strategic guidance on an economic facilities consolidation study for the development of a \$300M+ capital improvements program for Clackamas County. Led the capital cost and the schedule implementation evaluation regarding future operations of three treatment facilities under five different management options including downsizing the real property portfolio, various load sharing scenarios, and contemporary treatment improvements.

Selected Publications and Presentations

Dunams, Anthony W., chapter, *Municipal Pollution Prevention Programs*, in the text, *Pollution Prevention: Fundamentals and Practice*.

Dunams, Anthony W., Asset Management Benchmarking Program for USACE Water Resource Structures, New England Water Environment Association Annual Conference, January 2009.

Dunams, Anthony W., Utility Asset Management/Rate Recovery Implementation Program for National Park Service, New England Water Environment Association Annual Conference, January 2009.



Education
AA Liberal Arts Miami-Dade
College 1967

Years of Experience
Total – 40
With ARCADIS – 5

Professional Affiliations
American Public Works
Association
American Society for Public
Administration
Municipal Waste Management
Association, Past National
President
Solid Waste Association of
North America

Thomas Henderson

Project Support

Mr. Henderson has more than 30 years of experience in developing and managing large waste-to-energy (WTE) facilities and integrated solid waste management systems. He has served as project manager on WTE facilities with more than 7,500 tons per day (tpd) of waste and 211 MW of electrical generating capacity. These facilities have successfully combusted more than 51 million tons of municipal solid waste over a combined 61 years of operation.

Mr. Henderson has also served as a Senior Public Works Executive with a record of accomplishment in the reengineering and operating solid waste management programs for large urban governments with diverse, changing, and unionized work forceS. His experience includes the planning, design, permitting, financing, construction, startup, and operation of projects including transfer stations, landfills, material recovery facilities and WTE facilities costing more than \$1 billion. He is a specialist in all aspects of solid waste management, including facility development, operation, and maintenance; structuring of project-backed taxable and tax-exempt debt; intergovernmental relations; budget making; managed competition; and design and utilization of information systems and office automation.

Detailed Experience

District of Columbia: Administrator, Solid Waste Management Administration / Washington DC. Administration provides a wide range of solid waste management and basic sanitation services to the district's residents, businesses, institutions, and visitors. Services provided include garbage, bulk, recycling, and household hazardous waste collection; street and alley sweeping and cleaning; street litter can collection; fall leaf collection; rights-of-way mowing; snow removal; transfer station operations; sanitation regulation enforcement, debris management during emergencies; and support of special events.

- Improved provision of basic services comparing 1999 to 2008: collection of garbage on scheduled day for 111,000 residential customers from 97.7% to 99.8%; collection of bulk waste on schedule from 42% to 99.6%; cleaned streets rated clean from 63% to 98% in residential areas, 63% to 100% in high-visibility areas, and 11% to 81% in industrial areas.
- In 2005, district residents rated street and alley cleaning and trash and recycling collections the two "best city services."
- Negotiated a long-term transfer station use agreement with Waste Management Inc. and Allied Waste Inc. under which each company ceased separate operation of a transfer station and agreed to use the district's stations exclusively for district-generated waste.

- Developed a capital facilities and equipment plan which cut the average age of the Administration's fleet from nine years to three and a half years and funded renovations of two transfer stations (\$25 million) and sweeper garage (\$7 million).
- Developed and implemented a real-time browser-based management information system for operational control and reporting on all operating activities, including garbage, recycling and bulk waste collection, and street and alley cleaning.
- Developed geographic information system (GIS) routing capacity for garbage, recycling, bulk waste collection, and street and alley cleaning activities. Garbage collection routes were comprehensively redrawn for the first time in a generation with a 15 to 22% improvement in productivity.
- Through a Labor-Management partnership brought back in-house recycling collection in 2005 after a seven-year lapse, and conversion from a two-sort bin system to a single-sort cart collection system. In 2006, cleaning and mowing of rights-of-way on federal aid highway system was brought back in-house after five years. The combined total annual saving is more than \$2 million.
- Developed an emergency response plan for management of debris from natural and man-made events and successfully implemented it during Hurricane Isabel in September 2003. District representative to the National Capitol Region Emergency Support Function (ESF#3 - Public Works) team planning and implementation efforts.
- Reorganized and retooled district snow and ice management effort with significant improvement in service during 2003 and 2004 snowstorms.
- Managed support of special events ranging from First Amendment protests to presidential inaugurations and from state funerals to street festivals.

Solid Waste Authority of Palm Beach County: New WTE Facility / West Palm Beach FL.

Task leader on development of Request for Qualification (RFQ) and Request for Proposal (RFP) packages for a 3,000-tpd WTE Facility. Scheduled to be operational in 2015, this is the largest WTE project currently under development worldwide.

Air National Guard: Solid Waste Characterization Survey for 13 Installation / Multiple VA.

Obtained quantitative data on waste disposal and recycling activities. Performed a data analysis used to evaluate the diversion rate for each of the installations, obtain an averaged waste diversion rate for all 13 installations, identify methods that can be incorporated on a program-wide basis to increase ANG's overall waste diversion, and provide options to reduce waste disposal costs through applicable changes to collection services and composting, mulching, recycling and reuse diversion methods.

Broward County: Director, Office of Integrated Waste Management / Broward County

FL. Provided a wide range of solid waste management services to 24 municipalities, county unincorporated area, and public school and community college districts. Services provided

included waste disposal at landfills and WTE facilities, waste collection, recycling, household hazardous waste, waste tire management, and lot clearing.

- Operated the largest WTE system of any local government, 4,500 tpd of capacity, with 100% availability from 1991 to 1999.
- Developed recycling collection programs serving more than half a million residential, commercial, and institutional customers including a 300-tpd materials recovery facility.
- Reduced waste collection service complaints to less than 50 per million customer contacts and stabilized consumer rates with increases held to less than inflation.
- Developed an emergency response plan for dealing with hurricane debris.
- Recognized by the Solid Waste Association of North America as operator of the best small landfill (2003) and best large WTE plant (1994), along with numerous annual awards from the National Association of Counties, National Association of County Information Officers, and U.S. Conference of Mayors.

County Administrator's Office: Director, Resource Recovery Project / Broward County

FL. The Project Program Office directed and coordinated the county's efforts to develop new solid waste disposal capacity including two 2,250-tpd, 67-megawatt WTE plants; a 588-acre sanitary landfill; 60-acre ash residue landfill; and 243 acres of wetland mitigation.

- Projects represented the largest investment in WTE plant capacity by a local government. This was the first and only time a local government developed two WTE plants simultaneously.
- Innovative project financing techniques including first-ever tax-exempt short-term escrow bond issue (1984), local government tax-exempt pooled loan issue (1986), largest-ever WTE tax-exempt bond issue (1989), and tax-exempt and taxable commercial paper program (1989) minimized consumer costs.
- Developed and successfully implemented procurement of private contractors to design, construct, start up, operate, and own the two WTE plants, including an equity contribution of more than \$106 million.

North Santa Clara Solid Waste Management Authority: General Manager / North Santa

Clara CA. Managed a Joint Exercise of Powers Authority (JPA) special district established by interlocal agreement to plan, develop, and manage interim and long-term solid waste management solutions.

- Chief negotiator and drafter of Joint Exercise of Powers (interlocal) Agreement which established the independent authority from what had been an informal committee.
- Negotiated a five-year, 500,000-ton interim landfilling agreement.

- Selected and directed activities of consultants in evaluating alternative projects, including transfer stations, landfills, and WTE facilities.
- Developed and implemented an aggressive public participation program.
- Developed and implemented a pilot commercial/industrial recycling program.

Real Estate Div. Baltimore Dist. USACE: Fort Riley WTE Fatal Flaw Analysis / Fort Riley KS. Led the feasibility evaluation of leasing a land parcel for development of a WTE facility. This analysis for Fort Riley and U.S. Army Corps of Engineers focused on the cost and demand for solid waste disposal near Fort Riley along with the demand for electrical energy. A conceptual WTE facility was modeled and evaluated to see if any fatal flaws could be identified. Several potential fatal flaws related to project cost and contracting framework were found and project has been placed on hold. Identifying these potential problems at a very early project stage significantly benefited the client.

Solid Waste Authority of Palm Beach Coun: SWA New WTE Facility / West Palm Beach FL. Task Leader on completing the Power Plant Siting Act application for a proposed 3,000 ton per day, 100 MW WTE Facility. All state, regional and local government permitting including solid waste management, land use and zoning, consumptive water use and stormwater permitting are included. Federal permits including those under the Prevention of Significant Deterioration (PSD) air and National Pollutant Discharge Elimination System (NPDES) stormwater permitting programs are coordinated within this consolidated process.

Solid Waste Authority of Palm Beach County: NCRRF Refurbishment DB Procurement / West Palm Beach FL. Provided support to the Authority in negotiating and drafting an Engineering, Procurement and Construction Services Agreement for the refurbishment of the 2,000-tpd North County Resource Recovery Facility. Agreement covered the engineering, procurement, demolition and reconstruction of two 1,000-tpd WTE process units, including boilers, air pollution control equipment and control systems.

Publications

Henderson, T.M., Richter, L.K., "**Palm Beach County WTE Expansion Model**," *Proceedings*, 18th North American Waste-to-Energy Conference (NAWTEC 18), American Society of Mechanical Engineers, Orlando FL, May 11-13, 2010.



Education

BScE Chemical Engineering
University of Florida 2005
BS Chemistry University of
Florida 2005

Years of Experience

Total – 10
With ARCADIS – 7

Professional Registrations

Professional Engineer
Certified Construction
Documents Technologist
(CDT)

Professional Affiliations

American Water Works
Association
Solid Waste Association of
North America

Cindy Eckert, PE

Project Support

Ms. Eckert's project experience includes evaluation and negotiation of a landfill gas to energy facility development agreement as well as modifications to a landfill operating agreement, preparing annual reports for waste-to-energy (WTE) facilities and material recycling facilities, PPSA permitting, and Engineer of Record inspections.

Detailed Experience

Broward County Waste and Recycling Services: WTE Facilities Monitoring / Fort

Lauderdale FL. Assisted with the preparation of Semi-Annual and Quarterly Reports for the North and South WTE Facilities. Reviewed operational and environmental compliance data and composed reports.

Collier County: Landfill Gas-to-Energy / Naples FL. Provided technical services, including compilation of a benchmark survey of other landfill gas to energy (LFGE) facilities, financial analysis of proposals for facility development, and participated in negotiations and development of a LFGE Facility Agreement between the Client and a private contractor.

Collier County: Landfill Operations Negotiations / Naples FL. Provided service in support of negotiations between the County and the landfill operator. These services included evaluation of operator claim for additional reimbursement, developing documentation to support the County's position regarding the claim, and assisting with closure of the claim. Additional services include negotiating an amendment to the current operating agreement for use and reimbursement for alternative daily cover materials.

Collier County: Landfill Operating Agreement (LOA) Alternative Daily Cover (ADC) /

Naples FL. Assisted the client with financial and technical evaluations of landfill ADC uses and agreement terms. Assisted in the negotiation efforts to incorporate the use of ADC in the existing LOA.

Miami-Dade Department of Solid Waste Management: FY 2008 Annual Resource

Recovery Facility / Miami FL. Assisted with the preparation of the Resource Recovery Facility Annual Report by compiling necessary operational and environmental information, data analysis, and composing report.

Solid Waste Authority of Palm Beach County: New WTE Facility / West Palm Beach FL.

Prepared the Waste to Energy Requirements Review section on the PPSA application by gathering information from the client and surveying other local WTE facilities.



Education

BS Civil and Environmental
Engineering Cornell
University 1999
Program completed in MPA
Public Administration &
Policy Georgetown
University 2009

Years of Experience

Total – 14
With ARCADIS – 3

Professional Registrations

Professional Engineer
Certified Construction
Documents Technologist
(CDT)

Health & Safety Training

Construction Safety
Awareness
Ergonomics

Professional Affiliations

American Water Works
Association, Member
New England Water Works
Association, Young
Professional Committee
Member

Danusha S. Chandy

Project Support

Ms. Chandy has in depth experience on a wide range of projects, including strategic planning, financial analysis, asset management, contract administration and procurement, program management, design engineering, permitting, and construction administration. Her experience is with public utilities, which includes water, wastewater, and solid waste. She has prepared technical and economic feasibility reports and prepared contract and technical schedules outlining performance requirements for service agreements.

Detailed Experience

Estruturadora Brasileira de Projetos: Municipal Solid Waste Processing Technology

Feasibility Study / Sao Jose dos Campos SP Brazil. Evaluating the economic feasibility of a proposed municipal solid waste processing facility for Sao Jose dos Campos. The approach to be evaluated consists of a preprocessing system, an anaerobic digestion process, a thermal combustion unit, and residual waste management, which may include composting. Also preparing the technical feasibility report.

New York City Department of Environmental Protection: Wards Island Plant

Stabilization 2 / New York NY. As part of the Wards Island Value Engineering Team, participated in the development of value engineering submittals for the Plant Stabilization 2, which are valued at approximately \$200 million of construction. The activities included the development of VE presentation and the coordination of the development of responses to the VE recommendations and design suggestions.

York County Solid Waste Authority: Evaluations of Resource Recovery Center / York

PA. Prepared an operations model, including expenses, revenues, and waste processing projections. The model was developed in conjunction with an e-Forecast analysis which presents a variety of financial strategies to meet expected demands.



Education

Studies in BCE Civil and
Environmental Engineering
Carnegie-Mellon University
2005

Years of Experience

Total – 7
With ARCADIS – 7

Health & Safety Training

Confined Space Entry
Ergonomics
Initial 40 Hour Hazardous
Waste Operations Safety
Training

Professional Memberships

American Society of Civil
Engineers

Saskia Alonso

Project Support

Detailed Experience

York County Solid Waste Authority: RRC Evaluations / York PA. Conducted research for the different types of waste-to-energy technologies available and obtained detailed cost estimates for such technologies existing in the US and worldwide. Assisted with the evaluation and development of the technology analysis report as well as the expansion analysis of the York County Resource Recovery Center (YCRRC). Contributed with an analysis of waste generation projections for the YCRRC to determine when the capacity of the facility will be exceeded.

USACE: Baltimore District, ORAP FY07 NW / Baltimore MD. Assisted with the development and production of the Phase I Qualitative Assessment reports and assumed the role of lead author for a number of the installations.

USACE: Baltimore District, ORAP NW / Baltimore MD. Researched documents for the Phase I Qualitative Assessment Reports of the US Army installations in the northwest region and prepared read ahead packages to provide the installations with prior to the site visit.

Fairfax County MSM Division: Fairfax County Stormwater Rehabilitation (89-2 PCA/BOR) / Fairfax VA. Served on a team of engineers to provide storm water system inspection and planning services for Fairfax County Maintenance and Storm water Management Division (MSMD).

U.S. Army Environmental Center (USAEC): AEC Dept Support 06 / Aberdeen MD. A certified RACER (cost estimating software for remediation and restoration projects) cost estimator for the Military Munition Response Program (MMRP) to update FY2006 Cost-to-complete (CTC) estimates for the Active Army installations.

USAEC: 2007 AEC CTC / Arlington VA. Performed CTC estimates for the MMRP sites at Active Army installations using RACER 2007 to update costs to current year, prepared MFRs, and uploaded estimates and documentation to the database of record (AEDB-R).

USAEC: IAP/CTC Support AEC / Aberdeen MD. Assist Army installations perform yearly updates to their Installation Action Plan (IAP) and develop their Cost-to-Complete (CTC) estimates for FY2008 and ensure that the estimates and backup documentation are uploaded into the database of records for all the IR and CC sites with underway or future cleanup phases.

USAEC: IAP/CTC Year 2 / Aberdeen MD. Prepared the FY2009 CTC Report for the Army Cleanup Program Technical and Program Management Support for USAEC.



Education

BS Natural Resources
University of Florida,
Gainesville 2003
M.Sc. Environmental
Engineering Sciences
University of Florida,
Gainesville 2007

Years of Experience

Total – 6
With ARCADIS – 2

Health & Safety Training

Initial 40 Hour Hazardous
Waste Operations Safety
Training

Professional Memberships

Solid Waste Association of
North America, Member

Aaron J. Jordan

Project Support

Mr. Jordan has managed the development of guidance related to the disposal and decontamination of large volume of water.

Detailed Experience

City of Fairbanks: North Star Borough Solid Waste Disposal Center / Fairbanks AK.

Responsible for the Phase II municipal solid waste gas collection and control system (GCCS) 35 percent design. Design work included layout of the header and laterals and specification of locations and depths of the vertical well network system. Provided USEPA LandGEM models. Calculated peak production estimate of total landfill gas, well field schedule, and expected landfill gas production.

Estruturadora Brasileira de Projetos: Waste-to-Energy (WTE) Feasibility Study / Sao Jose dos Campos SP Brazil. Developed conceptual design for a WTE facility. Provided an overview of pre-processing technologies, waste flow diagrams, anaerobic digestion and waste combustion systems.

Fairfax County Energy Resource Recovery Facility: I-95 Landfill Greenhouse Gas Emission Calculation and Reporting / Fairfax VA. Prepared greenhouse gas emission reports and calculations that meet the new requirements of state and federal regulations. Provided accurate consulting to guide facility leaders in taking appropriate actions to adhere to the guiding regulations. Developed a scope and plan for revising the gas control and collection system design plan to reflect the current and future regulatory changes. Surveyed site history and evaluated historical data to develop a landfill gas monitoring plan to achieve state and federal regulatory compliance with regard to landfill gas monitoring methodology.

Fairfax County: WTE Facility Purchase Project Plan / Fairfax VA. Developed a Facility Purchase Project Plan and provided an Engineer's Feasibility Report to assist the Solid Waste Authority in the decision-making process regarding the purchase of a WTE facility.

Harford County Department of Public Works: Waste Disposal Center Landfill Cell Design / Bel Air MD. Resident engineer for reviewing regulations, design plans and drawings; implementing specifications; reducing operational costs; and documenting the construction of the expansion of the Harford Waste Disposal Center landfill liner and leachate system.

Southeastern Public Services Authority: Energy Resource Recovery / Suffolk VA. Field engineer for expansion of the landfill gas control and collection system and provided oversight

over liner repairs to the landfill liner system. Responsible for all documentation and regulation related to the construction and installation of the expanded landfill gas collection system.

Three Rivers Solid Waste Authority: Resource Recovery Project / Aiken SC.

Implemented design specifications for the expansion of the TRSWA landfill gas collection system. Provided oversight during the installation of vertical extraction wells, conduit and main header line that included trench work, pipe work, and drilling monitoring.

US Trade & Development Agency: Feasibility Study for Mass Burn WTE Plant / Rio de

Janeiro RJ Brazil. Currently assisting in feasibility studies for several dual-system (anaerobic/incineration) WTE facilities located in Rio de Janeiro.

York County Solid Waste Authority: Resource Recovery Center Evaluation / York PA.

Project engineer supporting services related to the life extension study of York County Resource Recovery Center.



Education

Program completed in BSE
Geology/Petroleum
Engineering University of
Texas, Austin 2007

Years of Experience

Total – 6
With ARCADIS – 6

Professional Registrations Fundamentals of Engineering

Health & Safety Training
Construction Safety 10 Hr
Initial 40 Hour Hazardous
Waste Operations Safety
Training
Health and Safety Orientation

Desiree D. Halsor

Project Support

Ms. Halsor's work experiences include working in the federal government and in consulting. She has worked on a wide array of projects including environmental site assessments, hydrology and hydraulics, and munitions work.

Detailed Experience

Pecan Grove Municipal Utility District: Design of SWTP / Richmond TX. Conducted historical record reviews, site visit, contacted local government for open records search, and site owner/representative interview to obtain necessary information on 16-acre site being considered for site of future surface water treatment plant for the Pecan Grove Municipal Utility District. Evaluated data to determine if any recognized environmental conditions existed at the site. Wrote Phase I ESA report presenting the information obtained and Malcolm Pirnie's conclusion.

Sunoco: Bayport Drain / Pasadena TX. Completed a calculation brief to assess the surface water flow conditions of the drainage ditch in the southern portion of the Sunoco Bayport Facility. The calculation brief calculated the peak discharge of the run-off generated by a 25-year storm event and the normal flow depths and velocities in the existing drainage ditches for this peak discharge. Calculated peak discharges from six discharge points and characteristics of the channel flow for each corresponding section (subcritical/supercritical, and areas of overbank flow) at the Sunoco Bayport Facility. Completed a calculation brief which provided discussions regarding assumptions, equations, methods, and conclusions. Created excel tables and charts as part of calculation brief.

Tulsa District, USACE: FTBL-11 Oversight / Fort Bliss NM. Assisted in completion of calculation brief, assessing the surface water flow conditions for a drainage ditch at the north end of FTBL-11. Provided support by using FlowMaster to calculate channel velocities and flow depths, creating and updating excel tables and charts to present calculation information, modifying maps and figures in GIS, and updating the discussion portions of the calculation brief.



Education
Graduate studies in MA
Environmental and
Corporate Law Ohio
University
BS Environmental Science
University of Delaware
2000
MS Geography
Specializing in
Climatology University of
Delaware 2004

Years of Experience
Total – 8
With ARCADIS – 7

Professional
Memberships
Union of Concerned
Scientists

Tiffany M. Novak

Project Support

Ms. Novak prepares Environmental Assessment (EA) forms and statements and Categorical Exclusion (CE) documents for the National Environmental Policy Act (NEPA) process, as well as environmental permit applications. She has also been responsible for the management, coordination, and implementation of community outreach efforts and obtaining legal access agreements with industrial and private residential property owners.

Detailed Experience

New York City Department of Environmental Protection (DEP) Bureau of Engineering Design and Construction (BEDC): NC50 Permitting CT65 / New York NY. Coordinated efforts to complete EA and EIS in accordance with NY SEQRA and CEQR requirements. Researched and wrote sections on land use, zoning, public policy, neighborhood character, open space, socioeconomic conditions, community facilities and services, and historic resources. Consulted with the New York City Department of City Planning (NYCDPC) and completed the Uniform Land Use Review Procedure (ULURP) Zoning and Fair Share Analyses for site selection and landfill activities associated with the project scope.

New York City DEP - CDA: Bypass / Newburgh, Wappinger NY. Prepared environmental compliance planning documents, including Regulatory Compliance Work Plan (RCWP), permitting schedule, compliance and outreach communication plan, and permitting matrix and progress reports. Secured State and local regulatory approval and permitting requirements.

New York City DEP BEDC Cap Program Management: DEP Permit Tracking / New York NY. Created a Permit Identification Checklist (PIC) to be used by consultants in the future so that all applicable permits and approvals have been received for any and all project aspects.

New York City DEP BEDC: DEL-283 Risk Management / Newburgh NY. Prepared PIC and monthly updates to the Permit Tracking Database (PTD) for NYCDEP. Assisted in the preparation and finalization of access agreements with local property owners to perform required project activities on their properties.

New York City DEP Bureau of Environmental Engineering: DEL-283 RWB Tunnel Magnetic Leak Detection Investigation / Newburgh NY. Prepared PIC and monthly updates to the PTD. Researched and conducted EA of project activities in accordance with NY SEQRA and CEQR regulations, including land use, zoning, public policy, neighborhood character, open space, socioeconomic conditions, community facilities, cultural and historic resources, traffic and parking, visual resources, and public health sections. Coordinated and

conducted public relations/community outreach requirements, including public notices, private property access agreements, and public meetings.

New York City DEP Bureau of Environmental Engineering: Kensico Back-up Turbidity / Mount Pleasant NY. Coordinated efforts to expedite tasks associated with completing EA documents and permitting for Kensico Reservoir Back-up Turbidity Curtain installation mandated by NYS Department of Health Administrative Order. Researched and wrote EA traffic and parking and visual/aesthetic resources sections in accordance with NY SEQRA and CEQR requirements.

New York City DEP Bureau of Water Supply: CRO-365 Shoreline Stabilization at the Catskill Upper Effluent Chamber on Kensico Reservoir / Mount Pleasant, North Castle NY. Conducted environmental review of project design and construction activities and managed and coordinated the completion of NY SEQR and CEQR requirements associated with the Full Environmental Assessment Form (EAF). Researched and authored EAF sections such as land use, neighborhood character, open space and recreation, cultural and historic resources, traffic and parking, and visual resources.

New York City DEP Planning and Capital Budget: Environmental Approvals - DEL-185 / Wawarsing, Gardiner, Newburgh, Wappinger and Putnam NY. Prepared Regulatory Compliance Delivery Plan for planned regulatory activities associated with project scope. Coordinated efforts to complete EA and EIS in accordance with NY SEQRA and CEQR requirements. Researched and wrote sections on land use, zoning, public policy, neighborhood character, open space, socioeconomic conditions, community facilities, cultural and historic resources, coastal zone management and visual/aesthetic resources and reviewed and edited all other sections in report for submittal. Consulted regulatory agencies, including New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Permits and Natural Heritage Program for listed species and Critical Environmental Areas information, New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) for historic and cultural resources information, and the United States Fish and Wildlife Service (USFWS) for listed species information. Prepared site plan approval applications.



Maureen T. Koetz, Esq.

National Capital Asset Valuations

Maureen T. Koetz is currently a capital asset management consultant and strategic advisor for complex production and service systems reliant on significant infrastructure and energy components. In particular, Ms. Koetz works with industry and government enterprises whose ongoing investment and operational enhancements have created natural capital and sustainability value that remains unrecognized, unrecorded, and underutilized in system-wide enterprise decision-making.

Ms. Koetz has served in key positions as both decision maker and analyst for public and private enterprise throughout her career in the legal, legislative, and managerial fields related to capital and logistics management. Focusing on operational optimization that achieves triple bottom line goals and meets mission and enterprise performance parameters, Koetz and Duncan LLC service offerings in the fields of Natural Capital Asset Management™, Sustainability Profiles™, and Sage Tags™ are a direct result of over 25 years of executive, analytic, and advisor experience to enterprises whose operational goals require significant, ongoing, and affordable access to scarce air, land, and water assets in shrinking natural capital pools.

Beginning as an active-duty attorney in the Judge Advocate General Corps of the US Navy in 1984, Ms. Koetz has served as counsel for the US Environmental Protection Agency, the General Counsel Office of the United States Air Force, Senator Pete Domenici of New Mexico, and the Energy and Natural Resources Committee of the US Senate. Upon joining the Nuclear Energy Institute in 1997, she instituted the first program to calculate and record emission avoidance credits for large scale, capital intensive industries whose investments in natural capital use reductions were a missing feature of return-on-investment calculations for continued and expanded production.

As a Presidential appointee to the post of Deputy Assistant Secretary for Environment, Safety and Occupational Health in 2002, Ms. Koetz instituted several new management programs to capture the capacity, capability, and value of critical air, land, and water assets at military installations under the Natural Infrastructure Management (NIM) program. These capability modeling formats were adopted at major commands, including combat aircraft wings, to protect against encroachment, account for return on investment in capital budgeting and projects, and capture credits and other equity made available for mission expansion. Weapons system recapitalization, green building, waste management and diversion programs, environmental restoration, and ongoing pollution prevention programming all achieved higher mission value



Maureen T. Koetz, Esq.

National Capital Asset
Valuations

outcomes after natural capital use avoidance was factored into management actions

Since forming Koetz and Duncan LLC, Ms. Koetz has applied her unique understanding of air, land, and water assets as natural capital whose vital capacity and capability are better managed by adapting systems applied to facilities, finances, and the workforce. Her clients have included the US Department of Energy, Noragh Data Solutions, and the Carlyle Group, engineering firms, and transaction parties requiring advanced asset appraisal protocols.



Education

BS Civil Engineering
Massachusetts Institute of
Technology 1983

Professional Qualifications
Greater Washington Board of
Trade

Leadership Washington
District of Columbia Chamber of
Commerce

Prince George's County
Chamber of Commerce

National Association of Black
Public Administrators

National Association of Minority
Contractors

Ron Adolph

Alternatives/Scenario Analysis and Community Business Issues

Ron is a seasoned professional with 30 years of experience in all phases of waste management, transportation, construction management and real estate with a civil engineering background.

RKE ENTERPRISES, LLC: Executive Vice–President. Manage day-to-day operations of the consulting division. Focused on strategic assignments for municipalities, Fortune 500 corporations, and public-private partnerships. Areas of concentration include municipalities - solid waste management, logistics, waste conversion, strategic partnering with the private sector; large corporations – serving as the owner’s representative or strategic consultant that resolves regulatory hurdles, manages and maintains municipal relations, negotiates strategic solutions between private and public entities, obtains and negotiates entitlements and manages resulting requirements including economic and public inclusion programs; Public Private Partnerships – serving as the owner’s representative or strategic consultant shaping strategic vision, deal structure creation and resulting contract document review, negotiating public financial incentives/initiatives, managing public relations/community involvement initiatives, managing political relationships and lobbying efforts, managing legal team, managing other consultants, tracking data and documenting results, provide required reporting, oversee and/or implement project close out, assist with long term planning, maintenance, and follow up.

TAC COMPANIES, LLC: President & CEO. Founded and managed a corporate entity that carried out two main functions: 1) Performed strategic consulting function for municipalities, Fortune 500 companies, and public private partnerships. 2) Created operating companies to service long term contracts in problem areas for Fortune 100 corporations and /or acquired their underperforming business unit, reorganized it, and operated it as a subcontractor to accomplish the objective.

TAC solved specific problems that required extensive negotiations and creative solutions. Contracts included negotiating a 20-year disposal agreement with DC and the waste industry implemented in 2003 and still in effect; creating a program to satisfy State and County requirements for a \$2.0B waterfront development project with large state subsidies in MD; developing and implementing an emergency water distribution system for the 144 schools in the DC Public School system; providing emergency logistics and deployment of 60 pieces of equipment to handle the DC DPW snow cleanup requirements during the crippling snow storm February 2010; and developing and implementing a 2-year joint venture DBE training program for the MD and DE State Highway Administrations.



Ron Adolph

Alternatives/Scenario
Analysis and Community
Business Issues

TAC Companies created TAC TRANSPORT, LLC in May 2001 and Ron manages operations servicing over the road transportation needs for Waste Management, Allied Industries (later know as Republic Services), Covanta, municipalities, and other entities required to move large volumes of waste on a daily basis consistently six days a week and Sundays as required. TAC Transport at its peak operated 200 trucks, moved in excess of 2.0 million tons of trash annually, and generated revenues of \$45M per annum. TAC Companies created four other operating entities in various disciplines.

WASTE MANAGEMENT, INC.: Division President. Managed all day to day aspects of a \$100 Million, multi-site, hauling, transfer, and recycling division serving the Washington, DC metropolitan area and Maryland suburbs. Performed strategic planning, detailed business planning, and set budgets for the operation. Managed revenue growth, cost control, customer retention, customer service, operations, maintenance, processing, and disposal. Handled strategic negotiations with major customers, acquisition candidates, local politicians and government officials, and community groups. Managed 400 professional and front line employees with full P&L responsibility. Exceeded budget goals in FY1997 and was on track to do the same in FY1998 prior to the company's merger with USA Waste in July 1998. Oversaw the integration of 14 separate operating companies during the year long merger integration achieving targeted synergies. Participated in strategic planning for our \$500 million region.

FAITH CONSTRUCTION, INC.: Building Division Manager. Created and managed a building division for a well-established and successful general contracting and asphalt paving firm after Faith acquired my company. Oversaw day to day management of all office and field activities. Performed business development, estimating, and project management functions as required. Measured division's performance against stated goals and objectives and made adjustments as required to maintain profitability. Worked closely with the other partners and participated in company-wide strategic planning and coordination.

THE ADOLPH GROUP, INC.: President & CEO. Established and managed a construction management/general contracting firm specializing in commercial and residential rehab and new residential construction. Created business plans, financial packages, practices and procedures, and oversaw day to day office and field operations. Created marketing packages and implemented business development activities. Was acquired and became a division of Faith Construction, Inc.

GILBANE BUILDING COMPANY, INC.: Project Manager. Performed conceptual and detailed estimates, constructed bar chart and CPM schedules, formulated construction documents, created scopes of work, solicited bids, negotiated contracts, ran monthly cost reports, participated in sales presentation. Managed a \$4.0 million construction project from groundbreaking through final occupancy. Participated in the project management of several large commercial projects ranging in size from \$20 to \$300 million.



Education

BS Civil Engineering University
of Maryland College Park
MS Engineering Management
Cornell University
MS Regional Planning

Professional Registrations

Professional Engineer DC, MD,
VA, NC, GA

Veronica O. Davis, PE

Community Business Issues

Ms. Davis has the perfect blend of both technical and grassroots/community organizing skills. She is currently a Partner and Principal Planner at Nspiregreen, LLC. She is responsible for the management of the major planning functions such as program assessment, economic analysis, market analysis, planned development, policy development, sustainability analysis and long range planning for infrastructure projects. In addition, she manages the public involvement projects for transportation.

Prior to Nspiregreen, Ms. Davis was project engineer on several energy-from-waste facilities across the U.S. Projects included environmental site assessments, economic feasibility analysis, sustainability planning, financial valuation, strategic planning, and brownfield redevelopment. She conducted a financial valuation of two waste-to-energy plants in Broward County using replacement cost less depreciation and original cost plus inflation methods. The analysis was subsection of a feasibility study to determine replacement versus renovation options. She managed the development of permit documents for the relocation of the materials recycling facility (MRF) on the campus of the West Palm Beach Solid Waste Management Authority as required by the State of Florida Power Plant Siting Act. The permit included environmental and a fatal flaws analysis which addressed specific issues to building the facility, including developing technical specification and conceptual design.