



**Jurisdictions of the City of Alexandria, Virginia &
County of Arlington, Virginia**

Economic Analysis of Covanta Extended Term Agreement

FINAL

October 2013



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A handwritten signature in blue ink, appearing to read "D. Sawyers", written over a horizontal line.

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**Economic Analysis of Covanta
Extended Term Agreement**

Prepared for:

Jurisdictions of the City of Alexandria,
Virginia & County of Arlington, Virginia

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Acronyms and Abbreviations

BAE	Bay Area Economics
CPI	Consumer Price Index
EAT	Excess Annual Tonnage
EOBTF	Extension Option Base Tipping Fee
E/RRF	Energy and Resource Recovery Facility
Facility	Alexandria/Arlington Resource Recovery Facility
FMG	Facility Monitoring Group
FY	Fiscal Year
tpd	Ton per day
tpy	Ton per year
MAT	Minimum Annual Tonnage
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MWCOG	Metropolitan Washington Council of Governments
MWR	Metropolitan Washington Region
NPV	Net Present Value
NVRC	Northern Virginia Regional Commission
OCNLD	Original Cost New Less Depreciation
RCNLD	Replacement Cost New Less Depreciation
SWOT	Strengths, Weaknesses, Opportunities, Threats

Executive Summary

Background

The Alexandria/Arlington Resource Recovery Facility was jointly developed by the City of Alexandria and Arlington County (Jurisdictions) to handle the waste from the two jurisdictions. It has been in operation since February 1988, is operated by Covanta Arlington/Alexandria, Inc. (Covanta), and is capable of handling 975 tons of waste each day, while producing 21 megawatts (MW) of energy. The Facility was determined to be the most environmentally sustainable means of disposing of waste generated by the Jurisdictions after reduction, reuse and recycling, and has had a stellar environmental record, achieving emissions well below United States Environmental Protection Agency (EPA) permitted levels.

In January 2012, the Jurisdictions entered into a new Waste Disposal and Services Agreement (Agreement) with Covanta for processing waste at the Facility at a rate considered to be below market rate, beginning in January 2013. This Agreement was approved unanimously by both the City Council and the County Board. This new Agreement left open several decisions that will need to be made for the continued use of the Facility by the Jurisdictions. In brief, the Jurisdictions could take over ownership of the Facility in 2025, or could elect to extend their site lease with Covanta to 2038, with the Jurisdictional tip fee dropping to \$0 for the period from 2025 through 2038, with the Facility and Facility Site then returning to the Jurisdictions in 2038. The issue at hand is whether or not the Jurisdictions should extend the term of the Agreement, and if so, in what timeframe.

The Economic Study

ARCADIS, US Inc. (ARCADIS) was retained to conduct an independent economic evaluation of the Agreement, specifically to look at the extension options and costs of alternatives afforded to the Jurisdictions to support their decision-making process. As part of the study, ARCADIS reviewed the Agreement, conducted a market study to estimate waste disposal capacity and costs, conducted workshops to refine the alternatives examined, and then identified the risks, benefits and costs of these alternatives. A financial model was developed for each scenario to calculate the net cost per ton during the planning period, the total cost of each scenario, and the potential range in cost based upon changing market conditions.

The three basic scenarios modeled through 2038 are as follows:

- Base Case: in which the Jurisdictions exercise the Extension in FY2014, at which point the tipping fee for Jurisdictional waste “freezes” at the current rate of \$43.16/ton through 2024, dropping to \$0/ton in 2025.
- Case A: in which the Jurisdictions pay market rate (including transportation to access markets) from 2019 to 2025, and then in 2025, operate (or hire an operator to operate) the Facility to 2038.
- Case B: in which the Jurisdictions pay market rate (including transportation to access markets) from 2019 to 2025, and then sell the Facility in 2025, using the proceeds of the sale to offset their disposal costs through 2038.

Conclusions

From the economic analysis conducted in this study, it was concluded that the Base Case Scenario to Extend the Agreement in 2014 offers one of the lowest costs and has the least amount of financial risk. Drawbacks of this scenario include loss of control of the Facility and Facility Site from 2025 to 2038 and potential unleveraged value from sale and/or operation of the Facility during this period. If such drawbacks are of manageable concern, then extending the Agreement in 2014 to maximize the savings available under the Agreement is considered a preferential course to follow. If concerns regarding the control of the Facility remain, consideration should be given to postponing the decision to extend the Agreement but with a reevaluation scheduled well in advance of July 1, 2018, while the Jurisdictions maintain the unilateral right to extent.

In making such a decision, it is important that the Jurisdictions also consider their tolerance for risk, as risk tolerance may be an overriding factor for exercising the extension and there is a cost (in this case, a loss of savings) associated with postponing the decision to extend. As discussed further in Section 6 and illustrated in Table 6-1 of the Report, postponing the extension results in increased costs in the amount of approximately \$500,000 annually from now until July 1, 2018. The increased cost is directly related to the 2.75% annual increase in tipping fees per ton of waste processed which, under the Agreement, continues until the extension is exercised.

1. Introduction

The Alexandria/Arlington Resource Recovery Facility (Facility) is a 975 ton per day (tpd) mass burn resource recovery facility located on a 4-acre site (Site) in Alexandria, VA. The Facility was jointly developed by the City of Alexandria (City) and Arlington County (County) (jointly referred to as the Jurisdictions) and is currently owned and operated by Covanta Arlington/ Alexandria, Inc. (Covanta), a subsidiary of Covanta Energy, Inc. The Facility converts processible municipal solid waste (MSW) from the Jurisdictions, as well as other customers, into electric power. This electricity is then sold to Virginia Electric and Power Company (Virginia Power), a subsidiary of Dominion. The ownership of the Facility is scheduled to revert back to the Jurisdictions who, through the City of Alexandria, Virginia Sanitary Authority and Arlington County Solid Waste Authority (Authorities), originally financed the Facility through the sale of revenue bonds.¹

Prior to the current agreement, Covanta operated the Facility in accordance with an Amended and Restated Facility Construction and Operation Agreement (Construction and Operation Agreement) originally dated October 1, 1985, and amended on November 1, 1998 by the Operating Lease Agreement when a major air pollution upgrade to the Facility was required. In 2013, pursuant to the original agreements Covanta took title to the Facility but did not take title to the underlying land or to the retro-fit related improvements financed by the 1998 Series B bonds. Covanta has the right to operate the Facility at the Site until 2025, in accordance with the Amended and Restated Facility Site Lease (Facility Site Lease), dated October 1, 1985, at which time the Site, the Facility, and all improvements revert back to the Jurisdictions "in good order and condition, reasonable wear and tear of the Improvements excepted."

The Facility is designed to accept and process 350,000 tons per year of MSW. The Authorities currently deliver to the Facility between 50,000 and 70,000 tons of waste per year collected from primarily from single-family homes within the Jurisdictions. The balance of the 350,000 tons is waste procured by Covanta through agreements with private haulers collecting commercial and multi-family MSW.

¹ For practical purposes in this Report, the Authorities and Jurisdictions are collectively referred to as the Jurisdictions.

In January 2012, the Jurisdictions entered into a new Waste Disposal and Service Agreement (Agreement) with Covanta for the processing and disposal of the Jurisdictions' collected MSW from January 1, 2013, through June 30, 2019. Entering into the Agreement was previously projected to provide disposal savings ranging from \$26-\$54 million over the potential life of the Agreement, as compared to market rates.² The Jurisdictions have a unilateral right to extend the Agreement through 2038 (the Extended Term) via an Extension Option if such right is exercised prior to June 30, 2018. If the Extension Option is not exercised, the Agreement will renew through September 30, 2025 (the Renewal Term) unless either the Jurisdictions or Covanta decide to opt out of the renewal. If a Renewal Term occurs, the Jurisdictions would then have another opportunity through September 30, 2025, to exercise the unilateral right to extend the Agreement through 2038. The Agreement is structured such that the savings to the Jurisdictions under the Agreement are greater the earlier the extension option is exercised. The Jurisdictions are evaluating their right to extend the Agreement through 2025 and through 2038.

1.1 Purpose / Objectives

The purpose of this Economic Analysis of Covanta Extended Term Agreement Report (Report) is to provide an economic analysis of alternatives to estimate the cost and benefits of exercising (or not exercising) the extension term option(s), and a recommendation as to the time frame for taking such action. This Report provides a discussion of the information reviewed, analysis undertaken and the findings and conclusions of the economic evaluation. The Report is organized as follows:

- Section 2 - Background. This section presents a history of the Facility, an examination of the Facility's service area, and a review of existing agreements between the key parties.
- Section 3 - Evaluation of Waste Disposal and Service Agreement. In this section, each term of the Agreement (Initial, Renewal, and Extended Terms) and the period after expiration of the Agreement in 2038 (if the extension option is exercised) is discussed and evaluated.

² Memorandum dated January 9, 2012 presented to the Arlington County Board at the January 21, 2012 meeting.

- Section 4 - Baseline Assessment. This section identifies the strengths, weaknesses, opportunities, and threats (SWOT) governed by the Agreement. The baseline assessment also examines the current market condition and disposal alternatives for MSW for the Jurisdictions.
- Section 5 - Review of Alternatives. This section identifies the alternatives, if and when the Jurisdictions extend the Agreement into the Renewal Term or Extended term(s). These alternatives, or scenarios, are evaluated, taking into consideration the benefits and risks and the decision making factors identified in Section 4.
- Section 6 - Financial Analysis. Finally, in this section, a summary analysis is provided to identify the findings, risks, and potential opportunities within the terms of the Agreement, and to assist the Jurisdictions in mitigating such risks and making a fully informed decision at key decision making points.
- Appendices. The appendices provided at the end of this Report include a listing of the documents received and reviewed as part of the study (Appendix A), the Solid Waste Market Analysis Memorandum (Appendix B), the July 10, 2013 Facility Site Visit Memorandum (Appendix C), the Evaluation of Alternatives and Assumptions Memorandum (Appendix D), the Financial Model Assumptions (Appendix E), and Review of January 2012 Cost Savings Projections and Current Findings (Appendix F).

The Report summarizes the work completed up to the date of the issuance of the Report. Changed conditions occurring or becoming known after such date could affect the material presented and the conclusions reached herein to the extent of such changes.

2. Background

A wide range of information was compiled and reviewed as part of this study including existing records and documents provided by the Jurisdictions and their consultants. This information was supplemented based on our experience and a limited assessment of the Facility and Site. In addition, a series of workshops and meetings were conducted to facilitate data gathering and vet the information reviewed. Appendix A presents a listing of the documents received and reviewed as part of the study.

ARCADIS has not independently verified the accuracy of the information provided by or on behalf of the Jurisdictions. However, we consider such sources reliable and the information obtained to be appropriate for the analysis undertaken and the conclusions reached herein. To the extent that the information provided to ARCADIS is not accurate, the conclusions and recommendations contained in this Report may vary and are subject to change. The following section provides a brief historical perspective of solid waste management in the Jurisdictions and describes other important background information relevant to the current planning process.

2.1 Service Area Statistics

The Jurisdictions provide solid waste management planning for all MSW generated within their municipal boundaries. The following subsection provides a description of the Jurisdictions and their associated solid waste services and population demographics.

2.1.1 City of Alexandria

The City of Alexandria (City) is an independent city in the Commonwealth of Virginia. The City is bounded on the east by the Potomac River, on the north by Arlington County, and on the west and south by Fairfax County. The City of Alexandria Department of Planning and Zoning estimates the City's population at 145,030¹ with most of the residential housing growth in the next thirty years taking place on the western and eastern edges of the City.

¹ Source: MWCOG. Round 8.2 Forecasts, Planning Division (May 2013).

The City provides MSW collection and disposal services for approximately 19,000 single-family residential customers and 280 small commercial customers. The City provides in-house MSW collection crews once a week on a designated collection day, Monday through Thursday. The City does not contract with outside collection services. MSW collected by the City is disposed of at the Facility. In Calendar Year 2012, approximately 91,000 tons of MSW² requiring disposal was generated within the City. Of this amount, the City collects approximately 22,000 tons per year (tpy) from residential customers and approximately 3,000 tpy from its commercial customers. As with the County, approximately 70% of the MSW produced in the City from multi-family residences and the majority of the commercial sector is collected and disposed of separately and not controlled by the City. Only the existing commercial customers are grandfathered into the new Agreement with Covanta.

In addition to MSW collection and disposal, the City provides contracted collection services for single-stream recycling year-round and leaf collection in the fall with vacuum trucks and leaf bag pickups. Single-stream recycling is transported to the Waste Management Recycle America MRF. Beginning in 2014, the City will provide brush and grass collection for residents, and will continue brush collection/recycling in the parks and operation of its brush site for storm debris. The City also provides a household hazardous waste collection site, recycling drop off site and a residential bulky waste drop off site. The residential bulky waste drop-off site is located at the Facility Site.

In 2012, the City reported recycling of approximately 71,000 tons of material and disposing of approximately 91,000 tons of MSW for a base recycling rate of 43.8%. The City claimed credits for 15,489 tons of recycling residue, solid waste reuse, and non-MSW recycled plus a 2% credit for source reduction, thereby increasing the adjusted recycling rate to 50.7%. The final recycling rate reported by the City in 2012 was 48.8%. This final recycling rate is less than the adjusted recycling rate because the City claimed the maximum of 5% credit over the base recycling rate for material reuse and source reduction.³

² Source: Commonwealth of Virginia Department of Environmental Quality Locality Recycling Rate Report for Calendar Year 2012 for the City of Alexandria

³ Source: Commonwealth of Virginia Department of Environmental Quality Locality Recycling Rate Report for Calendar Year 2012 for the City of Alexandria.

The City's budget for refuse and recycling collection in 2012 was \$7.1 million. Recycling program costs in 2012 were approximately \$1.7 million. Refuse collection costs were \$5.4 million, which was approximately 11% of the budget of the Transportation & Environmental Services department. The upcoming approved expenditure for FY 2014 is \$5.9 million, which is a significant reduction from historic costs due in large part to the new Agreement with Covanta. This results in a residential refuse fee of \$328 per year, which the residents are billed as a separate Waste User Fee line item on their tax bill on a semi-annual basis.

2.1.2 County of Arlington

Arlington County (County) is an urban county of about 26 square miles located across the Potomac River from Washington DC. The County is bounded by on the east by the Potomac River, on the south by the City of Alexandria, and to the north and west by Fairfax County. There are no incorporated towns or cities within the County. On January 1, 2012, the Arlington Planning Division estimated the County's population was 211,700⁴ with 107,500 single- and multi-family housing units.

As of 2013, the County provides MSW collection services for 32,800 customers. These customers include County offices, townhomes, single-family homes, and few small businesses and churches. The County currently contracts with two haulers, each servicing approximately 16,000 homes, and a third hauler to service the County municipal buildings and churches. The single-family residences with collection services comprise approximately one-third of the residential sector in the County. The remaining two-thirds of the residential sector are multi-family residences that make their own arrangements for MSW collection and disposal. The County contracted haulers are directed to transport their MSW to the Facility for disposal. In Calendar Year 2012, approximately 110,000 tons of MSW⁵ requiring disposal was generated within the County. Of this amount, approximately 36,000 tons was collected from the County's MSW collection customers.

In addition to MSW collection and disposal, the County also provides collection services for single-stream curbside recycling, electronic waste (e-waste), and

⁴ Source: Arlington Profile Summary 2012 (Round 8.1 Forecasts, CPHD Planning Division February 2012).

⁵ Source: Commonwealth of Virginia Department of Environmental Quality Locality Recycling Rate Report for Calendar Year 2012 for Arlington County

brush/yard waste. In 2012, the County reported recycling of approximately 95,000 tons for a base recycling rate of 46.3%. The County claimed credits for approximately 72,000 tons for solid waste reuse and receives a 2% credit for source reduction, thereby increasing the adjusted recycling rate to 62.3%. The final recycling rate reported by the County in 2012 was 51.3%. This final recycling rate is less than the adjusted recycling rate because the County can only claim a maximum of 5% credit for material reuse and source reduction.⁶ Curbside recycling is transported to the Waste Management Recycle America single-stream materials recovery facility (MRF). In addition to curbside pickup for recycling and e-waste, the County has two drop-off recycling centers for businesses, which include a citizen box where residents can drop off bulky items, such as a couch. Brush is brought to the Earth Products Recycling facility or to County facilities for processing. The County currently plans to expand collection of organic waste to a 10-month program, excluding the months of January and February. MSW (also referred to as refuse in the County) services are billed on a utility billing system with water and sewer. Water, sewer, and refuse are billed to residential customers monthly and to commercial customers quarterly. The County's budget for revenues received from refuse and recycling collection in 2012 was \$10.6 million. This resulted in an annual residential charge of \$325.72 for refuse and recycling. In 2013, the adopted budget was reduced to \$9.5 million, reducing the residential charge to \$293.92. The reduction in fee was due, in part to the new Agreement with Covanta. In 2013, refuse and recycling fees account for 19.5% of the revenues received for County services.

2.1.3 Population and Waste Generation Projections

Population projections used for this study were provided by the Jurisdictions and the Metropolitan Washington Council of Governments (MWCOG). For the purposes of projecting MSW generation over the course of the planning period, MWCOG Round 8.2 population forecasts were used for the City and the Arlington Profile Summary 2012 population forecasts were used for the County. Table 2-1 summarizes projected population for the City of Alexandria and Arlington County over the 2038 planning period.

⁶ Source: Commonwealth of Virginia Department of Environmental Quality Locality Recycling Rate Report for Calendar Year 2012 for Arlington County.

2.2 Facility History

On December 1, 1984, an inter-local joint enterprise agreement was entered into between the City of Alexandria, VA Sanitary Authority and Arlington County Solid Waste Authority (collectively referred to as the “Authorities”) to develop the Facility, a waste-to-energy facility for processing MSW generated by residents, commercial establishments, and institutions located within the municipal boundaries of the Jurisdictions. This joint enterprise was tasked with the design, construction, equipping, testing, and operation of the Facility. In addition, the Authorities raised funds for the development of the Facility by selling revenue bonds. For the purposes of this Report, the Authorities and the Jurisdictions can be considered the same entity and are in general jointly referred to as the Jurisdictions. However, in this section, they will be referred to separately for ease of discussing the contract relationships below. The Facility has been operated by Covanta Arlington/ Alexandria, Inc. (Covanta) since opening in 1988.

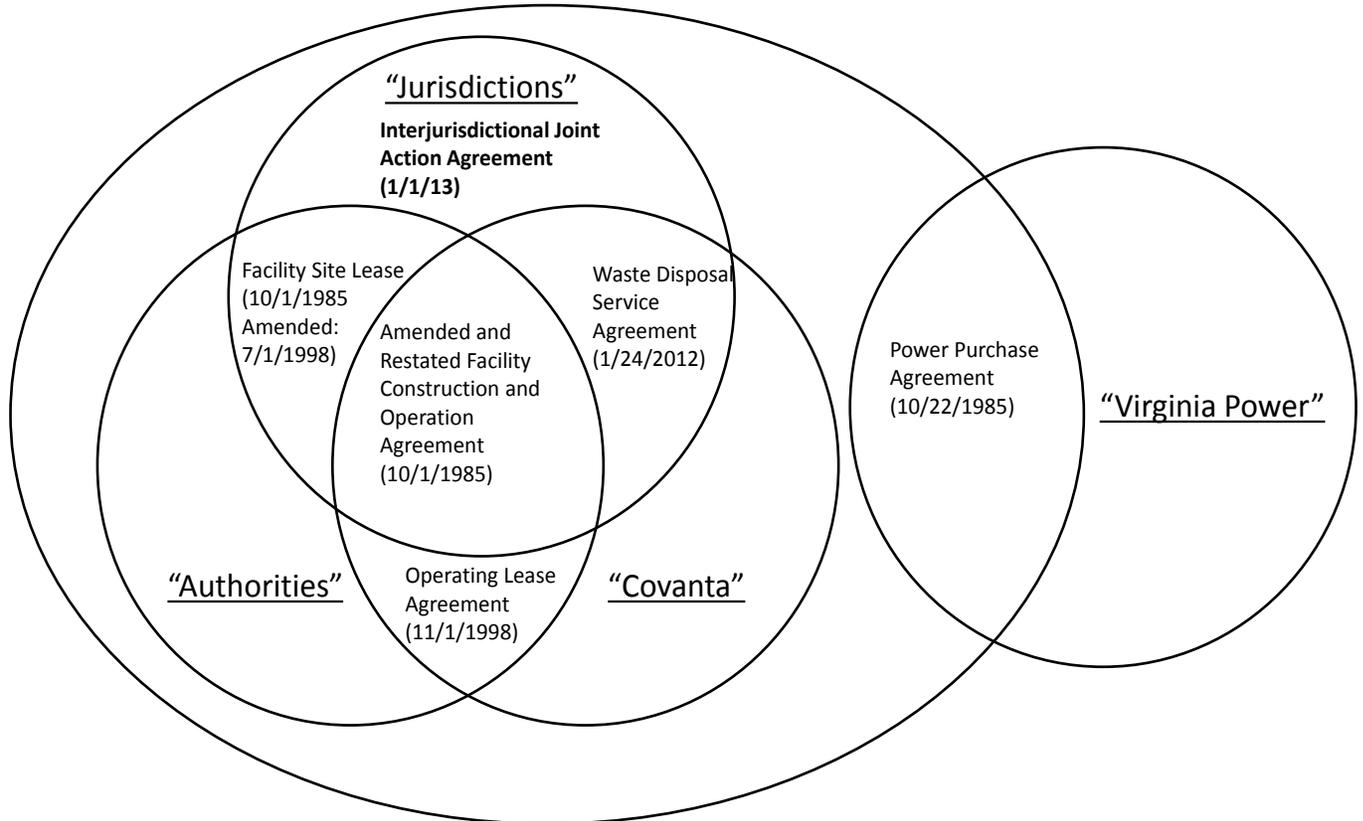
Table 2-1: Jurisdiction Population and Waste Generation Projections

Projection	2013	2015	2020	2025	2030	2035	2038
City of Alexandria							
Population ¹	145,030	148,513	158,102	167,085	174,030	184,741	190,765
Total Waste Generated (tons) ²	179,000	183,000	195,000	206,000	215,000	228,000	235,000
Estimated Net Recycling Rate ³	48.8%	49.5%	51.4%	53.4%	55.4%	57.5%	58.8%
Processible Waste Requiring Disposal (tons) ⁴	91,500	92,400	94,700	96,000	95,900	96,900	96,800
Alexandria Collected Processible Waste (tons) ⁵	22,200	22,400	23,000	23,300	23,300	23,500	23,500
Arlington County							
Population ¹	211,700	217,669	233,400	239,294	244,239	248,543	251,162
Total Waste Generated (tons) ²	226,000	232,000	249,000	255,000	261,000	265,000	268,000
Estimated Net Recycling Rate ³	51.3%	52.1%	54.1%	56.1%	58.2%	60.5%	61.8%
Processible Waste Requiring Disposal (tons) ⁴	109,900	111,200	114,400	111,900	109,000	104,800	102,300
Arlington Collected Processible Waste (tons) ⁵	36,000	36,400	37,500	36,700	35,700	34,300	33,500
Notes:							
1. Alexandria projections based on Round 8.2 Forecasts, Planning Division (May 2013) and Arlington based on Arlington Profile Summary 2012 (Round 8.1 Forecasts, CPHD Planning Division February 2012).							
2. 2013 estimate is calculated based on the Final Recycling Rate and MSW Disposed data reported in the Commonwealth of Virginia Department of Environmental Quality Locality Recycling Rate Report for Calendar Year 2012; thereafter increasing based on increases in projected population.							
3. 2013 Net Recycling Rate based on Commonwealth of Virginia Department of Environmental Quality Locality Recycling Rate Report for Calendar Year 2012 Final Recycling Rate; thereafter escalated by 0.75% annually.							
4. 2013 estimated based on Commonwealth of Virginia Department of Environmental Quality Locality Recycling Rate Report for Calendar Year 2012; thereafter increasing based on estimated increases in estimated total waste generated.							
5. 2013 estimates based on 2012 actuals provided by the City and County; thereafter increasing based on estimated increases in total processible waste requiring disposal.							

2.3 Existing Agreements

The following section provides a brief description and key provisions of the existing agreements between the Jurisdictions/Authorities, Covanta, and Virginia Power. The relationships of these parties and the agreements described in this subsection are provided in Figure 2-1 below.

Figure 2-1: Contract Relationships



2.3.1 Amended and Restated Facility Construction and Operation Agreement

The Amended and Restated Facility Construction and Operation Agreement (Construction and Operation Agreement), dated October 1, 1985, establishes the relationship between the Jurisdictions (Landlords), the Authorities (Tenants), and Covanta (Company). Under the Construction and Operation Agreement, the Jurisdictions leased the Facility Site to Covanta for a 40-year term through September 30, 2025. Covanta agrees to accept, process, and dispose of the Jurisdictions' MSW at the Facility.

2.3.2 Amended and Restated Facility Site Lease and First Amendment

Under the Amended and Restated Facility Site Lease (Facility Site Lease), dated October 1, 1985, the Jurisdictions lease the site to the Authorities for a term of 40 years from October 1, 1985 to September 30, 2025. The Site is only to be used for the

collection, transfer, and disposal of MSW. The annual rent is \$129,034 plus 70% of the seasonally adjusted Consumer Price Index (CPI) All Urban Earners DC Metro Area from January 1, 1985 and adjusted every 5 years. As of today, July 2013, the current rent amount is \$420,651. The rent is payable quarterly and the income from which is split equally between the City and the County. Amendment No. 1 to the Facility Site Lease, dated July 1, 1998, was entered into by the Jurisdictions and Authorities to allow for the construction of air pollution control equipment with the Clean Air Act and other site improvements to the site to comply. At the end of the term, on October 1, 2025, the Site and improvements are to be turned over to the Jurisdictions in good order and condition, reasonable wear and tear of the improvements excepted.

2.3.3 Operating Lease Agreement and First Amendment

Under the Operating Lease Agreement, dated November 1, 1998, the Authorities (Lessor) agreed to finance air pollution control equipment to comply with the Clean Air Act and other site improvements including construction of a new roadway, acquisition of land for the new roadway, construction of a new scale house, and construction of miscellaneous improvements and upgrades to the Facility (Facility Improvements). The Authorities issued bonds in the amount of approximately \$43 million in 1998 to finance the Facility Improvements. The bonds were paid off in FY 2013.

Under the Operating Lease Agreement, Covanta (Lessee) agrees to lease and operate the Facility Improvements through October 1, 2025, or through December 31, 2038 if the Jurisdictions exercise their Extension Option in the Agreement described in Section 2.3.6 below, unless the Lease has been terminated prior to October 1, 2025. As part of the Operating Lease Agreement, Covanta assumes all responsibilities of the Authorities to the Jurisdictions under the Facility Site Lease.

2.3.4 Power Purchase and Operating Agreement

The Power Purchase and Operating Agreement, dated October 22, 1985, is between Covanta (formerly the Alexandria/Arlington Resource Recovery Corporation), the Jurisdictions, and the Authorities (jointly referred to as the Operator) and Virginia Power. The term of this agreement is 30 years from December 18, 1984 for public owners, ending December 18, 2014, and 35 years from completion of performance testing by Covanta. It is our understanding that performance testing was completed in 1988 and therefore the Power Purchase and Operating Agreement term between Covanta and Virginia Power will expire in 2023. This agreement details energy payments by Virginia Power and Capacity Credits to the Operator.

2.3.5 Interjurisdictional Joint Action Agreement

The purpose of the Interjurisdictional Joint Action Agreement is to establish the relationship between the Jurisdictions and the rights and duties under the Agreement discussed in Section 2.3.6 below. This agreement identifies both the City of Alexandria and Arlington County, Virginia as joint owners of the Facility Site, owning equal shares, and establishes a Facility-Monitoring Group (FMG) to liaise with each other to discuss the matters in the Agreement. Furthermore, the Interjurisdictional Joint Action Agreement establishes the Alexandria & Arlington Waste Disposal Trust Fund to administer the Jurisdictions' financial obligations under the Agreement. By this agreement, cost allocation and revenue are allocated sixty percent (60%) to the County and forty percent (40%) to the City. Revenue from the sale of the real property Site is split equally.

2.3.6 Waste Disposal and Service Agreement

The Agreement was entered into by the Jurisdictions and Covanta on January 24, 2012 and establishes the tipping fee and put-or-pay quantities for the Jurisdictions to dispose of MSW at the Facility. The Jurisdiction's initial base tipping fee is \$42.00 per ton, which escalates at an annual rate of 2.75%, with the first escalation effective July 1, 2013. The Jurisdictions agree to deliver between 50,000 and 70,000 tons annually, a range that may be adjusted with limitations.

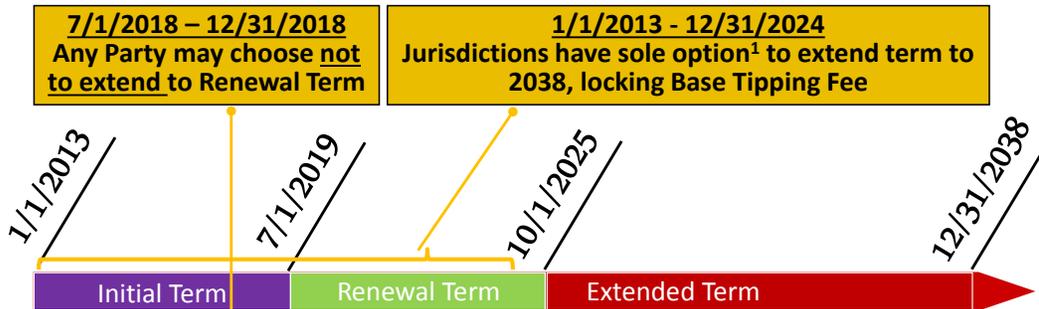
The provisions of the Agreement are split among three terms: the Initial Term, the Renewal Term, and the Extended Term. The Initial Term extends from January 1, 2013 through June 30, 2019. From July 1, 2018 through December 31, 2018, either party may choose to not extend the Agreement into the Renewal Term. If both parties agree to extend the Agreement, the Renewal Term begins on July 1, 2019 and ends on September 30, 2025. At any time during the Initial Term and the Renewal Terms, the Jurisdictions may exercise the "Extension Option", extending the Agreement and the Site and Facility leases through the Extension Term, which terminates on December 31, 2038.

During the Initial and Renewal Terms, the Jurisdictions' tipping fee can be increased by a change-in-law resulting in increased operating, maintenance, or capital direct costs to Covanta greater than \$5,000, or by increased residue disposal costs. The Jurisdictions can also receive a credit if a change-in-law results in a decrease in direct costs to Covanta. In addition, the Jurisdiction's tipping fee during the Initial and Renewal Terms is subject to adjustment through a credit or rebate for Covanta's disposal of ash

residue at the Lorton Landfill in Fairfax County (also known as the Fairfax County' I-95 ash monofill). This credit is discussed further in Section 3 of this Report.

Upon exercising the Extension Option, the Jurisdictions lock in their tipping fee in effect of that date, through September 30, 2025. Moreover, Covanta automatically extends their lease on the Facility from October 1, 2025, through December 31, 2038; and the Jurisdictions' tipping fee beginning October 1, 2025 would be zero dollars per ton for Jurisdiction collected waste. Should the Jurisdictions exercise the Extension Option, increases in direct costs for operating and maintaining the Facility and residue disposal will be borne by Covanta. However, during the entire Agreement, the Jurisdictions do not receive any benefits, nor encumber any risks related to future electricity prices, renewable energy credits or carbon credits, nor do they receive any revenues from ferrous materials recycled from the Facility. A timeline of the Agreement is shown in Figure 2-2 below.

Figure 2-2: Agreement Timeline



Range of Base Tipping Fees (BTF) + Excess Tonnage Fee (ETF) (\$/ton)		
BTF: \$42.00 - \$49.42 ETF: \$47.00 - \$55.30	BTF: \$60.46 - \$71.14 ETF: \$66.51 - \$78.25	BTF: \$0 ETF: EOBTF ² + \$7.11- \$10.12
Minimum Annual Tonnage (MAT) = 50,000 tons Excess Annual Tonnage (EAT) = 70,000 tons Jurisdictions can adjust +/- 5,000 tons annually		EAT = average tons of waste for preceding 2 years, calculated 10/1/2025, 1/1/2035, 7/1/2035 EAT shall not be < 65,000 tons or > 80,000
Residue credit up to \$5.50 per ton	Residue credit up to \$9.50 per ton	No Residue credit

Notes:

- 1) During the period of July 1, 2018 to December 31, 2018, either party may choose not to extend into the Renewal Term.
- 2) EOBTF = Base Tipping Fee in effect in the Contract Year in which the Jurisdictions exercise the Extension Option.

3. Evaluation of Waste Disposal and Service Agreement Extension

The primary purpose of the Agreement is to establish the tipping fee and put-or-pay quantities for the Jurisdictions to dispose of MSW at the Facility, which is leased by Covanta. The provisions of Agreement are split among three terms: the Initial Term, the Renewal Term, and the Extended Term.

3.1 Initial Term

The Initial Term begins on January 1, 2013 and ends on June 30, 2019. During the Initial Term, the tipping fee for the Jurisdictions is set for the first six months (Year 0) and is escalated annually thereafter per a set schedule. The tipping fee ranges from \$42.00 for Year 0 (January 1, 2013 through June 30, 2013) to \$49.42 in Year 6, the final year of the Initial Term (July 1, 2018 through Jun 30, 2019). The Jurisdictions are required to deliver a MSW Minimum Annual Tonnage (MAT) of 50,000 tons per year, but can raise or lower the MAT up to 5,000 tons each contract year. The Jurisdictions have established a MAT of 48,000 tons for FY2014. A Shortfall Fee is required to be paid if the Jurisdictions deliver less than the MAT, as adjusted. In addition, the Jurisdictions are held to an Excess Annual Tonnage (EAT), which equals 20,000 tons above the MAT. If the Jurisdictions deliver more than this EAT in a contract year, an Excess Tonnage Tip Fee is added to the base tipping fee. The Excess Tonnage Tip Fee is \$5.00 per ton for Year 0 and escalates annually up to \$5.88 per ton in Year 6 of the Initial Term. For the period one year to six months before the end of the Initial Term, from July 1, 2018 through December 31, 2018, either party may choose not to not extend the Agreement to the Renewal Term. At this point, the Agreement may be terminated or renegotiated.

During the Initial and Renewal Terms, the Jurisdictions' tipping fee can be increased by a change-in-law resulting in increased operating, maintenance, or capital direct costs to Covanta greater than \$5,000, or increased residue disposal costs. If the increase in the tipping fee exceeds \$10.00, adjusted by a factor defined in the Agreement, the Jurisdictions have the option to terminate the Agreement. The Jurisdictions can also receive a credit if a change-in-law results in a decrease in direct costs to Covanta. Furthermore, if a change-in-law necessitates a capital alteration or addition of a capital project that costs greater than \$2 million, adjusted by the factor defined in the Agreement, both the Jurisdictions and Covanta have the option to terminate the Agreement.

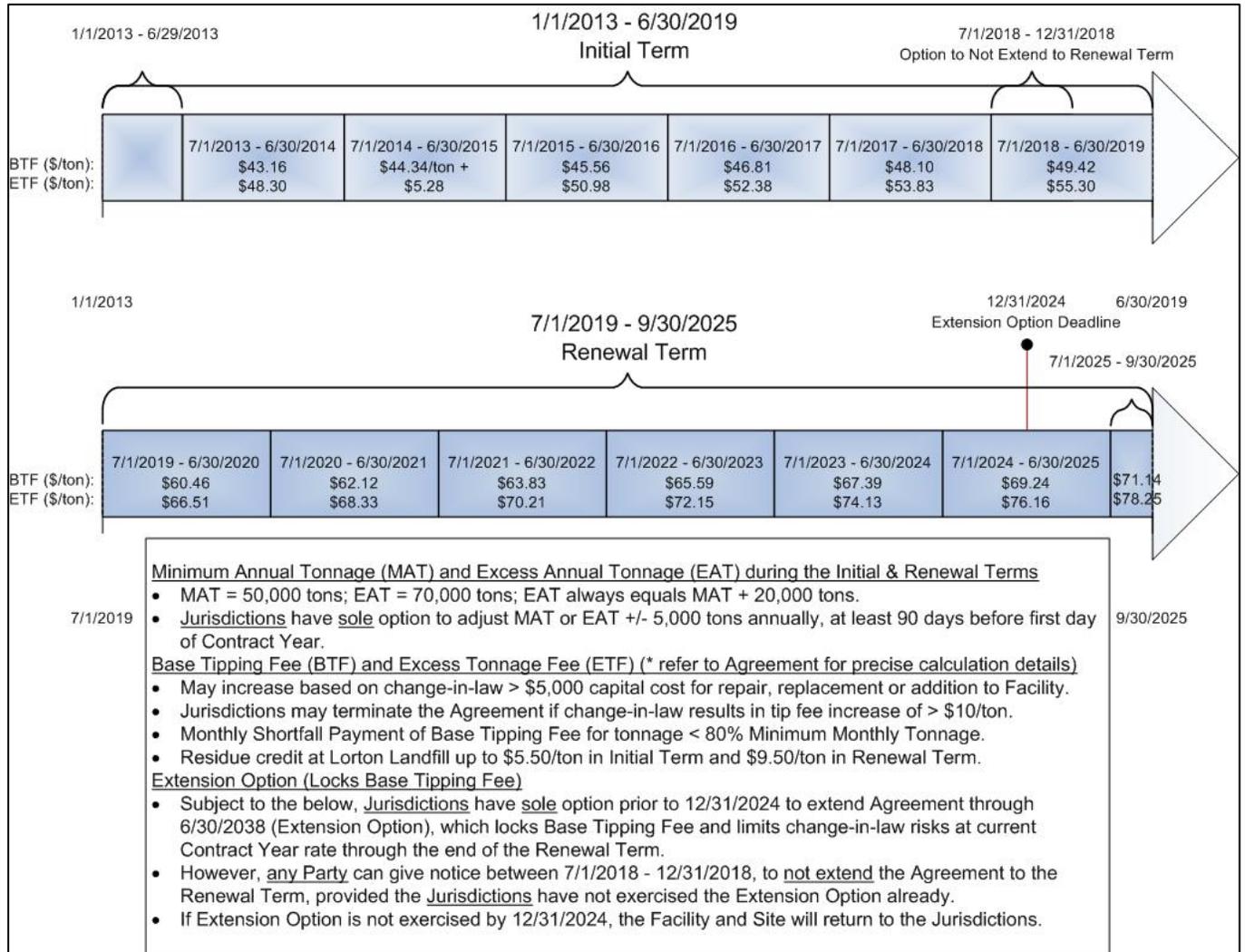
In addition to the provisions regarding the tipping fee and put-or-pay tonnage requirements, the Jurisdiction's tipping fee during the Initial and Renewal Terms is subject to adjustment through a credit or rebate for Covanta's disposal of ash residue at the Lorton Landfill in Fairfax County. During these two terms, the Residue Disposal Credit equals the product of the number of tons of residue disposed at the Lorton Landfill and the difference between the gate fee charged at the Lorton Landfill and fifty percent (50%) of the base tipping fee paid by the Jurisdictions at the Facility. The Residue Disposal Credit of up to \$5.50 per ton of ash during the Initial Term and up to \$9.50 per ton of ash during the Renewal Term is to be paid by Covanta to the Jurisdictions for any of the Facility's ash residue Covanta disposes of at the Lorton Landfill. If the credit exceeds the amount payable by the Jurisdictions to Covanta for disposal of MSW, a rebate is to be provided to the Jurisdictions. The Jurisdictions are not entitled to any Residue Disposal Credit during the Extended Term.

At any point in the Initial Term or the Renewal Term, subject to the six month period discussed above, the Jurisdictions may choose to exercise the Extension Option. This option extends the contract through December 31, 2038. Once the Jurisdictions exercise the Extension Option, the base tipping fee in the current contract year is frozen through the end of the Renewal Term. In addition, the Jurisdictions are alleviated of future change-in-law risks, subject to terms and conditions of the Agreement. The MAT, EAT, and Excess Tonnage Tipping Fee remain in effect.

3.2 Renewal Term

The Renewal Term begins on July 1, 2019 and ends on September 30, 2025, unless terminated or renegotiated by the parties during the period of July 1, 2018 and December 31, 2018. During the Renewal Term, the tipping fee for the Jurisdictions jumps up to \$60.46 in Year 7 and escalates annually on July 1 of each contract year per a set schedule up to \$71.14 in Year 13. Note that the Renewal Term ends on September 30, 2025, only partway through Year 13. The MAT remains 50,000 tons plus or minus any annual adjustments and the EAT remains 20,000 tons more than the MAT. The Excess Tonnage Tip Fee ranges from \$6.05 in Year 7 to \$7.11 in Year 13. At the end of the Renewal Term, the Agreement is terminated unless the Jurisdictions choose to exercise the Extension Option, which extends the contract through the Extended Term, described below. Key provisions of the Initial and Renewal Terms are shown in Figure 3-1 below.

Figure 3-1: Key Provisions of the Initial and Renewal Terms



3.3 Extended Term

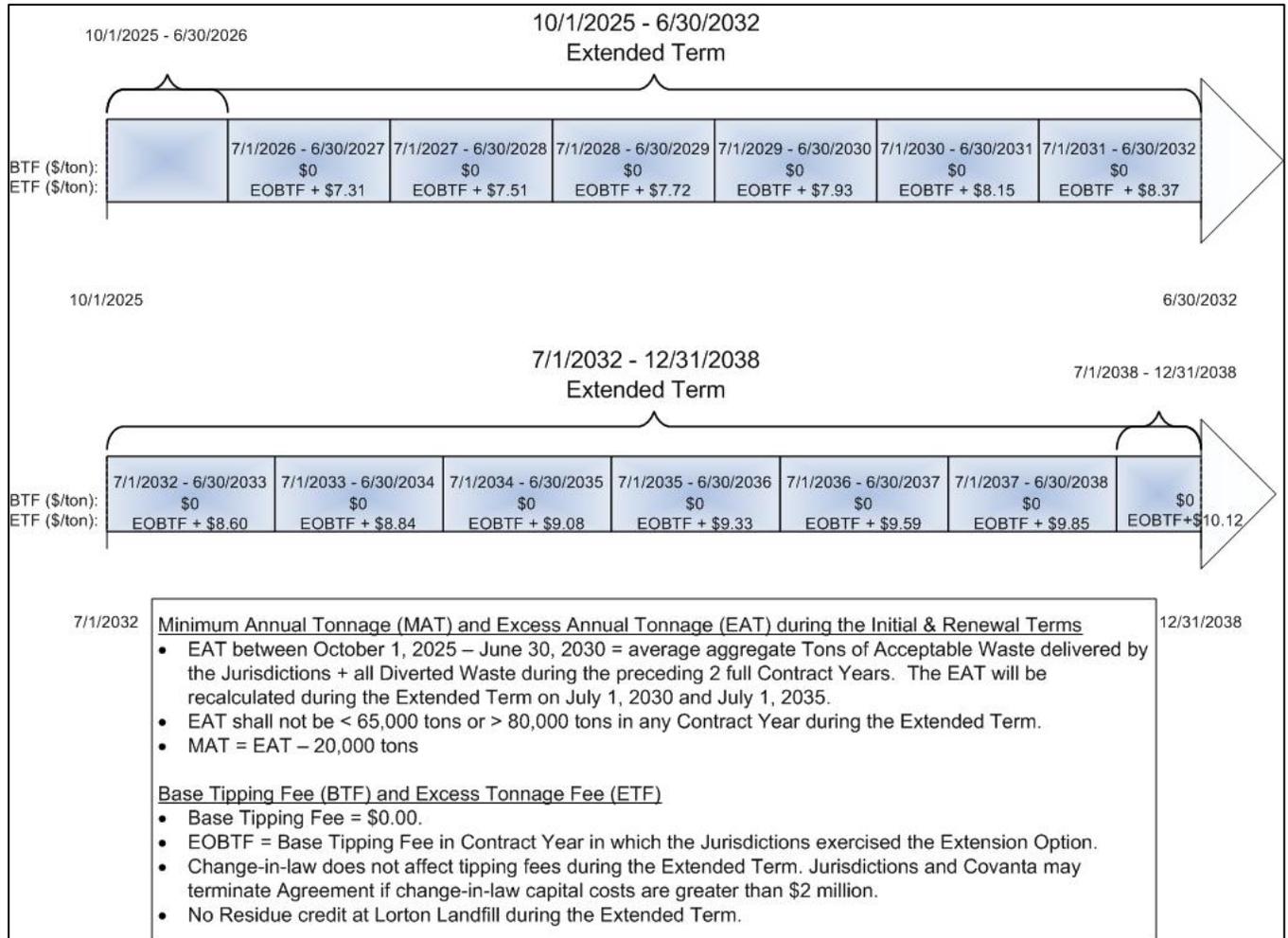
If the Jurisdictions exercise the Extension Option, the Extended Term begins on October 1, 2025 and ends on December 31, 2038. During the Extended Term, the base tipping fee for the Jurisdictions is \$0 per ton. There is no MAT. Instead, the EAT is calculated every five years and equals the average tonnage of waste delivered during the prior two years, and shall not be less than 65,000 tpy nor greater than 80,000 tpy. The EAT is calculated on October 1, 2025, July 1, 2030, and July 1, 2035.

Although the base tipping fee is \$0 per ton, an Excess Tonnage Tip Fee is to be paid by the Jurisdictions for MSW delivered above the EAT. The Excess Tonnage Tip Fee equals the base tipping fee when the Jurisdictions chose to exercise the extension option (which ranges from \$42.00 to \$71.14) plus an additional amount ranging from \$7.11 in Year 13 (October 1, 2025 to June 30, 2025), escalating annually to \$10.12 in Year 26 of the contract.

Should the Jurisdictions exercise the Extension Option, most of the change-in-law cost risks will be borne by Covanta. However, if a change-in-law necessitates a capital alteration or addition of a capital project that costs greater than \$2M, adjusted by the factor defined in the Agreement, both the Jurisdictions and Covanta have the option to terminate the Agreement.

During the entire Agreement, the Jurisdictions do not receive any benefits, nor encumber any risks related to future electricity prices, renewable energy credits or carbon credits, nor do they receive any revenues from ferrous materials recycled from the Facility. Key provisions of the Extended Term are shown in Figure 3-2 below.

Figure 3-2: Key Provisions of the Extended Term



3.4 Post-Extended Term

At the termination of the Agreement, ownership of the Facility reverts to the Jurisdictions. At that time, it is Covanta's responsibility to surrender the Facility and Improvements to the Jurisdiction in good order and condition, with the exception of reasonable wear and tear. At this point, the Facility will be approximately 50 years old and although the Facility is to be in "good order and condition," the remaining life of the Facility from that point onwards is unknown as the typical expected life for such facilities is estimated at 50 years.

**Economic Analysis of Covanta
Extended Term Agreement**

Evaluation of Waste Disposal
and Service Agreement

This Report does not make any evaluations after the Extended Term.

4. Baseline Assessment

To facilitate the decision making process, an understanding of current market conditions, Facility operations, and the potential strengths, weaknesses, opportunities and threats (SWOT) facing the Jurisdictions is reviewed. This section provides a summary of a market study conducted for the region, findings from the review of available operations monitoring reports for the Facility and a Facility site inspection, and findings from the conduct of a SWOT review of the Agreement including a workshop with the Jurisdiction's Facility Monitoring Group (FMG). These analyses, along with review of the Agreement in Section 3, were used to develop the three case scenarios selected for detailed evaluation in this Report.

4.1 Current Market Conditions

ARCADIS conducted a market study to estimate current and projected future MSW disposal capacity supply and demand, pricing trends and potential future market rates for MSW in the market area. A primary focus of the market study was potential disposal alternatives in 2019 to coincide with the early termination option in the Agreement available to the Jurisdictions. This section summarizes the findings of the market study. The full Market Analysis Memorandum is provided in Appendix B.

4.1.1 MSW Generation

The assessment of waste demand in the region was based on review of available published waste generation data including information compiled by the Northern Virginia Regional Commission (NVRC). According to the NVRC, the City of Alexandria and Arlington County together produce approximately 10 percent of the post-recycling waste generated in the Metropolitan Washington Region (MWR), which includes selected jurisdictions in Northern Virginia, Suburban Maryland, and the District of Columbia. The estimated post-recycling waste generation in the MWR is approximately 2.7 million tons in 2013. Using an overall waste generation annual growth rate of 0.5 percent and targeted average recycling/diversion rates for Virginia, Maryland and the District of Columbia, post-recycling waste generation are conservatively projected at 3.2 million tons in 2038.

The waste generation projections compiled by the NCRV show a general decrease in waste generation and disposal requirements over the next 20 years based on population projections provided by the Weldon Cooper Center for Public Service, historic trends and anticipated increases in recyclable material recovery. Waste

generation in the Jurisdictions, however, is not projected to decline primarily due to increasing population as presented in Section 2 of this Report.

In estimating the available supply of MSW in the region, post-recycling waste generated in jurisdictions with anticipated long-term waste disposal capacity was excluded. The resulting estimated post-recycling waste stream generated in the area ranges between 1.0 million and 1.2 million tons per year over the 2038 planning period.

4.1.2 MSW Disposal Capacity

A review of the NVRC projections regarding disposal capacity in the MWR indicates that current local disposal capacity exceeds the quantity of post-recycling waste requiring disposal (waste supply). Approximately 60% of waste generated in region is disposed at one of three waste-to-energy (WTE) facilities (Covanta Alexandria/ Arlington, Covanta Fairfax, Covanta Montgomery County) or three public landfills (Prince William, Loudoun, or King George Landfill). These local landfills, however, have limited capacity; and unless additional local capacity is constructed, waste will need to travel further for disposal.

To assess the viability of potentially available disposal facilities for the Jurisdiction within the timeframes of the Jurisdictions' decision making process relative to its Agreement with Covanta, a desk-top analysis of MSW disposal facilities within the 100-mile straight-line radius of the Facility was conducted.

Five WTEs operating within a 100-mile radius of the Facility were identified. With the exception of the Facility, none of these facilities offer sufficient daily disposal capacity at this time, nor would proposed or planned new capacity reliably at this time become available by 2019. One exception may be the Covanta I-95 Energy and Resource Recovery Facility (E/RRF); however this facility is also owned and operated by Covanta.

Five transfer stations were identified including two private transfer stations in the District of Columbia (owned and operated by Waste Management, Inc. and Progressive Waste, Inc.), the District of Columbia's Benning Road and Fort Totten Transfer Stations, and the Fairfax County I-66 Transfer Station. Both the District of Columbia and Fairfax County's transfer capability currently have operating capacity available for the annual amount of MSW sent to the Facility by the Jurisdictions on an annual basis.

Ten landfills were identified, all in Virginia and Pennsylvania. Landfills in close proximity to the Jurisdictions are few, and of those none are without question regarding potential future available disposal capacity. While sufficient disposal capacity exists at landfills within the search area, transportation (in some cases distances up to approximately 150 miles one-way) is required.

There are limited or few other operating facilities that provide for the processing and/or disposal of MSW in the MWR. There are no known mixed waste material recovery facilities (MRFs) in the study area.

4.1.3 Market Pricing

A market cost analysis was conducted to estimate transportation and disposal costs for the Jurisdictions to access potentially available disposal facilities identified in this study. Market cost assumptions were applied to eight landfill facilities expected to be accessible by the Jurisdictions (the Loudoun County and Prince William County landfills, which may only be accessible to the Jurisdictions through specific inter-jurisdictional agreements, were excluded from further consideration). A summary of the market cost analysis for landfill disposal is provided in Table 4-1 below.

Table 4-1: Summary of Market Cost Analysis - Landfill Disposal

Facility	City	State	Map Code ⁽¹⁾	Permitted Daily Capacity	Reported Remaining Life ⁽²⁾	Tip Fee (\$/ton) ⁽³⁾	One-way Distance ⁽⁴⁾	Transport Cost (\$/ton) ⁽⁵⁾	Total Cost (\$/Ton)
Cumberland County Landfill	Shippensburg	PA	PA-16	1,350	20+	\$80	130	\$33	\$113
IESI Blue Ridge Landfill	Chambersburg	PA	PA-23	1,500	15+	\$66	110	\$28	\$94
Modern Landfill & Recycling	York	PA	PA-35	648	4+	\$62	122	\$31	\$93
Mountain View Reclamation Landfill	Upton	PA	PA-38	700	2+	\$65	107	\$27	\$91
Charles City County Landfill	Charles City	VA	VA-33	1,193	5+	\$42	125	\$31	\$73
King & Queen County Landfill (South Atlantic Inc.)	Little Plymouth	VA	VA-54	4,500	10+	\$25	143	\$36	\$61
King George County Landfill & Recycling Facility	King George	VA	VA-55	6,000	15+	\$32	57	\$17	\$49
Old Dominion Landfill	Richmond	VA	VA-67	3,000	10+	\$30	110	\$28	\$58

Notes:

1. Map Code cross-references to Figure 2.
2. Reported remaining life refers to reported current permitted capacity. New capacity development is anticipated.
3. Tip fees based on stated rate schedules or discussions with facility operators.
4. One-way distance derived using MapQuest.
5. Transport Cost - assumed average transfer trailer load of 18 tons.
6. Total Cost - sum of Tip Fee and Transport Cost.

As illustrated in Table 4-1, the per ton market cost, in 2013 dollars, ranges from approximately \$49 per ton to over \$110 per ton. There is a clear separation of market rates for facilities in Virginia and those in Pennsylvania. For Virginia facilities, per ton market costs are estimated to range from \$49 per ton to \$73 per ton.

A limited comparison of estimated market costs to the Jurisdictions' current contracted disposal costs under the Agreement was conducted, with escalation of tipping fees over the course of the Agreement. This comparison is presented in Table 4-2 below and indicates that the Jurisdictions' scheduled costs under the Agreement are below or at the low end of the projected market cost range. It is also noted that several important factors that introduce uncertainty in long-term market cost projections include fuel cost

variability, changes in supply and demand, length of contract (short-term versus long-term), and infrastructure needs and associated capital cost.

Table 4-2: Comparison of Costs: Agreement vs. Market

Year	2013	2019 ⁽¹⁾	2025 ⁽²⁾
Agreement ⁽³⁾	\$43.16-\$48.30	\$60.46-\$66.51	\$0-\$76.16
Market Cost ⁽⁴⁾	\$49-\$73	\$58-\$88	\$70-\$105
Notes:			
1. Range presented assumes Extension Option not exercised prior to 2019; Renewal Term continues.			
2. Range presented assumes Extension Option exercised in 2024.			
3. Cost range representative of the Jurisdictions' Base O&M Fee and Excess Waste incremental charge. Escalated per the Agreement.			
4. Estimated Market costs (see Appendix B, Table 3) are escalated at an assumed annual rate of 3.0 percent. Market costs representative of selected facilities in Virginia only.			

4.2 Assessment of the Facility

ARCADIS visited the Facility on July 10, 2013 to assess the condition, location, operation, and maintenance of the Facility and reviewed historical facility performance including the past three years' Facility Reports, prepared by HDR. These reports have consistently concluded that the Facility is well operated and maintained. The Facility, at the time of our visit, was observed to appear clean and well maintained. Covanta reported maintenance activities and frequencies similar to other facilities including, but not limited to semi-annual Facility outages with intermediate hydroblast cleaning of the boilers on an as-needed basis. Furthermore, data in the HDR Facility Reports show that the Facility's preventive maintenance, coupled with maintenance overhauls, has resulted in a well-run Facility, as verified by such leading indicators as availability, number of unscheduled shutdowns, and good air pollution control system performance. A memorandum further detailing key observations of the site visit is provided as Appendix C.

Based on observations and discussions from the site visit and review of the Facility Reports, the following findings were included in the financial model used to evaluate the case scenarios.

- Although the Facility is in very good condition, capital investment will be required to extend the life to 2038. It is anticipated that such life extension costs will be on the order of approximately 15-25% of the replacement cost

new of the Facility. The financial analysis assumes approximately \$43 million or 20% of the estimated replacement cost of the Facility.

- Significant air pollution control upgrades were completed in 1998, however, additional upgrades are anticipated to be required to address continued implementation of more stringent air emission limits. It is anticipated that some type of upgrade to address increased regulatory requirements, will be required within the next 10-15 years.
- The Facility's boilers are capable of producing steam in excess of the steam permit limitation. There may be potential at the Facility to increase the permit limit, thereby increasing processing capacity and improving economies of scale.
- Covanta indicated an anticipated life of 60 years, however, based on equipment vendors' opinion and prudent industry practice, for the purposes of the financial analysis, a typical 50 year facility life is assumed.
- Alexandria ReNew and Covanta are discussing a reuse water program. It is possible that the Facility, within the next 5-10 years, will be able to substitute reuse water for potable water for cooling towers which could reduce future water costs.
- Covanta appears to be accepting a growing amount of "special" wastes which garner premium tip fees and as such, the model will assume continuation of this practice to enhance revenues.
- Due to space limitations at the Facility site it is not anticipated that any significant additions/improvements to enhance operations will be implemented at the Facility Site.

4.3 SWOT Analysis of the Agreement

The SWOT analysis is a tool to identify the strengths, weaknesses, opportunities, and threats presented in the Agreement. The SWOT analysis was conducted to facilitate the identification and development of alternatives for the disposal of Jurisdictional waste that warrant further investigation and economic evaluation under this study.

The strengths and weaknesses presented below generally represent factors that are governed by the Agreement. Understanding them sets the stage for identifying opportunities that the Jurisdictions may want to explore to build on strengths and mitigate weaknesses. The opportunities and threats presented below generally relate to external factors. Understanding opportunities and threats set the stage for managing potential barriers to implementation and establishing direction. The primary strengths, weaknesses, opportunities and threat factors identified are presented in Table 4-3 below.

Table 4-3: Strength, Weakness, Opportunity, and Threat Factors

Strengths	Weaknesses
<ul style="list-style-type: none"> • Long-term disposal capacity (single-family residential customers) • Cost certainty • No changes to current system • Flexibility – commitment adjustable • Minimum administrative requirements • Below market rate for single-family residential customers • Extended Term flexibility for Excess Waste 	<ul style="list-style-type: none"> • Contractual benefit for single-family residential and grandfathered commercial customers only • Excess waste cost risk • Delays return of Facility from 2025 to 2038 (requires extension of Site Lease beyond 2025) • Limited access to competition
Opportunities	Threats
<ul style="list-style-type: none"> • Renewal Term Option <ul style="list-style-type: none"> ◦ Access Market July 2019 (renegotiate) ◦ Renew • Do not exercise Extension Option: 2025 – Leverage Facility asset with: <ul style="list-style-type: none"> ◦ Commercial customers ◦ Regional partners ◦ Operate, Lease or Sell Facility • Exercise Extension Option: <ul style="list-style-type: none"> ◦ Realize Extended Term cost savings ◦ Leverage system fee for expanded recycling programs • Expand solid waste program • Exit waste disposal business 	<ul style="list-style-type: none"> • Long-term commitment <ul style="list-style-type: none"> ◦ Commodity values, inflation, unknowns ◦ Regulatory/capital requirements ◦ Replacement disposal capacity if CA/A closes • If Extension Option not exercised prior to 2019: <ul style="list-style-type: none"> ◦ July-Dec 2018 – either Party can choose not to extend ◦ Renewal Term Tip Fee increase in 2019 ◦ If no Renewal Term – Market rates • If Extension Option Exercised: <ul style="list-style-type: none"> ◦ Merchant waste competition ◦ Changing Market conditions ◦ Potentially disincentives' recycling • Public opinion/Political pressures Change in law in excess of \$2M (Covanta has right to terminate)

4.3.1 Strengths

The most significant strength of the Agreement is the assurance of long-term MSW disposal capacity for the Jurisdictions' waste collection customers at a known cost. The tipping fee is essentially set, limiting future financial risk. The base tipping fee is expected to be below market rate throughout the term, as previously discussed. The Jurisdictions have flexibility in the contract term including the option of not entering into Renewal Term in 2019 as well as the option of extending the Agreement through 2038. During the Initial and Renewal Terms, the Jurisdictions' MSW commitment is also

flexible, adjustable by plus or minus 5,000 tons annually. During the Extended Term, should the Jurisdictions exercise the Extension Option, the EAT is recalculated every five years, based on an average of the MSW tonnages for the previous two years. However, the EAT shall not be less than 65,000 tpy nor greater than 80,000 tpy. In addition, if extended, the Jurisdictions exposure to change-in-law risk is mitigated. Lastly, there are no changes to the current waste disposal system for the Jurisdictions thereby minimizing any customer or administrative changes.

4.3.2 Weaknesses

Weaknesses of the Agreement potentially include risks associated with being locked into a long-term contract with a guaranteed annual commitment and costs for excess waste disposal. Although disposal capacity is assured for a MAT of 50,000 tons (adjustable +/- 5,000 tons annually) starting in 2013, this assured capacity will only benefit primarily single-family residential customers. The Jurisdictions will be limited in their ability to expand services to multi-family residences and/or private commercial customers. If the Agreement enters the Extended Term, the Jurisdictions will postpone return of the Facility and Facility Site from 2025 to 2038.

4.3.3 Opportunities

Opportunities present themselves at three key periods during the Agreement. Exercising the Extension Option is the first opportunity for the Jurisdictions. By exercising this option, the Jurisdictions can take full advantage of the cost savings opportunity through the end of the Extended Term in 2038. The Jurisdictions can also leverage the cost savings to support expanded recycling programs.

If the Extension Option is not exercised, opportunities also present themselves at the end of the Initial Term and at the end of the Renewal Term. Towards the end of the Initial Term, during a six-month period from July 1, 2018 to December 31, 2018, both parties have the opportunity to terminate the Agreement before entering the Renewal Term on July 1, 2019. This presents an opportunity to renegotiate the terms of the Agreement based on current market conditions.

Assuming both parties agree to continue into the Renewal Term, when the Agreement and Facility Site Lease terminate at the end of Renewal Term in 2025, ownership of the Facility will revert back to the Jurisdictions. At this time, the Jurisdictions have the opportunity to leverage the Facility by operating, leasing or selling the Facility; or by expanding services to commercial customers or regional partners.

4.3.4 Threats

Threats generally arise from unknown external factors associated with the long-term nature of the Agreement. These threats change depending on the Jurisdictions' decision of whether to exercise the Extension Option. If the Extension Option is not exercised by the Jurisdictions prior to July 1, 2018, Covanta has the opportunity to choose not to extend the Agreement into the Renewal Term. If both parties agree to extend into the Renewal Term, tipping fees increase by more than \$10 per ton in July 2019. However, if either party chooses not to extend to the Renewal Term, the Jurisdictions will likely be subject to market rates for MSW disposal which may be higher than the rates in the Agreement and potentially the additional cost of accessing regional transfer stations.

If the Agreement is extended into the Renewal Term and the Extension Option is exercised, potential arises for other threats as the Jurisdictions near the end of the Agreement in 2038. Competition for capacity at the Facility may come from other merchant haulers; or market conditions may be better than those locked in place by the Agreement. As recycling rates increase in the Jurisdiction, the goal to maintain the MAT may disincentivize recycling efforts. While the Jurisdictions are protected from change-in-law costs that may affect the tipping fee, Covanta also has protection with the ability to back out of the Agreement if change-in-law capital costs exceed \$2 million. The return of the Facility and Facility Site is delayed from 2025 to 2038. The Facility must still be returned in working order less normal wear and tear, but will likely have reached its anticipated useful life unless additional investment is made to extend the life.

The following future unknown factors, presented in no particular order, can also impact the decision making process:

- Value of the Facility and Site in 2025 and 2038.
- Changes in solid waste management and market conditions including long-term viability and availability of disposal capacity and quantities of MSW requiring disposal.
- Regulatory and capital improvement requirements.

- Public opinion and political pressures, such as local government legal obligations to all customers.¹
- Back-up disposal capacity/catastrophic event management.
- Other potential technical, environmental, institutional, and financial impacts.
- New opportunities and compatibility with changing operations.

4.3.5 Priorities

A workshop was conducted on June 12, 2013 to review and discuss the various SWOT factors to obtain an understanding of those factors which present significant concern and those which are of less concern. The findings from this workshop identified that securing economically-viable and environmentally-friendly long-term disposal capacity for the MSW currently collected by the Jurisdictions was of top priority and concern to the Jurisdictions as this was the original mission established by the Jurisdictions when they were tasked with negotiating the Agreement. The strengths of the Agreement are not by accident. The strengths specifically align with the original mission and goals for negotiating the Agreement.

Changes to disposal practices were of secondary concern. Disposal costs that are within the range or lower than market rates are desired. The delay in the return of the Facility to 2038 is of concern but balanced with the reduction in Facility operating liability. The disposal of waste outside of the Jurisdiction boundaries while the Jurisdiction still hosts an operating Facility is a significant negative, but potentially acceptable on a short-term basis. Long-term unknowns and risks are also of concern. While the Jurisdictions are generally risk adverse, they are willing to weigh potential opportunities to evaluate risks and to take action to minimize risks.

Concern regarding the fact that the existing Agreement only secures disposal capacity for MSW collected by the Jurisdictions was discussed at length. These concerns included but were not limited to historic and potential continued controversy regarding challenges to waste flow control, private sector desire to limit Jurisdictional involvement in solid waste collection and disposal, and potential for residential waste subsidizing private sector costs. Ultimately, the lack of guaranteed capacity for privately collected waste was not identified to be of a significant concern as clear direction was provided

¹ The Code of Virginia (Section 10.1-1411 and VA Regulations for SWMP (9 VAC 20-130-10) give statutory authority, regulatory responsibility and accountability to local governments for planning and handling of all types of non-hazardous solid wastes.

to specifically focus on the portion of the waste stream currently in direct control of the Jurisdictions (i.e. the MSW collected by the Jurisdictions primarily from single-family residents).

5. Review of Alternatives

The Jurisdictions have an important decision to make regarding when and if they should exercise the Extension Option under the existing Agreement. While it has already been determined that the new Agreement and the Extension Option provides significant savings to the Jurisdictions over market rates, questions remain regarding the potential costs and risks of rights afforded the Jurisdictions under the Agreement, as well as the impact of the timing of any such decisions. If the Jurisdictions decide not to exercise the Extension Option, they must decide how else to manage the waste. Figure 5-1 presents a decision matrix illustrating decision points and time frames. As illustrated in Figure 5-1, alternatives include, but are not limited to:

- Exercise Extension Options:
 - Exercise extension to 2038 during the Initial Term
 - Exercise extension to 2038 during the Renewal Term

- Do Not Exercise Extension Options:
 - Negotiate New Terms with Covanta (terms to be determined)
 - Go to Market for 2019-2025 then:
 - Own/Operate Facility
 - Sell/Lease Facility
 - Close Facility

The above represent both short-term and long term alternatives. However, in addition to the alternatives listed above, several sub-variations exist, each with their own risks, benefits, and costs. Some of the most critical factors impacting the economics of alternatives include:

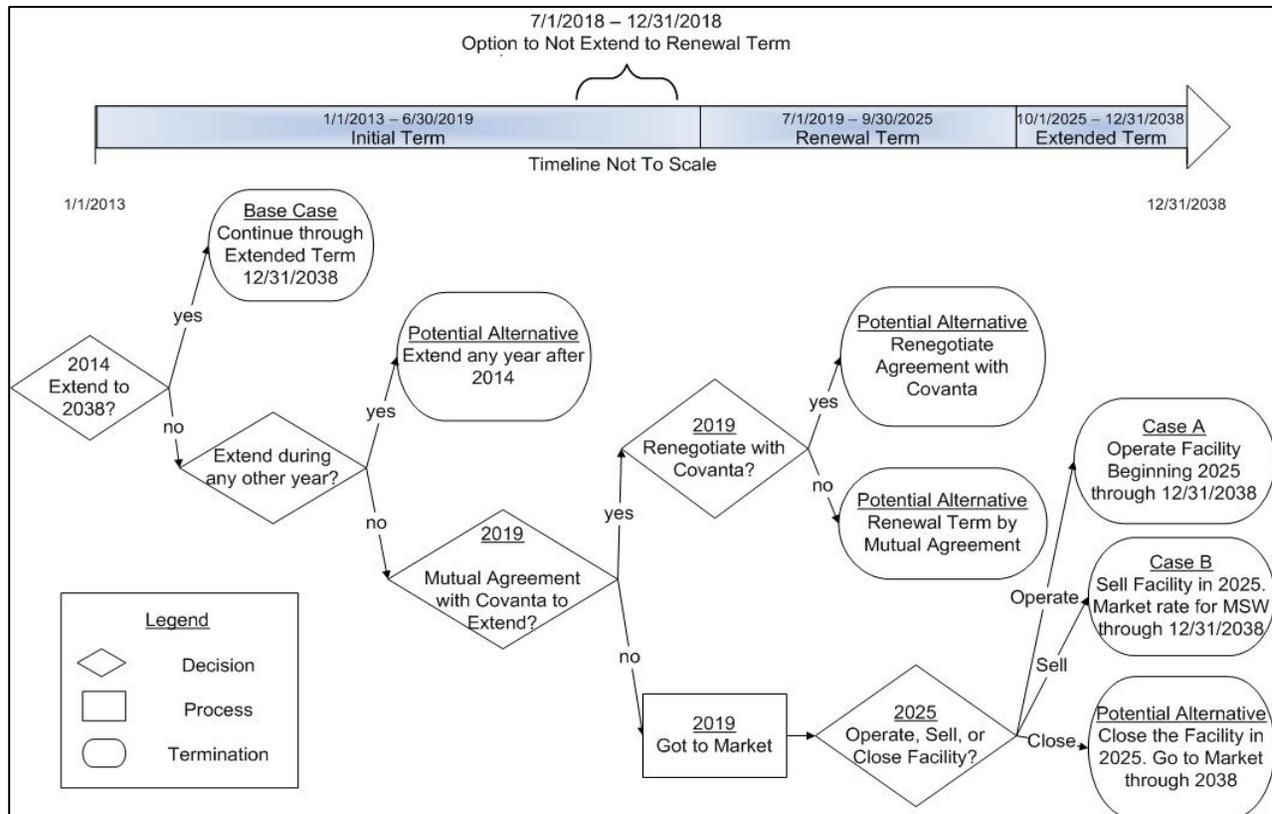
- Disposal alternatives and costs during the period of 2019 and 2025. These costs can vary from the current rate of \$43.16 to more than \$100 per ton if waste must be direct hauled to an out-of-Jurisdiction transfer station and then transferred and long-hauled to landfill.
- Facility energy production and prices. Energy revenues offset a significant portion of the operating costs of the Facility. Low and high energy projections can easily vary by more than 5 cents per kWh by 2025. A differential in energy price of \$0.05 per kWh amounts to \$22 per ton for each ton of waste processed at the Facility.
- Availability of waste and market rates. Recycling in the region continues to increase resulting in downward pressure on the quantity of waste requiring disposal. At the same time, some landfills in the region are nearing capacity.

Market rates for solid waste will be dependent on supply and demand in the region, as evident from historic operations, and can vary substantially from current projections.

The risks, benefits, and costs associated with pre-2025, short-term alternatives and post-2025, long-term alternatives are discussed further in the Evaluation of Alternatives and Assumptions Memorandum, Appendix D.

Based on the baseline assessment, market study, SWOT analysis, conference calls, and a series of workshops on June 12, 2013 and July 23, 2013 with Jurisdiction representatives, three key case scenarios were selected for a detailed financial evaluation and comparison. The purpose of this section is to present an overview of these case scenarios and why they were selected. This section also includes a discussion of the alternatives not selected for further evaluation at this time.

Figure 5-1: Decision Tree of Agreement Alternatives



5.1 Case Scenarios Selected for Detailed Evaluation

The following scenarios were selected for further evaluation at this time:

- Base Case: Exercise Extension in 2014
- Case A: Go to Market in 2019, Operate Facility Beginning 2025
- Case B: Go to Market in 2019, Sell Facility Beginning 2025

5.1.1 Base Case - Exercise Extension in 2014

The Jurisdictions can exercise the extension of the Agreement to 2038 at any time between now and 2025, subject to the terms and conditions of the Agreement. The earlier the extension is exercised the greater the savings under the existing Agreement, since the execution of the extension serves to lock in the then current rate. As such, for the purposes of this scenario, exercising the extension in 2014 was selected as it serves to maximize the savings under the existing Agreement and also eliminates the risk of Covanta potentially backing-out of the Agreement for which Covanta has that option between July 1 and December 31, 2018. While several other advantages and disadvantages exist, a financial evaluation of this primary option was conducted to serve as a basis for comparison with Case A and Case B. The potential impact of delays in exercising the extension, however, was quantified and is discussed in subsequent sections of this Report.

5.1.2 Case A - Go to Market in 2019, Operate Facility Beginning 2025

Case A assumes that the Jurisdictions do not exercise the extension during the Initial Term, and the parties do not agree to the Renewal Term (i.e., Covanta opts to back out of the Agreement in 2018). It is assumed that Covanta is neither interested in negotiating new terms nor will they accept Jurisdiction delivered waste to any of its facilities. Consequently, it is assumed that the Jurisdictions will need to haul their collected MSW for ultimate disposal at an alternate disposal facility during the period of July 1, 2019 through September 30, 2025, until the Jurisdictions can take back operations of the Facility on October 1, 2025.

There are a limited number of landfills with available capacity within a 50 mile radius of the Jurisdictions. However, there is expected to be ample available capacity within a 100 mile radius. A transfer station will be required to economically access an alternate disposal facility. Currently, there are no permitted MSW transfer stations in the Jurisdictions' service area, although there are permitted construction and demolition debris transfer station and recycling facilities. The nearest existing permitted MSW

transfer stations with capacity to accept the Jurisdictions' waste is located in Washington DC. While it is possible for a private contractor to permit and develop a transfer station within the Jurisdictions' service area prior to 2019, Case A assumes the use of existing transfer stations in Washington DC for the Jurisdictions' collected waste and ultimate disposal in a landfill for the period of July 1, 2019 to September 30, 2025.

While it is possible for the Jurisdictions' waste to continue to be disposed at the Facility under a potential private contractor account or through negotiations with Covanta, Case A is based on a conservative option that is within the Jurisdictions' control. The parties recognize, however, that it is likely that the costs for disposal during the period of 2019 and 2025 have a greater opportunity of being less than estimated vs. greater than estimated, and this is reflected in the risk analysis. A specific sensitivity analysis, however, was conducted to quantify potential savings if the Jurisdictions are able to continue to dispose of waste at the Facility based on the rates established in the Agreement (Renewal Term rates) should the parties agree to the Renewal Term under the Agreement.

Upon transfer of ownership and operations back to the Jurisdictions on October 1, 2025, the Jurisdictions' collected waste will be processed at the Facility. It is assumed that the Jurisdictions will conduct a procurement to secure a contract operator for the Facility. The Jurisdictions likely would be able to allocate certain performance based risks of operations to the contract operator based on the negotiated terms of the agreement, but would also likely retain capacity, capital improvement, change-in-law, unforeseen circumstance and other typical Facility ownership risks.

The Jurisdictions' collected waste currently represents about 17% of the processing capacity of the Facility. The Facility will need to run close to capacity to maximize its economic benefits. This will require the marketing of approximately 280,000 tons of MSW to fully utilize the available capacity of the Facility. As such, the financial analysis for Case A is based on the assumption that the Jurisdictions will establish below market gate rates at the Facility to provide for economic waste flow control to maximize the Facility's capacity utilization. Commercial customers/non-Jurisdictional collected waste generated in the service area will pay the established gate rate.

5.1.3 Case B - Go to Market in 2019, Sell/ Long-Term Lease Facility in 2025

This scenario is similar to Case A. However, it is assumed that the Jurisdictions choose to sell the Facility and Site in 2025 instead of operating the Facility. The sale of the Facility serves to limit the Jurisdictions future liability for the Facility and provide the

Jurisdictions with a purchase price for the assets. It is anticipated that as a condition of the sale, the purchaser will be required to continue to operate the Facility through 2038, as the continued use of the Facility for processing waste is anticipated to represent the highest and best use of the Facility and Site. The Facility will continue to accept the Jurisdictions' collected waste for disposal at then current market rates. Case B also assumes that the proceeds from the sale will be deposited into a sinking fund for the Jurisdictions' collected waste and will be used to offset disposal costs for Jurisdiction collected waste.

A summary of the relevant risks and benefits associated with the selected scenarios is presented in Table 5-1 below.

Table 5-1: Risks, Benefits, and Costs of Alternatives

Alternative	Risks	Benefits	Cost
Base Case: Exercise Extension during Initial Term	<ul style="list-style-type: none"> Loss of asset control Potential loss of asset value as Facility may be at its useful life by 2038 	<ul style="list-style-type: none"> Cost certainty Immediate savings Insulated from market No impact to current System Facility returned in working order 	<ul style="list-style-type: none"> Agreement tipping fees are below market rates Minimizes future cost risks
Case A: Go to Market in 2019, Operate Beginning 2025	<ul style="list-style-type: none"> Fuel/transportation cost risk 2019-2025 Multiple contracts Owner/operator risks <ul style="list-style-type: none"> Facility compliance Commodity prices Regulatory/Capital Additional Jurisdictional staff for oversight Public/political risks Limited competition for contract operators Change in law costs Availability of waste Lack of cost certainty 	<ul style="list-style-type: none"> Facility ownership 2025 Opportunity to re-evaluate programs Increased control Capacity for non-residential Jurisdictional waste Risk allocation 	<ul style="list-style-type: none"> Capital requirements Procurement of operator Operation and maintenance cost Organizational / administrative cost Cost dependent on Facility revenues/market conditions which are subject to change
Case B: Go to Market in 2019, Sell Facility in 2025	<ul style="list-style-type: none"> Fuel/transportation cost risk 2019-2025 Multiple contracts Buyers / purchase price Public/political risks Lack of cost certainty Loss of Facility Site 	<ul style="list-style-type: none"> May avoid delivery commitment Asset sale cash infusion Opportunity to re-evaluate programs Risk transfer 	<ul style="list-style-type: none"> Capital requirements Procurement of purchaser Transaction costs

5.2 Additional Potential Alternatives

The following presents a summary of several additional alternatives available to the Jurisdictions. These alternatives, however, were not selected for detailed financial evaluation at this time either because they do not currently align with the mission, goals and objectives established and reviewed as part of the Baseline Assessment or a variation of the alternative is easily assessed based on and subsequent to the findings of the three case scenarios that were selected for evaluation.

5.2.1 Exercise Extension During Any Other Year of Initial Term

During the Initial Term, the Jurisdictions have the unilateral right to extend the Agreement to 2038. Furthermore, exercising the extension locks in the then current disposal rate through 2025, providing for immediate savings. As such, the earlier the extension is exercised the greater the savings. The greatest savings, however, occurs after 2025 when the disposal rate for the base tons drops to zero. This zero dollar base rate is the same regardless of when the extension is exercised. As such, exercising the extension in FY 2014, versus any other year of the Initial Term, was selected for evaluation as the base case since the current study is being conducted at this time (in 2013). This allows the Jurisdictions to take advantage of maximizing savings under the Agreement. A separate table summarizing the cost impact of exercising the extension during any other year of the Initial Term is provided in Section 6 of this Report to address the other alternative extension dates. Delaying the extension to 2018 is projected to result in a loss of savings of approximately \$2 million in today's dollars.

5.2.2 Renewal Term by Mutual Agreement

If the extension is not exercised during the Initial Term, the Jurisdictions still have the option of exercising during the Renewal Term. However, the Jurisdictions would no longer have the unilateral right to extend, as the extension is subject to Covanta mutual agreement during the period of July 1, 2018 to December 31, 2018. In addition, the base disposal fee would increase to more than \$60 per ton (an increase of more than \$10 per ton) during the first year of the Renewal Term, if the extension is not already exercised during the Initial Term. Waiting to extend during the Renewal Term introduces uncontrollable risk since a) the extension is subject to Covanta agreement and b) this alternative would still require the Jurisdictions to develop a "back-up" plan should Covanta not agree to extend. This alternative was not selected for evaluation at this time because an understanding is first required of the "back-up" plan and because Covanta may not be willing to enter into the Renewal Term. Case scenarios A and B discussed above serve to provide an analysis of the potential cost of a "back-up" plan. In addition, a separate calculation was conducted to quantify the anticipated cost differential between the potential "back-up" plan and Renewal Term costs. This is discussed in the subsequent section of the Report.

5.2.3 Negotiate New Terms/Agreement with Covanta

The Jurisdictions have the option to not extend and potentially negotiate/renegotiate a new agreement with Covanta. This may be warranted should new information or

changes in market conditions occur that would provide the Jurisdictions with additional leverage that did not exist at the time the Agreement was negotiated. The findings of the market analysis currently indicate that the existing Agreement's rates are less than market rates, thereby providing Jurisdictions with little negotiation leverage unless significant changes such as to the term of agreement or guaranteed annual tonnage is also reevaluated. In addition, the results/potential impacts, if any, of long-term disposal plans for key adjacent communities including Fairfax County, District of Columbia, and Prince George's County remain largely unknown as these communities are also in the state of re-evaluating their long-term solid waste management opportunities' and costs. While some new information regarding cost saving enhancements implemented by Covanta since execution of the Agreement have been identified, and some additional potential for cost savings exist, they do not warrant a reopening of the Agreement at this time. As such, it was agreed that this alternative will not be evaluated at this time due to the unknowns, but may be evaluated at a later date depending on the findings of the current study and as new information becomes available.

5.2.4 Close Facility

The Jurisdictions have the option of closing the Facility in 2025. Closing the Facility in 2025 would require the transfer and disposal of Jurisdiction MSW at an alternate facility. In 2009 the City of Alexandria commissioned a special study in response to land use and business operating debates in the Eisenhower West area. The 2009 Industrial Use Study, jointly prepared by Bay Area Economics (BAE), HDR, and MACTEC Engineering, explored various economic questions concerning four industrial uses in the West End section of the City, including the Facility Site. The study identified that significant hurdles to the area's redevelopment exist and that issues regarding if the benefits of redevelopment have a greater value to the City than the maintenance of an industrial zone need to be addressed. Specific to the Facility, the Study identified that the Facility is a resource that provides a vital municipal service and represents a significant investment on the part of the Jurisdictions. Lastly, the closure of the Facility prior to 2038 is not consistent with the mission, goals, objectives and direction previously provided to the FMG. Based on these findings and the lack of other disposal facilities within the Jurisdictions' boundaries, the evaluation of this alternative is not being considered at this time.

6. Financial Analysis

A dynamic Microsoft Excel based financial proforma was developed for each of the three case scenarios selected for further evaluation to address the numerous variables that exist. The proforma was developed to model the annual revenue and expense of each case scenario over the planning period. @Risk™ software was also used to conduct a financial risk analysis of the proforma findings. This information was then utilized to calculate the resulting net cost per ton of Jurisdictional collected waste for each year of the planning period as well as the total net present value (NPV) cost of each scenario in today's dollars. A comparison of the findings was then conducted to facilitate the development of recommendations regarding if and when to exercise the extension option under the Agreement.

The planning period selected for the evaluation runs from FY 2014 through FY 2038 to coincide with the anticipated life of the Facility (50 years) and the potential extended term of the Agreement (December 31, 2038). The cost estimates are based on managing only that portion of the post-recycling MSW collected by the Jurisdictions primarily from single-family residential establishments.

The following subsections provide an overview of the financial modeling approach used to conduct the analysis, the assumptions used to populate the financial models and the findings of the financial evaluation.

6.1 Financial Model Approach

As in most situations, over the short-term it is much easier to reliably project outcomes than in the long-term. Over the long-term additional variables that are outside of a communities' control increasingly come into play. To assist in evaluating the potential long-term risks due to factors outside of the Jurisdictions' control, @Risk™ software was utilized to incorporate probabilistic modeling into the dynamic financial model of case scenarios to help to quantify potential financial risks. The @Risk™ software provides for the use of Monte Carlo simulation techniques to provide a range of multi-year cost estimates for each alternative and the probabilities associated with those estimates. Monte Carlo simulation methods are especially useful for conducting analyses that include numerous related variables because the simulation takes each variable's uncertainty into account. The output from such simulations provides the likelihood of an outcome and the level of risk associated with each outcome.

Key variables that could most impact future performance including waste flow, energy pricing, capital investment needs, Facility performance, contracted facility operation and maintenance costs, escalation factors and market rates were assigned a range of values and probabilities based on our professional judgment established in developing financial models for solid waste facilities; our solid waste engineering expertise; and resources, data, and input available from a variety of sources including the Jurisdictions and their consultant HDR.

These key variables were given a range of possible values instead of one single value and each value in the range was assigned a likely probability. The simulation runs thousands of iterations for each case, with the computer choosing a value for each variable from among the specified range of values in each iteration, based on the probability assigned to that value. The simulation compiles the results and produces a range of costs with a given probability, such as: “90% probability that the cost will be \$45 per ton.” A graphical output providing a trend analysis of the potential range in the net cost per ton and the most probable cost per ton provides for an assessment of the financial risk in any given year of the planning period.

6.2 Financial Model Inputs

Appendix E to this Report provides a table of the financial model inputs utilized to evaluate the case scenarios and their likely ranges in value. Presented in this Appendix is a “low,” “proforma,” and “high” value for the key input variables, along with an explanation for how the ranges were chosen. Those variables are shaded and highlighted in bold type, including but not limited to such factors as waste generation, facility availability, market rates, energy sales, operation and maintenance costs, capital requirements and inflation rates, were identified as being outside the control of the Jurisdictions and as having a potential significant financial impact on the financial analysis. As such, these values were used to run the @Risk™ analysis portion of the analysis.

It is noted that a change in the ranges and the probability curve associated with each variable will result in a change in the distribution outputs of the analysis. It is believed, however, that the ranges selected are a reasonable assessment of the potential risks associated with the key variables. To the extent possible these inputs were consistently applied for all alternatives and scenarios to better allow for common comparisons.

6.3 Financial Model Outputs

The following subsections provide a discussion of the three case scenarios selected for evaluation and presents the key financial model outputs associated with each. The outputs include the financial proforma findings and a trend graph that illustrates the range of estimated tipping fees over the planning period when taking into account the range in variables discussed above and presented in Appendix E. The solid yellow line on each of the graphs presents the mean or average value of the iterations, while the dashed blue line presents the proforma results. The red band represents output falling within a standard deviation of the mean trend value 90% confidence limit and the green band presents the 90% confidence range including the values contained within range for one standard deviation.

Also provided for each of the case scenarios are the @Risk™ outputs for the estimated distribution of the total project costs presented in today's dollars (NPV cost)¹. The total project costs represent the sum of the annual cost of disposal for the Jurisdictions MSW over the planning period (Fiscal Year 2014 through Fiscal Year 2038) presented in today (current) dollars. The solid red bars represent the inner 90% of the distribution. These total "project costs" are not to be confused with the savings² afforded by the Jurisdictions entering into the Agreement, as all of the alternatives considered below provide savings when compared to market rates,

6.3.1 Base Case Scenario – Extend to 2014

As discussed in Section 5, the Base Case assumes that the Jurisdictions exercise the extension of the Agreement prior to June 30, 2014 to lock in the base tipping fee at \$43.16 as this serves to maximize the savings under the Agreement and also eliminates the risk of Covanta potentially backing-out of the Agreement, per Covanta's sole option between July 1 and December 31, 2018.

¹ The total project cost in today's dollars, expressed in terms of Net Present Value (NPV), was calculated based on discount factor of approximately 5% (CPI plus 2%).

² Refer to Appendix F for discussion of comparison of costs to savings identified in January 9, 2012 meeting docket memo.

Figure 6-1 presents a trend graph of the potential range in costs associated with the Base Case scenario over the planning period. As illustrated in this figure, the Base Case option presents a low cost option from a risk perspective. Because the tipping fee costs are essentially fixed under the Agreement, there is minimal pricing risk associated with this option and the mean values mirror the proforma's forecasted findings. The only significant variables are the quantities of waste requiring disposal and the value of Ash Residue Credit due to the Jurisdictions.

Figure 6-1: Base Case Trend Graph

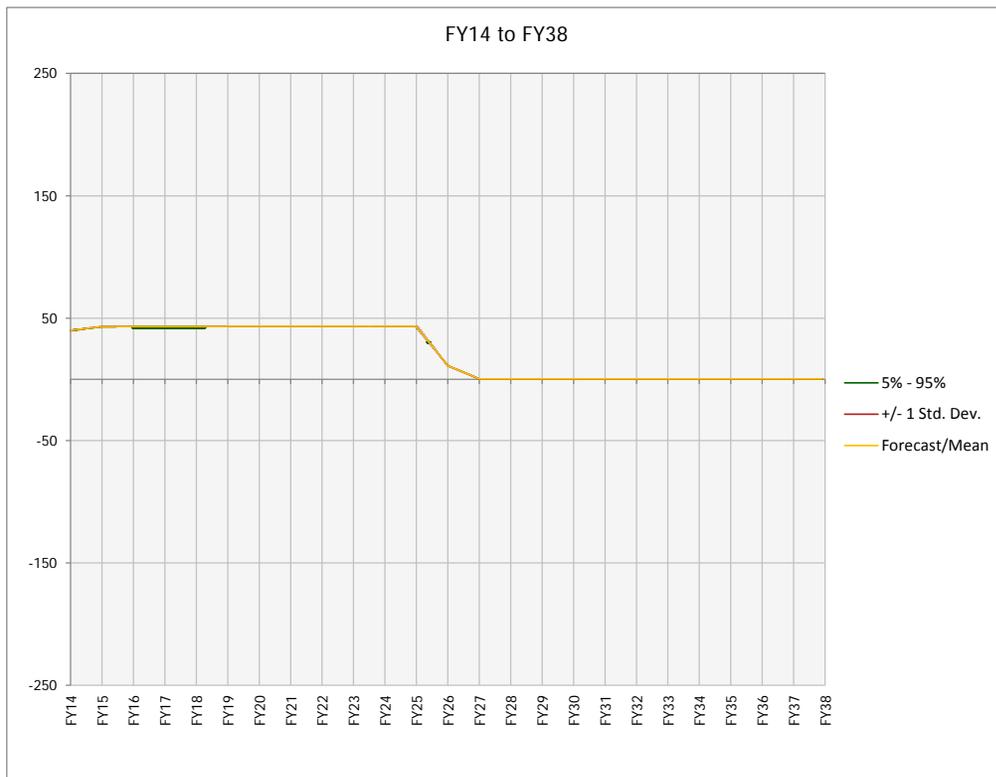
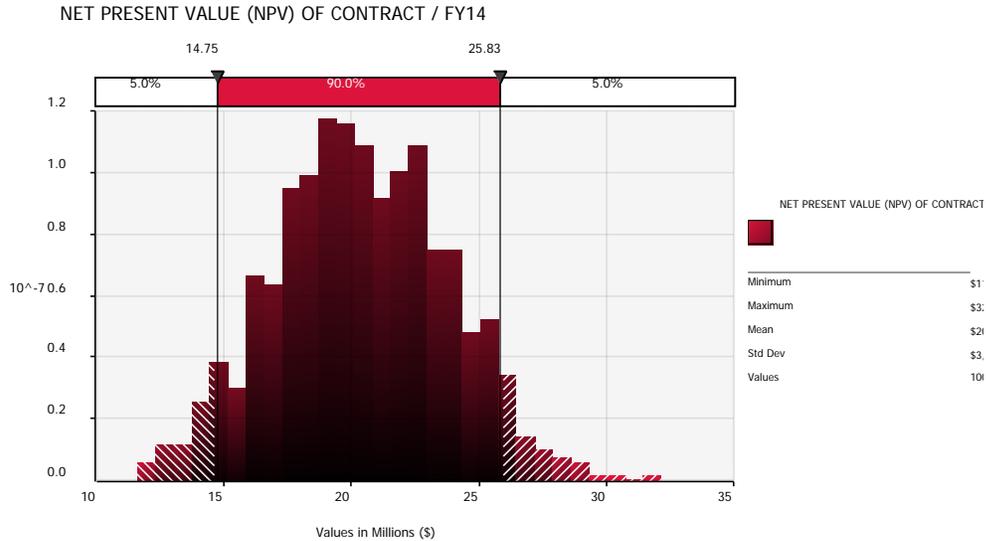


Figure 6-2 presents the NPV cost assessment of the Base Case scenario.

Figure 6-2: Base Case Net Present Value of Total Project Cost



As illustrated in Figure 6-2 the mean total project cost of the Base Case is approximately \$20.4 million with a standard deviation of approximately \$3.4 million over the planning period. This total project cost range is relatively low for the disposal of Jurisdictional collected waste over the planning period.

The Jurisdictions also have the option of extending the Agreement at various other points throughout the Agreement; however, the savings are reduced as tip fees increase until such time that the Jurisdictions lock in the rates through exercising the extension. Table 6-1 presents a summary of the anticipated loss in savings/ increased cost of escalated tip fees associated with postponing the decision to extend. This increased cost is in direct relation to the 2.75% annual increase in tipping fees per ton of waste processed which continues until the extension is exercised. These costs are borne by the Jurisdictions in proportion to the quantity of Jurisdictional waste. As illustrated in this table the loss in savings/cost of postponing is approximately \$500,000 annually based on the disposal of approximately 58,000 tons per year of Jurisdictional waste.

Table 6-1: Cost of Waiting to Exercise Extension Option in Initial Term

NPV of Contract Extension Savings (5% discount)			Loss in Savings by Waiting to Extend*	
If Extend by June	Extension Savings Over Contract Term (2038)	Extension Savings Through 2025	Annual Cost for Delay in Extension	Cumulative Cost of Delay in Extension
2014	\$26,138,442	\$4,960,644	\$0	\$0
2015	\$25,618,210	\$4,440,412	\$520,232	\$520,232
2016	\$25,105,527	\$3,927,729	\$512,683	\$1,032,915
2017	\$24,642,810	\$3,465,012	\$462,717	\$1,495,633
2018	\$24,230,152	\$3,052,354	\$412,658	\$1,908,291

* Includes ash residue credit and assumes Covanta continues to dispose of ash at the Fairfax County Lorton Landfill.

6.3.2 Case A – Go to Market 2019, Operate Facility Beginning 2025

This case scenario assumes that Covanta is neither interested in negotiating new terms nor will they accept Jurisdiction MSW to any of its facilities. Consequently, the Jurisdictions will need to haul their collected MSW to an alternate facility for disposal during the period of July 1, 2019 through September 30, 2025, until the Jurisdictions can take back operations of the Facility on October 1, 2025.

While it is possible for the Jurisdictions waste to continue to be disposed at the Facility during the period of July 1, 2019 to September 30, 2025 under a potential private contractor account or through negotiations with Covanta, the financial proforma's financial forecast of this scenario is based on a conservative option that is within the Jurisdictions control. The @Risk™ portion of the analysis, however, takes into account that it is likely that the costs for disposal during the period of 2019 and 2025 have a greater opportunity of being less than estimated.

Figure 6-3: Case A Trend Graph

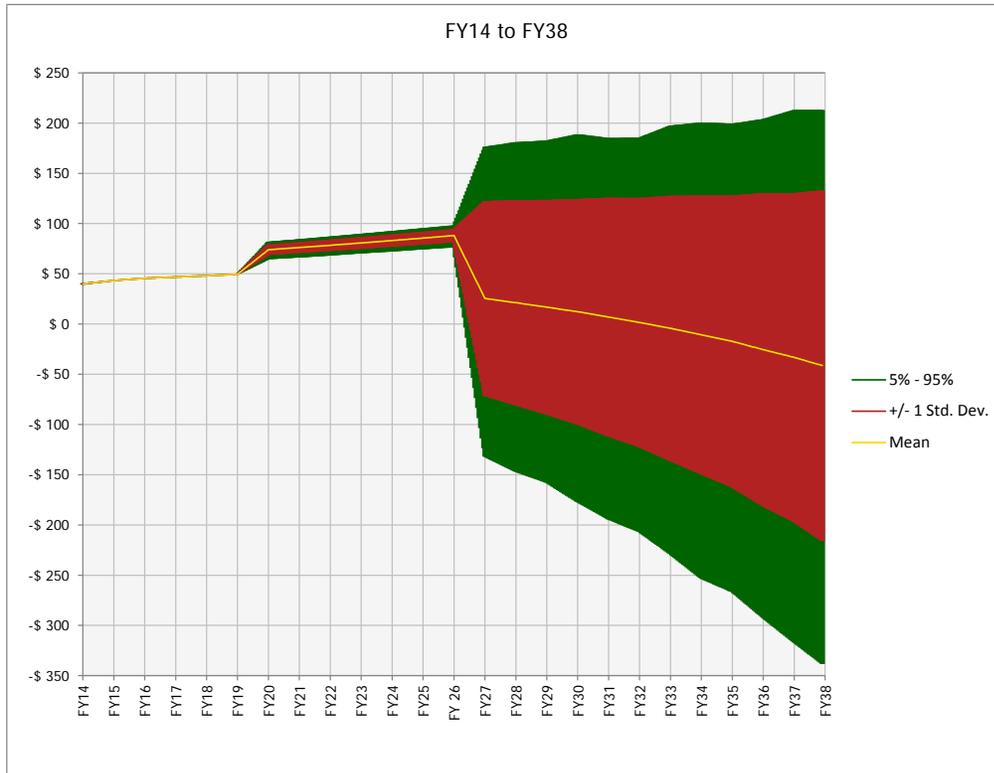


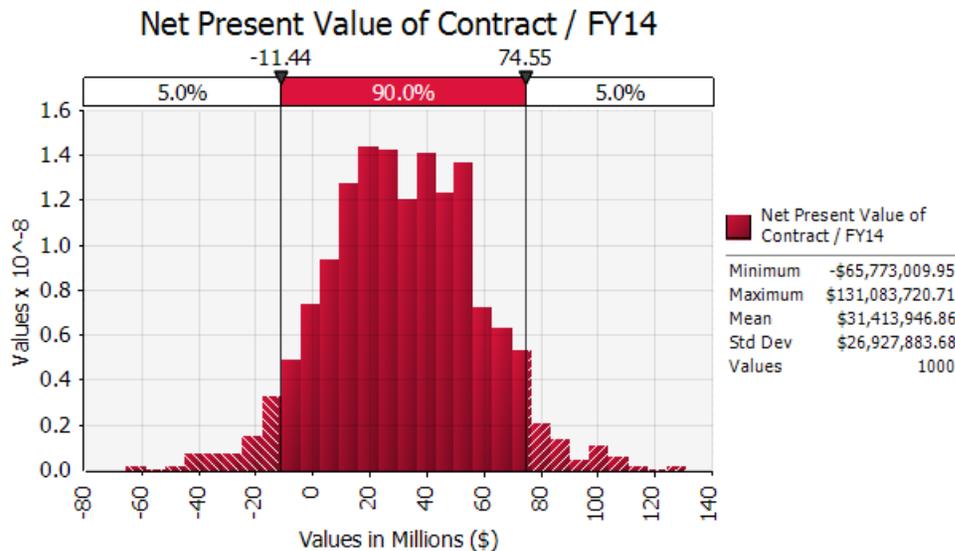
Figure 6-3 above presents the trend graph of the potential range in costs associated with Case A over the planning period. As illustrated in this figure, the tip fee for the Jurisdiction collected waste increases significantly beginning in 2019 as the Jurisdictions are potentially required to transfer to an alternate disposal facility. During the period of 2025 through 2038, however, the cost drops dramatically as the Jurisdictions leverage the ownership of the Facility.

Under this Case A scenario the Jurisdictions operate the Facility and use the revenues generated by the Facility to offset the disposal costs for the Jurisdictions collected waste (which represents only 17% of the processing capacity of the Facility). The revenues generated by the Facility include energy revenues and gate fee revenues from commercial, multifamily and outside waste customers. The continued decline in the mean annual cost for disposal of Jurisdictional collected waste during this time period indicates that it is likely that the revenues generated through Facility operations will increase at a rate faster than the cost of operations (e.g., the difference between the gate rate and the actual cost per ton to process

waste is generating increasing revenues that are credited solely to the Jurisdictional collected waste). The Case A option, however, presents significant financial risk not only due to variables associated with Facility performance but also because commercial customers/non-Jurisdictional collected waste generated in the service area pay the market gate rate, with the difference between that gate rate and actual costs either credited to or paid by the Jurisdictions. As a result, the financial variability and liability associated with this scenario is high. This variability and liability, however, can be mitigated, if legally permissible, through regulatory waste flow control.

Figure 6-4 presents the NPV of total project costs for Case A. As illustrated in this figure the total project cost range of this scenario is very high for the disposal of Jurisdictional collected waste, with a standard deviation of plus or minus \$27 million as compared to a standard deviation of \$3.3 million under the Base Case.

Figure 6-4: Case A Net Present Value of Total Project Cost



Specific sensitivity analysis were conducted to quantify/isolate the potential impact the following assumptions may have on the total project costs for this Case A:

- Savings if Jurisdictions are able to continue to dispose of waste at the Facility based on the rates established in the existing Agreement (Renewal

Term rates) should the parties agree to the Renewal Term under the existing Agreement;

- Reduction in costs if energy prices increase in accordance with high end pricing versus the conservative pricing; and
- Case A financial benefits to commercial customers if Jurisdictions were to implement waste flow control to minimize financial risks.

Table 6-2 provides a summary of the sensitivity analysis findings.

Table 6-2: Summary of Selected Case A Sensitivity Analysis

Sensitivity Scenario	Case A Forecast of Total Project Cost	Sensitivity Forecast of Total Cost	Difference Cost /(Savings)
If from 2019-2025 Dispose of MSW at Facility at Renewal Term Rates vs. Long-Haul to Landfill	\$31 M	\$26 M	(\$5 M)
If from 2025-2038 Energy Revenues are at High Range of Projections		(\$25 M)	(\$56 M)
If from 2025-2038 Commercial pays same rate as Jurisdictional Collected		\$57 M	\$26 M

As illustrated in Table 6-2, the total project cost for Case A can vary significantly. It can provide significant revenue to the Jurisdictions if energy prices are high or result in a higher cost for disposal of Jurisdictional collected waste if the Jurisdictions charged a uniform rate for all deliveries of waste to the Facility.

6.3.3 Case B – Go to Market 2019, Sell Facility Beginning 2025

Case B is similar to Case A; however, it is assumed that the Jurisdictions' choose to sell the Facility and Site in 2025 versus operate the Facility. This scenario assumes that the proceeds from the sale will be deposited into a sinking fund for use in offsetting disposal costs for the Jurisdictional collected waste. As such, the purchase price of the Facility has a significant impact on the financial performance of this scenario.

To estimate the potential purchase price of the Facility a review of original cost new less depreciation (OCNLD) and replacement cost new less depreciation (RCNLD) was

conducted. Typically, the OCNLD would represent a minimum price for the assets and the RCNLD a maximum price for the assets. Table 6-3 below presents a summary of the OCNLD and RCNLD estimates for the Facility.

Table 6-3: Facility OCNLD and RCNLD

Asset Category	Year Installed	Original Cost	Estimated Life (years)	2025 Accumulated Depreciation ⁴	OCNLD ⁵	Replacement Cost New (2025 \$)	2025 Accumulated Depreciation ⁴	RCNLD ⁶
Land (4 acres) ¹	-	-	-	-	\$2,992,740	-	-	\$3,796,000
Facility ²	1988	\$82,937,979	50	\$61,374,105	\$21,563,875	\$306,538,591	\$226,838,557	\$79,700,000
APC Upgrade ³	1998	\$43,000,000	40	\$29,025,000	<u>\$13,975,000</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
					\$38,531,615	\$306,538,591	\$226,838,557	\$83,496,000

1) Original cost of land not available. Alexandria currently carries a land value of \$2.99 million for the site. 2025 land value estimated based on 2% annual escalation in land value.

2) Facility construction cost of \$75.9 million in 1985 dollars, escalated by 3% annually to 1988 dollars (install completion date). Replacement cost new based on estimated install cost of \$220k per ton per day (tpd) of capacity (975 tpd Facility capacity) escalated to 2025 dollars by 3% annually.

3) Original cost of air pollution control (APC) upgrade based on 1998 Bond Issue. Replacement cost new of Facility already includes compliance with all current regulations.

4) Accumulated depreciation as of 2025 assuming straight line depreciation.

5) Original Cost New Less Depreciation (OCNLD).

6) Replacement Cost New Less Depreciation (RCNLD)

7) Life extension costs excluded from above. Assumes that the increase in asset value associated with life extension improvements will equal (net-out) the outstanding debt (liabilities) associated with improvements resulting in a zero net increase in asset value.

In addition to the above RCNLD and OCNLD analysis a review of potential comparable sales was conducted. Facilities where a sale has, was or is contemplated include Southeastern Public Service Authority of Virginia (SPSA); Chester PA, Hudson Falls NY, Harrisburg PA and Fairfax VA. The potential purchase prices being discussed varied significantly and are likely dependent on the specific terms and conditions of the proposed sale. An investigation of such comparable sales was beyond the scope of this study; however, the general range on a per ton basis was reviewed. This review indicated proposed sale prices that ranged from a low of approximately \$32 per ton per

day of processing capacity (Hudson Falls NY 2012)³ to a high of approximately \$138 per ton per day of processing capacity based on the valuation of the Fairfax County RRF (2010).⁴ This indicates that the potential sale price could be in the range of \$30 million to \$130 million for the Facility, with a mid-point of approximately \$80 million. These ranges are greater than that identified through a review of the RCNLD and the OCNLD for the Facility. Given the difficulty in siting a waste-to-energy facility and depending on market conditions and remaining facility life as compared to depreciation schedule it is not inconceivable, although not likely, that the purchase price would be greater than the RCNLD estimate. For the purposes of this economic evaluation an estimated mid-point purchase price of \$63 million (in 2025 dollars), with a range consistent with the OCNLD and RCNLD estimates developed in Table 6-3, was assumed for the Facility and Site.

Figure 6-5 presents the trend graph of the potential range in costs associated with Case B over the planning period.

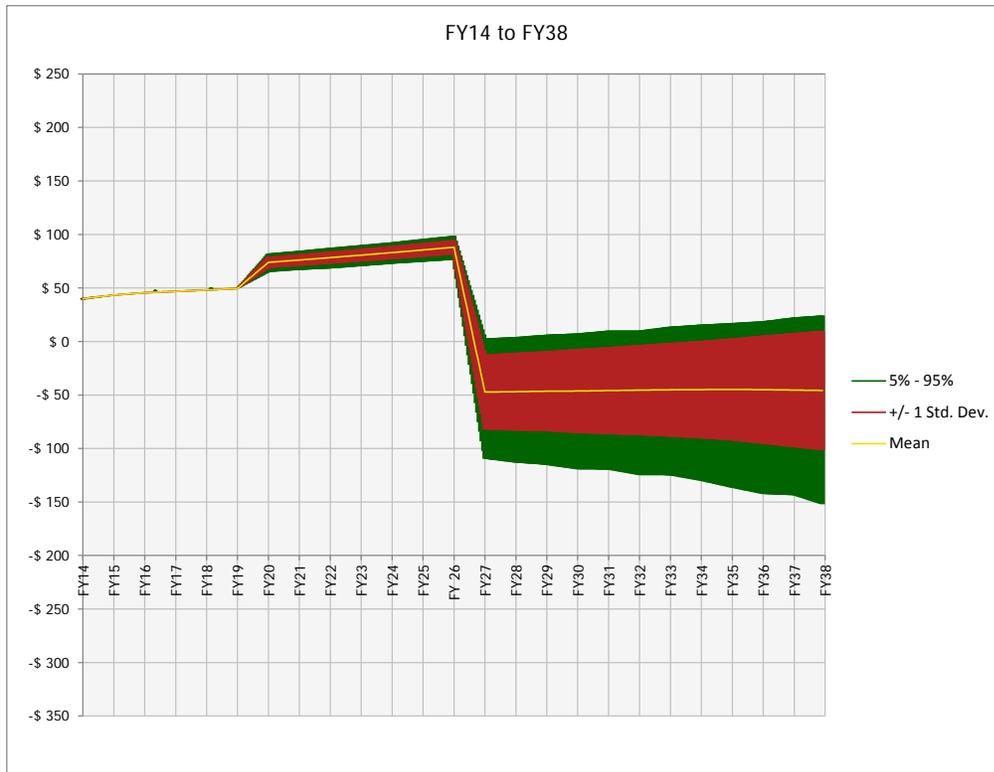
³ Source: Wheelabrator Technologies Press Release

<http://www.wheelabratortechnologies.com/index.cfm/linkservid/F1F67774-5056-905C-364DD65403102DEC/showMeta/0/>.

⁴ Source: Fairfax County Chamber of Commerce Website

<http://www.fairfaxchamber.org/clientuploads/2011%20PDFs/Background%20on%20Trash%20Facility.pdf>.

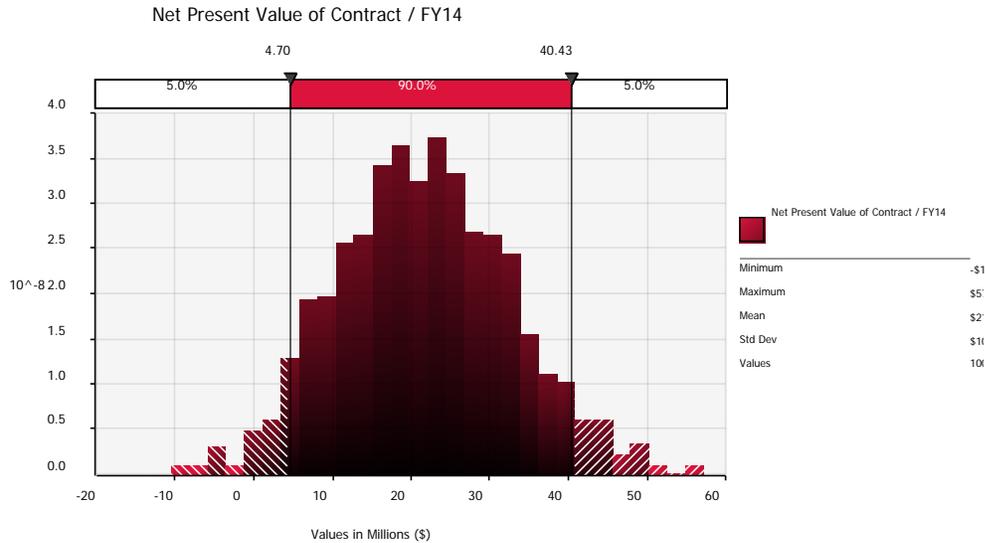
Figure 6-5: Case B Trend Graph



As illustrated in Figure 6-5, the tip fee for the Jurisdiction collected waste under Case A and B mirror each other up until 2025. Beginning in 2025, however, Case B assumes that the Jurisdictions sell the Facility and use the proceeds to offset future disposal costs for Jurisdiction collected waste. The Case B financial forecasts assume that 100% of the proceeds from the sale are distributed in equal annual installments over the remaining planning period. As illustrated in Figure 6-5, the financial risks associated with this Case B scenario is significantly less than Case A as the Facility operating risks are transferred to the purchaser of the Facility.

Figure 6-6 presents the total project cost, in today's dollars for Case B. As illustrated in this figure the cost range of this scenario is still high with a standard deviation of plus or minus \$10.9 million as compared to a standard deviation of only \$3.3 million under the Base Case, but significantly less than the standard deviation of \$27 million associated with Case A.

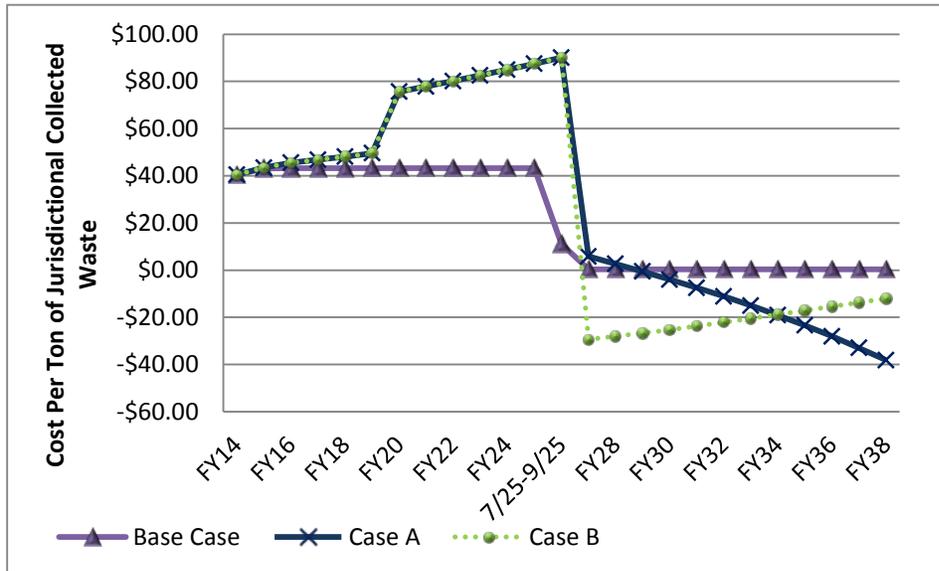
Figure 6-6: Case B Net Present Value of Total Project Cost



6.3.4 Comparison of Findings

Figure 6-7 below provides a summary of the “forecasted” cost per ton for each case scenario for each year over the planning period. The forecasted unit cost per ton for disposal of Jurisdiction collected waste is based on the input values under the “Proforma” column in Appendix E. These represent static calculated costs and will naturally vary from the “mean” or average value outputs generated through the thousand or so iterations utilizing the @Risk™ software as discussed above.

Figure 6-7: Comparison of Forecasted Annual Cost per Ton



The forecasted tip fee for each of the case scenarios can be divided into three distinct time periods: a) the Initial Term of the Agreement (current to 2019); b) potential Renewal Term (2019-2025) and c) potential Extended Term (2025-2038).

During the Initial Term, the tip fee for Case A and Case B are slightly higher than the Base Case since they assume no contract extension and continued escalation of rates during this period.

During the period of 2019-2025, the tip fee for Case A and Case B are also substantially higher than the Base Case as it is assumed that Jurisdiction collected waste will require the haul and disposal of waste at an alternate facility.

The tip fee for the Jurisdiction collected waste during the period of 2025 through 2038; however, drops significantly as the Jurisdictions leverage the ownership of the Facility. Under Case A the Jurisdictions operate the Facility and use the revenues generated by the Facility to offset the disposal costs for the Jurisdictions collected waste, which represents only 17% of the processing capacity of the Facility. The revenues generated by the Facility include energy revenues and gate fee revenues from commercial, multifamily and outside waste customers. The continued decline in annual cost during this time period indicates that the revenues generated through Facility operations are

increasing at a rate faster than the cost of operations (e.g., the difference between the gate rate and the actual cost per ton to process waste is generating increasing revenues that are credited solely to the Jurisdictional collected waste to offset Jurisdictional collected waste costs). In Case B, the Jurisdictions do not operate the Facility, but sell the Facility and use the proceeds to offset future Jurisdiction disposal costs.

Table 6-4 presents a comparison of the total project cost assessment of the case scenarios, presented in today's dollars.

Table 6-4: Financial Model Economic Evaluation Findings (2013 Dollars)¹

@Risk™ Output	Base Case	Case A	Case B
Proforma Forecasted Total Project Costs over Planning Period ²			
Total Project Cost (\$)	\$22.9M	\$31.5M	\$28.7M
Total Project Cost (\$ per ton)	\$16 per ton	\$23 per ton	\$21 per ton
Statistical Findings of Min/Max, Mean and Standard Deviation of Total Project Costs ³			
@Risk™ Min to Max Range	\$12M to \$32M	(\$66M) to \$131M	(\$11M) to \$57M
@Risk™ Mean (Average) Value	\$20.4M	\$31.4M	\$21.7M
@Risk™ Standard Deviation	\$3.3M	\$26.9M	\$10.9M
Statistical 90 Percent Confidence Limit of Total Project Costs over Planning Period ⁴			
@Risk™ 90% Confidence Range (\$)	\$15M to \$26M	(\$11M) to \$75M	(\$5M) to \$40M
@Risk™ 90% Confidence Range (\$/ton)	\$15-\$18 per ton	(\$12)-\$65 per ton	\$5-\$28 per ton

1. Findings presented in today's dollars based on a NPV analysis of the project costs over the planning period of 2014-2038.
2. Financial proforma output before applying @Risk™ to assess key variables.
3. Statistical output of the Monte Carlo simulation analysis using @Risk™
4. Ninety percent (90%) confidence limits of the Statistical output of the Monte Carlo simulation analysis using @Risk™.

As illustrated in Table 6-4, the Base Case option presents a low cost option with the least amount of financial risk. Because the costs are fixed under the Agreement, there is minimal pricing risk associated with this option. With respect to the Case A and Case B options, the range of potential costs is largely variable due to unknowns and factors outside of the Jurisdictions' control and includes significant potential cost overlap over the planning period, with certain periods of differentiation. Both the "Case A" and "Case B" options present cost-effective options for the long-term management of the Jurisdictions' MSW, but with significantly more pricing risk both positive and negative.

The following are observations regarding potential additional factors that are not directly included in the cost analysis but which could impact the decision process:

- The potential residual value of the facility beyond 2038 has not been factored into the analysis, as this timeframe extends beyond the planning period and the typical 50 year life for similar facilities. Covanta reports that the life of the Facility could readily be extended to 60 years. Such extension, however, would likely require additional life extension capital investment.
- The tipping fee rates for Jurisdictional collected waste presented in Case A is based on economic flow control. The implementation of regulatory flow would serve to reduce the financial risk, hence the range of costs, associated with this option. Flow control, while currently a legally defensible option, is subject to much debate in the solid waste industry and is not considered without risk of challenge. The Jurisdictions should seek advice from counsel regarding this and other potential legal issues.
- The further into the future, the more difficult it is to accurately or reliably project future cost. As illustrated in the @Risk™ trend graphs, the risk of higher costs in the long term is greater under the Case A and Case B options than the Base Case option.

6.4 Conclusions

As previously described, a majority of the cost assumptions used in the proforma are outside the control of the Jurisdiction and consequently, actual costs can vary substantially from those presented in the proforma. This is common in any long-term planning project. In addition, each of the options presents unique pricing risks which further complicate the decision process and ability to conduct direct comparisons. This is particularly true the further costs are projected beyond a five- to ten-year period.

Our findings indicate that each of the case scenarios has the potential for providing cost-effective, below market rates for long-term disposal. The Base Case Scenario to Extend the Agreement in 2014 offers one of the lowest costs and has the least amount of financial risk. Potentially significant drawbacks of the Base Case include:

- a) postponement of the Jurisdictions' ability to control the Facility and Site from 2025 to 2038, and
- b) potential unleveraged value of the Facility during this time period (note: the value of the Facility in 2038 vs. 2025 will be significantly reduced as the Facility will be near the end of its useful life unless refurbished); and

If the above potential drawbacks and other potential factors not directly included in the cost analysis as discussed previously continue to be of marginal concern as identified during the conduct of the SWOT review and direction provided by the Jurisdictions during the study, the Jurisdictions' extending the Agreement in 2014 to maximize the savings available under the Agreement is recognized as a preferential course to follow.

If, however, concerns regarding the control of the Facility and other potential factors not directly included in the cost analysis remain, then it is recommended that the Jurisdictions consider postponing the decision to extend the Agreement but with a re-evaluation scheduled well in advance of July 1, 2018, when the Jurisdictions still have the unilateral right to extend. There is a cost/loss of savings associated with postponing the decision that is borne by the Jurisdictions in proportion to their quantity of waste. This additional cost is approximately \$500,000 annually based on processing of approximately 58,000 tpy of Jurisdictional collected waste. This amount, however, is small in comparison to the total project cost of the Base Case scenario.

The new information that may become available during this time period that could impact the decision to extend or not extend may include but may not be limited to:

- Reduced uncertainty in the market place due to a more stable economy,
- Reduced uncertainty in the regional market through anticipated resolution of long-term agreements for neighboring jurisdictions including Fairfax County, VA, Prince George's County, MD, and the District of Columbia,
- Existence of any locally-permitted transfer facilities that could manage Jurisdiction collected waste during the period of 2019 to 2025,
- Information regarding newly proposed regulations which may impact capital improvement requirements and/or waste generation,

- Opportunities for ash recycling or other Facility enhancements that could serve to reduce operating costs or increase revenue,
- Ability to refine key projections regarding:
 - Local and regional MSW and recycling quantities.
 - Energy and capacity rates including green energy credits.
 - Local solid waste supply, demand and market rates.

In conclusion, the findings indicate that the decision regarding the best option for the Jurisdiction should be based on the Jurisdiction's tolerance and ability to manage risks over the planning period and other institutional factors.



Appendix A

Alexandria and Arlington Solid Waste
System Data Inventory

ALEXANDRIA AND ARLINGTON SOLID WASTE SYSTEM DATA INVENTORY

Status as of June 7, 2013

DATA ITEMS REQUESTED	DOC #	DOCUMENT RECEIVED/SOURCE	SUMMARY OVERVIEW/COMMENTS
FINANCIAL INFORMATION			
1. Summary of Outstanding Bonds	ALX014 and ARL0??	Alexandria and Arlington 2012 CAFR's. Official Statements for 2012 bond issuances for both the City and County.	Documents contain summaries and maturity schedules for all bonds outstanding for the City and County. Understanding is no debt service is outstanding from the 1998 bonds issued by IDA.
2. Latest Financial Statements		Alexandria and Arlington 2012 CAFR's. 2014 Proposed Budgets for Alexandria and Arlington contain most recent financial data for both municipalities.	Both financial statements and budget documents contain operational data pertinent to the study.
3. Solid Waste Billing Information			
Number and Type of Customers	ALX013	Alexandria Customer Database	
Historical User Rates and Charges	ALX004	Commercial Collection Billing Notification Letter	Dated 11/19/2012 informing that City of Alexandria will now be directly billing commercial refuse customers
	ARL010	Current Residential Refuse Disposal Rate/ Arlington County Website	
4. Solid Waste System Budget Data			
Operations			
Organizational Structure	ALX015	Organizational Chart	See also Budget Summaries
Copy of Last Three Years (Budget and Actual)	ALX005	FY2013 Approved Operating Budget for Public Works	Links to past budgets appear broken

SOLID WASTE SYSTEM STUDY DATA INVENTORY (Cont.)

DATA ITEMS REQUESTED	DOC #	DOCUMENT RECEIVED/SOURCE	SUMMARY OVERVIEW/COMMENTS
	ARL001	Department of Environmental Services FY 2013 Budget Summary	Summary of FY 2013 Budget and 10 year History
	ARL002	Arlington County FY 2013 Adopted Budget	Complete Budget. Solid Waste is in Environmental Services Department
	ARL003	Arlington County FY 2012 Budget Closeout Report	
	ARL004	Arlington County FY 2012 Adopted Budget	
	ARL005	Arlington County FY 2011 Budget Closeout Report	
	ARL006	Arlington County FY 2011 Adopted Budget	
	ARL007	Arlington County FY 2010 Budget Closeout Report	
	ARL008	Department of Environmental Services FY 2010 Budget Summary	Link for complete FY 2010 Budget missing
	ARL016	Arlington County FY2014 Proposed Budget	Also contains various recycling performance statistics including measures by customer class.
LEGAL INFORMATION			
5. Extended Term Agreement	AA001	Waste Disposal and Service Agreement (WDSA)	Dated 1/24/2012 with Covanta Alexandria/Arlington Inc. initial term ending June 30, 2019 with options for extension
6. Jurisdictional Agreement	AA002	Interjurisdictional Joint Action Agreement Regarding the Arlington/Alexandria Waste-to-Energy Facility	Same duration as WDSA, identifies relationship and responsibilities between the jurisdictions
7. I-95 Interlocal Agreement	FAX001	MOU I-95 Resource Recovery, Land Reclamation and Recreation Complex	Dated 7/22/1981 replaces 1973 MOU between County of Fairfax, DC, and Metropolitan Washington Waste Management Agency, transfers operation from DC to Fairfax County
	FAX002	Supplemental Agreement to the MOU I-95 Resource Recovery, Land Reclamation and Recreation Complex Executed July 22, 1981	Final signature 6/21/1982, clarifying some points of the MOU

SOLID WASTE SYSTEM STUDY DATA INVENTORY (Cont.)

DATA ITEMS REQUESTED	DOC #	DOCUMENT RECEIVED/SOURCE	SUMMARY OVERVIEW/COMMENTS
	FAX003	Major Agreements Governing the Operation of the I-95 Landfill	Includes Agreement documents from 1967 to 1993 including MOUs on I-95 Resource Recovery, Land Reclamation and Recreation Complex
	FAX004	I-95 Document File Table of Contents	Lists contractual documents from <i>Evolution of the I-95 Resource Recovery Land Reclamation and Recreation Complex</i> and lists documents from 1967 to 2002
8. Site Lease	ALX001	Additional Facility Site Grounds Lease with Ogden Martin Sys	Dated 11/1/1998, expired 11/1/2003, lease for "Additional Facility Site" to support the Facility, including access roads and scale house.
	AA003	Amended and Restated Facility Site Lease	Dated 10/1/1985 between City of Alexandria and Arlington County as Landlords, and Alexandria Sanitation Authority and Arlington Solid Waste Authority (Tenants) for collection, transfer, and disposal of solid waste
	AA004	Amendment 1 to Amended and Restated Facility Site Lease	Dated 7/1/1998, modifying the Use of Lease Premises, Obligations of Tenants, and Acknowledgement of Conditional Sale Agreement
	AA005	Operating Lease Agreement	Dated 11/1/1998 between City of Alexandria Sanitation Authority and Arlington County Solid Waste Authority and Ogden Martin Systems
	AA006	Amendment 1 to Operating Lease Agreement	Dated 1/2012, modifying several definitions, adding sections, and modifying the term of the Agreement

SOLID WASTE SYSTEM STUDY DATA INVENTORY (Cont.)

DATA ITEMS REQUESTED	DOC #	DOCUMENT RECEIVED/SOURCE	SUMMARY OVERVIEW/COMMENTS
9. Power Purchase Agreement	AA007	Power Purchase and Operating Agreement	Dated 10/22/1985 with Virginia Electric and Power Company for a 35 year term (2020)
10. Hauler Agreements			
11. Applicable Ordinances	ARL009	Arlington County Code: Garbage, Refuse, and Weeds/ARL website	
TECHNICAL DATA			
12. Solid Waste Management Plans	ALX002	City of Alexandria Solid Waste Management Plan	Dated 7/1/2004
	ARL014	Arlington County Solid Waste Management Plan	Dated 6/12/2004
13. W-T-E Facility Data	AA008	Alexandria/Arlington Waste-to-Energy Facility Audit Report FY2008	Summarizes Facility performance for FY 2008 ending in June 2008
	AA009	Alexandria/Arlington Waste-to-Energy Facility FY 2009 Annual Report	Summarizes Facility performance for FY 2009 ending in June 2009
	AA010	Alexandria/Arlington Waste-to-Energy Facility FY 2010 Annual Report	Summarizes Facility performance for FY 2010 ending in June 2010
	AA011	Alexandria/Arlington Waste-to-Energy Facility FY 2011 Annual Report	Summarizes Facility performance for FY 2010 ending in June 2011
	AA012	Alexandria/Arlington Waste-to-Energy Facility FY 2012 Annual Report	Summarizes Facility performance for FY 2010 ending in June 2012
	ARL011	Waste to Energy Information Booklet/Arlington County Website FAQ	
14. Facilities/Other Assets Related to the solid waste system	AA014	Elements of Virginia's Solid Waste Management Program/Virginia State website	
15. Capital Improvement Program	ALX006	FY 2013 CIP/website	

SOLID WASTE SYSTEM STUDY DATA INVENTORY (Cont.)

DATA ITEMS REQUESTED	DOC #	DOCUMENT RECEIVED/SOURCE	SUMMARY OVERVIEW/COMMENTS
	ARL013	FY 2013 – 2022 Adopted CIP/website	
16. Records and Reports			
	ALX017	Industrial Use Study	
Recycling Data	ALX003	FY 2011 State of Recycling Report/website	41.4% recycling rate for CY 2010
	ALX007	CY2011 Recycling Report to DEQ/Yon	
	ALX008	CY2010 Approved Recycling Report to DEQ/Yon	
	AA013	Virginia 2011 Recycling Report/State DEQ Website	
	ARL015	Multi-family and Commercial Solid Waste and Recycling Survey	
FAQs	ARL012	Arlington County Environmental Services Department FAQs/website	
Other	ALX009	Alexandria Industrial Use Survey	
	ALX010	Alexandria's Round 8.2 Development Forecast	
	ALX011	Alexandria Breakdown of Housing	
	ALX012	Alexandria 2010 Census Data Profile	
	AA015	Northern Virginia Household Projections	
	AA016	Northern Virginia Regional Commission Survey of Public Waste Services and Management Practices	

SOLID WASTE SYSTEM STUDY DATA INVENTORY (Cont.)

DATA ITEMS REQUESTED	DOC #	DOCUMENT RECEIVED/SOURCE	SUMMARY OVERVIEW/COMMENTS
	AA017	Population Projections for Virginia Cities and Counties	
	AA018	Population Projections for Virginia Large Towns	
	COV001	Covanta Fiscal Year 2008 (FY08) Reconciliation	
	COV002	Covanta Fiscal Year 2009 (FY09) Reconciliation	
	COV003	Covanta Fiscal Year 2010 (FY10) Reconciliation	
	COV004	Covanta Fiscal Year 2011 (FY11) Reconciliation	
	COV005	Covanta Fiscal Year 2012 (FY12) Reconciliation	

Document Number Code Key:
 AA – Alexandria and Arlington
 ALX – City of Alexandria
 ARL – Arlington County
 FAX – Fairfax County
 COV - Covanta



Appendix B

Solid Waste Market Analysis
Memorandum



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MEMO

To:
Yon Lambert, City of Alexandria
Erik Grabowsky, Arlington County

Copies:
Doug Sawyers, ARCADIS
File

From:
Isabella Schroeder

Date:
July 9, 2013

ARCADIS Project No.:
06654001.0000

Subject:
Solid Waste Market Analysis

Introduction

The Alexandria/Arlington Resource Recovery Facility (Facility) was jointly developed by the City of Alexandria (City) and Arlington County (jointly referred to as the Jurisdictions) and is operated by Covanta Arlington/Alexandria, Inc. (Covanta). The Jurisdictions have entered into a new Waste Disposal and Service Agreement (Agreement) with Covanta for the processing and disposal of the Jurisdictions' waste through June 30, 2019. The Jurisdictions are evaluating their right to extend the Agreement via options through 2025 and through 2038. As part of this evaluation, ARCADIS conducted a market study to estimate current and projected future municipal solid waste (MSW) disposal capacity supply and demand, pricing trends and potential future market rates for MSW in the market area. A primary focus of the market study was potential disposal alternatives in 2019 to coincide with the early termination option in the Agreement available to the Jurisdictions.

Information and market data resources utilized in this analysis are listed below:

- Twelfth Edition of the Public Solid Waste Services in the Washington Metropolitan Region, dated January 2012. Prepared by the Northern Virginia Regional Commission;
- Directory of Waste Processing & Disposal Sites. Waste Business Journal. 2010/updated 2011;
- Solid Waste Managed in Virginia During Calendar Year 2011. Commonwealth of Virginia, Department of Environmental Quality. June 2012;

- Virginia Annual Recycling Rate Report- Calendar Year 2011 Summary. Commonwealth of Virginia, Department of Environmental Quality. October 2012;
- Maryland Solid Waste Management and Diversion Report 2010. Maryland Department of the Environment (MDE). November 2011;
- ARCADIS' experience regarding solid waste management systems, operational cost data and knowledge of the solid waste disposal market in the Mid-Atlantic region;
- Commercial websites; and
- Other data and information provided by the Jurisdictions.

This memorandum discusses the following:

- Demand – MSW Generation in the Metropolitan Washington Region
- Supply – MSW Disposal Capacity in the Metropolitan Washington Region
- Market Cost Analysis
- Competition in the Market

Demand – MSW Generation in the Metropolitan Washington Region

According to the NVRC, the City of Alexandria and Arlington County together produce approximately 10 percent of the MSW generated in the MWR. Table 1 summarizes projected estimates of MSW generation, disposal and recycling for the City of Alexandria and Arlington County over the 2038 planning period.

Table 1 – Waste Generation Projections
City of Alexandria and Arlington County

Projection	2013	2015	2020	2025	2030	2035	2038
City of Alexandria							
Population ¹	145,030	148,513	158,102	167,085	174,030	184,741	190,765
Waste Generation Rate ² (lb./cap/day)	6.77	6.77	6.77	6.77	6.77	6.77	6.77
Total Waste Generated (tons)	179,082	183,383	195,223	206,315	214,891	228,117	235,555
Estimated Reuse and Recycling Rate ³	48.40%	49.13%	51.00%	52.94%	55.37%	57.48%	58.78%
Processible Waste Requiring Disposal (tons)	101,647	102,618	105,228	106,801	105,502	106,706	106,810
Alexandria Collected Processible Waste (tons) ⁴	22,207	22,419	22,989	23,333	23,049	23,312	23,335
Alexandria Collected Waste (as % of total)	22%	22%	22%	22%	22%	22%	22%
Arlington County							
Population	211,700	217,669	233,400	239,294	244,239	248,543	251,162
Waste Generation Rate (lb./cap/day)	6.84	6.84	6.84	6.84	6.84	6.84	6.84
Total Waste Generated (tons)	264,371	271,825	291,470	298,830	305,006	310,381	313,652
Estimated Reuse and Recycling Rate	49.70%	50.45%	52.37%	54.36%	56.85%	59.02%	60.36%
Processible Waste Requiring Disposal (tons)	132,979	134,694	138,831	136,379	131,595	127,197	124,341
Arlington Collected Processible Waste (tons) ⁴	36,000	36,464	37,584	36,921	35,626	34,435	33,662
Arlington Collected Waste (as % of total)	27%	27%	27%	27%	27%	27%	27%
Notes:							
1. Alexandria projections based on Round 8.2 Forecasts, Planning Division (May 2013) and Arlington based on Arlington Profile Summary 2012 (Round 8.1 Forecasts, CPHD Planning Division February 2012).							
2. Estimated based on State of Virginia 2011 waste generation data and 2010 United States Census Data.							
3. Estimated based on increasing current reported recycling rates by 0.75% annually.							
4. 2013 estimates based on 2012 actuals provided by the City and County; thereafter increasing based on estimated increases in total processible waste requiring disposal.							

Post-recycling waste generation in the greater metropolitan region is estimated based on selected jurisdictions, including the City of Alexandria, Arlington County, the District of Columbia, Montgomery County and Prince George’s County Maryland and Fairfax County, Loudoun County and Prince William County Virginia.¹ As shown in Table 2, estimated post-recycling waste generation in the defined area is

¹ Virginia county projections include independent cities and towns.

approximately 2.7 million tons. Using an overall waste generation annual growth rate of 0.5 percent and targeted average recycling/diversion rates for Virginia, Maryland and the District of Columbia, post-recycling waste generation are conservatively projected at 3.2 million tons in 2038.

Table 2 – Post-Recycling Waste Generation in Greater Metropolitan Region

Source Area	2013	2015	2020	2025	2030	2035	2038
Northern Virginia	1,478,979	1,493,526	1,537,635	1,610,704	1,691,833	1,778,030	1,832,327
Suburban Maryland	599,435	605,444	620,732	636,406	652,476	668,952	679,037
District of Columbia	619,823	626,037	641,845	658,053	674,669	691,706	702,133
Total	2,698,237	2,725,006	2,800,212	2,905,163	3,018,978	3,138,688	3,213,497
Committed Tonnage	(1,671,243)	(1,687,709)	(1,736,915)	(1,816,034)	(1,903,519)	(1,996,283)	(2,054,625)
Available Supply	1,026,993	1,037,298	1,063,297	1,089,128	1,115,459	1,142,404	1,158,872

Notes:

1. Northern Virginia includes the City of Alexandria and Arlington, Fairfax, Prince William and Loudoun Counties. Independent cities and towns are included.
2. Suburban Maryland includes Prince George’s County and Montgomery County. Due to limited data availability, for Prince George’s County Maryland waste generation was based on the calendar year 2010 waste delivered to the Brown Station Road Landfill (scheduled to close in 2018).
3. District of Columbia waste generation includes waste managed by the DC Department of Public Works and private companies operating in the District servicing the residential, commercial and institutional sectors.
4. Gross waste generation assumed to escalate at 0.5% per year.
5. Targeted average recycling rates: Virginia: 44.5%; Suburban Maryland: 41.0%; District of Columbia: 25%.
6. Average recycling/diversion rates estimated to increase at an average annual rate of 0.75%.

In estimating the available supply of MSW in the region, post-recycling waste generated in jurisdictions with anticipated long-term waste disposal capacity was excluded.² The resulting estimated post-recycling waste stream generated in the area ranges between 1.0 million and 1.2 million tons per year over the 2038 planning period.

² Jurisdictions with anticipated long-term disposal capacity available (or “committed” tonnage) includes Montgomery County Maryland and Fairfax County, Prince William County and Loudoun County Virginia.

Supply – MSW Disposal Capacity in the Washington Metropolitan Region

Most MSW in the MWR is managed at one of the three waste-to-energy (WTE) facilities (Covanta’s Alexandria/Arlington, Fairfax and Montgomery County facilities) or three public landfills (Prince George’s County MD; Prince William County VA; and Loudoun County VA). According to the NVRC, 61 percent of the area’s MSW is disposed at a waste to energy plant, a percentage much higher than the national average.

A review of the NVRC projections regarding disposal capacity in the MWR indicates that in total, current disposal capacity exceeds waste supply. It is noted, however, that the capacity accessible to different entities varies as several disposal facilities are waste source constrained due to contractual commitments and policies limiting “outside” wastes. Figure 1 below illustrates the location of all currently known permitted MSW disposal facilities within a 100-mile straight-line radius of the Facility. A larger version of this Figure 1, including the associated “key” listing the facility names and capacities is provided in Exhibit A at the end of this memorandum.

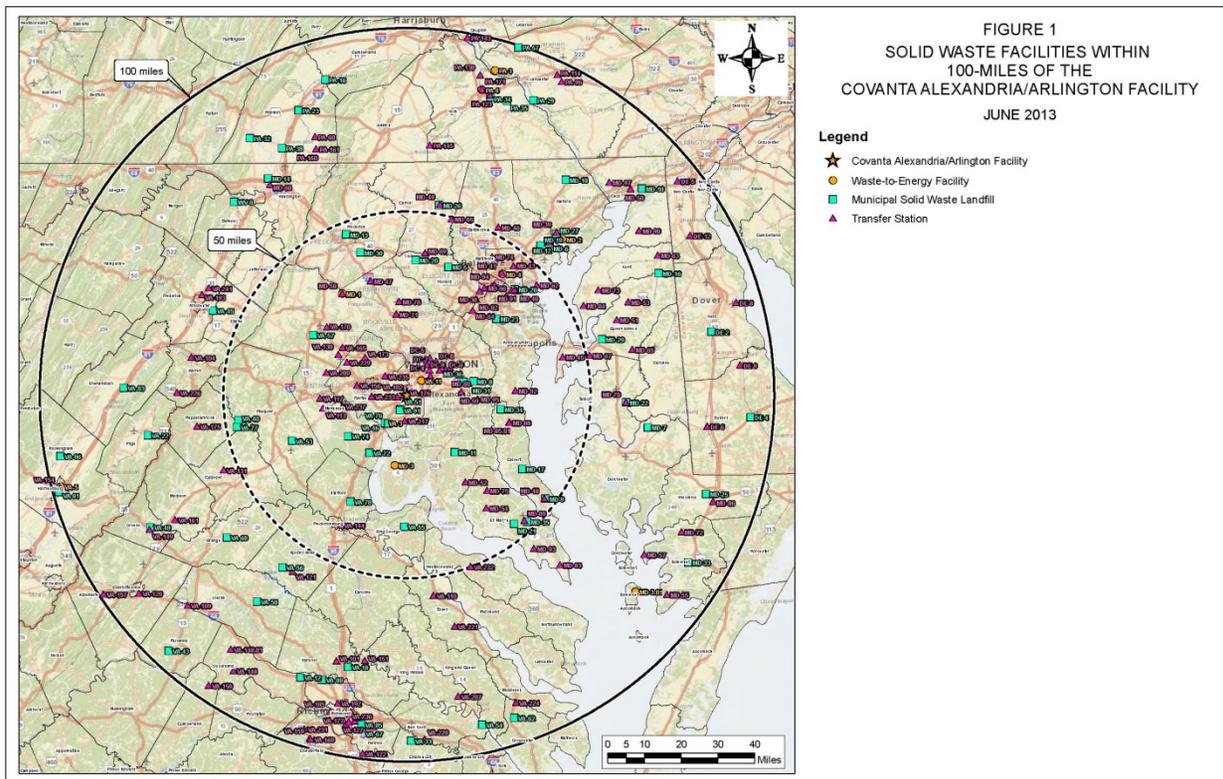


Table 3 below presents information on the WTE facilities and landfills in and around the City of Alexandria and Arlington County. The I-95 Resource Recovery Facility, in Fairfax County, is the closest WTE facility to the City of Alexandria and Arlington County but most of the area jurisdictions also use the I-95 Facility for waste disposal. Therefore, the I-95 Facility may not have adequate available disposal capacity. Of the closest landfills, only two out of the seven are projected to have available disposal capacity for the next 20 years based on current disposal rates. While it may appear there are a number of potentially available disposal facilities in and around Alexandria and Arlington, access to such facilities will likely be limited when taking into account other local demand and existing or potential disposal agreements or obligations. These include waste sourcing constraints/ policies limiting “outside” wastes, limited available sustained capacity, and planned facility closures.

Table 3 – Disposal Facilities In or Adjacent to Jurisdictions⁽¹⁾

Facility	Tonnage Disposed in 2008	Daily Permitted Capacity	Remaining Life Expectancy
Covanta Alexandria/ Arlington Resource Recovery Facility	345,477	975 TPD	2038
Covanta Fairfax I-95 Energy Resource Recovery Facility	644,367	3,000 TPD	2028
I-95 Landfill	323,184	NA	2040
King George County Landfill and Recycling Facility	1,222,676	NA	2024
Loudon County Landfill	85,746	NA	2068
Prince William County Landfill	308,589	NA	2023
Brown Station Road Sanitary Landfill	433,075	NA	2016
Millersville Municipal Landfill	2,888,404	NA	2034
Charles County Municipal Landfill No. 2	61,631	NA	2039

Therefore, to assess the viability of potentially available disposal facilities for the Jurisdiction within the timeframes of the Jurisdictions’ decision making process relative to its agreement with Covanta, a desk-top analysis of MSW disposal facilities within the 100-mile straight-line radius of the Facility was conducted. The analysis developed during this task involved the following elements:

- Identifying and reviewing information for alternative disposal sites within a radius up to the 100-mile radius of the Facility³;
- Determining disposal facilities, that as of 2019, could potentially provide capacity for the Jurisdictions' MSW (estimated to be on the order of 50,000 – 70,000 tons per year), considering such items as daily and annual capacity limits, contract terms, permit status and capability to provide an economically attractive and environmentally suitable means of disposal, and other relevant factors; and
- Developing per-ton cost estimates, including transportation, for disposal of the Jurisdictions' MSW, based on the assumption of utilizing available (or assumed) transfer capabilities.

Identification and Review of Potential Disposal Facilities

Alternative disposals sites were selected based on criteria and assumptions provided by the Jurisdictions, interviews with MSW disposal facility operators, and knowledge of the local municipal waste industry. The initial screening of potential disposal facilities included landfills, transfer stations, and WTE facilities that are either currently operating or are known by ARCADIS to be in a planning or development stage. The initial screening identified 63 potential disposal facilities and included landfills, transfer stations and existing and proposed WTEs. Facilities identified through the initial screening were further evaluated based on the exclusionary criteria, listed below.

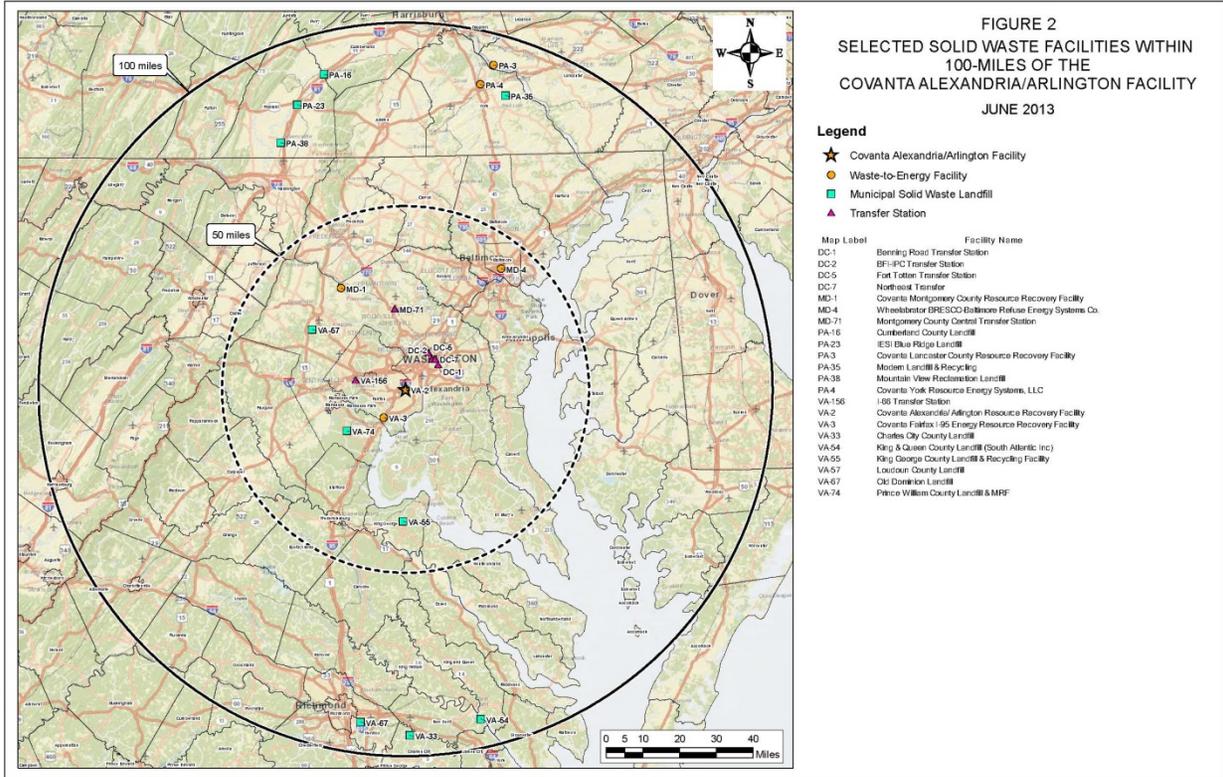
- Exclusion of facilities with daily waste acceptance capacity of less than 500 tons per day.
- Exclusion of facilities scheduled for closure before 2019.⁴
- Defined service areas from which the Jurisdictions would be expected to be excluded.
- Service provider operating practices/markets served.⁵

³ The initially planned 50-mile search radius was expanded to 100 miles to capture known large disposal facilities with reasonably expected long-term capacity.

⁴ In select cases facilities with reported limited remaining life were retained due to a variety of factors including plans for expansion.

⁵ Major service providers operating in the region (*i.e.*, Republic Waste Industries, Inc.; Waste Management, Inc.) may own and/or operate multiple facilities in the search area but would direct MSW from any one source to a primary disposal facility. Other service providers are currently marketing materials from defined areas.

Of the 63 facilities identified, application of the exclusionary criteria reduced the number of facilities potentially accessible to the Jurisdictions to 22 selected facilities, located on Figure 2 below. A larger version of Figure 2 is included in Exhibit B at the end of this memorandum.



It is noted that several publicly-owned facilities, including the Montgomery County MD Transfer Station and the Prince William County VA and Loudoun County VA landfills may only be accessible to the Jurisdictions through specific inter-jurisdictional agreements, should sufficient capacity be made available.⁶ The capacities of the facilities anticipated to be available to the Jurisdictions was previously presented in Table 3.

⁶ Based on known limitations or restrictions regarding sources of MSW, these facilities are not considered viable options for the Jurisdictions.

Waste-to-Energy Facilities

Five WTEs operating within a 100-mile radius of the Facility were selected (not including the proposed Frederick County MD and Energy Answers WTE facility southeast of Baltimore MD). Contract-based tipping fees at these WTEs typically range from \$50-\$80 per ton.⁷ With the exception of the Facility, none of these facilities offer sufficient daily disposal capacity at this time, nor would proposed or planned new capacity reliably at this time become available by 2019.⁸ One exception may be the Covanta I-95 E/RRF; however this facility is also owned and operated by Covanta.⁹

Transfer Stations

There are a limited number of transfer stations currently operating in the immediate area surrounding the Jurisdictions. Potentially accessible options include two private transfer stations in the District of Columbia (owned and operated by Waste Management, Inc. or Progressive Waste, Inc.), the District of Columbia's Benning Road and Fort Totten Transfer Stations and Fairfax County's I-66 Transfer Station. Both the District of Columbia and Fairfax County's transfer capability currently have operating capacity available for the annual amount of MSW sent to the Facility by the Jurisdictions on an annual basis.

Landfills

Ten landfills were identified, all in Virginia and Pennsylvania. Landfills in close proximity to the Jurisdictions are few, and of those none are without question regarding potential future available disposal capacity. While sufficient disposal capacity exists at landfills within the search area, transportation (in some cases distances approaching 150 miles one-way) is required.

⁷ WTE facility tipping fees are based on average stated tipping fees. Harrisburg, PA WTE excluded.

⁸ The schedule for the development of proposed new facilities or planned facility expansions is not clear at this time. Pricing for capacity at privately-owned WTE facilities, if available by 2019, would likely reflect overall market rates which are influenced by the cost of transportation and disposal to commercially operated landfills.

⁹ Fairfax County has provided the predominant amount of waste processed at the Covanta I-95 E/RRF under Fairfax County's current Service Agreement, which expires in February 2016.

Other Facilities

There are limited or few other operating facilities that provide for the processing and/or disposal of MSW in MWR. Examples include Peninsula Composting’s organics processing facility in New Castle, DE.¹⁰ There are no known mixed waste material processing facilities (MRFs) in the study area.

Market Cost Analysis

A market cost analysis was conducted to estimate transportation and disposal costs for the Jurisdictions to access potentially available disposal facilities identified in this study. The basis of the market cost analysis is:

- Use of transfer trucks/trailers is assumed as long distance hauling using local collection vehicles is not cost-effective.
- The average load per transfer is assumed to be 18 tons.
- Transportation cost varies based on distance. Per ton-mile (one-way) transportation costs assuming use of transfer trucks/trailers are:

One-way Haul Distance	Haul Cost (\$ per ton-mile)
<50 miles	\$ 0.35
>50 < 100 miles	\$ 0.30
<100 < 150 miles	\$ 0.25

- The market cost analysis focused on landfill disposal, which is a primary driver of market costs in the region.

The market cost assumptions were applied to the eight landfill facilities expected to be accessible by the Jurisdictions (as discussed above, the Loudoun County and Prince William County landfills were excluded from further consideration). As shown in Table 4, the per ton market cost, in 2013 dollars, ranges from approximately \$49 per ton to over \$110 per ton. There is a clear separation of market rates for facilities in Virginia and those in Pennsylvania. For Virginia facilities, per ton market costs are estimated to range from \$49 per ton to \$73 per ton.

¹⁰ Peninsula Compost Company (Wilmington, DE) – In operation since late 2009/early 2010, the facility aerobically composts source separated organic waste to produce a saleable compost product. Company information reports a processing capacity of 438 tons per day, processing commercial food waste, yard waste and wood waste.

As a clarifying point, the tip fees included in the market cost study are based on readily available information. The Jurisdictions may be able to secure a lower market rate through a procurement process that consolidates both transportation and disposal. Additionally, as noted above the use of a transfer station is assumed for long-haul disposal. Additionally cost will be incurred by the Jurisdictions to deliver waste to an accessible transfer station. While a separate analysis of the incremental packer haul cost for the Jurisdictions would be required, it is anticipated that these additional costs could be on the order of \$10 per ton. These additional costs are currently excluded from the above estimated transportation costs.

Table 4 - Summary of Market Cost Analysis - Landfill Disposal

Facility	City	County	State	Map Code ⁽¹⁾	Permitted Daily Capacity	Reported Remaining Life ⁽²⁾	Tip Fee (\$/ton) ⁽³⁾	One-way Distance ⁽⁴⁾	Cost / Load ⁽⁵⁾	Cost / Ton
Cumberland County Landfill	Shippensburg	Cumberland	PA	PA-16	1,350	20+	\$80.00	130	\$2,025	\$112.50
IESI Blue Ridge Landfill	Chambersburg	Franklin	PA	PA-23	1,500	15+	\$66.00	110	\$1,683	\$93.50
Modern Landfill & Recycling	York	York	PA	PA-35	648	4+	\$62.00	122	\$1,665	\$92.50
Mountain View Reclamation Landfill	Upton	Franklin	PA	PA-38	700	2+	\$64.50	107	\$1,643	\$91.25
Charles City County Landfill	Charles City	Charles City	VA	VA-33	1,193	5+	\$42.00	125	\$1,319	\$73.25
King & Queen County Landfill (South Atlantic Inc.)	Little Plymouth	King and Queen	VA	VA-54	4,500	10+	\$25.00	143	\$1,094	\$60.75
King George County Landfill & Recycling Facility	King George	King George	VA	VA-55	6,000	15+	\$32.00	57	\$884	\$49.10
Old Dominion Landfill	Richmond	Henrico	VA	VA-67	3,000	10+	\$30.00	110	\$1,035	\$57.50

Notes:

1. Map Code cross-references to Figure 2.
2. Reported remaining life refers to reported current permitted capacity. New capacity development is anticipated.
3. Tip fees based on stated rate schedules or discussions with facility operators.
4. One-way distance derived using MapQuest.
5. Cost / Load - assumed average transfer trailer load of 18 tons.

For the purposes of this study, a limited comparison of estimated market costs to the Jurisdictions' current contracted disposal costs under the Agreement was conducted. Table 5 summarizes this comparison for the current year and key dates in the Jurisdictions Agreement.

Table 5 – Comparison of Costs: Agreement vs. Market

Year	2013	2019 ⁽¹⁾	2025 ⁽²⁾
Agreement ⁽³⁾	\$43.16 - \$48.30	\$60.46 - \$66.51	\$0 - \$76.16
Market Cost ⁽⁴⁾	\$49-\$73	\$58-\$88	\$70-\$105

Notes:

1. Range presented assumes Extension Option not exercised prior to 2019; Renewal Term continues.
2. Range presented assumes Extension Option exercised in 2024.
3. Cost range representative of the Jurisdictions Base O&M Fee and Excess Waste incremental charge. Escalated per the Agreement.
4. Estimated Market costs (see Table 3) are escalated at an assumed annual rate of 3.0 percent. Market costs representative of selected facilities in Virginia only.

The above comparison indicates the Jurisdiction’s scheduled costs under the Agreement are below or at the low end of the projected market cost range. It is also noted several important factors introduce uncertainty in long-term market cost projections, including:

- Fuel cost variability;
- Changes in supply and demand
- Length of contract (short-term versus long-term)
- Infrastructure needs and associated capital cost

Market Competition

In the immediate area surrounding the Jurisdictions (District of Columbia and Northern Virginia, major competitors¹¹ to the Facility include:

- Covanta’s I-95 E/RRF (Fairfax County VA)¹²
- Waste Management’s King George Landfill (King George County VA)¹³
- Progressive Waste, Inc.’s BFI-IPC Transfer Station (District of Columbia)¹⁴

¹¹ For the purposes of this discussion, competitors are assumed to be operators and facilities that are currently in a position to attract waste generated within the Jurisdictions, including waste not currently directly managed by the Jurisdictions.

¹² Covanta’s ability to market merchant capacity in the future is not clear at this time.

¹³ Waste Management is positioned to direct waste from the region to this facility (as well as other landfills in the Waste Management network of facilities in the greater Mid-Atlantic region) through its transfer station located in the District of Columbia.

- Waste Management's Northeast Transfer Station (District of Columbia)

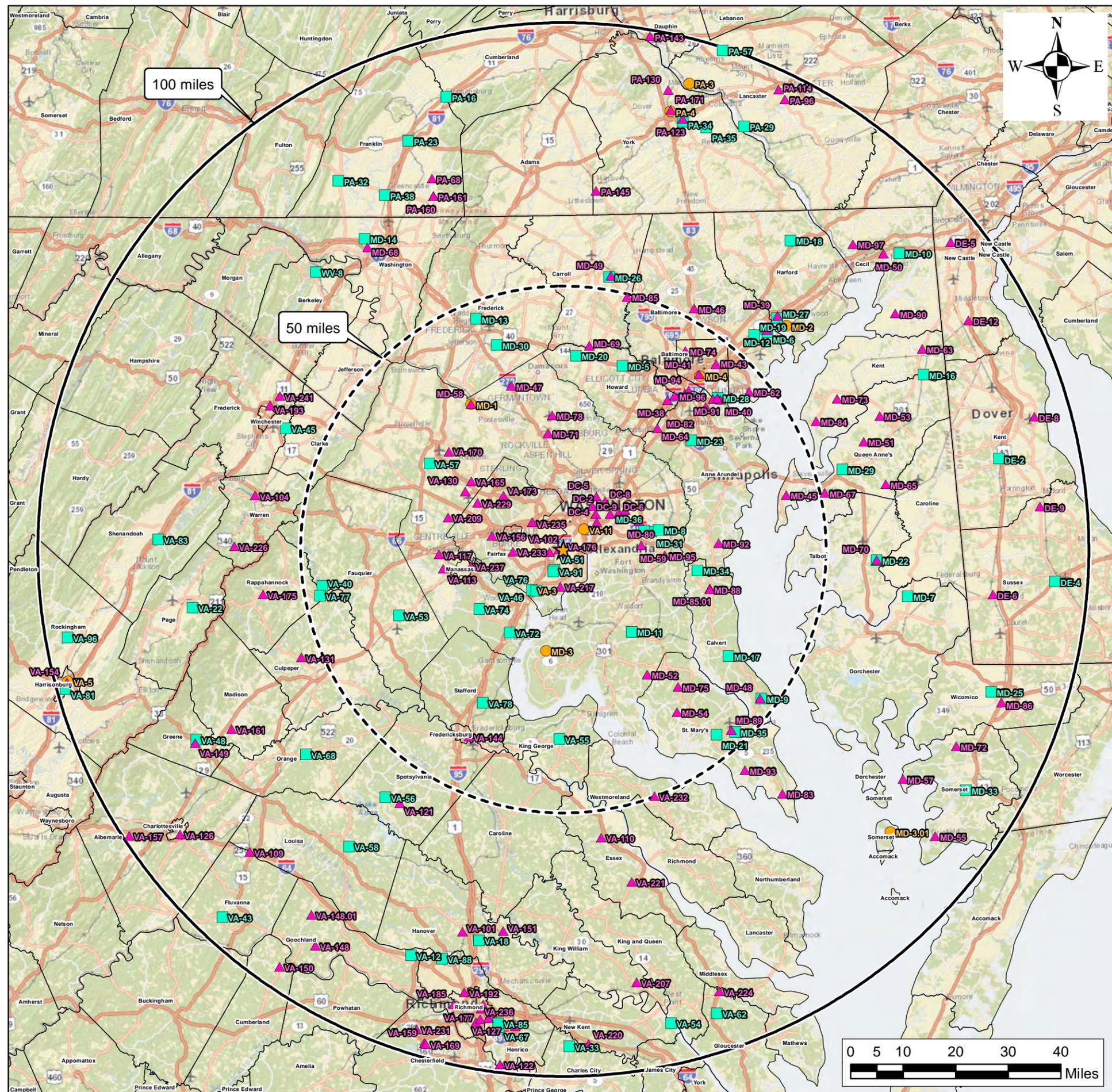
Other service providers operating in the area continue to actively seek opportunities to increase market share. For the foreseeable future, competition in the market place is expected to remain high due to the combination of steady waste generation, limited local disposal options, sufficient disposal capacity available within affordable hauling distances and the private sector's desire to develop robust programs that provide insulation from market fluctuations.

¹⁴ Progressive Waste currently transfers waste from its District of Columbia transfer station to its IESI Blue Ridge Landfill in Chambersburg PA.

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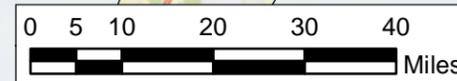
EXHIBIT A

FIGURE 1
 SOLID WASTE FACILITIES WITHIN
 100-MILES OF THE
 COVANTA ALEXANDRIA/ARLINGTON FACILITY
 JUNE 2013



Legend

- ★ Covanta Alexandria/Arlington Facility
- Waste-to-Energy Facility
- Municipal Solid Waste Landfill
- ▲ Transfer Station



KEY TO FIGURE 1
SOLID WASTE FACILITIES WITHIN 100-MILES OF THE
COVANTA ALEXANDRIA/ARLINGTON FACILITY

JUNE 2013

Map Label	Facility Name	Type	Volume_Des
DC-1	Benning Road Transfer Station	TS	MSW: 250 TPD
DC-2	BFI-IPC Transfer Station	TS	MSW: 1,000 TPD
DC-3	Eagle Services MRF / Washington DC	TS	REC: 13 TPD
DC-4	Eastern Trans Waste of Maryland	TS	MSW: 500 TPD
DC-5	Fort Totten Transfer Station	TS	MSW: 500 TPD
DC-6	James L. Taylor Trash Removal TS	TS	
DC-7	Northeast Transfer	TS	MSW: 1,200 TPD
DC-8	Rodgers Brothers TS	TS	
DC-9	Rodgers Brothers TS	TS	C&D: 10 TPD
DE-12	Pine Tree Corners Transfer Station	TS	MSW: 167 TPD
DE-2	Delaware Central Solid Waste Management Center	LF	MSW: 840 TPD
DE-4	Jones Crossroads Landfill	LF	MSW: 720 TPD
DE-5	City of Newark Transfer Station	TS	MSW: 56 TPD
DE-6	City of Seaford	TS	SLU: Less than 25 TPD
DE-8	Eastern Shore Environmental (ESE)	TS	REC: 193 TPD
DE-9	Milford Transfer Station	TS	
MD-1	Covanta Montgomery County Resource Recovery Facility	IN	MSW: 1,442 TPD
MD-10	Cecil County Central Landfill	LF	MSW: 246 TPD
MD-11	Charles County Landfill	LF	MSW: 113 TPD
MD-12	Days Cove Road Rubble Landfill	LF	MSW: 0.86 TPD
MD-13	Fort Detrick Municipal Landfill	LF	MSW: 9 TPD
MD-14	Forty West Municipal Landfill	LF	MSW: 301 TPD
MD-16	Glanding Disposal Area	LF	
MD-17	Hance Land Clearing Debris Landfill	LF	C&D: Less than 25 TPD
MD-18	Harford Waste Disposal Center	LF	MSW: 110 TPD
MD-19	Honey-Go-Run Reclamation Center	LF	C&D: 1,195 TPD
MD-2	Harford County Waste-to-Energy Facility	IN	MSW: 333 TPD
MD-20	Hoods Mill Road Landfill	LF	
MD-21	AAA Materials Landfill & Recovery	LF	DR : 273 TPD
MD-22	Midshore Regional Landfill	LF	MSW: 370 TPD
MD-23	Millersville Municipal Landfill	LF	MSW: 123 TPD
MD-25	Newland Park Municipal Landfill	LF	MSW: 338 TPD
MD-26	Northern Landfill	LF	MSW: 253 TPD
MD-27	Pappy's Landfill	LF	C&D: 67 TPD
MD-28	Quarantine Road Landfill	LF	MSW: 305 TPD
MD-29	R B Baker & Sons Rubble Landfill	LF	C&D: 58 TPD
MD-3	NSWC Solid Waste Incinerator	IN	MSW: 1 TPD
MD-3.01	Smith Island Incinerator	IN	MSW: 0.33 TPD
MD-30	Reichs Ford Municipal Landfill & Recycling Center	LF	MSW: 482 TPD
MD-31	Ritchie Land Reclamation Landfill	LF	C&D: 1,334 TPD
MD-33	Somerset County / Fairmount Road Landfill	LF	MSW: 56 TPD
MD-34	Soundings Road Land Clearing Debris LF	LF	LCD: 27 TPD
MD-35	St. Andrews Municipal Landfill	LF	MSW: 1 TPD
MD-36	Westphalia Road Landfill	LF	

KEY TO FIGURE 1
SOLID WASTE FACILITIES WITHIN 100-MILES OF THE
COVANTA ALEXANDRIA/ARLINGTON FACILITY

JUNE 2013

Map Label	Facility Name	Type	Volume_Des
MD-38	AMW (AmeriWaste Transfer & Hauling)	TS	MSW: 140 TPD
MD-39	Auston Contracting Inc	TS	C&D: 3 TPD
MD-4	Wheelabrator BRESKO-Baltimore Refuse Energy Systems Co.	IN	MSW: 1,887 TPD
MD-40	Baltimore City Composting Facility	TS	SLU: 120 TPD
MD-41	Berg Brothers Recycling	TS	MET: 72 TPD
MD-42	Baltimore Processing Center (BPC)	TS	MSW: 397 TPD
MD-43	Baltimore Recycling Center, LLC	TS	C&D: 186 TPD
MD-45	Batts Neck Transfer Station	TS	MSW: Less than 25 TPD
MD-46	BCRRF - Baltimore County Resource Recovery Facility & MRF	TS	MSW: 1,182 TPD
MD-47	C&D Recovery Processing Facility	TS	C&D: 243 TPD
MD-48	Calvert County Transfer Station	TS	MSW: 527 TPD
MD-49	Carroll County Recycling Center	TS	MSW: 325 TPD
MD-5	Alpha Ridge Municipal Landfill	LF	MSW: 52 TPD
MD-50	Central Recycling Center	TS	
MD-51	Centreville Transfer Station	TS	MSW: Less than 25 TPD
MD-52	Charlotte Hall Transfer Station	TS	MSW: Less than 25 TPD
MD-53	Church Hill Convenience Center	TS	MSW: Less than 25 TPD
MD-54	Clements Landfill & Transfer Station	TS	MSW: Less than 25 TPD
MD-55	Crisfield Transfer Station	TS	
MD-56	Curtis Creek Processing Facility & Transfer Station	TS	MSW: 188 TPD
MD-57	Deal Island/Chance Transfer Station	TS	
MD-58	Dickerson Composting Facility	TS	MSW: 0-0 TPD
MD-59	Dower House Road Recycling & Processing	TS	C&D: 127 TPD
MD-6	Baltimore County/Eastern Municipal Landfill	LF	MSW: 672 TPD
MD-61	Eastern Transfer Station	TS	MSW: 255 TPD
MD-62	ER&WR Processing Facility	TS	MSW: 73 TPD
MD-63	Galena Transfer Station	TS	MSW: 2 TPD
MD-64	Garnet of Maryland Processing & Transfer Station	TS	MSW: 1,894 TPD
MD-65	Glanding Transfer Station	TS	MSW: Less than 25 TPD
MD-66	Glen Burnie Convenience Center	TS	
MD-67	Grasonville Convenience Center	TS	MSW: Less than 25 TPD
MD-68	Hagerstown MRF	TS	REC: 40 TPD
MD-69	Hoods Mill Road Transfer Station	TS	MSW: 14 TPD
MD-7	Beulah Sanitary Landfill	LF	MSW: 130 TPD
MD-70	Midshore Transfer Station	TS	MSW: 109 TPD
MD-71	Montgomery County Central Transfer Station	TS	MSW: 1,443 TPD
MD-72	Mount Vernon Transfer Station	TS	MSW: 25-100 TPD
MD-73	Nicholson Landfill & Transfer Station	TS	MSW: 1 TPD
MD-74	Northwest Transfer Station	TS	MSW: 167 TPD
MD-75	Oakville Landfill & Transfer Station	TS	MSW: 15 TPD
MD-78	Office Paper Systems, Inc. Fiber MRF	TS	REC: 519 TPD
MD-8	Brown Station Road Sanitary Landfill	LF	MSW: 1,368 TPD
MD-80	Prince George's County Materials Recovery Facility	TS	REC: 313 TPD
MD-81	Recovermat Metal Recycling Plant	TS	

KEY TO FIGURE 1
SOLID WASTE FACILITIES WITHIN 100-MILES OF THE
COVANTA ALEXANDRIA/ARLINGTON FACILITY

JUNE 2013

Map Label	Facility Name	Type	Volume_Des
MD-82	Recycle America Elkridge MRF	TS	REC: 1,115 TPD
MD-83	Ridge Landfill & Transfer Station	TS	MSW: Less than 25 TPD
MD-84	Rock Hall Transfer Station (Sharptown TS)	TS	MSW: Less than 25 TPD
MD-85	Roll-Off Express Processing Facility	TS	MSW: 113 TPD
MD-85.01	Rubble Bee Recycling	TS	
MD-86	Salisbury MRF	TS	REC: 40 TPD
MD-87	Sheriff Road Transfer Station	TS	C&D: 355 TPD
MD-88	Southern Maryland PF & TS	TS	MSW: 0.01 TPD
MD-89	St. Andrews Transfer Station	TS	MSW: Less than 25 TPD
MD-9	Calvert County Appeal Landfill	LF	MSW: 390 TPD
MD-90	Stemmer's Run Transfer Station	TS	MSW: 3 TPD
MD-91	Stericycle - Chesterfield RMW Transfer Station	TS	MED: 67 TPD
MD-92	Sudley Convenience Center	TS	
MD-93	Valley Lee Transfer Station	TS	MSW: Less than 25 TPD
MD-94	Western Acceptance Facility	TS	MSW: 606 TPD
MD-95	Western Branch Composting Facility	TS	
MD-96	Weyerhaeuser Recycling & Document Destruction Services	TS	REC: 250 TPD
MD-97	Woodlawn Transfer Station	TS	MSW: 6 TPD
PA-114	Lancaster County SW Transfer Station	TS	MSW: 916 TPD
PA-123	Modern Landfill Recycling, Inc. / Recycle America Inc	TS	REC: 260 TPD
PA-130	Penn Waste, Inc.	TS	REC: 100 TPD
PA-143	Spectrum Recyclers Inc.	TS	REC: 61 TPD
PA-145	Staiman Recycling	TS	REC: 21 TPD
PA-16	Cumberland County Landfill	LF	MSW: 1,325 TPD
PA-160	Washington Township Recycling Center	TS	REC: 23 TPD
PA-161	Washington Township Transfer Station	TS	MSW: 14 TPD
PA-171	York County Solid Waste Compost Site	TS	
PA-23	IESI Blue Ridge Landfill	LF	MSW: 1,496 TPD
PA-29	Lancaster County Frey Farm Landfill	LF	MSW: 28 TPD
PA-3	Covanta Lancaster County Resource Recovery Facility	IN	MSW: 938 TPD
PA-32	Lycoming County Landfill	LF	MSW: 550 TPD
PA-34	Mifflin County Solid Waste Authority LF	LF	MSW: 36 TPD
PA-35	Modern Landfill & Recycling	LF	MSW: 648 TPD
PA-38	Mountain View Reclamation Landfill	LF	MSW: 693 TPD
PA-4	Covanta York Resource Energy Systems, LLC	IN	MSW: 1,466 TPD
PA-57	Veolia Lancaster, LLC	LF	
PA-68	American Recycling Services	TS	
PA-96	Full Circle Recycling	TS	
VA-101	AERC Recycling Solutions	TS	CRT: 2 TPD
VA-102	Alexandria Waste Recovery Facility	TS	C&D: 221 TPD
VA-104	Applehouse Compactor	TS	
VA-105	Aqua Clean Environmental of Virginia, LLC	TS	CS : 101 TPD
VA-109	BFI Fluvanna Transcyclery	TS	MSW: 202 TPD
VA-11	US Department of Defense - Pentagon	IN	MSW: 7 TPD

KEY TO FIGURE 1
SOLID WASTE FACILITIES WITHIN 100-MILES OF THE
COVANTA ALEXANDRIA/ARLINGTON FACILITY

JUNE 2013

Map Label	Facility Name	Type	Volume_Des
VA-110	BFI Organics / Pioneer Southern Ladysmith Horticulture	TS	
VA-113	Broad Run Recycling MRF	TS	C&D: 223 TPD
VA-117	C & D Recovery LLC	TS	C&D: 189 TPD
VA-119	Capitol Fiber Inc	TS	REC: 450 TPD
VA-12	623 Landfill, Inc.	LF	C&D: 1,282 TPD
VA-121	Chancellor Transfer Station & MRF	TS	MSW: 25-100 TPD
VA-122	Charles City Road Public Use Area	TS	MSW: Less than 25 TPD
VA-123	Chemtech Of Richmond Inc MRF	TS	
VA-126	Coiner's Recyclery	TS	REC: 1 TPD
VA-127	Cox's Construction and Demolition Recycling	TS	C&D: 86 TPD
VA-130	CSI Con-Serv Industries MRF	TS	MSW: 65 TPD
VA-131	Culpeper County Transfer Station	TS	MSW: 103 TPD
VA-140	East Coast Resources LLC	TS	
VA-141	East Richmond Road Landfill & Convenience Center	TS	MSW: 120 TPD
VA-144	Fredericksburg Recyclery	TS	MSW: 184 TPD
VA-148	Goochland County Central Convenience Center	TS	MSW: 34 TPD
VA-148.01	Goochland County Western Convenience Center	TS	MSW: Less than 25 TPD
VA-149	Greene County MRF & Compost Facility	TS	MSW: 92 TPD
VA-150	Hamilton Transfer Station	TS	MSW: Less than 25 TPD
VA-151	Hanover County Transfer Station	TS	MSW: 115 TPD
VA-154	Harrisonburg MRF	TS	REC: 5 TPD
VA-156	I-66 Transfer Station	TS	MSW: 2,279 TPD
VA-157	Ivy Materials Utilization Center	TS	MSW: 99 TPD
VA-159	Leaf Compositing Demonstration	TS	YW : 25-100 TPD
VA-161	Madison County Transfer Station	TS	MSW: 29 TPD
VA-165	Metro Recycling / Sterling MRF	TS	C&D: 150 TPD
VA-169	Northern Area Transfer Station	TS	MSW: Less than 25 TPD
VA-170	Old Dominion Transfer Station & MRF	TS	MSW: 291 TPD
VA-173	Prince William County Yard Waste Composting @ Balls Ford	TS	MSW: 101 TPD
VA-175	Rappahannock County Flatwood Refuse & Recycling Center	TS	
VA-176	Recycle America Alliance - Alexandria	TS	REC: 272 TPD
VA-177	Richmond Southside Transfer Station	TS	MSW: 617 TPD
VA-18	Ashcake C&D Debris LF	LF	C&D: 163 TPD
VA-185	Shoosmith LF Leaf Compost Fac	TS	
VA-192	Southeast Paper Recycling Corp	TS	REC: 100 TPD
VA-193	Southern Scrap Inc	TS	REC: 28 TPD
VA-207	Superior Disposal Inc Materials Recovery Facility	TS	MSW: 128 TPD
VA-209	SWPP Development Ticonderoga Farms, Inc.	TS	C&D: 100-500 TPD
VA-217	US Army / Fort Belvoir Transfer Station	TS	MED: 0.01 TPD
VA-22	Battle Creek Landfill	LF	MSW: 102 TPD
VA-220	Virginia Recycling Corp.	TS	MSW: 20 TPD
VA-221	VPPSA - Essex County Landfill TS Since	TS	MSW: 9 TPD
VA-224	VPPSA - Middlesex County Transfer Station	TS	MSW: 11 TPD
VA-226	Warren County Transfer Station	TS	MSW: 108 TPD

KEY TO FIGURE 1
SOLID WASTE FACILITIES WITHIN 100-MILES OF THE
COVANTA ALEXANDRIA/ARLINGTON FACILITY

JUNE 2013

Map Label	Facility Name	Type	Volume_Des
VA-229	Waste Not Recycling, Inc.	TS	REC: Less than 25 TPD
VA-231	Watkins Nurseries Incorporated	TS	YW : 20 TPD
VA-232	Westmoreland County Transfer Station	TS	MSW: 51 TPD
VA-233	WM Recycle America - Fairfax Recycling MRF	TS	REC: 400 TPD
VA-235	WM Recycle America - Merrifield MRF	TS	MSW: 2 TPD
VA-236	WM Recycle America - Richmond	TS	REC: 200 TPD
VA-237	WMI Manassas Transfer Station	TS	MSW: 212 TPD
VA-241	Zuckerman Company Materials Recovery Facility	TS	REC: 19 TPD
VA-3	Covanta Fairfax I-95 Energy Resource Recovery Facility	IN	MSW: 2,821 TPD
VA-33	Charles City County Landfill	LF	MSW: 1,193 TPD
VA-40	Fauquier County Landfill	LF	MSW: 324 TPD
VA-43	Fluvanna County Landfill	LF	MSW: 47 TPD
VA-45	Frederick County Sanitary Landfill	LF	MSW: 253 TPD
VA-46	Furnace Road / Lorton Debris Landfill	LF	C&D: 2,102 TPD
VA-48	Greene County Landfill	LF	MSW: 25-100 TPD
VA-5	Harrisonburg Steam Plant	IN	MSW: 166 TPD
VA-51	Hilltop Sand & Gravel Landfill	LF	C&D: 167 TPD
VA-53	I-95 Landfill	LF	MSW: 5 TPD
VA-54	King & Queen County Landfill (South Atlantic Inc)	LF	MSW: 3,104 TPD
VA-55	King George County Landfill & Recycling Facility	LF	MSW: 3,411 TPD
VA-56	Livingston Landfill	LF	MSW: 103 TPD
VA-57	Loudoun County Landfill	LF	MSW: 257 TPD
VA-58	Louisa County Landfill	LF	MSW: 51 TPD
VA-62	Middle Peninsula Landfill & Recycling Facility	LF	MSW: 1,570 TPD
VA-67	Old Dominion Landfill	LF	MSW: 2,194 TPD
VA-68	Orange County Landfill	LF	MSW: 103 TPD
VA-72	Potomac Debris Landfill	LF	C&D: 371 TPD
VA-74	Prince William County Landfill & MRF	LF	MSW: 760 TPD
VA-76	Rainwater Concrete Debris Landfill	LF	MSW: 0-0 TPD
VA-77	Rappahannock County Landfill	LF	MSW: 15 TPD
VA-78	Rappahannock Regional Landfill	LF	MSW: 304 TPD
VA-81	Rockingham County Landfill	LF	MSW: 113 TPD
VA-83	Shenandoah County Landfill	LF	MSW: 61 TPD
VA-85	The East End Landfill	LF	C&D: 457 TPD
VA-88	Springfield Road Landfill	LF	MSW: 330 TPD
VA-91	Telegraph Road Debris Landfill	LF	
VA-96	Waynesboro City Landfill	LF	MSW: 8 TPD
WV-8	LCS Services Landfill	LF	MSW: 383 TPD

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EXHIBIT B

FIGURE 2
SELECTED SOLID WASTE FACILITIES WITHIN
100-MILES OF THE
COVANTA ALEXANDRIA/ARLINGTON FACILITY
JUNE 2013



Legend

- ★ Covanta Alexandria/Arlington Facility
- Waste-to-Energy Facility
- Municipal Solid Waste Landfill
- ▲ Transfer Station

Map Label	Facility Name
DC-1	Benning Road Transfer Station
DC-2	BFI-IPC Transfer Station
DC-5	Fort Totten Transfer Station
DC-7	Northeast Transfer
MD-1	Covanta Montgomery County Resource Recovery Facility
MD-4	Wheelabrator BRESKO-Baltimore Refuse Energy Systems Co.
MD-71	Montgomery County Central Transfer Station
PA-16	Cumberland County Landfill
PA-23	IESI Blue Ridge Landfill
PA-3	Covanta Lancaster County Resource Recovery Facility
PA-35	Modem Landfill & Recycling
PA-38	Mountain View Reclamation Landfill
PA-4	Covanta York Resource Energy Systems, LLC
VA-156	I-66 Transfer Station
VA-2	Covanta Alexandria/ Arlington Resource Recovery Facility
VA-3	Covanta Fairfax I-95 Energy Resource Recovery Facility
VA-33	Charles City County Landfill
VA-54	King & Queen County Landfill (South Atlantic Inc)
VA-55	King George County Landfill & Recycling Facility
VA-57	Loudoun County Landfill
VA-67	Old Dominion Landfill
VA-74	Prince William County Landfill & MRF



Appendix C

Alexandria/Arlington Resource
Recovery Facility Site Visit
Memorandum



3101 Wilson Blvd.
Suite 550
Arlington
Virginia 22201
Tel 703 351 9100
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MEMO

To:
Yon Lambert, City of Alexandria
Erik Grabowsky, Arlington County

Copies:
Isabella Schroeder, ARCADIS
Doug Sawyers, ARCADIS
File

From:
Amit Chattopadhyay

Date:
July 18, 2013

ARCADIS Project No.:
06654001.0000

Subject:
Alexandria/Arlington Resource Recovery Facility Site Visit

Introduction

ARCADIS-US (ARCADIS) visited the Alexandria/Arlington Waste to Energy Facility (Facility) on Wednesday, July 10, 2013. The key purpose of the site visit was to better understand the facility condition, location, operations and maintenance to facilitate the development of assumptions for long-term financial modeling of resource recovery operations.

Observations

Kyle Perrin of HDR accompanied Amit Chattopadhyay of ARCADIS during the visit. On Covanta's side Michael Renga, Business Manager, and Brian Donnelly, Facility Manager facilitated the visit and participated in discussions. The following presents a summary of the key observations and findings based on discussions with Covanta.

1. Covanta was courteous and cooperative during the visit;
2. Covanta expressed their hope to keep operating the plant beyond 2025 (when land lease expires) through 2038. They pointed out a few sweeteners in their extended operations deal, such as (a) zero escalation in tipping fee from the date of signature of the extension through 2025, and (b) zero tipping fee beyond 2025 for the Alexandria/Arlington waste; and (c) zero risk for Alexandria/Arlington for change-in-law impact after 2025;

3. The Facility looks well maintained with a reasonable cleanliness level, and no alarming corrosion areas were seen;
4. Similar to other plants we aware of, Covanta uses two scheduled Facility outages per year with intermediate hydroblast cleaning of the boilers as needed;
5. The data presented in the HDR Facility Reports (ARCADIS reviewed the last three annual reports) show that the Facility's preventive maintenance, coupled with maintenance overhauls has resulted in a well-run Facility, as verified by such leading indicators as availability and unscheduled shutdowns;
6. Air pollution control system performance has been good – majority of the pollutant emissions were significantly below the respective permit limits;
7. On specific mercury emissions stack testing data during the operating years 2001-2012, the data for 2010 was high. There was no explanation on why the mercury emission concentration in 2010 tested at levels that were over 30 times higher as compared to the average of the other 11-years, although meeting permit limit was still not an issue;
8. While we have not investigated the regulatory forecast for Virginia, it appears that the EPA NOx emission limit of 205 ppm applies to the Facility at this time; however, a lower level of NOx set point of 160 ppm is voluntarily used, which is routinely met. From our experience with projects in some other states, a major NOx control retrofit will be needed if the future NOx limit is reduced significantly for the Facility;
9. With extremely small size of the Facility site (4.0 acres) any additions to the Facility will be challenging, if possible;
10. The two steam turbine generators (TG units) are rated 14 MW each, however, total MW produced is typically up to 23 MW;
11. There is a steam production limit of 77 klbs/h per boiler, while each boiler is capable of producing up to 90 klbs/h;
12. In Covanta's opinion, the Facility is good for a 60-year life- typically they plan for a 5 – 10 year maintenance forecast as a part of their routine operating practice;
13. Regarding any major improvement, Covanta only me mentioned beneficial water use possibility using the Alexandria ReNew's wastewater plant effluent as the water source for the cooling tower;
14. Some recent major maintenance/improvements items include: extra elevator installed at the end of outside of MSW storage pit wall to facilitate handling of such wastes as (non-hazardous) special (high disposal fee, but low quantity) waste to be placed directly in the feed hopper, new scales, and new ash dischargers. In addition, Covanta improved its water spray addition in concert with an enhanced water level detection and control system (in place of the original float-type system) which accomplished the desired level of ash moisturizing, and resulted in a sizable reduction of wet ash tonnage to be disposed.

Findings

Based on the observations and discussions during the site visit, we anticipate incorporating the following assumptions into the financial model:

- Although the Facility is in very good condition, capital investment will be required to extend the life to 2038. It is anticipated that such life extension costs will be on the order of approximately 15-25% of the replacement cost new of the Facility.
- Significant air pollution control upgrades were completed in 1998, however, additional upgrades are anticipated to be required to address continued implementation of more stringent air emission limits. It is anticipated that some type of upgrade to address increased regulatory requirements, most likely for NOx and possibly for mercury will be required within the next 10-15 years.
- The Facilities boilers are capable of producing steam in excess of the steam permit limitation. We are aware of other facilities which have modified their permits which have in effect allowed for increases in processing capacity and hence improved facility economics. It appears that there may be potential at the Facility to increase processing capacity and economies of scale.
- Covanta indicated an anticipated life of 60 years, however, based on equipment vendors' opinion and prudent industry practice, for the purposes of the financial analysis, a typical 50 year facility life will be assumed.
- Alexandria ReNew is anticipating implementing a reuse water program. It is anticipated that the Facility, within the next 5-10 years will be able to substitute reuse water for potable water for cooling towers which is anticipated to reduce water costs by 20 percent.
- Covanta appears to be accepting a significant amount of "special" wastes which garner premium tip fees and as such, the model will assume continuation of this practice to enhance revenues.
- Due to space limitations at the Facility site it is not anticipated that any significant additions/improvements to enhance operations will be implemented at the Facility site.



Appendix D

Evaluation of Alternatives and
Assumptions Memorandum



ARCADIS U.S., Inc.
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Tel 703 351 9100
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MEMO

To:
Yon Lambert, City of Alexandria
Erik Grabowsky, Arlington County

Copies:
Doug Sawyers, ARCADIS
File

From:
Isabella Schroeder

Date:
July 9, 2013

ARCADIS Project No.:
06654001.0000

Subject:
Evaluation of Alternatives and Assumptions

Introduction

The Jurisdictions have an important decision to make regarding if and when they should exercise the Extension Option(s) under the existing Waste Disposal and Service Agreement, and if not how else should the waste be managed. Several short and long-term alternatives exist including, but not limited to:

- Exercise Extension Option(s):
 - Exercise extension to 2038 during “Initial Term” (which runs from 1/1/2013-6/30/19)
 - Exercise extension to 2038 during “Renewal Term” (which runs from 7/1/19-9/30/25)
- Do Not Exercise Extension Option(s):
 - Negotiate New Terms with Covanta (terms to be determined)
 - Go to Market for 2019-2025 then:
 - Own/Operate Facility
 - Sell/Lease Facility
 - Close Facility

In addition to the above alternatives, several sub-variations can exist. Furthermore, each of these alternatives poses its own risks, benefits and costs. Tables 1 and 2 below summarize some of these key risks, benefits and costs associated with the various alternatives.

Table 1: Waste Disposal and Service Agreement Alternatives
Short-Term Alternatives

Alternative	Risks	Benefits	Cost
Exercise Extension during Initial Term	<ul style="list-style-type: none"> Long-term unknowns Illegal dumping due to below market rates Potential loss of asset value Capacity for non-residential waste 	<ul style="list-style-type: none"> Cost certainty Immediate savings Insulated from Market Reduced change-in-law risks No impact to current System 	<ul style="list-style-type: none"> Below Market rates Minimizes future cost risks
Renewal Term by Mutual Agreement	<ul style="list-style-type: none"> Contingent on Covanta Agreement Cost escalation vs. market Excess waste premium Capacity for non-residential waste 	<ul style="list-style-type: none"> Cost certainty Opportunity to reevaluate 	<ul style="list-style-type: none"> Higher cost if Extension Option not exercised
Negotiate Terms with CA/A post-July 2019	<ul style="list-style-type: none"> Then-current Market conditions Preferred terms Negotiation leverage 	<ul style="list-style-type: none"> Cost certainty Likely advantageous relative to Market Greater cost certainty than Market 	<ul style="list-style-type: none"> Cost to renegotiate Potential additional cost pressures
Go to Market	<ul style="list-style-type: none"> Cost risk (fuel/transportation) Institutional acceptance Contract length Multiple contracts Time 	<ul style="list-style-type: none"> May avoid delivery commitment Facility ownership 2025 Re-evaluate programs 	<ul style="list-style-type: none"> Capital requirements Procurement

Table 2: Alternatives for Facility Post 2025 if Extension Not Exercised

Long-Term Alternatives

Alternative	Risks	Benefits	Cost
Own/Operate Facility	<ul style="list-style-type: none"> Owner risks <ul style="list-style-type: none"> Facility compliance Commodity prices Regulatory/Capital Public/political risks Limited competition for contract operators Impact to System 	<ul style="list-style-type: none"> Asset value Merchant capacity Increased control Risk allocation Re-evaluate programs 	<ul style="list-style-type: none"> Organizational/Administrative cost Lack of cost certainty
Close Facility	<ul style="list-style-type: none"> Then-current Market conditions Ability to secure cost-effective replacement capacity Lack of control 	<ul style="list-style-type: none"> Site Redevelopment Opportunity for new technology 	<ul style="list-style-type: none"> Decommissioning Lack of cost certainty
Sell or Lease Facility?	<ul style="list-style-type: none"> Asset value Buyer competition Public/political risks 	<ul style="list-style-type: none"> Asset value Risk transfer Re-evaluate programs Cash infusion 	<ul style="list-style-type: none"> Lack of cost certainty Transactional cost

Imagine the result



Evaluation of Alternatives

To facilitate the decision making process, it was agreed that a detailed financial evaluation and comparison would be conducted for up to three key alternatives. To assist in identifying the three key alternatives, a workshop was conducted on June 12, 2013. The workshop included the following:

- Review of contractual relationships between the parties and key terms and conditions of the following governing agreements:
 - Jurisdictional Agreement
 - Facility Site Lease
 - Operating Site Lease
 - Waste Disposal and Service Agreement
 - Power Purchase Agreement;
- Review of the key decision points of the Waste Disposal and Service Agreement and the options/alternatives/risks associated with each;
- Discussion and rating of the strengths, weaknesses, opportunities and threats (SWOT) of the existing system;
- Review of market analysis findings including alternative disposal facilities, market rates and potential impacts on decision making process;
- Discussion of the advantages/disadvantages of alternatives and the determination of the top three alternatives recommended for further evaluation.

Based on this workshop, the following alternatives were not selected for further evaluation at this time:

- Exercise Extension During Any Other Year of Initial Term – During the Initial Term, the Jurisdictions have the unilateral right to extend the agreement to 2038. Furthermore, exercising the extension locks in the then current disposal rate through 2025, providing for immediate savings. As such, the earlier the extension is exercised the greater the savings. The greatest savings, however, occurs after 2025 when the disposal rate for the base tons drops to zero. This zero dollar base rate is the same regardless of when the extension is exercised. As such, it was agreed that exercising the extension in 2014, versus any other year of the Initial Term, should be evaluated as a base case since the current study is being conducted at this time (in 2013) to allow the Jurisdictions to take advantage of maximizing savings under the agreement and because a separate table summarizing the cost impact of exercising the extension during any other year of the Initial Term can be prepared to address the other alternative extension dates.
- Renewal Term by Mutual Agreement – If the extension is not exercised during the Initial Term, the Jurisdictions still have the option of exercising during the Renewal Term. Unfortunately, the Jurisdictions no longer have the unilateral right to extend, as the extension is subject to Covanta mutual agreement during the period of July 1, 2018 to December 31, 2018. In addition, the base disposal fee would increase to more than \$60 per ton during the first year of the Renewal Term, if

the extension is not already exercised during the Initial Term. Waiting to extend during the Renewal Term introduces uncontrollable risk since a) the extension is subject to Covanta agreement, b) would require Jurisdictions to develop a back-up plan should Covanta not agree to extend and c) the unit cost increase during the Renewal Term is more than \$10 per ton. As such, this alternative was not selected for evaluation at this time. It was concluded that the Jurisdictions will need to make a decision prior to this time to avoid these risks.

- Negotiate New Terms/Agreement with Covanta – The Jurisdictions have the option to not extend and potentially negotiate/renege a new agreement with Covanta. This may be warranted should new information or changes in market conditions occur that would provide the Jurisdictions with additional leverage that did not exist at the time the current agreement was negotiated. The findings of market analysis currently indicate that the existing agreement's rates are less than market rates. In addition, the results/potential impacts, if any, of ongoing negotiations between Covanta and Fairfax County regarding the Covanta Fairfax Energy/Resource Recovery Facility remain unknown. While some new information regarding cost saving enhancements implemented by Covanta since execution of the last agreement have been identified, they do not warrant a reopening of the agreement. As such, it was agreed that this alternative will not be evaluated at this time due to the unknowns, but may be evaluated at a later date depending on the findings of the current study and as new information becomes available.

- Close Facility – The Jurisdictions have the option of closing the Facility in 2025. Closing the Facility in 2025 would require the long-haul of municipal waste outside of the Jurisdictions boundaries, as it is not likely that a new disposal facility would be permitted within the Jurisdiction's boundaries. In 2009 the City of Alexandria commissioned a special study in response to land use and business operating debates in the Eisenhower West area. The 2009 Industrial Use Study, jointly prepared by Bay Area Economics (BAE), HDR, and ACTEC Engineering, explored various economic questions concerning four industrial uses in the West End section of the City, including the Facility Site. The study identified that significant hurdles to the area's redevelopment exist and that issues regarding if the benefits of redevelopment have a greater value to the City than the maintenance of an industrial zone need to be addressed. Specific to the Facility, the Study identified that the Facility is a resource that provides a vital municipal service and represents a significant investment on the part of the Jurisdictions. Based on these findings and the lack of other disposal facilities within the Jurisdictions' boundaries, the evaluation of this alternative will not be considered at this time.

Based on this workshop, the following alternatives were identified for further evaluation at this time:

- Exercise Extension in 2014
- Go to Market in 2019, Operate Facility Beginning 2025
- Go to Market in 2019, Sell/ Long-Term Lease Facility Beginning 2025

A teleconference was subsequently held on July 26, 2013 to review and confirm the June 12 workshop findings and the alternatives selected for further evaluation. Presented below is a detailed description of the key alternatives selected for financial comparison based on the July 12th workshop and July 26th teleconference including the rationale for selection.

1. **Exercise Extension in 2014** – The Jurisdictions can exercise the extension of the Agreement to 2038 at any time between now and 2025, subject to the terms and conditions of the Agreement. As discussed previously, the earlier the extension is exercised the greater the savings under the existing agreement, since the execution of the extension serves to lock in the then current rate. As such, for the purposes of this alternative, exercising the extension in 2014 was selected as it serves to maximize the savings under the existing agreement and also eliminates the risk of Covanta potentially backing-out of agreement for which Covanta has that option between July 1 and December 31, 2018. While several other advantages and disadvantages exist, a financial evaluation of this primary option is recommended to serve as a basis for comparison with the other alternatives. The potential impact of delays in exercising the extension, however, will be quantified and discussed in the final report.

2. **Go to Market in 2019, Operate Facility Beginning 2025** – This alternative assumes that the Jurisdictions do not exercise the extension and/or Covanta decides to back out of the agreement in 2018 in advance of the Jurisdictions exercising the extension. Under this alternative, it is assumed that Covanta is not interested in negotiating new terms and will not accept Jurisdiction delivered waste at any of its facilities and the Jurisdictions will take back operations of the Facility on October 1, 2025. In the interim, the Jurisdictions will need to long-haul its collected municipal solid waste for ultimate disposal at a landfill during the period of July 1, 2019 through September 30, 2025. While it is possible for the Jurisdictions waste to continue to be disposed at the Facility under a potential private contractor account or through negotiations with Covanta, this alternative is based on a conservative option that is within the Jurisdictions control. The parties recognize, however, that it is likely that the costs for disposal during the period of 2019 and 2025 have a greater opportunity of being less than estimated vs. greater than estimated. Sensitivity analysis will be conducted to quantify potential savings associated with potential opportunity to continue to dispose of waste at the Facility under a potential private contractor account.

There are a limited number of landfills with available capacity within a 50 mile radius of the Jurisdictions; however, there is expected to be ample available capacity within a 100 mile radius. A transfer station will be required to economically long-haul the Jurisdictions' waste. Currently, there are no permitted municipal solid waste transfer stations in the Jurisdictions' service area, although there is a permitted construction and demolition debris transfer station and recycling facilities. The nearest existing permitted municipal solid waste transfer stations with capacity to accept the Jurisdictions' waste is located in Washington DC. While it is possible for a private contractor to permit and develop a transfer station within the Jurisdictions' service area prior to 2019, this alternative will assume the use of existing transfer stations in Washington DC for the Jurisdictions' collected waste and ultimate disposal in a landfill for the period of July 1, 2019 to

September 30, 2025. Again, this assumption is based on a conservative option that is within the Jurisdictions' control, recognizing that opportunities may exist to reduce costs.

Upon transfer of ownership and operations back to the Jurisdictions on October 1, 2025, the Jurisdictions' collected waste will be processed at the Facility. The Jurisdictions collected waste currently represents about 15% of the processing capacity of the Facility. The Facility will need to run close to capacity to maximize its economic feasibility. As such, the financial analysis for this alternative will be based on the assumption that the Jurisdictions' will implement waste flow control to maximize capacity utilization. A comparison of the resulting cost per ton compared to market pricing will be conducted to identify margins that may be available to pay for other solid waste program costs of the Jurisdictions.

3. **Go to Market in 2019, Sell/Long-Term Lease Facility in 2025, Long-Haul After 2025** – This alternative is similar to Alternative 2; however, the Jurisdictions' waste continues to be long-hauled through the remainder of the planning period (2038). The Facility still reverts back to the Jurisdictions in 2025, however, it is assumed that the Jurisdictions' choose to sell/long-term (50-year) lease the Facility and Site to achieve maximum purchase price for the assets. It is anticipated that the purchaser will continue to operate the Facility, as the continued use of the Facility for processing waste is anticipated to represent the highest and best use of the Facility and Site. While the Jurisdictions could potentially still dispose of waste at the Facility while under private ownership, this alternative assumes that it would not due to loss of control of the Facility. As such, this alternative likely represents a worst case scenario. Sensitivity analysis, however, will be conducted to quantify potential savings associated with continued disposal at the Facility post 2025. In addition, while the Jurisdictions may be able to lease the Facility for a much shorter term and retain some control for continued disposal of Jurisdiction waste at the Facility this would likely reduce the lease/purchase price. The evaluation of this alternative is recommended as it also allows for assessment of impact to the Jurisdictions if the Facility were closed.

Key Assumptions

A dynamic financial model is being developed to conduct the financial evaluation of the alternatives to address the numerous variables and scenarios that exist. It is for this reason the financial models will also be developed to allow the conduct of sensitivity analyses. In addition, the models will incorporate probabilistic modeling using @Risk™ software to help quantify potential financial risks. As in most situations, over the short term it is much easier to reliably project outcomes than in the long-term. Over the long-term additional variables that are outside of a community's control increasingly come into play. To assist in evaluating the potential long-term risks due to factors outside of a community's control a range of values and probabilities will be assigned to key variables that could most impact future performance such as waste flow, energy pricing/fuel costs, capital investment needs to meet regulatory requirements, and market rates. In the interim, however, certain base assumptions will need to be made in order to develop the financial models. The following summarizes the key assumptions that coupled with the selection of the three key assessment alternatives will serve as a basis for development of the models and its projections.

To the extent possible these assumptions will be consistently maintained for all alternatives and scenarios to better allow for common comparisons.

Table 3: Key Assumptions

Key Items	Overview of Assumptions for Financial Model
Planning Period:	The existing contract, if extended, continues to 12/31/2038. The Fiscal Year begins July 1 st . The planning period will run from July 1, 2013 through December 31, 2038 for all scenarios. The cost per ton for disposal of Jurisdiction waste and the net present value of each alternative over this planning period will be evaluated and compared.
Facility Life:	With proper maintenance and regular capital investment the typical useful life of a waste-to-energy facility is accepted to be approximately 50 years. The life can be extended beyond 50 years, however, significant upgrades and rehabilitation would be required. The Facility commenced operations in 1988 and for the purposes of the evaluation is projected to have a useful life that is co-terminus with the 2038 Planning Period.
Processible Waste Quantities:	<p>Waste quantities under Jurisdictional control will vary based on changes in waste generation, recycling and population, legislative actions, disposal practices, market conditions, contractual arrangements and Jurisdictional choices. Currently Jurisdictions collect primarily single family residential waste (although some schools, small businesses, churches, etc. are included based on historic practices) and deliver approximately 58,000 tpy of processible waste to the WTE for processing, although this number appears to be decreasing and the Jurisdictions are lowering their GAT to 48,000/68,000. Currently, this represents approximate 17% of the total waste processed at the Facility. Single family residential represents approximately 1/3rd of the residential population. It is estimated that the Jurisdictions collect between 22% and 27% (Alexandria and Arlington, respectively) of total processible waste generated within the municipal boundaries, with the remainder being generated for disposal by multi-family and commercial establishments. Population is projected to increase; however, multi-family and commercial will grow faster than single family. In addition, recycling is anticipated to increase which will offset the quantities of processible waste available for disposal.</p> <p>Key Assumptions:</p> <ul style="list-style-type: none"> • Waste Generation Rates Per Capita will remain consistent over the planning period. Current generation rates are in the order of 6.8 pounds per person per day. • Population projections will be based on Metropolitan Washington Council of Governments (MWCOG) latest projections which show an approximate 6% and 18% growth in population from 2012 to 2038 for Alexandria and Arlington, respectively. • Recycling rates will increase from current rates by an estimated 0.75% annually, bring rate from current rates of approximately 49% to approximately 60% by 2038. • Jurisdictions will continue to be responsible for collection and disposal of single family residential waste. • Commercial and multi-family waste will continue to be privately collected and disposed. • Evaluation of alternatives will focus only on the disposal of Jurisdiction collected “processable” waste. • It is assumed that disposal of “non-processible” waste will continue to be managed separately. We recognize, however, that different disposal facilities may have different requirements regarding “acceptable” wastes. For the purposes of the analysis it is assumed that the definition of “acceptable” waste at alternative disposal facilities will have a negligible impact on the cost comparisons being conducted.

Key Items	Overview of Assumptions for Financial Model
<p>MSW Hauling Costs:</p>	<p>The Jurisdictions currently direct haul to the Facility. It is unlikely that another disposal facility will be constructed within the Jurisdictions boundaries. As such, the likely alternative to the Facility would require transport to an out-of-jurisdictional boundary landfill facility. The Market Analysis identified several landfills with sufficient capacity, but not within economical direct haul distance. As such, a transfer station is needed to economically long haul waste. The Market Analysis identified several existing transfer stations in Washington DC capable of accepting Jurisdiction collected waste.</p> <p>Key Assumptions:</p> <ul style="list-style-type: none"> • As an alternative to direct haul to Facility, Jurisdictions would direct haul to a DC transfer station, which for financial evaluation purposes is estimated to add approximately 15 miles (one way) of direct haul cost to the Jurisdictions costs. • Waste delivered to the DC transfer stations will subsequently be transferred into trailers and long-hauled to landfill facilities at then current market rates. • The then current market rates will be based on the Market Analysis findings taking into account transfer station operating costs, landfill locations and transfer trailer hauling costs and landfill disposal gate and contract rates.
<p>Facility Ownership and Operations:</p>	<p>If extension not exercised, Facility reverts to Jurisdictions in 2025. At that time, Jurisdictions have the option of a) selling Facility; b) leasing Facility (short or long term), c) contracting for short or long-term operations at a to be negotiated level of Jurisdictional risk, d) self-operating, e) mothballing, f) building/expanding/upgrading to extend life, and/or e) negotiating a new Jurisdictional Agreement. For the purposes of the financial analysis the alternative to be evaluated will focus on Jurisdictional ownership, assuming continuation of existing Jurisdictional Agreement, with a contract operator providing operating and maintenance labor.</p> <p>Key Assumptions:</p> <ul style="list-style-type: none"> • Jurisdictional Ownership with Contract Operations from 2025 to 2038, if extension not exercised. • No major refurbishment or capital upgrades to extend life beyond 2038. • Jurisdictions continue site lease payments consistent with that under extension option. • Jurisdictions continue payment in lieu of taxes consistent with property tax that would have been paid under extension option. • Facility operations consistent with historic facility performance as further discussed under "Facility Operating Costs". • Jurisdictions will operate facility at cost, not for profit. • Rates to be charged for disposal services will be uniform across the Facility's customer base. • Jurisdictions will not institute/enforce legislative waste flow control, but will rely on economic flow control.

Key Items	Overview of Assumptions for Financial Model																												
<p>Facility Operating Costs:</p>	<p>Cost to dispose of waste at the Facility depends on operating performance, capital recovery requirements, and revenue generation capabilities. Key factors include waste quantity and composition, processing capacity, online availability, energy generation rates, contracted energy payments, metals revenue, ash generation and disposal costs, staffing requirements, chemical usage and costs, administrative needs, taxes and fees.</p> <p>Key Assumptions:</p> <ul style="list-style-type: none"> Assumes facility performance will be consistent with historic based on available monitoring data compiled by HDR coupled with industry standards including: <table border="1" data-bbox="566 667 1239 1104"> <thead> <tr> <th>Item</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>On-line Availability</td> <td>96%</td> </tr> <tr> <td>Max Processing Capacity Per Steam Permit Limit</td> <td>347,000 tpy</td> </tr> <tr> <td>Net Energy Production</td> <td>440 kWh/ton</td> </tr> <tr> <td>Ash Disposal</td> <td>22% by weight</td> </tr> <tr> <td>Ferrous Recovered (% waste processed)</td> <td>2.7%</td> </tr> <tr> <td>Non-Ferrous Recovered (% ash)</td> <td>1%</td> </tr> <tr> <td>Fuel Oil</td> <td>0.1 gal/ton</td> </tr> <tr> <td>Boiler Make-up</td> <td>20 gal/ton</td> </tr> <tr> <td>Cooling Tower Make-up</td> <td>400 gal/ton</td> </tr> <tr> <td>Ammonia</td> <td>1.5 lbs/ton</td> </tr> <tr> <td>Carbon</td> <td>1.2 lbs/ton</td> </tr> <tr> <td>Pebble Lime</td> <td>15 lbs/ton</td> </tr> <tr> <td>Dolomitic Lime</td> <td>5 lbs/ton</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Energy pricing based on PJM LMP Zone DOM real-time energy and capacity projections. The only “other” revenue to be included in the analysis is ferrous revenue and to-be-determined non-ferrous revenue. Currently Covanta accepts ash from Arlington/Alexandria at its Fairfax Facility for non-ferrous processing prior to disposing in adjacent I-95 ash mono-fill. Continuation of practice dependent on Covanta Fairfax, economics and ash disposal location. 	Item	Quantity	On-line Availability	96%	Max Processing Capacity Per Steam Permit Limit	347,000 tpy	Net Energy Production	440 kWh/ton	Ash Disposal	22% by weight	Ferrous Recovered (% waste processed)	2.7%	Non-Ferrous Recovered (% ash)	1%	Fuel Oil	0.1 gal/ton	Boiler Make-up	20 gal/ton	Cooling Tower Make-up	400 gal/ton	Ammonia	1.5 lbs/ton	Carbon	1.2 lbs/ton	Pebble Lime	15 lbs/ton	Dolomitic Lime	5 lbs/ton
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Key Items	Overview of Assumptions for Financial Model
Debt Service and Life-Extension Costs:	<p>Assumes Facility in good operating condition when transferred back to Jurisdictions in 2025 and as such no major rehabilitation or upgrades required.</p> <p>Key Assumptions:</p> <ul style="list-style-type: none"> • No existing debt • No refurbishment to extend life beyond 2038. • Some capital investment required in addition to regularly scheduled maintenance items to address potential changes in regulatory requirements. • Assumes [\$30] million of capital investment will be required in 2025 to provide for continued operations in accordance will regulatory requirements through 2038. • Bonds to be amortized over remaining life of facility • Leveled debt service schedule • Financing costs: 5% of capital cost • Financing rate: 6% interest • Debt Service Reserve Fund required • Debt Service Reserve Fund interest earnings: 2.5% • Debt Service coverage requirement of 1.0
Ash Disposal Costs:	<p>Ash is currently disposed of at the Fairfax County's I-95 Landfill (or the Lorton Landfill). It is anticipated that the Jurisdictions will continue to dispose of ash in the I-95 landfill or at another nearby landfill. The tipping fee for ash disposal, however, will be based on a projection of then current market rates. It is possible that ash recycling becomes an economically feasible option by 2025; however, the financial analysis will assume that ash will be hauled direct from the Facility to a permitted landfill.</p>
Jurisdiction Solid Waste Program and Administrative Costs:	<p>The Jurisdictions incur administrative costs associated with its collection operations, recycling programs and the Facility Monitoring. Changes to the system will require changes to administration requirements including costs for consultant services for potential new procurements and contract negotiations. For the purposes of this financial evaluation we will assume the differences in administrative/consultant costs between alternatives is not significant or a criteria in the decision making process and as such have been excluded from the analysis.</p>
Escalation Factors and Financing Costs:	<p>Projecting inflation and interest rates over the short and long-term can be difficult as significant swings can occur within a short period of time, especially to individual items (health care, metals, etc.) and can be compounded over the long term. Anticipate maintaining simplicity due to long-term nature of evaluation and basing projections on historic escalation rates.</p> <p>Key Assumptions:</p> <ul style="list-style-type: none"> • Average O&M cost escalation of 3% annually



Appendix E

Financial Model Assumptions

Exhibit E: Financial Model Assumptions

Economic Analysis of Covanta Extended Term Agreement

			Assumptions		
			Low	Proforma	High
1.	Jurisdictional Waste Quantity Available for Processing				
a.	Jurisdiction Population	Based on Round 8.2 Population projections (2012).	340,000	356,750	441,927
b.	Jurisdiction Waste Generation (lbs/pp/day)	Low assumes generation rate varies by -10% from 2012 per capita generation rate and high by +20%. Proforma calculated from 2012 Recycling Report and Round 8.2 population projections.	6.3	7.0	8.4
c.	Annual Increase in Recycling Rate (%/yr)	Assumed based on discussions with team.	0.00%	0.75%	1.00%
d.	Jurisdictional Recycling/Diversion (% of generation)	Low and Base reflect current rates based on 2012 Recycling Report. High based on highest achieved in US (San Francisco 2012 reported diversion rate).	60%	60%	80%
e.	Jurisdictional Processible Waste (tpy)	Equal to the Jurisdiction Waste Generation less quantity Recycled/Diverted.	78,071	181,061	270,603
f.	Jurisdiction Collected Waste (tpy)	Equal to 32.6% of the Jurisdictional Processible Waste based on current ratios.	25,451	58,992	88,217
2.	Alexandria/Arlington Resource Recovery Facility Processing Capacity				
a.	Design Capacity (tpy)	Fixed based on original design capacity of 975 tpd converted to tons per year (tpy).	355,875	355,875	355,875
b.	On-line Availability (average annual %)	Low assumes aging facility, high based on max potential performance. Note: percentages higher than typical but consistent with Facility performance.	94%	96%	99%
c.	Max Processing Capacity per Permitted Steam Limit	Facility limits per steam limitation of current permit assumed to be maintained for all scenarios. High assumes potential to increase limit to correlate with processing capacity.	347,000	347,000	352,316
d.	Projected Processing Capacity (tpy)	Equal to the Design Capacity multiplied by the On-line Availability.	334,523	341,640	352,316
3.	Out-side Waste Marketing Requirements				
a.	Total Tons Processed at Facility (tpy)	Equal to the lessor of Processing Capacity or sum of available Jurisdictional and Non-Jurisdictional Processible Waste.	141,991	341,640	352,316
b.	Non-jurisdiction Waste Required (tpy)	Equal to difference between Facility processing capacity and quantity of total available Jurisdictional Processible Waste.	63,920	160,579	274,245
c.	Market Rate to Attract Waste to Facility	Low based on lowest current rate offered. Proforma and high based on estimated range in market rate.	\$22	\$45	\$65
d.	Regional Market Rate for Disposal of Waste	Based on findings of Market Study.	\$45	\$55	\$65
e.	Special Waste Rate	Estimated range assuming variable types and of special wastes.	\$50	\$200	\$300
f.	Special Waste Quantities	Assumes low equals zero, base is 1% of waste processed and high is 2% of waste processed.	0	3,416	7,046
4.	Energy Generation Rates				
a.	Net Energy Generation Rate (kWh/ton)	Based on historical performance and 2012 actual.	395	439	445
b.	Annual Energy Production (MWh/yr)	Based on annual energy generation and processible waste totals.	132,116	149,919	156,781
c.	Guaranteed Energy Capacity (MW)	Equal to the guaranteed monthly MW energy production that forms bases of capacity payment.	12	14	14
c.	Annual Average Energy Production (MW)	Annual Energy Production (MWh/yr) converted to MW by multiplying by number of hours in a year.	15	17	18
e.	% of Capacity Guarantee Achieved	Equal to Energy Production (MW) divided by Guaranteed Energy Capacity (MW)			
5.	Electrical Revenue				
a.	Capacity Payments (\$/MW-day.)	Low and high based on a review in the range of PJM-SW real all-hours capacity prices projections.	\$30	\$170	\$300
b.	Capacity Payments Escalation (%/yr)	Annual escalation assumed to be less than inflation to maintain conservatism in light of unknowns regarding shale gas price impacts on energy pricing.	1%	2%	4%
c.	Energy Payments (\$/MWh)	Low and high based on a review in the range of PJM-SW real all-hours energy price projections.	\$38	\$47	\$55
d.	Renewable Energy Credits (\$/MWh)		\$0	\$2	\$10
e.	Adj.to PJM Est. to Nominal Value (%/yr)	Annual escalation assumed to be less than inflation to maintain conservatism in light of unknowns regarding shale gas price impacts on energy pricing.	1%	2.0%	4%
6.	Ferrous & Non-Ferrous Revenues				
a.	Ferrous Recovery (% of waste Processed)	Low and high assumed to be +/- 20% of proforma value.	1.9%	2.40%	2.9%
b.	Ferrous Market Price (2010\$/ton)	Low and high assumed to be +/- 30% of proforma value.	98	140	182
c.	Non-Ferrous Recovery Rate (% of waste processed)	Based on Fairfax County non-ferrous recovery rate. Low and high assumed to be +/- 30% of proforma.	0.10%	0.14%	0.18%
d.	Non-Ferrous Market Price (\$/ton)	Based on information provided by Fairfax County regarding their facility. Low and high assumed to be +/- 30% of proforma value.	\$700	\$1,000	\$1,300
e.	Ferrous and Non-Ferrous Revenue Escalator		1.00%	2.00%	4.00%

Exhibit E: Financial Model Assumptions

Economic Analysis of Covanta Extended Term Agreement

			Assumptions		
			Low	Proforma	High
7.	Operation and Maintenance Fee				
a.	Annual Operation and Maintenance Cost (2014 \$ per year)	Low and high based on a 10% reduction/increase in Base estimate, respectively	11,100,000	12,300,000	13,500,000
b.	Annual Operation and Maintenance Cost (2025 \$ per year)	Low and high based on a 10% reduction/increase in Base estimate, respectively	14,500,000	16,100,000	17,700,000
c.	Chemicals and Utilities (Note: electric included in net kWh)				
	Fuel Oil (gal/ton)	Based on historical performance and 2012 actuals.	0	0.1	0.5
	Fuel Oil (\$/gallon)	Based on historical performance and 2012 actuals.	\$3.00	\$3.50	\$4.00
	Boiler Make-up (gal/ton)	Based on historical performance and 2012 actuals.	16	20	24
	Boiler Make-up (\$/1000gallons)	Based on historical performance and 2012 actuals.	\$3.60	\$3.60	\$3.80
	Cooling Tower Make-up (gal/ton)	Based on historical performance and 2012 actuals.	360	400	440
	Cooling Tower Make-up (\$/ 1000 gallon)	Based on historical performance and 2012 actuals.	\$1.92	\$2.40	\$2.64
	Ammonia (lbs/ton)	Based on historical performance and 2012 actuals.	1	1.5	1.8
	Ammonia (\$/ton)	Based on historical performance and 2012 actuals.	\$630	\$700	\$770
	Carbon (lbs/ton)	Based on historical performance and 2012 actuals.	0.4	1.2	1.5
	Carbon (\$/ton)	Based on historical performance and 2012 actuals.	\$900	\$1,500	\$2,000
	Pebble Lime (lbs/ton)	Based on historical performance and 2012 actuals.	12	15	17
	Pebble Lime (\$/ton)	Based on historical performance and 2012 actuals.	\$150	\$170	\$200
	Dolomitic Lime (lbs/ton)	Based on historical performance and 2012 actuals.	3	5	7
	Dolomitic Lime (\$/ton)	Based on historical performance and 2012 actuals.	\$200	\$230	\$260
d.	Pass Through Costs on Per Ton Basis	Equal to Prorated Sum of Above	\$2.44	\$4.66	\$8.06
8.	Waste Haul and Landfill Disposal Costs				
a.	Ash Generation Rate After Metals Removal	Low and high based on +/- 10% of 2012 Facility performance.	21%	23%	25%
b.	Ash Disposal Costs (2013 \$/ton of ash)	Based on Fairfax County current charges, escalated at \$2 per year to 2017 and then @ inflation thereafter per Fairfax estimate.	\$19.50	\$19.50	\$19.50
c.	Ash Haul Costs (2013 \$/ton of ash)	Low and high based on +/- 20% of current estimated costs.	\$9.60	\$12.00	\$14.40
d.	Incremental Packer Haul Cost	Low assumes local facility is available, high based on +20% of proforma estimate of incremental direct haul to transfer station.	\$0	\$10	\$12
e.	Transfer, Long Haul and Disposal at Landfill	Low and high based on +/- 20% of current estimated costs.	\$45	\$56	\$67
9.	Life Extension Costs				
a.	Facility Replacement Cost	Based on recent bid prices for the Palm Beach County RRF adjusted based on size/location/inflation.	190,000,000	215,000,000	270,000,000
b.	Total Cost for Life Extension (2020/2025 \$)	Life extension typically needed at 25 years of age (2013). Assume 20% of replacement cost of facility based on facility in very good condition and 1998 upgrade.	21,500,000	43,000,000	64,500,000
c.	Percentage Paid and Completed by Covanta Prior to 2025	Low assumes Covanta will completely delay refurbishment. Base and high assumes Covanta will be limited in its ability to delay while still returning Facility in good operating condition.	0	24%	50%
d.	Life Extension Cost Escalation Rate (%/yr)	Low and high based on +/- 20% of base rate. Base assumes today costs are somewhat suppressed by the economy and future construction will be escalated faster than CPI.	2.80%	3.50%	4.20%
10.	Debt Service Schedule				
a.	Existing Debt / Change in Law	Anticipate new air regulations will require upgrades to APC within next 10-15 years (however, no SCR requirement assumed).	0	1,800,000	3,600,000
b.	Financing Interest Rate (%/yr)	Low and high based on +/- 20% of base rate.	4.0%	5.0%	6.0%
11.	Other Costs				
a.	Lease Payment	Current Payment Amount per Site Lease	420,651	420,651	420,651
b.	Property Taxes	Based on current taxes and anticipated range in future value of Facility.	250,000	612,999	1,000,000
c.	Environmental Testing	Current Estimated Cost	40,000	40,000	40,000
d.	Insurance	Current Estimated Cost	300,000	300,000	300,000
e.	Other	Miscellaneous expenses	50,000	50,000	50,000
12.	Other Factors				
a.	Facility Purchase Price (2025 dollars)	Low and high based on OCLD and RCLD respectively.	41,000,000	63,000,000	85,000,000
b.	Annual Inflation Rate (%/yr)	Inflation rate based on 30 year historic Consumer Price Index (CPI) for All Urban Consumers distribution from 1982-2012, published by the US Bureau of Labor Statistics. Low and high represent the low and high experienced during this time period.	-0.4%	3.0%	5.4%
c.	Net Present Value Discount Factor (%/yr)	Based on above annual inflation rate plus 2%.	1.6%	5.0%	7.4%



Appendix F

Review of January 2012 Cost Saving
Projections and Current Findings

Exhibit F:
Review of January 2012 Cost Savings Projections and Current Findings
Economic Analysis of Covanta Extended Term Agreement

This Appendix F discusses previously projected savings the Jurisdictions would realize by entering into the Waste Disposal and Service Agreement (Agreement) with Covanta, relative to not entering the Agreement and resulting in exposure to market based disposal costs.¹ The previous analysis, conducted in January 2012, indicated that the Jurisdictions would realize savings in the range of approximately \$26-\$54 million over the life of the Agreement. If the option to extend the Agreement through 2038 was exercised in 2014, the projected savings, based on assumed values for certain factors, was estimated at approximately \$42 million.²

Based in part on these potential savings, the Jurisdictions subsequently executed the Agreement with Covanta, which became effective on January 1, 2013. The Initial Term of the Agreement runs through 2019, and provides for a Renewal Term through 2025 and an Extended Term through 2038. The Jurisdictions have already secured significant savings from the Agreement as evident from the \$43.16 per ton rate currently being paid by the Jurisdictions as compared to an estimated market rate of \$55 per ton, which translates to a savings of almost \$700,000 in FY14 alone based on current waste deliveries. These savings are currently being passed on to the Jurisdictions refuse customers as evident by the reduction in Jurisdiction refuse fees for FY14.

The analysis presented in this Economic Analysis of Covanta Extended Term Agreement Report (Report) does not evaluate the savings offered under the Agreement as the Agreement has already been executed and the Jurisdictions are already benefiting from a portion of these savings. The analysis in this Report is based on the potential cost to the Jurisdictions, through 2038, of exercising the Extended Term as compared to other alternatives or opportunities afforded the Jurisdictions under the executed Agreement. While not evaluating the question of whether or not to enter into the Agreement, the Report details the analysis of three case scenarios that represent the Jurisdictions options under the Agreement. The findings of the analysis (forecasted total project costs) of the three case scenarios are summarized below. The “costs” associated with the alternatives presented in the below table are not to be confused with the “savings” associated with the current Agreement, as all of the below scenarios offer savings as compared to market rates, thereby confirming the benefits of executing the Agreement. The question now is not of whether to enter into the Agreement, but when and if to exercise the extension options offered under the Agreement.

Scenario	Forecasted Total Project Cost
Base Case: Exercise Extension in 2014	\$22.9 million
Case A: Go to Market in 2019, Operate Facility Beginning 2025	\$31.5 million
Case B: Go to Market in 2019, Sell Facility Beginning 2025	\$28.7 million

¹ Arlington County Board Agenda Item. Meeting of January 21, 2013. Arlington County, Virginia. Dated January 9, 2012

² The values assumed for certain factors used in the referenced analysis (*e.g.*, Jurisdiction tons, Discount Rate, market rate). For example, the projected savings of approximately \$42 million was based on 65,000 tons, a Discount Rate of 4.5%, and a market rate of \$55.00 per ton.

Exhibit F:
Review of January 2012 Cost Savings Projections and Current Findings
Economic Analysis of Covanta Extended Term Agreement

As shown above, the Base Case scenario represents the lowest cost option to the Jurisdictions relative to other alternatives or opportunities afforded under the executed Agreement. The statistical analysis also indicates the Base Case to have the least financial risk. Each of the three case scenarios is preferable to projected market rate conditions.

Considering the Base Case alone, as this scenario parallels the framework of the previous analysis, the analysis in the Report indicates a savings of approximately \$26 million is projected by exercising the extension option in 2014, as compared to taking no action within the Agreement continuing through the Renewal Term at the Renewal Term rates and through 2038 based on a 2.75% annual escalation of the previous year’s rates.

NPV of Contract Extension Savings (5% discount)			Loss in Savings by Waiting to Extend*	
If Extend by June	Extension Savings Over Contract Term (2038)	Extension Savings Through 2025	Annual Cost for Delay in Extension	Cumulative Cost of Delay in Extension
2014	\$26,138,442	\$4,960,644	\$0	\$0
2015	\$25,618,210	\$4,440,412	\$520,232	\$520,232
2016	\$25,105,527	\$3,927,729	\$512,683	\$1,032,915
2017	\$24,642,810	\$3,465,012	\$462,717	\$1,495,633
2018	\$24,230,152	\$3,052,354	\$412,658	\$1,908,291

* Includes ash residue credit and assumes Covanta continues to dispose of ash at the Fairfax County Lorton Landfill.

As stated previously, based on the market study conducted as part of the study, each of the case scenarios are financially preferable to market rates. Accordingly, when compared to market based disposal costs, the savings potentially realized by the Jurisdictions of exercising the Extended Term in 2014 would be greater than that shown in the above table. There are several points of difference in projected savings that are important to note:

- The previous analysis assumes market rates apply after the Initial Term of the Agreement (2019). The analysis conducted in the study, as described in the Report, assumes the Agreement would continue through the Renewal Term.
- Values assigned to factors used in the analysis differ from those used in the analysis to estimate projected savings by entering into the Agreement. For example, factors such as Jurisdictional tonnage, market rates, and discount factors differ, each of which separately influence the projected results.

The two sets of analyses considered in this Appendix are different in nature and were developed to address different questions. Given the above, the findings of the previous analysis and the analyses presented in this Report, while different, are consistent and indicate the greatest potential for savings to the Jurisdictions is exercising the Extended Term option early. The reader of this Appendix F is referred to the full Report for a full understanding of the assumptions and analyses conducted as part of the Study.