CITY OF ALEXANDRIA SOLID WASTE MANAGEMENT PLAN

July 1, 2004

CITY OF ALEXANDRIA, VIRGINIA
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TABLE OF CONTENTS

List of Figures

List of Tables

Appendices

CITY OF ALEXANDRIA, VIRGINIA
SOLID WASTE MANAGEMENT PLAN

1.0 Introduction

1.1 Summary

The City of Alexandria is an independent city, which derives its governing authority from a charter granted by the Virginia General Assembly. The City operates under the council-manager form of government. Under Alexandria's charter, City Council has the authority to establish City policy, adopt ordinances, issue bonds, and appoint the City Manager, City Attorney, City Clerk and members of City boards and commissions. This Solid Waste Management Plan is the City's planning document that summarizes all of its solid waste management activities and alternatives.

On August 1, 2001, Commonwealth of Virginia regulations for solid waste management planning (9VAC20-130-10 et seq.) became effective. These regulations replaced previous regulations adopted on May 15, 1990. The current regulations state that "every city, county, and town in the Commonwealth – singly or in conjunction with other jurisdictions as a planning district – must submit a completely revised solid waste management plan between July 1, 2003, and July 1, 2004."

The City of Alexandria has prepared its comprehensive solid waste management document for submission to the Virginia Department of Environmental Quality (DEQ) in accordance with the terms of the planning regulations. The document addresses the City's solid waste management needs through 2025 and illustrates the methods by which the City will exceed the 25% recycling mandate.

The City's solid waste management document builds on the previous planning efforts and describes methods for expanding the waste management programs in the City. In this manner, the document is intended to serve as a management tool for the City of Alexandria. Still, portions of the document discuss joint efforts with Arlington County and neighboring jurisdictions, as well as public/private partnerships. In particular, the recycling alternatives are presented for both jurisdictions in order to illustrate the collective impacts on the Alexandria/Arlington Waste-to-Energy facility.

1.2 Goals for Document (140.2)

This document is intended to comply with the Code of Virginia (Section 10.1-1411) and the Virginia Regulations for Solid Waste Management Planning (9VAC20-130-10, et seq.), which gives statutory authority, regulatory responsibility and accountability to local governments for planning the handling of all types of non-hazardous solid waste.
This document will clearly demonstrate the manner in which the following goals of the mandatory objectives, as defined in 9VAC20-130-120, shall be accomplished:

- An integrated waste management strategy
- Implementation of the plan

- Solid waste management objectives within the jurisdiction
- Definition of incremental stages of progress toward the objectives and their implementation schedule
- Necessary funding and resources description, including consideration of fees dedicated to future facility development
- Strategy for the provision of necessary funds and resources
- Public education and information strategy on source reduction, reuse, and recycling, and
- Consideration of public and private sector partnerships and private sector participation in document execution.

Solid waste management goals identified by the City are also included in this document. These are presented in Section 5.

1.3 Solid Waste Management Plan Development Approach

In accordance with 9VAC20-130-130, the City submitted the draft document to the Environmental Policy Commission, a volunteer group who provides City Council with environmental policy feedback and guidance, on April 19, 2004. Alexandria's City Council received the revised Solid Waste Management Plan June 9, 2004, for adoption consideration. A public hearing was held June 12, 2004, to receive comments on the Solid Waste Management Plan.

1.4 Solid Waste Management Plan Adoption

On June 12, 2004, the City of Alexandria's City Council approved the Solid Waste Management Plan, which led to the submission of the Solid Waste Management Plan to the DEQ. The approved Plan was signed subsequent to the June 12, 2004, public hearing. A copy of the City Council's approval statement is provided in Appendix A.

2.0 Projections and Waste Quantities (150)

Integrated solid waste management approaches that meet sound economic and environmental objectives often require waste types that are generated individually to be kept separated throughout the collection, processing, recovery, and disposal sequence. Previous practices had all waste types mixed in the management cycle, which resulted in health and environmental hazards and hindered reuse and recovery of the resources. For example, a program for recovering tires for use as sports area surfaces can only be effective if they are not mixed with other waste types, which contaminate the crumb rubber and jeopardize the health and safety of the sport field users.

This document addresses the twelve waste streams specified by the Virginia Department of Environmental Quality – Waste Management Waste Regulations – Chapter 130, as follows:

1. Municipal Solid Waste (MSW)
2. Construction and Demolition Debris
3. Industrial Waste
4. Regulated Medical Waste
5. Vegetative and Yard Waste
6. Incinerator Ash
7. Sludge other than land applied
8. Tires
9. White Goods
10. Friable Asbestos
11. Petroleum Contaminated Soil
12. Other Special Waste

The Other Special Waste category includes more than one waste subtype not identified in the other eleven types. These wastes include those materials, other than municipal solid waste, accepted at the Alexandria/Arlington Waste-to-Energy facility, and other special wastes generated in the City including: electronics, dead animals, waste dirt and street sweepings, used oil, oil filters, antifreeze, and batteries.

How various waste types or streams are managed is affected to a large degree by quantity, composition, and physical qualities of each waste type. Further, characteristics of the planning area, such as population, employment, income level, land use, topography, etc., are significant factors in the composition and quantities of waste streams generated.

This section presents a brief description of the City of Alexandria planning area, summary descriptive information, composition estimates of the waste streams, and historical information of waste streams for which quantity information is received from collection and management program operators. Detailed transaction records are not maintained for each waste type, so projected quantities of the major waste streams were developed for the 20-year planning period where reasonable estimates could be determined.

2.1 Description of Plan Area

The demographic and physical characteristics of the City play a key role in shaping the solid waste management program, including reduction and recycling activities. The location of the jurisdiction, its relationship to its neighbors, topography, and geographical factors influence the program. The type and density of development, including both residential and commercial buildings, have had major impacts on the population, housing and businesses in the City, which, in turn, determine the types of waste generated. Higher density development imposes special requirements on the storage and collection of both solid waste and recyclable materials.

The City of Alexandria is one of the eighteen jurisdictions that make up the Metropolitan Washington Council of Governments (MWCOG) as shown in Figure 2-1. The City is an independent entity that was incorporated in 1779 and obtained its current status as a city when it was re-chartered in 1852. The City is located in the urban core of the MWCOG area and is bounded on the east by the Potomac River, on the north by Arlington County and by Fairfax County on the west and south.

The City of Alexandria (Figure 2-2) is an urban area of 15.75 square miles that lies within the Coastal Plain Province. In this province, free flowing waters drain to the Potomac River through several tributaries. Two of these tributaries, Four Mile Run and Cameron Run, essentially form the north and south borders of the City, respectively. Figure 2-2 provides a map of the City of Alexandria showing these natural features and the street patterns. This demonstrates the highly urbanized nature of the City and the challenges this poses for effective waste management.

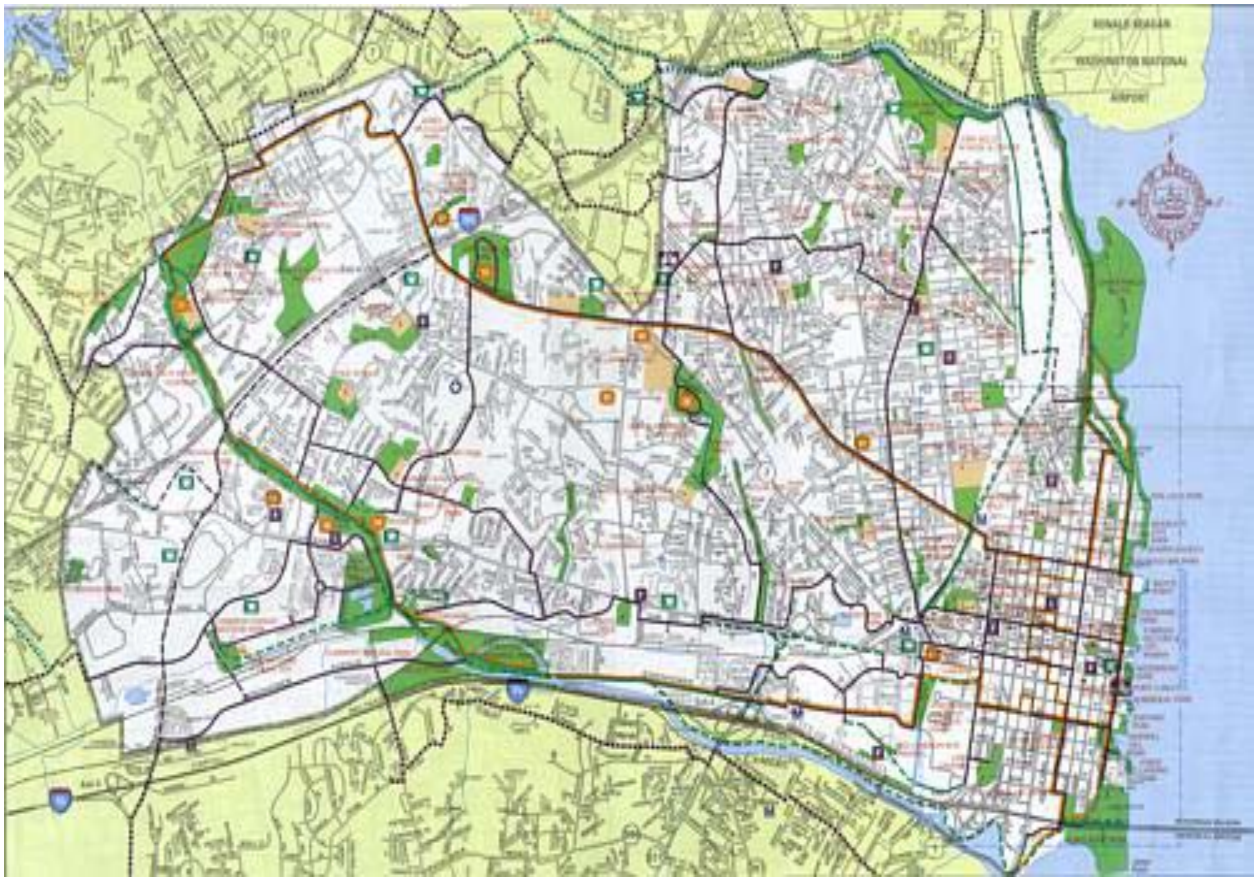
The soils that underlie the City tend to be mixed crystalline rocks and sediment, ranging from sand to clay. The slow permeability of these soils places a large demand on flood and storm water management systems. The high-density development and the impervious structures add to this demand.

The Potomac River, on the eastern boundary of the City, is part of the Chesapeake tidal estuary, and the shore is essentially at sea level. The series of hills along King Street and Seminary Road raise the average elevation of the City to approximately 30 feet. The lower level areas along the Potomac River and its tributaries have been subject to periodic flooding.

There has been a significant level of development and redevelopment in the City since 1990, with over 2 million square feet of commercial space completed. Many new apartments and town homes have been added to the available housing stock In the eastern portion of the City, known as “Old Town,” the development reflects the Colonial seaport heritage, with many small buildings and narrow alleyways that make modern solid waste management difficult.

Figure 2-1
Metropolitan Washington Council of Governments Area Map

Figure 2-2
City of Alexandria Map



2.1.1 Transportation

Commercial and residential development experienced by Alexandria and neighboring jurisdictions has increased travel demands and traffic congestion in the City. Traffic congestion generally peaks during morning and afternoon commuting periods - "rush hour." A second important factor influencing travel demand is the high cost of housing. Because of the limited supply and rapidly rising housing costs, increasing numbers of workers are commuting by car from outlying jurisdictions where housing is cheaper. As a result, traffic into and through the City quickly congests and tends to spill over into residential streets.

The City of Alexandria contains or is immediately adjacent to many transportation assets, including Ronald Reagan National Airport, a north-south rail line, major east-west and north-south road arteries, and a rapid transit (Metro) line. The Metro line is a key factor in the two development corridors discussed earlier. I-95, as well as Duke Street and Eisenhower Avenue, also serves the Eisenhower Corridor. These provide automobile, bus and truck access to the corridor. The Jefferson Davis Corridor is formed around US 1, the pre-interstate north-south route from Maine to Florida. This roadway still carries a high volume of commuter and commercial traffic even though it runs through this urban area. In addition, the City has many urban streets and roadways, bicycle and pedestrian systems and a comprehensive DASH bus system. As noted in the following section, the City of Alexandria has had a period of sustained growth. This has added to the traffic originating in the City and coming into the City in recent years.

The City of Alexandria is served by I-395, the primary north-south artery in the central core of the Metropolitan Washington region. I-395 connects with the Washington Beltway and I-95, the primary east coast north-south route. Because some major regional solid waste landfills are located within a reasonable distance from Alexandria, a significant portion of the solid waste transfer originating in the region uses I-395/I-95 to haul waste for disposal to these landfills. In addition, a rail line is utilized to transport solid waste from transfer stations to nearby landfills in Virginia. Currently, none of this solid waste originates from transfer stations in the metropolitan area. Virginia is the second largest importer of solid waste in the country.

In terms of waste management, the City has adjusted to the growing traffic congestion by scheduling and configuring collection routes to avoid rush hour trouble spots. For example, routes are scheduled to be completed prior to peak rush hour times. Further, alternative routes are taken to avoid the busiest streets whenever possible.

2.2 Population Data and Projections

Population distribution and economic development patterns impact the design of the City's waste management system. The diversity of the City's housing stock and employment centers presents challenges and opportunities for waste management services. Population and economic indicators also provide a means of estimating solid waste generation rates, disposal needs, and quantity of available recyclables.

In the past two decades, the City population has grown rapidly. In 1990, the City had a population of 111,200, about 8 percent greater than 1980 levels. In 2000, the population had increased to 128,283, an increase of about 14.5 percent greater than 1990 levels. Figure 2-3 shows the household density in the various areas of the City of Alexandria.

Figure 2-3
City of Alexandria Household Density

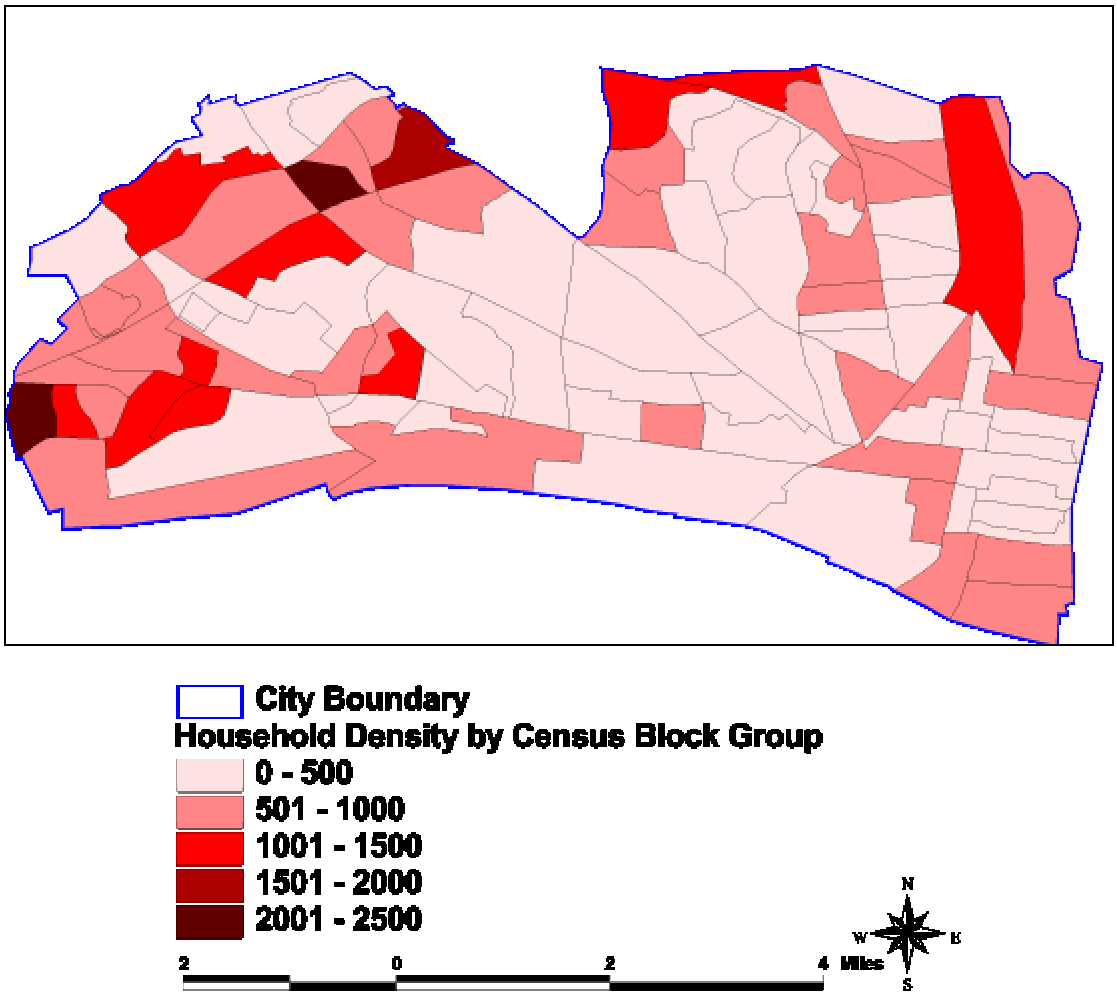


Table 2-1 shows the City population in calendar year 2000, as well as the population projections for 2000 through 2025. Based on Metropolitan Washington Council of Governments Round 6.2 Forecasts, the population is projected to increase approximately 18 percent, to about 151,500 residents in 2025. Average household size has been stable in recent years, although the City projects it will decrease about four percent over the planning period.

Table 2-1
City of Alexandria Population
Calendar Years 2000 Through 2025

	2000	2005	2010	2015	2020	2025
Population	128,283	135,036	142,859	146,486	148,840	151,552

Sources: U.S. Census for 2000; City Department of Planning and Zoning & MWCOG (Growth Trends to 2025, Round 6.2 Forecasts) for 2005 through 2025.

During 2000, Alexandria's estimated population density was 8,145 persons per square mile (i.e., population divided by square miles).

According to MWCOG, economic growth in the region will continue to attract new residents and stimulate demand for new housing. Households provide the basis for population forecasts in the City. Table 2-2 provides a summary of Alexandria households during calendar year 2000 and includes a breakdown for single family and multi-family units. The number of projected households is also included for the planning period of 2005 through 2025. During calendar year 2000, the U.S. Census reported that the median household income in the City was $56,054.

Table 2-2
City of Alexandria Households
Calendar Years 2000 Through 2025

	2000	2005	2010	2015	2020	2025
Total Households	61,889	66,194	70,029	71,807	72,961	74,290
Single Family	22,571	23,555	24,197	24,433	24,690	24,812
Multi-Family	39,318	42,639	45,832	47,374	48,271	49,478

Source: Department of Planning and Zoning, City of Alexandria, 2003. Projected years beyond FY2003 are estimated using the population growth rate.

During 2000, the U.S. Census reported the City's population to be 128,283. The U.S. Census also reports that the City's average number of persons per household during 2000 was 2.04. This number reflects the fact that not everyone in the City's population lives in households. Some may live in nursing homes, reside as wards of the state in government facilities, or rely on temporary shelters for housing, and these persons are not included in the total household count. In addition, the MWCOG's Round 6.2 Forecasts assume the City's per capita household size will remain constant during the planning period.

2.2.1 Employment Trends

The employment indicators of the City provide insight into the quantity and composition of the commercial waste stream of the City. Understanding the employment profile of the City's businesses also supports efforts to target businesses for source reduction, recycling assistance and market development.

According to the City Department of Planning and Zoning and Dun & Bradstreet, 98,552 people were employed in Alexandria during 2000. Table 2-3 shows these employees by different employer categories. Office workers constitute approximately two-thirds of the work force. The employment by category is projected in five-year increments through the planning period.

Table 2-3
City of Alexandria Employment
Calendar Years 2000 Through 2025

Employer Category	2000	2005	2010	2015	2020	2025
Office	64,432	68,811	84,180	91,839	100,305	105,233
Retail	19,177	19,773	21,222	21,911	22,160	22,297
Industrial	11,222	11,352	11,352	10,605	10,505	10,405
Other	3,721	3,921	3,978	3,978	3,978	3,978
Total	**98,552**	**103,857**	**120,732**	**128,333**	**136,948**	**141,913**

Sources: Dun & Bradstreet, 1997, for the 2000 data; and City Department of Planning and Zoning.

Table 2-3 indicates that there were 98,552 jobs in the City during 2000. Based on the table projections, employment in the City is projected to grow 44% during the 2000 through 2025 planning period. This compares with a 39% projected employment increase for the total MWCOG region, as projected in the MWCOG Round 6.2 Forecasts. According to the City Department of Planning and Zoning, employment growth during the later portion of the planning period is linked to anticipated jobs at the Patent and Trademark Office and planned development in the Eisenhower Corridor.

The unemployment rate, as of February 2004, was 2.3 percent, far below the national average. The largest employers in the City are the U.S. Department of Defense, the U.S. Patent and Trademark Office, the City of Alexandria, the INOVA Alexandria Hospital, and the Alexandria Public Schools.

2.2.2 Office Space Trends

The amount of office space (i.e., square footage) can also be used as an indicator of commercial waste generation, and the City Department of Planning and Zoning recommends assuming 3.5 employees per 1,000 gross square feet of office space. Vacancy rates are generally not included in City projections since it is assumed that the demand for space is sufficiently high. Table 2-4 summarizes the projected commercial office space trend in Alexandria, based on the recommended factor mentioned above.

Table 2-4
City of Alexandria Office Space Projection
2005 Through 2025
(sq. ft. in thousands)

	2005	2010	2015	2020	2025
Office Space (Sq. Ft.)	29,673	34,495	36,667	39,128	40,547

Source: City Department of Planning and Zoning, 2003. Assumes 3.5 employees per 1,000 square feet of office space.

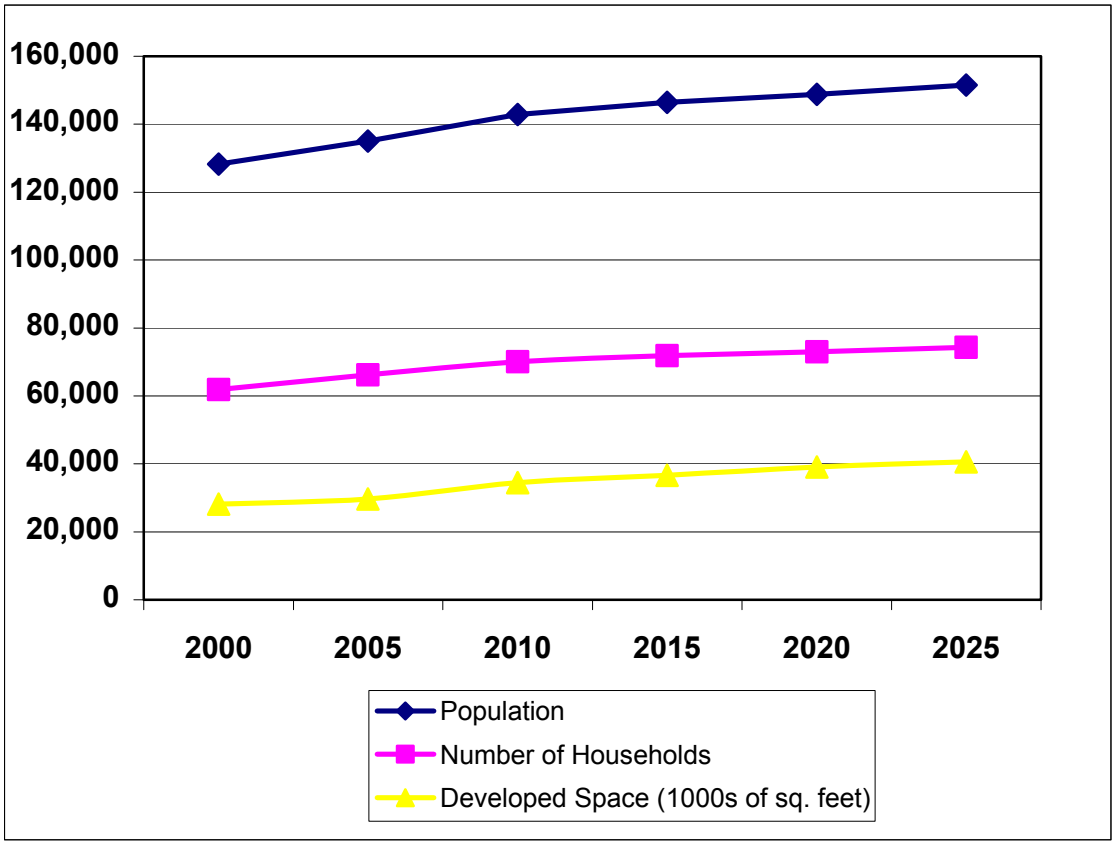
2.2.3 Other Growth Indicators

Two other growth indicators that will be used to calculate waste generation are the number of registered automobiles and the number of forested land acres that have been cleared annually. Cars generate special wastes like antifreeze, batteries, tires, and waste oil. Land clearing for development generates debris that must be managed as either a commodity or solid waste.

2.2.4 Overall Growth Trends

As discussed above, the individual demographic indicators for the City of Alexandria are all showing continued growth. This is shown graphically in Figure 2-4 and is indicative of the more intensive development currently taking place in the City. The graph also reflects the expectation that the demographic indicators will taper off over time and that growth will continue at a slower pace.

Figure 2-4
City of Alexandria Growth Trends



2.3 Composition of Solid Waste

Understanding the composition and quantity of the solid waste stream is essential for sound planning. Waste stream characterization forms the basis for projecting future requirements for recycling, disposal and other integrated solid waste management programs, and for measuring the effectiveness of those programs. Composition data are also useful for determining solid waste heat content and the amounts of noncombustible materials in the waste stream, which are important considerations for waste-to-energy programs.

While a detailed physical sorting and characterization of the City's waste stream is most desirable, such evaluations are time consuming and expensive. Further, they often do not produce sufficient new information to justify their cost. The waste composition described in this document is based on a combination of known waste quantities managed by the City, quantities reported by private solid waste companies, comparison to detailed waste stream evaluations completed by nearby area jurisdictions, and published data. As discussed previously, DEQ identified 12 different waste types or streams of interest to be addressed by the City. These are defined in the remainder of Section 2. Section 3 will describe these waste streams in more detail, within the context of the City's solid waste management system.

2.3.1 Municipal Solid Waste (MSW)

Municipal solid waste (MSW) is comprised of those wastes generated daily by residential, institutional, and/or commercial sources. Examples include household refuse, food waste, inorganic wastes, container packaging, durable and non-durable goods and yard wastes.

The U.S. Environmental Protection Agency (EPA) in its report, Municipal Solid Waste in the United States: 2000 Facts and Figures, describes the national figures for generation, recovery and disposal for the MSW stream. These data are aggregated for the entire United States based on data collected between 1960 and 2000. This report uses an industrial production model to estimate the goods produced and their useful life, and projects when the products become waste. Using this model, EPA developed a breakdown of the materials generated in the United States and their percentage by weight in solid waste. Table 2-5 provides a summary of EPA's results for 1998-2000.

Table 2-5
Materials Generated in the U.S. Municipal Waste Stream

Percent of Total Generation

	1998	1999	2000
Materials In Products			
Paper and Paperboard	37.7	38.2	37.4
Glass	5.7	5.6	5.5
Metals (Ferrous & Nonferrous)	7.5	7.7	7.8
Plastics	10.0	10.4	10.7
Rubber and Leather	3.1	2.7	2.7
Textiles	3.9	3.9	4.0
Wood	5.4	5.4	5.5
Other	1.7	1.7	1.7
Total	**75.0**	**75.6**	**75.4**
Other Wastes			
Food Scraps	11.2	10.9	11.2
Yard Trimmings	12.4	12.0	12.0
Miscellaneous Inorganic Wastes	1.5	1.5	1.5
Total	**25.0**	**24.4**	**24.6**
Total MSW Generated - %	**100.0**	**100.0**	**100.0**

Source: U.S. EPA, Municipal Solid Waste in the United States: 2000 Facts and Figures.

In terms of regional assessments, no comprehensive MSW waste sort, to determine the composition of solid waste, has been conducted since 1992. During that year, the District of Columbia conducted a characterization analysis of their solid waste stream. These data are still relevant since there haven't been dramatic changes to waste stream composition, plus this regional sampling is much more applicable than national average data. The waste quantities sampled were broken into residential and commercial

components. The summary results of the MSW composition study as published in the District of Columbia, Comprehensive Solid Waste Management Plan are shown in Table 2-6. This table reflects weighted percentages for each component and total waste since the distribution and quantity of residential and commercial waste are not equal.

Comparison of the two tables highlights some important trends in solid waste composition. For example, the EPA report shows significantly more plastic and less glass than the District of Columbia characterization. Metals are approximately the same. Paper products are a greater percentage of the District composition, which most likely reflects characteristics and activities of the people and the businesses in this area.

To obtain the data shown in Table 2-6, the District had 40,000 pounds of solid waste sorted by hand into the 33 categories. Trucks delivering the materials were identified as being either from the single family residents or the commercial sector. This sort provided composition for solid waste "As Disposed." Recycling quantities and composition were also obtained. The As Disposed MSW was added to the recycled material quantities to develop the "As Generated" composition for residential and commercial. Final overall composition percentages were calculated using weighted averages to obtain the percentage weight of each material in the total waste. Like materials were summed into broad categories such as Paper. While no comprehensive MSW sort has been undertaken in the City, it is likely that these percentages shown in Table 2-6 are representative of the composition of residential/commercial municipal solid waste in the City of Alexandria.

2.3.2 Construction and Demolition (C&D) Waste

C&D wastes are generated from the construction and renovation of homes and buildings. Also included are wastes resulting from other development activities, including land clearing and demolition of old buildings. Table 2-7 shows USEPA's estimated national C&D composition during 1996. These data are shown in thousands of tons. The C&D debris managed on-site should be deducted from generation. No data exists on quantities managed on-site.

Table 2-6
Estimated D.C. Composition of Residential/Commercial Municipal Solid Waste

Common Material	Residentially Collected Waste	Commercially Collected Waste	Total Waste
PAPER			
Newspaper	12.00%	13.83%	13.34%
Office Paper	1.20%	9.67%	7.37%
Magazines	4.03%	3.65%	3.75%
Corrugated Paper	3.09%	9.52%	7.77%
Mixed Paper	5.32%	6.48%	6.17%
Other Paper	6.74%	7.46%	7.26%
	32.38%	50.62%	45.67%
PLASTIC			
PET	0.68%	0.32%	0.42%
HDPE	0.96%	0.79%	0.83%
PVC	0.20%	0.15%	0.17%
Film	3.36%	3.18%	3.23%
Styrene	0.67%	0.98%	0.90%
Other	1.49%	1.33%	1.38%
	7.37%	6.75%	6.93%
GLASS			
Green	2.36%	1.40%	1.67%
Clear	7.03%	4.88%	5.47%
Brown	1.88%	1.14%	1.34%
Other	0.32%	0.28%	0.29%
	11.58%	7.71%	8.77%
METAL			
Steel Cans	1.82%	1.64%	1.69%
Other Steel	1.89%	4.05%	3.47%
Non-ferrous	0.06%	0.15%	0.12%
Aluminum Cans	0.52%	0.79%	0.71%
Other Aluminum	0.88%	1.80%	1.55%
	5.17%	8.44%	7.55%
MISCELLANEOUS			
Yard Waste	15.23%	3.15%	6.43%
Wood Waste	1.07%	1.06%	1.05%
Food	8.57%	7.97%	8.12%
Textiles	3.41%	2.30%	2.60%
Misc. Inorganics	2.55%	1.84%	2.03%
Misc. Organics	0.45%	0.18%	0.25%
Batteries	0.06%	0.04%	0.05%
Diapers	2.84%	1.64%	1.96%
Fines	8.48%	8.23%	8.29%
HHW	0.17%	0.09%	0.11%
Tires	0.00%	0.00%	0.00%
Commingled Material	0.66%	0.00%	0.18%
	43.49%	26.48%	31.08%
TOTAL	100.00%	100.00%	100.00%

Source: District of Columbia Comprehensive SWMP and GBB re-calculations.

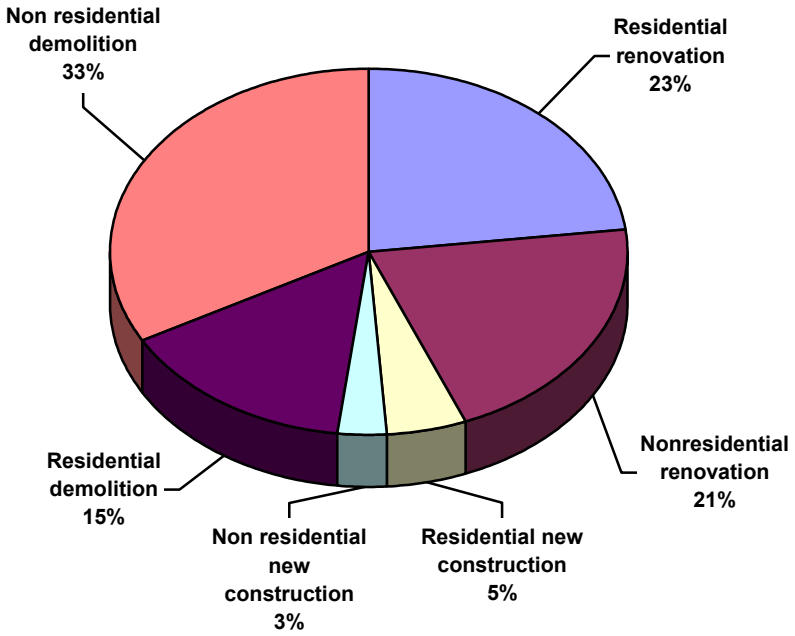
Table 2-7
Estimated Building-Related C&D
Debris Generation, 1996
(Thousands of Tons)

Source	Residential		Nonresidential		Totals	
	Waste Quantities (000 tons)	Percent	Waste Quantities (000 tons)	Percent	Waste Quantities (000 tons)	Percent
Construction	6,560	11	4,270	6	**10,830**	**8**
Renovation	31,900	55	28,000	36	**59,900**	**44**
Demolition	19,700	34	45,100	58	**64,800**	**48**
Totals	**58,160**	**100**	**77,370**	**100**	**135,530**	**100**
Percent	**43**		**57**		**100**	

Source: Characterization of Building-Related Construction and Demolition Debris in the United States, EPA530-R-98-010, June 1998.

The EPA report regrouped these figures into the six categories shown in Figure 2-5.

Figure 2-5
Generation of Construction and Demolition Debris from Buildings



Source: Characterization of Building-Related Construction and Demolition Debris in the United States, EPA530-R-98-010, June 1998.

As shown in Table 2-7, the C&D composition varies with the type of construction and/or demolition. Also, the composition of C&D varies by geographic area. The National Association of Home Builders (NAHB) Research Center, located in Prince George's County, Maryland, has developed C&D sample compositions for new residential construction and multi-family demolition through waste sampling. These results are shown in Table 2-8.

Table 2-8
C&D Sample Compositions

	Residential New Construction	**Multi-family Demolition**
Wood	42%	14%
Drywall	27%	17%
Metals	2%	-
Plastics	2%	-
Roofing	6%	3%
Brick	6%	14%
Miscellaneous	15%	1%
Rubble	-	51%
Total	**100%**	**100%**

Source: NAHB Research Center.

In its research, the NAHB Research Center focused on only residential new construction and multifamily housing demolition, and, therefore, roadway, bridge and land clearing debris are not included. Roadways are comprised of asphalt and concrete, and bridges of asphalt, concrete and steel. Land clearing debris consists of trees, stumps, and soil and rock.

2.3.3 Industrial Waste

The composition of industrial waste is generally industry specific and depends on the process. Details pertaining to the types of industrial waste generated in the City are provided in Section 3.

2.3.4 Regulated Medical Waste (RMW)

Hospitals, clinics, medical facilities, and doctor and dentist offices generate RMW. Examples include human blood and body fluids, or items contaminated with these fluids, discarded vaccines, organs, tissues, body parts and sharps (i.e., needles and syringes).

2.3.5 Vegetative and Yard Waste

Vegetative and yard waste include materials generated by lawn, yard care and landscaping activities. Residential and commercial units generate the same constituents in this waste type but in different quantities. The constituents include:

- Grass clippings (seasonal - spring and summer)
- Leaves (seasonal - fall)
- Brush, including tree and shrub trimmings
- Large brush, including tree trunks and logs
- Christmas trees

2.3.6 Incinerator/Combustion Ash

Incinerator/combustion ash includes those largely inert materials that remain following the combustion of one of the other waste types.

2.3.7 Sludge

Sewage sludge or biosolids means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, domestic septage, portable toilet pumpings, Type III marine sanitation device pumpings, and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge. Sludge is primarily water with organic matter in the mixture.

2.3.8 Tires

Tires used on passenger cars and trucks are primarily rubber, both natural and synthetic, with steel wire and/or fabric reinforcements. A typical passenger tire weighs approximately 20 pounds, with between 5 to 6 pounds of steel wire.

According to the Virginia DEQ Waste Tires website, waste tires had been a major problem in Virginia until the early 1990s. In 1989, the General Assembly enacted a 50 cents per tire tax (Section 58.1-641 of the Code of Virginia), and DEQ was directed to develop and implement a plan for the transportation and management of all waste tires generated in the Commonwealth. The funds are placed in the Waste Tire Trust Fund. The purpose of the Fund was to transform the struggling waste tire management system into a viable, long-term enterprise, capable of taking waste tire recycling from less than 10 percent in 1991 to almost 100 percent today.

2.3.9 White Goods

White goods is the term applied to large appliances, such as stoves, washers, hot water heaters, etc. These are comprised primarily of ferrous metal (iron and steel) and contain smaller quantities of other metals (aluminum, copper, etc.). Recent trends show an increased use of plastic in white goods.

2.3.10 Friable Asbestos

Friable asbestos means any material containing more than 1 percent asbestos by weight that, when dry, may be crumbled, pulverized or reduced to powder by hand pressure and is regulated as a special waste. Although friable asbestos comprises less than 1 percent (0.18%) of the overall waste stream in Virginia, Virginia DEQ still requires counties and jurisdictions to report generation tonnages.

2.3.11 Petroleum Contaminated Soil

These solids are primarily dirt and rock with small amounts of petroleum products that form a contaminant. Contamination is the result of spills or leaking underground storage tanks at residences, filling stations and other commercial establishments. Spills of quantities as small as 25 gallons can trigger remediation, which results in soil removal. The amount of soil contaminated by a spill or leak depends on the type of soil and its permeability.

2.3.12 Special Wastes

Special wastes are those materials that require or are chosen for special handling and precautions prior to recycling and/or disposal, and may be included in the waste types mentioned above. They also are often subject to special programs and recycling and include electronics, dead animals, waste dirt and street sweepings, used oil, oil filters, antifreeze and batteries.

2.4 Solid Waste Generation Projections and Flow Patterns

Effective solid waste management planning requires methods for approximating the quantities of each waste type generated. The City of Alexandria keeps detailed records for the individual wastes it manages and solicits the cooperation of the private sector in reporting waste quantities and compositions. The Commonwealth's reporting program, administered by DEQ, requires permitted solid waste facilities to report waste quantities by the 12 waste types and by state of origin, as shown in Appendix B. These reports do not provide quantities or composition by jurisdiction within the Commonwealth of Virginia. As previously discussed, the City's solid waste generation rate depends on several factors, including population, number of households, employment, type of commercial activity, commercial space square footage and other factors. Solid waste generation includes the types of waste defined above. The City of Alexandria only tracks the MSW that City vehicles collect, with the Waste-to-Energy plant tracking waste delivered to the WTE plant. The City itself does not collect MSW data from private haulers.

The lack of physical sample data for municipal solid waste in the City of Alexandria has resulted in estimating waste generation using a variety of parameters. This is discussed in the following section.

2.5 Waste Stream Projections

2.5.1 Municipal Solid Waste

City MSW quantities for calendar years 2001 through 2002 have been documented by weighing the trucks of residential and commercial collectors at the Alexandria/Arlington Waste-to-Energy facility. This captures all waste quantities except for commercially collected waste disposed independent of City programs. These data form the foundation for waste stream projections. For projection purposes, MSW has been broken into the following subtypes:

- Single family Residential – Waste from residential buildings with four or less units, City facilities and others, such as churches, collected by the City
- Multi-family Residential – Waste from residential buildings with five or more units, collected by private haulers
- Commercial – Waste from commercial establishments, collected by private haulers

Each generator type exhibits a different growth rate due to the selection of a unique factor used to project waste generation through the planning period. Pounds per household per year was the selected generation rate for both single and multi-family residences; however, the pounds generated differed between the two types (Multi-family Recycling: A National Study, EPA530-R-99-011). For businesses, square footage was the selected factor, as it has been shown to be a reliable parameter for waste generation (California Integrated Solid Waste Management Board). The projected generation rates were based on the actual MSW quantities for calendar years 2001-2002.

The City collects MSW from all single family residences and City facilities and takes this waste to the Alexandria/Arlington Waste-to-Energy facility for disposal. The historic quantities for the fiscal years 2000-2003 are shown in Table 2-9 as Disposed for Residential, City Collection. The Residential City Collection Recycled quantity is the sum of the curbside collection of recyclables, yard waste and scrap metal. Recycled and Disposed quantities were added to obtain the total waste generated, shown in the table under Residential City Collection Generated. The waste generated was divided by the number of households and averaged for the four historical fiscal years to obtain the Generation Rate shown in the table. The current household waste generated is estimated to increase from 58,400 tons per year in FY 2003 to 62,556 tons per year by the year 2025.

While much of the commercially collected multi-family and business MSW is weighed and disposed of at the Alexandria/Arlington Waste-to-Energy facility, a significant portion is diverted and taken to private facilities for disposal. The quantity of diverted waste needs to be estimated, based on the haulers known to take a certain percentage of waste outside the City for disposal, and added to the total known waste disposed for

commercial collection to calculate the total estimated waste disposed for these sectors. The waste generation rate for multi-family residences from the EPA study has been used to estimate the quantity of waste generated by multi-family dwellings. This is estimated at 44,300 tons per year. The remainder of the commercially collected waste disposed is estimated at 160,000 tons per year and has been allocated to business establishments. In total, it is estimated that all municipal solid waste generated in Alexandria totals some 262,700 tons per year from households, multi-family dwellings and commercial business. This is about 90,000 tons more than recorded by the City (see Appendix D) due to the under-reporting of solid waste collections to the City by private haulers.

The total waste generated in the City of Alexandria from all three generating sectors is projected to grow as the City grows. This is projected to increase from a total MSW generation of 262,700 tons in FY 2003 to between 300,000 tons and 340,000 tons per year by the year 2025, depending on the amount and nature of new development and redevelopment which occurs in the City.

The City offers a wide variety of solid waste management programs for MSW that makes beneficial use of or recycles the materials. Also, the City manages data collection for programs in the private sector, as described in Section 3. These programs capture the solid waste recycling flows for these materials and programs. All solid waste collected by the City of Alexandria is either recycled or disposed of at the Alexandria/Arlington Waste-to-Energy facility.

2.6 Types of Waste Generated

Table 2-10 shows the recovered material MSW flows in the City for the years 2000 through 2003. The specific recycling uses are discussed in Section 3. Detailed notes relating to this table are provided in Appendix C. N/A indicates that data were not available for the particular waste category.

An effective solid waste management plan must assess the City's current and future demand for solid waste management resources. This section demonstrates the demand for a waste management system capable of handling different waste types. This system needs to accommodate growing waste tonnage forecasted to increase 27% during the 2004 through 2024 period.

Table 2-9
City of Alexandria Historical Household Municipal Solid Waste Generation

CITY COLLECTION Single Family Residential & Governmental					
	Population Note 1	**Household Note 2**	**Recycled Note 3**	**Disposed Note 4**	**Gen. Note 5**
Fiscal Year Past			**(tons)**	**(tons)**	**(tons)**
2000	128,283	22,571	28,550	28,412	57,459
2001	129,409	22,735	29,972	28,909	58,881
2002	130,534	22,899	27,128	28,237	55,365
2003	131,660	23,063	28,550	29,833	58,383

Notes
1. U.S. Census data and City estimates.
2. Source of Households for FY 2000 through 2003 – City of Alexandria Division of Solid Waste.
3. Data from City of Alexandria annual (CY) Division of Solid Waste Reports for FY 2000 through 2003
4. Quantities of waste collected by City of Alexandria Division of Solid Waste collection system from 1- and 2-family households from Covanta Energy. Source for FY 2000 through 2003 – Covanta WTE Facility FY Tonnage Data Reports.
5. Sum of recycled and disposed quantities

Table 2-10
City of Alexandria Recycled and Diverted Materials Flows in Tons

Material Type	2000[1]	2001	2002	2003
1. MSW[2]:				
A - Commingled	1,907	1,902	1,912	2,170
B - Paper:	17,876	19,507	16,245	17,949
C - Commercial Recyclables				
- Metal[3]	7,039	9,342	4,653	9,338
- Plastic	160	277	42	574
- Glass	451	571	331	184
2. Construction & Demolition	15,000	24,497	3,000	3,727
3. Industrial Waste	N/A	N/A	N/A	N/A
4. Regulated Medical Waste	N/A	N/A	N/A	N/A
5. Vegetative and Yard Waste:				
- Yard Waste	4,068	4,160	3,976	4,738
- Wood Waste	210	325	95	83
- Tree Stumps/Debris	273	500	45	0
6. Incineration Ash[4]	40,576	39,691	40,433	50,110
7. Sludge (composted)	15,166	15,004	15,327	2,761
8. Tires	176	170	182	225
9. White Goods/Metal[5]	370	492	331	467
10. Friable Asbestos	N/A	N/A	N/A	N/A
11. Petroleum Contaminated Soil	N/A	N/A	N/A	N/A
12. Special Waste:				
A - Dead Animals	20	20	21	0
B - Waste Dirt	N/A	N/A	N/A	N/A
C - Street Sweepings[6]	7,923	7,595	8,250	8,175
D - HHW	12	12	12	12
E - Other Materials				
- Used Oil	1,866	1,570	2,162	1,477
- Oil Filters	18	0	35	17
- Antifreeze	151	170	132	123
- Lead Acid Batteries	6	8	3	2
- Electronics	N/A	11	30	11
- Other[7]	317	60	574	907

Notes: See Appendix C
[1]Unless otherwise noted, due to the lack of tonnage data, 2000 data reflect an average of 2001 and 2002 data.
[2]Disposal quantities of municipal solid waste generated by single family residential and governmental, multi-family, and commercial businesses are provided in Table 2-9.
[3]Reflects 95% of total metals reported to VA DEQ, based on ratio derived from Arlington County data.
[4]2000 through 2002 based on fiscal year MSW tonnage data from the Alexandria-Arlington Waste-to-Energy facility. Total ash is assumed to be 30% of total MSW processed. Alexandria's portion of the ash total is assumed to be 40%. Ash is diverted and landfilled.
[5]Reflects 5% of total metals reported to VA DEQ, based on ratio derived from Arlington County data.
[6] Street sweepings are diverted from storm drains.
[7] Primarily food waste reported by restaurants and grocery stores.

3.0 Solid Waste Management System

This section describes existing programs and approaches used to manage solid waste in the City. The management system involves citizens, private companies, and local government. Components of the system include collection, processing, disposal, recycling and public outreach initiatives. The City's solid waste management programs reflect Alexandria's commitment to environmental quality, efficient public service, and the economic vitality of the community.

3.1 Collection

Details pertaining to City collection programs, divided for the various waste types defined in Section 2, are discussed in the following sections.

3.1.1 Municipal Solid Waste

3.1.1.1 Residential Solid Waste Collection

The Alexandria Division of Solid Waste has provided municipal solid waste collection services for over half a century. During FY 2001, the City provided weekly solid waste collection for about 19,400 service locations (i.e., about 18,500 single family homes [defined to include residential buildings with four or less units] and various City facilities, churches and private schools) and 752 street cans. The historic Old Town part of the City receives manual collection in alleys or at the curb. The remaining areas of the City receive semi-automated or automated curbside solid waste collection using a 90-gallon cart (a.k.a., SuperCan). During FY 2001, the City collected 27,899 tons of solid waste. The amount increased during calendar year 2002, when City crews collected 29,137 tons of household solid waste. Municipal waste collected by the City is transported to the Alexandria/Arlington Waste-to-Energy facility. In the City of Alexandria, MSW is the largest of the twelve waste type categories.

Generally, the following type of household items may be disposed of as solid waste: food scraps, grass clippings, soiled paper products, consumer packaging, discarded clothing, old furniture and carpet, and designated building materials. Household items that are not acceptable for disposal include liquid materials, rocks, dirt, sand, bricks, drywall, concrete, hazardous waste, unbundled lumber, branches or wood, loose yard waste and broken glass. Further, the City reserves the right to refuse collection of material deemed to be unsafe for solid waste workers to pick up or any materials that may be rejected for disposal at the Waste-to-Energy facility.

Residential waste collection and disposal costs are included in residents' real estate taxes. For FY 2005, the cost associated with weekly solid waste collection and disposal service will be $205 per household, which represents a 100% direct cost recovery.

In addition, City residents can drop off small amounts of solid waste (limit 500 pounds) free of charge at the City's disposal center, located at the Alexandria/Arlington Waste-to-Energy facility.

City institutional waste accounts use the SuperCan (90 gallon cart) and some dumpsters and are serviced once a week by City collection crews. In addition, City buildings receive weekly or daily collection service. Also, City buildings and schools are provided collection service five days per week. Street litter bins are also serviced throughout the City.

Each spring, the City offers residents a Spring Clean-Up service to those who receive trash collection services from the City. This program is aimed at collecting residents' appliances, brush, mattresses, and other large or bulky items at the curb. Every year, this service is provided to City neighborhoods on designated Saturdays during April. Examples of acceptable materials for this program include appliances, steel pipe, furniture, mattresses, brush and tires off the rim. Examples of unacceptable materials for this program include concrete, hazardous waste, unbundled lumber or brush, loose yard waste, and building materials such as drywall. For FY 2001, 700 tons of waste were collected during the Spring Clean-Up event. An additional 84 tons were collected as part of special collections. These totals increased to about 725 tons for Spring Clean-Up and to about 97 tons for special collections during FY 2003.

3.1.1.2 Multi-Family Residential and Commercial Solid Waste Collection

The City's commercial solid waste stream consists of materials generated by business establishments and multi-family residences with five or more units. Section 2.6 estimates that the commercial haulers collected 95,299 tons of MSW in FY 2003. According to data collected in 2001, there were 8,208 unique businesses located in the City with different physical addresses. These range from restaurants and hotels to auto repair shops, retail stores, doctors' offices, and more. The businesses in the City predominantly use private haulers for waste collection. Among the businesses surveyed during a 2001 telephone interview, 78 percent reported they were currently being serviced by one of the three large haulers – Browning-Ferris Industries, Inc. (Allied), Waste Management, Inc., or AAA Rainbow (Republic Inc.). The remaining 22% of the businesses had service provided by one of the small haulers or the City. Table 3-1 provides the distribution of the service providers identified by the businesses surveyed.

Table 3-1
Solid Waste Haulers Used by City Businesses
(includes multi-family properties)

Hauler Name	Number of Businesses	Percent of Businesses
Browning-Ferris Industries	20	31
AAA Rainbow (Republic)	17	27
Waste Management	13	20
City of Alexandria	5	8
Garcia's Inc.	2	3
Con-Serv Industries Inc.	2	3
Urban System Services Inc.	1	1.5
Jeffries	1	1.5
H.A.M. Inc.	1	1.5
Chester Garvin and Sons	1	1.5
City Residential Collection	1	1.5
Total	**64**	**100**

Source: Gershman, Brickner & Bratton, Inc.,
City of Alexandria Commercial Waste Analysis, July 2001 Draft. Column does not add due to rounding.

All told, 18 City-licensed collection firms and the City, resulting in an estimated 38 trucks on the streets each day, service businesses in the City. Further, many individual businesses share waste containers in large buildings and shopping complexes, significantly reducing the number of commercial waste customers. Much of the commercial waste collected in the City is disposed of at the Alexandria/Arlington Waste-to-Energy facility. Still, the GBB 2001 Commercial Waste Analysis revealed that Waste Management, Inc. collected an estimated 44,000 tons of City commercial waste that was not disposed of at the Alexandria/Arlington Waste-to-Energy facility, but was taken to its own landfill outside the region.

Private haulers pick up municipal solid waste discarded by multi-family housing (defined as five or more units). This MSW is mixed in with the commercially collected waste from businesses and is not tracked separately. As discussed above, much of this waste is taken to the Alexandria/Arlington Waste-to-Energy facility.

3.1.1.3 Household Hazardous Waste

In June 2001, the City opened a permanent household hazardous waste collection site on Wheeler Avenue. Prior to its startup, the City's household hazardous waste collection program consisted of waste collection events that were held twice a year. Since June

2001, the City's permanent collection site has been available for residents to bring their household hazardous wastes. This site is open every Monday (except for holidays) from 10:00 a.m. until 6:00 p.m. Waste from Conditionally Exempt Small Quantity Generators is accepted on an appointment-only basis. Acceptable items at the collection site are summarized in Table 3-2. Unacceptable items include explosives, ammunition, biological waste, radioactive materials and unknown substances.

Table 3-2
Materials Accepted at
City Household Hazardous Waste Collection Facility

Antifreeze	Garden Products	Propane Tanks
Battery Acid	Herbicides	Pet Supplies
Gasoline	Pesticides	Photographic Chemicals
Motor Oil	Ant Bait or Traps	Developers
Auto Cleaning Products	Rodent Control Products	Fixers
Car Batteries	Oil-Based Paints	Insect Spray Cans
Fire Extinguishers	Flammable Caulks & Adhesives	Computers
Household Cleaning Products	Lacquers	Televisions
Flammable Waxes & Abrasives	Spray Can Paint	VCRs
Driveway Sealer	Varnishes	Printers
Household Batteries	Thinners	Cellular Phones
Lawn Care Products	Mineral Spirits	Other Electronics
	Drain Cleaners	

Source: City of Alexandria Office of Recycling, 2003

The City contracted with Care Environmental Corporation to operate the Wheeler Avenue facility. Data collected for the City by Care Environmental during the period June 4, 2001, through December 9, 2002, indicate that 35,650 pounds of household hazardous waste were delivered to the collection facility. That equals nearly 18 tons of material and an average of about 1 ton of household hazardous waste delivered on a monthly basis.

3.1.1.4 Used Oil/Oil Filters

The City contracts with U.S. Filter to manage the used oil dropped at the household hazardous waste collection site by City sources and residents. During calendar year 2002, the City reported to DEQ that 2,162 tons of used oil was recycled. Also during 2002, 35 tons of oil filters were recycled.

3.1.1.5 Antifreeze

During calendar year 2002, the City reported to DEQ that 132 tons of antifreeze was collected at the household hazardous waste facility for recycling. Private haulers also collected antifreeze in the City and reported their quantities to City officials.

3.1.1.6 Batteries

During calendar year 2002, the City reported to DEQ that 2.5 tons of car batteries and dry cell batteries were collected at the various drop-off locations in the City, including the household hazardous waste facility, for recycling. In addition, private sector collection of car batteries within the City limits was reported to City officials.

3.1.2 Construction and Demolition Collection

Private contractors collect C&D waste in the City. During calendar year 2002, the City reported to DEQ that 3,000 tons of construction waste were managed. During calendar year 2001, the City reported to DEQ that 500 tons of demolition waste were managed, along with 1,210 tons of recycled concrete and 23,269 tons of recycled asphalt. C&D materials generated in the City are typically collected by private contractor and transported to the Lorton Landfill in Fairfax, Virginia for disposal.

3.1.3 Industrial Waste Collection

The City has very few industrially-zoned areas; hence, the quantity of industrial waste collected is small. Expansion of industrial waste sources is not projected. Within the City's current solid waste system, industrial solid waste is treated as commercial waste and collected by the private haulers, with the tonnages incorporated in that waste stream.

Industrial waste is generated by light industry in the City. The industrial waste includes waste coming from warehouses, distribution facilities and some light assembly, such as paper box facilities. As a result, the composition largely consists of packing materials, including pallets, corrugated boxes, plastic wrap, metal and plastic strapping, etc. Other sources of industrial waste include an asphalt plant and an aggregate facility located in the Eisenhower Corridor, catering businesses, printing, and automobile-related operations.

3.1.4 Regulated Medical Waste Collection

The City has a variety of dental offices, medical clinics, and related facilities that generate regulated medical waste and are serviced by private contractors. The largest generator of regulated medical waste in the City is the INOVA Alexandria Hospital. This waste is managed by a private contractor who takes the material off-site and out of the region for processing. No data is available regarding how much regulated medical waste is collected in the City by private haulers. No regulated medical waste is accepted at the Alexandria/Arlington Waste-to-Energy facility.

3.1.5 Vegetative and Yard Waste Collection & Processing

Every fall, the City provides residents with vacuum leaf collection. City crews drive through neighborhoods with specialized vacuum-equipped trucks to collect leaves that have been raked to the curb. Each neighborhood receives a minimum of six passes on their street between mid-October and the end of December. Each house receives one

pickup per collection period. During FY 2001, 29,500 cubic yards of leaves were collected in the City. This was reported to DEQ as about 4,000 tons of material for calendar years 2001 and 2002. For FY 2003, about 30,000 cubic yards of leaves were collected.

During April and May, residents may pick up mulch generated from the leaves the City has collected. The leaves collected in the fall are shredded in a large "tub grinder" to produce the leaf mulch product. Christmas trees collected by the City in January are also shredded and chipped into "wood mulch." The City's mulch site on Eisenhower Avenue is generally open to the public for several months during the spring. Mulch is free of charge on a first-come, first-served basis. Mulch is also available for delivery by the City at $30 per load if delivered within the City limits, or $50 per load delivered outside the City limits.

In addition, private contractors handle debris collected from land clearing activities in the City. This material is hauled to Fairfax County for disposal in the Lorton Landfill or the other C&D facilities identified later in this section. During calendar year 2002, the City reported to DEQ that 45 tons of land clearing debris were managed.

3.1.6 Incinerator Ash

Incineration ash is the byproduct of the City's MSW burned at the Alexandria/Arlington Waste-to-Energy facility located on Eisenhower Avenue. The ash from this facility is approximately 3 percent ferrous metal, 1 percent non-ferrous metal, and 96 percent inert materials. Covanta contracts for the collection and transport of this ash from the Alexandria/Arlington Waste-to-Energy facility to the I-95 Ash Monofill in Lorton, Virginia. The ash meets all State and federal requirements for landfill disposal.

3.1.7 Sludge

City wastewater treatment plant sludge generation totals from the Alexandria Sanitation Authority (ASA) have risen from 11,000-12,000 dry tons per year in 1998 and 1999 to 14,000-15,500 dry tons during 2000, 2001 and 2002. This rise has occurred during a $330 million upgrade to the ASA facility to meet new effluent limits imposed by the Commonwealth of Virginia and total nitrogen requirements of the Chesapeake Bay program. This on-site construction has resulted in a temporary but significant increase in chemicals used to treat incoming sewage sludge. The wastewater facility upgrade is ongoing and is scheduled to be completed by the end of 2005.

The Alexandria Sanitation Authority, which manages the City's sludge under contract, has changed from a fixed film biological treatment system enhanced by physical chemical treatment schemes to a state-of-the-art biological nutrient removal, activated sludge system. This change has affected the data.

ASA will continue to gravity thicken primary sludge and mechanically thicken waste activated sludge and tertiary sludge. All of these go through a pasteurization process to inactivate pathogens, followed by anaerobic digestion. The digested material is then

mechanically dewatered and trucked to permitted land application sites in Virginia where it is recycled into farmland soil.

The Authority projects an average of 13,000 dry tons per year over the next ten years once on-site construction is complete. This is a high estimate of production for future years, and the amount of biosolids produced with the new process will not be firm until they acquire operational experience under this new process.

3.1.8 Tires

Waste tires are collected from a number of sources within the City of Alexandria, with the greatest volume coming from retail tire dealers who collect them when they sell new tires. Other sources are discount stores and auto service shops. During FY 2002, the Virginia DEQ estimated 130,500 waste tires were generated (i.e., about one tire per person) in the City, which generated about $65,000 for the State tire fund (i.e., $0.50 per tire).

The City collects tires from City vehicles in a roll-off container bin located at Fleet Services located on South Quaker Lane. These tires are subsequently processed for recycling. Additional tires are collected during the City's Spring Clean-up event. During calendar year 2002, the City reported to DEQ that 182 tons of tires were recycled.

3.1.9 White Goods

The City collects white goods with City trucks and crews and contracts with Davis Industries for processing. During calendar year 2002, the City reported to DEQ that 4,984 tons of metals were recycled. Of this total, City officials estimate that 4,653 tons were attributed to metals collection from commercial sources, and 331 tons were linked to the collection of white goods.

In addition, private companies that sell appliances will remove old appliances for a fee when replacing them with new ones.

3.1.10 Friable Asbestos

Management of friable asbestos discovered in buildings located in the City is the responsibility of the building/property owner. Friable asbestos is typically found during renovation and demolition activities, and the objective is to remediate the site to ensure that any airborne disbursement is minimized. For City buildings, the City's Code Enforcement Division of the Fire Department is involved with ensuring proper asbestos management. Data are not available regarding how much friable asbestos waste is collected in the City and then disposed of outside the City by private contractors. The City government did not handle any nor report any asbestos tonnage to the DEQ during calendar year 2002.

3.1.11 Petroleum Contaminated Soils

Proper cleanup of soils contaminated with petroleum in the City are the responsibility of the property owner, in accordance with federal, State, and local statutes. The City's Code Enforcement division of the Fire Department is responsible for ensuring proper management takes place on City property. There are typically five to six petroleum contaminated soils incidents each year within the City. These are usually due to leaks in commercial and residential underground oil and gas tanks that have been excavated for replacement. Hydraulic leaks from vehicles are another source in the City, such as the spill that occurred at the Patent and Trademark Office (PTO) site, which had to be remediated. A train derailment at the Potomac Yard area of the City also resulted in the need to remediate contaminated soil.

The metropolitan area has approximately 70 environmental engineers who will manage contaminated soil remediation. Generally, the engineering firm specifies collection and disposal to prevent further environmental damage and in order to meet all federal, State and local disposal requirements.

Data are not available regarding how much petroleum contaminated soils is collected in the City by private contractors. The City did not report any petroleum contaminated soils tonnage to the DEQ during calendar year 2002.

3.1.12 Other Special Waste

As previously noted, special wastes are materials that require or are chosen for special handling and precautions prior to recycling and/or disposal. They also are often subject to special programs and recycling.

3.1.12.1 Electronics Recycling

During Earth Day 2002, the City sponsored an electronics recycling collection event at a school parking lot. Residents were encouraged to recycle their outdated or unusable electronic equipment so that valuable precious metals could be recycled and hazardous electronics elements, such as lead and mercury, could be removed from the waste stream. During 2002, the City reported to DEQ that 30 tons of the following types of electronic equipment were collected for recycling: monitors, CPUs, printers, keyboards, network equipment, cables and peripherals, televisions, radios, stereos, cellular phones, and VCRs. Recycling service for electronics and computers is provided at Alexandria's household hazardous waste collection site. Future quantities of electronics collected for recycling are expected to remain relatively constant.

3.1.12.2 Tree Stumps

Data are not available relative to the quantity of tree stumps generated in the City.

3.1.12.3 Spill Residues

The Code Enforcement Division within the City's Fire Department is responsible for responding to any hazardous spills and ensuring proper mitigation occurs, in accordance with federal, State, and local regulations. If the responsible party can be identified, it is their responsibility to hire the remediation contractor. If one cannot be identified, Code Enforcement brings in its own contractor. If there is a non-hazardous MSW spill, the City's Solid Waste Division handles the cleanup. The City does not weigh liquid and solid hazardous waste spills; therefore, spill residue tonnage data are not available.

In addition, an emergency plan exists to properly handle spill residues at the Alexandria/Arlington Waste-to-Energy facility.

3.1.12.4 Dead Animals

Management of dead animals collected in the City is handled through a contract with the Animal Welfare League of Alexandria, located at 4101 Eisenhower Avenue. Animals collected by animal control officers, plus those brought to the League by citizens, are taken to a crematorium in Chantilly, Virginia. During 2002, 21 tons of dead animals were cremated. The year before, 20 tons were managed.

3.1.12.5 Litter

To help keep the City of Alexandria clean, the City has recently established an adopt-a-block program for litter control. Citizens and businesses sign up to keep a four-block area clean at least four times a year. The City provides collection bags and safety vests prior to such cleanup events. No waste tonnage data are available from this program.

3.1.12.6 Waste Dirt

The City Maintenance Division within the Transportation & Environmental Services Department is responsible for street improvement and sewer maintenance activities that generate waste dirt. This material is disposed of at the I-95 Landfill in Lorton, Virginia. No tonnage data are available. In addition, private contractors manage waste dirt generated at construction sites within the City.

3.1.12.7 Street Sweepings

The City's Solid Waste Division provides all services associated with maintaining the cleanliness of the City's right-of-way by cleaning City streets through street flushing and sweeping. During FY 2001, the City swept 7,595 cubic yards of debris from Alexandria streets. This equates to about 7,600 tons. This quantity is forecasted to increase to about 8,250 tons in FY 2003.

3.2 Disposal

There is one municipal solid waste disposal facility located in the City of Alexandria, the 975 tons-per-day Alexandria/Arlington Waste-to-Energy facility. Additional MSW and other types of waste are managed by the private sector, which has developed a wide variety of disposal facilities in the metropolitan area that are easily accessible from the City. These are identified by waste type in the following subsections.

3.2.1 Municipal Solid Waste

The primary method of MSW disposal in the City of Alexandria is combustion with energy recovery at the Alexandria/Arlington Waste-to-Energy facility located in Alexandria and operated by Covanta Energy, Inc. This 975 tons-per-day facility, developed jointly by Arlington County and the City of Alexandria, has been the centerpiece of the jurisdictions' solid waste management systems since it began operations on February 16, 1988. The plant burns municipal solid waste and converts it into steam, which is then used to generate electricity for sale to Dominion Virginia Power. At the time it was constructed, it met Best Available Control Technology (BACT) air quality standards. The facility has a capacity to process 356,000 tons of waste annually and has a gross energy output of 24 megawatts, with approximately 23 megawatts of reusable energy sold to Dominion Virginia Power. The electricity generated is sufficient to power 23,000 homes.

The City of Alexandria is obligated by the operating agreement with Covanta and the bond covenants to send (or cause to be sent) at least 90,000 tons per year of MSW to the facility until the year 2013 under these "put-or-pay" agreements. Arlington County is similarly obligated until 2013, with the County required to send at least 135,000 tons of MSW to the facility annually. The total "put-or-pay" requirement of the two jurisdictions totals 225,000 tons, or about 60% of the Waste-to-Energy facility's capacity. To ensure that sufficient amounts of waste were received at the facility to cover operating expenses, the City of Alexandria enacted a "flow control ordinance" in 1985. This was a customary tool used by local governments in the United States to ensure a steady flow of MSW to MSW processing facilities such as transfer stations, waste-to-energy facilities and landfills. This ordinance controlled the flow of solid waste by designating that solid waste generated within the City be taken for disposal to the Alexandria/Arlington Waste-to-Energy facility. Flow control was deemed essential for long-term solid waste management planning, as it guaranteed the economic viability of the disposal system. This is important for any large capital-intensive investment such as a WTE facility, as it depends on the waste supply for both disposal fee revenue and for energy generation revenue.

In a 1994 landmark decision, *Carbone vs. Town of Clarkstown, NY*, the U.S. Supreme Court ruled that flow control interferes with interstate commerce and is a violation of federal law. This decision invalidated the City ordinance and MSW has been free to go to large, private landfills in Virginia, Maryland and Pennsylvania. To remain competitive

with these landfills, the City of Alexandria, Arlington County and Covanta developed a competitive pricing strategy that utilizes the plant to capacity.

In fiscal year 2002, the Alexandria/Arlington Waste-to-Energy Facility processed a total of approximately 288,030 tons of refuse from Arlington County, the City of Alexandria and private haulers for a daily average of 789 tons. This included approximately 115,212 tons per year (315 tons per day) from the City of Alexandria. Of these 115,212 tons, approximately 86,794 tons were generated from commercial generators.

Most of the commercial waste generated in the City is disposed of at the Alexandria/Arlington Waste-to-Energy facility. However, one major and a number of smaller private collectors utilize other disposal facilities located outside the City. Table 3-3 shows the major licensed landfills and transfer stations accessible to haulers servicing the City of Alexandria.

After undergoing a $43 million retrofit in 1999 and 2000 to install an advanced state-of-the-art emissions control system (at Maximum Achievable Control Technology [MACT] air emissions standards) and to upgrade the scales, scale house and facility's appearance, the facility is currently operating well within its air emissions permit limits. These investments were made so the facility could meet the requirements of the 1990 Amendments to the Clean Air Act (regulations not issued until 1995 for compliance by 2001) and reduce its impact on its neighbors.

Table 3-3
Major Landfills & Transfer Stations

Facility Name	Location	Facility Type	Owner	Public or Private	TPD Limit
Benning Road	District of Columbia	Transfer Station	District of Columbia	Public	600
Fort Totten	District of Columbia	Transfer Station	District of Columbia	Public	900
I-95 Sanitary Landfill	Fairfax County	Landfill	Fairfax County	Public	N/A
I-95 Ash Monofill	Fairfax County	LF/Ash Monofill	Fairfax County	Public	N/A
I-95 Energy Resource Recovery Facility	Fairfax County	WTE	Covanta Energy, Inc.	Public	3,000
Brown Station Road Landfill	Prince George's County	Landfill	Prince George's County	Public	N/A
I-66 Transfer Station	Fairfax County	Transfer Station	Fairfax County	Public	2500
Independent Hill Sanitary Landfill	Prince William County	Landfill	Prince William County	Public	N/A
Loudoun County Sanitary Landfill	Loudoun County	Landfill	Loudoun County	Public	N/A
Old Dominion Transfer Station	Loudoun County	Transfer Station	Waste Management, Inc.	Private	460
Manassas Transfer Station	Manassas	Transfer Station	Waste Management, Inc.	Private	350
King George Landfill	King George County	Landfill	Waste Management, Inc.	Private	4,000 –4,500
King and Queen Landfill	King & Queen County	Landfill	Browning-Ferris Industries	Private	4,000
First Street T.S. S.E.	District of Columbia	Transfer Station	Waste Systems, Inc.	Private	550

3.2.2 Construction and Demolition Waste

In many cases, C&D waste is disposed of in sanitary landfills along with MSW; however, there are specialized facilities available. Table 3-4 shows the major C&D disposal facilities accessible to haulers serving the City of Alexandria.

Table 3-4
Major C&D Facilities in Region

Facility Name	Location	Owner	Year Permitted
Hilltop Sand & Gravel Co. Inc.	Fairfax County	Hilltop Sand & Gravel Co. Inc.	1980
Lorton CDD Landfill	Fairfax County	Furnace Road Associates	1981
Potomac CDD MRF	Alexandria	Crippen Companies	1995
Potomac Landfill	Prince William County	Crippen Companies	1985
Rainwater Concrete Co. Landfill	Fairfax County	Rainwater Concrete Co., Inc.	1980
Merrifield MRF	Fairfax County	Waste Management	N/A
FG Pruitt Debris Landfill	Goochland County	Six Two Three Landfill	1987
Ashcake C&D Debris LF	Henrico County	Unknown	1994
US Army/Fort AP Debris	Caroline County	U.S. Army	N/A

3.2.3 Ash Disposal

Combined fly and bottom ash are collected at the Alexandria/Arlington Waste-to-Energy facility and hauled for disposal at the Fairfax County I-95 Ash Monofill. The ash monofill is operated by Fairfax County under a Memorandum of Understanding initiated in 1981 among the District of Columbia, the City of Alexandria, Arlington County, and Fairfax County. This landfill initially received MSW, but that portion of the facility has been closed. Currently, it receives only ash from the Alexandria/Arlington Waste-to-Energy facility and the Fairfax County Waste-to-Energy facility. Fairfax County has estimated sufficient disposal capacity at the monofill through 2025.

The ash produced by the Alexandria/Arlington Waste-to-Energy facility is tested on a monthly basis to meet both federal and State concentration levels of toxins. To date, the tests have shown the ash to be non-hazardous.

In FY 2003, the Alexandria/Arlington Waste-to-Energy facility generated approximately 93,080 tons of ash (277 tons per day) that were landfilled at the I-95 Ash Monofill. Of this, approximately 33,000 tons were estimated to be from City of Alexandria waste.

3.2.4 Sludge (Biosolids) Disposal

The Alexandria Sanitation Authority currently has a three-year contract with Synagro for the land application of their biosolids. This contract has additional one-year renewals that expire in 2007. Synagro subcontracts the hauling of these biosolids. No septage is currently accepted at the City's treatment plant. Fairfax County is a wholesale customer

and paid more than half of Alexandria's operating and maintenance expenses for fiscal year 2002.

3.3 Recycling

In 1990, the Commonwealth of Virginia issued regulations that required all localities to develop ways to meet and maintain a 25 percent recycling rate. To meet this goal, the City of Alexandria developed a comprehensive recycling program that included residential curbside collection, drop-off collection centers, and voluntary commercial and multi-family recycling. The City's recycling program has successfully exceeded the Commonwealth's goal. In calendar year 2002, the City submitted a recycling rate of 28 percent to DEQ using the official state formula.

3.3.1 Residential Recycling

The City provides weekly curbside collection of aluminum and steel cans, plastic bottles and jugs, glass bottles, newspapers, magazines and catalogs, and telephone books on the same day as regular municipal waste collection. Each household is provided an 18-gallon yellow bin for recyclables, to be placed at the curb. There is no alley collection of the yellow bins. Citizens can mix the recyclables together in the yellow bin, with the exception of newspapers and magazines. These are placed next to or on top of the yellow bin at the curb.

During FY 2001, 3,032 tons of newspapers and 1,534 tons of aluminum, plastic and glass containers were collected curbside for recycling. For FY 2003, the City estimated 3,000 tons of newspapers and 1,550 tons of aluminum, plastic and glass containers were collected.

For elderly and handicapped residents, City collection crews will remove solid waste from containers left at the door and also provide pickup of household hazardous waste. Eligible citizens must call to establish these walkout services.

In addition, each residential unit receives call-in collection of white goods (e.g., old appliances). Scheduled pickups are typically provided on Friday. Citizens can also drop off white goods for free at the Alexandria/Arlington Waste-to-Energy facility. During FY 2001, 313 tons of white goods were collected. About 340 tons were collected in FY 2003.

Materials collected curbside for recycling are processed by Waste Management Recycle America at a materials recovery facility (MRF) located in the Merrifield section of Fairfax County. Newspaper and corrugated cardboard are processed at an environmental recycling MRF. White goods are handled by Davis Industries. Used oil is primarily handled by U.S. Filter and is collected at the City's household hazardous waste site. In addition, Mid-States Oil Refining handles a small amount of used oil. The MWCOG region is a competitive market in terms of processing services. It is expected that there will not be any trouble for the City to maintain or find new processing services once the existing contracts expire. Starting in FY 2005, the residential recycling program will be

contracted out to the private sector. It is also planned that white paper and cardboard will be added to the items which can be placed in the curbside bins for recycling.

3.3.2 Commercial and Multi-Family Recycling

The City offers assistance to commercial entities and multi-family dwellings if there is an interest in initiating or expanding recycling efforts. The type of assistance offered includes technical advice, referrals to recycling services, and information on incentive programs.

The City Department of Transportation and Environmental Services promotes business recycling by way of a brochure, entitled "Simple Steps to Successful Recycling at Your Alexandria Business." The brochure provides a step-by-step guide for selecting a recycling company, designating collection and storage areas, collecting recyclables, transporting materials to the storage area, promoting and sustaining the program, information on local recycling haulers, pricing, collection options and more.

From a collection standpoint, the businesses in the City predominantly use private haulers for recycling. The City does recycle its own office paper. Effective in 2002, new commercial developments in the City, as part of their Special Use Permits, must put a recycling program in place. Details are being worked out regarding the types of materials, with paper, plastics, metals and cardboard under consideration. An annual recycling report must be submitted to the City.

Commercial recycling is handled by the private sector. Most materials are taken to materials recovery facilities (MRF), where they are sorted and processed for marketing. Facilities that are available and convenient to process recyclables from the City of Alexandria are listed in Table 3-5.

3.3.3 Drop-Off Centers

The City has recycling drop-off centers open to residents 24 hours a day, seven days a week. Each center has recycling containers for residents to deposit their recyclables.

Materials accepted at the drop-off centers include aluminum and steel cans, plastic bottles and jugs, glass bottles and jars, newspapers and magazines, household batteries and office paper. The City also has 15 newspaper stops. Drop-off centers generate some 500 tons of newspapers and over 100 tons of aluminum, plastic and glass containers per year.

Table 3-5
Active Material Recovery Facilities in Northern Virginia and Maryland

Facility Name/Owner	County/City	Materials Accepted
BFI Fredericksburg Recyclery	Fredericksburg	Cardboard, plastics, scrap metal, aluminum & metal cans, pizza boxes, white paper
Capitol Fiber, Inc.	Annandale	Paper
Con-Serv Industries	Sterling	Mixed paper, newspaper and cardboard, glass, metal and aluminum cans, plastics
Davis Industries, Inc.	Lorton	Scrap metal
Joseph Smith & Sons, Inc.	District of Columbia	Scrap metal
Environmental Recycling, Inc.	Alexandria	Paper
Fairfax Recycling, Inc.	Burke	Aluminum and ferrous cans, glass, and plastic
FCR Virginia, Inc. (Waste Management, Inc.)	Alexandria	Newspapers, aluminum and ferrous metal cans, plastics
Metalpro, Inc.	Springfield	Used tires
Metro Recyclers, Inc.	Sterling	Various
Office Paper Systems, Inc.	Gaithersburg	All paper and cardboard
Potomac CDD (Crippen Companies)	Alexandria	Construction & demolition debris
Southeast Paper Recycling	Bristow	All paper and cardboard
USA Waste of Virginia	Fairfax/Loudoun/Sterling	Newspaper, glass bottles, aluminum cans, cardboard (Fairfax), office paper, plastics

Source: GBB & Active Solid Waste Facilities in Virginia's DEQ Northern Regional Office. Virginia Department of Environmental Quality - Office of Waste Programs.

Most types of household batteries may be recycled at any City recycling center in red barrels, labeled "Household Batteries Only." All other batteries may be brought to the household hazardous waste collection center for safe disposal.

The drop-off centers are serviced by one collection vehicle on Monday and Thursday.

3.3.4 Other Recycling Programs

Other City recycling programs are described in the following subsections.

3.3.4.1 Bicycle Recycling

The City promotes the efforts of Pedals for Progress, which conducts a bicycle recycling collection drive during the month of May. Pedals for Progress collects, repairs, and ships old bikes to developing countries for transportation purposes. A designated collection

location is provided for citizens to bring their old bikes. During 2002, more than 155 used bicycles were donated to the cause.

3.3.4.2 Youth Recycling Education Programs

The City's Office of Recycling provides youth recycling education programs in the classroom for environmental clubs and youth groups. This program is further described in the Public Education section below.

3.3.4.3 Plastic Bottle Collection Grant

During the summer of 2002, the City received a grant to collect plastic bottles for recycling. This effort focused on special events and festivals and collected over 1,500 pounds of plastic from eight events.

3.3.4.4 Mercury Reduction

The City has initiated a mercury reduction program aimed at diverting products containing mercury from the waste stream. For example, fluorescent lights are accepted at the household hazardous waste collection facility.

3.3.5 Closed Facilities

There have been no closed waste management or recycling facilities in the City since the last solid waste management plan was issued in 1992.

3.4 Public Education

The City budgets about $15,000 per year for public education efforts. A summary of program efforts is provided immediately below.

In July 2002, the City Office of Recycling launched a new website, www.alexrecycles.org, making it easier to access information about the City's recycling program. The website provides a summary of information on what to recycle in Alexandria, where recycling drop-off centers are located, how to request a new recycling bin, as well as the latest recycling program news.

The City also released the "Simple Steps to Successful Recycling" brochure aimed at increasing commercial recycling among City businesses. This is described above under the Commercial Recycling Collection section.

Another brochure, entitled "Let's Talk Trash and Recycling," describes current recycling initiatives in the City, along with trash collection information, waste disposal destinations, and relevant contact information.

In addition, the City's recycling team periodically works with MWCOG to develop radio advertising campaigns about the importance of recycling all that you can, all the time.

The City also has a recycling mascot, Robbie the Recycling Squirrel. Robbie visits schools, recreation centers, youth groups, and civic associations to spread the word about recycling in the City. Groups are encouraged to schedule a visit from Robbie.

Further, the Office of Recycling conducts presentations to civic associations and community groups upon request. The City also encourages citizens' groups and businesses to participate in recycling promotional events throughout the year, including America Recycles Day and Earth Day events.

During November, the City participates in America Recycles Day. In 2001, Alexandria won a national award from Waste Management, Inc. recognizing the City for hosting one of the best America Recycles Day programs in the country. This event focuses on promoting recycling in the community.

The Alexandria Department of Transportation and Environmental Services publishes an annual newsletter, entitled "The 2nd Time Around." This newsletter features the latest developments in the City's recycling program, lists upcoming events, provides useful recycling insights, and contact information. Arlington and Alexandria have jointly produced brochures and information about the Waste-to-Energy plant, titled "Partners for Progress – Environmental Stewardship in Waste Management Programs."

3.5 Public/Private Partnerships

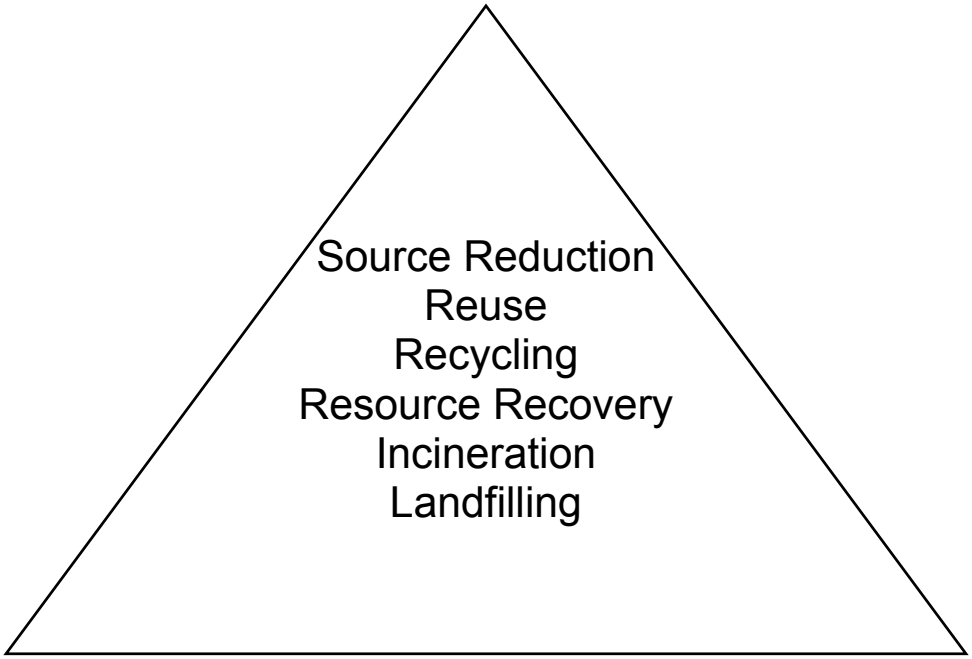
The City has a number of public/private partnerships as part of its solid waste management system. These include:

- A hauling contract with Browning-Ferris Industries to pick up solid waste from a compactor room serving businesses in Old Town Alexandria;
- An agreement with the I-95 Landfill to accept ash from the Alexandria/Arlington Waste-to-Energy facility;
- Private companies to process recyclables collected from different programs;
- A partnership with Arlington County and Covanta Energy, Inc. with regard to the Alexandria/Arlington Waste-to-Energy facility;
- A partnership with the Sanitation Authority with regard to the management of sludge.

4.0 Hierarchy (140.1)

The Code of Virginia and the Virginia Solid Waste Management Regulations require local governments to develop a comprehensive and integrated solid waste management plan. An integrated solid waste management plan is one that addresses the six management strategies embodied in the solid waste management hierarchy originally developed by USEPA, as shown in Figure 4-1.

Figure 4-1
Solid Waste Management Hierarchy



The Solid Waste Management Plan must provide a strategy that encompasses the elements of the hierarchy in the major waste management operations of generation, collection, transportation, processing, and disposal. The plan must demonstrate how the local jurisdiction has met the mandatory requirement of recycling 25 percent of the municipal solid waste generated each year.

4.1 Source Reduction

Source reduction is any action that reduces the amount or toxicity of solid waste that must be managed. These actions take place prior to a material becoming part of the municipal waste stream, and at the generator level or before. One example of source reduction is a manufacturer reducing the amount of packaging used to ship and display a product. An individual resident could achieve source reduction by bringing bags to the grocery store to package their purchases rather than obtaining new bags, or composting yard waste in their back yard. One reduction example, which is applicable to business, governmental and home offices, is double-sided copying. This can save up to 50 percent of the paper used in documents.

Many source reduction decisions are beyond the realm of municipal programs and are made by individual manufacturers, citizens and businesses. However, in addition to practicing source reduction in City facilities, the City can influence decisions made by residents and businesses through public education and promotion. The fundamental goal is to influence attitudes and change behavior. Included in the program scope of work were source reduction materials. Current activities in the City of Alexandria are summarized in the discussion of the City's public education program in Section 3.4.

4.2 Reuse

Reuse is a waste management technique where a product is reused for its original purpose in a new application without undergoing physical change. For example, building materials that are removed during renovation or demolition, such as a sink, can be installed in another building. There are a number of community service companies, usually not-for-profit, that collect used clothing and household items for resale. The Salvation Army, Goodwill Industries, and Purple Heart are a few of these firms that provide service in Northern Virginia. In addition, much reuse takes place as a result of yard sales and sales through consignment stores.

The City of Alexandria does not currently identify or track reuse activities of private citizens or not-for-profit organizations that operate in the City.

4.3 Recycling

Recycling is a process where resources that would become part of the waste stream for disposal are diverted and processed for use in the production of new products. Recycling primarily addresses materials such as ferrous metals, aluminum, other non-ferrous metals, glass, plastic and paper fiber. These materials must be collected, separated, cleaned and aggregated into industrial quantities before they can be utilized by industry in new products. Recycling saves the extraction and processing of virgin materials such as iron ore, and avoids the resulting environmental impacts. A number of recycling processes save energy when compared to the utilization of virgin materials.

Recycling in the City is described in Sections 2 and 3. In addition to the City's residential recycling program already described, the City is using the Special Use Permit process to require new commercial businesses to include recycling in their business activities. The City's recycling rate for calendar year 2002 was 28.01 percent. This exceeds the mandatory Virginia requirement by 3.01 percent.

4.4 Resource Recovery (Waste-to-Energy)

Combustion of municipal solid waste will reduce the volume of material by a factor of 10 and the weight by approximately 75 percent. The resulting ash is usually landfilled in a Subtitle D landfill in a cell dedicated to ash. The combustion of MSW in a waste-to-energy facility captures the energy released and converts it to steam. This steam can be used directly for heating or to drive a turbine generator to generate electricity. The

extraction of the energy from the combustion gases reduces their volume and, consequently, the capacity and costs of the emissions controls needed.

The City of Alexandria was a co-sponsor, along with Arlington County, of the development of the Alexandria/Arlington Waste-to-Energy facility located in the City. The facility has a long-term contract with Dominion Virginia Power for the sale of the electricity generated. A long-term contract for disposal of the ash produced exists with the I-95 Landfill in Fairfax County, as discussed in Section 3.

4.5 Incineration

Incineration is the combustion of MSW without energy recovery. Incineration of MSW in large fixed installations without energy recovery is essentially no longer practiced in the United States, mainly due to air emissions standards and the resultant cost of pollution control equipment. There are some areas that allow small portable units (pit burners) to be used; however, there are no incinerators operating in City of Alexandria.

4.6 Landfill

Sanitary landfilling of MSW is allowed by federal legislation, RCRA Subtitle D, and controlled by a permit process managed by Virginia DEQ. A sanitary landfill is an engineered waste burial facility designed to minimize the likelihood of environmental impacts, including surface and groundwater pollution and air pollution. The design of these facilities includes liners and leachate capture systems, capping to minimize water penetration and gas capture and treatment systems. In integrated waste management systems, all waste that is not source reduced, recycled or combusted is landfilled.

The City of Alexandria, as noted in the previous sections, does not own, operate or utilize a landfill for MSW disposal. MSW under control of the City is burned in the Alexandria/Arlington Waste-to-Energy facility and the ash disposed in the I-95 Landfill operated by Fairfax County.

5.0 Objectives (120.A.3, 140.2)

The goals of the Solid Waste Management Plan are stated in Section 1, which provides a structure for evaluating the Plan's success. The City of Alexandria has set forth these goals to demonstrate that it has fulfilled its responsibility in assessing and planning for the City's solid waste management needs. This section outlines more specific objectives related to the goals and establishes a background for Section 6, Implementation of the Solid Waste Management Plan, which provides greater detail as to how the goals and objectives will be accomplished.

This section is structured by re-stating the goals found in Section 1, followed by the related supporting objectives.

Goal 1:

Establish a planning process and document that meets Virginia statutory and regulatory requirements, that fosters public participation, and that ensures that the City's solid waste management needs will be met.

Related Objectives:

A) Identify and project for the planning period the volume and types of waste generated in the City of Alexandria.

B) Identify the solid waste management system components that will handle all non-hazardous solid waste generated in the City of Alexandria.

C) Maintain a comprehensive, integrated solid waste management approach that addresses collection, transportation and disposal. The approach will address the solid waste hierarchy elements of source reduction, reuse, recycling, resource recovery, incineration and landfilling, in proportions appropriate for the City's needs.

D) Establish a single point of contact (Solid Waste Planner position) for provision and management of technical solid waste information in the City. This position will support future planning decisions and comply with State reporting requirements.

E) Provide a framework that will allow for a periodic review and evaluation of the recommendations and guidelines set forth in the Solid Waste Management Plan to ensure that the Plan remains responsive to City needs.

F) Foster the participation and involvement of the general public in solid waste management planning and implementation.

G) Establish an Emergency Solid Waste Management Plan for disasters.

Goal 2:

Identify and/or maintain mechanisms to ensure that needed solid waste collection services are available throughout the City.

Related Objectives:

A) Provide convenient, competitively priced solid waste collection services that are self-supported through user fees.

B) Identify collection system components that currently meet the City's needs.

C) Identify a schedule for action to sustain the current collection system components that meet the City's needs.

D) Establish, enforce, and periodically update collection service standards.

E) Continue to provide collection services that meet the needs of elderly and disabled residents.

F) Evaluate methods of achieving increased efficiencies in solid waste collection.

G) Compile and analyze information regarding collection operations to ensure that existing operations are operated in a safe, sanitary and efficient manner, and that collection costs are necessary and reasonable.

Goal 3:

Identify and provide for the availability of facilities to ensure that options for solid waste disposal are available throughout the City.

Related Objectives:

A) Identify disposal system components that meet the City's current needs.

B) Identify a schedule for action to sustain collection system components that currently meet the City's needs.

C) Keep the Waste-to-Energy facility operating at capacity, meet requirements of its emissions permits, ensure it is fiscally viable, and track its performance carefully.

Goal 4:

Identify, implement, and/or maintain programs for ensuring that solid wastes are managed in accordance with federal and State laws and regulations in a manner that protects public health, safety, and the environment.

Related Objectives:

A) Protect the environment by fulfilling the laws, regulations, ordinances and other requirements as set forth by the City, Commonwealth of Virginia, and the federal government.

B) Develop programs to reduce the toxicity of wastes generated in the City (consumer electronics, appliances, household batteries, mercury-containing lamps, including fluorescent lights and thermostats).

C) Reduce waste toxicity in products and packaging through pollution prevention concepts.

D) Work with national and regional initiatives to develop industry standards for production, identification of material substitutes and the reduction of volume, targeting consumer items that are responsible for contributing to the toxicity of the waste stream.

Goal 5:

Maximize diversion of recyclable solid waste from disposal by using techniques that provide and promote recycling programs and that encourage private sector recycling.

Related Objectives:

A) Establish minimum standards and requirements for recycling that are achievable and understandable.

B) Expand the multi-family recycling program by mandating recycling at all existing and new commercial and multi-family developments.

C) Expand the number and type of materials collected in the recycling curbside program.

D) Increase the number of drop-off centers throughout the City by adding additional containers at each current location.

E) Initiate increased education and enforcement of recycling mandates.

F) Increase recycling in City-run facilities.

Goal 6:

Ensure that those providing solid waste services meet standards of customer service excellence policies.

Related Objectives:

A) Provide and publicize convenient methods and technologies by which customer complaints can be filed and resolved.

B) Improve investigation practices of all complaints regarding solid waste collection and maintain records of complaint resolution.

C) Implement annual customer service training for all employees.

D) Measure customer satisfaction with solid waste services.

E) Develop an orientation and training program for all in-house staff working in the Solid Waste Division.

6.0 Implementation Plan (120.A.2, A.4)

The following implementation strategy outlines the actions needed to implement the goals listed in Section 1 and the goals and objectives outlined in Section 5. The implementation strategy discusses the current systems that will continue, the plan's new initiatives and the milestones or deadline for accomplishing the objectives. This Solid Waste Management Plan (SWMP) has been designed to respond to the City's 20 year solid waste management needs by being proactive, flexible and responsive.

This section reiterates the objectives found in Section 5 (identified by a goal number and an objective letter) and then lists the related supporting implementation strategies.

6.1 Goal 1: Establish a planning process and document that meets Virginia statutory and regulatory requirements, that fosters public participation, and that ensures that the City's solid waste management needs will be met.

6.1.1 Objective A: Identify and project for the planning period the volume and types of waste generated in the City of Alexandria.

This information is presented in Section 2 of this document.

6.1.2 Objective B: Identify the solid waste management system components that will handle all non-hazardous solid waste generated in the City of Alexandria.

This information is presented in Section 3 of this document.

6.1.3 Objective C: Maintain a comprehensive, integrated solid waste management approach that addresses collection, transportation and disposal. The approach will address the solid waste hierarchy elements of source reduction, reuse, recycling, resource recovery, incineration and landfilling, in proportions appropriate for the City's needs.

A discussion of the waste hierarchy is presented in Section 4 of this document. The primary solid waste management option for municipal non-recyclable solid waste disposal in the City of Alexandria is combustion with energy recovery at the Alexandria/Arlington Waste-to-Energy facility located in the City of Alexandria and operated by Covanta Energy, Inc. Recycling is the secondary option for disposal.

Refuse and source reduction will be promoted through various public outreach and educational programs as an integral component of the overall solid waste management system. Some refuse and reduction efforts are in effect in the City. The City staff will seek opportunities with, and help from, the private sector in promoting source reduction through education efforts and outreach programs with the private sector.

6.1.4 Objective D: Establish a single point of contact (Solid Waste Planner position) for provision and management of technical solid waste information in the City. This position will support future planning decisions and comply with State reporting requirements.

The Solid Waste Division in the Department of Transportation and Environmental Services will act as the City's agent for collecting, maintaining, compiling, analyzing and reporting basic solid waste management information (until a Solid Waste Planner's position can be established).

The Solid Waste Division will prepare and submit the annual solid waste and recycling reports according to requirements in the Virginia Solid Waste Management Act and the Virginia Solid Waste Management Regulations 9 VAC 20-130-165 and 9 VAC 20-80-115 (Waste Information and Assessment Program).

The Solid Waste Division staff will continue to serve as a solid waste information clearinghouse and will provide frontline customer service in response to citizen requests for solid waste information. These requests typically regard solid waste collection in the City, facilities, collectors, types of materials recycled, locations of recycling drop-off centers (DOCs), household hazardous waste collection, and waste-to-energy operations.

6.1.5 Objective E: Provide a framework that will allow for a periodic review and evaluation of the recommendations and guidelines set forth in the Solid Waste Management Plan to ensure that the plan remains responsive to City needs.

The Solid Waste Division will be responsible for reviewing and evaluating the waste generation projections contained in the Solid Waste Management Plan and will assess the status of the implementation plan components. The Division will conduct this review at the completion of each odd numbered fiscal year, with recommendations for issues that may require attention. This report will be available by September 1 for the reporting period.

The Solid Waste Division will monitor municipal solid waste (MSW) disposal capacity availability and demand, and will propose adjustments as needed for the life of this plan during the proposed review process.

The Solid Waste Management Plan will be reevaluated periodically, or under certain conditions. Examples of conditions that would warrant reevaluation of the plan are: regulatory changes, changes in the types or quantities of waste generated, reductions in the waste stream due to successful recycling programs, changes in the availability of regional disposal facilities, and new or amended contracts that affect solid waste management.

6.1.6 Objective F: Foster the participation and involvement of the general public in solid waste management planning and implementation.

Section 9 of the Solid Waste Management Plan outlines the planning process and provides details on the public information, outreach and opportunities for public comment and participation in the Plan's formation.

The Solid Waste Division will continue its current role in providing public information, educational activities and materials (including printed materials), purchased advertising, joint promotions with other agencies and organizations, educational programs to Alexandria schools, information booths at public events and facilities, public speaking engagements and waste tours.

6.1.7 Objective G: Establish an Emergency Solid Waste Management Plan for disasters.

The planning process identified the City's lack of an emergency solid waste management plan for use in the event of a disaster. Emergency preparedness is necessary to protect public safety and to help the solid waste management system prepare to absorb the excess waste volumes created in an emergency or disaster.

To address this issue, the Solid Waste Division will develop an Emergency Solid Waste/Debris Management Plan. The Plan will contain the elements outlined by the Washington Area Council of Government's Emergency Solid Waste/Debris Plan. In addition, the Solid Waste Division will seek DEQ pre-approval of an emergency solid waste/debris site(s); establish mutual aid agreements with other jurisdictions in Northern Virginia for disaster response; and include solid waste management planning in the City's Emergency Management Plan.

6.2 Goal 2: Identify and/or maintain mechanisms to ensure that needed solid waste collection services are available throughout the City.

6.2.1 Objective A: Provide convenient, competitively priced solid waste collection services that are self- supported through user fees.

The Solid Waste Division should continue to evaluate its refuse collection services in comparison with neighboring jurisdictions, and best management practices identified from across the country. The cost to deliver these services will be monitored and assessed during plans review period.

6.2.2 Objective B: Identify collection system components that currently meet the City's needs.

The staff believes that the current collection system, such as white goods collection, street litter can collection and bulk item pick up at the curbside, should continue to be provided by the City, and the private sector is generally responsive to the needs of the City. Possible changes in requirements on businesses and multi-family units to increase recycling rates have been identified and are discussed in the recycling objectives.

The City should continue to offer the Spring Clean-Up service each spring to those who receive trash collection services from the City. This program is aimed at collecting residents' appliances, brush, mattresses and other large or bulky items at the curb.

Currently, the City residents can drop off small amounts of solid waste (limit 500 lbs.) free of charge at the City's disposal center, located at the Alexandria/Arlington Waste-to-Energy facility. The residents should continue to have this option available for their use.

6.2.3 Objective C: Identify a schedule for action to sustain the current collection system components that meet the City's needs.

Multi-family properties, townhome communities and businesses not receiving City services will continue to rely on private sector waste collection service providers for residential and business recycling and trash collection.

Service contracts in these communities will continue to be direct contracts between service providers and customers. Homeowner associations will continue to act as contracting agents for association members. Costs will be borne by the customer in the form of homeowner association dues or some other fee assessment mechanism as determined by the provider and customer. The City government will continue to collect solid waste and recyclables from public schools and other City buildings. This will be evaluated during the review period to determine the economic feasibility and the cost effectiveness of continuing these means of collection.

Private roll-off service companies will continue to conduct collection of construction and demolition waste (C&D) through direct contracts between the service company and the customer.

The City will maintain its public/private partnerships listed in Section 3.5 as part of its solid waste management system, as long as it is economically feasible. These partnerships will be evaluated during the Plan's review period.

6.2.4 Objective D: Establish, enforce, and periodically update collection service standards.

The City has set and will enforce minimum standards of service required of collection services provided under Title 5, Chapter 1 (Solid Waste Control). The City's Code Enforcement officers and the Solid Waste Division inspector will be responsible for inspections and reporting pursuant to and enforcing the provisions of this chapter.

The City Code and Ordinances should be reviewed periodically to ensure they meet the needs of the service providers and protect the public at large. The most recent review/update of the solid waste ordinance was in June 2003.

The Solid Waste Division will continue to participate in the City-wide Code Compliance meetings, which provide a collaborative approach to addressing issues facing the City.

6.2.5 Objective E: Continue to provide collection services that meet the needs of elderly and disabled residents.

The City offers special "walk-out" refuse services to eligible City residents. Eligible residents must be a minimum of 72 years old, be physically unable to take refuse out on their own and have no one else residing in the home that is capable of taking out the refuse.

Under the walk-out service arrangements, residents set their refuse in proper containers and bags at their door. City crews will walk up to the house to remove the refuse and return the cans when complete. Walk-out service limits customers to a total of six bags per week.

Elderly and handicapped refuse customers may also request assistance in the removal of household hazardous wastes.

6.2.6 Objective F: Evaluate methods of achieving increased efficiencies in solid waste collection.

The Solid Waste Division will continue to gather and maintain data from existing data bases, work orders, tipping fee payment records, scale tickets, maintenance logs and other routine reports. The Division should continue to study alternate solid waste collection methods and new vehicle technologies for consideration within the City's integrated solid waste management system. A constant evaluation of cost and service delivery compared to other jurisdictions in the metro area and best management practices will be used to assess the efficiencies in the solid waste collection.

6.2.7 Objective G: Compile and analyze information regarding collection operations to ensure that existing operations are operated in a safe, sanitary and efficient manner, and that collection costs are necessary and reasonable.

In FY 2004, a study was completed that evaluated efficiency, cost and effectiveness of the refuse and recycling collection systems.

Several recommendations from the report were incorporated in the Approved FY 2005 Budget and will be implemented. The Solid Waste Division will continue to submit the recommended system enhancements through the budget process until they are adopted.

6.3 Goal 3: Identify and provide for the availability of facilities to ensure that options for solid waste disposal are available throughout the City.

6.3.1 Objective A: Identify disposal system components that meet the City's current needs.

The City will continue to rely on the Waste-to-Energy facility for disposal as its primary solid waste management disposal solution until at least the year 2013, when the current "put-or-pay" contract expires. The facility is reliable and meets the City's needs.

Additional municipal solid waste and other types of waste are managed by the private sector, which has developed a wide variety of disposal facilities in the metropolitan area that are easily accessible from the City. These are identified by waste type in the previous sections.

Most of the commercial waste generated in the City is disposed of at the Alexandria/Arlington Waste-to-Energy facility. However, one major and a number of smaller private collectors utilize other disposal facilities located outside the City. Table 3-3 shows the major licensed landfills and transfer stations accessible to haulers servicing the City of Alexandria.

6.3.2 Objective B: Identify a schedule for action to sustain collection system components that currently meet the City needs.

The staff did not identify requirements for new facilities to serve the City at this time. The current Waste-to-Energy facility is sufficient for meeting the City's needs for municipal solid waste. Available vegetative waste management facility capacity is adequate to handle the City's requirements. In addition, any debris collected from land clearing activities in the City will be handled by private contractors. This material is hauled to Fairfax County for disposal in the Lorton Landfill or the other C&D facilities identified in this plan.

6.3.3 Objective C: Keep the Waste-to-Energy facility full with waste, ensure it is fiscally viable and track its performance carefully.

The Covanta Waste-to-Energy facility has been a reliable source for the City disposal since it went into operation in 1988. Most of the MSW processed at the facility comes from within Alexandria and Arlington – people who live in houses and apartments, or work in offices, restaurants, stores, hotels, and other businesses.

The contractual relationship with Covanta is complex and the financial commitments have been significant. It is recommended that the City continue its contractual relationship with Covanta Energy and Arlington County until at least January 1, 2013, which is the end date of the current "put-or-pay" agreement between the City and Covanta Energy. Under the Covanta contract, comprehensive reviews are scheduled.

Under the original agreement executed in 1985, the jurisdictions stand to inherit this Waste-to-Energy facility on October 1, 2025, once Covanta's land lease with the City of Alexandria and Arlington County (which jointly own the land under the facility) expires, and it may be in the interest of the jurisdictions to take steps to make sure the facility continues as a viable business enterprise to its owner (Covanta) and is maintained properly to 2025. To best accomplish this, the jurisdictions may need to continue their relationship with Covanta after January 1, 2013, under a negotiated amendment to the current service agreement relationship. Covanta should also have interest in doing this so that a longer-term service and business can be secured for its reorganized company.

Aggressive administration and management of the relationship with Covanta needs to be continued by the Alexandria-Arlington staff working group. The staff working group can accomplish this by:

- Ensuring that a long-term financial plan is developed, implemented and adjusted when necessary using the WTE Trust Fund as the primary source of financial support. The periodic Trust Fund projections of expenses and revenues should continue to be undertaken.

- Assuring that the private waste supply continues to provide for full utilization of the facility;

- Continuing to monitor the facility's operational and environmental performance and Covanta's compliance with service agreement terms;

- Closely monitoring Covanta's organization and financial status carefully, especially with regard to meeting its financial and capital maintenance responsibilities;

- Developing a new service agreement, as well as determining if Covanta is to continue being the service provider if it is determined that waste-to-energy is to provide disposal services for Alexandria and Arlington through 2025 and beyond.

With continued reliance on waste-to-energy as a disposal strategy beyond 2013, Alexandria and Arlington will need to:

- Continue to ensure, in cooperation with Fairfax County, access to the I-95 Landfill for cost-based ash disposal. Ash recycling economics (which now, along with VDOT regulations, preclude recycling ash at this time) for future diversion of ash to either extend I-95 Landfill capacity or have landfill alternatives planned for the 2025 – 2030 time period, when the I-95 Landfill is projected to reach capacity.

- Be more actively engaged in tracking regional state implementation plans (SIPs) with respect to the emissions of the Waste-to-Energy facility.

6.4 Goal 4: Identify, implement, and/or maintain programs for ensuring that solid wastes are managed in accordance with federal and State laws and regulations in a manner that protects public health, safety, and the environment.

6.4.1 Objective A: Protect the environment by fulfilling the laws, regulations, ordinances and other requirements as set forth by the City, Commonwealth of Virginia, and the federal government.

The City is, and will continue to be, in compliance with all laws, regulations and ordinances. Through Title Nine Environmental Protection and Enhancement, Chapter 7 (Solid Waste Control), the City helps to ensure that other solid waste management agencies or facilities are compliant with such requirements.

The Solid Waste Division's role will be to provide compliance oversight in regard to solid waste statutes and regulations. This oversight is provided through inspections of the various solid waste management facilities and enforcement of the statutory and regulatory requirements. The Solid Waste Division will take consistent and appropriate enforcement actions when violations to solid waste laws and regulations are identified.

6.4.2 Objective B: Develop programs to reduce the toxicity of wastes generated in the City (consumer electronics, appliances, household batteries, mercury-containing lamps, including fluorescent lights and thermostats).

The City has initiated a hazardous waste and mercury reduction program aimed at diverting products containing them from the waste stream. For example, fluorescent lights and thermostats are accepted at the household hazardous waste collection facility, along with consumer electronics and household batteries.

6.4.3 Objective C: Reduce waste toxicity in products and packaging through pollution preventions concepts.

The Solid Waste Division should continue to expand the procurement policy to the purchase of recycled content products and fully implement the policy in all departments. The City departments need to pay close attention to the products they purchase, and ensure they are buying products for their operations that minimize the inclusion of toxic products. For example, when buying paints for litter cans or park equipment, departments would purchase paint that minimizes volatile organic compounds (VOCs), or lead exposure, etc.

6.4.4 Objective D: Work with national and regional initiatives to develop industry standards for production, identification of material substitutes and the reduction of volume, targeting consumer items that are responsible for contributing to the toxicity of the waste stream.

The Solid Waste Division will continue to educate consumers about household hazardous waste, encourage residents to buy less toxic materials and participate in the household hazardous waste collection program. City departments should track/monitor their own bulk purchases of toxic products, ensuring they purchase only what is needed, and train employees in the use, storage and disposal of toxic products.

6.5 Goal 5: Maximize diversion of recyclable solid waste from disposal by using techniques that provide and promote recycling programs and that encourage private sector recycling.

6.5.1 Objective A: Establish minimum standards and requirements for recycling that are achievable and understandable

The target diversion goal for the City in this new Plan is 35%. The City meets the 25% State mandate, with a current rate of 26.3%. The City should continue efforts that exceed the State's recycling goal of 25% through increased waste reduction and recycling measures prescribed in this plan.

A periodic assessment of the waste system should be conducted to identify materials remaining in the waste stream and to aid in future program planning

development. The assessment data obtained will be used to focus on the lowest cost means of achieving/maintaining the recycling goals.

The City staff will work towards consistent requirements for recycling and solid waste management in order to enhance the public's understanding of and compliance with recycling requirements.

6.5.2 Objective B: Expand the multi-family (including condominiums) recycling program by mandating recycling at commercial and multi-family developments.

A proposed City Code change will be drafted for community and City Council consideration in the fall of FY 2005 to mandate recycling at commercial and multi-family developments to ensure that the City maintains or increases the current recycling rate in Alexandria. Commercial and multi-family solid waste currently comprise approximately 65 to 70 percent of the total solid waste disposal in Alexandria. The City is currently the only major jurisdiction in Northern Virginia that does not mandate some form of commercial and multi-family recycling. This mandate will support the City ordinance recently passed on May 18, 2002, requiring local waste and recycling haulers to report their collection data annually to the City, in order to accurately report its recycling rate to the State.

6.5.3 Objective C: Expand the number and type of materials collected in the recycling curbside program.

Historically, the City has collected only newspapers, magazines, catalogs and telephone books. The City vehicles are not designed or equipped to handle an expansion to mixed paper or cardboard.

An analysis of the recycling program was conducted which concluded that the City's curbside recycling collection should be privatized. City Council approved this contracting out as part of the FY 2005 budget adoption. Expansion to mixed paper and cardboard is now planned for implementation in FY 2005.

6.5.4 Objective D: Increase the number of drop-off centers throughout the City by adding additional containers at each current location.

The City should continue to maintain the four recycling drop-off centers in the City, which are open to residents 24 hours a day, seven days a week. Each center has recycling containers for residents to deposit their recyclables. An assessment of each center should be conducted to determine the feasibility of increasing the number of containers and the modification of materials collected at each site. The City should implement those changes to the centers that are determined by the assessment to be cost effective in reaching the established recycling goal.

A fifth drop-off location is being considered for development in 2004.

6.5.5 Objective E: Initiate increased education and enforcement of recycling mandates.

The City should continue to work to develop and implement a public education program for residents about recycling opportunities. Current public education and outreach activities sponsored by the City should continue and expand where appropriate. These activities include curbside recycling education, recycling education in schools, displays and advertising, news article distribution, the use of outside resources (such as community cable channels, newspaper advertising and posting on mass transit/buses), and in-house waste reduction and recycling programs. The City should continue to investigate ways to measure the effects of education on public attitudes and behaviors.

The City of Alexandria will provide educational material, technical assistance and referrals to recycling services to help businesses and multi-family properties meet this mandate. Peer matching programs, educational brochures, drop-off recycling centers, and shared collection programs for multiple tenants of the same property are all strategies that will be used by the City to increase recycling efforts and help commercial and multi-family properties fulfill the requirements of the local ordinance.

New businesses and multi-family properties would be required to submit plans and any waste hauler contracts providing proof of a planned recycling program at their property developments. These properties will also be audited by Code Enforcement regularly to confirm that the recycling program meets the Code requirements.

6.5.6 Objective F: Increase recycling in City-run facilities.

The recycling program currently collects office paper, managed through a contract with Environmental Recycling, Inc. (ERI). Environmental Recycling, Inc. collects paper from 21 City-owned facilities and 16 schools, but not from any leased City buildings. Seven buildings and eight schools have a volunteer employee coordinator who works with janitorial staff to ensure that the paper is being properly collected and recycled. A formal recycling program to collect cans and bottles is currently limited to a few common areas on each floor of City Hall. To expand recycling in City buildings, the following actions and resources are being considered:

1. *Incorporate a recycling collection requirement into leasing agreements*. The City's Department of General Services may include a recycling collection requirement into leasing agreements so that City-leased spaces provide recycling opportunities for employees.

2. *Encourage department directors to designate recycling monitors.* Recycling monitors in each building are helpful for reporting collection program problems, ensuring adequate collection containers are available, and generally promoting the ongoing success of recycling in each building through the City. The Recycling Specialist coordinates with a number of outstanding City employees who have volunteered themselves as monitors in several of the buildings, but more volunteers are always useful. The support of directors for both the recycling program and volunteers to oversee it would provide help to the Recycling Specialist in managing all of the City building recycling collection programs.

The City's office paper recycling program is successful in most City facilities, including both City offices and all schools, but improvement should be considered to further build upon the success of this program. An annual recycling event such as "clean your files day" provides an excellent opportunity for employees to maintain enthusiasm for the program. To celebrate Earth Day and promote recycling, employees dress down and dedicate a couple of hours to clean their files and desks of unnecessary paper (which is not required to be maintained per FOIA) that can be recycled.

Prior to initiating or implementing a container recycling program in the City-managed buildings and schools, a needs assessment and a cost analysis should be conducted.

6.6 Goal 6: Ensure that those providing solid waste services meet standards of customer service excellence policies.

6.6.1 Objective A: Provide and publicize convenient methods and technologies by which customer complaints can be filed and resolved.

Currently, the entire T&ES department is participating in an accreditation process administered by the American Public Works Association (APWA). The program gives visible and tangible evidence that a public works agency is being managed and operated according to nationally recognized practices. The voluntary, multifaceted program is designed to provide guidance and technical resources as managers seek to evaluate and upgrade the performance of their agencies.

An American Public Works Association Accreditation demonstrates a mark of professionalism and the ongoing commitment to the improvement in public works service delivery for the City of Alexandria. Through the accreditation process, this objective can be considered and implemented.

Accreditation will provide an opportunity to evaluate the organization against objective criteria developed by public works practitioners nationwide. The Department will benefit from improved communications, clarification of

operational needs, identification of management needs, promotion of teamwork, increased knowledge of service history and improved interdepartmental coordination.

6.6.2 Objective B: Improve investigation practices of all complaints regarding solid waste collection and maintain records of complaint resolution.

The Solid Waste Division currently has an automated work order system that is used in conjunction with a manual process for tracking and maintaining solid waste collection complaints. These two mechanisms should be evaluated and updated accordingly with the most current technological advances in the solid waste industry.

6.6.3 Objective C: Implement annual customer service training for all employees.

As a result of the increased call volume and the wide range of diverse calls in the Solid Waste Division, and the stress placed on the frontline customer service representatives and the dispatchers, an annual customer training should be established. The training should encompass all facets of telephone communication, such as proper telephone etiquette, radio procedures and handling irate or angry calls.

The accreditation process will facilitate in identifying the training needs of each employee in the Solid Waste Division, and through this process a comprehensive training plan will be developed.

6.6.4 Objective D: Measure customer satisfaction with solid waste services.

The solid waste industry is inherently known for its high turnover rate of drivers and employees. These changes often impact the delivery of solid waste services negatively. The effects of these turnovers in personnel are significantly reduced by establishing an employee cross-training program that is proactive.

Currently, the Solid Waste Division has a career ladder for employees that will provide an incentive and a means for advancement within their career fields. The employee is provided upward mobility and rewarded for professional growth and initiative. This plan was also developed to create continuous learning, performance assessment and a compensation path for multi-skilled solid waste employees (MSSWE) that support the Division's goal of high quality customer service. This progressive career plan provides both management and staff with greater flexibility to cover the overall work requirements more effectively and efficiently.

A customer satisfaction survey for solid waste services will be created and implemented. This survey can be conducted by phone calls (using accepted sampling techniques) to citizens recently receiving service, through mailers or via

the website. The results of the survey could be used to evaluate the consistency of services delivered and identify possible areas for improvement.

6.6.5 Objective E: Develop an orientation and training program for all in-house staff working in the Solid Waste Division.

Solid Waste superintendents and assistants will work as members of a planning/focus group to develop and implement a comprehensive employee orientation and training program. This plan will assure that their staff receive the information needed to allow them to effectively carry out the duties of their positions. Superintendents will also encourage their staff members to attend one external training event each year.

7.0 Funding and Construction Schedules (120.A.5, A.6)

In the City of Alexandria, the Division of Solid Waste (DSW) within the Department of Transportation & Environmental Services has been providing refuse collection services for over half a century. Through the years, the DSW's commitment to providing public services in a professional and responsible manner has remained unchanged. It is the DSW's goal to provide services that protect the environment and respond to the needs of the community at the least possible cost.

The DSW oversees the following programs: refuse collection and disposal; recycling and solid waste reduction; leaf collection; leaf mulch, street sweeping and litter control; household hazardous waste collection; and an annual spring cleanup for City residents who receive trash collection services.

The General Fund, using a combination of tax monies and user fees, funds the programs of the DSW. The General Fund is the primary operating fund of the City and supports the majority of public services, including public safety, human services, community services, and the maintenance of the City's transportation systems.

More specifically, for FY 2004, residential refuse and recycling collection and disposal, including the vehicle maintenance and depreciation costs, are funded 100 percent by the $185 user fee, plus recycling revenues and fund balances. The DSW revenue for this fund comes largely from the annual $185 residential refuse collection fee, charged to each single family residence in the City. The fee is reviewed yearly as part of the budget process and adjusted, if necessary, by the City Council after a public hearing. The collection fee is billed annually as part of the real estate tax bill. The rate for FY 2005 will be $205 and will generate $3.6 million. The other programs that fall under the DSW, as discussed above, are funded from General Fund general tax revenues.

The City's FY 2004 adopted budget for the DSW was $6.3 million. The FY 2005 DSW General Fund budget is $6.7 million.

The financial management of the Waste-to-Energy facility is largely handled by Covanta Energy, which operates the facility under long-term contracts with Alexandria and Arlington. Tip fees are paid by commercial haulers, as well as by the City of Alexandria and Arlington County government, based on the number of tons hauled to the plant multiplied by the applicable tip fee. Covanta pays the operating costs, and on behalf of the localities, Covanta also pays the debt service on the locally issued revenue bonds (issued in 1986 and refinanced in 1998) which financed the construction of the facility, as well as the locally issued revenue bonds issued in 1998 which financed the air pollution control systems retrofit which was completed in 2000. Covanta sells electricity to Dominion Virginia Power and uses these revenues to help pay for a portion of the plant's operating and debt service costs.

As per contractual obligations, Alexandria and Arlington are jointly responsible for certain facility revenue shortfalls, and they receive certain revenues from the facility as well. In order to handle these financial issues, as well as in recognition that the solid waste marketplace is influenced by external variables which can greatly impact the finances of the facility, in 1986 Alexandria and Arlington established a Waste-to-Energy Waste Trust Fund. The Fund, which is accounted for as a component unit on the ledgers of the Arlington County government, has been instrumental in keeping the finances of the Waste-to-Energy facility stable, and the impact on Alexandria and Arlington's operating and capital budgets minimal. The Fund's finances are overseen jointly by Alexandria and Arlington staff.

As mentioned in Section 3, ash from the Alexandria/Arlington Waste-to-Energy facility is disposed of at the I-95 Landfill operated by Fairfax County. Covanta pays the cost of the landfilling of the ash as part of the operations cost of the Waste-to-Energy facility. The City is represented on the I-95 Committee that oversees the operation of the I-95 Landfill and approves the disposal fees. Disposal fees of the I-95 Landfill are set to recover operating and capital costs, as well as post-closure obligations as articulated by the Virginia Department of Environmental Quality and the U.S. Environmental Protection Agency.

8.0 Public Participation

8.1 Introduction

Public participation is a key part of the solid waste management planning process. State regulations (9 VAC 20-130-130) require an open process of deliberation, comment and review. Public participation also ensures that the ideas and concerns of the varying constituent groups, ranging from the regulated solid waste service providers to the individual jurisdictions and their individual residents, will be served by the Plan.

This chapter discusses the public participation in the development and review of this Solid Waste Management Plan (SWMP), including citizen involvement, public meetings, the consideration of public/private partnerships, and the public outreach and education strategies to execute the future vision of the solid waste management (SWM) system.

8.2 Stakeholders Meetings

City staff retained the support of a consultant under contract to the WTE Trust Fund to assist the City in preparing the State-required elements of the solid waste plan. The consultant, along with City staff, met with identified stakeholders to gather input on new initiatives to be considered for the new Solid Waste Management Plan. The consultant assisted the City in review of new initiatives obtained through the stakeholders meetings and prepared a draft plan for public comment based on the preliminary study. The consultant completed its work on the required elements of the Solid Waste Management Plan in early July 2003.

A meeting was held with representatives of Fairfax County and Arlington County to coordinate information about the respective solid waste management plans on March 5, 2004. Several of the recommendations in the SWMP have regional impact.

8.3 Public Meetings and Input Sessions

City staff gave a presentation on the solid waste management planning process at a series of public information and input sessions held in November 2003. The public input process provided the City's residents with the opportunity to review the effectiveness of the City's solid waste management programs and provide policy direction for improving or changing them in the future.

The City of Alexandria's Environmental Policy Commission (EPC) is required to study and make recommendations on the environmental impact of various

projects and solid waste program initiatives. A draft copy of the Plan was presented for their review and comment on April 19, 2004.

Several of the Environmental Policy Commission's comments were considered and/or incorporated into the Plan. The EPC suggested that the City take strong measures to strengthen public awareness and education programs through newspaper advertisements, postings on mass transit/buses and community cable channels. They also suggested that an economic evaluation of the current and future City recycling programs be conducted.

The City staff incorporated into its Solid Waste Management Plan citizens' concerns and issues about multi-family recycling that were sent to the Solid Waste Division through the City's electronic mail process, known as Citymail. Citizens also voiced their concerns through letters and telephone calls and inquiries about solid waste issues.

8.4 Web Page

The City of Alexandria created and placed a SWMP web page (located at www.alexandriava.gov) on the City's website. The site provided an overview of the SWMP requirements, with frequently asked questions and a timeline for completion of the Plan. It also provided how citizens can become involved in development of the Plan. Links were created so that residents could type comments and forward them directly to the Solid Waste Division.

8.5 Public/Private Partnerships

In developing this SWMP, City staff will encourage and support private sector initiatives such as source reduction, reuse and recycling initiatives, as resources allow. City staff will continue to look for partnerships with other jurisdictions that will allow for the efficient and effective disposal of waste and recycling initiatives.

8.6 Public Hearing

The public hearing is scheduled for June 12, 2004.

Comments and results from the public hearing will be incorporated into the final Solid Waste Management Plan submitted to the Virginia Department of Environmental Quality.

8.7 Future Public Outreach, Community Involvement, and Education

The City of Alexandria plans to increase its use of public outreach and education to promote its SWMP actions throughout the implementation period. A newly budgeted Solid Waste Planner position will help to facilitate these public outreach

efforts. Staff will increase promotion of source reduction and reuse programs to help reduce the amount of waste that needs to be disposed. Staff will also enhance its efforts to inform the public about new programs or changes to collection, recycling or disposal programs.

Public outreach and education will be executed through a variety of media. The City will use its website to post timely information. The City will also use advertisements and cable TV notices to inform residents of changes in policy or to provide "how-to" for recycling and disposal of their waste.

Education efforts will continue through the Alexandria Public Schools system. Materials will be developed to help students learn about the need for source reduction and reuse, recycling and safe disposal of materials. Through educational and fun programs at City-sponsored events, children will learn how to best manage solid waste to protect the environment.

It has been determined that citizens prefer to receive periodic mailings to their home as the primary means of receiving information from the City. Staff will endeavor to use direct mailings when funding or other avenues are available to support the mail costs.

The SWMP is a strategic plan providing the direction for solid waste management into the future. Implementation plans will need to be prepared with the attendant studies and analyses to ensure that recommended changes improve effectiveness, efficiency or environmental responsibility. Only through engaging the community appropriately can City staff ensure that the services offered to residents meet community needs and desires for the future.

9.0 Tables, Appendices, etc.

List of Tables

Appendix B

Notes to Table 2-9

1. U.S Census data and City estimates.

2. Source of Households for FY 2000 through 2003 - City of Alexandria Division of Solid Waste.

3. Data from City of Alexandria annual (CY) Division of Solid Waste Reports for FY 2000 through 2003.

4. Quantities of waste collected by City of Alexandria Division of Solid Waste collection system from 1- and 2-family households from Covanta Energy. Source for FY 2000 through 2003 – Covanta WTE Facility FY Tonnage Data Reports.

5. Sum of recycled and disposed quantities.

Appendix C

Notes to Table 2-10

[1]Unless otherwise noted, due to the lack of tonnage data, 2000 data reflect an average of 2001 and 2002 data.
[2]Disposal quantities of municipal solid waste generated by single family residential and governmental, multi-family, and commercial businesses are provided in Table 2-9.
[3]Reflects 95% of total metals reported to VA DEQ, based on ratio derived from Arlington County data.
[4]2000 through 2002 based on fiscal year MSW tonnage data from the Alexandria-Arlington Waste-to-Energy facility. Total ash is assumed to be 30% of total MSW processed. Alexandria's portion of the ash total is assumed to be 40%. Ash is diverted and landfilled.
[5]Reflects 5% of total metals reported to VA DEQ, based on ratio derived from Arlington County data.
[6]Street sweepings are diverted from storm drains.
[7]Primarily food waste reported by restaurants and grocery stores.

Appendix D

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Commonwealth of Virginia
Locality Recycling Rate Report
For Calendar Year 2003

Contact Information

Reporting Jurisdiction: City of Alexandria

Person Completing This Form: Alton Weaver

Title: Solid Waste Division Chief

Address: 133 S. Quaker Lane Alexandria VA 22314
Street/P.O. Box City State Zip

Phone #: (703) 751-5130 **Fax #:** (703) 751-2569

Email Address: alton.weaver@ci.alexandria.va.us

Member Governments (The local governments identified in your regional solid waste management plan)**:** N/A

Calculated Recycling Rate: Using the formula provided below and the information identified on Page 2 calculate your recycling rate for the reporting period.

[P + S] / [P + S + M] X 100 = Recycling Rate

[35,036.64 + 9,667.18] / [35,036.64 + 9,667.18 + 125,275.12] X 100
[Total PRM (P) + Total SRM (S)] / [Total PRM (P) + Total SRM (S) + Total MSW (M)] X 100

= 26.30 %
Recycling Rate

I certify that I have personally examined and am familiar with the information submitted in this form and any attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. These records will be made available for auditing purposes, if requested.

	Solid Waste Division Chief	April 29, 2004
Authorized Signature	Title	Date

Alton R. Weaver

Locality Recycling Rate Report — For Calendar Year 2003

Part I: Principal Recyclable Material (PRM): Report only PRM generated within the reporting jurisdiction(s), NOT imported PRM.

PRM TYPE		RECYCLED AMOUNT (TONS)
Paper		17,948.72
Metal		9,338.00
Plastic		573.92
Glass		184.30
Commingled		2,170.30
Yard Waste (composted or mulched)		4,738.31
Waste wood (chipped or mulched)	(see Other, Page 3)	83.09
Textiles		0
TOTAL PRM		**35,036.64 (P)**

Part II: Supplemental Recyclable Material (SRM): Report only SRM generated within the reporting jurisdiction(s), NOT imported SRM.

SRM TYPE	RECYCLED AMOUNT/Tons	REUSED* AMOUNT/Tons*
Waste Tires	224.79	
Used Oil	1,476.81	
Used Oil Filters	17.20	
Used Antifreeze	122.60	
Abandoned automobiles removed	418.50	
Batteries	1.50	
Sludge (composted)	2,761.00	
Electronics	10.76	
Tree Stumps (> 6" Diameter)	0	
Other (from Page 3)	0	
SUBTOTALS	**5,033.16** (RECYCLED SRM)	
Construction Waste		3,727.04
Demolition Waste		0
Debris Waste		0
6.0 Ash (see Other, Page 3)	**0**	
Other (from Page 3)		906.98
SUBTOTALS		**4,634.02** (REUSED SRM)
TOTAL SRM	**9,667.18 (S)**	

Part III: Total Municipal Solid Waste (MSW) Disposed:** Report only MSW generated within the reporting jurisdiction(s), NOT imported waste.

MSW TYPE	TOTAL AMOUNT DISPOSED (TONS)
Household	29,976.12
Commercial	95,299.00
Institutional	0
Other***	0
TOTAL MSW DISPOSED	**125,275.12 (M)**

Locality Recycling Rate Report Instructions

OPTIONAL: Use this page to report and summarize information for the "Other" categories on Page 2 of this form.

1.1 SRMs, "other" material: (If your locality processed and recycled storm debris from the hurricane, this excess material should be listed here and not included in the waste wood or yard waste category under PRMs.)

Material	Tons Recycled

Total SRMs Recycled _____ (to "Other" entry, Page 2)

1.2 SRMs, "other" material: (Ash generated by an industrial operation does not quality as MSW material and should not be included in the Ash category on Page 2, or included in the recycling rate calculation. Tonnage and use should be identified on Page 4 as beneficial reuse.)

Material	Tons Reused
Food Waste	906.98

Total SRMs Reused 906.98 (to "Other" entry, Page 2)

Locality Recycling Rate Report Instructions

OPTI ONAL: Use this page to identify those programs, activities, procedures or operations which you feel reflect the locality's commitment to waste minimization, waste reduction, and/or materials reuse which by definition on the recycling rate reporting form may not be included in the recycling rate calculation.

Locality Recycling Rate Report Instructions

Amended Regulations for the Development of Solid Waste Management Plans (9 VAC 20-130-10 et seq.) became effective on August 1, 2001. The amended regulations require that Regions as well as each city, county, and town not part of a designated Region in the Commonwealth develop complete, revised solid waste management plans. Section 9 VAC 20-130-120 B & C of the Regulations requires that a minimum recycling rate of 25% of the total municipal solid waste generated annually in each city, county, town, or region be maintained. It also requires that the plan describe how this rate shall be met or exceeded and requires that the calculation methodology be included in the plan. Section 9 VAC 20-130-165 D establishes that every city, county, and town in the Commonwealth, or solid waste management planning region shall submit to the department by April 30 of each year, the data and calculations required in 9 VAC 20-130-120 B & C for the preceding calendar year.

PLEASE NOTE: IF YOUR LOCALITY'S RECYCLING PROGRAM IS INCORPORATED INTO A DESIGNATED REGION'S PROGRAM, YOU WILL ONLY NEED TO FILL IN THE CONTACT INFORMATION SECTION FOR YOUR LOCALITY AND SPECIFY THE REGION.

It is requested that the amounts included on the form be listed in **tons**, rounded to the nearest whole ton. If actual weights are not known, volumes can be converted to weight estimates. To assist you with these estimates, a standardized volume-to-weight conversion table is attached.

Contact Information Section: Please provide information on the Reporting Jurisdiction and information on the individual completing this form. Under Member Governments, please list the local governments identified in the applicable solid waste management plan, unless the plan indicates the participating local governments will be reporting on the status of their recycling collection programs independently.

Calculated Recycling Rate Section: Using the formula provided, calculate your recycling rate for the reporting period from information identified in the Recycling Rate Calculations Section.

Signature Block Section: Please provide an authorized signature prior to submitting the completed form.

Recycling Rate Calculations Section: Please provide the requested information:

Part I: Principal Recyclable Material (PRM): Report the amount in tons of each PRM collected for recycling in the named jurisdiction(s) during the reporting period. PRMs include paper, metal (except automobile bodies), plastic, glass, commingled, yard waste, waste wood, and textiles. The total weight in **tons** of all PRMs collected for recycling represents the letter **P** in the Recycling Rate Calculation.

Part II: Supplemental Recyclable Material (SRM): Report the amount in tons of each SRM recycled and the amount reused in the named jurisdiction(s) during the reporting period for each of the requested categories. Recycled SRMs include waste tires, used oil, used oil filters, used antifreeze, abandoned automobiles removed, batteries, sludge (composted), electronics, and large diameter tree stumps (>6” diameter). For a material to classify as "reused" a solid waste material must be separated from the waste stream and used, without processing or changing its form, for the same or another end use. Reused SRMs include construction waste, demolition waste, debris waste and ash. The total weight in **tons** of all SRMs collected for recycling and/or reuse represents the letter **S** in the Recycling Rate Calculation.

Vegetative and Yard Waste Material may only be counted towards your recycling rate if they are being mulched or composted, and used for agricultural or landscaping purposes. Sludge that is de-watered and then land applied should not be included as a SRM.

Part III: Total Municipal Solid Waste (MSW) Disposed: Report the total amount in **tons** of MSW that was disposed of by the reporting jurisdiction(s) during the reporting period for each of the source categories (Household, Commercial, Institutional, and Other). For the purpose of this report, "disposed," means delivery to a permitted sanitary landfill or waste incinerator for disposal and excludes industrial wastes. Totals for each of these categories should include only the amount of MSW generated by and then disposed of by the reporting jurisdiction(s). The total weight in tons of MSW disposed of represents the letter **M** in the Recycling Rate Calculation.

Appendix E
Waste Type Data Chart

Material	Volume	Weight in Pounds
Metal		
Aluminum Cans, Whole	One cubic yard	50-74
Aluminum Cans, Flattened	One cubic yard	250
Aluminum Cans	One full grocery bag	1.5
Ferrous Cans, Whole	One cubic yard	150
Ferrous Cans, Flattened	One cubic yard	850
Automobile Bodies	One vehicle	2,000
Paper		
Newsprint, Compacted	One cubic yard	720-1,000
Newsprint	12" stack	35
Corrugated Cardboard, Loose	One cubic yard	300
Corrugated Cardboard, Baled	One cubic yard	1,000-2,000
Plastic		
PETE, Whole, Loose	One cubic yard	30-40
PETE, Whole, Loose	Gaylord	40-53
PETE, Whole, Baled	30" x 62"	500
Film, Baled	30" x 42" x 48"	1,100
Film, Baled	Semi-Load	44,000
Film, Loose	Standard grocery bag	15
HDPE (Dairy Only), Whole, Loose	One cubic yard	24
HDPE (Dairy Only), Baled	32" x 60"	400-500
HDPE (Mixed), Baled	32" x 60"	900
Mixed PET & Dairy, Whole, Loose	One cubic yard	32
Mixed PET, Dairy & Other Rigid (Whole, Loose)	One cubic yard	38
Mixed Rigid, No Film	One cubic yard	49
Glass		
Glass, Whole Bottles	One cubic yard	600-1,000
Glass, Semi-Crushed	One cubic yard	1,000-1,800
Glass, Crushed (Mechanically)	One cubic yard	800-2,700
Glass, Whole Bottles	One full grocery bag	16
Glass, Uncrushed to Manually Broken	55 gallon drum	125-500
Arboreal		
Leaves, Uncompacted	One cubic yard	250-500
Leaves, Compacted	One cubic yard	320-450
Leaves, Vacuumed	One cubic yard	350
Wood Chips	One cubic yard	500
Grass Clippings	One cubic yard	400-1,500

Other		
Battery (Heavy Equipment)	One	60
Battery (Auto)	One	35.9
Used Motor Oil	One gallon	7.4
Used Oil Filters (Uncrushed)	55 gallon drum	66 Lbs./Used Oil + 110 Lbs./Ferrous Metal
Used Oil Filters (Crushed)	55 gallon drum	16.5 Lbs./Used Oil + 368 Lbs./Ferrous Metal
Tire - Passenger Car	One	20
Tire - Truck, Light	One	35
Tire - Semi	One	105
Antifreeze	One gallon	8.42
Food Waste, Solid & Liquid Fats	55 gallon drum	412
This Table For General Guidance Only.		