



Alexandria Industrial Use Study

Submitted To:
City of Alexandria

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Executive Summary

The City of Alexandria commissioned this Industrial Use Study to explore various economic questions concerning four industrial uses in the West End section of the City. As a result of recent land use and business operating debates in the Eisenhower West area, the City of Alexandria initiated this special economic study of the four industrial land uses:

- Vulcan Materials Van Dorn Yard (Vulcan): provides aggregate materials, such as stone and gravel to other companies in the area
- Virginia Paving Asphalt Plant (Virginia Paving, a division of The Lane Construction Corporation, hereafter referred to as “Virginia Paving”): produces asphalt and builds and maintains area roads
- Covanta Energy from Waste (Covanta) Facility: produces energy from processing solid waste
- Norfolk Southern Railroad Ethanol Transloading Facility (Norfolk Southern): transfers ethanol from rail to trucks

Vulcan, Virginia Paving, and Covanta have been cooperative in providing information for this study. Norfolk Southern declined to participate in the study due to on-going litigation between Norfolk Southern and the City.

This technical study does not provide a specific plan for redevelopment of the four uses (either together or separately) nor was it intended to, but rather considers economic questions pertaining to the long-term future of each use. Specifically, the study considers market demand for a variety of uses and analyzes the financial viability and fiscal impact of redeveloping the four subject parcels (collectively known as the study sites) into a mixed-use, pedestrian- and transit-oriented development. The study also considers some of the environmental impacts of redevelopment, particularly air quality impacts, as well as a qualitative evaluation of quality of life and sustainability issues. This study provides important background information necessary to inform the future Eisenhower West small area plan.

Key questions explored in this study include the following:

- What are the economic and environmental costs and benefits of the existing industrial uses?
- What are the location requirements of the current industries and where could they relocate if the sites were redeveloped?
- What is the redevelopment potential of the area?
- Would the potential value appreciation in redeveloping the sites encourage the current operations to relocate?
- What is the cost of providing public services if the area undergoes redevelopment?

- How do the economic and environmental impacts of possible future redevelopment compare to existing conditions?

Findings by Topic

The summary below addresses the key questions posed by the Industrial Use Study.

What are the economic and environmental costs and benefits of the existing industrial uses?

The tables below summarize the economic and environmental costs and benefit associated with the four subject properties. Table ES-1 is a summary of the jobs, tax revenue, goods and services, and quality of life considerations associated with the existing uses. Table ES-2 summarizes the estimated emissions that can be attributed to the existing uses and the extent to which the existing uses contribute to the City's emissions.

Table ES-1: Summary of Economic Benefits and Costs of Existing Uses

	<u>Vulcan</u>	<u>Virginia Paving</u>	<u>Covanta</u>	<u>Norfolk Southern</u>
Economic Benefits/Costs				
Employees	3 to 7	170 to 191	48	N/A
Tax Revenue to City (a)	\$140,000	\$524,000	\$331,000	N/A
Green Jobs Potential (b)	Yes	Yes	Yes	Yes
Other Benefits/Costs				
Goods and Services	Provides aggregate to Virginia Paving, as well as other business entities	Provides 100% of City asphalt	All solid waste collected by City is processed here. Provides electricity to City residents and businesses	N/A
Quality of Life	Diminished views	Dust and diminished views	Diminished views	Potential hazard
Notes:				
(a) City in various tax revenues in 2008, including real property taxes, business licenses, business tangible property, and sales tax.				
(b) Definitions of what constitutes "green" jobs vary widely, but by some measures, a segment of the employment found at some of the four operations under study could be considered green because they either involve production of environmentally sustainable products or utilize production methods that result in waste reduction.				
Source: City of Alexandria, 2009; MACTEC, 2009; HDR, Inc., 2009; BAE, 2009.				

- In addition to the four types of taxes described in Table ES-1 above, provided to the study by the City of Alexandria, Virginia Paving provided information about an additional \$217,000 in revenues to the city, attributable to other taxes such as the Hot Mix Use Tax.
- The average of 234 jobs provided by Vulcan, Virginia Paving and Covanta represent less than one percent of total City employment in 2008.
- Vulcan provides low cost materials to the City of Alexandria, which can be directly attributed to the Vulcan property's railcar access, as the distribution cost for building materials is the most significant cost component.
- Although having a solid base of goods-producing sectors such as manufacturing and construction can improve economic diversity, these sectors can often demonstrate as much, if not more, volatility and fluctuation as service sectors. These sectors have also demonstrated relatively slower growth historically and are forecasted to continue lagging other sectors in the future. While these sectors may continue to lag, communities will continue to need the services that these sectors provide (solid waste services, asphalt services, etc).

Table ES-2: Summary of Air Quality Conditions of Existing Uses (2007)

	Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total	Percent of City Emissions (a)
Point and Mobile Sources of Emissions from the Existing Uses (b)						
CO (carbon monoxide)	0.1	13.5	62.1	<0.1	76	0.4%
Nox (oxides of nitrogen)	0.5	14.8	576.4	0.1	592	12.9%
PM ₁₀ (particulate matter less than 10 microns in size)	0.8	7.0	4.2	0.2	12	0.5%
PM _{2.5} (particulate matter less than 2.5 microns in size)	0.1	4.8	3.1	<0.1	8	1.4%
SO ₂ (sulfur dioxide)	<0.1	5.2	12.6	<0.1	18	0.4%
VOC (volatile organic compounds)	<0.1	4.0	2.3	<0.1	6	0.2%
Notes:						
(a) City emissions total includes point, mobile, area, and non-road mobile sources.						
(b) The 2007 emissions estimates are the latest publicly available data from VDEQ.						
Source: MACTEC, 2009; BAE, 2009.						

- Emissions from the four industrial sources in the study area, including both the industrial processes and associated truck traffic, comprise a very small fraction of the total City-wide criteria air pollutant emissions.

What are the location requirements of the current industries and where could they relocate if the sites were redeveloped?

Table ES-3 summarizes the relocation requirements of each of the uses and the potential relocation sites available.

Table ES-3: Relocation Considerations

Consideration	Vulcan	Virginia Paving	Covanta	Norfolk Southern
Land	Minimum of 15 acres	Minimum of 9 acres	See Notes (a)	N/A
Transportation Access	Need rail line	Need rail line	See Notes (a)	Need rail line
Proximity to end user	N/A	Need to be within short distance from current location to continue to serve current market	See Notes (a)	Need to minimize travel to tank farms in Springfield and Fairfax City
Estimated Business Relocation/ Cessation Costs (b)	\$15.5 million/ \$7 to \$15 million	\$10.5 to \$14.5 million/ \$23 to \$27 million	\$300 to \$335 million for new facility, \$11.5 million for transfer station	N/A
Possible Relocation Alternative (c)	Industrial Zone in Springfield close to Newington exit on I-95	Industrial Zone in Springfield close to Newington exit on I-95	None identified	Industrial Zone in Springfield close to Newington exit on I-95
Notes:				
<p>(a) The agreements governing the Covanta operation and acceptance of solid waste from Alexandria and Arlington (the jurisdictions) severely constrain the ability for the site to relocate. The existing lease is set to expire on October 1, 2025, at which time the facility reverts to the City and County. Prior to 2025, redeveloping the site of the EFW facility would be a violation of the terms of the lease, requiring renegotiation of terms that would be satisfactory to Covanta and requiring a costly replication of the site on another site suitable to Covanta. After 2025, when the land and all of the improvements on it revert to the City of Alexandria and Arlington County, the terms of the lease will be met and there will be no obligation to provide a relocation or buyout to Covanta. However, if a relocation of the site is desired after that date, the City, in agreement with Arlington County, will need to either address its waste disposal needs through the siting and construction of a new facility, or arrange for a different method for the disposal of their waste.</p> <p>(b) HDR estimated business relocation/cessation cost for the Covanta site does not include property acquisition.</p> <p>(c) The site that represents the closest available property that meets the basic requirements for each of the uses. Relocation issues and constraints are discussed in the report.</p>				
Source: City of Alexandria, 2009; Vulcan, 2009; Virginia Paving, 2009; HDR, Inc., 2009; BAE, 2009.				

What is the redevelopment potential of the area?

A market analysis and an analysis of the characteristics of the study sites yields these findings:

- **Residential** uses have the greatest long-term market support and would likely be the predominant use of the study sites.
- **Neighborhood serving retail** can be supported on the site and would provide an amenity that would enhance the marketability of the site.
- **Office space** could be constructed, but demonstrates weaker market support as it would be competing against a large supply of proposed office space in and near Alexandria.

Comparison of the benefits, costs, and impacts of redevelopment to existing conditions requires the creation of potential future development alternatives. The redevelopment alternatives, described in Table ES-4, are hypothetical but based on an understanding of long-term market potential for residential and commercial space, as well as the physical characteristics of the study sites that could impact future redevelopment.

Table ES-4: Summary of Redevelopment Alternatives

Alternatives (a)	Vulcan	Virginia Paving	Covanta (b)	Norfolk Southern
A: Baseline	Townhouses and low rise multifamily housing, neighborhood-serving retail	Townhouses and low rise multifamily housing, neighborhood-serving retail	Mid-rise office space, neighborhood serving retail	Mid-rise office space, neighborhood serving retail
B: Baseline plus Open Space	Townhouses and low rise multifamily housing, neighborhood-serving retail	Park/open space	Mid-rise office space, neighborhood serving retail	Mid-rise office space, neighborhood serving retail
C: Baseline minus Covanta and Norfolk Southern	Townhouses and low rise multifamily housing, neighborhood-serving retail	Townhouses and low rise multifamily housing, neighborhood-serving retail	No Change	No Change
D: Baseline plus Additional Density and Multimodal Bridge	Townhouses and neighborhood-serving retail	Townhouses and neighborhood-serving retail	Mid-rise office, mid-rise multifamily and neighborhood-serving retail	Mid-rise office, mid-rise multifamily and neighborhood-serving retail
Notes:				
(a) The assumptions associated with each alternative are described in detail in the report but include the following: portions of the sites within the Resource Protection Area (RPA) and the 100-year flood plain are not developed; and all parking is underground.				
(b) Assumes redevelopment would occur after 2025, when Covanta's lease expires.				
Source: City of Alexandria, 2009; BAE, 2009.				

Would the potential value appreciation in redeveloping the site encourage the current operations to relocate?

Table ES-5 summarizes the results of the financial analysis of the redevelopment alternatives. The financial analysis estimates the change in land value (calculated as the value of the revenue produced by new construction, minus the costs of redevelopment), and compares it to estimated relocation and business cessation costs.

Table ES-5: Summary of Financial Analysis by Existing Use

Consideration	Vulcan	Virginia Paving	Covanta	Norfolk Southern
Land	Minimum of 15 acres	Minimum of 9 acres	See Notes (a)	N/A
Transportation Access	Need rail line	Need rail line	See Notes (a)	Need rail line
Proximity to end user	N/A	Need to be within short distance from current location to continue to serve current market	See Notes (a)	Need to minimize travel to tank farms in Springfield and Fairfax City
Estimated Business Relocation/ Cessation Costs (b)	\$16 million/ \$7 to \$15 million	\$10.5 to \$14.5 million/ \$23 to \$27 million	\$300 to \$335 million for new facility, \$11.5 million for transfer station	N/A
Possible Relocation Alternative (c)	Industrial Zone in Springfield close to Newington exit on I-95	Industrial Zone in Springfield close to Newington exit on I-95	None identified	Industrial Zone in Springfield close to Newington exit on I-95
Notes:				
<p>(a) The agreements governing the Covanta operation and acceptance of solid waste from Alexandria and Arlington (the jurisdictions) severely constrain the ability for the site to relocate. The existing lease is set to expire on October 1, 2025, at which time the facility reverts to the City and County. Prior to 2025, redeveloping the site of the EFW facility would be a violation of the terms of the lease, requiring renegotiation of terms that would be satisfactory to Covanta and requiring a costly replication of the site on another site suitable to Covanta. After 2025, when the land and all of the improvements on it revert to the City of Alexandria and Arlington County, the terms of the lease will be met and there will be no obligation to provide a relocation or buyout to Covanta. However, if a relocation of the site is desired after that date, the City, in agreement with Arlington County, will need to either address its waste disposal needs through the siting and construction of a new facility, or arrange for a different method for the disposal of their waste.</p> <p>(b) HDR estimated business relocation/cessation cost for the Covanta site does not include property acquisition.</p> <p>(c) The site that represents the closest available property that meets the basic requirements for each of the uses. Relocation issues and constraints are discussed in the report.</p>				
Source: City of Alexandria, 2009; Vulcan, 2009; Virginia Paving, 2009; HDR, Inc., 2009; BAE, 2009.				

- None of the alternatives presented in Table ES-5 demonstrate an increase in residual land value that can support the full costs of redevelopment, including likely costs to relocate or buy out the existing businesses.
- Only in Alternatives C and D do land values resulting from redevelopment exceed existing land values.

- No alternative has an outcome in which all four parcels have residual land values that are greater than their current values.

Appendix F describes in detail the assumptions, methodology, and findings of the financial analysis.

How do the economic and environmental impacts of possible future redevelopment compare to existing conditions?

The fiscal impact of the redevelopment alternatives measures estimated net revenue by subtracting the estimated costs to service new development from the estimated general fund revenue gained from taxes produced by the new development.

Table ES-6: Impacts of Redevelopment Compared to the Status Quo

Benefits/Costs	Status Quo	Alternatives			
		A	B	C	D
Economic					
Fiscal Impact	\$890,000	\$4,450,000	\$4,230,000	\$1,950,000	\$3,620,000
Potential Employees	234	4,500	4,460	80	2,500
Environmental					
Change in Emissions from Industrial Retention Scenario (tons/yr) (a):					
CO		-16	-20	7.3	-50
NO _x		-579	-579	-11	-586
PM ₁₀	N/A	-7.6	-7.9	-6.4	-10.2
PM _{2.5}		-7.6	-7.7	-4.8	-7.8
SO ₂		-18	-18	-5.1	-18
VOC		0.6	0.1	-1.6	-3.4
Notes:					
(a) The table shows that in most cases emissions will decrease in the immediate West End Study Area; however, these emissions will not eliminate but rather transferred to other Northern Virginia neighborhoods where the industrial sources may be relocated.					
Source: MACTEC, 2009; BAE, 2009.					

Next Steps

Additional findings from this study are summarized below and provide direction for near term decision-making regarding possible redevelopment of the study sites.

- **Market pressure supporting short term redevelopment is weak.** Long term demand trends, compared to opportunities presented by Potomac Yards, Landmark Van Dorn, Braddock, and other redevelopment areas, indicate that there is more than adequate land available to meet development pressure as economic conditions improve. In the near term, the study sites do not present a strong opportunity for transit-oriented development (TOD). Physical barriers that impede high quality TOD include the physical barrier created by the freight rail line (without construction of strong vehicular and pedestrian connections as mitigation) and the large surface parking lot that services the Metrorail station.
- **Significant constraints to redevelopment exist.** Hurdles to redevelopment include: 1) difficulties in relocating the existing uses; 2) the City's limited legal and practical options for relocating or ceasing operations of the ethanol transloading and the Covanta facility; and 3) environmentally sensitive lands and other development constraints found on the study sites.
- **If hurdles facing the development of all or a portion of the sites are overcome, there could be fiscal and economic benefits to redevelopment.** Benefits include increased revenues to the City from an expanded tax base. Fiscal and economic benefits will accrue if redevelopment results in an expansion of the base of jobs and households in the City. . Economic and fiscal benefits need to be weighed against potential traffic and air quality impacts.
- **Even in the long term, comprehensive redevelopment would likely require substantial City involvement.** The financial analysis suggests that even when market demand is more favorable for redevelopment in the long term, public subsidy or other incentives will be required to cover some infrastructure and possible business relocation/cessation costs in order to attract private investment. It is possible that the fiscal benefits that would accrue to the City through redevelopment could be used to as a source of funds to cover all or a part of the subsidy required.

The study recommends two general paths for further consideration by the City and area stakeholders. These non-mutually exclusive recommendations recognize the short-term constraints to redevelopment but also encourage long-term planning.

- **Improve existing conditions around the study sites and in the Eisenhower West area.** The City will initiate a process to explore improvements to the Eisenhower West industrial area for the benefit of the industrial uses and the surrounding residential neighborhoods. The focus of this effort should be on practical design, circulation, and infrastructure projects that can be implemented in the short term to ameliorate some of the existing conflicts which gave rise to this study.

- **Explore whether rezoning is appropriate through a small area planning process.** A rezoning would allow the private sector to undertake desired redevelopment when conditions are right and can set the stage for the eventual realization of a vision for the area's future. A planning process would be the forum in which the key issues over the area's reuse would be debated. It would endeavor to resolve these issues to the greatest extent possible. As part of the process participants should consider among other issues:
 - The continued industrial use of the area, in the event that one of the existing uses voluntarily ceases operation.
 - The conditions under which redevelopment of the area should occur, and the City's role in implementing redevelopment.
 - Promotion of transit-oriented development.

Introduction

The City of Alexandria (City) is a historic city with a distinctive urban form and a robust civic culture. Known for its architecturally unique downtown and its pleasant residential neighborhoods, Alexandria also serves as a major node of economic activity and innovation for Northern Virginia and the broader Washington metropolitan region.

The City of Alexandria commissioned this study to explore the various economic and environmental questions concerning heavy industrial uses in the West End section of the City. This study comprises an objective and in-depth examination of four heavy industrial uses in the broader context of the City's long-term need to sustain a high quality of life for its residents in tandem with an ongoing commitment to maintaining Alexandria's status as an important economic center and commercial tax base. The study examines four existing uses: Vulcan Materials, Virginia Paving, the Energy from Waste (EfW) facility operated by Covanta Energy, and the Norfolk Southern ethanol transloading facility.

Specifically, the study considers market demand for a variety of uses and analyzes the financial viability and fiscal impact of redeveloping the four subject parcels (collectively known as the study sites) into a mixed-use, pedestrian and transit-oriented development. Also considered as part of this study are some of the environmental impacts of redevelopment, particularly air quality impacts, as well as a qualitative evaluation of quality of life and sustainability issues. This study provides important background information necessary to inform a future Eisenhower West small area plan.

Study Background and Purpose

Within the City of Alexandria, the area known as Eisenhower West contains four heavy industrial uses, some of which have actual and potential conflicts with nearby residential and school uses. The recent debate around permitting for the Virginia Paving facility, the commencement of the operation of ethanol transloading at the Norfolk Southern railway spur, and the recommendations of the Economic Sustainability Work Group, raised the question of compatibility of heavy industrial uses in close proximity to existing neighborhood amenities (an elementary school, a Metrorail Station and the Capital Beltway). As a result, the City initiated a study analyzing the costs, risks, benefits, and opportunities associated with redeveloping four industrial sites in Eisenhower West into mixed-use communities.

The City of Alexandria retained the consulting firm, Bay Area Economics (BAE), to perform the analysis. MACTEC Engineering supported BAE for the environmental analysis for all the industrial sites and HDR Inc. provided support for the economic and environment analysis for the Covanta

Plant. BAE, MACTEC, and HDR are collectively referred to as the Consultant Team for the purposes of this report.

Key questions explored in this study include the following:

- What are the economic and environmental costs and benefits of the existing industrial uses?
- What are the location requirements of the current industries and where could they relocate if the sites were redeveloped?
- What is the redevelopment potential of the area?
- Would the potential value appreciation in redeveloping the sites encourage the current operations to relocate?
- What is the cost of providing public services in the case of redevelopment?
- How do the economic and environmental impacts of possible future redevelopment compare to existing conditions?

This study is not intended to provide a specific plan for redevelopment of the four uses (either together or separately), but instead considers the full range of economic, environmental, and policy questions pertaining to the long-term future of these uses.

Study Approach

Each industrial use examined in this study has a unique set of business practices, economic considerations, and real estate needs. Taking into account the full economic and environmental complexity of these four distinct industrial uses, this study provides an in-depth examination of each use relying on primary research as well as an exhaustive review of secondary research and data sources. Vulcan Materials, Virginia Paving, and Covanta have been cooperative in providing information for the study. Norfolk Southern declined to participate in the study as a result of ongoing litigation between Norfolk Southern and the City. To the extent feasible given privacy concerns and other access issues, the overall approach of this study is to understand how the four industrial uses operate in their present locations, what benefits the Eisenhower West sites provide, and the various costs of relocation.

At the same time that this study attempts to develop a fine-grained and nuanced understanding of the business and location needs of the existing industrial uses, there is an equally rigorous effort to quantify the full range of economic and environmental costs and benefits of the four uses to the City and the surrounding community. For each individual use and then for a range of combined redevelopment alternatives, this study provides an indication of the economic and environmental costs and benefits of maintaining the current uses versus redevelopment at some future date.

Community Outreach Process

The Alexandria community includes a full range of opinions and perspectives on the four industrial uses and on the various current and future development scenarios for the Eisenhower West Industrial area. Taking this into account, City staff in consultation with the Consultant Team initiated a broad and inclusive community outreach campaign at the outset of the study to provide all segments of the Alexandria community with an opportunity to share ideas, perspectives, and information.

The first step in the process was a series of key stakeholder interviews of City staff, representatives from the subject industrial uses and a variety of local community members. The Consultant Team recommended this first step in the community process as a means of allowing diverse interest to be heard in a candid and confidential setting and to lay the ground work for subsequent community meetings. The interview list and interview guides for these stakeholder interviews are provided as Appendix A.

Following the key stakeholder interviews, City Staff and consultants convened two community meetings on February 26 and May 13, 2009. The first meeting introduced the study to the community and at the second meeting the Consultant Team presented preliminary findings. Presentation materials and recordings from these meetings are available on the City web site as is a variety of other information related to this study effort.

At each stage of the study process, the Consultant Team sought the broadest range of community and business input and all ideas and sources of information have been considered equally and objectively in the preparation of this study.

Report Organization

This introduction is followed by a detailed profile of the four subject industrial uses, their benefits costs to the City, and their relocation considerations. The study then moves on to examine the potential for redeveloping the area starting with a real estate market feasibility analysis and moving on to a comparative financial, fiscal impact, and environmental analysis of the current uses versus four market-based redevelopment alternatives. The study concludes with a set of overall findings and suggested next steps.

The Existing Industrial Uses

This section provides an introduction to the four heavy industrial uses located in the Eisenhower West area. These uses are hereinafter referred to collectively as the study sites. The study sites, centered around the intersection of South Van Dorn Street and Eisenhower Avenue, is part of a larger corridor of industrial land that extends along Eisenhower Avenue to the east and Farrington Avenue to the west. Other industrial uses in the corridor are generally light industrial, such as warehouse and flex space, and contain production, distribution, and repair (PDR) operations. Other uses surrounding the study sites include the Summer's Grove residential development located southwest of the study sites. The Cameron Station residential development and the Samuel W. Tucker Elementary School are situated northeast of the study sites. A combination of retail uses and additional light industrial uses are found north of the study sites on Pickett Street.

The active Norfolk Southern rail line bisects the study sites. In addition to carrying freight to active industrial users along the rail line, the line also carries passenger rail service: it is the line that Amtrak uses to service Richmond and points south, and that VRE uses to transport commuters in and out of Washington Union Station. The Van Dorn Metro station is situated adjacent to Eisenhower Avenue, southwest of the Covanta facility. Access to the Metro station is provided from Metro Road, which also serves as the access to the Norfolk Southern transloading facility operating immediately adjacent to and south of the Norfolk Southern rail line.

Figure 1 identifies the location of the four uses under study and their relation to other uses and features of the neighborhood.

Brief Description of Operations

Vulcan Materials

The Vulcan Materials Van Dorn Yard (Vulcan) is located on approximately 18 acres, accessible from South Van Dorn Street. The facility provides aggregate materials, such as stone and gravel, to many different companies in the area, including Virginia Paving across the street. Ninety percent of the material processed through the Vulcan site arrives by rail on the adjacent Norfolk Southern railway. The aggregate is then transferred from the railcar to the yard, processed and then transferred by rail or truck to its customers. Virginia Paving represents approximately 40 percent of their sales, followed by Virginia Concrete, which is owned by Vulcan Materials. During periods of low demand, the Van Dorn site is closed and customers are served out of the Edsall Road facility located in Fairfax County, Virginia. This site is zoned as Industrial.

Vulcan Materials is a publicly traded company headquartered in Birmingham, Alabama.

receiving aggregate via rail. An oil recycling facility, FCC Environmental, leases property from Virginia Paving and contributes petroleum products to the asphalt production processes.

Covanta Energy from Waste (Covanta) Facility

The Alexandria/Arlington Energy from Waste facility, operated by Covanta Energy (Covanta), converts solid waste from the City of Alexandria and Arlington County into electric power. Situated on approximately six acres, it operates 24 hours per day, 365 days per year processing 975 tons of waste on a daily basis. Through the incineration process, the facility produces steam that generates 23 Mega Watts (MW) of power, which is equivalent to the power consumption of 20,000 home annually. Two MW are used to operate the facility and the remaining 21 MW are delivered to the electrical grid operated by Dominion Power.

The Covanta facility began operation in 1988, with enhanced air pollution controls added in 2001 to reduce emissions and to bring the facility into compliance with the Clean Air Act 1990 Amendments at a cost of approximately \$45 million. Currently zoned Office Commercial Medium, the facility has been operating under a special use permit since 1998. The facility began a metal recycling operation that removes ferrous material from the ash and markets it, reducing the amount of ash requiring disposal. In addition, the Alexandria Sewer Authority is undertaking a study to determine the feasibility of using treated wastewater effluent (reclaimed water) for non-potable uses within the City, including the Covanta facility, which may be able to use this reclaimed water as cooling tower make-up water. Should this prove to be feasible, this would provide a benefit to both the City and to Covanta.

Buildings, land ownership, and waste disposal arrangements are part of a complex set of agreements among the City, Arlington County (Arlington), and Covanta. The City and Arlington own the land and the air pollution control equipment installed in 2001. Covanta operates the facility, owns the building, and makes lease payments to the City and Arlington under a lease expiring in 2025. Arlington County is required to deliver 135,000 tons per year to the Covanta facility, while the City is required to deliver 90,000 tons. This requirement, called the “put or pay” agreement, remains in place until January 1, 2013. After this date, the City and Arlington are under no obligation to use the facility or pay Covanta for solid waste disposal. However, Covanta has a right to operate the plant and accept solid waste from other customers until its lease expires in 2025, when the land and all improvements revert to joint ownership by the Jurisdictions. The goal of the City’s Solid Waste Management Plan, as approved by the City Council four years ago, was to handle waste locally, consistent with the City’s Eco-City Charter.

The City and Arlington financed the construction of the facility through a bond issue. The City and Arlington are responsible for the bond obligation, which will be paid off in 2013. The funds to pay for bond repayment and ongoing costs of solid waste disposal are paid through tipping fees.

Norfolk Southern Ethanol Transloading Facility

The Van Dorn Railyard has been in operation for over 100 years. It is currently owned by the Norfolk Southern Railway Company, a subsidiary of Norfolk Southern Corporation, a publicly traded company. The Norfolk Southern Corporation operates rail facilities, switching stations, and transportation of goods in a geographic area of the United States extending from the East Coast to the Midwest, and along most of the Eastern Seaboard.

Prior to its current use as an ethanol transloading facility, it was an intermodal facility, which transferred goods from railcars to trucks. Ethanol transloading on the property began in 2008. It is unclear exactly how much land is owned and controlled by Norfolk Southern Railway Company (Norfolk Southern) in the Eisenhower West area. Information available to the public regarding sales of railroad property and rail right-of-way is not updated frequently.

Ethanol is delivered to the railyard by train, transferred to trucks, and ultimately delivered to “tank farms” in Springfield and Fairfax City, where it is mixed with gasoline prior to delivery to local gas stations. The operation takes place approximately 300 feet from the rail line, with a maximum of three rail cars being transloaded at one time. Each of the rail cars can hold approximately 29,000 gallons of ethanol. Each tank truck can hold approximately 8,300 gallons (Source: U.S. District Court).

Currently, transloading occurs from 7 a.m. to 6 p.m. daily, but the facility has the ability to operate 24 hours a day (Source: U.S. District Court). The facility does not require a special use permit. Recent United States District Court proceedings (Norfolk Southern Railway Co. v. City of Alexandria, et al.) have exempted these operations from regulation by the City as well as the operations of the trucks leaving the facility. The United States Surface Transportation Board (STB Finance Docket No. 35157) also ruled that the trucks leaving the facility are protected railroad operations. Appeal avenues available to the City include the United States Court of Appeals and the United States Supreme Court.

Because of the on-going litigation associated with the ethanol transloading facility, Norfolk Southern declined to participate in the study. Norfolk Southern representatives, when contacted during the stakeholder outreach and interview process at the commencement of the study, responded with the letter dated February 9, 2009 which can be found in Appendix B. Norfolk Southern states in the letter that the ethanol transloading operation “occupies only a portion of a much larger rail yard which for many years has been, and continues to be, a site for several important interstate rail operations. For the past hundred years it has served as an important rail yard for the service of customers in the Alexandria area and in the recent past has served as a prime intermodal facility.” As a result of Norfolk Southern’s unwillingness to participate in this

study, the information provided in this report is limited to what is available from public sources and from independent research on freight rail operations and ethanol production and delivery.

Benefits, Costs and Impacts of Existing Uses

This section provides an overview of the various benefits, costs, and impacts of the four existing uses as they currently operate. Factors considered in this assessment include employment and business operations, fiscal impact on the City, and the operations' impact on environmental air quality. Tables 1 and 2 summarize the economic and environmental conditions associated with the four subject properties.

Table 1: Benefits, Costs and Impacts of Existing Uses

	Vulcan	Virginia Paving	Covanta	Norfolk Southern
Economic Benefits/Costs				
Employees	3 to 7	170 to 191	48	N/A
Tax Revenue to City (a)	\$140,000	\$524,000	\$331,000	N/A
Green Jobs Potential (b)	Yes	Yes	Yes	Yes
Other Benefits/Costs				
Goods and Services	Provides aggregate to Virginia Paving, as well as other business entities	Provides 100% of City asphalt	All solid waste collected by City is processed here. Provides electricity to City residents and businesses	N/A
Quality of Life	Diminished views	Dust and diminished views	Diminished views	Potential hazard
Notes:				
(a) City in various tax revenues in 2008, including real property taxes, business licenses, business tangible property, and sales tax.				
(b) Definitions of what constitutes "green" jobs vary widely, but by some measures, a segment of the employment found at some of the four operations under study could be considered green because they either involve production of environmentally sustainable products or utilize production methods that result in waste reduction.				
Source: City of Alexandria, 2009; MACTEC, 2009; HDR, Inc., 2009; BAE, 2009.				

Table 2: Summary of Air Quality Conditions of Existing Uses

	Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total	Percent of City Emissions (a)
Point and Mobile Sources of Emissions from the Existing Uses						
CO (carbon monoxide)	0.1	13.5	62.1	<0.1	76	0.4%
Nox (oxides of nitrogen)	0.5	14.8	576.4	0.1	592	12.9%
PM ₁₀ (particulate matter less than 10 microns in size)	0.8	7.0	4.2	0.2	12	0.5%
PM _{2.5} (particulate matter less than 2.5 microns in size)	0.1	4.8	3.1	<0.1	8	1.4%
SO ₂ (sulfur dioxide)	<0.1	5.2	12.6	<0.1	18	0.4%
VOC (volatile organic compounds)	<0.1	4.0	2.3	<0.1	6	0.2%
Notes:						
(a) City emissions total includes point, mobile, area, and non-road mobile sources.						
Source: MACTEC, 2009; BAE, 2009.						

Economic Benefit: Employment and Business Operations

The existing operations directly employ an estimated average of 234 full time employees, as depicted in Table 3. This figure does not include numbers of direct employees for Norfolk Southern’s operations, and it also does not include personnel who are not employed directly by the four businesses, such as private haulers who pick up material at Vulcan and the ethanol transloading facility. Virginia Paving employees represent the majority of this figure, at 170 to 191 full-time jobs, according to a recent economic impact study commissioned by Virginia Paving.¹ Covanta’s operation supports 48 full-time employees and the Vulcan site employs anywhere from 3 to 7 staff members depending on demand conditions.

Table 3: Direct Employment of Current Uses

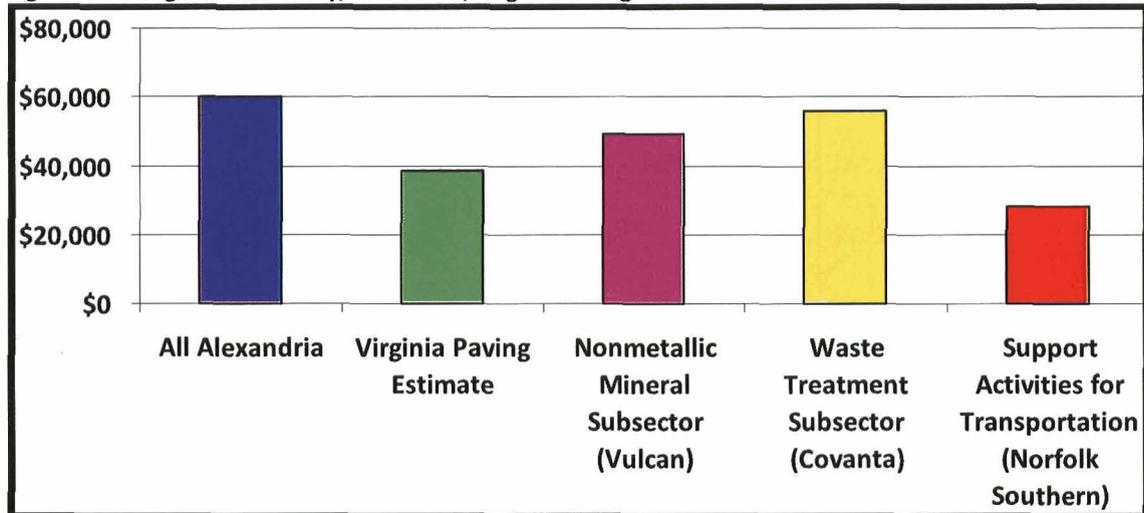
Entity	Employment Range		
	Minimum	Maximum	Average
Vulcan	3	7	5
Virginia Paving	170	191	181
Covanta	48	48	48
Total	221	246	234
Source: Virginia Paving, 2009; Vulcan Materials, 2009; Covanta, 2009; HDR, 2009; BAE, 2009.			

¹ Source: *The Impact of the Virginia Paving Company on the City of Alexandria Economy*, prepared by Stephen Fuller, PhD, Director, Center for Regional Analysis, George Mason University. The study examines the facility’s 2008 payroll data. According to the study, as many as 40 employees reside in Alexandria. The company also hired 17 independent contractors as haulers. Additionally, FCC Environmental, which operates on the property, employed 24 full time workers in 2008.

Within the context of the Alexandria economy, 234 jobs represent 0.23 percent of the total City employment (101,310 according to the City of Alexandria and Virginia Employment Commission). Vulcan and Virginia Paving’s combined 186 average employees represent 3.6 percent of the total Goods-Producing domain for the City of Alexandria, which consists of the Natural Resources and Mining, Construction, and Manufacturing sectors and totals 5,156 employees. Covanta’s employment falls into the Service-Providing domain in the Administrative and Waste Services sector, which totaled an average of 7,246 employees in 2008. Covanta’s 48 employees represent 0.6 percent of this sector although it represents 19 percent of the Waste Management and Remediation Service subsector (NAICS code 562).

The salaries offered by these operations are not known in detail although some information can be gleaned from various resources, including the Virginia Paving economic impact study as well industry wage data from the Virginia Employment Commission. According to the economic impact study, the facility had an annual payroll of \$6.95 million in 2008. Using 181 as the average total full-time employees referenced above, this total payroll equates to an average annual salary of \$38,500 per full-time employee, with a range of \$36,400 to \$40,900 using the 170 to 191 employment range.

Figure 2: Average Annual Salary, Alexandria, Virginia Paving and Industrial Subsectors



Source: Virginia Employment Commission, 2009; BAE, 2009.

The average salary for Covanta’s sector, Waste Management and Remediation Service, was \$48,600. However, Covanta’s likely subsector, Waste Treatment and Disposal, had a higher average salary of \$56,000 in the City of Alexandria as of the third quarter of 2008. The average

salary for Vulcan's subsector, Nonmetallic Mineral Product Manufacturing, was \$49,200 in 2008. The average salary across all Alexandria industries in 2008 was \$60,300.

Economic and Employment Diversity

A diverse economy with employment and firms drawing from a variety of industry sectors tends to be more stable than less diverse economies that may be reliant on only a few more prevalent sectors. Less diverse economies can be prone to more fluctuation in employment and overall economic activity if exposed to only a few larger sectors. Although the four operations do produce high quality jobs in certain industrial sectors, they represent only a small fraction of all jobs in the City. While goods-producing sectors such as manufacturing and construction can improve economic diversity, these sectors can often demonstrate as much, if not more, volatility and fluctuation as service sectors. These sectors have also demonstrated relatively slower growth historically and are forecasted to continue lagging other sectors in the future.

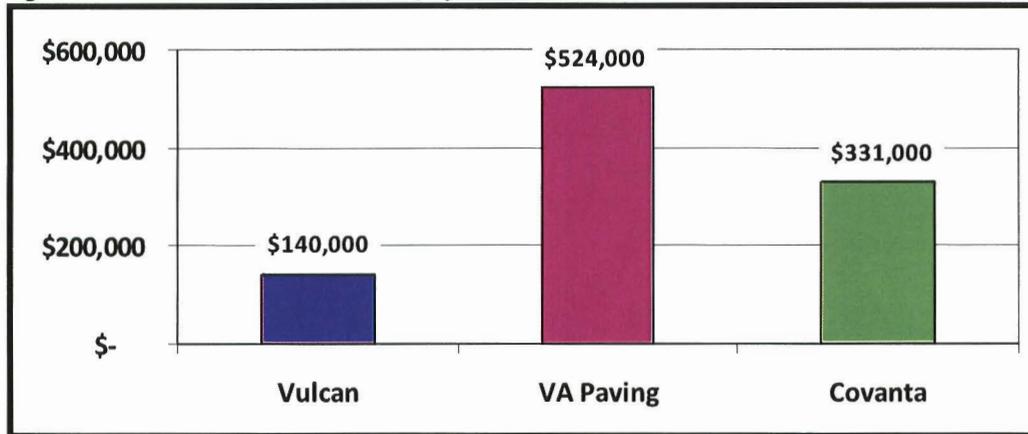
Economic Benefit: Tax Revenues

According to the City of Alexandria, Covanta, Virginia Paving, and Vulcan Materials contributed a total of \$995,000 to the City in four categories: real property taxes, business licenses, business tangible property, and sales tax² in 2008. This total represents 0.2% of the \$520,459,050 in total general fund revenues for the same fiscal year. The breakdown is shown below, with the exclusion of Norfolk Southern, which is exempt from taxation at the local level. Virginia Paving provided information that the company provided nearly \$741,000 in revenues to the city, including several other categories such as environmental services (\$82,279) and Hot Mix Use tax (\$110,684).

Norfolk Southern pays into a state railroad fund. The City of Alexandria receives an allocation from the railroad fund contributions, based on the state's assessment of railroad property in the City.

² These taxes represent the bulk, but not necessarily all, of the revenue the four existing uses contribute to the City.

Figure 3: 2008 Tax Revenue Breakdown, by Industrial Use



Source: City of Alexandria, 2009; BAE, 2009.

Environmental Benefit: Environmental Sustainability

Definitions of what constitutes “green” jobs vary widely, but by some measures, a segment of the employment found at some of the four operations under study could be considered green because they either 1) involve production of environmentally sustainable products or 2) utilize production methods that result in waste reduction.

- Vulcan Materials and Virginia Paving utilize the freight rail line to receive materials, saving fuel required to transport these materials by truck.
- Virginia Paving’s Alexandria facility considers sustainability in its business practices, and incorporates recycled materials, including recycled asphalt, to the greatest extent possible. According to the National Asphalt Paving Association (NAPA), asphalt is the most recycled material in the United States.³ Virginia Paving’s manufacturing process incorporates recycled oil from FCC Environmental, which collects used oil from local businesses and filters the oil on site.
- By processing waste generated in Alexandria and Arlington, the Covanta facility reduces the volume of waste by approximately 90 percent. An electromagnet was installed to recover ferrous metals from the back-end of the facility, reducing the quantity of material requiring disposal.

³ Based on the FWHA/EPA’s 1996 Pavement Recycling Executive Summary and Report. Additional analysis has not been conducted to determine whether asphalt is still the number one recycled US product.

- Energy from Waste (EfW) facilities offset the CO₂ emissions which would be generated from other energy production methods. The generation of electricity is one of the largest contributors of greenhouse gas (GHG) emissions in the United States, due to the effects of burning coal and natural gas. EfW facilities also reduce greenhouse gases by reducing land filling of the waste. Landfills generate methane, and methane has a greenhouse effect 25 times greater than carbon dioxide, according to the Intergovernmental Panel on Climate Change. Both EPA and VDEQ rank EfW facilities as preferable to landfilling.
- As a biofuel, ethanol is considered to be better for the environment than gasoline because it produces lower carbon monoxide and carbon dioxide emissions. Its increasing production replaces an equivalent amount of gasoline as a source of power for automobiles. It is primarily blended with gasoline at 10% ethanol to 90% gasoline. Organizations such as the Renewable Fuel Association (RFA), a lobbying and advocacy vehicle for the ethanol industry, promotes its environmental and economic sustainability features.

Environmental Costs: Air Quality

This summary of baseline air quality conditions presented by the four existing industrial uses begins with background information on the types of emissions that are measured and analyzed. Subsequently presented are 1) a summary of the air pollutant emissions from the four study sites, both from the industrial operations and related vehicle traffic; 2) a comparison of emissions from these four industrial sources to other emission sources in the surrounding community; and 3) a summary of air quality levels compared to the health-based National Ambient Air Quality Standards (NAAQS). A full report describing the emissions produced by the four existing industrial uses, the possible changes in emissions under redevelopment, and a qualitative discussion of air quality impacts of redevelopment is presented in Appendix C.

Summary of Stationary Air Emissions from Four Industrial Uses

Table 4 summarizes the stationary air emissions from the four industrial facilities in the study area.

Vulcan Materials. In general the site has negligible air emission as it relates to the criteria pollutants. There are some PM_{2.5} emissions generated by trucks traveling on plant roads and by wind erosion of aggregate storage piles. The City amended the SUP in 1996 which sets conditions for minimizing fugitive dust emissions from the facility during loading, unloading, and storage operations. The site does not generate a significant amount of HAPs or greenhouse gases. The chemical composition of the emissions from Vulcan Materials is primarily mineral oxides and other naturally occurring crystal materials that are not classified as HAPs.

Table 4: Stationary Air Emissions (Tons/Year)

Air Quality Emissions		Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total
Criteria Pollutants (a)	CO	0	12.9	61.8	0	74.7
	NO _x	0	12.5	575.2	0	587.7
	PM ₁₀	0.3	4.4	2.8	0	7.6
	PM _{2.5}	<.01	4.4	2.8	0	7.3
	SO ₂	0	5.2	12.6	0	17.8
	VOC	0	3.9	2.3	<0.1	6.2
Hazardous Air Pollutants (HAPs) (b)		No Emissions	Arsenic Cadium Chromium Lead PCBs Halogens	Cadium Lead Mercury Acid gases Dioxins Furans	No Emissions	N/A
Greenhouse Gases (c)		No Emissions	Small amount from combustion	Generates from incineration of solid waste	No Emissions	N/A
Notes:						
(a) The Clean Air Act requires the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for common air pollutants. The USEPA calls these pollutants "criteria air" pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible exposure levels. The NAAQS are for particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead.						
(b) The USEPA also regulates Hazardous Air Pollutants (HAPs), a group of 187 chemicals such as arsenic, benzene, formaldehyde, mercury, and dioxins. Some HAPs are known or suspected to cause cancer. Other HAPs may cause respiratory effects, birth defects, and reproductive and other serious health effects.						
(c) A third group of air pollutants, primarily carbon dioxide and methane, are classified as Greenhouse Gases (GHGs). These pollutants are linked to global climate change, and the City is beginning to address GHG emissions through the Environmental Action Plan.						
Source: MACTEC, 2009; BAE, 2009.						

Virginia Paving. The primary emission sources from Virginia Paving are two hot oil heaters for liquid asphalt, and two drum dryer mixers for producing hot mix asphalt. As a condition of the SUP, Virginia Paving has reduced emissions from the drum dryer stacks, fugitive emissions from material transfer areas, and emissions from diesel powered machinery.

Virginia Paving is permitted to combust distillate oil, and recycled fuel oil. The recycled fuel oil contains small amounts of arsenic, cadmium, chromium, lead, PCBs, and halogens. Virginia Paving is required to obtain a certification from the recycled/used oil supplier, including sampling and analysis representative of each shipment purchased, to ensure that the levels of these chemicals meet specifications regulated by the State and EPA. The Virginia Paving facility generates a small amount of GHGs from the combustion of distillate oil and recycled oil.

Covanta Facility. The facility operates under a Title V operating permit that sets emission limitations and all emissions parameters are measured continuously against those limits. The primary emission sources are three municipal waste combustion units. In response to Clean Air Act requirements, the City and Arlington County funded a \$45 million pollution control upgrade in 2000. The retrofit dramatically lowered emissions of both criteria and hazardous air pollutants. The air pollution control equipment improvements consist of semi-dry flue gas scrubbers with lime injection, fabric filter baghouses, a nitrogen oxide control system, a mercury control system, and a continuous emissions monitoring (CEM) system.

The Covanta facility is permitted to emit small amounts of metals (cadmium, lead, mercury), acid gases (hydrogen chloride) and organics (dioxins and furans). The retrofit dramatically lowered emissions of both criteria and hazardous air pollutants (see Table 4), and the facility achieves emission results that are easily in compliance with the permitted levels.

Although the Covanta facility generates GHGs, disposing of solid waste at the facility helps prevent climate change in several ways: (1) the facility avoids methane production that would occur if the waste was sent directly to a landfill; (2) the facility generates cleaner energy and reduces the amount of electricity generated from fossil fuels; and (3) by recovering steel from the waste stream, the facility reduces the quantity of fossil fuels and energy used for mining and manufacturing raw materials. It is estimated that for every ton of trash combusted, nearly one ton less of carbon dioxide equivalent is released into the air due to avoided methane from land disposal, fossil fuel power generation, and metals productions.

Norfolk Southern Facility.⁴ As ethanol is transloaded (off-loaded by the railroad's contractor into tanker trucks) for final delivery to gasoline tank farms in Springfield and in Fairfax City, emissions of volatile organic compounds occur as organic vapors in "empty" cargo tanks are displaced to the atmosphere by the liquid being loaded into the tanks. Coarse particulate emissions are generated by trucks traveling on plant roads. The industrial operations at the Norfolk Southern transloading

⁴ Information about Norfolk Southern ethanol transloading activities derives from general information made available to the public by the City of Alexandria on its website (<http://alexandriava.gov/transloading>). No information was provided by Norfolk Southern.

facility do not generate a significant amount of HAPs or GHGs. The emissions from Norfolk Southern are primarily ethanol, which is not classified as a HAP.

Baseline Emissions from Vehicles in the Study Sites

Emissions were calculated for vehicle traffic associated with the industrial operations as well as emissions from all types of vehicle traffic within a study area. The study area is bounded by the segment of the Capital Beltway from Clermont Avenue to I-395/I-495/I-95 Springfield Interchange. The western boundary is the segment of I-395 from the Springfield Interchange to Route 236/Duke Street. The northern boundary is Duke Street from I-395 to North Pickett Street. The eastern boundary is the line connecting the Duke Street/North Pickett intersection and the Clermont Avenue/Capital Beltway Interchange. Included in the study area are South Van Dorn Street, South Pickett Street, and Edsall Road. A map of the study area boundaries is shown in Exhibit 3 of the Appendix C report.

The truck traffic associated with the four industrial sources was estimated given the assumptions and data sources used, as described in Appendix C report.

Table 5 summarizes the criteria air pollutant emissions from the vehicle traffic in the study area. The truck traffic associated with the four industrial facilities accounts for only 0.13 percent of the total vehicles miles traveled (VMT) and a small percentage of the total emissions in the study area.

Motor vehicles also emit a number of HAPs, both in the exhaust gas and from fuel evaporation. The two primary HAPs emitted from motor vehicles are benzene and methyl tert-butyl ether (MTBE). The truck traffic associated with the four industrial facilities accounts for about 0.031 tons of benzene, compared to 23.2 tons of benzene from all other vehicles in the study area. The truck traffic associated with the four industrial facilities accounts for about 0.034 tons of MTBE, compared to 25.6 tons of MTBE from all other vehicles in the study area.

Table 5: Onroad Vehicle Emissions in the Study Area

Source	VMT	Emissions (tons/yr)					
		CO	NOx	PM10	PM2.5	SO2	VOC
All Vehicles in Study Area							
All Vehicles	375,393,790	2,612	553	145	11	4	204
Truck Traffic Associated with Industrial Operations							
Vulcan Materials	56,784	0.1	0.5	0.5	0.1	<0.1	<0.1
Virginia Paving	276,349	0.6	2.3	2.5	0.4	<0.1	0.1
Covanta	144,144	0.3	1.2	1.3	0.2	<0.1	0.1
Norfolk Southern	17,472	<0.1	0.1	0.2	<0.1	<0.1	<0.1
Total	494,749	1.00	4.20	4.50	0.70	<0.1	0.20
Contribution from Industrial Sources	0.13%	0.04%	0.80%	3.10%	6.30%	0.20%	0.10%

Source: MACTEC, 2009.

In addition, GHG emissions from the vehicle traffic in the study area were calculated. The truck traffic associated with the four industrial facilities accounts for about 752 tons of CO₂, compared to 216,343 tons of CO₂ from all other vehicles in the study area.

Baseline Emissions in the Study Area Compared to Larger Community Emissions

The previous two sections discussed the emissions from the stationary industrial operations and associated truck traffic in the study area. This section compares the emissions in the study area to the emissions generated City-wide by all sources in Alexandria. Data for this analysis were obtained from the Virginia Department of Environmental Quality (VADEQ).

Baseline Ambient Air Quality

The City of Alexandria has been taking measurements of air quality for nearly 50 years. The Office of Environmental Quality (OEQ) currently maintains and operates an ambient air monitoring station at 517 North St. Asaph Street. OEQ measures carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter (PM₁₀) year round. Ozone is continuously measured during the months of April through September.

The City began monitoring ambient air for particulate matter in June of 2004 at a new monitoring station located at Armistead Boothe Park, near the Samuel Tucker Elementary School in Cameron Station. The City conducted the monitoring to measure the ambient air concentrations of PM₁₀ in the air surrounding Cameron Station. Long-term monitoring at this location started in June of 2006. A comparison of the monitoring results with the NAAQS shows that the ambient PM₁₀ concentrations at Cameron Station are well in compliance with the NAAQS. The highest 24-hour concentration measured to date was 56 µg/m³, well below the 24-hour PM₁₀ standard of 150 µg/m³.

Table 6 summarizes the criteria air pollutant emissions from the industrial sources in the study area and the City-wide emissions. Emissions from the four industrial sources, including both the industrial processes and associated truck traffic, comprise a very small fraction of the total City-wide criteria air pollutant emissions.

Table 6: Stationary Source Air Emissions in the Study Area Compared to City-wide Emissions⁵

Source Type	Emissions (tons/yr)					
	CO	NOx	PM10	PM2.5	SO2	VOC
City of Alexandria						
Point Sources	260	2,937	113	31	3,768	27
Area Sources	1,386	548	2,276	502	543	2,144
Onroad Mobile Sources	9,314	916	26	14	21	601
Nonroad Mobile Sources	7,346	171	19	18	10	446
Total for Alexandria	18,306	4,572	2,434	564	4,342	3,218
Industrial Sources in Eisenhower West Area						
Point Sources	75	588	8	7	18	6
Onroad Mobile Sources	1	4	4	1	<0.1	<0.1
Total for Industrial Sources	76	592	12	8	18	6
Percentage of Total Emissions	0.40%	12.90%	0.50%	1.40%	0.40%	0.20%

Source: MACTEC, 2009.

Benefits/Costs: Other Considerations

Other factors are also important to consider, but cannot be easily quantified.

Goods and services provided to the City of Alexandria

Some of the existing industries are the sole suppliers of certain goods to the City of Alexandria. The City receives 100 percent of its asphalt from Virginia Paving, asphalt which includes aggregate from Vulcan Materials quarries. Vulcan Materials identifies distribution as the most significant component of cost, therefore lower cost of rail delivery can be passed on as a benefit to the City of Alexandria and other consumers of their products. All solid waste collected by the City of Alexandria is processed by the Covanta facility, which produces electricity used by the City and its residents and businesses.

⁵ VADEQ groups emission sources into four major categories, as follows (1) *Point Sources* are comprised of stationary facilities that emit pollutants above a certain threshold, from a stack, vent or similar discrete point of release (2) *Area Sources* consist of numerous small sources diffused over a wide geographical area. For example, small dry cleaners, and gasoline stations. (3) *Mobile Onroad Sources* include internal combustion engines used to propel cars, trucks, buses, and other vehicles on public roadways. (4) *Mobile Nonroad Sources* are sources of air pollution from internal combustion engines such as airplanes and forklifts.

Property values and quality of life issues

Noise, dust, and diminished views, as a result of the existing uses, impact residents to varying degrees. In addition, the large parcels required by the operations contribute to the lack of street connectivity in the area by impeding the development of small blocks that are more pleasant and easy to navigate on foot.

Nearby residents have asked: to what extent are current property values reduced because of proximity to these industrial uses? It is difficult to separate the impact of the existing uses from other location, market, and economic conditions that could be impacting the residential real estate market through an analysis of home sales data. The residential development projects in closest proximity to the industrial uses were developed after the establishment of these facilities, with the exception of the ethanol transloading operation, therefore any diminution of home values would have been reflected in the initial purchase price of the home. It is difficult to conclusively calculate the effect of the ethanol transloading facility (both the activity itself and the publicity surrounding it) on property values since the timing of it coincides with a sharp decline of an overheated housing market. There is no evidence from the property valuation process used by the City's tax assessor that indicates a negative impact.

Residents have also asked if the continued presence of industrial uses in the area will negatively impact Landmark/Van Dorn redevelopment. Again, it is difficult to separate the various factors that could impact the area's redevelopment potential. Concerns about the negative impacts of proximate industrial uses could potentially be outweighed by other factors, such as the cost of land and the willingness of a property owner to make land available for redevelopment. Landmark Gateway, a proposed redevelopment project in close proximity to Virginia Paving, was the first site plan submission within the Landmark/Van Dorn planning area, and a positive indication that proximity to heavy industrial uses will not impede development. In addition, an analysis of 2008 assessed values for property in the Landmark/Van Dorn planning area shows relatively high land prices: an average of \$2-3 million an acre. While the parcel-by-parcel values varied somewhat, the land values closest to Virginia Paving and Vulcan were closer to the \$3 million mark than other parcels farther away.

Relocation and Business Cessation Analysis

The current location of the industrial area provides advantages, including its proximity to both rail and I-495 (the Capital Beltway) which allows these businesses to efficiently receive input materials and service minimize product delivery times to customers. Their location inside the Capital Beltway also provides access to a dense base of customers, including residents and businesses in Alexandria. The relocation site requirements described for each operation reflect the need to maintain those logistical requirements in an alternate location.

The table below summarizes the relocation requirements and relocation/business cessation costs.

Table 7: Summary of Relocation Requirements and Business Cessation Analysis

Consideration	Vulcan	Virginia Paving	Covanta	Norfolk Southern
Land	Minimum of 15 acres	Minimum of 9 acres	See Notes (a)	N/A
Transportation Access	Need rail line	Need rail line	See Notes (a)	Need rail line
Proximity to end user	N/A	Need to be within short distance from current location to continue to serve current market	See Notes (a)	Need to minimize travel to tank farms in Springfield and Fairfax City
Estimated Business Relocation/ Cessation Costs (b)	\$16 million/ \$7 to \$15 million	\$10.5 to \$14.5 million/ \$23 to \$27 million	\$300 to \$335 million for new facility, \$11.5 million for transfer station	N/A
Possible Relocation Alternative (c)	Industrial Zone in Springfield close to Newington exit on I-95	Industrial Zone in Springfield close to Newington exit on I-95	None identified	Industrial Zone in Springfield close to Newington exit on I-95
Notes:				
<p>(a) The agreements governing the Covanta operation and acceptance of solid waste from Alexandria and Arlington (the jurisdictions) severely constrain the ability for the site to relocate. The existing lease is set to expire on October 1, 2025, at which time the facility reverts to the City and County. Prior to 2025, redeveloping the site of the EfW facility would be a violation of the terms of the lease, requiring renegotiation of terms that would be satisfactory to Covanta and requiring a costly replication of the site on another site suitable to Covanta. After 2025, when the land and all of the improvements on it revert to the City of Alexandria and Arlington County, the terms of the lease will be met and there will be no obligation to provide a relocation or buyout to Covanta. However, if a relocation of the site is desired after that date, the City, in agreement with Arlington County, will need to either address its waste disposal needs through the siting and construction of a new facility, or arrange for a different method for the disposal of their waste.</p> <p>(b) HDR estimated business relocation/cessation cost for the Covanta site does not include property acquisition.</p> <p>(c) The site that represents the closest available property that meets the basic requirements for each of the uses. Relocation issues and constraints are discussed in the report.</p>				
Source: City of Alexandria, 2009; Vulcan, 2009; Virginia Paving, 2009; HDR, Inc., 2009; BAE, 2009.				

Relocation Requirements of the Existing Uses

The main relocation considerations of the existing uses are:

- Size of parcel
- Proximity to source of materials
- Proximity to customers
- Appropriate zoning
- Distance from competition

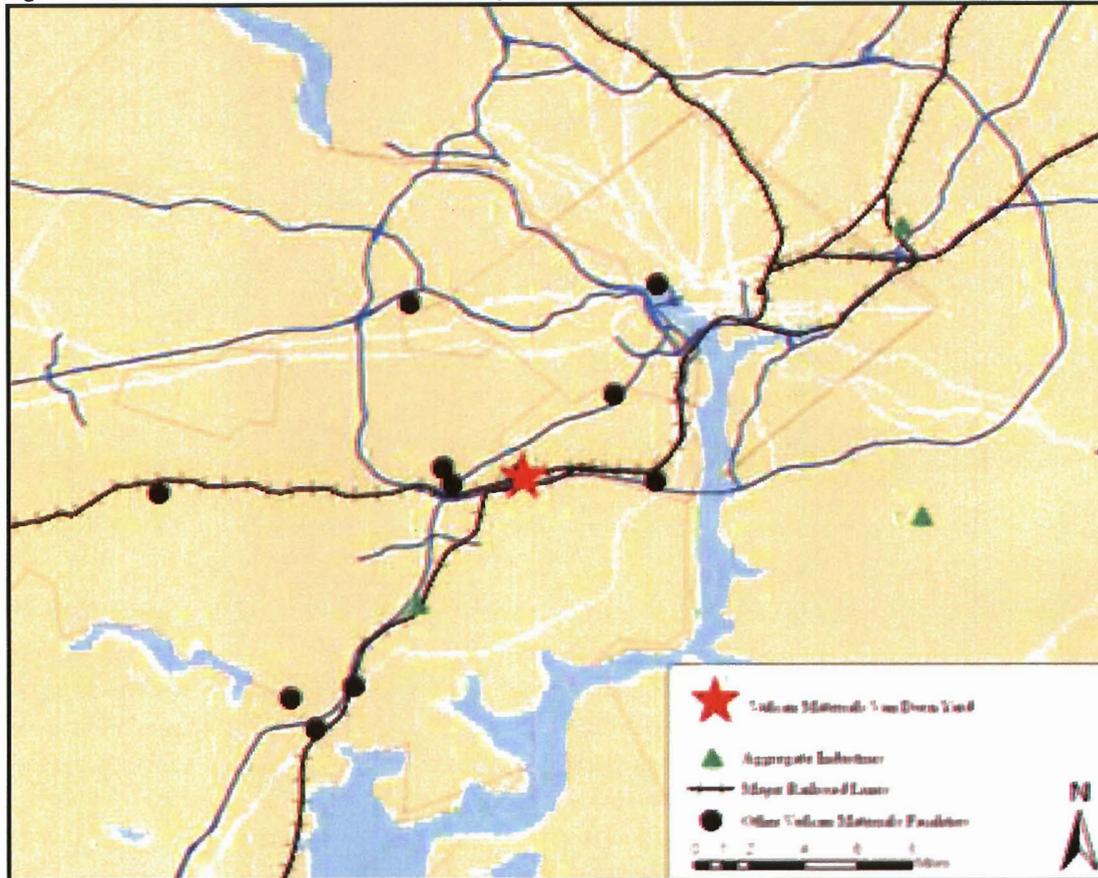
Vulcan Materials

Vulcan Materials receives aggregate from its Manassas quarry via rail and stores it for customers to pick up by truck. The rail line is invaluable in providing large quantities of quarry material to the site more cost effectively and without the traffic that would be generated if it were transported by truck delivery.

According to staff at Vulcan Materials, the operation would need a minimum of 15 usable acres. Although Vulcan has another nearby facility, serviced by rail, in the Edsall Road Industrial Park, Vulcan staff indicates that that site is not large enough to supply materials to all of its customers during the peak months. The Alexandria location is beneficial to Vulcan because it provides additional capacity, and better serves the market for aggregate in the Alexandria area, while the Edsall Road site serves business located in Fairfax and to the west. The Alexandria location is also beneficial for Vulcan's customers in the Alexandria area market. As with asphalt delivery, an efficient servicing of a major construction project with aggregate is be organized so that trucks deliver the material precisely when it is needed, without gaps or bunches in truck arrivals. Also, fewer trucks are required to service large projects in shorter delivery distances, thereby allowing for a more cost effective operation.

Few competitors exist within Vulcan Materials' Alexandria site service area. Of the three closest aggregate storage sites, Vulcan Materials operates two sites, while Aggregate Industries operates the third. The access to both rail and the highways, combined with a lack of competition makes this site strategic for Vulcan Materials. Figure 4 shows the location of competitors and other Vulcan Materials facilities around the Van Dorn Yard.

Figure 4: Location of Vulcan Materials and Competitor Locations



Source: Vulcan Materials, 2009; Aggregate Industries, 2009; ESRI; BAE, 2009.

Virginia Paving

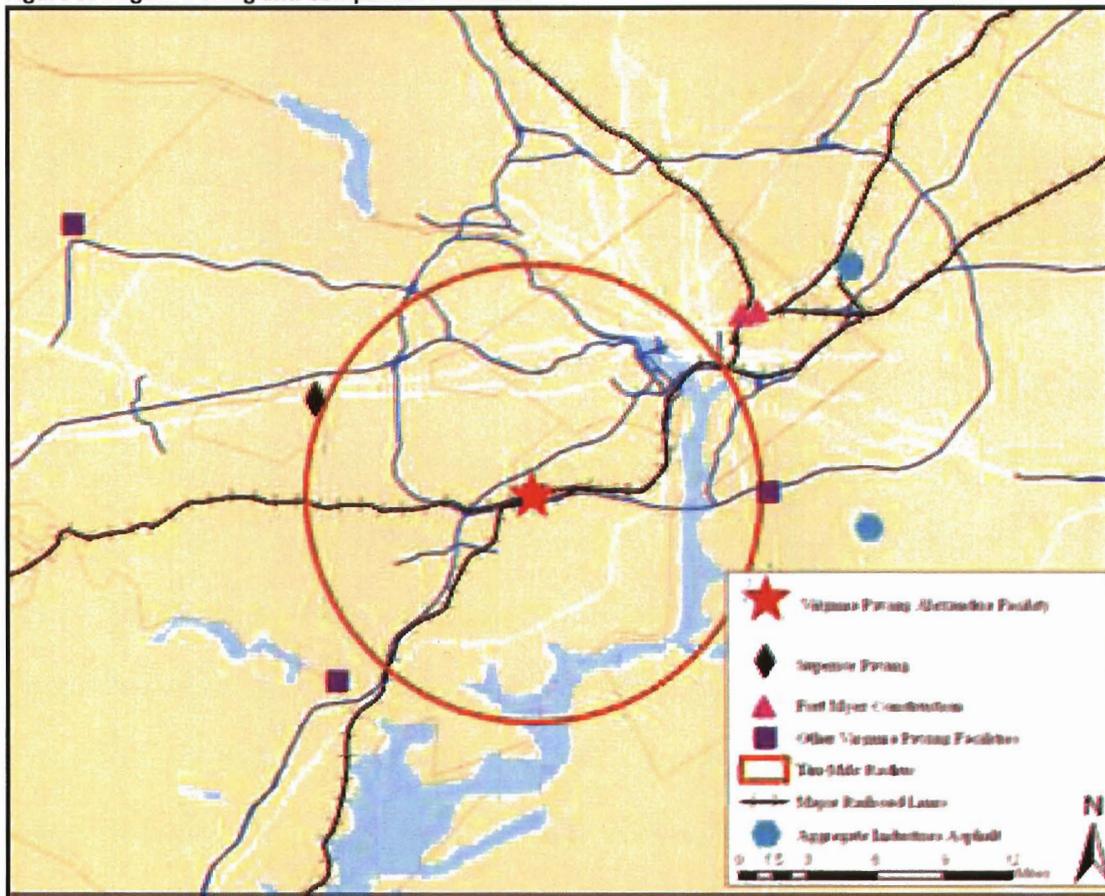
Like Vulcan Materials, the rail access and proximity to the Capital Beltway and I-95 at the Van Dorn Street facility allows Virginia Paving to efficiently receive its inputs and deliver its products. Virginia Paving uses the rail line to receive raw materials supplied by the Vulcan Materials Manassas quarry. On site, Virginia Paving mixes the raw materials into asphalt, which it then delivers to its customers.

The process of delivering hot mix asphalt to large construction projects requires “just-in-time” delivery so that the asphalt arrives at the right temperature. An efficient paving operation will have trucks that are able to deliver asphalt, return to the mixing facility and re-load with asphalt within a short amount of time, without gaps in the arrival of asphalt or backups in trucks waiting to unload asphalt. Traffic poses a risk to the successful delivery of asphalt, and the frequency and

severity of traffic in Northern Virginia and the Metropolitan Washington area limits the distance that an asphalt plant can effectively service. According to the Virginia Asphalt Association, a statewide organization representing asphalt manufacturers, an asphalt producer in a non-congested area can typically serve a 50 mile radius. However, in Northern Virginia, the delivery radius that a manufacturer can service well, without risk to the quality of the asphalt or delivery schedule, shrinks to 10 miles.

- As Figure 5 shows, there are only two other paving companies located within 10 miles of Virginia Paving's Alexandria site, National Asphalt Paving in Fairfax (owned by Superior Paving), and another facility owned by Lane Construction, Senate Asphalt, in Oxon Hill, Maryland.

Figure 5: Virginia Paving and Competitor Locations



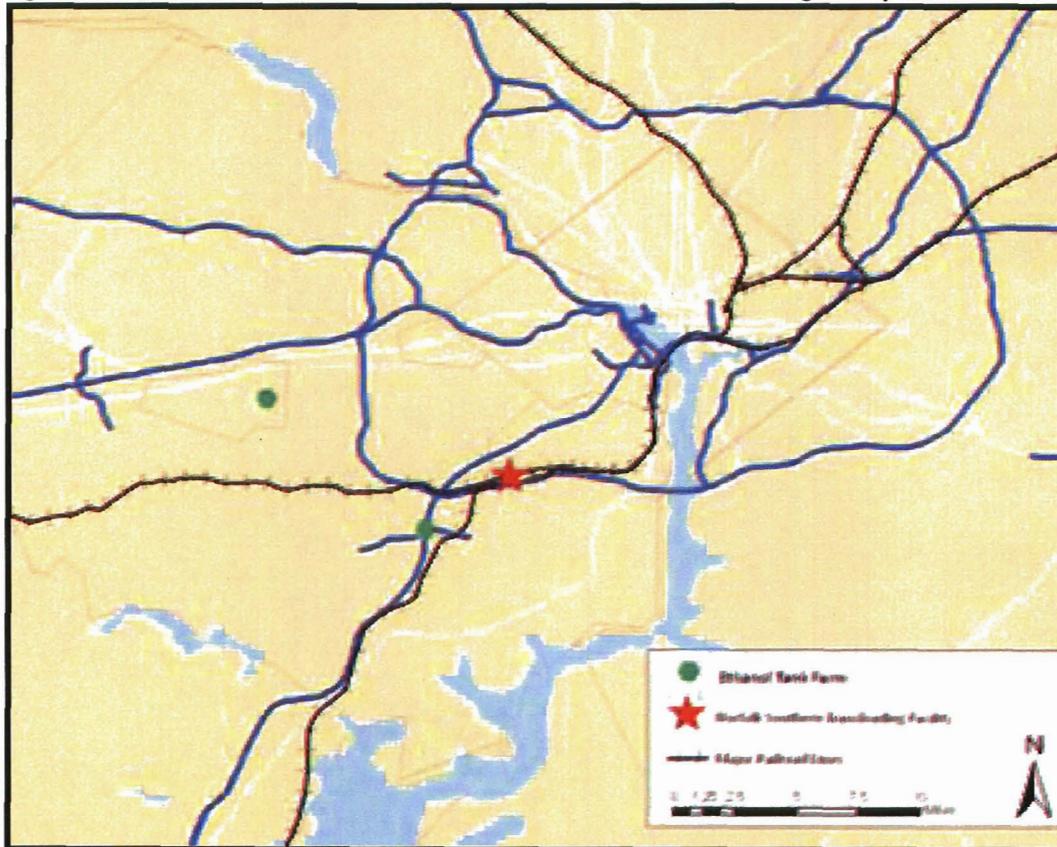
Source: Virginia Paving, 2009; Superior Paving, 2009; Fort Myer Construction, 2009; Aggregate Industries, 2009; ESRI, 2009; BAE, 2009.

- Virginia Paving staff indicated that a relocation site would need to be at least nine acres of vacant land located on rail line within a short distance from its current location.

Norfolk Southern Ethanol Transloading

Ethanol arrives at the Norfolk Southern facility in liquid form on rail cars and is loaded to tanker trucks for local transport. It is an industry standard to keep transloading facilities as close to end users as possible, to limit the amount of time that ethanol is in road-transit. The ethanol is delivered, by truck, to end users located in Springfield and in Fairfax City. The current site is less than five miles from Springfield and about ten miles from Fairfax City, allowing for fairly short ethanol transporting times from the facility to gasoline tank farms. Figure 6 shows the tank farms' proximities to the Norfolk Southern transloading facility.

Figure 6: Tank Farm Locations and the Norfolk Southern Ethanol Transloading Facility



Source: City of Alexandria, 2009; ESRI; BAE, 2009.

As ethanol is flammable, transporting ethanol via rail to gasoline tank farms is less risky and preferable to trucking the material. However, as gasoline tank farms are typically not located on rail lines, the ethanol must be loaded from rail onto trucks to arrive at its final destination. Again, due to its flammable nature and the higher risk of accidents associated with truck travel, rail generally takes the ethanol as close to the tank farms as possible before the ethanol is loaded onto trucks.

Covanta Energy from Waste

The agreements that allow the Covanta Alexandria/Arlington (Covanta) facility to operate and govern its acceptance of solid waste from the City and Arlington severely constrain the ability for the site to relocate in the short and mid term. The existing lease is set to expire on October 1, 2025, at which time the facility site reverts to the City and County. The City and Arlington have a “put or pay” agreement in place with Covanta until 2013 whereby the City and Arlington commit to pay for disposal 225,000 tons of waste generated by the City and County and delivered to the facility each year. After 2013, the two jurisdictions can continue to send their waste to the facility, or can choose an alternative method of waste disposal.

Therefore, prior to 2025, redeveloping the site of the EfW facility would be a violation of the terms of the lease, requiring renegotiation of terms that would be satisfactory to Covanta Energy Corp. A move before 2025 would require a costly replication of the facility on another site suitable to Covanta. After 2025, when the land and all improvements on it revert to the City and Arlington, there will be no obligation to provide a relocation or buyout to Covanta. However, if a relocation of the site is desired after that date, the City, in consultation with Arlington County, would need to come to agreement on the disposition of the site, and the City would need to determine how to best dispose of its municipal waste.

Relocation Options within Northern Virginia Market Area

To determine potential relocation options for the existing businesses, this analysis looked for sites that would allow heavy industrial uses within a five-mile radius of the Eisenhower West area. This included interviews with local brokers, as well as a search for commercially zoned property within Alexandria, including the industrial areas located east and west of the study sites, along Edsall Road, and south of the Beltway.

Available Industrial Property

As vacancy rates are relatively low in and around Alexandria, the area is nearly built out, and industrial zoned land is scarce, this analysis was able to identify few vacant industrial sites in Alexandria. Table 8 shows the available industrial sites in and around Alexandria.

Table 8: Industrial Space for Lease/Sale In and Around Alexandria, April/May 2009

For Lease		
Address	Size (SF)	Asking Rate
5600 General Washington Drive	3,186	\$14 psf NNN
100 S Early Street	5,000	\$4,500/month
4823 Eisenhower Avenue	1,648	\$12 psf NNN
6404 Telegraph Road	2,626	\$4500/month
6404 Telegraph Road	3,231	\$3,600/month
409-453 Calvert Avenue	4,806	\$10.50 psf NNN
326-466 Calvert Avenue	5,670	\$10.50 psf NNN
801 S. Pickett Street	42,304	\$10 psf NNN
6306 Gravel Avenue	8,663	\$0.75 psf NNN
5701 General Washington Drive	8,130	\$12.75 psf NNN
901-929 S. Pickett Street	7,042	\$10.50 psf
5300-5320 Eisenhower Avenue	8,000	\$10 psf
5300-5320 Eisenhower Avenue	2,800	\$13 psf
4536-4598 Eisenhower Avenue	3,000	\$14.50 psf
For Sale		
Address	Size (SF)	Asking Rate
418 E Raymond Avenue	5,700	\$1,495,000
501 E Monroe Avenue	10,844	\$3,250,000
3106 Colvin Street	5,300	\$1,760,000
Source: Loopnet, 2009; CoStar, 2009; BAE, 2009.		

None of these properties are suitable for the relocation needs of the existing uses due to size and/or lack of rail access. Industrial areas in close proximity to the study sites, with access to freight rail service, are described below.

Farrington Avenue Industrial Area and Edsall Industrial Area

These two industrial areas in Fairfax County are the closest industrial areas to the subject site with access to the Norfolk Southern rail line. Farrington Avenue, south and west of the study sites, originates at South Van Dorn Street and extends west, providing access to small warehouse, building supply and related uses. The Norfolk Southern rail line forms the northern boundary of properties on the north side of Farrington Avenue. The Shirley Edsall Industrial Park, within approximately four miles west of the subject sites and accessible from I-395 and the Capital Beltway, is a large complex of warehouse, flex space, manufacturing, and heavy industrial uses. Certain parcels within this industrial area have access to the Norfolk Southern rail line.

There are currently no parcels marketed for sale or lease within these two areas that would meet the relocation requirements of the existing industrial uses. If land were available in the future in either area that met size and rail access requirements, it could provide the most feasible relocation option for some or all of the existing uses. Both areas are outside of Alexandria and would therefore require adherence to the land use policies and decision-making of Fairfax County.

Springfield Industrial Area

Two sites in this area, located close to the I-95 Newington exit in Springfield and approximately four miles from the study sites, are currently being marketed for sale as industrial property. One parcel is approximately 24.5 acres and located at the northeast corner of Loisdale Road and Newington Road. The second parcel is approximately 105.2 acres and is along Loisdale Road, south of Loisdale Park, but has topographical and environmental conditions that limit the use of much of the land.

While each site meets Virginia Paving's and Vulcan Materials' stated criteria, there are some potential drawbacks to each site that could present obstacles to Virginia Paving, Vulcan Materials or the ethanol transloading facility from actually relocating there.

- **Zoning and land use issues.** The Fairfax County Comprehensive plan identifies both sites as part of the I-95 industrial area, planned for continued industrial use. However, the plan calls for operations that are within buildings, or properly screened, to maintain an attractive appearance for the area. The plan also discourages storage uses. Furthermore, with the exception of 4.5 acres of industrially zoned land not adjacent to the rail line, the land would require rezoning from the current residential use. According to Fairfax County planning staff, it is likely that a Special Use Permit would be required for the types of uses that would relocate, in addition to the rezoning. The public process involved in the rezoning would likely produce opposition to the action for the same reasons that continued operations of some of the four uses are opposed on their current site. Portions of the larger site are immediately adjacent to residential areas, and the industrial park is in close proximity to established residential neighborhoods.
- **Site development issues.** Both sites have irregular topography and would need significant grading or fill in order to access the rail line. Use of the rail line would necessitate construction of a rail spur, which would add to the site development costs. Construction of the rail spur would also require approval of the railroad company and/or the federal agencies that regulate the use of the rail line.

- **CSX owns the rail, not Norfolk Southern.** Another major obstacle to accessing the rail at this location is that it is controlled by CSX. The quarries that provide construction materials to the Vulcan and Virginia Paving facilities are located on Norfolk Southern rail lines, and the ethanol producer utilizes Norfolk Southern for transport. According to the Association of American Railroads, sharing track usage rights is a common partnership between major U.S. railroads. However, obtaining track usage rights has associated costs, which could not be verified but have been estimated at \$5 to \$7 per ton, and could vary for different materials.

Relocation and Business Cessation Alternatives and Costs

The relocation of the existing industrial study sites would depend on obtaining a suitable new location. Assuming a suitable location is available, the proceeds of the land sale would need to be enough to incent the owner to cease operation. If land sale proceeds were not sufficient to induce the owner to relocate or discontinue business operations, funding by public sources would be necessary to advance redevelopment.

The calculations should not be perceived as hard and fast recommended valuations for the businesses, as only the owner knows the value required for them to sell. The estimates are meant to demonstrate various approaches and methodologies to valuation that could be applied. A true valuation effort would require numerous adjustments based on further financial details of the specific operations. However, the calculations do offer some guidance as to how an appraiser might go about calculating a business valuation.

For the purposes of this analysis, it is assumed that Vulcan, Virginia Paving and the ethanol transloading operation would relocate to the previously mentioned Springfield I-95 Industrial Area. The unique nature of Covanta's operation and the significant investment in the Covanta facility restricts options for its physical relocation; therefore other alternatives for the disposal of solid waste currently taken to the facility are also discussed.

Vulcan Materials

Potential Relocation

According to Vulcan Materials staff, moving their facility to a new location would cost approximately \$1 million. The cost of purchasing new property could vary. The \$326,500 per acre cost of the Springfield site would need to be supplemented by additional funds for feasibility studies, entitlements, and site work. In comparison, the cost for vacant industrial land is at least \$838,000 per acre based on the assessed value of Vulcan's existing property. The change in operating costs of this relocation are difficult to estimate, but could be significant depending on the cost for track usage rights.

Business Cessation Costs

Because the economic activity associated with the sale of aggregate occurs at the quarry, and the Van Dorn Yard is a storage and distribution site, one approach to valuing the business operation on the site is to assume that it is equal or nearly equal to the land value.⁶ Therefore, a key point of reference for the business cessation calculation is the value of the land. According to the City of Alexandria, the assessed value of Vulcan's Van Dorn Yard is \$14.8 million, which is based on 100 percent of the estimated market value of the land

Since Vulcan Materials is a publicly traded company, much of the key relevant financial information is available and numerous assumptions from the firmwide value can be made to help calculate the value of the local on-site operation. A simple preliminary valuation could apply the firmwide price-to-sales ratio to the onsite operation's sales. The current firmwide price-to-sales ratio is 1.31, based on the current share price and the firm's trailing 12 month revenues.⁷ At an assumed value of \$25.50 per ton, the Van Dorn Yard had \$12.75 million in revenues in the past year. As such, applying the 1.31 price-to-sales ratio yields a value of \$16.7 million for the Van Dorn Yard operation, which is \$1.9 million higher than the current land value.

Applying this ratio, however, is extremely simplistic for a variety of reasons. Using the firmwide value assumes that the Van Dorn Yard operation is a miniature representative of the firm's operations as a whole, which is not the case since the company's activities include more than the storage of construction materials. Nevertheless, it represents a "quick and dirty" way to at least begin the conversation of valuation and demonstrate the logic in the process. Adjustments can be made to the firmwide value based on details of the firm's overall operations. For instance, only 65 percent of the firm's revenues came from aggregate sales. Furthermore, not all aggregate sales derive from the firm's 89 different sales yards. Some customers are served directly from production facilities. Therefore, adjustments would need to be made to make the connection from the firmwide value to that of the Van Dorn Yard operation. However, if these adjustments serve to reduce the \$16.7 million figure downward substantially, the \$14.8 million land value becomes the "floor" for sale value once again.

According to equity research reports covering publicly traded firms in the General Building Materials industry, Vulcan and its competitors are typically measured using what is known as the

⁶ However, the valuation of the business at or near land value would imply that a rational business owner would sell the land. The decision not to sell in this scenario could be based on two reasons: 1) the owner could be anticipating further land value appreciation in the future and therefore prefers not to sell despite the financial gain from relocating to cheaper land today; 2) the land's strategic locational strengths relative to the specific operation, or lack of comparable land, provide value to the business operation.

⁷ Source: Yahoo! Finance

enterprise value multiple, which compares the firm's enterprise value (EV)⁸ to its earnings before interest, taxes, depreciation and amortization (EBITDA). Applying the industry average enterprise value multiple to the Van Dorn Yard's revenues yields a valuation of \$16.4 million. Further details on the calculation are found in Appendix D.

Virginia Paving

Potential Relocation

Relocation of Virginia Paving would require disassembly of current facilities, moving the on-site equipment, and reassembling the plant in the new location. Virginia Paving staff has not estimated their moving costs. For purposes of this analysis, a \$1.5 million cost to move, including plant disassembly and reassembly, is assumed. The cost of purchasing new property could vary. The \$326,500 per acre cost of the Springfield site would need to be supplemented by additional funds for feasibility studies, entitlements, and site work. In comparison, the cost for vacant industrial land could be as high as \$1.15 million per acre based on the assessed value of Vulcan's existing property. The change in operating costs of this relocation are difficult to estimate, but could be significant depending on the cost for track usage rights.

Potential Business Cessation

Virginia Paving is a subsidiary of Lane Construction, a privately held company, an examination of public records to analyze the economic value of the Alexandria operation was not feasible. However, research for this report identified a data source from the Internal Revenue Service (IRS), which publishes data from tax returns which provides average gross receipts, net earnings, and net worth estimates for U.S. firms within the asphalt paving, roofing, other petroleum and coal products manufacturing minor sector. According to IRS data, of a total of 716 returns for firms in this category, the average firm had gross receipts of approximately \$17.5 million in 2006, of which \$752,000 were net earnings. In addition, the IRS estimated that the average net worth these same firms was approximately \$3.0 million, which translates into a sector-wide average price-to-sales ratio of approximately 0.17.

Since the IRS data includes several firms engaged in manufacturing other materials, and provides a relatively low estimate for average annual revenues and price-to-sales ratio, this analysis adjusts the estimate of business value to account for the site's economic activities. According to Virginia Paving's company materials, the facility produced 546,829 tons of asphalt in 2008, generating an estimated approximately \$43 million in revenues, dramatically outperforming the IRS' average estimate. Applying the IRS' price-to-sales ratio of 0.17 suggests that the business has a value based on this method, of approximately \$7.5 million. However, research into valuation multipliers for similar publicly traded businesses indicated that the price-to-sales ratio could be

⁸ Enterprise value equals the firm's market value plus total debt minus cash and represents the theoretical takeover value of a business

closer to 0.56, which would yield a value of \$24.4 million. Using an enterprise value multiple approach similar to Vulcan above yields a value range of \$23.3 to \$26.9 million depending on the publicly-traded comparable firms used in the calculation.

Covanta Energy from Waste Facility

As previously mentioned, it would not be practical to relocate the Covanta facility prior to 2025, when Covanta's site lease with the Jurisdictions expires. After that time, the City will need to determine how to best dispose of its solid waste, which could include building a transfer station, entering into a contract with the Fairfax facility or another EfW facility for disposal, constructing an alternative waste handling facility, or entering into a long-term contract which may extend Covanta's lease at the present site beyond 2025.

Alternatives to Relocation

Alternatives to handling the waste at the Covanta facility would be to transport the waste a farther distance, to another EfW facility, such as the Covanta facility in Fairfax County (Fairfax facility), or to a transfer station, where the City's and commercial waste haulers would unload the waste into larger transfer vehicles which would then transport the waste outside the City and County to more distant landfills.

Currently, there is no indication that there is sufficient capacity available to guarantee the long-term disposal of all of the waste generated by the City and Arlington at the Fairfax facility. Additionally, even if capacity were available, the City would relinquish control of costs and environmental considerations, if not disposed of within the City, and truck-miles traveled would increase.

The City could also potentially construct a transfer station within the City, if a site were available, and contract out for operation and disposal services. However, the waste generated within the City would not be disposed of in the City, and would have to travel considerably greater distances to its final disposal. This alternative is in direct opposition to the goals of the City's Eco-City Charter. Given that Covanta's site lease entitles them to operate at the present site until 2025, from an environmental standpoint, it would not make sense to dispose of the City's waste outside of the City, while importing waste from outside the City to be handled at the Covanta facility.

Costs of Relocation

The cost for constructing a new EfW facility of comparable size, 975 tons per day (tpd), would be in the \$300 million to \$335 million range, not including the costs for site acquisition, or the soft costs associated with permitting, financing, and environmental review. Demolition of the existing facility and remediation were estimated at an additional \$15 million.

Some salvageable components of the existing facility could be recovered for reuse, such as the newer equipment installed during the air pollution control retrofit. It is possible that the large fans, large pumps and the turbine generators could be refurbished to “like-new” condition as well. The cost under this scenario was estimated to range from \$232 million to \$284 million, although Covanta would add a cost for the risk in reusing the older equipment which might add an additional 10 percent to those numbers. These estimates do also not include the costs for site acquisition, permitting, financing or environmental review.

Costs for Construction of a Transfer Station

Once the land and improvements revert back to the City and County in 2025, no payment will be required to Covanta to shut down the operation. However, if Covanta ceases to operate, the City would need to transport its waste to a transfer station or find another EFW facility to take their garbage. The estimated cost for building a new 500 tpd transfer station in northern Virginia is estimated to be \$9 million ± 10 percent with open top loading. This cost does not include site acquisition or the cost of transfer trailers, since the number required would depend on the distance to the disposal site. Standard open-top rolling transfer trailers, which haul about 30 tons each cost approximately \$65,000 each (a minimum of 20 would be required), and tractors would cost an additional \$250,000 each. Soft costs, as in the other estimates, are not included.

Norfolk Southern Ethanol Transloading

Because Norfolk Southern has recently been involved in litigation with the City of Alexandria, verifying possibilities and opportunities to work with CSX was not possible. However, any alternative involving Norfolk Southern to lease rail or track rights will necessitate additional costs that exceed the current facility’s budgeted expenses.

Potential Discontinuance of Transloading Operation at Current Site

The available land in the Springfield I-95 Industrial Area provides rail access and is closer to the Springfield tank farm. However, certain issues mentioned earlier, particularly the switch to CSX tracks would certainly make relocation difficult from a practical standpoint. Furthermore, the City does not appear to have any legal “levers” to push to regulate the Norfolk Southern’s activities, let alone compel a move to another site. One potential lever that the City might have is its power to up zone the property and increase its value if it were no longer dedicated to rail use, in order to incent Norfolk Southern to dispose of the facility for a financial gain.

If Norfolk Southern were to move the facility, there would not be substantial capital costs to move the facility, but there may be costs involved in constructing the rail spur needed. The value of this operation at the current facility is challenging to value, and only Norfolk Southern knows what price it would accept to dispose of the property. Furthermore, ceasing ethanol transloading on the site would not necessarily cease the transport of ethanol along the same rail line.

Redevelopment Options

This chapter details the study findings related to the feasibility of redevelopment and the impacts of redevelopment compared to the current condition.

Summary of Market Potential for Redevelopment

An evaluation of long term market potential compares the long term demand for new development and the future supply of space available for development. From these two trends the potential unmet future demand can be discerned. Because the redevelopment scenario envisions a mixed-use development pattern that takes fuller advantage of the existing Metro station, the market analysis focuses on residential and office development. Retail is also considered at a neighborhood-serving scale, rather than as a dominant land use that served a wider population, given 1) plans to strengthen the regional retail presence of the Landmark Mall area through the recent Landmark/Van Dorn Corridor Plan, and 2) the greater suitability of office and residential as the predominant forms of transit-oriented development. The market analysis, described in fuller detail in the report found in Appendix D, defined the market area as the Northern Virginia jurisdictions of the City of Alexandria, Arlington County, Fairfax County, the City of Fairfax, and the City of Falls Church.

Although there is strong long-term demand projected for Alexandria and the Northern Virginia market area close in to the region's core, there is also a substantial supply of developable land that is available to accommodate demand in the short to mid term. In particular, the City of Alexandria has successfully addressed an identified need for additional office development through its redevelopment planning efforts, providing economic development opportunities and allowing for a more even balance of non-residential and residential tax base in the future.

Demand Projections

The Metropolitan Washington DC area is expected to continue experiencing strong growth over the next 20 to 25 years. The Metropolitan Washington Council of Governments (MWCOC) projects regional growth to add nearly 384,000 jobs and 156,000 households between 2005 and 2030. The market area contains about 30 percent of the Metro DC area's jobs and households (31 percent of its jobs and 29 percent of its households), a share that is expected to remain relatively constant by 2030. The MWCOC projections, based on data provided by all jurisdictions within the metropolitan area, generally follow past trends and are not policy-based projections that take into account any strategies to promote higher density development at the core or around high quality transit infrastructure. Therefore, as inner core jurisdictions, the market area could potentially take a higher share of the region's development if such policy measures were

promoted, and high growth projected at the fringe of the metropolitan was redirected to infill and redevelopment closer in to the region's core.

The City of Alexandria is expected to grow by 36,000 jobs and 21,000 households within the 2005-2030 period. According to these projections the City will also maintain its approximate share of the region's jobs, households and population during this period. Table E-1 in Appendix E provides the current round of MWCOG 2030 growth projections.

Supply Conditions

Although mostly built out, Alexandria can accommodate future growth through planned redevelopment of several areas of the City. Areas of the City carefully planned for redevelopment include the Eisenhower East/Carlyle area, Braddock Road, Potomac Yard, and the nearby Landmark/Van Dorn planning area where a planning effort recently concluded. Although the buildout of these four areas represent the bulk of future development potential in the area, two areas in Fairfax County in close proximity to the study sites have also been re-envisioned as the sites of more intense, transit-oriented development that take advantage of existing Metro stations. The Fairfax Comprehensive Plan incorporates plans for more transit-oriented development at the Huntington and Springfield-Franconia Metro stations. An inventory of the development envelope remaining in these five areas is found in Table E-13 in Appendix E. The total proposed development envelope that can be built out in these five areas allows for flexibility in the uses that can be built, and therefore the total buildout is represented as a range.

- Residential: a total of *8,500 to 14,000 new units of housing* upon buildout.
- Office: *6 to 11 million square feet* of new office development upon buildout.
- Retail: up to an *additional 652,000 square feet* of new retail development upon buildout.

Market Potential of Study Sites

If the study sites were appropriately rezoned and available for mixed-use redevelopment, they would be competing with major planned redevelopment sites in Alexandria and nearby areas of Fairfax County. Any developer delivering new development at the study sites would potentially be facing competition from similar types of residential, office, and retail space in nearby locations that would represent alternate choices for households and businesses seeking new space. These competing development sites generally are more "ripe" for redevelopment than the study sites for various reasons, including 1) their readiness for redevelopment given existing approvals, and 2) their attractiveness as residential and commercial locations given their location and fit within an existing fabric of adjacent uses. All sites have Metro access with the exception of Potomac Yard, where a new Metro station on the existing blue/yellow line that runs through the site is being pursued.

Given the future inventory of planned redevelopment:

- **Currently there is no immediate market pressure for redevelopment of the study sites.** The development pipeline represented by the existing development envelope of the five closest major redevelopment sites is substantial enough to take care of any short term development pressure once real estate market conditions improve enough over the current situation to support new construction. While it is possible that redevelopment of the study sites would leapfrog some of the future development envelope that already exists, most or all of these areas could be considered more attractive development options and they have progressed further along in the approvals process.
- **There is stronger support for residential use than office use.** Given long-term growth projections, there is a greater availability of future office supply than residential supply to meet projected long term demand. As a point of comparison, the 5.7 million square feet representing the minimum amount office space in the development envelope would house approximately 22,800 workers, at 250 square feet of office space per worker. If future employment reflects the current split between office and non-office employment, the proposed supply from the developments in the other parts of the Northern Virginia market area would accommodate most or all of the projected employment growth for the City of Alexandria between 2005 and 2030. On the other hand, the minimum 5,400 new housing units in the planned development envelope represents only one quarter of Alexandria's projected new households between the same period.

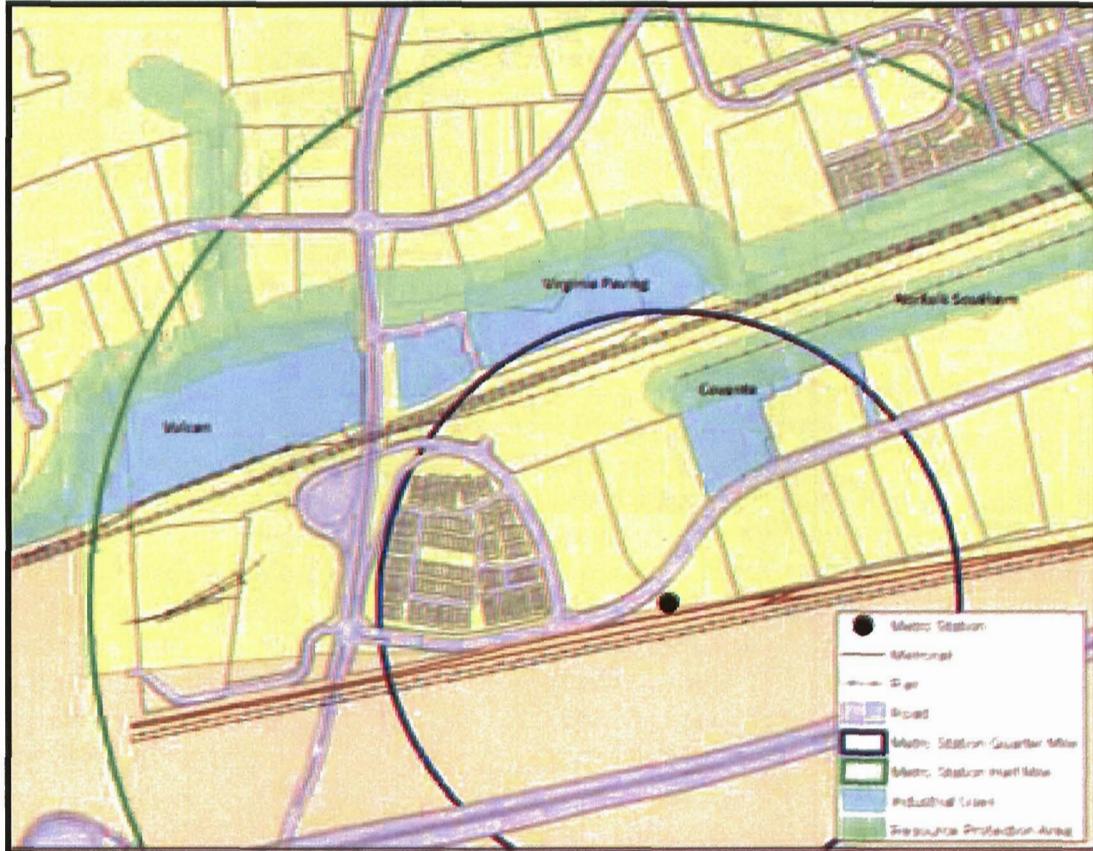
Site Conditions Impacting Redevelopment

The redevelopment of the study sites must also acknowledge site conditions that influence their development potential. A preliminary analysis identifies the following features. Figure 7 depicts the parcels, rail and road network found in and around the study sites as derived from the City's geographic information systems (GIS) database.

Access and Connectivity

As a whole, the site is impaired by the lack of direct access to the Metro station as well as the limited opportunity for connecting new roads in a grid pattern to make a more porous circulation network that benefits pedestrians and vehicles. The freight rail line bisects the site and necessitates the use of bridges to cross the line with a roadway network in order to eliminate grade crossings. South Van Dorn Street currently bridges over the freight rail line, providing limited road frontage for retail on the Virginia Paving and Vulcan Materials sites, and allowing a road connection to the site's interior only at the northern end of the parcels, where Courtney Street now exists.

Figure 7: Parcels, Road Network and Physical Characteristics of the Study Sites



Source: City of Alexandria, 2009; ESRI; BAE, 2009.

The freight rail is part of a regional network that carries goods through the area as well as to the study sites and nearby destinations. It cannot be removed, nor will redevelopment of the study sites eliminate the transmission of industrial goods (including ethanol) through the area.

Due to this street pattern, most of the Virginia Paving and Vulcan Materials sites are more than a one half mile walking distance from the Van Dorn Metro on roads that are not welcoming for walking. Therefore, the potential for a true transit-oriented development pattern on these sites is minimized without more direct connection to the Metro. As a result these sites relate more to the development pattern and transit opportunities of the Landmark-Van Dorn Corridor area, which will be served by dedicated transit, along South Van Dorn.

Parcel Boundaries

Figure 7 illuminates constraints related to the dimensions and configuration of the Covanta facility and the site of ethanol transloading operations. In this figure, the parcels comprising the four existing uses are shaded in blue. The ethanol transloading takes place on a site that is not a delineated parcel, but rather on a portion of the freight rail right-of-way that extends through Alexandria and beyond. To be redeveloped, this land would need to be subdivided from the rail property, although the feasibility of this action and legal process required to do so is beyond the scope of this study. Norfolk Southern owns a parcel of land to the east of the Covanta facility that could be included in a future redevelopment scenario. However, this property is less than 100 feet deep, immediately adjacent to the rail line and without road access.

Figure 7 also depicts the irregular dimensions of the Covanta facility property. The property surrounds the current Alexandria Police Department indoor firing range, proposed to be site of a new fire station serving the west end of Alexandria. The eastern parcel comprising the Covanta facility sits to the north and east of the City property, forming a sliver of land that has limited use for development beyond roadway access. The northern portion of the Covanta property, and the parcel owned by Norfolk Southern, vary in depth from approximately 60 to 97 feet⁹. There is a large amount of property adjacent to both parcels that is a rail right-of-way, including the rail yard. Extending 50 feet back from the active rail line, depths range from approximately 221 feet to 252 feet.

Resource Protection Areas and Flooding Risk

Redevelopment of any of the study sites must also address the existing Resource Protection Areas (RPAs) and 100-year flood plains found on portions of each site. As depicted by the green shaded area in Figure 8, RPAs are found on all four properties. The RPA provides significant constraints on development. If the land is undeveloped (bare of impervious surface), it must remain undeveloped and function as a buffer to the adjacent perennial stream. If the land is already developed, there are some "grandfathered" rights of the existing impervious surface which might be explored. If the land is replatted, all constraints within the Chesapeake Bay regulations must be honored (impervious surface within the RPA only under specifically defined conditions).

One RPA is connected to Backlick Run, which forms the northern boundary of the Vulcan Materials and Virginia Paving properties, and an unnamed stream has also been identified to the south of the tracks that covers all of the Norfolk Southern parcel and the northern edge of the Covanta property.

⁹ Measurements are based on information found in the city's GIS, not from a survey.

Much of the Virginia Paving property, and a small portion of the Vulcan Materials property is in a 100 year flood plain. Delineation of the flood plain on FEMA maps is preliminary, and has not been confirmed, but appears to cover about half of the Virginia Paving site. Structures, including garages, cannot be built in the 100 year flood plain without mitigation measures that remove the flood hazard to property and life safety.

Preliminary Site Feasibility Conclusions

A preliminary analysis of site conditions yields several findings relevant to the study sites.

- The configuration of the Metro station and the freight rail line around the study sites will make transit-oriented development challenging. Full implementation of a transit-oriented development (TOD) on the study sites will require that both the Covanta facility and the Norfolk Southern ethanol transloading site be available for redevelopment and connected to the northern properties for pedestrian and vehicle access to the Metro. Unfortunately, both the Covanta facility and the ethanol transloading operation face the strongest practical impediments to redevelopment in the foreseeable future due to existing financial and legal commitments to Covanta, the reliance on the EfW operation to handle the City's solid waste, and the City's lack of authority to require a move by Norfolk Southern.
- Redevelopment of the southern study sites will be difficult if either operation (the Covanta or the transloading facility) remains. The size, configuration and access issues of the study sites south of the freight rail preclude the redevelopment of one of the sites while the other remains.

Redevelopment Alternatives

Comparison of the benefits, costs and impacts of redevelopment to the conditions presented by the existing industrial uses requires the creation of a potential future development scenario reflecting what might be built on the study sites if they were to redevelop. The redevelopment scenario is based on an understanding of long-term market potential for residential and commercial space, as well as the physical characteristics of the study sites that will impact their redevelopment. Contained in the redevelopment scenario is a baseline development program and three alternate development programs that allow for the analysis of varying redevelopment conditions. These four alternate programs are evaluated against the existing industrial use conditions, defined as the industrial retention or status quo scenario.

The redevelopment scenario is not intended to precisely predict the future, or suggest the most appropriate use of the site prior to further planning efforts. Rather, it illuminates contrasting economic and environmental impacts of potential redevelopment compared to the retention of

heavy industrial uses. The redevelopment scenario is, of course, a hypothetical picture of future development. To create the scenario and perform the comparative analysis of current conditions to redevelopment conditions, assumptions need to be made about a future mixed-use development program and about the disposition of the four industrial operations currently existing in the area. In making assumptions, it is important to note that future conditions such as changes in business operations, changes in market conditions, the availability of suitable industrial land, and the available methods of solid waste disposal are difficult to predict in a longer view.

A baseline alternative, or Alternative A, reflects the type of development considered most likely to occur given market potential. Three alternate scenarios (Alternatives B, C, and D), based on Alternative A, consider possible variations suggested by site conditions as well as the interest in more fully utilizing the Metro station.

Alternative A: Baseline Alternative

Alternative A has the following characteristics:

- **Development area:** All four existing uses will eventually develop under this alternative. The size of the sites, and the estimated amount of developable land, is found in Table 9. A significant portion of the Virginia Paving site is left as open space due to development constraints. The parcel owned by Norfolk Southern and the northern edge of the Covanta site are also unavailable for development due to RPA restrictions.
- **Development Program:** The northern study sites are developed primarily with market rate townhouse and low-rise multifamily housing similar to other development in the area. This development pattern is estimated to produce a development intensity of 50 dwelling units/acre gross density for the portion of the sites that are developable. The portion of the study area south of the freight rail line will be commercial development totaling 1.1 million square feet of office space. The development program will include neighborhood serving retail throughout the development area.
- **Parking:** All parking will be underground and will be provided according to current City standards.
- **Timing:** Build out of the redevelopment area will take place over a 15-20 year period, with the Covanta facility redeveloping near the end of the buildout period due to legal constraints on redevelopment prior to 2025. To facilitate development of the other uses prior to the demolition of the Covanta facility, aesthetic enhancements to the facility will be made at the start of redevelopment period.

- **Relocation of existing businesses:** Vulcan Materials, Virginia Paving and the ethanol transloading operation are assumed to relocate to the closest available land suitable for industrial use that is of sufficient size and has rail access. The number and destination of trips from industrial users will be assumed to be the same as they are at present.
- **Solid waste disposal:** The City's waste needs must be addressed. Under this alternative it is assumed that solid waste currently going to the Covanta facility will be taken to transfer stations.

Alternative B: Open Space Alternative

This alternative proposes the incorporation of additional open space, beyond what is left undeveloped due to site constraints posed by flooding and waterway protection. Given the constraints on the development of the Virginia Paving property, this alternative assumes that the City purchases the entire property from Virginia Paving and develops the land as a park. All other assumptions are the same as Alternative A.

Alternative C: Retention of Covanta and Ethanol Transloading Facilities

Alternative C considers the difficulties described in redeveloping the portion of the study sites on the south side of the freight rail line. This alternative addresses the significant investment in the Covanta facility, as well as the diminished development opportunity of the rail property separate from Covanta due to the rail property size, accessibility and its location immediately adjacent to the Covanta facility. It assumes the retention of both the Covanta facility and the Norfolk Southern property (rail spur) at their current locations. Virginia Paving and Vulcan are assumed to develop as mentioned in Alternative A.

Alternative D: Transit-Oriented Development Alternative

Alternative D considers the potential for a transit-oriented development if additional improvements are made to the site. This alternative maintains the same assumptions as Alternative A, with the following modifications:

- **Infrastructure:** The cost of a multimodal bridge over rail line is included, one of several connections over the freight rail line suggested in the Landmark/Van Dorn Corridor Plan.
- **TOD premium:** Revenues from rents and sales values closest to the Metro Station will include a premium for enhanced transit access.
- **Development program:** The development program and density will change to reflect enhanced connectivity and access to the Metro. On the study sites on the south side of the

freight rail tracks, residential development will replace a portion of the office development, reflecting the greater attractiveness of this area for residential use when closely connected to the metro and the open space found on the undeveloped portion of the Virginia Paving Site. This residential development will be mid-rise development of up to seven stories, at an assumed density of 90 dwelling units per acre for the developable portions of the site. The study site parcels north of the freight rail tracks consists of townhouses, slightly reducing the assumed density to 43 dwelling units per acre.

- **Parking:** Parking ratios near the Metro station will be reduced to standards appropriate for close proximity to transit.

Development Program Matrix

The development assumptions described above yield the site areas and densities for each redevelopment alternative organized in Table 9. The redevelopment alternatives use three types of residential structures - townhouses, low rise multifamily and mid rise multifamily structures – and a mid-rise office building as building blocks that will fit in with existing development patterns of the area and the types of development envisioned for the Landmark-Van Dorn area.

It is important to note that floor area ratios (FAR) provided in Table 9 measure the achieved density of each alternative given the building types and development assumptions used for this analysis. High rise structures would allow development to achieve a higher FAR and mitigate the density impacts of the high proportion of land with development constraints. Mitigation measures that allow for development of flood-prone land would also increase FAR. The allowed (as opposed to achieved) FAR, along with height limits and other development restrictions, should be determined through a planning process independent of the present analysis.

Table 9: Density Calculations for Each Alternative

	Virginia			Norfolk	Total
	Vulcan	Paving	Covanta	Southern	
Site Characteristics					
Site Area, Sq.Ft.	770,716	491,315	273,434	619,260	2,154,725
Site Area, Acres	17.7	11.3	6.3	14.2	49.5
RPA, Sq. Ft.	285,855	171,857	107,346	395,602	960,660
Estimated Flood Plain Coverage Outside RPA	5%	50%	0%	0%	
Developable Site Area, Sq. Ft.	460,618	159,729	166,088	223,658	1,010,093
Developable Site Area, Acres	10.6	3.7	3.8	5.1	23.2
Percent of Site Undevelopable	40%	67%	39%	64%	53%
Alternative A					
Residential Units	530	184	0	0	714
Gross Residential Density (du/acre)	30	16	0	0	
Residential Density - Developable Site Area (du/acre)	50	50	0	0	
FAR (Residential & Commercial Gross)	0.8	0.5	1.9	1.0	0.9
FAR (Residential & Commercial Developable Area)	1.4	1.5	3.1	2.7	2.0
Alternative B					
Residential Units	530	0	0	0	530
Gross Residential Density (du/acre)	30	0	0	0	
Residential Density - Developable Site Area (du/acre)	50	0	0	0	
FAR (Residential & Commercial Gross)	0.8	0	1.9	1.0	0.8
FAR (Residential & Commercial Developable Area)	1.4	0	3.1	2.7	1.7
Alternative C					
Residential Units	530	184	0	0	714
Gross Residential Density (du/acre)	30	16	0	0	
Residential Density - Developable Site Area (du/acre)	50	50	0	0	
FAR (Residential & Commercial Gross)	0.8	0.5	0	0	0.4
FAR (Residential & Commercial Developable Area)	1.4	1.5	0	0	0.9
Alternative D					
Residential Units	449	156	206	347	1,158
Gross Residential Density (du/acre)	25	14	33	24	
Residential Density - Developable Site Area (du/acre)	43	43	54	68	
FAR (Residential & Commercial Gross)	0.8	0.4	1.7	1.2	0.9
FAR (Residential & Commercial Developable Area)	1.3	1.3	2.9	3.2	2.0
Source: City of Alexandria, 2009; BAE, 2009.					

Economic and Environmental Analysis of Alternatives

Each of the redevelopment scenarios mentioned are compared to the “status quo” scenario presented by the existing industrial uses. This “status quo” scenario assumes that no further improvements in air quality, transportation, or aesthetics are made to the existing uses.

Financial Analysis of Redevelopment Alternatives

The purpose of the financial analysis is to determine if the redevelopment alternatives make sense from the perspective of a private developer/landowner engaging in the real estate development process. Ultimately, if the alternatives do not prove to be financially feasible (i.e., the costs associated with development outweigh the revenues from sales and leasing of property), redevelopment of the land by private developers is highly unlikely to occur without subsidies or other incentives. The analysis helps identify which alternative, if any, yields the best financial performance, and would therefore have the highest likelihood of occurring in the future. The analysis also helps compare the value of each alternative to other alternatives, as well as the magnitude of value change for each individual parcel across alternatives. Finally, for those redevelopment alternatives that prove to be financially feasible, the positive incremental change in land values derived from the financial analysis can be compared to the additional costs associated with redevelopment, including the relocation of existing operations on the parcels.

The financial analysis calculates the residual land value for the individual parcels under each alternative, which is what the land becomes worth given how much and what type of new development is constructed on it. In essence, the residual land value represents the value “left over” after building costs and developer profit are subtracted from project revenues, and describes the most a developer could afford to pay for the land to build the project profitably.

Highlights of the analysis are described below. Appendix F provides much greater detail on methodology, assumptions, and detailed findings of each alternative.

Key Findings

Table 10 below compares the results of the residual land value analysis to estimated relocation and business cessation costs.

Table 10: Summary of Financial Analysis by Existing Use

	<u>Vulcan</u>	<u>Virginia Paving</u>	<u>Covanta</u>	<u>Norfolk Southern</u>
Estimated Relocation Costs	\$16 million	\$10.5-\$14.5 million	Minimum \$300 million	N/A
Estimated Cessation Costs	\$15-\$17 million	\$23-\$27 million	Minimum \$11.5 million (after 2025)	N/A
Change in Residual Land Value from Current Use (a)				
Alternative A	\$10.2 million	(\$1.2 million)	(\$24.5 million)	\$13.1 million
Alternative B	\$10.2 million	No Change	(\$24.3 million)	\$13.1 million
Alternative C	\$10.2 million	(\$1.2 million)	No Change	No Change
Alternative D	\$22 million	\$5.3 million	(\$24.3 million)	\$17.9 million
Does Change in Land Value Support Relocation or Business Cessation Costs?				
	Possibly Alternative D	No	No	Unknown
Notes:				
(a) Relocation/business cessation estimates and residual land calculations are based on assumptions and methodology described in the report and in Appendices D and F.				
Source: BAE, 2009.				

Three additional costs to consider are outside of the land value calculation for each use.

- **Development of a new park as part of Alternative B.** Improvement of the existing land for an urban park is estimated to cost approximately \$30 per square foot, based on recent park construction costs in Alexandria. This per square foot cost estimate yields a total park construction cost of over **\$14.7 million**.

- **Construction of one multi-modal bridge as part of Alternative D.** A bridge over the freight rail tracks is necessary for the pedestrian and vehicular connectivity required to create a viable transit-oriented development as envisioned in Alternative D. The estimated cost of this improvement is **\$25 million**.
- **Aesthetic enhancements to the Covanta A/A facility.** Other cities in the U.S. and Europe have EfW plants incorporated into their urban fabric. Modifications to the exterior of the Covanta A/A facility could further enhance the attractiveness of the area around the plant. The estimated cost of this improvement is **\$7.5 million**.

None of the alternatives presented demonstrate an increase in residual land value that can support the full costs of redevelopment, including likely costs to relocate or buy out the existing businesses. Only in Alternatives C and D do land values resulting from redevelopment exceed existing land values. Additionally, no alternative has an outcome in which all four parcels have residual land values that are greater than their current values.

This analysis demonstrates how financial outcomes vary across the four parcels.

- Of the four parcels studied, Vulcan has the highest current potential for redevelopment, given that there are minimal known development constraints on the land, as well as minimal remediation and demolition costs.
- The financial viability of redevelopment at Virginia Paving is hindered by the significant development constraints assumed for this analysis, constraints which would need to be overcome in order to improve its redevelopment potential.
- The current Covanta facility has significant value, a hurdle that gives this property the poorest financial performance and negatively impacts the viability of the three alternatives (A, B and D) where the facility is redeveloped.
- If development on the Norfolk Southern property is feasible as assumed in this analysis, the land value enhancement in redevelopment might be one of the only “levers” that the City has in encouraging relocation of this facility. However, the costs of Norfolk Southern’s relocation of this facility are unknown, as is the price at which Norfolk Southern would find it worthwhile to relocate.

Under any redevelopment circumstances, it is unlikely that all four uses would have incremental land values from redevelopment that would support all required redevelopment costs. Therefore, for public subsidy in redevelopment to be minimized, key stakeholders involved in the

redevelopment would need to create potentially complex deal/transaction structures in which the different landowners share in the proceeds of the redevelopment.

It is important to note that the financial analysis is preliminary and that a developer considering development on the site(s) would commission a detailed land plan which would allow for more refined financial feasibility analysis. However, this analysis provides order-of-magnitude findings and conclusions that help determine if the redevelopment alternatives are worth further consideration and analysis.

Costs and Benefits of Redevelopment

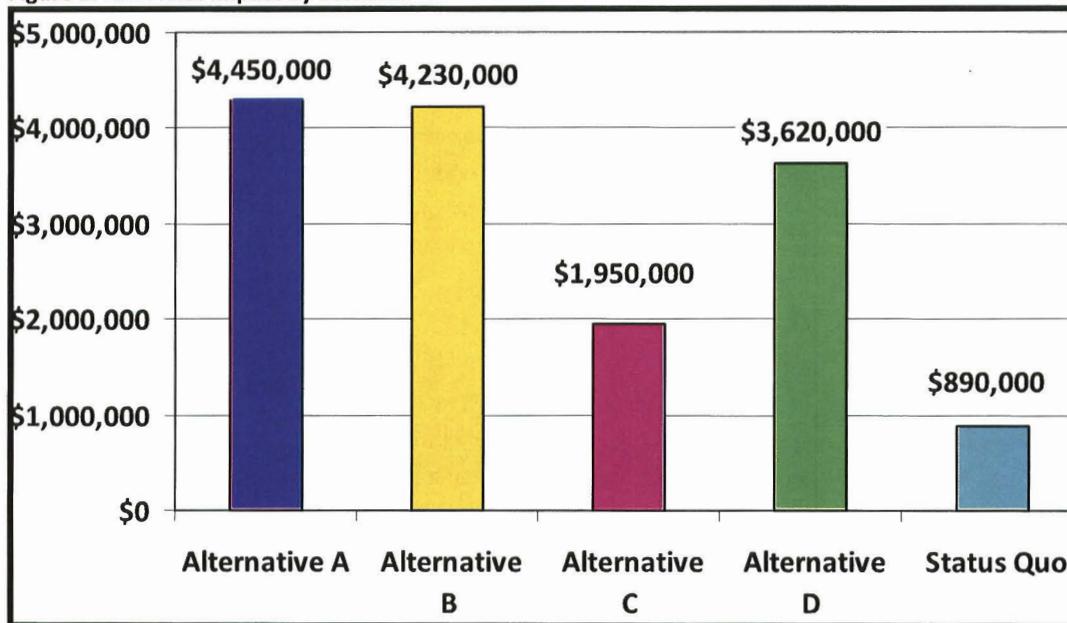
Fiscal Impact Analysis

The fiscal impact analysis calculates the changes to the City of Alexandria's revenues and costs stemming from the defined redevelopment alternatives. It serves to shed light on how the defined alternatives' changes to the residential and business population on the parcels would impact the City's fiscal performance. The analysis provides one more data point in the redevelopment decision-making process and answers the question as to whether any of the redevelopment alternatives are good for the City from a fiscal perspective.

The four redevelopment alternatives all yield strong positive annual net fiscal impacts. This positive net fiscal impact is primarily a result of the increase in the Real Property Tax category, because each scenario results in the delivery of hundreds of new residential units as well as large amounts of taxable commercial property. Although the City receives some property tax revenue from the existing uses, it is a small fraction of the amount that would be received under the redevelopment alternatives. The net fiscal impact by scenario is detailed in Figure 8.

Alternatives A and B yield the highest positive annual fiscal impact (\$4.5 and \$4.2 million per year) because these programs deliver the most office space, which is the most fiscally positive land use. Alternative B is slightly lower than Alternative A because less residential development occurs, and the park space delivered on the Virginia Paving parcel requires additional City costs to maintain and operate. Although Alternative D has the highest amount of residential units, it results in a lower fiscal impact (\$3.6 million per year) relative to A and C due to the drop in office square footage from 1.1 million square feet to 600,000. Alternative C results in the lowest fiscal impact of the four scenarios because the exclusion of Covanta and Norfolk Southern result in the smallest development program. Although it yields the lowest annual fiscal impact of \$1.95 million per year, it is still more than twice that of the existing uses, which result in \$890,000 in annual net fiscal impact.

Figure 8: Net Fiscal Impact by Scenario



Source: BAE, 2009.

In each alternative, the Real Property Tax category represents two thirds or more of the revenue that redevelopment creates for the City. Property tax revenue from redevelopment ranges from \$4.62 million to \$7.65 million, compared to about \$515,000 from the existing uses. The costs associated with providing schools and public safety (fire and police), combine to represent over half of redevelopment’s total cost to the City in each alternative.

The details of the fiscal cost assumptions and calculations can be found in Appendix G.

Projected Air Quality Under Alternative Development Scenarios

Redevelopment will add emissions associated with vehicle traffic from new development, as summarized in Table 11. New traffic associated with Alternatives A and B generated roughly two to three times more air pollution than Alternatives C and D, depending on the pollutant. Under Alternative C, there is no new office development or associated traffic. Alternative D is the transit-oriented development alternative, which generates less traffic than Alternatives A and B.

Table 11: Emissions Estimates for Vehicle Traffic Associated with Redevelopment Alternatives

Alternative	Emissions (tons per yr)								
	CO	NOx	PM-10	PM-2.5	SO2	VOC	Benzene	MTBE	CO2
A - Residential	16	3.4	1.2	0.1	0	1.8	0.2	0.2	4,548
A - Office	38	8.4	2.8	0.2	0.1	4.3	0.4	0.5	11,020
A - Retail	6.7	1.5	0.5	0	0	0.8	0.1	0.1	1,954
	60	13	4.4	0.3	0.1	6.9	0.7	0.8	17,522
B - Residential	12	2.6	0.9	0.1	0	1.3	0.1	0.2	3,376
B - Office	38	8.4	2.8	0.2	0.1	4.3	0.4	0.5	11,020
B - Retail	6.7	1.5	0.5	0	0	0.8	0.1	0.1	1,954
	56	12	4.1	0.3	0.1	6.5	0.7	0.7	16,350
C - Residential	16	3.4	1.2	0.1	0	1.8	0.2	0.2	4,548
C - Office	0	0	0	0	0	0	-	-	-
C - Retail	5.4	1.2	0.4	0	0	0.6	0.1	0.1	1,563
	21	4.6	1.5	0.1	0	2.4	0.2	0.3	6,111
D - Residential	12	2.7	0.9	0.1	0	1.4	0.1	0.2	3,570
D - Office	10	2.3	0.8	0.1	0	1.2	0.1	0.1	3,006
D - Retail	3.4	0.7	0.2	0	0	0.4	0	0	978
	26	5.7	1.9	0.1	0.1	3	0.3	0.3	7,554

Source: MACTEC, 2009.

Note: The standard USEPA emission factor models were used to predict gram per mile emissions from vehicle traffic. The MOBILE6.2 model was used to predict emissions factors for vehicle exhaust, tire and break wear, and evaporative emissions. Inputs to the MOBILE6.2 model were obtained from the Metropolitan Washington Council of Governments. The emission factor equation given in AP-42 Section 13.2.1 (Paved Roads) was used for predicting particulate emissions of re-entrained road dust.

Changes in Criteria Air Pollutant Emissions

Table 12 summarizes the net change in emissions associated with the study sites. Alternatives A, B, and D show fairly similar net decreases in emissions due to the relocation of all four industrial sources. Alternative C shows less of a reduction since Covanta will continue to operate at its current location under this alternative. Exhibits 12 to 15 in the air quality report (Appendix C) provide fuller detail of the net change in criteria air pollutant emissions for each alternative.

Table 12: Net Change in Emissions from Stationary Sources and Vehicle Traffic, by Alternative for the Study Sites

	Emissions (tons/yr)					
	CO	NOx	PM10	PM2.5	SO2	VOC
Alternative A	-16	-579	-7.6	-7.6	-18	0.6
Alternative B	-20	-579	-7.9	-7.7	-18	0.1
Alternative C	7.3	-11	-6.4	-4.8	-5.1	-1.6
Alternative D	-50	-586	-10.2	-7.8	-18	-3.4

Source: MACTEC, 2009.

It is important to note that source and vehicle emissions will not be eliminated, but rather will be relocated, given the relocation assumptions used for this analysis. Beyond the immediate Eisenhower West area, emissions from industrial operations will increase in the Springfield area due to the relocation of the Virginia Paving, Vulcan Materials, and Norfolk Southern. Emissions from the truck traffic associated with these facilities will remain the same since they will be serving the same customer base from facilities only four miles from their current locations.

Since a suitable alternative disposing of solid waste at Covanta has not been identified, it is not possible to quantify the regional change in emissions from alternative waste disposal options. If the solid waste is transferred to another energy from waste facility, there would be no net change from the waste combustion process. However, there would be increased emissions from the truck traffic associated with the transfer the solid waste to another facility, perhaps as far away as 120 miles. This emission increase from truck traffic will be about 88 tons per year of NOx, 15 tons per year of PM2.5, and 16,000 tons per year of CO2.

It was beyond the scope of this study to perform a quantitative air quality modeling analysis or risk assessment of each alternative. Based upon the estimated changes in emissions under each alternative, a qualitative assessment of changes in air quality was made with the following conclusions:

- **Alternative A.** Since all four industrial facilities will be relocated outside of the Eisenhower West area, emissions in the area will be reduced and air quality in the immediate area will show a small improvement. For example, recent air quality modeling of the Virginia Paving facility shows that its annual impact on PM10 air quality in Cameron Station is less than 1 $\mu\text{g}/\text{m}^3$. In comparison, the annual PM10 concentration measured in Cameron Station during 2008 was 19 $\mu\text{g}/\text{m}^3$ and the NAAQS was 50 $\mu\text{g}/\text{m}^3$. Relocating the Virginia Paving facility will improve PM10 air quality in Cameron Station by about 5 percent. Similar improvements in

PM 2.5 air quality are also expected. Since the emissions from Covanta are exhausted through a 210 foot stack, its emissions are widely dispersed and relocating Covanta would result in a very small improvement in PM10 in the Eisenhower West area. There would also be increased emissions from the truck traffic associated with the transfer the solid waste to another facility, perhaps as far away as 120 miles. The emissions associated with this new truck traffic would slightly degrade air quality in the northern Virginia region. Finally, the addition of new emissions from vehicle traffic associated with new residential, retail, and office space would result in a small degradation of air quality in the Eisenhower West area.

- **Alternative B.** This alternative is similar to Alternative A, except that the Virginia Paving site would be redeveloped as a park. The air quality impacts of Alternative B are very similar to Alternative A.
- **Alternative C.** Since Covanta remains at its current site under this alternative, the air quality improvements in the Eisenhower West area will not be as noticeable as under the other alternatives
- **Alternative D.** This alternative is similar to Alternative A, except the transit-oriented redevelopment will occur which will result in less new vehicle traffic in the area. Since emissions from vehicle traffic associated with new development will be less, this Alternative is the best in terms of air quality impacts in the immediate Eisenhower West area.

Other Impacts

Other consequences of redevelopment are important to note briefly, and include the following.

- **Cost of goods and services to the City of Alexandria.** The fiscal impacts above do not measure the change in cost of providing services to the City if the industrial uses are relocated. One measurable cost is the need to provide a solid waste disposal infrastructure that replaces the EfW facility. Construction of a transfer facility has been estimated at over \$10 million. The cost to provide solid waste disposal can fluctuate on many factors besides the disposal method used, but any change in service costs would be passed on directly to waste generators in collection fees. The disposition of Vulcan Materials and Virginia Paving could influence the cost of providing asphalt and aggregate to Alexandria purchasers, including the City of Alexandria.
- **Quality of Life and Property Values.** The impact of the area's redevelopment on property values or the marketability of new development in the Landmark/Van Dorn area will be difficult to correlate with any precision. However, several quality of life impacts which may impact property values and marketability will likely result. First, the area will benefit from the

provision of more retail amenities, although the retail built and redeveloped according to the Landmark/Van Dorn plan will dwarf the maximum 50,000 square feet of retail envisioned by the redevelopment scenario. Second, the aesthetics of the area will improve. In particular, a TOD development utilizing the entire Study Area will provide a more aesthetic gateway from the Metro station to the neighborhoods around it. Third, there will be opportunities for greater connectivity redevelopment allows the construction of a new vehicle and pedestrian connection over the freight rail tracks. Fourth, as discussed in connection with air quality impacts, redevelopment will produce more traffic from the greater intensity of land use, without necessarily reducing the truck traffic associated with the existing uses.

- **Sustainability.** Sustainability impacts can be measured in several ways. The accommodation of more development in a smaller footprint will contribute to more sustainable growth patterns in the region, and may reduce the growth in the total vehicle miles (VMT) traveled in the metropolitan area. Redevelopment will also result in the cleanup of any contamination on the subject site, although the preliminary investigation performed to develop order-of-magnitude costs revealed relatively minor cleanup. Perhaps the most important impact on sustainability will result from the potential redevelopment of the Covanta facility. Removal of the EfW facility on which both Alexandria and Arlington currently rely will require a new disposal method that will discard the significant investment in the existing solid waste system, which minimizes the waste stream.

Moving Forward

Based on the analysis and findings presented in the preceding chapters, the key points that follow highlight and reiterate the overall themes of the study findings. The study findings provide a foundation that the City can use to frame future action, policy, and land use decision-making. The study concludes with a recommended course of action suggested by the findings, for further consideration by the City.

Overall Findings

Market pressure supporting short term redevelopment is weak.

The study analyzed the growth potential of Alexandria and Northern Virginia, and compared it to the supply of land that is available and planned for new development in and around the City. There is more than adequate land available to meet the development pressure that will exist when economic conditions improve and for the next two decades. Land available for development has many attributes (such as its location) that generally makes it more attractive for development than the Van Dorn area. Moreover, the City has made a significant investment in the planning and implementation of redevelopment in these emerging areas, such as Potomac Yards and Landmark/Van Dorn.

The study sites do not present a strong opportunity for transit-oriented development (TOD) in the immediate future for both market reasons and physical infrastructure reasons. Physical barriers that impede high quality TOD include the physical barrier created by the freight rail line (without construction of strong vehicular and pedestrian connections as mitigation) and the large surface parking lot that services the Metrorail station.

Significant constraints to redevelopment exist.

The study finds several constraints that will pose a considerable hurdle to redevelopment. These hurdles would need to be overcome for redevelopment to occur.

- Their present locations provide the existing uses with benefits that that would not be easily relocated, and the infrastructure available to the heavy industrial uses cannot be easily replicated elsewhere. As long as these facilities are economically viable, they have little incentive to leave and few if any relocation options.
- In some instances, the City has limited legal and practical options for guiding or regulating the redevelopment of the area, particularly with respect to Norfolk Southern and Covanta.

- Other challenges found by the study include the development constraints posed by environmentally sensitive land (resource protection areas [RPAs] and flood-prone land), limited options for access to the development sites, and the need to subdivide the land used for ethanol transloading from the rail right-of-way.

All four uses provide goods and services to the City, its residents and businesses, directly or indirectly. However, the unique circumstances of Covanta need to be considered most carefully in the area's potential redevelopment. Contractual commitments to Covanta, joint decision-making with Arlington County, the significant public investment in the operation, the lack of attractive alternatives to the City's waste disposal needs, and facility's compatibility with the City's sustainability objectives present what could be insurmountable hurdles to the redevelopment of this use, especially before 2025 when the existing ground lease with Covanta expires.

If the hurdles facing development of all or a portion of the sites are overcome, there could be fiscal and economic benefits to redevelopment.

The study findings suggest that redevelopment over the long-term does provide benefits to the City. Benefits include increased net revenues to the City from an expanded tax base. The anticipated fiscal and economic benefits will accrue if redevelopment brings "net new" jobs and households, rather than merely redirecting new development to the study sites that otherwise would have occurred in other parts of the City planned for growth. Economic and fiscal benefits need to be weighed against potential traffic and air quality impacts. The mobile and stationary source emissions associated with the industrial uses will be removed from the immediate area, but not necessarily eliminated if the uses relocate. Any local benefit from the removal of industrial sources of emissions will be offset by the automobile use that will result from mixed-use redevelopment.

Even in the long term, comprehensive redevelopment would likely require substantial City involvement.

The financial analysis suggests that even when market demand is more favorable for redevelopment in the long term, public subsidy will be required to cover some infrastructure and possible business relocation/cessation costs in order to attract private investment. It is important to note that the financial analysis is preliminary, and that a more detailed analysis undertaken with a specific development proposal in mind could find ways to minimize the subsidy required. Also, the fiscal benefits to the City that would accrue with redevelopment could be used to as a source of funds to cover all or a part of the subsidy required. Nevertheless, the City would need to completely reconsider its waste disposal options if the Covanta facility were to be redeveloped, and understand the costs and environmental impacts involved with those options.

For Further Consideration

In the short term, the study's findings suggest policies by the City that acknowledge the significant hurdles the area's redevelopment in the short term. In planning for the longer term, an issue central to this study needs to be addressed: do the benefits of redevelopment have greater value to the City than the maintenance of an industrial zone? Redevelopment, at the right time, could bring long-term financial benefits to the City with more intensive use of the land and better use of an underutilized asset, the Van Dorn Metrorail stop. However, the freight rail line and established rail spurs are also a significant asset to the area, part of the well established industrial infrastructure of the area that has been in use for decades. Similarly, the Covanta Energy from Waste (EfW) facility also represents a resource in which the City (and Arlington County) have placed significant investment, a resource that provides a vital municipal service. Furthermore, this existing infrastructure is expected to have a useful life for many years to come: the EfW facility is expected to have a useful life past the contractual relationship with Covanta that terminates in 2025, and the freight rail line will continue to be in demand as long as it remains an effective means of delivering goods.

It is important to reiterate that the study findings do not support any one answer to this key question and the study recommends no specific course of action pertaining to land use. Instead, the study provides information that can be used by City officials, in collaboration with the City's residents and business community, to weigh the value of the status quo versus redevelopment and engage in a more focused discussion of the issues. Given the findings presented, here are two paths that the City and area stakeholders may want to pursue. These paths are not mutually exclusive and can be pursued concurrently.

Improve existing conditions around the study sites and in the Eisenhower West area.

As a multi-departmental work program item, the City will initiate discussions with the industrial landowners to explore improvements to the Eisenhower West industrial area for the benefit of the industrial uses and the surrounding residential neighborhoods. The focus of this effort should be on practical design projects that can be implemented in the short-term to ameliorate some of the existing conflicts which gave rise to this study.

The effort could consider relatively easily implementable actions that improve air quality and aesthetics, including:

- Reducing emissions from truck engines. Installation of diesel particulate filters (DPFs) on all or a subset of trucks associated with each of the four facilities is one option, as is an investigation of cleaner burning fuels such as CNG or biodiesel. Virginia Paving recently

retrofitted some of their on-site trucks and diesel engines that reduced particulate emissions by about 90 percent.

- Continued focus on truck activities associated with the existing uses. This may include investigation of anti-idling education and enforcement and/or re-examination of optimal truck routes.
- Investigation of tree buffers. Planting tree buffers can be effective in sequestering greenhouse gas emissions, and can also be considered as an aesthetic enhancement. There are limited locations where there may be opportunities for additional trees to be planted by the industrial landowners.
- Investigation of street trees. There are limited opportunities for additional tree plantings primarily in areas along Eisenhower Avenue in front of existing light industrial uses.

With respect to the Covanta facility, architectural enhancements which might be considered in the future may include:

- A more modern office space appearance to the casual observer walking down Eisenhower Avenue, and to the neighboring town home residents to the east, south and west of the facility.
- Another enhancement might be a replacement of the cooling tower, would be to replace the existing cooling tower with an air cooled condenser.

It should be noted that a number of energy from waste facilities, particularly in Europe, are located within urban and suburban neighborhoods, where, in general, a greater emphasis has been placed on architectural and aesthetic considerations during the initial design phase. For example, the Isseane waste to energy facility in Paris, which is in an area populated with new commercial office building development and is located 300 yards from a train stop, had the residents and business leaders help to choose the building design. Other facilities, such as the Nordforbraending facility outside of Copenhagen are also located immediately adjacent to residential communities, and are well accepted as necessary infrastructure. Even within the United States, the Hennepin Energy Recovery Center in downtown Minneapolis has been well integrated into an urban environment, with the steam from the facility to be used to heat the Minnesota Twin's new Target Field ballpark adjacent to the facility.

The overall effort could also provide the opportunity to investigate best practices in mitigating industrial/residential land use conflicts undertaken in other communities, and adopt similar innovative practices as appropriate. While these activities may not completely resolve the

legitimate complaints of all residents near the study sites, if this effort can yield some successes, it could then become a model for other neighborhoods in the region and beyond facing similar issues.

A forum for discussing solutions among stakeholders is important, as many actions may require a role from the four businesses, from government, and the residential community working together. Some actions may best be achieved through regulation, including conditions on future Special Use Permits. Voluntary actions might benefit from finding new or creative public funding sources. For example, DPFs could be funded by several available grant programs.

Explore whether rezoning is appropriate through a small area planning process.

A rezoning would allow the private sector to undertake desired redevelopment when conditions are right and can set the stage for the eventual realization of a vision for the area's future. A planning process would be the forum in which the key issues over the area's reuse would be debated, and would endeavor to resolve these issues to the greatest extent possible.

An Eisenhower West corridor or specific plan is currently on the City's work plan for 2011. When the process is initiated, the City and the planning process participants should consider the following, among other issues, both with respect to the four uses studied and the larger Eisenhower West Area.

- **The continued industrial use of the area, in the event that one or more of the existing uses voluntarily cease operation.** Other industrial uses, including green industry, were not evaluated as part of the financial analysis of this study because their financial benefits would be even less sufficient to encourage relocation than more intensive residential and commercial uses. However, these uses could be encouraged by appropriate zoning, if any of the heavy industrial uses studied cease operation in the future and no longer use the land. The examination should encompass the uses that can be attracted to and benefit from the existing rail infrastructure of the area, industry sectors that could contribute to the long term economic development of the City, and strategies for reducing industrial land use conflicts.
- **Conditions under which mixed-use redevelopment should occur.** Shaping the form of mixed-use development through density regulations, height restrictions and other conditions will also define the market conditions that need to be in place to trigger redevelopment interest from the private sector. The planning process should consider the acceptable role for the City in promoting redevelopment and incorporate this understanding into planning objectives. This could include the use of Tax Increment Financing or similar mechanisms for capturing the value of new development to fund public improvements.

- **Promotion of transit-oriented development.** If the future vision for the area surrounding the Van Dorn Metro station is a mixed-use redevelopment, planning guidelines should reinforce TOD. The planning process should consider what strategies could be employed to facilitate appropriate development on the Metro surface parking lot while meeting the parking needs of the station.