

Crystal City/Potomac Yard Corridor Interim Transit Improvement Project

Implementation Strategy

December 2005

1.0 INTRODUCTION

The Crystal City/Potomac Yard Corridor Interim Transit Improvement project is focused on developing an implementation program for interim transit improvements in the corridor running from the Pentagon/Pentagon City and Crystal City in Arlington to Potomac Yard and the Braddock Road Metrorail Station in Alexandria. These improvements will coincide with the development of Potomac Yard and redevelopment in Pentagon City and Crystal City. It is anticipated that this interim plan would precede implementation of higher capacity transit improvements in the corridor.

As a response to the large numbers of new residents and office workers expected in the corridor, Arlington County and the City of Alexandria asked the Virginia Department of Rail and Public Transportation (DRPT) to undertake a transit alternatives analysis (AA) that would explore options to improve transit service. The results of that study were published in 2003. In the two years since the completion of the AA, the pace of development in the corridor has increased. As a result, Arlington County, the City of Alexandria, and DRPT are working together to design an interim service that will serve the corridor until a Build Alternative from the AA can be put in place.

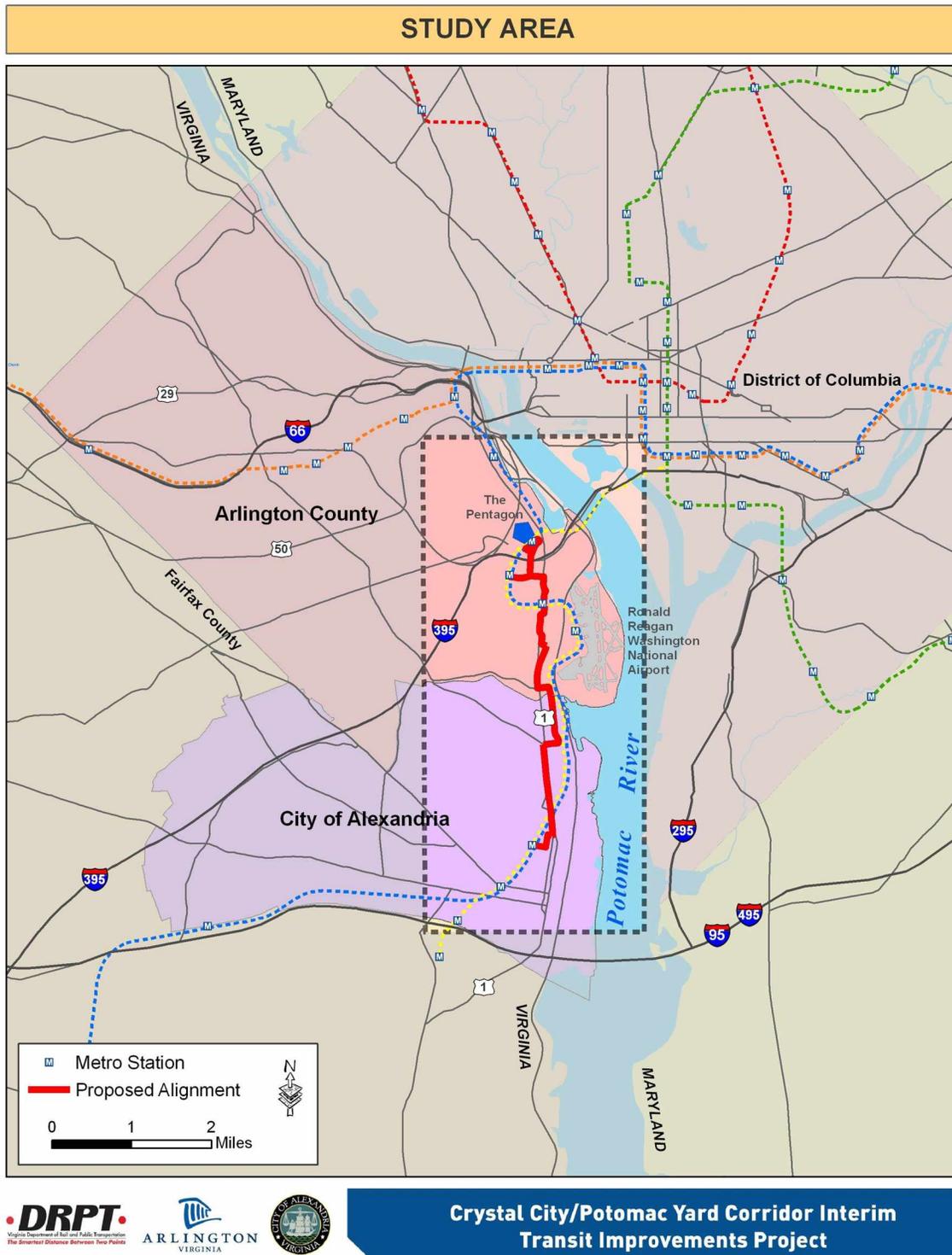
This implementation plan began with a series of workshops that engaged citizens, business owners, developers, and staff from Arlington and Alexandria in dialogues about the features that an interim transit service should have. The dialogue was sustained through monthly meetings of a Technical Advisory Committee composed of planning and transportation staff from both jurisdictions, representatives of the Washington Metropolitan Area Transit Authority (WMATA), and DRPT. Several technical memoranda have been prepared as part of the development of the implementation strategy for this interim service. These include a transit service implementation plan, station area plans, and an inventory of potential environmental issues within the corridor.

This implementation strategy describes the anticipated near-term changes to transit services as well as potential long-term scenarios for the corridor, under the assumption that the interim improvements will help establish an identifiable high-capacity transit corridor. The interim improvements are designed to prepare the way for future, higher capacity transit service – Bus Rapid Transit (BRT), Light Rail Transit (LRT), or a new Metrorail station – without precluding any of these long-term options.

1.1 Corridor Description

The Crystal City/Potomac Yard corridor in Arlington County and the City of Alexandria, Virginia runs north-south between the Pentagon and Braddock Road Metrorail Station. A map showing the corridor in relation to the Washington metropolitan region is shown in Figure 1. This corridor is currently undergoing extensive development and redevelopment. At the northern end of the corridor, projects include new residential buildings in Pentagon City and Crystal City, as well as a possible conference center and office building in Pentagon City just south of the Pentagon reservation. The central portion of the corridor is occupied by Potomac Yard, a 368-acre former rail yard that is being redeveloped with a mix of office, residential, and retail uses.

Figure 1: The Crystal City/Potomac Yard Corridor in Regional Context



Build-out of Potomac Yard over the next 10 years will result in approximately 4.4 million square feet of new office space, 3,000 new residential units, 1,200 new hotel rooms, and 270,000 square feet of new retail space. At the southern end of the corridor, at the edge of Old Town Alexandria, there is active redevelopment of several sites for residential and retail uses. From north to south, all of this development is occurring along a linear, relatively narrow corridor, setting the stage for – indeed requiring – improved transportation services and facilities.

1.2 Alternatives Analysis

In response to the large numbers of new residents and office workers expected in the corridor, Arlington County and the City of Alexandria asked the Virginia Department of Rail and Public Transportation (DRPT) to undertake a formal transit Alternatives Analysis (AA) that would explore options to improve corridor transit service to a level required to support the high level of development. The results of that study were published in 2003, detailing the characteristics of three main alternatives: BRT and LRT service along the entire corridor, and a new infill Metrorail Station at Potomac Yard Town Center. The AA analysis used 2030 projections as a basis of comparison, and assumed full build-out of development within Potomac Yard and along other portions of the corridor.

Given the extended development time frame associated with the capital-intensive transit improvements considered in the AA, and considering the rapid development occurring in the entire corridor, the two local jurisdictions and DRPT identified a need for interim high capacity transit service. These interim transit improvements are the focus of this study.

1.3 Need for Immediate Action

As noted, in the two years since the completion of the Crystal City/Potomac Yard Corridor Transit Alternatives Analysis (AA), the pace of development in the corridor has increased significantly. The first buildings to be completed in Potomac Yard (One and Two Potomac Yard) will open in March 2006, and transit service must be available at that time to provide a link between the office buildings and the Crystal City Metrorail Station, one mile away. Other development projects are currently under construction, and many others are in various stages of planning.

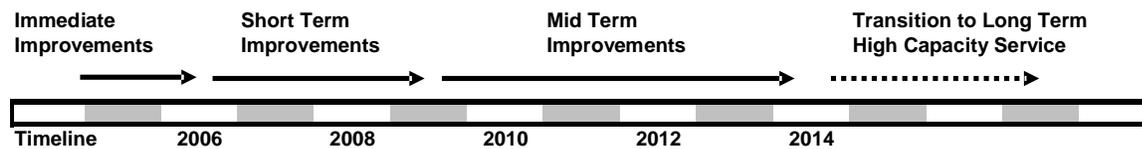
The purpose of the Crystal City/Potomac Yard Corridor Transit Implementation Strategy is to design an interim service that will serve the corridor until one of the Build Alternatives identified in the AA can be implemented. Transit improvements instituted as part of this strategy are meant to provide a high level of transit service without precluding the eventual implementation of Streetcar, full BRT, or the construction of an infill Metrorail station in the corridor. Under this interim strategy, transit improvements will be phased to coincide with development, so that service can meet increased demand associated with increased corridor development.

Outlined below is a summary of the proposed corridor transit improvements over the next ten years, phased to meet growing demand associated with corridor development activity.

1.4 Summary of Phased Improvements

As illustrated in Figure 2, corridor transit improvements will begin immediately and extend into the long-term. The immediate and short-term improvements will be implemented to satisfy the demand for transit service brought about with new development in the corridor opening in the next three years. The immediate and short-term improvements will include new routes, the availability of an initial segment of an ultimate system of exclusive transitway, and general rationalization of existing corridor transit service. In taking on unique character or image, and providing a clearly defined route structure, these improvements will set the groundwork for transition to higher levels of service.

Figure 2: Phased Service Improvements



The mid-term service, which is the main focus of this implementation strategy, will be a high-capacity, high-amenity, branded transit line that will serve the corridor through the forecasted major phases of population and employment growth. It will function as the precursor to the long-term improvements considered in the AA. In the long term, a BRT or LRT service in the corridor would utilize the transitway and stops constructed as part of the interim service. There is the additional possibility of construction of an infill Metrorail station on the Blue and Yellow lines in Potomac Yard, at the site of the proposed Potomac Yard Town Center.

2.0 ELEMENTS OF THE PROPOSED INTERIM IMPROVEMENTS

The focus of this implementation strategy is the mid-term improvements. Outlined below are the major elements of the overall strategy, including the service plan, station locations and features, running way configurations, and vehicles.

2.1 Service Plan

The service plan is the primary foundation of the implementation strategy. It outlines a step-by-step strategy to rationalize transit service in the Crystal City/Potomac Yard corridor into a high quality/high capacity corridor-wide service that meets estimated transit demand in a fully developed Crystal City/Potomac Yard corridor. Over the implementation period, the existing system of routes and multiple providers will transition to a uniform, branded, premium service running between the Pentagon and Pentagon City in the north, to Potomac Yard Town Center and Braddock Road Metrorail Station in the south. As illustrated in Figure 2 (page 4) the service plan is divided into three phases (immediate, short-term, and mid-term), which are timed to coincide with the increase in transit demand as the corridor develops.

2.1.1 Immediate Service Changes

Immediate changes will occur in the spring of 2006, when the Environmental Protection Agency (EPA) moves its headquarters to One Potomac Yard, at the south end of Crystal City. At this stage, a 6-minute peak service will be introduced to provide connections between the Arlington portion of Potomac Yard and the Crystal City Metrorail and Virginia Railway Express (VRE) stations. The service will run in mixed traffic on existing streets using standard 40-foot low-floor Clean Natural Gas (CNG) buses from the Washington Metropolitan Transit Authority's (WMATA) Four Mile Run maintenance facility, and will operate on weekdays only. Alexandria Transit (DASH) will develop a new service in the Alexandria portion of Potomac Yard. More detail on these changes is outlined in the project Service Implementation Plan Technical Memorandum.

2.1.2 Short-term Service Changes

Short-term service changes will be implemented in the 2 to 3 year time frame. During this time period, the Arlington Crystal City/Potomac Yard service will be extended to the Potomac Yard

Shopping Center in Alexandria, and DASH will continue to operate a separate service covering the Alexandria portion of Potomac Yard.

The expanded Arlington Crystal City/Potomac Yard service will operate Monday to Saturday, with 6-minute headways during weekday peak periods and 12-minute weekday off-peak and Saturday headways. This service will be operated by WMATA. The portions of Alexandria previously served by Metrobus routes 9B and 10P will be covered by a separate service operated by DASH.

In this time frame, the first segment of Arlington's transitway will open between the Arlington/Alexandria border at Four Mile Run and 26th Street South. This segment is scheduled to open in winter 2006/spring 2007. North of 26th Street South, the service will continue to operate in mixed traffic as design and construction of future transitway segments continue.

2.1.3 Mid-term Service Changes

Mid-term service changes will be implemented in the 4 to 7 year time frame. It is assumed that in this period, service between Alexandria and Arlington will be integrated into a single service running from one end of the corridor to the other, and will be operated by WMATA. Vehicles will start to make use of new exclusive transitway north of 26th Street South in Arlington and between East Glebe Road and the Monroe Avenue Bridge along Route 1 in Alexandria. This service will continue to use 40-foot low-floor CNG buses which will be housed at WMATA's Four Mile Run maintenance facility, and will operate between 5 a.m. and 12 a.m. on weekdays and between 7 a.m. and 12 a.m. on weekends.

Ridership

Development of the service plan in the mid-term time frame was based on estimated daily ridership volumes from the *Crystal City/Potomac Yard Transit Alternatives Analysis* and adjusted to correspond to the opening year of the mid-term service and the level of development in the Potomac Yard corridor at that time. Thus the maximum load point of 1,900 identified in the AA for the year 2015 was adjusted downwards to 1,814 for the opening year of 2010 to correspond to the level of build-out development anticipated for the corridor at that time (build out in 2010 is estimated to be 62% of total build out). This factoring to account for level of development results in an adjusted maximum load point of 1,124 in 2010. The maximum load points estimated for 2012 and 2014 are similarly adjusted to account for planned development projects along the corridor.

Phasing (mid-term service)

The mid-term service will provide connections between the Pentagon, Potomac Yard Town Center and the Braddock Road Metrorail Station, and between Pentagon City and Potomac Yard Town Center. The routes connecting these destinations will be introduced in phases within the mid-term time frame, as illustrated in Figures 3 and 4 (page 8). Frequencies will increase with each phase, starting at one vehicle approximately every 3 minutes along a trunk line where all branches of the combined service run and eventually equaling one vehicle approximately every 2 minutes (peak period). Service between Pentagon City and Potomac Yard Town Center will be introduced in the second phase. These frequencies are adapted to the passenger demand profile as modeled in the 2003 Alternatives Analysis and reflect a bus capacity of 60 passengers. An alternative scenario considered was to assume policy headways, which would match the Metrorail Blue Line schedule by providing one bus every 6 minutes along the trunk line. However, under this scenario anticipated ridership demand outstrips capacity from the outset. Therefore, the implementation strategy is based on the assumption that the demand based headway scenario will be used.

Operating Hours

It has been assumed that the mid-term improvements would operate with hours similar to the Metrorail Blue Line, with the exception that there would be no service after midnight. Service would operate on weekdays between 5 a.m. and midnight. Weekend service would operate between 7 a.m. and midnight.

Assumed daily time periods are:

Weekday Service

- Off-peak service from 5 to 6 a.m.
- AM peak from 6 to 9 a.m.
- Off-peak service from 9 to 11 a.m.
- Mid day peak service from 11 a.m. to 2 p.m.
- Off-peak service from 2 to 4 p.m.
- PM peak service from 4 to 7 p.m.
- Off-peak service from 7 to 12 a.m.

Weekend Service

- Saturday service from 7 a.m. to 10 p.m.
- Saturday service late-night from 10 p.m. to 2 a.m.
- Sunday service from 7 a.m. to midnight.

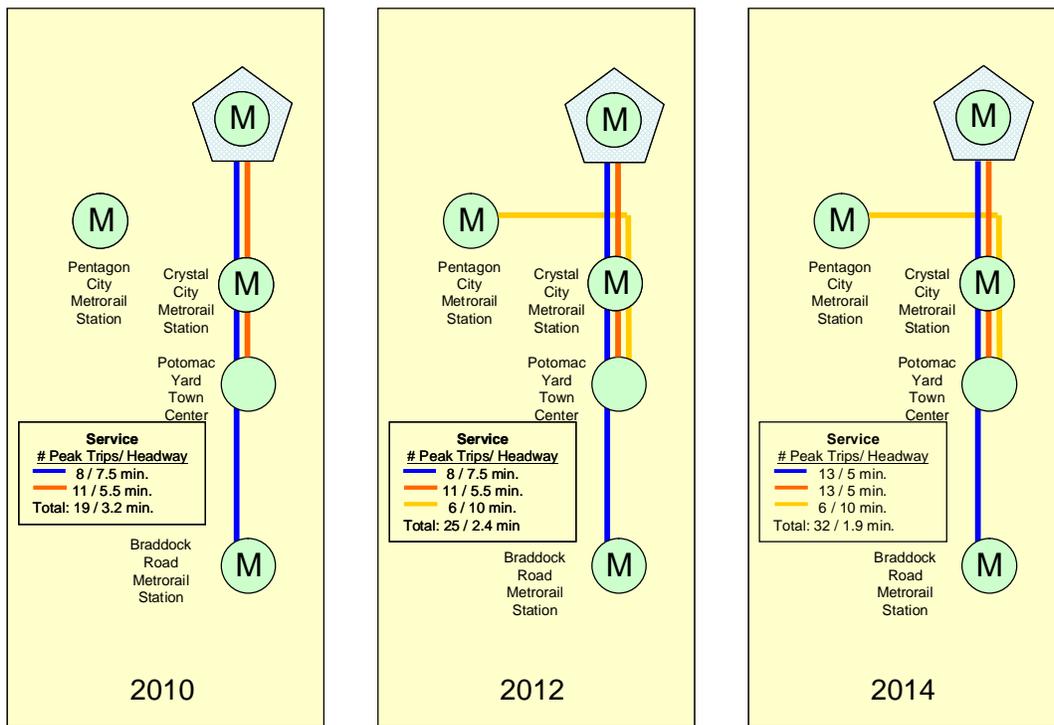
2.2 Transitway

Figure 5 (page 9) illustrates the proposed alignment and level of exclusive right-of-way for the mid-term service. The service between Pentagon City and Potomac Yard Town Center will begin at the Pentagon Metrorail Station at 12th and Hayes streets, proceeding east on 12th Street. The services between the Pentagon and Potomac Yard Town Center and between the Pentagon and Braddock Road Metrorail Station will begin at the Pentagon bus transfer center, proceeding south on Eads Street to 12th Street.

All branches will share a common routing between the intersection of 12th and Eads streets and Potomac Yard Town Center. This alignment will run along South Clark and South Bell streets through Crystal City, turning onto Crystal Drive in Potomac Yard.

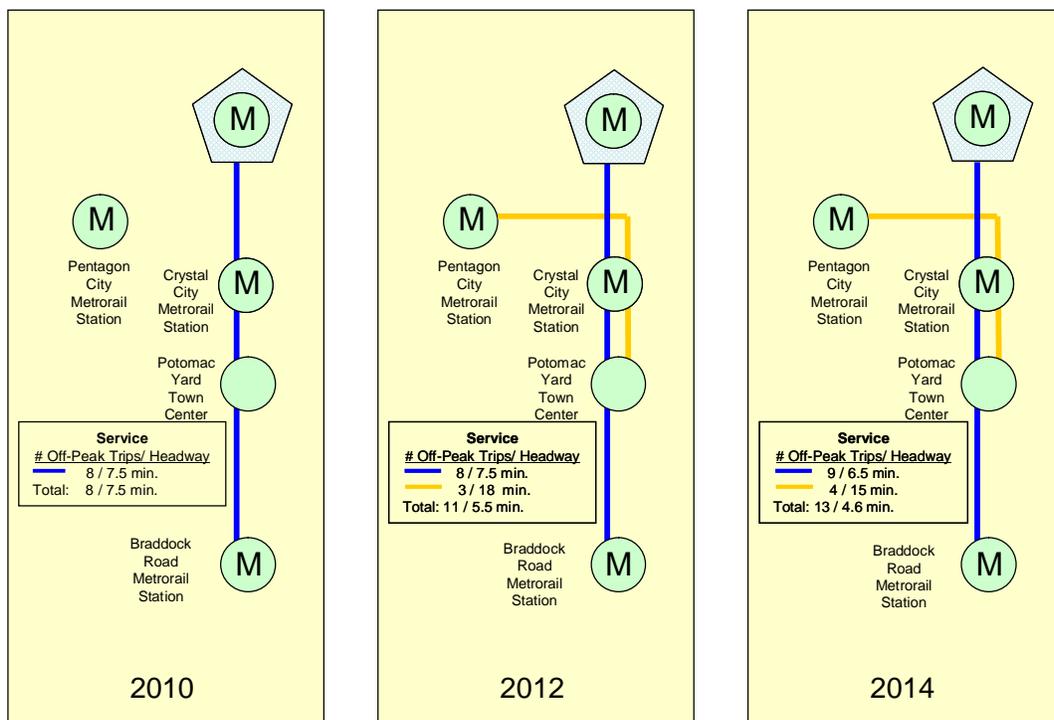
The northern portion of the alignment is assumed to be entirely in exclusive right-of-way starting at the intersection of Army Navy Drive and South Eads Street for the services from the Pentagon and starting at the intersection of 12th and Fern streets for the service from Pentagon City, proceeding south to the bridge crossing Four Mile Run on Potomac Avenue. The alignment will run in mixed traffic along Potomac Avenue behind the existing Potomac Yard Shopping Center before turning west along East Glebe Road at the Potomac Yard Town Center. The alignment will continue south in exclusive lanes along Route 1 to the Monroe Avenue Bridge, where it will transition back to mixed traffic before accessing the Braddock Road Metrorail Station via First, Fayette, and Madison streets.

Figure 3: Mid-Term Peak Service Plan



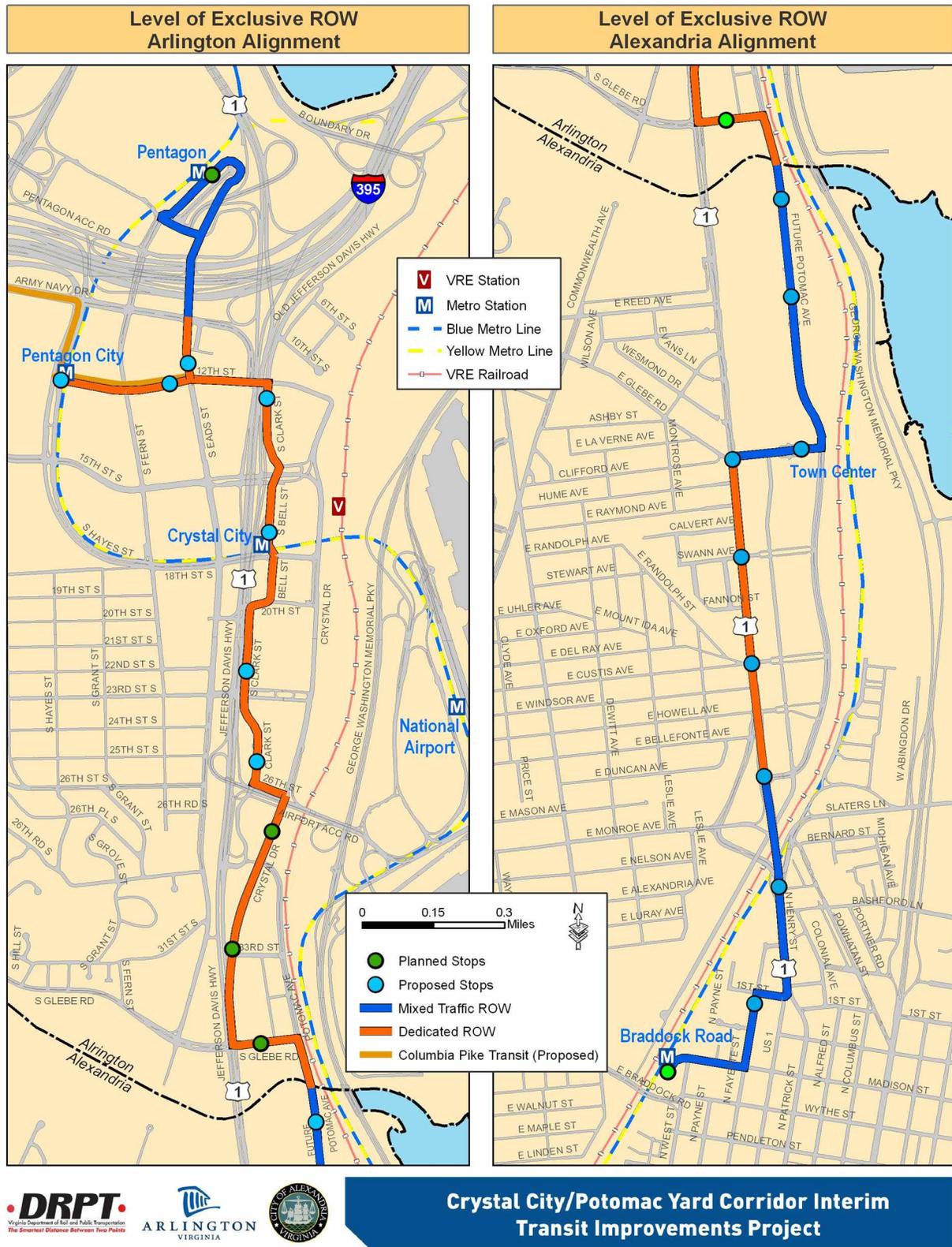
Note: # of buses assumes a maximum vehicle capacity of 60 passengers

Figure 4: Mid-Term Off-Peak Service Plan



Note: # of buses assumes a maximum vehicle capacity of 60 passengers

Figure 5: Transit Alignment and Level of Exclusive Right-of-Way



2.3 Station Stops

Planning for station stops involves selection of the general location of stops, specific station stop siting, and station stop design guidelines. Station stops will be located ¼ mile to ½ mile apart, with the intention of providing access to significant destinations and transfer points, as well as providing for efficient operation of service. Stop locations and configurations identified for the interim service do not preclude any of the longer term improvements as outlined in the 2003 Alternatives Analysis. Station stop locations have been determined based on proximity to activity centers, ease of pedestrian access, and the physical space available for facilities. General stop locations are shown in Table 1. Greater detail on stop locations and the characteristics of each individual stop are outlined in the Station Stop Planning Technical Memorandum.

Table 1: Stop Locations

Pentagon to Braddock Road Metro Service	Pentagon to Potomac Yard Town Center Service	Pentagon City to Potomac Yard Town Center Service
Pentagon	Pentagon	
12 th Street and Eads Street	12 th Street and Eads Street	
		Pentagon City
		12 th Street & Fern/Eads Street
12 th Street & Clark	12 th Street & Clark	12 th Street & Clark
Crystal City Metrorail Station	Crystal City Metrorail Station	Crystal City Metrorail Station
22 nd Street	22 nd Street	22 nd Street
25 th Street	25 th Street	25 th Street
26 th Street	26 th Street	26 th Street
31 st Street	31 st Street	31 st Street
South Glebe Road	South Glebe Road	South Glebe Road
Potomac Yard – North	Potomac Yard – North	Potomac Yard – North
Potomac Yard – Central	Potomac Yard – Central	Potomac Yard – Central
Potomac Yard Town Center	Potomac Yard Town Center	Potomac Yard Town Center
Hume Street		
Swann Avenue		
East Custis Avenue		
North of Monroe Avenue Bridge		
Slaters Lane		
1 st Street		
Braddock Road Metrorail Station		

Station stop design guidelines involve recommendations for platforms, shelters, passenger information, and other amenities. This study assumes a typical platform that is seventy-five feet long and twelve feet wide, which allows for adequate waiting room, circulation, and boarding, with enough area to ensure that patrons have protection from vehicles in adjacent lanes. These dimensions may be modified to fit local circumstances. Narrower platforms may be used where there are constraints due to narrow right-of-way or adjacent existing conditions. However,

platforms less than eight feet in width may not have enough circulation area to accommodate patrons safely. This study also assumes that platforms will be raised eleven to fourteen inches off the street (typically six to nine inches above the sidewalk) to accommodate level boarding onto low-floor vehicles.

Design guidelines for the shelter and waiting area are based on consultation with project stakeholders and with city, county, and agency staff. A preliminary list of station features is summarized in Table 2 below. A station concept that was developed for another study is shown in Figure 6 (page 12) illustrates potential scale of the canopies and station areas envisioned for the interim transit improvements. station canopy design that was developed in connection with a study for Pentagon City transit improvements.

Table 2: Station Stop Features

<i>Platform</i>	<ul style="list-style-type: none"> • Typical reinforced concrete platform 75 feet long and 12 feet wide by 14 inches high, with a 15-foot ramp at one end • The typical platform may be narrowed to 8 feet • Smaller platform (30 feet by 8 feet wide) at constrained locations • Stone or tile pavement finishes • Electrical and water connections for lighting and cleaning
<i>Shelter</i>	<ul style="list-style-type: none"> • Typical shelter 40 feet long and 12 feet wide • Shelter overhang provides covered boarding • Appropriate shelters for smaller stops • Design in keeping with adjacent development • Design vocabulary common to all stops along the corridor • Design and configuration may vary by location
<i>Wind screens</i>	<ul style="list-style-type: none"> • Transparent wind screens integral to the shelter structure • Stop identification and other graphics affixed to wind screens
<i>Seating</i>	<ul style="list-style-type: none"> • Benches • Leaning bars
<i>Signage</i>	<ul style="list-style-type: none"> • Station identification signs • Maps and schedule information • Real time bus arrival information
<i>Safety</i>	<ul style="list-style-type: none"> • Emergency telephone • Crosswalks • Additional stop and area lighting
<i>Other amenities</i>	<ul style="list-style-type: none"> • Trash receptacles • Landscaping

Figure 6: Potential Station Canopy Design



2.4 Vehicles

It was assumed for development of the mid-term scenarios that service would utilize Orion VII 40-foot low-floor CNG buses operated out of WMATA’s Four Mile Run maintenance facility. For comparison, demand headways and potential excess demand under policy headways were calculated and presented in the Service Implementation Plan. In addition, Appendix C of the Service Implementation Plan presents calculations using larger 60-foot articulated buses, though this vehicle is not anticipated to operate in this corridor. Table 3 shows the vehicle capacity assumptions, Table 4 shows the vehicle requirements over time, and Figure 6 shows an example of the vehicles.

Table 3: Vehicle Data*

Vehicle	Seats	Passenger Capacity (Seated and Standing)
Orion VII CNG (40-foot)	43	60

*Bus fleet data from WMATA

Table 4: Vehicle Requirements

2010		2012		2014	
Peak	Fleet	Peak	Fleet	Peak	Fleet
20	24	25	30	29	35

Figure 7: Orion VII 40-foot CNG Bus



2.5 Market Image

The specific image of the premium service will be developed through a collaboration of Arlington, Alexandria, WMATA, and corridor stakeholders. In general, the image will be readily distinguishable from standard Metrobus, DASH, and ART services. The image will have to be adaptable to the evolving components of transit service along the corridor. While the market image will likely be introduced in stages, it should be clear to observers that the roll-out is part of a seamless plan for implementation.

2.6 Fare Collection

Several methods of fare collection are applicable along the corridor. For the interim improvements, fare boxes will remain in place on transit vehicles, and the use of SmarTrip by customers will be encouraged. No new facilities for off-board fare payment are envisioned at the proposed station stops during the mid-term. However, station stops could be able to accommodate off-board fare payment in the long-term. It is anticipated that passengers will access the SmarTrip and ticket vending machines already in place at the Metrorail stations along the corridor.

2.7 System ITS

As described in this section, several “intelligent transportation systems” enhancements are assumed for the interim transit improvements.

2.7.1 Transit Signal Priority

It is assumed that at all signalized intersections along the transit corridor, there will be an optical sensor that is capable of adjusting the regular signal phase and either extend the green phase for buses arriving at the end of the green phase of the cycle or shorten the red phase for buses arriving at the end of the red phase of the cycle. In their simplest form these phase adjustments would occur automatically through communications between the signal controller and a transponder affixed to all buses in service. Cost estimates for the interim improvements do not include any provision for a centralized control of the priority system. It is possible that the system could be linked to other priority systems in the region, for example along Columbia Pike.

2.7.2 Passenger Information

Real time bus arrival information will be provided by a GPS-based system that will track each vehicle in the corridor and provide real-time information on bus arrivals through digital displays at each station stop. It is also envisioned that this information would be accessible to passengers via the internet or hand-held cellular devices. This technology would supplement posted schedule and route information, and provide a level of comfort for passengers regarding

the length of their wait for the next bus. This will be especially relevant in off-peak hours when buses will not run as frequently as during the peak.

2.7.3 Security and Safety

Emergency call boxes will be provided at all station stops. Stops will also include adequate pedestrian level lighting and comply with current standards for crime prevention through environmental design (CPTED).

2.7.4 Supervision and Operations Control

During the immediate and short-term time frames, street supervision will be provided by the general pool of street supervisors and their current methods and modes of organization. With the beginning of full-corridor integrated service in the mid-term time frame, it is likely that there would be an operations control supervisor dedicated to the corridor, with a supporting team of street supervisors that may share their time between the new service and other transit activity within the corridor. It is not anticipated that there would be an operations control center dedicated solely to corridor operations in the mid-term time frame. In the interim, an operation control center jointly used by other transit systems would accommodate the proposed corridor. A center dedicated solely to the corridor would be implemented as part of the long-term development of the potential Build Alternatives identified in the corridor AA.

2.7.5 Performance Data

With the known and projected growth of development and travel within the corridor, it will be vital to dynamically adapt the service to satisfy needs of current and potential transit passengers. Accurate performance data, efficiently collected will be a key element of system evaluation. This evaluation will focus on measures such as productivity, including factors such as boarding per revenue vehicle hour and farebox recovery, potential crowding issues, and reliability. Each of these measures will allow project sponsors to accurately chart levels of demand along the corridor and thus gauge the effectiveness of the new service. In this way, the levels of service and the timing of enhancements to the service may also be adjusted as necessary.

3.0 PROJECT DEVELOPMENT MILESTONES

To advance the physical improvements described above, and to initiate service along the proposed alignment, several key issues must be resolved and several actions must be taken in an organized sequence. This section presents a graphic schedule and describes the major steps in implementing the improvements, including planning, environmental review, design, marketing and branding, procurement, and construction.

The characteristics of the transitway, station stops, vehicles and service plan have been used to develop itemized estimates of capital and operating costs. One of the key issues to resolve in the early stages of continuing project development will be the apportionment of capital and operating and maintenance costs among the project sponsors. In addition, early in the development process, project sponsors should designate an operator or operators of the service, define the vehicle technology, and outline a strategy for marketing and branding the service. As soon as these issues are resolved, vehicle procurement should begin.

As planning and design advance, the project must satisfy environmental review requirements. Design and construction of the transitway and stop facilities will proceed in a phased progression as environmental requirements are met and funding from federal, state, and local sources is secured. Figure 8 below is a schedule showing the key implementation activities and potential time frames for their implementation.

Figure 8: Draft Implementation Schedule



The following discussion of implementation activities provides further description of the project development sequence as shown in Figure 7.

3.1 Service Operations Plan

Detailed service operations plans will be developed for each phase of the Crystal City/Potomac Yard service. Through coordination between WMATA operations planning staff and Arlington County staff significant work has already begun on the immediate and short-term improvements. This coordination will continue as Alexandria Transit continues its planning for modified DASH services to the Potomac Yard area.

Operations planning for the integrated service to be implemented in the mid-term time frame has been sketched in some detail as part of the Service Implementation Plan. Refinement of this plan will be a coordinated effort of Alexandria, Arlington and WMATA, with ultimate responsibility resting with the final operator.

3.2 Agreement on Operator and Garage

The agreement on the operator and garage will include a number of decisions, including the formal designation of WMATA as the operator of the new mid-term service, agreement on the allocation of estimated operating costs, agreement on the allocation of capital costs associated with vehicle procurement, and an assessment of potential maintenance capacity at existing or future facilities. The agreement could also address the degree to which distinctive vehicles will be used for the mid-term service.

3.3 Environmental Review and Design Development

During the current effort to develop an implementation plan, the proposed alignment and characteristics of the transitway have been defined to such a degree that a more detailed analysis of potential traffic and utilities effects may now be undertaken. Both Arlington and Alexandria are planning to carry out traffic analyses and utilities surveys in an attempt to establish the operational feasibility of the transit improvements and to validate the assumed levels of utilities modifications. These studies may be undertaken as part of or in parallel with the anticipated environmental reviews.

In order to advance the proposed transit improvements using federal funds, the appropriate level of environmental review must be completed. Under NEPA, there are three possible classes of action, which determine the documentation required. Class I actions are those which are likely to significantly affect the environment, and require preparation of an Environmental Impact Statement (EIS). Class II actions are those which do not individually or cumulatively have significant environmental impacts. For these actions, a Categorical Exclusion (CE) will be issued. CEs can either be listed in regulations (23 CFR 771.117(c)) or documented and qualify as a CE (23 CFR 771.117 (d)). Listed CEs usually do not require additional documentation. However, documented CEs do require additional NEPA documentation to determine whether a CE applies. Many bus-related projects, such as bus acquisitions for minor fleet expansions and installation of small passenger shelters, are predetermined by FTA to be CEs. Class III actions are those where the significance of the environmental impact is not clear. These actions require the preparation of an Environmental Assessment (EA), which will result either in a Finding of No Significant Impact (FONSI), or in identification of potentially significant impacts, in which case an EIS will be required.

During an October 2005 meeting with FTA staff, it was suggested that the proposed transit improvements would likely require the preparation of an Environmental Assessment. An EA prepared for the entire corridor would focus on capital improvements and service elements, with the recognition that some elements could change along portions of the corridor. Potential

impacts (specifically at potential station locations and any necessary roadway construction) would be analyzed within an envelope of expected improvements.

3.4 Marketing Activities

Marketing activities must begin early, so that the advertising campaign and service branding are ready at the appropriate times. Arlington and Alexandria staff have proposed designation of a marketing task force comprised of members from the two jurisdictions and WMATA (DRPT representatives are also recommended). Such a task force could be expanded to include citizens, property owners, and members of the development community.

Marketing activities include decisions on which service elements will be branded, the development of an advertising campaign, and physical branding of service elements. The branded service will begin as a “branded light” service in the immediate term, with the introduction of full branding in the short to mid-term. Full branding will include the roll-out of a branded image including vehicles, station stops, and the dedicated transitway.

3.5 Vehicle Procurement

The immediate and short-term service will operate largely using the new 40-foot low-floor CNG buses WMATA has purchased for use in northern Virginia. Later phases may use a different type of bus. Part of the vehicle procurement process will be the decision on what types of buses to use for the mid-term service. The mid-term phase will require a separate procurement because of the size of the fleet required to meet peak service levels and the use of a branded fleet. (It should be noted that buses purchased for the mid-term service should be configured in such a way that they can be easily integrated back into regular service on other Metrobus routes as the corridor transitions to the long-term transit improvements). Once decisions on vehicle type and branding are made, procurement activities should be initiated through the FTA 5307 grant process. A limited number of new, branded vehicles should be brought into service as they become available, with introduction of a new fleet providing full operating capacity with the introduction of the mid-term service.

3.6 Transitway Construction

Transitway construction will proceed in phases as funding becomes available and as environmental requirements are met. Construction of Segment 1 of the Arlington transitway should be complete by the beginning of 2008. Construction of Arlington Segment 2 and the Alexandria transitway along Route 1 should begin as construction of Segment 1 is completed. Arlington should begin construction of Segment 3 as construction on Segment 2 concludes. The transitway will be designed and constructed to accommodate potential future adaptation to BRT or LRT service.

3.7 Station Stop Construction

Station stop construction will proceed in phases as the transitway is constructed. Prior to the construction of Segment 1 of the Arlington transitway, a temporary bus station outside One Potomac Yard will serve riders of the immediate term service. Permanent stops will be constructed along Segment 1 as it is built, with temporary stops elsewhere along the alignment. Permanent stops along the entire mid-term alignment will be in place as segments of guideway construction are completed. Modifications to station stop design during the mid-term service time frame will be considered as needed to accommodate growth in passenger demand. As with the development of the transitway, close coordination of station design will be required for environmental clearance purposes as well as to ensure that stations implemented during the mid-term can accommodate long-term transit improvements such as BRT or LRT.

4.0 ESTIMATED COSTS

During service planning and preliminary station design, the project team made detailed assumptions regarding the elements of service and infrastructure that will characterize the interim transit improvements. The assumptions relate closely to the levels of anticipated capital and operating costs, which are outlined in detail below. There are several key areas where costs would likely be shared among the project sponsors. These areas are listed along with potential methods of apportioning costs.

4.1 Capital Cost Estimates

The estimated capital cost for the transit improvements proposed for the study corridor ranges from \$30 million to \$55 million for the Arlington portion of the corridor and from \$18 to \$33 million for the Alexandria portion of the corridor. Detailed cost tables are included as Appendix A to this document. Estimates are based on the following general features:

- § Bus service enhancements along a clearly defined alignment (with variations) to include more frequent, specially branded service;
- § Transitway construction, including reconfiguration of 1.7 miles of existing streets in Arlington and 0.8 miles of new pavement and associated infrastructure along Route 1 in Alexandria;
- § New passenger facilities appropriate to the scale of existing and future development in the corridor;
- § Intelligent Transportation Systems (ITS) features to include signal priority equipment, real-time bus arrival information systems, and security and supervisory capabilities;
- § Additional 40-foot CNG-fueled Metrobus vehicles (up to 35 new vehicles);
- § Allowances for expansion of existing storage and maintenance facilities or construction of new facilities to accommodate additional vehicles.

Tables 5 and 6 (page 18) are summaries of cost estimates for the Arlington and Alexandria portions of the proposed improvements. The “Alternative Low” and “Alternative High” figures, derived from planned and built projects, represent ranges over which costs have been observed to vary. Sources of cost data include WMATA Metrobus operations, Houston rapid bus construction and operations, the K Street Transitway study in Washington, and the Boston Silver Line.

Table 5: Estimated Capital Costs (Arlington)

ITEM		COST			
		Alternative Low		Alternative High	
Construction Costs	Busway Improvements	\$ 8,259,000	\$ 14,283,000	\$ 14,005,000	\$ 24,344,000
	Station Stops	\$ 5,010,000		\$ 8,406,000	
	Miscellaneous Items	\$ 1,014,000		\$ 1,933,000	
Vehicle Costs		\$ 10,436,000		\$ 15,320,000	
Planning, EA and Final Design Costs		\$ 1,143,000		\$ 1,947,000	
PM, CM, Admin and Owner's Insurance Program		\$ 2,571,000		\$ 4,260,000	
Cost Contingency		\$ 2,142,000		\$ 7,303,000	
GRAND TOTAL		\$ 30,575,000		\$ 53,174,000	

Table 6: Estimated Capital Costs (Alexandria)

ITEM		COST			
		Alternative Low		Alternative High	
Construction Costs	Busway Improvements	\$ 4,836,000	\$ 9,926,000	\$ 8,352,000	\$ 17,131,000
	Station Stops	\$ 4,251,000		\$ 7,097,000	
	Miscellaneous Items	\$ 839,000		\$ 1,682,000	
Vehicle Costs		\$ 4,128,000		\$ 6,064,000	
Planning, EA and Final Design Costs		\$ 794,000		\$ 1,371,000	
PM, CM, Admin and Owner's Insurance Program		\$ 1,787,000		\$ 2,998,000	
Cost Contingency		\$ 1,489,000		\$ 5,140,000	
GRAND TOTAL		\$ 18,124,000		\$ 32,704,000	

4.2 Operating Cost Estimates

The estimated operations and maintenance costs were calculated based on estimated revenue vehicle hours multiplied by the average cost per revenue hour for all regional Metrobus services. Specifically, the operations and maintenance (O&M) cost per revenue hour used in Table 7 shows daily and annual O&M costs calculated based on an average of operations and maintenance costs over all WMATA routes. This average cost per revenue vehicle hour is \$94. No allowance for maintenance of the transitway has been added to the estimates.

Table 7: Daily and Annual O&M Costs

Alternative/Phase	Daily Revenue Hours	Cost/Hour	Total Daily Cost	Total Annual Cost
Policy Headway	143	\$94	\$13,520	\$3,975,000
2010 Demand Headway	280	\$94	\$26,430	\$7,771,000
2012 Demand Headway	355	\$94	\$33,510	\$9,853,000
2014 Demand Headway	411	\$94	\$38,800	\$11,407,000

Note: Annualization factor is 294

4.3 Key Operating Agreement Elements

Because the proposed mid-term service will cross jurisdictional lines, a comprehensive agreement covering all elements of operations will be required. Outlined below are the key elements that will have to be considered in the development of the operating agreement.

4.3.1 Operator(s)

This is the most fundamental element of the operating agreement and is focused on who will operate the mid-term service. In discussions with the jurisdictions during the planning process, it has been envisioned that Metrobus would operate the service. If this approach is found for some reason to be infeasible as implementation moves forward, an alternative approach would be contract operations similar to the arrangement for the operation of the Downtown Circulator in Washington, D.C. as well as other operations within the region.

Related to the decision regarding the operator is the question of where the service's vehicles will be stored and maintained. Discussions during the planning process have indicated that WMATA's Four Mile Run facility is the consensus choice. However, the ability of the facility to handle 35 more buses (the total fleet requirement in 2014) is not possible based on existing operations. If Four Mile Run cannot accommodate the additional buses, this may affect the ultimate operator of the service.

4.3.2 Term of Agreement

This element of the operating agreement will be based on the selection of the final operator as well as the ultimate anticipated length of the mid-term service. A better understanding of both will be available as the project moves forward.

4.3.3 Apportionment of Capital and Operating Costs

Apportionment of capital and operating costs will depend to some degree on the final operator. If WMATA is the operator, the apportionment will occur within the framework of the WMATA Regional Compact. If another operating arrangement is ultimately selected, the apportionment of costs will be the subject of negotiations between the two jurisdictions.

It is assumed that costs for infrastructure improvements, including busway and station stop construction, would be allocated to the two jurisdictions simply according to the anticipated scale and complexity of improvements located within each jurisdiction. Miscellaneous items such as environmental mitigation and systems development, as well as owner costs such as design and project development, are likewise based on the anticipated scale of physical improvements in each jurisdiction. Bus procurement costs, in contrast, are apportioned among the jurisdictions according to the respective number of estimated operating hours in each.

Table 8 illustrates a potential method for apportionment of operating costs, according to the estimated number of service hours in each jurisdiction.

Table 8: Potential Apportionment of Operating Costs

Alternative/Phase	Total Annual O& M Cost	Daily Operating Hours Arlington/Alexandria	Arlington Annual O & M Cost	Alexandria Annual O & M Cost
Policy Headway	\$3,975,000	102 / 41	\$2,847,000	\$1,129,000
2010 Demand Headway	\$7,771,000	170 / 110	\$4,710,000	\$3,062,000
2012 Demand Headway	\$9,853,000	235 / 120	\$6,505,000	\$3,349,000
2014 Demand Headway	\$11,407,000	270 / 150	\$7,367,000	\$4,041,000

4.3.4 Vehicle Maintenance/Maintenance Facility

The arrangements for vehicle maintenance will ultimately depend on the final operator, who will be responsible for bus operations and vehicle maintenance. As noted, the consensus choice of the project team is to maintain vehicles at WMATA’s Four Mile Run facility but there may be a lack of capacity to add 35 buses (estimated requirement based on the Service Implementation Plan) and thus an alternative maintenance and storage approach may be required. This may include a new maintenance facility or a non-WMATA contractor provided facility.

4.3.5 Station and Transitway Maintenance

Station and Transitway maintenance can be handled in a number of different ways. The maintenance can be handled by WMATA or the contract operator or by the individual jurisdictions. Since the station and right-of-way facilities will likely be owned by the jurisdictions, the latter approach may be the most effective.

4.3.6 Vehicle Ownership

The final vehicle ownership arrangement will also be made complicated by the fact that the service will run between two jurisdictions. If it is a WMATA run service, then vehicle ownership may belong to WMATA, as with other regional services. If it operated by another contractor, the vehicle ownership may be apportioned among the two jurisdictions.

5.0 FUNDING AND PHASING PLAN

An important product of this implementation strategy is to present committed and potential funding sources along with the phasing sequence and associated costs. A schedule for implementing the interim improvements has been outlined above in Section 3.0, and estimated capital costs are summarized in Section 4.0. This section adds current information about project funding and describes potential funding sources.

By combining the known funding with the estimated costs and proposed schedule, specific funding needs will be identified and project sponsors will be able to program appropriate measures to assure adequate resources are available to support implementation of the interim improvements.

5.1 Funding Sources

Both Arlington County and the City of Alexandria have secured preliminary funding for the interim improvements and identified other potential funding sources. Tables 9, 10 and 11 summarize known funding sources for each jurisdiction, including grants that have already been approved for use in the development of corridor plans and improvements. The tables also indicate potential funding sources, for which capacities have not yet been assessed. More detailed versions of these tables are included in this document as Appendix B.

Table 9: Funding Sources (Arlington)

Project Title / Revenue Source Title		Fiscal Year	Sources	Available Funding	
Arlington Potomac Yard Transit Analysis, Phase II		2005	RSTP Federal	\$ 400,000	\$ 500,000
		2005	RSTP State	\$ 100,000	
Crystal City / Potomac Yard Transitway		2004	RSTP Federal	\$ 568,000	
		2004	RSTP State	\$ 142,000	
Potomac Yard Transitway		2003	\$5309 Federal Discretionary	\$ 786,943	
		2003	Local Match	\$ 196,736	
Potomac Yard Transitway and Station Construction		2006	Private sector - South Tract TMO	\$ 300,000	
Potomac Yard Transitway Planning and Design		2003/04	Bond/Dev Contribution	\$ 31,646	
Potomac Yard Transitway		2005	\$5309 Federal Discretionary	\$ 777,422	
		2005	Local Match	\$ 194,356	
PY Busway Project Construction		2006	RSTP Federal	\$ 400,000	
		2006	RSTP State	\$ 100,000	
Potential	Other Federal (§5309, §5307, RSTP, CMAQ)			\$ -	
	State and Local Taxes and User Charges			\$ -	
	Developer Contributions			\$ -	
	Benefit Capture Strategies			\$ -	
	Other			\$ -	
GRAND TOTAL				\$ 3,997,102	

Table 10: Funding Sources (Alexandria)

Project Title / Revenue Source Title		Fiscal Year	Sources	Available Funding	
Potomac Yard Environmental Impact Statement		2005	RSTP Grant	\$ 300,000	\$ 2,085,000
Potomac Yard Transit Services		2007	CMAQ Grant	\$ 1,785,000	
Alexandria - Potomac Yard transit improvements		2006-09	SAFTEA-LU earmark	\$ 1,000,000	
Potential	Other Federal (\$5309, \$5307, RSTP, CMAQ)			\$ -	
	State and Local Taxes and User Charges			\$ -	
	Developer Contributions			\$ -	
	Benefit Capture Strategies			\$ -	
	Other			\$ -	
GRAND TOTAL				\$ 3,085,000	

Table 11: Shared Funding Sources (Arlington & Alexandria)

Project Title / Revenue Source Title		Fiscal Year	Sources	Available Funding	
Alexandria & Arlington - Potomac Yard Busway including construction of shelters (\$2.5M Total)		2006-09	SAFTEA-LU earmark	\$ 2,508,000	
Other				\$ -	
GRAND TOTAL				\$ 2,508,000	

The funding sources and specific grants listed in tables 9, 10 and 11 require some explanation because their use may be limited to specific types of improvements or otherwise constrained. As these funds are combined and applied to different elements of the interim corridor improvements, there may be elements (design, bus procurement, station stop construction, etc.) for which sufficient funds are available, and other elements for which the funds thus far identified are far from sufficient. The following paragraphs provide descriptions of potential funding sources that have been identified for use with the Crystal City/Potomac Yard Corridor Interim Transit Improvements.

5.1.1 Section 5309 Grants

FTA Section 5309 Grants may be made to assist in financing bus and bus-related capital projects that will benefit U.S. transit systems. These grants are typically 80 percent federal funds, with a 20 percent local match. Funding is available for the year appropriated plus two years (total of three years).

Eligible purposes include: acquisition of buses for fleet and service expansion, bus maintenance and administrative facilities, transfer facilities, bus malls, transportation centers, intermodal terminals, park-and-ride stations, acquisition of replacement vehicles, bus rebuilds, bus preventive maintenance, passenger amenities such as passenger shelters and bus stop signs, accessory and miscellaneous equipment such as mobile radio units, supervisory vehicles, fareboxes, computers, shop and garage equipment, and costs incurred in arranging innovative financing for eligible projects.

As with other federal grants for capital improvements, Section 5309 funds carry with them the requirement that appropriate environmental reviews will be completed. Several applications, such as bus acquisitions and bus upgrading, for example, are automatically considered Categorical Exclusions. Other bus projects involve more construction and greater potential for off-site impacts, for example, new construction or expansion of bus terminals and transfer facilities. For these projects, the grant applicant must prepare environmental documentation with appropriate technical analysis to support a categorical exclusion. For any project not meeting the conditions for a categorical exclusion, the grant applicant must prepare an Environmental Assessment (EA) which documents the impacts of the proposed project and considers alternatives to the proposed site or design. An EA is subject to public comment. Finally, if significant environmental impacts are identified for a bus category project, an Environmental Impact Statement (EIS) will be required.

5.1.2 Section 5307 Grants

This program provides funds for planning, acquisition, construction, improvement, and associated capital maintenance items. These are typically defined as routine capital improvements and replacement projects, so they may have limited applicability for the Crystal City/Potomac Yard Corridor Interim Transit Improvements. Distribution of resources is on a formula basis, and capital projects are funded with a maximum 80 percent federal contribution and a 20 percent local match.

5.1.3 Surface Transportation Program

These “RSTP” funds, allocated through the regional formula, and are 80 percent federal funds, with a 20 percent state match. Before any funds may be applied, projects must be adopted into the financially constrained regional long range transportation plan (CLRP). Funding is designated for use in planning or construction and placed in the 6-year transportation improvement program. As with other federal funds, the appropriate level of environmental review must be completed before these funds may be used for construction activities.

5.1.4 Congestion Mitigation/Air Quality Program

CMAQ funds are allocated through the same regional formula process as the RSTP program, with 80 percent federal funds and a 20 percent state match. These funds are allocated to projects that demonstrate appreciable reductions in vehicle miles traveled or improvements in the effects of localized traffic congestion.

5.1.5 SAFTEA-LU Earmarks

The 2005 transportation reauthorization bill specifically names the Crystal City/Potomac Yard corridor and lists grant funding apportionments by year. Actual use of these funds for improvements in the corridor is subject to environmental approvals as well as available budgets at the time of allocation.

5.1.6 State and Local Taxes and User Charges

U.S. transit agencies draw extensively on local and state dedicated taxes and fees to support transit operations and capital. Because of tighter budgets at all levels of government, recently completed transit projects tend to rely more heavily on dedicated funding sources, as opposed to general funds from state or local governments. Perhaps the most common of these sources are local sales taxes that provide a dedicated revenue stream for transit capital and operating costs.

The following is a list of numerous new revenue mechanisms that could potentially be used at the local, regional, or state level to fund transit within the Crystal City/Potomac Yard corridor:

- | | |
|----------------------------|----------------------------------|
| § Local option sales tax | § Motor vehicle registration fee |
| § Corporate income tax | § Motor vehicle emissions fee |
| § Personal income tax | § Motor vehicle privilege fee |
| § Local property tax | § Surface parking fee |
| § Motor fuel gallonage tax | § Parking receipt tax |
| § Employer payroll tax | § Vehicle rental tax |
| § Mortgage recordation tax | § Fund balance transfers |
| § Real estate transfer tax | |

5.1.7 Developer Contributions

Improved transit facilities along the corridor will directly benefit the owners and tenants of new and existing housing, office, and retail development. With some of the proposed station and transitway facilities directly serving developments, mechanisms by which owners of those developments may contribute to the construction and maintenance of transit amenities are being discussed. The potential for such contributions exists in both Arlington and Alexandria.

5.1.8 Benefit Capture Strategies

In general, these approaches seek to return to the transit agency or operating jurisdiction some of the private economic benefits that accrue due to the public investment in transit service and infrastructure. A list of the various types of benefit capture strategies would include the following:

- § Leasing/selling development rights
- § Leasing/selling land or facilities
- § Concession leases to independent vendors
- § Density bonuses as developer incentives
- § Tax increment financing
- § Special benefit assessment districts

Jurisdictions around the U.S. are using tax benefit districts as a way of generating funds dedicated for specific public purposes. Both Arlington County and the City of Alexandria are considering tax benefit districts as a way of financing portions of the operating or capital expenses for a Potomac Yard transitway. To date, planning for the potential tax district has not focused on a particular geographic area or identified a potential level of funding capacity. The area could be limited to the new development within Potomac Yard proper or applied more broadly to include residences and businesses within a certain area along the length of the project corridor.

5.2 Phasing Scenarios

Potential funding sources, estimated capital costs, and the proposed implementation schedule combine to produce alternative phasing scenarios. Figures 9 and 10 below present an example scenario, in which the total estimated costs and the total identified funds have been applied over the interim period. It is anticipated that additional scenarios will be developed as more funding sources are identified and additional detail regarding capital improvements is articulated.

Figure 9: Arlington Capital and Operating Costs vs. Known Capital Funding

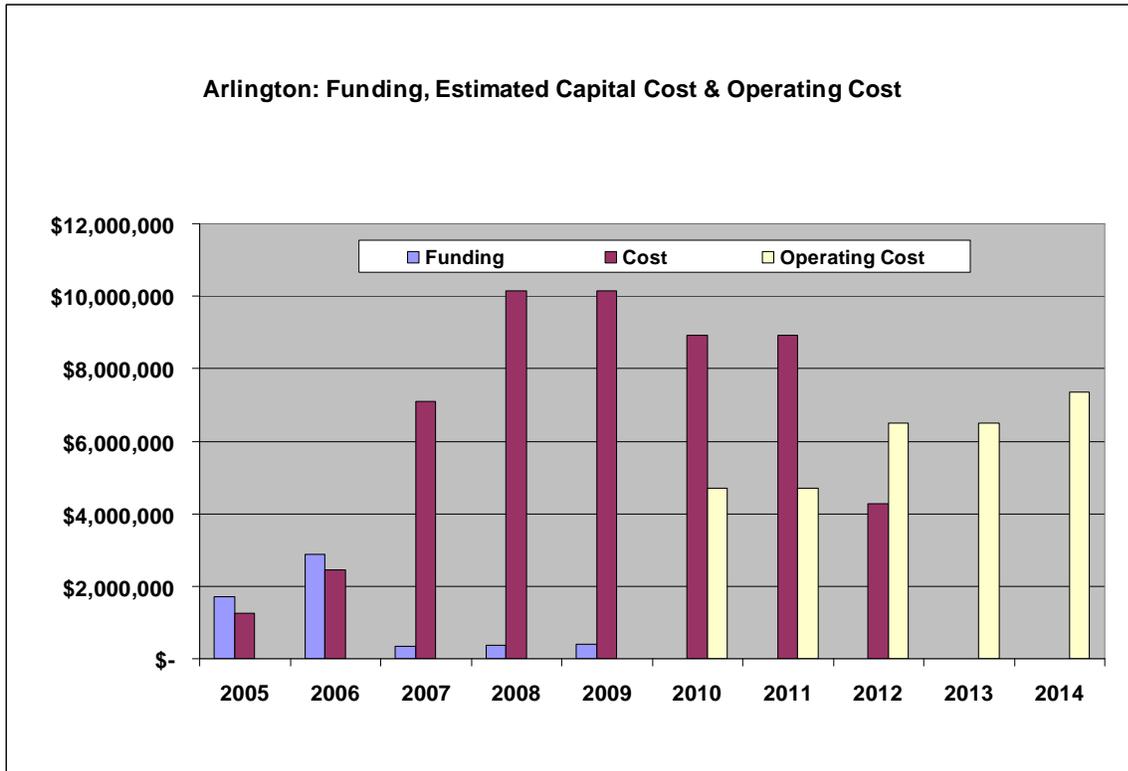
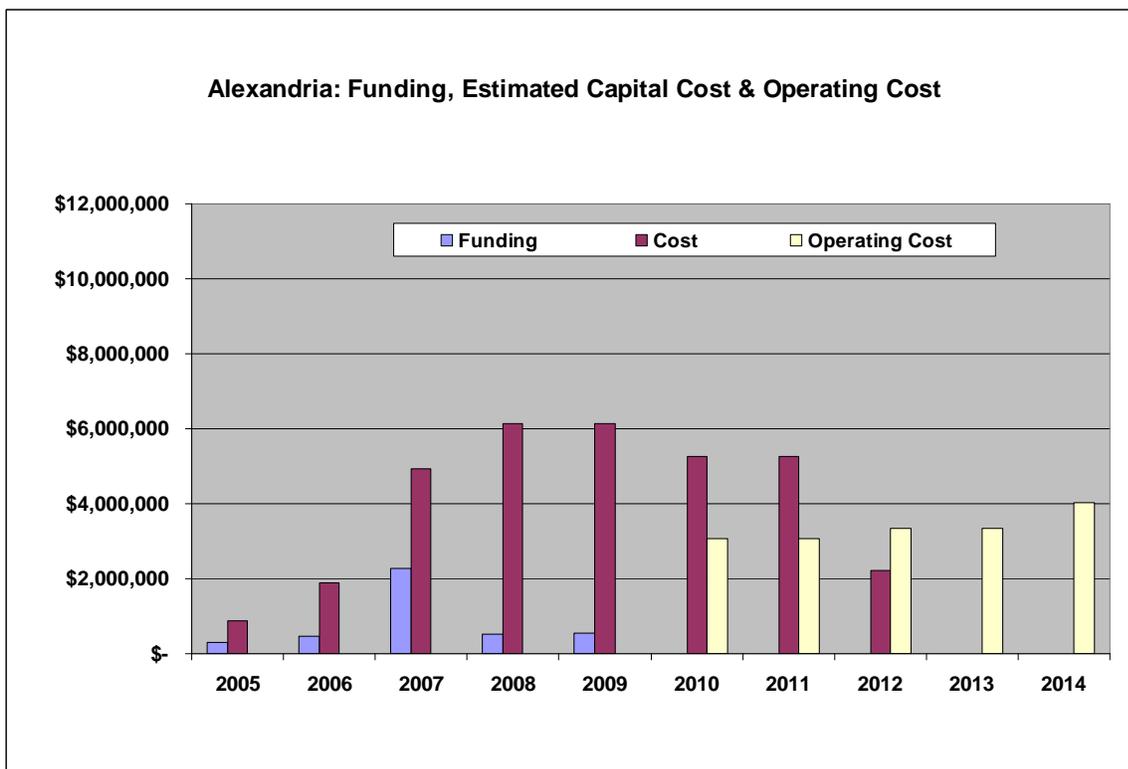


Figure 10: Alexandria Capital and Operating Costs vs. Known Capital Funding



As the project matures, particular funding sources will be attached to particular features along the transit corridor. These changes will in turn affect the range of potential alternative phasing scenarios. Appendix C illustrates an initial spreadsheet model that serves as the basis for figures 9 and 10. The model will continue to be updated and expanded as further sources of funding are identified, and as potential uses of the available funds are attached to specific construction and/or procurement items.

6.0 NEXT STEPS AND TRANSITION TO LONG-TERM SERVICE

This implementation planning process has established a framework for transit improvements in the Crystal City/Potomac Yard corridor. Detailed service plans and facility designs for each phase of corridor development will follow according to the schedule outlined in the Implementation Strategy. Meanwhile, there are several activities that require immediate attention.

6.1 Environmental Assessment

In order to make use of the federal funds that have been appropriated for construction of corridor transit improvements, requirements of the National Environmental Policy Act (NEPA) must be satisfied. The Federal Transit Administration (FTA) has suggested that project sponsors prepare an Environmental Assessment (EA) to document any potential impacts this project may have on the economic, social, and natural environments. Potential impacts (specifically at potential station locations and any necessary roadway construction) will be analyzed within an envelope of expected improvements.

6.2 Traffic and Transportation

The proposed improvements include modifications to travel lanes and circulation patterns throughout the study corridor. Arlington and Alexandria are evaluating traffic and transportation implications of the alignment, dedicated transitway, and station stop locations recommended in this study. Among the issues are turns at intersections, sidewalks, bike lanes, and pedestrian crossings.

6.3 Utilities Conflicts

This implementation planning process did not inventory potential utilities conflicts along the study corridor. Arlington and Alexandria staff have compiled preliminary data and are undertaking further analysis to document the locations of utilities and highlight potential conflicts. This information may lead to adjustments in the proposed alignment and station stop locations, and it could affect estimated costs for the improvements.

6.4 System Identity, or “Branding”

The appearance and design of vehicles, station stops, and other features should contribute towards establishing an identity for the system. Both Arlington County and the City of Alexandria have high expectations related to the design of public facilities, and to protecting and enhancing the character of their communities. The project Technical Advisory Committee has recommended that a task force be convened to formulate and advance the branding concept.

6.5 Agreements on System Operations and Maintenance

The short-term transit improvements are clearly defined as to who will operate and maintain system components. For the mid-term improvements, however, the system operator must be designated so that proper allocation of budget and proper development of facilities may proceed. The agreement will likely include the formal designation of WMATA as the operator of the new mid-term service, agreement on the allocation of estimated operating costs, agreement on the allocation of capital costs associated with vehicle procurement, and an assessment of potential maintenance capacity at existing or future facilities.

6.6 Transition to Long-Term Transit Service

During implementation of the mid-term improvements, preparation for the long-term transit service will begin. Activities would likely include continued planning that defines the elements of the operations of the mid-term service in more detail, project environmental clearance, and facility preliminary design. These activities would take into account prior and ongoing corridor improvements. The organizational structures by which the interim improvements are implemented will likely extend to the implementation of the more permanent, higher capacity, longer term improvements.

Appendix A: Capital Cost Estimates

Arlington Portion of Study Corridor

Total length (mi): 2.38
 Mixed traffic (mi): 0.68
 Exclusive guideway (mi): 1.7
 Number of typical stops: 9
 Number of smaller stops: 0

ITEM	UNIT	UNIT COST		QUANTITY	ITEM COST	
		Alt. (low)	Alt. (high)		Alternative Low	Alternative High
1.0 Busway Improvements						
1.1 Busway construction (2 lanes)	Sq. Feet	\$ 8	\$ 13	215,424	\$ 1,723,392	\$ 2,800,512
1.2 Misc. busway facilities	Route Feet	\$ 60	\$ 120	8,976	\$ 538,560	\$ 1,077,120
1.3 Special roadway construction (2)	Route Feet	\$ 200	\$ 400	1,000	\$ 200,000	\$ 400,000
1.4 Traffic signal priority system installation	Intersection	\$ 8,000	\$ 25,000	20	\$ 160,000	\$ 500,000
1.5 Additional intersection improvements (3)	Intersection	\$ 100,000	\$ 100,000	7	\$ 700,000	\$ 700,000
1.6 Utility relocations, public	Route Feet	\$ 350	\$ 550	8,976	\$ 3,141,600	\$ 4,936,800
1.7 Utility relocations, private	Route Feet	\$ 200	\$ 400	8,976	\$ 1,795,200	\$ 3,590,400
Busway Improvements Subtotal					\$ 8,258,752	\$ 14,004,832
2.0 Station Stops (Includes Segment 1 stops, but not Pentagon City)						
2.1 CIP concrete platform slab with finishes (75' x 12')	(4) sf.	\$ 100	\$ 180	16,200	\$ 1,620,000	\$ 2,916,000
2.2 CIP small concrete platform slab with finishes (30' x 8')	(4) sf.	\$ 100	\$ 180	0	\$ -	\$ -
2.3 Station canopy (40' x 12')	(5) Ea.	\$ 150,000	\$ 250,000	18	\$ 2,700,000	\$ 4,500,000
2.4 Wind screen shelter (6)	Ea.	\$ 15,000	\$ 25,000	0	\$ -	\$ -
2.5 Station furnishings (lighting, benches, phone, bike racks, maps, etc.)	Ea.	\$ 20,000	\$ 25,000	18	\$ 360,000	\$ 450,000
2.6 Ticket vending machines	Ea.	\$ -	\$ -	0	\$ -	\$ -
2.7 Concrete slab to prevent shoving in pavement (125' x 12' x 9")	sy.	\$ 80	\$ 120	3,000	\$ 240,000	\$ 360,000
2.8 Display signs (Variable Message Board Equipment)	Ea.	\$ 5,000	\$ 10,000	18	\$ 90,000	\$ 180,000
Station Stops Subtotal					\$ 5,010,000	\$ 8,406,000
3.0 Miscellaneous Items						
3.1 Environ. Mitig. (incl. Hazmat, Noise Reduct., etc.)	Route Mile	\$ 100,000	\$ 285,000	2.38	\$ 238,000	\$ 678,300
3.2 Maintenance of Traffic During Construction (8)	% Constr.	5%	5%	busway + sta	\$ 663,438	\$ 1,120,542
3.3 Communication system, central control	allowance	\$ 100,000	\$ 100,000	1	\$ 100,000	\$ 100,000
3.4 Systems / Operations Testing (9)	% Comm.	5%	5%	signal + mssg.	\$ 12,500	\$ 34,000
Miscellaneous Items Subtotal					\$ 1,013,938	\$ 1,932,842
SUBTOTAL CONSTRUCTION COSTS					\$ 14,282,690	\$ 24,343,674
4.0 Vehicle Costs						
4.1 Buses (40' Low Floor CNG) (10)	Ea.	\$ 370,000	\$ 420,000	14	\$ 5,034,848	\$ 5,715,233
4.2 Spares (40' Low Floor CNG) (10)	Ea.	\$ 370,000	\$ 420,000	2	\$ 794,976	\$ 902,405
4.3 Maintenance facilities construction allowance	Ea.	\$ 250,000	\$ 500,000	16	\$ 3,939,071	\$ 7,878,141
4.4 On-board communications equipment	Ea.	\$ 7,000	\$ 7,000	16	\$ 110,294	\$ 110,294
4.5 AVL (GPS, receiver, processor)	Ea.	\$ 5,000	\$ 5,000	16	\$ 78,781	\$ 78,781
4.6 Clever Devices Automated Stop Voice Annunciator, AVM and APC	Ea.	\$ 20,000	\$ 20,000	16	\$ 320,000	\$ 320,000
4.7 Branding (one-time allowance for vehicle paint, signage, etc.)	Ea.	\$ 10,000	\$ 20,000	16	\$ 157,563	\$ 315,126
Vehicle Costs Subtotal					\$ 10,435,533	\$ 15,319,981
5.0 Owner Costs						
5.1 Right-of-Way Acquisition (11)	Lump Sum	not included	not included	1	\$ -	\$ -
5.2 Planning, EA and Final Design Costs	% Constr.	8%	8%	constr. Subttl.	\$ 1,142,615	\$ 1,947,494
5.3 PM, CM and Admin.	% Constr.	13%	13%	constr. Subttl.	\$ 1,856,750	\$ 3,164,678
5.4 Owner's Insurance Program	% Constr.	5%	5%	constr. Subttl.	\$ 714,134	\$ 1,095,465
Owner Costs Subtotal					\$ 3,713,499	\$ 6,207,637
6.0 Cost Contingency						
6.1 Contractor Cost Contingency	% Constr.	5%	20%	constr. Subttl.	\$ 714,134	\$ 4,868,735
6.2 Owner Cost Contingency	% Constr.	10%	10%	constr. Subttl.	\$ 1,428,269	\$ 2,434,367
Cost Contingency Subtotal		15%	30%		\$ 2,142,403	\$ 7,303,102
GRAND TOTAL					\$ 30,574,126	\$ 53,174,393

- (1) Alternative "high" and "low" unit costs obtained from WMATA Metrobus, Houston rapid bus, K Street Transitway study, and Boston Silver Line.
- (2) Allowance for construction of new roadway configuration at locations where there is no existing facility.
- (3) Potential traffic signal installation
- (4) Assuming 2 platforms/station with station platform components including demolition, clearing, grading, utilities, concrete footings and platform, finishes, ramps, and railings.
- (5) Exists only at large stations. "High" value reflects estimated value for Stop A location in Arlington.
- (6) "Off the shelf" shelter used only at smaller platforms
- (7) Assuming 12 hours per typical platform and 8 hours per small platform.
- (8) Percentage based on construction subtotal: busway plus station stops
- (9) Percentage based on systems elements: signal priority system plus passenger information system
- (10) Fleet size assumes 2012 demand-based service, apportioned by estimated service hours: Arlington 179.55 per day; Alexandria 71.15 per day
- (11) Proportional to length of corridor within jurisdiction.

Alexandria Portion of Study Corridor

Total length (mi): 2.76
 Mixed traffic (mi): 1.96
 Exclusive guideway (mi): 0.8
 Number of typical stops: 7
 Number of smaller stops: 3

ITEM	UNIT	UNIT COST		QUANTITY	ITEM COST	
		Alt. (low)	Alt. (high)		Alternative Low	Alternative High
1.0 Busway Improvements						
1.1 Busway construction (2 lanes)	Sq. Feet	\$ 8	\$ 13	101,376	\$ 811,008	\$ 1,317,888
1.2 Misc. busway facilities	Route Feet	\$ 60	\$ 120	4,224	\$ 253,440	\$ 506,880
1.3 Special roadway construction (2)	Route Feet	\$ 200	\$ 400	4,224	\$ 844,800	\$ 1,689,600
1.4 Traffic signal priority system installation	Intersection	\$ 8,000	\$ 25,000	13	\$ 104,000	\$ 325,000
1.5 Additional intersection improvements (3)	Intersection	\$ 100,000	\$ 100,000	5	\$ 500,000	\$ 500,000
1.6 Utility relocations, public	Route Feet	\$ 350	\$ 550	4,224	\$ 1,478,400	\$ 2,323,200
1.7 Utility relocations, private	Route Feet	\$ 200	\$ 400	4,224	\$ 844,800	\$ 1,689,600
	Busway Improvements Subtotal				\$ 4,836,448	\$ 8,352,168
2.0 Station Stops						
2.1 CIP concrete platform slab with finishes (75' x 12')	(4) sf.	\$ 100	\$ 180	12,600	\$ 1,260,000	\$ 2,268,000
2.2 CIP small concrete platform slab with finishes (30' x 8')	(4) sf.	\$ 100	\$ 180	1,440	\$ 144,000	\$ 259,200
2.3 Station canopy (40' x 12')	(5) Ea.	\$ 150,000	\$ 250,000	14	\$ 2,100,000	\$ 3,500,000
2.4 Wind screen shelter (6)	Ea.	\$ 15,000	\$ 25,000	6	\$ 90,000	\$ 150,000
2.5 Station furnishings (benches, trash receptacles, maps, etc.)	Ea.	\$ 20,000	\$ 25,000	20	\$ 400,000	\$ 500,000
2.6 Ticket vending machines	Ea.	\$ -	\$ -	0	\$ -	\$ -
2.7 Concrete slab to prevent shoving in pavement (125' x 12' x 9')	sy.	\$ 80	\$ 120	2,333	\$ 186,667	\$ 280,000
2.8 Display signs (Variable Message Board Equipment)	Ea.	\$ 5,000	\$ 10,000	14	\$ 70,000	\$ 140,000
	Station Stops Subtotal				\$ 4,250,667	\$ 7,097,200
3.0 Miscellaneous Items						
3.1 Environ. Mitig. (incl. Hazmat, Noise Reduct., etc.)	Route Mile	\$ 100,000	\$ 285,000	2.76	\$ 276,000	\$ 786,600
3.2 Maintenance of Traffic During Construction (8)	% Constr.	5%	5%	busway + sta	\$ 454,356	\$ 772,468
3.3 Communication system, central control	allowance	\$ 100,000	\$ 100,000	1	\$ 100,000	\$ 100,000
3.4 Systems / Operations Testing (9)	% Comm.	5%	5%	signal + mssg.	\$ 8,700	\$ 23,250
	Miscellaneous Items Subtotal				\$ 839,056	\$ 1,682,318
	SUBTOTAL CONSTRUCTION COSTS				\$ 9,926,170	\$ 17,131,686
4.0 Vehicle Costs						
4.1 Buses (40' Low Floor CNG) (10)	Ea.	\$ 370,000	\$ 420,000	5	\$ 1,995,152	\$ 2,264,767
4.2 Spares (40' Low Floor CNG) (10)	Ea.	\$ 370,000	\$ 420,000	1	\$ 315,024	\$ 357,595
4.3 Maintenance facilities construction allowance	Ea.	\$ 250,000	\$ 500,000	6	\$ 1,560,929	\$ 3,121,859
4.4 On-board communications equipment	Ea.	\$ 7,000	\$ 7,000	6	\$ 43,706	\$ 43,706
4.5 AVL (GPS, receiver, processor)	Ea.	\$ 5,000	\$ 5,000	6	\$ 31,219	\$ 31,219
4.6 Clever Devices Automated Stop Voice Annunciator, AVM and APC	Ea.	\$ 20,000	\$ 20,000	6	\$ 120,000	\$ 120,000
4.7 Branding (one-time allowance for vehicle paint, signage, etc.)	Ea.	\$ 10,000	\$ 20,000	6	\$ 62,437	\$ 124,874
	Vehicle Costs Subtotal				\$ 4,128,467	\$ 6,064,019
5.0 Owner Costs						
5.1 Right-of-Way Acquisition (11)	Lump Sum	not included	not included	1	\$ -	\$ -
5.2 Planning, EA and Final Design Costs	% Constr.	8%	8%	constr. Subttl.	\$ 794,094	\$ 1,370,535
5.3 PM, CM and Admin.	% Constr.	13%	13%	constr. Subttl.	\$ 1,290,402	\$ 2,227,119
5.4 Owner's Insurance Program	% Constr.	5%	5%	constr. Subttl.	\$ 496,309	\$ 770,926
	Owner Costs Subtotal				\$ 2,580,804	\$ 4,368,580
6.0 Cost Contingency						
6.1 Contractor Cost Contingency	% Constr.	5%	20%	constr. Subttl.	\$ 496,309	\$ 3,426,337
6.2 Owner Cost Contingency	% Constr.	10%	10%	constr. Subttl.	\$ 992,617	\$ 1,713,169
	Cost Contingency Subtotal				\$ 1,488,926	\$ 5,139,506
	GRAND TOTAL				\$ 18,124,367	\$ 32,703,791

- (1) Alternative "high" and "low" unit costs obtained from WMATA Metrobus, Houston rapid bus, K Street Transitway study, and Boston Silver Line.
- (2) Allowance for construction of new roadway configuration at locations where there is no existing facility.
- (3) Potential traffic signal installation
- (4) Assuming 2 platforms/station with station platform components including demolition, clearing, grading, utilities, concrete footings and platform, finishes, ramps, and railings.
- (5) Exists only at large stations. "High" value reflects estimated value for Stop A location in Arlington.
- (6) "Off the shelf" shelter used only at smaller platforms
- (7) Assuming 12 hours per typical platform and 8 hours per small platform.
- (8) Percentage based on construction subtotal: busway plus station stops
- (9) Percentage based on systems elements: signal priority system plus passenger information system
- (10) Fleet size assumes 2012 demand-based service, apportioned by estimated service hours: Arlington 179.55 per day; Alexandria 71.15 per day
- (11) Proportional to length of corridor within jurisdiction.

Appendix B: Funding Tables

Arlington County Transit Program Capital Program Funding for Crystal City - Potomac Yard Transit Improvements Revenue Sources Confirmed as of October, 2005

Project Title/Revenue Source Title	Account/ UPC	Mgmt Lead	Fiscal Year	Sources	Funding	Expended	Balance	Status
Crystal City/Potomac Yard Transitway								
Arlington Potomac Yard Transit Analysis, Phase II		S	2005	RSTP Federal	\$400,000		\$400,000	Grant agreement needed with Alex's \$300k
Arlington Potomac Yard Transit Analysis, Phase II		S	2005	RSTP State	\$100,000		\$100,000	Grant agreement needed
					\$500,000	\$0	\$500,000	
Potomac Yard Busway and Stations								
Crystal City/Potomac Yard Transitway	T1117	S	2004	RSTP Federal	\$568,000		\$568,000	Grant agreement needed
Crystal City/Potomac Yard Transitway	T1117	S	2004	RSTP State	\$142,000		\$142,000	Grant agreement needed
Potomac Yard Transitway	Section 5309	C	2003	Federal Discretionary	\$786,943		\$786,943	Grant agreement needed
Potomac Yard Transitway		C	2003	Local Match	\$196,736		\$196,736	Match source TBD (possibly T11F)
Potomac Yard Transitway and Station Construction	014.S00.MA30	C	2006	Private sector - South	\$300,000		\$300,000	Accrued revenue, pending agreement with Potomac Yard property owners
Potomac Yard Transitway Planning and Design	014.S00.MA30	C	2003/04	Tract TMO Contribution	\$357,600	\$325,954	\$31,646	Design project approved and under contract with PBQ&D (Segment 1)
Potomac Yard Transitway	Section 5309	C	2005	Federal Discretionary	\$777,422		\$777,422	Grant agreement pending PL108-447
Potomac Yard Transitway		C	2005	Local Match	\$194,356		\$194,356	Match source TBD
PY Busway Project Construction	T76	C	2006	RSTP Federal	\$400,000		\$400,000	Request approved with RB Bus Stop Proj.
PY Busway Project Construction	T76	C	2006	RSTP State	\$100,000		\$100,000	Request approved with RB Bus Stop Proj.
					\$3,823,056	\$325,954	\$3,497,102	
Transit Benefit District (proposed) Developer Contributions (proposed)					\$0	\$0	\$0	
					\$0	\$0	\$0	
Totals					\$4,323,056	\$325,954	\$3,997,102	

Management Lead Assignment Code: C=County, W=WMATA, S=VDOT/DRPT, N=NVTC

City of Alexandria
Capital Program Funding for Crystal City - Potomac Yard Transit Improvements
 Revenue Sources as of October 13, 2005

Project Title/Revenue Source Title	Account/ UPC	Mgmt Lead	Fiscal Year	Sources	Funding	Expended	Balance	Status
Crystal City/Potomac Yard Transitway								
Potomac Yard Environmental Impact Statement			2005	RSTP Grant	\$300,000	\$0	\$300,000	
Potomac Yard Transit Services			2007	RSTP Grant	\$1,785,000	\$0	\$1,785,000	
					\$2,085,000	\$0	\$2,085,000	
Potomac Yard Busway and Stations								
Alexandria - Potomac Yard transit improvements			2006	SAFTEA-LU earmark	\$229,000	\$0	\$229,000	\$1M Discretionary earmark in reauthorization
			2007		\$238,000		\$238,000	
			2008		\$259,000		\$259,000	
			2009		\$274,000		\$274,000	
					\$1,000,000	\$0	\$1,000,000	
Transit Benefit District (proposed)					\$0	\$0	\$0	
Developer Contributions (proposed)					\$0	\$0	\$0	
Totals					\$3,085,000	\$0	\$3,085,000	

Management Lead Assignment Code: C=City, W=WMATA, S=VDOT/DRPT, N=NVTC

Arlington and Alexandria: Joint Use
Capital Program Funding for Crystal City - Potomac Yard Transit Improvements
 Revenue Sources Confirmed as of October, 2005

Project Title/Revenue Source Title	Account/ UPC	Mgmt Lead	Fiscal Year	Sources	Funding	Expended	Balance	Status
Potomac Yard Busway and Stations								
Alexandria & Arlington - Potomac Yard Busway including construction of shelters			2006	SAFTEA-LU earmark*	\$576,840	\$0	\$576,840	\$2.508M Discretionary earmark in reauthorization
			2007		\$601,920		\$601,920	
			2008		\$652,080		\$652,080	
			2009		\$677,160		\$677,160	
Totals					\$2,508,000	\$0	\$2,508,000	

Management Lead Assignment Code: C=County, W=WMATA, S=VDOT/DRPT, N=NVTC

Appendix C: Spreadsheet Models for Example Phasing Strategy

Arlington

FUNDING												
Project Title / Revenue Source Title		Sources	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Crystal City / Potomac Yard Rapid Transit	Arlington Potomac Yard Transit Analysis, Phase II	RSTP Federal	\$ 400,000									
		RSTP State	\$ 100,000									
		Jefferson Davis Transit Study	\$ 250,000									
Crystal City / Potomac Yard Transitway		RSTP Federal		\$ 568,000								
		RSTP State		\$ 142,000								
Potomac Yard Transitway		Federal Discretionary		\$ 786,943								
		Local Match		\$ 196,736								
Potomac Yard Transitway and Station Construction				\$ 300,000								
Potomac Yard Transitway Planning and Design				\$ 31,646								
Potomac Yard Transitway		Federal Discretionary	\$ 777,422									
		Local Match	\$ 194,356									
PY Busway Project Construction		RSTP Federal		\$ 400,000								
		RSTP State		\$ 100,000								
Alexandria & Arlington - Potomac Yard Busway including construction of shelters		SAFTEA-LU earmark		\$ 340,336	\$ 355,133	\$ 384,727	\$ 399,524					
Total			\$ 1,721,778	\$ 2,865,660	\$ 355,133	\$ 384,727	\$ 399,524	\$ -	\$ -	\$ -	\$ -	\$ -

CAPITAL COST											
Item	Total Cost	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Construction Costs	Busway Improvements	\$ 14,004,832			\$ 2,800,966	\$ 2,800,966	\$ 2,800,966	\$ 2,800,966	\$ 2,800,966		
	Station Stops	\$ 8,406,000		\$ 1,200,857	\$ 1,200,857	\$ 1,200,857	\$ 1,200,857	\$ 1,200,857	\$ 1,200,857	\$ 1,200,857	
	Miscellaneous Items	\$ 1,932,842			\$ 386,568	\$ 386,568	\$ 386,568	\$ 386,568	\$ 386,568	\$ 386,568	
Vehicle Costs	\$ 15,319,981				\$ 3,063,996	\$ 3,063,996	\$ 3,063,996	\$ 3,063,996	\$ 3,063,996	\$ 3,063,996	
Planning, EA and Final Design Costs	\$ 1,947,494	\$ 389,499	\$ 389,499	\$ 389,499	\$ 389,499	\$ 389,499					
PM, CM, Admin and Owner's Insurance Program	\$ 4,260,143	\$ 852,029	\$ 852,029	\$ 852,029	\$ 852,029	\$ 852,029					
Cost Contingency	\$ 7,303,102			\$ 1,460,620	\$ 1,460,620	\$ 1,460,620	\$ 1,460,620	\$ 1,460,620			
Total		\$ 1,241,527	\$ 2,442,384	\$ 7,090,540	\$ 10,154,536	\$ 10,154,536	\$ 8,913,008	\$ 8,913,008	\$ 4,264,853	\$ -	\$ -

OPERATING COST											
Item	Total Cost	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Annual O & M Cost (Mid Term Improvement)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,710,000	\$ 4,710,000	\$ 6,505,000	\$ 6,505,000	\$ 7,367,000

Alexandria

FUNDING												
Project Title / Revenue Source Title		Sources	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Crystal City / Potomac Yard Rapid Transit	Potomac Yard Environmental Impact Statement	RSTP Grant	\$ 300,000									
	Potomac Yard Transit Services	RSTP Grant			\$ 1,785,000							
Alexandria - Potomac Yard transit improvements		SAFTEA-LU earmark		\$ 229,000	\$ 238,000	\$ 259,000	\$ 274,000					
Alexandria & Arlington - Potomac Yard Busway including construction of shelters		SAFTEA-LU earmark		\$ 236,504	\$ 246,787	\$ 267,353	\$ 277,636					
Transit Benefit District (proposed)												
Developer Contributions (proposed)												
Total			\$ 300,000	\$ 465,504	\$ 2,269,787	\$ 526,353	\$ 551,636	\$ -	\$ -	\$ -	\$ -	\$ -

CAPITAL COST												
Item	Total Cost	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Construction Costs	Busway Improvements	\$ 8,352,168			\$ 1,670,434	\$ 1,670,434	\$ 1,670,434	\$ 1,670,434	\$ 1,670,434			
	Station Stops	\$ 7,097,200		\$ 1,013,886	\$ 1,013,886	\$ 1,013,886	\$ 1,013,886	\$ 1,013,886	\$ 1,013,886	\$ 1,013,886		
	Miscellaneous Items	\$ 1,682,318			\$ 336,464	\$ 336,464	\$ 336,464	\$ 336,464	\$ 336,464			
Vehicle Costs	\$ 6,064,019				\$ 1,212,804	\$ 1,212,804	\$ 1,212,804	\$ 1,212,804	\$ 1,212,804			
Planning, EA and Final Design Costs	\$ 1,370,535	\$ 274,107	\$ 274,107	\$ 274,107	\$ 274,107	\$ 274,107						
PM, CM, Admin and Owner's Insurance Program	\$ 2,998,045	\$ 599,609	\$ 599,609	\$ 599,609	\$ 599,609	\$ 599,609						
Cost Contingency	\$ 5,139,506			\$ 1,027,901	\$ 1,027,901	\$ 1,027,901	\$ 1,027,901	\$ 1,027,901				
Total		\$ 873,716	\$ 1,887,602	\$ 4,922,400	\$ 6,135,204	\$ 6,135,204	\$ 5,261,488	\$ 5,261,488	\$ 2,226,690	\$ -	\$ -	

OPERATING COST												
Item	Total Cost	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Annual O & M Cost (Mid Term Improvement)							\$ 3,062,000	\$ 3,062,000	\$ 3,349,000	\$ 3,349,000	\$ 4,041,000	