Final Report

Bethesda-College Park Corridor
Enhanced Bus Improvements

April 2007

Prepared for:

Washington Metropolitan Area Transit Authority
600 Fifth Street, NW
Washington, DC 20001

Maryland Transit Administration
6 St. Paul Street
Baltimore, MD. 21202-1614

BETHESDA-COLLEGE PARK CORRIDOR

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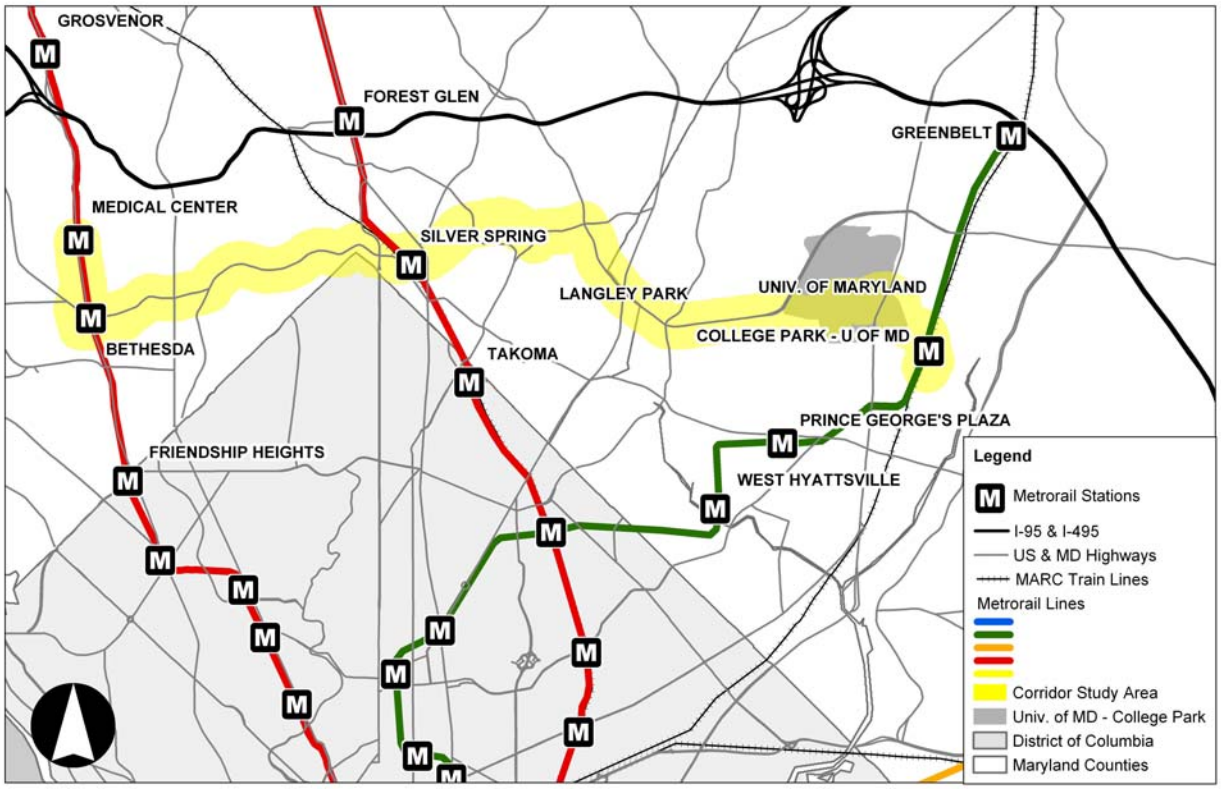
Executive Summary

Service Area

The Maryland Transit Administration (MTA) and the Washington Metropolitan Area Transit Authority (WMATA) undertook this study to evaluate the opportunities to provide Enhanced Bus Service between Bethesda and College Park, Maryland, prior to completion of the proposed Purple Line. The route is currently known as the Metrobus J4, a peak-period-only, limited stop service. The study corridor is located in Montgomery and Prince George's counties and is roughly 12 miles in length, connecting the Bethesda, Silver Spring, and College Park Metrorail stations and their respective central core areas. It includes the Langley Park crossroads area, one of the busiest transfer locations in the Metrobus system and the heart of the University Boulevard commercial strip.



Service Demand

The circumferential route just inside the Capital Beltway is also home to dense suburban apartment complexes, compact neighborhoods of single family homes, and a significant number of smaller neighborhood shopping venues. The major employers anchoring the corridor include the University of Maryland's flagship campus in College Park and the National Institute of Health and the National Naval Medical Center in Bethesda.

A survey of corridor passengers found that ridership is 78 percent transit dependent, 87 percent minority, and with low household incomes. They are predominantly young, slightly more likely to be female than male, and almost 50 percent pay with cash. Reflecting the high level of transit dependency, there is a high level of non-work travel, with one of every three morning trips (6 a.m. to noon) being for non-work purposes and half of all afternoon trips (noon to 6

p.m.) being for non-work purposes. Customer satisfaction was strong with 60 percent of passengers rating the service to 8 to 10 on a 10-point scale, where 10 is excellent and 1 is poor.

Fifty-four percent of surveyed corridor riders transfer between buses as part of their trip and roughly a quarter of surveyed Ride On 15 riders transferred to a J1, J2, or J3 bus, all of whom would experience an advantage by taking the enhanced J4. The enhanced J4 would also serve existing J2/J3 and Ride On 15 passengers who would benefit from the improved travel times and frequencies on a limited-stop service. An enhanced, limited-stop service will provide more direct and convenient transportation service to those who work and study at these major suburban destinations.

Project Purpose

Rapid and Enhanced Bus Service has been the subject of recent interest in the Washington region and was conceptually developed in WMATA's 2004 Regional Bus Study. Concurrent with the long-term planning for the Purple Line in this corridor, the Maryland Department of Transportation (MDOT) proposed a multi-agency evaluation of existing service in the corridor and the opportunity for physical and service improvements. MTA and WMATA are collaborating to achieve a coordinated set of physical improvements with service and running way enhancements that will meet WMATA's new MetroExtra brand criteria. This will be the first such service in suburban Maryland, preceded by the recent PikeRide initiative in Arlington County and REX service in Fairfax County. The corridor route is proposed as a family of service types branded as "CrossLink," reflecting the radial corridor crossroads connections.

MTA and WMATA worked closely with staff from the Prince George's and Montgomery counties' departments of public works and transportation, the Maryland-National Capital Park and Planning Commission, the State Highway Administration, and the University of Maryland. The agencies participated in the study to generate a concept of enhanced regional service that would potentially alter existing local transit and university shuttle service, provide physical enhancements to shelter waiting areas, and introduce traffic operations measures to improve on-time performance. Four separate task groups were created to focus technical expertise and corridor knowledge on the issues of traffic operations, service planning, stop improvements, and branding/marketing. The plans discussed and analyzed in this document have been guided by this coordination effort.

Project Goals

The project goals that guided the study are listed here.

1. Increase corridor ridership
2. Improve service reliability and schedule adherence
3. Reduce rider travel time
4. Increase span of service
5. Improve connections between major generators (i.e. reduce need for transfers)
6. Improve stop waiting conditions and access, including ADA accessibility
7. Provide better passenger information

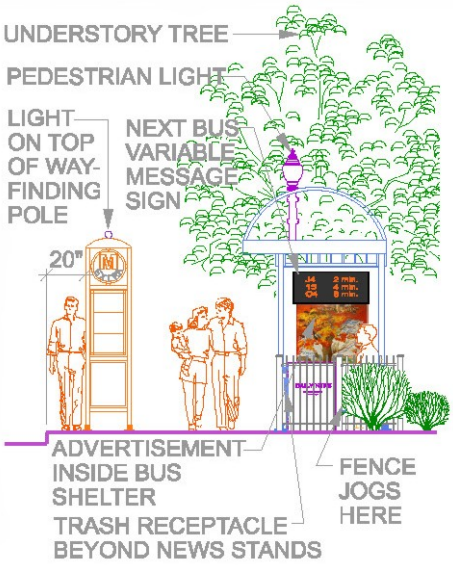
8. Make transit service more visually appealing
9. Better utilize corridor transit resources
10. Improve pedestrian safety at stop locations

Traffic Operations

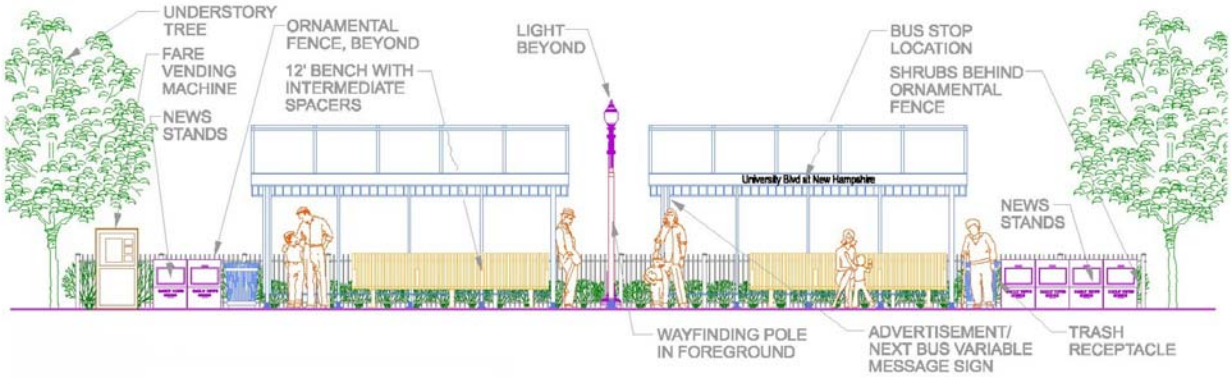
The Traffic Operations Task Group found that while much of the College Park and Silver Spring corridor is heavily congested during peak periods, transit signal priority is possible at most intersections during those hours and offers the potential for greater reductions in traffic delay during off-peak periods. Four intersections were identified for potential queue jumps or queue bypass lanes, creating the opportunity for the bus to further improve travel time and on-time performance. Transit signal priority is currently being pursued within Prince George's County and discussions on implementation are ongoing. Signal priority is not currently an option in Montgomery County due to limitations of existing traffic signal hardware and software. However, Montgomery County's plan for signal system procurements suggests that signal priority will be available in the long-term. An interim solution could address concerns that travel time variability must be addressed for a route this length.

Service Planning & Stop Improvements

The Service Planning and Stop Improvements task groups involved staff from Ride On (Montgomery County), TheBus (Prince George's County), Shuttle-UM (University of Maryland), Maryland Transit Administration (MTA), and the Washington Metropolitan Transit Authority (WMATA). The existing J4 service is the only limited-stop service in the corridor and it operates only during weekday peak periods. The project team worked to identify opportunities to consolidate stops and to modify routes and schedules to further reduce travel times and reach the highest passenger generators.



The new service plan proposes to improve and reduce redundant service in the corridor in three phases, starting with an August 2007 upgrade. The J4 currently operates at 20 minute headways during the peak period only. In Phase 1, this service will increase to 12 minute peak hour headways and 30 minute off-peak headways with operations throughout the day on weekdays. This 12 minute peak headway is the minimum required to qualify for MetroExtra designation. With a concurrent increase in service on the local J3 line, a reduction in service on the J1, and the elimination of the J2, total daily revenue hours of service for this route would increase from 30 to



100 hours per weekday in Phase 1. These changes will result in 19 additional hours of revenue service in the corridor in Phase 1 and increase total annual operating costs by $339,000.

Phases 2 and 3 propose increases in the frequency of limited-stop service along with adjustments to service on the Ride On 15 to further improve service efficiency. These subsequent phases would be implemented as passenger travel patterns balance between the services and as the completed Silver Spring and Takoma/Langley Park transit centers provide additional flexibility.

An evaluation of existing ridership in the J4 corridor resulted in the elimination of four stops and the addition of two stops to capture high-density residential uses in the corridor. The route will be modified to parallel the Ride On #15 bus route in order to add a bus stop in a high-density portion of the corridor. The analysis found poor access and waiting conditions at many stops in the corridor, and identified opportunities to improve the conditions of the shelters and the area surrounding the stops served by the limited stop service, including real-time bus information signs. Stop improvements are expected to cost $481,000 in Phase 1 and $830,900 total.

Branding

The Branding/Marketing Task Group discussed the need to reach out to the wide range of riders in the corridor and to appeal to existing and choice riders. Passenger surveys conducted at 10 existing bus stops east of Silver Spring identified the characteristics of existing riders and their travel patterns. Many passengers did not have an automobile available for the trip and rely on bus services for travel at least 5 times per week.

Conclusion

A new type of service is being designed not only to improve convenience and comfort for existing passengers but also to attract a greater number of transit choice riders. The marketing strategy looks beyond the traditional basic services characteristics and seeks to highlight the intangibles of the customer experience by improving customer access to knowledge of theseservice characteristics into the transit product. The limited-stop route is proposed as MetroExtra service and all of the bus service in the corridor is proposed to be identified under the "CrossLink" brand.

Implementation & Schedule

Pending approval by MDOT and WMATA, implementation of the Phase 1 Service Plan will occur in August 2007. This time-frame will coincide with the introduction of a University of Maryland bus pass program for students and staff. Ongoing work with employers to introduce the service, traffic engineering staff to implement running way enhancements, and local transit partners and state highway engineers to construct stop improvements, would continue beyond the initiation of Phase 1 service.

Chapter 1 Introduction

PROJECT OVERVIEW

The Maryland Transit Administration (MTA) is undertaking the Purple Line Alternatives Analysis and Draft Environmental Impact Statement (AA/Draft EIS) to study a range of alternative means to address mobility and accessibility issues in the corridor between Bethesda and New Carrollton, Maryland. The corridor is located in Montgomery and Prince George's Counties, immediately north of the District of Columbia boundary. The project is intended to provide a rapid transit connection along the 14 mile corridor that links the branches of the Metrorail Red Line (Bethesda and Silver Spring stations), the Green Line (College Park station) and the Orange Line (New Carrollton station).

During the interim study period, and prior to any decision on a Locally Preferred Alternative, the MTA is working with the Washington Metropolitan Area Transit Authority (WMATA) to study potential transit enhancements to the corridor between Bethesda and College Park. These potential enhancements include improved bus frequencies and travel times, improved bus stops and amenities, limited runningway improvements, transit signal priority, and a strategy for improving service quality and passenger satisfaction.

This document begins with a discussion of the project goals and performance measures followed by a description of the service enhancements proposed to the bus routes within the corridor. These sections are followed by alternatives to improve travel times, physical improvements to bus stops, and passenger information, including costs and branding strategies. This report proposes processes to communicate changes to existing riders and develop new riders from concentrated areas of employment and neighborhood activity along the corridor, including alternatives for attracting University of Maryland employees and students. Service marketing and financing of this project is being lead by WMATA and MTA staff.

Study Process

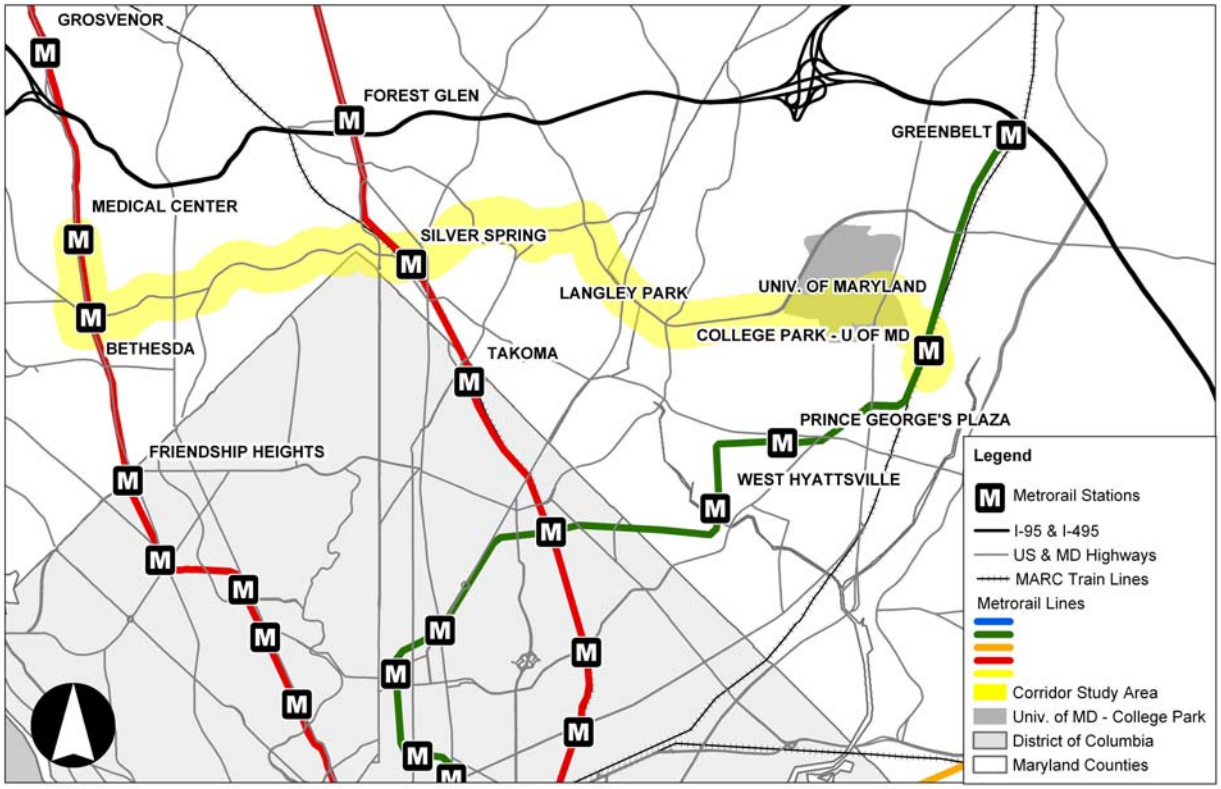
The local transit services and facilities within the study corridor are provided by Montgomery County, Prince George's County and the University of Maryland. The roadways and signal systems are also managed and maintained by local governments and the Maryland State Highway Administration (SHA). Collaboration and integration of systems are considered essential to creating a seamless and fully integrated service addition. In that spirit, this project began on May 31, 2006, with a meeting to introduce the concept of enhanced bus service for this corridor. Communication with local partners, including Montgomery County, Prince George's County, Maryland-National Parks and Planning Commission, and the University of Maryland, led to the creation of four working groups. WMATA and MTA staff, the consultant team, and staff from each county have been meeting to tailor approaches to the specific conditions and needs of each partner. The following task groups are listed in Appendix A along with key milestone meetings.

- Traffic Operations
- Service Planning
- Stop Improvements
- Branding/Marketing

PURPOSE AND NEED

The Bethesda-College Park corridor is densely populated and includes the core business districts of Bethesda, Silver Spring, and Langley Park, as well as key areas of concentrated activity in Takoma Park and the University of Maryland campus at College Park. The corridor is located approximately eight miles north and northeast of Washington, D.C. with a majority of the alignment situated one to three miles inside of the circumferential I-95/I-495 Capital Beltway.

Exhibit 1-1 Location of the Project Corridor



East-west passenger trip patterns are relatively strong, with the majority of trips to and from the major commercial areas of Bethesda, Medical Center, Silver Spring, and the University of Maryland. Many passengers also connect with the Metrorail system at those same locations. Bus service in the corridor is disjointed—the corridor is divided into three segments, each with different bus routes and service providers. Combined, the bus routes in the corridor carry more than 23,000 passengers each weekday, including through trips. WMATA's J1, J2, and J3 carry nearly 6,500 passengers per day between Montgomery Mall and Silver Spring; Ride On's 15 carries 7,200 between Silver Spring and Langley Park each day; and WMATA's C2/C4, Prince George's County's Route 17, and Shuttle-UM's Silver Spring route carry approximately 6,500 passengers between Langley Park and College Park. The only bus route operating the entire length of the corridor, WMATA's J4, carries nearly 1,000 weekday passengers. This service operates only during weekday peak periods at a 20 minute headway.

Improvements to the transportation system in the corridor would address the following transportation challenges:

- Increasing congestion
- Slow transit travel times

- Limited alternative travel options for suburban east-west markets
- Poor mobility and accessibility between key activity centers and employment hubs
- Slow and unreliable connections to radial Metrorail lines and to other rail and bus services.

PROJECT GOALS AND PERFORMANCE MEASURES

Service Goals

1. Increase corridor ridership
2. Improve schedule adherence and service reliability
3. Reduce rider travel time
4. Improve span of service
5. Improve connections between major generators (one seat ride)
6. Improve stop waiting conditions and access, including ADA accessibility
7. Provide better passenger information
8. Make transit service more visually appealing
9. Better utilize corridor transit resources
10. Improve pedestrian safety at stop locations

To achieve these goals, and to provide a means of measuring the success of the improvements in achieving these goals, specific service performance measures were developed by the study team, as shown in Exhibit 1-2. These measures represent a spectrum of performance and customer service attributes and, where quantifiable, include targets to achieve.

Prior to the start of the proposed service and stop changes, data will be collected by the transit agencies to provide the baseline for each of the performance measures. After at least 12 months following initiation of service changes, the same data will be collected and comparisons made to the baseline to determine how well the changes are achieving the stated goals. Improvements in ridership, customer satisfaction, passenger loadings, and travel times can all be assessed.

Service Performance Measures

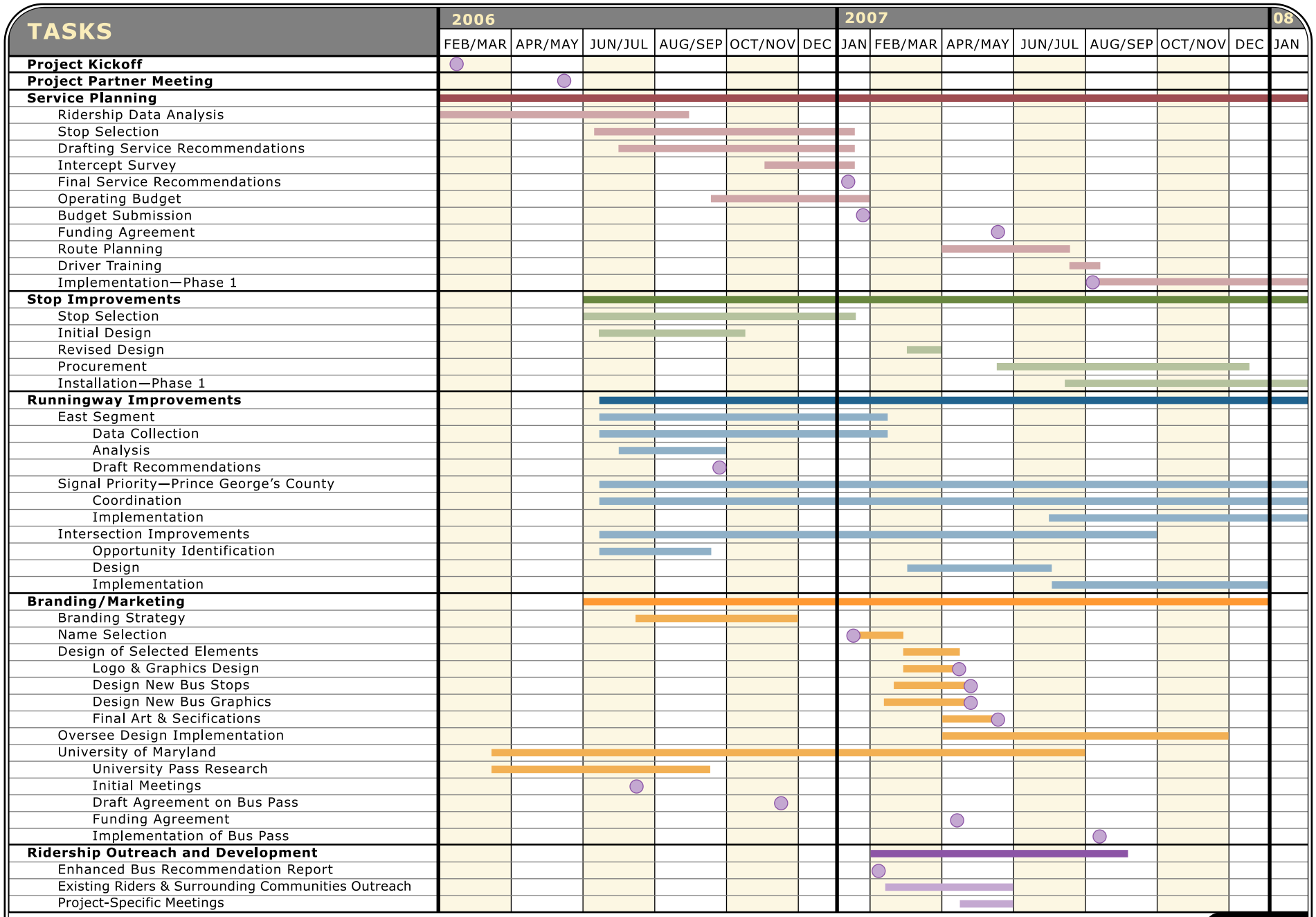
Exhibit 1-2 Service Performance Measures

Goal	Measure	Existing	Target	Evaluation Process
1	Increase Corridor & Route Ridership	Roughly 23,000 daily corridor riders	Increase corridor ridership by 5-10% within the first year	Measure ridership increases across all service within the corridor (Ride Check at each corridor stop before and after service deployment or selected peak period bus routes)
2	Minimize Overcrowding	Occasional overcrowding on C2/C4 line	Maximum Load Factor of 1.2[1]	On-board Ride Check or APC data
3	Improve Service Reliability (bus bunching)	Significant variability in corridor travel time (8 min. standard deviation, AVL variability)	5-10% reduction in number of late buses; 0% early	AVL schedule adherence, signal priority granting for late buses & other internal data collection
4	Reduce Passenger Travel Times	58 min. avg. on J4 avg. 80 min. avg. local bus	25% faster than local bus option[2]	AVL data comparison
5	Provide all day, all-week service	Peak service only	Phase in weekend service	Compare schedule service hours by day of week
6	Provide more "one-seat rides"	700 riders pass through Silver Spring without a transfer	10% increase	Conduct before and after on-street intercept surveys
7	Improve all J4 stops to have shelters and be ADA accessible	Inconsistent passenger waiting amenity at existing stops	All 16 J4 stops in corridor w/ enhanced sheltered waiting environment	Visual stop inspections
8	Provide better customer information	Static pole-mounted route and timetable	Real-time arrival information at all J4 stops & via the internet	Monitor introduction of Next Bus & web-based AVL tracking system
9	Present an image attractive to choice riders	21% of current corridor riders are choice riders	50% increase in corridor choice riders	Survey customers after 1 year of service improvements and branding implementation
10	Improve Corridor Transit Service Efficiency	WMATA corridor service currently averages 50.32 weekday pass./rev. hour (J4 is 32.8 pass./rev. hour, J1,2,3 is 46.5, F8 is 34.1, F4,6 is 50.8, and C2,4 is 58.5)	Maintain at least 36 weekday passengers/vehicle revenue hour[3] with new service	Monitor ridership & service provision
11	Increase Person Capacity of Transportation System	Current evaluation focuses specifically on vehicle throughput, not considering passengers conveyed by transit	Increase passenger throughput at key intersections	Measure person throughput across all facilities within the corridor at key cordon lines
12	Improve pedestrian safety at stop locations	Stops in corridor with unsignalized crossing, other unsafe features	All possible stops w/ traffic control, crossing safety & area lighting	Monitor road safety upgrades and stop relocations
Other	Minimize disruption to motorists	Varies by location	Limit increase in side street vehicle delay to 25%	Monitor complaint calls associated with signal priority

[1] Existing WMATA policy
[2] WMATA Regional Bus Study – Characteristics of RapidBus service
[3] WMATA Regional Bus Study – Characteristics of RapidBus service

PROJECT MILESTONES & TIMELINE

Figure 1-1 shows the span of work on different aspects of the project and key milestones along the way.



Milestones & Schedule

FIGURE 1-1

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Chapter 2 Service Plan

EXISTING TRANSIT

Existing transit operating east-west within the corridor consists of several overlapping or interconnecting routes as shown in Figure 2-1. WMATA operates the regional routes, those that are inter-jurisdictional routes, while each of the counties operate the local routes.

WMATA routes J1, J2, and J3, with a combined headway of 6 minutes (a bus every 6 minutes in the peak period), serve the long-haul trips between Montgomery Mall, Medical Center, Bethesda, and Silver Spring, with 6,500 daily weekday passenger trips. Ride On's route 15 is the primary service between Silver Spring and Langley Park with 4-minute headways in the peak period and nearly 7,200 daily weekday passenger trips. East of Langley Park, WMATA's C2 and C4 carry most of the load, with C4 diverting south to Prince George's Plaza and C2 continuing through the University of Maryland campus, then traveling north on US 1 to the Greenbelt Metro station. WMATA's route F6 also serves a portion of the corridor, connecting Prince George's Plaza Metro station with the University of Maryland campus, the College Park Metro station, and the New Carrollton Metro station.

The Silver Spring Metro station is a major transportation hub, with nearly 120 buses per hour in the peak periods. The majority of these routes terminate at Silver Spring. Approximately 10,000 bus-to-bus transfers take place daily, in addition to the large bus-to-rail movements. Route J4 is the only east-west route that does not terminate at Silver Spring (i.e. avoid transfer time penalty/ridership loss) east and west of Silver Spring.

Exhibit 2-1 Existing Corridor Bus Headways and Ridership

Route	Terminal and Intermediate Points	Early Morning	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday	Average Daily Riders
J1	Montgomery Mall-Medical Ctr-Silver Spring Metro		20		20				790
J2	Montgomery Mall-Bethesda-Silver Spring Metro	20	17	20	24	15	20	25	4,750
J3	Montgomery Mall-Bethesda-Silver Spring Metro		17		24				1,020
J4	Bethesda Metro-Silver Spring-College Park Metro		20		20				1,025
C2	Wheaton Metro-Greenbelt Metro		22	30	16		30		5,180
C4	Twinbrook Metro-Prince George's Plaza Metro	10	22	30	16	30	30	16	7,780
F4	Silver Spring Metro – New Carrollton Metro	12	12	40	15		30	60	4,640
F6	Silver Spring Metro– New Carrollton Metro		20	40	30				3,090
Ride On 15	Silver Spring Metro-Langley Park	15	4	12	4	30	12	15	7,150
TheBus 17	Langley Park-UMD-College Park Metro	45	45	45	45				44
Shuttle-UM Silver Spring	UMD – Silver Spring Metro		35	75	45	30			500

Operating Plan
Existing Transit

FIGURE
2-1

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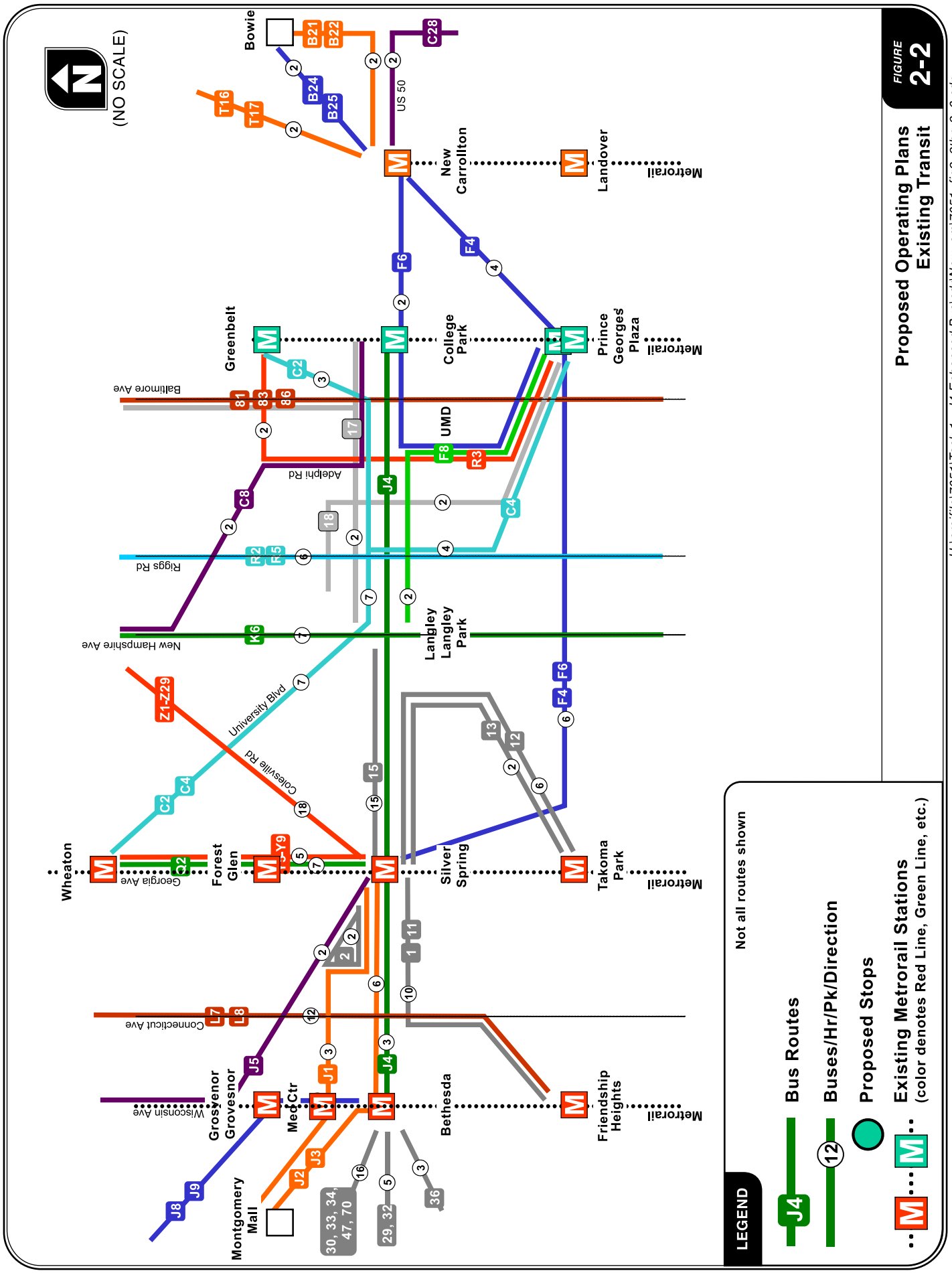
(NO SCALE)
Bowie
B21
B22
B24
B25
C28
US 50
T16
T17
New Carrollton
Landover
Metrorail
F6
F4
Greenbelt
College Park
Prince Georges Plaza
Metrorail
Baltimore Ave
81
83
86
C2
17
UMD
F8
R3
Adelphi Rd
J4
C8
18
C4
R2
R5
Riggs Rd
K6
New Hampshire Ave
Langley Park
Z1-Z29
University Blvd
Colesville Rd
15
13
12
Wheaton
Georgia Ave
Forest Glen
Y9
Silver Spring
Takoma Park
Metrorail
2
1
11
10
L7
L8
Connecticut Ave
J5
Grosvenor
Wisconsin Ave
J1
Med Ctr
Bethesda
Friendship Heights
Metrorail
J8
J9
Montgomery Mall
J2
J3
30, 33, 34, 47, 70
29, 32
36
LEGEND
Not all routes shown
Bus Routes
J4
Buses/Hr/Pk/Direction
12
Proposed Stops
Existing Metrorail Stations
(color denotes Red Line, Green Line, etc.)
M
FIGURE 2-2
Proposed Operating Plans
Existing Transit
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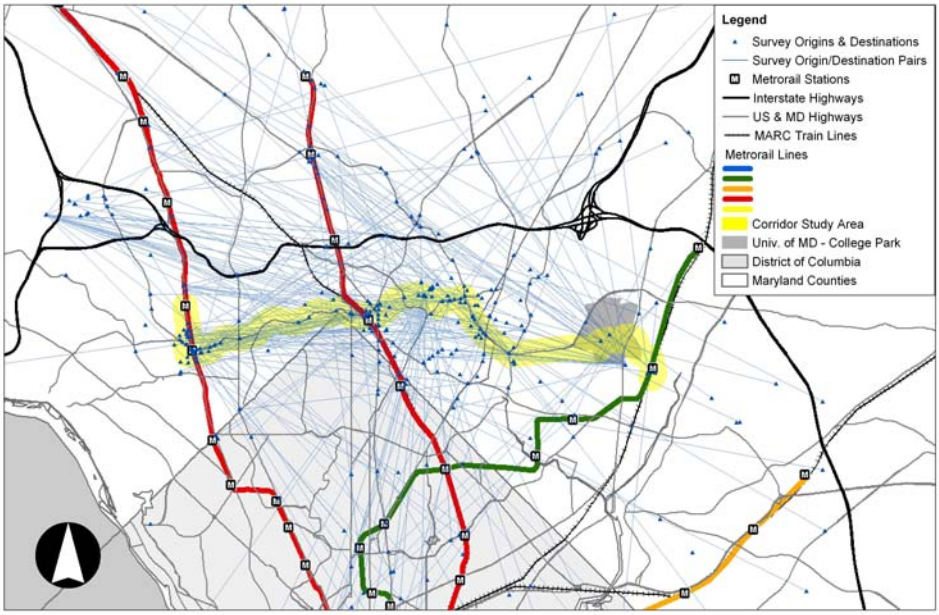
Passenger Survey

A passenger survey was conducted in late Fall of 2006 to gain a better understanding of the trip patterns within the corridor. Details of the survey can be found in Chapter 5 and Appendix B. The data suggests that around 15%[4] of the corridor's existing transit riders would benefit from a more frequent single seat ride, similar to what is provided by the current J4 route. It also suggests that the existing J4 is capturing less than half of the current market. This doesn't take into account riders from the University of Maryland — 500+ daily riders on their Silver Spring route and additional riders who previously rode a shuttle to Bethesda. Also, this only looks at existing transit riders and does not include potential riders that would be attracted to more frequent and better promoted service.

Additional support for a one seat ride comes from an analysis of those who are satisfied with the service and those who would make changes. Over half (54%) of those surveyed have to transfer to complete their trips. Riders who did not have to transfer were more likely to state that they were satisfied with their service and had no suggestions for improvement (44% of no-transfer Metrobus riders and 41% of no-transfer Ride On riders). Half as many of the riders who used multiple buses were satisfied with current service (27%). They were also slightly more likely to suggest that buses run on time.

Finally, looking at those who were neutral or dissatisfied with their service, almost half (49%) wanted the service to run on time, indicating that on-time performance is the most important factor in customer satisfaction.

Exhibit 2-2 Intercept Survey Origin & Destination Pairs



PROPOSED CONCEPT FOR ENHANCED SERVICE

The long-term vision for enhanced service in the corridor would include a hierarchy of limited-stop and local bus routes between Medical Center/Bethesda and College Park. The limited-stop

[4] Origin and destinations were not available from all surveyed passengers and it is likely that further analysis would show greater potential ridership for limited-stop service spanning this corridor

route(s) would provide faster connections between major origins and destinations, while the local routes would serve the less utilized stops. These routes would all be branded as part of the integrated 'CrossLink' service, with coordinated schedules, shelters, and signage.

As shown in Figure 2-3, the service concept includes two overlapping limited-stop routes, labeled "A" and "B," and a local route labeled "C." Limited-stop Route "A" would operate between the Bethesda Metro station and the College Park Metro station, replacing the existing Route J4. Route "B" would operate between the Medical Center Metro station and Riggs Road via Bethesda. Riggs Road is a desirable terminus because of the large number of boardings there and because east of Riggs Road the passenger volumes on University Boulevard drop off significantly. Both routes are proposed to operate at a 10-minute peak headway, providing a composite 5-minute headway between Bethesda and Riggs Road, where the passenger volumes are the highest, and a 10-minute headway between Riggs Road and the College Park Metro station, where the passenger volumes are not as high. If passenger volumes warrant, the 5-minute peak period headway could be extended to the College Park Metro station.

Route "C" would make all local sops and operate at 10-15 minute peak headways between Montgomery Mall, Bethesda, and College Park, either as a single service or as two services connecting at Langley Park.

Highlights:

- Routes A and B provide faster, one-seat rides between major activity centers, including Medical Center Metro Station, Bethesda Metro Station, Silver Spring Metro station, Takoma Park, Langley Park, University of Maryland, and the College Park Metro Station. These routes also serve transfers to bus routes operating on radial streets. In addition to the routes at the Metrorail stations listed, these routes include those on Wisconsin Avenue, Connecticut Avenue, Colesville Road and Georgia Avenue, University Boulevard, New Hampshire Avenue, and Riggs Road. Routes A and B serve the long-haul trips now carried by WMATA J2/J3/J4, Ride On 15, and, to a degree, WMATA C2/C4, and are estimated to serve nearly 80 percent of the passengers now riding those existing routes along this corridor.
- Route C, operating as either one continuous route or two connecting routes, provides service to the lower volume stops, as well as the stops served by the limited service, offering connections to the long-haul services. This service is provided by the J2 & J3, Ride On 15, and TheBus 17 in the following phases.

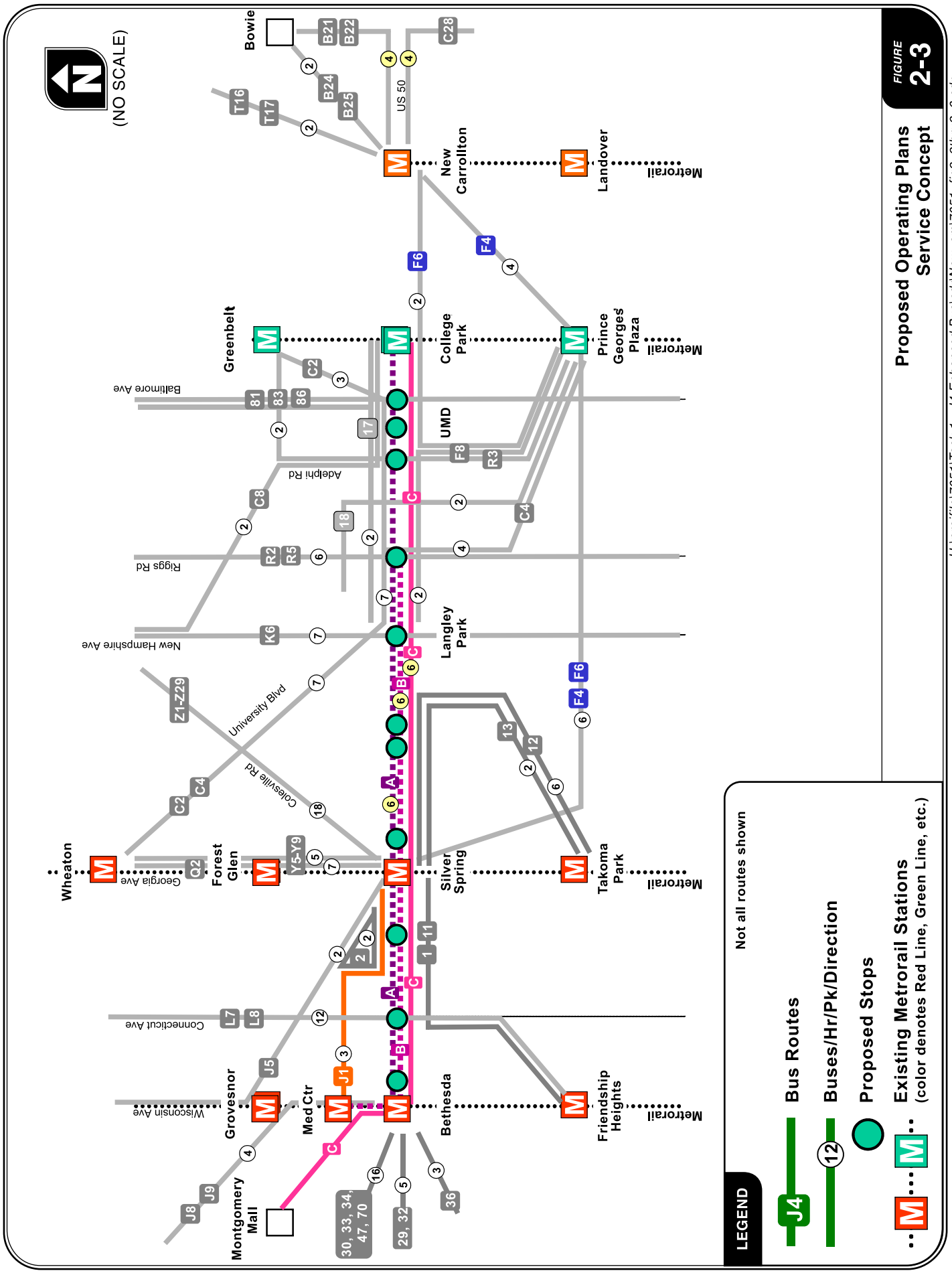


FIGURE 2-3

Proposed Operating Plans Service Concept

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SERVICE IMPLEMENTATION PHASING

The service changes described in the proposed concept are intended to be implemented in phases, which will institute the enhanced, limited-stop service before making significant changes to existing routes. Phase 1 improves weekday service on the J4, modifies routes J1-3, and implements service oversight and training to improve on-time performance and quality control. Phase 2 increases frequency of the J4, adds Saturday service, and begins to modify parallel routes. After passengers have the opportunity to try and become accustomed to the new service, Phase 3 would be implemented, making final changes to local route.

Phase 1

Phase 1 of the service implementation includes the changes that can be made by August 2007. Implementation of these changes will require the coordinated efforts of multiple agencies and jurisdictions in the project corridor.

- Re-branding of route J4 as a MetroExtra limited-stop service, increasing peak period frequencies to 5 buses per hour per direction, and adding base (midday and early evening) service at 2 buses per hour per direction. No weekend service.
- Combining J2 and J3 into one route (referred to as J3 from here on) and reducing frequency to a 15 minute headway.
- Terminating J1 at Medical Center
- Eliminating Shuttle-UM's Silver Spring route.

Exhibit 2-3 Phase 1 Bus Headways

Route	Terminal and Intermediate Points	Early Morning	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday
J1	Medical Center – Silver Spring		20		20			
J2	eliminate, combine with J3							
J3	Montgomery Mall-Bethesda-Silver Spring Metro	20	12	20	12	20	20	25
J4	Bethesda – College Park	30	12	30	12	30		
C2	Wheaton Metro-Greenbelt Metro		22	30	16		30	
C4	Twinbrook Metro-Prince George's Plaza Metro	10	22	30	16	30	30	16
F4	Silver Spring – New Carrollton	12	12	40	15		30	60
F6	Silver Spring – New Carrollton		20	40	30			
Ride On 15	Silver Spring Metro-Langley Park	15	4	12	4	30	12	15
TheBus 17	Langley Park-UMD-College Park Metro	45	45	45	45			
Shuttle-UM Silver Spring	eliminate							

In addition to improved frequency of service, other changes are proposed to help improve the quality of the ride and general reliability. Many of these changes are outlined below.

VEHICLE DESIGN AND AMENITIES

- Convert all J4 buses to the dedicated MetroExtra livery.
- Use regular Metrobuses on J1, J2, and J3.
- Seek demonstration of on-board television within the first year to determine passenger response.
- Ensure the heating and air conditioning equipment works properly on 95% of in-season days on all J1, J2, J3, and J4 buses.
- Ensure that all lights, destination signs, voice and visual annunciators, stop request systems, video displays and customer information are in clean working condition on all J1, J2, J3, and J4 buses.
- Ensure that the kneeling feature and the lift and/or access ramp on all in-service J1, J2, J3, and J4 buses work reliably with no pass-by of customers requesting service.
- Ensure that all seats and aisles are policed at the conclusion of each trip, swept daily and cleaned at least weekly to maintain a clean, non-soiled passenger compartment condition free of litter, graffiti, and damaged seats on all J4 buses.

CUSTOMER MARKETING AND COMMUNICATIONS

- Ensure that all J1, J2, J3, and J4 stops have high quality, current and accurate service schedules, route maps, fare descriptions, and rider information.
- Install Next Bus signs at all J4 bus stops and information provided via internet and telephone interactive voice recognition.
- Maintain a web page on the WMATA website to support J1, J2, J3, and J4 service promotions and project reports.
- Prepare a coordinated promotion plan for all activities in FY 2008 which focuses on the MetroExtra J4 and includes J1, J2, and J3, Ride On 15, C2, C4 and TheBus 17 as integral parts of the integrated CrossLink corridor.
- Provide sufficient promotional resource (at least $0.10 per annual rider per year) to sustain a promotion and customer communication program including internet, voice and print resources, and achieve 50% market awareness and 75% rider awareness of service identity and unrestricted access to route brochures.
- Install service information displays at each J4 bus stop and inserts regularly updated concerning upcoming holiday schedules, pre-planned detours, service adjustments and other information relevant to or affecting J1, J2, J3, and J4 passengers.
- Ensure that each J1, J2, J3, and J4 bus has current service information and schedules on display and in take-one holders.
- Create and update a J1, J2, J3, and J4 corridor brochure to promote and inform customers about the project and the integrated family of services.
- Install regional bus enhancement maps at bus stops at Metrorail stations.
- Provide trailblazer information and signs from Metrorail stations to J1, J2, J3, and J4 bus stops.
- Create coordinated and cooperative promotional partnerships with Rock Spring Park, Bethesda and Silver Spring TMDs, Ride On, TheBus, City of College Park, MTA, and University of Maryland.

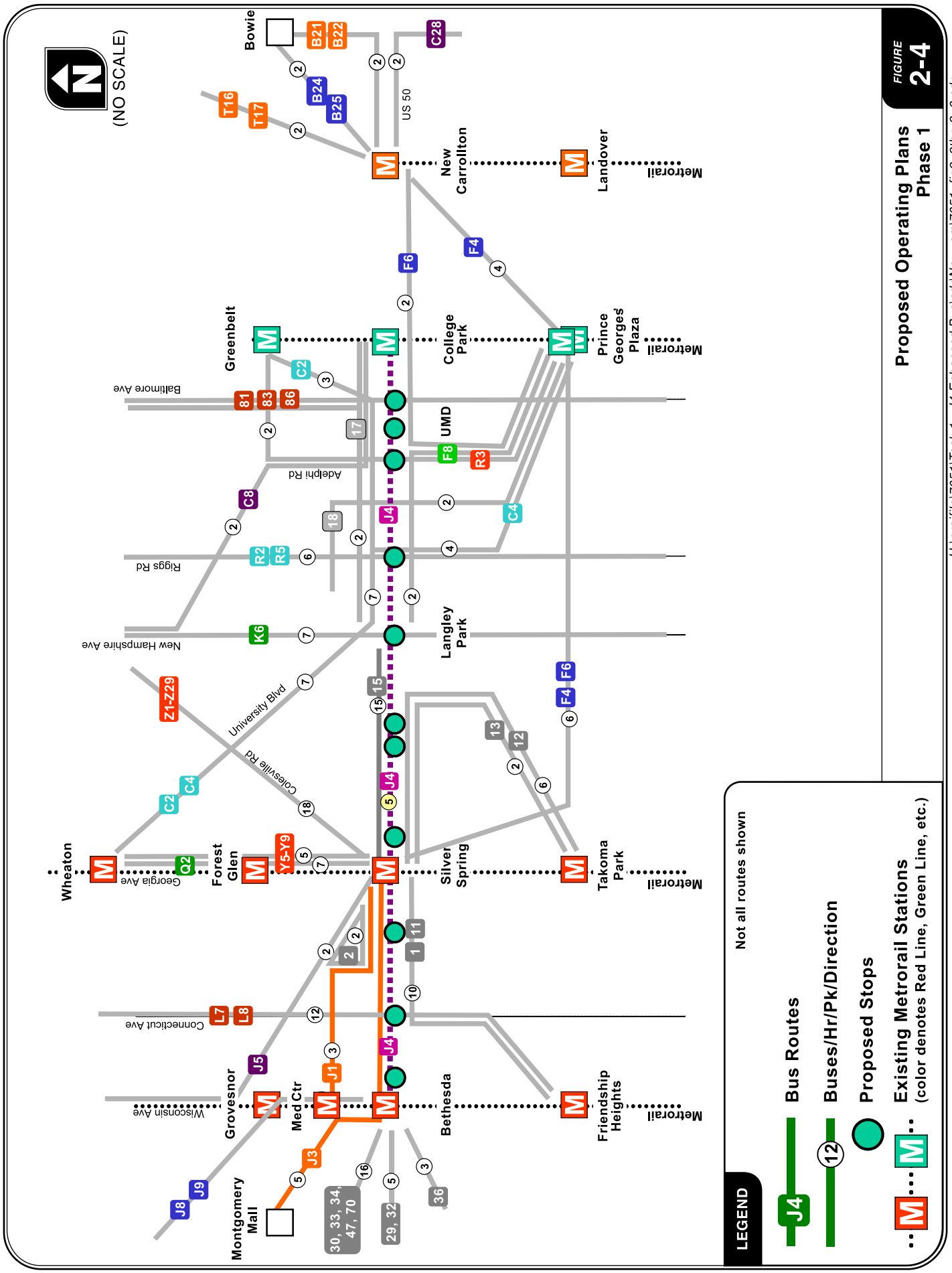
SERVICE PERSONNEL AND MANAGEMENT

- Dedicate a supervisory team to the J1, J2, J3, and J4 service with coverage during all hours of revenue operation.
- Have all J1, J2, J3, and J4 bus operators complete J1, J2, J3, and J4 service awareness training.
- Have all J4 bus operators complete enhanced customer service and area awareness training prior to operating service.
- Deploy Automatic Vehicle Location (AVL) on all buses involved in providing J1, J2, J3, and J4 service and use AVL to monitor and direct service.
- Ensure that all supervisor scout cars and operating divisions, in addition to existing radio communications, have internet access to AVL and Next Bus information to facilitate service management.
- Designate a CrossLink Corridor Project Manager to ensure follow-on, completion, and proper execution of all elements of project plans.
- Create a CrossLink Corridor Advisory Committee of stakeholder interests to provide ongoing project coordination and policy recommendations.
- Document service operations plans, including strategies for addressing detours, snow plans, operating procedures, terminal practices, on-time recovery, etc. by SOP and NTO and compile into a J1, J2, J3, and J4 Operations Plan.
- On-Time Performance - The service will be managed to achieve greater than 90% route and schedule adherence as measured as an average of a sample of at least 100 randomly selected trips per month measured at the beginning, midpoint, and end of the line.
- Prepare monthly performance monitoring reports by project team and widely distribute to stakeholder interests.

ENFORCEMENT, SAFETY, SECURITY AND INCIDENT RESPONSE

- Prepare a contact list of all first responders and responsibilities and distribute to all supervisory and management staff of transit operators.
- Metro Transit Police Department monitoring plan approved.
- Install video monitoring cameras on all J4 buses and >50% of J1, J2, and J3 buses.
- Prepare a plan for coordination of coverage and response strategies in conjunction with local police forces in the corridor.
- Prepare bus station incident response plans for Medical Center, Bethesda, Silver Spring and College Park.
- Document agency commitments to traffic enforcement strategies coordinated with operations plans.

Combined, these procedural and personnel changes will help maintain consistent and reliable service. These changes will be carried over and further enhanced as needed in subsequent phases.


(NO SCALE)
Bowie
B21
B22
C28
B24
B25
T16
T17
US 50
New Carrollton
Landover
Metrorail
F6
F4
Greenbelt
College Park
Prince Georges Plaza
Metrorail
C2
Baltimore Ave
81
83
86
17
UMD
F8
R3
Adelphi Rd
C8
18
J4
C4
R2
R5
Riggs Rd
K6
New Hampshire Ave
Langley Park
Z1-Z29
University Blvd
15
13
12
Colesville Rd
C2
C4
Wheaton
Georgia Ave
Q2
Forest Glen
Y5-Y9
Silver Spring
Takoma Park
Metrorail
11
1
2
L7
L8
Connecticut Ave
J5
Grovesnor
Wisconsin Ave
Med Ctr
J1
J3
Bethesda
Friendship Heights
Metrorail
J8
J9
Montgomery Mall
30, 33, 34, 47, 70
29, 32
36
LEGEND
Not all routes shown
Bus Routes
J4
Buses/Hr/Pk/Direction
12
Proposed Stops
Existing Metrorail Stations
(color denotes Red Line, Green Line, etc.)
M
Proposed Operating Plans
Phase 1
FIGURE
2-4
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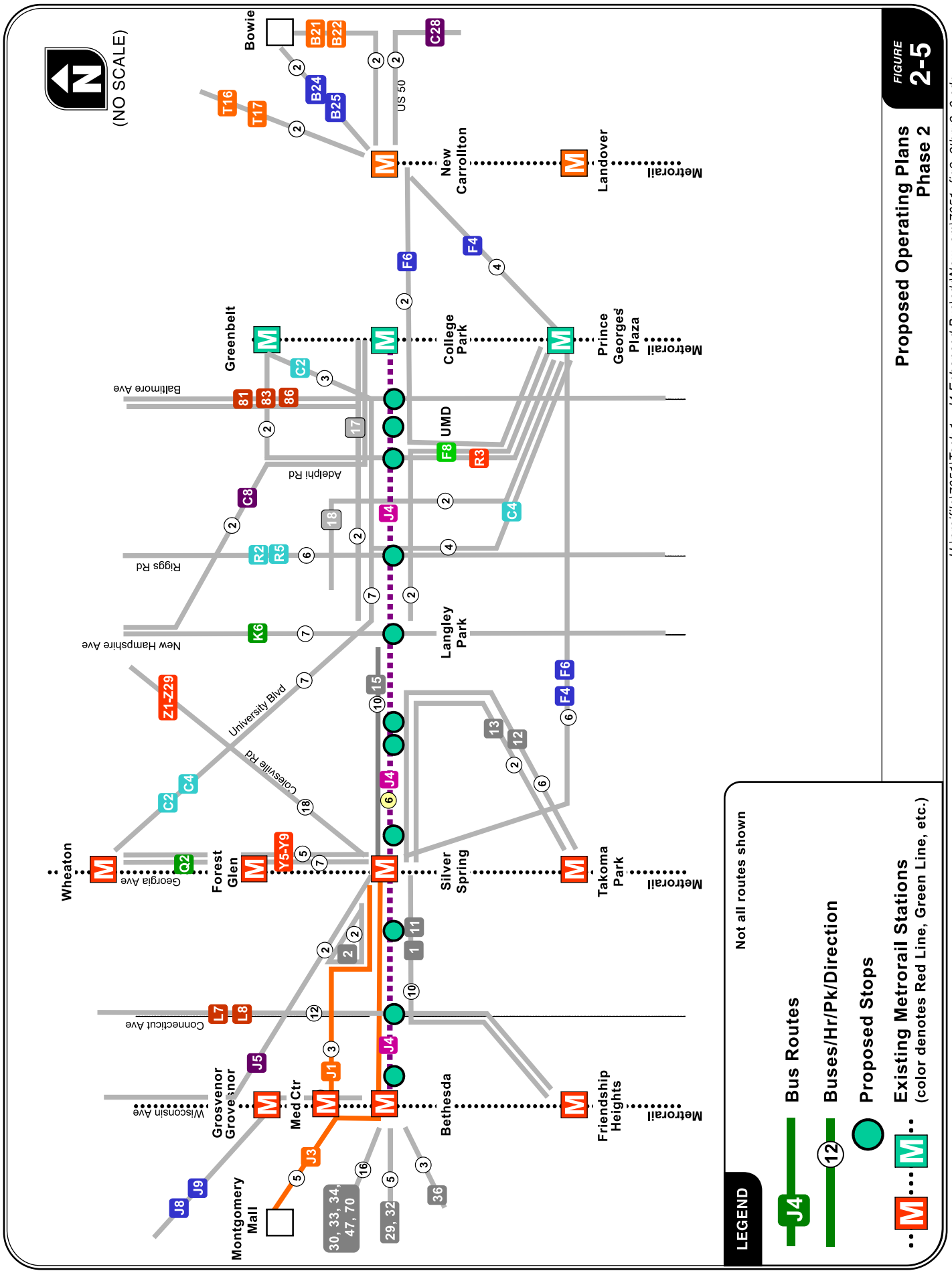
Phase 2

Phase 2 further improves weekday frequencies on route J4, adds Saturday service, and reduces some of the parallel local services. Phases 2 and 3 will be implemented as demand and funding justify additional service in the corridor.

- Peak period service is increased to 6 buses per hour per direction
- Base period service is increased to 3 buses per hour per direction.
- Saturday service is added, with either 2 or 3 buses per hour per direction.
- Ride On 15 service headways widened from between 4-6 minutes to reflect actual passenger loads.

Exhibit 2-4 Phase 2 Bus Headways

Route	Terminal and Intermediate Points	Early Morning	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday
J1	Medical Center – Silver Spring		20		20			
J3	Montgomery Mall-Bethesda-Silver Spring Metro	20	12	20	12	20	20	25
J4	Bethesda – College Park	20	10	20	10	20	30	
C2	Wheaton Metro-Greenbelt Metro		22	30	16		30	
C4	Twinbrook Metro-Prince George's Plaza Metro	10	22	30	16	30	30	16
F4	Silver Spring – New Carrollton	12	12	40	15		30	60
F6	Silver Spring – New Carrollton		20	40	30			
Ride On 15	Silver Spring Metro-Langley Park	15	6	12	6	30	12	15
TheBus 17	Langley Park-UMD-College Park Metro	45	45	45	45			


(NO SCALE)
Bowie
B21
B22
C28
B24
B25
T16
T17
US 50
New Carrollton
Landover
Metrorail
F6
F4
Greenbelt
College Park
Prince Georges Plaza
C2
Baltimore Ave
81
83
86
UMD
F8
R3
Adelphi Rd
C8
J4
C4
R2
R5
Riggs Rd
New Hampshire Ave
K6
Langley Park
Z1-Z29
University Blvd
Colesville Rd
Wheaton
Georgia Ave
Q2
Forest Glen
Y5-Y9
Silver Spring
Takoma Park
Connecticut Ave
L7
L8
Wisconsin Ave
J5
Grosvenor
Med Ctr
J1
J3
Bethesda
Friendship Heights
Montgomery Mall
J8
J9
30, 33, 34, 47, 70
29, 32
36
LEGEND
Not all routes shown
Bus Routes
Buses/Hr/Pk/Direction
Proposed Stops
Existing Metrorail Stations
(color denotes Red Line, Green Line, etc.)
FIGURE 2-5
Proposed Operating Plans Phase 2
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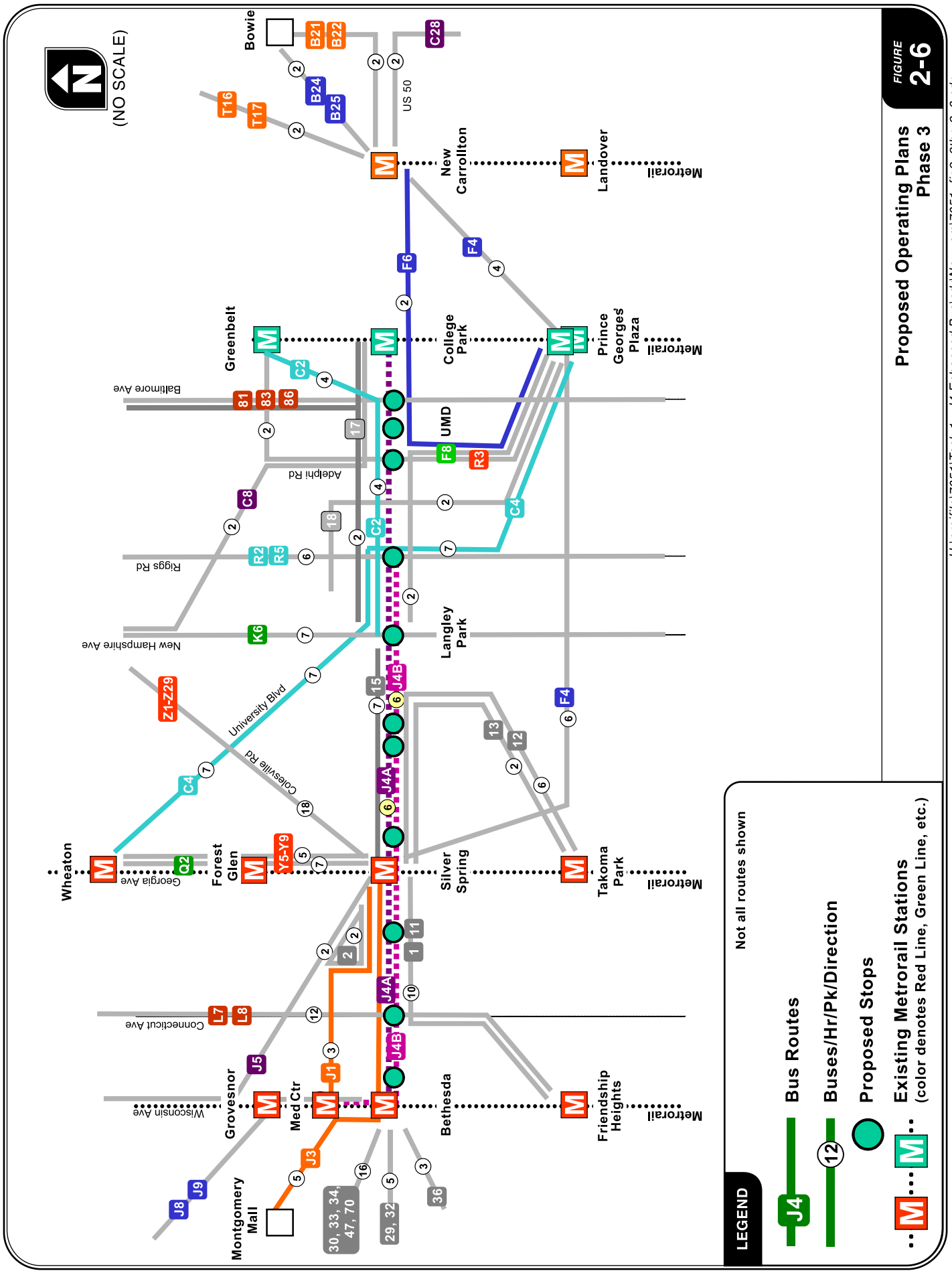
Phase 3

After passenger travel patterns adjust and balance, operating performance and ridership would be measured and Phase 3 improvements would be modified accordingly. As shown in Figure 2-6, the following changes are proposed for Phase 3:

- Adding a second variation of limited-stop service between Medical Center and Riggs Road ("B" in the concept drawing in Figure 2-3) at 6 buses per hour per direction in the peak and 3 buses per hour per direction in the base period. Composite headways between Bethesda and Riggs Road will be 5 minutes in peak and 10 minutes off-peak with the two routes.
- Reducing Ride On 15 service frequency to 8 minute headways in peak.
- Providing the local service between it and Greenbelt Metro Station in Prince George's County, the western end of Route C2 is terminated at Langley Park. This change requires a location in the Langley Park area for layover. Headways on Route C4 would be adjusted to serve the passenger volumes on University Boulevard.
- Terminating Route F6 at Prince George's Plaza Metro station, with the headways of F4 adjusted.

Exhibit 2-5 Phase 3 Bus Headways

Route	Terminal and Intermediate Points	Early Morning	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday
J1	Medical Center – Silver Spring		20		20			
J3	Montgomery Mall – Bethesda-Silver Spring Metro	20	12	20	12	20	20	25
J4A	Medical Center – Bethesda – Riggs Rd	20	10	20	10	20	30	
J4B	Bethesda – College Park	20	10	20	10	20	30	
C2	*Terminate at Langley Park* Langley Park – Greenbelt Metro Station	30	15	20	15	30	30	30
C4	Twinbrook Metro-Prince George's Plaza Metro	10	8	15	8	20	20	20
F4	Silver Spring – New Carrollton	12	10	20	10	30	20	30
F6	*Terminate at Prince George's Plaza* Prince George's Plaza – New Carrollton	30	30	30	30	30	30	30
Ride On 15	Silver Spring Metro – Langley Park	15	8	12	8	30	12	15
TheBus 17	Langley Park – UMD – College Park Metro	45	45	45	45			


(NO SCALE)
Bowie
B21
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R3
Adelphi Rd
C8
18
C4
R2
R5
Riggs Rd
K6
New Hampshire Ave
Langley Park
Z1-Z29
University Blvd
J4B
15
13
12
Colesville Rd
J4A
Wheaton
Georgia Ave
Q2
Forest Glen
Y5-Y9
Silver Spring
Takoma Park
11
1
2
L7
L8
Connecticut Ave
J5
J1
J4B
Grovesnor
Wisconsin Ave
Med Ctr
Bethesda
Friendship Heights
J3
J8
J9
Montgomery Mall
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36
LEGEND
Not all routes shown
Bus Routes
J4
Buses/Hr/Pk/Direction
12
Proposed Stops
Existing Metrorail Stations
(color denotes Red Line, Green Line, etc.)
M
FIGURE 2-6
Proposed Operating Plans Phase 3
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OPERATING COSTS

Operating costs charged to the jurisdictions for WMATA services are a function of "platform hours," which include revenue hours actually operated in service, plus the operating hours driving to and from the bus garage. For purposes of estimating changes in operating costs for this project, the non-regional bus rate of $88.48 per platform hour was used for WMATA routes. For Ride On operating costs, a rate of $70.38 per platform hour was used. Both cost figures were provided by the respective agencies. These costs represent the actual operating costs and do not account for fare revenues; therefore, they do not indicate the amount of subsidy required.

Existing Services

The operating costs for the existing WMATA and Ride On bus routes within the Bethesda – College Park corridor total $20.2 million per year, with $18.4 million per year for WMATA and $1.8 million per year for Ride On Route 15.

Exhibit 2-6 Existing Corridor Service Operating Costs

Route	Daily Revenue Vehicle Miles	Daily Revenue Vehicle Hours	Daily Platform Hours	Weekday Operating Cost	Total Annual Cost
J1	300	29	33	$2,930	$747,000
J2	1,370	117	132	$11,760	$3,903,000
J3	220	21	24	$2,148	$548,000
J4	384	30	40	$3,615	$922,000
C2	1,594	125	141	$12,555	$3,637,000
C4	1,430	112	127	$11,315	$3,969,000
F4	1,110	97	106	$9,405	$2,915,000
F6	866	69	75	$6,715	$1,712,000
WMATA Total	**7,274**	**603**	**683**	**$60,442**	**$18,353,000**
Ride On 15	653	70	79	$5,575	$1,815,000
Corridor Total	**7,928**	**674**	**833**	**$66,017**	**$20,168,000**

Phase 1

Changes in operating costs related to Phase 1 result from more frequent service proposed for route J4, which will increase operating costs by approximately $340,000 per year over existing services.

Exhibit 2-7 Phase 1 Service Operating Costs

Route	Daily Revenue Vehicle Miles	Daily Revenue Vehicle Hours	Daily Platform Hours	Weekday Operating Cost	Total Annual Cost
J4A	1,392	100	113	$10,038	$2,560,000
J4B	0	0	0	$0	$0
J1	126	12	14	$1,227	$313,000
J2	0	0	0	$0	$0
J3	1,200	105	119	$10,517	$3,586,000
J4	0	0	0	$0	$0
C2	1,594	125	142	$12,555	$3,637,000
C4	1,430	113	128	$11,315	$3,969,000
F4	1,110	97	106	$9,405	$2,915,000
F6	866	69	76	$6,715	$1,712,000
WMATA Total	**7,719**	**622**	**698**	**$61,771**	**$18,692,000**
Ride On 15	653	70	79	$5,575	$1,815,000
Corridor Total	**8,372**	**692**	**777**	**$67,346**	**$20,507,000**
Above Existing	444	19	15	$1,329	$339,000

Phase 2

Phase 2 further improves frequencies on J4 and adds Saturday service. The operating costs associated with the increased service on J4 are offset slightly by decreases in Ride On 15 peak period headways.

Exhibit 2-8 Phase 2 Service Operating Costs

Route	Daily Revenue Vehicle Miles	Daily Revenue Vehicle Hours	Daily Platform Hours	Weekday Operating Cost	Total Annual Cost
J4A	1,872	131	148	$13,123	$3,607,000
J4B	0	0	0	$0	$0
J1	126	12	14	$1,227	$313,000
J2	0	0	0	$0	$0
J3	1,200	105	119	$10,517	$3,586,000
J4	0	0	0	$0	$0
C2	1,594	125	142	$12,555	$3,637,000
C4	1,430	113	128	$11,315	$3,969,000
F4	1,110	97	106	$9,405	$2,915,000
F6	866	69	76	$6,715	$1,712,000
WMATA Total	**8,199**	**653**	**733**	**$64,856**	**$19,739,000**
Ride On 15	571	61	69	$4,851	$1,630,000
Corridor Total	**8,770**	**714**	**802**	**$69,707**	**$21,369,000**
Above Phase 1	398	22	25	$2,361	$862,000
Above Existing	842	40	40	$3,690	$1,201,000

Phase 3

Phase 3 completes the proposed service improvements, adding a second variant of the J4 (Route "B" as described in the previous section on proposed service concept), which will be offset by another reduction of Ride On 15 service.

Exhibit 2-7 Phase 3 Service Operating Costs

Route	Daily Revenue Vehicle Miles	Daily Revenue Vehicle Hours	Daily Platform Hours	Weekday Operating Cost	Total Annual Cost
J4A	1,872	131	148	$13,123	$3,607,000
J4B	1,404	104	118	$10,404	$2,653,000
J1	126	12	14	$1,227	$313,000
J2	0	0	0	$0	$0
J3	1,200	105	119	$10,517	$3,586,000
J4	0	0	0	$0	$0
C2	1,594	125	142	$12,555	$3,637,000
C4	1,430	113	128	$11,315	$3,969,000
F4	1,110	97	106	$9,405	$2,915,000
F6	866	69	76	$6,715	$1,712,000
WMATA Total	**9,603**	**757**	**851**	**$75,260**	**$22,392,000**
Ride On 15	415	44	50	$3,532	$1,294,000
Corridor Total	**10,018**	**801**	**901**	**$78,792**	**$23,686,000**
Above Phase 2	1,249	87	99	$9,085	$2,317,000
Above Existing	2,091	128	138	$12,775	$3,518,000

In addition to the added service on route J4, any concurrent changes to routes C2/C4 and F4/F6 would incur additional costs. To split Route C2 from C4 as described in Phase 3 of the service plan would add $2.3 million to the annual operating cost. Splitting Route F6 from F4 as described would add $1.5 million.

To extend Route J4B to College Park rather than Riggs Road, thereby maintaining a 5-minute peak headway the entire distance from Bethesda, would add $1.1 million to the annual operating cost.

SERVICE IMPROVEMENTS

The majority of proposed service improvements involve modifications to WMATA routes. As such, the WMATA calendar of schedule changes governs the timeline for implementation. Modified service typically takes six to seven months to implement. WMATA has two major system changes (picks) each year, in June and December, with jurisdiction approvals beginning the process six months prior. For Phase 1 improvements to occur by August 2007, approvals must be obtained by the following dates:

June 2007	Jurisdiction approval
June 2007	WMATA Board approval
July 2007	Scheduling department finalizes schedules
August 2007	Service changes implemented

Chapter 3 Stop Improvements

In addition to service improvements within the corridor, enhanced amenities are recommended for the bus stops selected to serve enhanced, limited-stop service routes. The concept is to provide a branded, easily identifiable set of bus routes and bus stops for the enhanced service, and to improve those selected bus stops to properly serve the passengers expected to use the enhanced service.

EXISTING BUS STOP FACILITIES

Both Montgomery and Prince George's counties have contracts with advertising vendors to provide and maintain new shelters at selected bus stops. Montgomery County's contract with Clear Channel calls for 400 new shelters over 3 years, about half of those were in place in October 2006. Prince George's County's current contract with Signal Outdoor Advertising has been extended while they issue a new Request for Proposal. The new contract will add 300 more shelters to the 160 existing shelters in Prince George's County. The advertising vendors make revenue from ads placed on the shelters.

In general, both contracts allow the respective counties to:

- Specify the type of shelter to be installed, though this is selected by each county prior to signing the agreement.
- Specify where the new shelters will be installed.
- Specify the size of the shelter at each location. Typically, the specific shelter design is available in different lengths, from 15' to 27'.
- Require the vendor to maintain the shelters.

The counties, therefore, have the ability to prioritize the location of shelters. The counties are responsible for the areas outside of the shelters, including emptying trash receptacles. The counties also have existing contracts that can be used to make sidewalk and other stop improvements.

Within the corridor, the facilities at each bus stop range from a simple sign on a public sidewalk to fully equipped stops with expanded paved waiting areas, new shelters, and trash receptacles. Generally, the stops with the highest passenger boardings have improved amenities, but there are exceptions such as where right-of-way restricts the size of the waiting area. Appendix C provides photos of the existing conditions for the highest volume stops between Bethesda and College Park. Exhibits 3-1 and 3-2 list the existing amenities at each of those stops.

LOCATION OF ENHANCED BUS STOPS

The intent of "limited-stop" bus service is to reduce travel time by reducing the number of stops and eliminating the associated dwell time, concentrating service at locations with the greatest ridership potential. Criteria were developed to help select the stops within the corridor that would serve the highest number of passengers while providing the connections inter-corridor trips require.

Selection Criteria

The bus stops for the limited-stop service were selected using these criteria:

- Select stops with the highest passenger volumes, with the intent of serving the largest number of existing and potential passengers. Stops with more than 100 passenger boardings per day were selected for initial screening, based on recommendations from WMATA's Regional Bus Study.
- Reduce the number of stops by consolidating adjacent stops. At several locations within the corridor, multiple high volume stops exist within only a few blocks. These were studied to determine if they could be consolidated, accounting for markets, walking distances, and accessibility. Where walking distances are within 2 blocks, several moderate volume stops could be consolidated into a single stop with more than 100 daily boardings.
- Select stops that provide connectivity between major markets. The study must select stops that serve the major residential and commercial areas within the corridor, such as Bethesda, Silver Spring, Langley Park, and College Park.
- Select stops that provide connections to other transit routes. A large percentage of transit passengers within this corridor transfer to other routes on crossing streets. The primary transfer locations include East-West Highway at Connecticut Avenue, University Boulevard at Piney Branch Road, University Boulevard at New Hampshire Avenue, and University Boulevard at Riggs Road, in addition to the Metro stations at Bethesda, Silver Spring, and College Park.

Along the WMATA bus Route J4, there are approximately 62 existing bus stops (in each direction) between Bethesda and College Park. Boarding and alighting data for each stop was obtained from WMATA, Ride On, and TheBus and plotted on a street map as shown in Figures 3-1 through 3-3. Tabular data was used to determine which stops have more than 100 passengers per day, as shown in Exhibits 3-1 and 3-2.

Based on the criteria, 24 of the existing 62 stops in each direction were initially selected for consideration. Several of these stops are located adjacent to each other, some only a block away. For example, the three stops on Piney Branch Road at Greenwood Avenue, Arliss Road, and Garland Avenue are all one block apart, with total daily boardings of 1,100 eastbound and 800 westbound. High volume stops also exist on University Boulevard on both the west and east sides of New Hampshire Avenue and Riggs Road.

At each of these locations, the potential for enhancing one stop to serve the areas surrounding nearby stops was examined. A single enhanced stop on Piney Branch Road at Arliss Road, for example, would serve residents and businesses from the adjacent stops. The other two stops on Piney Branch Road, indeed all existing stops, will remain as today for local service; no stops are being eliminated as part of this study. Likewise, the stops on University Boulevard at Riggs Road were consolidated into one enhanced stop on the west side of Riggs Road. The stops on University Boulevard at New Hampshire Avenue, however, were not consolidated because the volumes are so high at each stop and because the distance between the stops is more than two blocks and the high traffic volumes in both directions make the walk difficult. These stops will be consolidated into a transit center at a future date[5].

After identifying stops for consolidation, 16 stops in both directions were selected for enhanced service, in addition to the three Metro stations at Bethesda, Silver Spring, and College Park, as shown in Exhibits 3- 1 and 3-2. Two existing J4 stops will be eliminated due to low ridership: on East-West Highway at Summit Hills Apartments and on University Boulevard at 25th Avenue. Six other existing J4 stops will be eliminated, but all of these stops are either redundant (there is an existing stop on the other side of the cross street) or there will be J4 service within one

[5] See the separate Langley Park Transit Center study.

block: eastbound East-West Highway at the east side of Connecticut Avenue, southbound Colesville Road at 2nd Avenue, University Boulevard at Seek Avenue, westbound University Boulevard at the east side of Riggs Road, eastbound Campus Drive at Adelphi Road, and eastbound Paint Branch Parkway east of US 1.

Exhibit 3-1 Enhanced Bus Service - Bethesda to College Park
Bus Stop Improvements
2/19/2007

Eastbound

Stop #	County #	Stop Location	Stop Position	Juris	Routes Served	Avg Daily Activity	Markets Served	Shelter	Bench	Trash	Street Lights	Power	Improvements Needed: Shelter Facilities	Improvements Needed: Perceived Safe	Improvements Needed: ADA Access	Comments	Phase	Action
EB-1		Bethesda Metro Station	Bay B	MC	J2, 3, 4 and many others	1,970 (J2,3,4)	Downtown Bethesda, transfers	garage	Y	Y		Y	Improve lighting		Yes	Can get dark under plaza; study improved lighting.	3	Defer until add funding
EB-2	15320	Montgomery Avenue @ Waverly St	Farside	MC	J2, 3, 4	254	Downtown Bethesda	2 Old	Y	Y	Y	Y	Good	Very Good	Yes	Paved sidewalk; nice landscaping, no improvements needed.	3	Defer until add funding
EB-3a EB-3b	14668	East-West Hwy @ Connecticut Ave	Nearside Farside	MC	J2, 3, 4	115 + 65 from farside	Transfers	No, Yes New	No, Yes	No, Yes	Yes No	Yes No	Add Shelter, Good	Both fair due to busy intersection	Yes Yes	Nearside 3a and farside 3b combined. 3a has 13' to curb, shrubs need to be trimmed back. 3b's new shelter is tilted. Very busy intersection.	3 3	Defer until add funding
EB-4	1900	East-West Hwy @ Grubb Rd	Nearside	MC	J2, 3, 4	39	Local residential market	New	Y	Y	No	Y	Good	Good	Yes	Newspaper stands need concrete pad. Pin oaks starting to interfere with overhead wires. Evergreen and flowering shrubs recommended.	3	Defer until add funding. Study moving to far side for signal priority
EB-5	8634	Silver Spring Metro Station	Bay D	MC	Many	4,180 (J2, 3, 4)	Downtown Silver Spring; transfers	Y	Y	Y		Y				Will be improved and moved under cover with Silver Spring Transit Center in 2009.		
EB-6	7060	Wayne Ave @ Fenton St	Nearside	MC	J4, 12, 15	120	Downtown Silver Spring	New	Y	Y	Y	Y	Good	Good	Yes	Complete contrast to WB stop. More ROW and landscaping would improve appearance. Small flowering tree recommended.	3	Study moving to far side in front of church property.
EB-7	7074	Wayne Ave @ Manchester Rd	Nearside	MC	J4, 12, 15	210	Local residential	N	N	N	No		Add shelter, bench, trash	Good	Yes	Existing concrete pad is 6' wide and 10' deep. Understory flowering tree and evergreen shrubs recommended.	1	Recommend 1st priority; install landscaping
EB-8	3830	Manchester Rd @ Bradford Rd	Farside	MC	15	178 + 160 from nearby stops	Local residential	N	N	N	No	util pole nearby	Add shelter, bench, trash	Good	Yes	Consolidate stops along Manchester. R.O.W. issues may be a problem. Nice large Holly tree on corner and 20" caliper Tulip tree in back.	1	If ROW not an issue, recommend 1st priority
EB-9	4906	Piney Branch @ Arliss	Farside	MC	15	370 + 400 from nearby stops	Local residential and businesses	New	Y	Old	N Limited	Y	Good	Fair	Yes?	Ramp seems too steep. 3 Bradford pears street trees in fair shape. Shelter area is 16' x 35' wide.	1	Acceptable as is; consider longer shelter; install landscaping
EB-10	6678	University Blvd @ Piney Branch	Farside	MC	J4, C2, C4, 15	235	Local residential and transfers	New	Y	Y	Y	Y	Good	Fair	Yes	Existing Shelter pad is 12' x 20' Could extend pad for another shelter. Understory flowering tree and evergreen shrubs.	1	Acceptable as is; consider longer shelter; install landscaping
EB-11	6686	University Blvd @ Merrimac Dr	Nearside	MC	J4, C2, C4, 15	540	Local residential	Old	Y	Y	Limited	N	Improve shelter and amenities	Good	Yes	Existing Shelter pad has curb and is 13' deep and 17' wide. Lawn area around shelter should be improved. Stepping stones in back are not ADA compliant.	1	Initiate design
EB-12	6688	University Blvd @ Anne St	Farside	MC	J4, C2, C4, 15		Local residential and businesses; transfers	2 New	Y Two	Y	Limited	Y	Fair	Fair	Yes	Study consolidating with east side of New Hampshire. Heavy foot traffic around shelters. Recommend paving area and adding tree grates.	1	Repair shelters and clean up area
EB-13		University Blvd @ New Hampshire Ave	Farside	PG	J4, C2, C4	290	Local residential and businesses; transfers	N	N	N	Y but light is out	Util vault nearby	Add shelter, bench, trash	Poor	Yes	Study consolidating with west side of New Hampshire. Island is 8' wide. Bulb out may be possible for shelter. Understory tree and shrubs after bulb out.	2	Initiate design
EB-14	PG18S08	University Blvd @ 15th Ave (west side Riggs)	Farside	PG	J4, C2, C4	820	Local residential and businesses; transfers	Old	Y	Y	Yes	Yes	Improve shelter and amenities	Fair	No	Study consolidating with east side of Riggs Rd. New walk pinches into old walk less than 3'. Shelter is in poor shape. Existing trees are new red maples - more shrubs needed.	1	Recommend 1st priority; install landscaping
EB-15	PG17N11	University Blvd @ Riggs Rd	Farside	PG	J4, C2	145	Local residential and businesses; transfers	N	N	N	N	util pole nearby	Add shelter, bench, trash	Fair	Yes	Study consolidating with west side of Riggs Rd. R.O.W. line location is unclear. Concrete walk is 6.5' wide. Curb to Curb is 16'. Stepping stones go to bus stop. Area is maintained	1	Consider eliminating
EB-16	PG17N18	Campus Dr @ Presidential La	Nearside	PG	J4	110	University College	N	N	N	N	N	Add shelter, bench, trash	Good	Yes	Study moving to Adelphi for better transfers. Signal pole is down the road to provide power. Walk is 5' wide. After walk the grade slope down about 4 feet.	2	Coordinate with UMD; add stop in Phase 2
EB-17	PG17N20	Campus Drive @ Library La	Nearside	PG	J4	160	UMD	N	N	N	N	N	Add shelter, bench, trash	Good	Yes	Study consolidating with Shuttle-UM stop. 20' wide brick area is sandwiched between two concrete sidewalks. 25" cal. Oak provides shade for location. Trash receptacle is missing.	2	Initiate coordination with UMD
EB-18		Campus Dr @ Regents Dr	Farside	PG	J4	50	East side of UMD	N	N	Y	Y	light pole nearby	Add shelter, bench, trash	Good	Yes	Study moving to US-1 for better transfer. Shelter would require filling in over roots of existing red oaks but oaks are far enough away so there would be no harm to the trees	2	Coordinate with UMD; add stop in Phase 2
EB-19		College Park Metro Station		PG	Many	240												

All bus stops are able to accommodate a 36" diameter 12' high icon structure if proposed.
Phase 1 = able to implement prior to June 2007
Phase 2 = implement after Phase 1
Phase 3 = implement when funds available

Exhibit 3-2 Enhanced Bus Service - Bethesda to College Park
Bus Stop Improvements
2/19/2007

Westbound

Stop #	County #	Stop Location	Stop Position	Juris	Routes Served	Avg Daily Activity	Markets Served	Shelter	Bench	Trash	Street Lights	Power	Improvements Needed: Shelter Facilities	Improvements Needed: Perceived Safe	Improvements Needed: ADA Access	Comments	Phase	Action
WB-19		College Park Metro Station		PG	Many	240												
WB-18	PG17S14	Campus Dr @ Regents Dr	Nearside	PG	J4	105	East side of UMD	Old	Y	Y	Y	Auger under walk	Good	Good	Yes	Study moving to US-1 for better transfer. Adding shelter would require moving well used kiosk. Flowering tree in back need pruning. Well maintained.	2	Coordinate with UMD; add stop in Phase 2
WB-17	PG17S15	Campus Drive @ Library La	Farside	PG	J4	195	UMD	2 Old	Y	Y	Y	Y	Good	Good	Yes	Old Shelters are in good shape. Round planter behind is full of flowering perennials. Some yews are dead in the back planter.	1	Acceptable as is
WB-16	PG17S15	Campus Dr @ Presidential La	Farside	PG	J4	110	University College	N	N	N	N	util pole nearby	Add shelter, bench, trash	Good	Yes	Study moving to Adelphi for better transfers. There are two large storm drain inlets on both sides of the bus stop. Large overstory trees and evergreen shrubs recommended.	2	Coordinate with UMD; add stop in Phase 2
WB-15	PG17S22	University Blvd @ Riggs Rd	Nearside	PG	J4, C2	785	Local residential and businesses; transfers	N	N	N	Y - 30' away	Signal pole nearby	Add shelter, bench, trash	Fair	Yes	Study consolidating with west side of Riggs Rd. Existing pad is 5.5' wide and 9' deep. Understory trees behind sidewalk and evergreen and flowering shrubs recommended.	1	Consider eliminating
WB-14		University Blvd @ 15th Ave (west side Riggs)	Nearside	PG	J4, C2, C4	290	Local residential and businesses; transfers	New	N	N	Y but light is out	N	Poor, glass was broken	Poor	Yes	Study moving closer to Riggs Rd. Light pole had plastic trash bags tied to it. Trees in back has been cut down. Ex. Shelter pad 16' wide x 8.5' deep.	1	Recommend 1st priority; repair shelter; install landscaping
WB-13		University Blvd @ New Hampshire	Nearside	PG	J4, C2, C4, 15	865	Local residential and businesses; transfers	New	Y	Y	Y Tree blocks light	N	Good	Fair	Yes?	Bus sign too close to curb to be ADA compliant - less than 3'. Stop was messy.	1	Recommend 1st priority; make ADA compliant
WB-12	6690	University Blvd @ Lebenon	Nearside	MC	J4, C2, C4, 15	1,440	Local residential and businesses; transfers	2 New	Y	Y	Y	util pole nearby	Good	Fair	Yes	Heavy foot traffic around shelters. Recommend tree grates around 6" cal and 8" cal. Honeylocust or 5' fence behind shelters.	1	Recommend 1st priority; install landscaping
WB-11	6692	University Blvd @ Navahoe Dr	Nearside	MC	J4, C2, C4, 15	210	Local residential	N	N	N	N	N	Add shelter, bench, trash	Poor	No	Bulb out into service road; restrict parking on 20' wide service road. Median is 4'-9" wide. Overstory tree and groundcover recommended if bulb out occurs.	2	Initiate design
WB-10	4930	Piney Branch @ University Blvd	Farside	MC	J4, C2, C4, 15	345	Local residential and transfers	New	Y	Y	Tree in way	Y	Good	Fair	Yes	Empty planters need landscape. Bradford pear right under high wires. Bus sign is hidden between phone booths.	1	Recommend 1st priority; install landscaping
WB-9	10055	Piney Branch @ Arliss	Nearside	MC	J4, 15	335 +380 from area	Local residential and businesses	N	N	N	Y	util pole nearby	Add shelter, bench, trash	Fair	Yes	Consider moving to east side of Greenwood and consolidating with 10055 at Arliss. Conc. pad is 13' wide and 9.5' deep. Evergreen shrubs & groundcover recommended. Move steps to east of pole	1	Recommend 1st priority; install landscaping
WB-8	3812	Manchester Rd @ Bradford Rd	Nearside	MC	15	180 + 160/Reading	Local residential	Old	Y	N	Y	Auger to Shelter	Improve shelter and amenities	Good	Yes	Consolidate stops along Manchester. Small trash container attached to sign post. Overhead wire precludes large trees. Understory flowering trees recommended.	1	Recommend 1st priority; install landscaping
WB-7	7086	Wayne Ave @ Sligo Creek Pwy	Nearside	MC	J4, 12, 15	335	Local residential	New	Y	1 New 1 Old	Y	Auger to Shelter	Electrical feed	Good	Yes	Concrete pads for news stands. Remove old trash container and replace with new one. Repair lawn areas.	1	Recommend 1st priority; install landscaping
WB-6	7100	Wayne Ave @ Fenton St	Nearside	MC	J4, 12, 15	185	Downtown Silver Spring	Old	Y	Y 2 old	Y	Y	Improve shelter and amenities	Very Good	Yes	Well maintain shelter. Supermarket personal keeps bus stop tidy. No landscape recommendations.WB-6 Option: Plenty of room. Weak landscape. Not as pleasant location.	1	Acceptable as is, but study moving to farside
WB-5	8634	Silver Spring Metro Station	Bay D	MC	Many	4,180 (J2, 3, 4)	Downtown Silver Spring; transfers	Y	Y	Y		Y				Will be improved and moved under cover with Silver Spring Transit Center in 2009.		
WB-4	14739	East-West Hwy @ Grubb Rd	Farside	MC	J2, 3, 4	360	Local residential market	New	Y	Y	Y	Y	Good	Good	No	Ramp at corner does not seem to be ADA compliant. Perennials suggested on side of Shelter. Understory flowering trees recommended. Would need to lower curb.	3	Defer until add funding
WB-3	14740	East-West Hwy @ Connecticut Ave	Nearside	MC	J2, 3, 4	210	Transfers	N	Y	N	N	Auger under drive	Add shelter, trash	Good	Yes	Though there may be benefits to move to far side, there is a 6' high wall 10' feet off the curb. Shrubs or Perennials needed behind bench and evergreen shrubs along fence.	3	Defer until add funding
WB-2	1940	East-West Hwy @ Pearl St	Nearside	MC	J2, 3, 4	195	Downtown Bethesda	N	N	Y	Y	Y	Add shelter, bench, trash	Good	Yes	Consider combining with Waverly, which has more space. 7.5 feet from curb to edge of walk. R.O.W. issues. Landscaping is limited due to narrow space.	3	Defer until add funding; consider using stop at Waverly
WB-1		Bethesda Metro Station	Bay B	MC	J2, 3, 4 and many others		Downtown Bethesda, transfers	garage	Y	Y		Y	Improve lighting			Can get dark under plaza; study improved lighting.		

All bus stops are able to accommodate a 36" diameter 12' high icon structure if proposed.

ENHANCED BUS STOP IMPROVEMENTS

The WMATA Regional Bus Study[6] recommended amenities to be included at bus stops based on the number of daily passenger boardings. The study recommended that stops with more than 100 daily boardings be equipped with a large shelter, bench, and detailed schedule. Stops with more than 300 daily boardings were candidates for real-time (Next Bus) information on arrival times for approaching buses. Many of the stops selected for the enhanced service in this corridor approach or exceed 300 daily boardings today and would therefore be candidates for Next Bus displays.

Exhibit 3-3 WMATA Regional Bus Study Stop Criteria

Daily Boardings	Level concrete pad; pedestrian access; adequate lighting; accurate bus stop signs	Shelter; trash receptacle	Larger shelter; bench; detailed schedule	System map; real-time arrival info	Study conversion to Transit Center
< 50 pass	X				
> 50 pass	X	X			
> 100 pass	X	X	X		
> 300 pass	X	X	X	X	
> 500 pass	X	X	X	X	X

Enhanced stops in this corridor are proposed to use a new shelter larger than those being installed by Montgomery County and Prince George's County, as well as other improvements to make the entrance to the transit system pleasant and attractive. The key recommended improvements are: larger paved areas, better weather protection, landscaping, improved lighting, better signage and information, ADA compliance, and better access both laterally and at street crossings.

Figures 3-4 and 3-5 depict the proposed stops for the enhanced service. Figure 3-4 shows a smaller stop for residential areas, while Figure 3-5 shows a larger stop along a major arterial. Both figures show a larger paved area for waiting, larger shelters, landscaping, an information sign, and enhanced lighting. Additional lighting is placed to the far side of the shelter to illuminate the area near the bus door. Interior shelter lighting ensures the shelter and waiting passengers are visible. Landscaping demarcates the stop and provides a buffer from adjoining land uses. Newspaper racks are located along a fence. A wayfinding pole, with maps and bus information, includes a passenger activated light to flag a bus driver at night. Next Bus variable message signs sized to accommodate future integration of local service, indicating the arrival times of the next several buses, would be installed at all 16 stops when made available by WMATA.

[6] September 2003

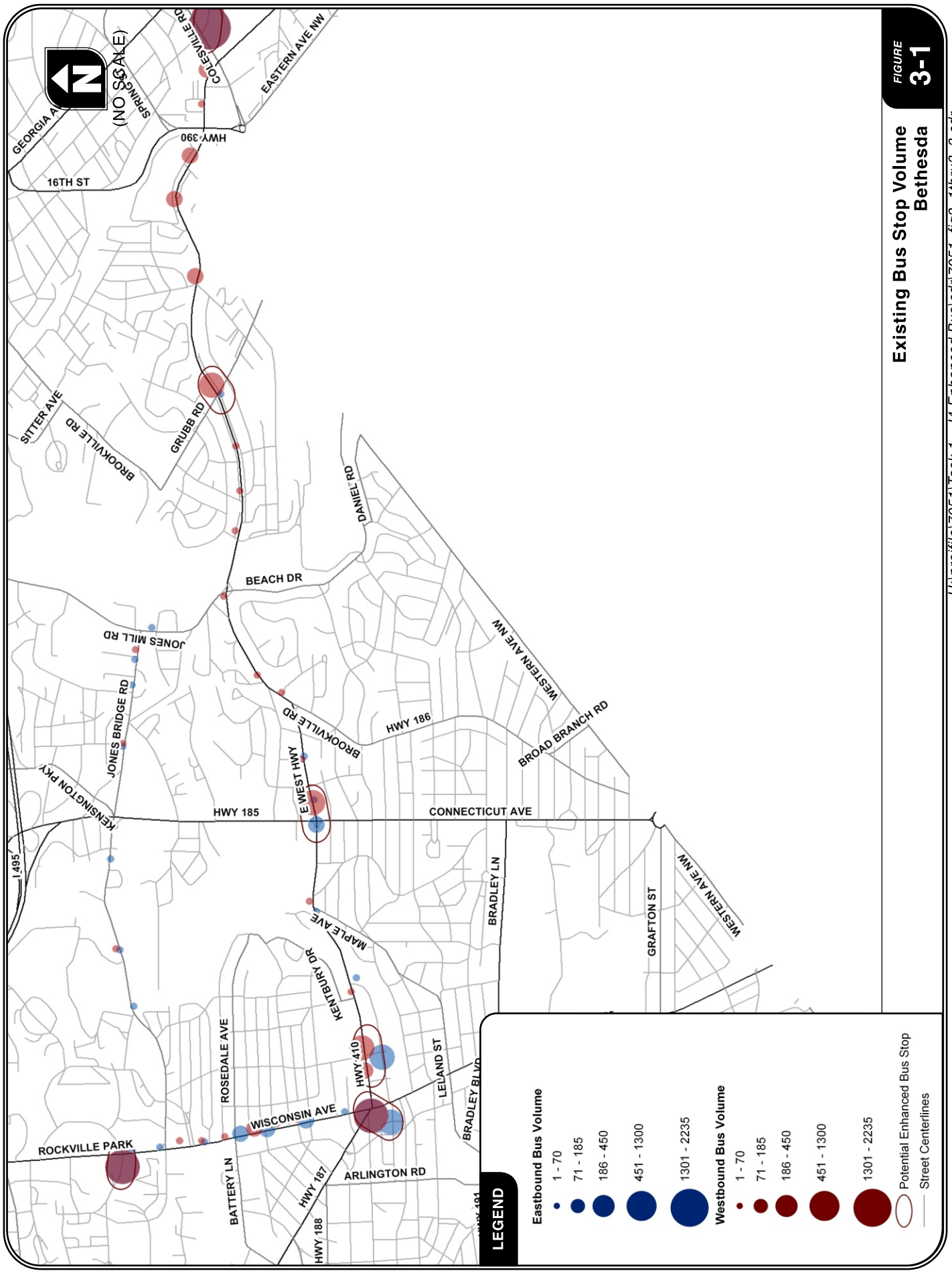

FIGURE 3-1

Existing Bus Stop Volume Bethesda

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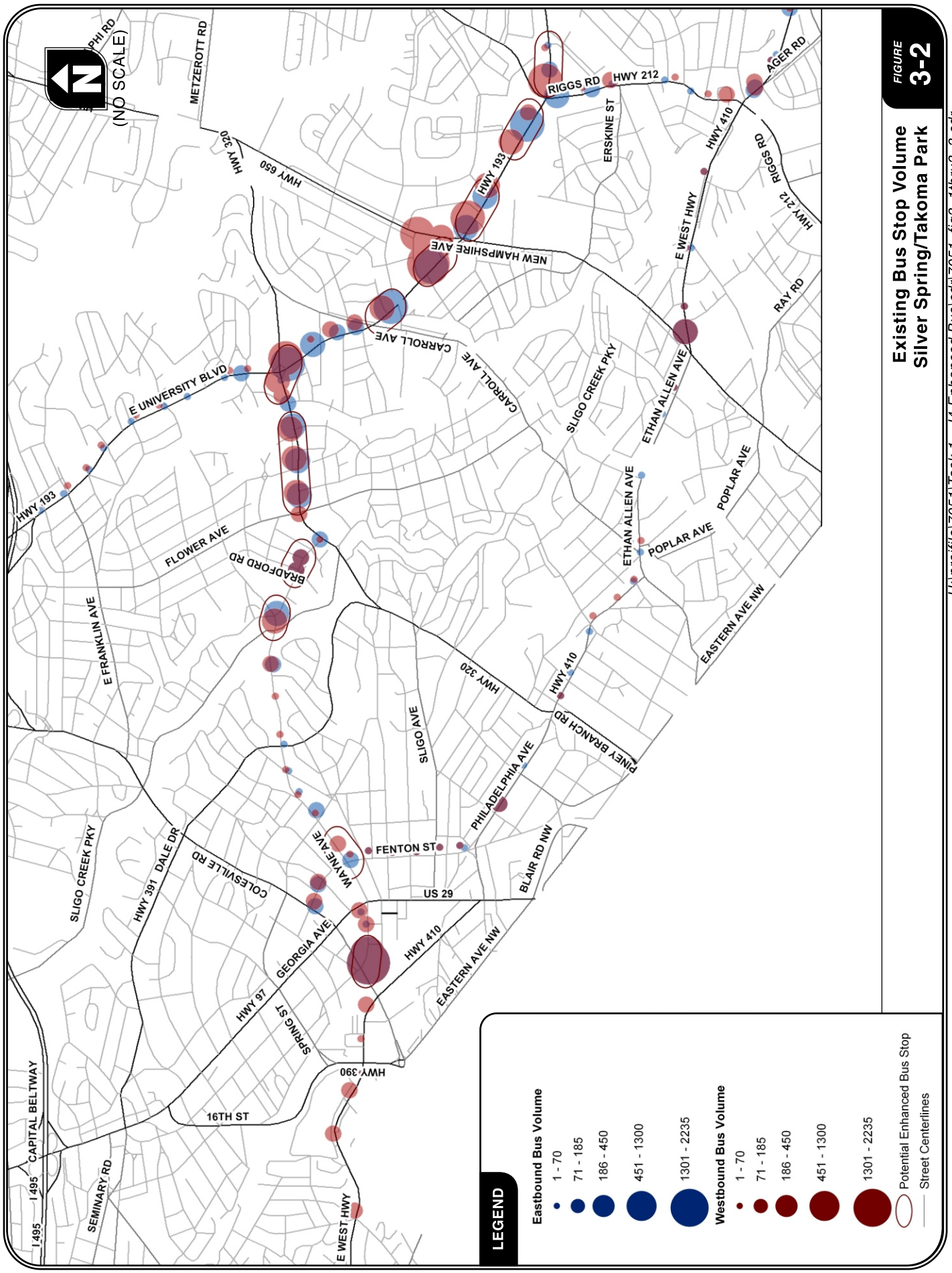
N
(NO SCALE)
LEGEND
Eastbound Bus Volume
1 - 70
71 - 185
186 - 450
451 - 1300
1301 - 2235
Westbound Bus Volume
1 - 70
71 - 185
186 - 450
451 - 1300
1301 - 2235
Potential Enhanced Bus Stop
Street Centerlines
METZEROTT RD
HWY 320
HWY 650
HWY 193
NEW HAMPSHIRE AVE
RIGGS RD
HWY 212
ERSKINE ST
HWY 410
AGER RD
RIGGS RD
HWY 212
E WEST HWY
RAY RD
CARROLL AVE
SLIGO CREEK PKY
ETHAN ALLEN AVE
POPLAR AVE
E UNIVERSITY BLVD
HWY 193
FLOWER AVE
BRADFORD RD
E FRANKLIN AVE
EASTERN AVE NW
HWY 320
HWY 410
PINEY BRANCH RD
SLIGO AVE
PHILADELPHIA AVE
FENTON ST
WAYNE AVE
BLAIR RD NW
US 29
SLIGO CREEK PKY
HWY 391
DALE DR
COLESVILLE RD
GEORGIA AVE
HWY 410
EASTERN AVE NW
HWY 97
SPRING ST
HWY 390
16TH ST
CAPITAL BELTWAY
I 495
SEMINARY RD
I 495
E WEST HWY
FIGURE
3-2
Existing Bus Stop Volume
Silver Spring/Takoma Park
H:\projfile\7051\Task 1 - J4 Enhanced Bus\cdr\7051_fig3_1thru3_3.cdr

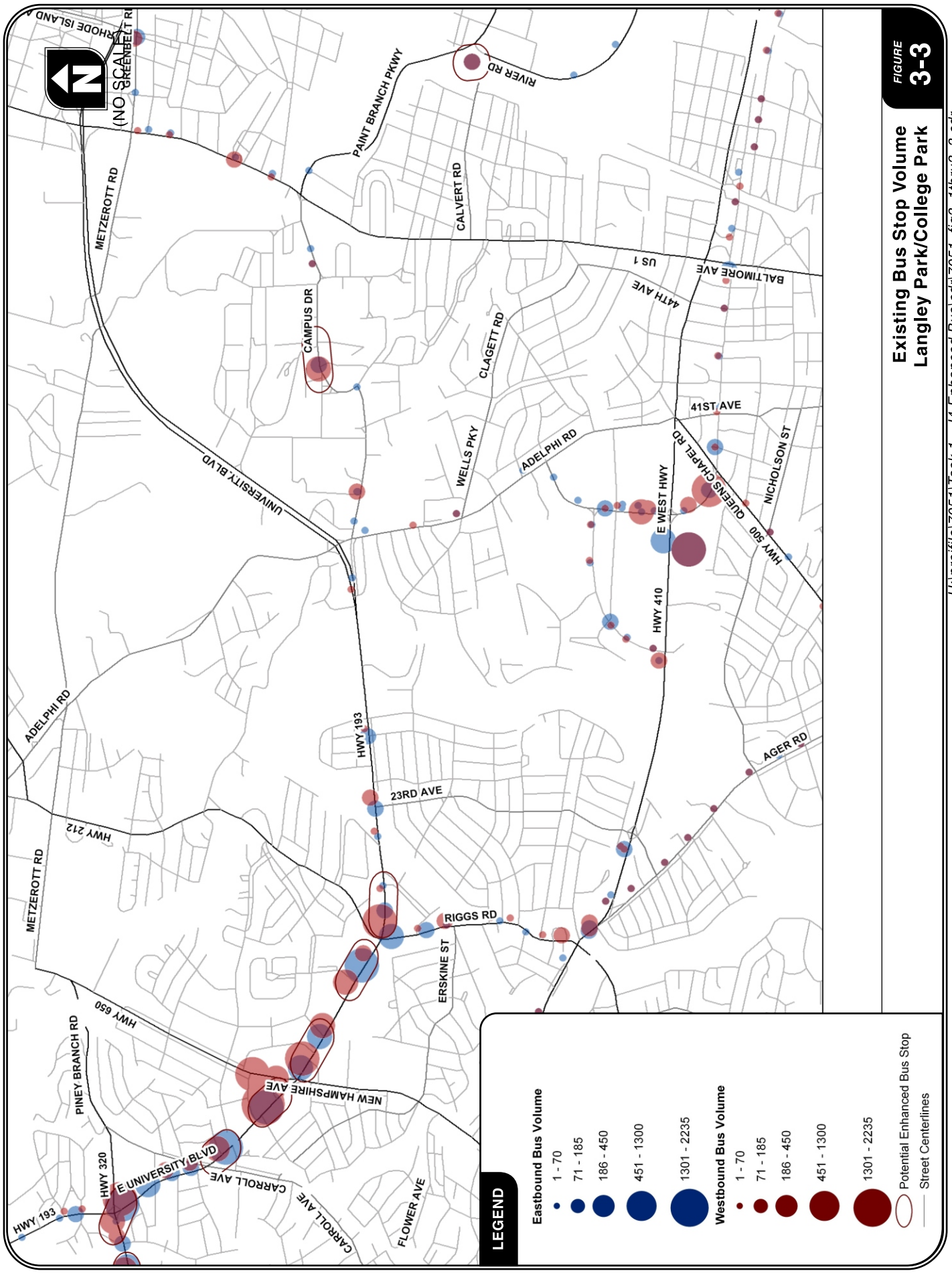

FIGURE 3-3

Existing Bus Stop Volume
Langley Park/College Park

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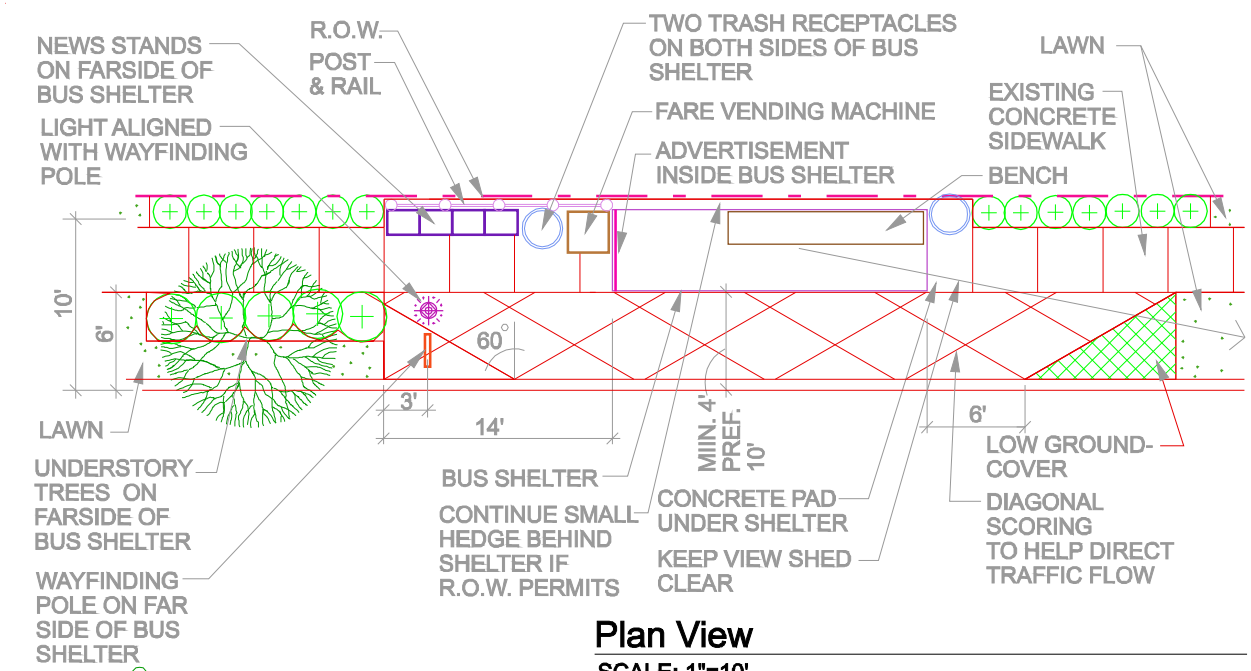
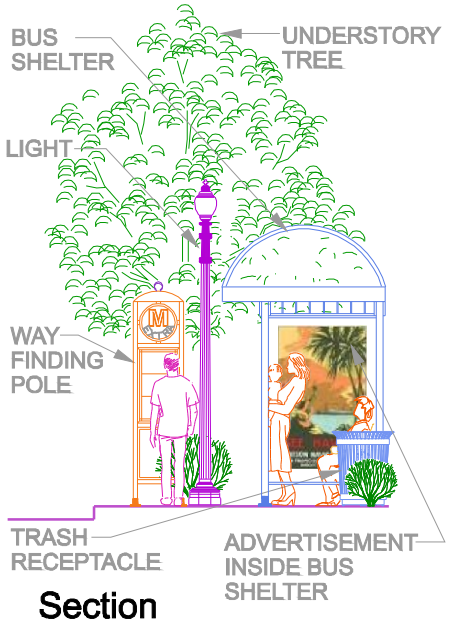


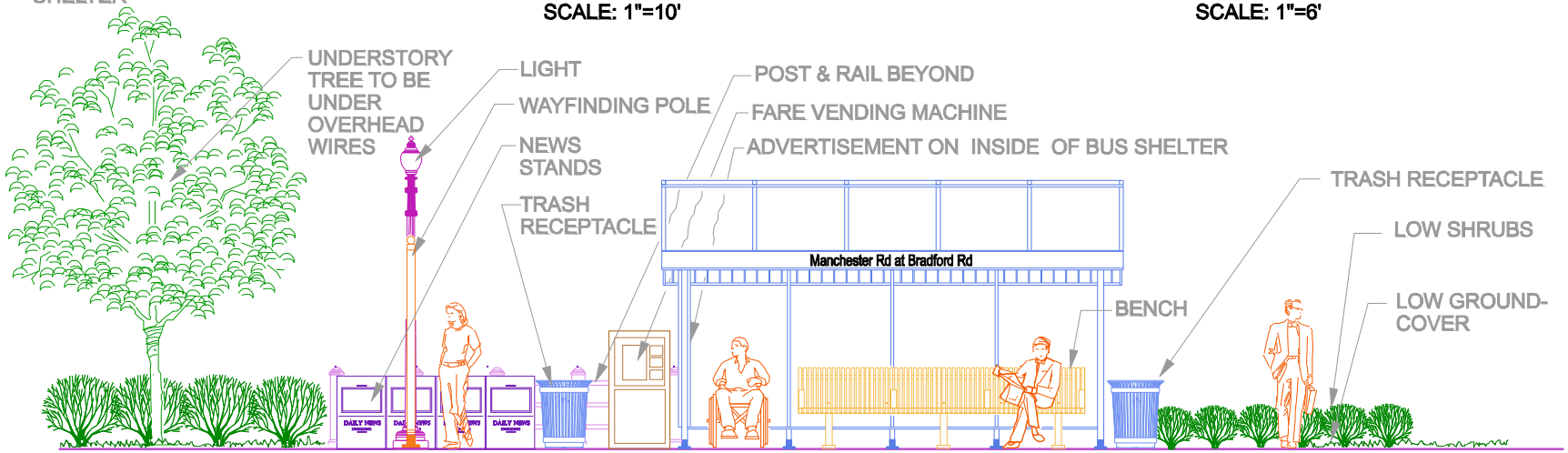
Plan View

SCALE: 1"=10'



Section

SCALE: 1"=6'



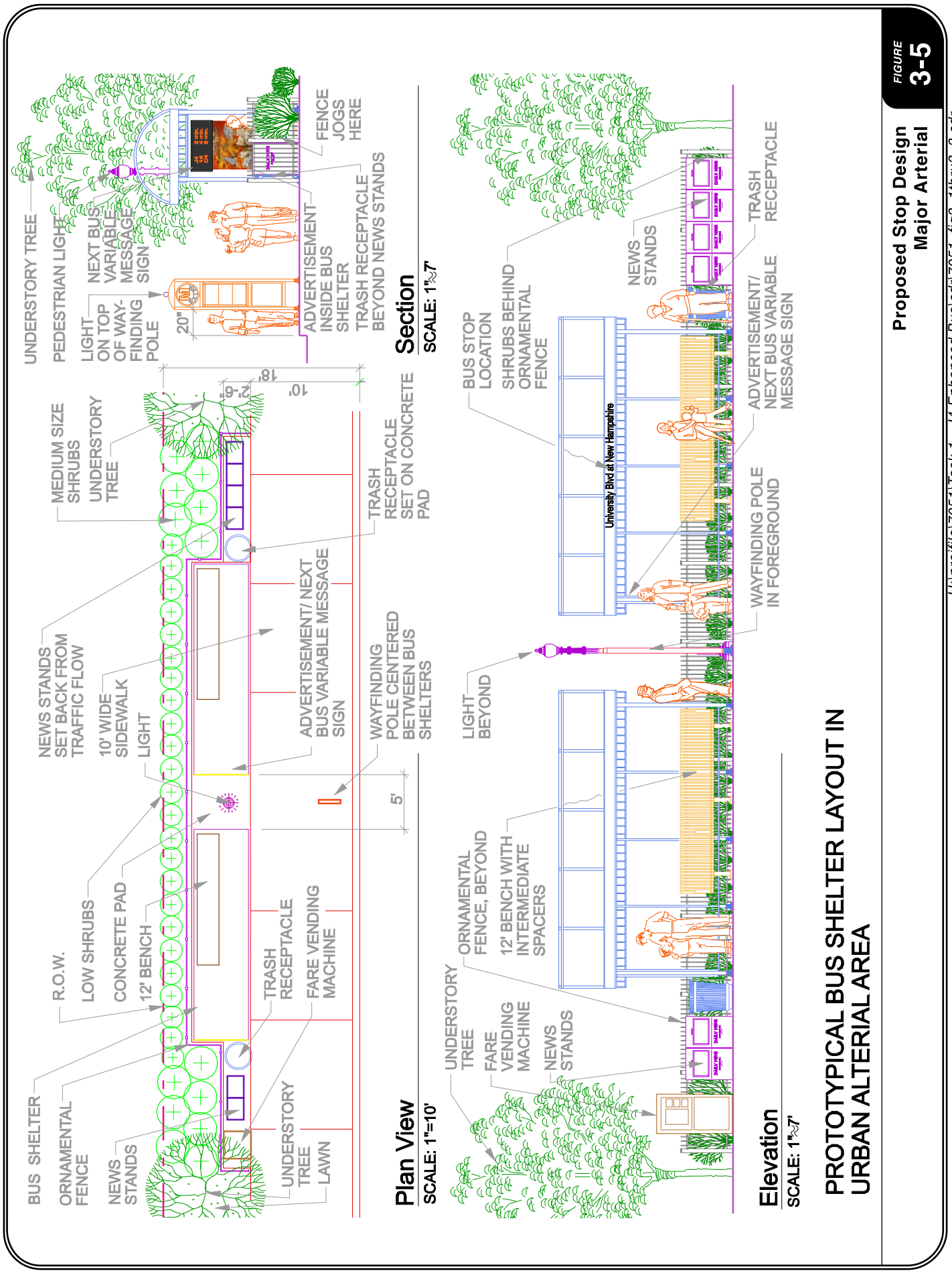
Elevation

SCALE: 1"=6'

PROTOTYPICAL BUS SHELTER LAYOUT IN RESIDENTIAL AREA WITH NARROW R.O.W.

Proposed Stop Design
Residential Areas

FIGURE
3-4


UNDERSTORY TREE
PEDESTRIAN LIGHT
NEXT BUS VARIABLE MESSAGE SIGN
LIGHT ON TOP OF WAY-FINDING POLE
20"
ADVERTISEMENT INSIDE BUS SHELTER
TRASH RECEPTACLE BEYOND NEWS STANDS
FENCE JOGS HERE
Section
SCALE: 1"=7'
MEDIUM SIZE SHRUBS
UNDERSTORY TREE
18'
2'-6"
10'
TRASH RECEPTACLE SET ON CONCRETE PAD
NEWS STANDS SET BACK FROM TRAFFIC FLOW
10' WIDE SIDEWALK
LIGHT
ADVERTISEMENT/ NEXT BUS VARIABLE MESSAGE SIGN
WAYFINDING POLE CENTERED BETWEEN BUS SHELTERS
5'
R.O.W.
LOW SHRUBS
CONCRETE PAD
12' BENCH
TRASH RECEPTACLE
FARE VENDING MACHINE
BUS SHELTER
ORNAMENTAL FENCE
NEWS STANDS
UNDERSTORY TREE LAWN
Plan View
SCALE: 1"=10'
BUS STOP LOCATION
SHRUBS BEHIND ORNAMENTAL FENCE
NEWS STANDS
TRASH RECEPTACLE
ADVERTISEMENT/ NEXT BUS VARIABLE MESSAGE SIGN
University Blvd at New Hampshire
WAYFINDING POLE IN FOREGROUND
LIGHT BEYOND
ORNAMENTAL FENCE, BEYOND
12' BENCH WITH INTERMEDIATE SPACERS
UNDERSTORY TREE
FARE VENDING MACHINE
NEWS STANDS
Elevation
SCALE: 1"=7'
PROTOTYPICAL BUS SHELTER LAYOUT IN URBAN ALTERIAL AREA
Proposed Stop Design
Major Arterial
FIGURE
3-5
H:\projfile\7051\Task 1 - J4 Enhanced Bus\cdr\7051_fig3_1thru3_3.cdr

Phasing

Because making the proposed improvements to some of the stops would require additional time and or coordination than could be accomplished in the short-term, these stop improvements are divided into three phases. Phase 1 includes those improvements that could be completed within the first year of Phase 1 Service changes. These improvements include sidewalk improvements to meet ADA guidelines, new pads and shelters at all stops not requiring additional right-of-way, landscaping, lighting, and wayfinding poles. Phase 2 includes those improvements that require additional right-of-way or stop relocation and would be completed within one year after Phase 1 Stop Improvements. Phase 3 consists of improvements to stops between Bethesda and Silver Spring, as those stops are not included in the current project scope. Exhibits 3-5 and 3-6 and Figures 3-6 through 3-10 indicate the selected stops and the proposed phasing.

Capital Costs

Capital costs are shown for those improvements necessary to bring existing stops or new stops to the proposed standards. To reduce costs, new shelters would be of a type obtainable by the two advertising companies, which would install and maintain the shelters under an amendment to their existing contracts. Wayfinding signs would likely be manufactured, but other elements would be readily available, such as light poles and trash receptacles. Installation costs for these items would be reduced by utilizing the existing contracts each county has for streetscape improvements.

The unit costs to purchase and install improvements are shown in Exhibit 3-4. These costs shown are above and beyond any existing agreements with shelter vendors. Exhibits 3-5 and 3-6 show the quantities of each item at each bus stop. An additional 25 percent is added to the subtotal to account for design, construction management, and contingency.

Exhibit 3-4 Bus Stop Improvement Unit Costs

Category	Cost	Unit
Demolition Prep Work	$500	Each
New Shelter with Bench	$4,000	Each
WayFinding Pole	$6,500	Each
Shelter Pad	$6	Square Foot
Sidewalk	$5	Square Foot
Electrical Power	$100	Linear Foot
Trash	$1,200	Each
Lighting	$2,500	Each
Grading	$250	Cubic Yard
Overstory Tree (>45')	$700	Each
Understory Tree (<45')	$550	Each
Shrubs	$40	Each
Ground Cover	$16	Each
Tree Pit Guard	$12	Linear Foot

Exhibit 3-5 Enhanced Bus Service - Bethesda to College Park

Eastbound Bus Stop Improvements

2/19/2007

Stop #	Stop Location	Demolition Prep Work	New Shelter with Bench	WayFinding Pole	Shelter Pad	Sidewalk	Electrical Power	Trash	Lighting	Grading	Overstory Tree	Understory Tree	Shrubs	Ground Cover	Tree Pit Guard	Total Costs	Phase	Comments
Unit		Unit	Each	Each	Square Foot	Square Foot	Linear Foot	Each	Each	Cubic Yard	Each	Each	Each	Each	Linear Foot			
Cost		$500	$4,000	$6,500	$6	$5	$100	$1,200	$2,500	$250	$700	$550	$40	$16	$12			
EB-1	Bethesda Metro Station	2	0	2	0	0	0	0		0	0	0	0	0	0	$14,700	3	Removal of approx. 50 old light fixtures. New light fixtures to be implemented. Approximately 50 high efficiency fixtures. 4 Wayfinding poles recommended.
EB-2	Montgomery Avenue @ Waverly St	1	2	1	0	0	15	0	0	0	0	0	0	150	64	$20,651	3	One Wayfinding pole needed. Improvements under overstory trees could include tree pit guard and groundcover to protect tree roots
EB-3a	East-West Hwy @ Connecticut Ave Nearside	1	1	1	150	0	15	1	0	0	0	0	4	23	0	$15,884	3	Need Bus Shelter, Wayfinding Pole, pad. Electrical power is nearby. Existing Shrub needs to be trimmed. Proposed shrubs around new shelter.
EB-4	East-West Hwy @ Grubb Rd	1	1	1	85	0	30	0	1	0	0	0	21	36	0	$19,347	3	Demolition includes some trimming and some excavation for concrete pads for trash receptacle and news stands, Light pole needed. Shrubs and groundcover needed. One Wayfinding Pole.
EB-5	Silver Spring Metro Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0	-	Will be improved and moved under cover with Silver Spring Transit Center in 2009.
EB-6	Wayne Ave @ Fenton St	3	1	1	0	0	0	0	0	0	0	1	10	25	40	$14,522	2	Demolition includes opening a planting bed in the sidewalk for Small Tree and some shrubs with tree guard and relocating and securing Trash receptacle. One Wayfinding pole.
EB-7	Wayne Ave @ Manchester Rd	4	1	1	85	60	20	1	1	0	1	0	25	50	24	$22,888	1	Demolition includes some excavation and relocation of sign. New Shelter, Wayfinding Pole, widening concrete pad, new trash receptacle, new street light, and Landscaping.
EB-8	Manchester Rd @ Bradford Rd	1	1	1	108	0	10	1	1	0	0	2	15	30	0	$19,454	1	Demolition includes excavation for shelter pad, street light, trash receptacle, wayfinding and landscaping proposed.
EB-9	Piney Branch @ Arliss	1	1	1	0	0	15	1	1	0	0	0	0	125	0	$19,110	1	Demolition includes trimming and fertilizing Bradford Pears. Wayfinding Pole proposed. One existing new shelter - no additional shelters. Replace old trash receptacle.
EB-10	University Blvd @ Piney Branch	1	1	1	108	500	0	1	0	8	0	1	12	200	0	$22,657	1	Demolition includes removing sidewalk, shelter pad and excavation. New concrete walk to curb and shelter pad plus new trash receptacle with pad. Wayfinding pole, understory tree and shrubs
EB-11	University Blvd @ Merrimac Dr	1	1	1	0	0	60	0	1	0	0	3	0	0	0	$22,208	1	Minor demolition and prep work, New shelter and Wayfinding pole recommended. Additional lighting added. 3 understory trees limbed up to 6 feet high.
EB-12	University Blvd @ Anne St	2	2	1	0	3000	20	1	1	0	0	4	20	50	80	$43,008	1	Demolition includes minor excavation, and refurbishing bus shelters. Pavement square feet doubled to accommodate special pavement. New light, trash receptacle, wayfinding pole, repacement of crab
EB-13	University Blvd @ New Hampshire Ave	4	1	1	0	0	15	1	1	0	0	0	6	20	0	$19,173	2	Demolition includes removing some pavement for planting area, removing light, relocating news stands. New shelter without bulb out, New light and trash receptacle. Minor landcaping. Tricky site.
EB-14	University Blvd @ 15th Ave (west side Riggs)	1	1	1	0	30	0	0	0	0	0	0	15	40	0	$13,010	1	Demolition includes removing old shelter. Sidewalk includes news stand pad and small piece to make walk ADA compliant. New Shelter and Wayfinding pole. Shrubs and groundcover
EB-15	University Blvd @ Riggs Rd	4	1	1	130	200	5	1	1	0	0	0	12	100	0	$21,588	1	Demolition includes sidewalk, stepping stones and relocating news stands. New Shelter, light, wayfinding pole and trash receptacle. Pad for news stands. No Trees - only shrubs and groundcover
EB-16	Campus Dr @ Presidential La	1	1	1	108	0	10	1	1	4	1	3	30	0	0	$21,943	2	Demolition for electrical wire. Fill required for shelter and landscaping around it. New Shelter, wayfinding pole, trash receptacle, and light. Moderate landscaping recommended.
EB-17	Campus Drive @ Library La	1	1	1	0	0	15	1	1	0	0	0	0	120	80	$20,034	1	Demolition for electrical wire. New Shelter, wayfinding pole, trash receptacle and light. Ground cover recommended under oak may be difficult to plant because of high roots. (trash receptacle upgraded)
EB-18	Campus Dr @ Regents Dr	1	1	1	108	0	40	0	1	20	0	0	15	0	0	$24,935	2	Demolition includes relocating signs. Fill is needed for bus shelter pad. New shelter, wayfinding pole, light. Shrubs are recommended.
EB-19	College Park Metro Station	1	0	1	0	0	0	0	0	0	0	0	0	0	0	$7,350	1	Bus stop not under consideration.

Estimated costs are based upon conceptual design.
Phase 1 = able to implement prior to June 2007
Phase 2 = implement after Phase 1
Phase 3 = implement when funds available

Summary by phases:
Phase 1 Total: $264,133
Phase 2 Total: $100,716
Phase 3 Total: $88,229

Notes:
Cost per new shelter is for additional payment to vendor; vendor would continue to cover the majority of the cost of each shelter
Costs include 25% for contingency and add-ons, such as design and construction management
This is a preliminary estimate of probable costs which is base on limited information available to Parsons Brinckerhoff.
This estimate does not account for market trends, labor fluctuations, inflation, hazardous waste, clean up, mobilization,
traffic management, certain service utilities, (phone, cable, etc) survey data, permits, application fees, testing, bonds and insurance,

Exhibit 3-6 Enhanced Bus Service - Bethesda to College Park

Westbound Bus Stop Improvements

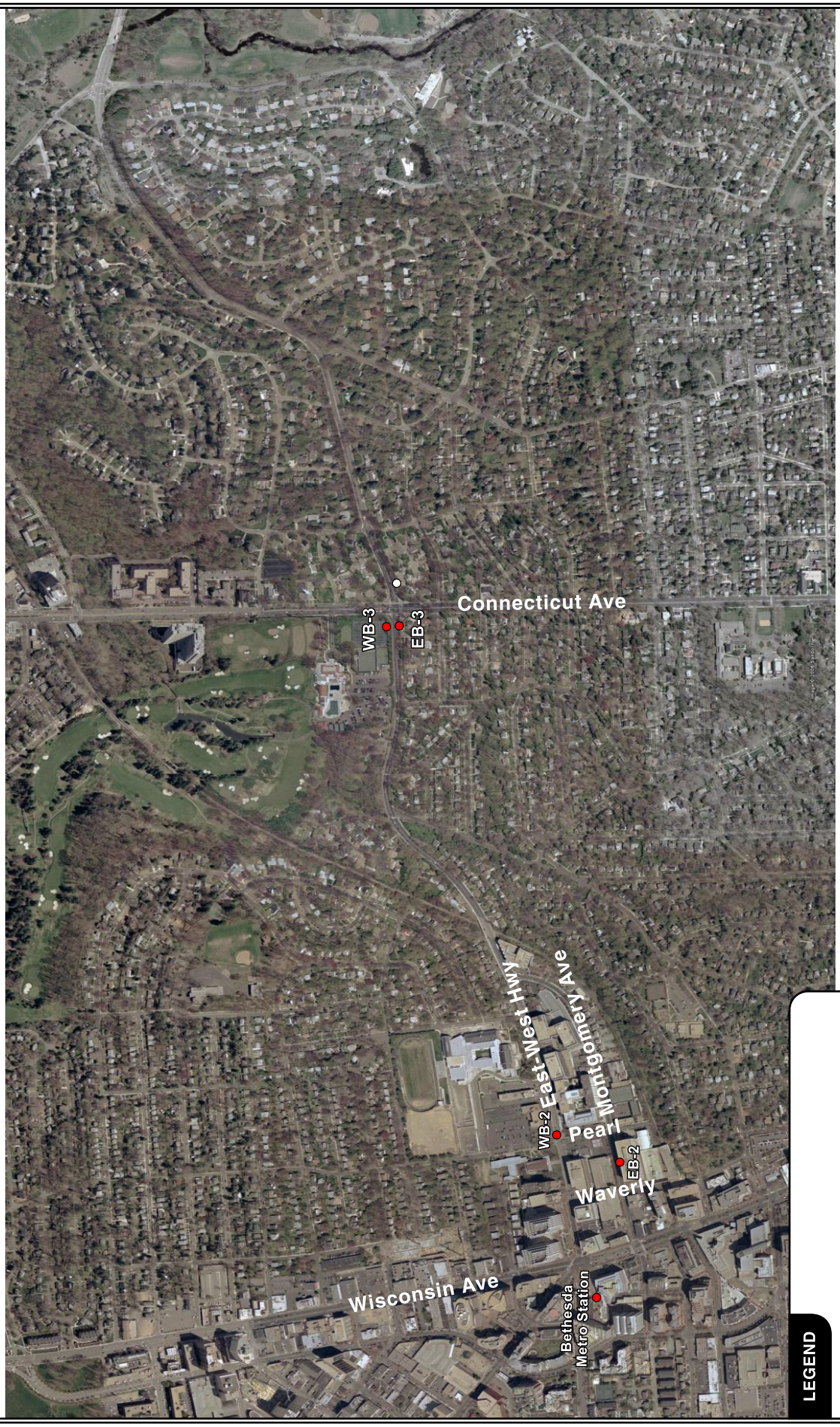
2/19/2007

Stop #	Stop Location	Demolition Prep Work	New Shelter with Bench	WayFinding Pole	Shelter Pad	Sidewalk	Electrical Power	Trash	Lighting	Grading	Overstory Tree	Understory Tree	Shrubs	Ground Cover	Tree Pit Guard	Total Costs	Phase	Comments
Unit		Unit	Each	Each	Square Foot	Square Foot	Linear Foot	Each	Each	Cubic Yard	Each	Each	Each	Each	Linear Foot			
Cost		$500	$4,000	$6,500	$6	$5	$100	$1,200	$2,500	$250	$700	$550	$40	$16	$12			
WB-19	College Park Metro Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0	-	Bus stop not under consideration.
WB-18	Campus Dr @ Regents Dr	1	2	1	108	10	0	0	0	0	0	3	12	0	0	$18,719	2	Demolition includes relocating trash receptacle and removing trash pad. Assume street lights are adequate for lighting area. One new shelter and replace old one. Minor landscaping. New wayfinding
WB-17	Campus Drive @ Library La	1	2	1	0	0	0	0	0	0	0	0	3	0	0	$15,876	1	Demolition includes removing old shelters. Two new shelters and wayfinding poles added. Shrubs included to replace dead one in planter behind shelter.
WB-16	Campus Dr @ Presidential La	1	1	1	108	10	30	1	1	0	0	5	20	0	0	$23,045	2	New shelter is tilted, demolition included to straighten shelter. Concrete Pad for trash receptacle. New Lighting needed. Flowering tree with shrubs. Tree guard and ground cover by existing tree
WB-15	University Blvd @ Riggs Rd	1	1	1	108	10	0	1	0	0	0	1	7	25	0	$14,834	1	Demolition includes some trimming and some excavation for concrete pads for trash receptacle and news stands, Light pole needed. Shrubs and groundcover needed. One Wayfinding Pole.
WB-14	University Blvd @ 15th Ave (west side Riggs)	2	2	1	0	120	5	1	1	0	0	0	15	0	0	$21,945	1	Demolition includes removal of tree trunks and general clean-up. Half shelter is for repair of existing shelter. Shrubs going in tree pits to maintain view of store. Expanded sidewalk along street.
WB-13	University Blvd @ New Hampshire	2	1	1	0	36	25	1	1	0	0	1	4	25	20	$20,192	1	Demolition includes relocation of bus sign, sidewalk removal and general clean-up. Running electrical to shelter/new light requires new sidewalk. Planting opening in sidewalk with understory tree &
WB-12	University Blvd @ Lebenon	1	2	1	0	0	0	0	0	0	0	0	21	200	100	$21,252	1	Demolition is for general cleanup. Ornamental fence could be added behind the shelters but would block access. After landscaping improvements - good maintenance would be needed.
WB-11	University Blvd @ Navahoe Dr	1	1	1	108	120	30	1	1	0	0	1	5	15	18	$21,162	2	Proposed bulb out includes demolition of curb and pavement. New shelter, wayfinding pole, curb, trash receptacle, light and shelter pad. Simple landscape recommended.
WB-10	Piney Branch @ University Blvd	0	2	1	0	0	5	0	1	0	0	4	30	25	0	$22,365	1	Light added because of tree blocking light. Empty R/R tie planters to be filled with small understory trees with shrubs underneath. Ornamental fence is to have groundcover and small shrubs.
WB-9	Piney Branch @ Arliss	2	1	1	0	30	0	1	0	2	0	0	0	20	0	$14,354	1	Demolition includes relocating wood fence and landscaping. Extend shelter pad to accommodate new shelter, wayfinding pole, news stands and trash receptacle. Groundcover included for repair
WB-8	Manchester Rd @ Bradford Rd	1	1	1	0	30	0	1	0	0	0	1	5	0	0	$13,755	1	Demolition included to remove old shelter, part of curb in back of shelter. Shelter pad is extended for new shelter, trash receptacle, wayfinding pole, and news stands. Small tree and shrubs
WB-7	Wayne Ave @ Sligo Creek Pwy	1	1	1	0	30	0	0	0	1	0	3	28	150	0	$17,399	1	Demolition includes general cleanup and landscape work. Concrete pad for news stands and trash receptacle. Soil needed to fill against drop off next to sidewalk. Flowering trees, shrubs and
WB-6	Wayne Ave @ Fenton St	0	0	1	0	0	0	0	0	0	0	0	0	0	0	$6,825	1	No improvements needed for this bus stop except for wayfinding pole.
WB-5	Silver Spring Metro Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0	-	Bus stop not under consideration.
WB-4	East-West Hwy @ Grubb Rd	2	1	1	0	100	0	0	0	0	0	0	0	0	0	$12,600	3	Demolition includes sidewalk repair, ramp repair and landscape cleanup. Concrete pad for news stands, wayfinding pole and sidewalk repair. No small flowering trees to preserve lights from
WB-3	East-West Hwy @ Connecticut Ave	1	1	1	20	0	70	1	1	0	0	0	15	20	60	$24,633	3	Demolition includes removing bench, shrubs and trash receptacle. New shelter would face same as existing bench. Some extension of sidewalk needed for shelter. Tree root pruning recommended.
WB-2	East-West Hwy @ Pearl St	2	1	1	36	0	40	1	1	3	0	1	11	100	0	$23,894	3	Demolition includes excavation and general cleanup. New shelter pad would need a retaining wall behind it. More shrubs would be needed if hedge were installed.
WB-1	Bethesda Metro Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0	-	Bus stop not under consideration.

Estimated costs are based upon conceptual design.
Phase 1 = able to implement prior to June 2007
Phase 2 = implement after Phase 1
Phase 3 = implement when funds available

Summary by phases:
Phase 1 Total: $210,995
Phase 2 Total: $78,658
Phase 3 Total: $76,409

Notes:
Cost per new shelter is for additional payment to vendor; vendor would continue to cover the majority of the cost of each shelter
Costs include 25% for contingency and add-ons, such as design and construction management
This is a preliminary estimate of probable costs which is base on limited information available to Parsons Brinckerhoff.
This estimate does not account for market trends, labor fluctuations, inflation, hazardous waste, clean up, mobilization,
traffic management, certain service utilities, (phone, cable, etc) survey data, permits, application fees, testing, bonds and insurance,



LEGEND

- Phase 1 – Implement in 1st Year of Service
- Phase 2 – Implement in 2nd Year of Service
- Phase 3 – Not Included in Current Scope
- Consider elimination

Bus Stop Improvement Phasing Map
Bethesda, Maryland

FIGURE **3-6**

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LEGEND

- Phase 1 – Implement in 1st Year of Service
- Phase 2 – Implement in 2nd Year of Service
- Phase 3 – Not Included in Current Scope
- Consider elimination

Bus Stop Improvement Phasing Map
Silver Spring, Maryland

FIGURE
3-7

LEGEND

- Phase 1 – Implement in 1st Year of Service
- Phase 2 – Implement in 2nd Year of Service
- Phase 3 – Not Included in Current Scope
- Consider elimination

Bus Stop Improvement Phasing Map
Takoma Park, Maryland

FIGURE
3-8

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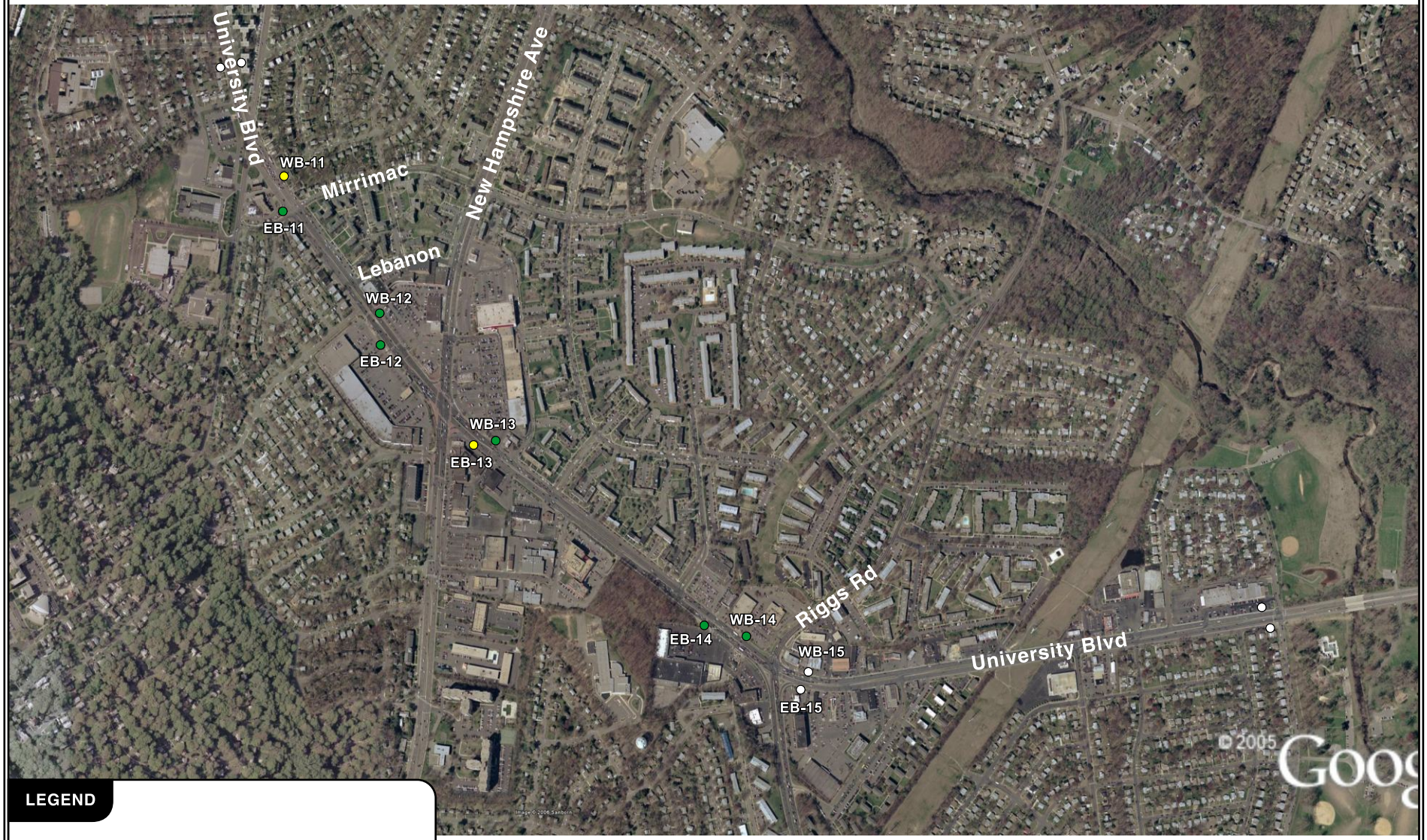

LEGEND

- Phase 1 – Implement in 1st Year of Service
- Phase 2 – Implement in 2nd Year of Service
- Phase 3 – Not Included in Current Scope
- Consider elimination

Bus Stop Improvement Phasing Map
Langley Park, Maryland

FIGURE
3-9

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LEGEND

- Phase 1 – Implement in 1st Year of Service
- Phase 2 – Implement in 2nd Year of Service
- Phase 3 – Not Included in Current Scope
- Consider elimination

Bus Stop Improvement Phasing Map
College Park, Maryland

FIGURE
3-10

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Twenty stops are proposed to be improved in Phase 1, at an average cost of $25,300 each. In Phase 2, an additional seven stops would be improved at an average cost of $26,500 each. Phase 3 would complete the improvements to the seven stops between Bethesda and Silver Spring. Total capital costs for each phase are shown below.

Exhibit 3-7 Total Stop Improvement Capitol Costs by Phase

	Phase 1	Phase 2	Phase 3	Total
Eastbound	$270,000	$100,700	$88,200	$458,900
Westbound	$211,000	$84,600	$76,400	$372,000
Total	**$481,000**	**$185,300**	**$164,600**	**$830,900**

Estimated costs are based upon conceptual design.

Phase 1 = able to implement prior to June 2007

Phase 2 = implement after Phase 1

Phase 3 = implement when funds become available

Cost per new shelter is for additional payment to vendor; vendor would continue to cover the majority of the cost of each shelter

Costs include 25% for contingency and add-ons, such as design and construction management

This is a preliminary estimate of probable costs which is base on limited information available. This estimate does not account for market trends, labor fluctuations, inflation, hazardous waste, clean up, mobilization, traffic management, certain service utilities, (phone, cable, etc) survey data, permits, application fees, testing, bonds and insurance, contractor fees and any unforeseen or extenuating circumstances.

IMPLEMENTATION OF BUS STOP IMPROVEMENTS

To save the cost and time associated issuing a separate RFP for the modest improvements to existing bus stops, the project team recommends these improvements be made using the existing contracts each county has for sidewalk and shelter modifications. A general calendar for the completion of Phase 1 stop improvements includes the following milestones:

2 months after Notice to Proceed (NTP)	Generic master plan for bus stop amenities.
2 months after NTP	Select shelter, branding, wayfinding sign design, and other elements.
3 months after NTP	Amend contracts between Montgomery County and Clear Channel and between Prince George's County and Signal Outdoor Advertising to specify the new shelter, any additional payments or compensation, and any additional restrictions related to advertising and maintenance.
3 months after NTP	(Advertising vendors) Order new shelters, which can take 4-6 months to deliver.
5 months after NTP	Complete final design of wayfinding pole and start of manufacturing.
6 months after NTP	Develop specific plans for individual stops
7 months after NTP	First phase of Enhanced service begins.
7 months after NTP	Flag each stop, locating the expansion to the existing shelter pad or marking a new pad, to be performed by each County's staff. Each county is also responsible for utility coordination.
7-8 months after NTP	(Shelter vendors) Install new pads and shelters.
8 months after NTP	(County contractors) Install new sidewalks, lighting (to poles), wayfinding signs, trash receptacles.
9 months after NTP	(Counties) install wayfinding poles; PEPCO connects lighting.

This schedule requires the contract amendments between each county and their advertising vendors to be completed by mid-January to allow sufficient time for those vendors to order the selected shelter. Those contract amendments will need County approval, which must occur mid-April. The contract amendments can be delayed only if the selected shelter and color are available "off the shelf" and can be delivered within 1-2 months.

Chapter 4 Runningway Improvements

INTRODUCTION

This section begins with a discussion of potential runningway improvements, then evaluates them for application on the eastern portion of the Purple Line corridor (between College Park and Silver Spring), which largely corresponds to the eastern portion of the existing J4 bus route. In addition to adding all-day service and increasing bus frequency, reducing the bus's travel time and improving its adherence to the schedule is likely to attract more riders. This increase in ridership is expected to make evident the need and opportunity for further transit improvements along the corridor. Techniques to reduce dwell time such as off-board fare collection, are outside the scope of this project and may be applied to the entire system in parallel with this effort. The following discussion focuses on the operating environment of the bus, with specific focus on transit signal priority, queue jump lanes, modified stop locations, and other runningway improvements.

EXISTING TRAFFIC & TRANSIT CONDITIONS

The transportation analysis is based on traffic data collected as a part of this project, historical data, and information from the local agencies along the corridor. The transit analysis uses data from WMATA's Automatic Vehicle Location (AVL) system. An analysis of existing conditions for vehicle traffic and the current J4 bus service was completed to identify the current conditions, which will be used to compare the potential of runningway improvements.

Existing Transit Service

Transit service throughout the corridor is extensive and is described in detail in Chapter 3 of this report. The existing transit service on the J4 bus route operates primarily at 20-minute headways in both directions during the weekday a.m. and p.m. peak hours. Generally, the first and last runs in both directions during both peak periods have slightly longer headways and slightly shorter schedules run times.

Bus travel time variability, which is an indication of service reliability, is one measure of evaluating the performance of an existing transit service. Unreliable transit service makes a service less attractive to passengers. Passengers of an unreliable service must allow more time for each trip to account for an early departure from the trip origin or a late arrival at the destination. From a transit provider's perspective, a transit travel time variability reduction can reduce a route's cycle time, allowing for smaller headways, additional scheduling flexibility, or even the elimination of a bus. The primary benefit of transit signal priority and other transit preferential treatment strategies is to reduce travel time variability.

AVL DATA/TRAVEL TIME RUN SUMMARY

The WMATA AVL system was used to summarize performance on the existing transit service. The system collects information during regular polling cycles (designed to be every two minutes) for each bus deployed. Data from the system were collected for 342 J4 bus runs between January 6 and April 5, 2006[7]. This data was used to determine bus travel times for all 342 buses

[7] The 2-minute AVL resolution can overestimate the bus travel time by up to two minutes at either end of the route. In addition, approximately 30% of the buses do not report in a given two-minute cycle. As a result, the recorded AVL travel times are up to several minutes longer than the actual travel time. The AVL travel times used in this study have been reduced to compensate for these discrepancies.

between the garages or layover areas at the beginning and end of the route. To supplement the AVL data, twelve J4 bus travel time runs were collected manually on September 8 and 9, 2006. The summarized results are shown in the Exhibit 4-1.

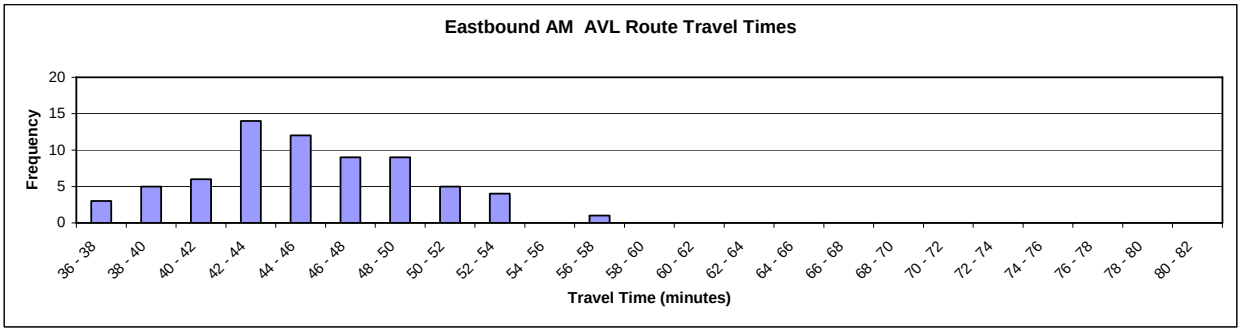
Exhibit 4-1 Average J4 Travel Time Data

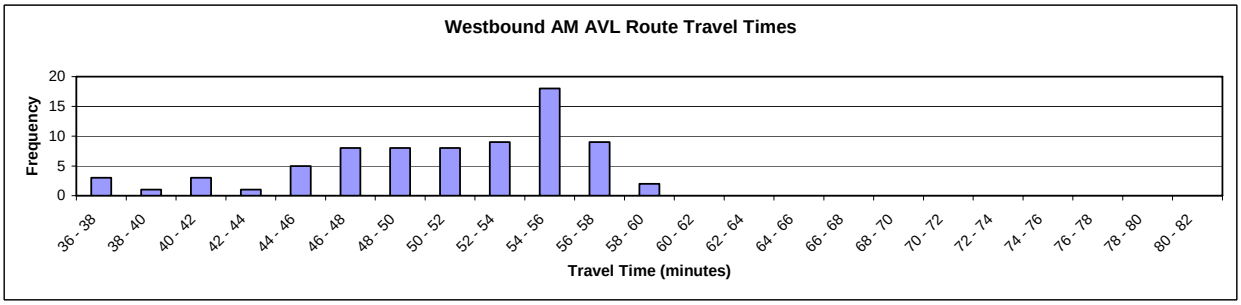
Run	Typical Scheduled Travel Time	AVL Travel Time			Observed Travel Time		
		Min	Mean	Max	Min	Mean	Max
Eastbound AM	50	36	46	58	46	50	52
Westbound AM	53	36	52	69	48	54	58
Eastbound PM	62	48	61	81	53	55	57
Westbound PM	55	46	57	70	57	58	59

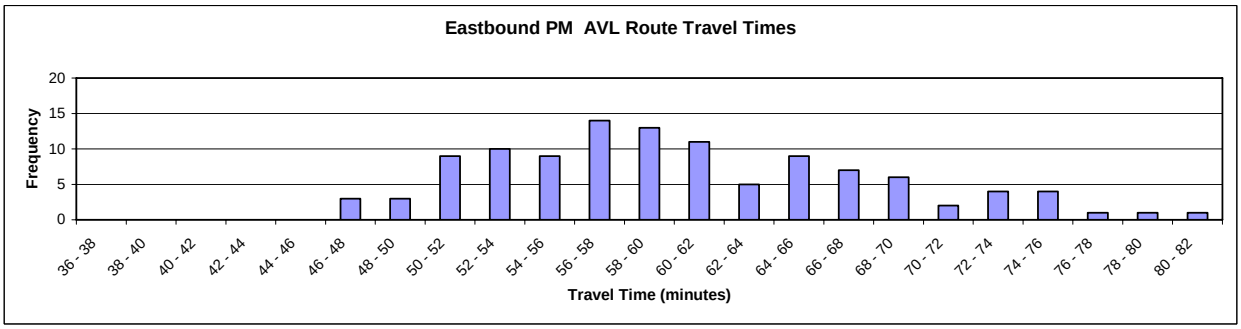
The AVL data in the table indicate that the J4 bus experiences a wide range of travel times. Similarly, the 12 manual runs varied up to 20% in travel time.

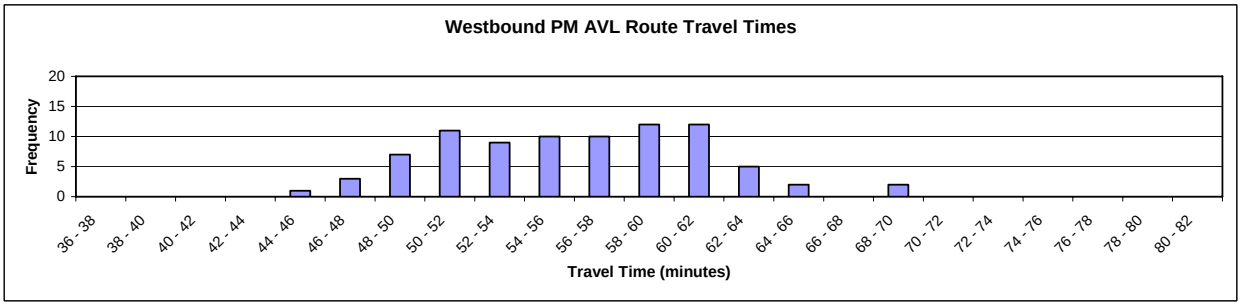
The individual travel time runs were summarized in two minute intervals and plotted in the histograms shown in Exhibit 4-2 for the eastbound and westbound directions during the weekday a.m. and p.m. periods.

Exhibit 4-2 AVL Route Travel Times



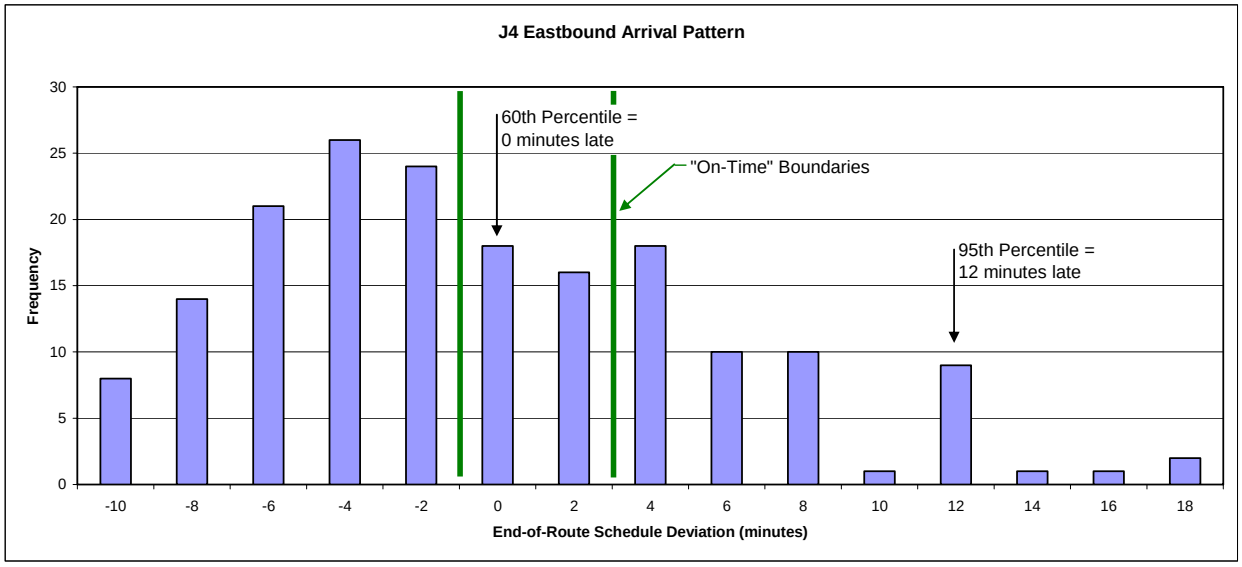


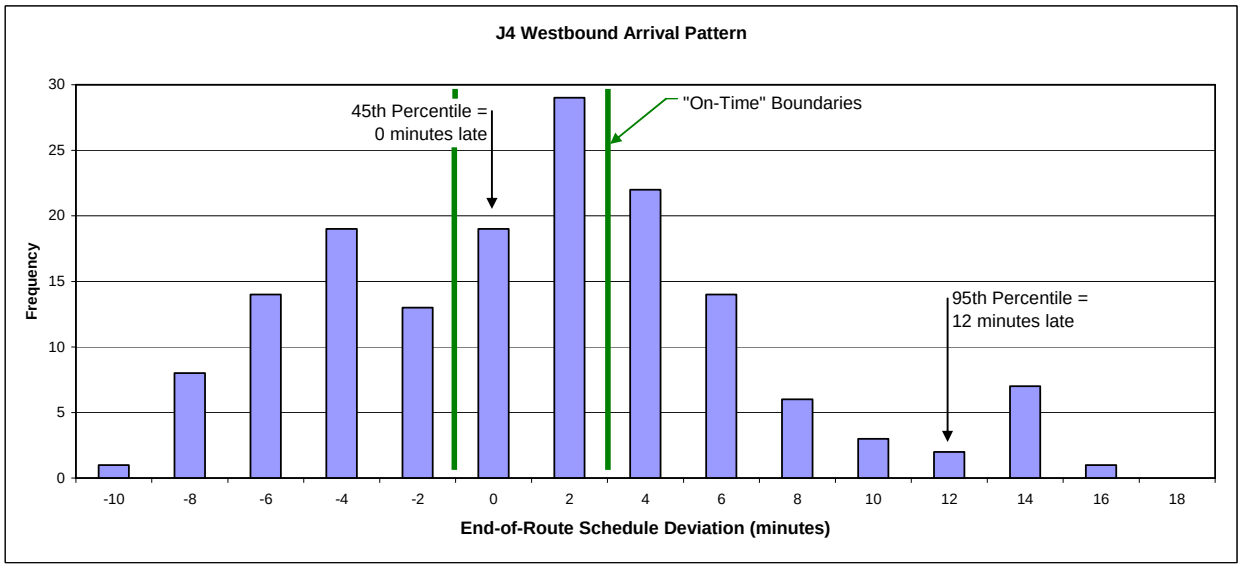




An additional histogram shows (Exhibit 4-3) the number of observations of all ranges of "lateness" at the end of the route (actual arrival time minus scheduled time). Exhibit 4-3 also displays the boundaries of the WMATA standard of "on time," which is zero to two minutes late.

Exhibit 4-3 Arrival Patterns





The graphs exhibit some significant instances of lateness, with the 95th percentile times significantly exceeding the industry standard. The data indicate that 19% of eastbound buses and 30% of westbound buses finished their routes within WMATA's standard of "on time." It is also important to note that 60% of eastbound buses and 45% of westbound buses finished earlier than the scheduled time. This schedule deviation can be more significant than late arrivals as passengers can arrive at a bus stop at scheduled arrival time and miss the bus because it arrived early, forcing the passengers to wait for the next bus.

Though the graphs show significant variation in both travel time and "lateness," that variation may not necessarily be fully reflected in the passenger's experience. The buses may run on schedule until the last timepoint, then run ahead of schedule through the end of the route and finish the route early with minimal passenger inconvenience. However, the data implies that the typical bus passenger will experience a degree of variation in arrival times and travel time.

The large range of bus travel times is not fully reflected in the variation of scheduled travel times, and it should be noted that the range of travel times far exceeds the maximum and minimum scheduled travel times.

As collected by AVL system, the vehicle speed on the corridor varies widely by route segment, partially due to posted speed changes, but also due to variations in signal delay and passenger loadings. Figure 4-1 shows the average vehicle speed on the J4 route.

The AVL and collected data imply that the bus passengers experience on-time performance variability beyond industry standards, which can reduce rider's perceptions of reliability and utility. As a result, the bus corridor is a good candidate for potential runningway and efficiency improvements to improve bus reliability and passenger perception.

A large number of early arrivals create the opportunity to reduce scheduled travel time. Transit priority measures can reduce the overall variability of the travel times, improving schedule adherence and shortening bus recovery times. However, when recovery time is not sufficient, a bus that finished a route behind schedule may start the next route behind schedule.

Overall Traffic Operations

An inventory of the existing transportation system was conducted and is outlined below. This information was used to analyze the existing traffic operations to help evaluate the impact of transit preferential treatments to non-transit vehicles. The existing roadways, from east to west, along the J4 route are described in the Exhibit 4-4.

Exhibit 4-4 Existing Transportation Facilities and Roadway Designations

Roadway	Classification	Cross Section	Speed Limit	Sidewalks?	On-Street Parking?
River Road	Urban Collector[8]	5-lane	35 mph	Yes	None
Paint Branch Road	Urban Minor Arterial[7]	4/5-lane	35 mph	Yes	None
Campus Drive	Urban Collector[7]	2/4-lane	20mph	Yes	Partial
University Boulevard (MD 193)	Urban OPA	5/7-lane	45 mph	Partial	None
Piney Branch Road	Urban Minor Arterial	5-lane	35 mph	Yes	None
Flower Avenue	Urban Collector	2/4-lane	35 mph	Partial	None
Wayne Avenue	Urban Collector[7]	2/4-lane	35 mph	Yes	Partial

The 28 signalized intersections on the eastern portion of the J4 bus route (College Park Metro Station through Silver Spring Metro Station) were analyzed during typical weekday a.m. (7:00 -

[8] Roadway classification for River Road, Paint Branch Road, Campus Drive, and Wayne Avenue based on consultant's professional judgment in lieu of other information.

9:00 a.m.) and p.m. (4:00 - 6:00 p.m.) peak hours[9]. These conditions were used as the baseline condition in the runningway improvement analysis. Figures 4-2 and 4-3 show the existing traffic conditions along the corridor. To assess the benefits of transit signal priority, a dynamic transit preferential treatment, only signalized intersections were analyzed in this way. Static treatments, such as queue jump lanes and stop improvements were also investigated and could be installed at signalized intersections and unsignalized intersections where the bus encounters a traffic control device, such as a stop sign.

The analysis shows that most of the study intersections operate below capacity during the weekday a.m. and p.m. peak hours, which suggests that TSP and other transit preferential treatments are likely possible at those locations. However, the University Boulevard/Riggs Road and the University Boulevard/New Hampshire Avenue intersections operate at or near capacity and with high levels of delay during the weekday a.m. and p.m. peak hours. Additionally, the Campus Drive/Baltimore Road (US Route 1), the Campus Drive/Adelphi Road, and the Wayne Avenue/Georgia Avenue intersections experience high levels of delay during the weekday a.m. and p.m. peak hours. It is likely that the implementation of transit improvements would adversely affect non-transit vehicles, and as a result, have limited potential use during the weekday a.m. and p.m. peak hours. However, transit preferential treatments may still be feasible at these intersections during off-peak periods.

TRANSIT PREFERENTIAL TREATMENTS

Transit preferential treatments come in many different forms. Each type is influenced greatly by the conditions of the roadway and intersections, including geometry, operations, and available right of way. The treatments considered for the study corridor are described below.

Transit Signal Priority

Transit Signal Priority (TSP) strategies were developed to offer a competitive advantage for transit vehicles in a congested urban setting. TSP is an operational strategy to reduce delay for transit vehicles at traffic signals. TSP alters the signal timing at an intersection to give an advantage or "priority" to transit operations. By giving preferential treatment to buses at traffic signals, TSP improves reliability for transit customers, which is needed to increase the attractiveness of the service. This report provides examples from Los Angeles, California, and Portland, Oregon; two transit agencies that have implemented TSP and have seen marked improvement on routes in mixed-traffic and have successfully attracted choice riders.

TSP is similar to signal preemption, in that both allow the traffic signal to dynamically change in response to an approaching vehicle. There is an important distinction with TSP that differentiates this strategy from preemption. *Signal priority* modifies the normal signal operation to accommodate transit vehicles within the coordinated operation of the signal system along a corridor. Also, minimum green times, and pedestrian times are always accommodated during a priority event. This is different from *signal preemption* which interrupts the normal signal operation

[9] The recently constructed Paint Branch Road/College Park Metro Garage signalized intersection located approximately 350 feet west of the Paint Branch Road/River Road was not included in this study due to a lack of traffic volume data. It is expected that the new signal will accommodate TSP implementation due to lower side-street volume and close coordination with the River Road signal.

Similarly, the Campus Drive/Presidential Drive signalized intersection on the University of Maryland campus was not included in the study due to lack of traffic volume data. The signal is not a likely candidate for TSP due to anticipated low transit delay, as the intersection has pedestrian push-buttons and low side-street volumes.

to accommodate special events (e.g., a train approaching a railroad grade crossing adjacent to a signal, or an emergency vehicle responding to an emergency call). Signal preemption is likely to disrupt signal coordination. Specifically, the transit detection system communicates a priority request to the traffic signal that may or may not be granted, whereas a fire engine sends a preemption request that instantly results in altered traffic signal timing to provide a green signal.

There are generally two approaches to providing TSP. The first is to provide priority to all transit vehicles. This is called unconditional priority, meaning there are no "conditions" put on the generation or service of a priority request. The other approach, conditional priority, utilizes integrated Intelligent Transportation Systems (ITS) technologies, such as AVL and scheduling, to determine whether an individual transit vehicle is behind schedule, or meets other predefined conditions, before requesting priority.

An integrated AVL system provides a means for knowing a bus's status (i.e., its geographic location and its position with respect to its schedule). The integrated system on board the bus communicates a message about the bus's status to the traffic signal controller. For example, if the on-board (or central AVL) computer determines that the bus is within certain pre-determined parameters (e.g., not more than 90 seconds behind schedule), no request for TSP will be made to the traffic signal controller. With conditional priority, a smaller percentage of transit vehicles request priority. This may be viewed as preferable if the emphasis is to maximize service reliability rather than to minimize absolute travel time.

To facilitate conditional priority, the Orbital AVL system used by WMATA is integrated with the Trapeze route scheduling system to provide real-time, on-board, route and schedule adherence information. With this system, each bus knows its status relative to its schedule.

To maximize the intelligence of an AVL-TSP integrated system, the system's on-board and off-board technologies should work as close to real time as possible. Any communication lag between the pieces of the system may decrease the effectiveness of TSP.

The priority request strategy considered for the J4 does not preempt the traffic signal, but rather alters the traffic signal timing. As proposed and illustrated in Exhibit 4-5, TSP alters the signal timing in one of two ways:

1. **Green Extension** – only occurs if the bus arrives while the traffic signal is green on its approach. The green time is then extended, by a predetermined amount, to allow the bus to progress through the intersection without having to wait for the next signal cycle's green.
2. **Red Truncation (Early Green)** – only occurs if the bus arrives while the traffic signal is not green on its approach. The green time on the other phase(s) at the intersection is reduced to return the traffic signal to green earlier than normal, thus shortening or truncating the amount of red time/delay the bus experiences at the intersection.

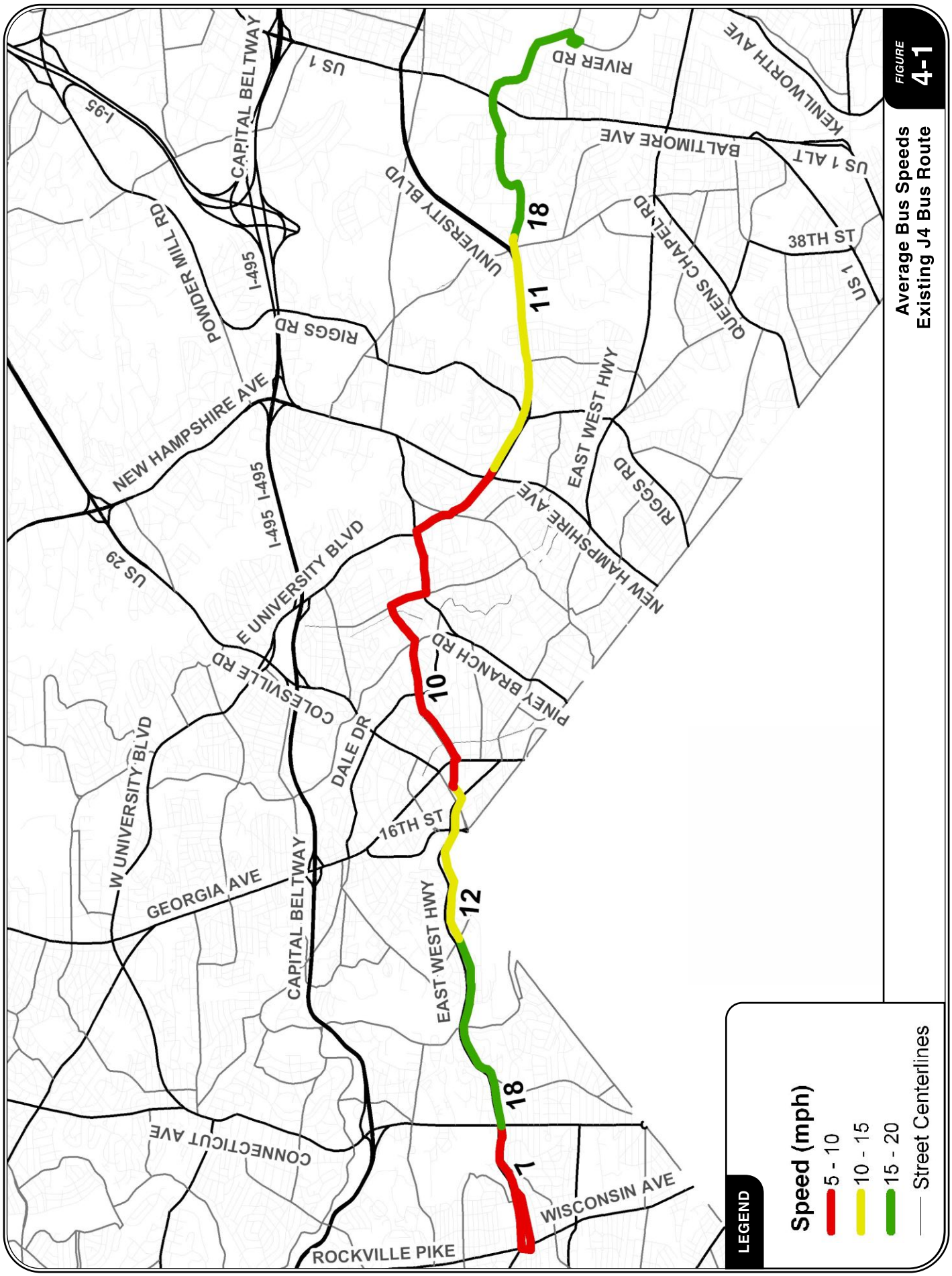


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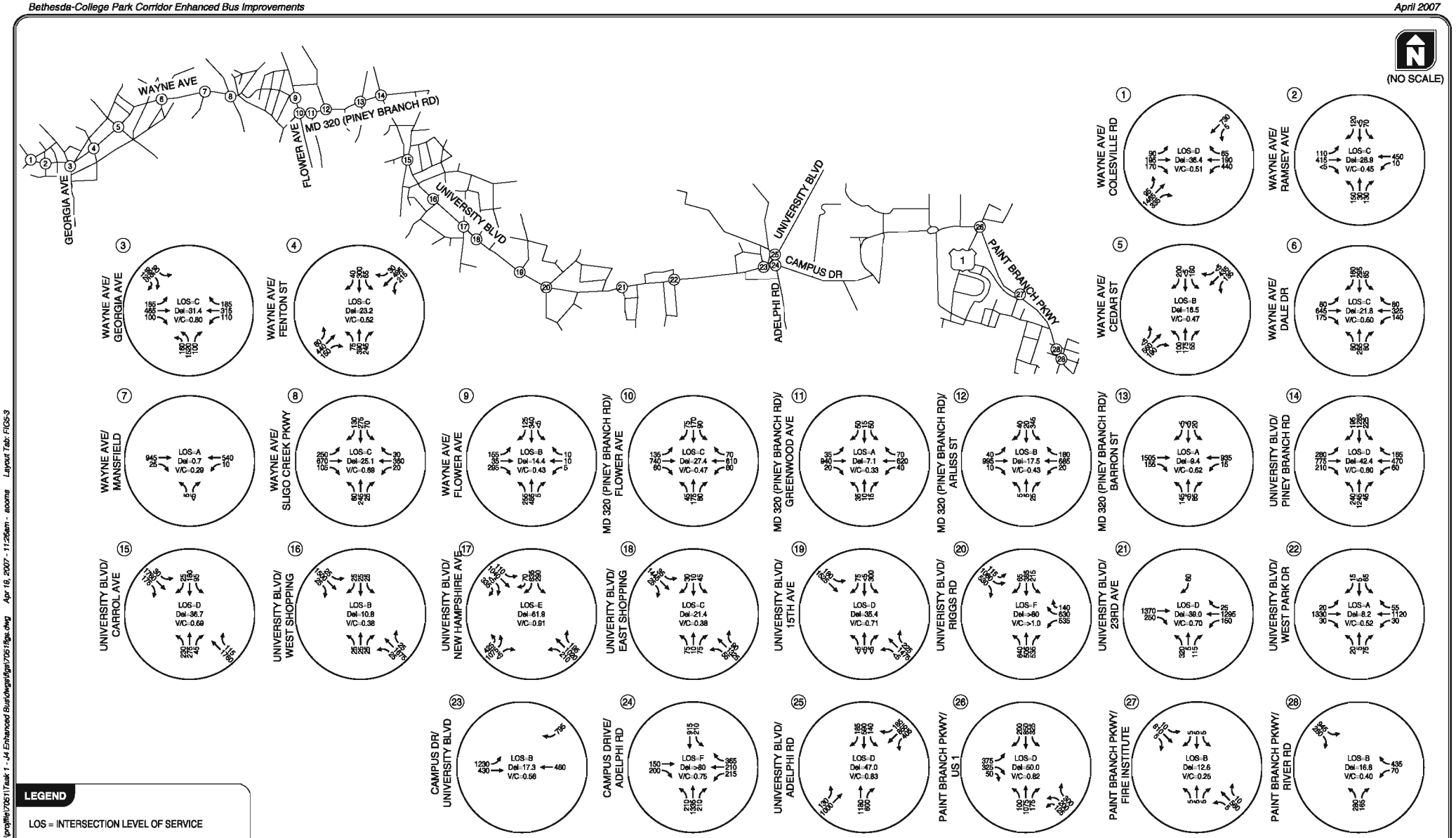
FIGURE 4-2

EXISTING TRAFFIC OPERATIONS
WEEKDAY AM PEAK HOUR
MTA / WMATA



LEGEND

LOS = INTERSECTION LEVEL OF SERVICE

Del = INTERSECTION AVERAGE CONTROL DELAY

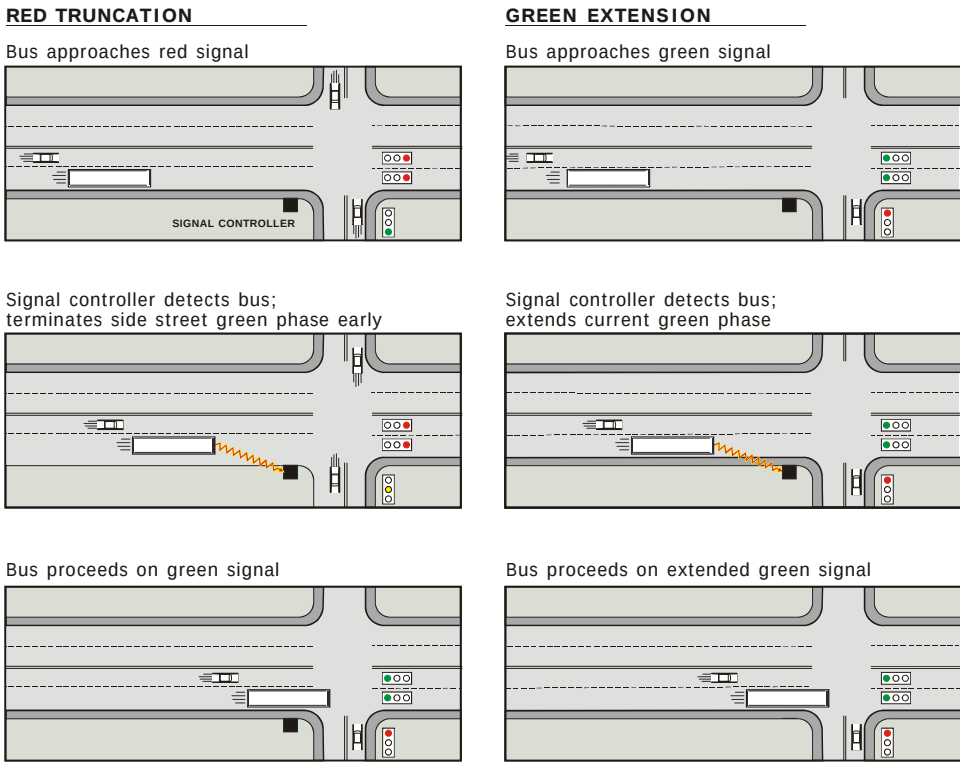
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

EXISTING TRAFFIC OPERATIONS
WEEKDAY PM PEAK HOUR
MTA / WMATA

FIGURE 4-3

In either case, side street pedestrian crossing times are maintained under a pedestrian call or if the signal operates with pedestrian recall on the side street crossings.

Exhibit 4-5 Transit Signal Priority Concept



SOURCE: *TCRP Report 100,* Transit Capacity and Quality of Service Manual, 2nd Edition

Detection systems designed to institute mainline signal priority include GPS systems, optical systems, wayside reader systems, and "smart" loop systems, among others[10].

OBSERVED BENEFITS

The use of TSP is growing among transit agencies throughout the country. A recent publication by ITS America[11] states that more than 70 percent of all transit providers with over 100 buses in their fleets are implementing or planning TSP projects. Thirty-six percent of all transit agencies reported having signal priority for at least one intersection. In addition, forty-four percent of transit providers report they have TSP projects underway, and 55 percent are currently planning a signal priority project.

Metro Rapid service in Los Angeles included transit signal priority as a key component of their transit improvement program. Their system is one of the most successful in the United States.

[10] A complete review of TSP detection technologies can be found in *WMATA Bus ITS Planning and Demonstration Project: Deliverable 4.3 & 4.4 – Market Package and Operational Concept, Task 4 – Traffic Signal Priority, 2005*

[11] "An Overview of Transit Signal Priority", http://www.itsa.org/tsp.html, ITS America, 2004, visited January 8, 2005.

Case studies[12] conducted in more than a dozen locations where TSP has been implemented show a range of benefits for buses: reduced signal delay and travel time, reduced number of stops, improved schedule reliability, and reduced travel time variability. Select findings from the case studies are shown below.

- Portland, Oregon, found a 17-percent reduction in travel time for buses that received priority and a 14-percent increase in on-time performance.
- Seattle, Washington, found a 25- to 35-percent reduction in average intersection delay for TSP eligible buses.
- Chicago, Illinois, showed a 7- to 20-percent reduction in transit travel time during certain periods and travel directions.
- Los Angeles, California had a 33- to 39-percent decrease in bus delay at signalized intersections.

In addition, the case studies consistently showed that the impacts to side-street traffic were minimal.

CHALLENGES

TSP Equipment Integration

Integrating an AVL system into a transit signal priority system has the potential to greatly increase the effectiveness of the TSP system through vehicle identification, tracking, and data processing capabilities. These characteristics create opportunities to interface with transit scheduling software to provide conditional priority and/or to improve the route scheduling to take better advantage of signal priority benefits.

The AVL and scheduling interfaces should also give WMATA the ability to provide real-time information to both passengers and bus drivers. These interfaces could also assist signal controller software in prioritizing multiple TSP requests at an intersection. The AVL system is a building block that makes a TSP system run as smartly and efficiently as possible.

Coordinating Among Multiple Agencies

Implementing and operating transit signal priority on a regional level will require collaboration and cost-sharing during nearly every step leading to the first day of operation.

The primary challenges to implementation are:

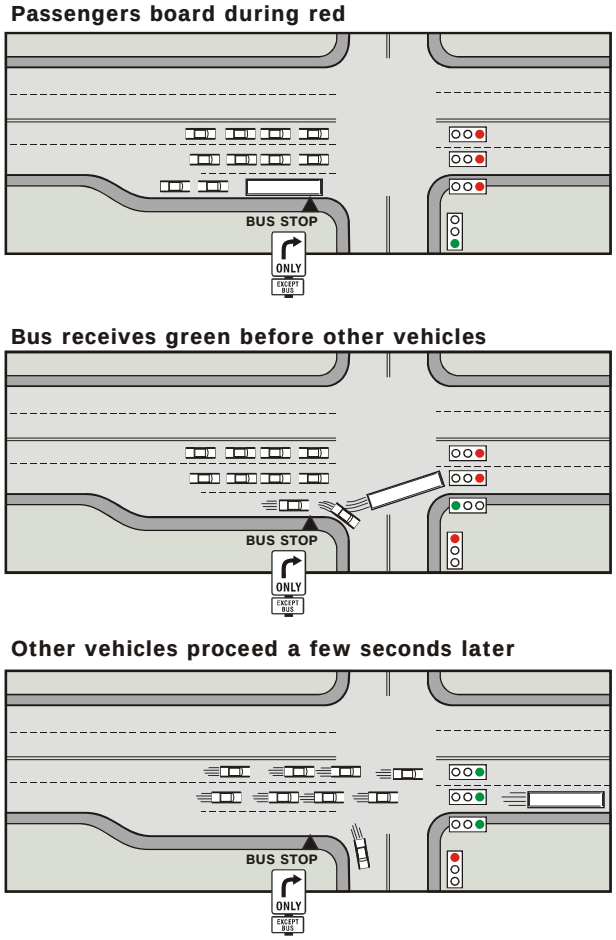
- Interoperability – Coordinating bus systems and traffic hardware and software across jurisdictional boundaries.
- Costs – Allocating cost among project partners, and sharing costs wherever possible.
- Stakeholder Agreement – Agreeing on what TSP should look like and accomplish within the region. Agreeing on acceptable levels of impact to non-transit vehicle operations.
- Operations & Maintenance - Agreeing on post-implementation responsibilities among project partners, prior to implementation.

[12] "An Overview of Transit Signal Priority", http://www.itsa.org/tsp.html, ITS America, 2004, visited January 8, 2005.

Queue Bypass/Queue Jump Lanes

A queue bypass lane is a simple bus preferential treatment. Queue bypass lanes allow buses to avoid long queues of vehicles at signalized intersections by using a bus-only lane or by allowing through buses to use right-turn-only lanes to enable them to travel through congested areas with reduced delay. A queue bypass lane treatment is only feasible if there is a receiving lane on the far side of the intersection for the bus to continue traveling on and merge back into traffic. In addition, any channelization obstructing a bus's through movement from the bypass lane must be altered to allow the through movement. Finally, to be able to fully utilize a queue bypass lane, the lane should extend upstream beyond the point where most traffic queues end in the adjacent through lanes. This treatment must be signed and striped to clearly inform other road users.

Exhibit 4-6 Bus Queue Jump/Queue Bypass Lane Examples[13]



(a) Near-Side Concept

(b) Near-Side Application (Copenhagen)

(c) Far-Side Application (Portland, Oregon)

[13] Transit Capacity and Quality of Service Manual, Transportation Research Board, 2002.

Queue Jump Operations

The queue jump operations treatment, shown in Exhibit 4-6, is identical to the queue bypass lane treatment, except that it also alters signal timing similar to TSP. In the queue jump treatment, the bus has its own lane or uses a right-turn lane for its through movement. This treatment is particularly useful when a near-side bus stop is possible, but there is no receiving lane on the far side of the intersection. The bus and signal controller will be equipped with the same detection technology used in TSP. Unlike TSP, where notable green time is taken from the non-bus approaches, here the other approaches' green times are hardly changed. Instead, a few seconds of early green are given to the bus on a separate, clearly-marked bus-only signal head, allowing the bus to progress through the intersection and merge back into the through lanes on the far side of the intersection ahead of the other vehicles waiting at the approach. Finally, to be able to fully utilize a queue jump treatment, the lane should extend beyond the end point of most traffic queues in the adjacent through lanes.

Stop Placement Modifications

Another important variable is the location of a bus stop relative to an intersection. Generally, when signal priority is being considered, it is preferable to locate bus stops on the far side of a signal rather than on the near side. Although far-side stops do not allow a bus stopped at a signal to use that time to service passengers, they do permit greater flexibility and effectiveness of signal timing plans that offer green extension (commonly referred to as "lengthen plans"). A bus requesting a green extension at an intersection with a far-side stop should travel through that intersection during the current green phase, because it can use the extended green and it does not have to stop prior to the signal to service passengers. The primary difficulty with near-side stops and transit priority can be seen when a bus calls for priority, and the signal extends the green, while the bus stops at the near-side stop to serve passengers. In this scenario, the bus will likely wait a longer time to get a green indication in the next cycle and side-street traffic at the intersection may experience longer delays. For this reason, each near-side stop at a signalized intersection should be considered for re-location to a far-side location. However, the characteristics of each stop should be considered individually before being moved as a number of factors, including right-of-way availability, sight-distance, and pedestrian amenities can impact the feasibility of stop relocation.

APPLICATION OF TSP ON THE J4 CORRIDOR

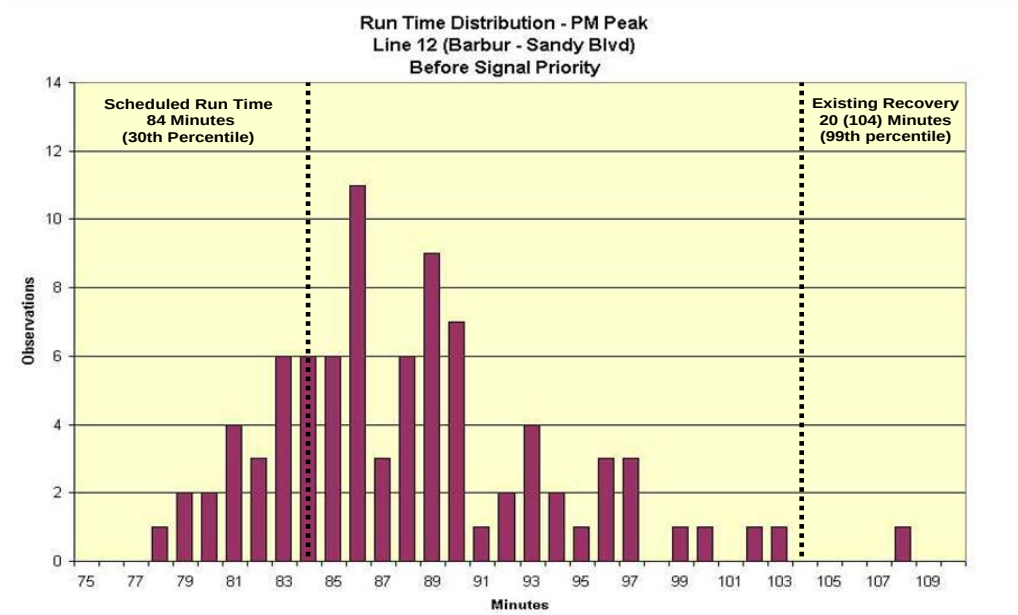
Corridor Opportunities Overview

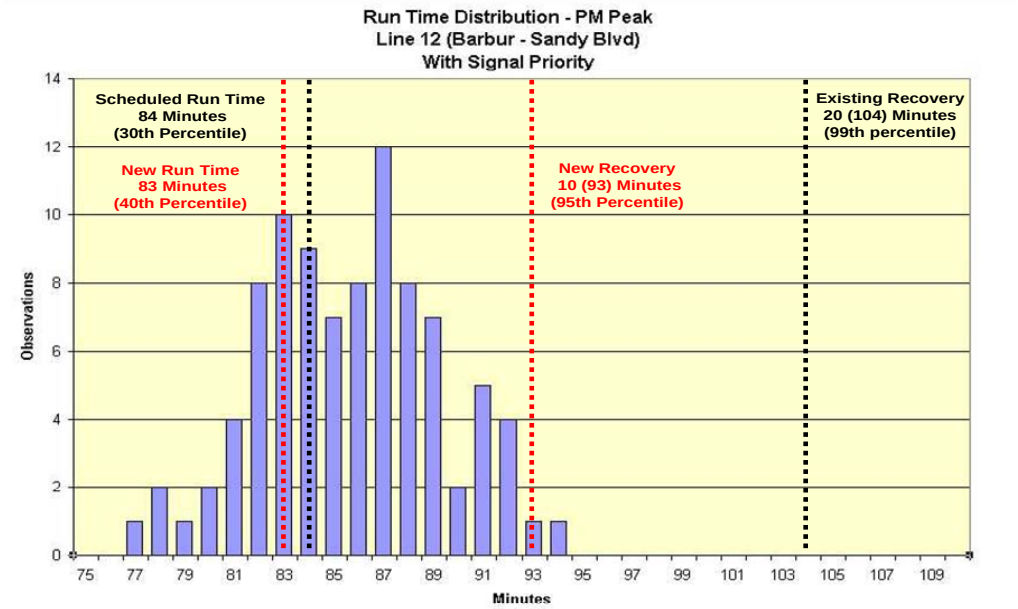
The travel time data from the AVL and the observation data show considerable variation in travel times for the J4 bus. The potential for bus bunching and passing increases considerably when a late-arriving bus is followed by an early-arriving bus. The late bus begins to pick up passengers originally destined for the next bus, which causes it to become further behind schedule with each stop. The second bus has fewer passengers to pick up as a result, and begins to run ahead of its schedule.

Reducing signal delay for transit vehicles, which reduces the travel time variability and improves on-time performance and reliability, is the primary benefit of TSP. If successful, TSP could allow WMATA to tighten schedules and reduce the overall time scheduled for buses and layovers. This would also improve user perceptions of reliability and efficiency and reduces operating costs.

The following graphs shown in Exhibit 4-7 were prepared and presented at the 2003 Transportation Research Board's Annual Meeting (*TriMet's Transit Signal Priority System and Evaluation (Transit Provider Perspective)*[14]). The graphs show the condition before and after TSP is implemented. The presentation demonstrates how the systematic implementation of a conditional transit signal priority system on Line 12 in Portland, Oregon reduced the scheduled run time by one minute (from 84 minutes to 83 minutes), and reduced the schedule recovery time by 11 minutes. As a result, TriMet, the regional transit authority, was able to increase bus frequency on this line without additional vehicles or drivers.

Exhibit 4-7 Run Time Distribution, TriMet Line 12





[14] http://www.signalsystems.org.vt.edu/documents/SignalControlWorkshop2002/TRB_SignalPriority_Callas.pdf

TSP Evaluation Methodology

This section briefly describes the methods used to asses the traffic operations along the J4 corridor after implementing TSP. The objective of the assessment is to identify the intersections along the eastern portion of the J4 corridor that would experience the greatest benefits of TSP, while minimizing impacts to autos and pedestrians. A more thorough description of the evaluation methodology is attached in Appendix D.

The initial step of the TSP screening evaluation identified intersections where (1) transit vehicles experience moderate to high delay and where (2) adequate capacity is available to allow for signal timing modifications when a TSP request is generated.

This assessment was conducted for 26 signalized intersections between the College Park and Silver Spring Metro stations. The intersections were ranked as having a Low, Medium, or High opportunity to reduce bus delay without causing adverse impacts to other traffic. Additional analyses were performed for the signalized intersections to estimate the potential travel-time savings with TSP in place and the potential impacts to side-street traffic. Twenty intersections from this analysis were recommended for TSP implementation.

Intersection Capacity and Delay Assessment

Bus delays and intersection volume-to-capacity ratios were estimated using the Synchro traffic analysis software. Along the J4 bus corridor, a Synchro traffic operations model was developed for all signalized intersections in the study area east of Silver Spring for the weekday a.m. and p.m. peak hours. Vehicle delay and intersection volume-to-capacity (v/c) ratio thresholds were calculated and reviewed to determine the opportunity for achieving benefits from TSP. Each intersection was rated as having a Low, Medium, or High potential. The intersections with a Medium or High ranking were considered for additional analysis. The results of this analysis for each intersection are shown in the appendices.

Bus Delay and Travel Time Savings

Bus delay and travel time savings were estimated for all intersections that were identified for further analysis by the initial screening evaluation. The bus delay savings were estimated using two methods which create effective minimum and maximum averages.

- **Synchro Method –** This method compares delay from two Synchro models: one without TSP in place and the other with TSP in place at selected intersections. The transit and travel time savings from this method represent TSP benefits for all traffic on the bus phases, underestimating the benefits to the transit vehicles. As a result, this method represents a minimum average delay savings for buses requesting TSP. This section discusses the key challenges reported by agencies that have evaluated and/or implemented TSP, including equipment integration and coordination among agencies.
- **Probabilistic Method –** This method estimates bus intersection delay savings as a result of TSP based on random bus arrivals during a cycle. Average TSP delay savings were calculated for each signal phase, and then multiplied by the probability of a bus arriving at the intersection on that phase. These weighted delay savings for each phase were then summed, resulting in an expected transit vehicle delay savings. However, this method does not account for bus interactions with vehicle queues or coordinated phase recall. As a result, this method represents a maximum average delay savings for buses requesting TSP.

The following points are worth noting regarding this analysis:

- The analysis results reported in this document are intended to be used at the planning level to identify: (1) high-opportunity intersections where benefits can be achieved from TSP, and (2) the relative range of delay savings from TSP at a corridor level.
- The traffic operations analysis focuses on the weekday a.m. and p.m. peak hours of traffic because these are the critical time periods for operations of the system and when impacts to other traffic are likely to be greatest. The delay savings are likely to be less during off-peak periods, given that less delay is incurred by buses during that time than during the peak period. However, the implementation of an aggressive signal timing plan may further reduce travel time variability during these off-peak periods.
- Under a conditional priority system, a request is generated only when a bus is late. If a bus is on time, it will not trigger a call for priority and thus there are no improvements to travel time. (However, schedule adherence is improved, which may allow recovery time reductions in the schedule.) In this report, the delay savings reported for transit vehicles with TSP in place assume that a priority request is generated and granted for all intersections where TSP is in place (i.e., assumes the bus is behind schedule for its entire trip).

Side-Street Impacts

The intersections along the eastern portion of the J4 bus corridor were analyzed to address traffic agency concerns about the traffic impacts associated with TSP and to estimate the impact to side-street traffic. These impacts were quantified by assessing the increase in average delay for the side-street traffic over the entire peak hour. It should be noted that while side-street traffic may experience increased delays when a TSP request is granted, the mainline traffic will experience a benefit.

INTERSECTION RECOMMENDATIONS

This section describes the results of the traffic operations analysis performed for the eastern J4 corridor and highlights key findings and conclusions. Detailed results of the analysis are provided in tabular form in appendices E-H.

This study found that TSP should be implemented at nearly all the intersections on the eastern portion of the J4 bus route. Several intersections involving major highways were removed from consideration due to unusual signal configuration and over-capacity conditions. The corridor was divided into four smaller segments for further discussion:

- **Paint Branch Parkway-Campus Drive** (from College Park Metro to University Boulevard)
- **University Boulevard** (from Campus Drive to Piney Branch Road)
- **Piney Branch Road** (from University Boulevard to Flower Avenue)
- **Wayne Avenue** (from Flower Avenue to Silver Spring Metro)

The following sections describe the detailed traffic operations analysis that was performed for each of the four segments considered for TSP implementation. Additionally, queue jumps and stop-location modifications were investigated at locations where these improvements could be readily implemented.

Paint Branch Parkway-Campus Drive Segment

This segment consists of five signalized intersections and runs through the University of Maryland-College Park campus. Three of the intersections were ranked as having a Medium potential for TSP benefits. However, two of the intersections are part of the coordinated University Boulevard/Campus Drive/Adelphi Road group of intersections. The unusual configuration and signal timing may make implementing TSP difficult, and will not be considered at these two intersections. The Paint Branch Road/Baltimore Avenue (US 1) intersection is under SHA jurisdiction while the remaining intersections are controlled by Prince George's County.

BUS DELAY SAVINGS

The estimated TSP bus delay savings estimated by the Synchro and Probabilistic Methods are presented in Exhibit 4-8.

Exhibit 4-8 Segment Bus Delay Savings

Direction	Synchro Method		Probabilistic Method	
	Seconds	Percent	Seconds	Percent
Eastbound AM Peak Hour	0	0%	44	26%
Westbound AM Peak Hour	5	1%		14%
Eastbound PM Peak Hour	22	12%	45	24%
Westbound PM Peak Hour	10	3%		15%

The estimated TSP bus travel time savings estimated by the Synchro Method are presented in Exhibit 4-9.

Exhibit 4-9 Segment Bus Travel Time Percent Savings

Direction	Weekday AM Peak Hour	Weekday PM Peak Hour
Eastbound	0%	7%
Westbound	1%	3%

As shown in the tables, the Synchro Method transit delay and travel time savings are minimal during the weekday a.m. peak hour for the three intersections where TSP was considered on this segment. As discussed above, the Synchro Method severely underestimates the TSP benefits on this segment due to eastbound and westbound buses not running on concurrent phases at two intersections. The Probabilistic Method more accurately captures the potential benefits of TSP at these intersections and indicates that significant savings can be realized on this segment. The travel time and delay savings are more substantial during the weekday p.m. peak hour.

SIDE-STREET IMPACTS

The impact to side-street delay is expected to be minimal, with an average hourly intersection delay increase of 2 seconds per vehicle during the weekday a.m. and p.m. peak hours. The

maximum increase is 13 seconds per vehicle at the Campus Drive/Baltimore Avenue intersection during the weekday a.m. peak hour.

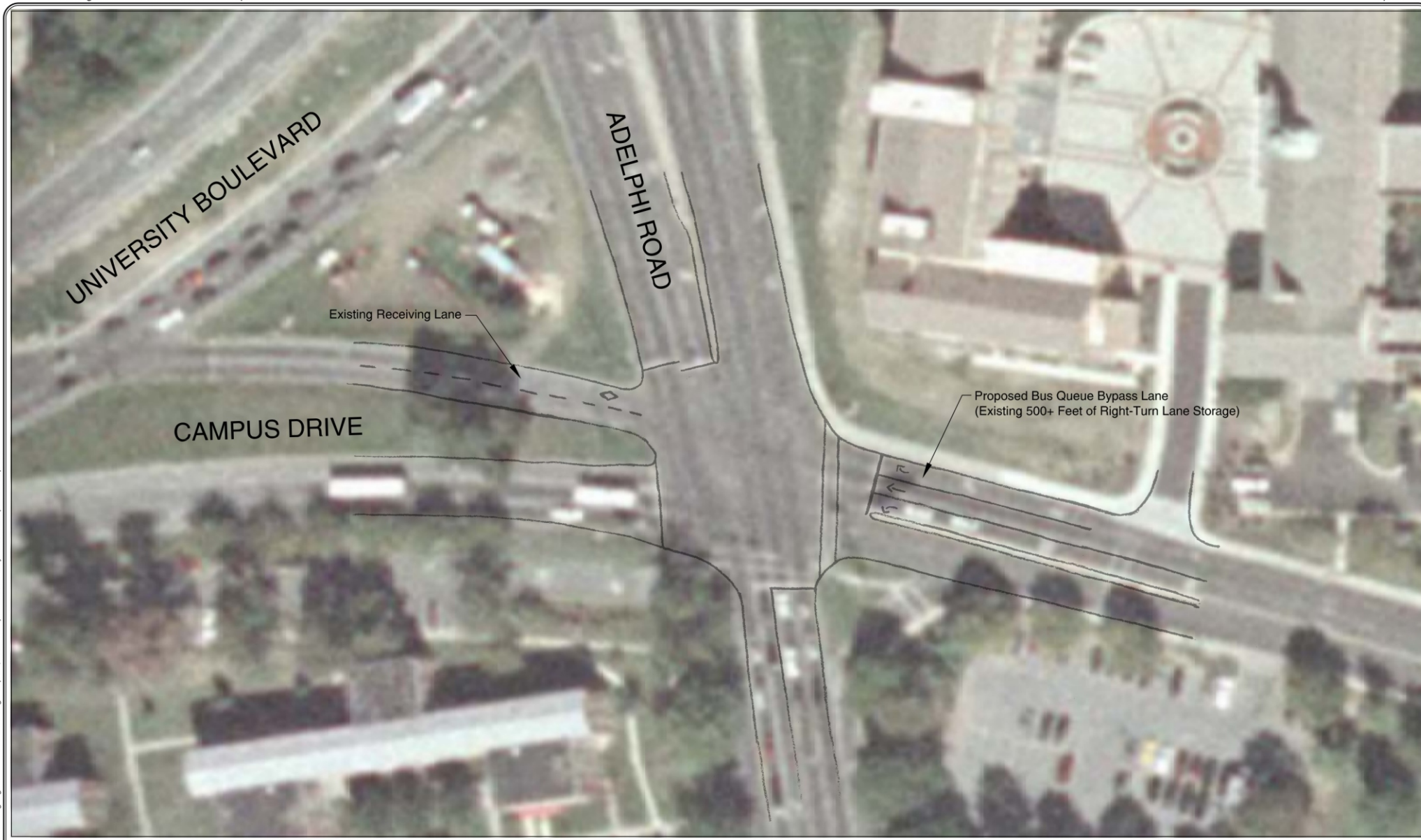
QUEUE BYPASS/JUMP IMPROVEMENTS

Queue bypass lanes were investigated on the westbound approach to the Campus Drive/Adelphi Road intersection. This approach includes one through lane and one right-turn-only curb lane. The west leg of the intersection has two existing receiving lanes. As a result, a queue bypass lane could be installed for westbound buses without any changes to signal equipment or timing; only minor signing and striping modifications would be necessary. This queue bypass lane could also be used by TheBus and ShuttleUM buses. A preliminary sketch of the queue bypass is shown in Figure 4-4.

With the installation of the queue bypass lane, the average transit delay and travel time would be reduced by approximately 55 seconds during the weekday a.m. peak hour and by 35 seconds during the weekday p.m. peak hour. A bus using the bypass lane could potentially prevent some right-turning vehicles from making a right-turn-on-red maneuver, though this movement is well under capacity.

STOP LOCATION MODIFICATIONS

No operations-related stop location modifications are recommended for this segment.



PRELIMINARY CAMPUS DRIVE/ADELPHI ROAD QUEUE BYPASS LANE
COLLEGE PARK, MD

FIGURE 4-4

University Boulevard Segment

TSP IMPLEMENTATION

This segment consists of eight signalized intersections, four of which are ranked with Medium potential for TSP benefits. However, the University Boulevard/Riggs Road intersection operates at capacity during both the a.m. and p.m. peak periods. Additionally, the University Boulevard/New Hampshire intersection is coordinated with two closely-spaced shopping center driveway intersections on University Boulevard and operates near capacity during the peak periods. As a result, these four intersections will not be considered for TSP implementation.

The University Boulevard/Carroll Avenue signal is maintained by Montgomery County and the remaining seven signals are under SHA jurisdiction.

BUS DELAY SAVINGS

The estimated TSP bus delay savings estimated by the Synchro and Probabilistic Methods are presented in Exhibit 4-10.

Exhibit 4-10 Segment Bus Delay Savings

Direction	Synchro Method		Probabilistic Method	
	Seconds	Percent	Seconds	Percent
Eastbound AM Peak Hour	6	3%	39	20%
Westbound AM Peak Hour	6	3%		20%
Eastbound PM Peak Hour	11	5%	25	12%
Westbound PM Peak Hour	12	13%		27%

The estimated TSP bus travel time savings estimated by the Synchro Method are presented in Exhibit 4-11.

Exhibit 4-11 Segment Bus Travel Time Percent Savings

Direction	Weekday AM Peak Hour	Weekday PM Peak Hour
Eastbound	5%	4%
Westbound	3%	3%

Though this segment exhibits high transit delay, the delay and travel time savings calculated by the Synchro Method are moderate. The transit benefits in the average vehicle delay results are diluted by heavy traffic volumes, so the true benefits are not captured. Additionally, long cycle lengths along the segment create the opportunity for larger delay savings from green extension not captured in this methodology. However, the Probabilistic Method takes both of these issues into account.

SIDE-STREET IMPACTS

The impact to side-street delay is expected to be minimal, with an average hourly intersection delay increase of 2 seconds per vehicle during the weekday a.m. peak hour and 1 second during the weekday p.m. peak hour. The maximum increase is 14 seconds per vehicle at the University Boulevard/Carroll Avenue intersection during the weekday a.m. peak hour.

QUEUE BYPASS/JUMP IMPROVEMENTS

A queue jump or bypass lane was investigated at the University Boulevard/West Park Drive intersection. The eastbound approach includes two through lanes and one right-turn-only drop lane. The east leg of the intersection has two existing receiving lanes with a wide shoulder and a newly-constructed sidewalk. If the curb on the east leg was reconfigured to provide a short bus-receiving lane, a queue bypass lane could be installed for eastbound buses without any changes to signal equipment or timing. A preliminary sketch of the queue bypass is shown in Figure 4-5.

As an alternative to the queue bypass lane, a queue jump lane could be installed without any changes to the east leg of the intersection by adding a bus-only signal phase. This improvement would reduce the intersection capacity slightly, but the operations analysis shows that the intersection is operating well under capacity.

As a result of the long green times on University Boulevard, the average transit delay savings at this intersection from a queue bypass lane would be nominal. Additionally, these benefits would likely be negated by the additional side-street green time needed to accommodate the additional pedestrian crossing time.

A queue jump or bypass lane was also investigated on the eastbound approach to the University Boulevard/Riggs Road intersection. Buses have been observed using the right-turn bypass lane and a striped median as an informal queue bypass lane at this intersection. A queue jump or bypass lane could be installed at this location to provide this movement safely and efficiently.

The eastbound approach to this intersection includes two through lanes and a channelized right-turn bypass lane which creates a pedestrian island. There is approximately 7'6" of striped island between the travel lanes and the curbed island. This island could be cut back a few additional feet to provide a bus storage lane. The east leg has two receiving lanes and a northbound right turn add lane which creates a pedestrian island. Similarly, the pedestrian island on this approach could be cut back to provide a bus-only receiving lane. A preliminary sketch of the queue bypass lane is shown in Figure 4-6.

As shown in the sketch, the bus would be located a bus-length ahead of vehicles at the stop bar, which may allow the bus to merge into through traffic safely without a bus-only signal phase, though one will be evaluated in a more detailed evaluation. However, if a bus-only phase is not installed, the red clearance for the intersection would likely have to be adjusted to accommodate for the bus's advance position, which may slightly impact intersection operations.

This analysis shows that, with the installation of the queue bypass lane, the average transit delay and travel time would be reduced by approximately 1 second during the weekday a.m. peak hour and by 4 seconds during the weekday p.m. peak hour. However, as these savings are averages across all vehicles on the approach, they include vehicles that do not stop. As a result, eastbound buses that stop at this intersection on red would experience greater benefits.

Furthermore, field observations indicate that the actual delay and travel time savings from a queue bypass or jump lane during the peak periods would be much greater due to the long queues created by over-capacity conditions.

Additionally, eastbound queues were observed to spill back beyond the existing near-side bus stop located approximately 500 feet in advance of the stop bar, forcing the bus to block the free right-turn lane until the bus can re-enter the travel lanes once the queues begin to clear. Creating a queue jump or bypass lane would eliminate this lane blockage and the need for that difficult merge maneuver.

These queue bypass lanes could also be used by TheBus and Ride On buses that travel on the University Boulevard corridor.

STOP LOCATION MODIFICATIONS

No operations-related stop location modifications are recommended for this segment.

PRELIMINARY UNIVERSITY BOULEVARD/WEST PARK DRIVE QUEUE BYPASS LANE
SILVER SPRING, MD

FIGURE 4-5

PRELIMINARY UNIVERSITY BOULEVARD/RIGGS ROAD QUEUE JUMP LANE
SILVER SPRING, MD

FIGURE
4-6

Piney Branch Road Segment

TSP IMPLEMENTATION

This segment consists of five signalized intersections, one ranked with High potential for TSP benefits. Additionally, the University Boulevard/Piney Branch Road intersection has bus delay of greater than 25 seconds, and experiences a volume-to-capacity ratio greater than 0.80 during the weekday a.m. and p.m. peak hours. Volume-to-capacity ratios at other intersections in the segment are reasonable. All signals are maintained by Montgomery County.

BUS DELAY SAVINGS

The estimated TSP bus delay savings estimated by the Synchro and Probabilistic Methods are presented in Exhibit 4-12.

Exhibit 4-12 Segment Bus Delay Savings

Direction	Synchro Method		Probabilistic Method	
	Seconds	Percent	Seconds	Percent
Eastbound AM Peak Hour	7	5%	71	56%
Westbound AM Peak Hour	7	11%		>100%
Eastbound PM Peak Hour	22	15%	52	34%
Westbound PM Peak Hour	7	13%		89%

On this segment, the westbound bus delay of 126 seconds is much higher than the eastbound delay of 57 seconds during the weekday a.m. peak hour. As a result, the average weekday a.m. peak hour delay savings calculated by the Probabilistic Method are greater than the existing bus delay in the westbound direction.

The estimated TSP bus travel time savings estimated by the Synchro Method are presented in Exhibit 4-13.

Exhibit 4-13 Segment Bus Travel Time Percent Savings

Direction	Weekday AM Peak Hour	Weekday PM Peak Hour
Eastbound	2%	16%
Westbound	3%	20%

SIDE-STREET IMPACTS

Impacts to side-street delays are expected to be moderate, with an average hourly delay increase of 1 second per vehicle during the weekday a.m. peak hour and 7 seconds during the weekday p.m. peak hour. The maximum increase is 27 seconds per vehicle at the Flower Avenue/Piney Branch intersection during the weekday p.m. peak hour.

QUEUE BYPASS/JUMP IMPROVEMENTS

No queue bypass lanes are recommended for this segment.

STOP LOCATION MODIFICATIONS

The existing eastbound Greenwood Avenue J4 bus stop is located mid-block, to the west of the Piney Branch Road/Greenwood Avenue intersection. A near-side stop relocation is recommended to ease pedestrian access and improve bus operations.

Wayne Avenue Segment

TSP IMPLEMENTATION

This segment consists of eight signalized intersections, three ranked as having a High potential for TSP benefits. Additionally, the Wayne Avenue/Georgia Avenue intersection has bus delay of greater than 25 seconds, but experiences a volume-to-capacity ratio greater than 0.90 during the a.m. peak hour. The volume-to-capacity ratios at the other intersections in the segment are acceptable.

All eight intersections along this segment were considered for the implementation of TSP. They are all within and maintained by Montgomery County.

BUS DELAY SAVINGS

The estimated TSP bus delay savings estimated by the Synchro and Probabilistic Methods are presented in Exhibit 4-14.

Exhibit 4-14 Segment Bus Delay Savings

Direction	Synchro Method		Probabilistic Method	
	Seconds	Percent	Seconds	Percent
Eastbound AM Peak Hour	59	39%	90	59%
Westbound AM Peak Hour	43	37%		78%
Eastbound PM Peak Hour	54	35%	93	61%
Westbound PM Peak Hour	42	42%		92%

The estimated TSP bus travel time savings estimated by the Synchro Method are presented in Exhibit 4-15.

Exhibit 4-15 Segment Bus Travel Time Percent Savings

Direction	Weekday AM Peak Hour	Weekday PM Peak Hour
Eastbound	10%	14%
Westbound	18%	16%

The transit delay and travel time savings along this segment are the highest along the J4 route, largely because this segment comprises small intersections with excess capacity, which creates opportunities for more aggressive TSP implementation.

SIDE-STREET IMPACTS

The impact to side-street delay is expected to be moderate, with an average hourly delay increase of 10 seconds per vehicle during the weekday a.m. peak hour and 12 seconds during the weekday p.m. peak hour. The maximum increase is 25 seconds per vehicle at the Wayne Avenue/Sligo Creek Parkway intersection during the weekday p.m. peak hour.

QUEUE BYPASS/JUMP IMPROVEMENTS

Queue bypass lanes were investigated on the eastbound and westbound approaches to the Wayne Avenue/Fenton Street intersection. After a recent reconfiguration, the eastbound approach includes one through lane and one right-turn only curb lane on which on-street parking is allowed except during the weekday p.m. peak hour. The east leg of the intersection has two existing receiving lanes. As a result, a queue bypass lane could be installed for eastbound buses without any changes to signal equipment or timing; only minor signing and striping modifications would be necessary.

With the installation of the eastbound queue bypass lane, average transit delay and travel time would be reduced by approximately 5 seconds during the weekday a.m. peak hour and by 1 second during the weekday p.m. peak hour. As discussed above, buses that stop at this intersection would typically experience greater benefits than those specified in the preceding segment. A bus using the bypass lane could potentially prevent some right-turning vehicles from making a right-turn-on-red maneuver, though this movement is well under capacity. If the existing near-side bus stop is maintained, a queue bypass lane would eliminate the need for a bus weaving maneuver to enter the through lane.

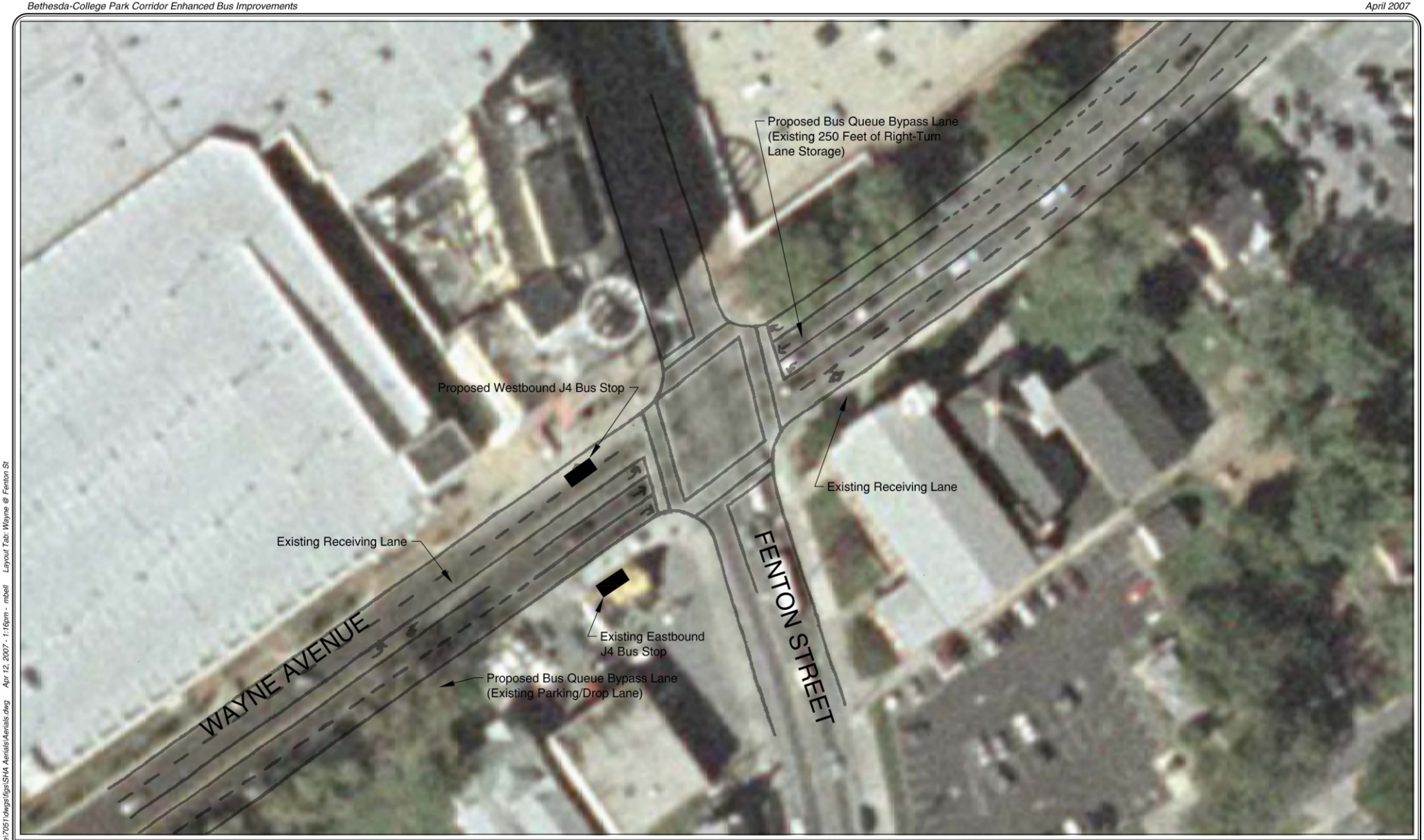
Similarly, the westbound approach includes one through lane and one exclusive right-turn lane with 450 feet of storage that could serve as a queue bypass lane. The west approach of the intersection has two existing receiving lanes. The bypass lane could be installed with only minor signing and striping modifications. These queue bypass lanes could also be used by Ride On buses on the Wayne Avenue corridor. A preliminary sketch of the queue bypass lanes is shown in Figure 4-7[17].

With the installation of the westbound queue bypass lane, the average transit delay and travel time would be reduced by approximately 2 seconds during the weekday a.m. peak hour and by 2 seconds during the weekday p.m. peak hour. As discussed above, buses that stop at this intersection would typically experience greater benefits than those specified in the preceding segment. A bus using the bypass lane could potentially prevent some right-turning vehicles from making a right-turn-on-red maneuver, though this movement is well under capacity. If the existing near-side bus stop is maintained, a queue bypass lane would eliminate the need for a bus weaving maneuver to enter the through lane.

STOP LOCATION MODIFICATIONS

The existing Fenton Street J4 westbound bus stop is located mid-block, to the east of the Wayne Avenue/Fenton Street intersection. Near- and far-side stop were considered to ease pedestrian access and improve bus operations. Ultimately, a far-side stop is recommended to maximize TSP effectiveness and reduce vehicular blockage in conjunction with the queue bypass lane.

[17] The Wayne Avenue/Fenton Street intersection was recently reconfigured to create a five-lane cross-section on Wayne Avenue. The aerial photograph shown with this sketch was the most recent available. It shows the current edge-of-curb, but not the current lane configuration.



PRELIMINARY WAYNE AVENUE/FENTON STREET QUEUE BYPASS LANES
SILVER SPRING, MD

FIGURE 4-7

RUNNING WAY ANALYSIS CONCLUSIONS

This assessment considered the potential benefits and impacts of implementing TSP, providing queue jump and bypass lanes, and shifting bus stop locations along the existing J4 bus route.

The key findings and recommendations from the TSP feasibility analysis for the intersections between College Park and Silver Spring are listed here

- The end-to-end travel time ranges from 36 to 97 minutes in the eastbound direction and 36 to 70 minutes in the westbound direction. While many factors influence the travel time of buses (dwell time, driver performance, incidents along the route, etc.), delay at traffic signals is often a significant contributor to the delay and variability of bus travel times.
- Over the eastern portion of the J4 corridor, 20 intersections are recommended for TSP implementation. These intersections are believed to be good candidates for TSP given that transit vehicles experience moderate to high delays and green time is available to be allocated to the bus movements when a priority request is received. These intersections are
    - Wayne Ave/Ramsey Ave
    - Wayne Ave/MD 97
    - Wayne Ave/Fenton St
    - Wayne Ave/ Cedar Ave
    - Wayne Ave/Dale Dr
    - Wayne Ave/Mansfield
    - Wayne Ave/Sligo Creek Pkwy
    - Wayne Ave/Flower Ave
    - Flower Ave/Piney Branch Rd
    - Piney Branch Rd/Greenwood Ave
    - Piney Branch Rd/Arliss
    - Piney Branch Rd/Barron St
    - Piney Branch Rd/MD 193
    - MD 193/Carroll Ave
    - MD 193/15th Ave
    - MD 193/23rd Ave.
    - MD 193/West Park Dr.
    - Campus Dr/US 1
    - Paint Branch Rd/Fire Academy
    - Paint Branch Rd/River Rd
- During the weekday a.m. peak hour, the potential overall travel time savings on the J4 route is estimated to be approximately 1 minute in the eastbound direction and 1.5 minutes in the westbound direction. This represents an average of 5 percent of the travel time along the corridor.
- During the weekday p.m. peak hour, the potential overall travel time savings on the J4 route is estimated to be approximately 2 minutes in the eastbound direction and westbound directions. This represents an average of 10 percent of the travel time along the corridor.
- During the weekday a.m. peak hour, the potential average bus travel time savings on the eastern portion of the J4 route, as a result of the proposed queue jump/bypass lanes, is estimated to be approximately 6 seconds in the eastbound direction and 57 seconds in the westbound direction.
- During the weekday p.m. peak hour, the potential average bus travel time savings on the eastern portion of the J4 route, as a result of the proposed queue jump/bypass lanes, is estimated to be approximately 5 seconds in the eastbound direction and 37 seconds in the westbound direction.
- In addition to the travel time savings, TSP, particularly in conjunction with queue bypass/jump lanes and far-side stops, will help to provide more consistent transit travel times and better schedule adherence that will attract choice riders and improve the transit experience.

Chapter 5 Ridership Outreach & Development

Initial concepts for improved service were developed using county planners' knowledge of the corridor and knowledge from the transit agencies that provide service in the corridor. Initial ideas for the service, bus stop, and customer information enhancements will be communicated to existing and potential riders in the corridor through a variety of methods. These communications have already begun, with a survey of existing bus riders within the corridor to determine the demand for a single, limited-stop service. This will be followed up by outreach to the broader rider and non-riding public through the various communication channels discussed below. Once a decision on the service is made, these same communication channels will be used to explain and refine any proposed service changes. This outreach effort would be in addition to marketing and promotional activities designed to increase use of the service (see Chapter 6, Branding).

INTERCEPT RIDER SURVEY

At the outset of the project there was little existing data on the travel patterns of bus riders in the College Park – Bethesda corridor. With the large number of overlapping routes and no single consistent route from College Park to Bethesda, it was unclear how many passengers were transferring between routes to complete their trip. In addition, there was no mechanism to determine customer satisfaction with the existing service, or the highest priority for improving service.

To understand how the service is used and to gain customer perceptions of service delivery, surveys were conducted of passengers waiting at major stops between College Park and Silver Spring. Riders provided their origins and destinations, trip purpose, bus routes, other modes used to make the trip, frequency of transit use, fare payment method, overall satisfaction with the service, demographics, and suggestions to improve service. The survey supports the service planning effort by determining the market from existing riders for a single seat ride for the entire corridor and identifying key transfer patterns between routes. The survey supports the capital and operating plans by identifying the critical issues as seen by the riders, including stop improvements (more shelters and seats) and operational improvements (on-time performance and service frequency).

Surveys were completed in English or Spanish, depending on the rider's language preference. A total of 448 surveys, 12% of which were in Spanish, were completed covering ten westbound bus stop locations. Surveys were conducted between 6 am and 6 pm weekdays, beginning the week of November 27 and ending the week of December 11, 2006. The full report can be found in Appendix B. A summary of the survey results is presented here.

Demographics

- 88% of the riders classify themselves as minority, with 55% responding Black/African American, 26% Hispanic/Latino, and 7% other; 14% classified themselves as White. (Note: multiple responses were allowed)
- Respondents are typically young, more than half being between the ages of 18 and 34. (Riders under 18 were not surveyed due to legal issues because they are minors.)
- Women made up 55% of the respondents.

- Annual Household income was $25,000 or less for 50% of the respondents; 17% of the respondents had household incomes greater than $50,000.
- Reflecting the lower income level of most riders, 78% of the respondents did not have a car available for the trip. However, 22% had a car but preferred to use the bus.
- 7% of the respondents were students at UM-College Park; 1% were faculty or staff members of the university. This small sample of University-related travelers makes it difficult to draw any conclusions about that group but also shows the significant opportunities for growth in ridership among that group

Customer Satisfaction

- Overall satisfaction with the service is very high, with 20% giving it a 10 on a scale where 10 is excellent and 1 is poor. A total of 60% gave service a positive rating (an 8, 9, or 10), with another 31% giving it a neutral rating (a 4, 5, 6, or 7). Just 5% of the respondents rated the service as poor, giving it a rating of 1, 2, or 3.
- When asked one thing they would change about the bus service on their trip, 34% had no suggestions and/or were satisfied with the service. The top improvement mentioned was to 'run on time' and 'run on schedule' (27%). The second most common request was for more service (25%). The service requests were broken down as follows:

  Frequent service (general): 16%

  More weekend service: 3%

  Buses later at night: 2%

  More express buses: 2%

  More buses during the rush hour: 2%
- Overcrowding was mentioned by 5% of the customers, which also reflects frequency of service. The two non-service related suggestions with more than one comment were to change the attitudes of some drivers (e.g. rude or uncaring) and to lower fares.
- Of the 36% of riders who rated their service neutral or poor, 49% wanted the service to run on time; more frequent service was mentioned by 14%.

Fare Payment

- Overall, just under half (47%) of the respondents paid with a cash fare while 20% paid with a SmarTrip® card.
- Looking at work trips, cash was still the primary method of payment (43%); SmarTrip® was used by 27% of those making a work trip, compared to just 11% for those making a trip for a purpose other than work.
- Riders who only used Ride On to make their bus trip were more likely to use a SmarTrip® card (33%) than were Metrobus only riders (22%). Those who used both were least likely to use a SmarTrip® card (17%).

Trip Purpose

- In the morning (6 a.m. to noon) 66% of the trips were from home going to work. In the afternoon (noon to 6 p.m.) 26% of the trips were going from home to work, while another 18% were returning home from work.

Conclusions

The primary concerns of existing riders relate directly to service, most notably on-time performance and frequency/hours of service. More direct service (a "one-seat ride") did not surface as a specific request, possibly because riders were making suggestions to fix their existing service rather than suggest new service. Similarly, stop and passenger amenities, while potentially desired by existing riders, are not of high enough concern to be the one thing to change to improve their bus service.

The current riders are ethnically diverse. The advertising, promotion and outreach activities should address African-American and Hispanic markets, the two largest ethnic segments of the existing riders. In addition, many of the riders are low income and/or non-English speaking and may lack the means to obtain information from non-tradition sources, such as the internet. Consequently, information needs to be provided in a variety of formats and locations to reach all riders.

The SmarTrip® card has potential to help simplify trip making, especially for those who transfer. The card is not being used by workers at the levels it would be expected given the frequency of trip making. This would provide a solid opportunity for developing the work trip market either through employer programs or by marketing directly to workers.

The survey only addresses the concerns of existing riders. In developing the branding and subsequent marketing campaigns, attention needs to be paid to the desires of the potential customers, also. It should be noted that improvements to the service aimed at current riders, or benefits aimed at future riders, will benefit all users and provide the most synergy for increased ridership.

RIDER OUTREACH

Broad and comprehensive efforts to engage the public are planned to begin right after the decision is made on moving forward with the proposed improvements, assumed to be April 2007. The purpose of the outreach efforts is to introduce the initial results of the planning process and to receive feedback from existing and potential riders about the proposed service changes. Listed below are techniques to engage riders and get their input before decisions are made on service changes. These same techniques will be used throughout the process so that riders and the public are clear about how they can both give and receive information about transit service changes.

Throughout this process it is essential to clarify the relationship of this project to other improvements in the corridor, specifically the ongoing Purple Line study and the Takoma/Langley Park and Silver Spring transit centers. Most important is to make it clear that the improvements under consideration are part of an initial, interim step toward improved transit service and they are not conceived of as the final product of the Purple Line project or as a fulfillment of the Bus Rapid Transit (BRT) option that is being considered as part of that project. While the potential for confusion with these other projects and their timelines poses a challenge, these projects have already engaged community members in the corridor with an interest in transit improvements and are essential to effectively utilize this information.

Several avenues to be considered during the planning and implementation of new service concepts are described below. While these techniques are typically used once service is in place, they can be considered during planning to gather community ideas about how to refine the service plan and other details of the project.

- **Customer Service Representatives (CSR).** One of the most effective, but intensive, communication techniques is to provide information directly to the riding public, where CSRs ride buses in the corridor handing out materials on the ***changes being considered,*** talking to customers, and answering questions. CSR's should be bi-lingual to ensure customers understand the changes and opportunities to comment. Stops being ***evaluated for elimination of limited-stop service*** would be targeted for special emphasis by the CSRs.
- **Rider Alerts.** A brochure in multiple languages should be distributed on board all routes serving the corridor to inform existing riders of the potential for changes to existing transit service and of some of the changes under consideration. The brochures would include methods the public may use to voice their comments on the service changes.

COMMUNITY OUTREACH

While it is critical to serve existing transit riders, particularly those who depend on transit, the broader community and "choice" riders should also be engaged. This outreach would include those who are currently using the Metrorail system to make trips between points along the study corridor. It is also an opportunity to engage those who live around transit stops, and community leaders who are interested in improving the transportation facilities serving their neighborhoods. Input from the individuals not using bus service in the corridor will help define service attributes that will make the service more attractive to them. This initial step has the potential to build a broader base of transit users, with increased investment in transit creating a viable alternative to auto use in the corridor. In addition to public meetings, a variety of forums are available to bring the public into the process of developing public transportation service that will meet their needs. These forums include:

- **Employers.** MTA and WMATA have relationships with many of the employers in the corridor and can make use of their relationships to promote the use of transit service. Transit Fairs can be held at employer sites to explain changes and solicit comments. Materials to be distributed would include additional methods for providing comment.
- **Neighborhood Meetings.** Project staff can attend regularly scheduled neighborhood and immigrant support agency meetings to talk about the proposed changes and solicit comment. This provides an important opportunity to connect directly with the riding and non-riding community that would not likely attend a public meeting on transit improvements.
- **Comment Line and Email.** In addition to traditional mail-in comments, a phone line and email address can be established to permit the public to call or write with their comments on the proposed changes. Options would be included on all printed materials and websites, and could be highlighted in community meetings.
- **Media.** Members of the media are regularly briefed through news releases, telephone conversations, and news conferences. Media representatives would be advised of these activities and invited to participate.

PUBLIC MEETINGS

Once there is consensus on service changes, open houses would be led by the transit agencies to inform existing riders of the enhanced service. Given the length of the corridor it will be

essential to hold any meetings in at least two locations, covering Prince George's and Montgomery Counties, and recognizing the varying cultural and geographic market segments. Venues could include the University of Maryland, the Takoma Langley area, Silver Spring, and Bethesda and employ the assistance of CASA of Maryland and the Hispanic Chamber of Commerce to raise awareness and participation. While communications must and should specifically discuss any reductions in service, these meetings will be planned to engage agency marketing resources to create enthusiasm for this new and enhanced transit option.

Chapter 6 Branding

INTRODUCTION TO BRANDING

To maintain a high degree of satisfaction with their current riders and to attract new riders, many public transportation agencies around the United States and internationally implement premium or other enhanced services with branding to distinguish them from regular bus service. The characteristics of the brand will be primarily dictated by the goals, objectives, and strategies established for each service.

Branding includes developing a strategic position (sometimes a new name) and creating tactical elements like a logo, color, and typography that articulate the strategic position. The tactical brand elements are applied to vehicles, stops and stations, the running way, and user information materials. Branding is particularly effective when all the branded elements carry the same core message to the riders. Branding should emphasize the characteristics that set one service apart from another. Branded elements make the enhanced service easier to recognize and are thus associated with higher service quality.

In addition to the Metrorail, there are four branded bus services operating along the Purple Line corridor: Metrobus, Ride On, TheBus, and the UM Shuttle. Branding at Metrobus has already occurred on a route basis while the development of a common geographic east-west corridor wide brand service has only recently come under consideration.

The terms Bus Rapid Transit (BRT) and Enhanced Bus define two clearly different types of service offerings and have different meanings.

Currently, BRT reflects a desired end-state that is more reliant on use of exclusive or highly-controlled bus lanes over a majority of the distance of the service, and that has achieved a high degree of deployment of the integrated operations, features and facilities to guarantee a high level of speed, safety, reliability, as well as quality customer service.

Enhanced Bus applications (sometimes known as “BRT lite”), on the other hand, while drawing from the same toolbox of enhancements, are designed to match the size and scale of the markets they serve, to accommodate constraints in their physical surroundings, and, in some cases, to reflect interim strategies of a phased implementation process, for example the recently completed MetroExtra branded service for Georgia Avenue in the District of Columbia.

Despite the differences, a common feature of both BRT and Enhanced Bus is the need for a unique service identity or brand to enhance customer understanding of the nature of the service as well as to provide a landmark for passengers entering the system. Later in this document, a discussion of whether the two services may share a brand identity or have different brand identities is also addressed. Finally, as the discussions on branding strategies among the local stakeholders have progressed, WMATA and the District have been advancing one of its premium service corridor projects on Georgia Avenue. Branding the service was one element of the project implementation.

BRANDING PROGRAM

The branding program involves two steps. Step 1 is to develop a Brand Strategy to formalize the strategic direction for the brand and develop a new name.

The brand strategy will influence the Brand Design, but it will also be a unifying source of guidance for marketing, architecture, and other infrastructure elements

Step 2 (Brand Design), is to design all of the tactical branding items such as the logo, bus graphics, and signage.

STEP 1: BRAND STRATEGY

Brand Strategy was initiated in Maryland at a briefing meeting on October 17, 2007. Research materials included project goals and measures, a comprehensive domestic and international survey of current bus branding practices, reviewing numerous relevant reports and documentation.

Exhibit 6-1 Bus Brands that intersect in the Corridor

Exhibit 6-2 Bus Graphics Survey

The Brand Strategy was submitted to the project management team on Nov 12, 2007 for feedback and discussion. This branding information contained observations and opportunities identified from the research, specific branding criteria, mission, vision and positioning statements as well as some preliminary user profiles and pattern studies to help understand the unique characteristics of the corridor.

On January 16, 2007, a subsequent Branding and Marketing Task Group meeting was conducted to review the Brand Strategy as well as to develop a new name. Potential names for the service were identified at this meeting. In addition, two important conclusions were reached.

1. The proposed, improved new J4 route will qualify as an enhanced bus brand and can use the recently created WMATA MetroExtra branding.

2. The new J4 route is the east-west spine of a "family of transit" services. Creating an "umbrella" brand encompassing all of the family of interconnected services can be a strong method of marketing and communicating to current and new riders the many benefits of using transit in this corridor.

The following Brand Architecture was developed to reflect the direction determined during the meeting: to assist in managing, implementing, and understanding how the new brand can coexist with all of the existing brands and transit services available in the corridor, and to map out how these brands may or may not be indicated at specific venues throughout the corridor.

Exhibit 6-3 Brand Architecture of Corridor Brand Concept

Brand Type	Brand Name	Route Designation	Service Type	Description	Venues
Corridor Brand	CrossLink			Marketing and communications tool for promoting the corridor's transit network benefits.	Bus Graphics, Media Channels, Web Site, Brochures, Bus Stop Flags, Route Map, Shelters Promotional items
Corridor Tagline	To Be Determined				Media, Promotions, Maps, Brochures, etc
Route Brands	Good:				
	MetroBus	J1, J2, J3, C2, C4	Local		Bus Graphics, Stop Flags
	Ride-On	15,11	Shuttle		Bus Graphics, Stop Flags
	The Bus	17	Shuttle		Bus Graphics, Stop Flags
	Better:				
	MetroExtra	J4 (Revised)	Limited Enhanced		Bus Graphics, Stop Flags
	Best:				
	Metro BRT (Rapid)	TBD	Rapid		Bus Graphics, Stop Flags
	Metro Light Rail	TBD	Light Rail		Bus Graphics, Stop Flags
	Metro:				
	Purple Line (Future)	TBD	Rail		Metro Branding

Clearly the Bethesda to College Park corridor contains unique features and characteristics. Probably the most unique is that within this 14 mile east-west route there are at least 3 different demographic groups, each with its own distinctly different mindset and motivations.

Exhibit 6-4 Corridor Customer Profiles for Branding Purposes

Customer Profiles:

Location	Bethesda	Silver Spring - Langley Park	College Park
Name:	Bruce & Kim 	Julio & Maria 	Edgar & Tiffany 
Mindset:	Skeptical, Unnecessary Reluctant, "Hard-Sell"	Open, Responsive Economically Driven	Open, New Energy Variety, Why-not
Income:	Affluent	Working Class	Student
Motivation:	Easier commute Save time, money, energy Solves parking problem	Easier commute Necessity Faster	Convenience Variety Entertainment - Fun
Offerings:	Business, Restaurants Entertainment	Culture, Restaurants Entertainment, Shops	Education, Sports Culture
Probability:	Unlikely till Enhanced	Highly Likely	Likely
Method:	Incentives, Education, $5 gal	Faster, Incentives, Connect	Incentives, Cross-sell New places...Fun
Summary:	Untapped ridership with multiple area offerings	Core ridership will appreciate added benefits	Will be interested in new benefits

Customer Experience Management Concept

Over the past four years, the private sector (particularly retail establishments) has taken a new approach to marketing called Customer Experience Management (CEM). CEM is about tailoring an individual customer's experience instead of treating them all the same, or "one size fits all" as was done in the past. The value of this approach is especially apparent in mass transit and yet CEM has not been adapted to the public sector.

Adapting CEM to transit may sound like an expensive and formidable challenge, but we believe that it can be done with relative ease and with huge success, especially in attracting new riders. What is especially interesting is that most of the "touchpoints" that comprise the three key categories—Service, Communications and Facilities—are already being addressed. All that is required will be a comprehensive program that unifies them as a whole.

The Total Customer Experience

Of the three Touchpoint categories, service has the most impact on increasing ridership, but all three should be addressed as a whole. Exhibit 6-5 briefly describes "touchpoints" and lists the touchpoints for transit service, facilities, and communications.

Exhibit 6-5 Customer Experience

Transportation Customer Experience

The Transportation Customer Experience is the seamless integration and management of the service, facility and communications "touchpoints" which insure that all customers will have consistent, positive, and memorable experiences.

	Goals:	Touchpoints:
Service:	Reliable, Frequent, Fast, Safe,	Headway, Security, Queue Jumping Signal Priority, Dedicated Lanes Bulbouts, Use Technology
Facility:	Safe, Comfortable , Attractive,	Vehicles, Payment Methods, Security Shelters / Stops, Buildings, Parking, Pavement Markings, Use Technology Lighting, Sound
Communications:	Simple, Easy to Understand, Unique, Different, Legible Available, Consistent Appropriate, Memorable	Name / Logo, Web Site, Brochures Posters , Maps, Signage, Phone Ads, PR / Media, Bus Driver, Agent

Naming

The one-day naming and strategy meeting was attended by both managers and marketing staff from WMATA, Montgomery and Prince George Counties, and MTA. During this session many different names were generated and evaluated based on the previously established brand criteria and strategy.

Four names were selected and their availability was searched by a professional name search firm in San Francisco. Fortunately, three of the names were available; CrossLink, MosaicLink and CruzWay. CrossLink was selected as the name for the family of transit services operating within the project corridor.

STEP 2: BRAND DESIGN

Having selected the "CrossLink" name for the family of services in the corridor, Brand Design has begin but not yet been completed. The brand design includes developing a logo that will be used on bus graphics, signs, shelters, and all marketing material within the corridor.

Marketing

In our research, we reviewed the Pike Ride Program. It is an excellent example of a comprehensive CEM which addresses all of the customer "touchpoints" and does an especially good job of developing a marketing plan that successfully increases ridership by implementing the following:

- Projects are about more than just transportation (Going Beyond the Bus)
- Consumers expect permanence and product differentiation

- Image managed to maximum impact on behalf of project:
    1. Build a base of support for the initiatives
    2. Increase consumer product awareness
    3. Leverage assets of agency and partners
    4. Encourage/explain trial use of service
    5. Create an expectation of "Customer Experience" (We have our act together)
    6. Differentiate ordinary from extraordinary
- Successfully create a marketing presence and image
- Image contributes to increased ridership and mission fulfillment

It is important to point out that with the decision to create an "umbrella" brand for Purple Line corridor, the most challenging goal of the marketing plan will be to make sure that both the existing and new riders understand what the specific benefits will be to them individually.

For example, the Rider Survey found that current riders want more service and that reliability and frequency were most important to them. We also must ask what benefits there would be for current riders as well as new riders to be part of this new geographic multi-service corridor. Some of the benefits could be:

- Increased reliability
- Simpler and easier connections
- Incentives like frequent user awards
- Unified maps and information
- A web site that connects Metrobus, MetroExtra, Ride On, TheBus and Metrorail in one place
- Fare incentives, such as simplified fare payment, a University of Maryland bus pass program for students and staff, and the potential for including SmarTrip chips in ID cards for local institutions
- Customer Service Representatives
- Others

The recommendations contained in Step 1, Brand Strategy, combined with the forthcoming designs in Step 2, Brand Design, along with all of the other service and facility improvements and the Intercept Survey will become the cornerstone for WMATA and MTA to establish the program's Marketing Plan.