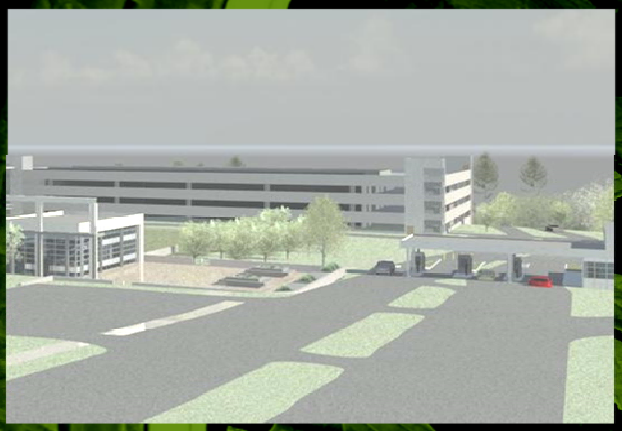


2011 Transportation Management Plan 4600 Sangamore Road Bethesda, MD 20816

November 9, 2011

LOYALTY – DUTY – RESPECT - SELFLESS SERVICE – HONOR – INTEGRITY - PERSONAL COURAGE

- U. S. Army Core Values

INTELLIGENCE COMMUNITY CAMPUS – BETHESDA

Table of Contents

1.0 INTRODUCTION

This Transportation Management Plan (TMP) has been developed in accordance with National Capital Planning Commission (NCPC) and Montgomery County (MC) guidance for redevelopment of properties in the capital region (Comprehensive Plan for the National Capital Region) and addresses transportation planning needs for redevelopment of the Intelligence Community Campus - Bethesda, located at 4600 Sangamore Road, Bethesda, Maryland.

A core focus of the proposed ICC-B improvements is to improve site safety and security by providing enhanced on-site parking and improved on-site transportation management infrastructure. Core features of these proposed improvements related to the TMP include:

- Construction of a new dual lane, divided roadway entrance drive
- Addition of new turning lanes, vehicle and pedestrian transition areas on Sangamore Road
- Consolidation of 12 acres of existing at-grade site parking into a 3-acre parking facility
- Provision of enhanced on-site cycling and pedestrian access facilities
- Provision of an enhanced bus shelter and drop off point for employees
- Developing infrastructure to support multiple occupant vehicle commuting to the site

These features will greatly enhance local traffic flow along Sangamore Road outside the complex, reduce traffic queues outside the site during peak demand periods; and enable removal of the existing four-way stop at the current facility entrance at Sentinel Drive. The proposed improvements will also significantly reduce off-site parking impacts which currently negatively impact area businesses and residents.

These proposed improvements and traffic benefits are presented in separate planning documents prepared for this redevelopment effort in 2010 and earlier in 2011, including the Environmental Assessment (EA) prepared in accordance with the National Environmental Policy Act (NEPA), and the ICC-B Site Development Guide prepared in accordance with NCPC criteria.

These earlier efforts included a detailed traffic study of the proposed action which led to development of the transportation improvements highlighted above. A copy of this traffic study and the transportation section of the ICC-B Site Development Guide are included in ***Appendices A and B*** of this document for future reference during TMP implementation.

Central transportation themes in the preliminary redevelopment planning include:

- Traffic management focus on improved on-site access queuing for site vehicles undergoing security screening; and improving the main vehicle entry configuration on Sangamore Road to reduce off-site peak commuter impacts; and
- Provision of sufficient on-site parking to reduce off-site parking practices which negatively impact surrounding residents and businesses and incentivizing parking for multi-passenger vehicles to increase overall average vehicle occupant loads and promote ride-sharing.

This planning addresses the sensitive nature of ICC-B site operations and the inability of personnel to use alternative work methods such as telecommuting and flexible work schedules due the secure integrated needs of the intelligence community that will be using this site.

The site is well served by the Capital Beltway (I-495), the Clara Barton Parkway, and MacArthur Boulevard, (major regional thoroughfares). Due to the relatively small size of the site population (approximately 3,000 current and future projected personnel) previous planning efforts found that regional traffic impacts were minimal and no additional off-site traffic improvements are warranted. Recommended improvements are therefore limited to improvements directly in front of the proposed development to reduce impacts to local residents and businesses traveling in front of the site along Sangamore Road. ***Figure 1.1*** provides a general overview of the site location and general planning area within the National Capital Region and Bethesda.

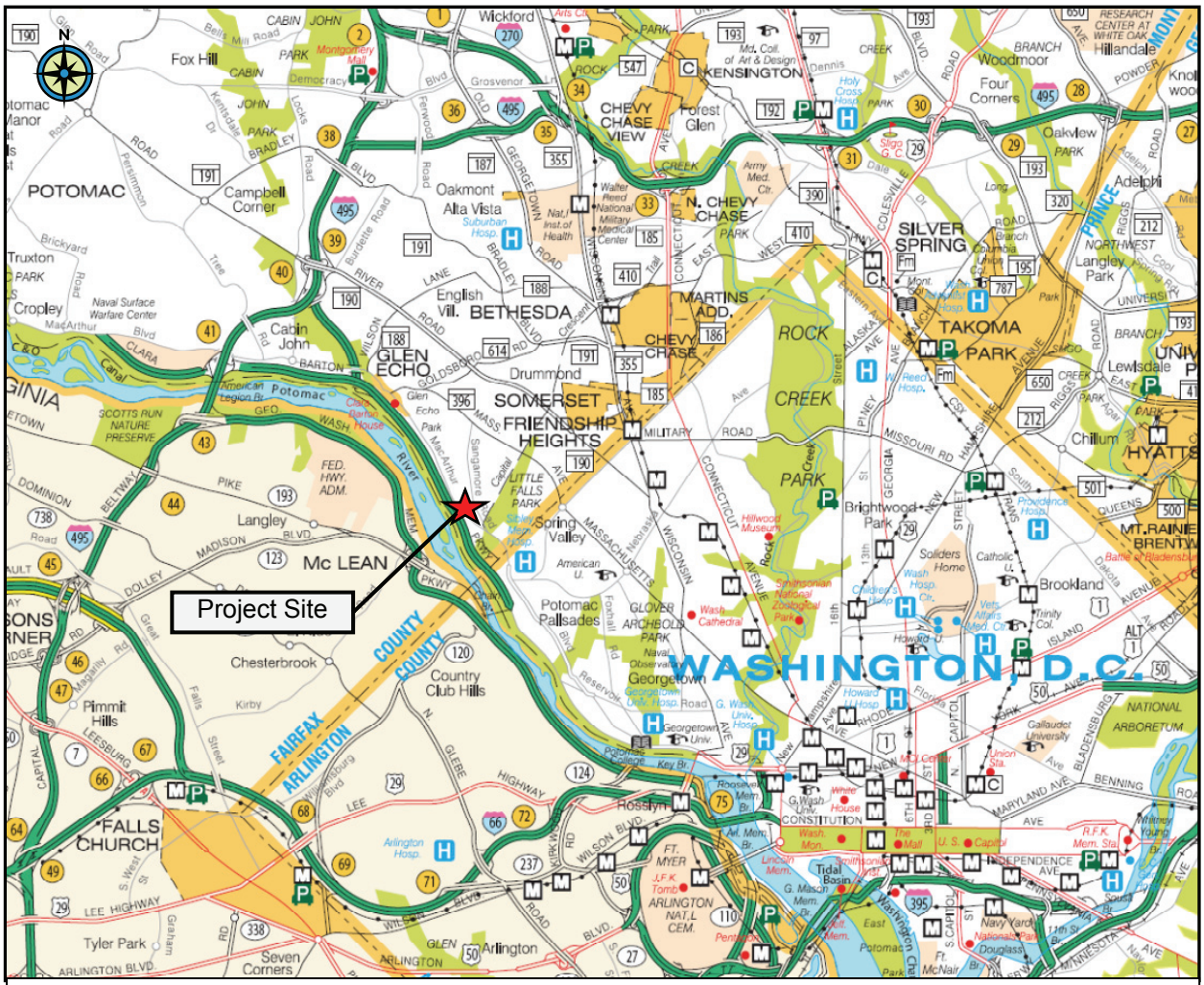


Figure 1.1: Regional Highway Map, 4600 Sangamore Road, Bethesda, Maryland, (Source: 2010 Maryland State Highway Administration).

Based on this operational setting, TMP strategies focus on reducing local traffic impacts of the proposed ICC-B site operations consistent with NCPC, MC, and Department of Defense (DoD) directives. These

include both capital facility improvements as well as long-term operational management improvements to effectively integrate site operations within the existing community.

A core focus of this plan is to minimize single occupant vehicle trips to the site, enhancing the use of mass transit and alternative transportation means for commuting to the site and reducing overall regional traffic congestion and air pollution levels.

Overarching long term goals for managing vehicle trips to the ICC-B site that will be key components of the TMP transportation demand management strategy include:

- Targeting a 25% reduction in peak hour vehicle trips associated with the site
- Achieving an on-site parking ratio of 2 parking spaces for every 3 employees, (1:1.5 NCPC ratio)
- Achieving an Average Vehicle Occupancy (AVO) ratio of 1.5 employees per vehicle
- Minimizing the impact of ICC-B traffic on regional road network and surrounding communities.

This TMP sets forth specific measurable goals and objectives for the future facility users at 4600 Sangamore Road consistent with regional traffic management objectives and provides a framework for long-term transportation plan implementation monitoring and periodic updates in cooperation with regional authorities. Facility operators are committed to providing sustainable transportation alternatives for site employees and plan to participate in future regional transportation alternatives to the maximum extent practical given site mission constraints.

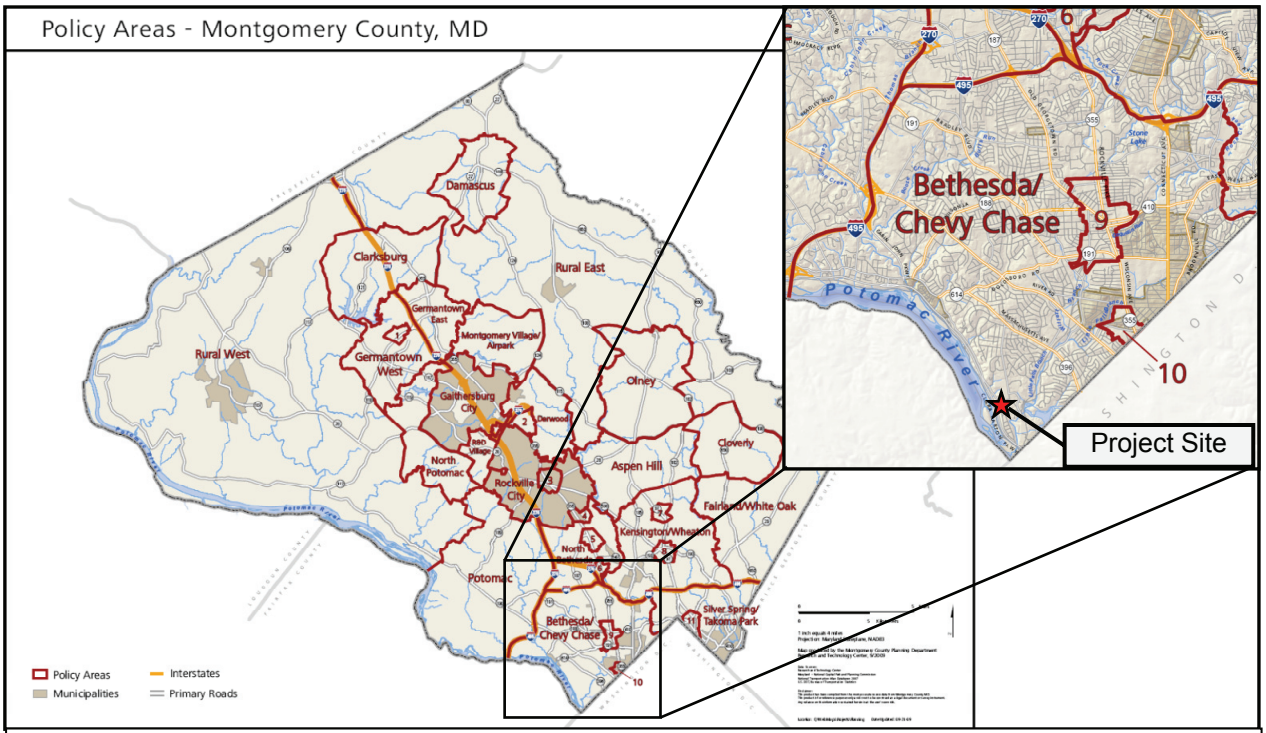


Figure 1.2: Montgomery County Policy Area mapping highlighting transportation planning relationship with ICC-B site (inset), (Source: 2011 Montgomery County Planning Department).

2.0 ICC-B TMP BASELINE CONDITIONS

In order to provide perspective on the scope of future ICC-B site operational impacts, it is important to review current operations and impacts, particularly as the proposed use and employment population of the site will not change significantly due to the proposed redevelopment activity.

Prior to the recent realignment of site operations, normal employee loading was approximately 2,800 personnel, with peak loadings up to 3,000 employees. These personnel commuted to the site by a variety of means, but primarily by private vehicle given mission needs at the facility.

This reflects general regional commuting statistics for Montgomery County presented by the U.S. Census Bureau in 2009, ***Figure 2.1*** which highlights that approximately 75% of the region's commuters drive private vehicles to work, with 66% of these commuters utilizing single occupant vehicle commutes. Reducing these single-occupant vehicle trips to the site is therefore a key objective of this TMP and regional planning authorities. Understanding the dynamics of employee commuting choices and existing traffic setting is therefore critical in the success of this endeavor, therefore a baseline traffic study was conducted for the site to assess existing transportation mechanisms and potential planning solutions.

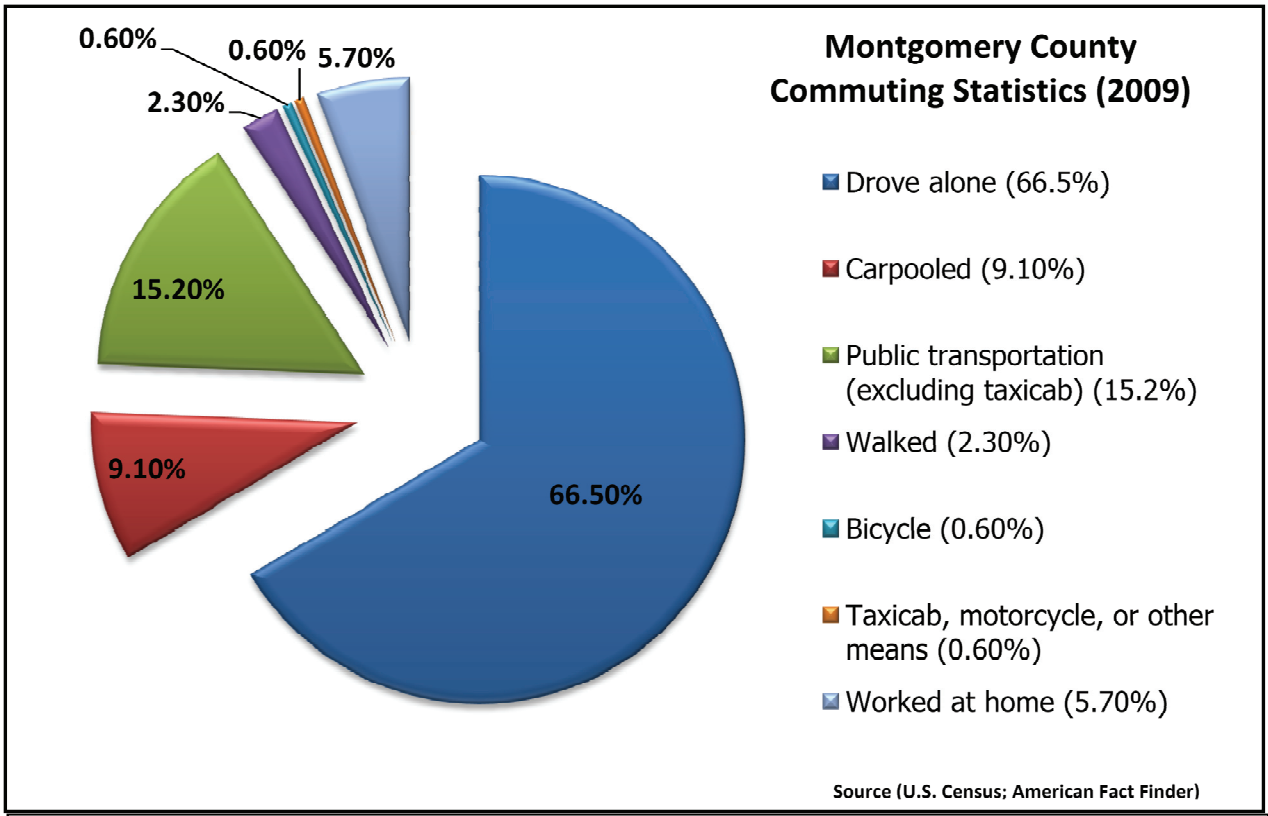


Figure 2.1: Regional Commuting Statistics, Montgomery County Maryland, (2009 U.S Census Data).

2.1 BASELINE TRAFFIC STUDY

A detailed traffic study for the proposed ICC-B redevelopment was conducted in December of 2010. This study indicated that local transportation improvements could be limited to reconfiguration of the main ICC-B site entrance and redevelopment impacts to the surrounding community will be positive with these improvements. The existing site entrance has several limitations which impede efficient traffic flow around the complex, particularly during peak commuting times; conditions that will be addressed with the proposed redevelopment. The new entry configuration will greatly enhance the capability of vehicle in-processing through the site security checkpoint, enabling peak vehicle security management within the complex, reducing traffic congestion on Sangamore Road.

According to the 2010 traffic study, existing security screening for the complex significantly contributed to the Level Of Service C (LOS-C) for local traffic performance along Sangamore Road during peak commuting times. The new site entry configuration and related improvements along Sangamore Road are projected to improve traffic performance to a LOS-A and B during these same peaks, this will be a significant positive impact to the local community around the complex and exceeds acceptable level of service according to current Institute of Transportation Engineers guidance for urban areas. A copy of this site traffic study is provided in ***Appendix A*** for reference.

Part of the reason that ICC-B traffic impacts are intrinsically minimized is that site commuter loads are not coincident with regional peak traffic demands as most employees arrive at the site between 5:45 and 6:45 AM and the regional commuting peaks are between 7:30 and 8:30 AM. ***Figure 2.2*** demonstrates the relationship of the ICC-B site commuting profile to these regional traffic peaks, indicating that approximately 74% of the regional workforce starts their travel day after ICC-B site personnel are already at work. The traffic study also indicates that ICC-B impacts are institutional in nature and do not reflect typical office, commercial or retail property traffic characteristics, (the site does not generate a significant number of ancillary vehicle trips during the workday, i.e. there are not many visitors to the site and off-site employee traffic movements during the workday are minimal).

Another key point addressed in the traffic study was lack of sufficient on-site parking. Over the last 50 years operations at the site have grown to encompass 12.5 acres of on-site parking (1,800 spaces), basically providing 1 space for every 1.55 employees. This parking ratio resulted in a deflection of up to 1,200 personal into the surrounding neighborhoods and businesses to find off-site parking as there are no viable mass transit connections or regional parking areas capable of serving this commuter load. This was a significant adverse operational impact of the former site operations. This has been mitigated by providing additional on-site parking and commuter hub connections as part of the proposed ICC-B redevelopment. The 2010 traffic study characterized this off-site parking impact as deflecting up to 44% of daily site commuters into the neighborhoods surrounding the ICC-B complex, based upon the existing on-site parking space allocation of 1,550 vehicles. In actuality currently there are 1,800 parking

spaces on-site, therefore the 44% figure provides a conservative planning estimate of proposed entry impacts, actual peak entry volumes are expected to be lower than this amount, particularly during initial redevelopment periods when employee loading will be at minimal levels.

The problem of off-site employee parking has been a source of community concern throughout the past several years and presents additional security risks for site employees given the sensitive nature of intelligence community work at the ICC-B site. In order to appropriately address this concern, the 2010 traffic study developed traffic mitigation measures to enable these additional 1,200 personnel to efficiently access the ICC-B site and increased the on-site parking capability from 1,800 to 2,225 spaces to address the neighboring community's off site parking concerns.

These improvements have been designed to improve the local traffic LOS along Sangamore Road from a LOS-C currently to LOS-A for northbound travelers during peak commuting hours with the proposed development, even with the projected 44% increase in site commuters entering the ICC-B complex, (based on the erroneous planning figure of 1,550 on-site parking spaces, i.e. there are really 1,800).

This is a significant security enhancement for site operations and will greatly reduce the impact of ICC-B site operations to the surrounding community during the morning commute. The traffic impact analysis modeling also indicates the proposed improvements will improve morning peak impacts for southbound vehicles on Sangamore Road to LOS-B, while afternoon peak impacts will remain at LOS-C. These LOS thresholds may be further improved based upon operational improvements to be implemented in accordance with the TMP milestones highlighted herein.

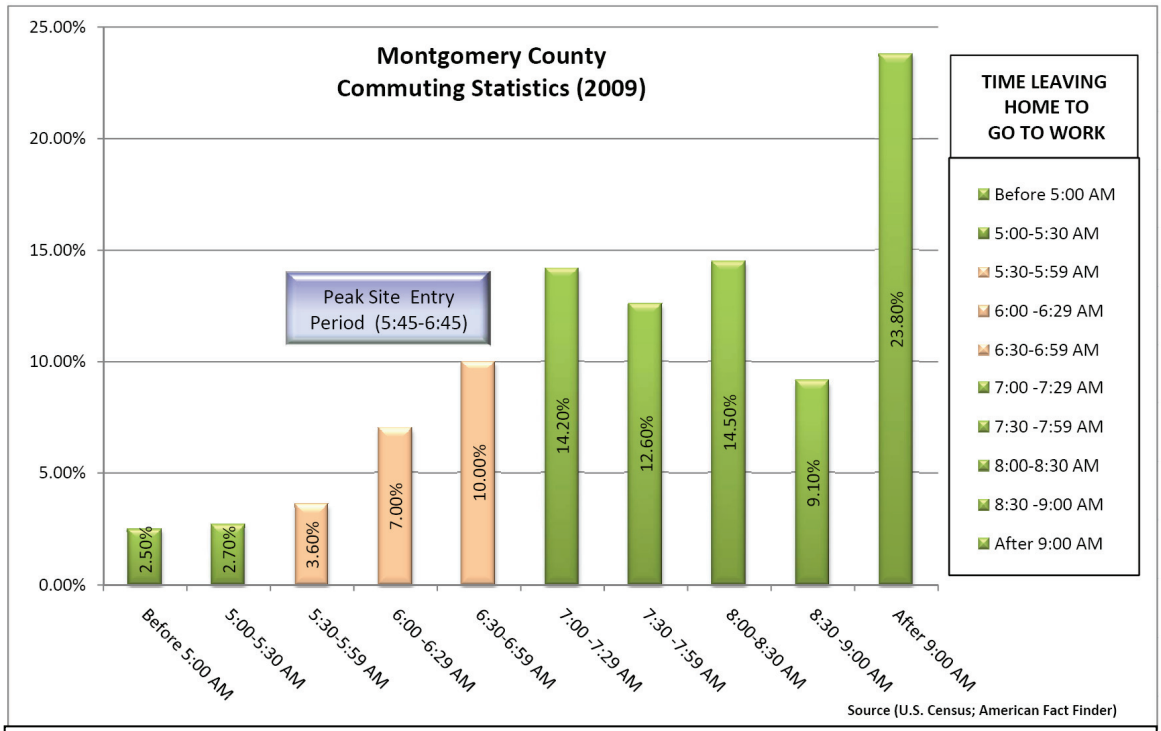


Figure 2.2: Montgomery County commuter departure times with ICC-B reporting times highlighted, (2009 U.S Census).

2.2 EXISTING REGIONAL TRANSPORTATION SETTING

Current mass transit options for the ICC-B site are limited to the regional Metro bus service operated by the Washington Metropolitan Area Transit Administration (WMATA) and local bus service operated by Montgomery County Transit, (Ride-On). Neither of these services are currently adequate to support commuter needs to the site as documented in ***Figures 2.3*** and ***2.4***.

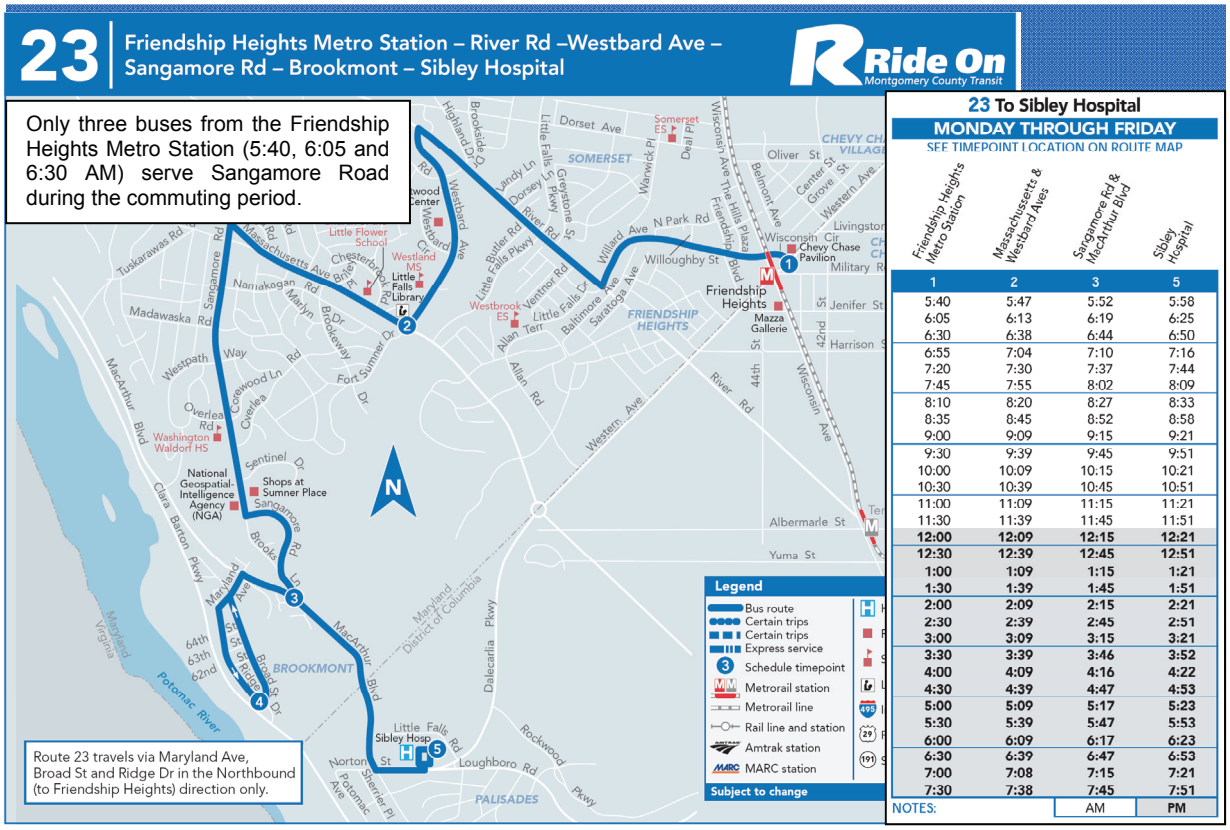
Montgomery County's Ride-On Service provides a link to the regional Metrorail connection at Friendship Heights and Bethesda metro stations via Bus Routes 23 and 29. Direct travel time from the Friendship Heights Metrorail station to the ICC-B site is approximately 10 minutes under non-peak traffic conditions, a distance of approximately 3.7 miles, the Route 23 bus requires approximately 30 minutes to make this journey.

The Metrorail connection in Bethesda is approximately 4.8 miles from the ICC-B site and optimal travel time is approximately 12 minute during non-peak traffic conditions, Ride-On Bus 29 requires 30-40 minutes to reach the ICC-B site. Comparing these bus only travel times to the average total commuting time of 32 minutes for the Montgomery County region listed by the U.S. Census it is apparent this mass transit alternative has a very limited utility for ICC-B site personnel.

The feasibility of the rail to bus connectivity is further impacted by the limited operating hours of the mass transit system. The first Metrorail service arrives at Friendship Heights at 5:33 AM therefore employees have limited opportunities to use mass transit to meet reporting times between 5:45 and 6:45 AM considering there is a minimum of a half hour bus ride from the nearest Metrorail station. The previous site tenants promoted a transit incentive program to promote bus ridership several years ago (2008 timeframe) in an attempt to alleviate site parking problems, however it was not successful due to the travel time limitations highlighted above and was discontinued after a period of six months.

Both the Friendship Heights and Bethesda Metrorail stations, do have bicycle storage lockers however there are no bicycle facilities or changing rooms at the existing Sangamore Road ICC-B complex. Neither rail station has public car parking to enable local commuting after utilizing the regional Metrorail alternative. There are public taxi's available at the Metrorail stations, however single passenger round trip fares range between $22.00-$26.00 making them uneconomical for most employees. Even with three employees ride sharing, this roundtrip fare remains between $8.00-$10.00 per person which is still uneconomical for daily commuting, especially considering the additive cost of rail transportation.

*As shown on **Figures 2.3** and **2.4**, mass transit alternatives are very limited to serve the proposed commuter requirements for the ICC-B. Future site operations will be coordinated with local transit authorities to maximize opportunities for site personnel to utilize future bus and rail service expansions to reduce single occupant vehicle trips to the site. This may include the use of direct shuttles to the regional transit hubs to reduce intermodal transfer connection costs and optimize transfer times, (as permissible under federal agency guidelines for the National Capital Region).*



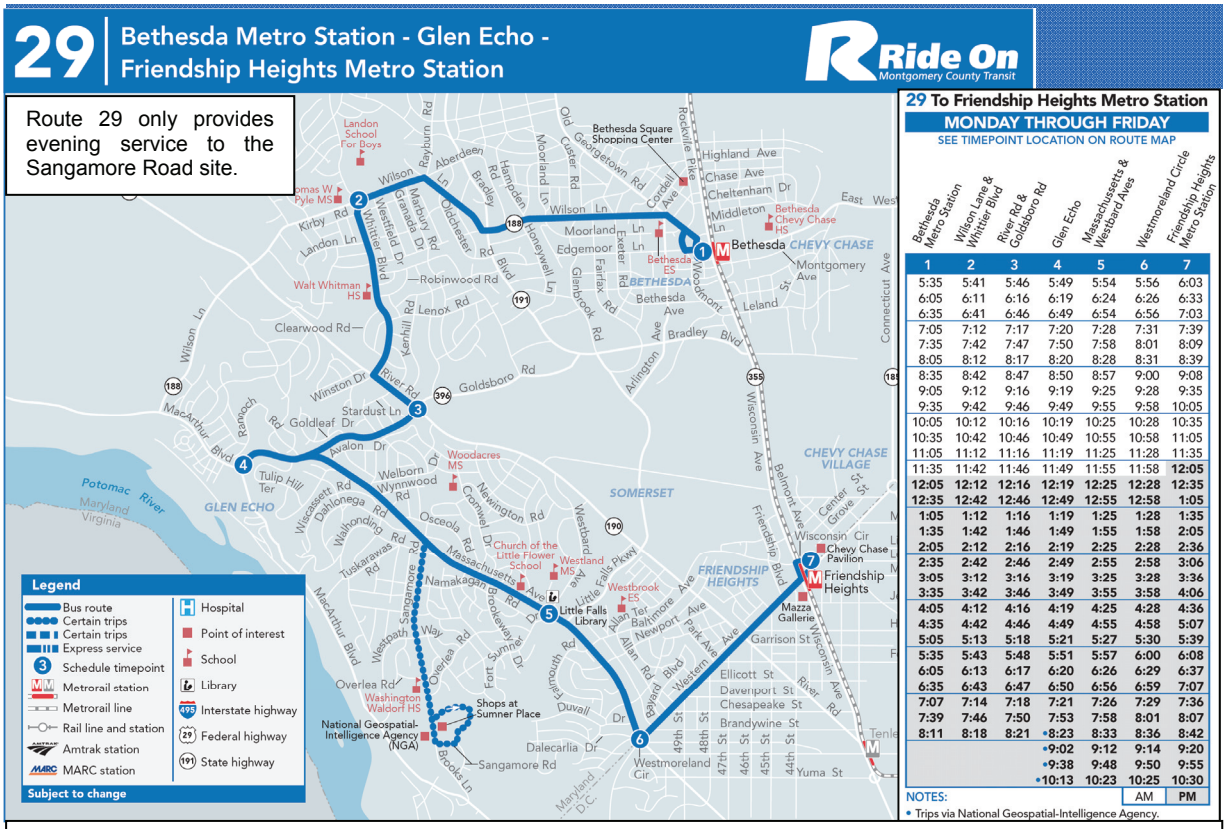
23 To Sibley Hospital

MONDAY THROUGH FRIDAY

SEE TIMEPOINT LOCATION ON ROUTE MAP

Friendship Heights Metro Station	Massachussetts & Westbard Aves	Sangamore Rd & MacArthur Blvd	Sibley Hospital
1	2	3	5
5:40	5:47	5:52	5:58
6:05	6:13	6:19	6:25
6:30	6:38	6:44	6:50
6:55	7:04	7:10	7:16
7:20	7:30	7:37	7:44
7:45	7:55	8:02	8:09
8:10	8:20	8:27	8:33
8:35	8:45	8:52	8:58
9:00	9:09	9:15	9:21
9:30	9:39	9:45	9:51
10:00	10:09	10:15	10:21
10:30	10:39	10:45	10:51
11:00	11:09	11:15	11:21
11:30	11:39	11:45	11:51
12:00	12:09	12:15	12:21
12:30	12:39	12:45	12:51
1:00	1:09	1:15	1:21
1:30	1:39	1:45	1:51
2:00	2:09	2:15	2:21
2:30	2:39	2:45	2:51
3:00	3:09	3:15	3:21
3:30	3:39	3:46	3:52
4:00	4:09	4:16	4:22
4:30	4:39	4:47	4:53
5:00	5:09	5:17	5:23
5:30	5:39	5:47	5:53
6:00	6:09	6:17	6:23
6:30	6:39	6:47	6:53
7:00	7:08	7:15	7:21
7:30	7:38	7:45	7:51

NOTES: AM PM



29 To Friendship Heights Metro Station

MONDAY THROUGH FRIDAY

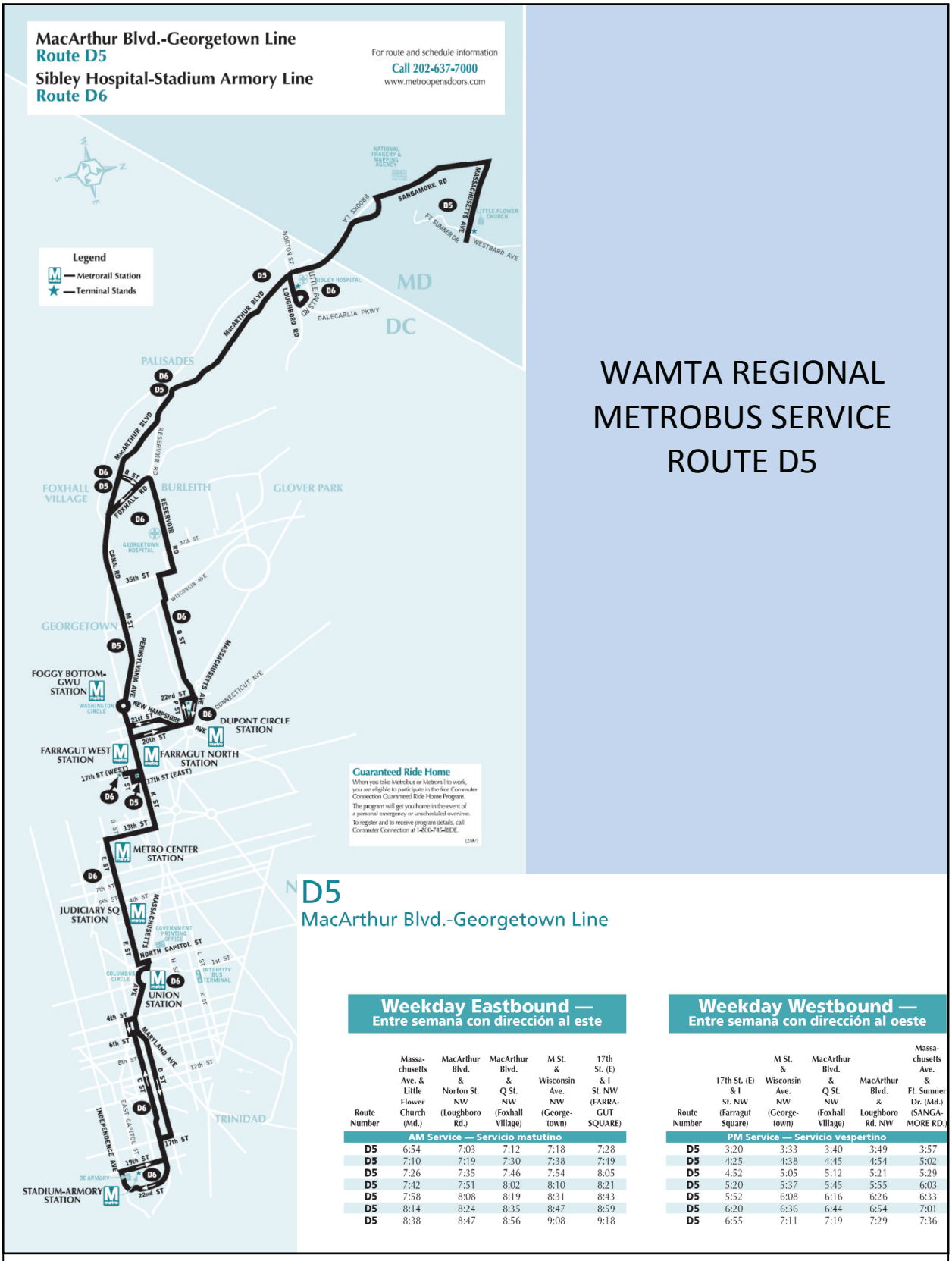
SEE TIMEPOINT LOCATION ON ROUTE MAP

Bethesda Metro Station	Wilson Lane & Whittier Blvd	River Rd & Goldsboro Rd	Glen Echo	Massachussetts & Westbard Aves	Westmoreland Circle	Friendship Heights Metro Station
1	2	3	4	5	6	7
5:35	5:41	5:46	5:49	5:54	5:56	6:03
6:05	6:11	6:16	6:19	6:24	6:26	6:33
6:35	6:41	6:46	6:49	6:54	6:56	7:03
7:05	7:12	7:17	7:20	7:28	7:31	7:39
7:35	7:42	7:47	7:50	7:58	8:01	8:09
8:05	8:12	8:17	8:20	8:28	8:31	8:39
8:35	8:42	8:47	8:50	8:57	9:00	9:08
9:05	9:12	9:16	9:19	9:25	9:28	9:35
9:35	9:42	9:46	9:49	9:55	9:58	10:05
10:05	10:12	10:16	10:19	10:25	10:28	10:35
10:35	10:42	10:46	10:49	10:55	10:58	11:05
11:05	11:12	11:16	11:19	11:25	11:28	11:35
11:35	11:42	11:46	11:49	11:55	11:58	12:05
12:05	12:12	12:16	12:19	12:25	12:28	12:35
12:35	12:42	12:46	12:49	12:55	12:58	1:05
1:05	1:12	1:16	1:19	1:25	1:28	1:35
1:35	1:42	1:46	1:49	1:55	1:58	2:05
2:05	2:12	2:16	2:19	2:25	2:28	2:36
2:35	2:42	2:46	2:49	2:55	2:58	3:06
3:05	3:12	3:16	3:19	3:25	3:28	3:36
3:35	3:42	3:46	3:49	3:55	3:58	4:06
4:05	4:12	4:16	4:19	4:25	4:28	4:36
4:35	4:42	4:46	4:49	4:55	4:58	5:07
5:05	5:13	5:18	5:21	5:27	5:30	5:39
5:35	5:43	5:48	5:51	5:57	6:00	6:08
6:05	6:13	6:17	6:20	6:26	6:29	6:37
6:35	6:43	6:47	6:50	6:56	6:59	7:07
7:07	7:14	7:18	7:21	7:26	7:29	7:36
7:39	7:46	7:50	7:53	7:58	8:01	8:07
8:11	8:18	8:21	•8:23	8:33	8:36	8:42
			•9:02	9:12	9:14	9:20
			•9:38	9:48	9:50	9:55
			•10:13	10:23	10:25	10:30

NOTES: AM PM

• Trips via National Geospatial-Intelligence Agency.

Figure 2.3: Montgomery County local bus service Routes 23 and 29 and schedule of service to Sangamore Road area, note there is no morning service into the Sangamore Road area on Route 29. (2011 Montgomery County Transit Mapping).



Weekday Eastbound — Entre semana con dirección al este

Route Number	Massachusetts Ave. & Little Flower Church (Md.)	MacArthur Blvd. & Norton St. NW (Loughboro Rd.)	MacArthur Blvd. & Q St. NW (Foxhall Village)	M St. & Wisconsin Ave. NW (George-town)	17th St. (E) & I St. NW (FARRAGUT SQUARE)
AM Service — Servicio matutino					
D5	6:54	7:03	7:12	7:18	7:28
D5	7:10	7:19	7:30	7:38	7:49
D5	7:26	7:35	7:46	7:54	8:05
D5	7:42	7:51	8:02	8:10	8:21
D5	7:58	8:08	8:19	8:31	8:43
D5	8:14	8:24	8:35	8:47	8:59
D5	8:38	8:47	8:56	9:08	9:18

Weekday Westbound — Entre semana con dirección al oeste

Route Number	17th St. (E) & I St. NW (Farragut Square)	M St. & Wisconsin Ave. NW (George-town)	MacArthur Blvd. & Q St. NW (Foxhall Village)	MacArthur Blvd. & Loughboro Rd. NW	Massa-chusetts Ave. & Ft. Sumner Dr. (Md.) (SANGA-MORE RD.)
PM Service — Servicio vespertino					
D5	3:20	3:33	3:40	3:49	3:57
D5	4:25	4:38	4:45	4:54	5:02
D5	4:52	5:05	5:12	5:21	5:29
D5	5:20	5:37	5:45	5:55	6:03
D5	5:52	6:08	6:16	6:26	6:33
D5	6:20	6:36	6:44	6:54	7:01
D5	6:55	7:11	7:19	7:29	7:36

Figure 2.4: WAMTA regional Metrobus service Route D5 and schedule of service to Sangamore Road area, note there is no morning service into the Sangamore Road area, regional bus is designed to bring commuters into the District. (2011 WAMTA Mapping).

2.3 LOCAL TRANSPORTATION SETTING

The site has excellent connectivity to regional pedestrian and cycling corridors and these alternative means of commuting are a viable and underutilized component of the existing site commuter alternatives. Currently there are sidewalks on both sides of the street in front of the complex on Sangamore road. Site distances are good and there is a well delineated pedestrian crossing at the crest of the small hill directly in front of the complex providing access to the bus shelter located on the north side of the roadway.

The sidewalk on the north side of the road has a broad grass and tree lined parkway separating the sidewalk from the road which accentuates pedestrian safety. Walkway curb transitions are provided at each driveway and side street connection facilitating use by bicycles, wheelchairs and other similar personal mobility equipment. Current facilities to promote walking and cycling to work at the ICC-B site are limited, and accentuating these features will be a strong component of the redevelopment plan.

The pedestrian and cycling connectivity is enhanced by the strong residential presence in the area however, home prices in the immediate area of the complex average around $1,020,000/single family residence and $730,000 in the greater Bethesda region, (based on 2011 MLS data). This is two to three times the average home price in Montgomery County and the region as a whole (average county home is valued at $370,000 and DC Metro region is around $325,000). Therefore most employees commute some distance to the site which limits use of independent cycling and walking options for direct commuting to the site. This is similar to regional patterns which indicate 38 percent of workers in Montgomery County commute into the County from suburban areas, (2009 U.S. Census Data).

General ICC-B site traffic flow outside of commuting hours is light with occasional delivery vehicles and supply trucks visiting the site, this traffic flow is not significant component of site operations. An intergovernmental shuttle is used for official business based on operational needs, but is not a consistent service to the complex and doesn't relate to employee commuting which is the primary traffic flow for the complex. Due to the nature of operations at the ICC-B site, general visitation numbers are low as there are no public components of site operations that would increase daily traffic demands.

The existing site also has few on-site community amenities, i.e. food service facilities, dry-cleaning, or simple convenience centers to reduce off-site travel during the workday. There is a community credit union on the site which reduced banking travel needs during the workday but other employee personal needs required off site travel. The proximity of the Shops at Sangamore Place across from the complex enable pedestrian mobility for lunch breaks and incidental errands, however options in the immediate vicinity of the complex (within walking or cycling distance) are limited as the complex is located primarily within a residential setting. Due to the limited on-site parking and mission security constraints few employees actually travel off-site in vehicles during the workday.

2.4 ALTERNATIVE COMMUTING OPTIONS

Telecommuting, flex-time and work-from-home alternatives are not a viable option for this site due mission security and interagency operational integration requirements. Personnel at this site are subject to high variability in workload and operating on fixed alternate schedules to alleviate traffic concerns is not a feasible alternative for site employees.

Currently there is no officially coordinated traffic management plan for site activities to promote the use of alternative transportation, carpooling, or mass transit connectivity and this is one area in particular that will be accentuated with the proposed redevelopment and implementation of this TMP.

2.5 REGIONAL TRANSPORTATION INITIATIVES

Montgomery County is currently engaged on numerous efforts to curb congestion, improve regional air quality and promote alternative transportation opportunities for area businesses and residents. Currently applicable programs that will be of potential benefit to the ICC-B site redevelopment include the development of the new "Purple Line" metro light rail improvement which is slated to connect New Carrolton on the eastern ring of the Capital Beltway to Bethesda. This initiative will form a vital east-west commuter rail link to the area, but it is only in the early planning stages and is not expected to be complete within the next 10 years. ICC-B site operators will continue to monitor this project and participate in planning to maximize potential benefits for commuting employees.

Montgomery County is also developing the Capital Crescent multi-purpose trail approximately a half mile from the ICC-B site. This project will enhance regional trail connectivity enabling more options for cycling and pedestrian commuters. Both of these projects have potential long term planning benefits for the ICC-B site and will be monitored during TMP implementation to maximize potential benefits.

Other regional projects to enhance transportation options within the Bethesda region are fairly remote from the ICC-B site and will therefore have limited potential impacts on TMP implementation. These include the numerous road improvements associated with construction of the new National Naval Medical Center (NNMC) in the northern section of Bethesda including the intersections at Connecticut Avenue and Jones Bridge Road; Rockville Pike and Cedar Lane; Rockville Pike and Cedar Lane; Rockville Pike and Jones Bridge Road and Old Georgetown Road and Cedar Lane which are currently being implemented.

These projects are required due to the anticipated influx of 2,500 employees and additional hospital visitors associated with this project which encompasses over 243 acres. The NNMC project is located six miles north of the ICC-B redevelopment and is served by the northern section of the National Capital Beltway (I-485) and I-270 and therefore impacts to ICC-B commuters will be minimal and the two facilities are independent from a transportation setting and scope perspective. ***Figure 2.6*** provides a perspective of the two sites and the difference in regional connectivity of these two locations within Montgomery County.

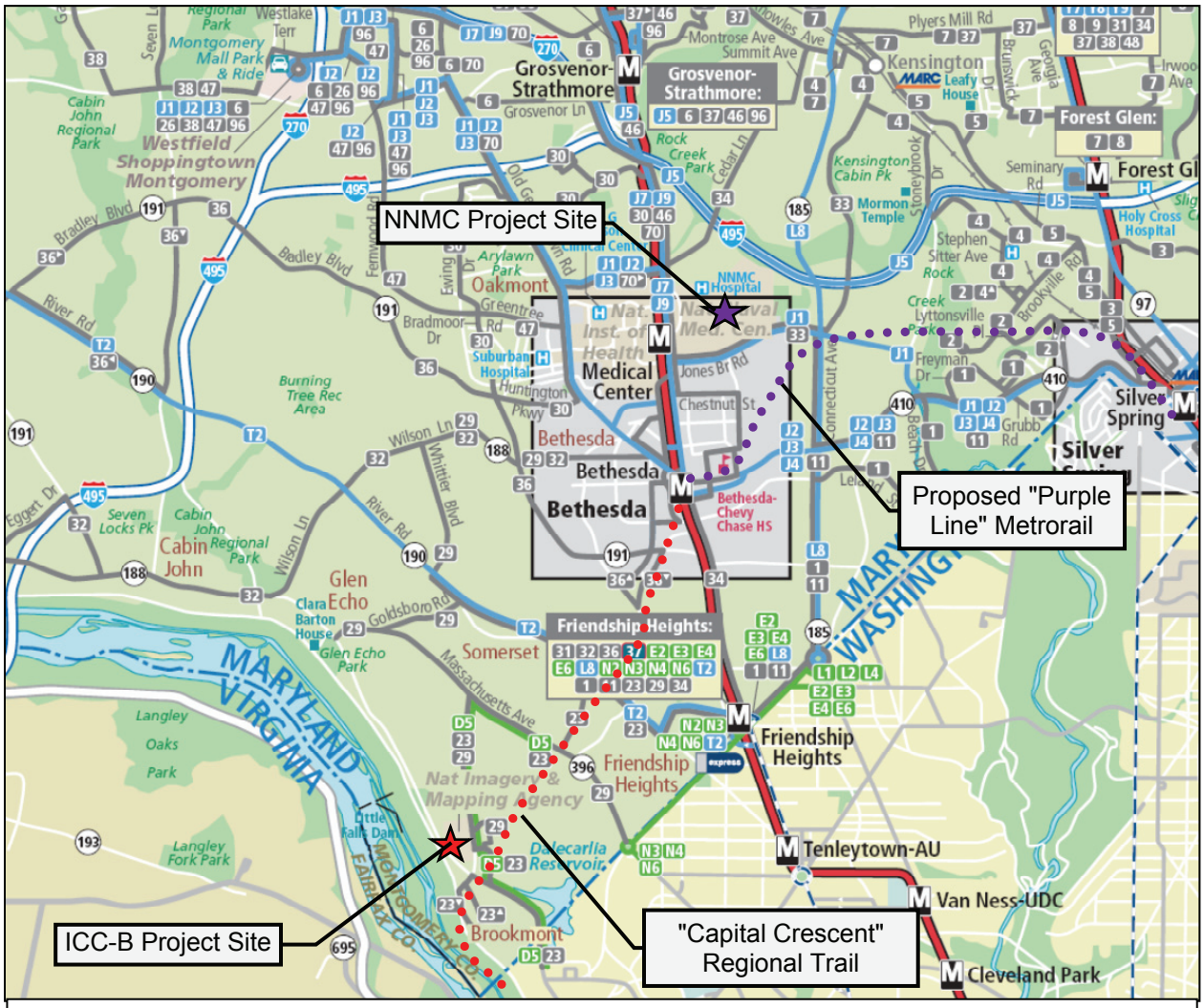


Figure 2.6: Regional transportation corridors showing relationship of ICC-B site to other federal facilities in the Bethesda Region, (2011 WMATA mapping).

2.6 EXISTING CONDITIONS AND IMPACT SUMMARY

Based on these conditions, it is evident that reducing single occupant vehicle trips to the ICC-B site will require sustained long-term planning and operational integration as the site is redeveloped. Development planning has identified that immediate local improvements to the main site access along Sangamore Road will greatly mitigate existing congestion around the complex and reduce transportation impacts of the existing and proposed site uses.

Provision of sufficient on-site parking to accommodate existing employee loading is another necessity that has been incorporated in ICC-B site development planning. Provision of 2,225 on-site parking spaces is consistent with efforts to reduce off-site traffic impacts and reduce impacts to area businesses and residences.

Based on a projected peak employee population of 3,000 employees, this parking works out to a ratio of 1.35 employees per parking space. This is consistent with regional planning objectives given the current

lack of available mass transit service to the site. Specifically, ***Policy 4*** within the NCPC transportation planning guidelines highlights that for federal facilities located in suburban areas located over 2,000 feet from a Metrorail station (i.e. the ICC-B site), parking ratios should be managed based on, *"a phased approach linked to planned development over time"* with a goal of 1.5 employees per parking space.

Personal vehicle parking for permanent facility employees will be limited via signage, dedicated parking areas, and other operational measures to achieve the targeted 1:1.5 ratio. Available parking above this ratio will be designated for government fleet, service vehicle, visitor and other non-permanent employee use.

As further excess space is identified through improved alternate transportation options, personal vehicle parking will be repurposed for car and vanpool parking, enhanced drop-off circulation areas, and potential integration of potential green roof amenities on the upper level of the parking facility. This integrated approach will enable site operators to continually stress the value of multi-occupant vehicle commutes consistent with the goals and objectives of regional planners.

As currently planned, the multi-level facility will be a considerable improvement over existing site conditions which include 12.5 acres of at grade parking. Development of this parking facility enables the government to incorporate many other sustainable features into the limited ICC-B site footprint, including; preferential parking for carpool, vanpool, hybrid and alternative fuel vehicles; secure bicycle storage for up to 140 bicycles; vehicle circulation patterns that promote employee drop-off and collection; and significant reductions in site stormwater runoff volumes and improvements in runoff quality consistent with environmental site design practices.

The ICC-B Transportation Liaison Officer will promote achievement of this objective by tracking average vehicle occupancies, monitoring available transit usage and periodically advising the site command on potential strategic transportation adjustments to achieve this objective. The initial goals and milestones to implement this program are provided in the following section.

3.0 TMP GOALS AND OBJECTIVES

Recognizing that the national capital region is routinely rated as one of the most congested areas of the nation, this TMP is focused on maximizing the use of alternative transportation means and minimizing single-occupant vehicle trips to the ICC-B site on Sangamore Road.

Paramount to this planning is the need to provide a safe, secure environment for employees, including uncongested access to the site and safe and secure parking for employee vehicles due to the mission sensitivity of the ICC-B complex. This will require a concerted effort by site leadership to fit regional planning guidance into facility operational policies. This TMP provides the framework for this effort.

General ICC-B TMP goals include:

1. Establishing policies, procedures and strategic planning to encourage commuting by other than single-occupancy vehicles. *Target Average Vehicle Occupancy at least 1.5 persons per vehicle.*
2. Continually optimizing commuting methods to reduce on-site parking requirements consistent with mission requirements and regional transportation policies and guidance.
3. Tracking employee commuting statistics to enable responsive demand management to reduce peak burden on regional and local roadways.
4. Establishing goals and timeframes for optimizing site commuting patterns and promoting alternative commuting mechanisms.
5. Monitoring transportation needs within five miles of the ICC-B site and participating with local planning officials in development of strategic improvements to enhance commuting options.
6. Providing a flexible framework for continual improvement of site commuting options and sustainable transportation management.

Specific ICC-B TMP objectives include:

1. Accentuating pedestrian-friendly attributes of site access. This will include improving safety and functionality of pedestrian connections to the site including the regional trail system and enhancing street crossings. Potential street crossing enhancements will include provision of intermediate refuge areas in conjunction with new turn lanes, improved illumination and delineation of crossing areas, additional signage and improved transitions at site entrances.
2. Promoting carpool and vanpool use for routine commuting to the site. This will include provision of covered drop-off and pick-up locations for vehicles up to a 15 passenger van size with the site, and promotion of the regional "Guaranteed Ride Home" program to foster car and vanpool participation. Brief new employees on the benefits of these programs and provide incentives for participation (as allowed by federal employment rules).

3. Providing pre-tax deferral elective option on payroll accounts to enable employees to offset cost of using public transportation as allowed by state and federal tax codes.

4. Publishing and continually promoting alternative transportation options for site employees in a formal guidance document establishing site policies. This will include means for providing mass transit commuting options information to new employees, intranet posting of car and vanpool routes, schedules and contact information within facility IT systems, and highlighting transportation metrics and quarterly commuting impacts to site employees.

5. Appoint a Transportation Liaison Officer (TLO) to coordinate site traffic impacts with the local community, regional authorities and employees. This person will provide periodic updates of regional initiatives to facility command staff, advise on means to reduce single vehicle occupancy trips to the site and increase average vehicle occupancy for commuting, and track and report transportation metrics consistent with this TMP. This individual will be responsible for review and update of this TMP in two year increments based upon initial occupancy date of the site and coordination of transportation planning with the Montgomery County Commuter Services Department, including coordination of the annual commuter survey with site employees.

6. Promote home ownership within 10 miles of the site through posting of local real estate listings and links to housing agencies that provide local area relocation assistance.

7. Offer work schedule enhancements for car and vanpool drivers to promote participation consistent with job requirements.

8. Develop on-site lockers and showers to encourage walking, jogging, or bicycling to work.

9. Provide secure, covered bicycle parking facilities and promote bicycling to work using the regional trail systems.

10. Implement a no-idling policy for parked or vehicle loading/unloading to curb emissions.

11. Provide enhanced parking conveniences for carpool, vanpool, hybrid and alternative fuel vehicles.

12. Provide a permanent and attractive display for transit and commuting information at main employee entrances, visitor access points and the parking facility. Post updated traffic advisories to staff to enable alternate route choices to avoid regional congestion during significant events and adverse air quality days.

13. Provide integrated employee services/amenities on-site to reduce need for off-site travel during the day. Promote use of local businesses within walking distance of the site for off-site needs.

14. Track vehicle entry times and adjust work reporting times to equalize traffic loads on 20 minute intervals during peak periods to reduce congestion and traffic idling time as consistent with site mission requirements. This will include intensive monitoring during the first four weeks of operations to address emerging problems in a proactive manner and integrate transportation resource cognizance into employee commuting habits.

3.1 TMP IMPLEMENTATION MILESTONES

Consistent with the goals and objectives outlined above, the following milestones are provided to guide implementation and establish reporting metrics from 2011-2013. These goals and objectives shall be updated every two years as part of on-going transportation improvement planning:

2011-2013 MILESTONES

Milestone	Description	Responsible Party	Target Date
DC-1:	Design proposed road and pedestrian improvements along Sangamore Road.	Site Design Agent/Owner	12 months before design occupancy date
DC-2:	Design multiple occupant vehicle and alternative fuel vehicle site amenities.	Site Design Agent/Owner	12 months before design occupancy date
DC-3:	Design bicycle, pedestrian and alternative transport facilities into site and buildings, i.e. lockers, etc.	Site Design Agent/Owner	12 months before design occupancy date
DC-4:	Design employee amenities on site to reduce off-site vehicle trip needs.	Site Design Agent/Owner	12 months before design occupancy date
OP-1:	Establish a Transportation Liaison Officer (TLO) responsible for internal and external TMP implementation and coordination.	Owner	6 months before design occupancy date
OP-2:	Develop Car and Van Pool Operations Guide and Policy to promote usage; set interim milestones for achieving 1:1.5 on-site employee parking ratio.	Owner	3 months before design occupancy date
OP-3:	Develop regional ride share program guide for employees set interim milestones for achieving 1:1.5 on-site employee parking ratio.	Owner	3 months before design occupancy date
OP-4:	Establish local transit link using direct shuttle connection to local Metro station(s) during peak hour commuting times, (AM and PM).	Owner	3 months before design occupancy date
OP-5:	Establish Tax-Exempt Transit benefit option for employees; Promote use of this benefit through TLO contact with employees prior to occupancy	Owner	3 months before design occupancy date
OP-6:	Implement IT based commuting options system for employees to manage commuting choices	Owner	3 months before design occupancy date
OP-7:	Establish a local real estate and relocation directory to promote local home ownership.	Owner	3 months before design occupancy date
OP-8:	Establish employee incentive program to promote carpooling and alternative commuting options.	Owner	3 months before design occupancy date
OP-9:	Implement a "No Idling" policy for vehicles, promote use of CNG or zero emissions GOV fleet	Owner	3 months before design occupancy date
OP-10:	Develop IT message boards and transit kiosks for employees and visitors; utilize internet surveys and web based dialogue with employees to promote alternate commuting choices.	Owner	3 months before design occupancy date
OP-11:	Track commuter data and implement schedule adjustments to reduce traffic peaks and set goal to achieve AVO of 1.5 within 6 years of occupancy.	Owner	Monthly upon occupancy
OP-12:	Partner with community and local businesses to evaluate transportation patterns and implement measures to reduce community impacts.	Owner	Monthly upon occupancy
OP-13:	Coordinate with other regional federal facility Transportation Liaison Officers (TLO's) to share resources and integrate programs.	Owner	Quarterly upon occupancy
OP-14:	Participate in local and regional transportation planning efforts to integrate with community efforts to enhance shared-use paths.	Owner	Quarterly upon occupancy

Notes: DC Milestones relate to design and construction features incorporated in the ICC-B site redevelopment plan.
OP Milestones relate to operational practices to be incorporated in long-term site management practices.

3.2 MEASUREMENT AND REPORTING TECHNIQUES

The ICC-B TLO will be responsible for implementation of this TMP and will use the following tools to manage and metric TMP planning objectives:

1. Average Vehicle Occupancy (AVO): The AVO = (number of employees reporting to the site) ÷ (number of vehicles entering the site). Vanpools (with 9 or more seats), buses, and bicycles do not count as vehicles when calculating the AVO. Compressed work schedules that allow for 1 day off per week enable a corresponding reduction in vehicle counts for calculating the AVO. Similarly, telecommuters, park and ride and drop off employees (kiss and ride) do not count as site vehicles in calculating the AVO. Carpool vehicles are counted as vehicle fractions depending on the number of persons in each carpool vehicle. Data on vehicle entry characteristics will be collected quarterly using a combination of internal surveys and observations at the site entry control facility.

2. Vehicle Trip Reduction (VTR): Actual site VTR will be measured by collecting site entry data from entry control point on a real-time basis using traffic counting equipment. This will enable calculation of 20 minute peaks, hourly and daily totals of entering and exiting traffic to gauge the effectiveness of TMP strategies and assist with formulating alternative management strategies. Construction vehicles, temporary contract and transient personnel will not be included in facility VTR calculations in order to enable a reliable baseline of vehicle trips associated with permanently assigned personnel for future benchmarking on TMP effectiveness. Given the secure nature of the site access control, this information will be readily available for the TLO to use for TMP benchmarking and optimization.

3. Mode Split (MS): MS reflects the number of persons using alternative commuting mechanisms to report to work, including use of bus, carpool, vanpool, shuttle, pedestrian and bicycle. This information is typically collected through statistically valid employee survey techniques. As all ICC-B site personnel will have to be processed through a formal pass and id process this information can be collected periodically during routine security screening questions and access badge applications. The TLO will work with site management personnel to effectively capture this data on an annual basis ensuring at least 25% of employees are polled each year. Survey information collected will include zip code where employees reside, existing travel mode, and changes in either, current work schedule and commuting vehicle occupancy.

Appendix A

2010 ICC-B
Traffic Impact Study

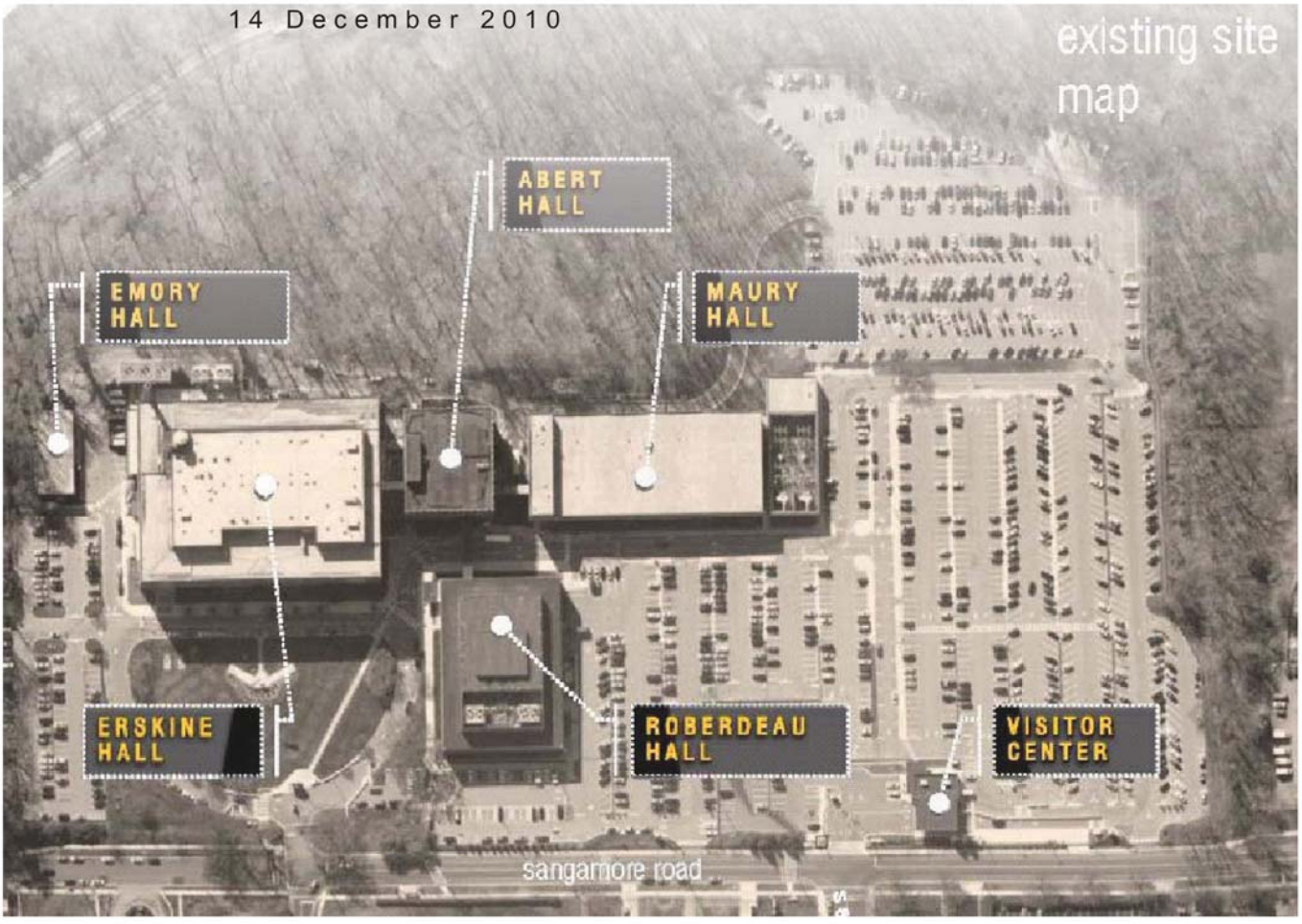
INTELLIGENCE COMMUNITY CAMPUS – BETHESDA

DEFENSE INTELLIGENCE AGENCY:
INTELLIGENCE COMMUNITY CAMPUS - BETHESDA

TRAFFIC IMPACT STUDY

Sumner Site - Bethesda, MD
Contract No. W912DR-10-D0018
Delivery Order 0005

14 December 2010



BLACK & VEATCH – WILEY|WILSON – TOTAL SITE SOLUTIONS

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Appendices

1.0 Executive Summary

1.1 Summary

A new tenant and improvements to the facility located at 4600 Sangamore Road will increase traffic generated by the site. Specifically the on-site parking that is accessible through the main gate will increase from 1550 spaces to 2225 spaces with the construction of a parking garage for employees and a new visitor surface parking area. The purpose of this study is to investigate the potential impacts to the traffic on the surrounding roads due to this increased site traffic and to determine the number of inbound lanes required at the entry control facility (EFC). The configuration and traffic control measures at the intersection of the proposed site entrance and Sangamore Road will be the main recommendation of this study.

The results of this study have determined the roadways that are adjacent to the project site can adequately accommodate the existing and proposed site generated traffic. Based upon recent census data and the density of current developments, the traffic volumes not associated with the site generated traffic are not expected to increase signficantly in the region in the near future. However, the traffic associated with the proposed parking reconfiguration improvements will increase the number of vehicles accessing the site by approximately 44%. The analysis shows that with the roadway and traffic control improvements noted below, motorists traveling along Sangamore Road in this area will see an improvement to their travel times even with the increase in site generated traffic.

The existing site entrance is effectively a two lane road (one inbound and one outbound) with an ECF located approximately 100 feet from its intersection with Sangamore Road. At the ECF the number of inbound lanes increases to two, which is helpful in processing the vehicles through the ID check area. The existing site entrance forms a four legged intersection with Sangamore Road and Sentinal Drive. It is an all way stop condition, which means each approach to the intersection is controlled by a stop sign.

The proposed site entrance is a four lane road (two inbound and two outbound) with an ECF located approximately 450 feet from its intersection with Sangamore Road. One of the purposes of this study is to provide information to the designer with respect to the number of lanes required at the ID check area based on two methods of processing vehicles and personnel. The results of this analysis were if tandem processing (two guards per lane) is used then two lanes are required and if single processing (one guard per lane) is used then three lanes are required at the ID check area.

The recommended configuration of the intersection for the site entrance and Sangamore Road was based on the operational analysis of three options. Option 1 maintains the existing four legged intersection and all way stop condition. Option 2 is similar to Option 1 but uses a traffic signal for controling the movement of traffic through the four legged intersection. Option 3 is based on relocating the site entrance approximately 350 feet north of its current location, which yields two three legged offset intersections.

The preferred option is Option 3 which reduces the travel time delay for motorists on Sangamore Road when compared to the existing intersection configuration and traffic control measures. The reason for this reduction is the removal of stop signs on Sangamore Road. The northbound motorists on Sangamore Road operate at a level of service (LOS) A in the morning and evening peak hours with this proposed option compared to LOS B and C for the existing traffic and intersection configuration. The southbound motorists on Sangamore operate at LOS B and C in the peak morning and evening respectively versus a LOS C and C for the same time periods of the existing condition. Although Option 3 improves the travel time for motorists on Sangamore Road, and as a result those workers accessing the site from Sangamore throughout the day, it does result in more delay per vehicle for those exiting the site as compared to the existing condition. Due to the large volume of turning vehicles into the site and onto Sentinel Drive, the addition of a dedicated left turn lane along Sangamore Road between Sentinel Drive and the site entrance is also recommended.

2.0 Introduction

2.1 Purpose

The purpose of this study is to avoid or minimize impacts to traffic on roadways surrounding the site due to an increase in site generated traffic.

2.2 Background

The current tenant of the thirty-nine acre Sumner site will be vacating the facility in the fall of 2011. The site will be redeveloped for a new tenant(s), and the total occupancy and parking capacity of the site will be expanded. The required improvements consist of significant building and site demolition, existing building renovation, and new building and parking garage construction. The resulting occupancy and parking capacity expansion will result in a 44% increase in the traffic accessing the site. Due to this increase, options will be developed and analyzed in this study to mitigate impacts on the roads which provide direct access to the site.

2.3 Location

The project site is located at 4600 Sangamore Road, south of Overlea Road and north of Brooks Lane in Bethesda, Maryland (see Figure 2.1). The expanded site is bounded by US Park Service property to the west, the Washington Waldorf School and a municipal park to the north, Sumner Place commercial retail to the east, and both single and multi-family residential areas to the northeast and south.

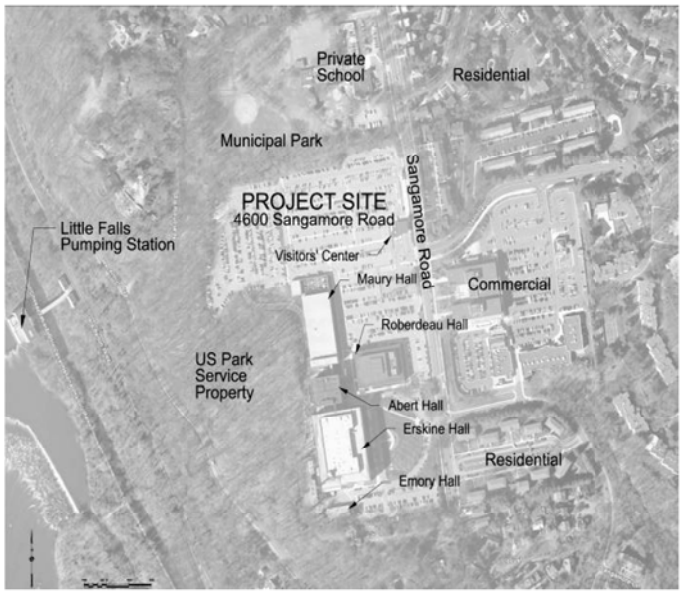


Figure 2.1 - Project Site

Direct access to the site is via Sangamore Road, a two lane north-south collector street. The site entrance is aligned with Sentinel Drive making a four legged, all-way stop intersection with Sangamore Road.

3.0 Existing Conditions

3.1 Data Collection

The traffic counts at Sangamore Road, Sentinel Drive, and the project site entrance were performed from Tuesday, October 12 through Thursday, October 14, 2010. Two methods were used to collect the traffic data. First, automated traffic counters were set up at six locations to obtain continuous 24-hour traffic volumes. The machine count information depicts the timing of the peak hours in the morning and afternoon along with the average daily traffic (ADT) volumes. The complete data from the counters in 15 minute intervals is included in Appendix A.

Second, manual turning movement counts were performed at the intersection of Sangamore Road, Sentinel Drive, and the site entrance during the morning and afternoon peak periods. The manual counts yield the intersection volumes by approach and turning movement. Vehicle classifications were also collected and consisted of passenger vehicles, single unit trucks, semi-trailer trucks, buses, motorcycles, pedestrians, shuttles, or bicycles.

3.2 Existing Conditions

As noted previously the existing site entrance forms a four legged intersection with Sangamore Road and Sentinel Drive. The site entrance is a two lane access road which has a tight 90 degree curve to the north once on the site, which passes motorist through an ID check area and an always deployed denial barrier (See Figure 3.1). If the credentials of the motorist are approved, the active vehicle barrier is then lowered to allow them access to the employee parking lot. Sangamore Road is a two lane collector street with a posted speed limit of 35 mph. Sentinel Drive is two lane local access street with a speed limit of 30 mph. Parallel on-street parking is allowed along Sentinel Drive in this area as well as Sangamore Road on the east side of the street just south of the intersection. A bus/shuttle stop is located on the west side of Sangamore Road several hundred feet south of the intersection.

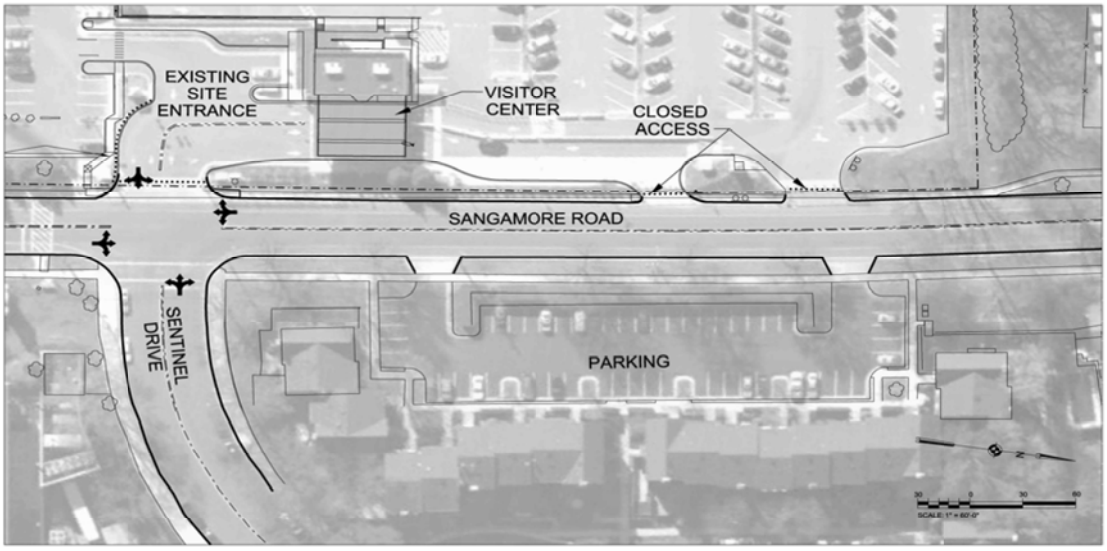


Figure 3-1 - Existing Site Conditions

Traffic volume varies considerably during the course of a 24-hour day, usually with the periods of maximum volume occurring during the morning and evening "rush" hours. These highest hourly volumes are referred to as peak hours and are used for design and operational analysis. The peak hour factor (PHF) is a relationship between hourly volume and the maximum rate of flow within the hour. Higher values of the PHF mean the volume of traffic is fairly consistent throughout the peak hour, while lower values signify a greater degree of variation in the flow during the hour. Typical PHF values range from 0.75 to 0.95. Peak hour factors for each leg of the intersection are shown in the Table 3.2 for the morning and afternoon peak hours.

3.3 Existing Intersection Analysis

Intersection level of service (LOS) refers to the adequacy or the ability of the intersections in the study area to accommodate the peak hour traffic volumes. Motorists making movements through unsignalized intersections are required to wait for gaps in the opposing traffic stream, and the LOS is a measurement of that delay experienced. The Highway Capacity Manual (HCM) by the Transportation Research Board dated 2000, defines six levels of service (see Table 3.1):

Table 3.1 – Level of Service (LOS) defined for intersections			
LOS	Delay per vehicle (seconds)		Expected delay
	Signalized	Unsignalized	
A	0-10	0-10	Little or no delay
B	10-20	10-15	Short traffic delays
C	20-35	15-25	Average traffic delays
D	35-55	25-35	Long traffic delays
E	55-80	35-50	Very long traffic delays
F	greater than 80	greater than 50	Congestion

All of the data collected and existing geometry was input into McTrans Highway Capacity Software (version HCS+T7F). The existing intersection operates very well as indicated by LOS A through LOS C for each of the approaches (see Table 3.2). For communities with population over 25,000 the Traffic Engineering Handbook by the Institute of Transportation Engineers (ITE), 5th Edition dated 1999, states the acceptable level of service is LOS D. In addition traffic volumes associated with a LOS D and LOS E are tolerated in these dense urban areas, especially for side streets movements, i.e. left turns out of an access drive from a facility.

Table 3.2 – Detailed Summary of Manual Traffic Count Data (Existing Conditions)										
	AM PEAK HOUR					PM PEAK HOUR				
Intersection Leg	Peak Hour	LOS	PK HR Volume	PK HR Factor	% Heavy Trucks	Peak Hour	LOS	PK HR Volume	PK HR Factor	% Heavy Trucks
Sangamore Road NB	7:30 – 8:30	B	320	0.87	0%	4:30 – 5:30	C	267	0.92	0%
Sangamore Road SB	7:30 – 8:30	C	482	0.87	2%	4:30 – 5:30	C	303	0.88	2%
Sentinel Drive WB	7:30 – 8:30	B	115	0.72	0%	4:30 – 5:30	C	257	0.90	0%
Site Entrance EB	7:30 – 8:30	A	21	0.58	0%	4:30 – 5:30	C	268	0.81	0%

Based mainly on 24-hour traffic data collected, the existing intersection was further analyzed in a Traffic Signal Warrant Analysis. This analysis was performed to determine if a traffic signal is a viable option for traffic control at this intersection. The Manual of Uniform Traffic Control Devices (MUTCD) by the U.S. Department of Transportation, Federal Highway Administration, 2009 Edition outlines 8 warrant

conditions that when satisfied may be justification for the addition of a traffic signal at the intersection. The warrant analysis is summarized in Table 3.3, and the complete study can be found in Appendix B.

Table 3.3 - MUTCD Signal Warrants		
Warrant 1	Eight-Hour Vehicular Volume	Did not meet
Warrant 2	Four-Hour Vehicular Volume	Did not meet
Warrant 3	Peak Hour	Met
Warrant 4	Pedestrian Volume	Did not meet
Warrant 5	School Crossings	Did not meet
Warrant 6	Coordinated Signal System	Did not meet
Warrant 7	Crash Experience	Did not meet
Warrant 8	Roadway Network	Met

Warrant 3 is designed to identify intersections with minor-street traffic that experiences undue delays during peak hours. Warrant 8 suggests consideration of a signal to better organize the existing roadway network. Just because one or two signal warrants are met does not mean the intersection should be signalized.

The existing all way stop intersection performs very well due to a fairly even distribution of traffic by approach to the intersection during the peak periods of traffic. Therefore, the installation of a traffic signal based on the existing traffic volumes is not justified for this intersection. However, since the future traffic condition will increase traffic and potentially create an unbalanced volume of approach traffic to the intersection, one of the options to be investigated for the proposed condition is a signalized intersection.

4.0 Proposed Conditions

4.1 Proposed Site Modifications

Major modifications to the Sumner site include increasing both the occupancy and the parking capacity. The current parking capacity accomodates 1,550 spaces. After the improvements, the parking capacity will be increased to 2,225 spaces – an increase of 44%. Therefore, since the traffic accessing this increased parking area uses the site entrance road, the site generated traffic for the proposed condition will increase proportionally at the same rate as the parking capacity (44%).

An assumption for the proposed condition is that the work shifts of the future employees at the site and the route by which they arrive to or depart from the site (from the north or south via Sangamore Road or from the east on Sentinal Drive) is assumed to mimic those of the existing workforce patterns. The traffic volume for the proposed condition was developed by dividing the existing turning movements at this location into two categories: site generated traffic and typical pass through traffic. The future traffic volumes not associated with the site generated traffic are not expected to increase significantly in this region, based on recent census data and the density of current developments. Therefore, the existing site generated traffic was increased by 44% and then added back into the typical pass through traffic to produce the anticipated future traffic movements in this area.

4.2 Entry Control Facility Lane Requirements

The number of inbound lanes required at the ECF is based on the volume of traffic at the gate and the ID checking procedures. The methodology for this analysis is from the Traffic and Safety Engineering for Better Entry Control Facilities (SDDCTEA Pamphlet 55-15) dated 2009 by the Military Surface Deployment and Distribution Command Transportation Engineering Agency. The SDDCTEA Pamphlet 55-15 has established lane processing rates for various force protection conditions (FPCON) and ID checking procedures (singe guard, two guards working in tandem in a single lane, and automated processing). It is recommended in the phamplet to design the ECF based on the FPCON Bravo Plus condition, which consists of a vehicle and identification of all occupants processing technique. This equates to average processing rates of 350 vehicles per hour per lane (vphpl) for a single ID checker or automated entry system set up and for 500 vphpl for tandem ID checkers.

Currently the number of lanes (inbound and outbound) approaching the ECF are one in each direction and at the second ID check area under the canopy the number of inbound lanes become two. The existing peak hour of traffic entering the facility at the

ECF is 522 vehicles during the time period 0545 – 0645. Note that the morning peak period of traffic entering the facility does not coincide with the peak hour of the intersection, which is from 0730 – 0830. This is a desirable situation because the majority of site generated traffic enters the facility prior to the peak hour of traffic for the surrounding roadways. In addition to the automated counts at the gate itself, manual counts of the number of cars in queue waiting to be processed through the gate were also noted. There were 6 vehicles in queue at the end of the peak hour of inbound traffic. Therefore, the existing demand at the gate is the number of vehicles that passed through the ID check area in the peak hour plus the number vehicles in queue at the end of that peak hour. This results in an existing demand of 528 vehicles at the gate.

The design demand at the gate in the proposed condition is the existing demand (528 vehicles) times the growth rate (44%), which yields 760 vehicles entering the facility during the morning peak hour. A worksheet in Appendix C depicts the calculations for the number of inbound lanes required at the gate based on the processing rates for a single ID checker or automated entry system set up and for tandem ID checkers. Table 4 provides a comparison of the number of inbound lanes at the ECF.

Table 4.1 - ECF Inbound Lane Data Comparison

Existing Inbound	Design Demand	
	Inbound Single Processing	Inbound Tandem Processing
2	3	2

The results of this traffic analysis show that if single processing or an automated entry system set up is the chosen ID check procedure in the future, then compared to the existing lane configuration, the gate would require an additional lane for a total of three inbound lanes. If tandem processing is used in the future then no additional lanes would be required when compared to the existing lane configuration.

The planned configuration of the future entrance road consists of two lanes entering the facility and two lanes exiting the facility. Therefore, if processing by a single guard at each lane is employed then either an additional lane should be added on the right side of the two inbound lanes or the inner outbound lane should be converted to a reversible third inbound lane only during the morning peak period of traffic (approximately 0600 – 0800).

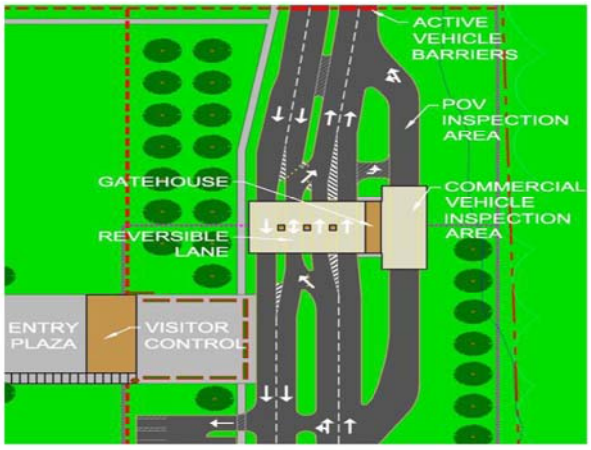


Figure 4.1 - Proposed Entry Control Facilities

Another option to accommodate the future traffic demand at the gate is to use tandem processing for ID checks during the morning peak period of traffic. Since this procedure only requires two inbound lanes, no lane additions would be required to the planned two lane entrance road at the ID check area.

4.3 Proposed Intersection Options

This section includes a brief description of the three options for the proposed intersection configuration of the site entrance road with Sangamore Road. They were developed sequentially as the results of the intersection analysis of each option were determined. Common amongst all options is the location of the ID check area with respect to its distance from Sangamore Road. Sufficient queue distance has been established by locating the canopy and ID check area approximately 450 feet from the intersection with Sangamore Road. In addition, the Master Plan depicts a four lane entrance road with two inbound and two outbound lanes.

Option 1 maintains the existing intersection layout as a four legged intersection and all way stop condition. The only difference in the configuration of the approach legs of this intersection versus the existing condition is that there are two lanes for traffic exiting the site.

Option 2 is similar to Option 1 except the traffic control for the intersection is a traffic signal. Signal phasing and timing scenarios were developed to optimize the flow of traffic through the intersection. This option was deemed viable based on the existing traffic signal warrant analysis and the fact that the intersection is approximately 680 feet away from the signalized intersection of Overlea Road and Sangamore Road to the north. This distance is greater than the 600 feet stated as the minimum separation distance of signalized intersections in the ITE Traffic Engineering Handbook.

Option 3 relocates the site entrance approximately 350 feet north of the existing intersection and provides for two three legged offset intersections. Stop signs will be eliminated along Sangamore Road in this area, while stop signs will remain for eastbound (EB) traffic exiting the site and westbound (WB) traffic on Sentinel Drive. Sangamore Road between Sentinel Drive and the site entrance will be widened by one lane to create a dedicated left turn lane for southbound (SB) motorists turning onto Sentinel Drive and northbound (NB) motorists turning onto the site entrance road. The high volume of left turning vehicles within a stream of traffic that is not controlled by a stop sign or traffic signal warrants the dedicated left turn lane.

4.4 Analysis of Intersection Options

The traffic volumes used for the intersection analysis are shown in Appendix A. The McTrans Highway Capacity Software (version HCS+T7F) was used for the analysis of the unsignalized and signalized intersection configurations represented by Options 1 – 3. The results of the morning and evening peak hour LOS analysis for each Option are depicted in Table 4.2.

Table 4.2 - Intersection LOS Summary

Intersection Approach	Existing Condition		Option 1 4-Way Stop		Option 2 Signalized Intersection		Option 3 Offset Intersection	
	AM	PM	AM	PM	AM	PM	AM	PM
Sangamore Road NB	B	C	D	C	C	B	A	A
Sangamore Road SB	C	C	E	C	B	D	B	C
Sentinel Dr WB	B	C	B	C	D	B	C	A
Site Entrance EB	A	C	B	C	C	C	E (only 30 cars)	D

Remember that the purpose of this study is to avoid or minimize impacts to traffic on roadways surrounding the site due to an increase in site generated traffic. This relates to motorists not associated to the site who travel on Sangamore Road and Sentinel Drive. The acceptable LOS for this urban setting is a LOS D and for site generate traffic exiting the site a LOS E is tolerable during the peak hour period per the ITE Traffic Engineering Handbook.

Option 1 reduces the LOS along Sangamore Road during the morning peak hour of traffic from LOS B to LOS D for NB traffic and LOS C to LOS E for SB traffic. It also reduces the LOS for EB traffic exiting the site from LOS A to LOS B in the morning

peak hour. The all way stop condition at this four legged intersection does not accommodate the increased traffic very well along Sangamore Road in the morning peak period because it creates approach volumes that are not as evenly distributed as compared to the existing condition.

Overall Option 2 performs a little better than Option 1 when compared to the existing condition. However, there was still an impact to traffic on Sangamore Road (NB morning and SB evening time periods) and Sentinel Drive during the morning peak hour. There was also a reduction of LOS for the traffic exiting the site (EB) in the morning from a LOS A to LOS C. Several phasing plans and cycle timings were investigated and although the intersection operates at an acceptable LOS, there were still impacts to motorists not associated with the site. As compared to Option 3, this is primarily due to the fact that traffic has to stop on Sangamore Road in Option 2 while there is almost a free flow condition along Sangamore Road in Option 3.

Option 3 improves the LOS for motorists on Sangamore Road due to the elimination of stop signs on the street in this area. The Sangamore NB approach improves from a LOS B/C to a LOS A/A and the SB approach improves from a LOS C/C to LOS B/C. The only impact to traffic not associated with the facility is a slight reduction in LOS on Sentinel Drive in the morning from a LOS B to a LOS C. This impact is well within the desirable limits of LOS and no mitigation is required. This reduction of WB LOS is the result of more traffic on Sangamore Road and the fact that Sangamore Road no longer has stop signs, which reduces the available gaps for traffic turning left from Sentinel Drive onto Sangamore Road. The evening peak hour LOS of Sentinel Drive improves from a LOS C to LOS A. Therefore, the impact to traffic for this option is for site generated traffic exiting the facility. The morning LOS for the site entrance road is reduced from a LOS A to LOS E. This decrease is felt by only 30 vehicles exiting the site as compared to the 892 other vehicles at the intersection which received a benefit of an increased LOS. The LOS during the evening peak hour for traffic exiting the site was reduced from a LOS C to LOS D. The reason for this decrease of LOS on the site entrance road is primarily due to the fact that Sangamore Road does not have stop signs and motorists exiting the site have to wait longer for available gaps in traffic. Again, the other motorists at this intersection achieved better or the same LOS as compared to the existing condition.

4.5 Recommended Intersection Option

The option that best achieves the purpose of this study of avoiding or minimizing impacts to motorists in this area who are not associated with the site generated traffic is Option 3. Therefore, Option 3 is the recommended intersection configuration for the site

entrance and Sangamore Road intersection. The proposed entrance to the site is illustrated in Figure 4.2, as well as the exclusive left turn lane on Sangamore Road between Sentinel Drive and the site entrance.

In fact, motorists traveling on Sangamore Road (which include those entering the site) enjoy improved travel times because the stop signs along Sangamore Road will be removed in this area. The only impact to traffic is to site generated traffic exiting the facility. As stated previously, these delays for EB traffic are tolerable in urban populations which are greater than 25,000 people.

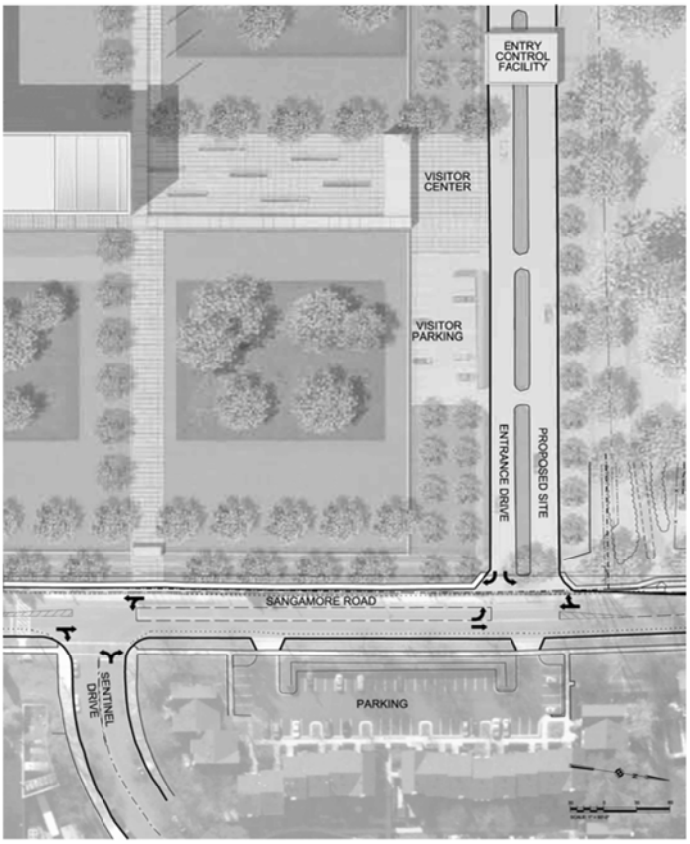


Figure 4.2 - Proposed Entrance Road

4.6 Construction Phase Traffic Control

The construction-phase traffic control will involve three primary elements:

1. Traffic Control along Sangamore Road
2. On Site Traffic Control
3. On Site Parking during Construction.

4.6.1 Traffic Control along Sangamore Road

Traffic control along Sangamore Road during public road improvements shall conform to MUTCD requirements and is expected to be comprised of a partial lane closure while the west lane is added between Sentinel Drive and the north end of the site. During construction, the west sidewalk and bike lane(s) in this area will be closed, and pedestrian and bicycle traffic will be rerouted to the east sidewalk. However, two-way traffic is expected to be maintained throughout the majority of construction.

4.6.2 Onsite Traffic Control

On site traffic control during construction shall conform to MUTCD requirements and is expected to be comprised of segregating the three primary groups (the initial, existing building occupants, the new and existing building contractors, and the parking garage and entry road contractors). To the greatest extent possible, the existing surface parking will be maintained until the parking garage and entrance road are complete. A portion of this parking is expected to be used by one or both of the contractor groups and the remainder will be used by building occupants. Construction fencing and vehicle barriers will be used to define the construction zones.

4.6.3 Onsite Parking during Construction

On site parking (for both building occupants and contractors) during construction will be the primary construction-phase traffic control issue until the parking garage is completed. As noted above, the existing surface parking will be maintained where feasible, and off site parking and shuttling will be utilized as necessary. However, due to the occupancy phasing, at no point prior to the completion of the parking garage is the combined number of on site personnel (both building occupants and contractors) expected to exceed the current occupancy and/or available parking.

Appendix A
Traffic Data

Existing Machine Counts

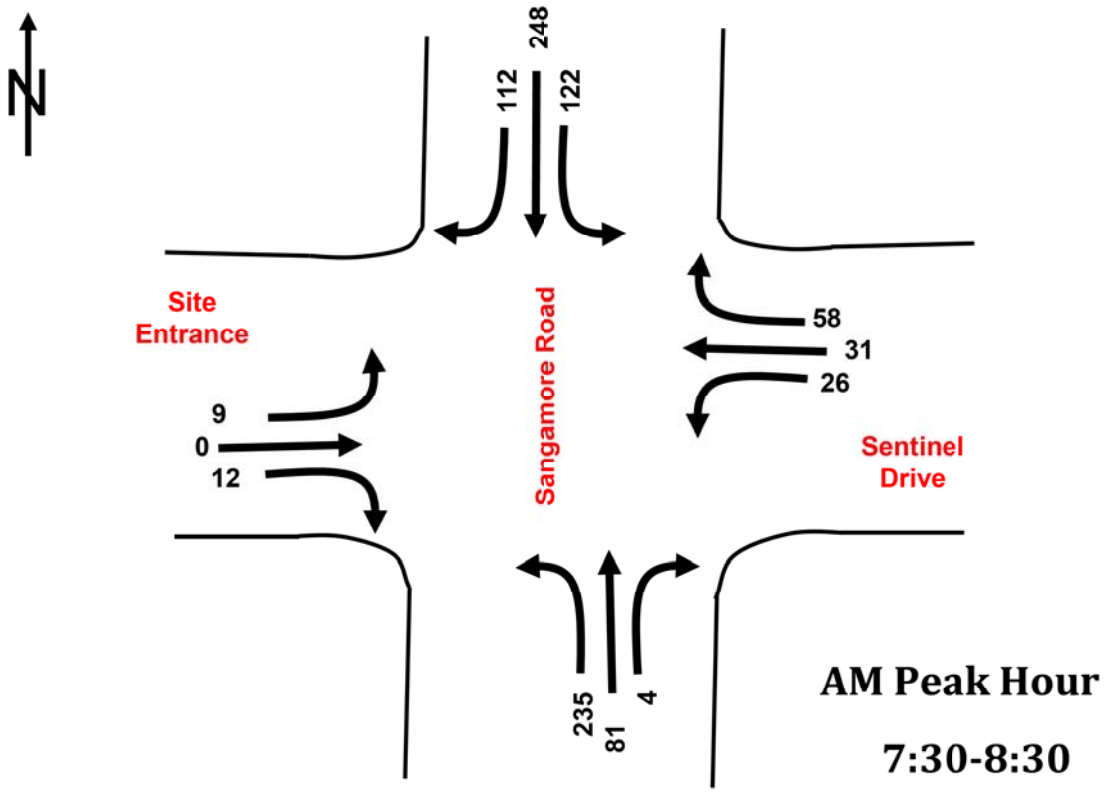
WEDNESDAY, OCTOBER 13, 2010

	Sangamore Rd		Sentinel	Site
Time	SB	NB	WB	EB
12:00 AM	0	3	2	5
12:15 AM	3	1	0	0
12:30 AM	0	0	1	2
12:45 AM	2	1	1	2
1:00 AM	1	6	0	3
1:15 AM	1	0	0	1
1:30 AM	2	0	0	1
1:45 AM	3	2	0	0
2:00 AM	3	3	0	0
2:15 AM	2	1	0	0
2:30 AM	0	1	1	0
2:45 AM	1	2	0	0
3:00 AM	3	0	0	0
3:15 AM	2	1	0	1
3:30 AM	2	2	0	1
3:45 AM	6	6	0	0
4:00 AM	2	6	0	2
4:15 AM	4	5	1	1
4:30 AM	14	10	0	2
4:45 AM	17	23	1	1
5:00 AM	15	19	1	5
5:15 AM	38	45	2	2
5:30 AM	50	69	5	2
5:45 AM	50	84	5	4
6:00 AM	60	88	7	8
6:15 AM	61	101	12	12
6:30 AM	44	86	10	8
6:45 AM	69	76	13	5
7:00 AM	71	93	18	11
7:15 AM	94	84	25	7
7:30 AM	110	87	24	13
7:45 AM	94	86	30	12
8:00 AM	122	73	34	6
8:15 AM	132	76	40	9
8:30 AM	115	68	23	10
8:45 AM	105	63	25	6
9:00 AM	98	56	26	13
9:15 AM	81	48	43	20
9:30 AM	55	36	43	11
9:45 AM	0	39	31	23
10:00 AM	58	39	36	19
10:15 AM	39	33	32	7
10:30 AM	52	27	40	10
10:45 AM	51	40	45	15
11:00 AM	61	26	42	15
11:15 AM	57	26	30	12
11:30 AM	71	39	47	23
11:45 AM	73	40	48	14
12:00 PM	79	39	42	28
12:15 PM	49	55	45	23
12:30 PM	79	53	44	11
12:45 PM	64	54	41	15
1:00 PM	66	33	43	23
1:15 PM	54	34	34	20
1:30 PM	61	48	37	20
1:45 PM	59	30	61	42
2:00 PM	68	55	60	62
2:15 PM	50	30	50	47
2:30 PM	51	51	64	89
2:45 PM	54	49	44	52
3:00 PM	62	47	59	86
3:15 PM	78	43	42	65
3:30 PM	71	52	57	112
3:45 PM	72	50	43	83
4:00 PM	65	40	33	129
4:15 PM	72	41	52	79
4:30 PM	72	69	66	73
4:45 PM	82	65	64	65
5:00 PM	54	66	73	79
5:15 PM	94	71	48	55
5:30 PM	68	59	56	56
5:45 PM	66	68	56	41
6:00 PM	68	53	42	42
6:15 PM	74	44	52	38
6:30 PM	74	48	63	35
6:45 PM	78	45	54	31
7:00 PM	44	47	50	20
7:15 PM	48	41	44	18
7:30 PM	44	46	31	13
7:45 PM	29	41	32	14
8:00 PM	27	25	21	12
8:15 PM	29	18	20	6
8:30 PM	36	14	20	8
8:45 PM	20	22	23	9
9:00 PM	25	16	20	11
9:15 PM	31	17	15	5
9:30 PM	19	22	16	4
9:45 PM	15	11	11	6
10:00 PM	13	10	9	18
10:15 PM	10	9	8	1
10:30 PM	9	10	6	8
10:45 PM	3	8	2	7
11:00 PM	6	4	5	11
11:15 PM	6	8	2	12
11:30 PM	2	3	2	3
11:45 PM	2	2	0	5

Existing Manual Traffic Counts

		Sangamore SB			Facility Entrance			Sangamore NB			Sentinel WB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
13-Oct	5:30	4	3	35			1	75		1		1	6
	5:45	5	4	46			1	76				2	
	6:00	6	9	47	1		2	89	2			5	3
	6:15	8	6	42			8	92	8			3	8
	6:30	9	13	32			3	83	5	1	2		5
	6:45	11	26	37			2	74	3	1	2	4	7
	7:00	16	19	49			3	75	14		2	5	8
	7:15	26	40	31	2		1	70	11	1	2	2	12
	7:30	22	58	35	1		2	57	26	1	4	2	18
	7:45	31	59	24	1		2	65	20	1	6	8	11
	8:00	33	63	26	3		3	55	17	1	10	13	18
	8:15	36	68	28	4		5	57	18	1	6	8	11
	3:00	29	22		27		39	6	21	2	1	2	46
	3:15	46	24	2	24		40	5	38	4	4	0	40
	3:30	54	22		43	1	49	1	41	3	5	0	54
	3:45	55	23	3	31	2	38	10	32	4	3	0	40
	4:00	36	26	1	35	2	88	7	31	5	3	1	32
	4:15	55	20		26	1	51	3	39	6	7	0	50
	4:30	48	22	1	20	4	42	5	54	3	4	1	60
	4:45	52	33		20	4	38	4	59	3	5	5	57
	5:00	48	14	1	25	2	44	4	63	4	7	1	62
	5:15	54	30		36	1	32	3	62	3	4	0	51

*Time noted is beginning of 15-minute interval noted in tables, i.e. 5:30 represents traffic from 5:30-5:45



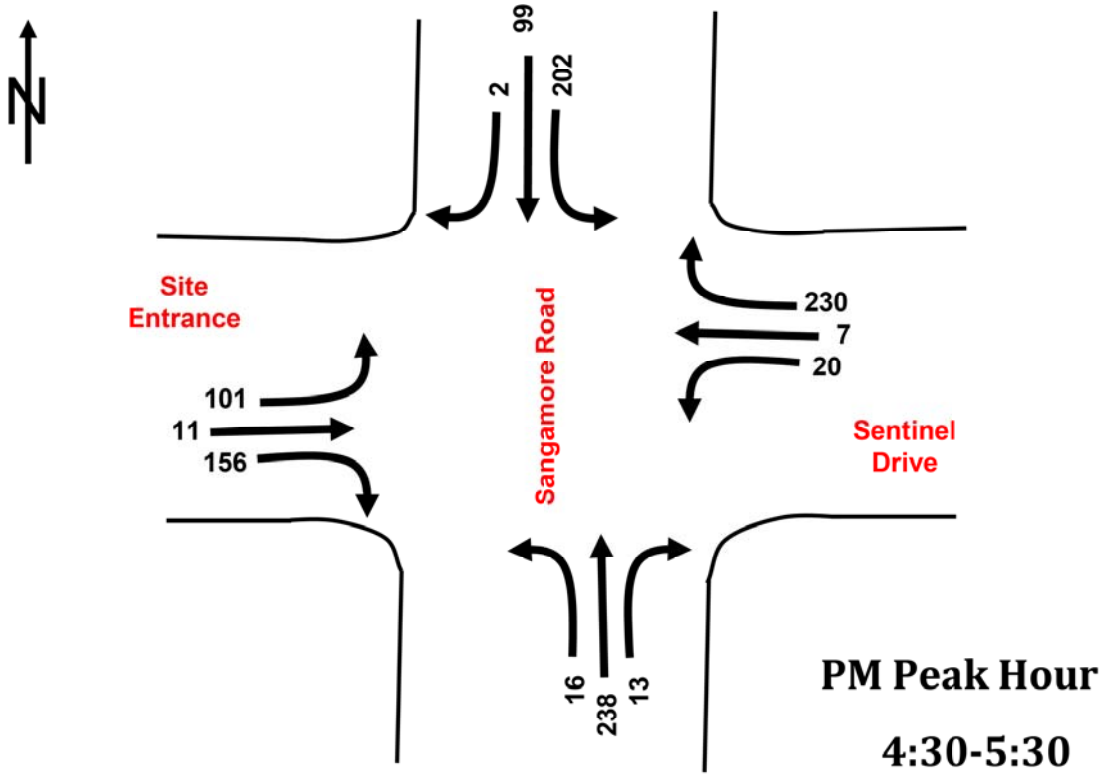


Figure 1 – Existing AM and PM Peak Hour

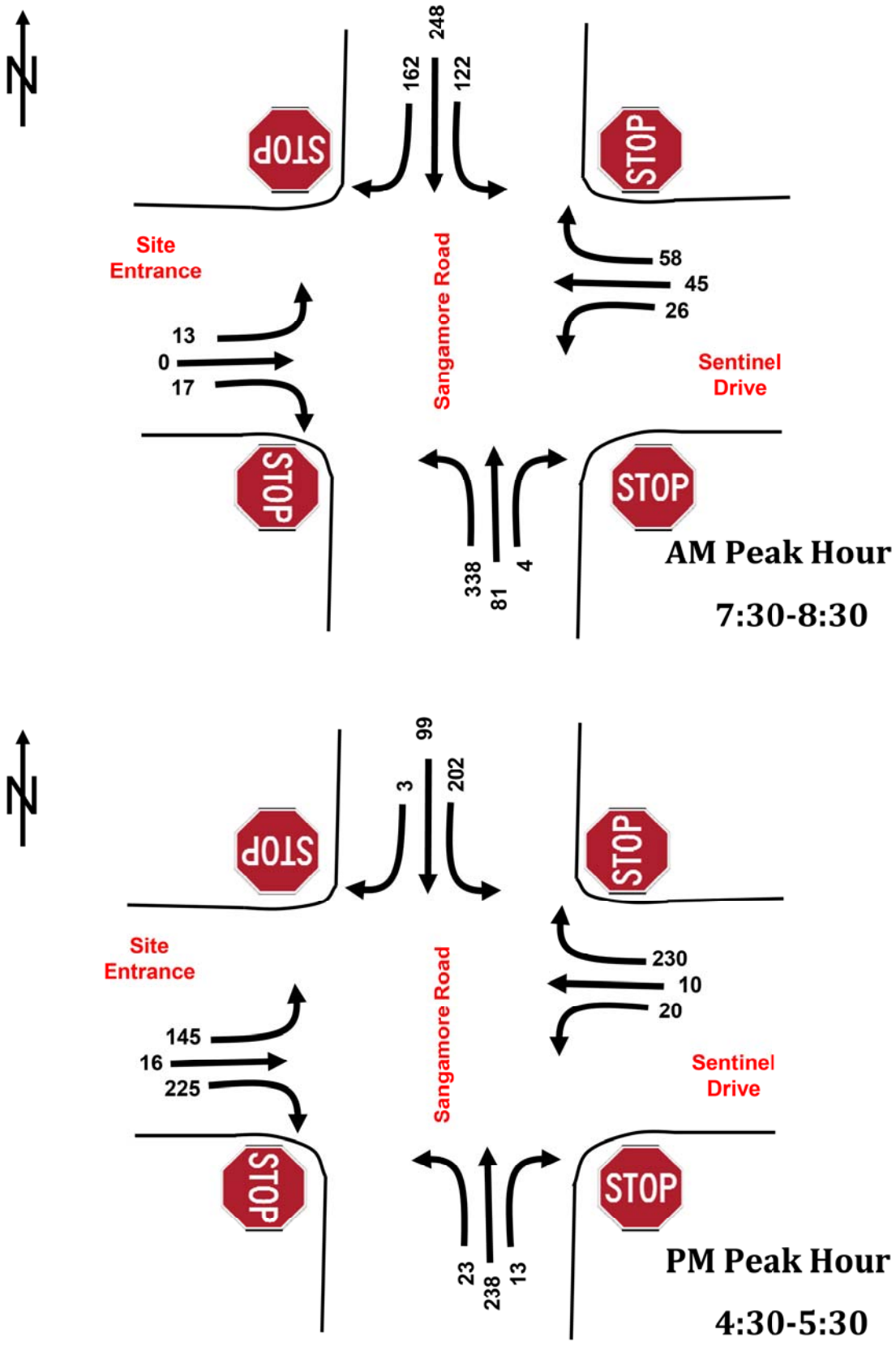


Figure 2 – Proposed Option 1 AM & PM Peak Hour

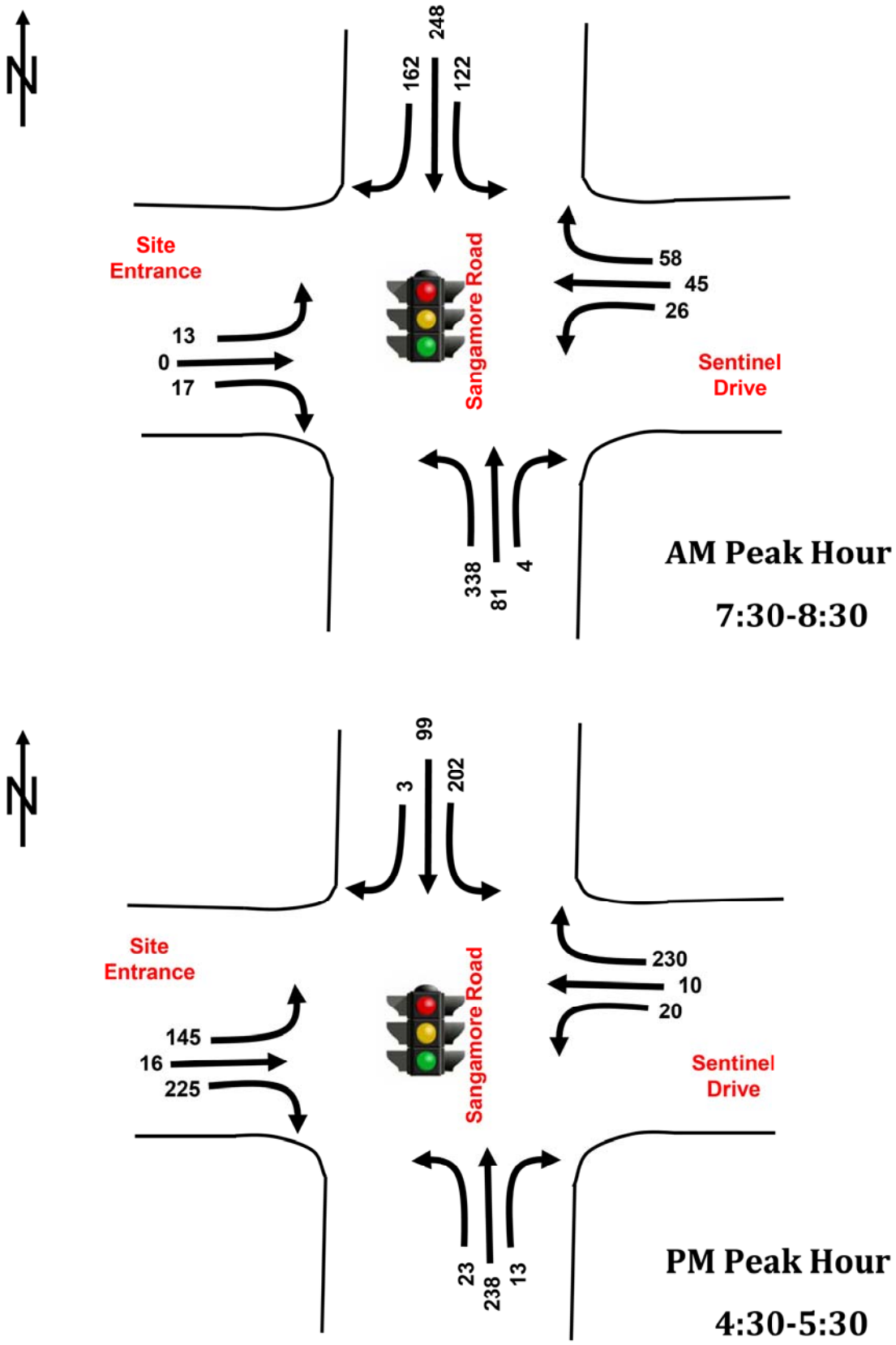


Figure 3 – Proposed Option 2 AM & PM Peak Hour

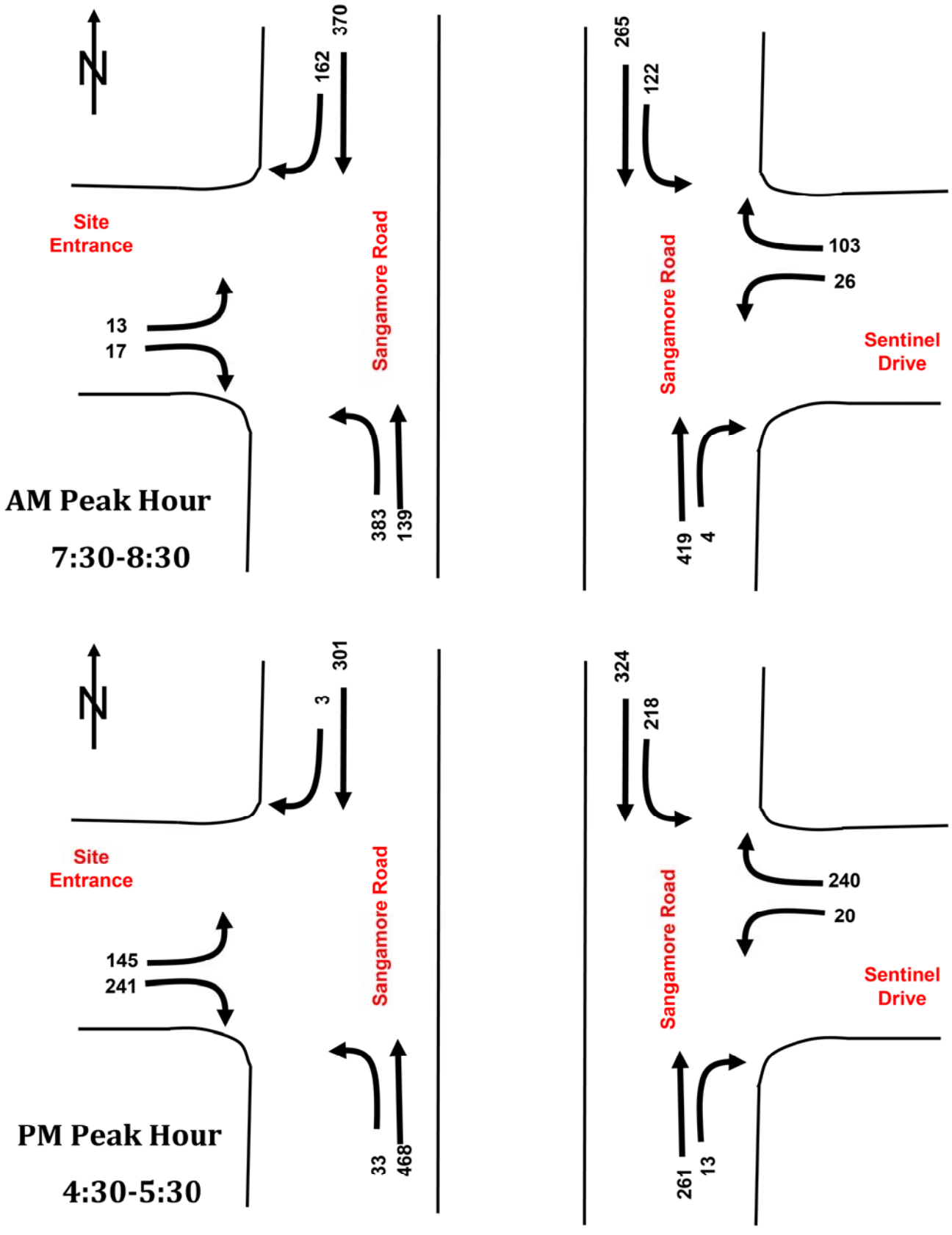


Figure 4 – Proposed Option 3 AM & PM Peak Hour

Appendix B
Traffic Signal Warrant Analysis

TRAFFIC SIGNAL WARRANTS ANALYSIS

for

Sangamore Road, Sentinel Drive and project site entrance

Bethesda, Maryland

November 5, 2010

ared for:

orps of Engineers

Introduction

A traffic signal warrants analysis has been conducted for the intersection of Sangamore Road, Sentinel Drive and the project site in Bethesda, Maryland. Data collected at the site has been compared to the guidelines set forth in the Manual of Uniform Traffic Control Devices (MUTCD). The manual describes eight warrants to be considered as justifying criteria necessary to be met before a traffic signal installation should be approved. A summary of results from the eight warrants is listed as follows:

Table 1
MUTCD Signal Warrants

Warrant 1	Eight-Hour Vehicular Volume	Did not meet
Warrant 2	Four-Hour Vehicular Volume	Did not meet
Warrant 3	Peak Hour	Met
Warrant 4	Pedestrian Volume	Did not meet
Warrant 5	School Crossings	Did not meet
Warrant 6	Coordinated Signal System	Did not meet
Warrant 7	Crash Experience	Did not meet
Warrant 8	Roadway Network	Met

The installation of a traffic signal must improve the overall safety and/or operation of the intersection. Satisfying one or more warrants alone does not in itself provide sole justification to consider a traffic signal.

The calculations below detail the process utilized to determine the results outlined in Table 1. Appendix A contains the data collected from the hand-held intersection counter and Appendix B is the output from the *Highway Capacity Software HCS+* utilized in Warrant 3.

TRAFFIC SIGNAL WARRANT ANALYSIS
24 HOUR TRAFFIC VOLUME COUNT

Sangamore Road, Sentinel Drive, and project site entrance

DATE: 10/13/2010
DAY: WEDNESDAY
LOCATION: Bethesda, Maryland

BY: C. McDonald, K. Doyle
N - S Street: Sangamore Road
E - W Street: Sentinel Drive/NGA entrance

TIME INTERVAL	ENTERING TRAFFIC ONLY				TOTAL ENTERING TRAFFIC	MAJOR STREET TOTAL ENTERING	MINOR STREET PRINCIPAL APPROACH
	Sangamore Road	Sangamore Road	NGA Entrance	Sentinel Drive			
	NB	SB	EB	WB			
12 - 1	5	5	9	4	23	10	9
1 - 2	8	7	5	0	20	15	5
2 - 3	7	6	0	1	14	13	1
3 - 4	9	13	2	0	24	22	2
4 - 5	44	37	6	2	89	81	6
5 - 6	217	153	13	13	396	370	13
6 - 7	351	234	33	42	660	585	42
7 - 8	350	369	43	97	859	719	97
8 - 9	280	474	31	122	907	754	122
9 - 10	179	290	67	143	679	469	143
10 - 11	139	200	51	153	543	339	153
11 - 12	131	262	64	167	624	393	167
12 - 1	201	271	77	172	721	472	172
1 - 2	145	240	105	175	665	385	175
2 - 3	185	223	250	218	876	408	250
3 - 4	192	283	346	201	1022	475	346
4 - 5	215	291	346	215	1067	506	346
5 - 6	264	282	231	233	1010	546	233
6 - 7	190	294	146	211	841	484	211
7 - 8	175	165	65	157	562	340	157
8 - 9	79	112	35	84	310	191	84
9 - 10	66	90	26	62	244	156	62
10 - 11	37	35	34	25	131	72	34
11 - 12	17	16	31	9	73	33	31
24 HOUR TOTAL	3486	4352	2016	2506	12360	7838	2861
PEAK HR 4 - 5	215	291	346	215	1067	506	346

WARRANT NUMBER 1 - EIGHT-HOUR VEHICULAR VOLUME (Condition A)

REQUIRED HOURLY VOLUMES	MAJOR STREET	MINOR STREET	TOTAL HOURS REQ'D	TOTAL HOURS MET
100%	500	150	8	2
80%	400	120	8	8
70%	350	105	8	10
56%	280	84	8	13

WARRANT NUMBER 1- EIGHT-HOUR VEHICULAR VOLUME(Condition B)

REQUIRED HOURLY VOLUMES	MAJOR STREET	MINOR STREET	TOTAL HOURS REQ'D	TOTAL HOURS MET
100%	750	75	8	1
80%	600	60	8	2
70%	525	53	8	3
56%	420	42	8	8

WARRANT 1 RESULT: SIGNAL NOT WARRANTED BY CONDITION A OR CONDITION B.

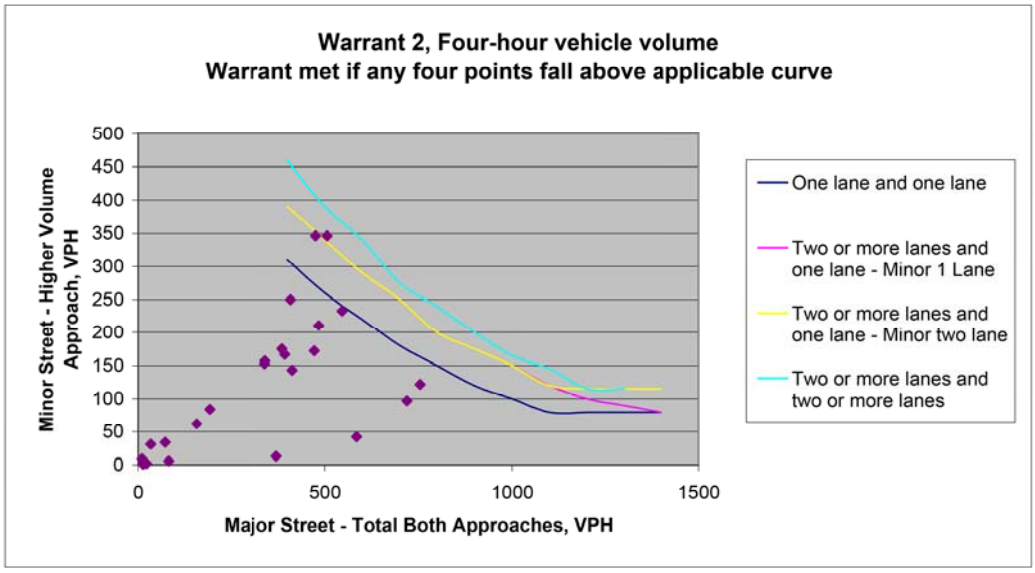
TRAFFIC SIGNAL WARRANT ANALYSIS
24 HOUR TRAFFIC VOLUME COUNT

Sangamore Road, Sentinel Drive, and project site entrance

DATE: 10/13/2010
DAY: WEDNESDAY
LOCATION: Bethesda, Maryland

BY: C. McDonald, K. Doyle
N - S Street: Sangamore Road
E - W Street: Sentinel Drive/NGA entrance

WARRANT NUMBER 2 - FOUR-HOUR VEHICULAR VOLUME



Sangamore Road and NGA entrance, and Sentinel Drive - One major lane and one minor lane

WARRANT 2 RESULT: TWO POINTS MET CRITERIA, SIGNAL NOT WARRANTED.

TRAFFIC SIGNAL WARRANT ANALYSIS
24 HOUR TRAFFIC VOLUME COUNT

Sangamore Road, Sentinel Drive, and project site entrance

DATE: 10/13/2010
DAY: WEDNESDAY
LOCATION: Bethesda, Maryland

BY: C. McDonald, K. Doyle
N - S Street: Sangamore Road
E - W Street: Sentinel Drive/NGA entrance

WARRANT NUMBER 3 - Peak Hour (Category A)

ALL THREE OF THE FOLLOWING CONDITIONS MUST BE MET:

1) Total Stopped time delay on one minor-street approach controlled by a stop sign must be equal to or exceed: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach.

SENTINEL DRIVE/NGA ENTRANCE MINOR STREET

EB Approach = 346 vehicles EB delay = 9.84 seconds (From HCS data)

EB Stopped time delay = 0.95 hours NOT GREATER THAN 4 HOURS

2) The volume on the same minor-street approach (one direction only) equals or exceeds 100 vph for one moving lane and 150 vph for two moving lanes.

EB Approach = 346 vehicles GREATER THAN 100 VPH

3) The total entering volume serviced during the hour equals or exceeds 650 vph for intersections with three approaches or 700 vph with intersections with four or more approaches.

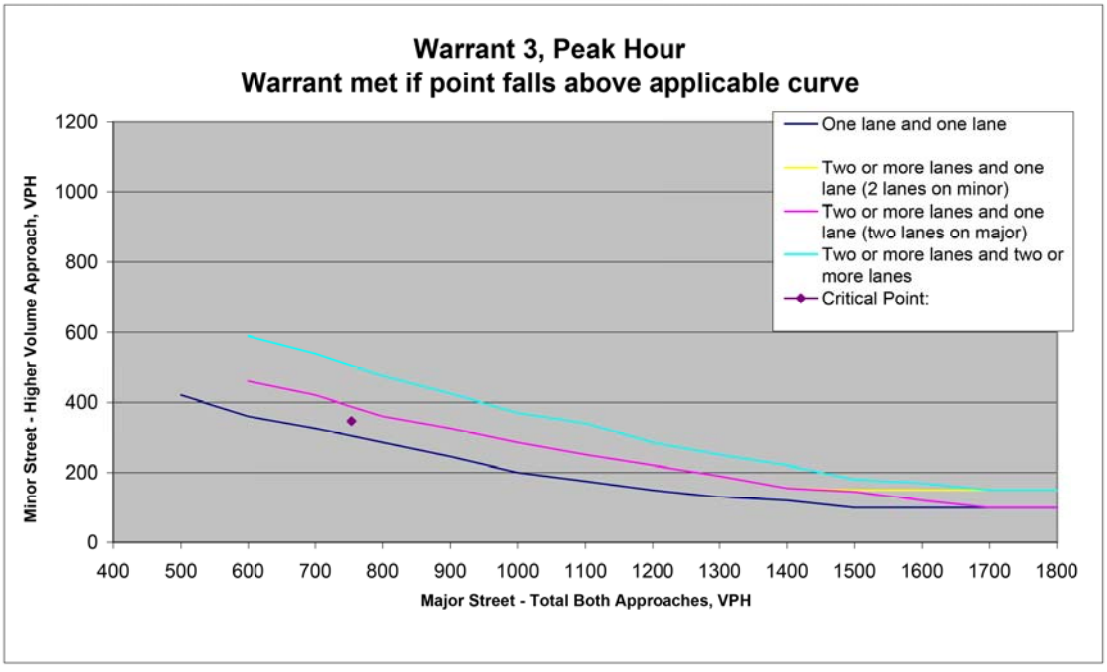
Total entering volume = 1067 vehicles GREATER THAN 650 VPH

WARRANT 3 CATEGORY A RESULT: CONDITION A NOT MET, SIGNAL NOT WARRANTED.

WARRANT NUMBER 3 - Peak Hour (Category B)

Intersection Configuration:

No. major street lanes:	1 lanes
No. higher volume minor street lanes:	1 lanes
Total volume on major street (all apprches):	754 vph
Total volume on higher volume minor street:	346 vph
Critical Point:	



WARRANT 3 CATEGORY B RESULT: CONDITION MET, SIGNAL WARRANTED.

TRAFFIC SIGNAL WARRANT ANALYSIS
24 HOUR TRAFFIC VOLUME COUNT

Sangamore Road, Sentinel Drive, and project site entrance

DATE: 10/13/2010
DAY: WEDNESDAY
LOCATION: Bethesda, Maryland

BY: C. McDonald, K. Doyle
N - S Street: Sangamore Road
E - W Street: Sentinel Drive/NGA entrance

WARRANT NUMBER 4 - Pedestrian Volume (Category A)

WARRANT 4 CATEGORY A RESULT: CONDITION NOT MET, PEDESTRIAN VOLUME CROSSING MAJOR STREET LESS THAN 100 FOR FOUR HOURS ON AVERAGE DAY AND LESS THAN 190 PER HOUR, SIGNAL NOT WARRANTED.

WARRANT NUMBER 4 - Pedestrian Volume (Category B)

WARRANT 4 CATEGORY B RESULT: CONDITION NOT MET, MORE THAN 60 GAPS PER HOUR AVAILABLE FOR PEDESTRIAN CROSSING, SIGNAL NOT WARRANTED.

WARRANT NUMBER 5 - School Crossing

WARRANT 5 RESULT: SCHOOL TRAFFIC NOT FOOUND TO CONFLICT WITH STUDY AREA, SIGNAL NOT WARRANTED.

WARRANT NUMBER 6 - Coordinated Signal System (Category A)

WARRANT 6 CATEGORY A RESULT: CONDITION NOT APPLICABLE, STUDY AREA IS NOT A ONE-WAY STREET AND DOES NOT HAVE TRAFFIC PREDOMINANTLY IN ONE DIRECTION, SIGNAL NOT WARRANTED.

WARRANT NUMBER 6 - Coordinated Signal System (Category B)

WARRANT 6 CATEGORY B RESULT: ADJACENT TRAFFIC SIGNALS PROVIDE DESIRABLE PLATOONING AND PROGRESSIVE MOVEMENT OF VEHICLES.

WARRANT NUMBER 7 - Crash Experience

ALL THREE OF THE FOLLOWING CONDITIONS MUST BE MET:

1) Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and

2) Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and

3) For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

WARRANT 7 RESULT: CONDITIONS 1 AND 2 NOT MET, SIGNAL NOT WARRANTED.

WARRANT NUMBER 8 - Roadway Network

ONE OR BOTH OF THE FOLLOWING CONDITIONS MUST BE MET:

1) The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or

2) The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a nonnormal business day (Saturday or Sunday).

WARRANT 8 RESULT: CONDITIONS 1 MET, SIGNAL WARRANTED.

Appendix C
ECF Inbound Lane Analysis

DIA: ICC-B, ECF Inbound Lane Requirements Worksheet			
Line	**Field**	**Calculation**	**Value**
1	Number of Vehicles Process in Peak Hour (**section 2.3.2.4**)		522
2	Number of Queued Vehicles at end of Peak Hour (**section 2.3.2.4**)		6
3	TOTAL EXISTING DEMAND	Line1 + Line2	528
4	Deployment Adjustment [DA] (**section 2.3.2.3**) *Percent of Total Base Population Deployed*	100%/(100% -DA%)	*0.0% *Deployment* = 1.00
5	TOTAL ADJUSTED EXISTING DEMAND	Line3 X Line4	528
6	Local Growth at ECF [LG] (**section 2.3.2.2**) *Percent of Estimated Local Growth*	(100% + LG%)/100%	*0% Local Growth* = 1
7	Future Growth [FG] (**section 2.3.2.1**) Percent of Estimated Future Growth	(100% + FG%)/100%	*44% Future Growth* = 1.44
8	DESIGN DEMAND	Line5 X Line6 X Line7	760
9	Design Processing Rate (**Exhibit 2.5**) *Single - Default 350 veh per hour per lane*		350
10	CALCULATED LANE REQUIREMENTS	Line8 / Line9	2.2
11	ROUNDED LANE REQUIREMENTS *Round to Next Highest Whole Number*		**3 Lanes**
12	Design Processing Rate (**Exhibit 2.5**) *Tandem - Default 500 veh per hour per lane*		500
13	CALCULATED LANE REQUIREMENTS	Line8 / Line12	1.5
14	ROUNDED LANE REQUIREMENTS *Round to Next Highest Whole Number*		**2 Lanes**

Notes:

1. Refer to Traffic and Safety Engineering for Better Entry Control Facilities SDDCTEA Pamphlet 55-15 by Military Surface Deployment and Distribution Command Transportation Enginnering Agency dated 2006 for the section and Exhibit callouts.

2. Existing peak hour of traffic entering the facility at this gate was 522 vehicles during the time period of 0545 - 0645.

3. There were 6 vehicles in que at the gate entrance at the end of the peak hour. Therefore, the demand equals those processed and those waiting to be processed at the end of the peak hour.

4. No deployment and no local growth, so factors for both are 1.0. Local growth deals with the pass through traffic and since this is a developed area and the population in the area has remained steady or declined, it is assumed 0% local growth.

5. Future growth is based on the increase in parking that is accessible at this gate.
   Future parking = 2225 spaces and existing parking = 1550 spaces.
   Thus increase equals 2225/1550 = 0.44.

Appendix D
HCS+ Analysis

ALL-WAY STOP CONTROL ANALYSIS- EXISTING AM

General Information

Analyst	*Kim Kossmann*
Agency/Co.	*Black & Veatch*
Date Performed	*11/4/2010*
Analysis Time Period	*October 13, 2010*

Site Information

Intersection	
Jurisdiction	*Montgomery Co.*
Analysis Year	*2010*

Project ID *ICC-B Traffic Study - Existing AM*

East/West Street: *Sentinel Dr/Site* North/South Street: *Sangamore Rd*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*9*	*0*	*12*	*26*	*31*	*58*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*235*	*81*	*4*	*122*	*248*	*112*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.58*		*0.72*		*0.87*		*0.87*	
Flow Rate (veh/h)	*35*		*159*		*367*		*553*	
% Heavy Vehicles	*0*		*0*		*0*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*0.4*		*0.2*		*0.7*		*0.3*	
Prop. Right-Turns	*0.6*		*0.5*		*0.0*		*0.2*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.3*		*-0.3*		*0.1*		*-0.1*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.03*		*0.14*		*0.33*		*0.49*	
hd, final value (s)	*6.41*		*6.04*		*5.43*		*5.02*	
x, final value	*0.06*		*0.27*		*0.55*		*0.77*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.4*		*4.0*		*3.4*		*3.0*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*285*		*409*		*617*		*706*	
Delay (s/veh)	*9.84*		*11.22*		*14.96*		*22.79*	
LOS	*A*		*B*		*B*		*C*	
Approach: Delay (s/veh)	*9.84*		*11.22*		*14.96*		*22.79*	
LOS	*A*		*B*		*B*		*C*	
Intersection Delay (s/veh)	*18.15*							
Intersection LOS	*C*							

 HCS+™ Version 5.5 Generated: 11/5/2010 11:03 AM

ALL-WAY STOP CONTROL ANALYSIS - EXISTING PM

General Information

Analyst	*Kim Kossmann*
Agency/Co.	*Black & Veatch*
Date Performed	*11/4/2010*
Analysis Time Period	*October 13, 2010*

Site Information

Intersection	*Sangamore Rd/Sentinel Dr/Site*
Jurisdiction	*Montgomery Co.*
Analysis Year	*2010*

Project ID *ICC-B Traffic Study - Existing PM*

East/West Street:

North/South Street: *Sangamore Rd*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*101*	*11*	*156*	*20*	*7*	*230*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*16*	*238*	*13*	*202*	*99*	*2*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.81*		*0.90*		*0.92*		*0.88*	
Flow Rate (veh/h)	*329*		*284*		*289*		*343*	
% Heavy Vehicles	*0*		*0*		*0*		*2*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*0.4*		*0.1*		*0.1*		*0.7*	
Prop. Right-Turns	*0.6*		*0.9*		*0.0*		*0.0*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.3*		*-0.5*		*-0.0*		*0.2*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.29*		*0.25*		*0.26*		*0.30*	
hd, final value (s)	*6.62*		*6.52*		*6.92*		*6.94*	
x, final value	*0.61*		*0.51*		*0.56*		*0.66*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.6*		*4.5*		*4.9*		*4.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*494*		*482*		*465*		*482*	
Delay (s/veh)	*19.25*		*16.23*		*18.25*		*22.45*	
LOS	*C*		*C*		*C*		*C*	
Approach: Delay (s/veh)	*19.25*		*16.23*		*18.25*		*22.45*	
LOS	*C*		*C*		*C*		*C*	
Intersection Delay (s/veh)	*19.21*							
Intersection LOS	*C*							

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ALL-WAY STOP CONTROL ANALYSIS - OPTION 1 AM

General Information

Analyst	*Kim Kossmann*
Agency/Co.	*Black & Veatch*
Date Performed	*11/4/2010*
Analysis Time Period	*October 13, 2010*

Site Information

Intersection	
Jurisdiction	*Montgomery Co.*
Analysis Year	*2010*

Project ID *ICC-B Traffic Study - Existing AM with future traffic*

East/West Street: *Sentinel Dr/Site* North/South Street: *Sangamore Rd*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*13*	*0*	*17*	*26*	*45*	*58*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*338*	*81*	*4*	*122*	*248*	*162*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LTR*	
PHF	*0.58*	*1.00*	*0.72*		*0.87*		*0.87*	
Flow Rate (veh/h)	*22*	*17*	*178*		*485*		*611*	
% Heavy Vehicles	*0*	*0*	*0*		*0*		*2*	
No. Lanes	*2*		*1*		*1*		*1*	
Geometry Group	*5*		*4a*		*2*		*2*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.2*		*0.8*		*0.2*	
Prop. Right-Turns	*0.0*	*1.0*	*0.4*		*0.0*		*0.3*	
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.5*	*-0.7*	*-0.2*		*0.2*		*-0.1*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	
x, initial	*0.02*	*0.02*	*0.16*		*0.43*		*0.54*	
hd, final value (s)	*8.49*	*7.25*	*6.78*		*5.79*		*5.39*	
x, final value	*0.05*	*0.03*	*0.34*		*0.78*		*0.91*	
Move-up time, m (s)	*2.3*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*6.2*	*5.0*	*4.8*		*3.8*		*3.4*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*272*	*267*	*428*		*611*		*664*	
Delay (s/veh)	*11.66*	*10.21*	*13.17*		*26.21*		*39.92*	
LOS	*B*	*B*	*B*		*D*		*E*	
Approach: Delay (s/veh)	*11.02*		*13.17*		*26.21*		*39.92*	
LOS	*B*		*B*		*D*		*E*	
Intersection Delay (s/veh)	*30.37*							
Intersection LOS	*D*							

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ALL-WAY STOP CONTROL ANALYSIS - OPTION 1 PM

General Information

Analyst	*Kim Kossmann*
Agency/Co.	*Black & Veatch*
Date Performed	*11/4/2010*
Analysis Time Period	*October 13, 2010*

Site Information

Intersection	*Sangamore Rd/Sentinel Dr/Site*
Jurisdiction	*Montgomery Co.*
Analysis Year	*2010*

Project ID *ICC-B Traffic Study - Existing PM with future traffic*

East/West Street:

North/South Street: *Sangamore Rd*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*145*	*16*	*225*	*20*	*10*	*230*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*23*	*238*	*13*	*202*	*99*	*3*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LTR*	
PHF	*0.81*	*1.00*	*0.90*		*0.92*		*0.88*	
Flow Rate (veh/h)	*179*	*241*	*288*		*296*		*344*	
% Heavy Vehicles	*0*	*0*	*0*		*0*		*2*	
No. Lanes	*2*		*1*		*1*		*1*	
Geometry Group	*5*		*4a*		*2*		*2*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*	*0.1*		*0.1*		*0.7*	
Prop. Right-Turns	*0.0*	*0.9*	*0.9*		*0.0*		*0.0*	
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.5*	*-0.7*	*-0.5*		*-0.0*		*0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	
x, initial	*0.16*	*0.21*	*0.26*		*0.26*		*0.31*	
hd, final value (s)	*8.10*	*6.91*	*6.91*		*7.19*		*7.20*	
x, final value	*0.40*	*0.46*	*0.55*		*0.59*		*0.69*	
Move-up time, m (s)	*2.3*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*5.8*	*4.6*	*4.9*		*5.2*		*5.2*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*417*	*483*	*470*		*460*		*472*	
Delay (s/veh)	*16.16*	*15.43*	*18.12*		*20.08*		*24.62*	
LOS	*C*	*C*	*C*		*C*		*C*	
Approach: Delay (s/veh)	*15.74*		*18.12*		*20.08*		*24.62*	
LOS	*C*		*C*		*C*		*C*	
Intersection Delay (s/veh)	*19.47*							
Intersection LOS	*C*							

HCS+™ Version 5.5

Generated: 12/13/2010 3:04 PM

HCS+™ DETAILED REPORT - OPTION 2 AM

General Information		Site Information	
Analyst	Kim Kossmann	Intersection	
Agency or Co.	Black & Veatch	Area Type	All other areas
Date Performed	12/9/2010	Jurisdiction	Montogomery Co.
Time Period		Analysis Year	
		Project ID	Existing Conditions with Signal and Future traffic- AM Peak

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Volume, V (vph)	13	0	17	26	45	58	338	81	4	122	248	112
% Heavy vehicles, %HV	0		0	0	0	0	0	0	0	2	2	2
Peak-hour factor, PHF	0.56	1.00	0.60	0.66	0.60	0.81	0.90	0.78	0.93	0.85	0.91	0.80
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P		P	P	
Start-up lost time, l_1		2.0			2.0			2.0			2.0	
Extension of effective green, e		2.0			2.0			2.0			2.0	
Arrival type, AT		3			3			3			3	
Unit extension, UE		3.0			3.0			3.0			3.0	
Filtering/metering, I		1.000			1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0			0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0	0	0	0	0	0	0	0	0	0	0	0
Lane width		12.0			12.0			12.0			12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0			0			0			0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	EW Perm	02	03	04	Excl. Left	SB Only	Thru Only	08
Timing	G = 11.8	G = 0.0	G = 0.0	G = 0.0	G = 10.3	G = 11.2	G = 26.7	G = 0.0
	Y = 4	Y = 0	Y = 0	Y = 0	Y = 4	Y = 0	Y = 0	Y = 0
Duration of Analysis, T =						Cycle Length, C = 68.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		51			186			484			557	
Lane group capacity, c		255			290			717			990	
v/c ratio, X		0.20			0.64			0.68			0.56	
Total green ratio, g/C		0.17			0.17			0.39			0.56	
Uniform delay, d_1		24.1			26.1			17.1			9.7	
Progression factor, PF		1.000			1.000			1.000			1.000	

I factor		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		1.8			10.4			5.0			2.3	
Initial queue delay, d_3		0.0			0.0			0.0			0.0	
Back of Queue		0.9			3.9			9.0			8.0	
Queue Storage Ratio												
Control delay		25.8			36.6			22.1			12.0	
Lane group LOS		C			D			C			B	
Approach delay	25.8			36.6			22.1			12.0		
Approach LOS	C			D			C			B		
Intersection delay	20.0			X_C = 0.00			Intersection LOS			B		

HCS+™ DETAILED REPORT - OPTION 2 PM

General Information		Site Information	
Analyst	*Kim Kossmann*	Intersection	
Agency or Co.	*Black & Veatch*	Area Type	*All other areas*
Date Performed	*12/9/2010*	Jurisdiction	*Montogomery Co.*
Time Period		Analysis Year	
		Project ID	*Existing Conditions with Signal and Future traffic- PM Peak*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*1*	*0*	*0*	*1*	*0*
Lane group		*LTR*			*LTR*			*LTR*			*LTR*	
Volume, V (vph)	*101*	*16*	*225*	*20*	*10*	*230*	*23*	*238*	*13*	*202*	*99*	*3*
% Heavy vehicles, %HV	*0*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*2*	*2*	*2*
Peak-hour factor, PHF	*0.56*	*1.00*	*0.60*	*0.71*	*0.35*	*0.93*	*0.90*	*0.94*	*0.81*	*0.94*	*0.75*	*0.80*
Pretimed (P) or actuated (A)	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*
Start-up lost time, l_1		*2.0*			*2.0*			*2.0*			*2.0*	
Extension of effective green, e		*2.0*			*2.0*			*2.0*			*2.0*	
Arrival type, AT		*3*			*3*			*3*			*3*	
Unit extension, UE		*3.0*			*3.0*			*3.0*			*3.0*	
Filtering/metering, I		*1.000*			*1.000*			*1.000*			*1.000*	
Initial unmet demand, Q_b		*0.0*			*0.0*			*0.0*			*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane width		*12.0*			*12.0*			*12.0*			*12.0*	
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B		*0*			*0*			*0*			*0*	
Min. time for pedestrians, G_p	*3.2*			*3.2*			*3.2*			*3.2*		

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = *34.9*	G = *0.0*	G = *0.0*	G = *0.0*	G = *25.1*	G = *0.0*	G = *0.0*	G =
	Y = *4*	Y = *0*	Y = *0*	Y = *0*	Y = *4*	Y = *0*	Y = *0*	Y =
Duration of Analysis, T =						Cycle Length, C = *68.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		*571*			*304*			*295*			*351*	
Lane group capacity, c		*707*			*811*			*664*			*402*	
v/c ratio, X		*0.81*			*0.37*			*0.44*			*0.87*	
Total green ratio, g/C		*0.51*			*0.51*			*0.37*			*0.37*	
Uniform delay, d_1		*13.8*			*10.0*			*16.2*			*20.0*	
Progression factor, PF		*1.000*			*1.000*			*1.000*			*1.000*	

I factor		1.000			1.000			1.000			1.000	
Delay calibration, k		0.50			0.50			0.50			0.50	
Incremental delay, d_2		9.6			1.3			2.1			22.2	
Initial queue delay, d_3		0.0			0.0			0.0			0.0	
Back of Queue		11.6			3.9			4.8			8.6	
Queue Storage Ratio												
Control delay		23.4			11.3			18.3			42.2	
Lane group LOS		C			B			B			D	
Approach delay	23.4			11.3			18.3			42.2		
Approach LOS	C			B			B			D		
Intersection delay	24.3			X_C = 0.83			Intersection LOS			C		

TWO-WAY STOP CONTROL SUMMARY - OPTION 3 AM

General Information		Site Information	
Analyst	*K. Kossmann*	Intersection	*Sangamore Rd/Sentinel Dr*
Agency/Co.	*Black & Veatch*	Jurisdiction	*Montgomery Co.*
Date Performed	*10/29/2010*	Analysis Year	*2010*
Analysis Time Period	*10/13/20*		

Project Description *Sentinel/Sangamore w/o entrance & SB Left AM Peak Hour*

East/West Street: *Sentinel Dr* | North/South Street: *Sangamore Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*419*	*4*	*122*	*265*	
Peak-Hour Factor, PHF	*0.90*	*0.78*	*0.93*	*0.85*	*0.91*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*537*	*4*	*143*	*291*	*0*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration			*TR*	*L*	*T*	
Upstream Signal		*1*			*1*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*26*		*103*
Peak-Hour Factor, PHF	*0.56*	*1.00*	*0.60*	*0.66*	*0.60*	*0.81*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*39*	*0*	*127*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*		*LR*				
v (veh/h)		*143*		*166*				
C (m) (veh/h)		*1028*		*388*				
v/c		*0.14*		*0.43*				
95% queue length		*0.48*		*2.09*				
Control Delay (s/veh)		*9.1*		*21.0*				
LOS		*A*		*C*				
Approach Delay (s/veh)	--	--	*21.0*					
Approach LOS	--	--	*C*					

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TWO-WAY STOP CONTROL SUMMARY - OPTION 3 PM

General Information		Site Information	
Analyst	K. Kossmann	Intersection	Sangamore Rd/Sentinel Dr
Agency/Co.	Black & Veatch	Jurisdiction	Montgomery Co.
Date Performed	10/29/2010	Analysis Year	2010
Analysis Time Period	10/13/20		

Project Description: Sentinel/Sangamore w/o entrance & SB Left -PM Peak Hour

East/West Street: Sentinel Dr | North/South Street: Sangamore Road

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		261	13	218	324	
Peak-Hour Factor, PHF	0.90	0.94	0.81	0.94	0.75	0.80
Hourly Flow Rate, HFR (veh/h)	0	277	16	231	432	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration			TR	L	T	
Upstream Signal		1			1	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				20		240
Peak-Hour Factor, PHF	0.56	1.00	0.60	0.71	0.35	0.93
Hourly Flow Rate, HFR (veh/h)	0	0	0	28	0	258
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		231		286				
C (m) (veh/h)		1269		569				
v/c		0.18		0.50				
95% queue length		0.66		2.81				
Control Delay (s/veh)		8.5		17.5				
LOS		A		C				
Approach Delay (s/veh)	--	--	17.5					
Approach LOS	--	--	C					

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TWO-WAY STOP CONTROL SUMMARY - OPTION 3 AM

General Information

Analyst	*K. Kossmann*
Agency/Co.	*Black & Veatch*
Date Performed	*10/29/2010*
Analysis Time Period	*10/13/20*

Site Information

Intersection	*Sangamore Rd/Site Entrance*
Jurisdiction	*Montgomery Co.*
Analysis Year	*2010*

Project Description *Traffic Stdy-Sagamore w/new Site Entran & NB turn AM Peak Hr*

East/West Street: *Site Entrance* | North/South Street: *Sangamore Rd*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*383*	*139*			*370*	*162*
Peak-Hour Factor, PHF	*0.90*	*0.78*	*0.93*	*1.00*	*0.91*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*425*	*178*	*0*	*0*	*406*	*202*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*1*			*1*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*13*		*17*			
Peak-Hour Factor, PHF	*0.56*	*1.00*	*0.60*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*23*	*0*	*28*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*425*					*23*		*28*
C (m) (veh/h)	*980*					*73*		*570*
v/c	*0.43*					*0.32*		*0.05*
95% queue length	*2.23*					*1.16*		*0.15*
Control Delay (s/veh)	*11.5*					*75.5*		*11.6*
LOS	*B*					*F*		*B*
Approach Delay (s/veh)	--	--				*40.5*		
Approach LOS	--	--				*E*		

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TWO-WAY STOP CONTROL SUMMARY - OPTION 3 PM

General Information

Analyst	*K. Kossmann*
Agency/Co.	*Black & Veatch*
Date Performed	*10/29/2010*
Analysis Time Period	*10/13/20*

Site Information

Intersection	*Sangamore Rd/Site Entrance*
Jurisdiction	*Montgomery Co.*
Analysis Year	*2010*

Project Description *Sangamore Rd w/relocate Site & exc. NBturn lane - PM Peak Hr*

East/West Street: *Site Entrance* North/South Street: *Sangamore Road*

Intersection Orientation: *North-South* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*33*	*468*			*301*	*3*
Peak-Hour Factor, PHF	*0.80*	*0.94*	*0.93*	*1.00*	*0.75*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*41*	*497*	*0*	*0*	*401*	*3*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*1*			*1*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*145*		*241*			
Peak-Hour Factor, PHF	*0.70*	*1.00*	*0.89*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*207*	*0*	*270*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*41*					*207*		*270*
C (m) (veh/h)	*1166*					*269*		*653*
v/c	*0.04*					*0.77*		*0.41*
95% queue length	*0.11*					*5.75*		*2.03*
Control Delay (s/veh)	*8.2*					*52.1*		*14.3*
LOS	*A*					*F*		*B*
Approach Delay (s/veh)	--	--				*30.7*		
Approach LOS	--	--				*D*		

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Appendix B

Section 4
Site Development Guide
Transportation Planning

INTELLIGENCE COMMUNITY CAMPUS – BETHESDA

4.1 Site Transportation Planning

A detailed traffic study for the proposed ICC-B redevelopment was conducted in December of 2010. This study indicated that transportation improvements could be limited to reconfiguration of the main site entrance and defined that ICC-B impacts to the surrounding community will be minimal with these improvements. The existing site entrance currently has several limitations which impede efficient traffic flow around the complex, particularly during peak commuting times and these will be addressed with the proposed redevelopment.

Figure 4.1 shows the configuration of the existing site entrances onto Sangamore Road, the Sentinel Road entrance is the only entrance currently in active use due to security concerns. Sangamore Road currently consists of two travel ways (one southbound and one northbound), with on-street parking permitted along the northbound lane. The roadway has a suburban collector character with a posted speed limit of 30 mph. Sangamore is not a major throughway for the region, and principally serves as a conduit for the adjacent residential areas to access regional arterial streets and highways.

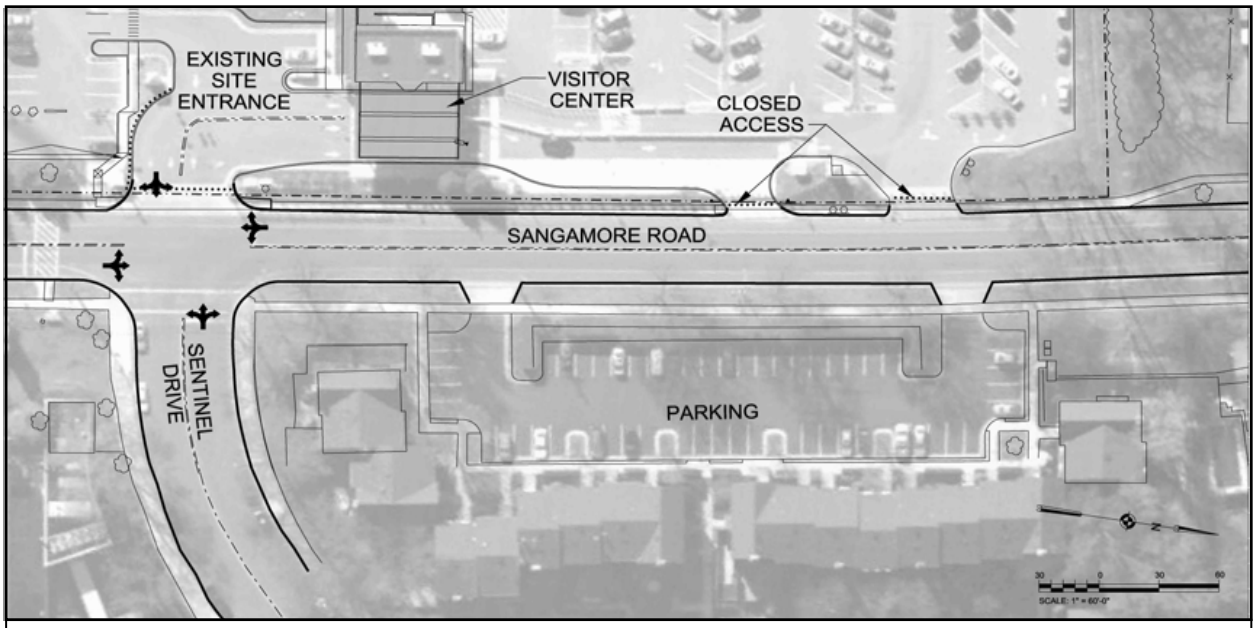

Figure 4.1: Existing Site Access, 4600 Sangamore Road, (December 2010 Traffic Study).

The 2010 traffic study utilized the *McTrans Highway Capacity Software* to model the existing conditions and proposed traffic management alternatives for the ICC-B site. Model runs indicated the existing configuration actually performs at an acceptable Level of Service (LOS), even during peak rush hour times. The minimum LOS identified with the existing configuration was LOS C, which is acceptable based on standards for urban roadways published by the Institute of Transportation Engineers.

Model input was created based on monitoring existing traffic flows into the facility and on adjacent streets to record total vehicle movements around the facility on a timed basis. This indicated peak vehicle movements into the site occur between 5:45 and 6:45 AM with an average peak of 528 vehicles

entering the facility during this hour. As this does not coincide with regional traffic peaks on Sangamore Road (7:30 to 8:30 AM), direct site impacts to peak regional traffic movements are minimized. Future site operations are predicted to mimic this usage pattern and are therefore were used as the basis of the ICC-B traffic analysis.

4.2 Proposed Site Entrance Configuration

Future site operations are predicted to entail 760 vehicles entering the facility during the peak period, which was used as the basis for developing the dual entrance lane access configuration proposed inside the complex and reconfiguring Sangamore Road in front of the ICC-B complex. The functionality of these improvements were then modeled with various vehicle in-processing operations to configure on-site traffic management alternatives to reduce vehicle cycle times and potential off-site impacts.

The main improvements recommended for Sangamore Road include a new consolidated site entrance at the north end of the site, a dedicated left turn lane from the northbound travelway of Sangamore Road, and a limited area of right-turn widening at the new entrance. The dedicated left-turn lane can be readily integrated into the existing width of Sangamore Road as it was originally designed for on-street parking on both sides of the road. Currently on-street parking is prohibited along this side of the roadway due to ICC-B site security requirements, therefore elimination of the southbound on-street parking will not adversely impact local parking availability. ***Figure 4.2*** outlines the configuration of these proposed improvements to improve traffic flow in front of the ICC-B Complex .

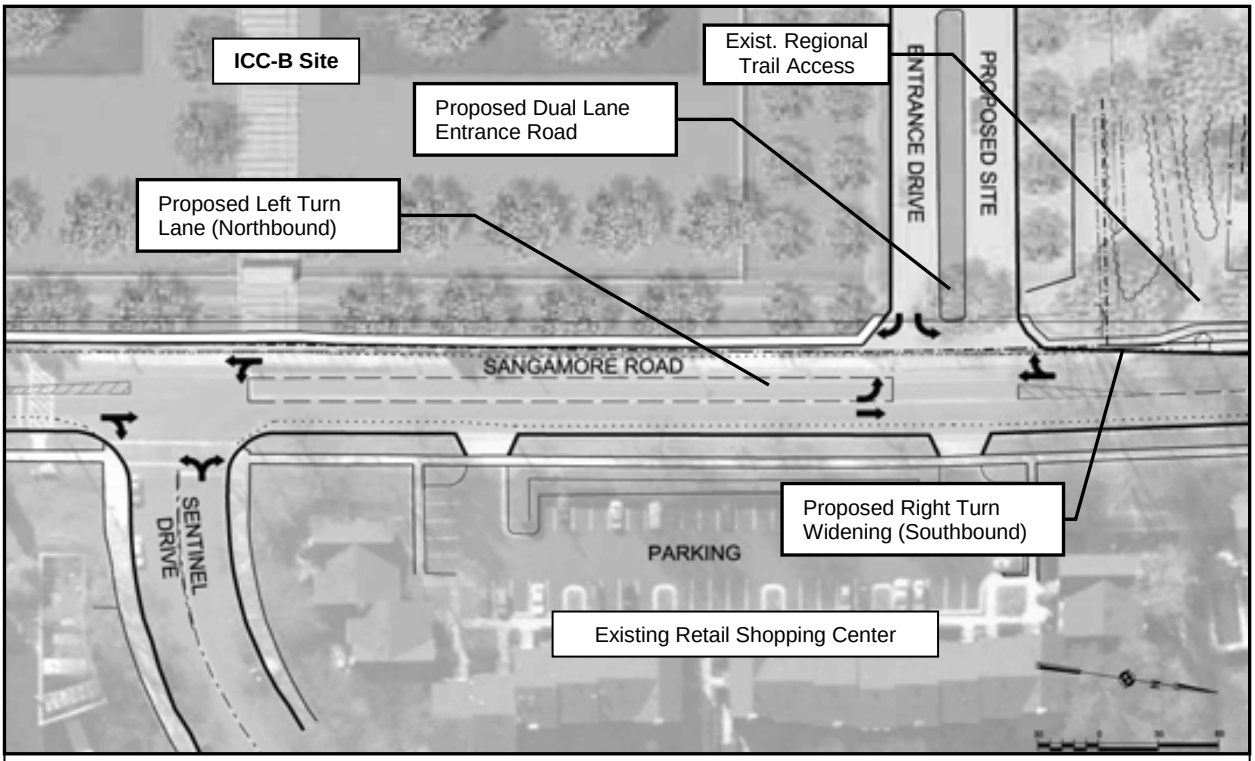

Figure 4.2: Proposed Access Improvements, ICC-B Site, 4600 Sangamore Road, (December 2010 Traffic Study).

This conceptual plan was based on detailed analysis of daily traffic flows into and out of the site and included comprehensive traffic counts and vehicle surveys for the existing facility to define future needs in relation to the surrounding infrastructure. This resulted in development of a the new 450-foot long multi-lane entrance to reduce traffic queuing impacts on Sangamore Road. The new entrance lanes will provide storage for up to 28 vehicles based on dual lane intake processing and the proposed configuration enables a third lane of intake processing as required during peak hours to further reduce off-site traffic impacts along Sangamore Road. Up to 40 vehicles can be stored in this space if required.

Key Issue:

The new entrance lanes will provide for vehicle queuing based on dual lane intake processing, and the proposed configuration enables a third lane of intake processing as required during peak hours to further reduce off-site traffic impacts along Sangamore Road. Up to 40 vehicles can be queued in this space if required. This will provide significant community and site security benefits.

The traffic analysis determined that existing roadways adjacent to the site can handle projected loads without any significant impacts once the new entry control facility is constructed. The study included an assessment of future area traffic loads based on census data and density of current developments in the area and found that the existing roadway capacities will be sufficient to handle the proposed development and future regional growth. Traffic flow analysis along Sangamore Road completed in conjunction with the proposed entryway reconfiguration indicates that even with potential site traffic counts increasing by 44 percent, local commuters traveling past the ICC-B complex will see a reduction in travel times due to removal of the existing four-way stop associated with the new entrance configuration and provision of the new dedicated left turn lane into the complex.

Within the proposed ICC-B site, transportation impacts will be very positive due to the provision of the new entrance, improved vehicle checkpoint configuration and consolidation of parking greatly improving traffic flow. The new parking facility will enable consolidation of approximately 2,200 parking spaces into a space just under 3 acres, enabling significant improvements to the existing site footprint which includes approximately 12 acres of parking currently.

Key Issue:

The proposed Parking Facility will provide approximately 400 more spaces than the current configuration which will reduce off-site parking impacts associated with current site operations. This will be a positive community benefit as a significant number of existing employees park off-site, adversely impacting area businesses and residents, particularly at the adjacent shopping center.

These proposed improvements will reduce congestion on Sangamore Road and provide improved LOS for all motorists accessing the facility and passing through the area.

4.3 Construction Phase Planning

There will be some temporary impacts to regional traffic flow during construction of the improvements, however impacts will be minimized by following standard highway safety guidelines during construction activities. Two-way traffic flow will be maintained along Sangamore Road throughout the construction period. It is anticipated that construction may require a *partial* lane closure in the southbound lane of Sangamore Road between Sentinel Drive and the proposed entrance to enable construction of the additional left-hand turn lane in this area. The west sidewalk and bike lane in this area may also be closed during the construction period, cyclists and pedestrians will be routed to the sidewalk adjacent to the northbound lane of Sangamore Road during these improvements. *Traffic impacts associated with this work will be minimal as street improvements will be scheduled to occur during planned drawdown of personnel at the site.*

On-site parking impacts associated with construction will be significant, but will be managed to reduce impact to ongoing operations. The new parking facility will be constructed at the rear of the site on the existing 3 acres of at-grade parking in this area during the operational transition period. This will result in the loss of approximately 460 on-site parking spaces during construction, but it is planned that impacts will be reduced due to the transition of staff into the new facility (i.e. peak personnel loads will not coincide with construction phasing).

4.4 Regional Transportation Coordination

The region has a robust transportation network and the proposed improvements and personnel loadings will not significantly impact area roadways or mass transit systems. The proposed redevelopment currently includes a new bus stop shelter along Sangamore Road to encourage staff utilization of mass transit but due to the length of connection times and expected mission requirements at the site, mass transit opportunities appear to be minimal for normal site commuting. ***Figure 4.3*** highlights the availability of these regional transit alternatives to the ICC-B site.

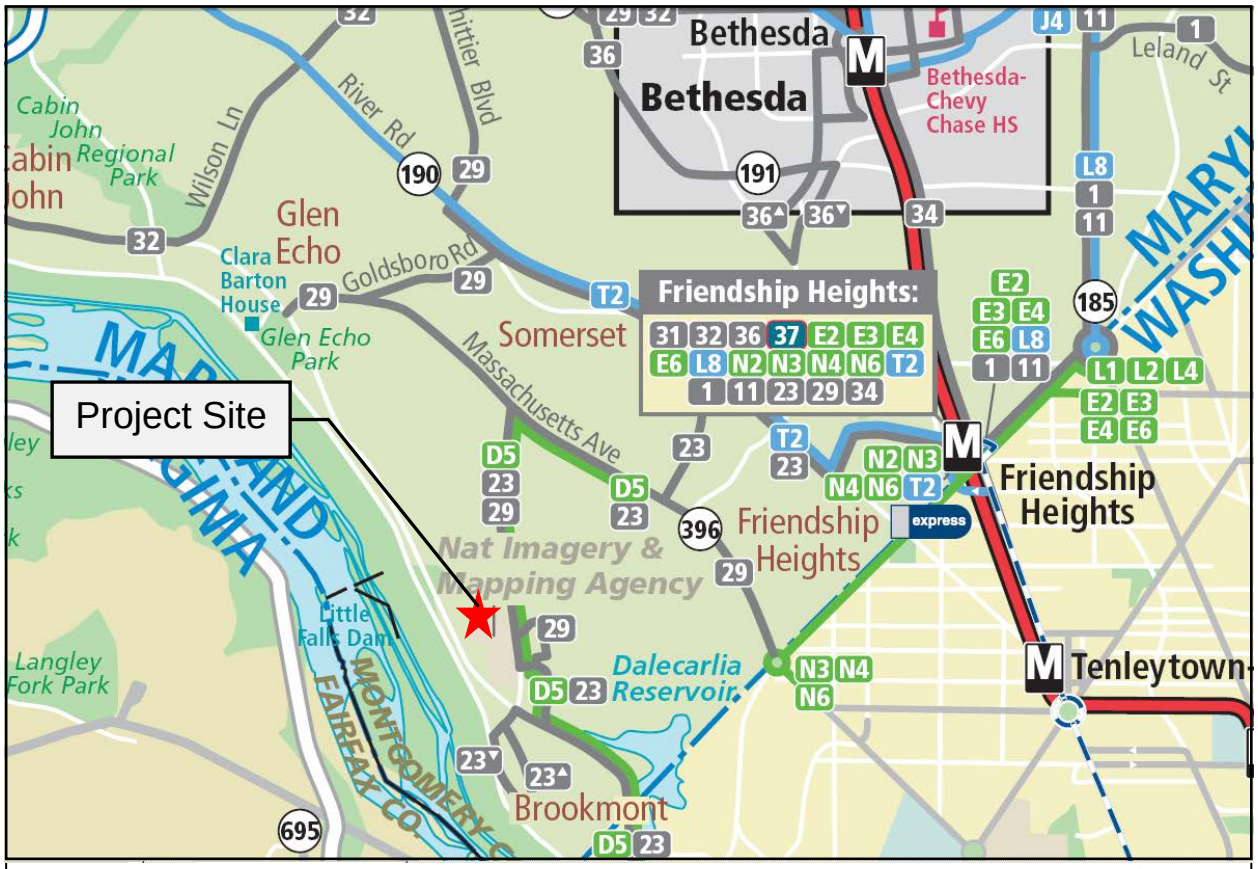

Figure 4.3: Regional Transit Mapping, Red-Line Metro to Bethesda, Bus #29 to 4600 Sangamore Road, ICC-B Site (★) (2011 WMATA Service Area Map).

In addition to the motorized means of accessing the ICC-B site, Montgomery County maintains an extensive network of walking and cycling trails nearby that will enable site employees to utilize alternative commuting methods to report to work. The Capital Crescent Trail provides connectivity from Bethesda to Georgetown via a 13 mile paved trail. This trail follows an old railroad corridor within a half mile of the ICC-B site and therefore provides an excellent profile for non-motorized commuting, ***Figure 4.4*** highlights the local connectivity of these trails to the ICC-B site.

Figure 4.4: Regional Trail Mapping, Capital Crescent Trail runs 13 miles into the center of Washington D.C.; C&O Canal Trail runs 184 miles to West Virginia, providing excellent trail coverage for the ICC-B Site. (2011, Coalition for the Capital Crescent Trail Map).

This interconnectivity to the intermodal regional transportation network significantly improves the sustainability of the ICC-B site redevelopment and will assist in meeting LEED™ objectives for the redevelopment.

Other sustainable transportation features currently considered include provision of E-Vehicle charging stations within the parking facility, assignment of choice parking locations to carpool, compact and alternate energy vehicles, bicycles and motorcycles. Internal traffic circulation will also be designed to accommodate ride-share drop-off and collection points to promote employee carpooling. Parking for up to 140 bicycles is also being integrated into the site development plan.

4.5 Future Transportation Planning

Traffic analysis of the proposed redevelopment has been focused on identified build out conditions for this site. The detailed traffic study completed in December, 2010 does not project any additional traffic loadings other than outlined herein, and notes that the existing regional development densities and corresponding traffic patterns are not likely to change during the planning period of this project. Given these analyses, the ICC-B site redevelopment is projected to improve traffic conditions around the area and will not adversely impact future regional transportation needs.

From a regional perspective, Montgomery County is actively engaged in developing transportation improvements to enable at least 37 percent of commuters to utilize alternatives to car based travel during peak commuting times. A significant component of this strategy is the recent approval of *The Purple Line* a new 16-mile east-west light rail project which will connect central Bethesda with New Carrolton just inside the eastern edge of the Capital Beltway (I-95/495) as shown in ***Figure 4.5***. It is estimated it will take ten years or more to complete this effort.

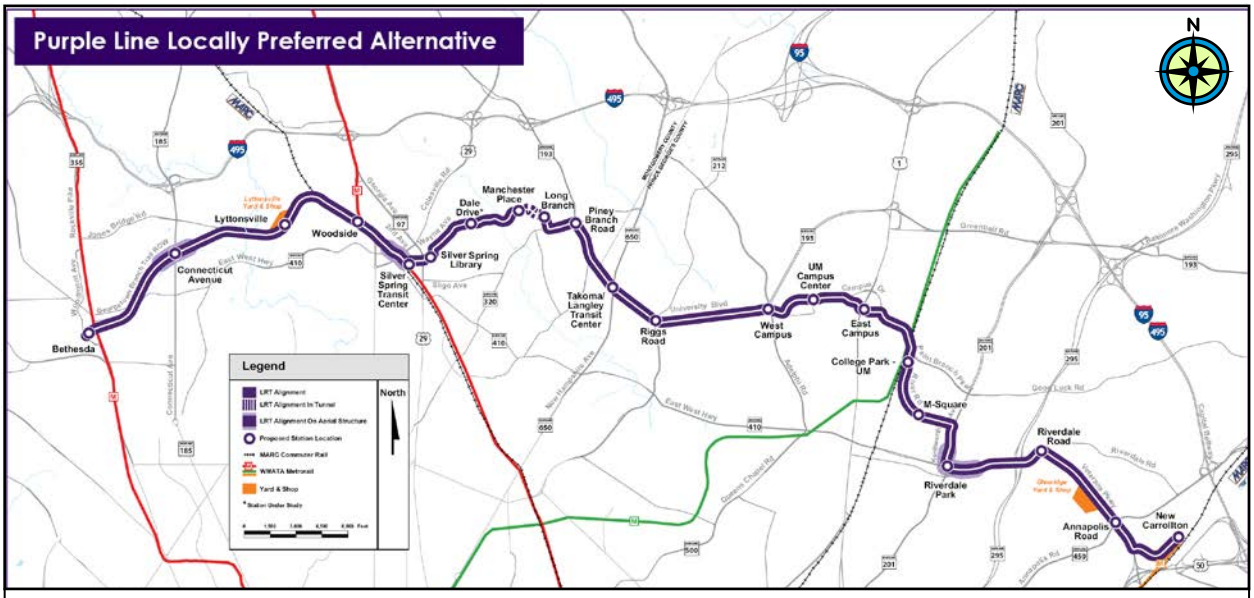

Figure 4.5: Proposed Montgomery County Light Rail Project, *The Purple Line*, (2011 MTA Project Map)

These integrated transportation options are major sustainability components for the ICC-B site and form a core basis of future transportation planning for the proposed redevelopment.

4.6 Landscape Planning

Consolidating the parking into a tiered garage enables the proposed development to restore significant green space to the front of the building consistent with regional planning objectives. Approximately 6 acres of existing site pavements will be reclaimed for landscaping under the proposed plan.

A comprehensive landscaping plan will be developed in conjunction with the proposed facilities to provide an enhanced viewshed from Sangamore Road and break up building masses. This will incorporate native

species endemic to the region to accentuate connectivity to the adjacent parkland. The new Centrum Building will be very effective in shielding the parking garage from view and the elimination of 1,800 at grade parking spots will greatly improve the site character from the core business corridor.

Overall the proposed facilities enable targeted reuse of this site in environmentally sustainable manner and the architectural concepts result in a demeanor consistent with regional planning objectives.

2011 ICC-B TMP

"A FORWARD PLAN FOR ENHANCED MOBILITY AND IMPROVED SUSTAINABILITY"
4600 SANGAMORE ROAD, BETHESDA, MARYLAND 20816

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