II. ALTERNATIVES CONSIDERED

A. I-95 Master Plan Concepts

In addition to identifying the need for four independent projects and their termini along the JFK, the I-95 Master Plan considered six conceptual highway concepts for each of the four independent projects (including the Section 200 Project), and recommended which should be carried forward. The six concepts considered represented a broad range of potential highway improvements.

1. Concept C-1: No-Build

The No-Build Concept would retain the existing I-95 highway and associated interchanges in their present configurations, and allow for routine maintenance and safety upgrades. Existing I-95 would remain four lanes in each direction from the I-895(N) split to MD 24, and three lanes in each direction from MD 24 to the Delaware State Line. Although this concept would not meet the needs of the project, it was recommended for further evaluation as a baseline for comparing other alternatives.

2. Concept C-2: All Lanes Tolled

The All Lanes Tolled Concept would require tolls on all existing and any additional travel lanes. This concept would not add any additional lanes to the JFK. This concept would include collector-distributor (C-D) lanes where needed to address capacity and safety concerns. This concept assumes four lanes per direction between I-895 and MD 24; and three lanes per direction between MD 24 and the Delaware state line.

Tolling of all lanes would be expected to increase peak hour traffic volumes on parallel routes (primarily US 40, US 1, and MD 7) by 25 to 70 percent, causing operational failures along the entire highway network. Improvements to the parallel routes could increase environmental and community impacts related to transportation needs. Based on this assessment, this concept was not recommended for further consideration.

3. Concept C-3: High Occupancy Vehicle (HOV) Lanes

This concept would include additional general purpose lanes between I-895 and I-695, one new HOV lane in each direction from MD 43 to MD 24 and one additional general purpose lane per direction north of MD 24.

HOV lanes would be expected to create an incentive for carpooling. However, in this instance, the HOV lanes may have limited value since motorists would be

required to cross 3 or more general purpose lanes in order to access the HOV lane (located adjacent to the median). The existing average auto occupancy rate on the JFK exceeds the average rate of 11 percent for other freeways with existing HOV lane.

Today, vehicles with two or more occupants within the study area comprise 12 percent to 16 percent of weekday peak-period traffic north of MD 43 and 66 percent of weekend mid-day traffic. Traffic analyses indicate that during the weekday, the peak hour/peak direction traffic in the general purpose lanes would operate at or above capacity (LOS E and LOS F) up to MD 543, while the HOV lane would operate between LOS B and LOS C. Based on this assessment, the HOV Lanes Concept was considered unable to meet the project need of improving congestion, and was therefore dismissed from further consideration.

4. Concept C-4: Reversible Lanes

This concept would include the addition of a two-lane separated and reversible roadway in the median from south of I-695 to MD 543 and one new general purpose lane per direction north of MD 543. This concept would result in a total of ten lanes - four general purpose lanes in each direction, and two reversible lanes located between the northbound and southbound lanes, separated from the general purpose lanes by median barriers. The reversible roadways could be operated as managed lanes (HOV, tolled expressway, or other) in the peak direction during weekday and weekend peak periods.

During the weekday, the peak hour/peak direction traffic in the general purpose lanes would operate at or above capacity (between LOS E and LOS F), while the reversible lanes would operate between LOS A and LOS B. During the weekend, the section south of MD 543 would operate at or above capacity (between LOS E and LOS F) in the direction in which the reversible roadway is not in operation.

It is anticipated that the Reversible Lanes Concept would work well during weekday peak periods (traffic flow is 65 percent in the peak direction); however, serious operational and maintenance concerns would arise when peak directions of flow were not established (50 percent north/50 percent south). Reversing traffic flow direction could take up to one hour for each four-mile section of roadway, and would reduce roadway capacity during flow reversal.

Since the peak traffic volumes during holidays and weekends are evenly distributed between directions, this concept would not offer the necessary flexibility for successful traffic management of regional traffic flows. In addition, extensive geometric modifications would be essential at connecting interchanges, and bridge replacement would be required, incurring substantial costs due to restricted placement opportunities for structural piers.

Based on this assessment, the Reversible Lanes Concept was found to be unable to meet the project need of reducing congestion, and was considered to be unreasonable due to extensive geometric modifications, costs when compared to the overall benefit achieved by this alternative, and time constraints required to both construct and operate the facility. This concept was therefore dismissed from further consideration.

5. Concept C-5: Managed Roadways

The Managed Roadways Concept would include the addition of two managed lanes per direction between I-895 and MD 543, and one additional general purpose lane per direction north of MD 24. From I-695 to the MD 43 Interchange, a C-D roadway, consisting of two lanes, would be added.

The managed lanes could operate under a single management strategy 24-hours per day, or on a "time-share basis" with different restrictions at different times of day. Management strategies could include restrictions at access locations (ramps), by time of day (peak/off-peak), by vehicle type (trucks/buses), by type of use (commercial/transit), or by price (tolling). Managed lanes would be designed for flexibility so that management strategies could be modified over time to maximize person-moving capacity, optimize vehicle carrying capacity, and achieve transportation and community goals.

During the weekday, the peak hour/peak direction traffic in the general purpose lanes is projected to operate at or above capacity (between LOS E and LOS F), while capacity would be available in the managed lanes, which are projected to operate between LOS A and LOS D. Modification of the management strategy to adjust the traffic split between the general purpose and managed lanes would assist in providing consistent travel times and levels of service along the managed lanes. Based on this assessment, the Managed Roadways Concept was found to meet the project needs, and was considered reasonable. This concept was therefore recommended for further consideration and evaluation.

6. Concept C-6: General Purpose Lanes

This concept would include the addition of general purpose lanes as necessary to accommodate the projected traffic demand. In order to reach a desirable weekday and weekend LOD E and LOD D, respectively, this concept would provide the following number of lanes per direction: six lanes between the I-895(N) split and I-695, five general purpose lanes and two C-D lanes between I-695 and MD 43, six lanes between MD 43 and MD 152, five lanes between MD 152 and MD 543, and four lanes north of MD 543.

This concept would provide good overall traffic operations for both weekday and weekend peak periods. However, due to the number of accessible travel lanes provided, there is no readily available means to implement a travel demand management program and limited incentive for transit or carpooling. Based upon the traffic analysis, this concept was found to meet the needs of the project, and was therefore recommended for further consideration and evaluation.

In summary, the I-95 Master Plan process resulted in the recommendation of three concepts to be carried forward into preliminary engineering analysis – No-Build, General Purpose Lanes Concept, and Managed Roadways Concept. Federal and State agencies involved in the I-95 Master Plan process (including the FHWA, EPA and the USACE) concurred in the decision to advance these concepts into preliminary engineering analysis, while eliminating the other concepts considered in the I-95 Master Plan process.

B. Consistency with the State Transportation Policy

On May 4, 2004, the Maryland Secretary of Transportation announced an ETL initiative. Under this initiative, the Secretary directed the MDOT and the Authority to consider implementing ETLs on several existing facilities in Maryland, including I-95. The ETL concept, as outlined in this initiative, involves the construction of new tolled lanes adjacent to existing free lanes. Tolls would be collected electronically, without the use of toll booths, and would vary by time of day and demand. The ETL Alternative, as defined in this EA, would allow for the use of the ETL concept.

C. Section 100

Section 100 was the first independent project identified in the I-95 Master Plan. Construction is currently underway, and is anticipated to be completed in late 2011. Section 100 involves the addition of two barrier-separated ETLs in each direction and interchange modifications at I-895, I-695 and MD 43. The southern limit of the Section 200 project will connect to the northern limit of the Section 100 project.

D. Development/Analysis of Preliminary Alternatives

The I-95 Master Plan recommended three concepts for further study, including the No-Build, General Purpose Lanes, and Managed Roadways Concepts. The recommendation to carry these three concepts was concurred upon by the FHWA, EPA, USACE, NMFS, MDE, and DNR during the development of the I-95 Master Plan. Additional agency concurrence was also provided at that time for the purpose and need for the I-95 improvements and the termini, included in the *Description for Logical Termini* dated July 2001, for all four independent projects.

The No-Build, General Purpose Lanes, and Managed Roadways I-95 Master Plan Concepts were further evaluated by the Authority during the initial stage of the Section 200 project planning study. In addition to the two mainline preliminary Build Alternatives developed during this planning study, interchange options were developed for the four interchanges in the study area for each Build Alternative. The preliminary alternatives and interchange options outlined below were presented to the public during a series of focus group meetings and a public workshop held on June 22, 2006. Additional details regarding these alternatives can be found in the *Alternatives Retained for Detailed Study (ARDS) Report* prepared for this project.

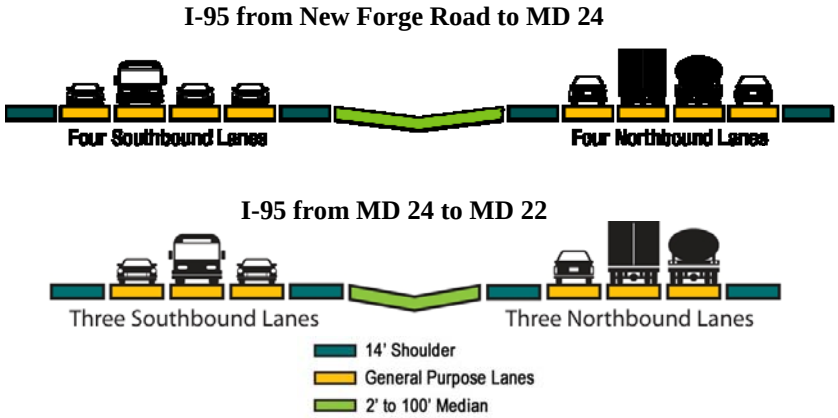
Interchange options were compared based on the analysis of: 1) operations/LOS; 2) design standards/exceptions; 3) environmental impacts; 4) displacements; 5) major utility involvement; 6) maintenance of traffic; 7) construction costs; and 8) maintenance considerations. These criteria were used to reduce the number of preliminary options selected for detailed study. The following summarizes why options were selected and dropped from detailed study. For more detailed information about each Option, please refer to the *Alternatives Retained for Detailed Study Report*.

1. No-Build Alternative

The No Build alternative maintains I-95 and the existing interchanges the same as they are today. Under this alternative, I-95 in each direction would maintain:

- Four GPLs from north of MD 43 to MD 24,
- Three GPLs from MD 24 to the project limits north of MD 22.

Figure II-1. No-Build Alternative - Typical Roadway Section



Under the No-Build Alternative the existing interchanges will remain the same. Routine maintenance and safety upgrades would be done as needed.

No Build Interchange Analysis

- I-95/MD 152 Interchange: Diamond
- I-95/MD 24 Interchange: Partial Cloverleaf – Triple Loop

Necessary traffic and safety improvements to the MD 24 interchange were identified prior to the Section 200 project. These improvements were broken into two phases, with phase 1 being constructed prior to Section 200. The phase 1 improvements were designed to minimize improvements that would be lost from the Section 200 improvements, minimize delay to motorists along I-95 and provide cost effective interim improvements that could be transitioned to the Section 200 improvements. The scheduled completion of the phase 1 improvements is 2010. The phase 1 improvements will address the following issues: back-ups that occur along I-95 northbound with traffic exiting onto MD 24, congestion at the MD 24 intersection with MD 924/Tollgate Road, and the weave movement from I-95/MD 24 ramps to Tollgate Road.

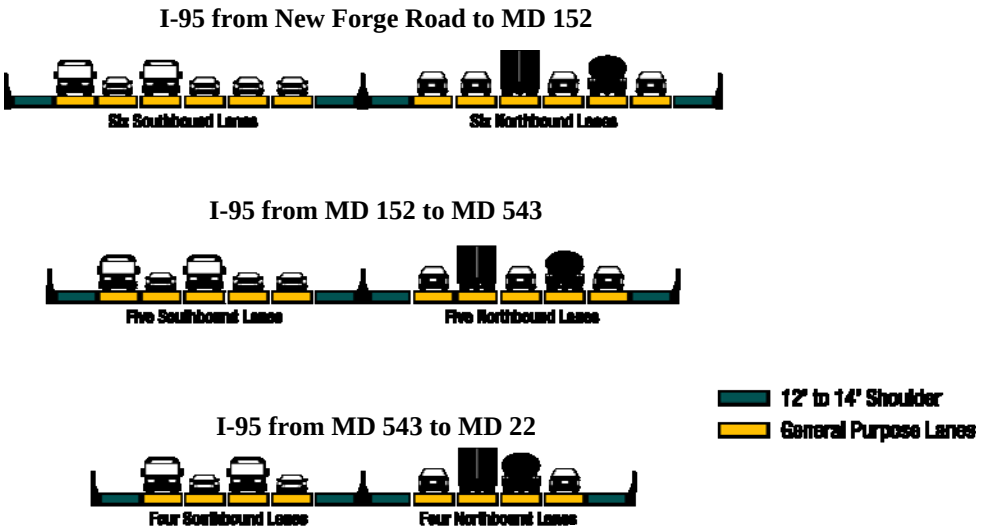
- I-95/MD 543 Interchange: Diamond
- I-95/MD 22 Interchange: Partial Cloverleaf – Double Loop

2. General Purpose Lanes Alternative

Additional General Purpose Lanes (GPLs) would be added to I-95 to accommodate the projected increase in traffic. Under this alternative, I-95 in each direction would have:

- Six GPLs from north of MD 43 to MD 152,
- Five GPLs between MD 152 and MD 543, and
- Four GPLs from MD 543 to the project limits north of MD 22.

Figure II-2 – General Purpose Lane Alternative - Typical Roadway Section



General Purpose Lanes Alternative Interchange Options

a. I-95/MD 152 Interchange

- Option 1: Diamond
- Option 2: Tight Diamond
- Option 3: Single Point Urban Diamond
- Option 4: Partial Cloverleaf – Single Loop
- Option 5: Partial Cloverleaf – Double Loop

Analysis:

- Options 1 and 4 were carried forward for detailed study. Option 1 provides a minimal footprint, therefore reducing environmental impacts. It also provides similar LOS as the other options that have higher construction costs and more environmental impacts. Option 4 was also carried forward. This option addressed the future traffic demands with a satisfactory LOS and presented minimal environmental impacts.
- Option 2 was dropped due to failing level-of service (LOS F) for the year 2030.
- Option 3 was dropped due to sufficient deficiencies in constructability and also had some traffic operational issues.
- The Option 5 double loops had a considerable amount of environmental impacts associated with them, as well as some residential displacements. The LOS for Option 5 was no better than Options 1 and 4, therefore Option 5 was dropped.

b. I-95/MD 24 Interchange

- Option 1: Modifications to structure and ramps
- Option 2: MD 24/MD 924 Flyover Ramp

Analysis:

- Option 1 was dropped from further consideration because it was no longer compatible with the Phase 1 interchange improvements being constructed at the I-95/MD 24/MD 924 Interchange.
- Option 2 is the most efficient option in addressing the capacity and safety issues at this interchange. Option 2's engineering and constructability is the most compatible with the recent improvements at the I-95/MD 24/MD 924 Interchange that is currently under construction.

c. I-95/MD 543 Interchange

- Option 1: Diamond
- Option 2: Tight Diamond

- Option 3: Single Point Urban Diamond
- Option 4: Partial Cloverleaf – Single Loop
- Option 5: Partial Cloverleaf – Triple Loop with CD Roads
- Option 6: Partial Cloverleaf – Double Loop
- Option 7: Partial Cloverleaf – Single Loop

Analysis:

- Options 1 and 7 were carried forward for detailed study. These options best address the future traffic capacity needs, while maintaining a relatively small footprint, thereby reducing environmental impacts.
- Option 2 was dropped due to failing LOS F for the year 2030.
- Option 3 was also dropped due to a failing LOS F for 2030, and future maintenance would also impact the capacity of this option.
- Option 4 was dropped from further consideration due to significant commercial displacements, while not providing any additional benefits in LOS over the other options.
- Option 5 was dropped because of its large footprint that would result in additional environmental and socioeconomic impacts.
- Option 6 was dropped due to the extensive environmental impacts and construction costs associated with a loop ramp, which is not necessary to achieve an acceptable LOS.

d. I-95/MD 22 Interchange

- Option 1: Partial Cloverleaf – Double Loop with Modifications to CD roads

Analysis:

- Option 1 would maintain the existing partial cloverleaf configuration with no modifications. There will be some minor improvements, but the overall existing interchange will remain the same.

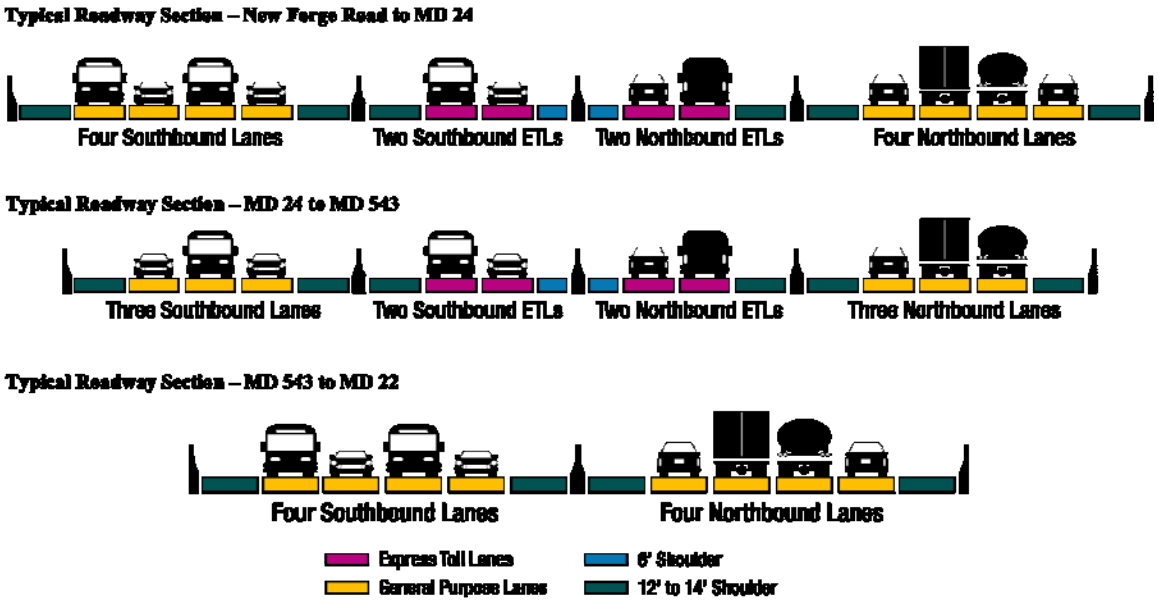
The Maryland House Travel Plaza will not be affected by the General Purpose Lanes Alternative. Existing access to the Maryland House Travel Plaza is a left in and left out along the northbound and southbound lanes. The design of the General Purpose Lanes Alternative will not change the access to the travel plaza. Also, all widening of I-95 for the one additional GPL in this section will be towards the outside, therefore there will be no impacts to the property.

3. Express Toll Lanes Alternative

The Express Toll Lanes Alternative includes:

- Two ETLs and four GPLs from north of MD 43 to north of MD 543.
- Four GPLs from MD 543 to project limits north of MD 22.

Figure II-3 Express Toll Lane Alternative - Typical Roadway Section



Express Toll Lane Interchange Options

a. I-95/MD 152 Interchange

- Option 1A: Diamond with ETL Median Access Ramps
- Option 1B: Diamond with ETL Flyover Access Ramps
- Option 2: Tight Diamond with ETL Flyover Access Ramps
- Option 3: Single Point Urban Diamond with ETL Flyover Access Ramps
- Option 4A: Partial Cloverleaf – Single Loop with ETL Median Access Ramps
- Option 4B: Partial Cloverleaf – Single Loop with ETL Flyover Access Ramps
- Option 5A: Partial Cloverleaf – Double Loop with ETL Median Access Ramps
- Option 5B: Partial Cloverleaf – Double Loop with ETL Flyover Access Ramps

Analysis:

- Option 1A provides the capacity needed for the 2030 traffic volumes while maintaining a footprint that has relatively minor environmental impacts compared to the other Options. Option 1A was retained for detailed study.
- Option 1B was dropped due to the extensive environmental impacts and impacts to parkland. Also, the traffic operations for Option 1B were not as efficient as other Options retained for detailed study.
- Option 2 was dropped due to a failing LOS for 2030 traffic and extensive environmental impacts.
- Option 3 was dropped because the flyover ramps would result in extensive environmental impacts and very high construction cost. Also, maintenance of the bridges in the interchange would be very difficult.
- Option 4A provides the necessary operations to serve future traffic volumes while both minimizing environmental impacts and keeping construction costs minimal compared to other Options for this interchange. Option 4A was retained for detailed study.
- Options 4B and 5A had significant amount of environmental impacts and residential displacements. They had the same LOS as other Options retained that have less environmental impacts, therefore these options were dropped.
- Option 5B was dropped because the loop ramps caused a significant amount of environmental impacts and residential displacements.

b. I-95/MD 24 Interchange

- Option 1: Partial Cloverleaf – Double Loop with ETL Flyover Access Ramps
- Option 2: MD 24/MD 924 Flyover Ramp with ETL Median Access Ramps

Analysis:

- Option 1 was dropped from further consideration because it was no longer compatible with the Phase 1 interchange improvements being constructed at the I-95/MD 24/MD 924 Interchange.
- Option 2 is the most efficient option in addressing the capacity and safety issues at this interchange. Option 2's engineering and constructability is the most compatible with the recent improvements at the I-95/MD 24/MD 924 Interchange that is currently under construction.

c. I-95/MD 543 Interchange

- Option 1A: Diamond with ETL Median Access Ramps
- Option 1B: Diamond with ETL Flyover Access Ramps

- Option 2: Tight Diamond with ETL Flyover Access Ramps
- Option 3: Single Point Urban Diamond with ETL Flyover Access Ramps
- Option 4A: Partial Cloverleaf – Single Loop with ETL Median Access Ramps
- Option 4B: Partial Cloverleaf – Single Loop with ETL Flyover Access Ramps
- Option 5A: Partial Cloverleaf – Triple Loop with ETL Median Access Ramps
- Option 5B: Partial Cloverleaf – Triple Loop with ETL Flyover Access Ramps
- Option 6A: Partial Cloverleaf – Double Loop with ETL Median Access Ramps
- Option 6B: Partial Cloverleaf – Double Loop with ETL Flyover Access Ramps
- Option 7: Partial Cloverleaf – Single Loop with ETL Median Access Ramps

Analysis:

- Option 1A was dropped because it had a failing LOS for 2030 traffic.
- Option 1B was dropped due to extensive environmental impacts associated with the flyover ramps.
- Option 2 has a failing LOS in 2030 and extensive environmental impacts.
- Option 3 was dropped because it had a failing LOS for 2030 traffic.
- Options 4A and 6A were dropped due to the commercial displacements associated with the proposed loop ramp in the northeast quad. These Options did not provide a better LOS than Option 7.
- Option 4B was dropped due to extensive environmental impacts, including impacts to the Bush Declaration Area.
- Options 5A, 5B, and 6B were dropped because they had commercial displacements, impacts to the Bush Declaration Area, extensive stream and forest impacts. These Options didn't provide a better LOS than Option 7.
- Option 7 was retained for detail study. Option 7 address the 2030 traffic operation needs, has less environmental impacts than other Options for this interchange, and has lower construction costs than other options that provide the same benefits at this interchange.

d. I-95/MD 22 Interchange

- Option 1: Partial Cloverleaf – Double Loop with Modifications to CD roads

Analysis:

- Option 1 would maintain the existing partial cloverleaf configuration with no modifications. There will be some minor improvements, but the overall existing interchange will remain the same.

The Maryland House Travel Plaza will not be affected by the Express Toll Lanes Alternative. Existing access to the Maryland House Travel Plaza is a left in and left out along the northbound and southbound lanes. The current design of the Express Toll Lanes Alternative has ETLs terminating at MD 543, south of the travel plaza. Therefore, there will be no changes made to the access of the travel plaza. Also, all widening of I-95 for the one additional GPL in this section will be towards the outside, therefore there will be no impacts to the property.

E. Alternatives Recommended for Detailed Study

The public was given the opportunity to provide feedback on the preliminary alternatives, including interchange options, during several focus group meetings and a Public Workshop held on June 22, 2006. Based upon public feedback, engineering traffic analysis, right-of-way impacts, and environmental impacts for each option, the viability of the alternatives was evaluated and it was determined which options would be carried forward and which option would be dropped. The following are descriptions of the mainline alternatives, as well as the interchange options that have been carried forward for detailed study.

1. No-Build Alternative

The No-Build Alternative would retain the existing I-95 highway, and allow for maintenance improvements and safety upgrades. Some of the improvements and upgrades associated with the No-Build Alternative include the replacement of bridge decks, resurfacing of pavement, and replacement and upgrades of traffic barriers, signs and lights. There would be no increase in roadway capacity and an increase in congestion and accidents would likely occur. The No-Build option for each interchange has been retained for further study.

2. General Purpose Lanes Alternative

This alternative would include additional GPLs to accommodate the projected traffic demand. Improvements would be proposed along the mainline of I-95 from north of MD 43 to north of MD 22 and at the MD 152, MD 24, MD 543 and MD 22 interchanges.

This concept would tie four GPLs and two ETLs in each direction at New Forge Road from Section 100 into six GPLs in each direction from New Forge Road to the MD 24 interchange. From the MD 24 interchange to the MD 543 interchange, there would be

five GPLs in each direction and from the MD 543 interchange to north of MD 22, there would be four GPLs in each direction. At the northern limit of Section 200, the four GPLs would merge to tie into the existing three GPLs in each direction.

a. Interchange Options

I-95/MD 152 Interchange Option 1: Diamond (Figure II-4)
This option would consist of a diamond interchange. Two full traffic signals would be maintained with this option similar to existing conditions. This option incorporates cul-de-sacs to eliminate direct access from Old Mountain Road into the interchange ramp area. The Old Mountain Road bridge over I-95 would be removed and not need to be replaced.

The I-95 northbound approach would consist of six lanes. A two-lane diagonal ramp would lead to MD 152 northbound and southbound. A one-lane diagonal ramp from MD 152 would merge into I-95 northbound. Six I-95 northbound lanes would continue north of the interchange.

The I-95 southbound approach would consist of six lanes. A one-lane diagonal ramp would lead to MD 152 northbound and southbound. A two-lane diagonal ramp from MD 152 would merge into I-95 southbound, south of the interchange.

Two through lanes would generally be provided on MD 152, with additional turn lanes at the interchange ramps.

I-95/MD 152 Interchange Option 4: Partial Cloverleaf – Single Loop (Figure II-5)
This option would include a diamond interchange with the addition of a single loop ramp from northbound I-95 to northbound MD 152. Two full traffic signals would be maintained with this option similar to existing conditions. This option incorporates cul-de-sacs to eliminate direct access from Old Mountain Road into the interchange ramp area. The Old Mountain Road bridge over I-95 would be removed and not need to be replaced.

The I-95 northbound approach would consist of six lanes. A one-lane diagonal ramp would lead to MD 152 southbound, followed by a one-lane loop ramp to MD 152 northbound. Six I-95 northbound lanes would continue north of the interchange.

The I-95 southbound approach would consist of six lanes. A one-lane diagonal ramp would lead to MD 152. A two–lane diagonal ramp from MD 152 would merge into I-95 southbound, south of the interchange.

Two through lanes would generally be provided on MD 152, with additional turn lanes at the interchange ramps.

I-95/MD 24 Interchange Option 2: Flyover for MD 24/MD 924 (Figure II-6)
This option would be a combination partial cloverleaf/directional configuration, with loops in the northwest and southwest quadrants, and a flyover ramp from northbound I-95 to northbound MD 24/MD 924/Tollgate Road. One half traffic signal along MD 24 northbound would provide access for the I-95 northbound on ramp. One half traffic signal along MD 24 southbound would provide access for the I-95 southbound off- ramp.

The I-95 northbound approach would consist of six lanes. A three-lane directional flyover ramp would lead to MD 24/MD 924/Tollgate Road. This ramp would split before crossing I-95, with one lane to MD 24 southbound, and two lanes crossing I-95 to northbound MD 24/MD 924/Tollgate Road. This directional flyover ramp would then split again, with one lane to MD 24 northbound and one lane leading to MD 924/Tollgate Road. Five I-95 northbound lanes would continue north to MD 543.

The I-95 southbound approach would consist of five lanes. The I-95 southbound approach would add a one-lane C-D roadway. A one-lane outer connection ramp would lead to MD 924/Tollgate Road. The loop ramp in the southwest quadrant would lead to MD 24. The loop ramp in the northwest quadrant would serve traffic from MD 24 northbound to I-95 southbound. The one-lane C-D roadway would then merge into I-95 southbound. A two-lane outer connection ramp from MD 24 Southbound/MD 924/Tollgate would merge to form a sixth lane added to I-95 southbound.

Three through lanes would generally be provided on MD 24, with additional lanes added or dropped at interchange ramps. A braided ramp system would be constructed along MD 24 northbound and southbound between I-95 and the MD 924/Tollgate Road interchange.

I-95/MD 543 Interchange Option 1: Diamond (Figure II-7)
This option consists of a diamond interchange. Two full traffic signals would be included with this option similar to existing conditions.

The I-95 northbound approach would consist of five lanes. A two-lane diagonal ramp would lead to MD 543 northbound and southbound with the fifth lane of I-95 northbound dropping at this ramp. A one-lane diagonal ramp from MD 543 would merge into I-95 northbound. Four I-95 northbound lanes would continue north to MD 22.

The I-95 southbound approach would consist of four lanes. A one-lane diagonal ramp would lead to MD 543 northbound and southbound. A two-lane diagonal ramp from MD 543 would merge to form a fifth added lane to I-95 southbound.

Two through lanes would generally be provided on MD 543, with additional turn lanes at the interchange ramps.

I-95/MD 543 Interchange Option 7: Partial Cloverleaf – Single Loop (Figure II-8)

This option would include a diamond interchange with the addition of a single loop ramp from northbound MD 543 to southbound I-95. Two full traffic signals would be included with this option similar to existing conditions.

The I-95 northbound approach would consist of five lanes. A two-lane diagonal ramp would lead to MD 543 northbound and southbound with the fifth lane of I-95 northbound dropping at this ramp. A one-lane diagonal ramp from MD 543 would merge into I-95 northbound. Four I-95 northbound lanes would continue north to MD 22.

The I-95 southbound approach would consist of four lanes. A one-lane outer connection ramp would lead to MD 543 northbound and southbound. The loop ramp in the northwest quadrant would serve traffic from MD 543 northbound to I-95 southbound adding the fifth lane on I-95 southbound. A single-lane diagonal ramp from MD 543 southbound would merge into I-95 southbound.

Two through lanes would generally be provided on MD 543, with additional turn lanes at the interchange ramps.

I-95/MD 22 Interchange Option 1: Partial Cloverleaf – Double Loop with Modifications to CD roads (Figure II-9)

This option would maintain the existing partial cloverleaf configuration with no modifications. The existing interchange contains loops in the northwest and southeast quadrants. One full traffic signal along MD 22 provides access for the I-95 northbound off-ramp. One full traffic signal along MD 22 provides access for the I-95 southbound off-ramp. I-95 through the interchange would consist of four GPLs in each direction.

The existing I-95 northbound approach provides a one-lane C-D roadway. A one-lane ramp then leads to MD 22. The existing I-95 southbound approach provides a one-lane C-D roadway. A one-lane ramp then leads to MD 22.

Two through lanes are generally provided on the existing MD 22, with additional turn lanes at the interchange ramps.


General Purpose Lanes
Option 1
CLAYTON ROAD
CONSERVATION AREA
152
95
INTERSTATE
7
TRINITY
CHURCH
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE / OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE RIGHT-OF-WAY LINE
FIREHOUSE
CHURCH

Figure II-4


General Purpose Lanes
Option 4
CLAYTON ROAD
CONSERVATION AREA
TRINITY
CHURCH
JOPPA-MAGNOLIA
FOX
STA
INTERSTATE
95
MARYLAND
152
MARYLAND
7
TAYLOR SEWELL
ROAD
PENNSBURY VILLE ROAD
DUGAN
DRIVE
STAHL
ROAD
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE /
OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE
RIGHT-OF-WAY LINE
FIREHOUSE
CHURCH

Figure II-5

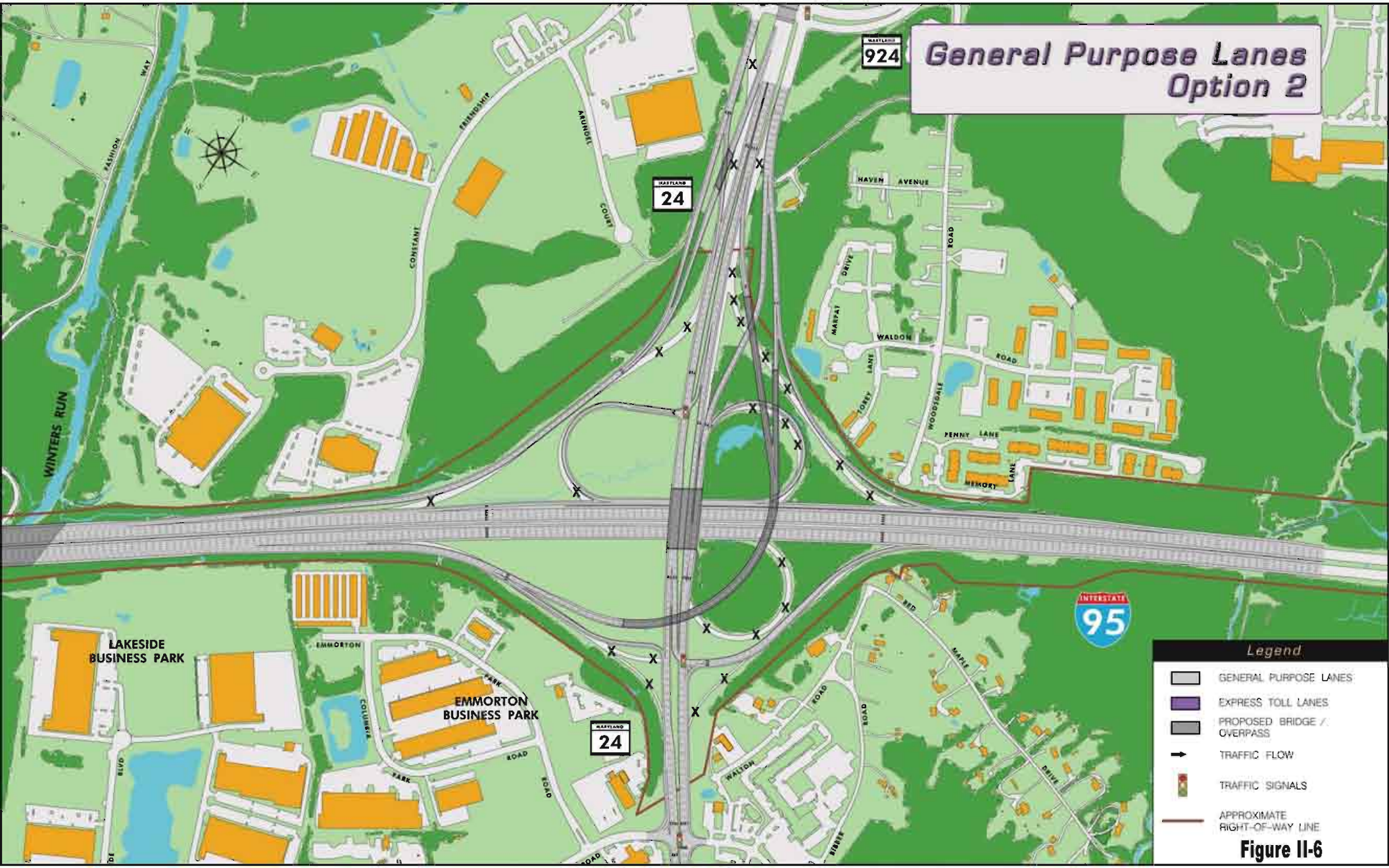

General Purpose Lanes
Option 2
924
24
24
95
INTERSTATE
MARYLAND
WINTERS RUN
FRIENDSHIP
ARUNDEL
COURT
CONSTANT
HAVEN AVENUE
WALDON
ROAD
DRIVE
MARPAT
LANE
TOREY
WOODSDALE
PENNY LANE
MEMORY
LANE
LAKESIDE
BUSINESS PARK
EMMORTON
EMMORTON
BUSINESS PARK
PARK
COLUMBIA
BLVD
ROAD
WALTON
ROAD
MAPLE
ROAD
DRIVE
BIRDIE
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE / OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE RIGHT-OF-WAY LINE

Figure II-6


General Purpose Lanes
Option 1
JAMES RUN
MARYLAND
543
INTERSTATE
95
BUSH DECLARATION
NATURAL RESOURCES
MANAGEMENT AREA
MARYLAND
7
VILLAGE OF
CHURCH CREEK
CRESWELL ROAD
OLD PHILADELPHIA ROAD
CANDLE DRIVE
GOLDEN ROD COURT
PRIMROSE PLACE
SANFORD COURT
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE / OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE RIGHT-OF-WAY LINE
CHURCH

Figure II-7


General Purpose Lanes
Option 7
JAMES RUN
MARYLAND
543
INTERSTATE
95
MARYLAND
7
BUSH DECLARATION
NATURAL RESOURCES
MANAGEMENT AREA
VILLAGE OF
CHURCH CREEK
CREWELL ROAD
EARLEIGH HEIGHTS ROAD
HANDLEY DRIVE
OLD PHILADELPHIA ROAD
BELLCAMP ROAD
GOLDEN ROD COURT
PRIMROSE DRIVE
MARIGOLD LANE
BAWE DRIVE
DALMATION DRIVE
BRISTOL FOREST
SANFORD COURT
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE / OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE RIGHT-OF-WAY LINE
CHURCH

Figure II-8


General Purpose Lanes
Option 1
MARYLAND
22
RIPKEN
YOUTH BASEBALL
ACADEMY
RIPKEN
STADIUM
INTERSTATE
95
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE /
OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE
RIGHT-OF-WAY LINE

Figure II-9

3. Express Toll Lane Alternative

This alternative would include adding ETLs to the existing GPLs to accommodate the projected traffic demand. This alternative would extend the typical section of Section 100 from just north of the MD 43 interchange to the MD 24 interchange. This typical section consists of four GPLs and two ETLs in each direction. From MD 24 to MD 543, three existing GPLs would be retained, providing three GPLs and two ETLs in each direction. The ETLs would terminate at MD 543 providing four GPLs to the project limits north of MD 22. Improvements would be proposed at the MD 152, MD 24, and MD 543 interchanges. At the northern limit of Section 200, the four GPLs will merge to tie into the existing three GPLs in each direction.

a. Interchange Options

I-95/MD 152 Interchange Option 1A: Diamond with ETL Median Access Ramps (Figure II-10)

This option would consist of a diamond interchange. The interchange includes median ETL ramp access to MD 152. Two full traffic signals would serve I-95 GPL ramp traffic and one full traffic signal would serve I-95 ETL ramp traffic. This option incorporates cul-de-sacs to eliminate direct access from Old Mountain Road into the interchange ramp area. The Old Mountain Road Bridge over I-95 would be removed and would not be replaced.

The I-95 northbound approach would consist of four GPLs and two ETLs through the interchange. A one-lane diagonal GPL ramp would lead to MD 152 northbound and southbound. Access to the I-95 GPL northbound lanes from MD 152 would be provided via a one lane diagonal ramp. A one-lane, left-side median ETL ramp would connect I-95 northbound ETLs to MD 152 northbound and southbound. A one-lane, left-side median ETL ramp would lead to the I-95 northbound ETLs.

The I-95 southbound approach would consist of four GPLs and two ETLs through the interchange. A one-lane diagonal GPL ramp would lead to MD 152 northbound and southbound. Access to the I-95 GPL southbound lanes from MD 152 would be provided via a two lane diagonal ramp. One-lane, left-side median ETL ramps would connect I-95 southbound ETLs to MD 152 northbound and southbound. A one-lane, left-side median ETL ramp would lead to the I-95 southbound ETLs.

Two through lanes would generally be provided on MD 152, with additional turn lanes at the interchange ramps.

I-95/MD 152 Interchange Option 4A: Partial Cloverleaf – Single Loop with ETL Median Access Ramps (Figure II-11)

This option would include a diamond interchange, with a single loop ramp from northbound I-95 to northbound MD 152. The interchange includes median ETL ramp access to MD 152. Two full traffic signals would serve I-95 GPL ramp traffic and one full traffic signal would serve I-95 ETL ramp traffic. This option incorporates cul-de-sacs to eliminate direct access from Old Mountain Road into the interchange ramp area. The Old Mountain Road Bridge over I-95 would be removed and would not be replaced.

The I-95 northbound approach would consist of four GPLs and two ETLs through the interchange. A one-lane diagonal GPL ramp would lead to MD 152 southbound, followed by a one-lane loop GPL ramp to MD 152 northbound. A one-lane, left-side median ETL ramp would lead to MD 152. A one-lane, left-side median ETL ramp would lead to the I-95 northbound ETLs.

The I-95 southbound approach would consist of four GPLs and two ETLs through the interchange. A one-lane diagonal GPL ramp would lead to MD 152 northbound and southbound. A two-lane diagonal ramp from MD 152 would merge into I-95 GPL southbound. One-lane, left-side median ETL ramps would connect I-95 southbound ETLs to MD 152 northbound and southbound. A one-lane, left-side median ETL ramp would lead to the I-95 southbound ETLs.

Two through lanes would generally be provided on MD 152, with additional turn lanes at the interchange ramps.

I-95/MD 24 Interchange Option 2: MD 24/MD 924 Flyover Ramp with ETL Median Access Ramps (Figure II-12)

This option would be a combination partial cloverleaf/directional configuration, with a single loop in the southwest quadrant, and a flyover ramp. One half traffic signal along MD 24 northbound would provide access for the I-95 northbound GPL on-ramp. One full traffic signal along MD 24 would provide access for the I-95 northbound and southbound ETL median access ramps. One half traffic signal along MD 24 southbound would provide access for the I-95 southbound GPL on- and off-ramps.

The I-95 northbound GPL approach would consist of four lanes. A two-lane flyover ramp would lead to MD 24/MD 924/Tollgate Road. This ramp would split, with one lane to MD 24 southbound, and two lanes crossing I-95 to MD 24 northbound/MD 924/Tollgate Road. This ramp would then split again, with one lane leading to MD 24 northbound and one lane to MD 924/Tollgate Road. Three I-95 northbound GPLs would continue north to MD 543. The I-95 northbound ETL approach would consist of two lanes. A one-lane, left-side median ETL ramp would lead to MD 24. A one-lane, left-side median ETL ramp would lead

to the I-95 northbound ETLs. Two I-95 northbound ETLs would continue north to MD 543.

The I-95 southbound GPL approach would consist of three lanes. The I-95 southbound approach would add a one-lane distributor roadway. A one-lane outer connection ramp would lead to MD 924/Tollgate Road. The one-lane far side loop ramp would then lead to MD 24. An outer connection ramp from MD 24/MD 924/Tollgate Road would add a lane to I-95 southbound and four GPLs would continue south to MD 152. The I-95 southbound ETL approach would consist of two lanes. A one-lane, left-side median ETL ramp would lead to MD 24. A one-lane, left-side median ETL ramp would lead to the I-95 southbound ETLs. Two I-95 southbound ETLs would continue south to MD 152.

Three through lanes would generally be provided on MD 24, with additional turn lanes at the interchange ramps. A braided ramp system would be constructed along MD 24 northbound and southbound between I-95 and the MD 924/Tollgate Road interchange.

I-95/MD 543 Interchange Option 7: Partial Cloverleaf – Single Loop with ETL Median Access Ramps (Figure II-13)

This option would include a diamond interchange with the addition of a single loop ramp from northbound MD 543 to southbound I-95. Two full traffic signals on either side of the interchange would provide access for I-95 GPL ramps. One full traffic signal along MD 543 would serve I-95 ETL median access ramps.

The I-95 northbound approach would consist of three lanes. A two-lane diagonal ramp would lead to MD 543. A one-lane diagonal ramp from MD 543 would merge onto I-95 northbound. The I-95 northbound ETL approach would consist of two lanes. The left-hand ETL would drop at the one-lane median access ramp to MD 543. One I-95 northbound ETL would join three GPLs to carry four GPLs north to MD 22.

The I-95 southbound GPL approach would consist of four lanes. The left GPL would drop into the I-95 southbound ETLs and three GPLs would continue south to MD 24. A one-lane outer connection ramp would lead to MD 543. The loop ramp in the northwest quadrant would serve traffic from MD 543 northbound to I-95 southbound. A one-lane diagonal ramp from MD 543 southbound would merge on to I-95 southbound. A one-lane, left-side median ETL ramp would lead to the I-95 southbound ETLs. Two I-95 southbound ETLs would continue south to MD 24.

Two through lanes would generally be provided on MD 543, with additional turn lanes at the interchange ramps.

I-95/MD 22 Interchange Option 1: Partial Cloverleaf – Double Loop with Modifications to CD roads (Figure II-14)

This option would maintain the existing partial cloverleaf configuration with no modifications. The existing interchange contains loops in the northwest and southeast quadrants. One full traffic signal along MD 22 provides access for the I-95 northbound off-ramp. One full traffic signal along MD 22 provides access for the I-95 southbound off-ramp. I-95 through the interchange would consist of four GPLs in each direction.

The existing I-95 northbound approach adds a one-lane C-D roadway. A one-lane ramp then leads to MD 22. The existing I-95 southbound approach adds a one-lane C-D roadway. A one-lane ramp then leads to MD 22.

Two through lanes are generally provided on the existing MD 22, with additional turn lanes at the interchange ramps.


Express Toll Lanes
Option 1A
CLAYTON ROAD
CONSERVATION AREA
MARYLAND
152
INTERSTATE
95
TRINITY
CHURCH
MARYLAND
7
JOPPA-MAGNOLIA
CO
STA
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE /
OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE
RIGHT-OF-WAY LINE
FIREHOUSE
CHURCH

Figure II-10


Express Toll Lanes
Option 4A
MARYLAND
152
INTERSTATE
95
CLAYTON ROAD
CONSERVATION AREA
TRINITY
CHURCH
MARYLAND
7
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE / OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE RIGHT-OF-WAY LINE
FIREHOUSE
CHURCH

Figure II-11


Express Toll Lanes
Option 2
924
24
24
95
INTERSTATE
WINTERS RUN
LAKESIDE
BUSINESS PARK
EMMORTON
BUSINESS PARK
HAVEN AVENUE
WALDON ROAD
PENNY LANE
MEMORY LANE
WOODSDALE
MARFAT DRIVE
TOBEY LANE
CONSTANT FRIENDSHIP WAY
ARUNDEL COURT
EMMORTON PARK ROAD
COLUMBIA PARK ROAD
LAKESIDE BLVD
WALTON ROAD
RIDER ROAD
REID MAPLE ROAD DRIVE
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE / OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE RIGHT-OF-WAY LINE

Figure II-12


Express Toll Lanes
Option 7
JAMES RUN
MARYLAND
543
INTERSTATE
95
BUSH DECLARATION
NATURAL RESOURCES
MANAGEMENT AREA
MARYLAND
7
VILLAGE OF
CHURCH CREEK
CRESWELL ROAD
OLD PHILADELPHIA ROAD
MANOR DRIVE
GOLDEN ROD COURT
PRIMROSE PLACE
MARIGOLD LANE
SANFORD COURT
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE / OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE RIGHT-OF-WAY LINE
CHURCH

Figure II-13


Express Toll Lanes
Option 1
MARYLAND
22
RIPKEN
YOUTH BASEBALL
ACADEMY
RIPKEN
STADIUM
INTERSTATE
95
Legend
GENERAL PURPOSE LANES
EXPRESS TOLL LANES
PROPOSED BRIDGE /
OVERPASS
TRAFFIC FLOW
TRAFFIC SIGNALS
APPROXIMATE
RIGHT-OF-WAY LINE

Figure II-14

F. Comparison of Alternatives

The following discussion is a comparison of the No Build, General Purpose Lanes, and Express Toll Lanes Alternatives, based on five categories of evaluation criteria including ability to meet purpose and need, environmental impacts, operational efficiency, fiscal responsibility, and regulatory compliance. A summary of the impacts associated with each alternative and interchange option is in **Appendix F**.

1. Ability to Meet Purpose and Need

a. Congestion

Table II-1 provides a summary of the future LOS for the alternatives considered.

The General Purpose Lanes Alternative would add one to two additional GPLs in each direction. This would improve traffic operations over the no build condition. Traffic is anticipated to operate at LOS D or better on the weekday and LOS E or better on the weekends. Although this alternative would provide good overall traffic operations for both weekday and weekend peak periods the number of accessible travel lanes would make it difficult to implement a travel demand management program. Overtime, the General Purpose Lanes Alternative would experience increasing congestion levels on all lanes of travel since there would be limited opportunities for travel demand management programs. Additionally, there would be limited incentive for transit or carpooling.

The Express Toll Lanes Alternative would provide superior service for motorists that utilize the ETLs (separated from the GPLs). The ETLs are anticipated to operate at a superior LOS compared to the LOS of the GPLs in both the Express Toll Lanes and General Purpose Lanes Alternatives. The volume for the ETLs would vary depending on the time of day with the greater ETL volumes occurring when more congestion is present in the GPLs.

One of the potential benefits of ETLs is the ability to provide for predictable and dependable travel times and speeds. Predictable travel times promote transit by providing reliable service.

Table II-1. Project Weekday 2030 LOS Summary

Alternative	Roadway Section		AM Peak Hour		PM Peak Hour		Weekend Peak Hour	
			NB	SB	NB	SB	NB	SB
No-Build	New Forge Road to MD 152		D	F	F	D	F	F
	MD 152 to 24		C	F	F	D	F	F
	MD 24 to MD 543		D	F	F	E	F	F
	MD 543 to MD 22		C	C	D	D	F	F
General Purpose Lanes	New Forge Road to MD 152		B	D	D	C	D	C
	MD 152 to MD 24		B	C	D	C	C	C
	MD 24 to MD 543		B	C	C	C	D	D
	MD 543 to MD 22		B	C	C	C	E	D
Express Toll Lanes	New Forge Road to MD 152	ETL	A	C	C	A	B	B
		GPL	C	E	E	D	E	D
	MD 152 to MD 24	ETL	A	C	B	A	B	B
		GPL	C	D	D	D	D	D
	MD 24 to MD 543	ETL	A	A	B	A	B	B
		GPL	D	D	E	E	E	E
	MD 543 to MD 22	GPL	B	C	C	C	E	D

b. Safety

The safety of any roadway is based on many factors. This includes geometrics, roadside obstructions, congestion, and traffic control devices. Geometrically, if there are too few lanes, the roadway could be congested, increasing the potential for rear end and sideswipe crashes which occur at a greater rate with those conditions. With multiple lanes, motorists need to weave across several lanes to access interchange ramps increasing the potential for sideswipe crashes.

The General Purpose Lanes Alternative would consist of six contiguous lanes in each direction from New Forge Road to MD 24 and five lanes in each direction from MD 24 to MD 543; this could generate difficulty for disabled vehicles trying to access the shoulder, and would increase the number of lanes that a driver must weave across to exit the highway.

The Express Toll Lanes Alternative would consist of two contiguous ETLs and four contiguous GPLs in each direction from New Forge Road to MD 24, separated by a median barrier. Vehicles in the ETL lanes will have dedicated ramps at each of the existing interchanges. The ETLs are expected to be operated at LOS D or better, thereby allowing for gaps in traffic where vehicles can switch lanes to pass other drivers. By separating the GPLs and ETLs and providing a maximum of four contiguous lanes, safety

would be enhanced through a reduction of lanes to be traversed when entering or exiting, and allowing disabled vehicles to more easily access the shoulder.

The provision of ETLs will reduce congestion, improve emergency response times, and/or reduce the number of conflict points between vehicles, thereby providing opportunities for improved public safety. In addition, the Express Toll Lanes Alternative could improve work zone safety by allowing for off-peak closures of the managed or general purpose system thus reducing conflict points between motorists and maintenance or construction activities.

2. Operational Efficiency

a. Incident Management

It is essential that police, fire, rescue, and maintenance personnel be able to respond quickly to an incident by accessing the site, assessing the nature of the incident, and taking appropriate measures. To that end, both of the Build Alternatives have been designed with 14-foot shoulders. This would not only provide additional clearance for emergency vehicles using the shoulders, but would also give the emergency responders additional room to establish their work perimeter and the necessary traffic control measures.

Of the two Build Alternatives, the Express Toll Lanes Alternative would offer the most benefit for incident management. First, physical separation of the GPLs and ETLs would provide adjacent detour routing and/or access for emergency services during traffic related and other incidents. In addition, the ETLs would provide emergency responders with unimpeded access throughout Section 200, since the ETLs would operate at LOS D or better. Furthermore, by having a maximum of four contiguous lanes (GPLs) and additional shoulders associated with the ETLs, additional areas would be available for crews to work and safely access the site.

b. Facility Maintenance

Heavily traveled Interstate facilities require substantial levels of routine maintenance such as the replacement of pavement markings and overhead lights, cleaning of drainage systems, replacement/repair of guardrail and energy absorption systems, repaving/resurfacing, and upkeep of stormwater management (SWM) facilities. High traffic volumes make almost any maintenance activity a major undertaking. As a result, most maintenance is performed off-peak, quite often at night.

Of the two Build Alternatives, the Express Toll Lanes Alternative would offer the least obstacles to facility maintenance. Most work could be done off-peak by diverting traffic to either the managed lane roadway or to the general purpose roadway. There would be minimal effort and materials required to redirect the traffic, and worker safety would be enhanced by the concrete barrier that would separate them from the traffic.

c. Enforcement

The No-Build Alternative would provide decreasing opportunities for enforcement activities as congestion increases, the ability of police units to pull motorists over to the highway shoulder decreases. The General Purpose Lanes Alternative will reduce congestion, thereby increasing opportunities for safer roadside activities. The Express Toll Lanes Alternative, with a maximum separation of two lanes from an available shoulder, will facilitate roadside patrols and enforcements.

d. Intermodal Access

Section 200 provides access to the Port of Baltimore, BWI and Martin State Airports, Amtrak rail service, and the local transit system. In order to provide dependable intermodal connectivity, it is important that highway travel times remain fairly consistent, and that those times be perceived as reasonable by users.

The General Purpose Lanes Alternative would have a moderate effect on bus transit in the Section 200 corridor. Although the capacity of I-95 would increase, all travelers including transit services would experience decreasing benefits as traffic volumes grow over time.

The Express Toll Lanes Alternative would allow buses to benefit from the higher LOS during peak periods. By providing reliable and predictable transit service times, the Express Toll Lanes Alternative could improve the attractiveness of transit services. Access to and from the ETLs at interchanges where transit services are planned would be considered in the design of the Express Toll Lanes Alternative and the proposed Park and Rides.

The success of ETLs hinges on a user's ability to consistently experience a predictable travel time and a facility operator's ability to consistently manage traffic volumes to provide the expected travel speed and travel time with a high degree of certainty. Predictable travel times create advantages for transport fleets with schedules to meet such as those engaged in transit services or commercial "just in time" freight delivery services. **Table II-2** provides estimated travel times and speeds for 2030 for ETLs and GPLs.

Table II-2. Estimated Travel Speeds and Times for 2030

		From MD 543 to the I-95/I-895 (N) Split (18 miles) in the Peak Direction		
		Travel Time	**Travel Speed**	**Level of Service Range**
Existing		24 Min	60 MPH	C to E
2030 No Build		57 Min	15 MPH	F
2030 General Purpose Lanes Alternative	**Section 100 and 200 GPLs**	29 Min	40 MPH	C to E
	Section 100 ETL and Section 200 GPLs	21 Min	55 MPH	
2030 General Purpose Lanes Alternative	**Section 100 and 200 GPLs**	33 Min	35 MPH	C to E
	Section 100 and 200 ETLs	18 Min	65 MPH	A to C

Based on the information in Table II-2, In 2030, the use of ETLs over GPLs during peak periods can reduce the travel time up to 11 minutes and increase travels speeds as much as 25 MPH. Based on this assessment, the Express Toll Lanes Alternative would best provide for intermodal access, because it is anticipated that the ETLs would operate at LOS D or better, and provide faster, more consistent travel conditions as compared to the GPL Alternative.

3. Park and Ride Facilities

The results from a parking facility usage study, versus average daily traffic analysis allowed for the determination of preliminary size requirements for the four main park & ride facilities located at Section 200 interchanges. Approximate lot size requirements for MD 152, MD 24, MD 543, and MD 22 were established based upon an assumption that approximately 80 spaces can be provided per acre. The projected lot sizes, as summarized in Table II-3, were used as a search criteria for potential properties for future park and ride lots.

Table II-3. Projected Needs for Park and Ride Facilities

Park and Ride Location	Total Existing Spaces	2006 Utilization	Projected Spaces	Projected Acreage
MD 152	209	168	450-500	3.0
MD 24	75	53	450-500	2.0
MD 543	133	9	30	N/A
MD 22	64	29	25	N/A

a. Analysis of Park and Ride Facility Options

Based upon impacts to existing park & ride facilities and anticipated increase in need from commuters, the Authority conducted an extensive site search for potential park & ride locations at both the MD 152 and MD 24 interchanges. The existing park & ride facilities at each of these interchanges are located in close proximity to the I-95 corridor. The goal of the park & ride study is to identify a preferred parcel, located within ½ mile of the interchange, which provided sufficient space to accommodate the projected park & ride needs.

The future needs were developed for a design year of 2030. The utilization of a park & ride is dependent upon numerous variables including: roadway traffic volumes; ease of access into the facility; congestion on I-95; parking rates in Baltimore City; reliability and service of transit; gasoline prices; safety; and community acceptance. Many of these factors can not be quantified and are variable. The only quantifiable factors are past trends, current roadway volumes, and project roadway volumes. The strategy for forecasting future lot sizes consisted of analyzing the average daily usage for each facility versus the average daily traffic. This comparison was analyzed for the previous ten years, from 1996 thru 2006.

The site search for a new park & ride facility analyzed several variables, including parcel size, access, existing environmental features and utilities. Below summarizes the findings for each the MD 152 and MD 24 interchange.

b. MD 152

The future needs forecast for a park & ride facility at the MD 152 interchange showed a need of approximately 350 spaces. Based upon this projection, as well as input from SHA and the Maryland Transit Administration (MTA) officials for the non-quantifiable variables, a projected spacing goal of 450 to 500 spaces was determined. An initial search was conducted to identify all parcels, located within ½ mile of the interchange, which met the anticipated size requirements. The identified parcels were reviewed base upon access and existing conditions. This review identified five sites to be investigated further. These five sites were analyzed with respect to access, existing environmental features and utilities. Also, preliminary site layouts were completed for each site. Base upon the layout and further analysis, the Authority identified a preferred parcel.

The preferred parcel, Map 65 / Parcel 10), is a 14.6 acre located near the north-west quadrant of the I-95 / MD 152 interchange (**Figure III-15**). The lot consists of an active church, which only utilizes a small portion of the parcel.

c. MD 24

The future needs forecast for a park & ride facility at the MD 24 interchange showed a need of approximately 200 to 250 spaces. Based upon this projection, as well as input from State Highway and Maryland Transit Administration officials for the non-quantifiable variables, a projected spacing goal of 450 to 500 spaces was determined. An initial search was conducted to identify all parcels, located within ½ mile of the interchange, which met the anticipated size requirements. The identified parcels were reviewed base upon access and existing conditions. This review identified three sites to be investigated further. These three sites were analyzed with respect to access, existing environmental features and utilities. Also, preliminary site layouts were completed for each site. Base upon the layout and further analysis, the Authority identified a preferred parcel.

The preferred parcel, Map 61 / Parcel 602, is a 5.15 acre lot located near the north-west quadrant of the I-95 / MD 24 interchange (**Figure III-16**). There is a second parcel adjacent to the preferred lot which could provide the potential for additional space or future expansion.

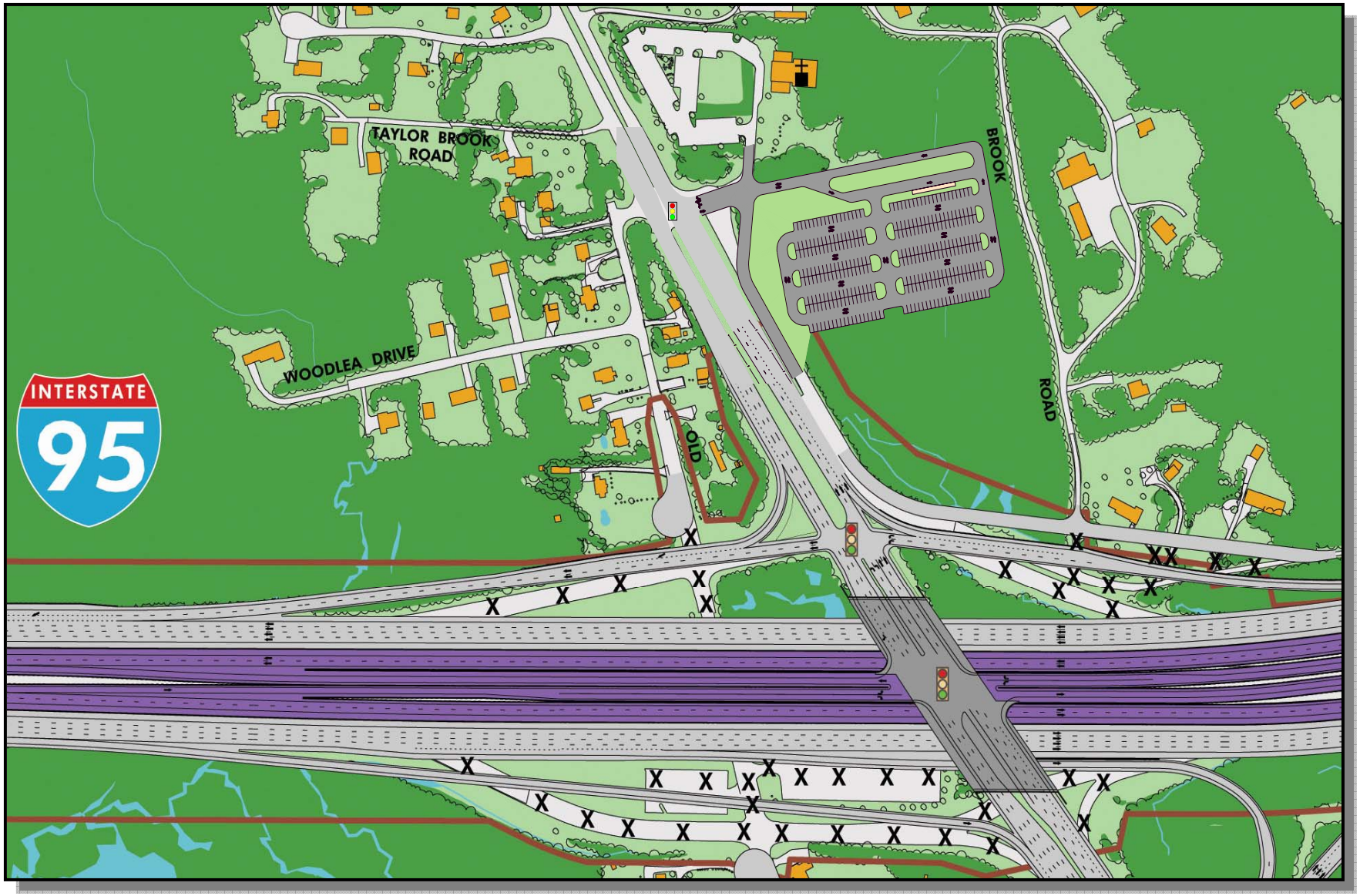


Figure II-15. MD 152 Park and Ride Facility

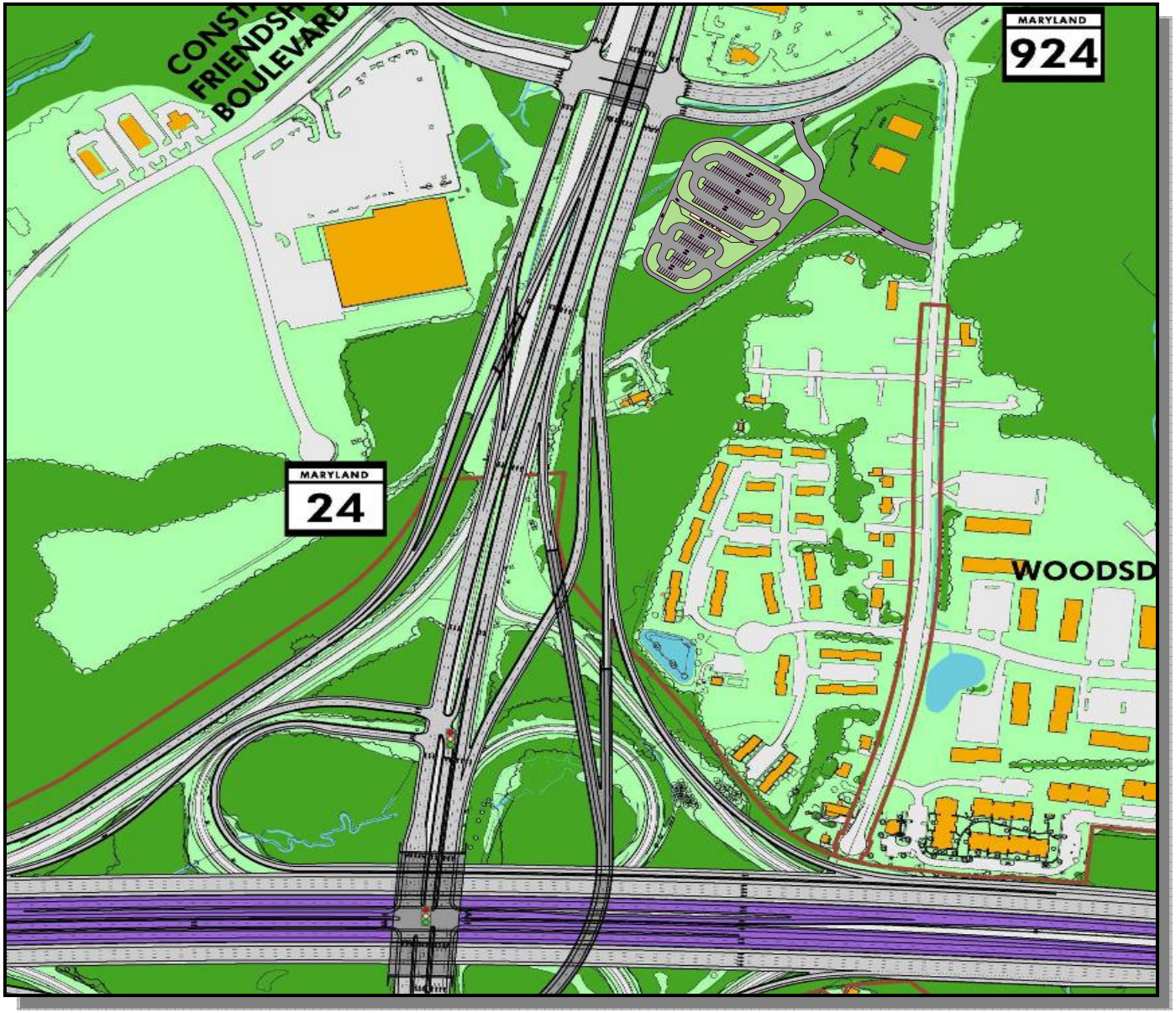


Figure II-16. MD 24 Park and Ride Facility

4. Costs

The term No-Build is often misleading. It does not mean that there would be no cost associated with this alternative. Rather, it means that no funds would be expended to increase the capacity of the roadway. There would still remain costs associated with maintaining the facility. This would include activities such as roadway resurfacing, bridge replacement, signing, lighting, pavement markings, etc.

There was no preliminary cost estimated for the No-Build Alternative since it did not include any additional work beyond the normal maintenance activities. General Purpose Lanes Alternative preliminary cost estimate is approximately $1,35M, while the Express Toll Lanes Alternative preliminary cost estimate is approximately $1,62M.

The following table lists the estimated costs of the different interchange options for each alternative that have been carried forward for detailed study.

Table II-4. Estimated Costs for Each Interchange Option

General Purpose Lanes Alternative		Estimated Cost
Mainline		$742,000,000**
Interchange Options	MD 152 Option 1	N/A
	MD 152 Option 4	$182,770,000*
	MD 24 Option 2	$321,250,000*
	MD 543 Option 1	N/A
	MD 543 Option 7	$107,500,000*
	MD 22 Option 1	N/A
Total		**$1,35M**
Express Toll Lanes Alternative		Estimated Cost
Mainline		$730,300,000**
Interchange Options	MD 152 Option 1A	N/A
	MD 152 Option 4A	$318,400,000*
	MD 24 Option 2A	$400,000,000*
	MD 543 Option 7	$168,500,000*
	MD 22 Option 1	N/A
Total		**$1,62M**

*Included in the total cost for the representative Build Alternative
** Mainline cost includes overpasses

Under the Express Toll Lanes Alternative, the revenues collected by the ETLs would help offset the cost to construct and monitor the facility.