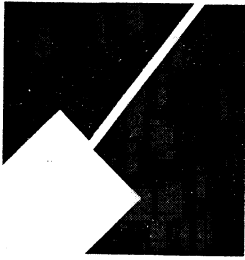


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MONTGOMERY COUNTY DEPARTMENT OF PARK & PLANNING

THE MARYLAND-NATIONAL CAPITAL
PARK AND PLANNING COMMISSION

8787 Georgia Avenue
Silver Spring, Maryland 20910-3760

MCPB
ITEM NO. 12
6-26-2003

June 20, 2003

MEMORANDUM

TO: Montgomery County Planning Board

VIA: Jeffrey Zyontz, Chief
County-wide Planning Division

Richard C. Hawthorne, Chief
Transportation Planning

RC Hawthorne

FROM: Alex Hekimian: 301-495-4525, for the Park and Planning Department *AH*

SUBJECT: Jones Bridge Road – Purple Line Busway Alternatives Analysis

Staff has prepared the attached report, "Jones Bridge Road – Purple Line Busway Alternatives Analysis," which examines the concept of a proposed busway on Jones Bridge Road and a comparison of this concept to the busway alternative previously studied by the Maryland Department of Transportation within the master-planned Georgetown Branch right-of-way. Our staff's analysis is in response to the request by County Council President Michael Subin, who asked the Board to evaluate the State's proposal to study a busway on Jones Bridge Road.

Due to time constraints and limited staff resources, this analysis was limited to evaluating, at a planning concept level, the impacts, benefits, and costs of busway alternatives in the Purple Line corridor between Jones Mill Road and MD 355. It is not meant to be a detailed engineering or design study. Rather, it is meant to provide important planning information to help County and State decision-makers reach a consensus on the direction for the proposed Purple Line project.

The following sections are included in the report:

1. Staff Recommendations and Study Findings
2. Jones Bridge Road Busway Findings
3. Georgetown Branch Busway Findings
4. Purpose of Study
5. General Guiding Principles

6. Description of the Busway Alternatives
7. Travel Demand Forecasting
8. Cost Analysis
9. Master Plan Consistency
10. Impacts on Existing Community
11. Environmental Impacts

On June 18, staff held an open house meeting to provide information on the proposal and obtain feedback from citizens. A number of comments were collected, and these will be included for the July 10 worksession along with our summary of the testimony submitted at the June 26 public hearing and in written form before July 1.

After considering the information available to us at this time, staff's overall recommendation is that, if a busway is desired, it should be on the Georgetown Branch right-of-way, not on Jones Bridge Road. This road is not appropriate to accommodate the large volumes of buses that would be needed to meet the demands for a high-quality transit connection between the two sides of the Metrorail Red Line. Dedicated bus lanes would be needed, requiring rebuilding of the road cross section. Also, grade separations at some locations, while expensive, would be needed to make the facility competitive. Without these capital features to separate buses from the general traffic, running buses in mixed traffic on the current road would result in bus travel times that would not attract new transit riders, and would not be an improvement over continuing to use the more direct East West Highway bus routes for most transit trips.

We look forward to hearing from the community near Jones Bridge Road as well as others over the coming weeks to assist us in fine-tuning our staff findings in preparation for the Board worksession on July 10.

AH:ct

Attachment

JONES BRIDGE ROAD — PURPLE LINE BUSWAY ALTERNATIVES ANALYSIS June 2003

STAFF RECOMMENDATIONS AND STUDY FINDINGS

If a future decision is made to place a busway instead of a light-rail line in the Purple Line corridor, the results of this preliminary study indicate that **it is clearly preferable to place a high-quality busway on the Georgetown Branch right-of-way rather than on Jones Bridge Road.** Because there are significant concerns about placing a busway on Jones Bridge Road, staff recommends that this alternative not proceed to further study in detail by the Maryland Department of Transportation (MDOT).

The staff has organized the findings in this section into two general headings:

- Jones Bridge Road Busway (JBRB)
- Georgetown Branch Busway (GBB)

It is recognized that more detailed analysis would provide some additional answers to questions and remove some of the uncertainty about alternatives. However, staff feels that additional information would not change the basic findings presented as long as the County maintains its goal of providing a dedicated transitway between Silver Spring and Bethesda.

JONES BRIDGE ROAD BUSWAY FINDINGS

- It would be possible to construct a busway along Jones Bridge Road, but a reconstruction of the current road cross section would be necessary to provide for an acceptable and safe busway and street.
- The Jones Bridge Road Busway avoids the reconstruction and realignment of the Capital Crescent Trail within the available right-of-way, and removal of trees on the Georgetown Branch right-of-way.
- It places a busway in the edge of, rather than through, Columbia Country Club property and avoids impacts to homes backing up to the Georgetown Branch right-of-way.
- It will require taking property from some houses along Jones Bridge Road, perhaps the demolition of some houses and the relocation of families.
- The busway configuration that takes the least amount of property (the undivided center busway) is also the least safe for users.
- It would significantly change the character of Jones Bridge Road. A busway is not compatible with the Master Plan and with the use of Jones Bridge Road as a primary residential street, especially east of Connecticut Avenue.

- Grade separations will be disruptive to adjacent property, but necessary if major intersection delays are to be avoided.
- The Jones Bridge Road Busway makes accommodating access to houses and the North Chevy Chase Elementary School very complex, and reduces access to adjacent properties under any of the potential cross sections. As many as 150 homes must use Jones Bridge Road for their driving and walking access.
- The Jones Bridge Road Busway faces serious problems in finding a place to put a bus terminal on the western end of Jones Bridge Road. Due to lack of sufficient right-of-way and traffic problems, no configuration is clearly workable. Using the existing street system would slow buses, cause delays on MD 355, and constrain bus use. This is a major drawback to this proposal.
- Direct bus access to the Bethesda CBD will need to be in mixed traffic after buses leave the Medical Center Metrorail station, since a take-away lane, or construction of new lanes is not feasible.
- It would be more disruptive to traffic during the construction phase than the Georgetown Branch Busway alternative.

GEORGETOWN BRANCH BUSWAY FINDINGS

- All right-of-way is available and in public ownership for the area under study.
- The Georgetown Branch Busway can be implemented faster because there are much fewer right-of-way acquisition problems.
- No homes would be demolished.
- The Capital Crescent Trail would be completed as part of the project, including a grade separation over Connecticut Avenue.
- High-speed transit is possible since there would be no side friction due to traffic.
- Trees would be removed along the right-of-way.
- The busway would run through the Columbia Country Club.
- To reach the Bethesda Metrorail station, buses would leave the busway and run a short distance in mixed traffic.

Staff examined JBRB and GBB busway alternatives that were consistent with the demand for a high-quality and fast transit service in the Purple Line corridor as well as a safe and well-landscaped facility. While staff found that placing a busway in the Georgetown Branch right-of-way was clearly preferable, the State may nevertheless choose to further study placing a busway on Jones Bridge Road.

At this stage, staff cannot be aware of all options the State might pursue, but we do know that the State is entertaining the idea of compromising the Bus Rapid Transit (BRT) concept by suggesting that buses run in mixed traffic rather than in a dedicated lane, particularly for the segment east of Connecticut Avenue. This idea sacrifices bus travel time savings and system reliability in order to avoid adding additional lanes and minimizing impacts to the community

around Jones Bridge Road. State officials recently discussed with staff the outlines of such an idea.

The State is also interested in some improvements at the intersection of Jones Mill Road and Jones Bridge Road, but without a grade separation. On the other hand, the State sees significant advantages in having a grade separation at the intersection of Jones Bridge Road and Connecticut Avenue. Such a structure would be designed to reduce traffic queues on Jones Bridge Road. The State had already studied grade separations at this location when the ramp to I-495 was reoriented to Connecticut Avenue. If an interchange is to be provided at Connecticut Avenue for general traffic, it would be preferable to provide it at East West Highway, which has a higher road classification than Jones Bridge Road.

Between Connecticut Avenue and MD 355 there is both more traffic and more opportunity for a widening of Jones Bridge Road. The State would consider additional “bus only” lanes on this segment. It is unclear what design the State would choose at the MD 355 intersection, but some type of grade separation would be proposed to achieve time savings for the bus operation.

The idea of buses sharing a lane with cars and trucks and getting bogged down in general traffic on Jones Bridge Road is contrary to the concept of BRT. Buses would not by any means be “rapid” or reliable because they would be subject to all of the uncertainties of the anticipated heavy traffic flows. This represents another significant concern in the Jones Bridge Road proposal.

PURPOSE OF STUDY

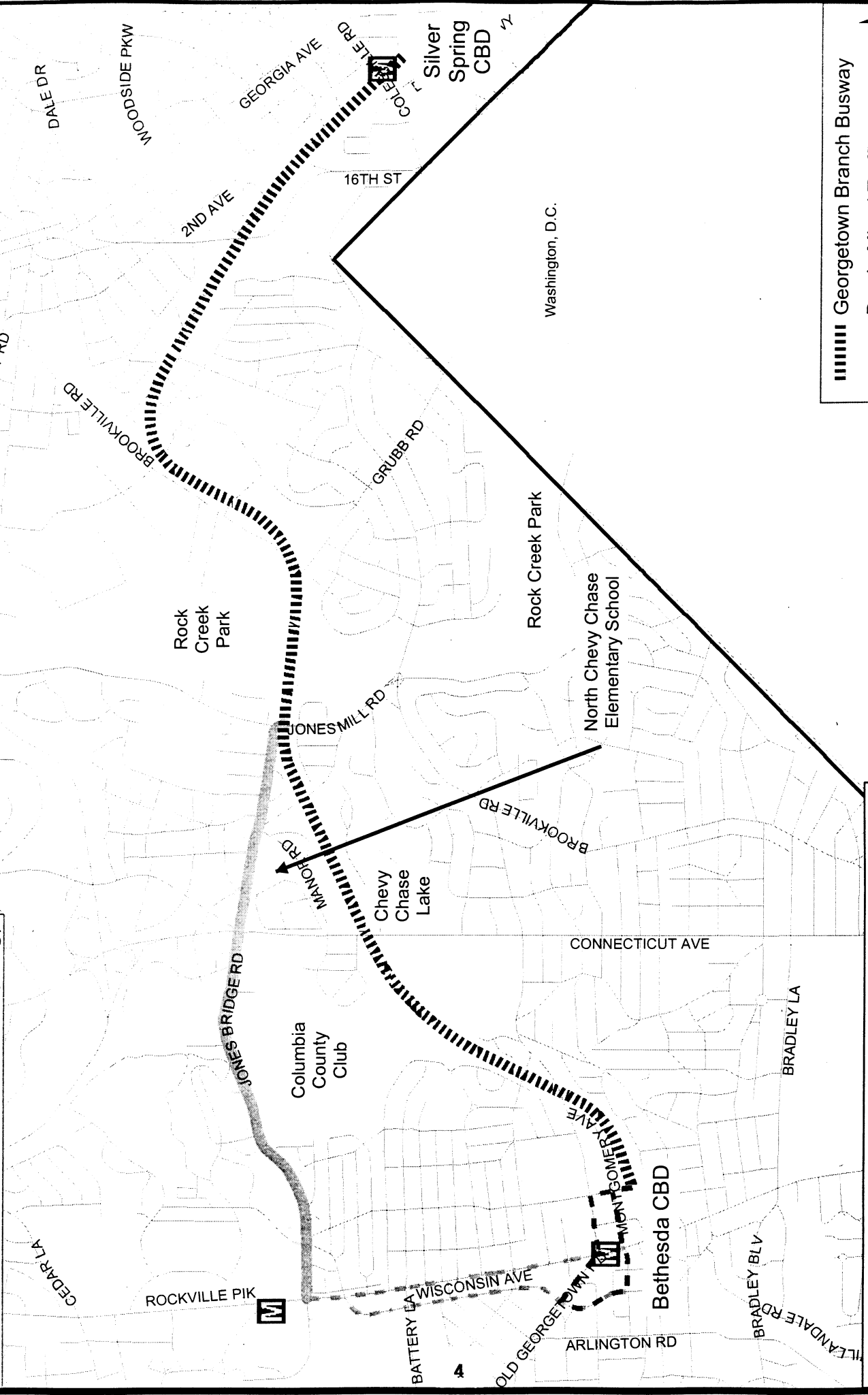
The purpose of this study is to identify for the Planning Board, County Council, County citizens, and property owners the potential impacts, benefits, and costs of providing a busway on Jones Bridge Road between Jones Mill Road and MD 355, and to compare this with a similar busway on the Georgetown Branch right-of-way. This busway segment would be part of an overall busway connecting Silver Spring with either the Bethesda or the Medical Center Metrorail station (see Figure 1). This study examines and compares various potential alignments and cross sections within an east-west segment of the busway between Jones Mill Road and MD 355 (see Figure 2).

To maintain as much as possible the functional equivalent of a light-rail line, staff assumed high-quality BRT service between Silver Spring and Bethesda. We used the BRT definition from the Transportation Research Board, which specifies dedicated transit lanes, except where high-speed operation is possible without them. In the case of Jones Bridge Road, dedicated lanes are necessary because trying to run buses in heavy mixed traffic there would not produce high-speed operation.

Study History

In March 2003, Maryland Secretary of Transportation Robert Flanagan, during a tour of the Purple Line alignment, proposed that a busway could be routed off of the Georgetown Branch right-of-way and onto Jones Bridge Road. He indicated this would be a way of avoiding

Figure 1: Jones Bridge Road / Georgetown Branch Busway Area Overview (Bethesda-Silver Spring)



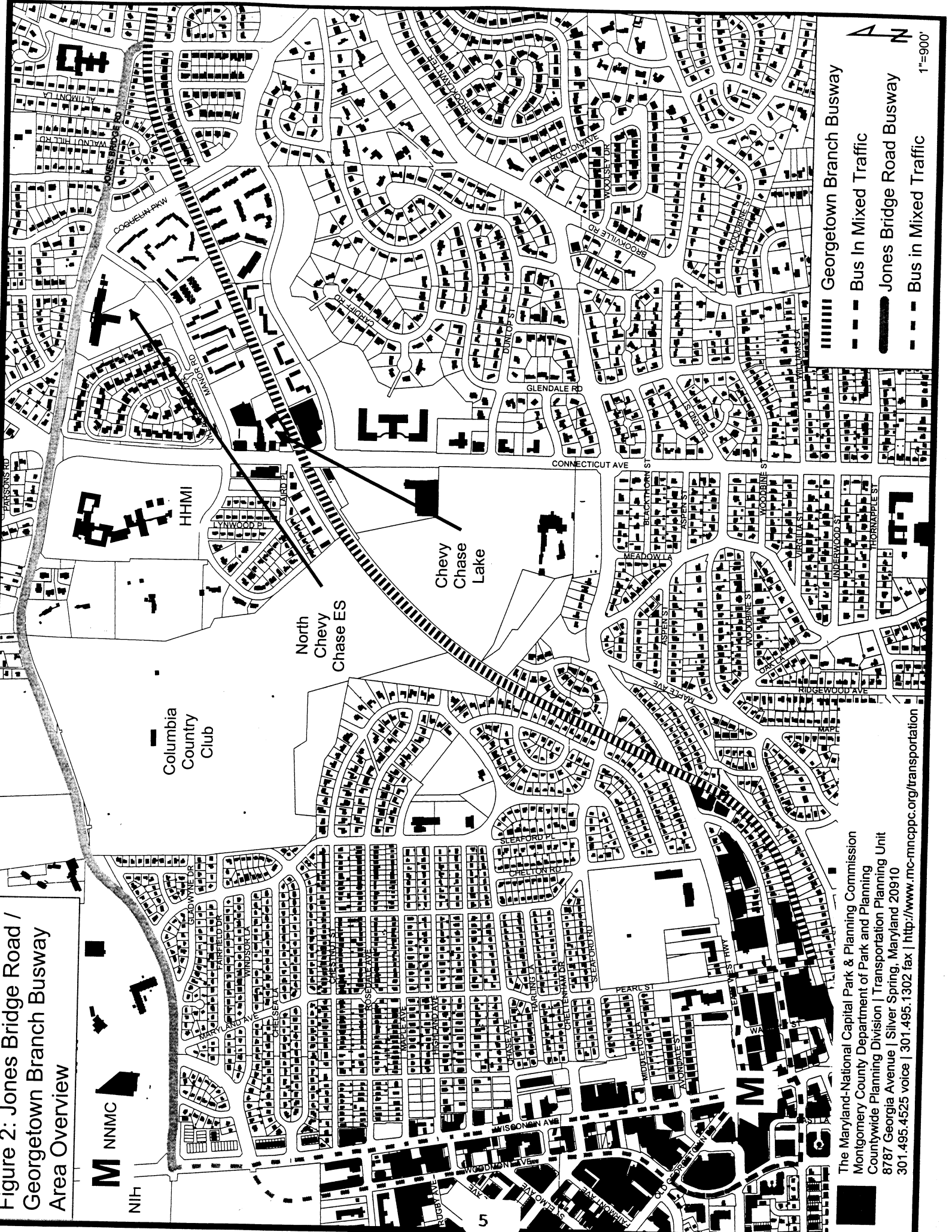
Legend:

- Georgetown Branch Busway
- Bus In Mixed Traffic
- Jones Bridge Road Busway
- Bus in Mixed Traffic

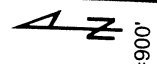
Scale: 1" = 2000'

The Maryland-National Capital Park & Planning Commission
 Montgomery County Department of Park and Planning
 Countywide Planning Division | Transportation Planning Unit
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Figure 2: Jones Bridge Road / Georgetown Branch Busway Area Overview



- Georgetown Branch Busway
- - - - - Bus In Mixed Traffic
- Jones Bridge Road Busway
- - - - - Bus in Mixed Traffic



1"=900'

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M NNMC

Columbia
Country
Club

North
Chevy
Chase ES

Chevy
Chase
Lake

the impacts of a busway or light rail on the Columbia Country Club and other properties that are adjacent to the Georgetown Branch right-of-way, and also minimizing any impacts on the existing interim Capital Crescent Trail which is currently on this alignment. Publicity on this proposal prompted Montgomery County Council President Subin to ask the Montgomery County Planning Board to review this proposal and give the Council a report by the end of July 2003. (See Exhibit 1 of the Appendix)

If pursued by MDOT, a formal analysis of this proposal will be incorporated into the Project Planning study now underway for a transitway connection between the Bethesda and the New Carrollton Metrorail stations. This alignment, known and described in this report as the Purple Line, is also now referred to by MDOT as the Bi-County Transitway since it would connect Montgomery and Prince George's Counties.

The analysis of a transitway between Silver Spring and Bethesda has been underway for approximately eight years. Although this segment was ready to go to a Final Environmental Impact Statement (FEIS) in the autumn of 2002, MDOT has indicated it will complete a Draft Environmental Impact Statement (DEIS) for the entire length of the transitway, from Bethesda to New Carrollton, before proceeding with any decisions on the section from Silver Spring to Bethesda.

MDOT initially chose light rail as the preferred mode for the connection between Silver Spring and Bethesda based on the 1996 DEIS stage, which compared both busway and light rail alternatives. However, this selection process has been re-opened, and additional analysis will be provided before the FEIS is completed.

GENERAL GUIDING PRINCIPLES

Given the constraints on time and staff resources available for this study, it was important to establish several general principles to guide the evaluation of busway alternatives.

Type of Study

This is a preliminary study that analyzes the basic planning concept of an east-west busway connecting Bethesda with Silver Spring. While it can help our County and State elected and appointed officials decide which direction to proceed with the concept, it is by no means a substitute for a detailed engineering or design study. However, detailed design takes time and is expensive, so it should be undertaken only if the general concept appears feasible and the costs and benefits are worth the additional study.

Transit Mode

The analysis was meant to compare the relative advantages and disadvantages of placing a busway on either of two possible alignments — on the Georgetown Branch right-of-way or on Jones Bridge Road. Therefore, the study focused on comparing potential busway alternatives, not on comparing the merits of a busway versus light rail or buses in mixed traffic.

Study Limits

Comparisons of the two possible alignments were limited to the segment of the busway between Jones Mill Road and MD 355. While the segment east of Jones Mill Road toward Silver Spring along the Georgetown Branch/CSX rights-of-way would be part of the entire busway corridor, that segment is common to both the GBB and JBRB alignments.

Quality of Transit Service

This study assumes the provision of BRT service. By definition, the service on either busway alignment must not only be relatively “rapid” but also reliable in order to attract sufficient customers. That will require a dedicated bus lane in each direction and grade separations at the major cross streets — Jones Mill Road, Connecticut Avenue, and MD 355. Minimal improvements at these locations, such as queue jumpers for at-grade intersections, would not be in keeping with the needs and function of this transitway corridor. Also, the current street cross section, with one travel lane and parking cannot adequately accommodate buses and other vehicles. If vehicle access is to be allowed, a separate bus lane will need to be constructed within an expanded roadway cross section.

The bus lanes would be reserved for express buses 24-hours per day. Local buses would continue to use the regular traffic lanes. Express bus headways during peak periods would be three minutes in order to satisfy the anticipated ridership demand. High-quality articulated buses (60-foot length) would be required to meet anticipated ridership demand. The only intermediate stop between Jones Mill Road and MD 355 for the express buses was assumed to be at Connecticut Avenue.

Quality of the Landscape

Both the existing Georgetown Branch and Jones Bridge Road rights-of-way have many segments that are very attractive with landscape panels, trees, and designated ways for pedestrians and bicyclists. An objective of this study was to maintain and enhance, wherever possible, the landscape elements of the two alternative rights-of-way. Knowing, however, that the addition of a busway would cause the removal of some existing plantings, the study’s proposed cross sections include as much restoration or improvement of those landscape elements as possible.

Balance between Right-of-Way Needs and Community and Environmental Impacts

Introducing a busway into a mature, densely developed area understandably makes some community and environmental impacts unavoidable. However, attempts were made in this study to scale back the dimensions of the alignments and cross sections to maintain the character of the area while at the same time preserving the transportation function and physical requirements of the busway concept.

The addition of two dedicated lanes for buses and grade separations at major cross streets would require some expansion of existing pavements and rights-of-way. For example, much of the existing pavement on the segment of Jones Bridge Road east of Connecticut Avenue is too narrow to allow two traffic lanes in addition to two bus lanes, so expanding the pavement and

right-of-way would be necessary there. At the same time, the busway is able to stay within much of the existing right-of-way by taking a traffic lane in each direction for busway in the wider segment of Jones Bridge Road west of Connecticut Avenue, where up to five traffic lanes currently exist.

The study assumes that the cross sections at the grade-separated intersections will need to flare out and maintain as much of the current lane configurations as possible. All cross sections assume a minimum six-foot planting strip and five-foot sidewalk next to the outside curbs. This is necessary to maintain or enhance the physical appearance and pedestrian safety of the area. Also, the study's cross sections include a 16-foot curb lane to allow motorists and bicyclists to safely co-exist, which conforms to the *Master Plan of Bikeways* and the design policies of both the County and State for new roads in urbanized areas. The cross sections do not account for possible easements needed for construction and some grading.

DESCRIPTION OF THE BUSWAY ALTERNATIVES

In reviewing the State's general proposal for a busway in this corridor, staff has found there are a wide variety of ways that it could be provided within the study area. The guiding principles of high operating speed and frequent headways make some physical separation between buses and other vehicles a necessity. However, there is a clear trade-off between this separation using medians, and both the ability of vehicles in local traffic to make turning movements and the amount of right-of-way needed. This relationship, in turn, defines many of the community impacts of the proposal. This section of the report describes the various busway alignments and cross sections that are possible within the context of providing a high-quality BRT service on dedicated lanes and appropriate landscaping features.

Georgetown Branch Busway Cross Section and Alignment

A busway could be constructed in the Georgetown Branch right-of-way between Jones Mill Road and downtown Bethesda as part of a full Purple Line route. The busway would have similar features as those previously detailed for the Georgetown Branch light-rail proposal over the past several months. Most of the impacts and benefits would remain the same since a two-way busway will need about the same space as a two-way light-rail line. This study assumed the same typical cross section studied in the 1996 DEIS by the Maryland Transit Administration (see Figure 3). The typical cross section includes 24-feet for the bus travel way, an eight-foot shoulder on one side, and a ten-foot trail separated from the busway by a landscaped buffer. This cross section would fit within the available Georgetown Branch right-of-way. The existing right-of-way is shown on the maps in Exhibit 2 of the Appendix.

Features

- Alignment is fully owned by public, no additional right-of-way needed.
- Safe high-speed movement is possible since the buses would be separate from general traffic and grade separations are feasible with minimal disruptions to adjacent property.
- Access to Bethesda Metrorail station would be provided via local streets.

Figure 3

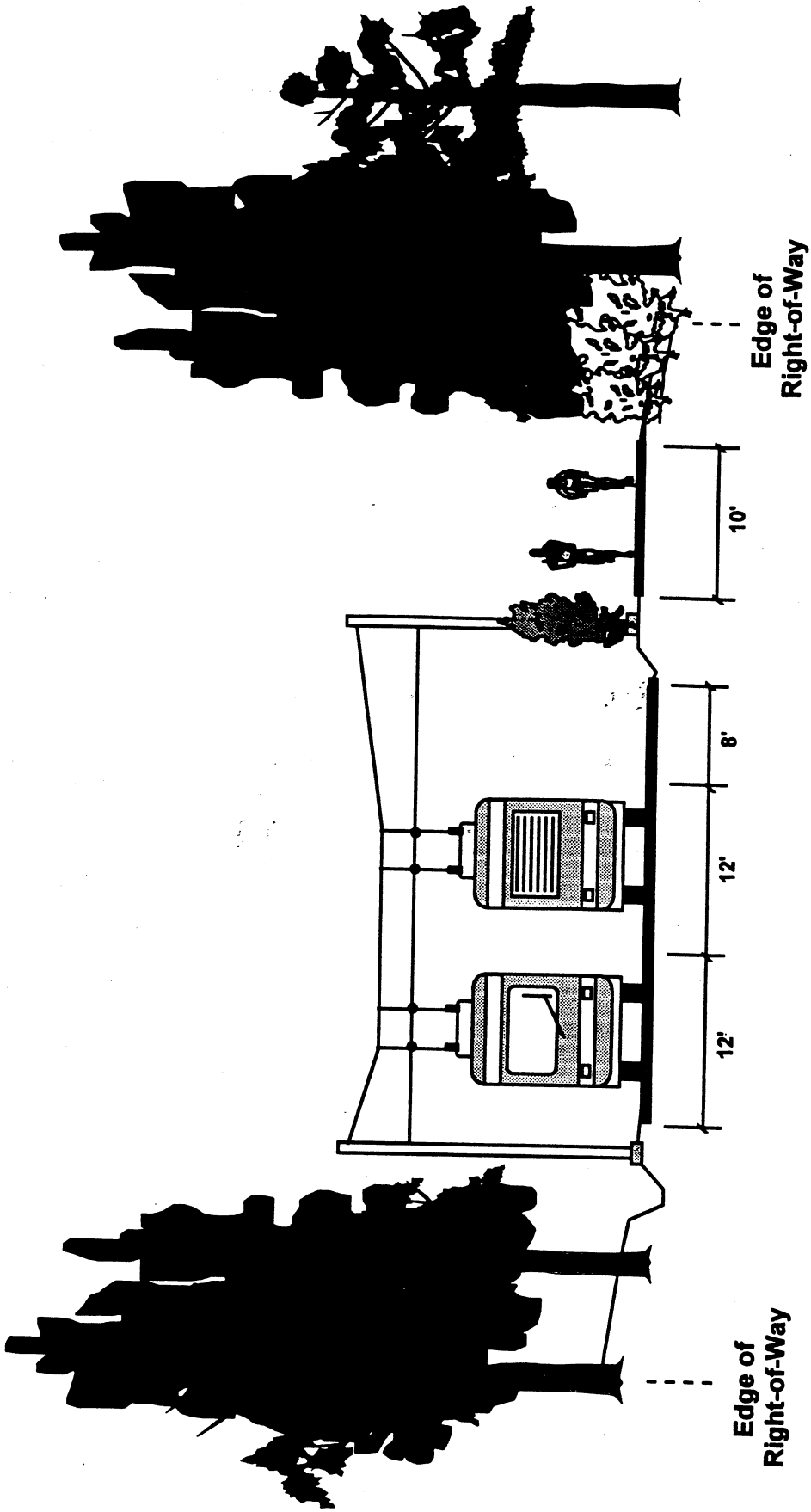


Figure 2.2-6 (Sheet 1 of 6)
Two-Lane Busway with At-Grade Trail

Georgetown Branch
Transitway/Trail

- The Capital Crescent Trail would be completed in conjunction with the busway, with a grade separation at Connecticut Avenue.
- The Capital Crescent Trail would need to be relocated within the available right-of-way.
- Many existing trees would be removed.
- Noise impacts and some visual impacts would affect back yards of adjacent property and the Columbia Country Club.

Jones Bridge Road Busway Alternative Cross Sections

In examining the physical features of Jones Bridge Road, staff finds that under any JBRB cross section, the road and streetscaping will need to be completely reconstructed.

The location of drainage and other utilities, depth of pavement to support bus movement, and other design aspects indicate that the current road would be inadequate for the busway and that existing trees and sidewalks would not be properly sited. Some disruption of virtually all of the adjacent properties along much the entire length of the alignment is anticipated if the busway is on the JBRB alignment.

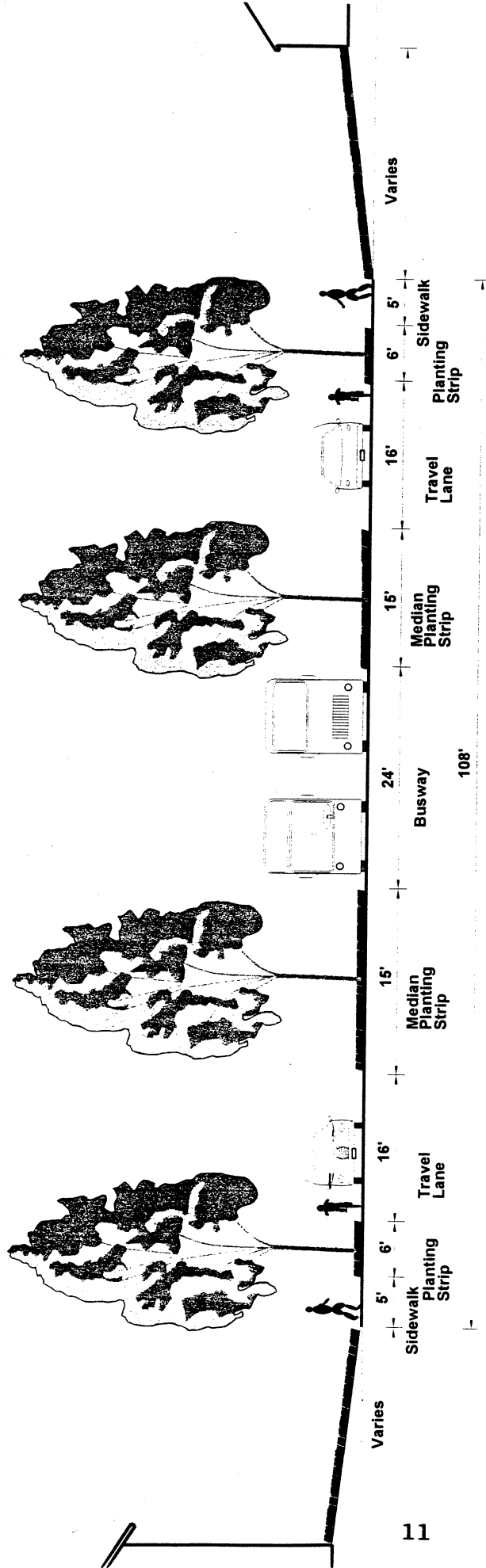
Center Busway with Medians (CBM)

The typical 108-foot cross section for CBM separates a 24-foot busway from the adjacent vehicular traffic with planted medians of 15-feet each. This width allows turning lanes to be created at signalized intersections, and still have a five-foot median remain. However, the width could be reduced to six feet where turning lanes are not needed. The rest of the cross section includes a 16-foot general purpose lane in each direction (which allows room for an on-street bicycle route), a six-foot planting strip, and a five-foot sidewalk on each side. The typical cross section for this option is shown in Figure 4.

Features

- Maximizes safety by separating express buses from general traffic and provides medians for pedestrians and vehicle turning movements.
- Provides a bicycle-friendly general purpose travel lane of 16 feet, which also allows for passing a stalled vehicle.
- Incorporates trees in both the medians and planting strip to soften the visual impact of the busway for all users.
- Provides the highest passenger capacity since buses would have the highest speeds and least “friction” of the JBRB alternatives.
- Needs widest amount of right-of-way, thus causes the maximum negative effect on adjacent community.
- Severely restricts left turns into and out of local streets since they could only be made at specific locations where signalized intersections exist.
- Properties on both sides of Jones Bridge Road would be affected.

Figure 4



Center Busway with Medians

- Access to properties would require around-the-block movement or U-turns at signalized intersections for travel in one direction.

Undivided Center Busway (UCB)

The UCB cross section is the minimum cross section width that this study examined for a busway in this corridor. Anything less would be incompatible with the proper functioning of a BRT and other transportation needs, as well as the appearance and safety of Jones Bridge Road. The typical cross section for UCB is shown in Figure 5.

Features

- Minimizes right-of-way needed and can fit into some existing public right-of-way sections.
- Provides some access to adjacent properties from both vehicle travel directions assuming turns from side streets can be made across the busway.
- Provides maximum flexibility for incident management since bus and general purpose lanes are adjacent and usable for short sections
- Causes significant safety concerns without a separation between express buses and general traffic since general traffic can stray into bus lanes.
- Pedestrians have no refuge when crossing the road.
- Provides only one row of trees on each side.
- The lack of separation between express buses and general traffic may cause slower bus operating speeds and greater potential for delays caused by vehicle conflicts.

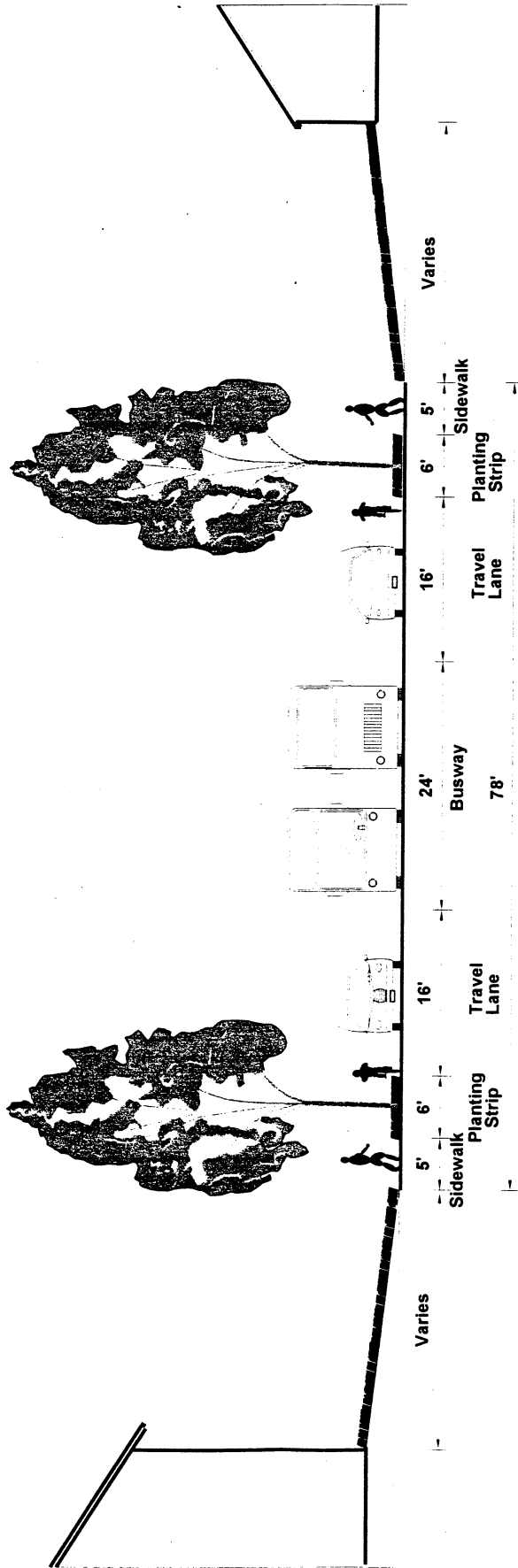
Northside Busway (NB)

The NB cross section was developed to address some of the problems that the CBM cross section has with creating difficulties in accessing adjacent properties. The typical 108-foot cross section for NB includes a 24-foot busway separated from general purpose lanes by a 20-foot planting strip. The general purpose lanes have a 16-foot lane in each direction plus a continuous-turning lane. A six-foot planting strip and five-foot sidewalk on each side complete the cross section. The full cross section for NB is shown in Figure 6.

Features

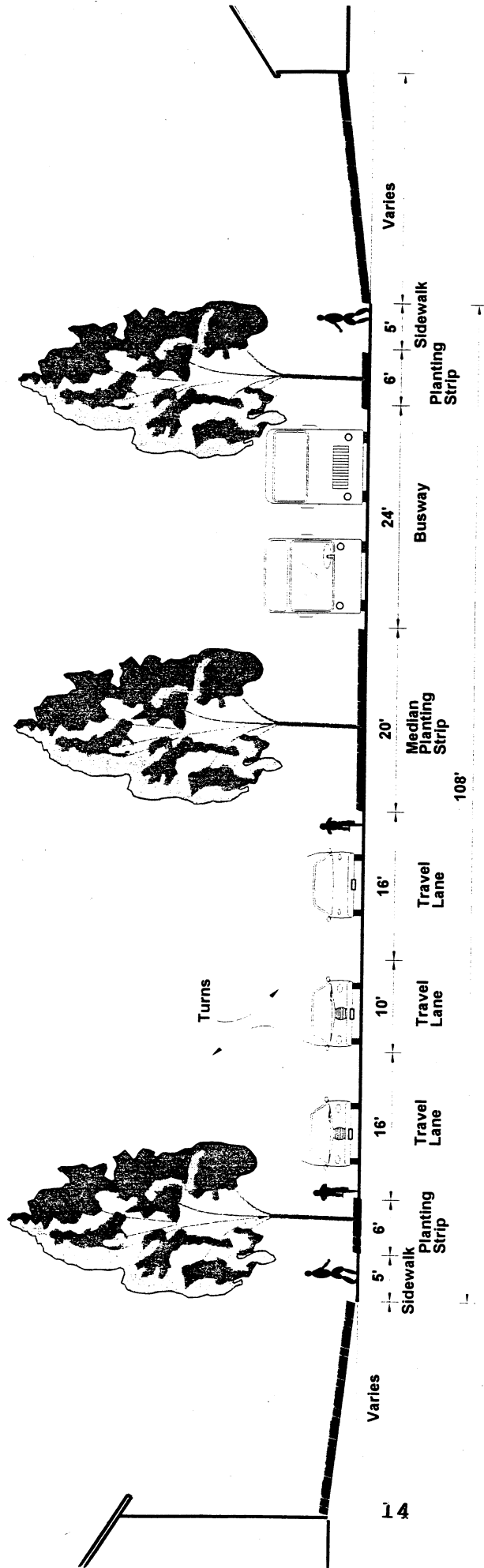
- Separates buses and vehicles, providing good safety.
- Has 20-foot median allowing refuge for cars and small trucks crossing busway from side streets and adjacent properties on the north side of the road.
- Provides full vehicle access to properties on south side of Jones Bridge Road, with center turning lane.
- Provides a row of trees in the median to soften the visual effects.
- Provides a refuge for safer pedestrian crossings.

Figure 5



Undivided Center Busway

Figure 6



Northside Busway

- Brings buses closer to houses on the north side of the road.
- Causes somewhat more difficult access to houses on the north side of the road.
- Provides fewer street trees than with the CBM cross section.
- Median would not be wide enough to store large trucks and buses waiting to cross.

JBRB Treatment Options

The JBRB alignment has several critical sections where various treatments are possible. This review will proceed from east to west and describe potential treatments. The rights-of-way needed for the range of JBRB cross sections are shown in the maps in Exhibit 2 in the Appendix.

Note that the need to flare out the road at signalized intersections for all cross section options causes the required right-of-way to be greater than shown in the typical cross sections. The need for consistent lane configurations at these intersections will also cause the required right-of-way for the various options to be somewhat similar at those locations despite the differences in the widths of the options' typical cross sections.

On the other hand, it is also possible to have a cross section that is narrower than the typical cross section in road segments. For example, in the CBM cross section, the median planting strip(s) can be reduced to six feet if left-turn lanes are not needed in certain segments.

Georgetown Branch Right-of-Way/Jones Mill Road Intersection

This intersection experiences some vehicle delay in the peak hours now and it has a high volume of bicyclists on weekends using Jones Mill Road as part of a connection to Beach Drive and the existing Capital Crescent Trail, including the newly-opened Rock Creek Trestle. Consequently, an underpass is needed at this location. However, the right-of-way to the west of this intersection is only 70-feet wide in places, so the point where the busway resurfaces onto Jones Bridge Road would highly impact adjacent properties.

At-grade designs are also complex. The three-minute headways make it very hard to use a traffic signal here unless buses control the signals as they approach the intersection. Allowing for movement without delaying buses on Jones Mill Road, and from Jones Mill Road to Jones Bridge Road (both of which would cross the busway) would be challenging but it is possible. However, with bus pre-emption of the signals, the busway would cause more delay for general traffic than the current at-grade situation. A roundabout is a possible solution, although the length of articulated buses to be used on the busway means the turning circle would have to be larger than minimum and safety would be a concern. Accommodating the high volume of cyclists safely in a roundabout design would also be difficult.

From Jones Mill Road to Connecticut Avenue

From Jones Mill Road westward to Manor Road, Jones Bridge Road is only two lanes wide, with approximately 39-46 feet of pavement and as little as 70-feet of right-of-way. There are more homes on the south side than north, and significant grades on the properties on the north side. Any of the potential cross sections could be used here, but the wider cross sections

will require taking more properties. The NB cross section could work somewhat better than the CBM cross section for houses on the south side of the road because those houses would have full access from the road.

West of Manor Road is the North Chevy Chase Elementary School. Access to the school is currently along Jones Bridge Road. This study assumes that the current driveway access on Jones Bridge Road cannot be safely accommodated with a center busway. If needed, access could be reconfigured so school bus movements would take place to and from Manor Road using a new access driveway from the current east side parking lot. Although the slope is steep, this could be feasibly accomplished and would provide alternative access. Potential conflicts with school bus routes now utilizing Jones Bridge Road would be a concern with the busway.

At Connecticut Avenue a grade separation would be provided. The busway is assumed to go under Connecticut Avenue, and at that point there would not be any connecting bus ramps to the busway. A small, walk-up bus station is assumed below grade. Any of the three possible cross sections could be used here, because a two-lane busway underpass would be needed under any situation. Turning movements for vehicles would be fully maintained at street level above the underpass.

Coquelin Parkway Optional Alignment

The eastern section of Jones Bridge Road between the Georgetown Branch right-of-way and Manor Road is the most constrained from the standpoint of space available for new construction due to houses along both sides of the road. This section can potentially be avoided by continuing on the Georgetown Branch right-of-way, just west of Jones Mill Road, then curling northward onto the existing right-of-way for unbuilt Coquelin Parkway for a distance of about one-half mile, entering a new tunnel under Jones Bridge Road, and then resurfacing on the west side of Connecticut Avenue. This optional alignment is shown in Exhibit 3 of the Appendix.

This option would avoid impacts on approximately 20 homes on Jones Bridge Road, and potentially avoid having to remove any of them. In addition, this option allows for a below-grade connection to the new busway in a way that minimizes impacts on the North Chevy Chase Elementary School and allows Manor Road to operate with all movements easily. However, the problems are that it uses a stream valley on the Coquelin Parkway right-of-way, and express buses would operate next to the back yards of more and different homes in this area than would otherwise be affected by the Georgetown Branch alignment. It also would be very expensive since it would require extensive engineering to prepare the right-of-way over the steep slopes of the stream valley and to provide a lengthy tunnel under Jones Bridge Road.

West of Connecticut Avenue to MD 355

Here, the right-of-way and number of lanes are greater than on the eastern side of Connecticut Avenue with four or five lanes available in a right-of-way that is generally 100 feet. However, the traffic volumes are much higher along this stretch with an average of about 22,000 vehicles per day currently and over 30,000 vehicles per day by 2005, which requires maintaining the current number of approach lanes for general traffic at both Connecticut Avenue and MD

355. The current eastbound approach to Connecticut Avenue has lengthy queues during many times of the day, and approaching motorists often endure several traffic signal cycles before they can proceed through the intersection in the evening peak period.

There are homes in various locations along both sides of the street. However, west of Hawkins Lane, there are no homes on the north side due to the presence of the Uniformed Services University of the Health Sciences and the National Naval Medical Center (NNMC), so the NB cross section would work better than either the CBM or the UCB cross sections here. However, transition from a CBM to a NB cross section would be an issue, and may preclude the NB option.

MD 355 and Medical Center Metrorail Station

The most complex question for the JBRB is how to deal with crossing MD 355 and connecting to the Medical Center Metrorail station. There are major physical constraints at the MD 355 intersection: the NNMC on the northeast side, National Institutes of Health (NIH) on the northwest side, and homes on the southeast side. Also, the entrance to the current Medical Center bus bays is at roughly 1000 feet to the north of Jones Bridge Road, requiring complex turning movements if this entrance were to be used by express buses from the busway. In effect, a vehicle going westbound on Jones Bridge Road would have to turn right on MD 355, then cut across three to four lanes of traffic over a short distance to make a left turn into the bus bay entrance. The Medical Center station extends generally under MD 355 to just north of the Jones Bridge Road intersection, creating a good opportunity for an underground connection.

Since an engineering study would be needed to resolve the complexity of this situation, a recommended solution is not provided here. Much negotiation with Federal agencies and complex design would be required. Nevertheless, the following design principles would seem to point toward the best solution.

Create an underground bus station that can directly access the Medical Center station platform via a new entrance to the south end of the platform. This station would be located either under land owned by NNMC on the northeast, or under NIH property on the northwest. In either case, no surface entrance would be required on the Federal property except for possible ventilation. Access would be for buses from an underground entrance reached from a portal beginning on the eastern side of the intersection.

- An alternative approach would be **a flyover for buses onto NIH property and a surface-level bus loop here**. This would require significant amounts of property from NIH and necessitate a walk for bus users from the bus area to the Metrorail entrance. The walk would be up to a few hundred feet depending on how much land is available from NIH. The benefit of this type of station is that it would allow buses to leave the station and travel either east along the JBRB or south along Woodmont Avenue to the Bethesda Metrorail station.
- An at-grade connection from Jones Bridge Road to the current Metrorail bus station area is not feasible. There is not sufficient space in the existing Medical Center bus bays to accommodate the number of buses that would use the busway, and the geometrics into and out of the station are not adequate for larger vehicles. Also,

providing green time for buses to turn left at two locations along MD 355 (northbound to westbound at the entrance to the current bus area and southbound to eastbound at Jones Bridge Road) would create significant delays along this section of MD 355 which is already suffering delays due to high traffic volumes and problems with vehicles entering and leaving the two large Federal facilities.

- **Running express buses in mixed traffic along Woodmont Avenue and MD 355 is the only feasible alternative for connecting with downtown Bethesda.** Bus service from the western end of the JBRB to the Bethesda Metrorail station was tested as part of this analysis. It was found that bus travel from downtown Silver Spring to the Medical Center, and then on to downtown Bethesda via Woodmont Avenue would take about the same time, or longer, when compared with travel of local bus service on East West Highway directly between Silver Spring and Bethesda. Some buses could connect from the Medical Center area to Bethesda for convenience purposes for some riders. **However, no bus priority seems possible between the two areas due to the heavy use of both MD 355 and Woodmont Avenue, so neither taking a lane or new lanes are feasible on those streets.**

TRAVEL DEMAND FORECASTING

Travel forecasts for the proposed busway provide an indication of the success of this facility in terms of increasing transit ridership in the corridor by providing mobility benefits for new and existing transit riders, and supporting the economic viability of the communities connected by the busway.

Future travel conditions are a function of both the underlying land-use patterns and assumptions about the transportation network. Both population and employment are expected to increase for the area of Montgomery County inside of the Beltway. Between 2000 and 2025, employment is forecasted to increase by 17.5 percent and households are expected to increase by 15.3 percent. Information from the 1997 Census Update Survey reveals that 18.4 percent of Montgomery County residents work inside the Beltway, a total of about 85,000 workers. These assumptions were used for all alternatives tested.

Any of the alternatives considered would provide a critical link between the two legs of the Metrorail Red Line. As a result, such an improvement would serve both local and regional transit trips. Many of the riders would be expected to have at least one trip end within the portion of Montgomery County within the Beltway, but there would also be a number of potential through trips on the line — riders that begin and end their trips outside of the corridor.

Forecasting Methodology

The analysis of transportation and mobility impacts performed for this study were based on travel forecasts performed using the M-NCPPC TRAVEL/2 demand model. This analysis used MWCOG Round 6.2 cooperative land-use forecasts for the year 2025 as the primary input to project travel demand. TRAVEL/2 is a regional travel model encompassing the greater Washington-Baltimore region, but with greater network detail within Montgomery County.

Projections of daily and annual ridership have been developed by factoring evening peak-period totals. The peak-to-daily factor is a key assumption that affects the daily and annual evaluation measures. There is a range of values for existing Metro stations to convert evening peak to daily trips, depending on the level of midday and non-work trips. The system average is about 3.0, but values can range from 2.6 for New Carrollton to 3.8 for Dupont Circle. To be consistent with the Georgetown Branch DEIS, a peak-to-daily factor of 3.5 was used in this study. A daily-to-annual factor of 285 was also used to generate annual trip estimates.

Description of Alternatives Tested

A summary description of the alternatives that were tested using the forecasting model is provided below.

- **Georgetown Branch Busway (GBB).** Bus rapid transit operating along the master-planned Georgetown Branch right-of-way between the Silver Spring and Bethesda Metrorail stations via a short section on local streets in Bethesda. This alternative is consistent with the CLRP.
- **Jones Bridge Road Busway (JBRB), Silver Spring Metrorail station to Medical Center Metrorail station, Center Busway with medians (CBM) or Northside Busway (NB).** BRT on Jones Bridge Road using either the Center busway with medians or the Northside busway cross section.
- **Jones Bridge Road Busway with connection to downtown Bethesda.** Sensitivity test with buses continuing beyond the Medical Center in mixed traffic providing local bus service along Woodmont Avenue and Wisconsin Avenue (MD 355) between the Medical Center and Bethesda Metrorail stations. This extension was found to compete with existing bus service, thereby not increasing transit ridership while requiring additional capital and operating costs.
- **Jones Bridge Road Busway without grade separations.** Buses using a restriped existing Jones Bridge Road cross section to give buses two lanes and other vehicles two lanes, with signal priority treatments rather than grade separations at one or more of the major intersecting streets. There are many combinations of at-grade and grade separations possible, each having impacts to property and benefits to buses.

It is important to keep in mind that a key objective of creating the busway is to attract new transit users. An improperly-planned busway with delays of only three to four minutes in travel time over that of the other busway alternatives studied is enough delay to result in virtually no new transit trips. Rather, such a busway merely attracts riders who were using other transit routes, and can now save several minutes by using this route rather than going all the way along the Red Line or using existing bus services. This delay results in an average travel speed of about 17 miles per hour rather than 22. It was found that this delay reduces overall ridership by about 25 percent over the higher speed busway. Also, the operating costs and access to properties of this alternative are the same as those of the other busway options. **Because of the poor ridership characteristics and high relative negative impacts, the option of using the current cross section was not defined and evaluated further.**

Travel Time Savings

The GBB would average 25 miles per hour over 4.5 miles between downtown Silver Spring and downtown Bethesda for a total time of 10.9 minutes. The JBRB would have an average speed of 22 miles per hour over 4.5 miles between downtown Silver Spring and Medical Center for a total time of 12.2 minutes. The average time on a Metrorail train between Bethesda and Silver Spring on the Red Line via downtown Washington, DC, is currently 35 minutes; the J2 bus travels between Silver Spring and Bethesda in 24 minutes.

One measure of the benefits of the busway is the travel time savings for existing transit riders. GBB exhibited the greatest travel time savings when compared with a no-build scenario without a transitway in this corridor. GBB showed a peak period time savings of 867 hours. This amounts to a total time savings of 2,601 hours daily or about 741,300 hours annually. JBRB showed peak period time savings of only 191 hours. This amounts to a total time savings of only 573 hours daily or about 163,300 hours annually.

Impact on Mode Shares

The GBB results in slightly higher mode shares at most work and home ends of trips. In Table 1, the mode shares are summarized by the two major activity areas — Bethesda and Silver Spring.

Table 1. Transit Mode Share for Work Trips

Policy Area	GBB		JBRB	
	Work End	Home End	Work End	Home End
Bethesda	18.7%	19.5%	18.3%	18.5%
Silver Spring	15.2%	20.3%	15.7%	19.9%

Projected Ridership

Relative to the JBRB, the GBB alternative shows higher peak period ridership. The GBB alternative is forecast to carry roughly 23,200 daily trips compared to 22,400 for the JBRB alternative. The GBB alignment would attract many more new transit trips than the JBRB alternatives.

COST ANALYSIS

This section of the report describes the cost analysis comparison for GBB and JBRB. This analysis is provided in two sections:

- Capital costs
- Cost effectiveness

Several JBRB optional treatments are described in this section. This section describes the sketch-level capital and operating cost assumptions and resulting estimates for these options.

As described previously, the purpose of this analysis is to compare the differences between BRT along Jones Bridge Road to BRT in the master-planned Georgetown Branch right-of-way. The only differences in capital costs, therefore, occur in the section west of Rock Creek Park. However, in developing cost-effectiveness comparisons, capital and operating costs must be synthesized. This synthesis must consider the “least common denominator” for both logical capital and operating segments. Therefore, the cost analyses described in this section have the following characteristics:

- Both capital and operating costs are for a busway connection between Silver Spring and a western terminus at either the Bethesda or Medical Center Metrorail stations.
- The capital costs **do not include a Silver Spring station**, because the means by which a BRT option would interface with the evolving Silver Spring Transit Center have not been evaluated in this sketch-level analysis
- Due to the lack of a Silver Spring station analysis, the capital costs and the cost efficiency of any of the BRT options described in this report are not comparable to prior MDOT estimates prepared for light-rail technology in the same corridor.

Capital Costs

Table 2 shows the estimated capital costs for the GBB and JBRB treatments.

Table 2. Comparison of Busway Capital Costs

Alternative	GBB	JBRB (CBM/NB)	JBRB (UCB)
Alignment	Georgetown Branch	Jones Bridge Road	Jones Bridge Road
Western terminus treatment	Bethesda via Pearl St.	Medical Center with below grade loop	Medical Center with below grade loop
Busway crosses Connecticut Avenue	Above grade	Below grade	Below grade
Typical Jones Bridge Road ROW width	n/a	108	78
Cost Element			
Construction	\$86.5	\$102.8	\$92.9
Western terminal station	\$0.0	\$36.0	\$36.0
Connecticut Avenue station	\$1.7	\$2.5	\$2.5
Utilities, vehicles, mitigation	\$35.0	\$32.4	\$32.4
Other (mobilization/real estate)	\$57.9	\$85.4	\$70.6
Total Estimated Capital Cost	\$181.1	\$259.1	\$234.4

GBB is the bus rapid transit (BRT) implementation on the **Georgetown Branch** alignment, generally following the conceptual design described in the 1996 Georgetown Branch MIS/DEIS. In the Bethesda CBD, access to the Metrorail station is provided via the Pearl Street connection proposed in the DEIS.

JBB (CBM/NB) is a BRT implementation using either the center busway with median (**CBM**) or the north side busway (**NB**) **along Jones Bridge Road**, with the western terminus connection at the Medical Center Metrorail station provided via an underground bus loop in the southwestern corner of the Naval Medical Center property. The busway crosses Connecticut Avenue below grade.

The \$259M estimated cost for JBB (CBM/NB) is approximately \$78M more than GBB. The differences are primarily due to:

- \$36M increase for the western terminal station below the Naval Medical Center property
- \$16M increase due to the relative costs of implementing the guideway along an existing roadway as opposed to along a trail
- \$28M increase in “soft costs”, generally split about evenly between increased right-of-way costs and other project management and implementation costs that are directly related to the magnitude of the project

JBB (UCB) is a BRT implementation using the undivided center busway (**UCB**) **along Jones Bridge Road**, with the western terminus connection at the Medical Center Metrorail station provided via an underground bus loop in the southwestern corner of the Medical Center property. The busway crosses Connecticut Avenue below grade.

A comparison of Option 1 and Option 2 demonstrates that the undivided busway costs approximately \$25M less than the divided busway, due to reduced infrastructure (such as the two medians and their associated drainage requirements) as well as reduced property impacts and right-of-way requirements. However, Option 2 still includes the Naval Medical Center below-grade bus loop and requires busway grade separation at Connecticut Avenue.

Cost Effectiveness

Cost-effectiveness has been one of the key measures used by FTA to evaluate New Starts projects. Cost-effectiveness of a proposed major investment is measured in terms of its added benefits and added costs when compared to lower cost options. The FTA guidelines for cost-effectiveness have changed significantly since the Georgetown Branch DEIS was completed in 1996. At the time that the DEIS was completed, the cost-effectiveness formula included was calculated as follows:

$$\text{C.E. Index} = \frac{\text{Capital Costs} + \text{O\&M Costs} - \text{Travel Time Savings}}{\text{New Transit Riders}}$$

Where:

Capital Costs = change in annualized capital costs compared with Base

O&M Costs = change in operating and maintenance costs compared with Base

Travel Time Savings = value of travel time savings for existing (Baseline) riders annually

New Transit Riders = attraction of new transit riders annually

The DEIS compares the “Build” scenario with TSM and No-Build scenarios. The TSM scenario is the Transportation System Management alternative, designed to achieve the goals of the project without a major investment in new facilities. The Baseline scenario used in the JBRB analysis assumes a level of service between the No-Build and TSM alternatives in the DEIS, because it includes significant bus service improvements in the corridor already included in the CLRP.

Current FTA guidelines are being updated to include Hours of Transportation System User Benefits. This measure was not used in this study because the methodology has not been fully adopted in the region at this time. Travel time savings for existing riders does provide an indication of the relative levels of benefits for transit riders who would already be using transit, but would have reduced travel times with the GBB or JBRB.

Table 3 shows the cost-effectiveness for the GBB to JBRB. The tabulation demonstrates that the GBB is substantially more cost effective than either JBRB option. The figures shown are based on the latest available costs and ridership forecasts developed by M-NCPPC for this study. The table presents the annual costs (capital and O&M), annual ridership (total and new riders), and time savings (in hours and dollars). A value of \$11.70/hour was used to convert time savings into dollars, the same value used in the DEIS.

Three cost-effectiveness indices are presented:

- **Cost per New Rider:** the cost-effectiveness as calculated in the Georgetown Branch DEIS.
- **Cost per Total Rider:** Annual costs (with value of time savings subtracted out) are divided by Annual Total Riders (boardings).
- **Cost per Hour Saved:** Annual costs (with value of time savings subtracted out) are divided by Annual Travel Time Savings (in hours).

JBRB generally compares favorably to the GBB in terms of total ridership and annual operating costs. However, the higher capital cost of either JBRB option results in a higher cost per total rider, \$3.66 as compared to \$1.61.

Table 3. Cost Effectiveness Indices

Alternative	GBB	JBRB (CBM/NB)	JBRB (UCB)
Costs (000s)			
Total Capital	181,100	259,100	234,400
Annualized Capital Costs	14,800	21,100	19,100
Annual O&M	4,500	4,200	4,200
Total Annual Costs	19,300	25,300	23,300
Ridership			
Total Daily Riders	23,200	22,400	22,400
Annual Daily Riders (000)	6,612	6,384	6,384
Daily New Riders	2,900	900	900
Annual Daily New Riders (000)	827	257	257
Percent of Riders that are New	12.5%	4.0%	4.0%
Time Savings			
Annual Time Savings (hours) for Base Riders	741,300	163,300	163,300
Value of Time Saved (000)	\$8,673	\$1,911	\$1,911
Cost Effectiveness			
Cost Per Total Riders vs No-Build	\$1.61	\$3.66	\$3.35
Cost Per New Rider vs No-Build	\$12.85	\$91.01	\$83.23
Cost per Hour Saved	\$14.34	\$143.23	\$130.98

Extending Service to Bethesda Metrorail Station

As described previously, a sensitivity test of the JBRB was performed to evaluate a continuation of the JBRB service from the Medical Center Metrorail station to the Bethesda CBD Metrorail station. This extension would run as a local bus service in mixed traffic along Wisconsin Avenue, essentially supplementing the local bus services already in place between the two Metrorail stations. The Wisconsin Avenue extension would provide a “one seat ride” between the Silver Spring CBD and the Bethesda CBD. However, it would not be cost-effective, as it would require additional capital and operating costs without a commensurate increase in transit ridership.

For both the GBB and JBRB, slightly fewer than half of the patrons are originating in or destined for the Bethesda CBD on the western side of the trip. The primary objective at the western end of the JBRB, therefore, is to connect seamlessly to the western arm of the Red Line rather than to the Bethesda CBD.

The Wisconsin Avenue extension would only increase total JBRB ridership by about two percent to 22,800 daily riders. The extension would add nearly six minutes to the round trip time

for each bus, however, resulting in a need to operate seven more buses during peak periods and an increase in the annual operating cost by nearly 50 percent, to \$6.2M.

The differences between the GBB and JBRB options are far more pronounced when either “base” riders or “new” riders are used as the denominator in the cost-effectiveness equation. This is due to the fact that the GBB performs best in attracting new transit riders to the corridor. This is a function of the elasticity of mode choice; it takes a clearly superior travel time performance to effect a change in mode choice.

Traffic Impacts

The implementation of a busway along Jones Bridge Road would have a noticeable impact on local circulation patterns but could be designed to avoid severe disruptions to traffic patterns. The pertinent findings of the traffic analysis are summarized below:

- Traffic operates at substandard levels of congestion at the Jones Bridge Road intersections with Wisconsin Avenue (MD 355) and Connecticut Avenue (MD 185) and congestion is forecast to worsen by the year 2025.
- None of the busway alternatives studied will appreciably affect traffic volumes in the year 2025.
- Converting existing traffic lanes to bus-only lanes at the Jones Bridge Road intersections with MD 355 and MD 185 would severely affect traffic operations in the area.
- Converting traffic lanes to bus-only lanes in the segment of Jones Bridge Road between MD 355 and MD 185, but outside the influence area of those intersections, would have some operational impacts but would not severely affect carrying capacity or travel demand.
- Additional operational studies would be required to assess localized neighborhood access, traffic circulation, and incident management strategies associated with any Jones Bridge Busway option.

The traffic analysis study area encompassed an area defined by Jones Bridge Road to the north, East West Highway to the south, MD 355 to the west and Jones Mill Road to the east. The study was conducted to determine the effect of the busway on overall traffic as well as operation of buses on exclusive busway lanes on Jones Bridge Road.

Traffic analysis included the evaluation of existing and year 2025 traffic conditions. A total of 12 intersections were analyzed. Three intersections: Connecticut Avenue and Jones Bridge Road, MD 355 and Jones Bridge Road, and Connecticut Avenue and East West Highway fail to operate within an acceptable level of service. Demand generally exceeds capacity at these locations by about five to ten percent. Traffic congestion is within acceptable ranges at the other nine study area intersections.

Continued development increases in Silver Spring and Bethesda and in the region will substantially change traffic volumes by the year 2025. Traffic on area roadways is expected to increase by amounts ranging from five percent to more than 30 percent. Traffic congestion is

forecast to exceed the acceptable standard at the three substandard intersections by up to 35 percent in the year 2025, a condition substantially worse than today's conditions. Existing and forecast congestion levels are shown on Figures 7 and 8, respectively.

Busway Effect on Traffic Volumes and Congestion

Most of the transit riders on the BRT options examined would be riders shifting from one transit service to another, rather than changing mode from auto to transit. Therefore, none of the alternatives evaluated have a substantial effect on forecast vehicle miles traveled in the study area. Similarly, traffic volumes on the Capital Beltway were not affected significantly by any of the alternatives considered.

The effect of converting general purpose travel or turning lanes to bus-only lanes varies based on location. **In areas where intersection operations are already substandard, removing general purpose lanes would have a severe effect on capacity and level of service.** Staff therefore finds that take-a-lane options on Wisconsin and Woodmont Avenues are not feasible due to the effect on traffic congestion. Jones Bridge Busway options that connect the Medical Center and Bethesda Metrorail stations assumed buses running in mixed traffic along Wisconsin and Woodmont Avenues.

Due to the high level of congestion at the Jones Bridge Road intersections with MD 355 and MD 185, all Jones Bridge Busway options evaluated assumed that the busway would be grade separated so as to generally preserve all the lanes at each intersection and ensure that buses don't encounter delays waiting for signal phases.

In other locations, however, some conversion of general purpose capacity to busway capacity can be made without severe traffic impacts. Between Glenbrook Parkway and Platt Ridge Drive, staff assumed the number of through travel lanes along Jones Bridge Road would be reduced from two in each direction to one in each direction, to reduce property impacts associated with the busway.

This "take-a-lane" approach would have an adverse operational effect, as the forecast peak-direction, peak-hour volumes in this portion of Jones Bridge Road approach 1,950 vehicles per hour. This volume is higher than the theoretical capacity of an arterial roadway lane, but not beyond volumes that can be observed if conditions are favorable. In other words, a Jones Bridge Road link volume of 1,950 vehicles per lane is similar to the forecast CLVs that exceed 2000 at the Jones Bridge Road intersections at MD 355 and MD 185. Staff finds the MD 355 and MD185 intersections remains the "weak link" in the chain; they will reach true capacity before the single-lane portion of Jones Bridge Road connecting them reaches capacity.

In addition, the evening peak hour traffic on eastbound Jones Bridge Road approaching Platt Ridge Drive also experiences a high level of delay caused by traffic queues in the left-turn lanes at Connecticut Avenue. Currently, the left turn queue at Connecticut Avenue accumulates beyond Platt Ridge Drive and blocks the movement of traffic trying to cross Connecticut Avenue on Jones Bridge Road. The traffic queue for the left-turn must clear before through traffic can move beyond Platt Ridge Drive to cross Connecticut Avenue. Delay caused by this blockage at Platt Ridge Drive could be exacerbated in the future if a lane west of Platt Ridge Drive is converted to busway use.

In the westbound direction of Jones Bridge Road, the “take-a-lane” strategy was assumed to be implemented between the signalized intersections at Connecticut Avenue and at Platt Ridge Drive. Two lanes for westbound through traffic are required on the Jones Bridge Road approach to Connecticut Avenue. At Platt Ridge Drive, the inside or median lane would be designated as an exclusive left-turn lane to Platt Ridge Drive and the outside lane used for through movements continuing along Jones Bridge Road. This option would result in some delay for travelers when as many as 1,700 cars per hour weave into one lane within the 900 foot transition between the two traffic signals. As in the eastbound direction, however, this delay while undesirable is not expected to be the weak link in the local circulation system.

Operational Concerns

Although future traffic analysis indicates all except three intersections will operate within the congestion level, it does not represent a true picture of future delay and congestion experienced by travelers in the study area. **Further study would be required to address the operational concerns outlined below.**

Left Turn Restrictions

With a center busway (UCB or CBM), left turns from Jones Bridge Road would only be allowed at signalized intersections, and during an exclusive left-turn signal phase (a “left-turn green arrow”) while BRT vehicles are stopped. This operation, similar to the light rail operations along Howard Street in Baltimore, is necessary to avoid a left turning vehicles being struck by an overtaking transit vehicle.

With the CBM, the left-turn prohibition would also apply to traffic turning onto Jones Bridge Road; median breaks would only be provided at signalized intersections. Special signing and marking would be required to direct motorists to the correct side of the dual-median facility. As the busway is assumed to be grade separated at Wisconsin Avenue, Connecticut Avenue, and Jones Mill Road, the remaining signalized intersections with exclusive left-turn phases would be at Glenbrook Parkway, Platt Ridge Drive, and Manor Road. It is possible that the busway would lead to a signalized intersection being added at one of the entrances to the Naval Medical center, although a signal warrant study would be performed to make that determination. It is very unlikely that any of the other residential streets intersecting Jones Bridge Road would warrant traffic signal control either with or without busway implementation.

In general, the effect of left-turn restrictions would be a localized change in neighborhood traffic circulation. Left turns would commonly be replaced by a combination of a right turn onto or from Jones Bridge Road and a U-turn at a nearby signalized intersection. Local motorists would also tend to adjust their paths to travel “around the block”, arriving on Jones Bridge Road facing in the appropriate direction to access their properties. This restriction would be an inconvenience for as many as 150 households that are either adjacent to Jones Bridge Road or on a street that has no other access than Jones Bridge Road. The restriction would not be expected to substantially change travel demands or congestion.

Northside Busway Side Street Access

With the NB, concerns relating to side street and driveway access are somewhat different. No turning movements would need to be prohibited, but operational concerns are associated with all turns. Staff has assumed that a 20-foot median would be sufficient to store vehicles that need to cross the NB from driveways or minor, unsignalized side streets. The side street approaches to both the NB and Jones Bridge Road itself would be stop-controlled. Additional studies would need to consider the design of the median ends so that vehicles have appropriate sight lines at each of the side street stop bars. The risk and consequences of vehicular queues exceeding the 20-foot storage distance, whether due to more than one car attempting to share the same space or to the occasional longer vehicle (trash trucks, delivery or moving vans, etc.), would need to be evaluated.

Incident Management

Incident management would need to be evaluated for all busway scenarios. Recurring incidents, such as local school bus or public transit vehicle stops would need to be considered. The effects of non-recurring incidents such as vehicular breakdowns would also need to be reviewed.

Queue Lengths

Staff has proposed that the “take-a-lane” approach for the portion of Jones Bridge Road between Glenbrook Parkway and Platt Ridge Drive is not a fatal flaw for the busway options. However, the extent of vehicular queuing at signalized intersections, and the potential for queues extending beyond the current turn-lane lengths into the single-lane portions of Jones Bridge Road would need to be evaluated further.

MASTER PLAN CONSISTENCY

The JBRB is not consistent with the *Bethesda-Chevy Chase Master Plan* (April 1990). The master plan does not recommend that Jones Bridge Road include a dedicated transitway, it also classifies the street as a primary residential street to the east of Connecticut Avenue and as an arterial highway to the west. The major inconsistency with the master plan concerns the vision for the area east of Connecticut Avenue which is a community of single-family homes. The area is zoned R-60 and R-90. As a primary street, Jones Bridge Road is intended to serve the local community and carry local transit and school buses, which stop frequently for passengers. It serves as a front door to its community. The master plan designates the primary right-of-way at 70 feet which is not wide enough to accommodate the addition of a transitway. The community’s expectations, based on the master plan, are that the eastern length of this street will remain a primary, not an arterial highway and not a dedicated transitway.

The JBRB is also not consistent with recommendations of the *Georgetown Branch Master Plan* or the *Bethesda CBD Sector Plan*: The proposed Jones Bridge Road alignment is not consistent with the *Georgetown Branch Master Plan* in terms of:

- The alignment of the busway between Jones Mill Road and Bethesda

- The location of the Connecticut Avenue station
- The location of the terminal station outside the Bethesda CBD

The Georgetown Branch Master Plan also anticipates construction of the southern entrance to the Bethesda Metro Station as part of the project. This would not be necessary for the Jones Bridge Road alignment.

The proposed Jones Bridge Road alignment is not consistent with the *Bethesda CBD Sector Plan* (1992) which anticipates use of the Georgetown Branch alignment with a terminal in the CBD connected directly to the Bethesda Metro Station.

IMPACTS ON EXISTING COMMUNITY

Staff finds that the JBRB creates significant adverse impacts on neighborhoods. There would be a change in character, most notably east of Connecticut Avenue. There would be reductions of approximately five front or side yards as well as more extensive grading and higher retaining walls and a noticeable increase in the width of road pavement. Daily access would be compromised for the elementary school as well as for as many as 150 households along the road's entire length that depend on it for their sole access for walking to existing bus stops and driving. Over eighty existing single-family homes are on lots adjacent to Jones Bridge Road and would experience varying degrees of impacts. The impacts created by the Jones Bridge Road alignment differ from those created by the Georgetown Branch alignment, but they are as significant and are unanticipated impacts for the community since they are not reflected in the master plan for the area. A comparison is shown in the Table 4. Noise impacts are evaluated and addressed in the Environmental Impacts section of this report.

The JBRB creates impacts on public and private institutions. There are several institutional uses located along the Jones Bridge Road alignment that would be affected. They are located west of Connecticut Avenue where the road is classified as an arterial highway and zoned R-60 and R-90.

The Medical Institutions: The edges of two of the campuses would be affected by right-of-way acquisition or grading. This would result in some reduction in the woodland edge. In the case of the Uniformed Services University of Health Sciences, there is a security fence that might require relocation. In the case of the Howard Hughes Medical Institute, which is private, there is a tiered stone retaining wall that would need to be relocated.

The other two institutions are possible sites for the busway terminal at MD 355: NIH and the NNMC. In each case these are secured campuses and there are many issues related to locating a busway terminal on either one. The degree of impact and mitigation measures can only be properly evaluated with the full involvement of those institutions.

Columbia Country Club: The alignment would require additional right-of-way acquisition from Columbia Country Club. This would affect existing trees that screen the golf course from the road.

**Table 4. Comparison of Impacts on Neighborhoods:
Jones Bridge Road Alignment and Georgetown Branch Alignment**

	Georgetown Branch Alignment	Jones Bridge Road Alignment
Relationship to Neighborhood	Divider: forming the edges of neighborhoods & separating them. Homes back onto the alignment. Layout of homes responds to the freight line built before the neighborhoods.	Front Door: A main entry for the community. The elementary school and many homes face the alignment, which evolved as a residential street east of Connecticut Avenue.
Community Character	Loss of many mature trees behind homes: Less privacy: less natural beauty.	Reduced front or side yards (~5) & possible disinvestments, slope easements for grading & larger retaining walls, possible demolition of one house. Loss of some mature street trees near school.
Schools	None	Elementary school access more difficult for school buses, staff & walkers. Requires redesign.
Local Household Access: Walking; Biking; Driving; Transit	Loss of potential for more frequent pedestrian and bike connections across the alignment or onto the trail.	Increased difficulty for as many as 150 households with no other driving route option than Jones Bridge Road. Crossing street more difficult for pedestrians, bicyclists, and drivers going to school, bus stops, and other destinations.
Households Within 50 feet of Right-of-Way	~80 households (estimate)	~70 households (estimate)

Capital Crescent Trail

The JBRB alternatives do not have any negative impacts on the Capital Crescent Trail. The Jones Bridge Road alignment would leave the entire Georgetown Branch right-of-way, from Jones Mill Road to Bethesda, for trail use. In addition, the existing character of the interim trail could be maintained because a larger number of mature trees could be preserved. In addition, trail use would be interrupted for a much shorter period of time for construction of a permanent trail. The trail under the Apex building would have ample room and would not be shared with transit vehicles.

Transit Oriented Development

The JBRB does not support Transit Oriented Development at Connecticut Avenue. The shift from the Georgetown Branch alignment to the Jones Bridge Road alignment results in the loss of the opportunity to directly serve the Chevy Chase Lake commercial and residential area with a transit station. A Jones Bridge Road transit station would be at an intersection surrounded by single-family residential uses and the Howard Hughes Medical Institute and would serve fewer people.

ENVIRONMENTAL IMPACTS

Any transportation facility requiring Federal funds must go through an environmental impact statement. M-NCPPC has a Geographic Information System (GIS) that has information for a number of elements considered as sensitive areas. GIS is not intended to replace the millions of dollars that will ultimately have to go into detailed studies, but it does provide a preview of areas that may require avoidance, minimization, or mitigation. For the purposes of consistency, the data to create the chart below come from GIS. The chart did not use data from the Georgetown Branch DEIS, but used data from the Commission GIS to provide a consistent basis for comparison.

There are several cautions about the following information. This is a planning level analysis based on simplifying assumptions, and should be used as a preliminary screening method. The results are less precise than would be determined from individual project engineering studies and extensive environmental fieldwork. Limitations include the following:

- The locations and extent of impact were determined by a right-of-way that can extend to as much as 154 feet in certain locations along Jones Bridge Road. Areas of disturbance could change during the design process and impacts could be reduced through relocation and design and construction methods.
- Steep slopes are generally not accounted for. Steep slopes are defined as slopes of 25 percent and greater.
- The analysis does not capture individual specimen trees (>30 inch diameter at breast height), which may be located within the existing right-of-way, the expanded right-of-way, and on land areas necessary for stations.
- The right-of-way does not capture project components such as storm-water management facilities and staging areas, which create additional areas of disturbance.
- The amount of the environmental features is often more extensive than the indicators available in the GIS. Therefore, this tool should be used to compare alignments rather than to evaluate a single alignment.

These limitations are acceptable for a planning level review because the measurements are primarily to be used in relative terms rather than as absolutes. The table below indicates the impact to environmental features for a potential CBM or NB busway cross section on Jones Bridge Road as compared to one on the Georgetown Branch right-of-way between Jones Mill Road and Bethesda. For the JBRB, the 108-foot cross section was used. The impacts would be less if this was reduced. For definitions of environmental features see Exhibit 4 in the Appendix.

Neither route has impacts to floodplains, wetlands, forests of 100 acres or more in size, and interior forests. In addition, both alignments utilized existing stream crossings and therefore no new stream crossings would occur.

Table 5. Environmental Features

Environmental Features (Shown in acres, except at noted)	Georgetown Branch (Jones Mill Road to MD 355)	Jones Bridge Road (Jones Mill Road to MD 355)
Total acres of surface right-of-way (not tunnel areas)	14.1	19
Existing Stream Crossings	2	1
Stream Buffers (acres)	0	0.3
Park Property (acres)	0	0.1
Forest (acres)	0	0.1
Linear Feet of ROW Adjacent to Public Park	0	524

Existing noise levels on Jones Bridge Road between Connecticut Avenue and Jones Mill Road exceed the Federal noise abatement criteria of 67 dBA Leq. At the intersection of Jones Bridge Road and Jones Bridge Court, ambient (or background) noise levels were measured at 53 dBA and Leq levels of 69 dBA. The minimum and maximum noise levels in the monitoring period ranged from 53 dBA to 78 dBA. Automobile passenger cars add 10 to 15 decibels to background noise level. Buses, including school buses, Ride-On and WMATA buses add 20 to 25 decibels to the ambient noise level. At this location, increased noise levels were attributed to tires on the pavement and not from accelerating engines or braking vehicles.

Because of existing and future noise concerns along Jones Bridge Road, an alternative route for the busway was considered. This alternative would bypass the section of Jones Bridge Road between Jones Mill Road and Clifford Avenue by running along the Georgetown Branch right-of-way and then connecting to Jones Mill Road via the right-of-way for Coquelin Parkway. Running buses along this alternate route would not decrease noise levels below 69 dBA for peak-hour noise on Jones Bridge Road because of the traffic that would remain. In addition, this alternative would result in the loss of an additional two acres of forest and cause either the piping or bridging of the existing stream in the Coquelin Parkway right-of-way. This stream is heavily affected in two locations by stormwater discharges from Jones Bridge Road and Manor Road, the nearby school, and the surrounding residential developments. In the receiving stream, there is substantial scouring of the stream bank and the banks are deeply incised at the discharge points. However, 400 feet from Jones Mill Road all scouring and incision are gone; springs and seeps feed the stream, and aquatic organisms are present.

In the section of Jones Bridge Road between Connecticut and Wisconsin Avenues, noise levels were measured at lower levels. At the intersection of Jones Bridge Road and Lynbrook Drive, noise levels were measured at 66 dBA Leq. Part of this can be attributed to the wider roadway when compared to the section of Jones Mill Road east of Connecticut Avenue. However, increases in future traffic volumes, including buses, will increase noise levels above 66 dBA, but not substantially.

The State Highway Administration considers sound barriers for noise sensitive areas when existing noise levels exceed 66 decibels. Montgomery County only considers noise abatement when the sound level equals or exceeds 67 dBA for the peak-noise hour.

The noise levels monitored along Jones Bridge Road meet or exceed the criteria for noise mitigation. However, the opportunities to mitigate noise levels along Jones Bridge Road are greatly limited because of narrow setbacks between the houses and the right-of-way and the need to provide access points for individual driveways and sidewalks to the road. The only readily available alternative to mitigate noise levels along Jones Bridge Road is acoustical treatment on the houses and noise fencing between houses.

Historic Resources Analysis

The area along Jones Bridge Road between Connecticut Avenue and Wisconsin Avenue includes one historic district and two individually-designated historic sites, all of which have been designated on Montgomery County's *Master Plan for Historic Preservation*.

The Hawkins Lane Historic District represents an enclave of free blacks that was originally established in the late 1800s. In 1893, James H. Hawkins, an ex-slave, paid \$300 for three acres of land owned by Sophia Chew. Hawkins, a truck farmer and part-time Methodist minister, built a house for himself, which was later destroyed by fire. He had 12 children. His son, Samuel Hawkins, built the still-extant unpaved road known as Hawkins Lane in the early part of the 20th century and he built most of the houses on the west side of the lane. At least four other houses in the historic district were built by and lived in by other Hawkins siblings. In all, the historic district includes 15 historic residences, three of which front on Jones Bridge Road. These modest homes along the narrow rustic lane reflect the heritage and lifestyle of determined black citizens in the early 20th century.

The Gilliland-Lacy House at 4025 Jones Bridge Road is an individually-designated historic site, built in approximately 1896. The James Hurly House at 4023 Jones Bridge Road is an individually-designated historic site, built in approximately 1907.

A busway on Jones Bridge Road can be designed to avoid taking any of the historic properties. The proximity of the busway, nevertheless, could have a detrimental impact on an adjacent historic district and the two historic sites.

This proximity would initiate a review process to determine the extent (if any) of detrimental impacts to the historic resources. This process (mandated by Section 106 of the National Historic Preservation Act) would be carried out by the State Office of Historic Preservation.

Summary of Environmental Impacts

Impacts to the natural environment are similar for both the Jones Bridge Road alignment and the Georgetown Branch alignment. However, the Jones Bridge busway would result in impacts to many properties. Staff finds the Jones Bridge Road busway would increase noise levels and bring the noise source closer to the existing homes. The only reasonable noise mitigation technique for the existing homes is acoustical treatment.

APPENDIX



RECEIVED
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MONTGOMERY COUNTY COUNCIL
ROCKVILLE, MARYLAND


OFFICE OF THE CHAIRMAN
THE MARYLAND NATIONAL CAPITAL
PARK AND PLANNING COMMISSION

OFFICE OF THE COUNCIL PRESIDENT

MEMORANDUM

March 26, 2003

TO: Derick Berlage, Chair
Montgomery County Planning Board

FROM: 
Michael L. Subin, President
Montgomery County Council

SUBJECT: Alternative Alignment of Bethesda-Silver Spring Segment of the Inner Purple Line

As you know, the County Council has endorsed construction of the Inner Purple Line Light Rail system between Bethesda and New Carrollton, using the Georgetown branch alignment between Bethesda and Silver Spring. Last week, Governor Ehrlich endorsed the Inner Purple Line. In so doing, he agreed to review competing alignments for the Bethesda-Silver Spring segment, including the Georgetown branch. The Governor has also agreed to review an alternative alignment along Jones Mill and Jones Bridge Roads.

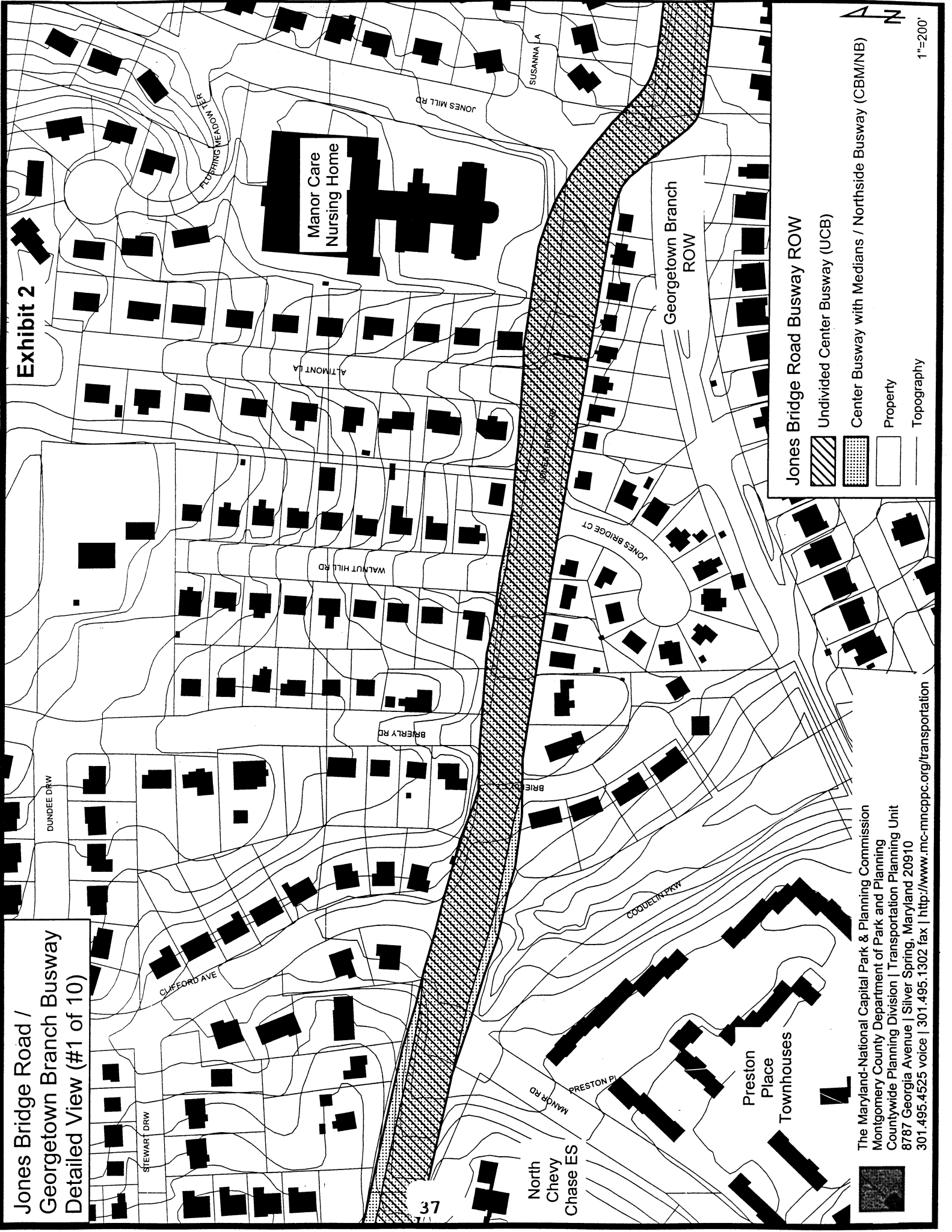
I would appreciate the Planning Board's prompt review of this alternative alignment, because the possibility that a full review of this alternative may delay the project for years, we request that your review be completed by July 30.

Thank you for your attention to this important matter.

Cc: Councilmembers
Glenn Orlin

**Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#1 of 10)**

Exhibit 2



Jones Bridge Road Busway ROW

Undivided Center Busway (UCB)

Center Busway with Medians / Northside Busway (CBM/NB)

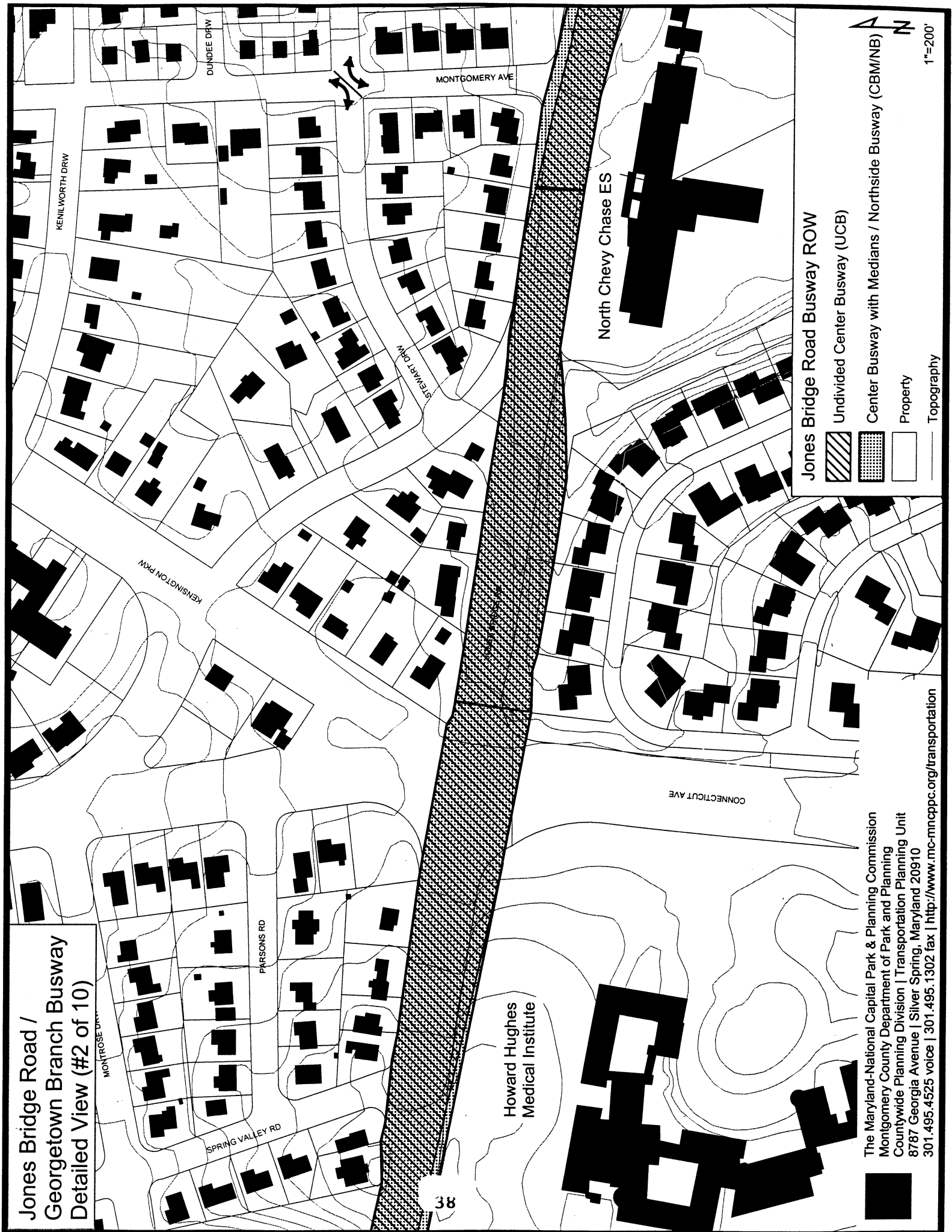
Property


Topography

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


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Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#2 of 10)



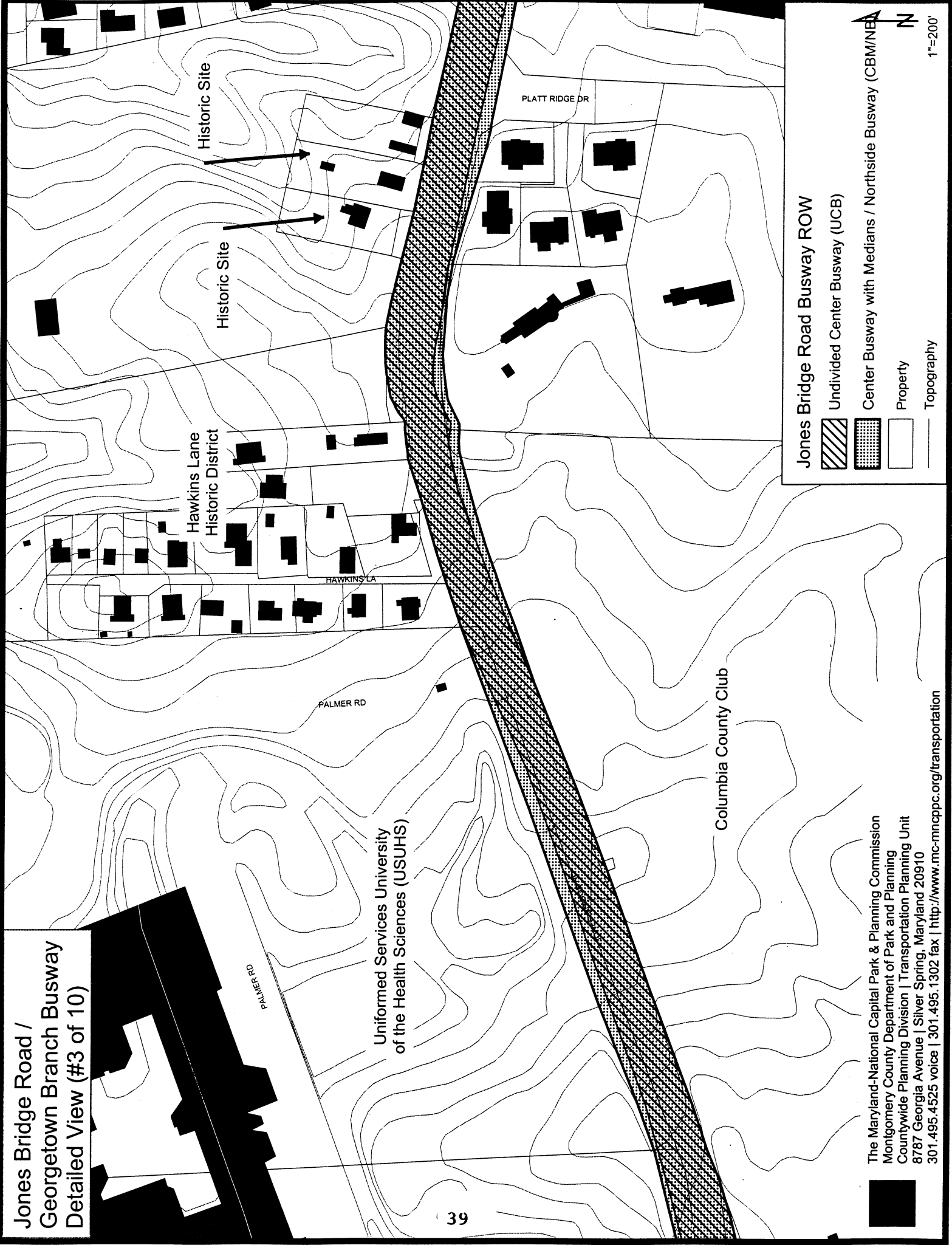


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Jones Bridge Road Busway ROW
 Undivided Center Busway (UCB)
 Center Busway with Medians / Northside Busway (CBM/NB)
 Property
 Topography

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**Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#3 of 10)**



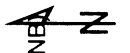
Jones Bridge Road Busway ROW

Undivided Center Busway (UCB)

Center Busway with Medians / Northside Busway (CBM/NBS)

Property

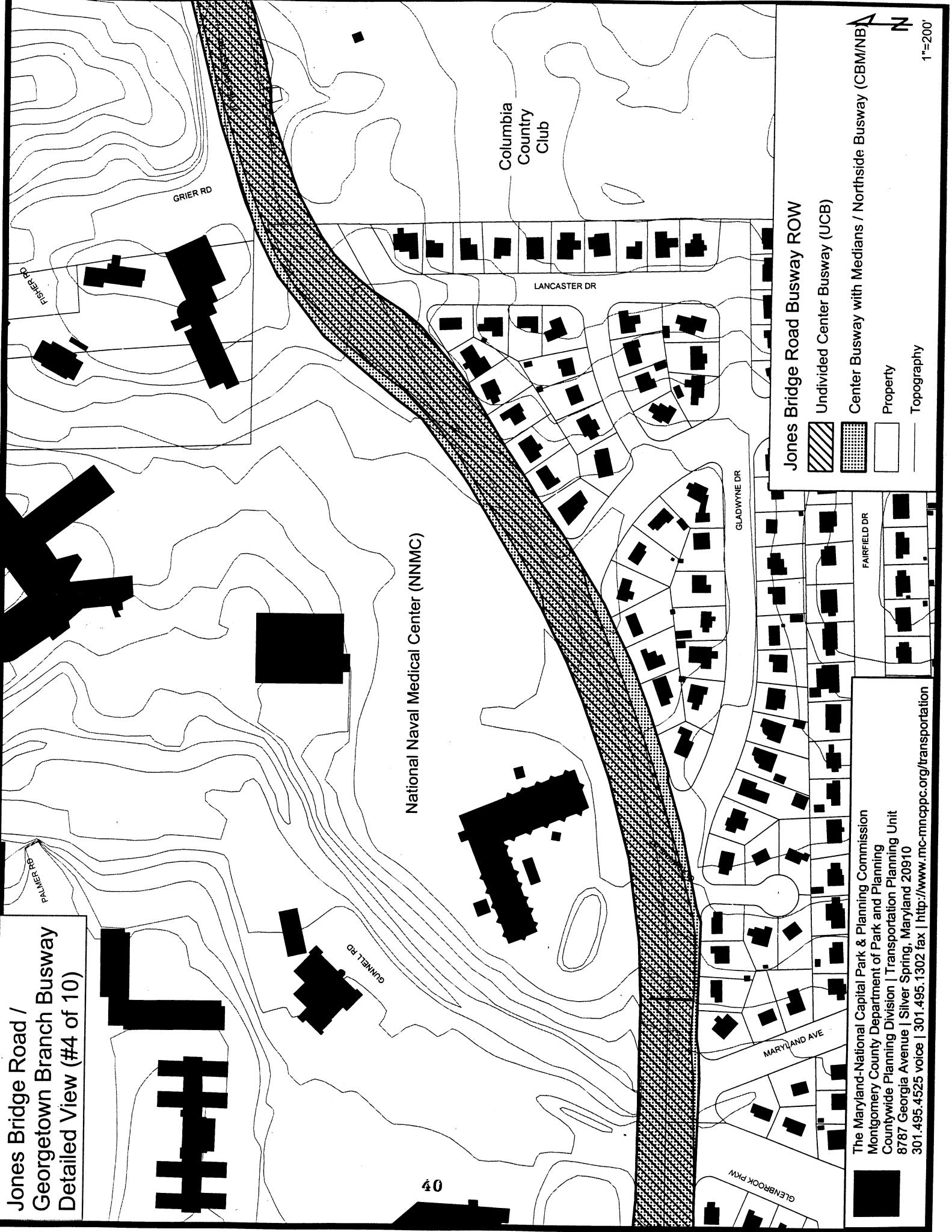
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


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**Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#4 of 10)**

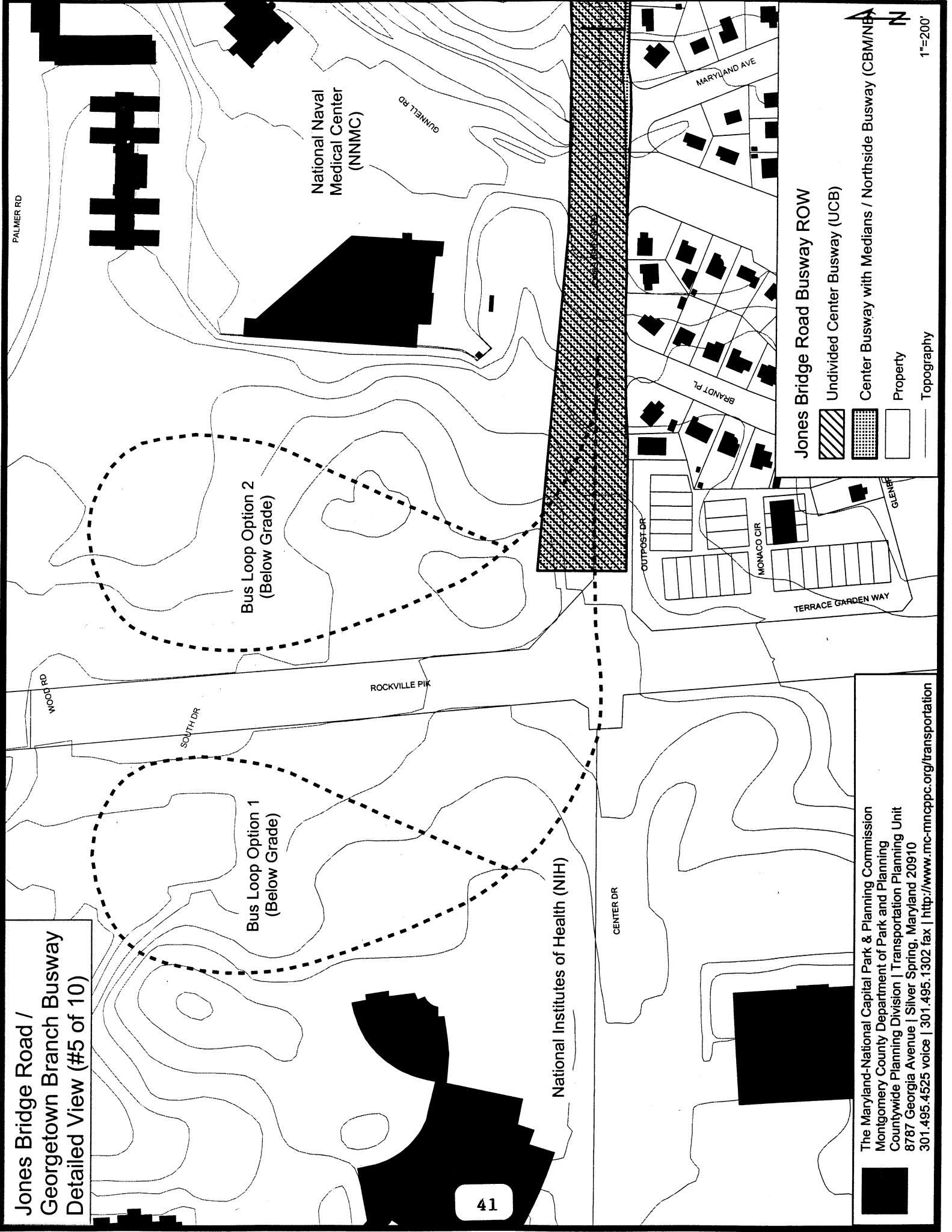


Jones Bridge Road Busway ROW

-  Undivided Center Busway (UCB)
-  Center Busway with Medians / Northside Busway (CBM/NB)
-  Property
-  Topography

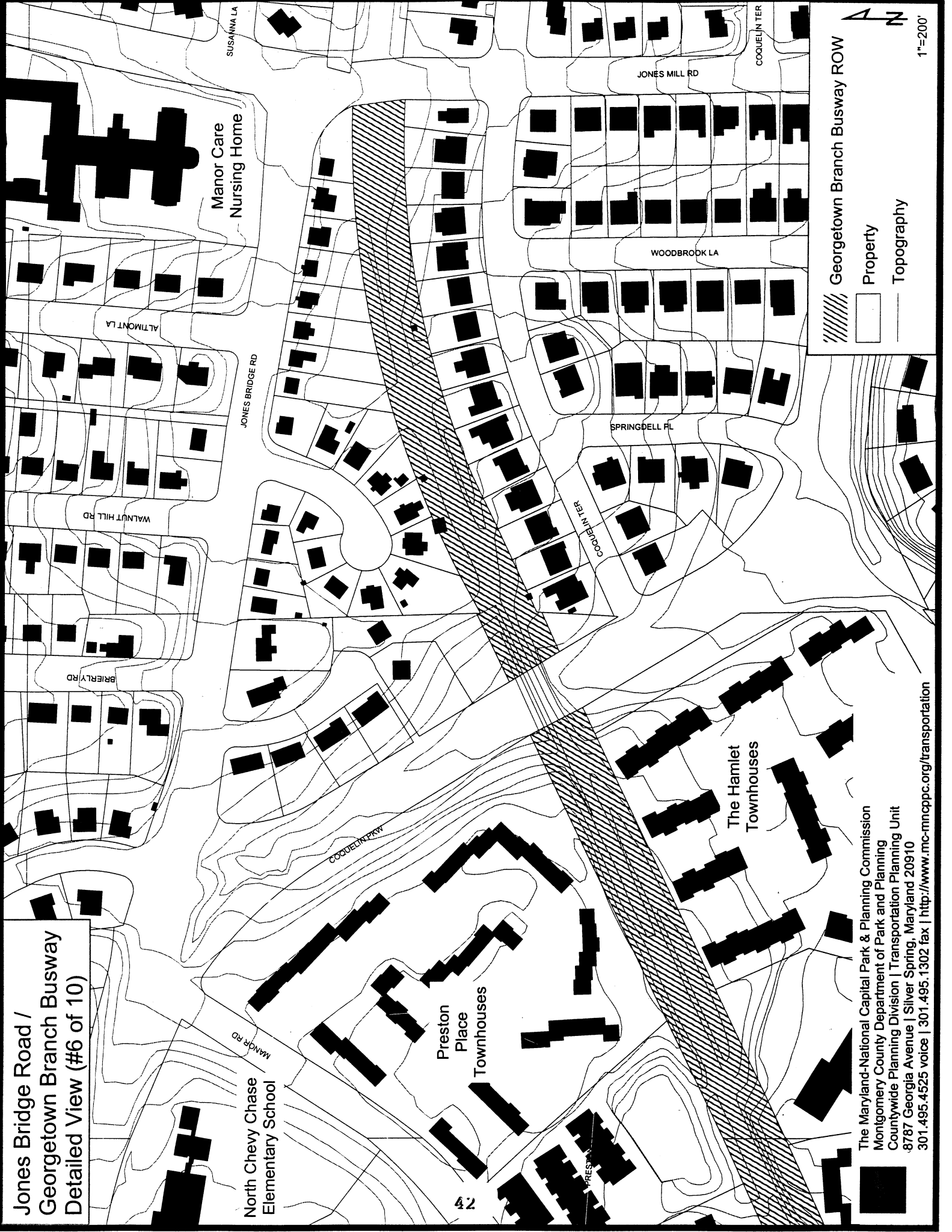
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**Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#5 of 10)**



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Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#6 of 10)



Manor Care
Nursing Home

North Chevy Chase
Elementary School

Preston
Place
Townhouses

The Hamlet
Townhouses

Georgetown Branch Busway ROW

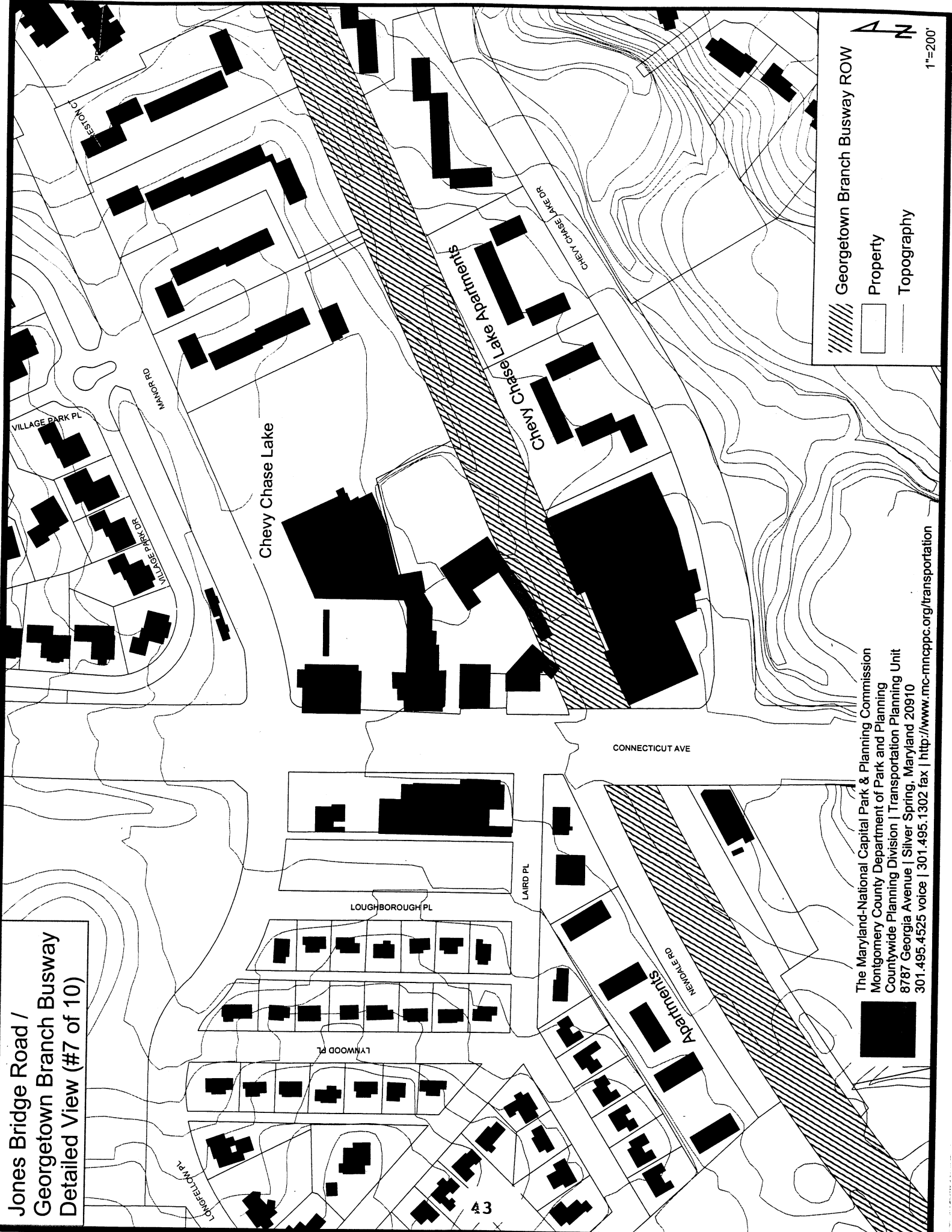
Property
Topography






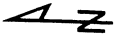
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Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#7 of 10)

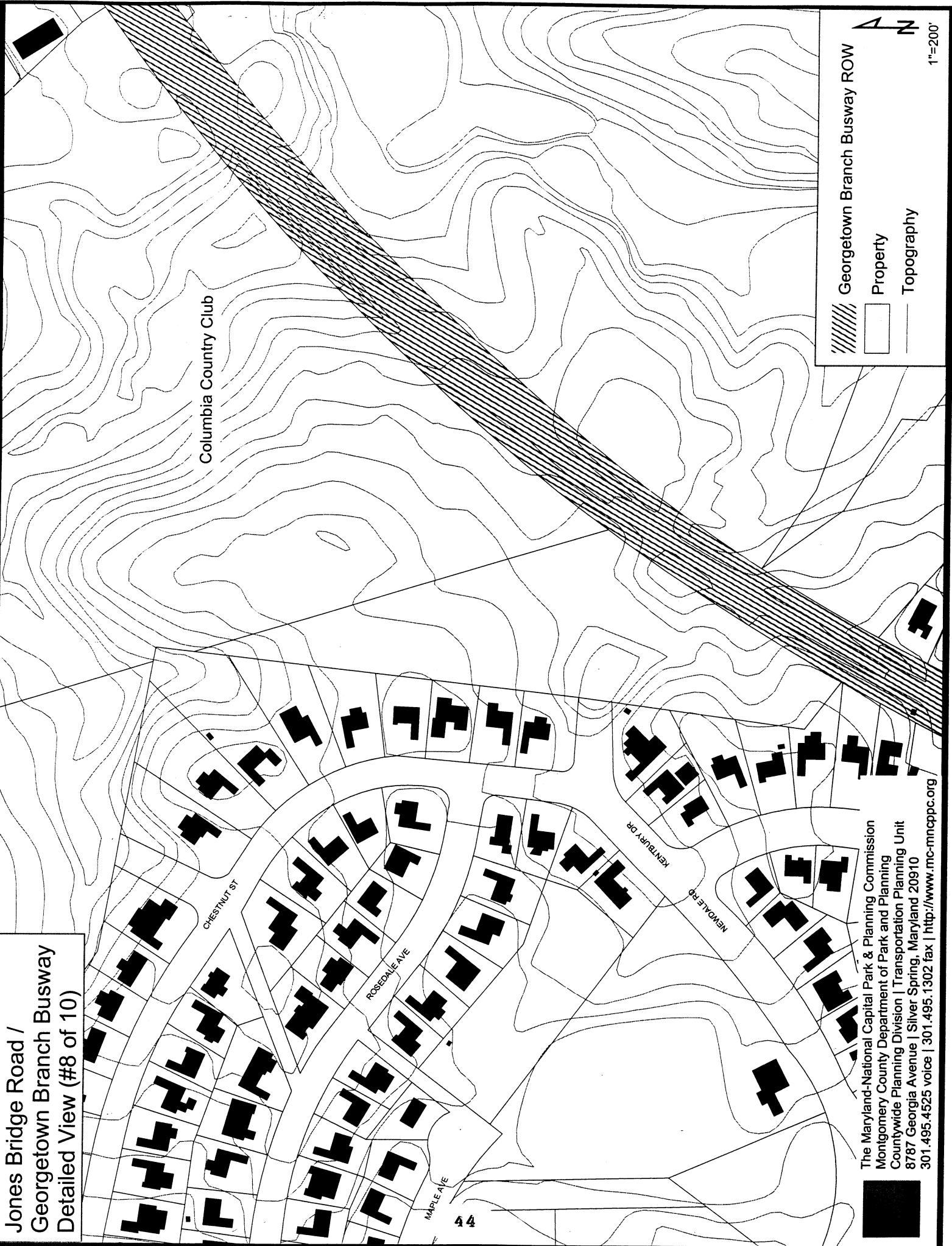


 Georgetown Branch Busway ROW
 Property
 Topography

 N
 1"=200'

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Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#8 of 10)



Columbia Country Club

MAPLE AVE

CHESTNUT ST

ROSEDALE AVE

KENTUCKY DR

NEMOLE RD

Georgetown Branch Busway ROW

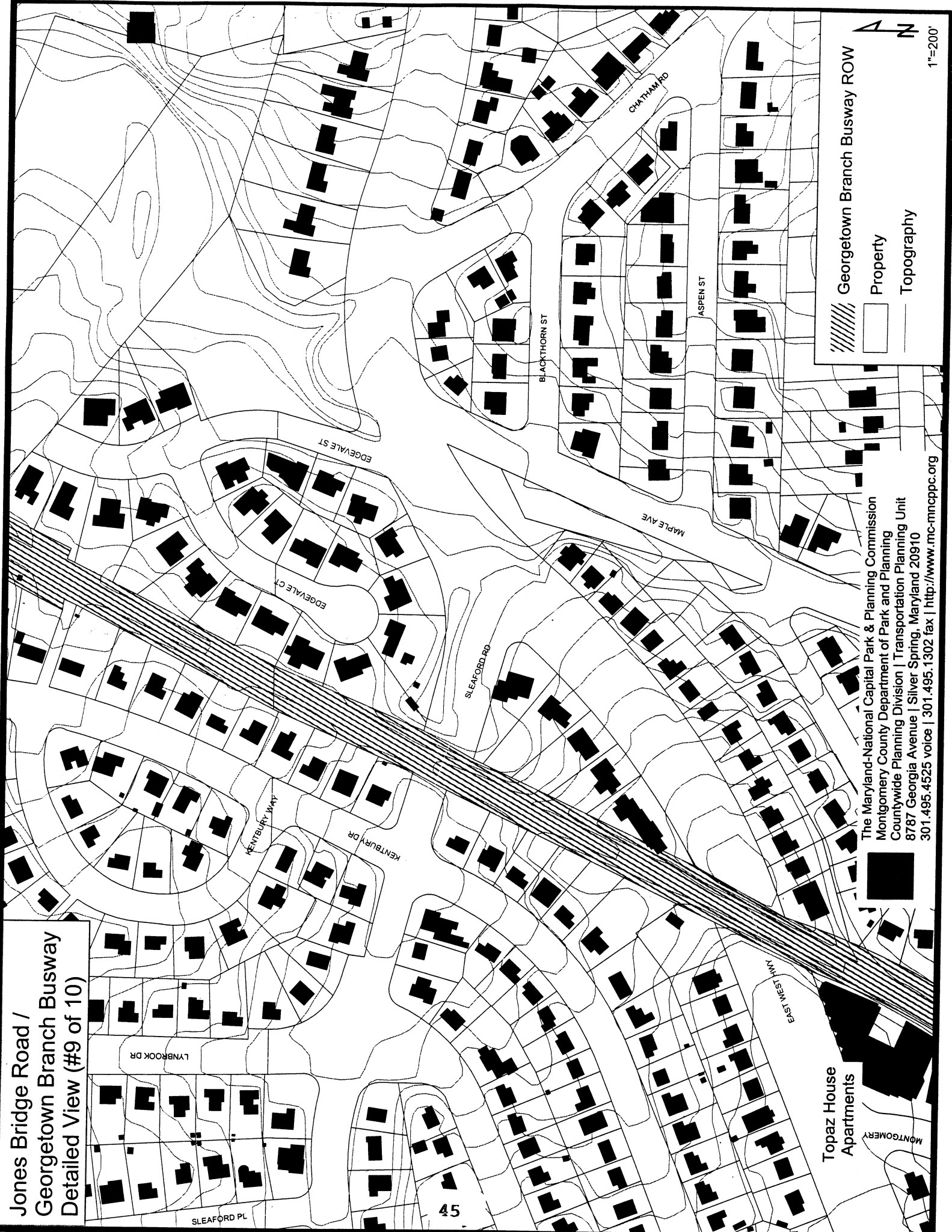
Property

Topography

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Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#9 of 10)



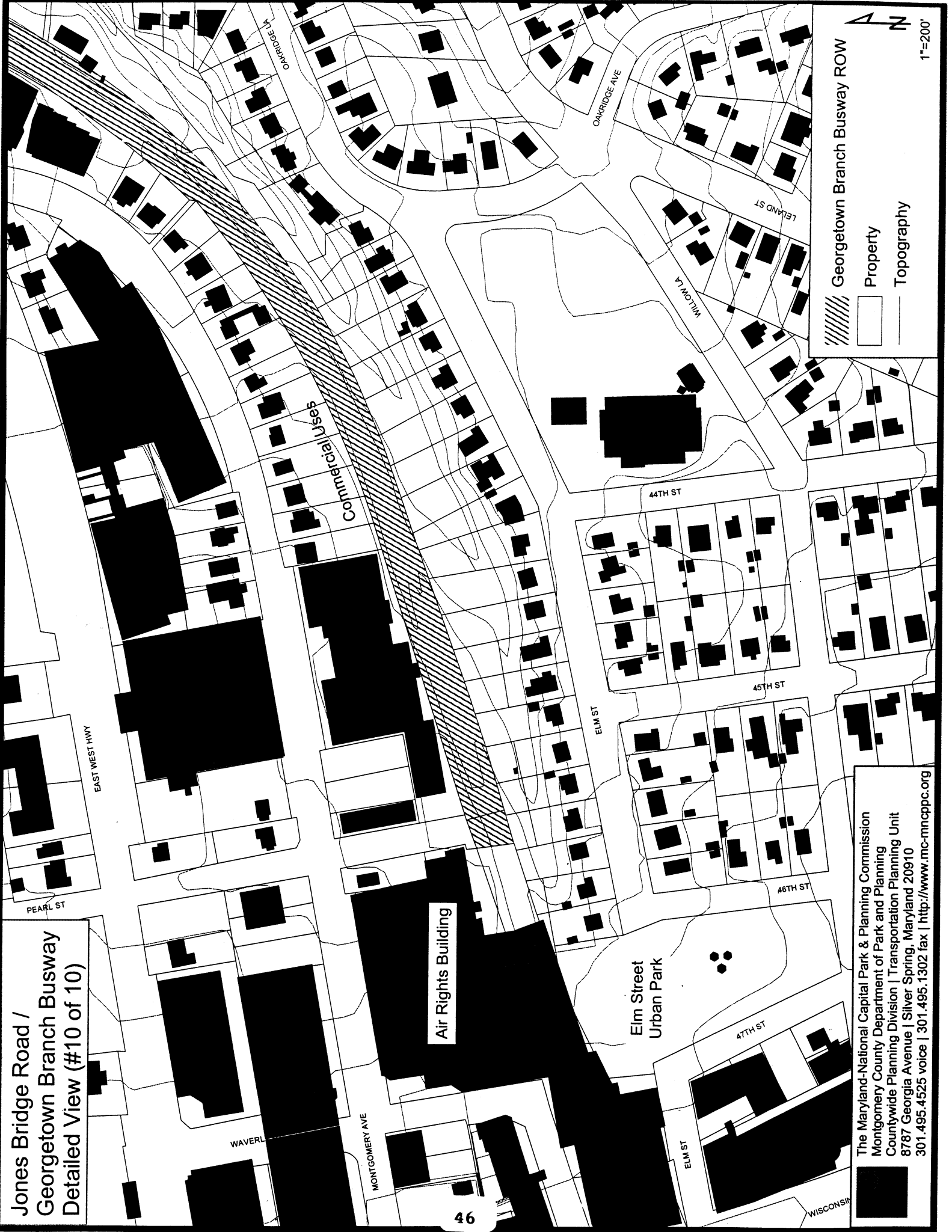
Georgetown Branch Busway ROW
Property
Topography

1"=200'

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Topaz House
Apartments

Jones Bridge Road /
Georgetown Branch Busway
Detailed View (#10 of 10)



Georgetown Branch Busway ROW

Property

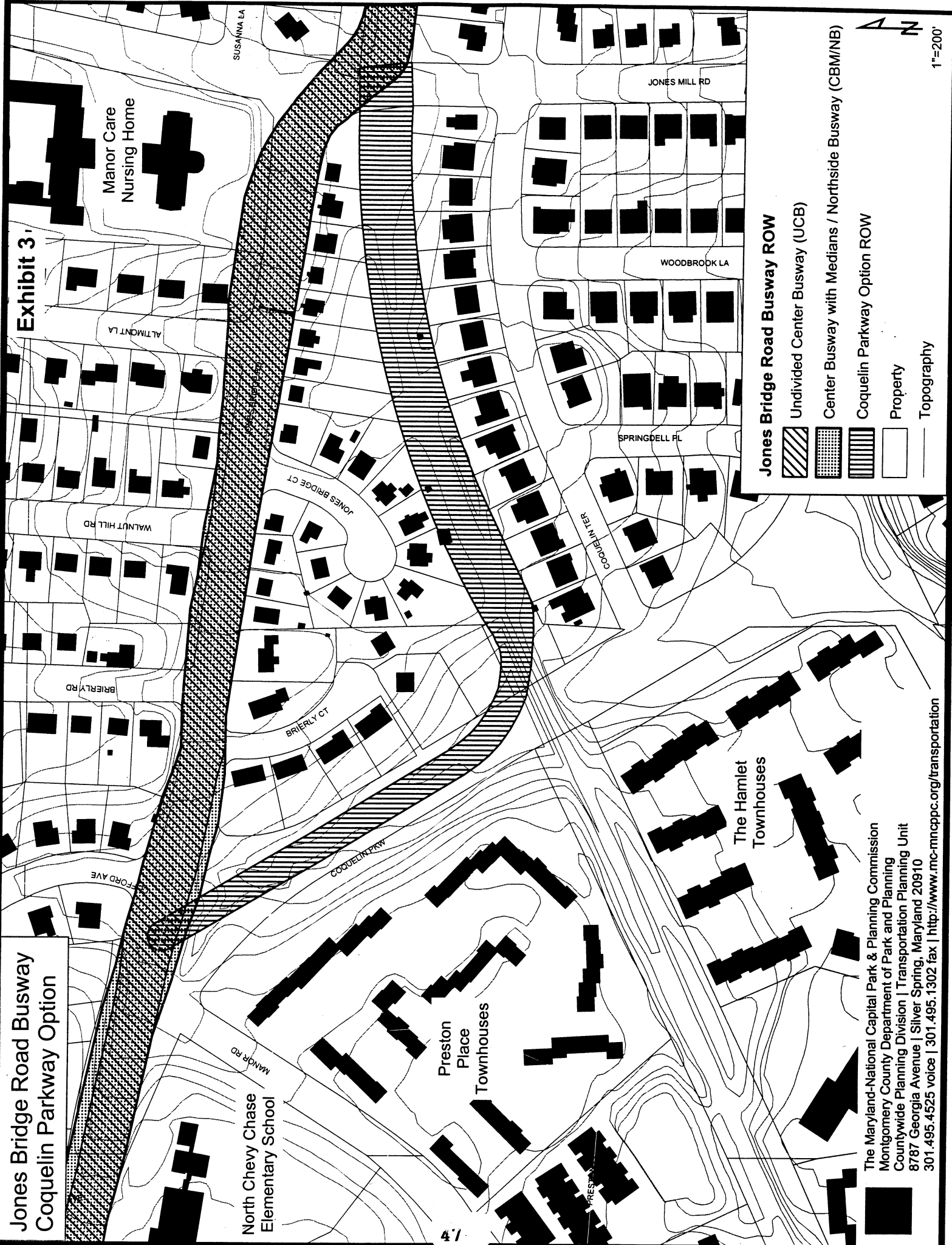
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



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Jones Bridge Road Busway Coquelein Parkway Option

Exhibit 3



Jones Bridge Road Busway ROW

-  Undivided Center Busway (UCB)
-  Center Busway with Medians / Northside Busway (CBM/NB)
-  Coquelein Parkway Option ROW
-  Property
-  Topography

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Exhibit 4. Definition of Environmental Features

Wetlands	According to both Federal and State wetlands statutes, a wetland is an area covered or saturated by surface or ground water for a long enough period to support a vegetation community that typically can live and adapt to water-saturated soil conditions. Only certain plants are able to grow and thrive in such wet conditions. In addition, many species of animals use wetlands for some portion of their life. Other species are completely dependent on damp soils and standing pools of water for their long-term survival. Wetland impacts were defined as the amount of wetlands within the road right-of-way. This definition provides a measure of direct, physical disturbance, but does not necessarily reflect such impacts as: fragmentation of a wetland system; degradation of wetland plant community through reduction in size, introduction of non-native, invasive species along disturbed edges; degradation of a wetland system through change in hydrology in and around the wetland.
Floodplains	Floodplains are low-lying areas adjacent to streams, subject to intermittent flooding. Building permits are restricted within floodplains. This coverage was derived from the United States Department of Agriculture (USDA) Soil Survey of Montgomery County, Maryland, because actual floodplain delineations have not been done uniformly over the entire county.
Stream Crossings	Stream crossings have a direct and significant negative impact on water quality. This is because not only sensitive buffer habitat is permanently removed and fragmented, but also crossings allow highly polluted road run-off to drain directly into the stream without the benefit of filtering through a naturalized buffer area. GIS generally underestimates the location of streams, especially in headwater areas but is useful in comparing impacts among alternatives.
Stream Buffers	These were initially delineated by measuring a buffer of 150 feet from the outer edge of each side of the stream. Stream buffers are important because they generally contain environmentally sensitive areas such as the natural stream channel, riparian forests, floodplains, wetlands and adjacent steep slopes. Alteration of these areas exacerbates watershed erosion/sedimentation and contributes significantly to water quality degradation.
Park Property	Park property is defined as State, Federal, M-NCPPC, WSSC, Municipal, and Revenue Authority.
Forests	A forest cover layer for the county was created by combining the existing woodland planimetric layer with 1999 state forest resource inventory attribute data. The layer was then updated using the forest inventories completed as part of recent master plans. The resulting updated layer was used as the basis for delineating significant forest.
Significant Forests	Defined as upland forest stands that are at least 100 acres in size, but also include riparian forest corridors that are at least 300 feet wide. Impacts to these areas were considered of primary importance to track. Larger forest stands contain more species diversity, provide higher levels of forest functional benefits, and have the potential to provide increasingly rare habitat for forest interior dwelling plant and animal species. Riparian forest corridors provide habitat and are avenues for wildlife movement, and they are critical for the protection of stream resources.
Forest Interior Habitat	Defined as any portion of a forest stand that is at least 300 feet inside the outer edge of the stand. Interior forest habitat losses are a combination of direct disturbance associated with a road, plus loss of interior resulting from the penetration of the forest interior and the creation of new outer forest edges, often resulting in a total loss of interior habitat exceeding direct impacts.