GUTS TURNAROUND ALTERNATIVES

PART I - Overview

A. Campus Plan Goals

1. Response to ANC 2E Request

In direct response to requests from ANC 2E, Georgetown agreed to look at ways to route GUTS buses off of neighborhood streets. Georgetown engaged planning and transportation consultants to look at alternatives for an on-campus GUTS turnaround, which would allow the University to use the Canal Road entrance for the majority of GUTS bus routes and minimize the number of buses on neighborhood streets.

2. Improve Service On-Campus

An on-campus turnaround will have the added benefit of enabling GUTS buses to serve both the north and south ends of campus. Currently, each GUTS route serves either the north end or south end of campus and many riders must walk the entire length of the campus to get to their destination. This is particularly burdensome for riders with mobility impairments because of the steep topography change between the north and south ends of campus. An on-campus turnaround would allow drop off and pick up of passengers on both ends of campus, which would enhance service and access to mass transit on-campus and further reduce reliance on single-occupancy vehicle trips.

These two goals shaped and guided Georgetown's search for the best way to create a turnaround on campus.

B. Current Service Operations

As shown on Figure 1 (GUTS Routes and Stops), three GUTS bus routes (Rosslyn, Arlington, and Law Center) access the campus from Canal Road and two routes (Dupont and Wisconsin Avenue) access campus from Reservoir Road. As a result of the lack of a campus turnaround, each route serves only the south or north end of campus, depending on where it enters or exits the campus. Table 1 breaks down the number of buses by route and time of day.

TABLE 1: EXISTING GUTS SERVICE

	Buses Per Peak Hour	Buses Per Off Peak Hour	Total Number Per Day
Dupont Circle Metro	10	3	101
Rosslyn Metro	10	3	106
Wisconsin Avenue	6	3	57
Law Center	1	1	9
Arlington Loop	1	1	12
Total	**22**	**8**	**285**

Note: Includes In and Outbound Trips

As shown on Figure 2 (South Campus GUTS Routing), buses traveling the southern routes (Rosslyn, Arlington, and Law Center) must exit campus from Prospect Street at all times, because there is no way for the buses to turn around on campus and exit via Canal Road.

As shown on Figure 3 (GUTS Routes and Stops—Dupont Only), during weekday peak hours, buses on the Dupont Circle route travel to and from campus via Q Street. During weekday off-peak hours, however, the University has re-routed the buses to Massachusetts Avenue to accommodate the request of the neighbors. During weekends, the buses leave from the southern end of campus and travel to and from the Dupont Circle metro station via the Whitehurst Freeway. This is also shown on Figure 3.

Therefore, as shown on Table 2, GUTS bus service currently has a limited impact on neighborhood streets.

TABLE 2: EXISTING OUTBOUND AND INBOUND GUTS VOLUMES (DAILY)

	Outbound Volume	Inbound Volume
Reservoir Road to 35th Street	112	112
Reservoir Road to Q Street	46	46
Canal Road	0	127
Prospect Street	127	0
Total	285	285

C. Evaluation Criteria

Georgetown carefully analyzed multiple design alternatives for the bus turnaround, evaluating all existing campus roadways and surface parking lots. Key evaluation criteria included:

- Impacts on GUTS service;
- Impacts on the surrounding roads;
- Impacts on pedestrian safety, traveling on campus pathways and queuing at bus stops;
- Impacts on campus roadway infrastructure and travel patterns; and
- Impacts on the efficient use of campus land and infrastructure.

D. Preferred Option

Using the above criteria, Georgetown concluded that the on-campus loop road shown in Figure 4 (Campus Plan Recommendation) (the "Preferred Option") was the only feasible means to facilitate bus turnarounds for the following reasons:

- Provides service on both the north and south ends of campus within a reasonable walking distance of University uses;

- Allows the University to avoid placing most GUTS traffic on neighborhood streets, and instead to use the Canal Road entrance;

- Minimizes impacts on pedestrian safety by separating bus traffic from high-volume areas of pedestrian activity at the center of campus, and provides safe areas for pedestrian travel and queuing near bus stops;

- Enables safe bus maneuvering throughout the on-campus loop; and

- Uses the roadway network.

During the AM peak hours (6:00 AM to 10:00 AM) and PM peak hours (3:00 PM to 7:00 PM) for GUTS operation, the Preferred Option will result in approximately 22 buses per hour using the Loop Road. During off-peak hours (4:45 AM to 6:00 AM, 10:00 AM to 3:00 PM, and 7:00 PM to 12:00 AM), the Preferred Option will result in approximately 8 buses per hour using the Loop Road.

As shown on Table 3, the Preferred Option would eliminate the use of Prospect Street and Q Street by GUTS buses, assuming that left turns are permitted on Canal Road during the AM peak hour. The University's traffic consultants have preliminarily concluded that the intersection could be changed to permit a left turn during the AM peak hour without an adverse impact on the roadway network, and will work with DDOT officials to confirm this conclusion.

TABLE 3: PROPOSED GUTS VOLUMES (WITH A.M. LEFT TURN) (DAILY)

	Outbound Volume	Inbound Volume
Reservoir Road to 35th Street	57	57
Reservoir Road to Q Street	0	0
Canal Road	228	228
Prospect Street	0	0
Total	285	285

The proposed on-campus loop does not require the AM peak hour left turn in order to greatly reduce the number of buses on neighborhood streets each day. As shown on Table 4-1 and Table 4-2 (on the following page), even if left turns are not permitted on Canal Road during the AM peak hour, the Preferred Option would still significantly reduce the number of trips on neighborhood streets. There are two ways to accomplish this:

1. Reduce the number of trips on Prospect Street from 127 to 75 trips per day; and

   Eliminate GUTS use of Q Street.

   OR

2. Reduce the number of trips on Prospect Street from 127 to 40 trips per day; and

   Reduce the number of trips on Q Street from 92 to 35 trips per day.

These trips would only occur during the AM between the hours of 6:15 AM and 10:15 AM.

TABLE 4-1: PROPOSED GUTS VOLUMES (NO A.M. LEFT TURN; NO Q STREET) (DAILY)

	Outbound Volume	Inbound Volume
Reservoir Road to 35th Street	57	57
Reservoir Road to Q Street	0	0
Canal Road	153	228
Prospect Street	75	0
Total	285	285

TABLE 4-2: PROPOSED GUTS VOLUMES (NO A.M. LEFT TURN) (DAILY)

	Outbound Volume	Inbound Volume
Reservoir Road to 35th Street	57	57
Reservoir Road to Q Street	35	0
Canal Road	153	228
Prospect Street	40	0
Total	285	285

E. Review of Alternatives

The University and its consultants considered a number of on-campus alternatives to the Preferred Option. After careful evaluation, these options were eliminated because they failed to satisfy the evaluation criteria set forth above. Each option, and its reasons for elimination, is summarized below. The first two options are discussed in detail in Part II of this analysis.

- Lombardi Circle Turnaround. A turnaround option on the north end of campus, in the area located between the Lombardi Cancer Center and the Leavey Center, was eliminated because there is limited space to accommodate bus maneuvering, and such turning activity would create significant pedestrian and vehicular conflict in the pedestrian-heavy area between the Leavey Center and the Lombardi Cancer Center. Many cancer patients, doctors, nurses and staff walk in this area between the two buildings and many patients and other passengers are dropped off here, close to the entrances to both buildings. Detailed information regarding this alternative follows in Part II of this analysis.

- Tondorf Drive Loop. A loop alternative using West Road and Tondorf Drive was eliminated because Tondorf Drive lacks the adequate width to accommodate both a bus through-lane and the heavy pedestrian and bicycle traffic along this primary north-south route. In addition, this alternative would create significant conflicts with pedestrian, vehicular, service, and taxi travel patterns in the narrow area between the Leavey Center and the Hospital. Detailed information regarding these constraints is also set forth in Part II of this analysis.

- Lot 3 Turnaround. A turnaround option on the south end of campus, on the surface parking lot south of McDonough Gymnasium, was eliminated because it failed to accomplish a key goal of the turnaround. This option would permit GUTS service only at the far southwest corner of campus, which is too remote from the majority of uses on campus, and in particular the Hospital, to promote greater use of GUTS. A turnaround in this location would not allow GUTS to serve both the north and south parts of campus. As shown on Figure 5 (Southwest Bus Depot Option), a large six-bay turnaround facility would be needed in order to accommodate the number of buses associated with both the Dupont and Rosslyn routes during peak hours.

- Turntable System. Georgetown investigated the feasibility of using a turntable system, but the alternative was ruled out because, like a traditional bus turnaround, this alternative requires space not only for the required equipment but also for related bus stops and queuing areas. The only location that could potentially accommodate the turntable option was in the far southwest corner of the campus, which is too remote to promote greater GUTS use. The turntable would also likely cause significant traffic backups during peak hour service. These delays would cause some riders to choose another alternative, thus reducing ridership. In addition, the turntable mechanism could malfunction, requiring additional turntables for which there is insufficient space. A broken turntable would cause major disruptions.

The University and its team also considered off-campus options, but all of these options were eliminated because they would increase, rather than decrease, the number of buses on neighborhood streets.

- Reservoir Road Loop (Figure 6). A loop on the north end of campus, which would require buses to exit and re-enter the campus using Reservoir Road, was eliminated because of concerns regarding the impact of additional bus activity on Reservoir Road.

- Foxhall Road Loop (Figure 7). A loop alternative requiring buses to exit the campus on Reservoir Road and proceed to the south via Foxhall Road was similarly eliminated because of concerns regarding the impact of bus activity on Reservoir and Foxhall Roads. This would also likely increase travel times.

- Dupont/Rosslyn Loop (Figure 8). A loop alternative combining the Dupont and Rosslyn routes into a single route that would turnaround at each station was eliminated because it would require additional buses, would continue to require buses to pass through neighborhood streets in West Georgetown and would face scheduling challenges, thus impacting ridership.

PART II - Detailed Analysis

Of all of the alternatives above, only three options permitted the University to accomplish its primary goals for the bus turnaround (take buses off neighborhood streets and improve service on campus): the Preferred Loop Option, the Lombardi Circle Turnaround, and the Tondorf Drive Loop. The University and its team evaluated each of these alternatives in detail before ruling out the Lombardi Circle Turnaround and Tondorf Drive Loop options.

A. Lombardi Circle Turnaround Evaluation

For the Lombardi Circle Turnaround option to work, it would need to accommodate the actual bus turnaround movement and permit adequate space for buses to pick up and drop off passengers. It would also need to safely accommodate the existing vehicular and pedestrian traffic. The analysis of this option must not only examine the required bus turnaround movements, but also consider conflicts with existing travel patterns, available space for passenger queuing, and potential conflicts with passenger travel patterns.

1. Leavey Center and Lombardi Cancer Center Constraints

The portion of campus between the Leavey Center and the Lombardi Cancer Center has significant constraints related to existing patterns of pedestrian and vehicular traffic and limitations imposed by the location of existing buildings and other infrastructure.

As shown on Figure 9 (North Campus Traffic Routing), this portion of campus includes a variety of vehicular traffic patterns that are critical to the Leavey Center and the Lombardi Cancer Center that cannot be relocated. These include:

- Lombardi Cancer Center Drop-off and Pick-up. The drop-off for the Cancer Center is located in the heart of this area. Constraints created by this activity include two-way vehicular travel between the Hospital and the Leavey Center as well as drop-off and turnaround activity itself in Lombardi Circle, in front of the Cancer Center.

- Taxi Stand, Drop-off and Pick-up. The University's only on-campus taxi stand is on the edge of Lombardi Circle, adjacent to the Leavey Center. It is an essential resource for both University and Hospital users and is heavily used.

As shown on Figure 10 (North Campus Pedestrian Flows), this portion of the campus also features heavy patterns of pedestrian activity, not surprising given its location at the center of the campus between two significant generators of pedestrian activity: the Hospital and the Leavey Center. Key drivers of pedestrian traffic to and through this area of campus include:

- Hospital users, including doctors, nurses, staff, patients and visitors traveling to and from the Leavey Center, which contains food service and other amenities used by the Hospital population;
- University users traveling between the academic, research, and other facilities at the Medical Center and elsewhere on the Main Campus;

- University users traveling from the south end to the north end of campus;
- Leavey Center hotel guests and conference center attendees;
- Pedestrians traveling from the Leavey Center parking garage to final destinations on campus; and
- Hospital patients and University visitors traveling to and from the taxi stand located in front of the conference center entrance of the Leavey Center

Existing buildings prevent the construction of new sidewalks to separate pedestrian and vehicular traffic or the widening of existing roadways to lessen vehicular conflicts. As shown on Figures 11 and 12 (West Road and Lombardi Circle – Dimensions and Photographs), the roadway network is particularly constrained at key locations between Leavey and North Kehoe Field and in the narrow area used for passenger vehicle drop-off and turnaround at Lombardi Circle.

Photographs of this portion of campus, illustrated on Figures 11 and 12, further demonstrate the limited space in Lombardi Circle that is available to accommodate the existing vehicular and pedestrian uses, much less additional GUTS bus traffic using the Circle as a turnaround. In addition, West Road, immediately south of and feeding into Lombardi Circle, contains room for only two through-lanes of traffic and a very narrow sidewalk on only one side of the street. Due to the existing placement of buildings, there is only room for a 3-foot wide sidewalk adjacent to West Road where it terminates at Lombardi Circle, which is not wide enough for a bus stop. There is no room for a sidewalk on the other side of West Road because of an existing retaining wall that runs along much of the length of West Road from Lombardi Circle all the way to the southern portion of the campus.

2. Evaluation and Analysis

Taken together, the constraints set forth above highlight the challenges associated with accommodating the Lombardi Circle Turnaround option. **The University concluded that the Lombardi Circle Turnaround would not be feasible because (1) constraints precluded creating a safe, effective, and efficient turnaround at Lombardi Circle and (2) West Road lacked sufficient width to accommodate two-way bus traffic, adequate sidewalks, and the needed area for a bus stop.**

a. *Turnaround Using Existing Road Network*

A review of the plans and sections included in this analysis demonstrates that the existing network cannot functionally or safely accommodate a turnaround. As shown on Figures 11 and 12, the two-way West Road narrows to 19'5" as it approaches Lombardi Circle, which is too narrow to safely accommodate bus through traffic as well as a bus stop lane on one side of the street. WMATA standards, for example, require 15 feet of width for the bus stop as well as 15 feet of width for the adjacent through lane.[1] Indeed, West Road is narrower than WMATA's standards for two-way bus traffic by itself (WMATA standards require 11 feet per lane, or 22 feet, for access roads with 2 or more lanes[2]).

[1] Source: WMATA Station Site and Access Planning Guidelines, Table 2-2.
[2] Source: WMATA Station Site and Access Planning Guidelines, Table 2-2.

Even if there were adequate road width, there is limited space available on either side of West Road to accommodate the queuing and waiting area required for a bus stop. Here, the adjacent sidewalk ranges from 3 to 5 feet, which is well below WMATA's bare minimum requirement of 12 feet (a minimum of 6 feet for the bus platform plus a minimum of 6 feet for the sidewalk).[3]

As shown on Figures 11 and 12, Lombardi Circle itself is relatively narrow. Figure 13 (Lombardi Circle Three-Point Turn) demonstrates that the only turning movements buses can make in the existing Lombardi Circle is a three-point turn. Such turning activity would impede vehicular traffic flow and would also pose a safety risk to vehicle and pedestrian activity in the area – including activity tied to the Cancer Center, the Hospital, and the Medical Center.

b. Turnaround Using Widened Circle

As shown on Figure 14 (Lombardi Circle Loop), Lombardi Circle could be widened to accommodate the radius needed for buses to turn around in a loop rather than a three-point turn. Such a widening would require significant slope and grading work to move the existing retaining wall further to the west. Even with this effort, however, the road network would still be unable to accommodate a safe turnaround. The turnaround activity would impede traffic flow and pose a safety risk to vehicles and pedestrians and, for the reasons stated above, West Road lacks the width needed to safely accommodate two-way through traffic, much less a bus stop.

c. Expanded Option with Bus Depot

To complete its exhaustive evaluation of this option, the University also considered whether more significant alterations could permit the creation of a more formal bus turnaround and depot at this location, including significant excavation and grading activity to create an area for the bus depot. As shown on Figure 15 (Lombardi Circle Depot), the width required for this activity (approximately 200 feet) would require that the University eliminate North Kehoe Field – one of only two fields available for intercollegiate athletic competition on the campus. Such activity would also reduce the potential space available on this site for a new hospital, should Medstar decide, the University agree to, and the Commission approve such relocation.

The creation of a large turnaround facility was also ruled out because it represented poor and inefficient planning. Devoting precious limited campus acreage to a bus turnaround facility is unnecessary given the ability to accommodate the loop on the campus roadway network. The use of roadway systems to permit such a loop is a common practice for bus systems operating in urban areas where the grid-based street network easily and efficiently permits such operation.[4]

---

[3] Source: WMATA Station Site and Access Planning Guidelines, Table 2-1 and Table 2-2.

[4] For example, the University is the "end of the line" for the G2 bus, which directly serves the campus at the 37th and O Street entrance. The G2 accomplishes its turnaround using the street grid system in West Georgetown. Similarly, other bus systems that serve the campus, such as the D1 and D2 lines, turn around at either end using the street grid.

3. Conclusion

Based on the foregoing, the University concluded that the Lombardi Circle Turnaround would not be feasible due to site constraints and the safety hazards for pedestrian and vehicular travel patterns in Lombardi Circle.

B. Tondorf Drive Loop Evaluation

The University considered an on-campus loop using Tondorf Drive. To be feasible, the design would not only need to accommodate widened sidewalks along Tondorf Drive for pedestrian through traffic, but also permit adequate space for passengers to queue while waiting for the bus. It must also accommodate the existing patterns of vehicular, pedestrian, and bicycle traffic.

1. Existing Limitations and Pedestrian Needs

The University's new construction over the past decade has been focused at the center of campus.[5] As a result, Tondorf Drive has emerged as a major new north-south pedestrian route for students, faculty, and staff. The existing pedestrian network, which ranges from narrow five-foot sidewalks south of the ICC to no sidewalk north of the ICC, cannot accommodate pedestrian demand. See Figure 16 (Tondorf Drive Uses and Issues). Accordingly, Georgetown ceased the use of Tondorf Drive for GUTS bus traffic in 2007. A central feature of the 2010 Plan is to turn Tondorf Drive into a dedicated pedestrian pathway.

As shown on Figure 9 (North Campus Traffic Routing) and Figure 10 (North Campus Pedestrian Flows), the area of campus between the Leavey Center and the Hospital suffers from significant constraints related to existing patterns of pedestrian and vehicular traffic and the location of existing buildings and infrastructure. Key conflicts include high levels of pedestrian activity related to the Hospital and the Leavey Center, taxicab activity, and vehicular activity related to Hospital drop-off and pick-up and the Leavey Center parking garage. In addition, loading docks for the Leavey Center are located across from Kober Cogan. These loading docks and related traffic are needed to bring food and supplies to the bookstore, the campus retail and dining options within the Leavey Center, and other uses in the building.

As shown on Figure 16 (Tondorf Drive Uses and Issues) and Figure 17 (Tondorf Drive – Dimensions and Photographs), existing development precludes constructing new sidewalks to separate pedestrian and vehicular traffic as well as widening the existing roadway network to lessen vehicular conflicts.

Photographs of this portion of campus, as shown on Figure 17, further demonstrate the limited space that is available to accommodate the existing vehicular and pedestrian uses, much less the addition of GUTS bus traffic.

[5] The Southwest Quadrangle, Multi-Sport Facility, New Science Center, and Hariri Building are all located west of Tondorf Drive. Prior to 2000, this portion of campus contained only surface parking lots and athletic fields.

2. Evaluation and Analysis

The University concluded that the Tondorf Drive Loop would not be feasible because Tondorf Drive lacked adequate width to accommodate (1) bus lane and sidewalk width and (2) needed area for bus stops. Constraints surrounding the Leavey Center and Hospital also precluded this option.

a. *Tondorf Drive Constraints*

The University explored the potential for Tondorf to include both a bus and pedestrian travel lane. As shown on Figure 17, however, Tondorf Drive lacks sufficient width to accommodate both. As discussed above, WMATA standards, for example, require 15 feet of width for the through lane plus 15 feet of width for each bus stop[6] as well as a bare minimum of 12 feet for a bus stop queuing and waiting area (a minimum of 6 feet for the bus platform plus a minimum of 6 feet for the sidewalk).[7] A minimum 18-foot lane width is recommended for the through lane, however, in order to provide passing room for towing access should a vehicle become disabled along the route.

The inclusion of a bus lane and related facilities would prohibit the creation of adequate pedestrian facilities to accommodate the high volume of pedestrians along Tondorf Drive, which would require a minimum of ten feet of sidewalk width (the District standard for streets in high traffic areas), and additional space between the sidewalk and the curb (such as a continuous planting strip), to separate pedestrian and vehicular traffic.

The constraints are particularly acute along the southern portion of Tondorf Drive between Harbin Hall and Harbin Field (Images 1 and 2 on Figure 17). This segment is proximate to the campus dining hall and multiple adjacent residence halls housing over 2,000 students. It is also the primary pedestrian connection between these residential/campus life facilities and the academic buildings located in the center of campus. The roadway segment also includes parking for facilities vehicles that cannot be relocated, as the facilities shops are located under the adjacent Harbin Esplanade. The combination of heavy pedestrian traffic, parked vehicles, and a narrow right of way preclude the creation of both a bus lane and adequate pedestrian facilities.

b. *Leavey Center Constraints*

As shown on Figure 9 and Figure 10, the roadway network is also constrained between the Leavey Center and Kober Cogan. Limited space is only available to accommodate the existing vehicular and pedestrian uses. There is not nearly enough space to accommodate new GUTS buses.

[6] Source: WMATA Station Site and Access Planning Guidelines, Table 2-2.
[7] Source: WMATA Station Site and Access Planning Guidelines, Table 2-1 and Table 2-2.

3. Conclusion

The University concluded that the Tondorf Drive Loop would not be feasible because the available roadway width along Tondorf Drive could not safely accommodate pedestrian and bus traffic, and existing vehicular and pedestrian activity near the Leavey Center would conflict with GUTS buses.

PART III – NATIONAL PARK SERVICE COORDINATION

Early in the planning process, the University recognized that the proposed completion of the road near the western perimeter was in close proximity to Glover-Archbold Park (which is operated by NPS) and the scenic easement. University representatives met with NPS representatives on multiple occasions to discuss the proposed location, design, and impacts associated with the road and to address any NPS concerns.

As a result of these discussions, the University agreed to locate the road such that it would not encroach at all on the scenic easement. The University engaged its engineering consultants to study the potential impacts of the construction and operation of the proposed road on the scenic easement as well as on Glover-Archbold Park. The consultant's report is attached as Appendix A.

Finally, the University has engaged an acoustical consultant to address concerns raised regarding the impacts of bus noise. The consultant's report will be provided when it is available.

APPENDIX A – DEWBERRY REPORT

Western Loop Road

Georgetown University, Washington, DC

Conceptual Alignment Study

March 2011

Prepared for:

Georgetown University
Washington, DC

Prepared by:

Dewberry
8401 Arlington Blvd
Fairfax, VA 22031

Background and Purpose

The purpose of this study is to investigate a potential alignment for a new one way loop road that will extend along the western perimeter of Georgetown University. The project will begin at Lombardi Circle and extend west and south to connect to the Canal Road entrance at the southern end of the campus. The study corridor is approximately ½ mile in length and is bordered by a National Park Service scenic easement on the west and Kehoe Field, Yates Fieldhouse and McDonough Gymnasium on the east, as generally depicted below:

Currently, a portion of the alignment already exists to provide service vehicle access to the rear of the Yates fieldhouse. That portion of West Perimeter Road was recently reconstructed in 2008. There is currently no vehicular path that allows for full circulation along the University's western periphery. The corridor in this study is intended to provide that vital link for service vehicles, including emergency vehicles and buses.

Design Constraints

The typical section for the loop road will be an 18' asphalt travelway with a minimum of 3' clear zone on each side. While the traffic direction will be unidirectional, an 18' travel width will provide passing room for towing access should a vehicle become disabled along the route. In the vicinity of the northwest corner of McDonough Gymnasium, there will be a portion of the road that necks down to a 12' minimum width. This reduced width is necessary due to the proximity of the building to the scenic easement line. The alignment depicted on the conceptual drawings was selected based on the following constraints:

- The need to avoid disturbance in the scenic easement. Other than existing encroachments into the easement, no new encroachments are proposed. Construction access and maintenance are intended to occur from the University side of the easement line, with the intention of leaving the easement area undisturbed.
- The desire to preserve as much of the recently constructed West Perimeter Road as possible while still providing smooth horizontal curvature. The majority of the newly constructed road will be usable without major modifications.
- The desire to minimize impacts to existing vegetated areas and landscaping. Retaining walls are recommended to avoid excessive clearing limits in areas of deep cut.
- The need to maintain access to the helipad as it is currently configured. In the presented design, vehicle access to the helipad remains unchanged.

Please refer to the conceptual design drawings for a complete description of the proposed cross section and alignment configuration.

Design Considerations

The construction of the new road would involve the following:

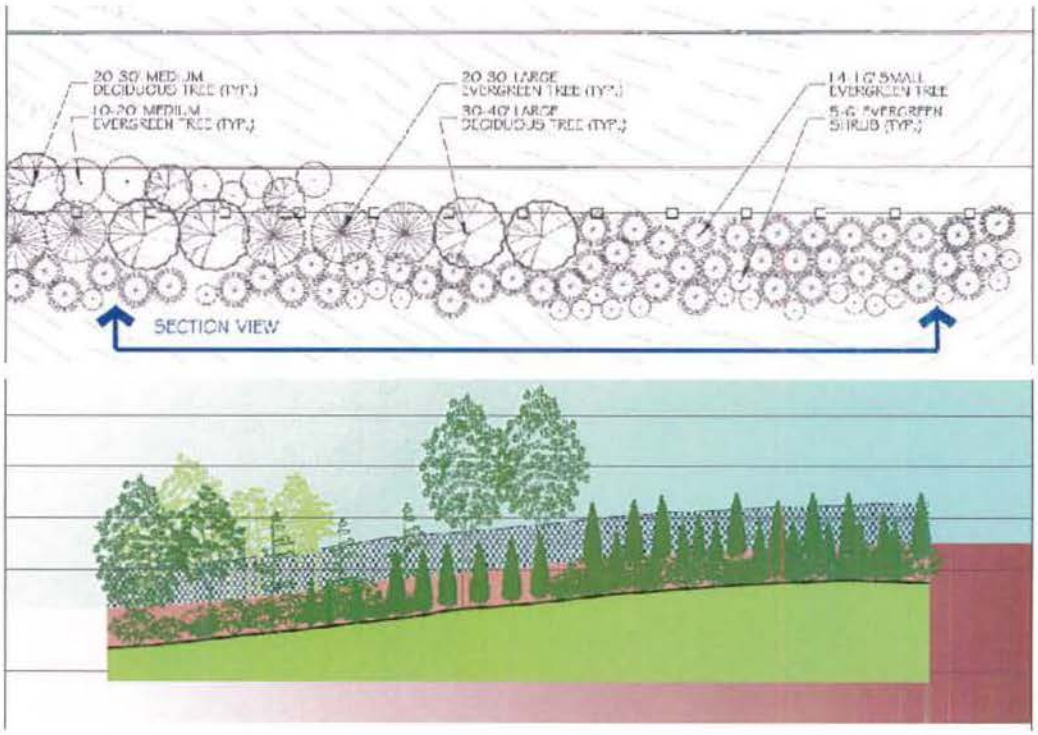
- **Clearing Adjacent to the Scenic Easement**
  The largest impact to areas adjacent to the scenic easement will occur over station range 3+50 to 6+00. In this area, several large trees are proposed to be removed in an area that is currently used as an informal walking trail that connects the existing West Perimeter Road to a service drive adjacent to McDonough Gymnasium. This area of mature tree stand will need to be cleared and the grade significantly cut (up to 15') to allow for the new road profile. Four 24" oak

trees, one 36" Poplar, one 24" Beech, one 6" Cheery and one 6" spruce are proposed to be removed from areas on Georgetown University property outside of the easement. To minimize lateral clearing areas that would otherwise be needed for tying back the cut slopes, retaining walls are proposed on both sides of the road.

- **Retaining Walls**
  Retaining walls proposed with this project are anticipated to be pile and lagging walls, which can be finished with a concrete, stone or brick facing. The advantage to pile and lagging walls is that they can be constructed from the University's side of the scenic easement, without the need to cross into the easement. Typically, these walls have a front-to back depth of roughly 2' and do not require any face battering, which allows for a very compact section. Due to the anticipated heights of the walls, it should be anticipated that tie backs will be required. While the tie backs would have to extend into the easement area, they would be underground and not visible. Within the scenic easement, grade falls away from the proposed retaining walls, minimizing the need for top-of-wall drainage systems adjacent to the easement.

- **Relocation of utilities**
  There are two major areas of cut proposed with the concept plan: the North Kehoe segment and the portion between McDonough and Yates. In these areas, there are multiple heavy utilities (steam, chilled water, water distribution, etc.) that will likely be impacted by the proposed grade changes. These utilities will require vertical relocation, and several manhole structures will need to be reconfigured to allow for the new road profile. It is not anticipated that areas outside of the cut zones will require utility relocation.

- **Screening**
  In the areas of deep cut, the retaining walls that are proposed to be in cut will provide a visual and noise barrier for properties situated to the west of the campus. In areas, where the alignment is not in cut, it is proposed that landscape screening be installed. These general areas are shown on the plans and are proposed to be planted as typically detailed on the following page:



By using a mix of evergreen, shrubs and deciduous trees, a year round buffer with denser vegetation close to the ground can be created to screen neighboring properties from vehicle lights.

- **Integration of existing pedestrian facilities**
  Currently, pedestrians on the western side of the campus are served by a series of access drives and informal paths. The existing path that extends from the Observatory north to the rear of Yates is proposed to be reconfigured into a stairway that connects to the new road alignment. Similarly, the existing path that extends from the northeast corner of Kehoe Field north to Lombardi Circle will need to be converted into a stair as well. In both cases, the significant cuts that are needed to accommodate the proposed vertical alignment of the Loop Road will require stairs, as the grade difference on the trails would lead to excessively steep slopes if the trails were to be simply graded. Alternatively, a ramp system could be designed for these areas if the trails are required to be accessible without stairs.

- **Stormwater Management Requirements**
  The vertical alignment of the road will allow for the reuse and extension of existing drainage facilities in the North Kehoe Road area. A new drainage system will be required from Yates southward which will likely connect to existing drainage in the McDonough parking area. Due to the addition of new imperviousness, stormwater management and BMPS strategies will need to be taken into consideration. While it is not anticipated that peak flow attenuation will be

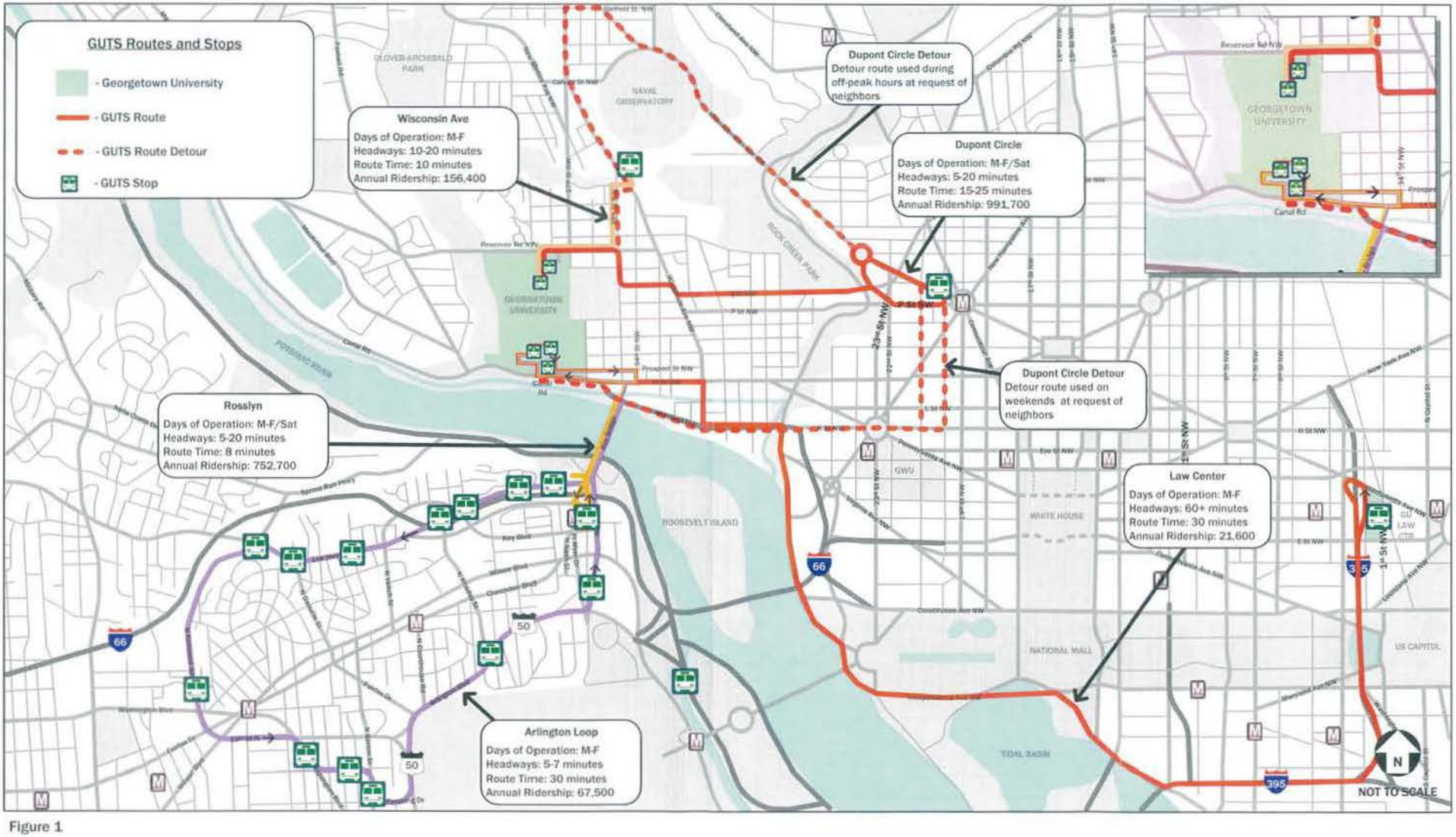

GUTS Routes and Stops
- Georgetown University
- GUTS Route
- GUTS Route Detour
- GUTS Stop
Wisconsin Ave
Days of Operation: M-F
Headways: 10-20 minutes
Route Time: 10 minutes
Annual Ridership: 156,400
Dupont Circle Detour
Detour route used during off-peak hours at request of neighbors
Dupont Circle
Days of Operation: M-F/Sat
Headways: 5-20 minutes
Route Time: 15-25 minutes
Annual Ridership: 991,700
Dupont Circle Detour
Detour route used on weekends at request of neighbors
Rosslyn
Days of Operation: M-F/Sat
Headways: 5-20 minutes
Route Time: 8 minutes
Annual Ridership: 752,700
Law Center
Days of Operation: M-F
Headways: 60+ minutes
Route Time: 30 minutes
Annual Ridership: 21,600
Arlington Loop
Days of Operation: M-F
Headways: 5-7 minutes
Route Time: 30 minutes
Annual Ridership: 67,500
NOT TO SCALE

Figure 1

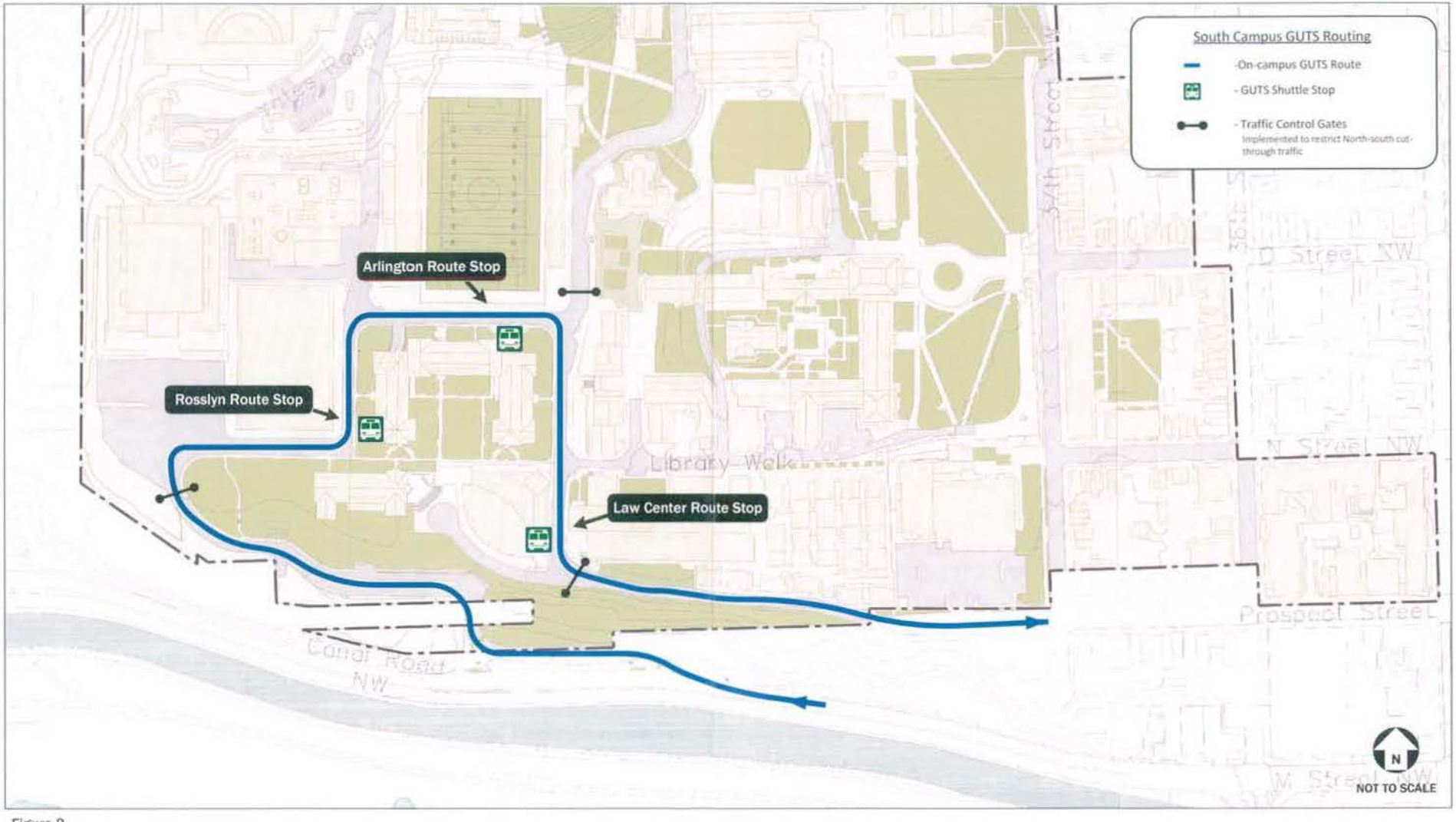

South Campus GUTS Routing
-On-campus GUTS Route
- GUTS Shuttle Stop
- Traffic Control Gates
Implemented to restrict North-south cut-through traffic
Arlington Route Stop
Rosslyn Route Stop
Law Center Route Stop
Library Walk
Canal Road NW
Prospect Street
N Street NW
M Street NW
34th Street NW
N
NOT TO SCALE

Figure 2


GUTS Routes and Stops
- Georgetown University
- GUTS Route
- GUTS Route Detour
- GUTS Stop
NOT TO SCALE
Dupont Circle Detour
Detour route used during off-peak hours at request of neighbors along Q Street
Dupont Circle
Days of Operation: M-F/Sat
Headways: 5-20 minutes
Route Time: 15-25 minutes
Annual Ridership: 714,128
Dupont Circle Detour
Detour route used on weekends at request of neighbors
ARCHIBALD PARK
NAVAL OBSERVATORY
ROCK CREEK PARK
GEORGETOWN UNIVERSITY
POTOMAC RIVER
GWU

Figure 3


Campus Plan Recommendation:
GUTS On-Campus Circulation
Buses entering from the north and/or south would circulate counterclockwise along West Road and Campus Service Road. Non-bus traffic would operate two-way along all roads but Campus Service Road.
Stops are located along the route in regular intervals, serving the north, central and south campus.
Routes arriving from the north
Counter clockwise circulation for all bus routes
One-way southbound along Campus Service Road
Alternate route to south, used when left turn at Canal Road is prohibited
Routes arriving from the south
N
NOT TO SCALE

Figure 4

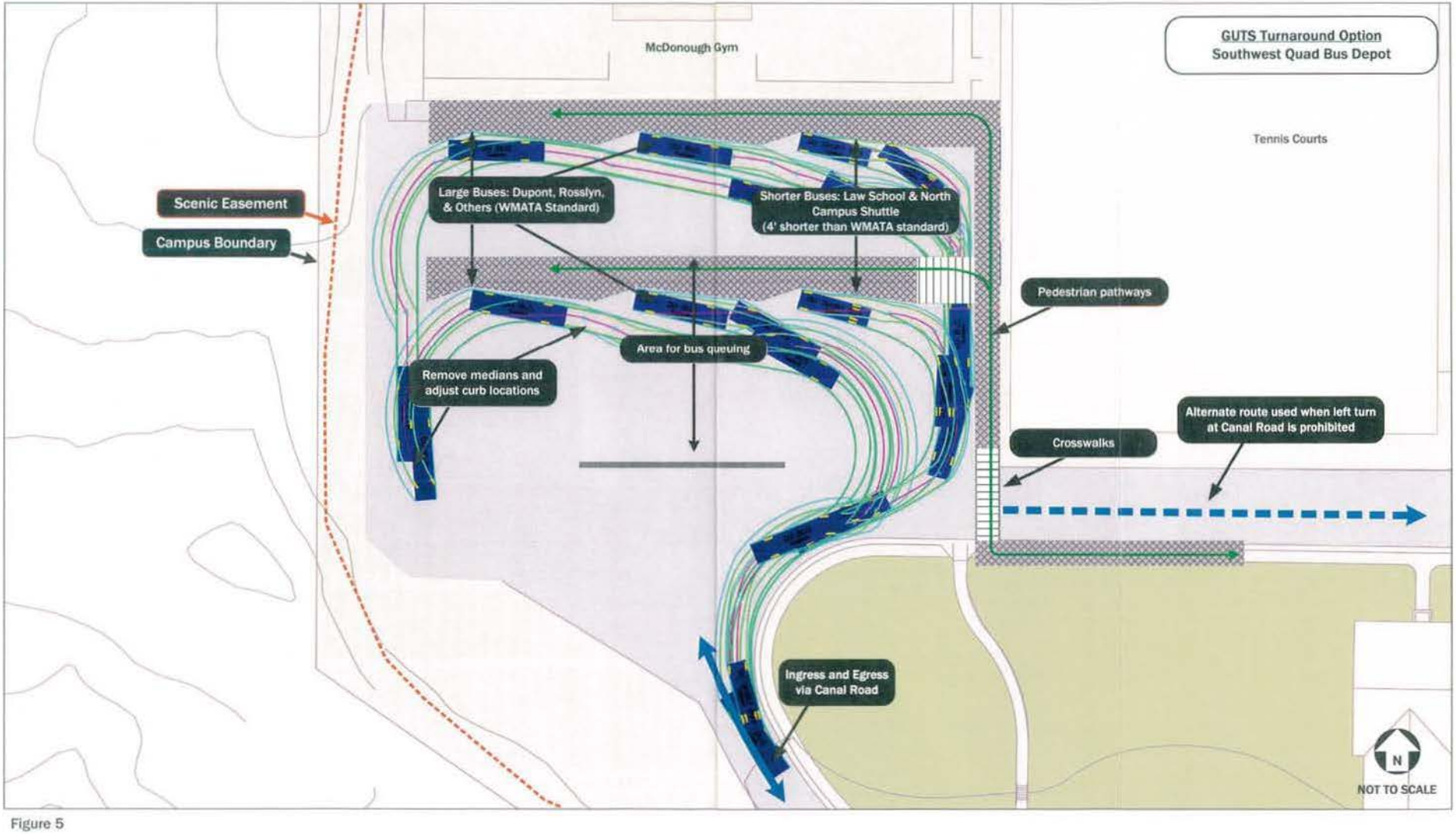

GUTS Turnaround Option
Southwest Quad Bus Depot
McDonough Gym
Tennis Courts
Scenic Easement
Campus Boundary
Large Buses: Dupont, Rosslyn, & Others (WMATA Standard)
Shorter Buses: Law School & North Campus Shuttle (4' shorter than WMATA standard)
Pedestrian pathways
Area for bus queuing
Remove medians and adjust curb locations
Alternate route used when left turn at Canal Road is prohibited
Crosswalks
Ingress and Egress via Canal Road
N
NOT TO SCALE

Figure 5

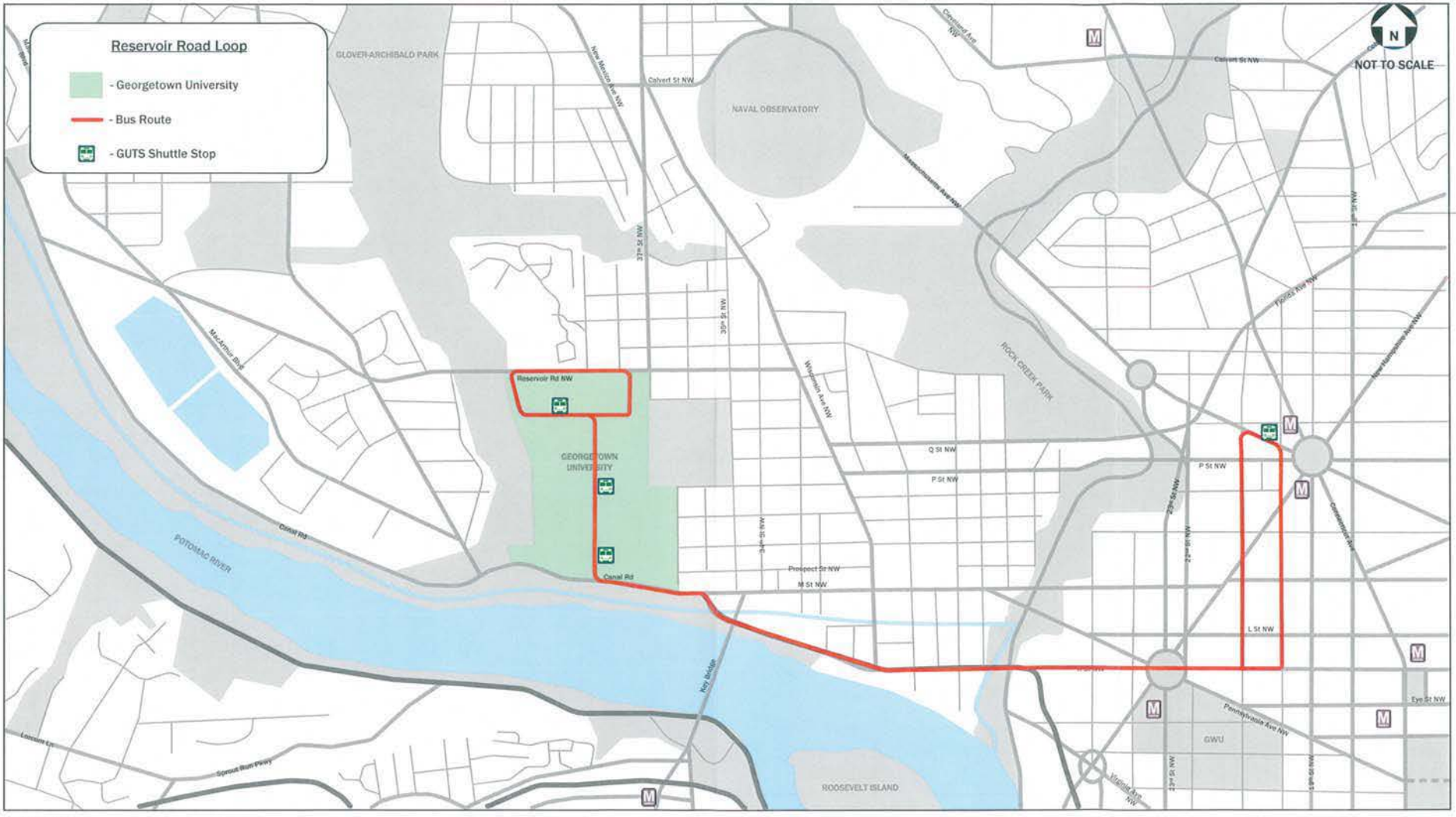

Reservoir Road Loop
- Georgetown University
- Bus Route
- GUTS Shuttle Stop
NOT TO SCALE
GLOVER-ARCHBALD PARK
NAVAL OBSERVATORY
ROCK CREEK PARK
GEORGETOWN UNIVERSITY
Reservoir Rd NW
Calvert St NW
New Mexico Ave NW
31st St NW
35th St NW
Wisconsin Ave NW
Massachusetts Ave NW
Q St NW
P St NW
Prospect St NW
M St NW
L St NW
Canal Rd
Canal Rd NW
MacArthur Blvd
POTOMAC RIVER
Key Bridge
Foxhall Rd NW
Loughboro Rd
Sprout Run Pkwy
ROOSEVELT ISLAND
GWU
Pennsylvania Ave NW
Virginia Ave NW
Eye St NW
Connecticut Ave
New Hampshire Ave NW
Florida Ave NW
23rd St NW
22nd St NW
15th St NW
13th St NW

Figure 6

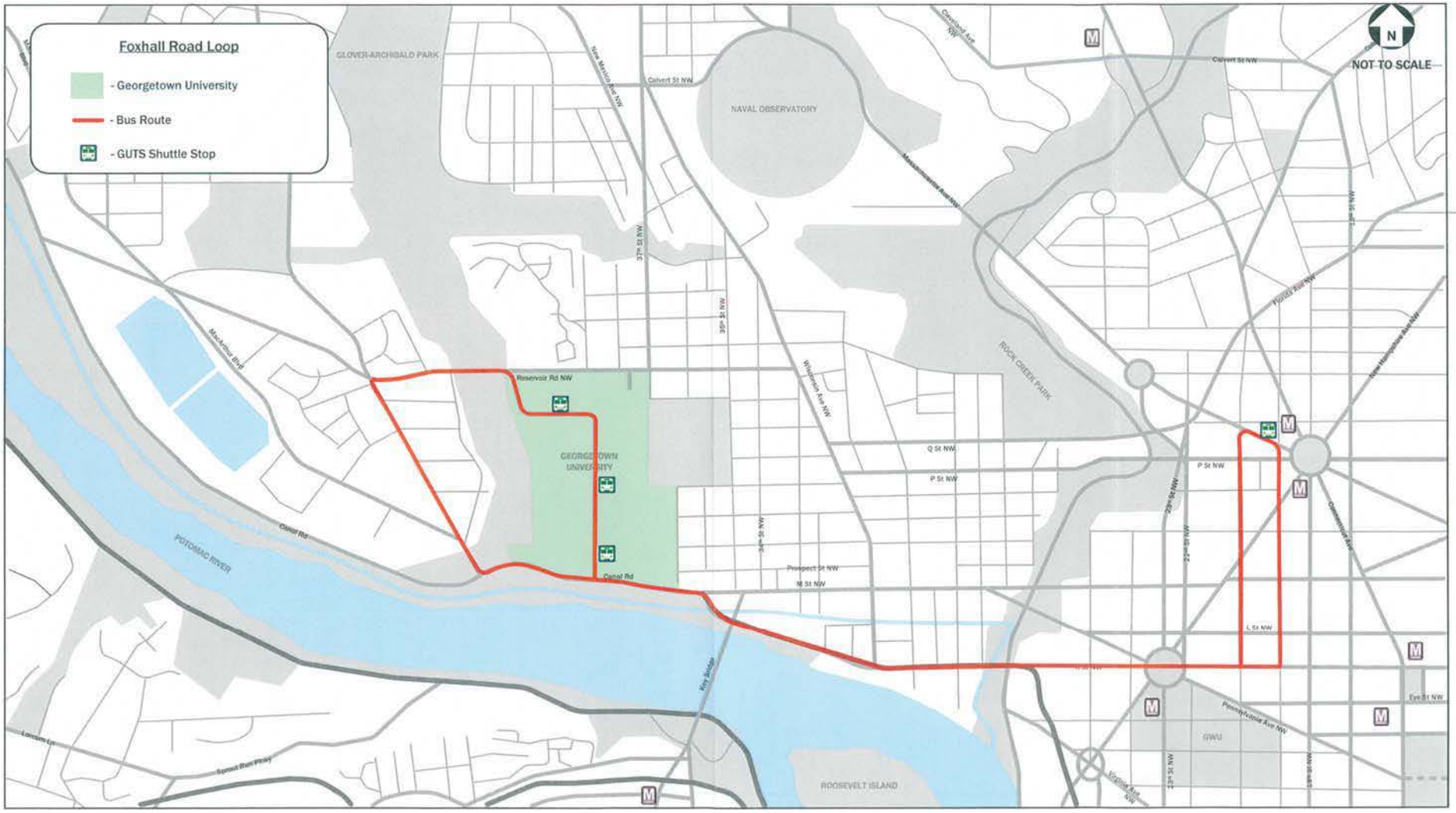

Foxhall Road Loop
- Georgetown University
- Bus Route
- GUTS Shuttle Stop
NOT TO SCALE
GLOVER-ARCHBALD PARK
NAVAL OBSERVATORY
ROCK CREEK PARK
GEORGETOWN UNIVERSITY
POTOMAC RIVER
ROOSEVELT ISLAND
GWU
Reservoir Rd NW
Canal Rd
Calvert St NW
Massachusetts Ave NW
Wisconsin Ave NW
Prospect St NW
M St NW
P St NW
Q St NW
Pennsylvania Ave NW
MacArthur Blvd
Key Bridge

Figure 7

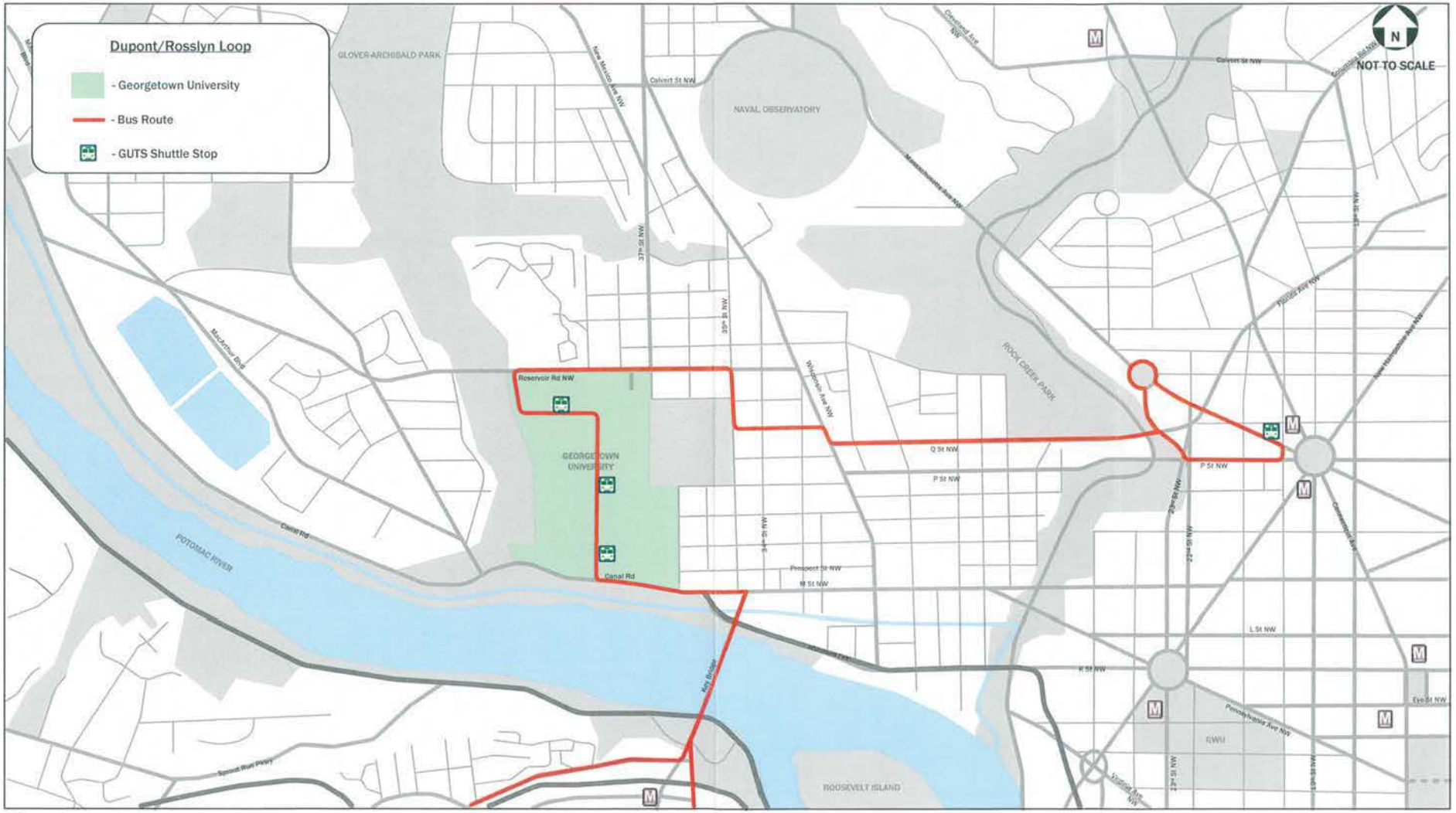

Dupont/Rosslyn Loop
- Georgetown University
- Bus Route
- GUTS Shuttle Stop
NOT TO SCALE
GLOVER-ARCHBALD PARK
NAVAL OBSERVATORY
ROCK CREEK PARK
GEORGETOWN UNIVERSITY
ROOSEVELT ISLAND
POTOMAC RIVER
Reservoir Rd NW
Canal Rd
Key Bridge
Q St NW
P St NW
K St NW
L St NW
Calvert St NW
Prospect St NW
Whitehaven Pkwy NW
Pennsylvania Ave NW
Virginia Ave NW
Spout Run Pkwy
MacArthur Blvd
Massachusetts Ave NW
Florida Ave NW
New Hampshire Ave NW
Connecticut Ave NW
Wisconsin Ave NW
New Mexico Ave NW
Cleveland Ave NW
37th St NW
36th St NW
34th St NW
23rd St NW
22nd St NW
21st St NW
20th St NW
19th St NW
Eye St NW

Figure 8

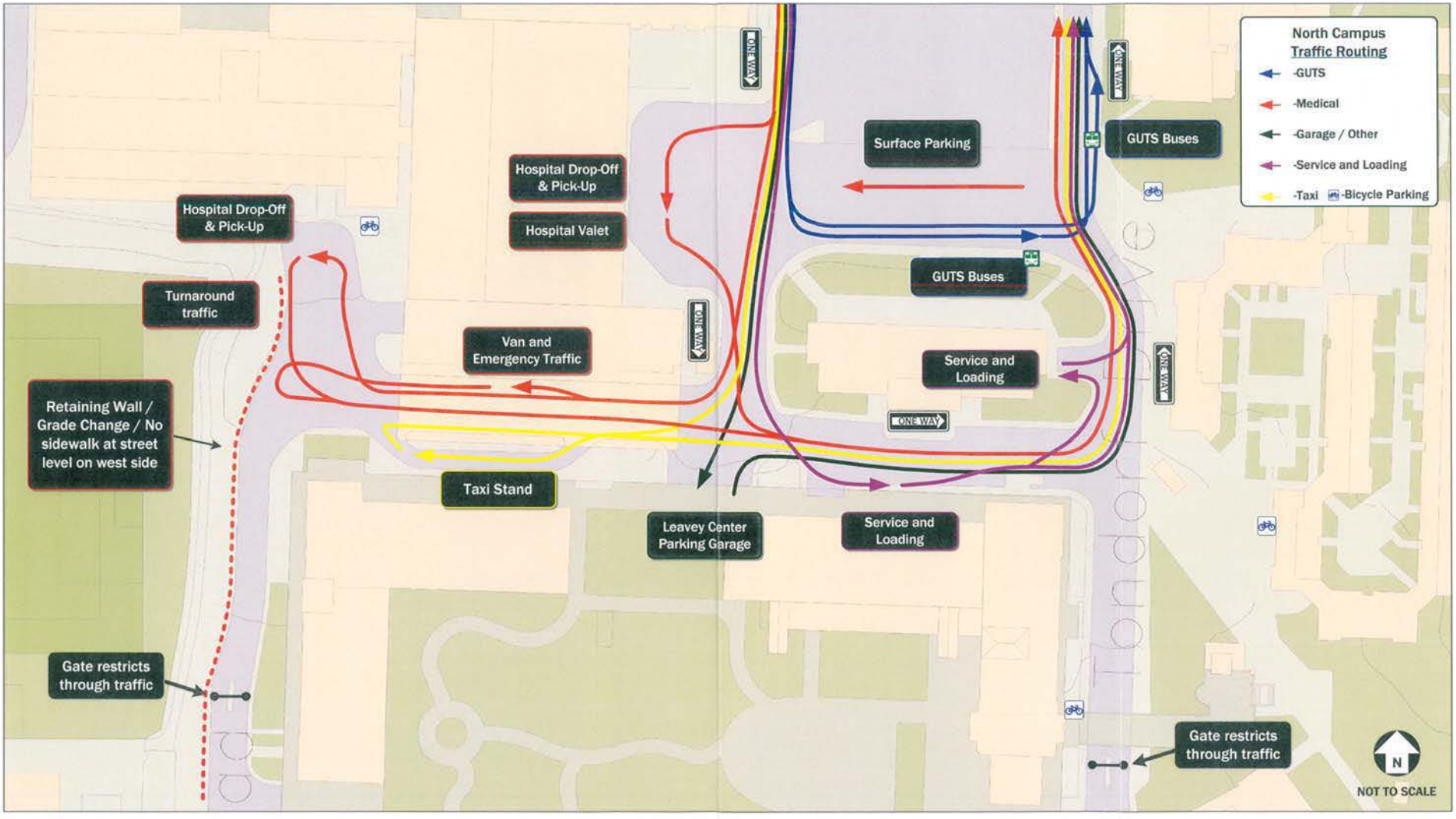

North Campus
Traffic Routing
-GUTS
-Medical
-Garage / Other
-Service and Loading
-Taxi
-Bicycle Parking
Surface Parking
GUTS Buses
Hospital Drop-Off & Pick-Up
Hospital Valet
Hospital Drop-Off & Pick-Up
GUTS Buses
Turnaround traffic
Van and Emergency Traffic
Service and Loading
Retaining Wall / Grade Change / No sidewalk at street level on west side
ONE WAY
Taxi Stand
Leavey Center Parking Garage
Service and Loading
Gate restricts through traffic
Gate restricts through traffic
N
NOT TO SCALE

Figure 9

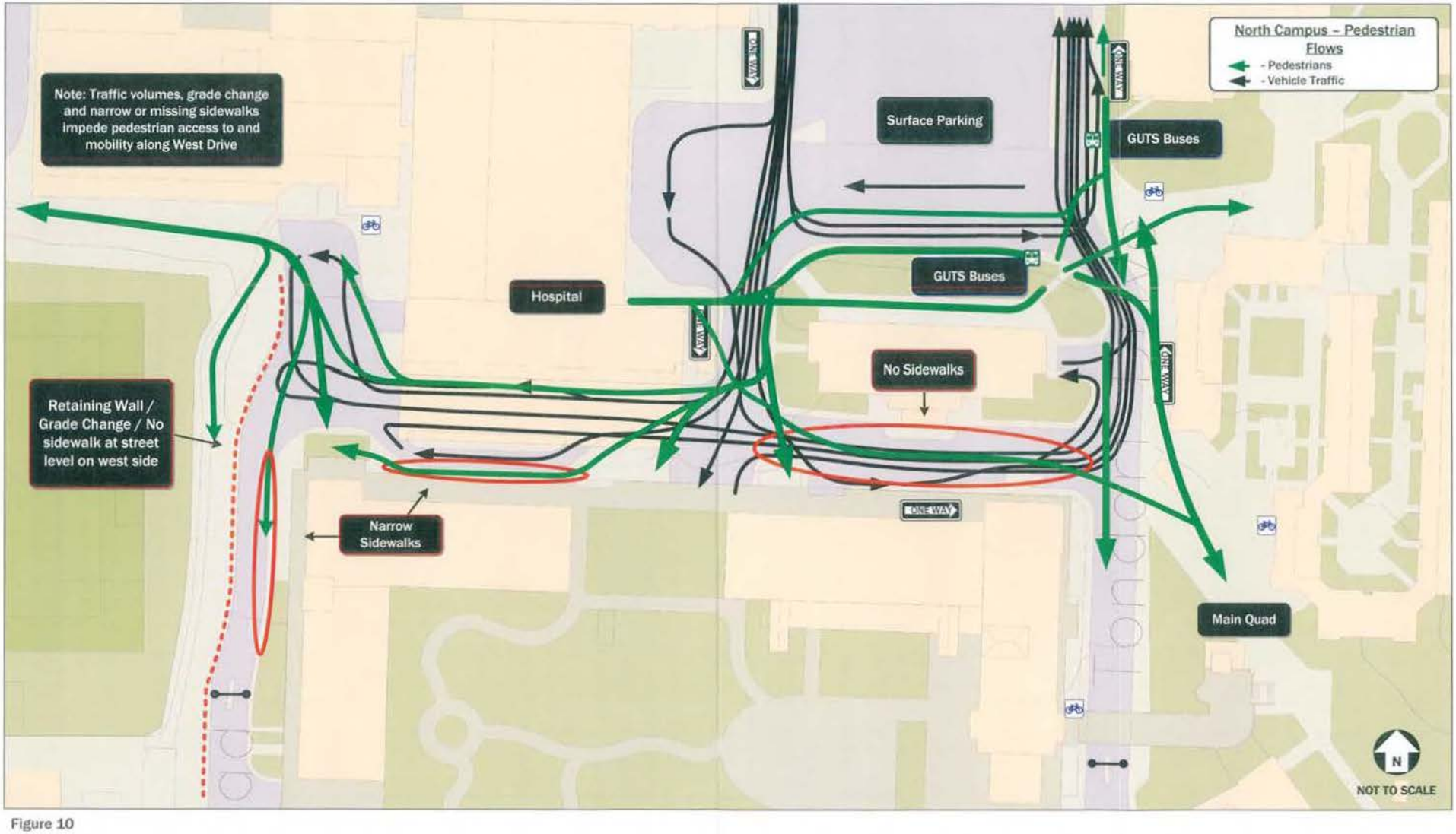

North Campus – Pedestrian Flows
- Pedestrians
- Vehicle Traffic
Note: Traffic volumes, grade change and narrow or missing sidewalks impede pedestrian access to and mobility along West Drive
Surface Parking
GUTS Buses
GUTS Buses
Hospital
No Sidewalks
Retaining Wall / Grade Change / No sidewalk at street level on west side
Narrow Sidewalks
ONE WAY
Main Quad
N
NOT TO SCALE

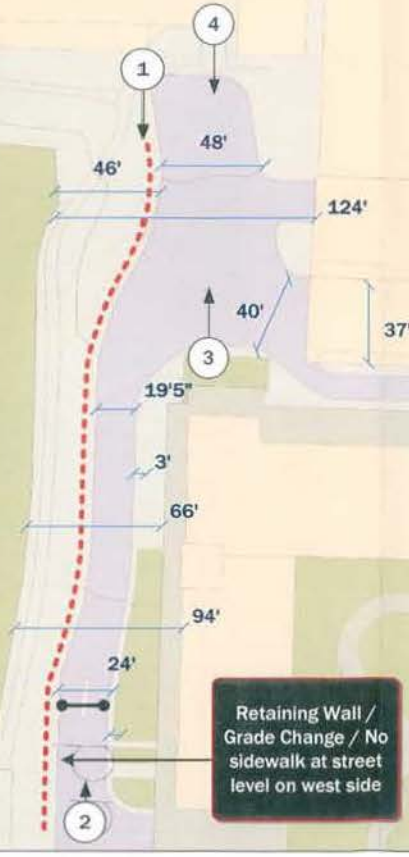
Figure 10

Image 1: Looking south along West Road toward South Campus: Shows location of Leavey building, narrow sidewalks along the east side, roadway conditions, lack of sidewalks along west side and grade change/retaining wall to the west.

Image 2: Looking north along West Road toward Lombardi Circle : Shows location of Leavey building, Leavey loading area, narrow sidewalks along the east side, roadway conditions, traffic gate location, lack of sidewalks along west side and grade change/retaining wall to the west.

Image 3: Looking north from West Drive towards Lombardi Circle: Shows conditions within Lombardi Circle, standing traffic, parked vehicles, through traffic, and pedestrian traffic.

Image 4: Looking south from Lombardi Center entrance: Shows conditions within Lombardi Circle, standing traffic, parked vehicles, pedestrian traffic, and bicycle traffic.



N

NOT TO SCALE

Figure 11

Image 1: Looking northwest toward Lombardi Center entrance: Shows bicycle parking, pedestrian traffic, building entrance conditions, and pedestrian pathway to the northwest.

Image 2: Looking south towards Leavey Center conference center entrance: Shows through traffic and taxi traffic standing north of the Leavey Center convention center entrance.

Image 3: Looking south towards Leavey Center conference center entrance: Shows pedestrian traffic, standing and parked vehicles, taxi traffic adjacent to Leavey Center, and building locations surrounding Lombardi Circle.

Image 4: Looking west towards Lombardi Circle: Shows pedestrian traffic, parked vehicles, bicycle parking location, and building locations surrounding Lombardi Circle.

N

NOT TO SCALE

Figure 12

Image 1: Looking south towards Leavey Center conference center entrance: Shows how existing traffic activities would conflict with a bus three-point turn at Lombardi Circle.

Image 2: Looking south towards Leavey Center conference center entrance: Shows how existing traffic activities adjacent to Leavey Center would conflict with a bus three-point turn at Lombardi Circle.

Figure 13

Image 1: Looking west towards Lombardi Circle: Shows how existing traffic activities would conflict with bus a turnaround within Lombardi Circle.

Image 2: Looking south from Lombardi Center entrance: Shows how existing traffic activities would conflict with bus a turnaround within Lombardi Circle.

Figure 14

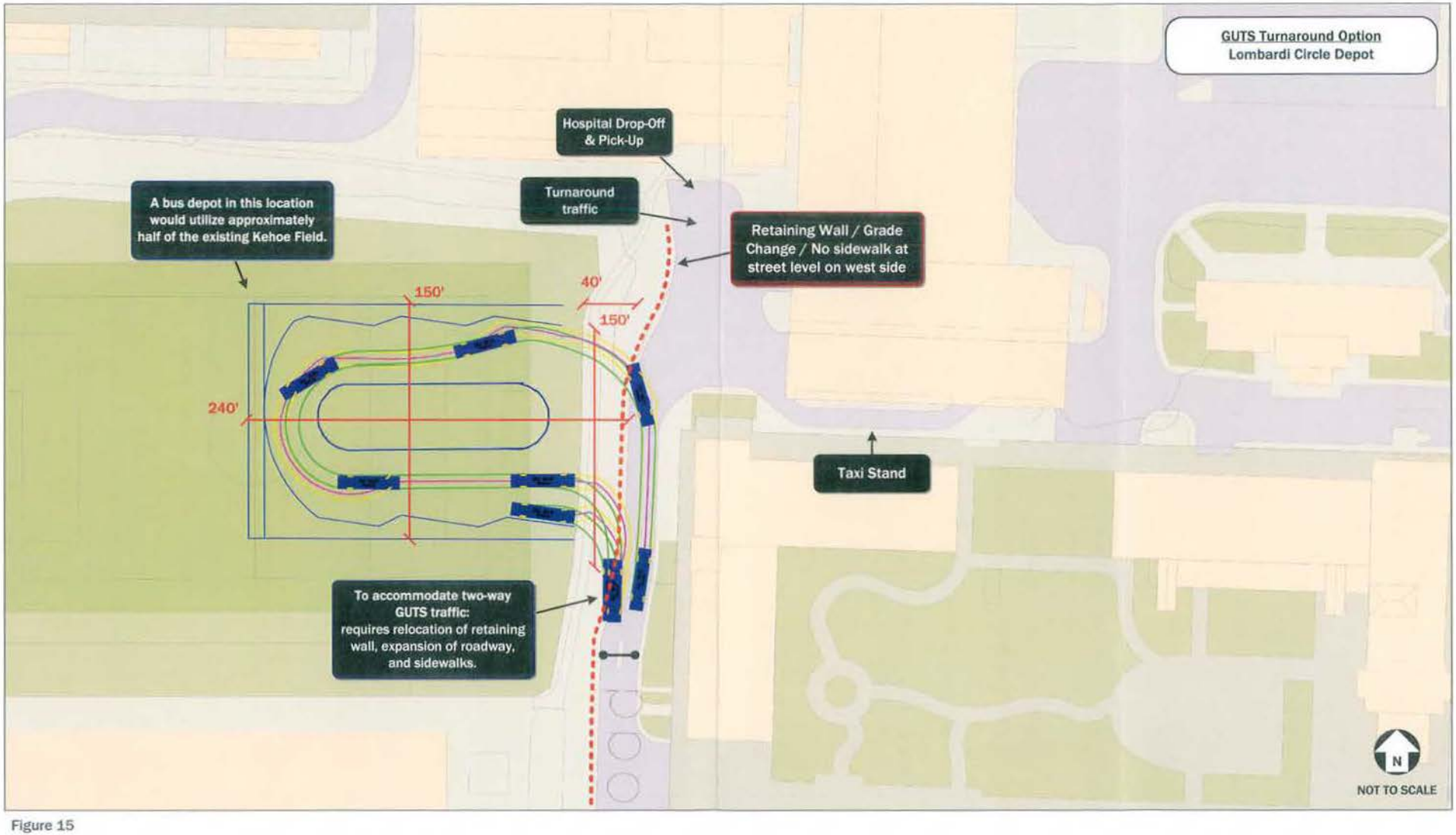

GUTS Turnaround Option
Lombardi Circle Depot
Hospital Drop-Off & Pick-Up
Turnaround traffic
A bus depot in this location would utilize approximately half of the existing Kehoe Field.
Retaining Wall / Grade Change / No sidewalk at street level on west side
150'
40'
150'
240'
Taxi Stand
To accommodate two-way GUTS traffic: requires relocation of retaining wall, expansion of roadway, and sidewalks.
N
NOT TO SCALE

Figure 15

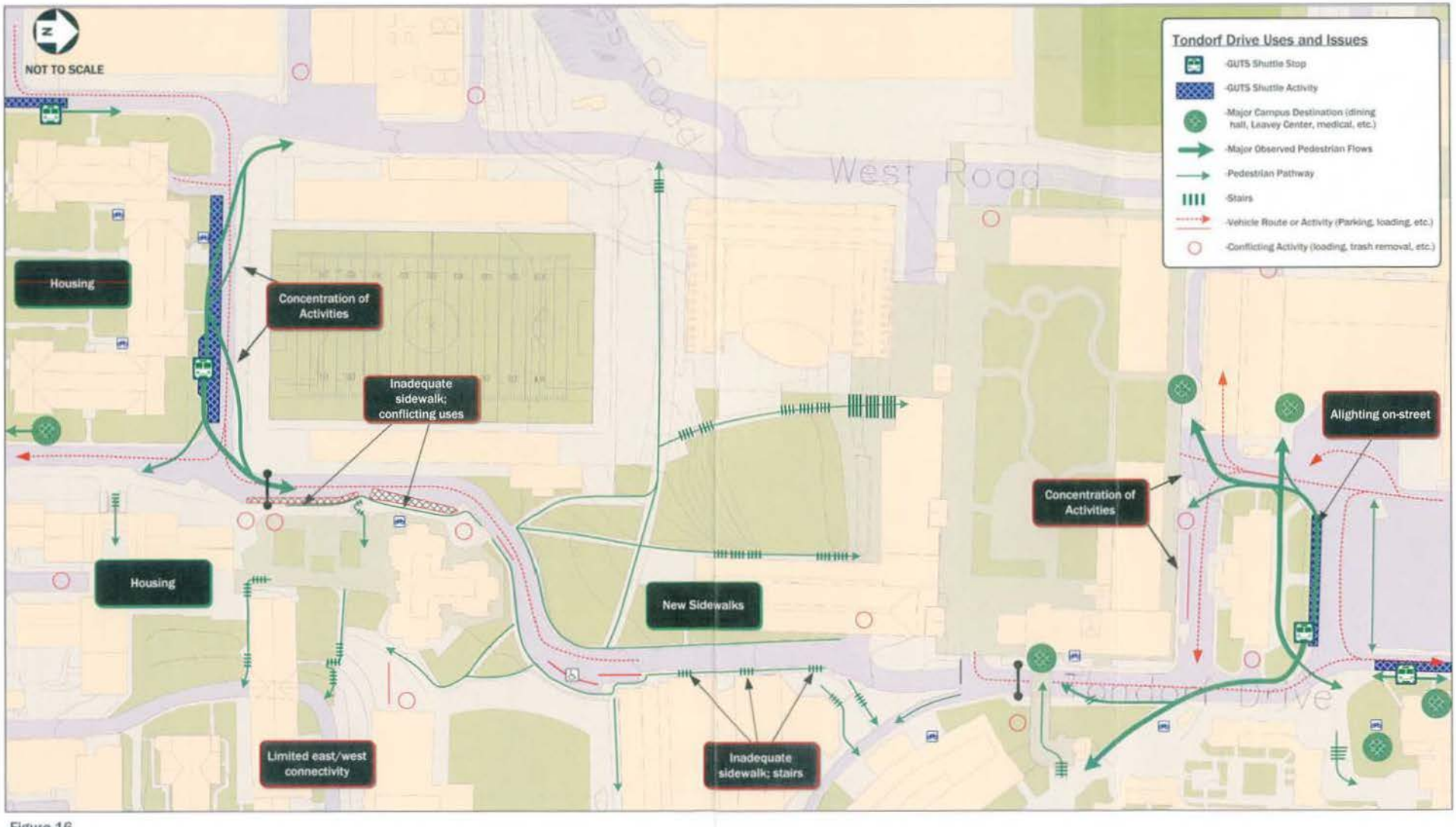

NOT TO SCALE
Tondorf Drive Uses and Issues
-GUTS Shuttle Stop
-GUTS Shuttle Activity
-Major Campus Destination (dining hall, Leavey Center, medical, etc.)
-Major Observed Pedestrian Flows
-Pedestrian Pathway
-Stairs
-Vehicle Route or Activity (Parking, loading, etc.)
-Conflicting Activity (loading, trash removal, etc.)
West Road
Housing
Concentration of Activities
Inadequate sidewalk; conflicting uses
Housing
New Sidewalks
Limited east/west connectivity
Inadequate sidewalk; stairs
Concentration of Activities
Alighting on-street

Figure 16

Image 1: Looking north along Tondorf Drive south of Harbin Field: Shows heavy pedestrian volumes and how they conflict with vehicular traffic on Tondorf Drive.

Image 2: Looking north along Tondorf Drive Sidewalk: Shows the narrow width and obstructions along the sidewalk adjacent to Harbin Hall, such as parked vehicles, narrow sidewalk widths, curb cuts, and a stairwell. This causes most pedestrians to walk on the street.

Image 3: Looking north along West Road toward South Campus: Shows pedestrian conditions prior to construction west of Tondorf and illustrates the lack of pedestrian facilities along the western edge and changes in topography.

Figure 17