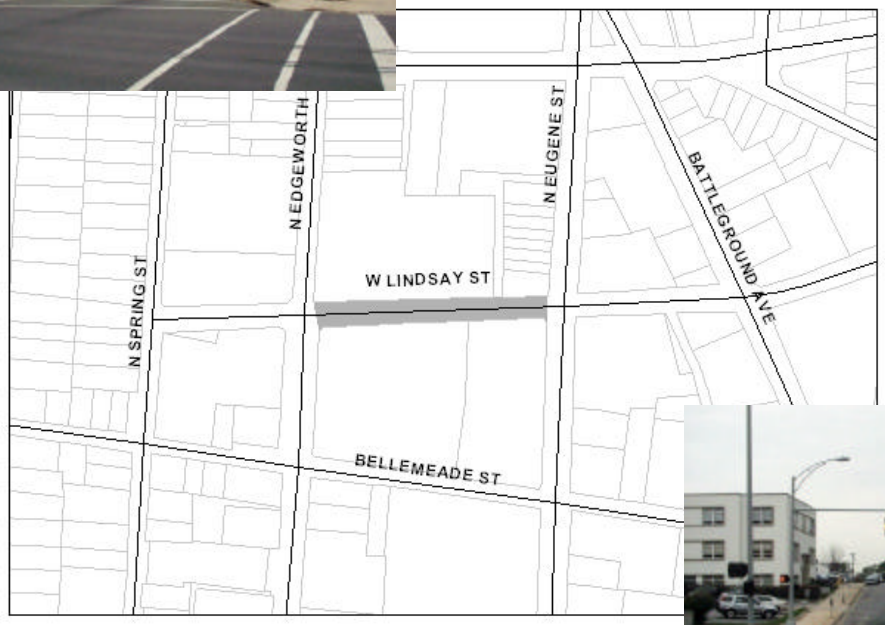
Proposed Closing of Lindsay Street

(Between Edgeworth Street and Eugene Street)

Traffic / Parking Analysis



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Executive Summary:

The City of Greensboro Department of Transportation has reviewed and technically evaluated traffic and parking conditions created by a proposed closure of Lindsay Street (between Edgeworth Street and Eugene Street) and the addition of a proposed baseball stadium located in the general vicinity of the proposed street closure.

Based on the analysis, the following findings and recommendations are offered:

- The proposed closure of Lindsay Street will not create any adverse traffic or safety conditions that require mitigation.
- The proposed closure of Lindsay Street will require some minor intersection changes to accommodate the closure. These changes are estimated to cost +/- $12,000.
- The proposed closure of Lindsay Street along with the addition of a proposed 7,000 seat stadium in the general vicinity of the proposed street closure will not create any adverse traffic or safety conditions that require mitigation.
- Sufficient on and off-street parking opportunities exist within ¼ mile of the proposed stadium to accommodate parking demand for a sell out event.

Other items:

- Eugene Street between Fisher Avenue and Parkway Street is expected to carry a small percentage of site traffic associated with the proposed baseball stadium (5% or 117 vehicles during a sell out event). Based on a review of existing and projected traffic conditions and available street capacity, Eugene Street can accommodate the closure of Lindsay Street and the extra traffic demand without creating any adverse safety or traffic conditions that require mitigation. Should City Council choose to provide enhancements to Eugene Street, options are offered in the report.
- Parking encroachment into residential areas adjacent to the proposed baseball stadium site are not envisioned nor anticipated to occur. Should this become an issue, City Council can address through increased parking enforcement and/or the implementation of residential permit parking (as exist in College Hills).
- Several downtown traffic and parking changes were presented to and approved by City Council for implementation in the Spring of 2002. Specifically, a portion of Lindsay (from Davie Street to Eugene Street) and Bellemeade Street (from Davie Street to Green Street) was to be modified from one-way traffic operations to two-way traffic operations within a 3-5 year time frame. While these changes are not required to accommodate traffic conditions associated with the proposed closure of Lindsay Street (between Edgeworth Street and Eugene Street) or traffic conditions associated with the proposed stadium, implementation of the previously planned traffic and parking changes along with a few others to Lindsay Street (between Edgeworth and Spring Streets) and Bellemeade Street (between Greene and Spring Streets) would further enhance traffic flow and access in the downtown area and should be consider for implementation by City Council should the proposed Stadium be constructed.

A more detailed overview of all data collection efforts, analysis, findings, facts, and figures are contained in the report. In summary, our analysis finds that the proposed closure of Lindsay Street (between Edgeworth Street and Eugene Street) and the addition of a proposed baseball stadium located in the general vicinity of the proposed street closure will not create any adverse traffic or parking issues or conditions that will require mitigation to accommodate.

Introduction:

A baseball stadium is proposed for downtown Greensboro in the block that is bordered by Smith Street to the North, Edgeworth Street to the West, Eugene Street to the East, and Bellemeade Street to the South (see Figure 1). To make room for the stadium site, the section of Lindsay Street between Edgeworth Street and Eugene Street would need to be closed.

The objective of this study is to evaluate existing traffic and parking conditions and the ability of the adjacent roadway network to accommodate a closure of Lindsay Street (between Edgeworth and Eugene Streets) and additional traffic volumes generated by the proposed baseball stadium site. The study includes and reviews parking availability, parking demand, trip generation for the stadium, traffic distribution, traffic capacity analysis, and offers improvements as needed.

Trip Generation:

The trip generation for the proposed baseball stadium was based on the assumption that the stadium would have a maximum of 7000 seats and applied the accepted vehicle occupancy rate of three (3) passengers per vehicle for sporting events. Using these values, a sold out baseball game would generate 2,333 trips. This would also be the number (2,333) of needed parking spaces for a sold out event.

Parking Assessment:

The parking study evaluated all existing parking spaces (on-street parking, surface parking lots, and parking decks) within one-quarter (¼) mile radius of the proposed site. The average person can walk a ¼ mile in 5 minutes. The total number of parking spaces within a ¼ mile radius of the proposed baseball stadium area is 5,760. It was assumed that at least 50% of these spaces would be available after 6:00 pm (a conservative estimate), making 2880 spaces available within easy walking distance of the stadium. **The 2880 available parking spaces can accommodate a sold out game with 7000 in attendance. Further, parking encroachment into residential areas adjacent to the proposed baseball stadium site are not envisioned nor anticipated to occur. Should this become an issue, City Council can address through increased parking enforcement and/or the implementation of residential permit parking (as exist in College Hills). See Figure 1 for a detailed breakdown of existing and available parking for the proposed baseball stadium.**

Traffic Distribution:

Baseball stadium traffic was distributed to the existing downtown roadway network based on available parking in close proximity to the proposed stadium site. Figure 2 illustrates where traffic is projected to originate from and go to before and after events at the proposed stadium site. As the figure shows, site traffic is expected to use major travel ways to access the proposed stadium site. Therefore, any use of adjacent local / residential streets to access the proposed stadium site is considered remote and will primarily involve and be limited to local traffic (i.e., residents of adjacent neighborhoods).

Site Traffic Entering Downtown	Site Traffic Exiting Downtown
• 20% from the northwest on Smith St. • 5% from the north on Eugene St. • 20% from the northeast on Lindsay St. • 10% from the east on Friendly Ave. • 15% from the south on Eugene St. • 15% from the south on Edgeworth St. • 15% from the west on Market St.	• 20% to the northwest on Battleground Ave • 5% to the north on Eugene St. • 10% to the northeast on Smith St. • 5% to the east on Bellemeade St. • 15% to the east on Market St. • 5% to the south on Greene St. • 10% to the south on Eugene St. • 15% to the south on Spring St. • 15% to the west on Friendly Ave.

Study Parameters and Existing Information:

The study area includes the following 22 signalized intersections and 4 unsignalized: (See Figure 2 for study area location)

- Battleground Ave. and Fisher Ave.
- Spring St. and Fisher Ave.
- Eugene St. and Battleground Ave.
- Smith St. and Spring St., Edgeworth St., Eugene St., Battleground Ave., Greene St.
- Lindsay St. and Spring St., Edgeworth St., Eugene St., Greene St.
- Bellemeade St. and Spring St., Edgeworth St., Eugene St., Greene St.
- Friendly Ave. and Spring St., Edgeworth St., Eugene St., Commerce Pl., Greene St.
- Market St. and Spring St., Edgeworth St., Eugene St., Commerce Pl., Greene St.

Four (4) conditions were evaluated for this study:

1) 2002 PM Peak (5-6) Existing Conditions
2) 2004 PM Peak (5-6) with Lindsay Street open and no downtown stadium
3) 2004 PM Peak (5-6) with Lindsay Street closed and downtown stadium traffic
4) 2004 PM Off-Peak (6-7) with Lindsay Street closed and downtown stadium traffic.

GDOT maintains an annual traffic count program and recent counts were available for all the intersections in the study area (See Figure 3A). A growth rate of 2% per year was used to project future background traffic volumes for the build-out year of 2004. The total traffic volumes were obtained by combining the generated site traffic with the projected background traffic for the build-out year of 2004. Figure 3B illustrates these projected traffic volumes.

The worst-case scenario would be if all the traffic for a sold out game arrived during the PM peak hour (5-6 PM). The most likely scenario is that traffic for a sold out event arrived in the hour before game time (6-7 PM).

Traffic Analysis:

The street network in this study was analyzed by the methods defined in the Highway Capacity Manual (HCM). The Highway Capacity Manual was developed by the Transportation Research Board in Washington DC and is a universal standard for evaluating traffic conditions. The quantitative measure used in the HCM to determine how an intersection is functioning is by the average delay experienced by each vehicle. The average delay per vehicle is then related to Level of Service (LOS). There are six LOS, A-F, A corresponding to the best-case scenario and F corresponding to the worst-case scenario. The following tables illustrate the range of delay of each LOS.

LOS Criteria for Signalized Intersections	
LOS	Delay per Vehicle (s/veh)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80
Source: Highway Capacity Manual 2000, p. 17-2	

LOS Criteria for Unsignalized Intersections	
LOS	Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50
Source: Highway Capacity Manual 2000, p. 16-2	

The following is a table listing the LOS and delay per vehicle for the conditions studied:

Level of Service and Delay Summary

Intersections	**2002 PM Peak (5-6 PM) Existing Conditions** LOS (Delay, s/veh)	**2004 PM Peak (5-6 PM) No Ballpark Traffic** LOS (Delay, s/veh)	*** 2004 PM Peak (5-6 PM) + Ballpark Traffic** LOS (Delay, s/veh)	****2004 PM Off-Peak (6-7 PM) + Ballpark Traffic** LOS (Delay, s/veh)
Battleground & Fisher	B (15.0)	B (15.2)	B (16.6)	B (10.6)
Spring & Fisher	A (10.6)	A (11.0)	A (11.0)	A (7.8)
Eugene & Battleground	B (10.7)	B (11.7)	D (40.0)	A (5.2)
Smith & Spring	B (11.7)	B (12.0)	B (11.8)	B (10.6)
Smith & Edgeworth	A (4.3)	A (4.3)	B (12.1)	A (5.3)
Smith & Eugene	B (15.6)	B (16.0)	B (17.9)	B (11.9)
Smith & Battleground	A (3.6)	A (3.6)	A (3.8)	A (2.9)
Smith & Greene	B (15.9)	B (13.5)	B (13.9)	B (12.7)
Lindsay & Spring	A (5.9)	A (6.0)	A (0.6)	A (0.3)
Lindsay & Edgeworth	A (6.8)	A (7.3)	A (9.2)	A (0.5)
Lindsay & Eugene	A (7.9)	A (8.4)	B (14.2)	A (6.6)
Lindsay & Greene	B (14.5)	B (14.1)	B (14.1)	A (9.5)
Bellemeade & Spring	A (0.2)	A (0.2)	A (3.4)	A (5.3)
Bellemeade & Edgeworth	A (4.3)	A (3.4)	A (5.8)	A (5.1)
Bellemeade & Eugene	A (9.1)	A (9.5)	B (12.8)	B (12.9)
Bellemeade & Greene	B (15.8)	B (15.6)	C (23.3)	A (6.2)
Friendly & Spring	B (12.1)	B (12.4)	A (8.2)	A (6.5)
Friendly & Edgeworth	B (10.0)	B (10.1)	B (17.2)	A (8.9)
Friendly & Eugene	A (9.7)	B (10.0)	B (13.8)	A (8.7)
Friendly & Commerce	A (8.7)	A (9.3)	B (12.2)	A (5.6)
Friendly & Greene	B (11.8)	B (11.9)	B (15.4)	B (11.8)
Market & Spring	B (12.6)	B (12.5)	B (17.9)	B (12.7)
Market & Edgeworth	B (11.8)	B (12.9)	B (11.1)	A (9.6)
Market & Eugene	B (16.1)	B (17.2)	C (21.2)	B (12.4)
Market & Commerce	A (0.7)	A (0.7)	A (0.7)	A (0.5)
Market & Greene	B (11.4)	B (10.8)	A (8.0)	A (9.2)

* Worst case scenario, ballgame traffic arrives during PM peak (5-6 PM)

** Most likely scenario, ballgame traffic arrives during off-peak (6-7 PM).

Findings and Recommendations:

The evaluation of the closure of Lindsay Street and traffic generated by the proposed stadium indicates that both actions will have minimal impacts to the surrounding street network. Even with these actions, all intersections in this study continue to operate at an acceptable LOS. It should be noted that the site trips plus the future projected PM peak background traffic is considered the worst-case scenario. Normally, games will be starting after the PM peak traffic hour when most daily commuter traffic has exited downtown. Additionally, this study does not take into account the relocation of 350+ County workers and associated traffic that would take place with the construction of this site. **Therefore, the proposed closure of Lindsay Street along with the addition of a proposed 7,000 seat stadium in the general vicinity of the proposed street closure will not create any adverse traffic or safety conditions that require mitigation.**

There will however, be some minor intersection changes required to accommodate the closure of Lindsay Street. It is estimated that the total cost of these changes would not exceed $12,000. These changes involve removal and replacement of conflicting pavement markings, removing traffic signals and signing:

1. **Revise intersection signs and pavement markings at Lindsay & Eugene and at Lindsay & Edgeworth; estimated cost = $2,700.**
2. **Miscellaneous signs and pavement markings around the new ballpark site; estimated cost = $1,500.**
3. **Remove traffic signal at Lindsay & Edgeworth; estimated cost = $7,500.**

Eugene Street Traffic Assessment:

Concerns have been expressed about additional traffic being generated on North Eugene Street between Fisher Avenue and Parkway Street through Fisher Park. This section of North Eugene Street is classified as a Collector Street and has a posted speed limit of 30 MPH. A recent speed study revealed that the average speed on this section of Eugene Street is 33 MPH. Currently, this street carries approximately 410 vehicles during the PM peak traffic hour, operates at a Level of Service B, and has an approximate vehicle carrying capacity of 1400 vehicles per hour (Level of Service D threshold). This means that under current PM peak hour traffic conditions, Eugene Street only uses 30% of its available travel capacity. With the proposed stadium, it is projected that an additional 117 vehicles will travel this section of Eugene Street before and after a sold-out event. While 117 vehicles represents a 28% increase over existing PM peak hour traffic levels, this additional traffic only increases the overall use of the available travel capacity of the street to 37% and does not change the streets Level of Service.

Therefore, based on a review of existing and projected traffic conditions and available street capacity, Eugene Street can accommodate the closure of Lindsay Street and extra traffic demand created by the proposed stadium without creating any adverse safety or traffic conditions that require mitigation. However, should City Council choose to provide enhancements to Eugene Street, the following options exist:

1. Targeted enforcement of existing speed limits by GPD to further discourage speed violations.
2. Place rumble strips and "Residential Area" warning signs at the entrances to the neighborhood to clearly delineate to motorists the presence of a residential area.
3. Place in-pavement pedestrian warning signs at pedestrian crossings to enhance pedestrian safety and slow traffic at these crossings.

The total cost to install these devices along this section of North Eugene Street is $1500. See Figure 4 for details on the potential changes to Eugene Street.

Proposed Downtown Traffic Enhancements:

In the spring of 2002, GDOT presented a downtown traffic and parking master plan to City Council. The plan was approved by Council for implementation in a 3-5 year time frame and was developed to enhance traffic circulation/access in the downtown area and to create more convenient on-street parking opportunities in Greensboro. The plan was the culmination of several traffic and parking studies conducted in the downtown area. **It should be noted that these proposed traffic and parking enhancements are not required to mitigate traffic generated by the closure of Lindsay Street or the proposed downtown baseball stadium.** The plan included the following elements:

1) Repave and remark Washington Street from Davie Street to Spring Street create additional on-street parking. Estimated cost = $20,000. (Davie to Greene St. complete, 28 spaces)

2) Repave and remark Spring Garden Street from Mcgee Street to Edgeworth Street. Estimated cost = $43,500. (Complete, 56 new on-street parking spaces)

3) Convert Greene Street from 1-way traffic to 2-way traffic between Washington and Mcgee, add angled parking, and build roundabout. Estimated cost = $650,000.

4) Convert Davie Street from 1-way traffic to 2-way traffic between Lindsay Street and Friendly Avenue. Estimated cost = $220,000.

5) Convert Lindsay Street from 1-way traffic to 2-way traffic between Davie Street and Eugene Street. Estimated cost = $200,000. **

6) Convert Bellemeade Street from 1-way traffic to 2-way traffic between Davie Street and Greene Street. Estimated cost = $100,000. **

7) Convert Davie Street from 1-way traffic to 2-way traffic between Washington Street and Mcgee Street. Estimated cost = $100,000.

8) Create on-street angled parking on Davie Street between Washington Street and Market Street. Estimated cost = $125,000.

** Although no changes to Lindsay or Bellemeade Streets are required for the proposed baseball stadium site, the conversion of these streets from 1-way traffic to 2-way traffic as described in items #5 and #6 above will enhance traffic flow and access around the proposed stadium site. (See Figure 5 for the approved changes to Bellemeade and Lindsay Streets).

Additional Traffic Flow Enhancements:

In addition to the previously approved enhancements listed above, should Lindsay Street be closed and the proposed stadium be constructed, there are a few additional facility improvements that City Council should consider for implementation to further enhance traffic flow and access in and around the downtown area. One such enhancement would be to convert the section of Lindsay Street between Edgeworth Street and Spring Street from a one-way street (Westbound) to a two-way street. Another section would be to convert Bellemeade Street from one-way to two-way between Spring Street and Greene Street. These projects are estimated to cost $25,000 and $100,000 respectively. **While these projects will increase downtown traffic flow and access neither is required to accommodate the closure of Lindsay Street or the addition of a proposed stadium.**

Conclusion:

In conclusion, our analysis finds that the proposed closure of Lindsay Street (between Edgeworth Street and Eugene Street) and the addition of a proposed baseball stadium located in the general vicinity of the proposed street closure will not create any adverse traffic or parking issues or conditions that will require mitigation to accommodate.