Bexley Square/Giant Eagle Traffic Access Study
Bexley, Ohio

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Proj. No. 201.142

E. P. FERRIS AND ASSOCIATES INC
CONSULTING CIVIL ENGINEERS AND SURVEYORS

880 KING AVENUE
COLUMBUS, OHIO 43212
614-299-2999
614-299-2992 FAX

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EXECUTIVE SUMMARY

A 30,000 gross square foot (gsf) Giant Eagle Market District Express Store (Market Store) is proposed at the location of the existing Bexley City Hall, along East Main Street. In addition, a portion of an existing commercial development to the west is proposed to be modified to provide 17,500 gsf of office space. See **Figure 1** for the development location, and **Figure 2** for the proposed development plan. Proposed modifications to driveways are shown in **Figure 4**. The key modifications are to sign the existing driveway west of existing City Hall for outbound right only, prohibiting left turns out of the existing driveway east of existing City Hall, and changing the driveway along Drexel Avenue to inbound only. For the driveway along Drexel Avenue, we recommended that the radius on the north corner be modified to facilitate turns. A driveway connection will be constructed for access to and from the Market Store and the commercial property to the west. This connection will be located along the south side of the proposed office, in between the office and the remaining retail. It will provide access to the existing traffic signal at the Main Street and College Avenue intersection.

Existing traffic volumes were obtained from the Mid-Ohio Regional Planning Commission (MORPC). This data was used to derive Year 2025 volumes (**see Figure 6**), which represent a typical analysis timeframe of 10 years after 'Opening Day'.

Trips to be generated by the proposed Office and the Market Store are respectively illustrated in **Figures 9 and 10.** Most of the Market Store traffic is assumed to exit via the signalized driveway opposite College Avenue. Not all of the development trips will be new trips on area roads. Some trips would be internal to the site, such as an office worker going to the Market Store or adjacent retail before heading home. Some of the Market Store traffic will consist of existing traffic currently passing by the site (pass-by trips), stopping at the store while on their way to or from another destination. **Figure 12** shows Year 2025 volumes including development traffic.

Traffic flows were evaluated for the study signalized intersections and the driveway on the east side of the Market Store. The results show acceptable flow conditions for the signalized intersections and for the driveway east of existing City Hall. Although no capacity improvements are recommended at that driveway, on-street parking would restrict sight distances for right turn exiting vehicles. From a preliminary analysis, consideration may be given to improving sight distance by removing one or two on-street parking spaces just east of that driveway.

An analysis was also conducted for the left turn lane storage lengths, to determine if the existing storage lengths could accommodate future left turn volumes, and if through lane backup might block off access to the left turn lanes. The results show that eastbound through volumes at Parkview Avenue and at College Avenue may occasionally extend beyond the left turn lanes. We recommended that backup conditions be monitored at all of the signals evaluated for this Study. For the signals at College Avenue and at Drexel Avenue, we also recommended implementing signal timing and/or signal coordination changes to help reduce potential backup concerns. Additional signal phasing changes were also considered at College Avenue, but are not recommended at this time. These phasing changes were also evaluated assuming the removal of the existing right exit driveway west of the College Avenue signal. Based on the analysis results, we recommend keeping the existing right exit driveway. However, the signal cabinet could be upgraded to allow phasing changes in the near future.

We also recommended that an internal signing plan be developed to inform the Market Store

patrons of the exit via the signalized driveway at College Avenue and Main Street. A detailed traffic control plan should be prepared for the site driveway approach to College Avenue to minimize potential vehicular conflicts and to provide an orderly approach to the signal. Refer to Figure 2 for a schematic illustration of this traffic control.

Summary of Recommendations

- Prepare a plan to revise the traffic control and pavement markings for the parking lot and north leg of the Main Street at College Avenue signalized intersection. Refer to Figure 2 for a schematic illustration of this traffic control.

- Replace the existing pole mounted controller cabinet at the traffic signal at Main Street and College Avenue with a new ground mounted controller cabinet, wired to provide additional signal phasing. At time of opening of the Market Store, modify the signal phasing at this intersection to the desired operation.

- Keep the existing right turn driveway just west of the signal at Main Street and College Avenue.

- The site access west of and adjacent to the Market District Express Store is to be designated one-way exiting. Install 'Do Not Enter' signs facing Main Street. Install signs to prohibit left turns exiting the site to Main Street.

- Install signing for the Main Street site access east of and adjacent to the Market District Express Store to prohibit left turns out.

- Develop and implement signing at the new entryway between the existing retail building and the Market District Express Store to direct the Market Store patrons to the signal at the Main Street and College Avenue intersection.

- Consider additional parking prohibitions on the north side of Main Street at the access driveway on the east side of the District Market Express Store to improve sight distance from the east (remove one or two parking spaces).

- Make the access driveway from Drexel Avenue one way in (westbound) and improve the radius on the north side of the drive to facilitate turns.

- Monitor left turn and through traffic backups along Main Street. Implement signal timing and/or coordination modifications to reduce potential backup concerns.

Introduction

A 30,000 gross square foot (gsf) Market District Express Store (Market Store) is proposed at the location of the existing Bexley City Hall, along East Main Street. In addition, a portion of an existing commercial development to the east is proposed to be modified to 17,500 gsf office use. See **Figure 1** for a vicinity map and **Figure 2** for the proposed development plan. The following outlines the analysis of peak hour traffic volumes and other traffic-related issues.

Project Study Area

The Study limits are the signalized intersections of East Main Street at South Parkview Avenue, at College Avenue/commercial driveway, and at South Drexel Avenue. Main Street, College Avenue and Parkview Avenue are all posted at 25 mph; Drexel Avenue is posted at 35 mph.

The lane configurations for existing conditions are shown in **Figure 3**. Main Street is a 5-lane roadway, with a middle left turn lane at the signals and at the driveway east of City Hall. On-street parking is provided along both sides of Main Street, with parking restrictions for the westbound direction during the AM peak period, and PM parking restrictions for eastbound traffic during the PM peak period. The net result is that during the PM peak hour, there are two eastbound travel lanes, and one westbound lane.

The distance between the Parkview Avenue and College Avenue intersections is about 630 feet, and is about 530 feet between College Avenue and Drexel Avenue. The two driveways serving existing City Hall that will continue to serve the Market Store are about 120 and 300 feet east of the College Avenue signal. A separate left turn lane is provided for the easternmost site driveway. The side streets of Parkview Avenue, College Avenue each have a separate left turn lane on their approaches to the signal. Drexel Avenue has separate right and left turn lanes at its approach to Main Street. The driveways on either side of City Hall are single lane approaches. The commercial driveway opposite College Avenue has a single approach lane for thru/left turns, plus a right turn egress lane not controlled by the signal.

On Drexel Avenue north of Main Street, on-street parking is allowed during both peak periods. The result is one travel lane per direction in the vicinity of the driveway will provide access to the Market Store site.

Various proposed modifications to driveways are shown in **Figure 4**. The key modifications are changing the existing driveway west of City Hall to outbound right only, prohibiting left turns out of the existing driveway east of existing City Hall, and changing the driveway at Drexel Avenue to inbound only. Also, a driveway connection will be constructed for access to and from the Market Store and the commercial property to the west. This connection will be located on the south side of the proposed office, in between the office and the existing retail.

Because the proposed development is predominantly commercial, only the weekday PM peak hour was evaluated. The volumes during the AM peak hour would be substantially less and as a result were not evaluated.

Main Street is on a slight downgrade to the west through the project intersections. On-street parking limits sight distance for motorists exiting the City Hall driveways. There are some gaps in east-west flows for exiting driveway traffic to make right turns.

Existing and Future Non-Site Traffic

Traffic volume data was obtained from the Mid-Ohio Regional Planning Commission (MORPC) for the intersections of Main Street at Parkview Avenue, at College Avenue, and at Drexel Avenue. The data is provided in **Appendix A** and summarized in **Figure 5**. At the time these volumes were recorded, part of the existing commercial development west of City Hall was not occupied, specifically the area proposed to be redeveloped as office space. As a result, the traffic anticipated to be generated by the office space can be added to these volumes. The office space traffic is discussed further below.

Because the data at each intersection was recorded on a different date, there are relatively minor variations when comparing volumes for each intersection. Some of that discrepancy can be related to on-street parking activity, as well as turns to and from Sheridan Avenue between Parkview Avenue and College Avenue. For the driveways at either side of City Hall, the volumes are shown balanced with the adjacent signal (i.e., the driveway volumes on the east side of City Hall balanced with Drexel Avenue volumes). Overall, these volume variations are relatively minor, and further refinement of the volumes to fully balance along the entire corridor are not expected to alter the Study conclusions.

The Year 2025 volumes, which represent a typical analysis timeframe of 10 years after 'Opening Day', were derived and evaluated. In deriving the future volumes, a growth rate was applied to the east-west through volumes on Main Street. Given this area is essentially fully developed; future growth in traffic is expected to be low. A 0.5 percent annual increase was applied to the east-west through volumes, or a total of 5.5 percent (from Year 2014 to Year 2025). This excludes the site development. The results are shown in **Appendix A, Figure 1A**. Since the project area driveways are proposed to be modified, existing driveway traffic at the City Hall driveways was deleted, and the exiting driveway volumes for the driveway on Drexel Avenue were rerouted to use one of the City Hall driveways. Those driveway volumes that would be deleted or rerouted are shown in **Appendix A**, **Figure 2A.**

The net result is in **Figure 6**, which represent Year 2025 volumes with the driveway modifications but without the site development (No Build Traffic)**.**

Proposed Site Development

Proposed Site Access/Egress

Although the existing driveway locations are assumed to remain unchanged, the ingress and egress conditions are proposed to be modified. The easternmost driveway (or the one east of existing City Hall) is proposed to be modified to prohibit exiting left turns out, while the western driveway (or the one on the west side of existing City Hall) is proposed to be modified to be one-way outbound with movements restricted to right-out only. Access to the existing commercial and proposed office space would remain opposite College Avenue.

Along Drexel Avenue, an existing 2-way driveway that presently serves some businesses and residents is proposed to be converted to one way in, and the driveway extended to the parking area for the Market Store. As part of this driveway modification, the radius on the north side of the driveway should also be modified to facilitate vehicle turns.

A driveway between the Market Store and the parking area for the commercial area to the west is also proposed, by removal of a portion of the existing retail building, and placing this driveway between the proposed office space and the remaining retail space. The driveway access/egress configurations are conceptually illustrated in **Figure 4**. Additional details for the proposed parking area layout, and the proposed driveway connection with the Market Store, are shown in **Figure 2**.

As noted previously, on-street parking will limit sight distance for motorists exiting the easternmost driveway on Main Street. Although gaps in east-west flows can allow right turns out of that driveway, consideration may be given to removing one or two on-street parking spaces east of the driveway, to improve sight distance conditions.

Trip Distribution

The trips estimated to be generated by the proposed development were distributed on the area roads based upon a combination of peak hour directional volumes along Main Street and familiarity with local travel patterns. The trip distribution for the proposed Office traffic is shown in **Figure 7** and for the Market Store in **Figure 8**. The percentages for both proposed land uses are also tabulated below in **Table 1**. The distribution for the Market Store traffic exiting the site assumes most patrons heading east from the site would utilize the signal at College Avenue, rather than turning from the stop-sign controlled driveway closer to Drexel Avenue.

Table 1. Site Traffic Distribution-PM Peak Hour

Peak Hour Trip Distribution Percentages	Office Trips		Market District Express	
From (Inbound) / To (Outbound) by Street	Inbound	Outbound	Inbound	Outbound
From the East /To the East on Main St	25%	45%	42%	55%
From the West /To the West on Main St	33%	13%	28%	5%
To the North /From the North on Parkview Ave	17%	17%	17%	25%
To the South /From the South on College Ave	17%	10%	8%	5%
To the North /From the North on Drexel Ave	8%	15%	5%	10%

Trip Generation

Trips to be generated by the proposed development were based upon data provided in the *Institute of Transportation Engineers (ITE) Trip Generation Report, 9th Edition*. The proposed office will provide about 17,500 gross square foot (gsf) of space, and the Market Store about 30,000 gsf of space. The results of the peak hour trip derivation are provided in **Appendix B** and summarized in **Table 2**. For the Market Store, the trips were generated based upon trip rates for a typical supermarket. However, given the proposed development is not planned to offer the range of items normally found at a typical supermarket, the peak hour trips are expected to be slightly lower. As a result, the trips were reduced by 10 percent.

Not all of the trips will be new trips on the area roads. Some trips are expected to be internal to the site, such as an office worker next door shopping at the Market Store before heading home. This results in a corresponding trip reduction for the Market Store. Some of the Market Store traffic will consist of traffic currently passing by the site (pass-by trips) that will instead stop at the store while on their way to or from another destination. Other than the internal trips, this Study assumes no other walk-in trips. In the future, walk-ins may become more common, although it is not known if there would be any significant change to projected traffic flow conditions.

The *Trip Generation Report* provides information about both internal trips and pass-by trips for similar types of development. The results indicate a relatively small number of internal trips. Data related to pass-by trips for the Market Store were based upon pass-by trips for supermarkets at various locations in the United States. The pass-by percentages for those specific locations can vary widely, but average around 30-35 percent. For this study, a 33 percent pass-by percentage is applied. **Table 2** shows total peak hour site trips, internal trips, pass-by traffic, and total new trips on area roadways. The site trips for the Office and the Market Store are respectively illustrated in **Figures 9 and 10**.

Table 2. Site Peak Hour Trip Generation

		PM Peak Hour		
		In	Out	Total
A	17,500 gsf Office Space Total Trips	17	81	98
B	Less Internal Office Trips	-5	-4	-9
C	Subtotal Office Trips Entering/Exiting Site (A-B)	12	77	89
D	30,000 gsf Market District Express Total Trips	147	141	288
E	Less Internal Market District Express Trips	-4	-5	-9
F	Subtotal Market District Express Trips Entering/Exiting Site (D-E)	143	136	279
H	Less Pass-By Trips (33 percent)	-47	-47	-94
I	Subtotal New Market District Express Trips on Area Roads (F-H)	96	89	185
	Total New Development Trips on Area Roads (C+I)	108	166	274

Figure 11 shows the combination of Office and Market Store Traffic. **Figure 12** shows the sum of this development traffic with Year 2025 volumes (or the sum of Figures 6 and 11).

Analysis

Intersection Capacity Analysis

The capacity analyses are based upon the 2010 Highway Capacity Software (HCS 2010). Two types of analyses were conducted: the signalized intersections of Main Street at Parkview Avenue, at College Avenue, and at Drexel Avenue; and the driveway (stop-sign controlled) on the east side of the Market Store. Year 2025 volumes were evaluated, and assumed the signals remain coordinated, the signal phasing remains, and lengths of green times are similar to existing conditions. A separate analysis that considers different signal phasing at the College Avenue intersection is presented further below.

The analysis results are shown in terms of Levels of Service (LOS) and overall delay (seconds). LOS ranges from A (minimal or no delays) to LOS F (extended delays). LOS D is typically considered to be acceptable during peak travel times.

The analyses for Existing and Year 2025 with the total new development traffic are provided in **Appendix B**. The results are summarized below in **Table 3**, and show the future volumes to have slightly higher delays compared to existing conditions, and all are expected in the Year 2025 to operate overall at a satisfactory LOS C or better at the signalized intersections. Typically Access studies may also provide an assessment of future volumes that exclude the future site development (or No-Build volumes). Given the acceptable LOS conditions at the signals that included site development, no additional capacity analysis was deemed necessary for the signalized intersections.

For the main driveway (easternmost driveway) serving the Market Store, the results show the site traffic exiting that driveway is also expected to operate satisfactorily at LOS C.

Table 3 Year 2025 LOS Conditions with Site Development-PM Peak Hour

Signalized Intersection	Seconds Delay/LOS*	
	Existing Conditions	Year 2025 w/Site Traffic
Main at Parkview	9.6 sec/LOS A	10.1 sec/LOS B
Main at College	18.0 sec/LOS B	20.7 sec/LOS C
Main at Drexel	12.4 sec/LOS B	14.2 sec/LOS B
Unsignalized Intersection	Seconds Delay/LOS**	Seconds Delay/LOS**
Main at Dist. Mkt. Expr. Driveway	17.9 sec/LOS C***	17.1 sec/LOS C

**For signalized intersections, the results represent delay conditions for total approach volumes.*

*** For unsignalized intersections, the results show delay conditions for the driveway approach volumes.*

**** The Existing driveway east of City Hall allows left turn volumes, while in 2025 exiting left turns assumed to not be allowed. The exiting left turns result are the reason for slightly higher delays in 2014 compared to Year 2025.*

Turn Lane Length Analysis

The left turn lane storage length analyses for future volumes were based upon the capacity analysis computations for the number of queued vehicles. For this study, the 95th percentile queue was considered (or a 95 percent probability that the queue would be a certain number of vehicles or less).

A comparison was made between existing storage lengths and the computed backups for left turn lanes and adjacent through lanes. The intent is to determine if future volumes might be expected to exceed the available left turn lengths, and to determine if through traffic backups might impede motorists from getting into the left turn lanes. The results show a comparison of existing storage lengths and computed storage length needs.

The analysis computations are provided in **Appendix B**. The computations indicate that for the predominant eastbound flows, the left turn storage lengths are sufficient for the left turn vehicle queues. However, for both eastbound Main Street at Parkview Avenue and at College Avenue, the through lane backups might occasionally extend beyond the length of the left turn lanes. This indicates that during the PM peak period some motorists at those intersections will not be able to maneuver into the left turn lane when the signal turns green. This can make the traffic flow less efficient; but, given the capacity analysis results traffic flows are still anticipated to operate at satisfactory delay conditions.

For Main Street at Drexel Avenue, the computations show that eastbound left turn volumes and eastbound through volumes are not anticipated to exceed the length of the existing left turn lane. Recent observations of existing flows, though, indicate that the backups for left turns and through lanes occasionally exceed the distance of the eastbound left turn lane.

No left turn backup issues are anticipated for vehicles turning left into the easternmost driveway.

We recommended that backup conditions be monitored at all of the signals evaluated for this Study. For the signals at College Avenue and at Drexel Avenue, we also recommended implementing signal timing and/or signal coordination modifications to help reduce potential backup concerns.

Internal Site Circulation

We recommended that internal signing be installed to inform the Market Store patrons of the exit via the signalized driveway at College Avenue and Main Street. This could facilitate egress for patrons who might otherwise experience higher delays trying to turn out of the easternmost driveway.

Because of the anticipated increase in volumes exiting the signalized driveway opposite College Avenue, the striping and signing at that driveway should be revised to more effectively channelize entering and exiting volumes, and in turn minimize potential conflicts for the increased driveway traffic. Refer to Figure 2 for a schematic illustration of those improvements.

Potential Signal Phasing Changes at Main Street and College Avenue

Because of the higher traffic volumes turning to and from the driveway opposite College Avenue, alternative signal phasing was considered for this intersection. Descriptions of the signal phasing are described further below.

The options evaluated are as follows, and the capacity analysis results are shown in **Table 4** further below.

Option 1- Provide a protected/permissive left turn signal for eastbound left turns into the driveway (or similar to the left turn signal for westbound left turns);

Option 2-provide split signal phasing for the north-south approaches; and

Option 3-assume both the left turn signal in Option 1 and the split phasing of Option 2.

Option 1-Protected/permissive left turn signal assumes left turning traffic gets a green arrow for protected left turns, followed by a green ball display to indicate left turns are permitted after yielding to oncoming traffic (and yielding to pedestrians in the crosswalk). This would be the same signal display as for westbound left turns at this intersection.

The advantage of Option 1 is to reduce left turn delays for traffic entering the development north of the intersection.

But there are several disadvantages for Option 1. First, the eastbound left turns are significantly lower than westbound left turns (turning south onto College Avenue). Hence, the left turn arrow for eastbound left turns would both reduce green time for westbound traffic and present a less efficient signal operation, resulting in higher overall delays.

Second, the existing signal controller cabinet and associated equipment would need to be replaced with newer equipment to allow for this type of signal phasing.

The intersection capacity analysis provided in the **Appendix B** for Option 1 shows a Level of Service C with an overall delay of 28.1 seconds. This is longer than the delay time shown in Table 3 using existing signal phasing which shows a Level of Service C with an overall delay of 20.7 seconds.

Option 2-Split phasing assumes the northbound traffic gets a green signal, followed by the southbound signal getting a green light (or vice versa). The advantage of Option 2 is to minimize delays for north-south left turning traffic, as the left turns on these approaches will have a protected left turn signal.

However, there are numerous disadvantages. First, split signal phasing is not efficient for this intersection, as it would reduce the green signal time for the heavier east-west through traffic. The result would be a significant increase in overall delays for this intersection. This can also affect traffic progression along Main Street and possibly result in extended backups at other intersections.

Second, in order to provide satisfactory delay conditions and still achieve signal coordination with the other signals along Main Street, the green times for the

northbound and southbound are significantly reduced. This means that if a pedestrian wants to cross Main Street, the green time for northbound or southbound traffic would need to be increased to allow for the pedestrian crossing time, and that would make this signal go out of coordination with the rest of the Main Street signals. The result of not being in coordination is that there would be extended backups and higher vehicle delays along the Main Street corridor. But given the existing pedestrian activity in this area, the probability is low that this signal would be out of coordination for extended periods. Although a longer signal cycle length might allow the signal to remain coordinated with the split signal phasing, the longer cycle length would mean pedestrians would have to wait longer to cross the street. This would degrade the desired walkable environment, and might induce pedestrians to cross against the light.

Third, split signal phasing and the resultant protected left turn signals for the north and south legs, will also result in the WALK signals on the east and west legs being shown at different times. For example, when northbound traffic has a green light and a green left turn arrow, pedestrians on the west leg would see a DON'T WALK signal. But pedestrians on the east leg would see a WALK signal. This may cause confusion for pedestrians on the west side of the intersection if they see someone crossing on the east leg, and they may decide to disregard the DON'T WALK signal and possibly walk in front of a left turning vehicle.

Fourth, the existing signal controller cabinet and associated equipment would need to be replaced with newer equipment to allow for this type of signal phasing.

The intersection capacity analysis provided in **Appendix B** for Option 2 shows a Level of Service D with an overall delay of 38 seconds. This is nearly double the delay time shown in Table 3 using existing signal phasing which shows a Level of Service C with an overall delay of 20.7 seconds.

Option 3-This Option includes the additional phasing from Options 1 and 2. The benefit of this option is to reduce left turn delays for all approaches to this intersection.

Option 3 has the same types of concerns as with the above Options, except that the available green signal time for east-west through traffic would be further reduced and further complicate signal coordination along the Main Street corridor. The intersection capacity analyses provided in the **Appendix B** for Option 2 shows a Level of Service D with an overall delay of 45.7 seconds, or more than double the delay time shown in Table 3.

Because these signal phasing modifications could significantly worsen delays, affect traffic progression along Main Street, and increase pedestrian delays, these signal phasing changes are not recommended at this time. However, the signal cabinet could be upgraded to allow phasing changes in the future.

A further analysis was conducted of the signal at Main Street and College Avenue, assuming that the right turn driveway is removed, and that the right turning traffic would instead exit at the signal. This scenario of removing the right turn driveway was evaluated using the 3 options noted above and as listed below:

Option 1- Provide a protected/permissive left turn signal for eastbound left turns into the driveway;

Option 2-provide split signal phasing for the north-south approaches; and

Option 3-assume both the left turn signal in Option 1 and the split phasing of Option 2.

For all options, the results are summarized below in **Table 4** and show higher delay conditions because of the additional right turning traffic exiting the driveway at the signal. For Option 1 and the results show increased delays but no change in LOS. Although Option 2 shows no change in the LOS, the delay conditions are significantly higher for exiting driveway traffic, with that approach being expected to operate at LOS F. For Option 3, significantly higher delays at LOS F are expected both for the exiting driveway traffic and for College Avenue traffic. Option 3 also shows high LOS D conditions for westbound Main Street traffic, meaning that if some signal green time is transferred from Main Street to either College Avenue or the driveway, then Main Street traffic would also be at unacceptable delay conditions.

Based upon this comparison of driveway traffic with and without the right turning traffic at the signal, removing the existing right turn driveway is not recommended as this could result in significant delay conditions, and in turn could cause extended backups both for College Avenue and for the driveway.

Table 4 Year 2025 LOS Conditions for Phasing Options at College Avenue

Main Street at College Avenue	Seconds Delay/LOS*	
	Existing Driveway	Add Right Turn Driveway Traffic
Option 1-Protected/Permissive left turn signal for eastbound left turns	28.1 sec/LOS C	28.3 sec/LOS C
Option 2-Split Signal phasing for the north-south approaches	38.0 sec/LOS D	47.9 sec/LOS C
Option 3-Left turn signal in Option 1, and split phasing in Option 2	45.7 sec/LOS D	50.8 sec/LOS D

Conclusions

Traffic at the study signalized intersections and at the driveway east of exiting City Hall is expected to operate at satisfactory flow conditions for the Year 2025. Although no capacity improvements are recommended at that driveway, on-street parking would restrict sight distances for vehicles exiting this driveway. Consideration may be given to improving sight distance by removing one or two on-street parking spaces just east of that driveway.

The analysis of the left turn lanes at the signalized intersections indicate eastbound through volumes at Parkview Avenue and at College Avenue may occasionally back up beyond the left turn lanes. We recommended backup conditions be monitored at the signals. For the signals at College Avenue and at Drexel Avenue, we also recommended implementing signal timing and/or signal coordination changes to help reduce potential backup concerns. Additional signal phasing changes were also considered at College Avenue, but are not recommended at this time. These phasing changes were also evaluated assuming the removal of the existing right exit driveway west of the College Avenue signal. Based on the analysis results, we recommend keeping the existing right exit driveway. However, the signal cabinet could be upgraded to allow phasing changes in the near future.

The driveway west of existing City Hall is recommended to be one way outbound with movements restricted to right out only, and the driveway east of existing City Hall changed to prohibit left turns out. It is also recommended that internal signing be installed to inform the Market Store patrons of the exit via the signalized driveway at College Avenue and Main Street. A detailed plan for the striping and signing of the driveway at College Avenue should also be prepared and implemented, to minimize potential conflicts for the increased driveway traffic. Refer to Figure 2 for a schematic illustration of this traffic control.

Summary of Recommendations

- Prepare a plan to revise the traffic control and pavement markings for the parking lot and north leg of the Main Street at College Avenue signalized intersection. Refer to Figure 2 for a schematic illustration of this traffic control.

- Replace the existing pole mounted controller cabinet at the traffic signal at Main Street and College Avenue with a new ground mounted controller cabinet, wired to provide additional signal phasing. At time of opening of the Market Store, modify the signal phasing at this intersection to the desired operation.

- Keep the existing right turn driveway just west of the signal at Main Street and College Avenue.

- The site access west of and adjacent to the Market District Express Store is to be designated one-way exiting. Install ‘Do Not Enter’ signs facing Main Street. Install signs to prohibit left turns exiting the site to Main Street.

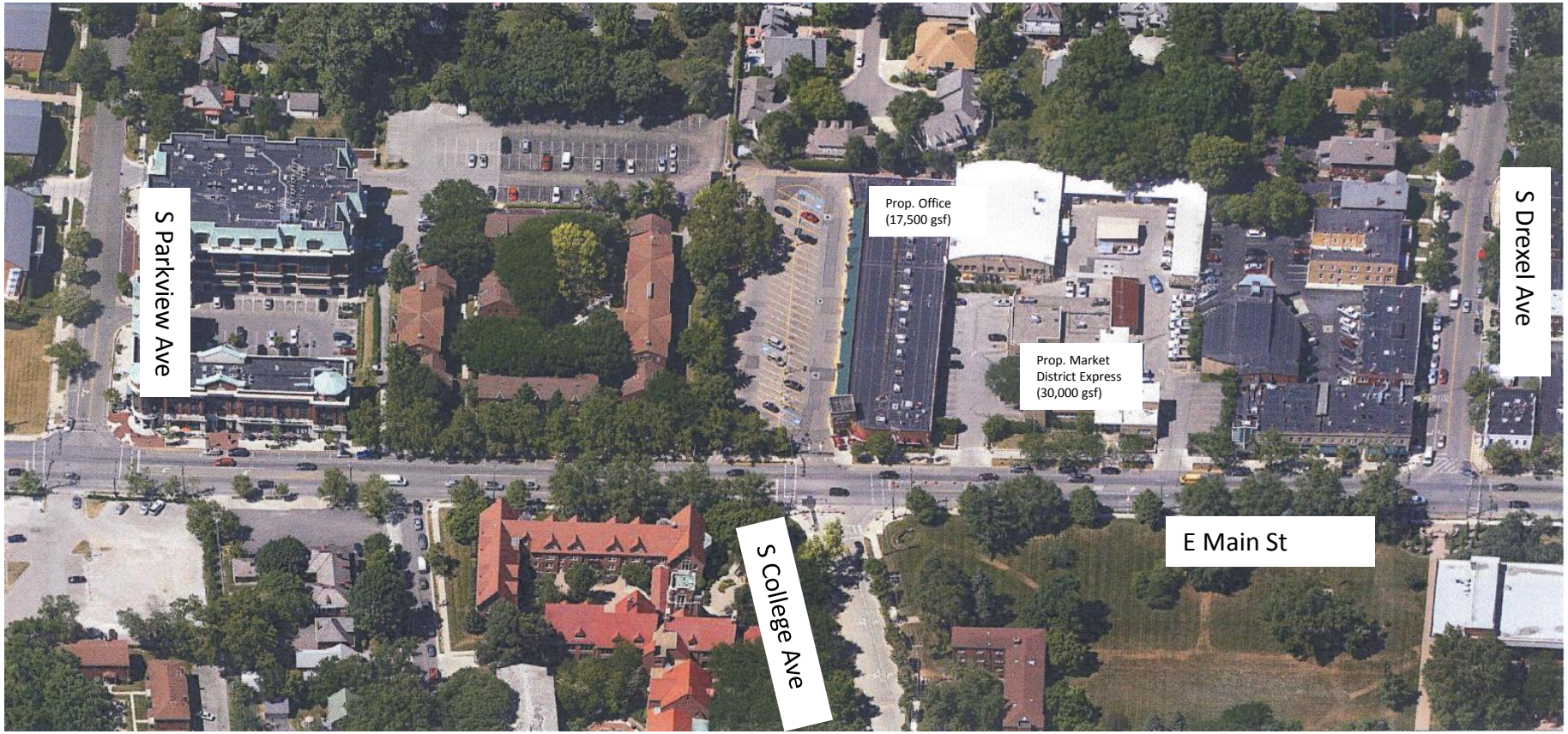
- Install signing for the Main Street site access east of and adjacent to the Market District Express Store to prohibit left turns out.

- Develop and implement signing at the new entryway between the existing retail building and the Market District Express Store to direct the Market Store patrons to the signal at the Main Street and College Avenue intersection.

- Consider additional parking prohibitions on the north side of Main Street at the access driveway on the east side of the District Market Express Store to improve sight distance from the east (remove one or two parking spaces).

- Make the access driveway from Drexel Avenue one way in (westbound) and improve the radius on the north side of the drive to facilitate turns.

- Monitor left turn and through traffic backups along Main Street. Implement signal timing and/or coordination modifications to reduce potential backup concerns.



Bexley Square Traffic Access Study- Study Area

Figure 1

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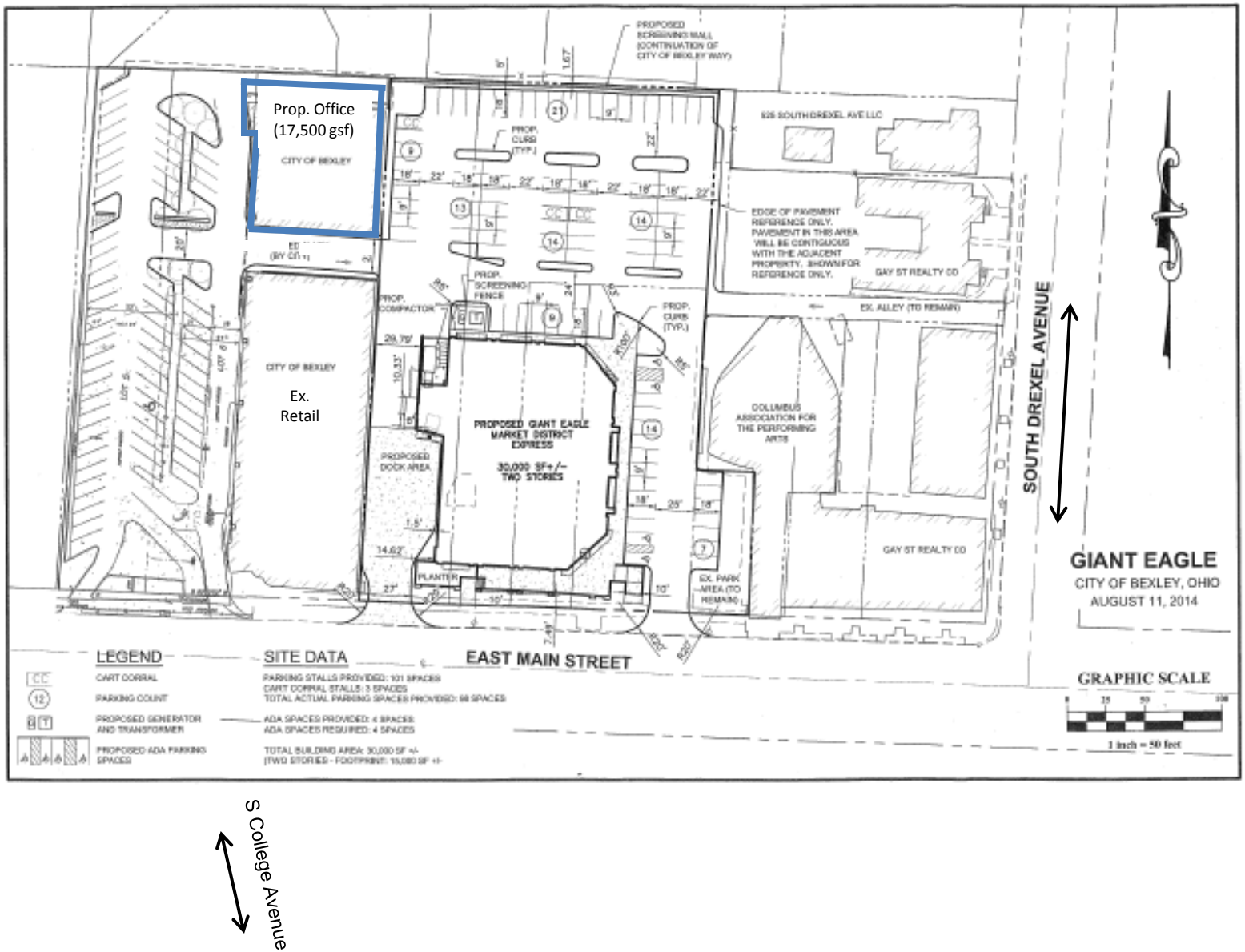

S College Avenue

Bexley Square Traffic Access Study- Proposed Site Development

Figure 2

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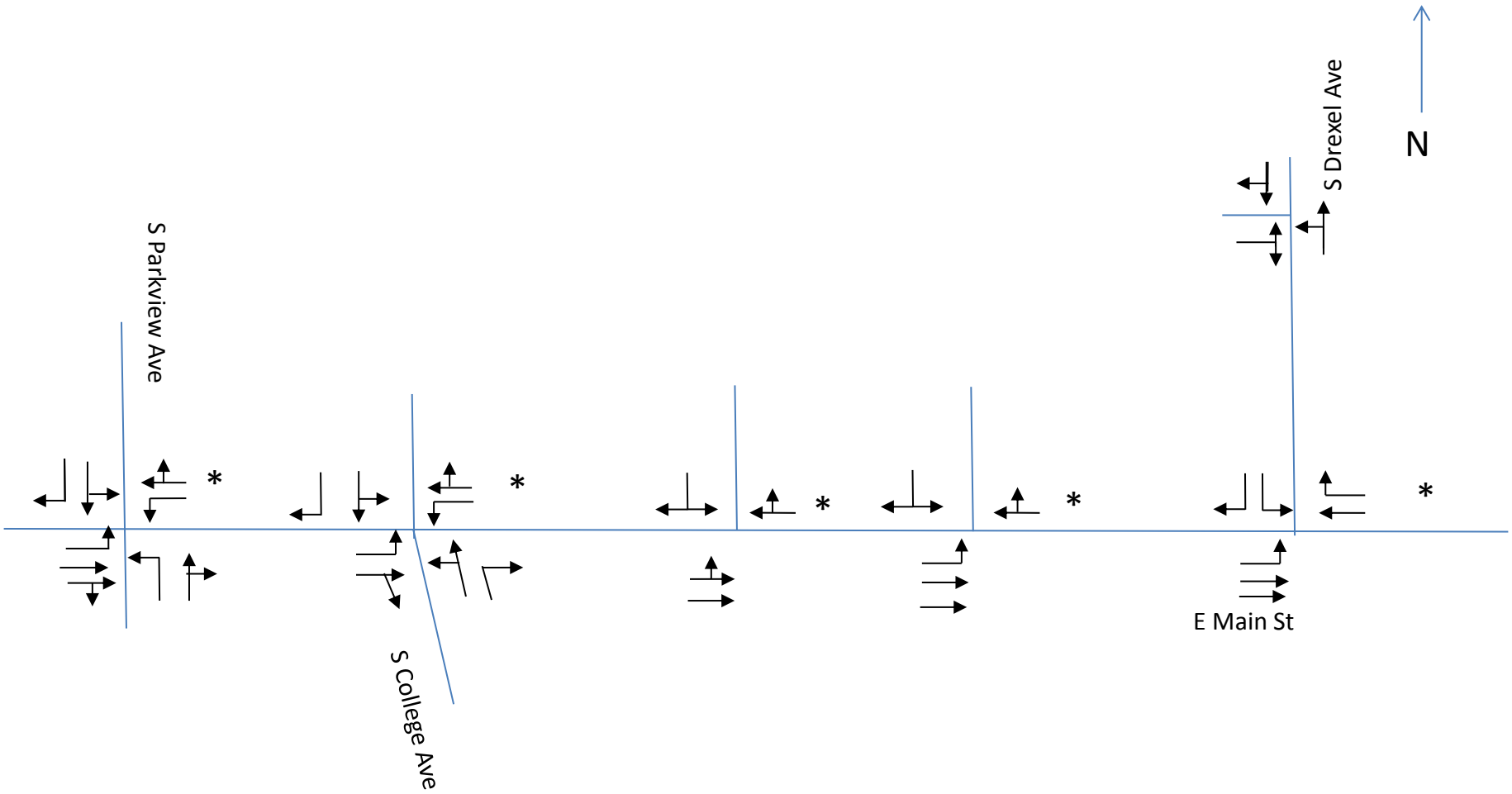

*The second westbound lane is assumed to have on-street parking during the PM Peak hours

Bexley Square Traffic Access Study- Existing Roadway and Driveway Configuration

Figure 3

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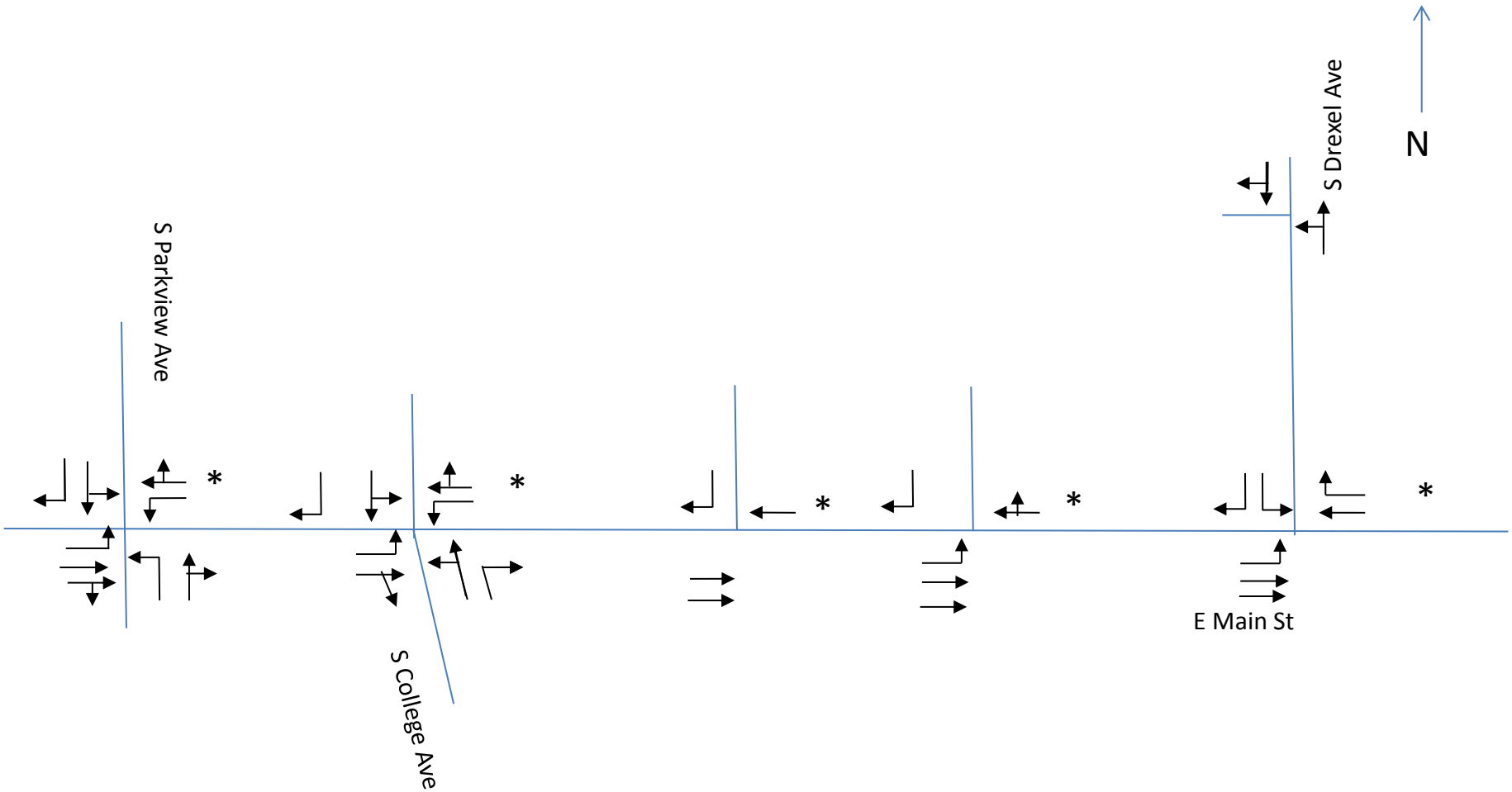

*The second westbound lane is assumed to have on-street parking during the PM Peak hours

Bexley Square Traffic Access Study- Proposed Roadway and Driveway Configuration

Figure 4

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880 King Ave - Columbus - Ohio - 43212 (614) 299-2999
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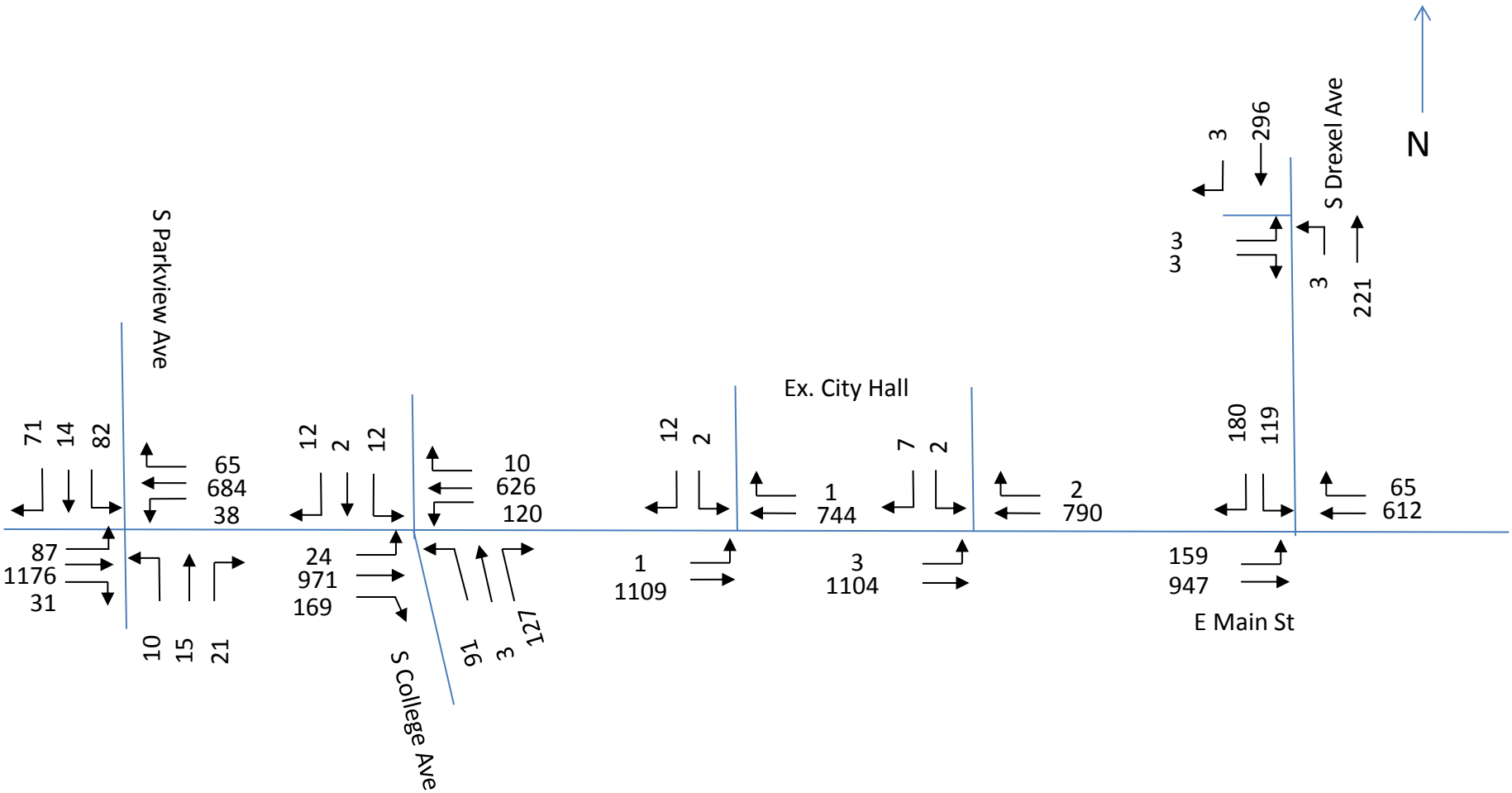
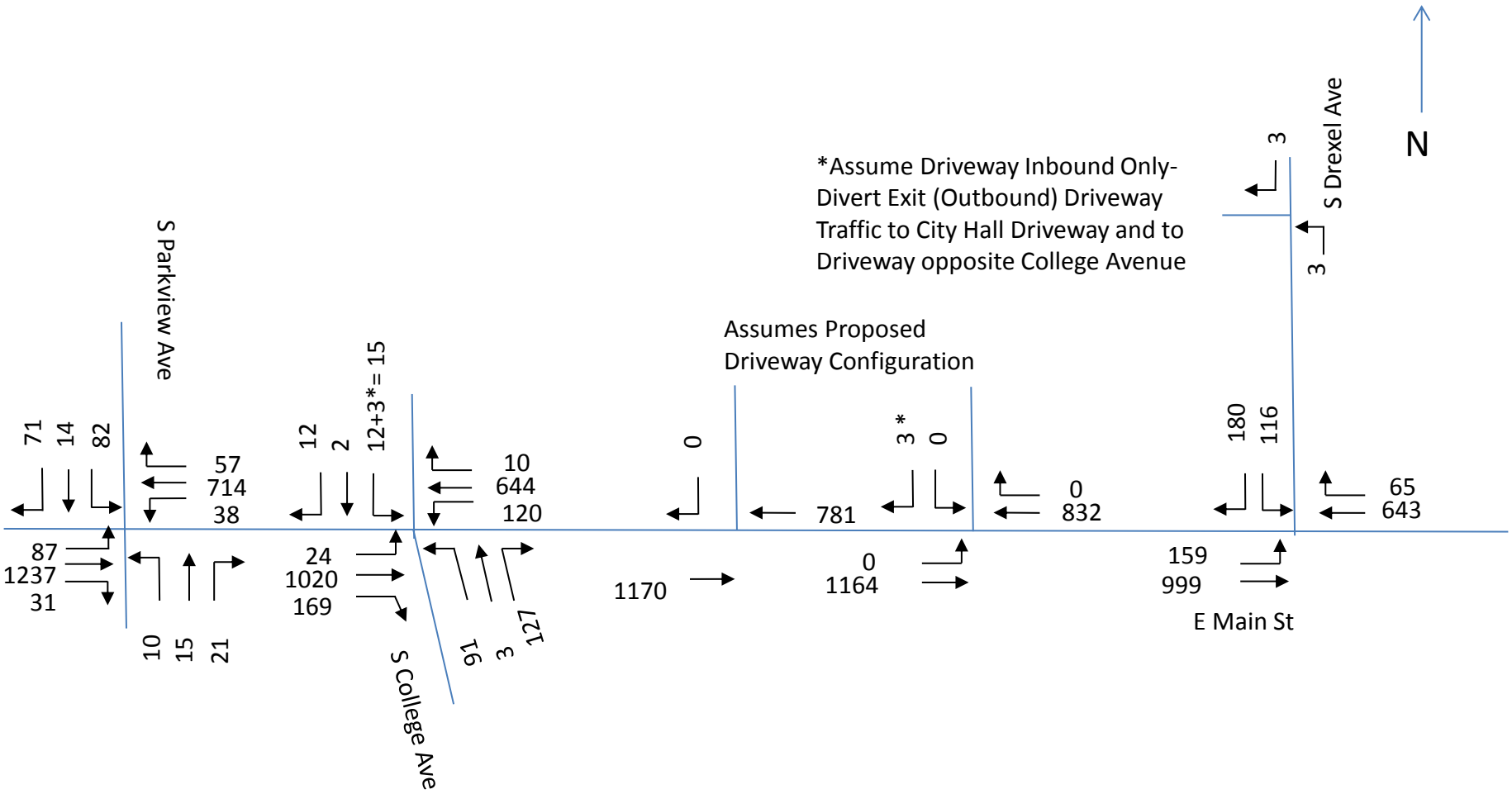


Bexley Square Traffic Access Study- Existing PM Peak Hour Volumes (2014)

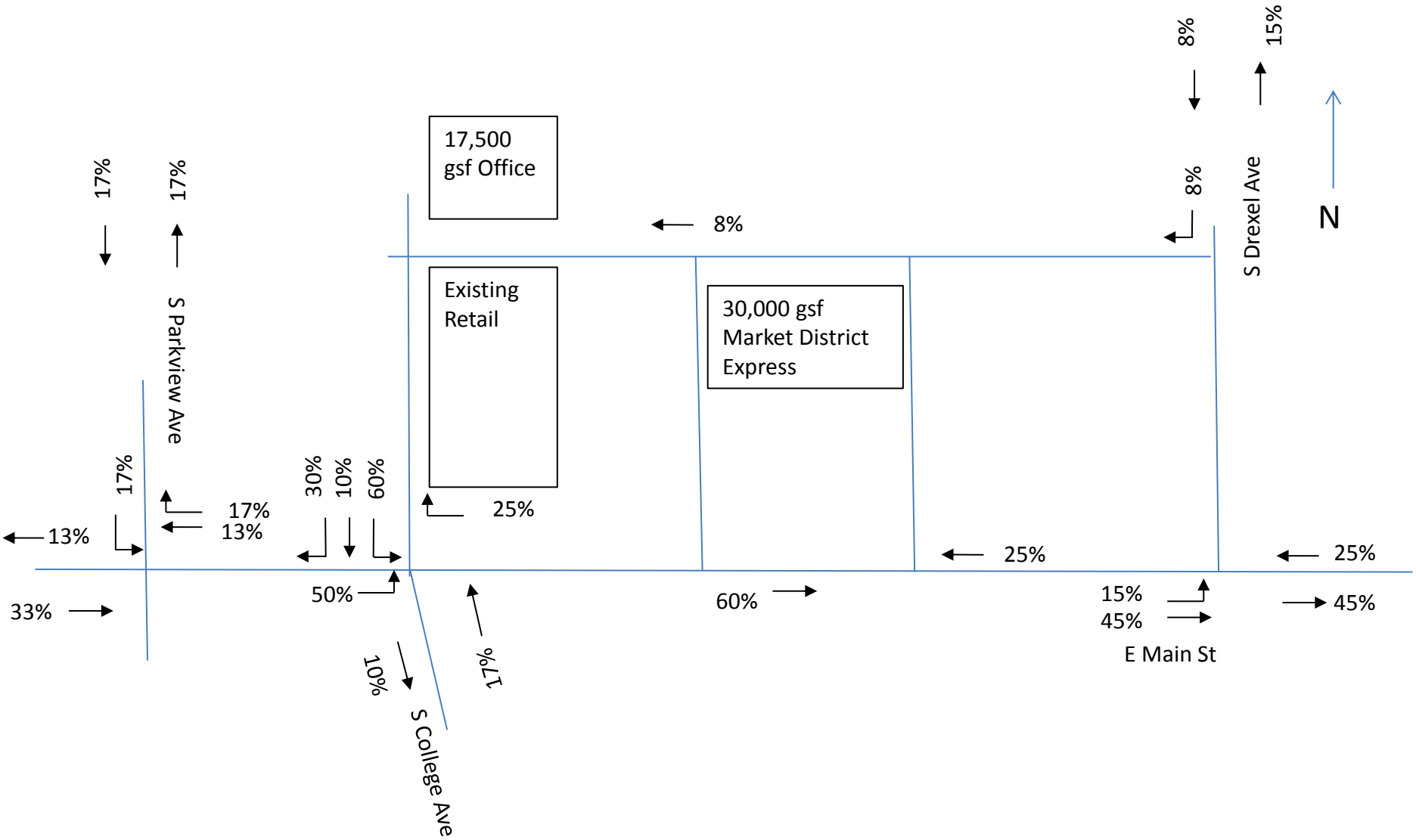
Figure 5

Note: Sum of Figures 1A and 2A
See Appendix B



Bexley Square Traffic Access Study- Year 2025 PM Peak With Reduction of City Hall Traffic and Diversion of Drexel Driveway Exit Traffic

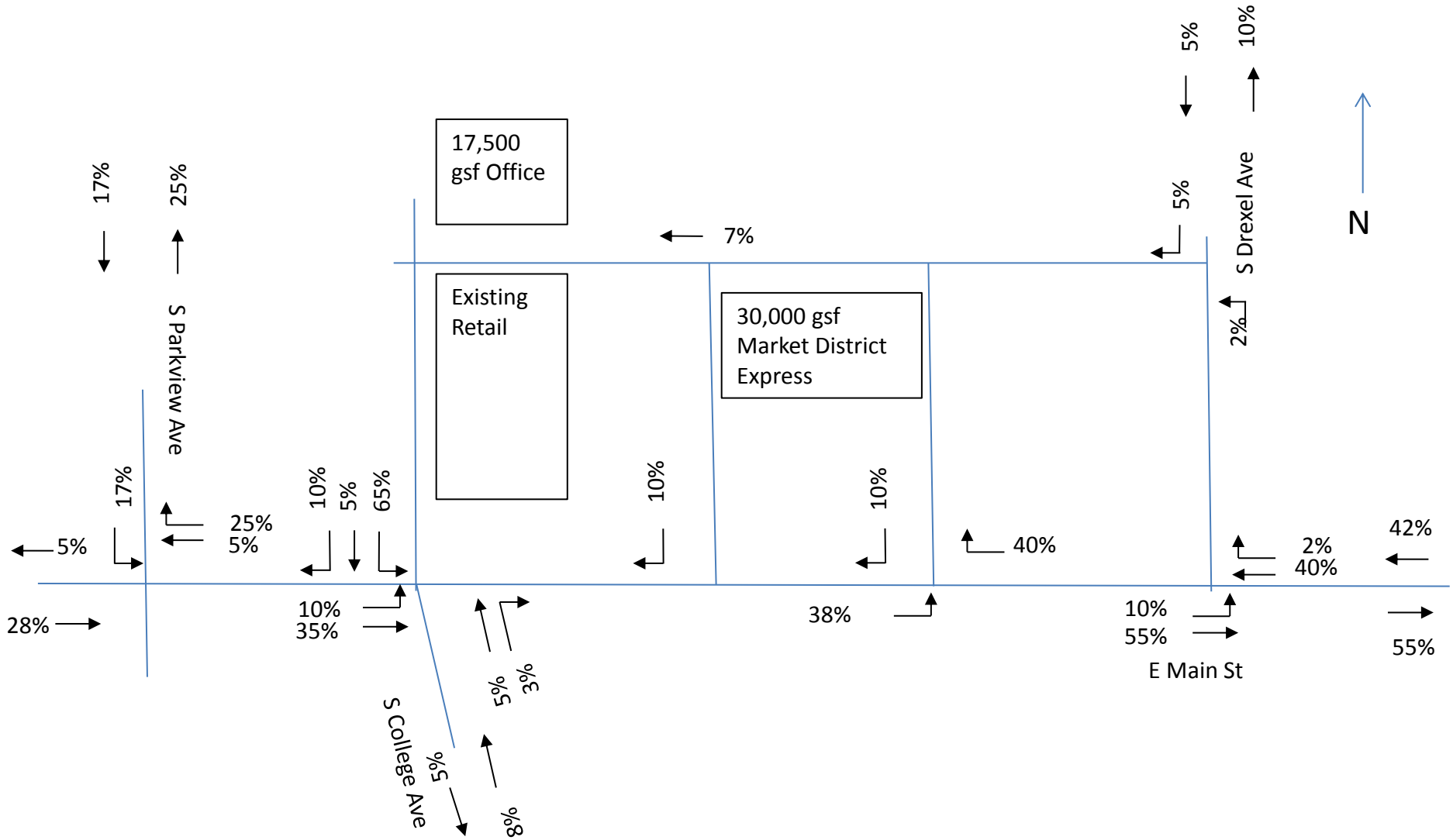
Figure 6



Note: These percentages represent new trips on area roads and exclude internal trips

Bexley Square Traffic Access Study- Office Trip Distribution (%)

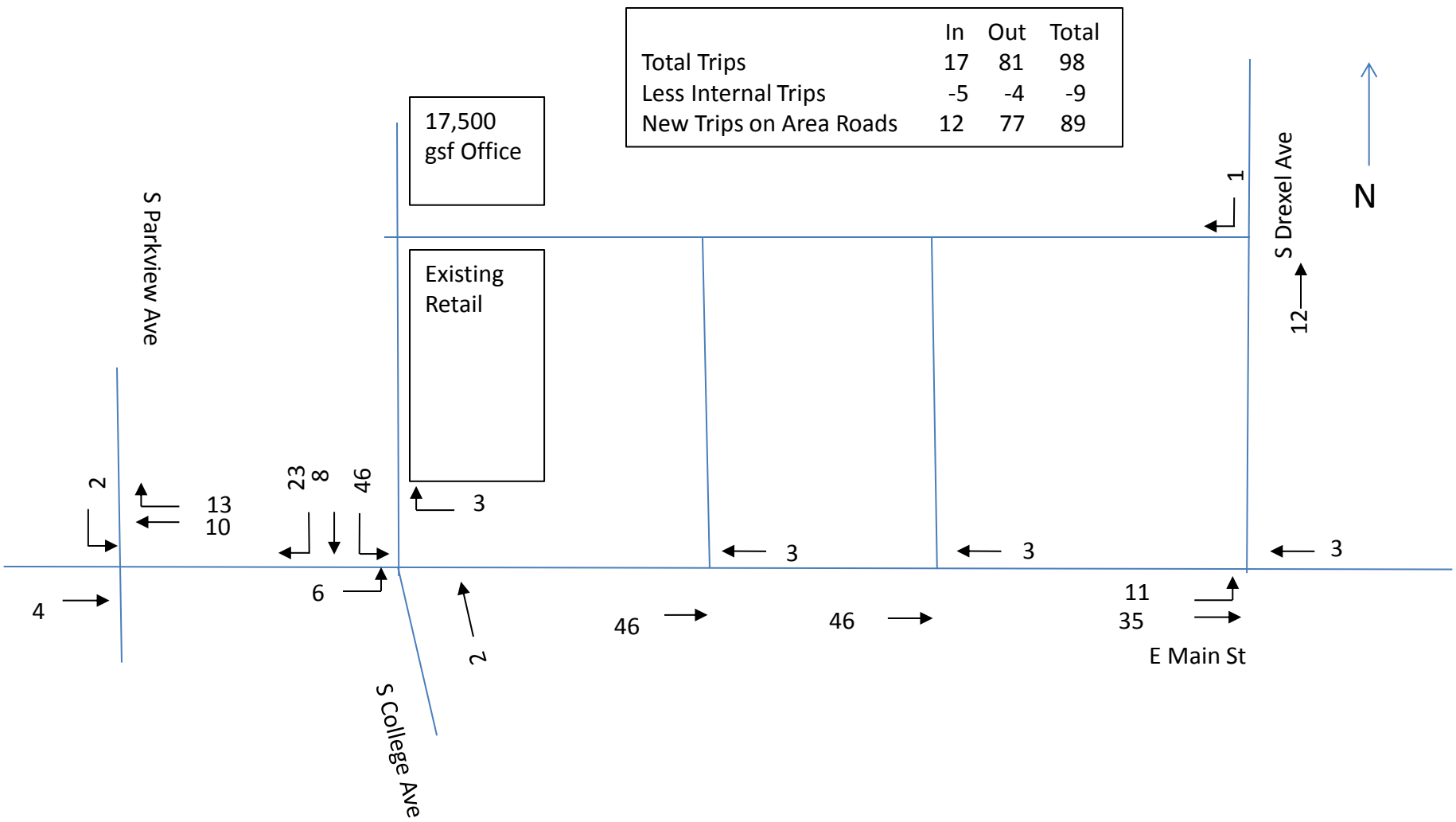
Figure 7



Note: These percentages represent new trips on area roads and exclude internal and pass-by trips

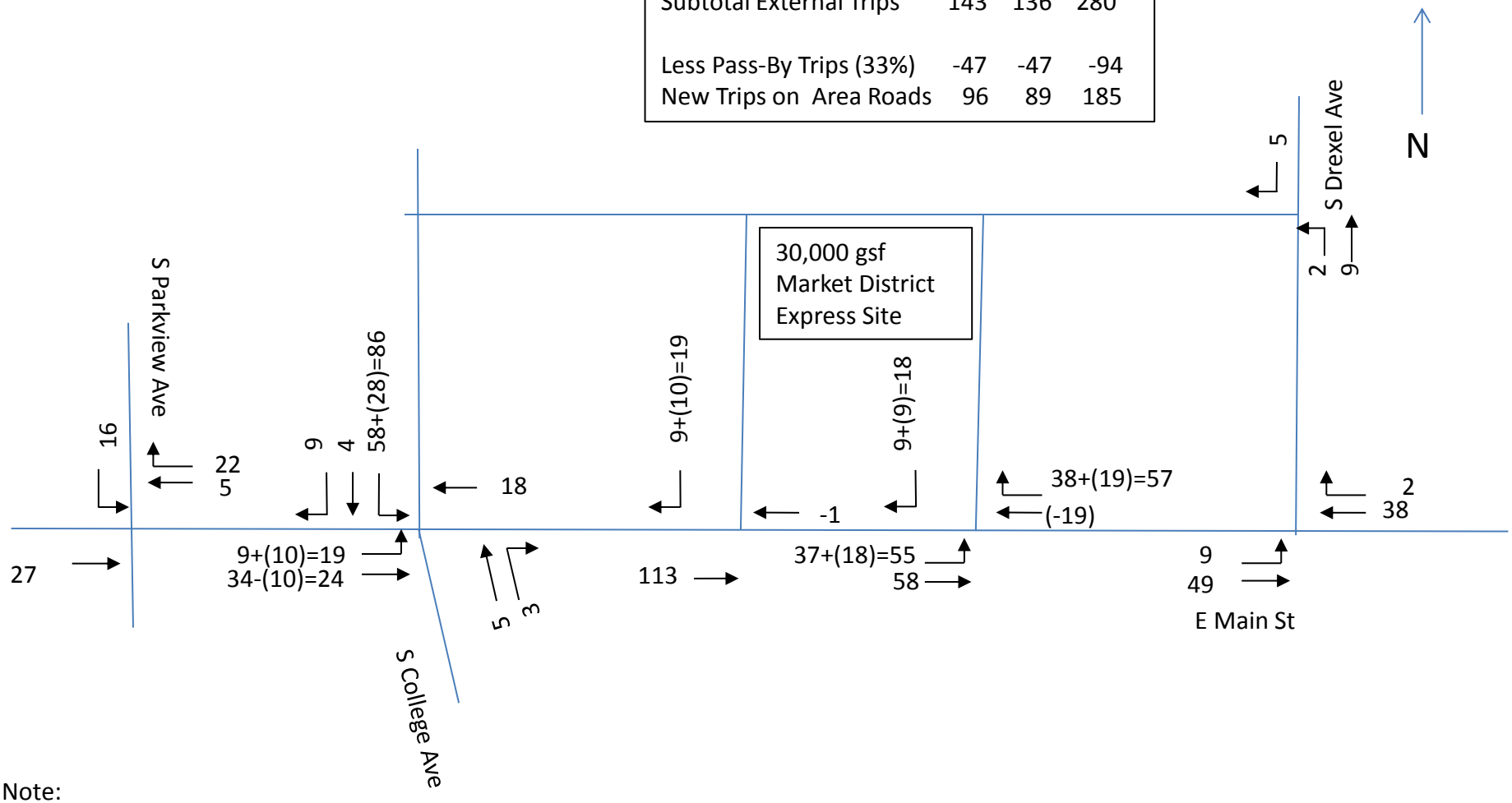
Bexley Square Traffic Access Study- Market District Express Trip Distribution (%)

Figure 8



Bexley Square Traffic Access Study- Proposed Office PM Peak Hour Traffic

Figure 9



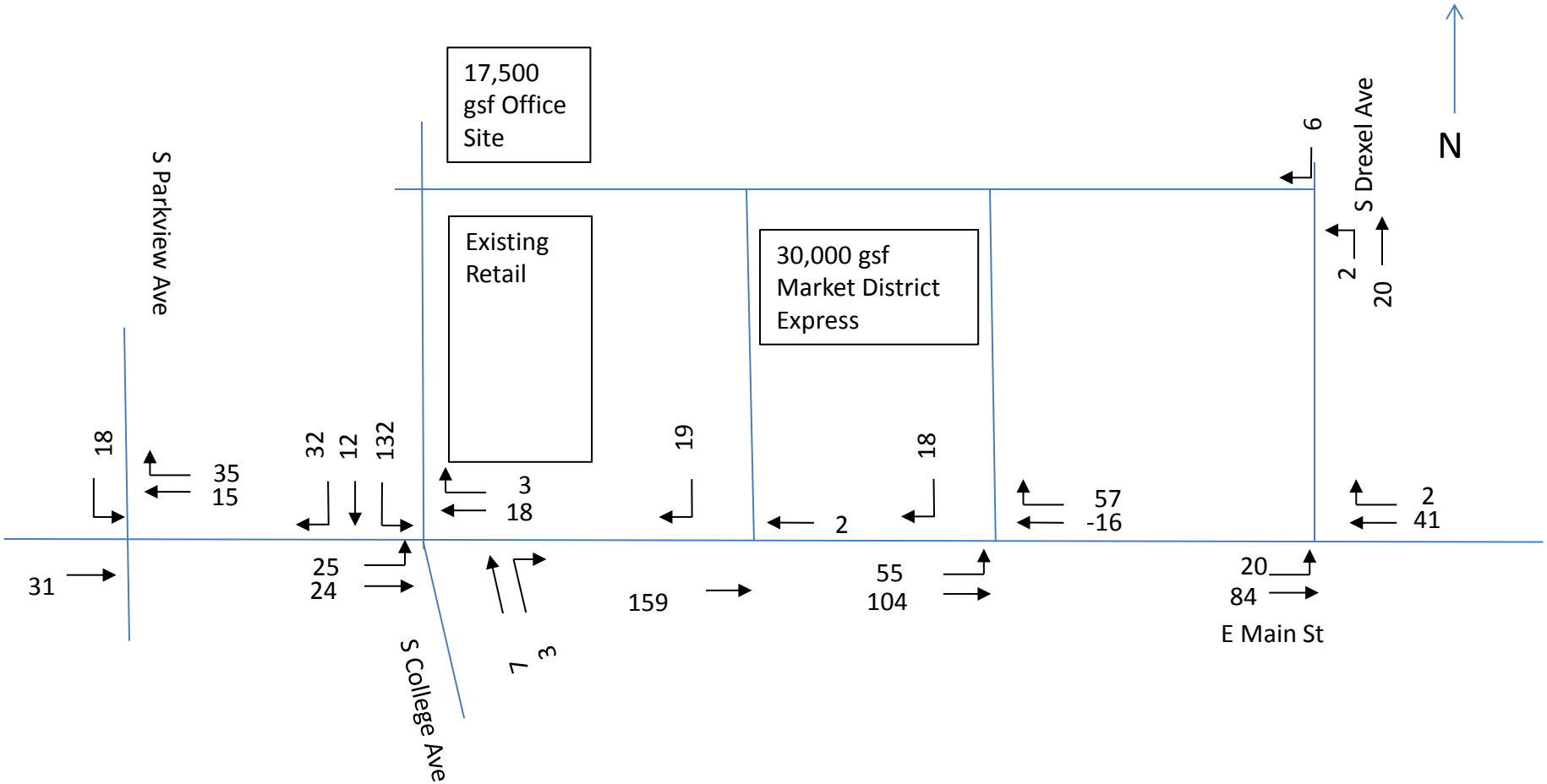
Note:

xx=New site trips on area roads

(xx)= Pass-by trips (existing trips to and from site on their way to another destination)

Bexley Square Traffic Access Study- Proposed Market District Express PM Peak Hour Traffic

Figure 10

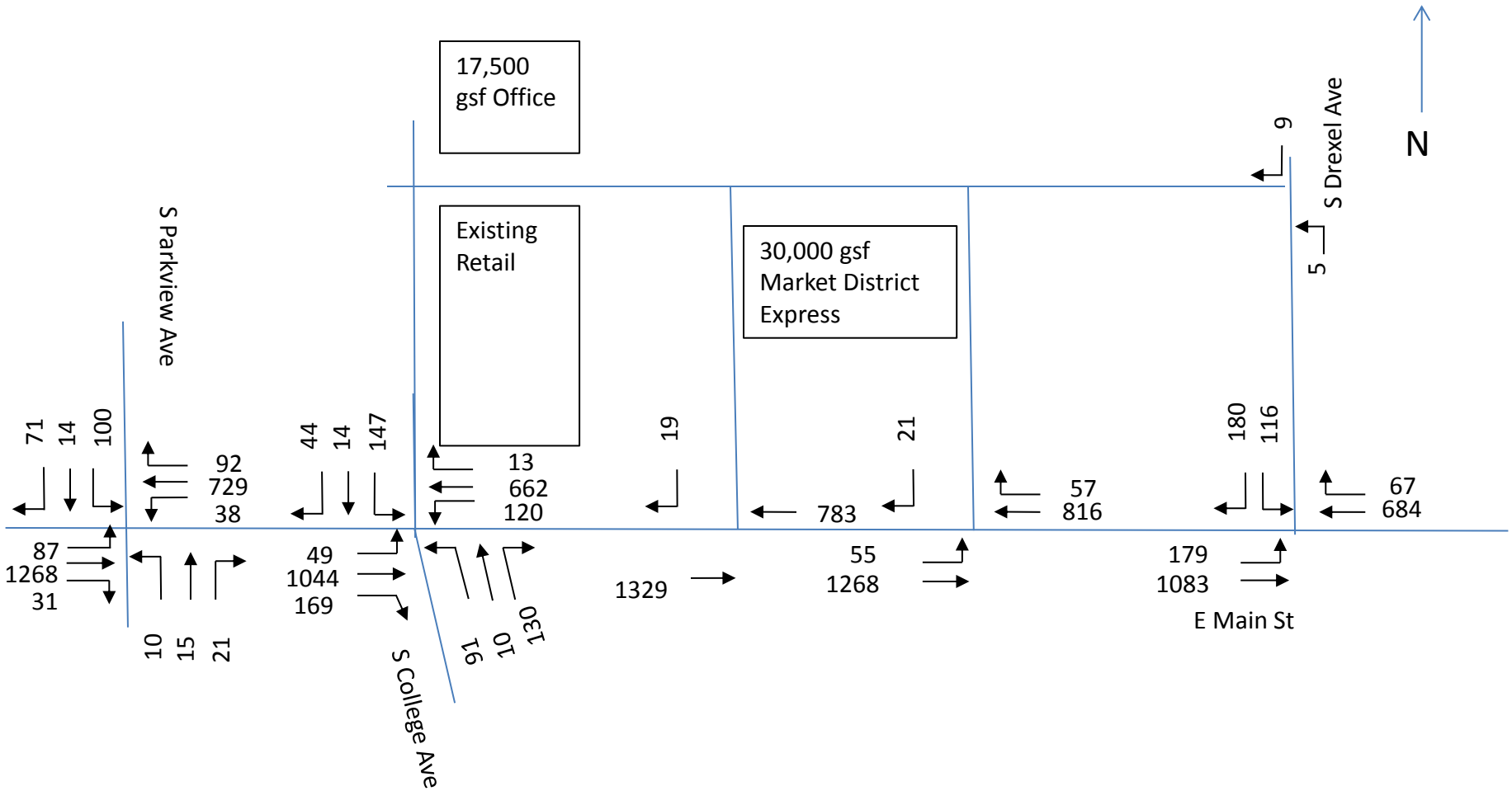


Volumes Sum of Figures 9 and 10

Note: Negative Volumes reflect the net result of Pass-by Trips to and from the Market District Express store

Bexley Square Traffic Access Study- Total New Development PM Peak Hour Trips

Figure 11



Volumes Sum of Figures 6 and 11

Bexley Square Traffic Access Study- Year 2025 PM Peak Hour + New Development Traffic

Figure 12

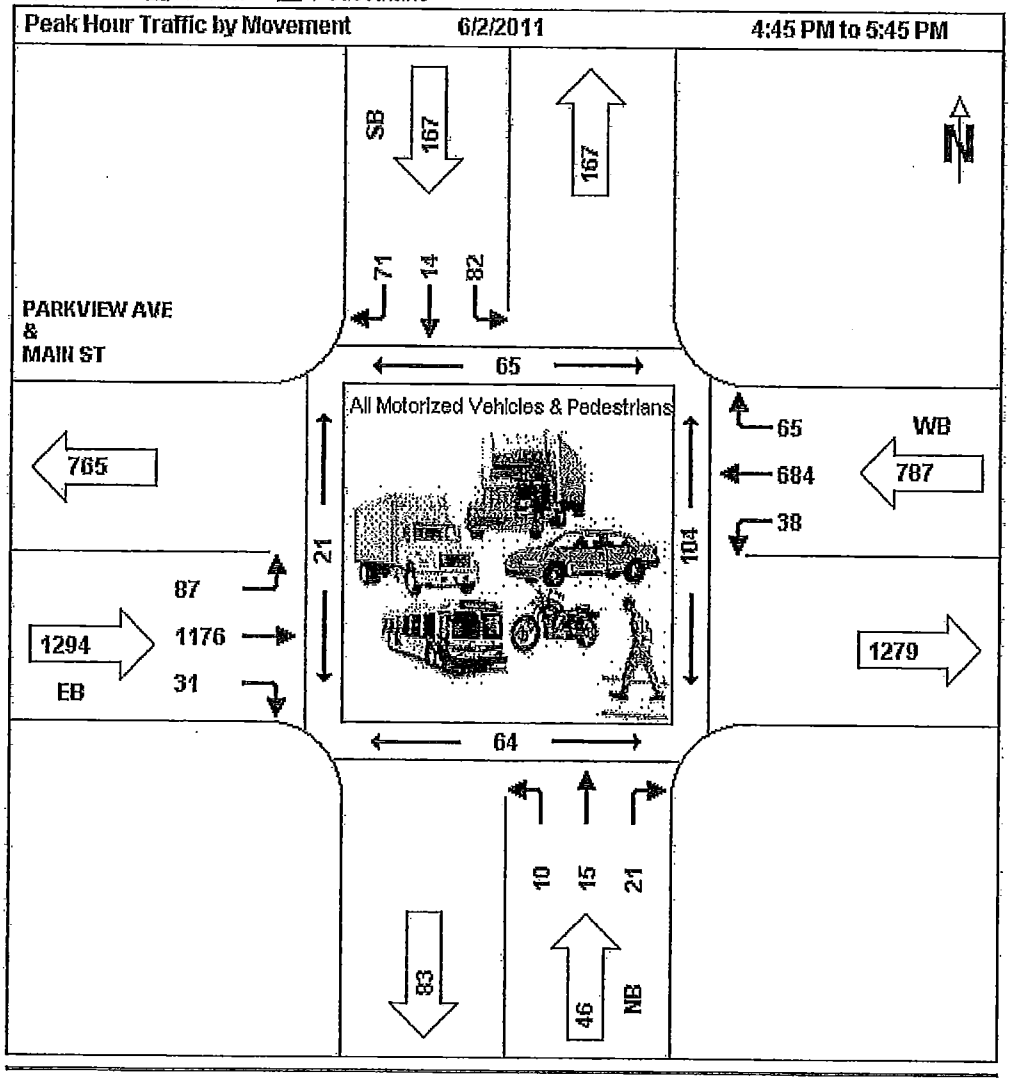
APPENDIX

A

PM Peak Hour
06/02/2011

Start Time	NB Left	NB Thru	NB Right	NB Ped	NB App Total	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
4:45 PM	2	5	6	36	13	24	288	10	23	322	23	4	15	3	42	13	173	17	9	203	580
5:00 PM	2	6	7	22	15	16	290	10	9	316	14	2	13	9	29	8	167	15	22	190	550
5:15 PM	3	2	5	34	10	19	298	7	20	324	24	2	17	5	43	8	181	16	17	205	582
5:30 PM	3	2	3	12	8	28	300	4	12	332	21	6	26	4	53	9	163	17	17	189	582
Total	10	15	21	104	46	87	1176	31	64	1294	82	14	71	21	167	38	684	65	65	787	2294
PHF	0.83	0.63	0.75		0.77	0.78	0.98	0.78		0.97	0.85	0.58	0.68		0.79	0.73	0.94	0.96		0.96	
HV %	0	0	0			0	1	0			0	0	1			0	2	2			

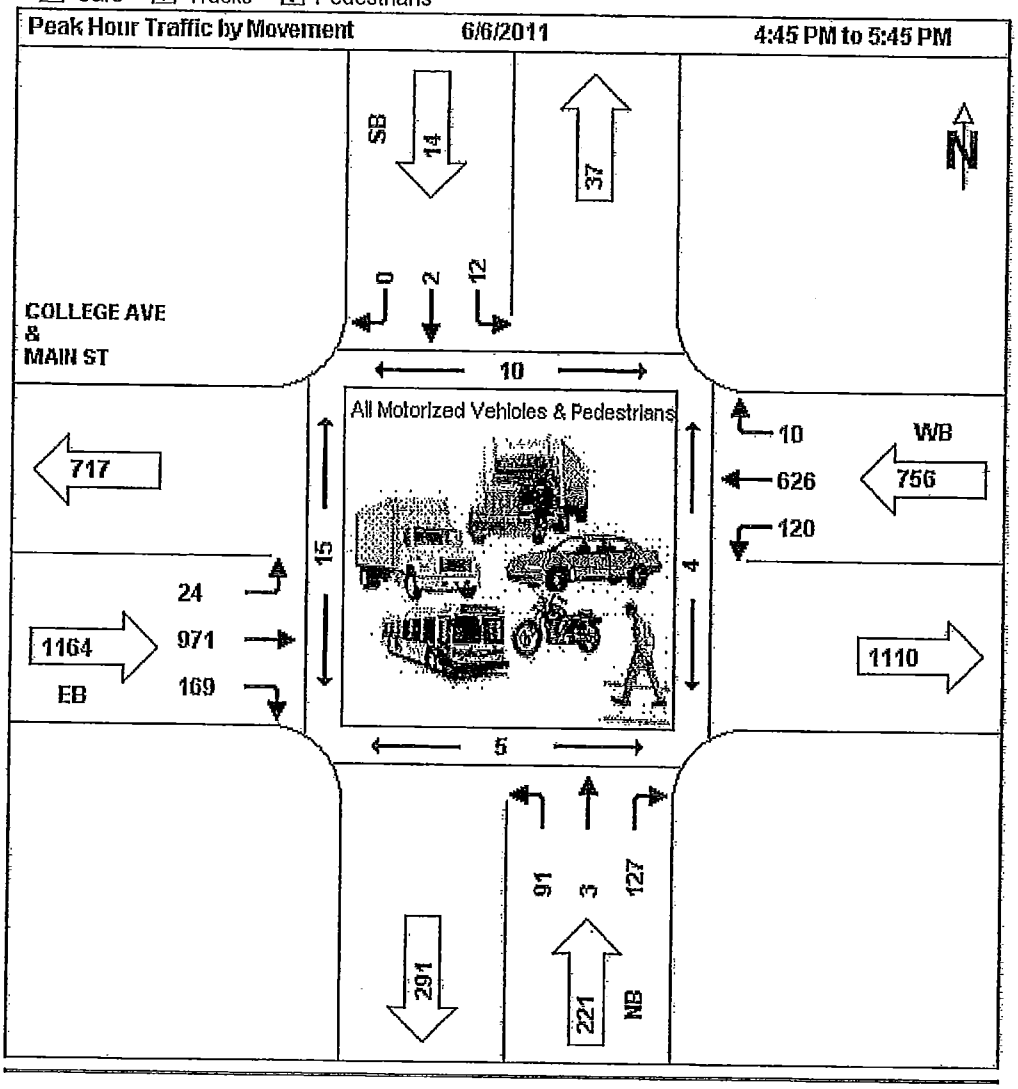
☑ Cars ☑ Trucks ☑ Pedestrians



PM Peak Hour
06/06/2011

Start Time	NB Left	NB Thru	NB Right	NB Ped	NB App Total	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
4:45 PM	30	1	39	0	70	3	251	38	2	292	4	0	0	4	4	26	161	2	4	189	555
5:00 PM	15	1	17	0	33	5	238	51	3	294	1	0	0	7	1	25	157	0	0	182	510
5:15 PM	22	1	35	2	58	11	256	47	0	314	3	1	0	1	4	34	149	6	2	189	565
5:30 PM	24	0	36	2	60	5	226	33	0	264	4	1	0	3	5	35	159	2	4	196	525
Total	91	3	127	4	221	24	971	169	5	1164	12	2	0	15	14	120	626	10	10	756	2155
PHF	0.76	0.75	0.81			0.79	0.95	0.83			0.93	0.75	0.50			0.70	0.86	0.97	0.42		0.96
HV %	2	0	2			0	1	0			0	0				2	3	0			

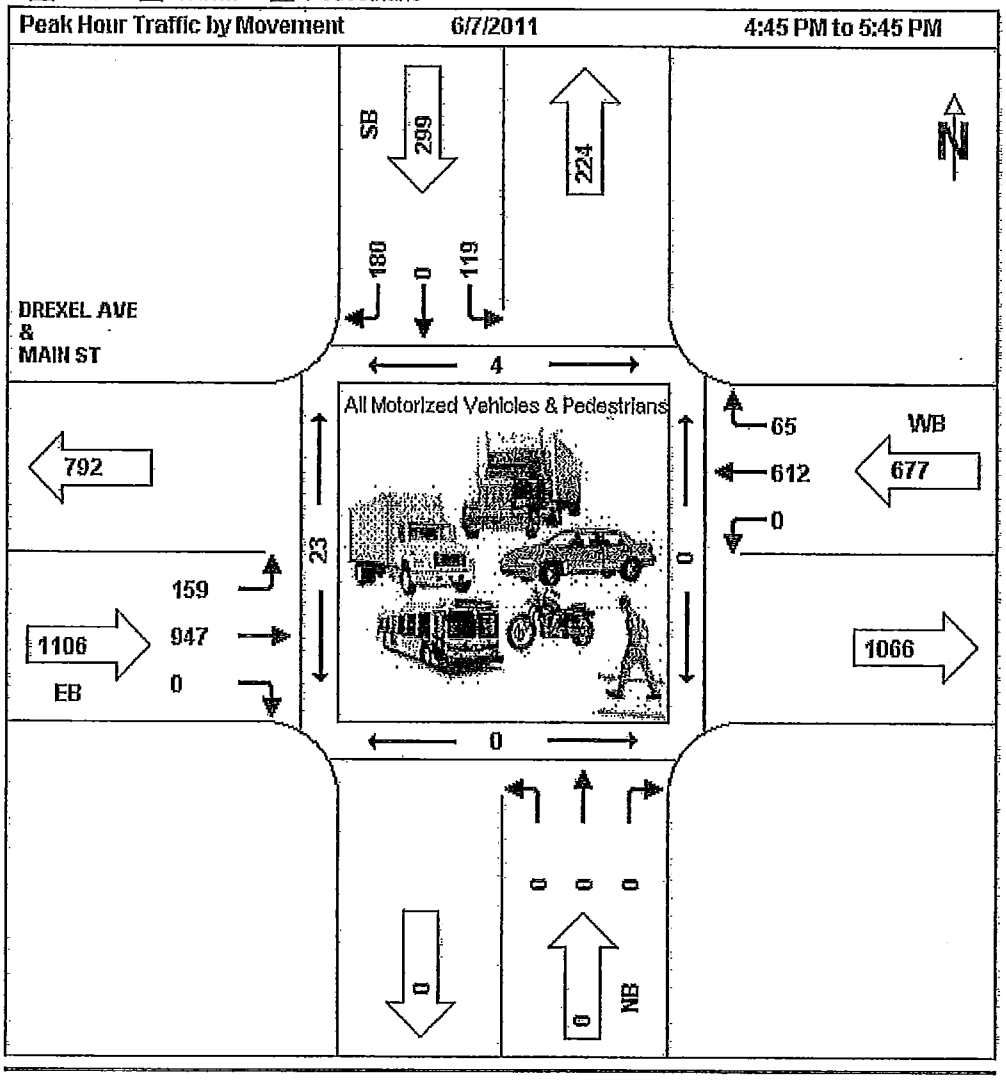
☑ Cars ☑ Trucks ☑ Pedestrians

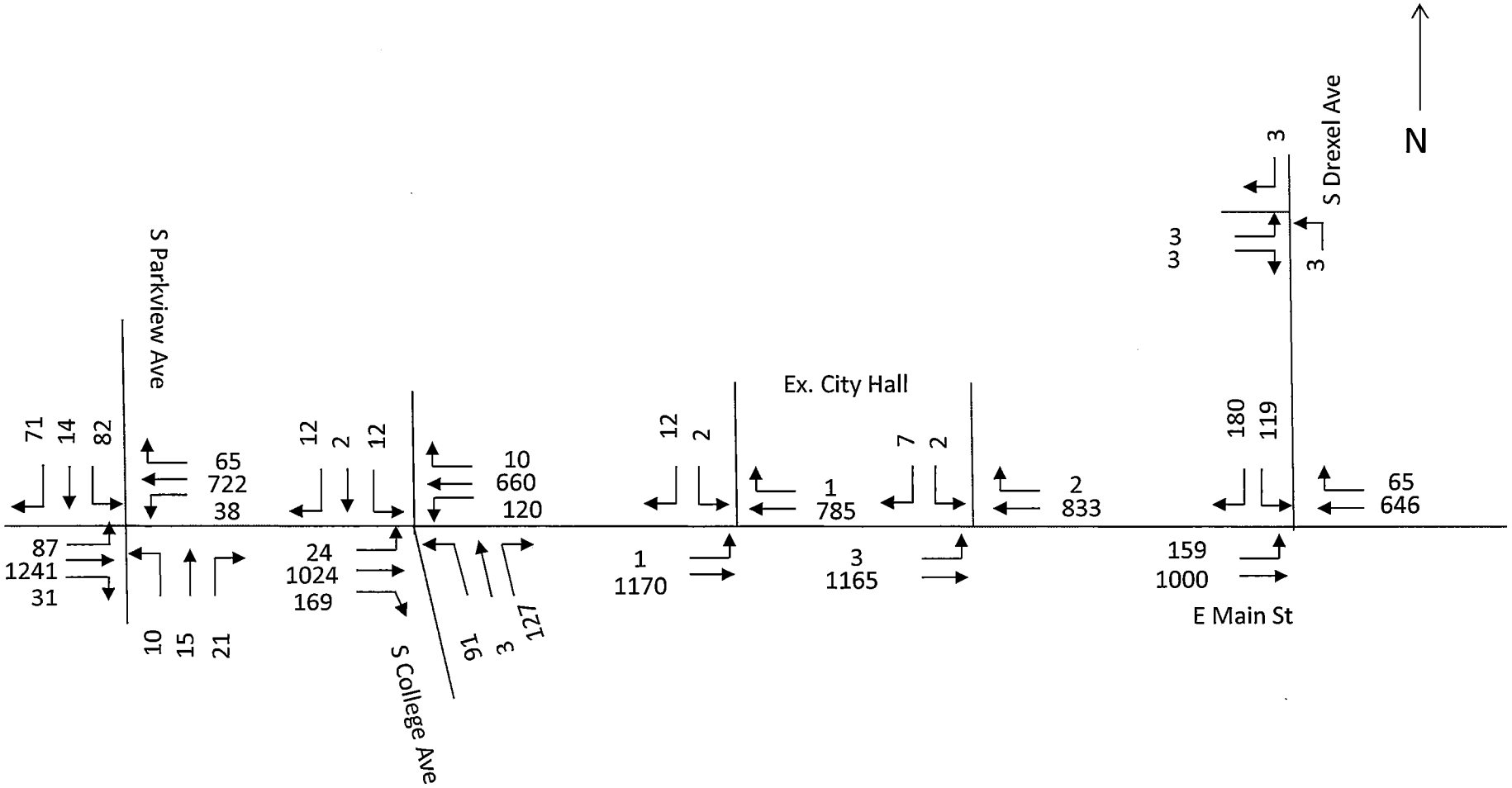


PM Peak Hour
06/07/2011

Start Time	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
4:45 PM	36	220	0	0	256	34	0	42	3	76	0	153	11	0	164	496
5:00 PM	44	227	0	0	271	26	0	48	10	74	0	159	13	3	172	517
5:15 PM	37	266	0	0	303	29	0	57	7	86	0	155	19	0	174	563
5:30 PM	42	234	0	0	276	30	0	33	3	63	0	145	22	1	167	506
Total	159	947	0	0	1106	119	0	180	23	299	0	612	65	4	677	2082
PHF	0.90	0.89			0.91	0.88		0.79		0.87		0.96	0.74		0.97	
HV %	1	1				0		3				3	0			

☑ Cars ☑ Trucks ☑ Pedestrians





Note: East-West Thru Volumes Increased by 5.5 Percent
(or 0.5 Percent per Year from 2014 to 2025)

Bexley Square Traffic Access Study- Year 2025 PM Peak With Existing Development

Figure 1A

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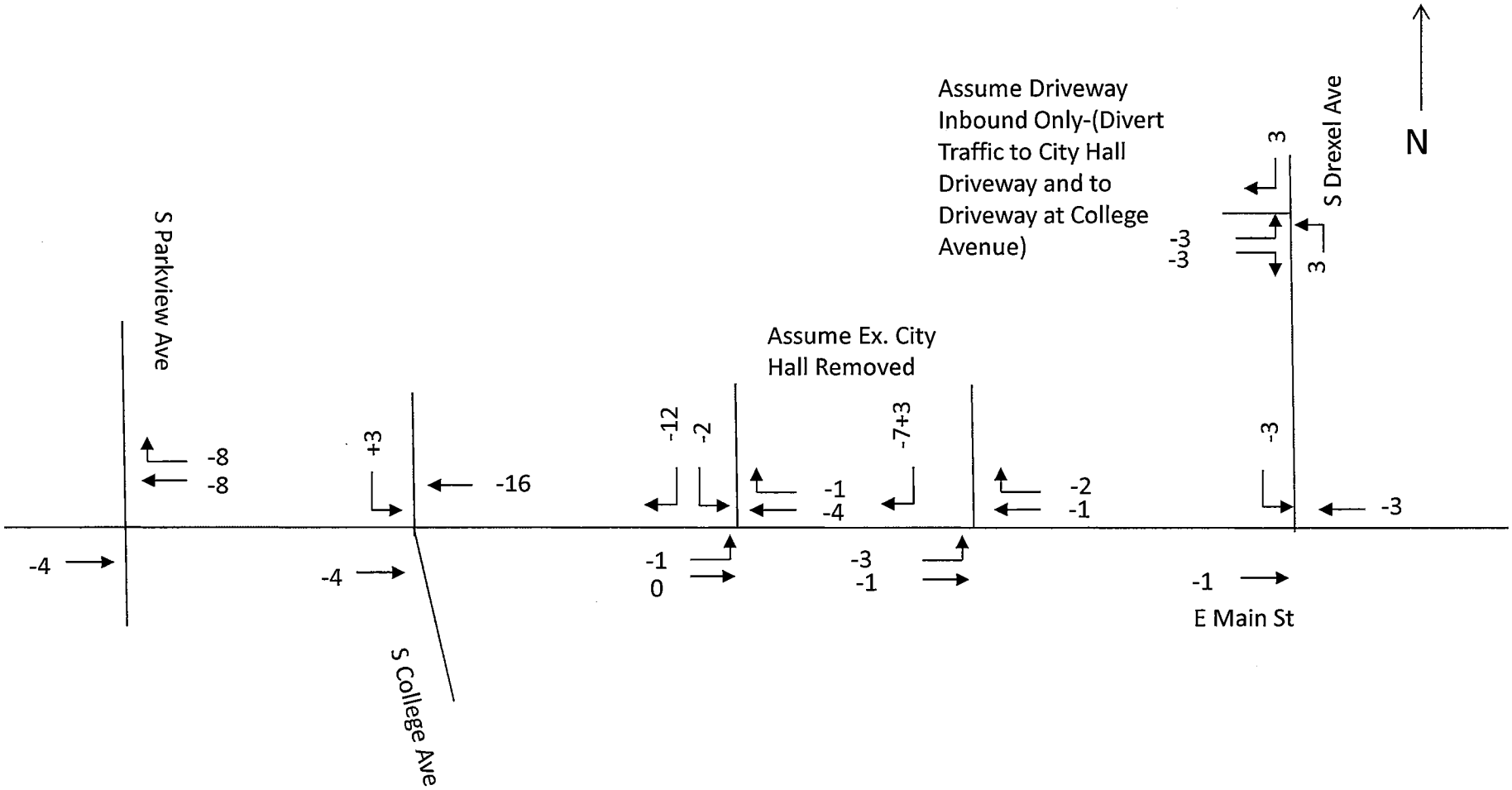


Bexley Square Traffic Access Study- Reduction of City Hall Traffic and Diversion of Drexel Driveway Exiting Traffic

Figure 2A

E. P. FERRIS AND ASSOCIATES INC
CONSULTING CIVIL ENGINEERS AND SURVEYORS

APPENDIX

B

BEXLEY SQUARE TRAFFIC ACCESS STUDY

TRIP GENERATION COMPUTATIONS

OFFICE SPACE-ITE LAND USE 710 17,500 GSF

PM PEAK HOUR TRIP RATE

T=1.12(X) +78.45

X=17.5 KSF

T=1.12 (17.5) + 78.45=98 PEAK HOUR TRIPS

TRIP DISTRIBUTION-17% ENTERING/83% EXITING

INBOUND-17 TRIPS
OUTBOUND-81 TRIPS

SUPERMARKET-ITE LAND USE 850 30,000 GSF

PM PEAK HOUR TRIP RATE

Ln(T)=0.74Ln(X) + 3.25

X=30 KSF

Ln(T)=0.74Ln(30) + 3.25 T=320 PEAK HOUR TRIPS

GIVEN CHARACTER AND SIZE OF SITE, ASSUME SITE HAS LESS TRIP GENERATION THAN A TYPICAL SUPERMARKET. ASSUME A 10% REDUCTION IN THE TYPICAL SUPERMARKET TRIPS FOR ESTIMATING TRIPS FOR THE EXPRESS MARKET DISTRICT SITE

320-32=288 TRIPS USED FOR ACCESS STUDY

TRIP DISTRIBUTION-51% ENTERING/49% EXITING

INBOUND-147 TRIPS
OUTBOUND-141 TRIPS

Land Use: 710
General Office Building

Description

A general office building houses multiple tenants; it is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building or buildings may contain a mixture of tenants including professional services, insurance companies, investment brokers and tenant services, such as a bank or savings and loan institution, a restaurant or cafeteria and service retail facilities. Corporate headquarters building (Land Use 714), single tenant office building (Land Use 715), office park (Land Use 750), research and development center (Land Use 760) and business park (Land Use 770) are related uses.

If information is known about individual buildings, it is suggested that the general office building category be used rather than office parks when estimating trip generation for one or more office buildings in a single development. The office park category is more general and should be used when a breakdown of individual or different uses is not known. If the general office building category is used and if additional buildings, such as banks, restaurants, or retail stores, are included in the development, the development should be treated as a multiuse project. On the other hand, if the office park category is used, internal trips are already reflected in the data and do not need to be considered.

When the buildings are interrelated (defined by shared parking facilities or the ability to easily walk between buildings) or house one tenant, it is suggested that the total area or employment of all the buildings be used for calculating the trip generation. When the individual buildings are isolated and not related to one another, it is suggested that trip generation be calculated for each building separately and then summed.

Additional Data

Average weekday transit trip ends—

> Transit service was either nonexistent or negligible at the majority of the sites surveyed in this land use. Users may wish to modify trip generation rates presented in this land use to reflect the presence of public transit, carpools and other transportation demand management (TDM) strategies. Information has not been analyzed to document the impacts of TDM measures on the total trip generation of a site. See the ITE *Trip Generation Handbook*, Second Edition for additional information on this topic.

The average building occupancy varied considerably within the studies for which occupancy data were provided. For buildings with occupancy rates reported, the average occupied gross leasable area was 88 percent.

Some of the regression curves plotted for this land use may produce illogical trip-end estimates for small office buildings. When the proposed site size is significantly smaller than the average-sized facility published in this report, caution should be used when applying these statistics. For more information, please refer to Chapter 3, "Guidelines for Estimating Trip Generation," of the ITE *Trip Generation Handbook*, Second Edition.

In some regions, peaking may occur earlier or later and may last somewhat longer than the traditional 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. peak period time frames.

The sites were surveyed between the 1960s and the 2000s throughout the United States.

Trip Characteristics

The trip generation for the A.M. and P.M. peak hours of the generator typically coincided with the peak hours of the adjacent street traffic; therefore, only one A.M. peak hour and one P.M. peak hour, which represent both the peak hour of the generator and the peak hour of the adjacent street traffic, are shown for general office buildings.

Source Numbers

2, 5, 20, 21, 51, 53, 54, 72, 88, 89, 92, 95, 98, 100, 159, 161, 172, 175, 178, 183, 184, 185, 189, 193, 207, 212, 217, 247, 253, 257, 260, 262, 279, 295, 297, 298, 300, 301, 302, 303, 304, 321, 322, 323, 324, 327, 404, 407, 408, 418, 419, 423, 562, 734

General Office Building
(710)

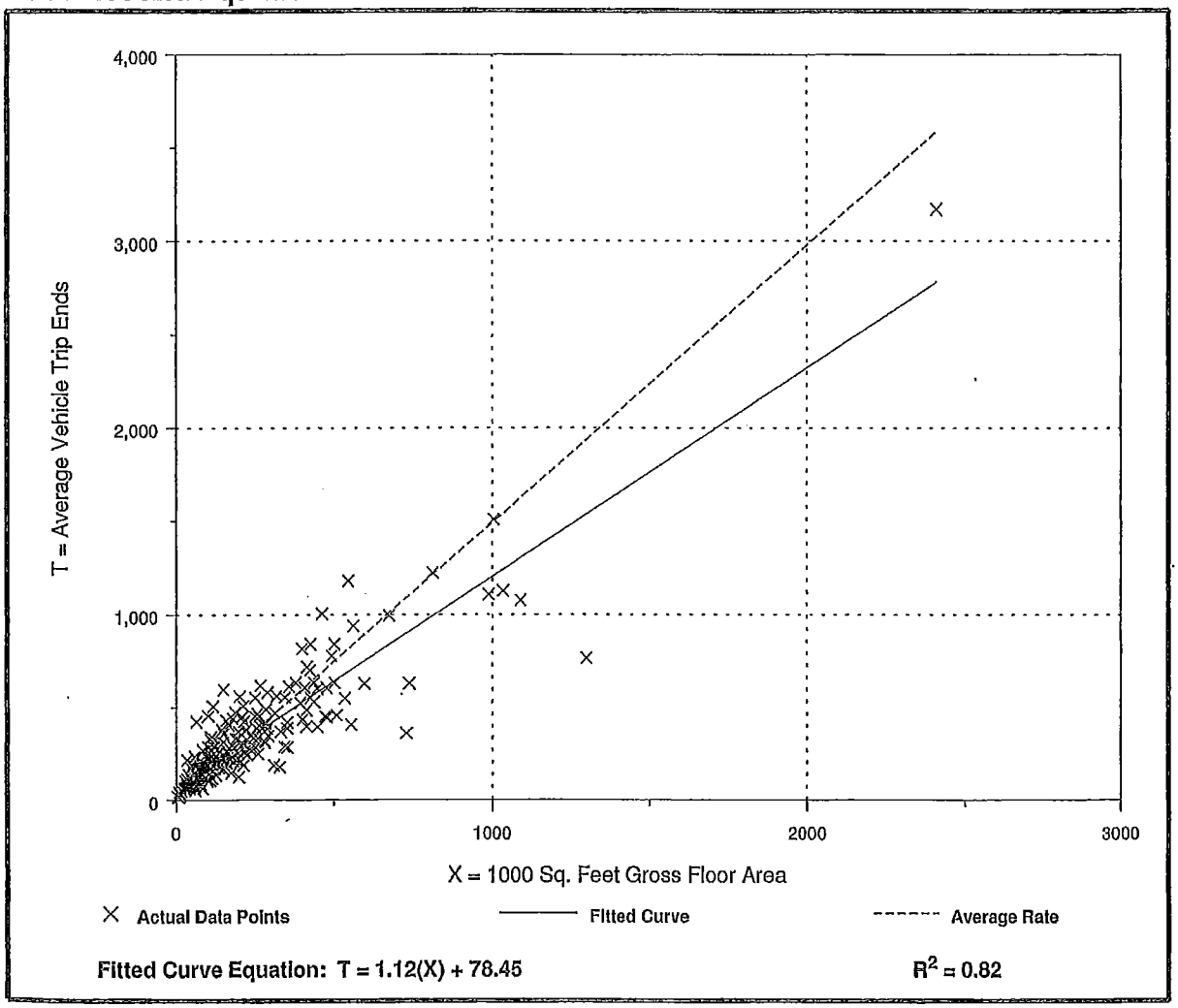
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
P.M. Peak Hour

Number of Studies: 236
Average 1000 Sq. Feet GFA: 215
Directional Distribution: 17% entering, 83% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.49	0.49 - 6.39	1.37

Data Plot and Equation



Fitted Curve Equation: T = 1.12(X) + 78.45

R^2 = 0.82

Land Use: 850
Supermarket

Description

Supermarkets are free-standing retail stores selling a complete assortment of food, food preparation and wrapping materials, and household cleaning items. Supermarkets may also contain the following products and services: ATMs, automobile supplies, bakeries, books and magazines, dry cleaning, floral arrangements, greeting cards, limited-service banks, photo centers, pharmacies and video rental areas. Some facilities may be open 24 hours a day. Discount supermarket (Land Use 854) is a related use.

Additional Data

Caution should be used when applying daily trip generation rates for supermarkets, as the database contains a mixture of facilities with varying hours of operation. Future data submissions should specify hours of operation of a site.

Specialized Land Use Data

One study provided data on a supermarket in Oregon that also carried clothing, footwear, bedding, furniture, jewelry, beauty products, electronics, toys, lumber and garden supplies. The secondary products offered at this supermarket varied from the other stores in this land use; therefore, the information collected for this facility is presented in the following table and was excluded from the data plots. The weekday morning and afternoon peak hours of the generator at this site were between 8:45 a.m. and 9:45 a.m. and between 4:45 p.m. and 5:45 p.m., respectively. The Saturday and Sunday peak hours of the generator were between 3:00 p.m. and 4:00 p.m. and between 12:45 p.m. and 1:45 p.m., respectively.

Independent Variable	Trip Generation Rate	Size of Independent Variable	Number of Studies	Directional Distribution
1,000 Square Feet Gross Floor Area				
Weekday A.M. Peak Hour of Generator	4.21	78	1	Not available
Weekday P.M. Peak Hour of Generator	10.13	78	1	Not available
Saturday Peak Hour of Generator	10.91	78	1	Not available
Sunday Peak Hour of Generator	9.83	78	1	Not available

Source: 746

The sites were surveyed between the 1960s and the 2000s throughout the United States.

Source Numbers

2, 4, 5, 72, 98, 203, 213, 251, 273, 305, 359, 365, 438, 442, 447, 448, 514, 520, 552, 577, 610, 716, 746

Supermarket
(850)

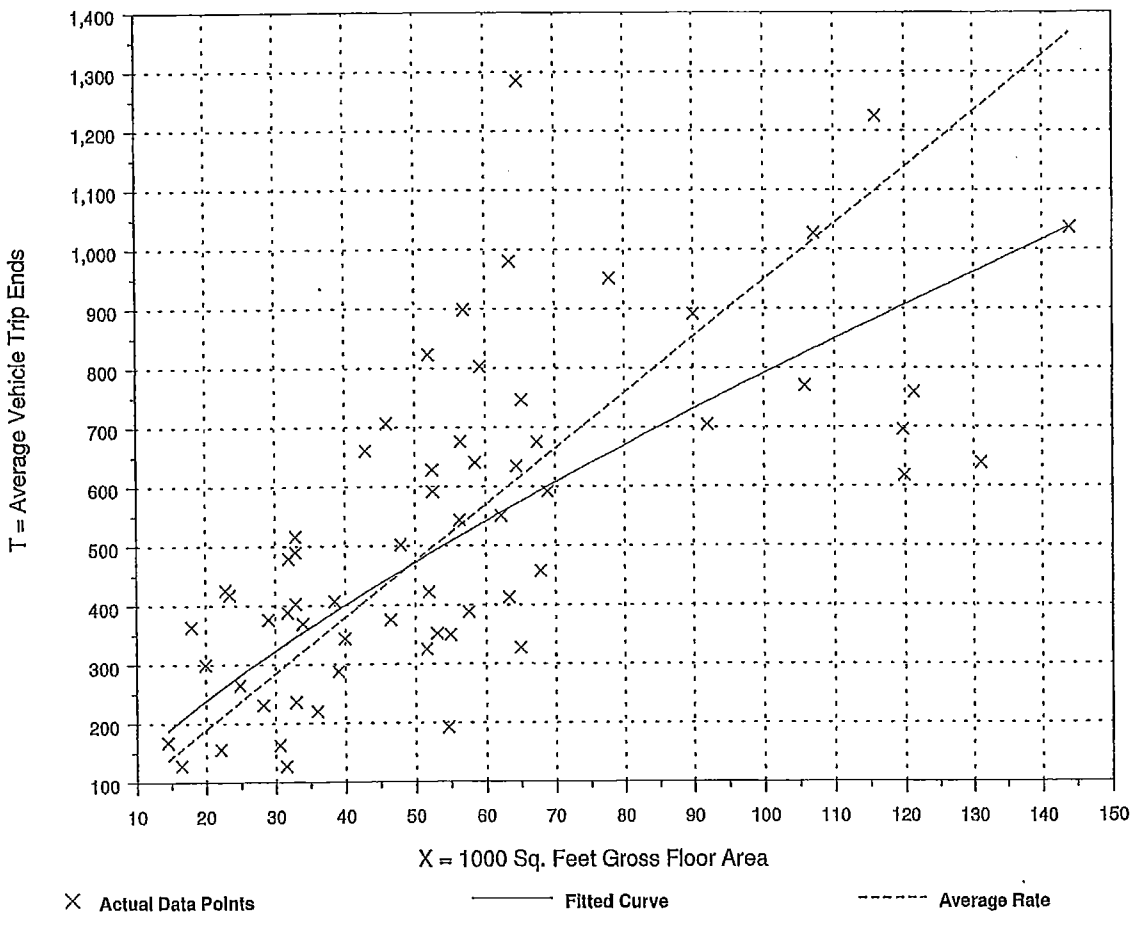
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Floor Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 62
Average 1000 Sq. Feet GFA: 56
Directional Distribution: 51% entering, 49% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
9.48	3.53 - 20.29	4.81

Data Plot and Equation

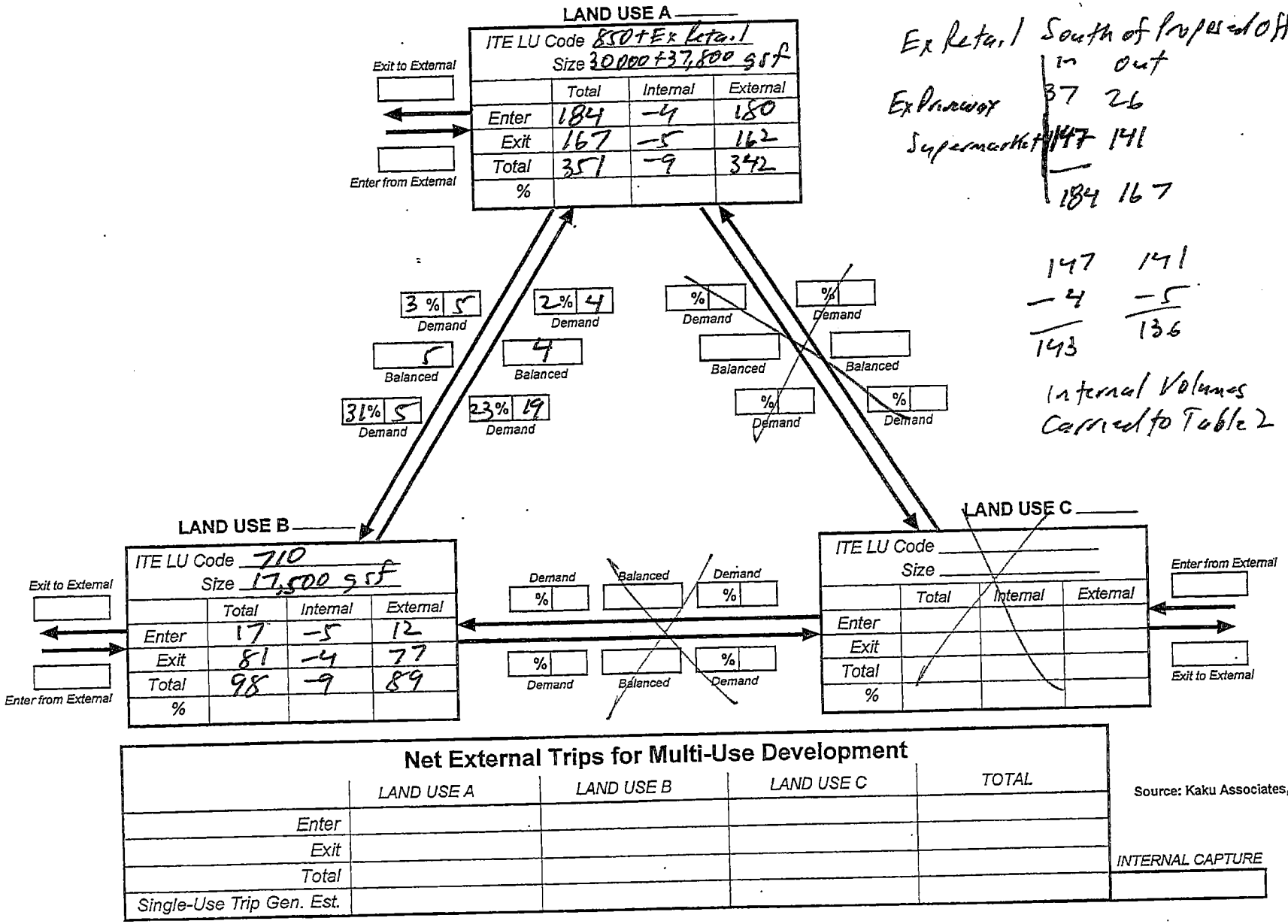


Fitted Curve Equation: Ln(T) = 0.74 Ln(X) + 3.25 $R^2 = 0.52$

Analyst _____
Date _____

MULTI-USE DEVELOPMENT TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Name of Dvlpt _____
Time Period _____



Ex Reta.1 South of Proposed Office

	in	out
Ex Restaurant	37	26
Supermarket	147	141
	184	167

147 141
-4 -5
143 136

Internal Volumes Carried to Table 2

Net External Trips for Multi-Use Development

	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter				
Exit				
Total				
Single-Use Trip Gen. Est.				

Source: Kaku Associates, Inc.

INTERNAL CAPTURE

Table 5.10
Pass-By Trips and Diverted Linked Trips
Weekday, p.m. Peak Period

Land Use 850—Supermarket

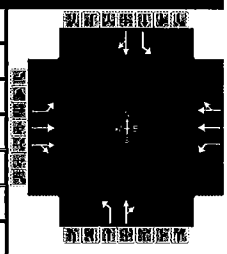
SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PRIMARY TRIP (%)	NON-PASS-BY TRIP (%)	DIVERTED LINKED TRIP (%)	PASS-BY TRIP (%)	AVERAGE DAILY TRAFFIC	SOURCE
30	Overland Park, KS	1987	40	4:30–5:30 p.m.	48	—	20	32	n/a	n/a
<25	Chicago suburbs, IL	1987	155	3:00–6:00 p.m.	—	44	—	56	n/a	Kenig, O'Hara, Humes, Flock
<25	Chicago suburbs, IL	1987	191	3:00–6:00 p.m.	—	43	—	57	n/a	Kenig, O'Hara, Humes, Flock
<25	Chicago suburbs, IL	1987	113	3:00–6:00 p.m.	—	44	—	56	n/a	Kenig, O'Hara, Humes, Flock
34	Omaha, NE	n/a	n/a	4:00–6:00 p.m.	29	—	27	44	15,200	University of Nebraska—Lincoln
66	Omaha, NE	n/a	n/a	4:00–6:00 p.m.	30	—	47	23	63,000	University of Nebraska—Lincoln
70	Omaha, NE	n/a	n/a	4:00–6:00 p.m.	30	—	44	26	34,300	University of Nebraska—Lincoln
31	Omaha, NE	n/a	n/a	4:00–6:00 p.m.	36	—	45	19	48,700	University of Nebraska—Lincoln
31	Omaha, NE	n/a	n/a	4:00–6:00 p.m.	40	—	32	28	23,500	University of Nebraska—Lincoln
55	Omaha, NE	n/a	n/a	4:00–6:00 p.m.	35	—	38	27	27,200	University of Nebraska—Lincoln
65	Omaha, NE	n/a	n/a	4:00–6:00 p.m.	25	—	50	25	44,700	University of Nebraska—Lincoln
31	Orlando, FL	1993	440	2:00–6:00 p.m.	—	65	—	35	n/a	TPD Inc.

Average Pass-By Trip Percentage: 36

Average approx 35% –
Assume 33%

HCS 2010 Signalized Intersection Results Summary

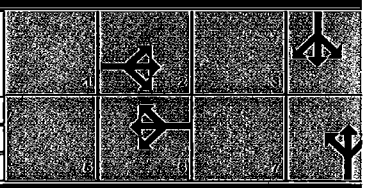
General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at Parkview	Analysis Year	2025	Analysis Period	1> 7:00
File Name	082114 2014 pm main at PARKVIEW.xus				
Project Description	2014 Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	87	1176	31	38	684	65	10	15	21	82	14	71

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	60.0	20.0	0.0	0.0	0.0	0.0	
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	
Red	1.0	1.0	0.0	0.0	0.0	0.0	



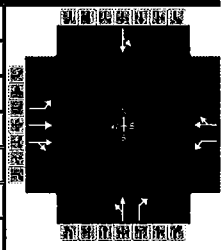
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		6.0		6.0
Phase Duration, s		65.0		65.0		25.0		25.0
Change Period, (*Y*+*Rc*), s		5.0		5.0		5.0		5.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.4		3.4
Queue Clearance Time (g_s), s						7.3		9.4
Green Extension Time (g_e), s		0.0		0.0		0.4		0.4
Phase Call Probability						1.00		1.00
Max Out Probability						0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	95	659	652	41	415	399	11	39		89	92	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	605	1710	1689	381	1710	1642	1188	1544		1246	1481	
Queue Service Time (g_s), s	6.2	18.8	18.9	2.1	3.6	3.6	0.7	1.8		5.5	4.7	
Cycle Queue Clearance Time (g_c), s	9.8	18.8	18.9	23.3	3.6	3.6	5.3	1.8		7.4	4.7	
Green Ratio (*g*/*C*)	0.67	0.67	0.67	0.67	0.67	0.67	0.22	0.22		0.22	0.22	
Capacity (*c*), veh/h	459	1140	1126	254	1140	1094	283	343		332	329	
Volume-to-Capacity Ratio (*X*)	0.206	0.578	0.579	0.163	0.364	0.365	0.038	0.114		0.269	0.281	
Available Capacity (c_a), veh/h	459	1140	1126	254	1140	1094	283	343		332	329	
Back of Queue (*Q*), veh/ln (95th percentile)	1.5	10.4	10.3	0.7	1.9	1.9	0.4	1.2		2.9	2.9	
Queue Storage Ratio (*RQ*) (95th percentile)	0.28	0.00	0.00	0.21	0.00	0.00	0.00	0.00		0.46	0.00	
Uniform Delay (d_1), s/veh	7.4	8.1	8.1	7.3	1.9	1.9	31.3	27.9		30.9	29.0	
Incremental Delay (d_2), s/veh	1.0	2.1	2.2	1.4	0.9	0.9	0.0	0.1		0.2	0.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	8.4	10.3	10.3	8.6	2.8	2.8	31.3	28.0		31.0	29.2	
Level of Service (LOS)	A	B	B	A	A	A	C	C		C	C	
Approach Delay, s/veh / LOS	10.2	B		3.1	A		28.7	C		30.1	C	
Intersection Delay, s/veh / LOS	9.6						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.6	A	1.2	A	0.6	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	082114 2014 pm main at COLLEGE.xus				
Project Description	2014 Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	24	971	169	120	626	10	91	3	127	12	2	

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On

Green	10.0	42.0	23.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

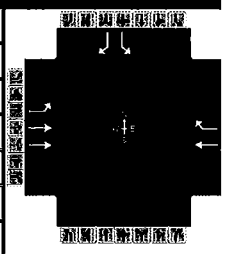
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		7.0		8.0
Phase Duration, s		47.0	15.0	62.0		28.0		28.0
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.5		3.5
Queue Clearance Time (g_s), s			5.1			9.8		2.6
Green Extension Time (g_e), s		0.0	0.1	0.0		0.5		0.5
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.12			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (*v*), veh/h	26	644	595	130	691			102	138		15	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	671	1710	1569	1629	1703			1167	1326		1353	
Queue Service Time (g_s), s	1.4	25.8	26.1	3.1	12.4			5.6	7.8		0.0	
Cycle Queue Clearance Time (g_c), s	1.4	25.8	26.1	3.1	12.4			6.3	7.8		0.6	
Green Ratio (*g/C*)	0.47	0.47	0.47	0.60	0.63			0.26	0.26		0.26	
Capacity (*c*), veh/h	393	798	732	334	1078			377	339		420	
Volume-to-Capacity Ratio (*X*)	0.066	0.807	0.813	0.391	0.641			0.271	0.407		0.036	
Available Capacity (c_a), veh/h	393	798	732	334	1078			377	339		420	
Back of Queue (*Q*), veh/ln (95th percentile)	0.4	13.6	13.0	1.7	5.4			3.1	4.3		0.4	
Queue Storage Ratio (*RQ*) (95th percentile)	0.14	0.00	0.00	0.38	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	9.3	13.9	14.0	13.5	3.5			27.2	27.8		25.2	
Incremental Delay (d_2), s/veh	0.3	8.6	9.6	0.3	2.9			0.1	0.3		0.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	9.7	22.5	23.6	13.8	6.5			27.3	28.1		25.2	
Level of Service (LOS)	A	C	C	B	A			C	C		C	
Approach Delay, s/veh / LOS	22.8	C		7.6	A		27.8	C		25.2	C	
Intersection Delay, s/veh / LOS	18.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.4	B
Bicycle LOS Score / LOS	1.5	A	1.8	A	0.9	A	0.5	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at Drexel	Analysis Year	2025	Analysis Period	1> 7:00
File Name	082114 2014 pm main at drexel.xus				
Project Description	2014 Existing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	159	947			612	65				119		180

Signal Information					EB			WB			NB			SB		
Cycle, s	90.0	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	10.0	45.0		20.0	0.0	0.0	0.0					
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0		4.0	0.0	0.0	0.0					
Force Mode	Float	Simult. Gap N/S	On	Red	1.0	1.0		1.0	0.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	15.0	65.0		50.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	0.0		0.0				3.3
Queue Clearance Time (g_s), s	5.9							13.0
Green Extension Time (g_e), s	0.1	0.0		0.0				0.4
Phase Call Probability	1.00							1.00
Max Out Probability	0.35							0.07

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	173	1029			665	71				129		196
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1629	1628			1710	1330				1622		1439
Queue Service Time (g_s), s	3.9	5.5			24.2	1.7				6.1		11.0
Cycle Queue Clearance Time (g_c), s	3.9	5.5			24.2	1.7				6.1		11.0
Green Ratio (*g/C*)	0.63	0.67			0.50	0.50				0.22		0.22
Capacity (*c*), veh/h	423	2171			855	665				360		320
Volume-to-Capacity Ratio (*X*)	0.408	0.474			0.778	0.106				0.359		0.612
Available Capacity (c_a), veh/h	423	2171			855	665				360		320
Back of Queue (*Q*), veh/ln (95th percentile)	2.0	2.2			11.9	0.9				4.2		7.1
Queue Storage Ratio (*RQ*) (95th percentile)	0.42	0.00			0.00	0.00				0.00		2.52
Uniform Delay (d_1), s/veh	11.3	2.0			11.5	7.8				29.6		31.5
Incremental Delay (d_2), s/veh	0.2	0.7			6.9	0.3				0.2		2.5
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	11.5	2.7			18.4	8.1				29.8		34.0
Level of Service (LOS)	B	A			B	A				C		C
Approach Delay, s/veh / LOS	4.0	A		17.5	B		0.0			32.3	C	
Intersection Delay, s/veh / LOS	12.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.7	B	2.5	B
Bicycle LOS Score / LOS	1.5	A	1.7	A				F

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*DLS*
Agency/Co.	*EP Ferris*
Date Performed	*2/3/14*
Analysis Time Period	*Existing PM Peak*

Site Information

Intersection	*Main at Market Dist Expr Drive*
Jurisdiction	*Bexley*
Analysis Year	*2014*

Project Description *Bexley Square Traffic Access Study*

East/West Street: *Main* | North/South Street: *East City Hall Drive*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*3*	*1104*			*790*	*2*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*3*	*1104*	*0*	*0*	*790*	*2*
Percent Heavy Vehicles	*1*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*1*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*2*		*7*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*2*	*0*	*7*
Percent Heavy Vehicles	*1*	*0*	*1*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

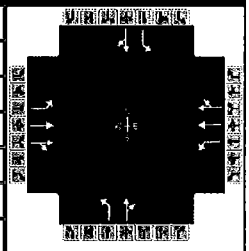
Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*						*LR*	
v (veh/h)	*3*						*9*	
C (m) (veh/h)	*751*						*288*	
v/c	*0.00*						*0.03*	
95% queue length	*0.01*						*0.10*	
Control Delay (s/veh)	*9.8*						*17.9*	
LOS	*A*						*C*	
Approach Delay (s/veh)	--	--					*17.9*	
Approach LOS	--	--					*C*	

HCS+™ Version 5.6 Generated: 8/21/2014 1:37 PM

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at Parkview	Analysis Year	2025	Analysis Period	1> 7:00
File Name	2025 pm main at PARKVIEW.xus				
Project Description	2025 PM w/Site				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	87	1268	31	38	729	92	10	15	21	100	14	71

Signal Information					EB		WB		NB		SB		
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	60.0	20.0	0.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0			
Force Mode	Float	Simult. Gap N/S	On	Red	1.0	1.0	0.0	0.0	0.0	0.0			

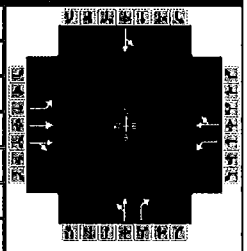
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		6.0		6.0		6.0		6.0
Phase Duration, s		65.0		65.0		25.0		25.0
Change Period, (*Y*+*Rc*), s		5.0		5.0		5.0		5.0
Max Allow Headway (*MAH*), s		0.0		0.0		3.4		3.4
Queue Clearance Time (g_s), s						7.3		10.7
Green Extension Time (g_e), s		0.0		0.0		0.4		0.4
Phase Call Probability						1.00		1.00
Max Out Probability						0.00		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	95	709	703	41	458	434	11	39		109	92	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	563	1710	1691	346	1710	1622	1188	1544		1246	1481	
Queue Service Time (g_s), s	6.9	21.3	21.3	2.4	4.2	4.2	0.7	1.8		6.9	4.7	
Cycle Queue Clearance Time (g_c), s	11.1	21.3	21.3	26.8	4.2	4.2	5.3	1.8		8.7	4.7	
Green Ratio (*g*/*C*)	0.67	0.67	0.67	0.67	0.67	0.67	0.22	0.22		0.22	0.22	
Capacity (*c*), veh/h	429	1140	1127	229	1140	1081	283	343		332	329	
Volume-to-Capacity Ratio (*X*)	0.220	0.622	0.623	0.181	0.402	0.402	0.038	0.114		0.328	0.281	
Available Capacity (c_a), veh/h	429	1140	1127	229	1140	1081	283	343		332	329	
Back of Queue (*Q*), veh/ln (95th percentile)	1.6	11.5	11.4	0.8	2.2	2.1	0.4	1.2		3.6	2.9	
Queue Storage Ratio (*RQ*) (95th percentile)	0.29	0.00	0.00	0.25	0.00	0.00	0.00	0.00		0.57	0.00	
Uniform Delay (d_1), s/veh	7.8	8.5	8.6	8.6	1.9	1.9	31.3	27.9		31.4	29.0	
Incremental Delay (d_2), s/veh	1.2	2.6	2.6	1.7	1.1	1.1	0.0	0.1		0.2	0.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	9.0	11.1	11.2	10.3	3.0	3.0	31.3	28.0		31.6	29.2	
Level of Service (LOS)	A	B	B	B	A	A	C	C		C	C	
Approach Delay, s/veh / LOS	11.0	B		3.3	A		28.7	C		30.5	C	
Intersection Delay, s/veh / LOS	10.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.7	A	1.3	A	0.6	A	0.8	A

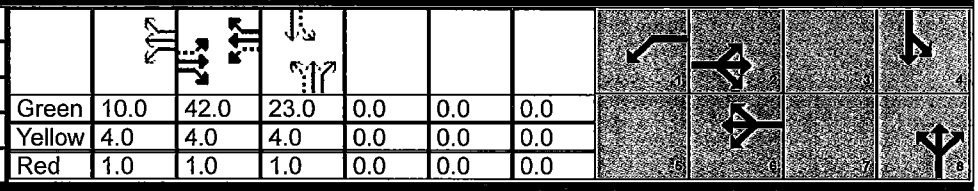
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	revised 022614 2025 pm main at COLLEGE.xus				
Project Description	2025 PM w/Site				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	1044	169	120	662	13	91	10	130	147	14	

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



	EB		WB			NB		
Green	10.0	42.0	23.0	0.0	0.0	0.0		
Yellow	4.0	4.0	4.0	0.0	0.0	0.0		
Red	1.0	1.0	1.0	0.0	0.0	0.0		

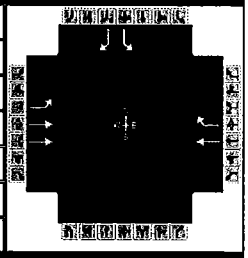
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		7.0		8.0
Phase Duration, s		47.0	15.0	62.0		28.0		28.0
Change Period, (*Y*+*Rc*), s		5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.3		3.3
Queue Clearance Time (g_s), s			5.1			10.0		11.8
Green Extension Time (g_e), s		0.0	0.1	0.0		0.8		0.8
Phase Call Probability			1.00			1.00		1.00
Max Out Probability			0.12			0.00		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (*v*), veh/h	53	683	636	130	734			110	141		175	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	646	1710	1577	1629	1701			1307	1326		1294	
Queue Service Time (g_s), s	3.2	29.0	29.6	3.1	14.2			0.0	8.0		4.3	
Cycle Queue Clearance Time (g_c), s	3.2	29.0	29.6	3.1	14.2			5.5	8.0		9.8	
Green Ratio (*g*/*C*)	0.47	0.47	0.47	0.60	0.63			0.26	0.26		0.26	
Capacity (*c*), veh/h	381	798	736	313	1077			410	339		407	
Volume-to-Capacity Ratio (*X*)	0.140	0.855	0.864	0.416	0.681			0.268	0.417		0.430	
Available Capacity (c_a), veh/h	381	798	736	313	1077			410	339		407	
Back of Queue (Q), veh/ln (95th percentile)	0.9	15.5	15.1	2.0	6.0			3.3	4.5		5.6	
Queue Storage Ratio (*RQ*) (95th percentile)	0.31	0.00	0.00	0.44	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	9.7	14.5	14.7	15.3	3.7			27.0	27.9		28.4	
Incremental Delay (d_2), s/veh	0.8	11.4	12.8	0.3	3.5			0.1	0.3		0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	10.4	25.9	27.5	15.7	7.2			27.1	28.2		28.7	
Level of Service (LOS)	B	C	C	B	A			C	C		C	
Approach Delay, s/veh / LOS	26.1	C		8.4	A		27.7	C		28.7	C	
Intersection Delay, s/veh / LOS	20.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.4	B
Bicycle LOS Score / LOS	1.6	A	1.9	A	0.9	A	0.8	A

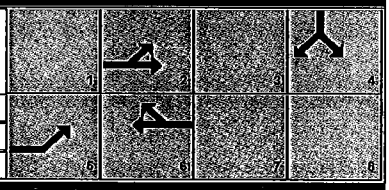
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at Drexel	Analysis Year	2025	Analysis Period	1> 7:00
File Name	2025 pm main at drexel.xus				
Project Description	2025 PM w/Site				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	179	1083			684	67				116		180

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	On



Green	10.0	45.0	20.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6				4
Case Number	1.0	4.0		7.3				9.0
Phase Duration, s	15.0	65.0		50.0				25.0
Change Period, ($Y+R_c$), s	5.0	5.0		5.0				5.0
Max Allow Headway (*MAH*), s	3.1	0.0		0.0				3.3
Queue Clearance Time (g_s), s	6.5							13.0
Green Extension Time (g_e), s	0.1	0.0		0.0				0.4
Phase Call Probability	1.00							1.00
Max Out Probability	0.68							0.06

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2			6	16				7		14
Adjusted Flow Rate (*v*), veh/h	195	1177			743	73				126		196
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1629	1628			1710	1330				1622		1439
Queue Service Time (g_s), s	4.5	7.0			31.0	1.8				5.9		11.0
Cycle Queue Clearance Time (g_c), s	4.5	7.0			31.0	1.8				5.9		11.0
Green Ratio (*g/C*)	0.63	0.67			0.50	0.50				0.22		0.22
Capacity (*c*), veh/h	363	2171			855	665				360		320
Volume-to-Capacity Ratio (*X*)	0.537	0.542			0.870	0.110				0.350		0.612
Available Capacity (c_a), veh/h	363	2171			855	665				360		320
Back of Queue (*Q*), veh/ln (95th percentile)	3.0	2.6			15.4	1.0				4.1		7.1
Queue Storage Ratio (*RQ*) (95th percentile)	0.63	0.00			0.00	0.00				0.00		2.52
Uniform Delay (d_1), s/veh	14.7	2.1			12.7	7.8				29.5		31.5
Incremental Delay (d_2), s/veh	0.8	1.0			11.7	0.3				0.2		2.5
Initial Queue Delay (d_3), s/veh	0.0	0.0			0.0	0.0				0.0		0.0
Control Delay (*d*), s/veh	15.6	3.0			24.4	8.1				29.7		34.0
Level of Service (LOS)	B	A			C	A				C		C
Approach Delay, s/veh / LOS	4.8	A		22.9	C		0.0			32.3	C	
Intersection Delay, s/veh / LOS	14.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	0.7	A	2.3	B	2.7	B	2.5	B
Bicycle LOS Score / LOS	1.6	A	1.8	A				F

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*DLS*
Agency/Co.	*EP Ferris*
Date Performed	*2/3/14*
Analysis Time Period	*2025 PM Peak*

Site Information

Intersection	*Main at Market Dist Expr Drive*
Jurisdiction	*Bexley*
Analysis Year	*2025*

Project Description *Bexley Square Traffic Access Study*

East/West Street: *Main* | North/South Street: *Site Drive*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*55*	*1268*			*816*	*57*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*55*	*1268*	*0*	*0*	*816*	*57*
Percent Heavy Vehicles	*1*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*1*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*21*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*21*
Percent Heavy Vehicles	*1*	*0*	*1*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*							*R*
v (veh/h)	*55*							*21*
C (m) (veh/h)	*678*							*318*
v/c	*0.08*							*0.07*
95% queue length	*0.26*							*0.21*
Control Delay (s/veh)	*10.8*							*17.1*
LOS	*B*							*C*
Approach Delay (s/veh)	--	--				*17.1*		
Approach LOS	--	--				*C*		

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Generated: 8/21/2014 1:05 PM

BEXLEY SQUARE TRAFFIC ACCESS STUDY

3/7/2014

COMPARISON OF AVAILABLE STORAGE LENGTHS AND 95TH PERCENTILE QUEUES*

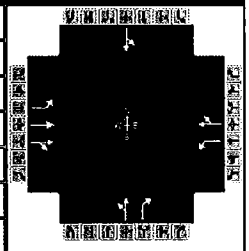
	EX LEFT TURN LANE LENGTH	95TH % QUEUE NO. OF VEHICLES	QUEUE LENGTH (ASSUME 22' PER VEHICLE)	RESULT
MAIN AT PARKVIEW				
EASTBOUND LEFT	134	1.6	35.2	OK
EASTBOUND THRU/RT	-	11.5	253	EXTENDS PAST LEFT LANE
WESTBOUND LEFT	79	0.8	17.6	OK
WESTBOUND THRU/RT	-	2.2	48.4	OK
SOUTHBOUND LEFT	160	3.6	79.2	OK
SOUTHBOUND THRU/RT	160	2.9	63.8	OK
MAIN AT COLLEGE				
EASTBOUND LEFT	72	0.9	19.8	OK
EASTBOUND THRU/RT	-	15.5	341	EXTENDS PAST LEFT LANE
WESTBOUND LEFT	111	2	44	OK
WESTBOUND THRU/RT	-	6	132	EXTENDS PAST LEFT LANE BY LESS THAN A CAR LENGTH
SOUTHBOUND LEFT/THRU	-	5.6	123.2	
NORTHBOUND LEFT	154	3.3	72.6	OK
NORTHBOUND THRU/RT	-	4.5	99	OK
MAIN AT DREXEL				
EASTBOUND LEFT	120	3	66	OK
EASTBOUND THRU/RT	-	2.6	57.2	OK

* 95TH PERCENTILE QUEUE: 95 PERCENT OF BACKUPS THIS LENGTH OR LESS (ALTERNATIVELY, ONLY A 5 PERCENT CHANCE THE QUEUE WILL BE LONGER).

CONCLUSIONS: WHERE INDICATED, IT IS LIKELY DURING THE COURSE OF THE PEAK HOUR THAT EASTBOUND THROUGH VOLUMES WILL OCCASIONALLY EXTEND PAST THE END OF THE LEFT TURN LANE, AND IMPEDE MOTORISTS FROM GETTING INTO THE LEFT TURN LANE AT THE BEGINNING OF A GREEN LIGHT AT THE SIGNAL.

HCS 2010 Signalized Intersection Results Summary

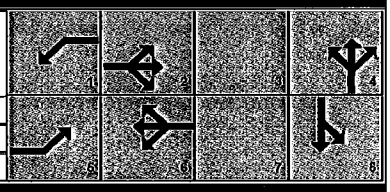
General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Mar 14, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	030714 add EB left phase 2025 pm main at COLLEGE.xus				
Project Description	Option 1 2025 PM w/Site add EB left phase				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	1044	169	120	662	13	91	10	130	147	14	

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	Off

Green	10.0	42.0	23.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						



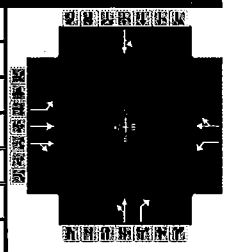
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		7.0		8.0
Phase Duration, s	15.0	47.0	15.0	47.0		28.0		28.0
Change Period, (*Y*+*Rc*), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.4		3.2
Queue Clearance Time (g_s), s	3.2		5.3			10.0		11.8
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		0.5		0.2
Phase Call Probability	1.00		1.00			1.00		0.99
Max Out Probability	0.00		0.14			0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	
Adjusted Flow Rate (*v*), veh/h	53	683	636	130	734			110	141		175	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1629	1710	1577	1629	1700			1307	1326		1294	
Queue Service Time (g_s), s	1.2	29.0	29.6	3.3	34.5			0.0	8.0		4.3	
Cycle Queue Clearance Time (g_c), s	1.2	29.0	29.6	3.3	34.5			5.5	8.0		9.8	
Green Ratio (*g*/*C*)	0.58	0.47	0.47	0.58	0.47			0.26	0.26		0.26	
Capacity (*c*), veh/h	316	798	736	305	794			410	339		407	
Volume-to-Capacity Ratio (*X*)	0.169	0.855	0.864	0.428	0.925			0.268	0.417		0.430	
Available Capacity (c_a), veh/h	316	798	736	305	794			410	339		407	
Back of Queue (*Q*), veh/ln (95th percentile)	0.7	15.5	15.1	2.0	19.1			3.3	4.5		5.6	
Queue Storage Ratio (*RQ*) (95th percentile)	0.25	0.00	0.00	0.44	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	14.8	14.5	14.7	16.0	15.6			27.0	27.9		28.4	
Incremental Delay (d_2), s/veh	0.1	11.4	12.8	0.4	18.1			0.1	0.3		0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	14.9	25.9	27.5	16.4	33.7			27.1	28.2		28.7	
Level of Service (LOS)	B	C	C	B	C			C	C		C	
Approach Delay, s/veh / LOS	26.2	C		31.1	C		27.7	C		28.7	C	
Intersection Delay, s/veh / LOS	28.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.4	B
Bicycle LOS Score / LOS	1.6	A	1.9	A	0.9	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

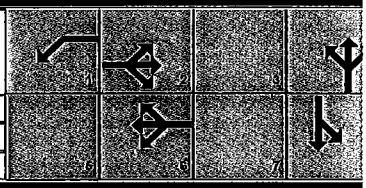
General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	030714 split phase 2025 pm main at COLLEGE.xus				
Project Description	Option 2 2025 PM w/Site add NS split phasing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	1044	169	120	662	13	91	10	130	147	14	

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	Off

Green	9.6	36.8	11.4	12.2	0.0	0.0	
Yellow	4.0	4.0	4.0	4.0	0.0	0.0	
Red	1.0	1.0	1.0	1.0	0.0	0.0	



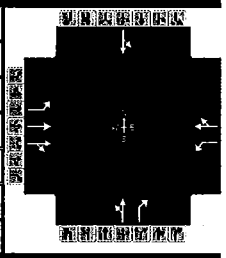
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		8
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		41.8	14.6	56.4		17.2		16.4
Change Period, (*Y*+*Rc*), s		5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.5		3.1
Queue Clearance Time (g_s), s			5.6			12.0		11.4
Green Extension Time (g_e), s		0.0	0.1	0.0		0.2		0.1
Phase Call Probability			0.96			1.00		0.99
Max Out Probability			0.13			0.69		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	
Adjusted Flow Rate (*v*), veh/h	53	684	635	130	734			110	141		175	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	645	1710	1571	1629	1701			1636	1235		1635	
Queue Service Time (g_s), s	4.3	35.1	35.9	3.6	21.8			5.6	10.0		9.4	
Cycle Queue Clearance Time (g_c), s	11.9	35.1	35.9	3.6	21.8			5.6	10.0		9.4	
Green Ratio (*g*/*C*)	0.41	0.41	0.41	0.54	0.57			0.14	0.14		0.13	
Capacity (*c*), veh/h	292	699	642	258	971			223	168		207	
Volume-to-Capacity Ratio (*X*)	0.182	0.979	0.989	0.506	0.755			0.493	0.841		0.847	
Available Capacity (c_a), veh/h	292	699	642	272	971			291	220		263	
Back of Queue (*Q*), veh/ln (95th percentile)	1.3	22.9	22.4	2.1	9.4			4.0	6.7		8.0	
Queue Storage Ratio (*RQ*) (95th percentile)	0.44	0.00	0.00	0.48	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	17.1	20.1	20.3	18.0	7.2			36.0	37.9		38.5	
Incremental Delay (d_2), s/veh	1.4	29.2	32.9	0.6	5.5			0.6	16.0		15.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	18.5	49.3	53.2	18.6	12.7			36.6	53.9		53.6	
Level of Service (LOS)	B	D	D	B	B			D	D		D	
Approach Delay, s/veh / LOS	49.9	D		13.6	B		46.3	D		53.6	D	
Intersection Delay, s/veh / LOS	38.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.5	B
Bicycle LOS Score / LOS	1.6	A	1.9	A	0.9	A	0.8	A

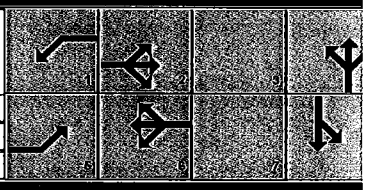
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	030714 ew left phase and ns split phase 2025 pm main at COLLEGE.xus				
Project Description	Option 3 2025 PM w/Site+EB LT ph & NS split phase				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	1044	169	120	662	13	91	10	130	147	14	

Signal Information					EB			WB			NB		
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	7.0	2.0		37.4	11.4	12.2	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.0	0.0		4.0	4.0	4.0	0.0		
Force Mode	Float	Simult. Gap N/S	Off	Red	1.0	0.0		1.0	1.0	1.0	0.0		



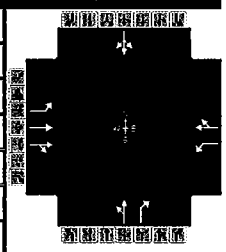
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		11.0		12.0
Phase Duration, s	12.0	42.4	14.0	44.4		17.2		16.4
Change Period, (*Y*+*Rc*), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.5		3.1
Queue Clearance Time (g_s), s	3.5		5.8			12.1		11.4
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		0.2		0.1
Phase Call Probability	1.00		1.00			1.00		0.99
Max Out Probability	0.55		0.87			0.81		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	
Adjusted Flow Rate (*v*), veh/h	53	684	635	130	734			110	141		175	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1629	1710	1572	1629	1700			1636	1235		1635	
Queue Service Time (g_s), s	1.5	34.4	35.1	3.8	38.1			5.6	10.1		9.4	
Cycle Queue Clearance Time (g_c), s	1.5	34.4	35.1	3.8	38.1			5.6	10.1		9.4	
Green Ratio (*g*/*C*)	0.49	0.42	0.42	0.52	0.44			0.14	0.14		0.13	
Capacity (*c*), veh/h	207	711	653	252	744			223	168		206	
Volume-to-Capacity Ratio (*X*)	0.258	0.962	0.972	0.517	0.986			0.493	0.842		0.848	
Available Capacity (c_a), veh/h	207	711	653	252	744			287	217		262	
Back of Queue (*Q*), veh/ln (95th percentile)	0.9	21.8	21.2	2.3	23.7			4.0	6.7		8.1	
Queue Storage Ratio (*RQ*) (95th percentile)	0.33	0.00	0.00	0.52	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	19.2	19.4	19.6	18.4	18.5			36.0	37.9		38.5	
Incremental Delay (d_2), s/veh	0.2	25.7	29.0	0.8	29.7			0.6	16.6		15.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	19.4	45.1	48.6	19.3	48.2			36.6	54.5		53.9	
Level of Service (LOS)	B	D	D	B	D			D	D		D	
Approach Delay, s/veh / LOS	45.7	D		43.8	D		46.7	D		53.9	D	
Intersection Delay, s/veh / LOS	45.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.5	B
Bicycle LOS Score / LOS	1.6	A	1.9	A	0.9	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Mar 14, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	061914 add southbound right add EB left phase 2025 pm main at COLLEGE.xus				
Project Description	Option 1 add EB left phase ADD DWY RIGHT TURNS				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	1044	169	120	662	13	91	10	130	147	14	44

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	Off
Force Mode	Float	Simult. Gap N/S	Off

Green	10.0	42.0	23.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						

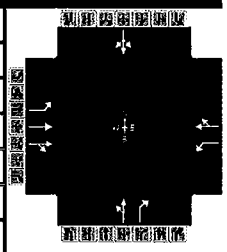
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		7.0		8.0
Phase Duration, s	15.0	47.0	15.0	47.0		28.0		28.0
Change Period, ($Y+R_c$), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.5		3.3
Queue Clearance Time (g_s), s	3.2		5.3			10.0		14.8
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		0.5		0.3
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.00		0.14			0.00		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	53	683	636	130	734			110	141		223	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1629	1710	1577	1629	1700			1175	1326		1324	
Queue Service Time (g_s), s	1.2	29.0	29.6	3.3	34.5			0.0	8.0		6.0	
Cycle Queue Clearance Time (g_c), s	1.2	29.0	29.6	3.3	34.5			6.8	8.0		12.8	
Green Ratio (*g/C*)	0.58	0.47	0.47	0.58	0.47			0.26	0.26		0.26	
Capacity (*c*), veh/h	301	798	736	305	794			376	339		407	
Volume-to-Capacity Ratio (*X*)	0.177	0.855	0.864	0.428	0.925			0.292	0.417		0.547	
Available Capacity (c_a), veh/h	301	798	736	305	794			376	339		407	
Back of Queue (*Q*), veh/ln (95th percentile)	0.7	15.5	15.1	2.0	19.1			3.4	4.5		7.5	
Queue Storage Ratio (*RQ*) (95th percentile)	0.25	0.00	0.00	0.44	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	15.6	14.5	14.7	16.0	15.6			27.4	27.9		29.4	
Incremental Delay (d_2), s/veh	0.1	11.4	12.8	0.4	18.1			0.2	0.3		0.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	15.7	25.9	27.5	16.4	33.7			27.6	28.2		30.3	
Level of Service (LOS)	B	C	C	B	C			C	C		C	
Approach Delay, s/veh / LOS	26.3	C		31.1	C		27.9	C		30.3	C	
Intersection Delay, s/veh / LOS	28.3						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.4	B
Bicycle LOS Score / LOS	1.6	A	1.9	A	0.9	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

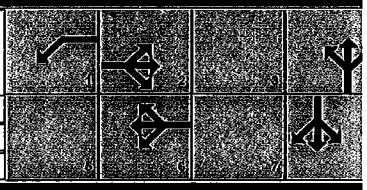
General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	062914 southboun right added split phase 2025 pm main at COLLEGE.xus				
Project Description	Option 2 add NS split phasing ADD DWY RIGHT TURNS				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	1044	169	120	662	13	91	10	130	147	14	44

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	Off

Green	9.6	36.7	11.4	12.2	0.0	0.0
Yellow	4.0	4.0	4.0	4.0	0.0	0.0
Red	1.0	1.0	1.0	1.0	0.0	0.0



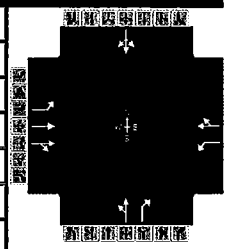
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		4		8
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		41.7	14.6	56.4		17.2		16.4
Change Period, (*Y*+*Rc*), s		5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.5		3.3
Queue Clearance Time (g_s), s			5.6			12.0		13.4
Green Extension Time (g_e), s		0.0	0.1	0.0		0.2		0.0
Phase Call Probability			0.96			1.00		1.00
Max Out Probability			0.13			0.69		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	53	684	635	130	734			110	141		223	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	645	1710	1571	1629	1701			1636	1235		1468	
Queue Service Time (g_s), s	4.3	35.1	35.9	3.6	21.9			5.6	10.0		11.4	
Cycle Queue Clearance Time (g_c), s	11.9	35.1	35.9	3.6	21.9			5.6	10.0		11.4	
Green Ratio (*g*/*C*)	0.41	0.41	0.41	0.54	0.57			0.14	0.14		0.13	
Capacity (*c*), veh/h	291	698	641	257	971			223	168		186	
Volume-to-Capacity Ratio (*X*)	0.183	0.980	0.990	0.507	0.756			0.493	0.841		1.198	
Available Capacity (c_a), veh/h	291	698	641	272	971			291	220		186	
Back of Queue (*Q*), veh/ln (95th percentile)	1.3	22.9	22.4	2.1	9.4			4.0	6.7		17.2	
Queue Storage Ratio (*RQ*) (95th percentile)	0.44	0.00	0.00	0.48	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	17.2	20.1	20.3	18.0	7.2			36.0	37.9		39.3	
Incremental Delay (d_2), s/veh	1.4	29.4	33.1	0.6	5.5			0.6	16.0		129.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	18.5	49.6	53.5	18.6	12.7			36.6	53.9		168.9	
Level of Service (LOS)	B	D	D	B	B			D	D		F	
Approach Delay, s/veh / LOS	50.2	D		13.6	B		46.3	D		168.9	F	
Intersection Delay, s/veh / LOS	47.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.5	B
Bicycle LOS Score / LOS	1.6	A	1.9	A	0.9	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

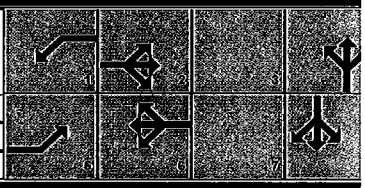
General Information				Intersection Information	
Agency	EP Ferris			Duration, h	0.25
Analyst	DLS	Analysis Date	Feb 3, 2014	Area Type	CBD
Jurisdiction	Bexley	Time Period	PM Peak	PHF	0.92
Intersection	Main at College	Analysis Year	2025	Analysis Period	1> 7:00
File Name	061914 add sb volumes and ew left phase and ns split phase 2025 pm main at COLLEGE.xus				
Project Description	Option 3 EB LT & NS split ph ADD DWY RIGHT TURNS				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	49	1044	169	120	662	13	91	10	130	147	14	44

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Float	Simult. Gap N/S	Off

Green	7.0	38.9	12.0	12.1	0.0	0.0						
Yellow	4.0	4.0	4.0	4.0	0.0	0.0						
Red	1.0	1.0	1.0	1.0	0.0	0.0						



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		4		8
Case Number	1.1	4.0	1.1	4.0		11.0		12.0
Phase Duration, s	12.0	43.9	12.0	43.9		17.1		17.0
Change Period, (Y+R_c), s	5.0	5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s	3.1	0.0	3.1	0.0		3.5		3.3
Queue Clearance Time (g_s), s	3.5		5.8			12.1		14.0
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0		0.0		0.0
Phase Call Probability	1.00		1.00			1.00		1.00
Max Out Probability	0.51		1.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	53	683	635	130	734			110	141		223	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1629	1710	1574	1629	1700			1636	1232		1475	
Queue Service Time (g_s), s	1.5	32.6	33.3	3.8	38.7			5.6	10.1		12.0	
Cycle Queue Clearance Time (g_c), s	1.5	32.6	33.3	3.8	38.7			5.6	10.1		12.0	
Green Ratio (*g*/*C*)	0.51	0.43	0.43	0.51	0.43			0.13	0.13		0.13	
Capacity (*c*), veh/h	208	739	681	222	735			220	165		197	
Volume-to-Capacity Ratio (*X*)	0.256	0.924	0.933	0.588	0.998			0.500	0.855		1.133	
Available Capacity (c_a), veh/h	208	739	681	222	735			222	167		197	
Back of Queue (*Q*), veh/ln (95th percentile)	0.9	19.3	18.8	2.6	24.7			4.0	7.8		15.9	
Queue Storage Ratio (*RQ*) (95th percentile)	0.31	0.00	0.00	0.58	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	19.0	17.7	17.9	19.4	19.0			36.2	38.1		39.0	
Incremental Delay (d_2), s/veh	0.2	19.0	21.6	2.8	32.7			0.7	31.1		104.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	19.3	36.7	39.4	22.1	51.7			36.8	69.2		143.6	
Level of Service (LOS)	B	D	D	C	D			D	E		F	
Approach Delay, s/veh / LOS	37.3	D		47.2	D		55.0	E		143.6	F	
Intersection Delay, s/veh / LOS	50.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.7	B	2.5	B
Bicycle LOS Score / LOS	1.6	A	1.9	A	0.9	A	0.9	A