

## **Memorandum**

Date: September 21, 2016

To: Dr. Mike S. Stacy, Superintendent, Beechwood Independent School District

cc: Sharmili Reddy, AICP, City Administration, City of Fort Mitchell  
Matt Stegman, Public Works Director, City of Fort Mitchell

From: Katie Dillenburger, P.E., Bayer Becker  
Chris Tritch, P.E., Bayer Becker

Subject: Beechwood Independent Schools – Site Circulation Review

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The purpose of this memorandum is to evaluate the site circulation of the Beechwood Independent Schools campus and if necessary, provide recommendations/alternatives to improve traffic flow onsite, on the adjacent roadway network (i.e. Beechwood Road), and the adjoining Kroger property.

The school campus is located at 54 Beechwood Road in the City of Fort Mitchell, Kenton County, Kentucky and includes an elementary school with approximately 750 students in preschool through 6<sup>th</sup> grade and a high school with approximately 650 students in 7<sup>th</sup> through 12<sup>th</sup> grades. Elementary school classes start at 7:50 AM and dismiss at 2:50 PM and high school classes begin at 8:00 AM and end at 3:00 PM. Students are not permitted in the building before 7:15 AM or after 4:00 PM unless supervised.

Bayer Becker conducted several site visits to observe traffic conditions and pedestrian movements at the Beechwood Independent Schools campus including Beechwood Road, Ashton Road, Page Road, and Dixie Highway (U.S. 25), and the adjoining Kroger property. Observations were made during the morning peak hour (7:15 AM to 8:15 AM) and afternoon peak hour (2:30 PM to 3:30 PM) on a typical clear, sunny day which occurred on Wednesday, March 30, 2016 (AM and PM peak hours) and on a typical rainy day which occurred on Thursday, March 31, 2016 (AM peak hour only) and on Friday, April 22, 2016 (PM peak hour only).

### **Existing Site Circulation**

Access to the elementary school is provided at Beechwood Road with separate entering and exiting driveways on the south side of the site. Staff, visitor, and student parking is accessed via the elementary school driveways with approximately 123 parking spaces dedicated to staff and visitors and approximately 51 parking spaces for students. There is also a small area between the staff and student parking lots that accommodates parking for approximately five buses. Student drop-offs and pick-ups generally occur at the southwest corner of the elementary school building with a designated traffic pattern using the staff parking lot for queueing and stacking. There is a secondary drop-off/pick-up area along the southeast side of the building; however, use of this location is discouraged in order to minimize student pedestrian traffic along the curb line and around the building. Two travel lanes (same direction) are provided at the elementary school entering and exiting driveways and around the perimeter of the staff/visitor parking lot. During the AM and PM peak periods, a police officer is positioned along Beechwood Road at the elementary school exiting driveway to direct traffic. At the elementary school entering driveway, left turns into the drive are prohibited between 7:45 AM and 8:15 AM and between 2:45 PM and 3:15 PM via signage. According to the police officer, cones are sometimes placed along the centerline of Beechwood Road to further enforce the restriction.

Some additional observations made at the elementary school driveways and within the staff parking lot during the AM drop-off peak period and the PM pick-up peak period include the following:

6900 Tylersville Road, Suite A  
Mason, OH 45040  
513-336-6600

110 S. College Ave., Suite 101  
Oxford, OH 45056  
513-523-4270

1404 Race Street, Suite 204  
Cincinnati, OH 45202  
513-834-6151

209 Grandview Drive  
Fort Mitchell, KY 41017  
859-261-1113

- Typically, only one travel lane was utilized along the entering driveway and within the parking lot area. Parent vehicles queued to allow for student drop-offs at the southwest corner of the elementary school building only.
- The maximum westbound queue observed on Beechwood Road was approximately 50 vehicles during the rainy PM peak period. This queue occupied the entire westbound travel lane between Dixie Highway (U.S. 25) and the elementary school entering driveway. Queues also extended onto Dixie Highway (U.S. 25) in both directions affecting traffic flow at the Beechwood Road and Dixie Highway (U.S. 25) intersection. In general, vehicles turning left from northbound Dixie Highway (U.S. 25) to westbound Beechwood Road waited at the traffic signal for an opportunity to turn; however, the queued southbound right turning vehicles restricted their movement and most of the northbound left turners “gave up” and continued northbound along Dixie Highway (U.S. 25). Westbound queues observed during other pick-up and drop-off periods did not reach Dixie Highway (U.S. 25); however, they occupied most of the westbound lane between Dixie Highway (U.S. 25) and the elementary school entrance driveway. When smaller queues were observed, several vehicles traveling westbound along Beechwood Road passed the queued vehicles by traveling in the eastbound lane, which is permitted by a dashed yellow centerline. The passing maneuvers occurred without encountering any approaching eastbound traffic.
- Some vehicles entering the elementary school made a left turn into the site from eastbound Beechwood Road (movement prohibited via signage).
- During the PM student pick-up peak period, a school staff person was positioned at the elementary school entering driveway where they radioed a vehicle number that is associated with a student to another staff person located at the building exit to prepare the student for release.
- After students entered or exited their vehicle, parents proceeded to the exiting driveway where two lanes were then used for left turns and right turns, with the majority of traffic exiting as a left turn to eastbound Beechwood Road toward Dixie Highway (U.S. 25).
- A police officer was positioned along Beechwood Road at the elementary school exiting driveway to direct exiting traffic.
- Significant eastbound queues associated with exiting vehicles occurred on Beechwood Road from Dixie Highway (U.S. 25), sometimes extending to the elementary school exiting driveway, during both the AM and PM peak periods.

The high school access is also provided at Beechwood Road by entering via Ashton Road and exiting to Page Road. Two travel lanes (same direction) are provided at the high school entering driveway along Ashton Road. Additional staff and visitor parking is located along Ashton Road, which includes approximately 20 parking spaces. Student drop-offs generally occur at the southwest corner of the high school building. Student pick-ups generally occurred at the southwest corner of the high school building; however, they also occurred to the south of the building along the east curb line of Ashton Road. Vehicles along Ashton Road occasionally utilized the second westernmost lane to pass waiting vehicles. During the AM and PM peak periods, a school staff person is positioned along Beechwood Road at Ashton Road and at Page Road to direct traffic. According to staff, a sign was previously located at Ashton Road prohibiting right turns into Ashton Road; however, the sign was removed as part of a sidewalk replacement project and has not been replaced. At Page Road, signage prohibits left turns onto Beechwood Road between 7:45 AM and 8:15 AM and between 2:45 PM and 3:15 PM.

Some additional observations made at Ashton Road and Page Road (the high school driveways) during the AM drop-off peak period and the PM pick-up peak period include the following:

- A school staff person was positioned along Beechwood Road at Ashton Road to direct entering traffic.
- When queues occurred along Ashton Road to Beechwood Road, with the east curb lane of Ashton Road only being used, staff typically directed vehicles to enter the second lane of Ashton Road.
- The majority of drop-off traffic entering Ashton Road arrived as left turns from eastbound Beechwood Road; however, some traffic entered from westbound Beechwood Road (previously right turns were prohibited).
- When queues occurred on eastbound Beechwood Road between Ashton Road and Page Road, several through vehicles passed the queued vehicles by traveling left of the double yellow solid centerline (not permitted).
- Queues also occurred along eastbound Beechwood Road beyond Page Road.

- A school staff person was positioned at the intersection of Beechwood Road and Page Road to direct exiting high school traffic and through traffic on Beechwood Road.

It is understood that approximately 32 parking spaces located on the adjacent Kroger property near the fuel center and pharmacy drive-through are reserved for Beechwood Independent Schools students. It was observed, however, that additional parking spaces on the Kroger property are being used for both student parking and student drop-offs and pick-ups, not only within the fuel center and pharmacy drive-through areas but also extending into the parking area near Dixie Highway (U.S. 25).

As would be expected, the layout of the Kroger property is not set up to accommodate student drop-offs and pick-ups. In particular, during the PM peak period, student pick-up traffic was disorganized and onsite queueing and back-ups were observed.

### **Proposed Site Circulation**

As previously stated, the backups and queues associated with the elementary school drop-off and pick-up traffic were observed to extend along the elementary school driveway, parking lot areas, Beechwood Road, and occasionally along Dixie Highway (U.S. 25) during both the AM and PM time periods. Therefore, the site circulation for the Beechwood Independent Schools campus was reviewed and proposed alternatives were considered.

To increase vehicle storage and queueing capacity onsite in an effort to alleviate congestion on Beechwood Road and/or Dixie Highway (U.S. 25), Bayer Becker has reviewed the layout of the staff, visitor, and student parking lots located along the eastern portion of the campus. As previously stated, two travel lanes (same direction) are provided at the elementary school entering and exiting driveways and around the perimeter of the staff/visitor parking lot. The parking lot itself is comprised of wide, one directional drive aisles (approximately 22 feet) and angled parking (approximately 75 degrees). The designated traffic pattern for student drop-offs and pick-ups consists of vehicles entering the site via the elementary school southernmost driveway, following the driveway around the east perimeter aisle of the parking lot, curving to the north and west toward the elementary school building (before entering the student parking lot), and finally, lining along the southeast elementary school sidewalk. Only one travel lane is utilized when entering the site and throughout the site. After student drop-offs and pick-ups occur, vehicles then approach the exiting driveway and begin to use the two exiting lanes. The length of the designated traffic pattern is approximately 850 feet, which can accommodate approximately 34 vehicles, assuming a vehicle length of 25 feet (i.e. length includes one travel lane only and is measured from the start of the entering driveway to the student drop-off/pick-up location). An exhibit presenting the existing parking lot areas and the current site circulation pattern is presented by attachment.

Bayer Becker evaluated the following potential short term, minor cost options relative to the modification of the existing parking lots located along the east side of the campus, to increase onsite storage and queueing capacity:

1. Modify the designated traffic pattern by utilizing the drive aisle of the student parking lot for additional stacking. To avoid interaction between student drop-off and pick-up traffic and student drivers using the rear parking lot, rearrangement of the users could be provided such that the student parking lot is relocated to the southernmost parking area where staff currently parks and moving staff to the northernmost parking area (formerly student parking). The number of parking spaces would increase for students but decrease for staff (75 spaces in the southernmost parking area vs. 51 in the northernmost parking area); therefore, parking relocations and/or splits may be necessary. The length of the revised designated traffic pattern is approximately 1,350 feet or approximately 54 vehicles, which is an increase of 59% of onsite queue storage over existing conditions.
2. Restripe the middle section of the staff and visitor parking lot to provide additional aisle space and modify the designated traffic pattern by utilizing the drive aisles of this section of the parking lot for additional queueing. According to Article XI, Off-Street Parking and Access Control Regulations of the City of Fort Mitchell Official Zoning Ordinance, dated November 2014, the minimum aisle width for 60 degree (angle) parking spaces is 15 feet. By restriping the parking spaces and decreasing the aisle widths, a similar number of parking spaces is maintained while an additional aisle is provided. The length of the revised

designated traffic pattern is approximately 1,200 feet or approximately 48 vehicles, which is an increase of 41% of onsite queue storage over existing conditions.

3. A combination of options 1 and 2, utilizing the student parking lot and the middle section of the staff and visitor parking lot for the queueing of drop-off and pick-up traffic while providing modifications to each parking area (relocate the student and staff parking and restripe the middle parking section) would result in a revised designated traffic pattern length of approximately 1,750 feet or approximately 70 vehicles, which would more than double the onsite storage (106% increase).

As with the existing designated traffic patterns, the potential modified designated traffic patterns assume that onsite drop-off and pick-up activities remain in place (i.e. one travel lane is utilized and school staff/police officer are positioned at various locations to assist students and parents) and the left turn restriction along Beechwood Road at the elementary entering driveway also remains.

Concept plans presenting parking lot striping modifications and revised site circulation patterns for each option described above are provided by attachment. Once an option is selected, appropriate traffic directing signage and/or barricades or cones should be incorporated into the plan. At a minimum, the signage/barricades/cones can be installed on a temporary basis, until the revised circulation patterns are well established. The revised site circulation patterns should also be presented to parents in the form of handouts, website, new student orientation, etc.

Relative to the Dixie Highway (U.S. 25) and Beechwood Road intersection, it is understood that the Kentucky Transportation Cabinet (KYTC) has a planned project that includes the construction of a northbound left turn lane on Dixie Highway (U.S. 25) at the intersection. As part of the project, KYTC may be willing to evaluate and/or modify the current signal timing plan. Specific changes to the signal timing could alleviate traffic congestion at the intersection. In particular, providing a northbound left turn protected phase would improve the northbound left turn movement, and increasing time allocated to eastbound Beechwood Road would improve the flow of eastbound traffic, not only at the intersection but also along Beechwood Road near the school driveways.

The following longer term site improvements to provide additional onsite storage and queueing capacity as well as increased parking spaces were also considered by Bayer Becker:

4. Restripe the southernmost staff parking lot with 60 degree (angle) parking spaces and 15' aisle widths, which will provide six additional parking spaces.
5. Relocate the miscellaneous equipment located north of the student parking lot and east of the football stadium to enlarge the student parking lot. This would add approximately 39 parking spaces. The resulting traffic pattern would be approximately 1,950 feet (78 vehicles) long, assuming a vehicle length of 25 feet and utilizing one travel lane, which is an increase of 129% of onsite queue storage over existing conditions.

An exhibit depicting the long term site improvements is attached (option 4 and option 5). As previously described with the short term, minor cost options, should a long term improvement be selected, appropriate traffic directing signage and/or barricades or cones should be incorporated into the plan. At a minimum, the signage/barricades/cones can be installed on a temporary basis, until the revised circulation patterns are well established. The revised site circulation patterns should also be presented to parents in the form of handouts, website, new student orientation, etc.

Backups and queues along Beechwood Road, Ashton Road, and Page Road were also observed during both the AM and PM time periods relative to high school traffic. As previously described, the designated traffic pattern for student drop-offs consists of vehicles entering the site via Ashton Road, which consists of two travel lanes, stopping at the southwest corner of the high school building, and then exiting the site via Page Road to Beechwood Road. The length of the designated traffic pattern is approximately 300 feet, which can accommodate approximately 12 vehicles, assuming a vehicle length of 25 feet and utilizing one travel lane. When two lanes are used, the designated traffic pattern is approximately 600 feet, which can accommodate approximately 24 vehicles. To further increase the onsite storage and queueing capacity, the designated traffic pattern could be extended along Ashton Road to

Page Road by approximately 175 feet, for an additional 7 vehicles if one lane is used, or approximately 350 feet for 14 vehicles if two lanes are used.

Improvements associated with the adjacent Kroger development have also been identified as follows as part of this assessment. Concept plans presenting parking lot modifications and student related drop-off and pick-up traffic patterns, option 6 and option 7, are provided by attachment.

6. Restripe the student parking and parent pick-up/waiting areas to provide additional parking spaces and waiting areas and to provide a defined traffic pattern for student drop-offs and pick-ups. The number of parking spaces would increase by approximately 9 spaces (from 19 existing spaces to 28 proposed spaces). The length of the designated traffic pattern is approximately 750 feet or approximately 30 vehicles. Designated waiting areas in the form of striped out zones may accommodate an additional 16 vehicles.
7. Restripe the student parking and parent pick-up/waiting areas to provide additional parking spaces and waiting areas and to provide a defined traffic pattern for student drop-offs and pick-ups. The number of parking spaces would increase by approximately 8 spaces (from 19 existing spaces to 27 proposed spaces). The length of the designated traffic pattern is approximately 800 feet or approximately 32 vehicles. Designated waiting areas in the form of striped out zones may accommodate an additional 14 vehicles.

Should an option be selected, appropriate traffic directing signage and/or barricades or cones should be incorporated into the plan. At a minimum, the signage/barricades/cones can be installed on a temporary basis, until the traffic patterns are well established. School staff may also be utilized to assist in the student drop-off/pick-up process. Designated traffic patterns should also be presented to parents in the form of handouts, website, new student orientation, etc.

While it is understood that the school has an agreement with Kroger to utilize some of the Kroger property for parking, proper arrangements should be made relative to student drop-off and pick-up activity that is occurring and/or will be maintained on the Kroger property.

### **Project Meeting**

A meeting was held on August 26, 2016 with representatives from Bayer Becker, the Beechwood Independent School District, and the City of Fort Mitchell in attendance. The purpose of the project meeting was to review Bayer Becker's observations associated with the site circulation of the school campus and Bayer Becker's subsequent recommendations/alternatives to improve traffic flow onsite, on the adjacent roadway network, and the adjoining Kroger property. Some notes taken at the meeting are summarized as follows:

- As a result of the review of recommendations/alternates conducted by the Beechwood Independent School District, there are concerns relative to short term, minor cost option 2, which calls for the restriping of the middle section of the existing staff and visitor parking lot and modifying the designated traffic pattern to use this section of the parking lot. The reconfiguration of the parking lot also calls for a reduction of the drive aisle widths which creates concern for the school relative to emergency access and also may create issues for occasions when students may need to leave early (i.e. parent/student pick-up or student drivers parked in the existing student parking lot). These same concerns are applicable to options 3, 4, and 5.
- There are some grass areas located between the middle section of the existing staff and visitor parking lot and the existing student parking lot. There is also a bus parking area located between the parking lots along the south property line of the school campus. To ease concerns relative to the modification of the middle existing staff and visitor parking lot but to also increase storage capacity on the school campus, the City of Fort Mitchell suggested paving the grass areas and relocating the bus parking area to create a larger connection to the existing student parking lot (i.e. one continuous parking field provided). To further improve site circulation, parking, and storage capacity, the middle existing staff and visitor parking lot can be restriped such that the locations of the drive aisle located along the south property line of the school campus and the first (southern) row of parking spaces are reversed (i.e. parking is provided along the south property line, the drive aisle is shifted to the north, followed by a single row of parking). This option (option 8) would



result in approximately 34 additional vehicular parking spaces and a revised designated traffic pattern for student drop-offs and pick-ups extending through the existing student parking lot at a length of approximately 1,275 feet or approximately 51 vehicles which is an increase of 50% of onsite queue storage over existing conditions.

An exhibit presenting parking lot striping modifications and revised site circulation patterns for option 8 described above is provided by attachment. If selected, appropriate traffic directing signage and/or barricades or cones should be incorporated into the plan. At a minimum, the signage/barricades/cones can be installed on a temporary basis, until the revised circulation patterns are well established. The revised site circulation patterns should also be presented to parents in the form of handouts, website, new student orientation, etc.

Some additional notes relative to the adjacent Kroger development are as follows:

- Beechwood Schools would like to see the school related traffic that utilizes the Kroger development to be more organized and if possible, they would like to see a police officer directing traffic during arrival and dismissal times.
- The City of Fort Mitchell identified that they typically do not position a police officer on private property.
- Beechwood Schools requested that the City of Fort Mitchell be involved in discussions with Kroger and the school regarding traffic and circulation patterns.

It was also confirmed with the City of Fort Mitchell that the construction of a northbound left turn lane on Dixie Highway (U.S. 25) at Beechwood Road is planned and funded; however, the actual design and construction schedule is unknown at this time.

### **Findings and Recommendations**

It is Bayer Becker's opinion, based on our experience and engineering judgment, that capacity improvements can be made to the site circulation associated with the Beechwood Independent Schools campus.

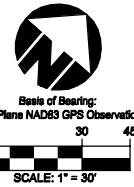
Due to the nature of traffic associated with schools (i.e. high traffic volumes arriving and departing the site in a relatively short time period) and based on the limited access and parking areas associated with the campus, traffic impacts to Beechwood Road and the adjacent properties cannot be eliminated altogether. The short term, low cost parking lot and designated traffic pattern modifications identified above (options 1, 2, and 3) would increase onsite vehicle storage and queuing capacity, which would reduce congestion on Beechwood Road and eliminate backups along Dixie Highway (U.S. 25). Likewise, the options for the parking lot modifications associated with the adjacent Kroger development (options 6 and 7) would also increase vehicle storage and queuing capacity for school traffic within the Kroger site and by providing a specific traffic pattern for school traffic on the Kroger property, driver confusion and the associated congestion would also be minimized.

The longer term, higher cost parking lot and designated traffic pattern modifications identified above (options 4, 5, and 8) should be considered to further reduce school related impacts to Beechwood Road and adjacent properties such as the Kroger development.

In conclusion, Bayer Becker recommends that the Beechwood Independent Schools District review the aforementioned proposed site circulation improvements within the existing elementary school and high school campus.

Please review this memorandum and the associated attachments. Should you have any questions or comments, please contact us at (859) 261-1113.



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**BEECHWOOD INDEPENDENT  
SCHOOL DISTRICT**

**54 BEECHWOOD ROAD  
FORT MITCHELL, KENTUCKY 41017**



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Fort Mitchell, KY 41017 - 859.261.1113

<b>16-0068 SITE CIRCULATION REVISIONS</b>	
Drawn by:	<b>KMD</b>
Checked By:	<b>EMR</b>
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**BEECHWOOD INDEPENDENT  
SCHOOL DISTRICT**

**54 BEECHWOOD ROAD  
FORT MITCHELL, KENTUCKY 41017**

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**ADJACENT KROGER PROPERTY OPTION 6**

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**BEECHWOOD INDEPENDENT  
SCHOOL DISTRICT**

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**54 BEECHWOOD ROAD  
FORT MITCHELL, KENTUCKY 41017**

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**ADJACENT KROGER PROPERTY OPTION 7**

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