



MEMORANDUM

TO: Federick County Public Schools

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DATE: December 1, 2023

RE: FCPS Middletown Elementary and Middle School Replacement - Schematic Design
Transportation Assessment

1 PROJECT BACKGROUND

The following memorandum provides a transportation assessment that evaluates transportation issues and opportunities associated with the schematic design phase of the Middletown Elementary and Middle Schools replacement.

In February 2023, the Board of Education of Frederick County (BOE) approved the feasibility study and recommendation to replace the elementary school and middle school as separate schools within a single co-located building. The existing instate Rated Capacity (SRC) of each school is 480 elementary students and 1,052 middle school students. The projected SRC would accommodate 523 elementary students and 839 middle school students, resulting in a potential net decrease of 170 students.

The existing Middletown Elementary School (MES) is located at the southwest corner of the campus on 201 E. Green St, Middletown, MD 21769. MES serves students in grades three through five and will continue to do so in the future.

The existing Middletown Middle School (MMS) is located at the southeast corner of the campus at 100 Martha Mason St, Middletown, MD 21769. MMS serves students in grades six through eight.

The existing Middletown High School (MHS) is located at the north end of the campus and will be replaced as part of a future design phase. Existing traffic and potential circulation associated with the high school were considered as part of this transportation assessment. However, transportation will need to be reevaluated as part of a future design phase. Currently, the schedule for the high school replacement has not been finalized.

Students currently attending MES and MMS will remain in the existing buildings while the replacement building is constructed. Following construction of the new building, the old Middletown ES and MS buildings will be demolished as part of this project.

The development is exempt from requiring a Traffic Impact Study as it generates less than 50 net peak hour trips. However, traffic analysis was conducted at campus access points where redistribution of traffic could have an impact on operations. Data collection and observations were made on Thursday, September 28, 2023.

2 EXISTING CONDITIONS

The existing site circulation plan is shown in **Figure 1**.

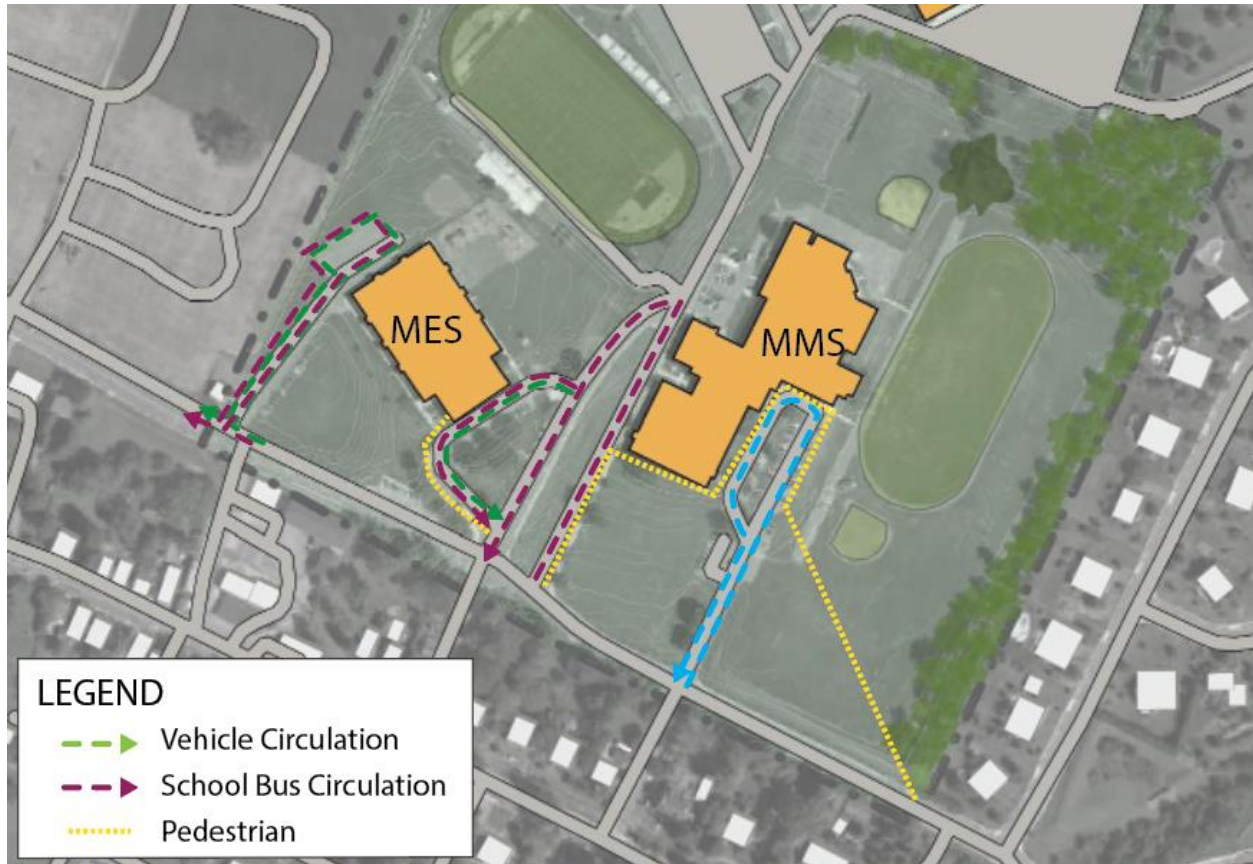


Figure 1: Existing Site Plan

Elementary School

Access to the elementary school is provided from Schoolhouse Drive and E. Green Street. Parent pickup/drop-off occurs behind the school accessed from E. Green Street. Parents also use the bus loop for pickup/drop-off. School bus pickup/drop-off primarily occurs at the one-way counter-clockwise loop in front of the school accessed from Schoolhouse Drive. School buses¹ also use the parking lot in the rear of the school for pickup/drop-off.

¹ Five school buses were observed using the rear lot on Thursday, September 28, 2023.

Currently, 66% of students take the school bus. There are ten regular and three special needs school buses serving the elementary school currently. All other students either walk, bike, or get picked-up/dropped-off.

MES starts at 8:55AM and dismisses at 3:25PM. Traffic data showed 121 inbound/120 outbound AM peak hour vehicle trips (8-9AM) and 79 inbound/92 outbound PM peak hour vehicle trips (3-4PM).

During the morning drop-off period the maximum queue was 21 vehicles (approximately 525 feet). Of the maximum queue, six vehicles spilled back to Schoolhouse Drive along E. Green Street. The queue on E. Green Street lasted for a few minutes starting at 8:30AM.

During the afternoon, vehicles started to arrive for pick-up at 3:15PM. The maximum queue was 39 vehicles (approximately 980 feet). Of the maximum queue, 14 vehicles spilled back to Schoolhouse Drive along E. Green Street. The queue on E. Green Street lasted for twelve minutes from 3:26 PM to 3:38PM.

Middle School

Access to the middle school is provided on Schoolhouse Drive and via Martha Mason Street. Parent pickup/drop-off occurs at the school entrance via Martha Mason Street. School bus pickup/drop-off occurs at the one-way counter-clockwise loop on Schoolhouse Drive.

Currently, 66% of students take the school bus. There are 23 regular and three special needs school buses serving the middle school currently. All other students either walk, bike, or get picked-up/dropped-off.

MES starts at 7:55AM and dismisses at 3:00PM. Traffic data showed 328 inbound/262 outbound AM peak hour vehicle trips (7-8AM) and 82 inbound/138 outbound PM peak hour vehicle trips (2:45-3:45PM).

During the morning drop-off period the maximum queue was 46 vehicles (approximately 910 feet). The queue extended (approximately seven total vehicles) off-site onto Martha Mason and E. Green Street for approximately three minutes from 7:50-7:53AM.

During the afternoon, vehicles started to arrive for pick-up at 2PM. The maximum queue was 70² vehicles (approximately 1,410 feet). The queue began at the pick-up location on-site and spilled back to E. Green Street. The queue on E. Green Street lasted for 21 minutes from 2:45-3:06PM. Vehicles were also parked on the north side of E. Green Street and Woodmere Circle for pickup.

3 SCHEMATIC PLAN

A new site access system was developed to separate bus traffic from parent vehicles and to remove queuing/parking from Green Street. Elementary, middle, and high school vehicle traffic will all use a

² Including vehicles in the drop-off line and vehicles parked in spaces on E. Green Street.

consolidated access point from Schoolhouse Drive. All school buses will enter and leave the Campus from Martha Mason Street. The schematic plan is shown in **Figure 2**.

Future trip generation associated with the new school was projected based on existing school trip generation. The net increase in site trips was calculated using the growth in student enrollment.



Figure 2: Schematic Plan

Elementary School

After the new building is constructed, parent pick-up/drop-off for the elementary school will occur at the north end of the building. Vehicles will access the school via Schoolhouse Drive and queue in the parking lot as shown in **Figure 2**. The school bus zone is located on the east side of the new building. Buses will enter and leave the site from Martha Mason Street. Pedestrians will use the south school entrance.

The future queue is projected using the growth in student enrollment to be 47 vehicles during the afternoon pick-up period. The new site plan provides adequate capacity on-site to accommodate the projected queue.

Middle School

After the new building is constructed, parent pick-up/drop-off for the middle school will occur at the south end of the building. Vehicles will access the school via the new traffic circle on Schoolhouse Drive and queue in the parking lot as shown in **Figure 2**. The school bus zone is located on the east side of the new building and shared with the elementary school. Buses will enter the site from Martha Mason Street and leave via Schoolhouse Drive at the north end of the site. Pedestrians will use the south school entrance.

The future queue is projected using the growth in student enrollment to be 62 vehicles (approximately 1,540 feet). The new site plan provides adequate capacity on-site to accommodate the projected queue.

4 TRAFFIC ANALYSIS

The development is exempt from requiring a Traffic Impact Study as it generates less than 50 net peak hour trips. However, traffic analysis was conducted at campus access points where redistribution of traffic could have an impact on operations.

The following study intersections were analyzed.

- Schoolhouse Drive/East Green Street
- East Green Street/Martha Mason Street
- Schoolhouse Drive/new traffic circle

Turning movement vehicle counts, pedestrian counts, and bicycle counts were conducted at the study intersections from 7:00-10:00AM and 2:00-7:00PM on Thursday, September 28, 2023. Counts were used as the basis for traffic analysis and future traffic projections.

The AM peak hour is from 7:00-8:00AM, which overlaps with MMS/MHS traffic. MES morning traffic falls outside of this peak. The PM peak hour is from 2:15-3:15PM, which overlaps with all three schools.

Future traffic projections include the redistribution of elementary and middle school traffic to Schoolhouse Drive and the shift of ES, MS, and HS school buses to the new bus access at Martha Mason Street.

Intersection capacity analyses were conducted utilizing the Highway Capacity Manual (HCM) methodology. LOS is a measure of the average control (i.e., signal or stop sign) delay experienced per vehicle and is designated using letters "A" through "F" with LOS "A" representing the best operating conditions and LOS "F" representing the worst. The Frederick County APFO guidelines consider an intersection to be adequate if a LOS "D" is maintained.

Analysis results show all intersections operate under adequate conditions except for the Schoolhouse Drive/East Green Street intersection during the AM Future Conditions.

5 RECOMMENDATIONS

The redistribution of traffic associated with the new site plan is projected to result in failing conditions at the Green Street/Schoolhouse Drive intersection. The following intersection improvements are recommended to mitigate conditions:

- Widen Schoolhouse Drive between East Green Street and the new roundabout to provide two northbound lanes.
- Add new pavement markings on Schoolhouse Drive, north of Green Street, to provide a southbound right lane and southbound through-left lane. The existing wide lane generally functions as two lanes today, but without formal lane markings.
- Restripe Schoolhouse Drive, south of Green Street, to accommodate two northbound lanes instead of one northbound lane. The Schoolhouse Drive/Green Street intersection would consequently function with a northbound thru-left lane and a thru-right lane.
- Change the Schoolhouse Drive/East Green Street intersection from a two-way stop controlled at Green Street to an all-way stop³.

The suggested recommendations would improve future conditions at the Green Street/Schoolhouse Drive intersection from a LOS F to an acceptable LOS C.

6 CONCLUSIONS

A new access system was developed to support the new school location on site. In addition to supporting new school entrance locations, the new site plan offers the following transportation benefits: 1) separates school bus traffic from passenger vehicles, 2) consolidates all school access from Schoolhouse Drive and removes queuing (and potentially parking) from Green Street, and 3) eliminates the second Schoolhouse Drive curb cut (currently used for buses). All buses (including HS buses) will access the Campus via Martha Mason and all vehicles will access the Campus via Schoolhouse Drive

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- Add new pavement markings on Schoolhouse Drive, north of Green Street, to provide a southbound right lane and southbound through-left lane. The existing wide lane generally functions as two lanes today, but without formal lane markings.

³ As outlined in the Manual on Uniform Traffic Control Devices (MUTCD), *the decision to install multi-way stop control should be based on a separate engineering study. Relevant criteria to be considered prior to installing a multi-way stop control should include review of minimum volumes.*

- Restripe Schoolhouse Drive, south of Green Street, to accommodate two northbound lanes instead of one northbound lane. The Schoolhouse Drive/Green Street intersection would consequently function with a northbound thru-left lane, and a thru-right lane.
- Change the Schoolhouse Drive/East Green Street intersection from a two-way stop controlled at Green Street to an all-way stop.

The suggested recommendations would improve future conditions at the Green Street/Schoolhouse Drive intersection from a Level of Service (LOS) F to a LOS C.