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Safety and Operational Feasibility Review

MACS Proposed Middle School Site Plan

Town of Micanopy Florida

Prepared for:
Public Hearing Record (PHPB / Town Commission)

Hearing Date: Monday, March 9, 2026
Prepared by: James V. Blake III, P.E.
Date: 3/6/2026

Executive Summary

TrueNorth Engineering Consultants, LLC performed a safety-focused operational feasibility review of the proposed MACS middle school site plan. This review addresses whether the plan, as currently configured and supported in the public record, demonstrates safe and reliable operations under foreseeable real-world school conditions (arrival, dismissal, and special events).

Primary Opinion (Safety/Feasibility): Based on the constrained footprint and the operational characteristics of school pick-up/drop-off traffic, the record does not clearly demonstrate that the site can reliably store and process peak queues within the property limits without spillback onto Seminary Avenue and potential propagation toward CR 234. Once queues encroach onto public roadways in a rural context with limited shoulder, conditions can shift from normal traffic flow to a roadway hazard (stopped/slow vehicles, unsafe passing/merging behavior, shoulder tracking and edge drop-off formation, reduced emergency response reliability, and increased pedestrian conflict potential).

Why generalized roadway "capacity/LOS" tables do not resolve this: Segment volume/capacity comparisons address whether a road can theoretically carry additional vehicles in motion. They do not evaluate the governing mechanism for school safety impacts: driveway bottleneck and on-site stacking capacity. A roadway can have remaining theoretical volume capacity and still become unsafe if the driveway/queueing system fails and the queue enters the roadway.

Path Forward: Given the constrained site geometry, preventing spillback may require extraordinary daily operational controls (assigned time slots, off-site staging/holding areas, managed release, continuous on-site traffic control). In practice, the level of daily coordination and compliance needed to make those controls effective—every school day, across normal human variability—is difficult to rely upon as the primary safety mechanism. The appropriate next step is to evaluate whether the site can function safely **without** reliance on extraordinary controls by providing standard operational exhibits:

1. peak AM/PM queue (stacking) analysis (vehicles and feet) tied to stated maximum enrollment and realistic peak-window assumptions
2. emergency/service vehicle turning and access exhibits under typical occupied parking and peak congestion conditions. If those exhibits demonstrate on-site queue containment and reliable emergency/service access, the circulation safety concerns can be considered addressed; if they do not, the configuration would require redesign and/or additional physical provisions.

Most importantly, if queues cannot be demonstrated to remain on-site, the risk is not limited to inconvenience. Off-site queue propagation toward CR 234 can create a stopped/slow-moving condition on a higher-speed rural corridor. Where horizontal curves and approach geometry constrain sight distance, the presence of a queue can reduce available reaction and stopping distance—an issue that becomes more pronounced during

low light and inclement weather. This is why the governing question is queue containment on-site, not segment capacity.

Purpose and Scope

The purpose of this report is to provide a safety-centered constructability and operational feasibility review of the proposed school site plan, focusing on:

- On-site stacking/queueing feasibility for arrival and dismissal operations
- Potential spillback impacts to Seminary Avenue and CR 234
- Emergency response access reliability during peak congestion and typical occupied parking conditions
- Service/refuse vehicle access feasibility and conflicts with circulation
- Rural roadway edge/shoulder behavior and predictable degradation mechanisms when queues extend onto public roadways
- Special-event conditions (open house, STEM nights, performances) where demand may exceed day-to-day operations.

This report does **not** constitute a stamped traffic impact study or legal opinion. It is a professional engineering assessment of foreseeable operational safety failure modes based on the record reviewed.

Qualifications Summary

The undersigned's opinions are informed by more than 12 years of roadway/bridge construction administration, constructability review, and real-world field operations under constrained site conditions, including:

- **Louisiana Department of Transportation and Development (LADOTD) – Project Engineer:** Oversaw two construction offices (28 staff) in north-central Louisiana administering roadway and bridge construction projects (largest single project approximately $48M). Responsibilities included FHWA and state compliance, constructability and bidability review, and field resolution of issues under variable site conditions. Work also included evaluation and troubleshooting of roadway performance concerns (including asphalt distress mechanisms), coordination with maintenance forces, and practical identification of contributing causes when existing roadway sections exhibited premature or atypical failures.
- **Florida Department of Transportation (FDOT), District 3 – District Geotechnical Engineer:** Responsible for geotechnical elements supporting both **design and construction** across district projects, including review and oversight of subsurface exploration programs, foundation design support (deep foundations including drilled shafts and driven piles), geotechnical reporting and recommendations, and construction-phase troubleshooting where field conditions diverged from design assumptions. Oversaw geotechnical quality/verification testing programs and

coordinated resolution paths that balanced safety, constructability, and schedule impacts.

- **Anderson Columbia Co., Inc. – Structures Manager (Bridge Division):** Heavy civil construction leadership role focused on bridge/structures delivery, including deep foundation construction (drilled shafts and driven piles), constructability planning, means-and-methods coordination, and field problem-solving to achieve safe, economical, and durable solutions when conditions and constraints require practical engineering judgment beyond "paper checks."
- **Forensic / Construction Defect Engineering:** Experience evaluating cause and origin and/or contributing factors for building-related losses and defects, including wind/hail/hurricane impacts, water intrusion and interior damage, plumbing-related failures, and construction defect conditions. Work emphasizes documentation, technical clarity for non-technical audiences, and practical identification of failure mechanisms consistent with observed conditions.

Documents Reviewed

- Proposed MACS site plan sheets and enlargements provided in the public record.
- Town meeting packet materials addressing the application and traffic/circulation discussions.
- Town of Micanopy Land Development Code (LDC) – Site Plan Review Standards (Article 10).
- Town of Micanopy Comprehensive Plan – school vicinity traffic circulation policy.
- Town of Micanopy Code of Ordinances – provisions related to obstruction of public streets/grounds.
- Photos/observations of existing MACS operations

Review Framework and Applicable Standards

Town LDC – Site Plan Review Standards

The Town's site plan review standards require findings that the plan will:

- enhance and protect public health, safety, and welfare (LDC §10.02.08(A))
- assure safe ingress/egress and internal circulation, including access for service and emergency vehicles (LDC §10.02.08(C))
- provide safe and reasonable circulation for garbage trucks and public safety vehicles (LDC §10.02.08(F)).

Comprehensive Plan – School Vicinity Traffic Circulation

The Town's Comprehensive Plan explicitly calls out "traffic circulation in the vicinity of schools," including provision of off-site signalization, signage, access improvements, sidewalks, and bus stops/turnarounds (Comp Plan Policy 1.1.4(5)).

This supports evaluating not only abstract roadway capacity, but off-site circulation impacts caused by school operations during peak periods.

Quasi-Judicial Burden of Proof
This application is being considered under the Town's quasi-judicial process. Under the LDC, the applicant bears the burden of proving by a preponderance of the evidence that the proposal satisfies applicable requirements and standards (LDC §10.10.02).

Accordingly, operational safety claims should be supported by standard exhibits demonstrating performance under peak conditions.

Off-Site Obstruction Considerations (Code of Ordinances)
The Town's Code of Ordinances prohibits placing or maintaining obstructions over or upon streets, sidewalks, or public grounds without written consent (Code of Ordinances Sec. 30-76).

While this report does not assume unlawful conduct, predictable spillback and roadside staging should be evaluated as an off-site operational risk because it can functionally obstruct roadway space during peak periods.

Safety Analysis Approach

School arrival/dismissal traffic is characterized by short-duration surges ("bursty" demand) that form queues governed by:

- **Arrival rate**: vehicles arriving during the concentrated peak window
- **Service/discharge rate**: how quickly vehicles can move through the loading area and exit
- **On-site storage**: how many vehicles can queue internally before the queue reaches the public roadway.

A roadway segment can have remaining theoretical capacity and still become unsafe if the on-site system cannot store the queue and the queue enters the roadway.

Relatable analogy: The main road may have room, but if the exit ramp and toll booth cannot process vehicles fast enough, the line backs up onto the main road anyway. The bottleneck governs.

Findings

Site footprint and circulation geometry elevate queue spillback risk

School pick-up/drop-off operations are operationally similar to a high-volume "drive-through" with higher stakes. A safe design should tolerate typical variability (early/late arrivals, weather, brief stoppages, noncompliance) without failing into the public roadway.

> **Finding:** Based on the constrained site footprint and the layout shown, the governing failure mode is queue growth that exceeds on-site storage and backs into Seminary Avenue.

Roadway capacity/LOS tables do not address the bottleneck mechanism
Capacity/LOS tables do not establish that peak school queues are contained on-site, nor do they demonstrate driveway operations, internal circulation reliability, or emergency/service access performance.

> **Finding:** Without a queue/stacking analysis tied to stated operating assumptions, the record does not clearly demonstrate safe ingress/egress and internal circulation under peak conditions as required (LDC §10.02.08(C)).
>
> This is consistent with the Comprehensive Plan's recognition that school circulation can require off-site measures and should be evaluated as a school-vicinity circulation issue, not merely a segment capacity question (Comp Plan Policy 1.1.4(5)).

CR 234 approach conditions increase consequences if congestion propagates off-site
CR 234 functions as a higher-speed rural corridor in proximity to I-75. If congestion propagates from Seminary to CR 234, the operating condition can shift from normal flow to stopped/slow queues and passing/merging conflicts where drivers may not expect a stopped line.

Where horizontal curves and approach geometry constrain sight distance, the safety mechanism is straightforward: approaching drivers may not have sufficient time/distance to perceive and stop for a queue. Risk increases during low light and inclement weather due to increased stopping distance and reduced perception.

> **Finding:** The current record does not clearly demonstrate that peak school queues will remain fully contained on-site such that queue propagation toward CR 234—and associated curve/approach stopping risk—can be reasonably excluded.

Rural roadway context increases safety hazards and predictable edge deterioration
Where paved shoulders are limited, overflow queues commonly result in vehicles staging partially off the travel lane (grass/edge-of-pavement) to allow passing. That behavior predictably causes:

- stopped/slow vehicles in unexpected locations
- unsafe passing and merging behavior
- progressive shoulder rutting and pavement edge drop-off formation

- reduced safety for the traveling public and pedestrians (including students) during loading/unloading and roadside movements

Finding: If spillback occurs, both immediate safety hazards and progressive roadway edge distress are foreseeable outcomes.

Emergency response access must be reliable during peak congestion and typical occupied parking

Emergency access needs to work when congestion is highest and parking is occupied, not only under empty-lot conditions.

Finding: The record should include an emergency vehicle turning/access exhibit demonstrating a clear route and staging capability under realistic occupied conditions. Without that, reliability is not clearly demonstrated (LDC §10.02.08(C)).

Service/refuse vehicle operations are explicitly part of the Town's circulation criteria

Refuse/service operations are not incidental; they are foreseeable and recurring. If the site requires extensive backing or multi-point turns in constrained areas, conflicts increase.

Finding: The record should include a refuse/service vehicle maneuvering exhibit demonstrating safe servicing and exit consistent with Town criteria (LDC §10.02.08(F)).

Accessibility note

Accessible parking, accessible passenger loading, and accessible route continuity can influence pedestrian conflict points and circulation behavior. This report does not constitute an ADA compliance review; however, accessibility should be considered as part of overall circulation safety where pedestrian routes interface with vehicle queues and drop-off areas.

Special events represent a predictable, higher-demand scenario

Special events (open house, STEM nights, performances, parent meetings) can exceed normal operations and extend over longer durations. If parking demand cannot be met on-site, roadside parking and circulation conflicts often result.

Finding: A special-event parking/traffic scenario should be addressed as part of operational feasibility because it can create prolonged and unpredictable roadway obstruction if unmanaged.

Professional Opinions

Within a reasonable degree of engineering judgment and based on the record reviewed:

1. The proposed configuration is not clearly demonstrated to reliably contain peak school queues within the site footprint without spillback onto Seminary Avenue and potential propagation toward CR 234.
2. The record does not presently contain sufficient operational exhibits (queue/stacking analysis; emergency/service and refuse/service access exhibits under realistic occupied conditions) to establish safe peak operations consistent with Town standards (LDC §10.02.08(A), (C), and (F)).
3. If spillback occurs, the rural roadway context increases the likelihood of roadway edge loading, shoulder tracking, and hazardous stopped/slow conditions inconsistent with predictable roadway operation—especially if congestion propagates toward higher-speed facilities such as CR 234.
4. Avoiding spillback solely by behavioral controls would require an unusual level of daily coordination and compliance (assigned time slots, off-site staging, managed release). Such measures may be described in theory but are difficult to rely upon as the primary safety mechanism in routine school operations.

Operational Feasibility and Next Steps

Based on the constrained site footprint and typical school operating patterns, preventing spillback may require extraordinary daily controls (assigned time slots, off-site staging/holding areas, managed release, continuous on-site traffic supervision). In practice, the level of daily coordination and compliance required to make those controls effective—every day, across normal human variability—is not typically practical to rely upon as the primary safety mechanism.

Therefore, the appropriate next step is to require the applicant to demonstrate—through standard operational exhibits—whether the site can function safely without reliance on extraordinary daily controls. At a minimum, this should include:

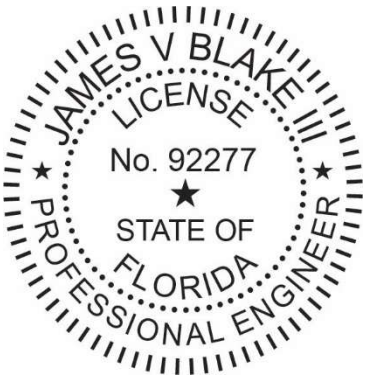
1. **Queue/stacking analysis (AM and PM):** using stated maximum enrollment and reasonable peak-window assumptions; provide queue length (vehicles/feet) and confirm maximum anticipated queue is fully contained on-site.
2. **Emergency and service vehicle access exhibits:** turning and staging routes for fire/EMS and refuse/service vehicles under typical occupied parking and peak congestion conditions.
3. **Operations basis:** a clear operating plan (bell times, drop-off/pick-up procedures, and special-event management) used consistently across the above exhibits.

If these exhibits confirm on-site queue containment and reliable emergency/service access, the circulation safety concerns can be considered addressed. If they do not, the configuration would require redesign and/or additional physical provisions to achieve safe operations, rather than reliance on behavioral controls.

Closing

This report is offered to assist the Town in evaluating circulation safety and operational feasibility based on foreseeable, real-world operating conditions. The governing concern is the predictable behavior of peak school queues and their interaction with a constrained site footprint and rural road environment. As currently supported in the record, the plan is not clearly demonstrated to function safely without reliance on extraordinary operational measures.

Sincerely,
TrueNorth Engineering Consultants, LLC
James V. Blake III, P.E.
Principal Engineer



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This item has been digitally signed and sealed by James V Blake III, P.E. on March 6, 2026.

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