
MEMORANDUM

To: City of Adair Village, Oregon

From: Scott Ferguson, PE; Ferguson & Associates, Inc.

Date: June 10, 2026

Subject: Review of the TIS for Santiam Christian Elementary School (C&A Project Number 20240201.00)

INTRODUCTION

As requested, we have reviewed the TIS prepared for an expansion of Santiam Christian Schools (January 26, 2026; revised April 15, 2026.)

The proposed project is a 47,496 square foot elementary school (Drawing LU100) that is projected to serve 350 elementary students in the 2029/2030 school year (Table 1 of the TIS). The new building would contain 18 new classrooms, with supporting facilities. One smaller building will be demolished.

The TIS includes useful traffic counts, HCM analyses, and sight distance evaluations; however, several important operational and policy issues remain insufficiently addressed.

EXECUTIVE SUMMARY

Ferguson & Associates, Inc. reviewed the Traffic Impact Study (TIS) prepared for the proposed Santiam Christian Elementary School expansion in Adair Village, Oregon. The proposed project includes construction of a 47,496-square-foot elementary school anticipated to serve approximately 350 elementary students.

Based on our review, the TIS does not provide sufficient information or analysis to adequately evaluate the transportation impacts of the proposed development or demonstrate compliance with applicable provisions of the Adair Village Development Code and Transportation System Plan (TSP). Substantial revisions and additional analysis are needed before the application can be fully evaluated.

The principal concerns identified in this review include:

- The TIS identifies significant congestion and operational problems at the Birch Lane/Arnold Avenue intersection but does not adequately address these impacts or identify mitigation measures.
- The TIS does not adequately evaluate on-site circulation and queuing associated with elementary school pick-up and drop-off operations. Preliminary

- analysis indicates that substantial vehicle queues may occur, potentially affecting internal circulation, adjacent streets, and nearby intersections.
- The TIS does not adequately address the status of Birch Lane, Marcus Harris Avenue, and Vandenberg Avenue as streets identified in the Transportation System Plan. The study does not evaluate future right-of-way needs, roadway classifications, frontage improvements, or impacts to planned transportation facilities or impingement of the proposed school and parking areas on these streets.
 - The study horizon and trip-generation assumptions appear to rely on short-term enrollment projections rather than long-term design capacity, potentially understating future traffic impacts.
 - The TIS does not provide clear supporting documentation, such as traffic assignment information, or a easily traceable analysis to allow independent verification of forecasts and conclusions.
 - Portions of the analysis, including the queueing analysis presented in Table 7, appear inconsistent with the Highway Capacity Manual (HCM) calculations provided in the appendix and require additional explanation and documentation.

Additional work is recommended to address site circulation, queueing, off-site impacts, pedestrian and bicycle connectivity, TSP compliance, roadway dedication requirements, and potential mitigation measures. Until these issues are addressed, the TIS does not provide a sufficient basis to conclude that the proposed development complies with applicable transportation-related approval criteria.

APPROACH TO THE REVIEW

The TIS review followed this approach:

1. The TIS was reviewed in terms of standard engineering practice, consistency, reasonableness of assumptions, etc.
2. Approval criteria as per the Development Code was reviewed (which by reference also includes the Transportation System Plan – TSP).
3. The TIS was evaluated in terms of whether it meets code requirements.
4. This memorandum was prepared which summarizes findings.

DOCUMENTS CONSIDERED IN THE REVIEW AND FINDINGS

The January 26, 2026, Traffic Impact Study (TIS) and subsequent update of April 15, 2026, for the Santiam Christian Elementary School was reviewed with respect to compliance with policy documents. The policy documents used in the review were:

1. The Adair Village Development Code; and,
2. The 2019 Transportation System Plan (TSP) for Adair Village.

1. DEVELOPMENT CODE

Section 2.140(19) of the Development Code states that for a site plan application:

"The estimated number of generated trips per day from each mode of travel by type: employees, customers, shipping, receiving, etc. A Traffic Assessment and possibly a Traffic Impact Study may be required if warranted by the traffic impact."

Finding: A 47,496 square foot elementary school is a significant development which would generate a notable amount of traffic. It was concluded that a full Traffic Impact Study (TIS) is warranted. The code is not specific on the requirements of the study. The presumption is that the study should address all potential impacts as guided and scoped by the City and its consultants.

Various additional elements of the code depend upon a TIS for the evaluation. These include:

Section 2.400(2) of the Development Code indicates that decision criteria for a Site Plan Review Application shall be based on a number of decision criteria. These include:

"(c) That traffic congestion is avoided, pedestrian and vehicular safety are protected, and future street rights-of-way are protected."

Finding: The TIS does not meet this decision criterion:

1. The TIS identified LOS F operations at Birch Lane in the appendix to the report but did not highlight this in the text and did not propose mitigation to alleviate forecast congestion. The TIS does not demonstrate that traffic congestion would be adequately addressed.
2. The TIS failed to evaluate queues at the drop-off/pickup location at the new elementary school. The TIS is incomplete in this regard. The adequacy of the proposed design to safely accommodate a school with 350-plus students during pickup operations has not been demonstrated.
3. There are a number of streets designated in the TSP as either minor collector or local streets that run through the school property. These have not been identified in the TIS as such. Without action to dedicate ROW, future street rights-of-way will not be preserved. It is also of concern that a local street is being used for parking lot circulation.

Section 4.141(4) of the Development Code applies to Educational Facilities Zones. It includes the following relevant development standards:

"(e) Access shall be designed to cause minimum interference with traffic movement on abutting streets. Where necessary, additional right-of-way shall be dedicated to maintaining adequate traffic circulation."

Finding: There are a number of streets designated as higher order or local streets in the TSP that abut or run through the school's property. The proposed school will impact these. The extent of impacts has not been fully analyzed. Potential mitigation measures and resulting impacts have not been adequately addressed in the TIS.

Section 5.120(1) of the Development Code applies to parking areas. Design criteria include:

"(g) Service driveways to off-street parking areas shall be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety of pedestrian and vehicular traffic on the site. The number and location of service driveways shall be approved by the City and limited to the minimum that will allow the property to accommodate and service the traffic anticipated."

Finding: The TIS did not provide sufficient analysis to evaluate the above criterion. Of concern is queued vehicles in the parking lots.

Beyond operational concerns, the TIS also does not adequately address consistency with the Transportation System Plan.

2. TRANSPORTATION SYSTEM PLAN (TSP)

The development code requires that all proposed developments comply with the Transportation System Plan (Section 1.140(3)) as well as other state law governing land development and local infrastructure standards. Relevant sections of the TSP include:

- Figure 4 -- The Street Functional Classification plan:
 - Arnold Avenue and Vandenberg Avenue are classified as Minor Collector streets.
 - Vandenberg Avenue is shown to connect from OR 99W to Arnold Avenue as a collector street, forming a 4-legged intersection with Birch Lane. It runs through the site.
 - Birch Lane is classified as a local street. It runs through the site.
 - Marcus Harris Avenue is classified as a Local Street. It runs through school property.
- Table 7 and Figures 5 to 12 -- show the typical cross-section standards.
 - Standards for bike lanes, sidewalks, ROW, etc.
- Table 10 and Figure 13 -- show transportation projects.

Finding: The TIS incorrectly identified Birch Lane and Marcus Harris Avenue as private streets; whereas in the TSP, they are designated as local streets. The TIS did not address deficiencies in these streets or the fact that ROW should be

dedicated according to the code and brought up to the TSP standard. Current ownership/status does not override planned functional classification.

The TIS did not address the TSP typical cross-section widths and elements, nor did it identify deficiencies on property frontage needed to bring streets up to standards, including ROW dedications and project side frontage improvements. This information is necessary to evaluate the application. The TIS did not consider the need for dedication for the local streets or the fronting minor collector streets. The TIS identified several projects in the TSP, but it did not show where they would be located, how they would impact the school, nor did the TIS evaluate the impact of the proposed project in relation to these TSP projects. The TIS should be updated to address these deficiencies so it can be evaluated properly. Finally, the TIS did not evaluate pedestrian access to nearby parks.

TIS REFINEMENTS AND UPDATES

The following section provides a detailed review of the TIS and outlines the analysis needed in an updated TIS to meet local codes and standards as well as to conform to standard traffic engineering practice. The following is organized following the same numbering system used in the TIS.

1. Property Description and proposed Development:
 - a. The property description should include a more complete summary of the property and the proposed project, as this information is useful to understand the study. Include the map and tax lots, site location, the size of the proposed building, the number of students served, the size of existing buildings, the size of the classroom building that is going to be demolished, resulting in student capacity (not just the short-term forecast). The building being demolished is very small in comparison to the new building. With the opportunity for redistributing classroom space in remaining buildings, one is left with the impression that the design capacity may be meaningfully greater than the year 2029/2030 student forecast.
2. Study Parameters:
 - a. A section called study parameters would typically include items such as, the study horizon year, growth rates, the study area intersections, and any assumptions regarding the analysis.
 - b. The comments provided by the City, as listed in this section, have not been addressed in full. These should all be addressed in an updated study.

3. Adair Village Transportation System Plan (TSP)

- a. Show the location of TSP projects impacting the school (funded and unfunded)
- b. Show the location of TSP streets in the study area, local and collector.
- c. Show the location of planned TSP streets passing through school property.
- d. ROW Dedication and Improvements. The TIS should evaluate consistency with the Transportation System Plan (TSP), including frontage obligations, future right-of-way preservation, and the potential impact of the proposed development on planned transportation facilities. The following items should be addressed:
 - i. Marcus Harris Road – Dedicate a 55-foot ROW and provide frontage improvements consistent with the TSP or the City's Standards and Specifications.
 - ii. Vandenberg Avenue -- Dedicate a 66-foot ROW throughout the school property. Provide proportionate frontage improvements consistent with collector street standards. The ROW should be preserved through to Arnold Avenue as per the TSP (now labeled as 5th Street on Google Earth).
 - iii. Ebany Lane and Santiam Lane – Dedicate ROW and provide frontage improvements consistent with the TSP or consider removal from the TSP.
 - iv. Address block length requirements to determine how these requirements can be best met, including a possible public street connection between Birch Lane and Vandenberg Avenue via 4th Street.
 - v. The future alignment of Marcus Harris Avenue Extension is located inside the urban growth boundary on the property line of the school property. It would be appropriate to dedicate a 66-foot ROW for a future minor collector street for the full length on school owned property between Vandenberg Avenue and Ryals Avenue. Dedication would prevent the preclusion of school development from infringing on these minor collector streets as shown in the TSP.
 - vi. The proposed building and parking area appears to be located on the future ROW of Vandenberg Avenue, which is shown as a Minor Collector in the TSP.

- vii. Finally, it would be rational to connect Birch Lane to Vandenberg Avenue via 4th Street, so a dead end is not created on Birch Lane.

4. Existing Conditions

- a. The original study included diagrams showing bus and vehicle traffic. These were useful and should be included to support the discussion.
- b. Correct and update Table 2.
 - i. The functional classification of Marcus Harris Avenue is a local street in the TSP and the extension to the south is identified as a minor collector;
 - ii. Birch Lane is classified as a local street in the TSP.
 - iii. Show the statutory speed instead of not posted. (Suggestion)
 - iv. Correct the on-street parking column, as some of these streets do allow on-street parking.
 - v. Address the limits of bike lanes and sidewalks on Arnold Avenue.
- c. Safety Analysis
 - i. Provide crash rate calculations.
 - ii. Provide 90th percentile crash rates for each type of intersection.
 - iii. Assess the safety of the off-set intersections on Arnold Avenue near the entrance.
 - iv. Expand the safety assessment into the future.
 - 1. Evaluate the safety of configuration of Birch Lane considering the future traffic flows. Recommend any changes to geometry, number of approach lanes, or stop control. Will pedestrians or bicyclists be impacted?
 - 2. Evaluate the pedestrian connections to and through the site, including connections between parking areas, sports facilities, nearby parks, etc. Identify any deficiencies and appropriate mitigation.
 - 3. Evaluate bicycle access and bicycle parking.
- d. Traffic counts
 - i. Traffic volumes are not balanced in the afternoon peak hour between closely spaced intersections on Arnold Avenue.

5. Site Development

- a. The forecast for the campus and the forecast for the elementary school should both be addressed.
- b. Table 3 shows the student forecast for the 2029/2030 school year. The traffic forecast, however, should be based on design capacity. What is the design capacity of the elementary school? What is the design

capacity of the campus after construction of the elementary school, removal of one small classroom building, and re-configuration of classrooms in existing buildings?

c. Trip Generation

- i. Develop a vehicle-trip forecast based on the design capacity, not a short-term enrollment forecast.
- ii. Show the trip generation forecast for the elementary school as a whole, not just the incremental increase campus wide.
- iii. The closest match for a trip rate when for looking at the elementary school impacts at site access and pickup/drop-off areas would be the K-8 trip rates, as the high school students would not be using this area and high school trip rates tend to be lower as students who arrive at the school and park at school generate one trip in the morning (inbound); whereas an elementary or middle school child being dropped off generates two trips (inbound and outbound) when dropped in the morning.
- iv. If local trip data is going to be used, follow ITE procedures from the Trip Generation Handbook. The initial analysis, however, suggests that the local rate is not materially different from the ITE rate. It is reasonable to continue using ITE trip rates. Also, the "local data" trip generation forecast is based on traffic counts of in/out traffic at three intersections, but it excludes traffic to and from the school which may have used Vandenberg Avenue. If the forecast is to be used directly or dismissed or incorporated into the dataset, both data collection and data analysis procedures should follow those outlined in the ITE Trip Generation Handbook. What was presented shows that the trip generation of the school is higher than the ITE rates for a K-12 private school.
- v. Update Table 4 and the supporting text.

6. Site Circulation

- a. This section should include an actual evaluation of site circulation, focusing on afternoon pickups.
 - i. Provide a queue analysis of drop-off and pickup operations, including queue lengths and problems that might cause, including conflicts with parked vehicles, internal circulation, and internal intersections (such as access points to the high school parking lot);
 - ii. How long will queues be?

- iii. What is the capacity of the pickup area? (4 to 5 vehicles?)
- iv. Will parking be available for parents to park and walk over to pick up children? Is that walk safe and well designed?
- v. Is there sufficient room for 350-plus students to stand in the waiting area?
- vi. Will queues in the drive aisles interfere with parking lot circulation, backing vehicles, or other driveways?
- vii. Is there a need for a separate queuing lane?
- viii. Is there a need to utilize Vandenberg Avenue to accommodate the pick-up of 350-plus students?
- ix. Will the queues interfere with access and egress from other parking areas or from other driveways on Birch Lane?
- x. Overall, this appears to be a significant operational impact that warrants additional analysis and development of potential mitigation measures. To illustrate the need for a detailed queueing analysis, application of ITE trip generation rates for a K-8 private school during the after-school peak period results in approximately 99 inbound vehicle trips (based on 350 students). Because many parents arrive before school release, a substantial vehicle queue could develop during pickup operations. Assuming 25 feet of storage per vehicle, 99 vehicles would equate to approximately 2,475 feet of potential queue storage demand as an upper bound. Even assuming that approximately half of these vehicles could be accommodated within the 70-space parking lot, the remaining queue could still approach 1,225 feet, potentially extending through the Birch Lane/Arnold Avenue intersection. While this is a screening-level estimate rather than a detailed operational analysis, it demonstrates the potential for substantial queueing and circulation impacts that should be evaluated in the TIS.
- xi. Since parents will likely be parking in the parking lot, a clear and safe path should be developed, including internal sidewalks to the parking lot, for the safety of children.
- xii. Development of potential mitigation to provide space for vehicles to queue. This could include wider aisles to allow for a queuing lane, separating of parking from queuing space, alternative routing schemes, etc. This is both a question of safety and smooth operations, both of which benefit the school and the community.

- b. Arnold Avenue
 - i. Safety and operations could be improved by consolidating intersections on Arnold Street. Realign Marcus Harris Avenue to intersect with Laurel Drive and take access to the parking lot off Marcus Harris Avenue. This would also help meet access spacing standards.
- c. Pedestrian Circulation should be evaluated:
 - i. Document walking routes and facilities for students walking to the campus from the nearby neighborhood and parks. Identify deficiencies.
 - ii. Document proposed walking routes and facilities with the modified campus. Evaluate the connectivity and safety of the routes, including parking lot conflicts, missing connectivity, connections to sports fields, parks, etc.
- d. Trip Distribution and Traffic Assignment
 - i. Figures 2 and 3 do not show traffic distributions (percentages) and assignments, as stated.
 - ii. Provide figures showing reassignments of existing traffic.
 - iii. Provide a figure showing the assignment of elementary school trips.
 - iv. Clarify what peaks are being studied: after school peak or the p.m. commuter peak. (In text and figures)
 - v. Extend the assignments to the OR 99W to determine if it is reasonable to exclude these off-site intersections.

7. Intersection Analysis

- a. Provide a justification for a 3-year horizon. It will take longer to reach design capacity.
- b. Provide a justification for not including other intersections forecast to operate at unacceptable levels in the TSP, including intersections on OR 99W. (Or provide an assessment if justified by added traffic. How much traffic will be added to these intersections?)
- c. In Table 6, show other performance measures other than volume-capacity ratios including delay, level of service, queues, etc. These are needed to address code requirements. On-site congestion may materially affect circulation, access, and safety – and the code speaks to congestion, not volume-capacity ratios. Level of Service F represents substantial delay and congestion for vehicles accessing the site.
- d. The results in Table 7 are suspect. The queue lengths reported in Table 7 differ substantially from the HCM 95th-percentile queues reported in

the appendix. For example, a queue of 20 vehicles (HCM calculations) would typically equate to approximately 500 feet of storage, assuming 25 feet per vehicle, which is materially different from the 275-foot queue reported in Table 7. Simulations are difficult to calibrate and subject to fluctuation depending on input assumptions. Of particular concern is the intersection of Birch Lane and Arnold Avenue, where demand is forecast to exceed available capacity by 39 percent. If a simulation model is going to be used to forecast queue length, document the calibration (with field data) and document assumptions or rely on the HCM queuing analysis, as was provided in the appendix.

- e. The TIS identified substantial congestion problems but stated that they did not apply since they were on a road that is currently identified as a private street. This interpretation does not appear consistent with the intent of the code, as outlined above. The impact should be addressed.
- f. Off-site impacts
 - i. What is the impact on the intersection on OR 99W? These are forecast to fail in the future.
 - ii. What is the impact on Arnold Avenue/Ryals Avenue
 - iii. If the volume is small, say under 25 vehicles per hour, these may be written off. Please provide the distribution so that this determination can be made.

8. Sight Distance

- a. The sight distance evaluation is reasonable at the intersections studied. No mitigation is needed.

9. Site Access

- a. The TIS report concludes that standards are met, despite showing at worst case a queue of 20 vehicles, Level of Service F, etc. Also, Birch Lane is shown in the TSP as a local street, not a private street. This incongruity should be addressed. Some sort of mitigation would be needed at the intersection of Birch Lane and Arnold Avenue to address code requirements.
- b. The TIS did not address queuing at pickup or its impact on the local street system. This should be addressed.
- c. Will traffic be allowed to use Vandenberg Avenue to access the school? With forecast congestion, even if this is not the initial intention, congestion will create pressure to use Vandenberg Avenue. A plan that involved the use of Vandenberg Avenue may be a reasonable mitigation; however, Vandenberg Avenue is not addressed in the study.

The study should be updated to evaluate whether use of Vandenberg Avenue may be necessary to accommodate elementary school traffic or mitigate congestion impacts at Birch Lane and Arnold Avenue.

10. Additional Completeness Related Items.

- a. The bell schedule should indicate whether Wednesday chapel impacts school times. If so, how does this impact the Wednesday traffic counts?
- b. How will growth in the afterschool program impact traffic?
- c. Special Events and After-Hours Traffic Analysis
 - i. We concur that the street system should not be designed for peak events.
 - ii. A traffic management plan may be used to accommodate traffic for peak events. This would be good to develop but is not typically a requirement of a TIS.
- d. Fire and Emergency Coordination.
 - i. Regarding the question of the Adair Fire Station, there is not sufficient analysis to conclude that the proposed elementary school expansion would have no impact on emergency access and circulation near the station. The TIS assumes that elementary school traffic will primarily use Birch Lane; however, there is no mechanism identified to ensure that this routing assumption will occur. If congestion develops on Birch Lane, there may be pressure for traffic to utilize Vandenberg Avenue and Marcus Harris Avenue for access.
 - ii. If emergency access or circulation near the fire station is identified as a concern by the Fire District or the City, additional evaluation of potential traffic interactions, queueing, and access routing in the vicinity of the station may be warranted.

11. Summary

- a. The conclusions need to be rewritten based on an updated traffic assessment.

12. Figures

- a. There are errors in Figure 1.
 - i. Vandenberg Avenue is mislabeled as Division Street
 - ii. The streets shown as private streets in the figure are Local Streets in the TSP Functional Classification map.
 - iii. Vandenberg Avenue is shown as a Minor Collector between OR 99W and Arnold Avenue for its entire length, not with portions identified as private/local streets.

- iv. The TSP also shows a future extension of Marcus Harris Avenue to the south. This should be shown in Figure 1.
- v. In general, the current ownership of a street is not its functional classification.
- b. Figures 2 & 3 are not referred to in the text as traffic forecasts. They are referenced as distribution and assignment figures, which they are not.
- c. Figure 3 should clarify whether it is the afternoon school peak or the p.m. commuter peak.
- d. There should be a figure for both the afternoon peak of the school and the p.m. peak hour of commuters, when overall traffic is typically the highest.
- e. The figures showing proposed circulation for cars and buses, as included in the first version of the TIS, should be included for clarity as to the plan for pick-up and drop-off.
- f. Again, there should also be distribution and assignment figures.

SUMMARY OF KEY FINDINGS

The review identified several significant deficiencies in the TIS that should be addressed before the application can be fully evaluated:

1. The TIS identifies substantial congestion and operational concerns at the Birch Lane/Arnold Avenue intersection but does not adequately evaluate mitigation measures or demonstrate compliance with applicable code criteria.
2. The TIS does not adequately evaluate elementary school pickup and drop-off operations, including queueing, internal circulation, pedestrian safety, and potential spillback onto Birch Lane and Arnold Avenue.
3. The TIS does not provide sufficiently clear and traceable documentation of trip generation, traffic assignment, redistribution assumptions, or queueing analysis to allow independent verification of results.
4. The study horizon and enrollment assumptions appear to rely on short-term projections rather than long-term design capacity, potentially understating future traffic impacts.
5. The TIS does not adequately address consistency with the Transportation System Plan, including future right-of-way preservation, frontage improvements, and impacts to planned transportation facilities crossing or fronting the site.
6. Portions of the queueing analysis appear inconsistent with the HCM calculations provided in the appendix and require additional explanation, documentation, and calibration support.
7. Additional analysis appears warranted regarding off-site impacts, pedestrian circulation, bicycle access, emergency access, and the potential need for alternative access or circulation modifications.

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Please feel free to contact us if you have any questions or comments on this memorandum.

Very truly yours,
FERGUSON & ASSOCIATES, INC.

Scott Ferguson, PE

