

Traffic Impact Study

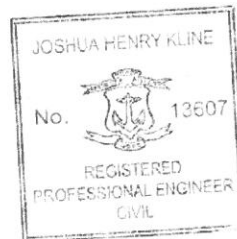
Proposed Multi-Use Development
0, 82, 88 Eddie Dowling Highway
Town of North Smithfield,
Providence County, Rhode Island

Prepared for:
Alrig USA Developments

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INTRODUCTION

This Traffic Impact Study was prepared to investigate the potential impacts of the proposed multi-use development on the adjacent roadway network. The subject property is located along the easterly side of Eddie Dowling Highway (Route 146A) in the Town of North Smithfield, Providence County, Rhode Island. The site location is shown on appended **Figure 1**.

The subject property is designated as Map 21-A, Lots 23, 24, and 49 as depicted by the Town of North Smithfield Tax Map. The site has approximately 453 feet of frontage along Eddie Dowling Highway. The existing site is occupied by two (2) vacant residential buildings and a driveway access for the adjacent hospital development. Access is presently provided via three (3) unrestricted driveways along Eddie Dowling Highway. Under the proposed development program, the existing structures would be razed, and a commercial development comprised of a 2,338 square-foot restaurant with drive-through window and a 2,380 square-foot coffee shop with drive-through window would be constructed. Vehicular access is proposed to be consolidated to one (1) full-movement driveway along Eddie Dowling Highway. Cross-access will also be provided with the easterly adjacent hospital development.

METHODOLOGY

Stonefield Engineering & Design, LLC has prepared this Traffic Impact Study in accordance with the recommended guidelines and practices outlined by the Institute of Transportation Engineers (ITE) within Transportation Impact Analyses for Site Development and by the Rhode Island Department of Transportation (RIDOT) within the Traffic Design Manual. A detailed field investigation was performed to assess the existing conditions of the adjacent roadway network. A data collection effort was completed to identify the existing traffic volumes at the study intersections to serve as a base for the traffic analyses. Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using the Highway Capacity Manual 2000 (HCM) and the Synchro II Software for all study conditions to assess the roadway operations.

For an unsignalized intersection, Level of Service (LOS) A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 50 seconds per vehicle. For a signalized intersection, LOS A indicates operations with delay of less than 10 seconds per vehicle, while LOS F describes operations with delay in excess of 80 seconds per vehicle. The Technical Appendix contains the Highway Capacity Analysis Detail Sheets for the study intersections analyzed in this assessment. The traffic signal timing utilized within the signalized analysis is based on signal timing directives provided by the RIDOT.

2023 EXISTING CONDITION

2023 EXISTING ROADWAY CONDITIONS

The proposed development is located at the northeast quadrant of the intersection of Eddie Dowling Highway (Route 146A) and Dowling Village Boulevard in the Town of North Smithfield, Providence County, Rhode Island. The subject property is designated as Map 21-A, Lots 23, 24, & 49 as depicted by the Town of North Smithfield Tax Map. The site has approximately 453 feet of frontage along Eddie Dowling Highway. Land uses in the area are predominantly residential and commercial.

Eddie Dowling Highway (Route 146A) is classified as a principal arterial roadway with a general north-south orientation, and is under the jurisdiction of the RIDOT. The roadway generally provides two (2) lanes of travel in each direction and has a posted speed limit of 35 mph. Within the vicinity of the site, curb and sidewalk are provided along both sides of the roadway, shoulders are provided along both sides of the roadway, and on-street parking is not permitted along either side of the roadway. Route 146A provides connection to thoroughfares such as Route 146, Route 104, and Interstate 95 for primarily commercial and residential uses along its length.

Dowling Village Boulevard is a private roadway which generally provides two (2) lanes of travel in each direction and has a posted speed limit of 15 mph. Along the site frontage, curbs are provided along both sides of the roadway, sidewalks are provided the southerly side of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is not permitted along either side of the roadway. Dowling Village Boulevard primarily services the adjacent Dowling Village commercial center and connects to Eddie Dowling Highway at each roadway terminus.

Old Louisquisset Pike is a local roadway with a general north-south orientation, and is under the jurisdiction of the Town of North Smithfield. The roadway generally provides one (1) lane of travel in each direction and does not have a posted speed limit. Curb and sidewalk are provided intermittently along the easterly side of the roadway, shoulders are not provided along either side of the roadway, and on-street parking is not permitted along either side of the roadway. Old Louisquisset Pike primarily services multi-family residential and office developments along its length and connects to Eddie Dowling Highway at each roadway terminus.

Eddie Dowling Highway, Dowling Village Boulevard, and Old Louisquisset Pike intersect to form a four (4)-leg signalized intersection. Please note that there is a private driveway which is aligned with the westerly intersection approach but does not operate under traffic signal control. The northbound approach of Eddie Dowling Highway provides one (1) shared left-turn/through lane, one (1) exclusive through lane, and one (1) exclusive right-turn lane. The southbound approach of Eddie Dowling Highway provides two (2) exclusive left-

turn lanes, one (1) exclusive through lane, and one (1) shared through/right-turn lane. The northwest-bound approach of Old Louisquisset Pike provides one (1) shared left-turn/through/right-turn lane. The westbound approach of Dowling Village Boulevard provides two (2) exclusive left-turn lanes and two (2) exclusive right-turn lanes. Please note that left turns from Dowling Village Boulevard onto Old Louisquisset Pike are prohibited at the subject intersection. Pedestrian signals with pushbuttons, crosswalks, and pedestrian ramps are provided across the northerly and easterly legs of the intersection.

2023 EXISTING TRAFFIC VOLUMES

Turning movement counts were collected during the typical weekday morning, weekday evening, and Saturday midday time periods to evaluate existing traffic conditions and identify the specific hours when traffic activity on the adjacent roadways is at a maximum and could be potentially impacted by the development of the site. Turning movement counts were collected at the intersection of Eddie Dowling Highway, Dowling Village Road, and Old Louisquisset Pike on the following dates and during the following times:

- ◆ Thursday, March 31, 2022, from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m.
- ◆ Saturday, April 02, 2022, from 11:00 a.m. to 2:00 p.m.

The study time periods were chosen as they are representative of the peak periods of both the adjacent roadway network and the proposed development. The traffic volume data was collected and analyzed to identify the design peak hour in accordance with HCM and ITE guidelines. Based on the review of the count data, the weekday morning peak hour occurred from 7:15 a.m. to 8:15 a.m.; the weekday evening peak hour occurred from 4:00 p.m. to 5:00 p.m.; and the Saturday midday peak hour occurred from 12:30 p.m. to 1:30 p.m. The Technical Appendix contains a summary of the turning movement count data. Please note that in order to provide a conservative analysis, the turning movement counts were grown by 1.0% to reflect any ambient growth which may have occurred between the turning movement count collection dates and the date of this report. The 2023 Existing weekday morning, weekday evening, and Saturday midday peak-hour volumes are summarized on appended **Figure 2**.

2023 EXISTING LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was conducted for the 2023 Existing Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersection. Under the 2023 Existing condition, the signalized intersection of Eddie Dowling Highway, Old Louisquisset Pike, and Dowling Village Boulevard is calculated to operate at an overall Level of Service B during the weekday morning peak hour and overall Level of Service C during the weekday evening and Saturday midday peak hours.

MOTOR VEHICLE COLLISION ANALYSIS

In order to assess the safety of the intersection of Eddie Dowling Highway and Dowling Village Boulevard, the three (3) years most recent years of motor vehicle collision data were obtained from the Town of North Smithfield Police Department. Accident data was reviewed for the time period spanning from March 1, 2020, to March 1, 2023. **Table I** provides a summary of the manner and severity of the motor vehicle collisions reported at the study intersection.

TABLE I – MOTOR VEHICLE COLLISION ANALYSIS SUMMARY

Location	Collision Type	Number of Collisions	Collisions Resulting in Injury	Collisions Resulting in Fatality
Eddie Dowling Highway at Dowling Village Boulevard / Old Louisquisset Pike	Rear End	10	4	0
	Sideswipe	2	0	0
	Right Angle	1	0	0
	Head On	1	0	0
	Collision with Cyclist	1	1	0
	Angle	1	0	0
	TOTAL	16	5	0

As shown in **Table I**, a total of 16 collisions were reported at the study network over the 36-month period; this equates to approximately one (1) collision every two (2) months. Please note that ten (10) of the 16 reported accidents were rear end collisions, which is a common collision type at a signalized intersection. It should be noted that zero (0) fatalities were reported at the study intersection. A summary table providing pavement, weather, light conditions, time of day, time of year, and apparent factors pertaining to the reported collisions is contained within the Technical Appendix. Crash rates at the study intersection are not anticipated to be adversely impacted by the proposed development.

2025 NO-BUILD CONDITION**BACKGROUND GROWTH**

The 2023 Existing Condition traffic volume data was grown to a future horizon year of 2025, which is a conservative estimate for when the proposed developments are expected to be fully constructed. In accordance with industry guidelines, the existing traffic volumes at the study intersections were increased by 1.0% annually for two (2) years, which is a conservative growth rate based on a review population growth data published by the U.S. Census Bureau for the Town of North Smithfield.

OTHER PLANNED DEVELOPMENT PROJECTS

To evaluate the future traffic conditions, it is important to consider the potential site-generated traffic of other projects that could influence the traffic volume at the study intersections. Other planned development projects include those that are either in the entitlement process or have recently been approved for building permits in proximity to the proposed development. Based on consultations with the Town of North Smithfield Planning Department, the following planned development was identified within the site vicinity:

- Storage Rentals of America, 415 Eddie Dowling Highway – proposed addition of a 61,200 square-foot self-storage facility located approximately 0.8 miles south of the subject site. Based on industry standard data, self-storage facilities typically generate minimal traffic volumes during peak roadway hours. Therefore, it is reasonable to assume that the expansion will not result in a significant increase in site-generated traffic volumes. As such, the applied background growth rate is anticipated to account for the traffic volumes associated with the planned development.

2025 NO-BUILD TRAFFIC VOLUMES

The background growth rate was applied to the 2023 Existing Traffic Volumes to calculate the 2025 No-Build Traffic Volumes for the weekday morning, weekday evening, and Saturday midday peak hours. These volumes are summarized on appended **Figure 3**.

2025 NO-BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2025 No-Build Condition during the weekday morning, weekday evening, and Saturday midday at the study intersection. Under the 2025 No-Build Condition, the signalized intersection of Eddie Dowling Highway, Old Louisquisset Pike, and Dowling Village Boulevard is calculated to operate generally consistent with the findings of the 2023 Existing Condition during the weekday morning, weekday evening, and Saturday midday peak hours.

2025 BUILD CONDITION

The site-generated traffic volume of the proposed developments was estimated to identify the potential impacts of the project. For the purpose of this analysis, a complete project “build out” is assumed within two (2) years of the preparation of this study.

TRIP GENERATION

Trip generation projections for the proposed restaurant developments were prepared utilizing ITE's Trip Generation Manual, 11th Edition. Trip generation rates associated with Land Use 930 “Fast Casual Restaurant”

and Land Use 937 "Coffee/Donut Shop with Drive Through Window" were cited for the proposed 2,338 square-foot restaurant with drive-through and 2,380 square-foot restaurant with drive-through, respectively.

It is important to note that the proposed 2,380 restaurant with drive-through window would not operate as a standard fast-food facility where the drive-through service is equipped with a menu ordering board and payment/pickup window. Rather, the drive-through window would function exclusively as an accessory pick-up window to service patrons receiving mobile orders which were processed and prepared ahead of arrival. Therefore, the drive-through window is not anticipated to have a significant impact on the number of trips arriving to the site, nor is it anticipated to generate significant queueing on site. As such, Land Use 930 "Fast Casual Restaurant" is an appropriate representation of the expected traffic impacts associated with the development. Table 2 provides the weekday morning, weekday evening, and Saturday midday peak hour trip generation volumes associated with the proposed development.

TABLE 2 – PROJECTED TRIP GENERATION

Land Use	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
2,338 SF Fast Casual Restaurant ITE Land Use 930	2	1	3	16	13	29	42	34	76
2,380 SF Coffee/Donut Shop with Drive Through Window ITE Land Use 937	104	100	204	46	47	93	105	104	209
Total	106	101	207	62	60	122	147	138	285

As stated within Chapter 10 of ITE's Trip Generation Handbook, 3rd Edition, there are instances when the total number of trips generated by a site is different from the amount of new traffic added to the street system by the generator. Restaurants with drive-through services are specifically located on or adjacent to busy streets to attract motorists already on the roadway. Therefore, the proposed restaurant developments would be expected to attract a portion of their trips from the traffic passing the site on the way from an origin to an ultimate destination. These trips do not add new traffic to the adjacent roadway system and are referred to as "pass-by" trips.

Please note that ITE does not publish pass-by rates for Land Use 930 "Fast Casual Restaurant;" however, based upon the published ITE data for similar Land Use 932 "High-Turnover Sit-down Restaurant," 43% of the site-generated traffic during the weekday evening peak period is comprised of pass-by traffic. Note that ITE does not publish a pass-by rate for Land Use 932 "High-Turnover Sit-Down Restaurant" during the Saturday midday peak period. However, it is reasonable to assume that a portion of the site-generated trips would be

comprised of pass-by trips during the study peak hour, and therefore the published 43% pass-by rate was applied to provide a comprehensive analysis.

Additionally, please note that ITE does not published pass-by rates for Land Use 937 "Coffee/Donut Shop with Drive Through Window;" however, based upon ITE data similar to Land Use 938 "Coffee/Donut Shop with Drive-Through Window and No Indoor Seating," 90% of the site-generated traffic during the weekday morning peak period, 84% of the site-generated traffic during the weekday midday peak period, and 98% of the site-generated traffic during the weekday evening peak period is comprised of pass-by traffic. Note that ITE does not publish a pass-by rate for Land Use 938 "Coffee/Donut Shop with Drive-Through Window and No Indoor Seating" during the Saturday midday peak period. However, it is reasonable to assume that a portion of the site-generated trips would be comprised of pass-by trips during the study peak hour, and therefore the published 84% weekday midday peak period pass-by rate was applied to provide a comprehensive analysis. Table 3 shows the projected site-generated traffic associated with the proposed development in terms of new and pass-by traffic.

TABLE 3 – PROJECTED TRIP GENERATION – NEW & PASS-BY TRIPS

Trip Type	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
"New" Trips	16	11	27	12	10	22	46	37	83
"Pass-By" Trips	90	90	180	50	50	100	101	101	202
Total Trips	106	101	207	62	60	122	147	138	285

At the site driveway, the calculated number of pass-by trips is shown as a negative number at the through movement as the vehicles are temporarily diverted from the typical travel stream into and out of the site access point.

TRIP ASSIGNMENT/DISTRIBUTION

The trips generated by the proposed development were distributed according to [the existing travel pattern along the adjacent roadways and the access management plan of the site. Please note that cross-access will be provided to the adjacent hospital development, and therefore it is anticipated that a portion of the site-generated trips would access the site via the existing driveway along Dowling Village Boulevard. However, the analysis contained herein conservatively assumes that all of site-generated trips would access the site via the proposed driveway along Eddie Dowling Highway. The "New" Site-Generated Traffic Volumes are illustrated on Figure 4 and the "Pass-By" Site-Generated Traffic Volumes expected to access the site are depicted on Figure 5.

2025 BUILD TRAFFIC VOLUMES

The site-generated trips were added to the 2025 No-Build Traffic Volumes to calculate the 2025 Build Traffic Volumes and are shown on appended **Figure 6**.

2025 BUILD LOS/CAPACITY ANALYSIS

A Level of Service and Volume/Capacity analysis was also conducted for the 2025 Build Condition during the weekday morning, weekday evening, and Saturday midday peak hours at the study intersection and proposed site driveways. Appended **Tables 4** through **7** compare the 2023 Existing, 2025 No-Build, and 2025 Build Conditions Level of Service and delay values.

Under the 2025 Build Condition, the signalized intersection of Eddie Dowling Highway, Dowling Village Boulevard, and Old Louisquisset Pike is calculated to operate generally consistent with the findings of the 2025 No-Build Condition during the weekday morning, weekday evening, and Saturday midday peak hours. Therefore, the proposed development is not anticipated to have a significant adverse impact on the operations of the adjacent roadway network.

The turning movements at the intersection of Eddie Dowling Highway and the proposed site driveway are calculated to operate at Level of Service B or better during the weekday morning peak hour and Level of Service C or better during the weekday evening and Saturday midday peak hours. The proposed driveway throat length would be sufficient to accommodate the calculated 95th percentile queue lengths during the weekday morning, weekday evening, and Saturday midday peak hours. Therefore, the proposed access management plan would adequately support the proposed development.

COMPARATIVE LEVEL OF SERVICE (DELAY) TABLES**EDDIE DOWLING HIGHWAY & OLD LOUISQUISSET PIKE & DOWLING VILLAGE BOULEVARD**

NWB (Northwest bound) approach is the Old Louisquisset Pike approach

WB (Westbound) approach is the Dowling Village Boulevard approach

NB (Northbound) and SB (Southbound) approaches are the Eddie Dowling Highway approaches

X (n) = Level of Service (seconds of delay)

TABLE 4 – WEEKDAY MORNING PEAK HOUR

Lane Group	2023 Existing	2025 No-Build	2025 Build
WB Left	C (22.2)	C (22.4)	C (22.4)
WB Right	B (15.9)	B (16.1)	B (16.1)
NB Through	B (19.5)	B (19.6)	B (19.6)
NB Right	B (11.5)	B (11.5)	B (11.4)
SB Bear Left	C (22.4)	C (22.5)	C (22.6)
SB Left	C (22.2)	C (22.4)	C (22.5)
SB Through	A (7.7)	A (7.7)	A (7.7)
NWB Left/Right	D (49.1)	D (49.3)	D (49.4)
Intersection	B (14.7)	B (14.8)	B (14.8)

TABLE 5 – WEEKDAY EVENING PEAK HOUR

Lane Group	2023 Existing	2025 No-Build	2025 Build
WB Left	C (30.9)	C (31.4)	C (31.6)
WB Right	C (21.9)	C (22.2)	C (22.4)
NB Through	C (29.3)	C (29.8)	C (29.7)
NB Right	B (13.6)	B (13.6)	B (13.6)
SB Bear Left	D (35.6)	D (36.7)	D (37.3)
SB Left	C (34.3)	D (35.3)	D (35.5)
SB Through	A (9.6)	A (9.7)	A (9.7)
NWB Left/Right	D (42.4)	D (43.6)	D (43.8)
Intersection	C (23.2)	C (23.7)	C (23.8)

TABLE 6 – SATURDAY MIDDAY PEAK HOUR

Lane Group	2023 Existing	2025 No-Build	2025 Build
WB Left	C (30.5)	C (30.9)	C (31.2)
WB Right	B (19.3)	B (19.6)	B (20.0)
NB Through	C (34.1)	C (34.7)	C (34.8)
NB Right	B (16.6)	B (16.8)	B (16.6)
SB Bear Left	C (33.7)	C (34.3)	D (35.1)
SB Left	C (32.6)	C (33.2)	C (33.7)
SB Through	B (10.7)	B (10.8)	B (10.8)
NWB Left/Right	D (44.1)	D (44.6)	D (45.1)
Intersection	C (23.3)	C (23.7)	C (23.9)

EDDIE DOWLING HIGHWAY & SITE DRIVEWAY

WB (Westbound) approach is the Site Driveway approach

SB (Southbound) approach is the Eddie Dowling Highway approach

X (n) = Level of Service (seconds of delay)

TABLE 7 – 2025 BUILD CONDITION

Lane Group	Weekday Morning Peak Hour	Weekday Evening Peak Hour	Saturday Midday Peak Hour
WB Left	B (12.6)	C (15.0)	C (23.6)
SB Left	A (2.2)	A (1.6)	A (4.0)

SITE CIRCULATION/PARKING SUPPLY

A review was conducted of the proposed restaurant developments using the Site Plan prepared by Stonefield Engineering and Design, dated June 16, 2023. In completing this review, particular attention was focused on site access, circulation, and parking supply.

Vehicular access is proposed via one (1) full-movement driveway along Eddie Dowling Highway, with cross access to be provided to the adjacent hospital development. A 2,380 square-foot coffee shop with drive-through window will be constructed on the northern portion of the property and a 2,338 square-foot restaurant with drive-through pick-up window will be provided on the center of the property. Vehicular circulation through the coffee shop drive-through will be facilitated via one (1) 12-foot-wide drive-through lane which will accommodate 18 vehicles without impacting on-site circulation. Vehicular circulation to the restaurant drive-through pick-up window will be facilitated via one (1) 12-foot-wide drive-through lane which will accommodate 10 vehicles without impacting on-site circulation, and one (1) 12-foot-wide bypass lane. The proposed restaurant drive-through window will not operate as a standard fast-food facility drive-through service equipped with a menu ordering board and payment/pick-up window. Rather, the drive-through window will function exclusively as an accessory pick-up window to service patrons receiving mobile orders which were processed and prepared ahead of arrival. Therefore, minimal queuing is expected at the window. Additionally, due to having separate drive-through lanes, the operations of the adjacent coffee shop are not anticipated to be adversely impacted. Off-street parking will be provided on the westerly and southerly portions of the property. Two (2)-way vehicular circulation will be facilitated on site via 24-foot drive aisles.

In order to assess the safety conditions of the proposed full-movement driveway along Eddie Dowling Highway, the available sight lines were evaluated in accordance with the American Association of State Highway transportation Officials (AASHTO) guidance for a design speed of 40 mph. Per AASHTO guidelines for a left-turn from the minor road with stop control, a minimum intersection sight distance of 475 feet in each direction is required. The sight lines at the proposed driveway location were verified exceed 475 feet, and as such the available sight lines are adequate for safe access along Eddie Dowling Highway. It is important to note that the proposed site driveway location is aligned with the existing two-way left-turn lane, and therefore the roadway

geometry is generally suited for left-turn ingress and egress movements at the subject site. Additionally, as the development is situated along a signalized corridor, it is anticipated that a platooning effect would be present, thereby creating gaps along the mainline for motorists accessing the subject site. Therefore, the proposed full-movement driveway along Eddie Dowling Highway is not anticipated to adversely impact the safety conditions or operations of the adjacent roadway network.

Regarding the parking requirements for the proposed development, the Town of North Smithfield Zoning Ordinance requires one (1) parking space per four (4) seats within a restaurant development. For the proposed 2,338 square-foot restaurant and 2,380-square-foot restaurant with a total of 98 seats, this equates to 25 spaces required. The site would provide a total of 29 parking spaces proximate to the proposed commercial developments, inclusive of three (3) ADA-accessible parking spaces, which meets the parking requirement. It should be noted that due to the nature of the proposed uses, the two (2) operations are anticipated to experience peak parking demand at different periods of the day, thereby reducing the total parking demand for the site. The spaces would be nine (9) feet wide by 18 feet deep in accordance with the Town of North Smithfield Zoning Ordinance and industry standards.

CONCLUSIONS

This report was prepared to examine the potential traffic impact of the proposed multi-use development. The analysis findings, which have been based on industry-standard guidelines, indicate that the proposed development would not have a significant impact on the traffic operations of the adjacent roadway network. The site-generated trips of the proposed development would consist largely of "pass-by" trips, as opposed to new vehicles on the roadway, due to the land use, location, and the access management plan. The site driveway and on-site layout have been designed to provide effective access to and from the subject property, and the proposed parking supply spaces would be sufficient to support this project.