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TECHNICAL MEMORANDUM

to Jet Brite Car Wash, Inc.

from Robert Casiello, P.E., PTOE

date October 19, 2020

subject Jet Brite Car Wash – Site Trip Generation
850 East Ogden Avenue, City of Naperville, Illinois

INTRODUCTION

Knight E/A, Inc. (Knight) was retained by Jet Brite Car Wash, Inc. to prepare a Trip Generation Study for a proposed car wash to be located at 850 East Ogden Avenue (US Route 34) in Naperville, Illinois. This development will provide one car wash tunnel with three pay stations/queuing lanes able to accommodate at least 63 vehicles. It will also provide 46 vacuum parking spaces, five prep spaces, and five employee parking spaces. Access to the car wash will be provided via a full access driveway off Ogden Avenue.

The purpose of this study is to discuss the transportation/traffic elements of the proposed site and estimate the number of vehicle trips that will be generated by the car wash. As a part of this study, the existing roadway network surrounding the site was observed and new trips generated based on the size and characteristics of the car wash were determined. This memorandum also provides general conclusions in regards to the access and operation of the car wash.

A map of the study location is presented in **Exhibit 1** while **Exhibit 2** shows an aerial of the study area.

EXISTING CONDITIONS

Information regarding the characteristics and operation of the adjacent roadways are based on observations and published data. A detailed summary of the findings are as follows.

The site is located at 850 East Ogden Avenue in Naperville, which was previously occupied by a restaurant. This parcel is located on the south side of Ogden Avenue just west of Sherman Avenue. The site is approximately a quarter-mile east of the signalized intersection of Ogden Avenue with Columbia Avenue. The nearest signalized intersection to the east is nearly three-quarters of a mile east at Iroquois Avenue. The Ogden Avenue corridor is primarily occupied by commercial uses with residential neighborhoods to the north and south.

A description of the existing roadway system within the study area is explained below and is illustrated in **Exhibit 2**.

Ogden Avenue (US Route 34) is generally an east-west principal arterial roadway providing two lanes in each direction separated by a two-way left-turn lane. It is under traffic signal control at its intersection with Columbia Avenue to the west while Sherman Avenue is under one-way stop control to the east. Ogden Avenue has a posted speed limit of 35 mph and is under the jurisdiction of the Illinois Department of Transportation (IDOT). It should be noted that this segment is not designated as a Strategic Regional Arterial (SRA). According to 2019 data published by IDOT, it carries an Average Annual Daily Traffic (AADT) volume of 29,400 vehicles.

Columbia Avenue is a north-south minor collector roadway generally providing one lane in each direction. At its signalized intersection with Ogden Avenue, it provides an exclusive left-turn lane and a combined through/right-turn lane in each direction. Columbia Avenue has a speed limit of 25 mph and has segments under the jurisdiction of the City of Naperville or Naperville Township. It carries an AADT of 2,250 vehicles (IDOT, 2016).

Sherman Avenue is a north-south local roadway generally providing one lane in each direction with segments under the jurisdiction of the City of Naperville or Naperville Township. At its stop sign-controlled intersection with Ogden Avenue, it provides one inbound lane and an exclusive left-turn lane and right-turn lane for southbound movements. It has a speed limit of 25 mph.

PROPOSED SITE REDEVELOPMENT

This section of the technical memorandum outlines the proposed redevelopment, summarizes site-specific traffic characteristics, and identifies other characteristics impacting future conditions.

The redevelopment will occupy the parcel located in the southwest quadrant of the intersection of Ogden Avenue with Sherman Avenue. As proposed, the site will contain a single car wash tunnel located on the northeast corner of the site. It will have three pay stations to the southeast of the site with queuing lanes extending along the southwest side of the site, as illustrated on the site plan provided in the **Exhibit 4**. It will also provide 46 vacuum parking spaces between the structure and queuing lanes along with five prep spaces and five employee parking spaces in the southern corner of the site. A five-stall bike rack will also be provided on site.

Access to the site will be provided via a full access drive located on the west side of its Ogden Avenue site frontage. The access drive will provide one inbound lane with outbound left- and right-turn lanes under stop sign control. This segment of Ogden Avenue provides two lanes in each direction separated by a two-way left-turn lane. This center lane will provide storage for inbound left turning vehicles while also allowing outbound left-turn movements to perform a left turn in two stages to reduce delay.

Internal circulation will be provided counter-clockwise along the exterior of the site, including the car wash structure and queuing lanes. Interior intersections will operate under stop sign control. The vacuum parking spaces will be easily accessed before or after entering the car wash tunnel. If patrons would like to use the vacuum spaces prior to their car wash, they will need to turn left immediately after entering the site. While this intersection is in close proximity to the Ogden Avenue access, there will not be any vehicles conflicting the inbound movement that would cause queuing onto Ogden Avenue. In general, vacuums are not utilized by every car wash patron. In fact, some studies state car wash traffic utilize the vacuum parking spaces one out of every four visits.

To minimize the impact of queued vehicles on the site and surrounding area, the entrance to the car wash tunnel will be located on the northeast side of the site allowing for ample queuing space on site. Between the entrance of the tunnel and the three pay stations, approximately nine vehicles can be queued without blocking the pay stations. Beyond the pay stations, a staging area providing three queuing lanes accommodating 21 vehicles for a total of approximately 63 total vehicles. Should an instance occur where queuing extends to the end of the staging area, internal circulation will not be significantly impacted and will not conflict with Ogden Avenue mainline traffic.

TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

Most Jet Brite Car Wash facilities operate seven days a week from 7:00 A.M. to 9:00 P.M. However, in general, car washes typically experience the majority of their traffic during the afternoon and evenings when the majority of people are returning from work or performing other daily trips. Car wash traffic in the Midwest typically is weather-dependent and can result in several near-capacity days per year. Overall, these facilities see a general increase in volume during the winter months when salt removal from vehicles is desired by patrons.

In order to determine the number of vehicles that will be generated by the redevelopment of the site on a typical day, data from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition, was utilized. The number of trips are estimated according to a vehicle trip generation rate based the use and size of the car wash. To generate trips for the site, the ITE land use for Automated Car Washes (Land Use Code [LUC] 948) was utilized based on the footprint of the car wash tunnel. However, since ITE does not provide a morning peak hour trip generation rate, the number of trips for the time period are based on one-half of the evening peak period rate. This is consistent with data provided by Jet Brite for their other car wash locations in the Chicagoland area.

Note that a number of the vehicle trips to and from the car wash will be from vehicles already traveling in the area, particularly on Ogden Avenue. These trips, known as pass-by trips, account for drivers attracted to the site while already en route from one destination to another. They are particularly common during the evening peak period when most drivers are commuting between home and work and can stop at an additional destination without deviating from their existing route. While these trips will be accounted for at the access drives, they will not add to the mainline traffic volumes.

Surveys of vehicle-related uses like gas stations typically result in average pass-by trip percentages of 60 percent or higher. Since ITE does not provide information for a car wash, a 50 percent pass-by reduction was assumed to account for these types of trips already within the roadway network. **Table 1** summarizes the trip generation and pass-by traffic anticipated for the car wash facility.

Table 1: Projected Trip Generation

	Morning Peak (7:00 – 8:00 A.M.)			Evening Peak (4:30 – 5:30 P.M.)			Saturday Midday (1:00 P.M. – 2:00 P.M.)		
	In	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Automated Car Wash ITE LUC: 948 – 6,300 s.f.	23	22	45	45	44	89	96	96	192
50% Pass-By Traffic	-11	-11	-22	-22	-22	-44	-48	-48	-96
TOTAL NEW TRIPS	**12**	**11**	**23**	**23**	**22**	**45**	**48**	**48**	**96**

All generated traffic was then assigned to the access driveway to and from the development based on a trip distribution (See **Exhibit 3**). The trip distribution is estimated at 40 percent and 60 percent of the site traffic arriving/departing from the east and west, respectively. The trip distribution was estimated based on the site location and its proximity to expressways and other major roadways.

CONCLUSION

Based on Knight's review of the proposed car wash as well as the existing and future traffic conditions in the area, the following conclusions are provided.

- Access to the site will be provided by a full access drive off Ogden Avenue. The access drive will provide one inbound lane and two outbound lanes striped to provided one left-turn lane and one right-turn lane under stop sign control.

- The provision of the two-way left-turn lane and platooning of traffic due to the traffic signals along Ogden Avenue will improve the operations of the proposed access drive.

- Most Jet Brite Car Wash facilities operate seven days a week from 7:00 A.M. to 9:00 P.M. although in general, car wash traffic typically experience the majority of their traffic during the afternoon and evenings.

- The car wash is estimated to generate 45 trips during the typical weekday morning peak hour, 89 trips during the typical weekday evening peak hour, and 192 trips during the Saturday midday peak hour.

- Car wash trips often draw vehicles already traveling on the mainline, known as pass-by traffic. Pass-by trips limit the impact the redevelopment has on the operation of Ogden Avenue and surrounding roadways by decreasing the number of new trips the car wash will bring to the area.

- Internally, traffic will circulate counter-clockwise around the exterior of the site. The internal intersections will be under stop sign control to limited potential for inbound vehicles to back-up onto Ogden Avenue.

- The site will accommodate approximately 63 queued vehicles within the queuing lanes without impacting internal circulation or the operation of any of the access drives. The site's three pay stations/queuing lanes will provide adequate capacity to prevent queues from spilling out onto the internal drive or Ogden Avenue.

- The car wash will provide 46 vacuum parking spaces, 5 prep spaces, and 5 employee parking spaces. The quantity of available spaces will reduce the potential for vehicles blocking the internal drives.

EXHIBITS

Exhibit 1 – Site Location Map

Exhibit 2 – Aerial of Study Area

Exhibit 3 – Estimated Site Generate Traffic Volumes

Exhibit 4 – Site Plan

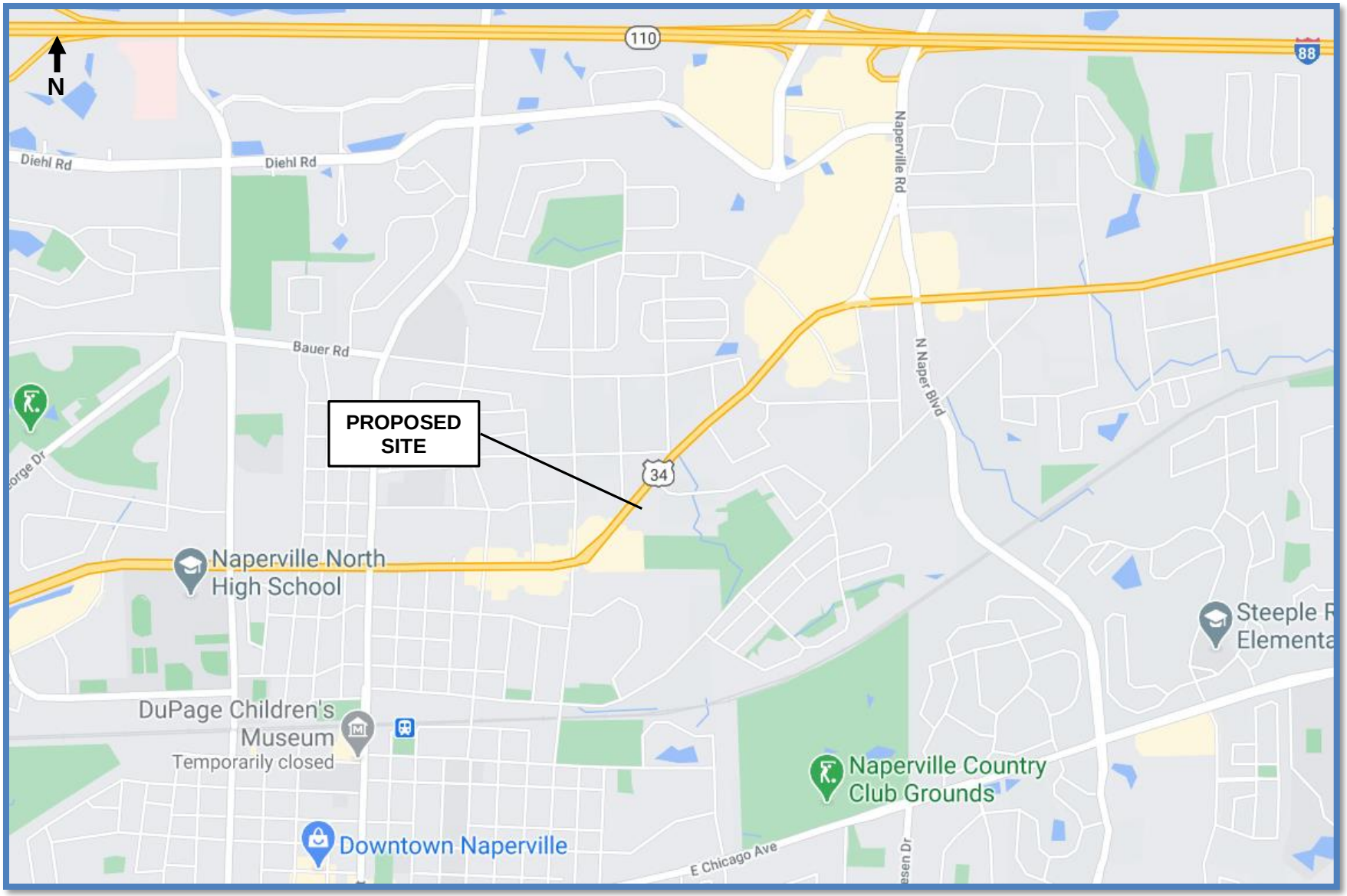

Exhibit 1: Site Location Map

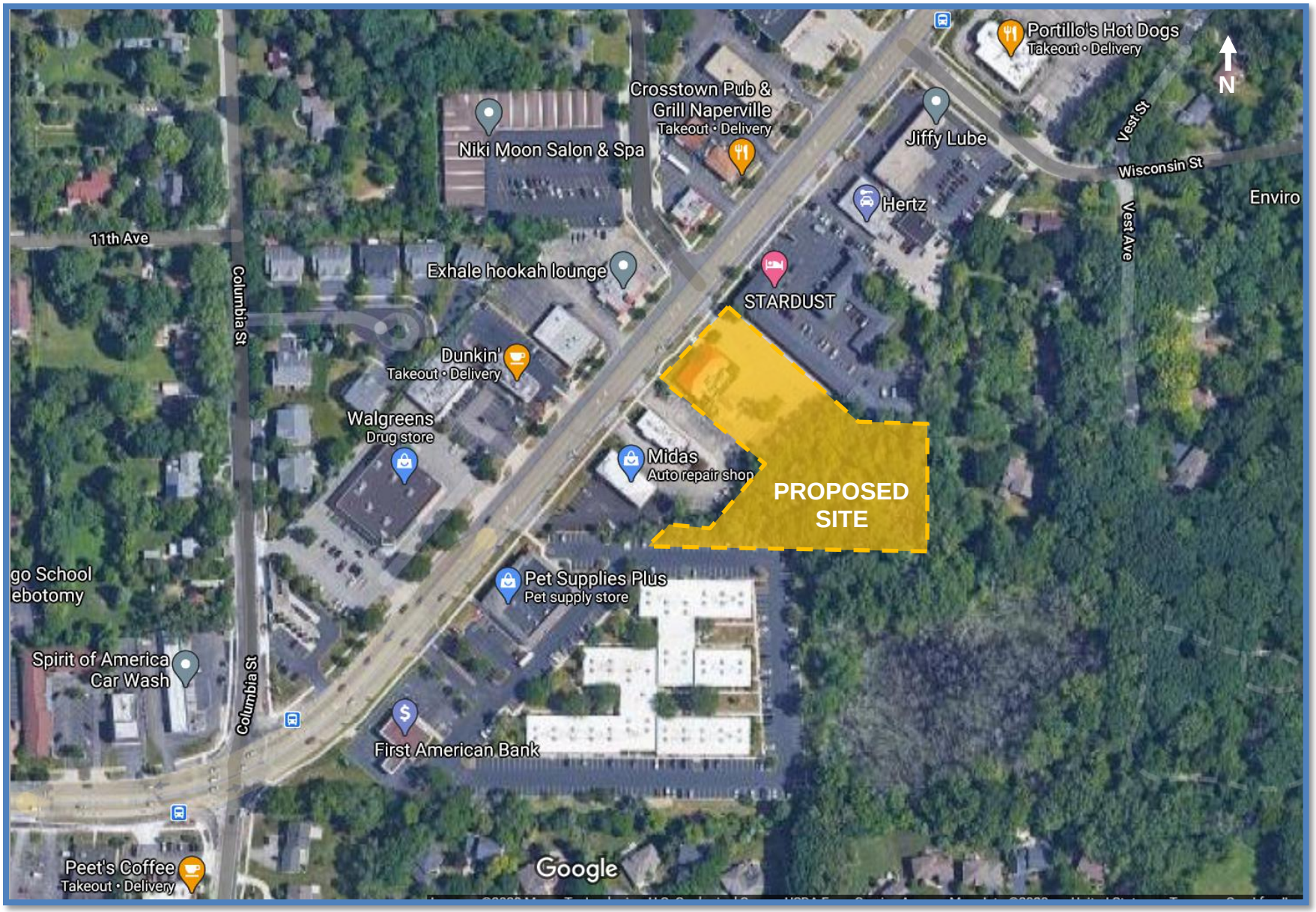

Exhibit 2: Aerial of Study Area

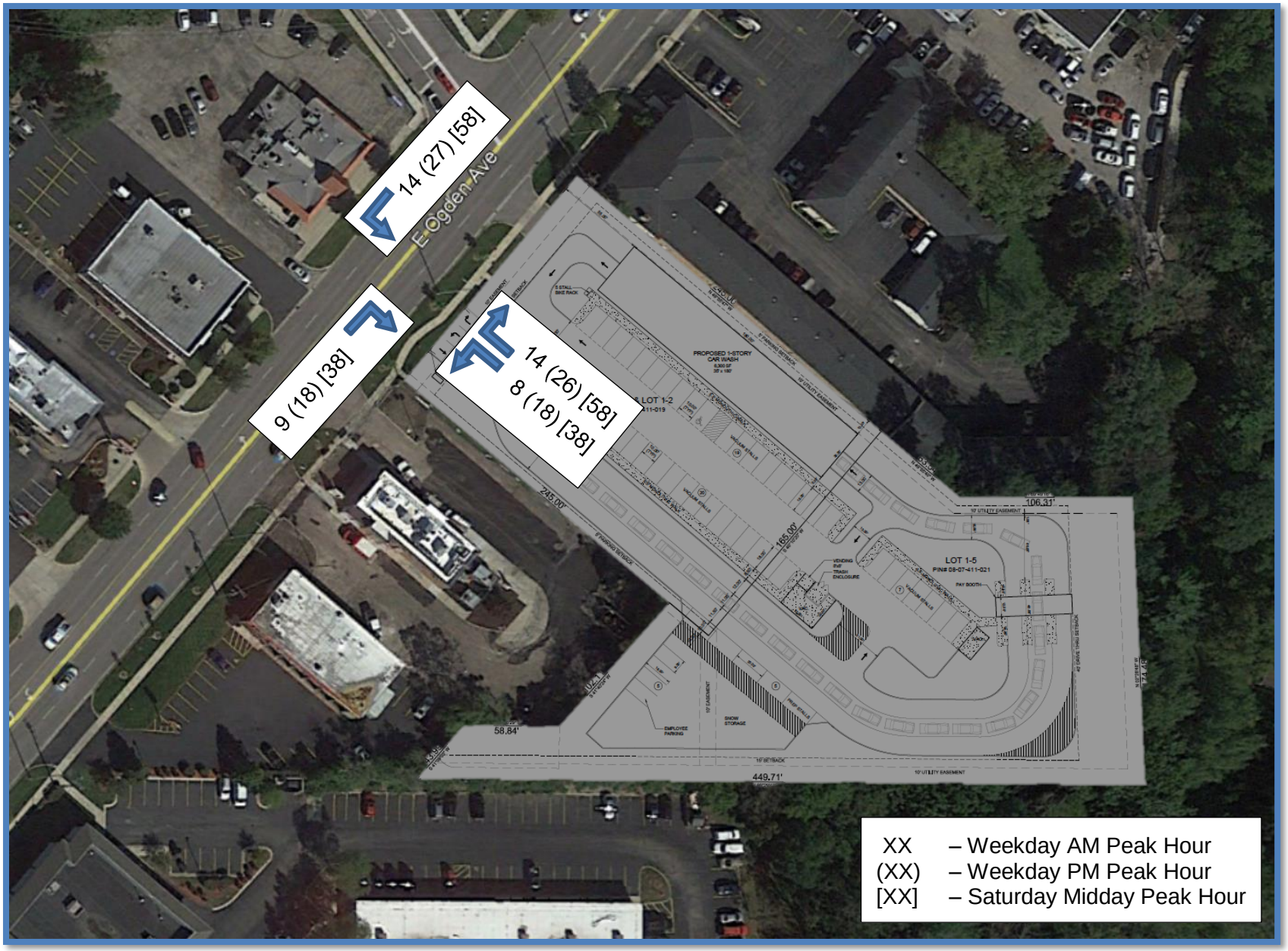

Exhibit 3: Estimated Site-Generated Traffic Volume

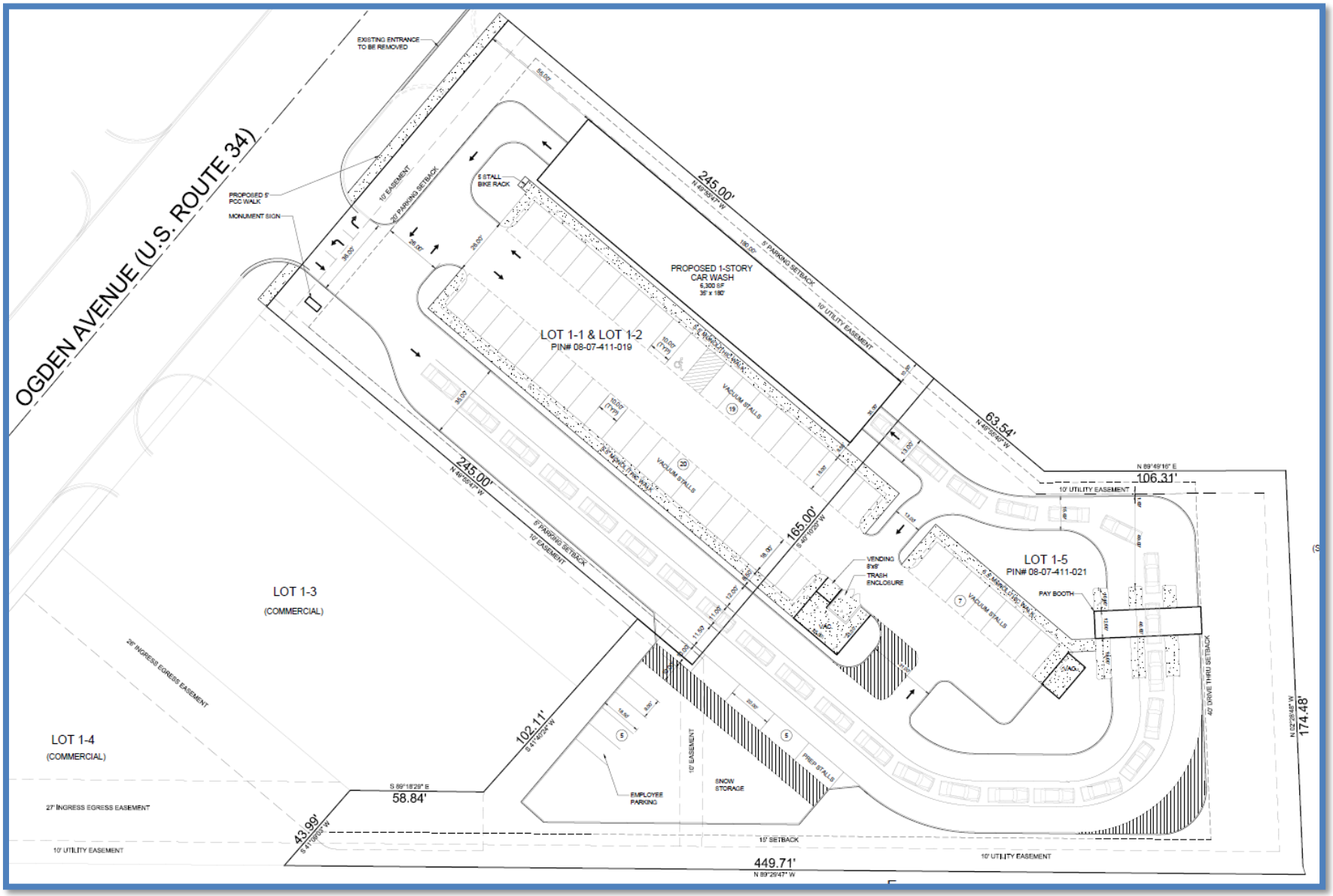

Exhibit 4: Site Plan