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MEMORANDUM

TO: Emile Bussiere,
Ocean Storage LLC

FROM: Kenneth P. Cram, P.E.

CC:

DATE: June 30, 2020

RE: Proposed Self-Storage Facility
Calumet Road, Methuen, MA

This traffic memorandum has been prepared to update the original January 18, 2018 traffic impact memorandum and subsequent October 30, 2018 and August 20, 2018 traffic memorandums prepared for the proposed self-storage facility to be located at 14 Calumet Road in Methuen, Massachusetts. This memorandum summarizes Bayside's observations and recommendations relative to the updated self-storage facility proposal.

PROJECT DESCRIPTION

The parcel of land to be developed is located on the north side of Calumet Road east of Merrimack Street (Route 110). Currently the site consists of wooded and undeveloped land. The proposed development currently consists of the construction of a single, three story mini-warehouse building comprising approximately 124,020 gross square feet (gsf) of storage space. The Net Rentable Area is 91,370 square feet (sf). Access to the site would be provided by way of an existing, single, full-movement driveway to Calumet Road.

EXISTING CONDITIONS

Geometrics

Roadways

Merrimack Street (Route 110) is functionally classified as an Urban Minor Collector that runs in a general east/west direction and is under the jurisdiction of the Massachusetts Highway Department (MassDOT). In the site vicinity, the roadway provides two 12 foot wide travel lanes per direction with variable width shoulders. Additional turning lanes are provided at key intersections. The existing roadway width is approximately 70 feet wide near Calumet Road. Travel lanes are separated by a double yellow centerline or raised concrete median. The posted speed limit is 35 miles per hour (mph). Illumination is provided by luminaries mounted on poles. Sidewalks are provided along both sides of the road. Land use along Merrimack Street in the vicinity of the site consists primarily of commercial uses.



Calumet Road is functionally classified as a local street that runs in a general east/west direction and is under the jurisdiction of the City of Methuen. In the site vicinity, the roadway provides one 12 foot wide travel lane per direction with variable width shoulders. The existing roadway width is approximately 26 feet wide. Travel lanes are separated by a double yellow centerline. The posted speed limit is 30 mph. Illumination is provided by luminaires mounted on poles. A sidewalk is provided along the south side of the road. Land use along Calumet Road in the vicinity of the site consists primarily of residential homes and commercial uses.

Jayson Road is a local street which runs in a general east/west direction from Calumet Road to its eastern terminus at Riverview Boulevard. There are no pavement markings on Jayson Road. There is a sidewalk along the south side of the road. Land use along Jayson Road is residential. Illumination is provided by luminaires mounted on telephone poles.

Intersections

Calumet Road and Jayson Road Calumet Road forms the south and west legs of this three legged unsignalized intersection with Jayson Road. Review of the existing pavement indicates that Calumet Road was most likely constructed prior to Jayson Road being constructed. Jayson Road forms the east leg of the intersection. As a result, the intersection is not a complete "T". The Jayson Road approach curves slightly into the curve (the 90 degree curve formed by Calumet Road). The Calumet Road northbound approach is under STOP sign control. There is currently no crosswalk across the Calumet Road northbound approach. Land use in the vicinity of the intersection consists of the Merrimack Valley Apartments, wooded land and a warehouse/distribution facility. There is a bituminous concrete sidewalk along the south side of Jayson Road and along the south side of Calumet Road (west of Jayson Road) and along both sides of Calumet Road (south of Jayson Road). Located at the intersection where Jayson Road meets Calumet road is an existing telephone pole supported by guy wires.

Calumet Road and Existing Driveway Calumet Road forms the east and west legs of this three legged unsignalized intersection with the existing driveway. The existing driveway forms the north leg of the intersection and serves as the driveway to a Heavenly Donut building. Land use in the vicinity of the intersection consists of the site, a landscape supply company and a warehouse/distribution facility (Donohue Bros. Inc.). There is a bituminous concrete sidewalk along the south side of Calumet Road. The driveway operates under STOP control (no STOP sign is present).

Traffic Volumes

The Massachusetts Department of Transportation (MassDOT) Traffic Data Management System was reviewed to determine traffic volumes for Calumet Road in the vicinity of the site. The most recent traffic volume data found was for Calumet Road, just south of Interstate 495 (I-495). The available data is summarized in Table 1.

Merrimack Street was recorded to carry approximately 18,900 vehicles per day (vpd) based on two separate counts in 2006. Based on trends in traffic volumes over the past 10 years, there has been little, if any growth due to the economic recessions. Therefore, the volumes in Table 1 most likely approximate current, pre COVID 19 pandemic daily traffic volumes on Merrimack Street.



Peak hour traffic volumes are typically in the range of 8 to 10 percent of the daily traffic volume. Therefore, the peak hour volumes are estimated to be between 1,500 and 1,900 vehicles per hour (vph).

TABLE 1
EXISTING TRAFFIC-VOLUME SUMMARY^a

Location	Year of Count	Weekday Traffic Volume ^b
Merrimack Street, east of I-495 Off-Ramp	2006	18,900

^aTwo-way traffic volume from MassDOT Traffic Data Management System.

^bDaily traffic expressed in vehicles per day.

CRASH EXPERIENCE

Motor vehicle crash data for the intersection were obtained from MassDOT for 2015 through 2019, the most recent five-year period for which data is available. Based on the MassDOT data, only one crash was reported in the study area. The crash occurred on June 19, 2015 at 9:50 AM and occurred at the intersection of Calumet Road and the driveway to 25 Calumet Road (across the street from the proposed site). The crash was an angle type collision with no personal injury.

INTERSECTION OBSERVATIONS

Intersection operations were observed during the weekday evening period on Wednesday August 8th, 2018 and during the weekday morning period on Thursday August 9th, 2018. Vehicles were observed to navigate the intersection of Calumet Road and Jayson Road with no difficulty even though the through movement from Calumet Road to Jayson road is slightly offset.

Traffic appears to flow well through the intersection. However, it was noted that there are no pavement markings delineating travel lanes. There is the potential of vehicles traveling on Calumet Road southbound to Jayson Road to cross into the opposing travel lane on Jayson Road. The addition of pavement markings will guide vehicles to safely maneuver through the intersection. Sightlines approaching the intersection from all approaches are good.

If the intersection were to be realigned, it would be at a substantial cost. This is primarily due to the telephone pole at the edge of road where Jayson Road and Calumet Road meet. Relocation of this pole and the utilities it serves would



affect the adjacent poles. They most likely would need to be adjusted due to the change in length between the poles (if moved).

TRAFFIC GENERATION

Site Traffic Generation

The calculated project-generated trips were determined on a daily basis, as well as for the weekday morning and evening peak hours, which are considered the 'worst case' time periods for commercial uses in accordance with industry standard practice. Trip generation for the project was based on data contained in the Institute of Transportation Engineers (ITE) *Trip Generation* manual¹.

The project-generated trips were estimated using LUC 151-Mini-Warehouse. Table 2 summarizes the projected vehicle trips for the proposed facility. The trip generation worksheets are attached.

TABLE 2
PROPOSED TRIP-GENERATION SUMMARY

	ITE Trip Rate^a	ITE Trips^b
Average Weekday Daily Traffic	1.51	188
<i>Weekday Morning Peak Hour:</i>		
Entering	0.06	7
Exiting	0.04	5
Total	0.10	12
<i>Weekday Evening Peak Hour:</i>		
Entering	0.08	10
Exiting	0.09	11
Total	0.17	21

^aBased on ITE LUC 151, Mini-Warehouse.

^bBased on 124,020 gsf.

As shown in Table 2, the proposed project is expected to generate 188 daily vehicle trips (94 vehicles entering and 94 vehicles exiting) based on the ITE data. During the weekday morning peak hour, 12 vehicle trips (7 vehicle entering and 5 vehicles exiting) are expected. During the weekday evening peak hour, 21 vehicle trips (10 vehicles entering and 11 vehicles exiting) are expected.

¹*Trip Generation*, Tenth Edition; Institute of Transportation Engineers; Washington, DC; 2017.

Based on the ITE data, the incremental peak hour traffic of 12 to 21 trips represents a very small increase on the already existing traffic volumes on Merrimack Street. This volume of traffic would not be significant enough to impact peak hour volumes or operations at adjacent intersections.

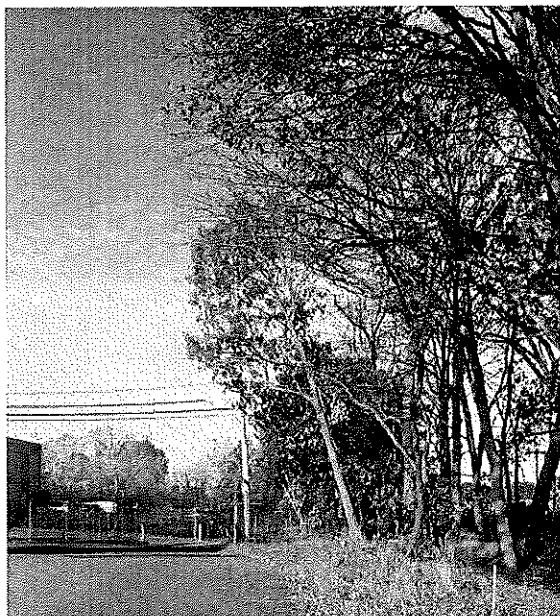
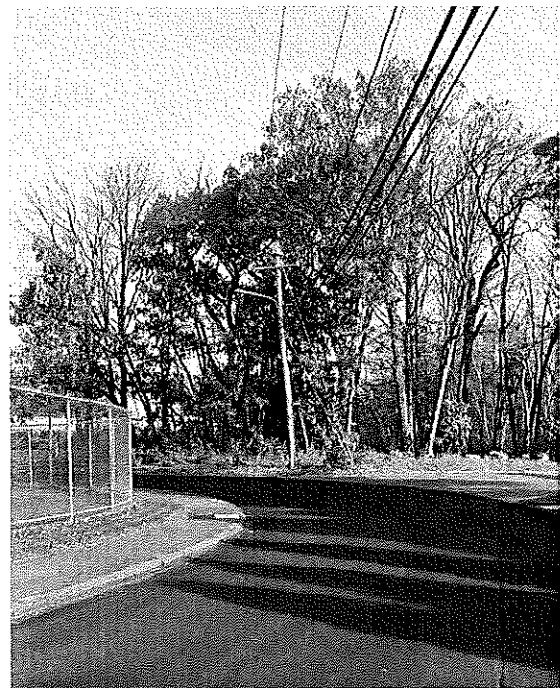
INTERSECTION REALIGNMENT

Observations of existing geometry indicate that Calumet Road was originally constructed with a 90 degree bend (eastbound to southbound) and Jayson Road was built later and tied into Calumet Road at the 'bend' in the road. This created the current, slightly off-set geometry at the intersection.

If the intersection were to be realigned, it would be at a substantial cost. This is due to the telephone pole at the edge of road where Jayson Road and Calumet Road meet and the resulting roadway alignment. Relocation of this pole and the utilities it serves would affect the adjacent poles. They most likely would need to be adjusted due to the change in length between the poles (if moved).

Further, if the intersection were to be realigned as suggested in the DPW's original review, Calumet Road (west of the intersection) would also have to be re-aligned. This would lead to the need for the intersection to be fully reconstructed. If not, there would be approximately forty (40) feet of pavement on the Calumet Road eastbound approach for two lanes of traffic.

Road realignment, which was suggested by City Staff in the first iteration review of this project, is not warranted because the proposed driveway has been removed from the intersection.



CONCLUSION AND RECOMMENDATIONS

Bayside has examined the potential traffic flow at the Calumet Road and Jayson Road intersection as well as at the existing driveway that will serve the site. The following is a summary of the results and conclusions of this effort:

- The Calumet Road and Jayson Road intersection is generally a typical three-legged unsignalized intersection, with Jayson Road approach being slightly off-set.



- The Calumet Road and existing driveway intersection is a typical three-legged unsignalized intersection, with the driveway operating under STOP control. A STOP sign should be installed on the driveway approach to Calumet Road.
- Only one crash has been reported to MassDOT in the study area from 2015 to 2019.
- Utilizing industry standards for site-generated trip estimates based on the gross square footage, the project site is expected to generate up to 188 vehicle trips on an average weekday (138 vehicle trips based on the Net Rentable Area). This equates to 94 vehicles entering and exiting over the course of a typical day.
- During the weekday morning peak hour, the project is expected to generate approximately 12 vehicle trips (7 vehicles entering and 5 vehicles exiting). During the weekday evening peak hour, the project is expected to generate a total of 21 vehicle trips (10 vehicles entering and 11 vehicles exiting). The addition of this volume of traffic will have a very small effect on intersection operations.
- Road realignment for the intersection of Calumet Road and Jayson Road, which was suggested by City Staff in the first iteration review of this project, is not warranted or recommended with the current proposed building plan because the proposed driveway has been removed from the intersection.
- The addition of pavement markings would guide vehicles to safely maneuver through the intersection of Calumet Road and Jayson Road.

Proposed Self-Storage Facility, Methuen, MA

Land Use Code (LUC) 151 - Mini-Warehouse

Source: Institute of Transportation Engineers (ITE) - 10th Edition

Average Vehicle Trips Ends vs.: 1,000 sq. ft.

Independent Variable (X): 124 ksf

AVERAGE WEEKDAY DAILY

T = 1.51 * (X) No Formula, Avg. Rate = 1.51 trips/ksf

T = 1.51 * (124.02) 15 Studies, Avg size = 52 ksf

T = 187.27

T = 188 vehicle trips

with 50% (94 vpd) entering and 50% (94 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.10 * (X) No Formula, Avg. Rate = 0.10 trips/ksf

T = 0.10 * (124.02) 11 Studies, Avg size = 65 ksf

T = 12.40

T = 12 vehicle trips

with 60% (7 vph) entering and 40% (5 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

T = 0.17 * (X) No Formula, Avg. Rate = 0.17 trips/ksf

T = 0.17 * (124.02) 16 Studies, Avg size = 54 ksf

T = 21.08

T = 21 vehicle trips

with 47% (10 vph) entering and 53% (11 vph) exiting.

SATURDAY DAILY

T = 1.95 * (X) No Formula, Avg. Rate = 1.95 trips/ksf

T = 1.95 * (124.02) 5 Studies, Avg size = 34 ksf

T = 241.84

T = 242 vehicle trips

with 50% (121 vpd) entering and 50% (121 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

T = 0.31 * (X) No Formula, Avg. Rate = 0.31 trips/ksf

T = 0.31 * (124.02) 1 Studies, Avg size = 71 ksf

T = 38.45

Limited Data

T = 38 vehicle trips

with 59% (22 vph) entering and 41% (16 vph) exiting.

Proposed Self-Storage Facility, Methuen, MA

Land Use Code (LUC) 151 - Mini-Warehouse

Source: Institute of Transportation Engineers (ITE) - 10th Edition

Average Vehicle Trips Ends vs.: 1,000 sq. ft.

Independent Variable (X): 91.37 ksf (Net Rentable Area)

AVERAGE WEEKDAY DAILY

$T = 1.51 * (X)$ No Formula, Avg. Rate = 1.51 trips/ksf

$T = 1.51 * (91.37)$ 15 Studies, Avg size = 52 ksf

$T = 137.97$

$T = 138$ vehicle trips

with 50% (69 vpd) entering and 50% (69 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.10 * (X)$ No Formula, Avg. Rate = 0.10 trips/ksf

$T = 0.10 * (91.37)$ 11 Studies, Avg size = 65 ksf

$T = 9.14$

$T = 9$ vehicle trips

with 60% (5 vph) entering and 40% (4 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$T = 0.17 * (X)$ No Formula, Avg. Rate = 0.17 trips/ksf

$T = 0.17 * (91.37)$ 16 Studies, Avg size = 54 ksf

$T = 15.53$

$T = 16$ vehicle trips

with 47% (8 vph) entering and 53% (8 vph) exiting.

SATURDAY DAILY

$T = 1.95 * (X)$ No Formula, Avg. Rate = 1.95 trips/ksf

$T = 1.95 * (91.37)$ 5 Studies, Avg size = 34 ksf

$T = 178.17$

$T = 178$ vehicle trips

with 50% (89 vpd) entering and 50% (89 vpd) exiting.

SATURDAY MIDDAY PEAK HOUR OF GENERATOR

$T = 0.31 * (X)$ No Formula, Avg. Rate = 0.31 trips/ksf

$T = 0.31 * (91.37)$ 1 Studies, Avg size = 71 ksf

$T = 28.32$

Limited Data

$T = 28$ vehicle trips

with 59% (17 vph) entering and 41% (11 vph) exiting.