TRUCK COUNT AND ASSESSMENT STUDY PHASE I

for
Providence, Rhode Island Port Area

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ACRONYMS AND ABBREVIATIONS

COVID-19	Coronavirus Disease
DEM	Department of Environmental Management
DERA	Diesel Emissions Reduction Act
DOA	Department of Administration and Planning
DOT	Department of Transportation
EPA	US Environmental Protection Agency
FMCSA	Federal Motor Carrier Safety
FHWA	Federal Highway Administration
ProvPort	Port of Providence
RI	Rhode Island
WTS	Waterson Terminal Services

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 1 planned a two-phase Truck Count and Assessment study for Providence port area of Rhode Island (RI).

The purpose of Phase I is to develop a representative inventory of medium and heavy-duty freight trucks (Class 5-8) and the activity they engage in while serving businesses and other facilities in the Providence working port study area. The working port study area encompasses the Port of Providence (ProvPort), approximately ten businesses that are tenants of ProvPort (operated by Waterson Terminal Services [WTS]), and many independent industrial properties.

EPA will exercise the option to conduct Phase II in September 2020. The purpose of Phase II is to identify potential strategies to reduce air emissions and other impacts (e.g., noise and congestion) from heavy-duty trucks and their activity.

2.0 BACKGROUND

As part of the port-community engagement aspect of EPA's National Ports Initiative, EPA Region 1 has been working with state and local agencies, port businesses, and community groups in Providence, RI to identify ways to reduce the environmental impacts of the working port on employees and neighbors, while supporting vital maritime commerce. A near-term goal of this work is to assess the degree to which trucks serving the Providence working port study area, among other sources, are contributing particulate matter and other air pollutants to ambient conditions at the port and in nearby neighborhoods. Trucks not only travel in the area, but also queue up to enter some port area businesses. These queueing trucks often idle while waiting, violating RI's 5-minute idle limit, restrict access to the bicycle lanes, and use secondary roads through residential areas to access the interstate.

Information obtained from this Phase I study will inform the following entities and programs:

- RI Department of Administration and Planning's (RI DOA's) freight assessment and planning efforts;
- RI Department of Transportation's (RI DOT's) Allens Avenue Road Safety Assessment;
- RI Department of Health's air quality monitoring and asthma reduction efforts;
- RI Department of Environmental Management's (RI DEM's) diesel emissions reduction program; and
- Planning, sustainability and environmental justice priorities of Providence, RI city government.

RI DEM plans to use data from this study for Diesel Emissions Reduction Act (DERA)-funded and other projects to replace older trucks that frequent the port. Similarly, RI DOA and RI DOT plan to use the results of this project to identify efficient logistical strategies that can remove waiting trucks from public roadways, improving pedestrian and bicyclist safety while preserving driver comfort and productivity.

3.0 DATA COLLECTION

Phase I data collection occurred between July 22, 2020 and August 14, 2020 in the Providence working port study area, as detailed in **Figure 1**. Data on truck movements, truck behavior, and truck characteristics were collected at key locations in the vicinity of the port by a surveyor. Based on interviews with port business owners and public agency stakeholders (EPA, RI DOA), data collection occurred on days during which peak port traffic was expected and targeted to times of day when business activity was highest. **Appendix A** provides the detailed Data Collection Plan for Phase I.

Data collection was initially conducted using a mobile app, Survey123. Due to the speed of the trucks entering the observation locations data collection continued via paper field sheets as outlined in the Data Collection Plan.

Based on discussions with EPA, Region 1 after the initial day of data collection, field sheets were updated to allow for recording of obviously old trucks based on visual cues.

3.1 BUSINESS INTERVIEWS

Fourteen businesses in the Providence working port study area were interviewed during Phase I. Interviewers were conducted via telephone and WebEx and occurred between July 8, 2020 and August 5, 2020. Businesses that participated in this study, and their location, are listed below:

- Morton Salt (ProvPort)
- Lehigh Cement (ProvPort)
- Grimaldi Export Car Terminal (ProvPort – loading contracted to WTS)
- Leed Salt (ProvPort – loading contracted to WTS)
- Washington Mills (ProvPort – loading and trucking contracted to WTS WTS/ProvPort
- Providence DPW (Allens Avenue)
- Mid-American Salt (ProvPort)
- McInnis Cement (ProvPort)
- Sea3 Terminal [Blackline Midstream] (ProvPort)
- Holcim Cement

- RIDOT
- Global Partners LP [New England Petroleum] (ProvPort)
- Sprague Energy (Sprague Terminal) (Allens Avenue)

The Salt and Cement businesses in the port area are largely represented. There were several attempts made to reach B&B Trucking by telephone and email as a number of businesses in the ProvPort contract with B&B Trucking for services, and the study team was interested in learning about how the contract trucking businesses operates; however, an interview was not secured during Phase I of the study.

The following businesses were contacted but not interviewed due to non-response:

- Univar (ProvPort)
- Schnitzer Northeast (ProvPort)
- Hudson Asphalt (Terminal Road)
- Shell Terminal (Allens Avenue)
- Sims/Metal Management (Allens Avenue)
- Narragansett Improvement (Allens Avenue)
- Rhode Island Recycled Materials (Allens Avenue)
- Champion Salt (Allens Avenue)
- Stericycle (Allens Avenue)
- B&B Trucking (Study Area-wide)

As a result of the interviews, the following occurred:

- Preliminary data collection began prior to the finalization of the Data Collection Plan to capture the truck activities associated with the arrival of the Cobblestone vessel that arrived in ProvPort on July 21, 2020;
- Public Street and Allens Avenue was added as an observation location; and
- Observation timeframes were confirmed to be 6:30 AM – 4:00 PM.
- Confirmation that coronavirus disease (COVID-19) did not adversely affect trucking volumes for their businesses during the data collection period.

3.2 DATA COLLECTION LOCATIONS AND HOURS

Nine observation locations were chosen in order to collect the largest amount of data possible at a minimal cost, with the aim of providing a representative sample of truck traffic and characteristics in the vicinity of the port. The observation locations are presented in **Table 1** and **Figure 1**.

Figure 1 – Observation Area and Locations

Thirty-six hours of data collection was planned for the nine data collection locations, as well as an additional four hours of study area-wide canvassing for idling vehicles. Data collection was scheduled during the AM (6:30 AM – 12:00 PM) and PM (12:00PM – 4:00PM) hours. Length of observations at each study location varied based on the number and type of data points collected. High-traffic study locations and locations where multiple characteristics were collected received longer observation periods, with emphasis on Terminal Road/Ernest Street and Allens Avenue. All trucks bound for the ProvPort main gate must pass through this location, as well as in the vicinity of the ProvPort main gate where trucks travel at low enough speeds to allow for more complete data gathering. The length of observations completed at each location is presented in **Table 1**.

Table 1 – Observation Locations and Durations

Location Number	Location	Data to Collect	Length of Observation (hours)
1	Terminal Road in the vicinity of ProvPort Entrance	All Characteristics + Behavior (focus on queueing)	6.5
2	Terminal Road/Ernest Street and Allens Avenue	All Characteristics + Behavior	12.75
3	Eddy Street and Thurbers Avenue	All Characteristics + Behavior	3
4	Sprague Terminal at Allens Avenue	All Characteristics + Behavior (focus on truck routing)	5.25
5	Oxford Street and Allens Avenue	All Characteristics + Behavior (focus on truck routing)	3
6	Thurbers Avenue and Allens Avenue/I-95 On-Ramp	All Characteristics + Behavior	4.75
7	Thurbers Avenue/I-95 SB Ramps	All Characteristics + Behavior (focus on Eddy Street vs. Allens Avenue routes)	3.75
8	Thurbers Avenue/I-95 NB Ramps	All Characteristics + Behavior (focus on Eddy Street vs. Allens Avenue routes)	2.75
9	Public Street and Allens Avenue	All Characteristics + Behavior (focus on truck routing)	4.25
10	Study Area Roadways*	All Characteristics (survey of parked/idling vehicles)	4

*General roadway not identified on Figure 1 as an Observation Area.

4.0 TRUCK DATA SUMMARY AND ASSESSMENT

Data collected in July was analyzed for completeness and data quality, and three days of additional surveying was conducted in August to address data gaps and provide a comprehensive accounting of truck traffic in the area. In total, 46 hours of truck data was collected over eight days at the nine study locations. This does not include the 4 hours of observations associated with idling vehicles on the study area roadways.

4.1 DATA REDUCTION AND ANALYSIS METHOD

Data recorded on the Data Collection field sheets for each day were entered into Excel and then reformatted and combined to create the Truck Count and Assessment Study database. A quality control review of the data was conducted using automated processes as well as manual observation to address data entry issues (typos on field sheets and consistency of notation, etc.) and allow for easy of analysis.

United States DOT (USDOT) numbers recorded in the field were matched to the Federal Motor Carrier Safety (FMCSA) database and information on truck ownership and fleet characteristics were extracted from the database for all matching USDOT numbers.

The Final Truck Count and Assessment Study database was used as the source for the summarization of this truck data assessment.

4.2 DATA SUMMARY

Over the course of the eight days of data collection, 1,361 trucks were recorded at study locations as presented in **Table 2 and Appendix B**. The data shows only the raw number of trucks recorded at each location and is not factored by the number of hours of collection at each location (see **Table 6** for vehicles per hour). Specific summaries of the types and classes of trucks recorded at each study location are provided in the following sections, as well as data on truck ownership and truck travel patterns observed in the study area.

Table 2 – Total Truck Count by Observation Location

Location Number	Location	Truck Count			
		AM	PM	No Time Data	Total Trucks
1	Terminal Road in the vicinity of ProvPort Entrance	143	89	0	232
2A**	Terminal Road and Allens Avenue	45	85	67*	197
2B**	Allens Avenue and Ernest Street	24	28	0	52
3	Eddy Street and Thurbers Avenue	68	43	0	111
4	Sprague Terminal at Allens Avenue	61	36	0	97
5	Oxford Street and Allens Avenue	52	64	0	116
6	Thurbers Avenue and Allens Avenue	113	87	0	200
7	Thurbers Avenue/I-95 SB Ramps	75	78	0	153
8	Thurbers Avene/I-95 NB Ramps	73	22	0	95
9	Public Street and Allens Avenue	62	45	0	107
	Total	**716**	**577**	**67**	**1,360**

*Total includes 67 entries for which no timestamp was recorded due to a technological issue with survey equipment. **For ease of visual observation during data collection, location was divided into two observation locations. Surveyor observed from different observation points.

4.2.1 Summary of Truck Characteristics Within The Study Area

Of the 1,360 trucks recorded within the study area, truck class data was recorded for 1,265 trucks. The breakdown of trucks between the four classes studied (5, 6, 7, 8) is shown in **Table 3** and **Figure 1**. **Appendix C** presents a map view of the truck classes within the study area. Class 7 and 8 trucks constituted more than two thirds of trucks observed, with 37% and 36% of all records, respectively.

Observation records for Bulk, Box, and Flatbed trucks that did not specify single unit or trailer were omitted from this chart.

Table 3 – Truck Classes Observed Within Study Area

Truck Class	Trucks Recorded					
	AM	%	PM	%	Total	Total % by Class
5	143	21%	99	17%	242	19%
6	47	7%	55	10%	102	8%
7	290	42%	178	31%	468	37%
8	212	31%	241	42%	453	36%
Total	**692**	**100%**	**573**	**100%**	**1,265**	**100%**

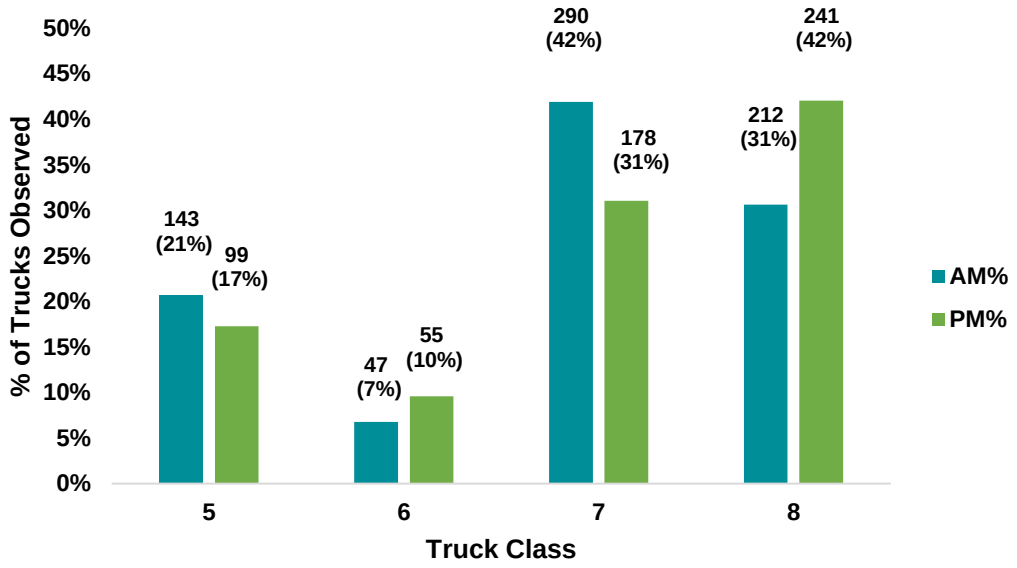

Figure 2 – Truck Classes Observed Within Study Area

Truck Body Type information was recorded for 1,348 trucks within the study area. **Table 4** and **Figure 2** shows the breakdown of trucks recorded by class. Dump trucks were the most common type of truck body type observed, 25% (342 trucks) of all recorded trucks.

Table 4 – Truck Body Types Observed Within Study Area

Body Type	Trucks Recorded					
	AM	AM %	PM	PM %	Total*	%**
Bulk (Type Unknown)	2	0%	6	1%	8	1%
Bulk Dry Powder	92	13%	46	8%	138	10%
Bulk Trailer	90	13%	90	16%	202	15%
Box Truck (Type Unknown)	13	2%	0	0%	13	1%
Box Single Unit	37	5%	52	9%	98	7%
Box Trailer	14	2%	17	3%	34	3%
Cab Only	0	0%	3	1%	4	0%
Pickup with Car Trailer	45	6%	41	7%	92	7%
Car Transporter Trailer	9	1%	20	3%	38	3%
Liquid Chemical	20	3%	10	2%	40	3%
Concrete Truck	3	0%	8	1%	11	1%
Dump Truck	202	29%	140	24%	342	25%
Flatbed Truck (Type Unknown)	6	1%	7	1%	13	1%
Flatbed Single Unit	22	3%	19	3%	41	3%
Flatbed Trailer	17	2%	16	3%	35	3%
Tanker	135	19%	99	17%	239	18%
Total	**707**	**100%**	**574**	**100%**	**1,348**	**100%**

* Total includes 67 entries for which no timestamp was recorded due to a technological issue with survey equipment.
**Percentages per body type do not sum to 100% due to rounding.

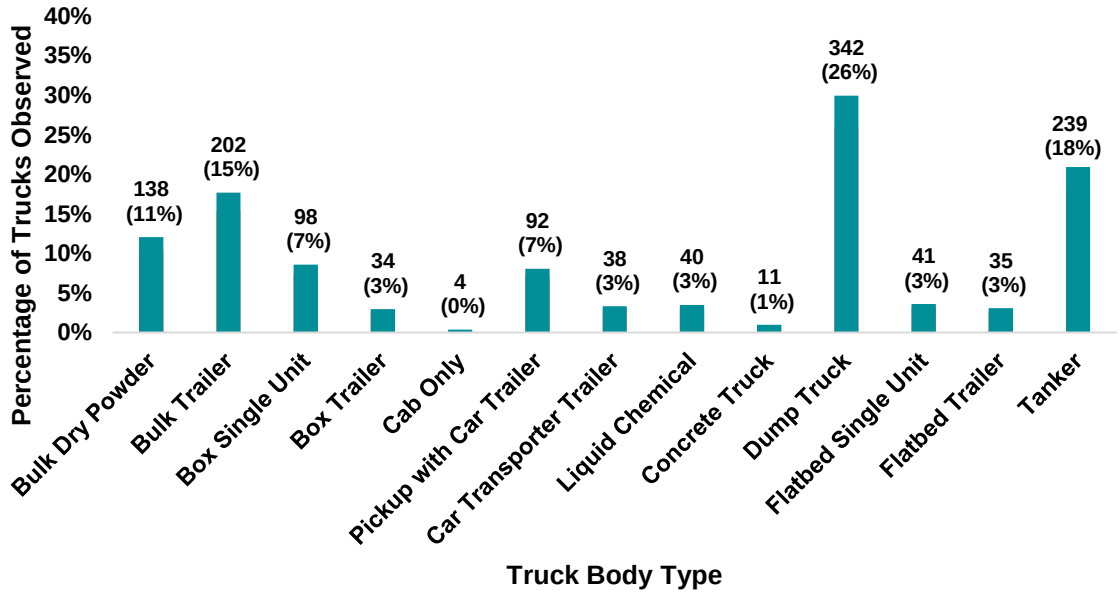

Figure 3 – Truck Body Types Observed Within Study Area

Data collection distinguished between single-unit and trailer body types. To allow for an overall understanding of cargo being transported within the study area, the two body types were combined for each truck type (Single Unit Box and Trailer Box, Bulk Trailer and Single Unit Dump Truck, etc.) yielding a broad overview of cargo types being hauled within the study area as shown in **Table 5** and **Figure 3.** Bulk cargo carrying trucks were the most common cargo type observed at 41% (530 records), with tanker-type cargo carrying trucks at 18% (239 records) as the second most common truck body type. Based on field observations and interviews with port area business, most of these tankers were transporting petroleum and fuel products. Liquid Chemical tankers were recorded separately from standard tankers.

Table 5 – Combined Truck Body Types Observed Within Study Area

Truck Body Type	Trucks Recorded	
	Total	%
Bulk	552	41%
Bulk Dry Powder	138	10%
Box	145	11%
Cab Only	4	0%
Concrete	11	1%
Car Transporter	130	10%
Liquid Chemical	40	3%
Flatbed	89	7%
Tanker	239	18%
Total	**1348**	**100%**

Note: Percentages per body type do not sum to 100% due to rounding

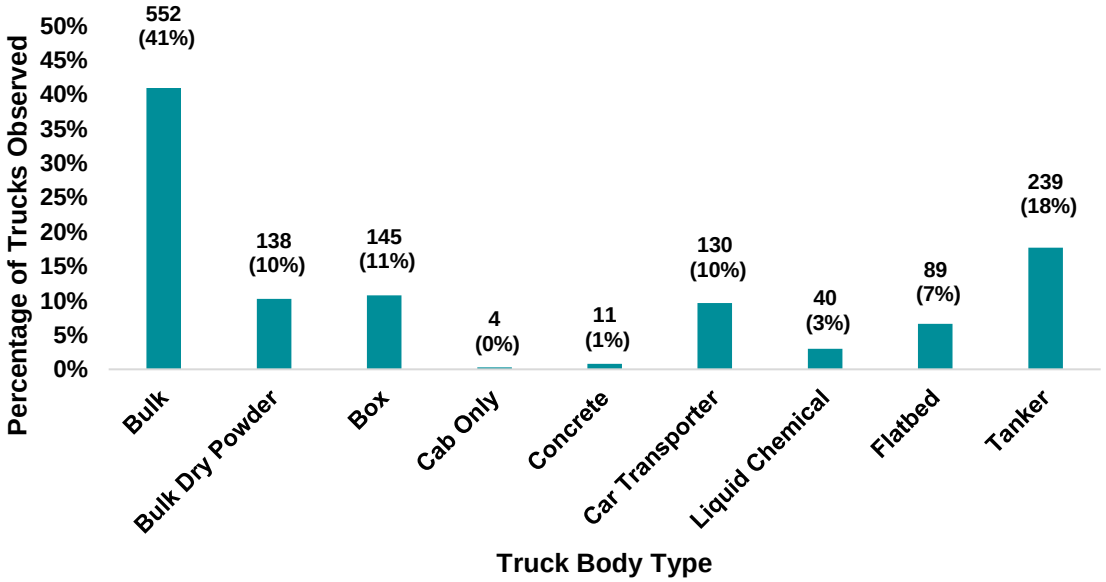

Figure 4 – Combined Truck Body Types Observed Within Study Area

4.2.2 Summary Of Truck Characteristics by Observation Location

Truck characteristics recorded at each of the nine observation locations are discussed in the following sections. Percentages shown in the charts below do not sum to 100% due to rounding.

4.2.2.1 Vicinity of ProvPort Entrance

Figures 4 and 5 detail the class and body types of trucks recorded in the vicinity of the ProvPort entrance. Class 7 trucks constituted the majority (149 records) of the trucks observed at 67%, with Bulk Dry Powder and Dump trucks constituting the most common truck body types observed totaling 53% (121 records).

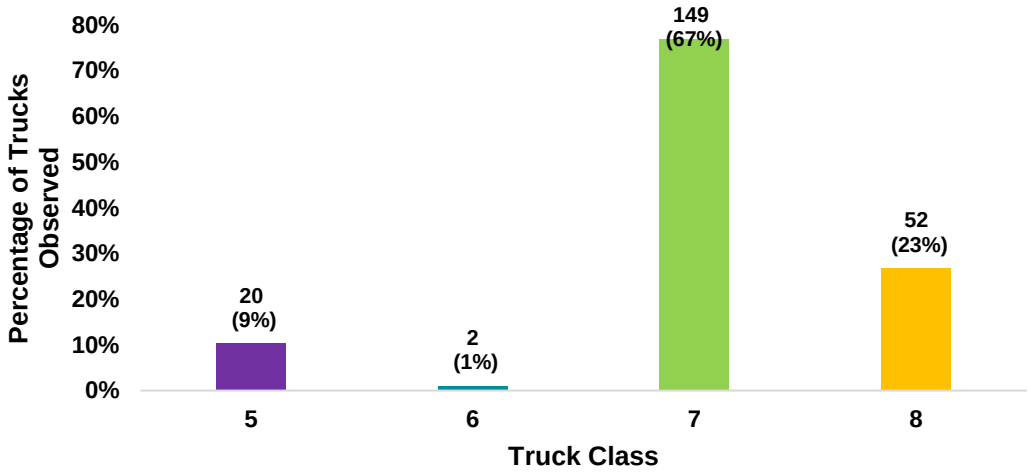

Figure 5 – Truck Classes in the Vicinity of ProvPort Entrance

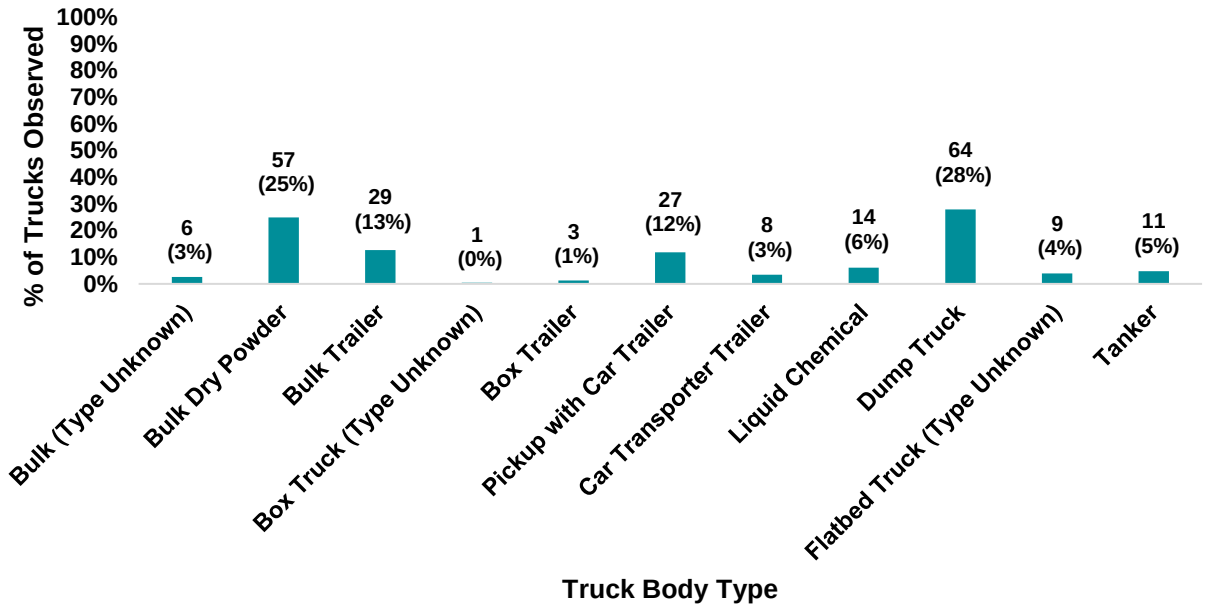

Figure 6 – Truck Types in the Vicinity of ProvPort Entrance

4.2.2.2 Allens Avenue and Terminal Road

Figures 6 and 7 detail the class and types of truck recorded at Allens Avenue and Terminal Road. Class 7 trucks constituted the largest percentage of trucks observed at 44% (56 records), with Bulk Dry Powder, Bulk Trailers, Dump and Tanker trucks constituting the most common truck body types observed totaling 61% (119 records).

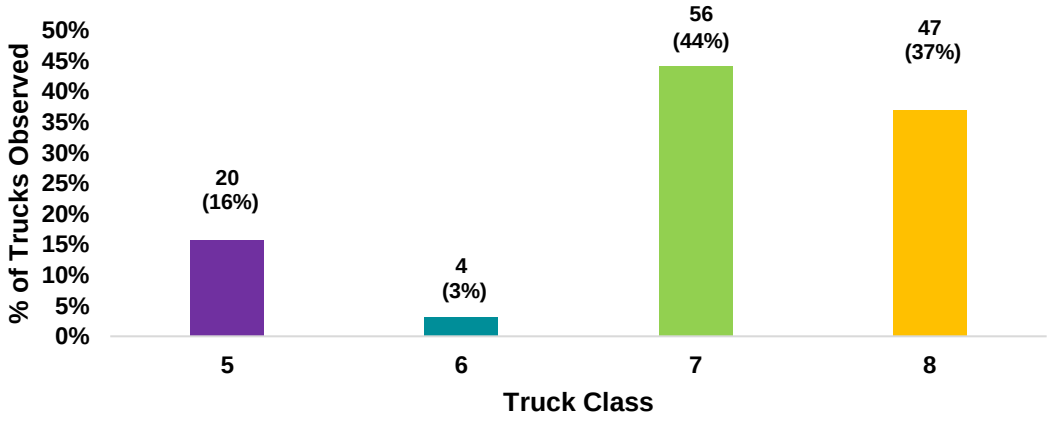

Figure 7 – Truck Classes at Allens Avenue and Terminal Road

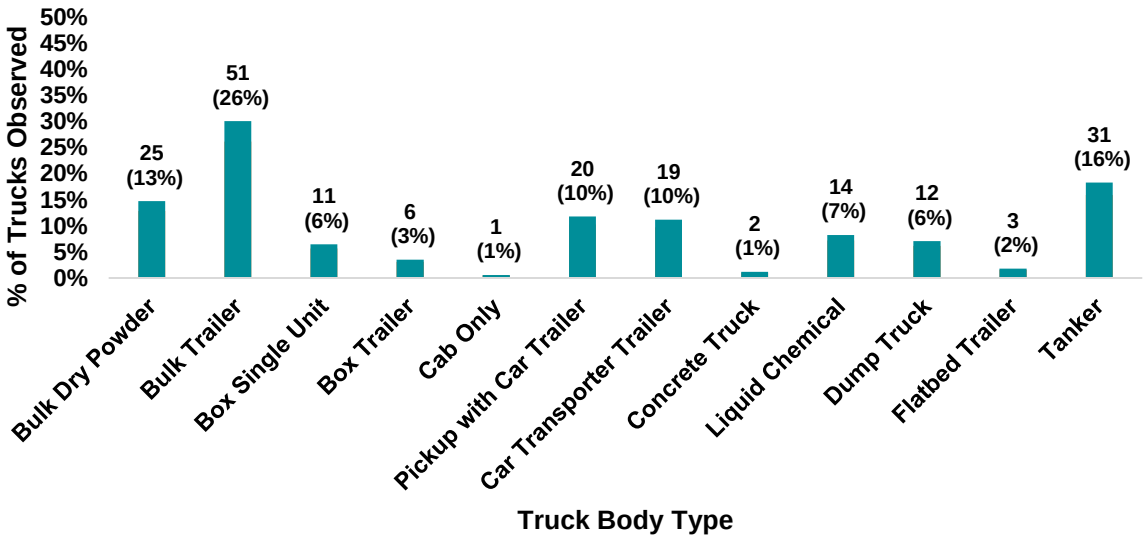

Figure 8 – Truck Body Types at Allens Avenue and Terminal Road

4.2.2.3 Allens Avenue and Ernest Street

Figures 8 and 9 detail the class and types of truck recorded at Allens Avenue and Ernest Street. Truck classes were observed in similar proportions to those at Allens Avenue and Terminal Road, with Bulk Dry Powder, Box, Dump, Flatbeds and Tanker trucks constituting the most common truck body types observed totaling 50% (25 records).

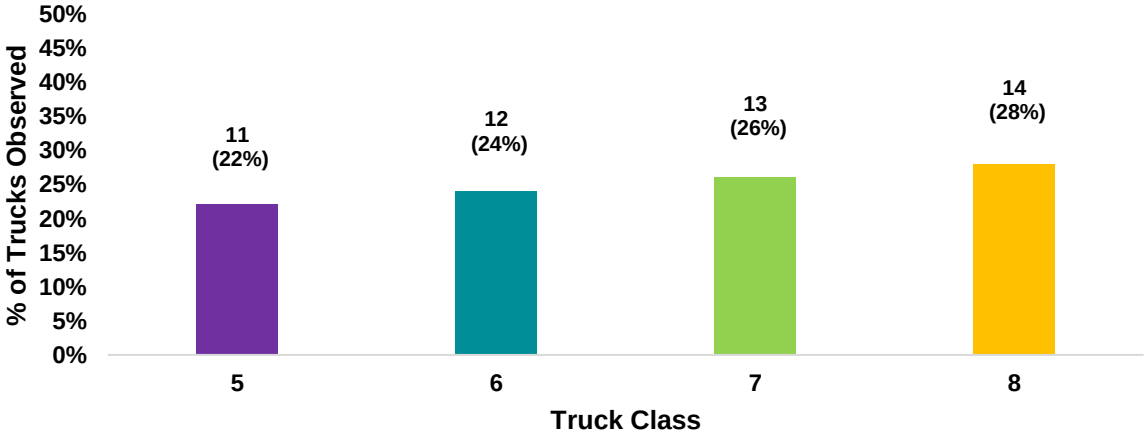

Figure 9 – Truck Classes at Allens Avenue and Ernest Street

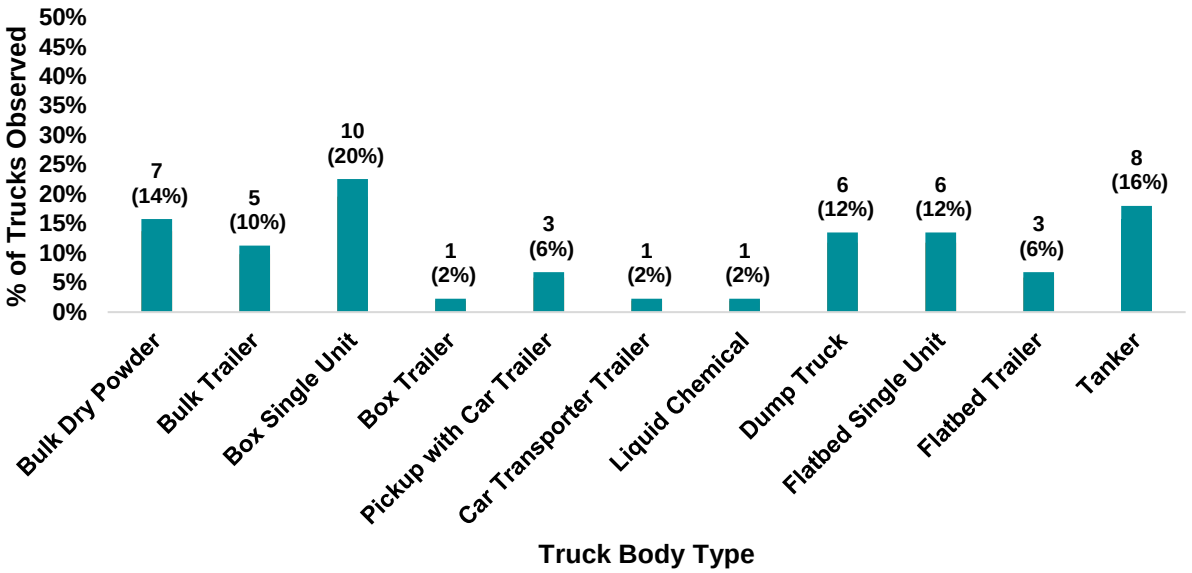

Figure 10 – Truck Body Types at Allens Avenue and Ernest Street

4.2.2.4 Thurbers Avenue and Allens Avenue/I-95 On-Ramp

Figures 10 and 11 detail the class and types of truck recorded at Thurbers Avenue and Allens Avenue/I-95 On-Ramp. Class 7 trucks were the largest percentage of trucks observed at 44% (88 records), with Tankers, Bulk Trailers, and Dump trucks constituting the most common truck body types observed totaling 62% (123 records).

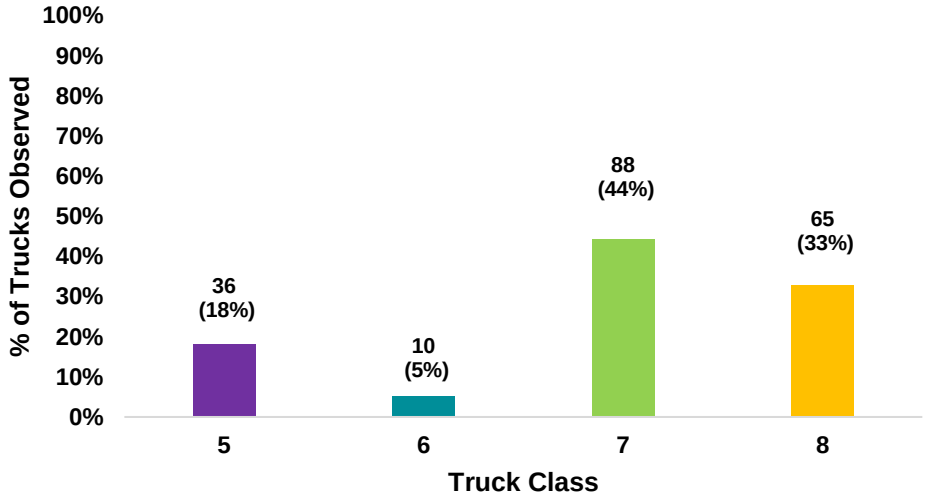

Figure 11 – Truck Classes at Thurbers Avenue and Allens Avenue/I-95 On-Ramp

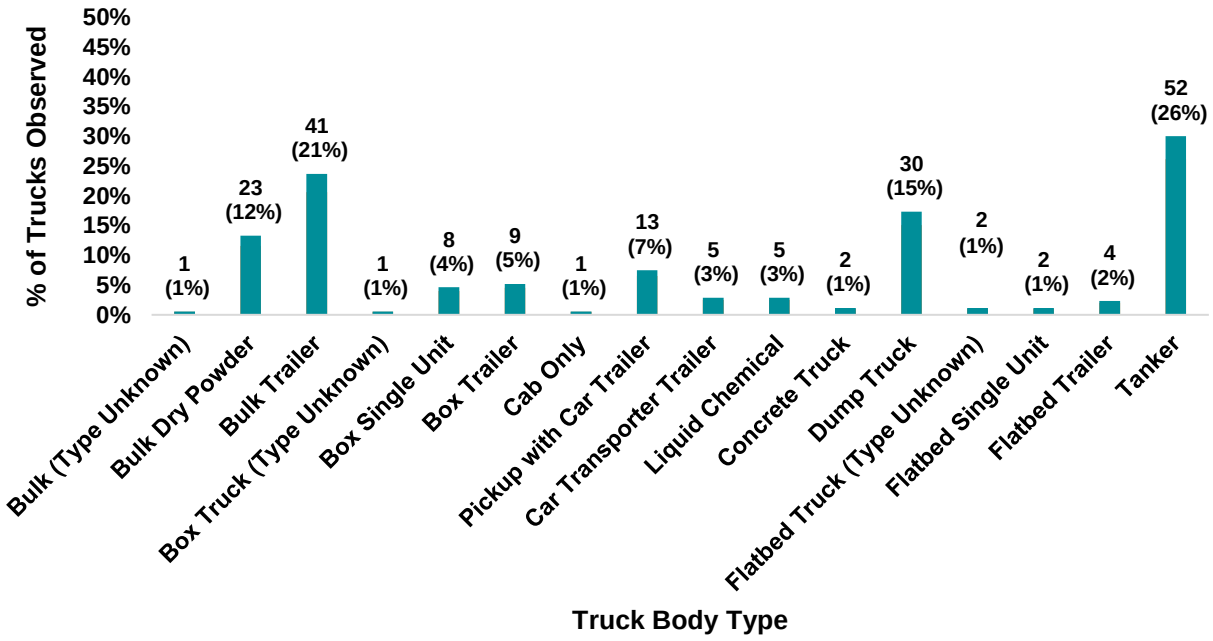

Figure 12 – Truck Body Types at Thurbers Avenue and Allens Avenue/I-95 On-Ramp

4.2.2.5 Thurbers Avenue and I-95 Southbound Ramps

Figures 12 and 13 detail the class and types of truck recorded at Thurbers Avenue/ I-95 Southbound (SB) Ramps. Class 7 trucks were the largest percentage of trucks observed at 48% (70 records), with Tankers, Box trucks, and Dump trucks constituting the most common truck body types observed totaling 65% (93 records).

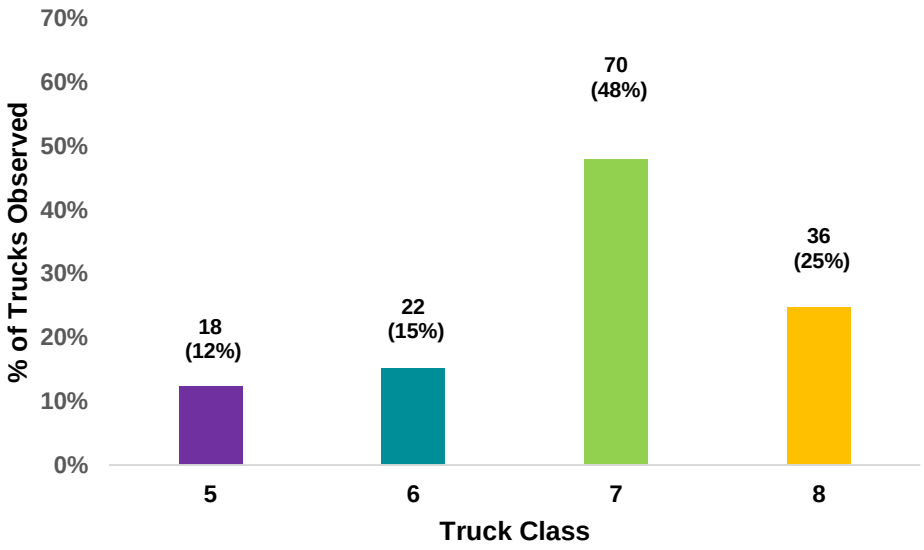

Figure 13 – Truck Classes at Thurbers Avenue/I-95 Southbound Ramps

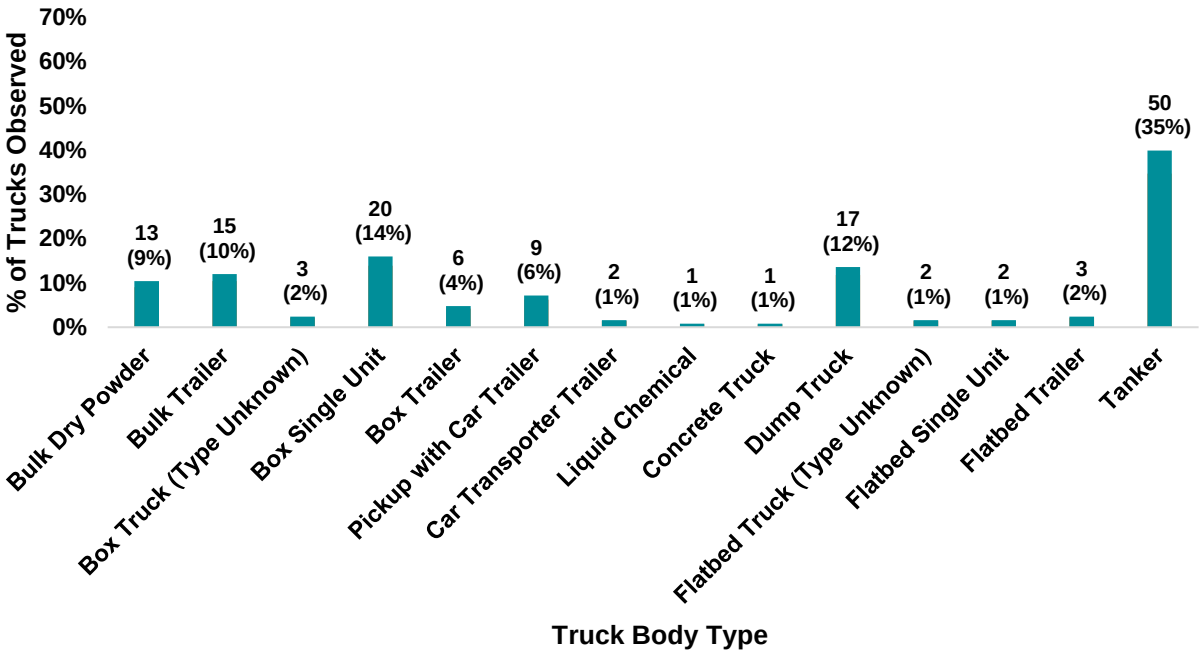

Figure 14 – Truck Body Types at Thurbers Avenue/I-95 Southbound Ramps

4.2.2.6 Thurbers Avenue/I-95 Northbound Ramps

Figures 14 and 15 detail the class and types of trucks recorded at Thurbers Avenue/ I-95 Northbound Ramps. Class 8 trucks were the largest percentage of trucks observed at this location at 40% (39 records), with Tankers, Bulk trailers, and Dump trucks constituting the most common truck body types observed totaling 61% (61 records).

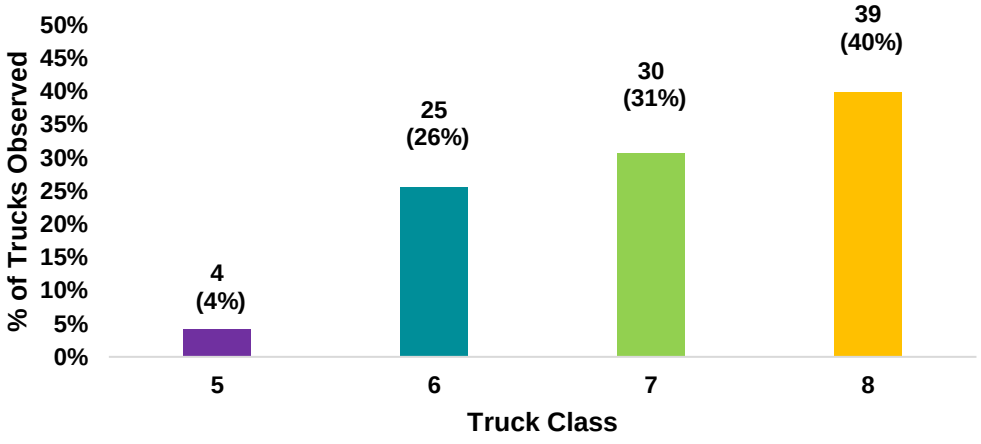

Figure 15 – Truck Classes at Thurbers Avenue/I-95 Northbound Ramps

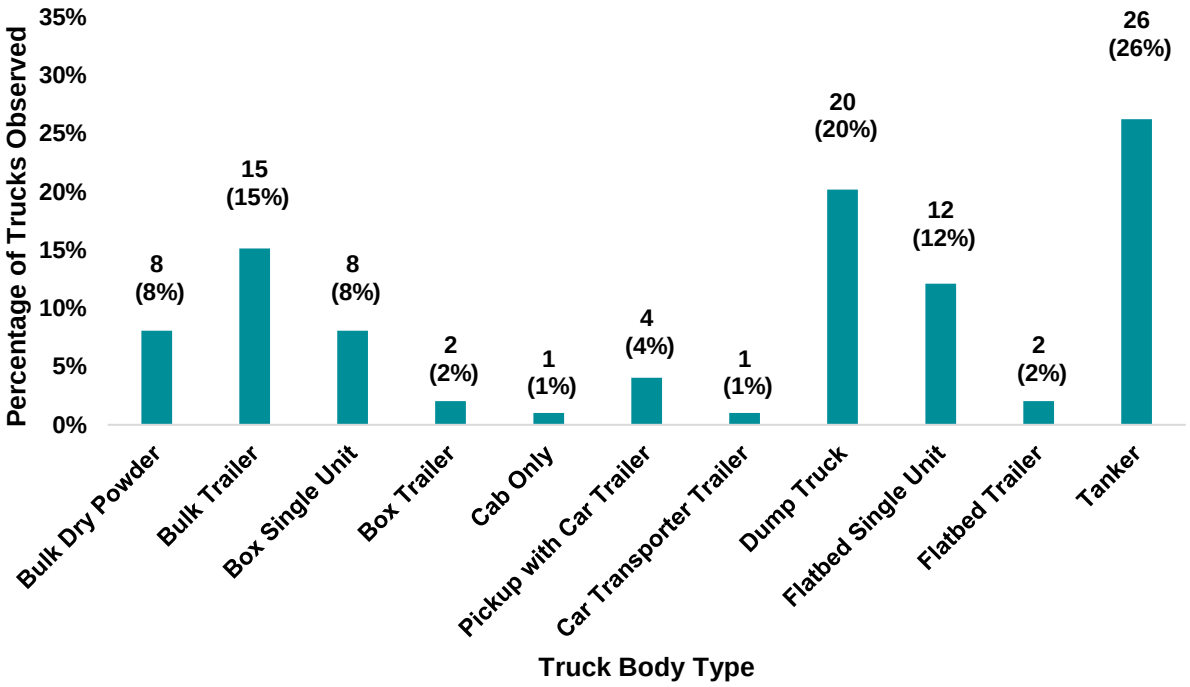

Figure 16 – Truck Body Types at Thurbers Avenue/1-95 Northbound Ramps

4.2.2.7 Eddy Street and Thurbers Avenue

Figures 16 and 17 details the class and types of truck recorded at Eddy Street and Thurbers Avenue. Class 8 trucks were the largest percentage of trucks observed at this location at 50% (55 records), with Dump trucks and Tankers constituting the most common truck body types observed totally 53% (59 records).

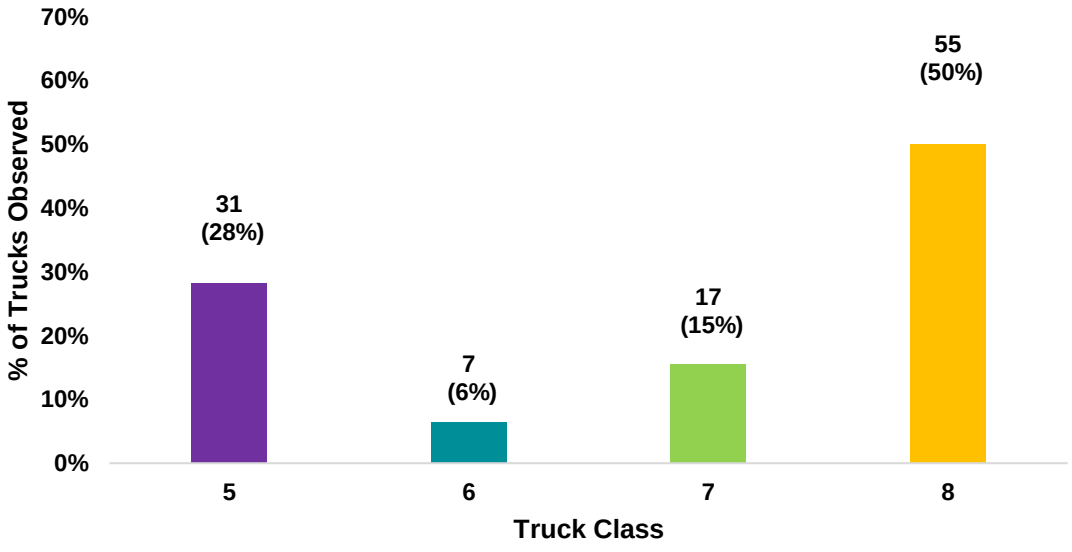

Figure 17 – Truck Classes at Eddy Street and Thurbers Avenue

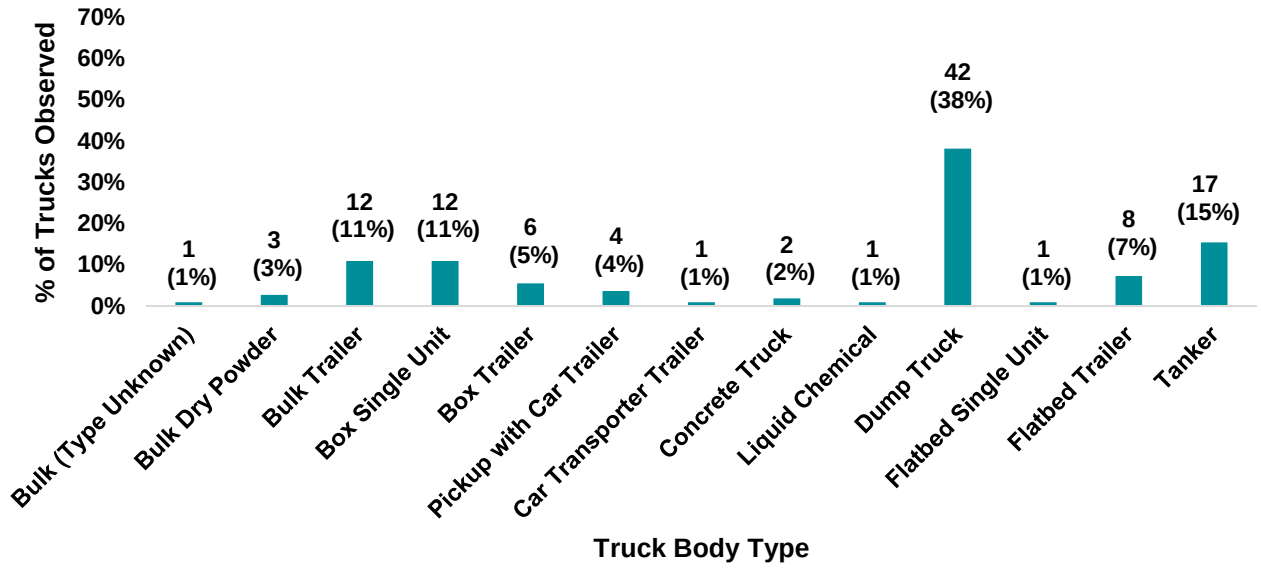

Figure 18 – Truck Types at Eddy Street and Thurbers Avenue

4.2.2.8 Allens Avenue and Public Street

Figures 18 and 19 detail the class and types of truck recorded at Allens Avenue and Public Street. Class 8 trucks were the largest percentage of trucks observed at this location at 47% (48 records), with Dump trucks, Tankers and Flatbeds constituting the most common truck body types observed totaling 81% (87 records). Construction was observed on the west leg of Public St during the study period, and it is possible that some vehicles that normally use Public St may have used an alternative route and were not recorded.

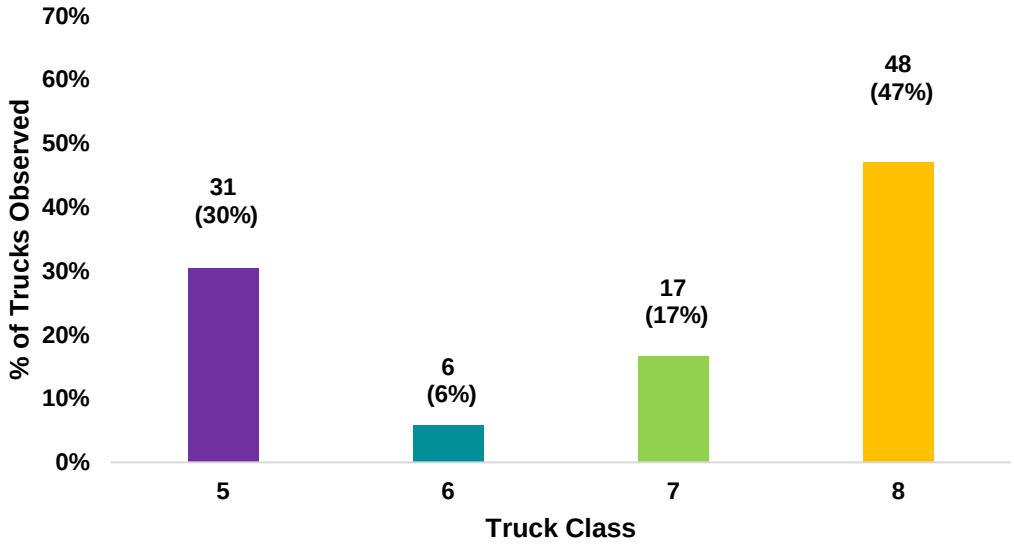

Figure 19 – Truck Classes at Allens Avenue and Public Street

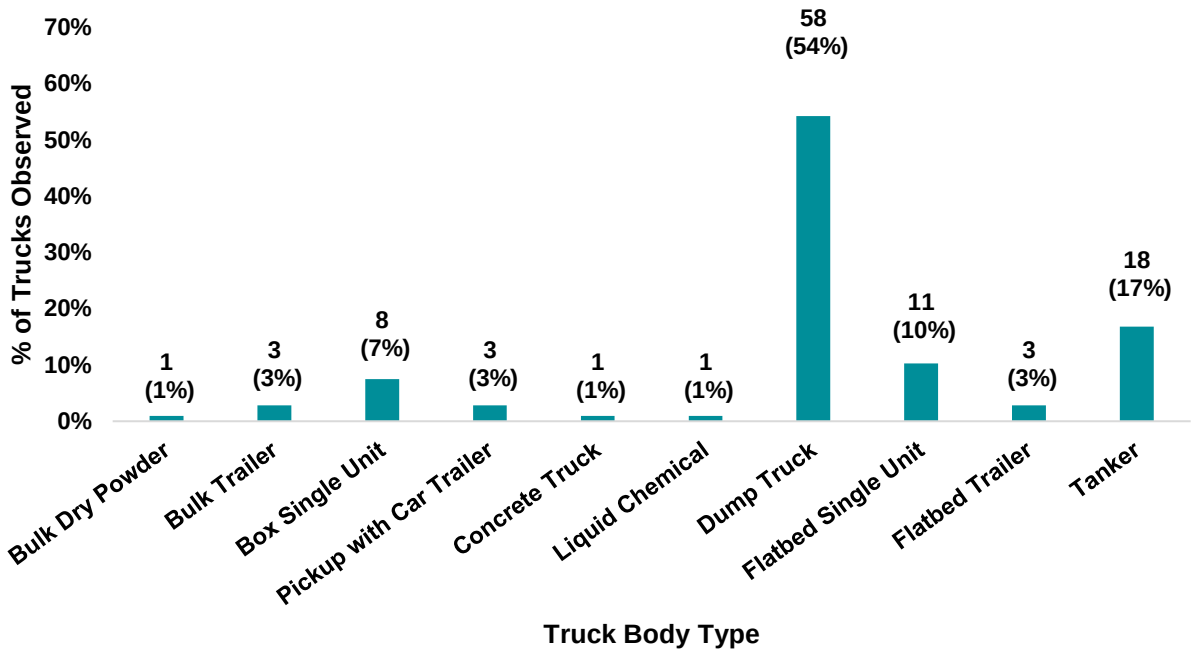

Figure 20 – Truck Types at Allens Avenue and Public Street

4.2.2.9 Allens Avenue and Sprague Terminal

Figures 20 and 21 detail the class and types of truck recorded at Allens Avenue and Sprague Terminal. Class 8 trucks were the largest percentage of trucks observed at 40% (38 records), with Dump trucks and Tankers constituting the most common truck body types observed totaling 73% (70 records).

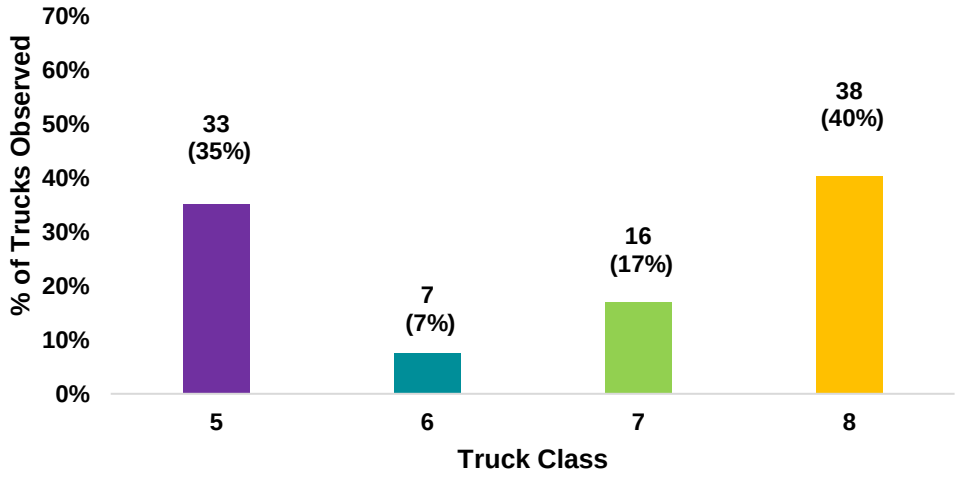

Figure 21 – Truck Classes at Allens Avenue and Sprague Terminal

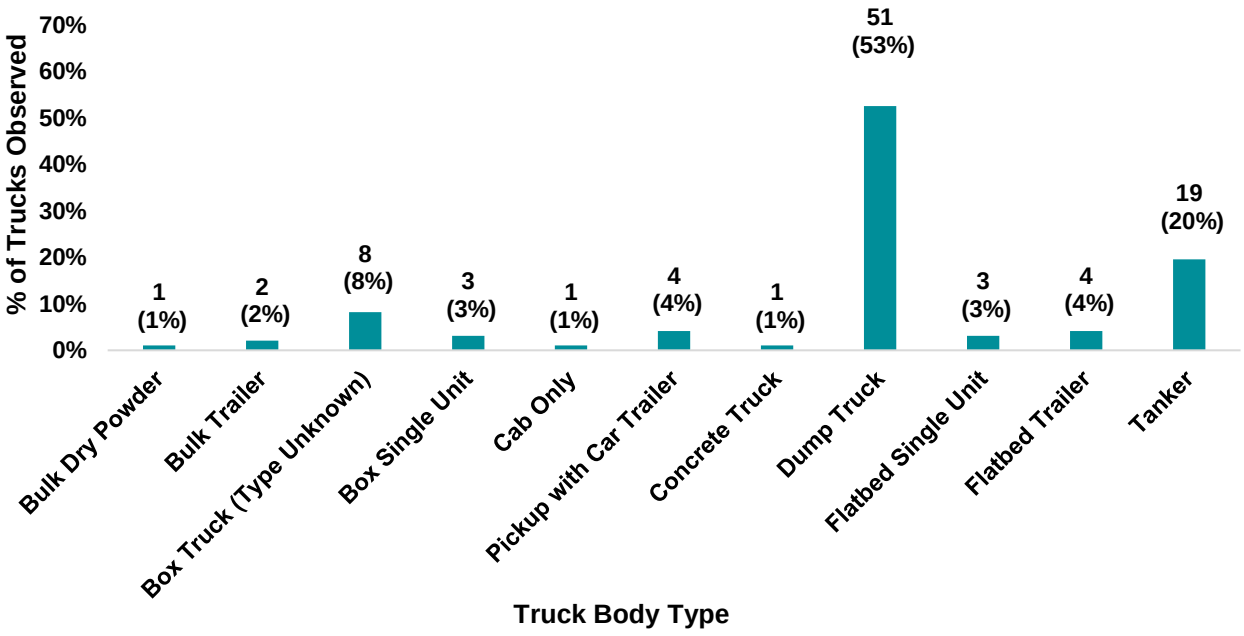

Figure 22 – Truck Types at Allens Avenue and Sprague Terminal

4.2.2.10 Allens Avenue and Oxford Street

Figures 22 and 23 detail the class and types of truck recorded at Allens Avenue and Oxford Street. Class 8 trucks were the majority of trucks observed at 51% (59 records), with Dump trucks, Bulk trailers and Box trucks constituting the most common truck body types observed totaling 79% (91 records).

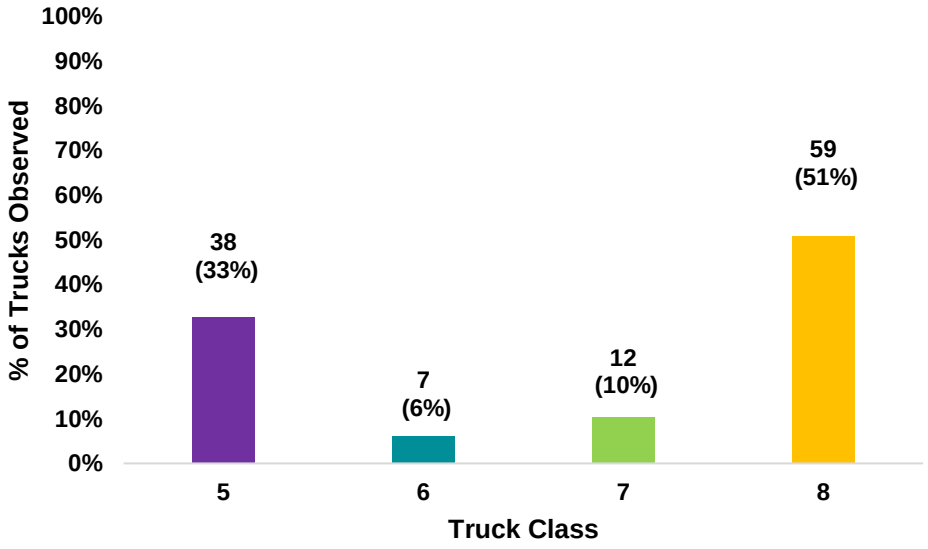

Figure 23 – Truck Classes at Allens Avenue and Oxford Street

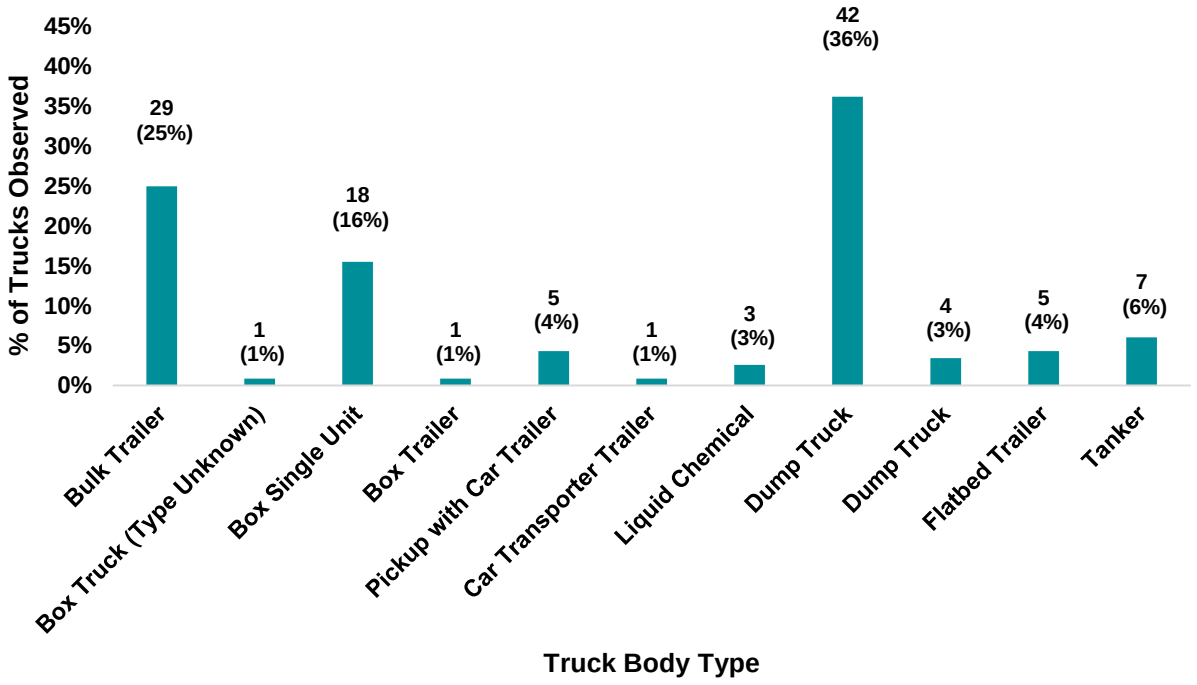

Figure 24 – Truck Types at Allens Avenue and Oxford Street

4.2.3 Summary of Truck Travel Patterns

Truck movements were recorded at study locations where observation locations allowed clear sightlines and a safe location for the surveyor to collect data. Locations were visited at different times and days. Comparing truck movement volumes per hour between locations as a definitive accounting of truck volumes is not advised as the exact same hours were not collected at each location (for example, volumes may have been recorded at one location during the busiest hour of the period and at another during the least busy hour of the period.) The overall intersection level volumes do allow for a rough approximation of the trucking volumes throughout the day at each location. The truck movement data allow for comparison among individual turning movements at any given intersection during a time period or overall and are useful in understanding truck travel patterns in the study areas.

The following sections analyses only include volumes for which movement data were recorded, trucks for which no movement data were recorded were not included.

Table 6 and Appendix D presents the overall trucks per hour at each location. These data have been normalized to account for the different numbers of hours that were recorded at each location. These volumes are shown in **Appendix D.**

Table 6 – Truck Volumes per Hour at Observation Location (with Movement Data)

Location Number	Location	Average Trucks per Hour
1	Terminal Road in the vicinity of ProvPort Entrance	36
2	Terminal Road and Allens Avenue/Ernest Street	26
3	Eddy Street and Thurbers Avenue	42
4	Sprague Terminal at Allens Avenue	17
5	Oxford Street and Allens Avenue	59
6	Thurbers Avenue and Allens Avenue/I-95 NB On-Ramp	60
7	Thurbers Avenue/I-95 SB Ramps	32
8	Thurbers Avene/I-95 NB Ramps*	47
9	Public Street and Allens Avenue	33

*Traffic from 1-95 Southbound Off-Ramp passes through this intersection

Sections 4.2.3.1 to 4.2.3.7 show detailed truck movements for selected locations. These are locations where the collected movement data helped answer some of the general research questions that were posed during the formulation of the study, and include:

- How do trucks access the Providence working port area, as well as ProvPort?
- How do trucks access I-95 Southbound given the lack of a direct ramp from Allens Avenue?
- Are trucks travelling through residential neighborhoods or off major truck routes?

4.2.3.1 2. Allens Avenue and Terminal Road

The majority of trucks observed at this location were travelling from the north on Allens Avenue to Terminal Road and vice versa. These trucks are presumed to be transiting to/from ProvPort, indicating that few trucks are travelling south of Terminal Road. The slightly lower percentage of trucks travelling northbound from Terminal Road on outbound trips as opposed to those coming from the north on inbound trips implies that some vehicles are using Ernest Street to approach I-95 southbound. **Table 7** presents truck volumes per hour at Allens Avenue and Terminal Road.

Table 7 – Truck Volumes per Hour at Allens Avenue and Terminal Road

Direction	Movement	AM	PM	Total	Truck Movement of Interest
Northbound (NB)	NB (unknown)	0	1	1	
	NBR	0	1	1	To ProvPort
	NBT	1	1	1	

Direction	Movement	AM	PM	Total	Truck Movement of Interest
Southbound (SB)	SBL	12	14	13	To ProvPort
	SBR	0	1	1	
	SBT	3	1	2	
Westbound (WB)	WBL	1	2	2	From ProvPort
	WBR	10	9	9	From Provport
Total		**27**	**30**	**30**	

Note: NB=Northbound, SB= Southbound, EB=Eastbound, WB= Westbound, L=Left-turn, R= Right-turn, T=Through movement

Table 8 – Movements of Interest Direction Splits at Allens Avenue and Terminal Road

Direction Split	AM	PM	Total
Direction split to ProvPort from South	0%	5%	4%
Direction split to ProvPort from North	100%	95%	96%
Outbound direction split from ProvPort towards Ernest Street	7%	15%	12%
Outbound direction split from ProvPort north on Allens Avenue	93%	85%	88%

4.2.3.2 3. Eddy Street and Thurbers Avenue

At this location, traffic approaching the I-95 On-Ramp from Eddy Street primarily approached from the south in the AM and from the north in the PM. Traffic from I-95 primarily headed south at the intersection. **Table 9** details truck volumes per hour at Eddy Street and Thurbers Avenue. Six trucks (five pulling trailers) were recorded at this location "creeping" through the intersection at slow speed, either due to traffic congestion at this location or difficulty making the turn for the five trailer trucks recorded.

Table 9 – Truck Volumes per Hour at Eddy Street and Thurbers Avenue

Direction	Movement	AM	PM	Total	Truck Movement of Interest
Eastbound(EB)	EBL	1	0	1	
	EBR	2	0	1	
	EBT	1	0	1	
NB	NBL	0	1	1	
	NBR	16	6	11	To I-95 from Ernest Avenue and points south
	NBT	2	0	1	
SB	SBL	8	19	14	To I-95 SB from Public Street/Oxford Street and points north
	SBT	2	0	1	
WB	WBL	5	11	8	Towards Ernest Street and points south
	WBR	3	6	5	Towards Public Street/Oxford Street and points north
	WBT	1	0	1	

Direction	Movement	AM	PM	Total	Truck Movement of Interest
Total		**41**	**43**	**45**	

Note: NB=Northbound, SB= Southbound, EB=Eastbound, WB= Westbound, L=Left-turn, R= Right-turn, T=Through movement

Table 10 presents the breakdown of trucks by direction for specific movement pairs.

Table 10 – Movements of Interest Direction Splits – Eddy Street and Thurbers Avenue

Direction Split	AM	PM	Total
Direction split of I-95 bound traffic from south	67%	24%	45%
Direction split of I-95 bound traffic from north	33%	76%	55%
Direction split from I-95 off-ramps to points north	56%	65%	62%
Direction split from I-95 off-ramps to points south	33%	35%	35%
Direction split from I-95 off-ramps to points west	11%	0%	4%

4.2.3.3 5. Oxford Street and Allens Avenue

Oxford Street is designated as a route from Allens Avenue to I-95 SB and is unsignalized (northbound vehicles must cross southbound traffic while turning). At this location, traffic turning onto Oxford Street primarily approached from the south. However, turning trucks were a small percentage of traffic in both the northbound and southbound directions. **Table 11** details truck volumes per hour at Oxford Street and Allens Avenue.

Table 11 – Truck Volumes per Hour at Oxford Street and Allens Avenue

Direction	Movement	AM	PM	Total	Truck Movement of Interest
EB	EBR	0	1	1	
	EBT	4	1	2	
NB	NBL	2	3	3	To I-95 SB
	NBT	32	36	35	
SB	SBR	2	1	2	To I-95 both directions
	SBT	12	18	16	
WB	WBT	0	2	2	
Total		**52**	**62**	**61**	

Note: NB=Northbound, SB= Southbound, EB=Eastbound, WB= Westbound, L=Left-turn, R= Right-turn, T=Through movement

Table 12 – Movements of Interest Direction Splits – Oxford Street and Allens Avenue

Direction Split	AM	PM	Total
Direction split to I-95 from south	50%	75%	67%
Direction split to I-95 from north	50%	25%	33%
Percentage of NB trucks turning onto Oxford Street	6%	8%	7%
Percentage of SB trucks turning onto Oxford Street	14%	5%	8%

4.2.3.4 9. Public Street and Allens Avenue

Public Street offers an alternative route from Allens Avenue to I-95 SB as compared to Oxford Street and is signalized. At this location, the majority of traffic was observed travelling in the direction of downtown Providence. As for the northbound traffic, 31% of trucks were observed to make the left turn onto Public Street. **Table 13** presents truck volumes per hour at Public Street and Allens Avenue

Table 13 – Truck Volumes per Hour at Public Street and Allens Avenue

Direction	Movement	AM	PM	Total	Truck Movement of Interest
EB	EBL	0	4	2	
	EBR	0	2	1	
NB	NBL	7	8	8	To I-95
	NBT	15	18	16	To Downtown Providence
SB	SBR	2	0	1	
	SBT	4	8	6	From Downtown Providence
WB	WBR	0	2	1	
Total		**28**	**42**	**35**	

Note: NB=Northbound, SB= Southbound, EB=Eastbound, WB= Westbound, L=Left-turn, R= Right-turn, T=Through movement

Table 14 – Movements of Interest Direction Splits – Public Street and Allens Avenue

Direction Split	AM	PM	Total
Direction split of NB traffic turning onto Public Street	31%	31%	31%
Direction split of NB traffic travelling towards downtown	69%	69%	69%

4.2.3.5 6. Thurbers Avenue and Allens Avenue/I-95 NB On-Ramp

Oxford Street is signed as a route from Allens Avenue to I-95 SB. For trucks exiting I-95, the majority of trucks turned right in the direction of ProvPort and points south. For traffic to the I-95 NB On-Ramp, the majority of traffic arrived from the ProvPort area to the south – this was expected given that southbound left-turning traffic onto the I-95 NB ramp must cross northbound traffic at an unsignalized intersection, a difficult maneuver for large trucks. **Table 15** details truck volumes per hour at Thurbers Street and Allens Avenue/I-95 NB On-Ramp

Table 15 – Truck Volumes per Hour at Thurbers Avenue and Allens Avenue/I-95 NB On-Ramp

Direction	Movement	AM	PM	Total	Truck Movement of Interest
EB	EBL	1	11	6	From I-95 to Allens Avenue north of Thurbers Avenue
	EBR	28	24	26	From I-95 to ProvPort area
NB	NBR	22	23	23	From ProvPort and points south to I-95 NB
	NBT	0	1	1	
SB	SBL	6	3	5	From Allens Avenue north of Thurbers Avenue to I-95 NB
	SBT	0	1	1	
Total		**57**	**63**	**62**	

Note: NB=Northbound, SB= Southbound, EB=Eastbound, WB= Westbound, L=Left-turn, R= Right-turn, T=Through movement

Table 16 – Movements of Interest Direction Splits – Thurbers Avenue and Allens Avenue/I-95 NB On-Ramp

Direction Split	AM	PM	Total
Direction split of I-95 Off-Ramps to north	3%	31%	19%
Direction split of I-95 Off-Ramps to ProvPort area	97%	69%	81%
Direction split of traffic to NB I-95 On Ramp from ProvPort area	79%	88%	83%
Direction split of traffic to NB I-95 On Ramp from Allens Avenue north of Thurbers Avenue	21%	12%	17%

4.2.3.6 8. Thurbers Avenue/I-95 NB Ramps

The majority of traffic exiting NB I-95 headed towards Allens Avenue were in the AM peak period. No trucks were recorded for the EB movements during the PM peak hour, which may indicate that data were not collected for these movements during the field visit. **Table 17** details truck volumes per hour at Thurbers Avenue/I-95 NB Ramps.

Table 17 – Truck Volumes per Hour at Thurbers Avenue/I-95 NB Ramps

Direction	Movement	AM	PM	Total	Truck Movement of Interest
EB	EBL	4	0	2	To I-95 NB On-Ramp from Eddy Street
	EBT	35	0	18	From I-95 SB Off-Ramp to Allens Avenue
NB	NBL	5	1	3	From I-95 NB Off-ramp to Eddy Street
	NBR	28	26	27	From I-95 NB Off-ramp to Allens Avenue
Total		**72**	**27**	**50**	

Note: NB=Northbound, SB= Southbound, EB=Eastbound, WB= Westbound, L=Left-turn, R= Right-turn, T=Through movement

Table 18 shows the breakdown of trucks by direction for specific movement pairs.

Table 18 – Movements of Interest Direction Splits – Thurbers Avenue/I-95 NB Ramps

Direction Split	AM	PM	Total
Direction split of NB I-95 traffic to Eddy Street	15%	4%	10%
Direction split of NB I-95 traffic to Allens Avenue	85%	96%	90%

4.2.3.7 7. Thurbers Avenue/I-95 SB Ramps

The majority of traffic exiting SB I-95 headed towards Allens Avenue were in the AM peak period. **Table 19** presents the truck volumes per hour at Thurbers Avenue/I-95 SB Ramps.

Table 19 – Truck Volumes per Hour at Thurbers Avenue and I-95 SB Ramps

Direction	Movement	AM	PM	Total	Truck Movement of Interest
EB	EBR	7	30	18	From Eddy Street to I-95 SB On-Ramp
	EBT	0	1	1	From Eddy Street to Allen Street or I-95 On-Ramp
SB	SBL	24	9	17	From I-95 SB Off-Ramp to Allens Avenue
	SBR	4	3	4	From I-95 SB Off-Ramp to Eddy Street
Total		**35**	**43**	**40**	

Note: NB=Northbound, SB= Southbound, EB=Eastbound, WB= Westbound, L=Left-turn, R= Right-turn, T=Through movement

Table 20 shows the breakdown of trucks by direction for specific movement pairs

Table 20 – Movements of Interest Direction Splits Thurbers Avenue/I-95 SB Ramps

Direction Split	AM	PM	Total
Direction split of SB I-95 traffic to Allens Avenue	86%	79%	84%
Direction split of SB I-95 traffic to Eddy Street	14%	21%	16%

4.2.4 SUMMARY BY TIME OF DAY

Overall truck volumes per hour were similar between the AM and PM periods, with slightly higher rates observed for the PM period as shown in **Table 21**. This did not match the responses from the business interviews, which indicated generally truck traffic is heaviest during the morning. This counter-intuitive result may be due to variation in the times of truck data collection between time periods (the AM period was longer than the PM, possibly resulting in more “off-peak” hours in the AM), or truck traffic not associated with the businesses that took part in the interviews.

Table 21 – Hourly Truck Volumes by Intersection (All Records)

Location Number	Location	AM Trucks per hour	PM Trucks per hour	Daily Trucks per Hour
1	Vicinity of ProvPort Entrance	32	45	36
2	Allens Ave and Terminal Rd/Ernest Street	25	27	26
3	Eddy Street and Thurbers Avenue	34	43	37
4	Sprague Terminal and Allens Avenue	18	21	19
5	Oxford Street and Allens Avenue	26	64	39
6	Thurbers Avenue and Allens Avenue/I-95 NB On-Ramp	42	44	43
7	Thurbers Avenue/I-95 SB Ramps	38	42	40
8	Thurbers Avenue/I-95 NB Ramps*	73	16	37
9	Public Street and Allens Avenue	23	30	26
	Total	**311**	**332**	**303**

4.2.5 SUMMARY OF TRUCK OWNERSHIP

USDOT numbers were recorded for 421 trucks, constituting 227 separate USDOT numbers. The USDOT numbers were matched to the FMCSA database and information on truck ownership and fleet characteristics were extracted from the FMCSA database for 142 matching numbers. The remaining numbers without matches were due to either typographic errors on the part of the field surveyor or motor carriers that had not removed an expired USDOT number from the cab door of the truck (the FMCSA database will not return ownership data for expired USDOT numbers).

The USDOT number dataset allows for characterizing truck owners by fleet size, driver number, and business name and address among other characteristics. **Table 22** details the characteristics of truck owners identified within the study area.

Table 22 – Truck Owner Fleet Size

Truck Fleet Size	# of Owners Recorded in Study Area	% of Owners Recorded in Study Area	Total Trucks Recorded in Study Area	% of Trucks Recorded in Study Area
1	17	12%	19	6%
2-10	40	28%	68	20%
11-24	21	15%	41	12%
25-49	14	10%	71	21%
50-99	14	10%	35	10%

Truck Fleet Size	# of Owners Recorded in Study Area	% of Owners Recorded in Study Area	Total Trucks Recorded in Study Area	% of Trucks Recorded in Study Area
100-500	16	11%	54	16%
500+	20	14%	48	14%
Total	**142**	**100%**	**336**	**100%**

The median truck fleet size observed in the study area was 19 trucks. Twelve percent of truck owners observed in the study area own a single truck, most likely as an owner-operator. More than half of the trucks observed in the study area are owned by an owner with fewer than 50 trucks in their fleet. **Table 23** details the top ten truck owners with the greatest number of trucks observed in the study area. A full list of all truck owner information is detailed in the USDOT Database Export tab of the Truck Database.

Table 23 – Top Truck Owners Observed in Study Area

Owner	City	State	Trucks Recorded in Study Area	Fleet Size
Wesco Oil Inc	Smithfield	RI	38	46
Univar Solutions USA Inc	Downers Grove	IL	21	1137
J P Noonan Transportation Inc	West Bridgewater	MA	17	176
Cumberland Farms Inc	Westboro	MA	14	122
B & B Trucking Corp	Rehoboth	MA	14	16
Narragansett Improvement Company	Providence	RI	8	3
Metals Recycling LLC	Johnston	RI	7	10
J E P Inc	West Bridgewater	MA	7	75
S C Ballard LLC	North Branford	CT	6	43
North American Bulk Transport Inc	Milwaukee	WI	6	99

4.2.6 IDLING BEHAVIOR

In response to anecdotal reports of truck idling on Allens Avenue, sweeps of the study area for idling, queueing and/or parked trucks on the roadway were conducted throughout the study period. These sweeps only recorded two vehicles idling on the roadway, a Stericycle vehicle in the vicinity of Eddy Street and a Car Transporter on Terminal Road. It is unclear if the limited idling observed was due to the sweeps being conducted during peak traffic times, or if seasonal businesses such as salt or fuel oil imports are associated with idling and were not observed due to the summer observation season.

4.2.7 SUMMARY OF TRUCK AGE

Due to wide variety of truck manufacturers and models, and the infrequent and minor changes in body type between truck model years, it was not possible to visually assess truck age from the observation areas. However, trucks with obvious signs of age (significant body deterioration/damage, belching smoke, etc.) were recorded on the data field sheets. Seventeen percent of the trucks had obvious sign of age (189 records).

Table 24 – Observed Truck Age

Obvious Sign of Age	Trucks Recorded	% of Older Trucks
Yes	189	17%
No	894	83%
Total	**1,083**	**100%**

5.0 CONCLUSIONS AND NEXT STEPS

The Truck Count and Assessment database provides a large trove of data for analysis. The preceding sections of this report summarize the data collected and provide interpretation of the raw data where possible. While difficult to draw definitive conclusions, the following are initial conclusions indicated by the data collected.

5.1 TRUCK TYPES, CARGO TRANSPORTED, AND PORT AREA BUSINESSES

Bulk Carriers (Bulk Dry Powder, Bulk Trailers, and Dump trucks) constituted the majority of the trucks observed, followed by Tanker trucks. This data conforms with the types of businesses that operate out of the Providence working port study area. While generally not possible to tell what is inside a bulk carrier from street-side observation locations (unless the type of good is labeled on the side of the truck), interviews with business owners and knowledge of the port imply that the majority of the bulk cargo transported through the area is comprised of concrete aggregates, cement powders, asphalt, and scrap metal. Cobblestone, aluminum oxide, and road salt are all shipped through the port on a seasonal or once-every-few-month basis (depending on demand, seasons and ship sailings). Data collection was scheduled to coincide with a cobblestone ship visit to ProvPort. Road salt trucking was not observed during the summer observation period but is prevalent through the fall and winter.

Based on interviews and knowledge of the port, the majority of tanker trucks observed in the area transport petroleum products, including gasoline, diesel/bio-diesel, and fuel oil. Data collection was conducted during the lowest months of the year (summer) for fuel oil consumption, though the summer does tend to represent high consumption levels of transportation related fuel, such as aviation fuel and gasoline.

Box trucks and containers comprised a small percentage of trucks in the port area, which was expected as there are no containers handled in the port area and little consumer related goods, finished goods and package type processing industries.

Many of the businesses interviewed operate on a wholesale terminal basis (especially for salt, fuel products) where the business imports a product and then sells it to customers who pick it up at the port using their own or contracted vehicles.

5.2 TRUCK CLASS AND ROADWAY ENGINEERING

Class 7 and 8 trucks were the majority of trucks recorded in the study area. These classes include the largest single-unit trucks on the road, as well as all commercial trailers (not including camper trailers, single car transporter trailers, etc.) The prevalence of larger trucks in the Providence working port study area does imply that much of the trucking is associated with the port or industrial businesses located in the area, as opposed to local truck traffic (which tends to be smaller box trucks making deliveries to stores, parcel delivery services, contractor vehicles, etc.) While a detailed analysis of truck turning radii at study area intersections was not conducted as part of this study, larger trucks do

require more space at intersections to make turns. At locations such as Eddy Street and Thurbers Avenue, and intersections along Eddy Street, large trucks may have difficulty making turns given the under-sized (for large trucks) geometry of the intersections. Of note, is that the center-line of the west leg of the intersection of Ernest Street and Allens Avenue was repainted to allow turning trucks more room to complete their turn onto Ernest Street (as per conversation with Providence DPW and the repainted line is visible in 2019 Google Streetview imagery).

5.3 TRUCK TRAVEL PATTERNS AND GEOGRAPHIC REACH OF PROVIDENCE PORT BUSINESSES

Section 4.2.3 provides truck travel pattern data in detail (also presented in raw form in the database). During project initiation, a variety of questions were considered in terms of travel patterns, including:

- How do trucks access the Providence working port study area, as well as ProvPort?
- How do trucks access I-95 Southbound given the lack of a direct ramp from Allens Avenue?
- Are trucks traveling through residential neighborhoods or off major truck routes?

The data collected was intersection-specific, and individual trucks were not followed through the course of their route through the port, so definitive statements as to origin and destination cannot be made from this data set. However, the following was apparent:

- The majority of truck traffic to the Providence working port area originates from the I-95 ramps at Thurbers Avenue.
- The majority of truck traffic exiting I-95 exits to Allens Avenue.
- Truck traffic bound for the I-95 southbound ramp via the Eddy Street and Thurbers Avenue intersection was observed arriving from the north slightly more often than from the south. These trucks from the north may be using Public Street, Oxford Street, or other cross-streets, while trucks from the south may be using Ernest Street.
- Very few trucks were observed accessing I-95 from west of Eddy Street, implying that few trucks are using Thurbers Avenue to travel through the residential neighborhood to the west.
- More trucks were observed using Public Street to reach Eddy Street than were observed using Oxford Street. This is likely due to the traffic signal at Public Street which allows for trucks to make an easier turn across oncoming traffic.

Businesses interviewed stated that most of their customers are located within Rhode Island, southern Massachusetts, and eastern Connecticut. This is especially true for import businesses (construction materials, fuel oil, etc.) as pricing for goods transport increases with distance, and as such there is a natural price equilibrium between the

Providence port and competing ports and fuel terminals along the eastern seaboard to the north and south in Massachusetts, Connecticut, New York, and New Hampshire.

5.4 TRUCK FLEET CHARACTERISTICS

As detailed in Section 4.2.5, 142 separate truck fleets were recorded in the Providence working port study area, ranging from owner-operators with one truck to large national corporations with thousands of trucks. This is in line with the business interviews, in which most terminal operators/import/wholesale businesses do not maintain their own truck fleets but instead contract to third parties, or customers bring their own trucks for pickup. Similarly, the car export operation that was observed, involves many independent small car export businesses (or individual sellers) delivering vehicles to the port in advance of sailing.

Phase II of the project will concentrate on outreach to truck owners to determine the level of interest in, and efficacy of, various programs to address truck emissions and impacts within the working port and neighboring communities. The USDOT number data can be used as a source of contact info for potential truck owner interviews, and fleet size can be used as a proxy for fleet age, as larger fleet owners tend to be better capitalized, operate newer trucks and replace their trucks on a more frequent basis, typically between 5 and 7 years.

5.5 NEXT STEPS

Phase II of the project will focus on gaining a detailed understanding of the mechanics of truck trips and how the trucking business interacts with the port area businesses and community. Through a targeted interview process, Phase II will collect, analyze and present information on the types of trips typically taken by trucks that frequent the Providence working port study area, including the following:

- Their origins and destinations, schedules, stops, and how long they spend in the port area;
- The way these trips are managed (by independent owner-drivers, third-party logistics providers, fleet dispatchers, and/or facility managers);
- The types of scheduling, appointment and wayfinding systems used;
- Percent empty hauls; and
- Other information that lends insight into potential ways to make truck trips in the port area more efficient.

The goal of Phase II is to propose policy, planning, design, and/or engineering strategies to manage traffic, improve freight efficiency and air quality. Phase II findings will be compared to current transportation planning and engineering research and practice to identify the policy, planning, design and/or engineering strategies that have the best

potential to improve traffic management, freight efficiency and air emissions in the project area.

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APPENDIX A

FINAL DATA COLLECTION PLAN

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FINAL

DATA COLLECTION PLAN

Truck Count and Assessment for Providence, RI Port Area

EPA Contract Number: 68HE0120P0002

Requisition Number: W912BV20F0036

Prepared for:

United States Environmental Protection Agency, Region 1
11 Technology Drive
North Chelmsford, MA 01863

Prepared by:

DAWSON

Dawson Solutions, LLC
4100 Market Street, Suite 117
Huntsville, Alabama 35808

August 2020

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ACRONYMS AND ABBREVIATIONS

DEM	Department of Environmental Management
DERA	Diesel Emissions Reduction Act
DOA	Department of Administration and Planning
DOT	Department of Transportation
EPA	US Environmental Protection Agency
FHWA	Federal Highway Administration
ProvPort	Port of Providence
RI	Rhode Island
WTS	Waterson Terminal Services

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 1 planned a two-phase Truck Count and Assessment study for Providence port area of Rhode Island (RI).

The purpose of Phase I is to develop a representative inventory of medium and heavy-duty freight trucks (Class 5-8) and the activity they engage in while serving businesses and other facilities in the Providence working port study area. The working port study area encompasses the Port of Providence (ProvPort), approximately ten businesses that are tenants of ProvPort (operated by Waterson Terminal Services [WTS]), and many independent industrial properties.

Depending on the outcome of Phase I, EPA may exercise the option to conduct Phase II. The purpose of Phase II is to identify potential strategies to reduce air emissions and other impacts (e.g., noise and congestion) from heavy duty trucks and their activity.

2.0 BACKGROUND

As part of the port-community engagement aspect of EPA's National Ports Initiative, EPA Region 1 has been working with state and local agencies, port businesses, and community groups in Providence, RI to identify ways to reduce the environmental impacts of the working port on employees and neighbors, while supporting vital maritime commerce. A near-term goal of this work is to assess the degree to which trucks serving the Providence working port study area, among other sources, are contributing particulate matter and other air pollutants to ambient conditions at the port and in nearby neighborhoods. Trucks not only travel in the area, but also queue up to enter some port area businesses. These queueing trucks often idle while waiting, violating RI's 5-minute idle limit, restrict access to the bicycle lanes, and use secondary roads through residential areas to access the interstate.

Information obtained from this study will inform the following entities and programs:

- RI Department of Administration and Planning's (RI DOA's) freight assessment and planning efforts;
- RI Department of Transportation's (RI DOT's) Allens Avenue Road Safety Assessment;
- RI Department of Health's air quality monitoring and asthma reduction efforts;
- RI Department of Environmental Management's (RI DEM's) diesel emissions reduction program; and
- Planning, sustainability and environmental justice priorities of Providence, RI city government.

RI DEM plans to use data from this study for the Emissions Reduction Act (DERA) funded project to replace older trucks that frequent the port. Similarly, RI DOA and RI DOT plan

to use the results of this project to identify efficient logistics strategies that can remove waiting trucks from public roadways, improving pedestrian and bicyclist safety while preserving driver comfort and productivity.

3.0 DATA COLLECTION

Phase I data collection will occur between July 22, 2020 and August 14, 2020 in the Providence working port study area, **Figure 1**. Data on truck movements, truck behavior, and truck characteristics will be collected at key locations in the vicinity of the port by surveyors. Based on interviews with port business owners and public agency stakeholders (EPA, RI DOA), data collection will be conducted on days during which peak port traffic is expected and targeted to times when business activity is highest based on the results of business interviews.

3.1 DATA TO BE COLLECTED

3.1.1 TRUCK CHARACTERISTICS

Physical attributes of trucks and trailers in the port area to be collected include:

- Classification: Class of Truck on Federal Highway Administration (FHWA) scale. Medium to heavy-duty trucks (Class 5-8) and Class 3 pickups towing older cars;
- Body Type: Truck Body Type (semi-trailer, single-unit, dumper, tanker, etc.);
- Cab Type: Day or Sleeper;
- Cargo Type: Type of cargo (from observations if possible);
- State of Registration: RI registration or out-of-state registration; and
- Ownership: DOT Number, Name, and Location of owner based on cab door labeling.
- Old Truck: Observe trucks that are obviously very old as shown by body damage, model type or smoke plume.

Appendix A provides a visual of the truck classes, cabs, and body types that will be observed during the study.

3.1.2 TRUCK MOVEMENTS AND BEHAVIOR

The following truck movements and behavior will be collected at study locations:

- Location: Location truck was observed (where did it come from and where was it going);
- Presence/Absence of Signage: Was the truck observed in a “no idling,” “no standing,” or “no stopping” zone, and was the truck following the posted regulation and RI’s 5-minute idle limit, if applicable;

- Date and time: Date and time truck was observed;
- Movement: Was the truck travelling with traffic, creeping in queue, or parked; and
- Engine On/Off while parked/standing: Was the truck engine on or off while truck was not-in-motion.

3.2 DATA COLLECTION METHOD

Truck characteristics and behavior will be collected via in-person observation at the designated locations. Surveyors will be located at observation locations with a clear view of the area of interest, either within a vehicle or on the sidewalk. Field sheets for each location will be prepared in advance allowing surveyors to easily record truck characteristics and behavior and provide efficient data collection and future data reduction. Sample field sheets are included as **Appendix B**.

Length of observations at each study location will vary based on the number and type of data points proposed for data collection. High-traffic study locations and locations where multiple characteristics can be recorded will receive longer observation periods. The length of observations at each location is presented in **Table 1**.

As surveyors travel to observations locations along the truck routes, the locations and characteristics of any parked or idling trucks will be recorded.

Where possible, simultaneous video recording of the truck activities at the observation locations will be conducted using a dash-mounted camera to allow for verification of data collection or future study as necessary. In addition, City of Providence video camera feeds from Red Light Violation cameras may be available and will be obtained if practicable.

3.3 DATA COLLECTION LOCATIONS

Observation locations were chosen in order to collect the largest amount of data possible at a minimal cost, with the aim of providing a representative sample of truck traffic and characteristics in the vicinity of the port. These locations were chosen in collaboration with EPA, RI State staff, and informed by discussions with the Providence City Engineer and Providence area business owners. **Appendix C** provides the interview questions used to facilitate the interviews with business owners. Interviews are summarized in **Appendix D**.

Observation locations are along primary truck routes between Providence port area businesses and Interstate-95, with a focus on areas with high truck traffic. In some instances, multiple locations will be observed from one location. The locations proposed for the data collection are presented in **Table 1** and on **Figure 1**.

Table 1 – Observation Locations and Durations

Location Number	Location	Data to Collect	Length of Observation (hours)
1	Terminal Road in the vicinity of ProvPort Entrance	All Characteristics + Behavior (focus on queueing)	6
2	Terminal Road/Ernest Street and Allens Avenue	All Characteristics + Behavior	8
3	Eddy Street and Thurbers Avenue	All Characteristics + Behavior	4
4	Sprague Terminal at Allens Avenue	All Characteristics + Behavior (focus on truck routing)	3
5	Oxford Street and Allens Avenue	All Characteristics + Behavior (focus on truck routing)	4
6	Thurbers Avenue and Allens Avenue/I-95 On-Ramp	All Characteristics + Behavior	4
7	Thurbers Avenue and I-95 SB Off-Ramps	All Characteristics + Behavior (focus on Eddy Street vs. Allens Avenue routes)	2
8	Thurbers Avenue/I-95 NB Off-Ramps	All Characteristics + Behavior (focus on Eddy Street vs. Allens Avenue routes)	2
9	Public Street and Allens Avenue	All Characteristics + Behavior (focus on truck routing)	3
10	Study Area Roadways*	All Characteristics (survey of parked/idling vehicles)	4

Notes:

*General roadway not identified on Figure 1 as an Observation Area.

Specific parking and standing locations at each observation location will be chosen by the field survey staff based on safety criteria and on-the-ground information at the time of survey. Surveyors will always be located within a parked vehicle or on a sidewalk; no observations will be made standing within the roadway at any time. A detailed Safe Work Plan is provided as **Appendix E.**

4.0 DATA REPORTING

Data collected during the field surveys will be consolidated in tabular (Microsoft Excel and CSV) and spatial (ArcGIS, ArcMap and Adobe) formats. The data will be analyzed, and a narrative report will be submitted in August 2020 for EPA review, along with a presentation of the spatial data. A final presentation of the Truck Study findings will be presented to the Providence Port Community Working Group in September 2020.

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FIGURES

TRUCK STUDY AREA WITH OBSERVATION LOCATIONS

Truck Activity Observation Areas
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	1

KEY

- Observation Area
- Working Port Study Area

Additional Source(s)
EPA, DAWSON, Esri

Projection
NAD 1983 HARN UTM Zone 19N

N W E S

0 500 1,000 Feet

DAWSON

Z:\Shared\ServiceLines\Environmental\GIS\PROJECTS\RI_ProvPort Truck Count\RI_ProvPort Truck Count.aprx | 9/8/2020 | KKeith

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APPENDIX A

TRUCK CLASSES, CABS, AND BODY TYPES

TRUCK CLASSES

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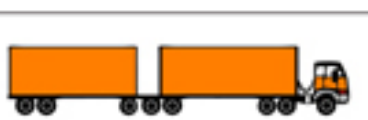
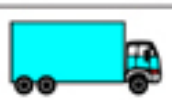
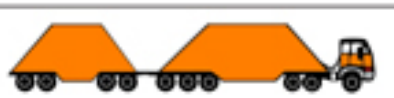
FHWA Truck Classes

Class 1 Motorcycles		**Class 7** Four or more axle, single unit	
Class 2 Passenger cars			
			
		**Class 8** Four or less axle, single trailer	
			
Class 3 Four tire, single unit			
		**Class 9** 5-Axle tractor semitrailer	
			
Class 4 Buses		**Class 10** Six or more axle, single trailer	
			
		**Class 11** Five or less axle, multi trailer	
Class 5 Two axle, six tire, single unit		**Class 12** Six axle, multi-trailer	
			
		**Class 13** Seven or more axle, multi-trailer	
Class 6 Three axle, single unit			
			
			

TRUCK CABS

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Truck Cab Types

Day Cab

Sleeper Cab

TRUCK BODY TYPES

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Truck Body Types

Car Transporter
CAR TR

Pick-Up/Small Truck with Car Transporter Trailer
CAR PU

Dry Bulk Powder
BLK DR

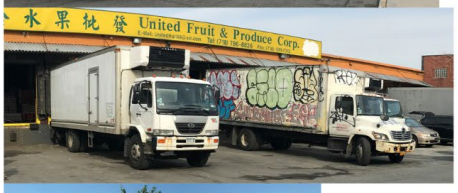
Dry Bulk Trailer
BLK TR

Tank (petroleum)
TNK

Tank (liquid chemicals)

Box Tractor-Trailer
BX TR

Box Single Unit
BX SU



Tractor Cab Only
CAB

Single Unit Tipper/Bulk
DMP

Dump

Flatbed (trailer)

FLT TR

Flatbed (single-unit)

FLT SU

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APPENDIX B

FIELD OBSERVATION SHEETS

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EPA - Rhode Island Truck Assessment **Date:** **1. ProvPort Entrance Vicinity**

Surveyor:

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Q # on arrival	Mvmt	ON/OFF	Old Truck?	Notes
	5	6	7	8	DAY/ SLP						FF/CREEP /STOP			

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

Movement Type: FF=Free Flow, CRP=Creeping, STP=Stopped

EPA - Rhode Island Truck Assessment **Date:** 7/7/20 **1. ProvPort Entrance Vicinity**

Surveyor: Phil B

Time	Class 5	Class 6	Class 7	Class 8	Cab DAY/SLP	Body Type	Cargo	State	USDOT #	Q # on arrival	Mvmt FF/CREEP/STOP	ON/OFF	Old Truck?	Notes
9:00 AM				✓	SLP	TNK	OIL	RI	268015	1	CREEP	ON		"No Idling" Sign Present
9:00 AM				✓	SLP	BX TR	?	MA	268016	2	CREEP	ON		"No Idling" Sign Present
9:00 AM				✓	SLP	FLT TR	BRICK	CT	268017	3	CREEP	ON		"No Idling" Sign Present
This shows 3 trucks that arrived together, creeping towards the entrance to ProvPort														
9:00 AM				✓	SLP	TNK	OIL	RI	268015	1	CREEP	ON		"No Idling" Sign Present
9:01 AM				✓	SLP	BX TR	?	MA	268016	2	CREEP	ON		"No Idling" Sign Present
9:02 AM				✓	SLP	FLT TR	BRICK	CT	268017	3	CREEP	OFF		"No Idling" Sign Present
This shows 3 trucks that arrived separately, all waiting to be allowed into ProvPort. Only 1 truck has turned its engine off														

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

Movement Type: FF=Free Flow, CRP=Creeping, STP=Stopped

EPA - Rhode Island Truck Assessment **Date:** **1. ProvPort Entrance Vicinity**

Surveyor:

Time	# of Vehicles in Queue	Notes

EPA - Rhode Island Truck Assessment **Date:** 7/7/20 **1. ProvPort Entrance Vicinity (Quick Check)**

Surveyor: Phil B

Time	# of Vehicles in Queue	Notes
9:00 AM	1	1 flatbed with bricks, engine off
10:00 AM	6	5 SU Box, 1 Flat trailer, all engines off
11:00 AM	2	2 oil tankers, engines on
12:00 PM	4	3 bulk trailer, 1 pickup car transporter 2 engines on, 2 off
1:00 PM	3	3 oil tankers, slowly creeping
These are all vehicles observed in queue on hourly checks of the ProvPort Entrance		

EPA - Rhode Island Truck Assessment **Date:** **2.**

Surveyor: **Allens Avenue and Terminal Rd/Ernest St**

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck ?	Allens Ave @ Terminal Rd			Allens Ave @ Ernest Ave				Notes
	5	6	7	8	DAY/ SLP						N	S	E	N	S	W	E	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** 7/7/20 **2.**

Surveyor: Phil B **Allens Avenue and Terminal Rd/Ernest St**

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck?	Allens Ave @ Terminal Rd			Allens Ave @ Ernest Ave				Notes
	5	6	7	8	DAY/ SLP						N	S	E	N	S	W	E	
9:00 AM				✓	SLP	TNK	OIL	RI	268015		TO		FR					Shell Corp
This example is a Class 8 Sleeper Cab Tanker carrying oil from Shell, registered in RI, travelling from the east leg to the North leg of Allens Ave @ Terminal Rd intersection																		
9:05 AM	✓				N/A	CAR PU	CAR	RI	N/A				TO			FR		
This example is a Pick-up with car trailer, registered in RI, travelling from west leg of Ernest Ave/Allens Ave to east leg of Terminal Rd/Allens Ave. The N/A cells can be left blank by surveyor (if it's a pickup, there's no cab type, and intrastate trucks may have no USDOT #																		
10:00 AM	✓				N/A	CAR PU	NONE	RI	N/A			TO	FR	FR		TO		Empty
This example is the same truck as above on it's outbound trip, but it is now empty (as shown by NONE in Cargo, and the "Empty" note)																		

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **3.**

Surveyor: **Eddy St and Thurbers Ave**

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck?	Eddy St & Thurbers Ave				Notes
	5	6	7	8	DAY/ SLP						N	S	W	E	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **4.**

Surveyor: **Sprague Terminal on Allens Ave**

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck ?	Allens Ave @ Sprague Terminal			Notes
	5	6	7	8	DAY/ SLP						N	S	E (Sprague Driveway)	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **5. Oxford St and Allens Ave**

Surveyor:

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck?	Oxford St & Allens Ave			Notes
	5	6	7	8	DAY/ SLP						N	S	W	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **6.**

Surveyor: **Allens Ave and Thurbers Ave**

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck?	Allens Ave & Thurbers Ave				Notes
	5	6	7	8	DAY/ SLP						N	S	W	E (95 NB Ramp)	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **7. Thurbers Ave and I-95 SB Off-Ramps**

Surveyor:

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck?	Thurbers Ave and I-95 SB Ramps				Notes
	5	6	7	8	DAY/ SLP						SB to W	SB to E	EB to S	EB to E	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **8. Thurbers Ave and I-95 NB Off-Ramps**

Surveyor:

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck?	Thurbers Ave and I-95 NB Ramps				Notes
	5	6	7	8	DAY/ SLP						NB to W	NB to E	EB to N	EB to E	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **9.**

Surveyor: **Public St and Allens Ave**

Time	Class				Cab	Body Type	Cargo	State	USDOT #	Old Truck?	Public St & Allens Ave				Notes
	5	6	7	8	DAY/ SLP						N	S	W	E	

Cab Type: DAY=Day Cab, SLP=Sleeper Cab. **Body Type:** FLT TR=Flatbed Trailer, FLT SU=Flatbed SingleUnit, DMP=Dump, CON=Concrete, TNK=Tanker, BX SU = Box SingleUnit, BX TR = Box Trailer, BLK TR=Bulk Trailer, BLK DR = Bulk Dry, CAR TR=Tractor-trailer car transporter, CAR PU=Pickup car transporter, CAB=Tractor Cab

EPA - Rhode Island Truck Assessment **Date:** **Parked/Idling Vehicle Log**

Surveyor:

Location	Time	Class				Cab	Body Type	Cargo	State	USDOT #	ON/OFF	Old Truck?	Notes
		5	6	7	8	DAY/SLP							

FF=Free Flow, CRP=Creeping, STP=Stopped

EPA - Rhode Island Truck Assessment **Date:** **Parked/Idling Vehicle Log**

Surveyor:

Location	Time	Class				Cab	Body Type	Cargo	State	USDOT #	ON/OFF	Old Truck ?	Notes
		5	6	7	8	DAY/SLP							
E side of Allens at Oxford	10:05 AM				✓	SLP	BX TR	?	RI	268015	OFF		No Driver Observed
N side of Terminal at Service Rd	10:30 AM				✓	SLP	BX TR	?	RI	268015	ON		Driver in Cab
These are vehicles observed parked/idling on the side of the road as surveyors are transiting between locations or otherwise driving in the study area													

FF=Free Flow, CRP=Creeping, STP=Stopped

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APPENDIX C

BUSINESS INTERVIEW QUESTIONS

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BUSINESS INTERVIEW QUESTIONS

1. Please describe what your company does. (business sector, etc.)
2. Does your company base and operate a truck fleet from your location in Providence, RI?
    a. If so, how many tractor units/single unit trucks do you operate at this location?
    b. What would be the average age of the tractor unit/single unit truck?
    c. If you do not operate a fleet at this location, who arranges for trucks to collect/pick up at your location?
3. How many trucks serve your location on an average day?
    a. Do you operate a delivery window, appointment or scheduling system for trucks collecting or delivering at this location?
4. What is the geographical location of customers served from this location? (how far do trucks go or where do they come from)
5. Do you know of any particular routes that trucks take to get to and from your location?
    a. Do you prescribe any routes that trucks should take?

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APPENDIX D

BUSINESS INTERVIEW SUMMARIES

Business	Interviewee(s)	Title	Email	Phone	Interview Date	Interview Summary (Full Notes Available)
Morton Salt	Juan Mora Daryl Degroff	Manager, Bulk Distribution Services - U.S. East Coast Environmental Manager - Stockpiles	jmora@mortonsalt.com ddegroff@mortonsalt.com	(312) 807-2678	7/16/2020	-Road Salt Business, imports salt by ship in summer/fall, exports to clients by truck in fall/winter -Contracts with trucking carriers managed by third-party (B&B Trucking according to Chris Waterson) -5AM-3PM normal hours Mon-Fri, Morton does not dictate truck routings or pick-up times, though most trucks use Allens Ave
Lehigh Cement	Craig Neville	Terminal Supervisor/F.S.O	Craig.Neville@LehighHanson.com	(401) 467-3652	7/16/2020	-Ready-mix bulk cement business, imports by ship/rail and exports by truck -Truck traffic is steady, driven by customer needs, not by ship/rail deliveries -Customers bring their own trucks to the facility to pick up cement -4AM-3PM Mon-Fri hours, no appointments or scheduling -Customers determine their own truck routes, though most customers are headed to Allens Ave/I-95
Grimaldi Export Car Terminal (Waterson Terminal Services Loading)	Chris Waterson	ProvPort General Manager	chwaterson@watersonllc.com	(401) 651-0589	7/17/2020	-Auto Export to West Africa business. Generally two ships per month. Cars must be delivered to ProvPort one week before the ship sails to allow for customs. -Grimaldi contracts with WTS to provide loading/berthing services -Steady delivery of vehicles to the port by independent auto exporters using their own vehicles (ranging from single vehicle delivered by driver to full car carrier with 10-12 cars). Deliveries ramp up 10-20% in the last two days before the cut-off date for a sailing -Average day has 100 export vehicles arriving (on a smaller number of trucks) -Terminal is open 8AM-3:30PM for vehicle deliveries -Most deliveries coming from I-95 or I-195 -Make sure that smaller pickups carrying 1-2 cars are counted in survey -Next sailing is on July 30th, with one-week delivery cut-off on 7/22 -Export volume is down from previous peak of 175 units per day due to COVID, though volumes have rebounded from the 60 units per day that were being shipped during March/April
Leed Salt (Waterson Terminal Services Loading)	Chris Waterson	ProvPort General Manager	chwaterson@watersonllc.com	(401) 651-0589	07/17/2020	-Imports road salt from Egypt, generally 50K ton of salt is delivered to the port, then is trucked over a period of weeks to Leed's storage facility in Cumberland -Leed contracts with third-party trucking firm -200 truck trips a day during unloading (25 trucks making multiple trips) -WTS does not dictate trucking routes, but same routing as most trucks (Allens Ave/I-95) -5AM-3PM operation -Summer/Fall is delivery of salt to ProvPort and trucking to Cumberland, generally no deliveries to Provport in winter time -Mild winter last year means that Leed has unused inventory from last year, ProvPort has not received a ship since the end of last winter. Chris expect that they might get a delivery in late fall as they being to draw down last year's inventory shipping early season salt to customers

Business	Interviewee(s)	Title	Email	Phone	Interview Date	Interview Summary (Full Notes Available)
Washington Mills (Waterson Terminal Services Loading/Trucking)	Chris Waterson	ProvPort General Manager	chwaterson@watersonll.com	(401) 651-0589	07/17/2020	-Aluminum Oxide import business. Raw materials are imported to ProvPort and then shipped to Grafton factory by truck. Washington Mills receive 3-4 ships per year. -Washington Mills leases a storage area t ProvPort which functions as a remote warehouse for their Grafton operation. Ships come in, unload to storage area, and then trucks deliver product to Grafton as needed on Just-in-Time model -Trucking is arranged by WTS using a firm called B&B Trucking and B&B's subsidiary Angel Trucking. B&B subcontracts to owner-operators as necessary if they need additional capacity -Fairly steady flow of 3-4 truck trips per day (one truck making multiple trips) throughout the year accessing ProvPort, Mon-Fri operation -No delivery window, generally first truck is at 6AM to allow for 4 truck trips in a day, otherwise 3 truck trip days end by noon -Trucks take I-95 to Route 146, but WTS does not specify what routes B&B trucking should use -Business has slowed a bit due to COVID as construction industry has slowed down
Waterson Terminal Services/ProvPort	Chris Waterson	ProvPort General Manager	chwaterson@watersonll.com	(401) 651-0589	07/17/2020	-Week of 7/20 is a good week to observe truck traffic as both Auto Export and Cobblestone Import ships will both be in port -Cobblestone operation is similar to salt, ship comes in, unloads to dock, and then trucked as fast as possible to Seekonk. Generally takes two weeks of constant trucking to empty supply. -Generally two cobblestone ships per year, WTS provides both unloading and contracted trucking service -Cobblestone ship to arrive 7/21, trucking provided by B&B Trucking -Port hours for WTS run business and services is generally 7AM-4PM, but tenants have access 24/7 -Deliveries/pick-ups to the port are not allowed access until the business opens. For example, Grimaldi opens at 8AM, but trucks will queue at the gate before 8AM until opening time. Cobblestone operation will begin at 7AM but trucks may queue outside of the gate prior to 7 AM. Queue observations the week of 7/20 at 6:45 and 7:45 AM would capture this behavior -Chris will put project team in touch with B&B to discuss truck ages and general practices
Providence DPW	William Bombard	City Engineer	Wbombard@providenceri.gov	(401) 680-7535	7/8/2020	-DPW office overlooks Allens Ave/Terminal Rd/Ernest St intersections -Traffic lights are coordinated along Allens Ave, but queues for turning trucks to/from Terminal Rd do occur at times -Major issue is access to I-95 SB. Trucks use Oxford St and Ernest St, but neither is ideal given the size of the roadways and track turning radii. Minor geometric/pavement parkings have been made to make this easier. -Allens Ave is a state road -DPW may be able to provide access to red light camera video feeds, will investigate on their end and report back -Surveyor can park a vehicle at DPW parking lot on Ernest Rd

Business	Interviewee(s)	Title	Email	Phone	Interview Date	Interview Summary (Full Notes Available)
Mid-American Salt	Mark Thiele Michael Recker	Vice President Title unknown	mark@midamericansalt.com michael@midamericansalt.com	(260) 387-6170 ext 1004	7/22/2020	-Providence location imports road salt for municipalities/contractors. Previously ran a retail bagging operation at ProvPort, but building was demolished as scheduled and now just bulk import -~2700 semi-truck loads per ship going to 30-40 customers in a given year. -Mid-American contracts out the trucking for some deliveries (often government clients), while some customers bring their own trucks, or subcontract trucks to make pick-ups from ProvPort -Customers start receiving product in October and receive on an ongoing basis due to limited storage -30-50 trucks per day on average during winter, 100-110 is the record -Truck traffic is driven by weather forecasts and customer product use -Mon-Fri typical operation from 6AM-4PM, though weekends very occasionally -50-75 mile radius for customer geography -Mid-American does not dictate routes, but most use Allens Ave/I-95 -No COVID impact so far on Providence as salt season has not begun -Mid-American is interested in EPA/State/Local policies on salt storage sheds as they believe sheds have environmental benefits but permitting is often difficult. Also interested, in government policies in regards to treated salt which may allow customers to reduce the amount of salt they apply to roadways
McInnis Cement	Seth Underwood		seth.underwood@cmcinnis.com	401-318-6544	7/23/2020	- Bulk cement powder distribution terminal -McInnis contracts to third-party trucking companies for 40% of their business, the other 60% pickup cement powder using their own trucks. -50-60 trucks per day -Customer delivery orders are scheduled for pickup at the terminal by McInnis' hired trucks just to make sure that trucks arrive at the customers' locations on time. Customers who pick up their orders do not have any scheduling, first-come first serve -Mon-Fri, 12AM-4PM. Spring and fall are busiest seasons, business will be steady through mild winters -Customer base extends to NH, New Haven, west to Hartford -No input on truck routing from the business -COVID had a slight impact in March/April but has rebounded
Sea3 Terminal (Blackline Midstream)	Willie Willis	VP of Operations for Blackline Midstream	willie.willis@sea-3.com	281-639-1925	7/24/2020	-Sea3 is a refrigerated propane terminal, propane shipped in and then picked up by customers (distribution companies) who arrange their own trucking (contracted or self-owned) -Peak season is winter, though there is still business in summer. The facility permit allows up to 240 trucks per day, but they have never hit the permit number -Customers have 24/7 access to site, no scheduling system for customers, first come-first served -3-6AM is busiest time as trucks receive propane before delivering to customers

Business	Interviewee(s)	Title	Email	Phone	Interview Date	Interview Summary (Full Notes Available)
						-Geographic reach is Southern New England (parts of NH, CT, RI, MA) -COVID did not impact sales during heating season as people stayed home, but slightly slower summer as resort business is down -Particularly interested in the effects of tolls/other fees on businesses that might affect the cost-competitiveness of their business versus other states/ports
Holcim Cement	Bill Kastin	Sr. Terminal Manager Providence RI / New Haven CT Terminals U.S East	bill.kastin@lafargeholcim.com	914-804-1929	7/23/2020	-Cement distribution in Providence. Portland cement brought in by barge, distributed by tractor trailer -75% of customers pick up with their own trucks, while Holcim contracts to third-party carrier to deliver the remainder to customers -35 trucks per day, no scheduling system, truck traffic is driven by customer needs -Fall and spring are busiest seasons, but will work through winter if it is mild -4AM-4PM hours, but peaks between 4-11AM -Truckers free to use their own routes, however many operate under a general overweight permit which requires use of specific overweight routes. This can be an issue for customers outside of RI who would require additional overweight permits for other states -COVID has not affected business much as Providence job sites did not close down
RIDOT	Sean Raymond	Managing Engineer, Traffic Safety Engineering	sean.raymond@dot.ri.gov	Web call	7/27/2020	-Traffic Safety Engineering did a Road Safety Assessment for Allens Ave, partially due to pedestrian fatality on Allens Ave at Stericycle. This study identified issues with truck idling. Project had proposed a road diet, but that potion has been delayed indefinitely due to construction on I-95 and resulting traffic spillover to Allens Ave -RIDOT has added regulatory signs addressing idling, though enforcement is left to Providence PD -Initial Allens Ave plans had attempted to include bike lanes and truck idling areas, but truck areas did not make it into the final plan (which was shelved) -I-95 SB Ramp Access has been discussed in the past, but Sean is unaware of any projects addressing that at present, and future projects would likely need to be grant funded -Sean will share Stericycle contacts, though they may be out-of-date -Traffic signal improves and pavement marking refresh were conducted as part of the Allens Ave project, as well as addition of a mid-block crosswalk at the Stericycle location on Allens Ave -Allens Ave project require many stakeholders to come to the table, especially in terms of balancing ped/bike safety and trucking interests
Global Partners LP	Dylan Remley	Senior Vice President of Terminal Operations at Global Partners LP	DRemley@globalp.com	Web call	7/27/2020	-National fuel distribution company, Providence is a wholesale terminal for bio-diesel, heating oil, and diesel fuels -Most fuel arrived by barge, though bio-diesel is generally trucked in from a local manufacturer -All product is picked up by customers using their own or contracted trucks -Busiest during winter due to heating oil season, 125-150 trucks per

Business	Interviewee(s)	Title	Email	Phone	Interview Date	Interview Summary (Full Notes Available)
						day during winter, roughly half to a third of that truck volume during summer -No delivery window system, most trucks pick up early in the day, with 5-6AM being the standard time for a first load, with some trucks returning for a second load or shift at noon if feasible -Terminal is open practically 24/7 during the winter except on Sundays. Most days are similar in volume, though weather plays a factor - cold weekend may mean a busier Monday based on heating oil distributors calculations -Service area is 75-100 miles -COVID had slight impact on motor fuel side of the business, no effect on heating oil
Sprague Energy (Sprague Terminal)	Larry Laverriere Eric Smith	Managing Director of Terminal Operations Terminal Manager, Providence	LLaverriere@spragueenergy.com EDSmith@spragueenergy.com	Web call	8/5/2020	-Wholesale fuel distribution terminal (heating oil and asphalt) -Fuel arrives by barge, picked up by customers using their own trucks -50-60 trucks per day during heating oil season -Open Mon-Fri 2 AM -8 PM, Saturday 6 AM - 12 PM during summer (Saturdays 6 AM-5 PM in winter) -Busiest 5 AM to 1 PM -Coverage includes Rhode Island and some of Southern Mass -While most trucks use major roadways, heating oil trucks travel on all types of streets on the last leg of their trip to residential customers

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APPENDIX E

SAFE WORK PLAN

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1.0 SAFE WORK PLAN

1.1 GENERAL INFORMATION

General Information			
Contract / Project Description:	EPA Region 1 – Truck Count and Assessment for Providence, RI Port Area	**Safe Work Plan (SWP) No.:**	001
General Contractor:	Dawson Solutions, LLC (DAWSON)	**Date:**	7/6/2020
Contractor Performing Work:	DAWSON and HDR Environmental Operations and Construction, Inc. (HDR)	**Revision No.:**	0
Primary Task:	Truck Data Pattern Observations		
Method of Construction:	Visual Observations		

Equipment / Materials (Product Data Sheets & Safety Data Sheets Attached):		
Clipboard	Camera	Vehicle

1.2 DEVELOPMENT TEAM

Development Team					
Prepared By:	**Position/Title**	**Date**	**Reviewed By:**	**Position/Title**	**Date**
Philip Betheil	Transportation Planner	7/6/2020	Bradley J. Kuntz	Environmental Health & Safety Manager	7/8/2020

1.3 FIELD PERSONNEL (ASSIGNED)

Field Personnel (Assigned)			
Field Personnel	**Discipline**	**Field Personnel**	**Discipline**
Louis Macri	Environmental Analyst		

1.4 FIELD PERSONNEL (ASSIGNED)

Safety Analysis			
Work Element(s)/Sub Tasks:	**Hazard Description**	**Hazard Control/Accident Prevention**	**Specific Training & PPE Required**
Prior to commencing work	▪ Lack of information. ▪ Lack of preparation. ▪ Improper personal protective equipment (PPE)	▪ Employee training. Survey work area for potential hazards. ▪ Job specific safety briefing. Participants review and sign SWP. ▪ Emergency numbers and SDS sheets to be available at work site. ▪ Ensure that first aid kit will be available at site during the survey. ▪ Use of required PPE.	▪ Safety Orientation on-site ▪ Safety vests, proper footwear.
Working on publicly accessible property	▪ Personal safety	▪ Adhere to clothing and PPE requirements. ▪ Fitness for duty inspection (zero tolerance for drug and alcohol use.) ▪ Conduct job safety briefing prior to the commencement of work and at any changes to work thereafter.	▪ Safety vests, proper footwear, proper clothing. ▪ Safety inspection checklist. ▪ Valid identification.
Truck Observations	▪ Auto Traffic ▪ Personal Safety	▪ Situational Awareness ▪ Record observations/take photos only from locations outside of the roadway (vehicle, sidewalk, median, grass). ▪ Minimize time within/crossing roadway and cross only with traffic light.	▪ Safety vests, proper footwear.
Emergency procedures	▪ Emergencies: fire, medical, disasters.	▪ Administer first aid if applicable. Call 911 for all emergencies. ▪ Nearest Hospital: Rhode Island Hospital, 593 Eddy Street, Providence, RI 02903 (401) 444-4000 ▪ Nearest Urgent Care Center:	▪ All employees to follow direction of emergency personnel.

Safety Analysis			
Work Element(s)/Sub Tasks:	**Hazard Description**	**Hazard Control/Accident Prevention**	**Specific Training & PPE Required**
		Providence Community Health Centers Express Clinic, 355 Prairie Avenue, Providence, RI 02905 (410) 444-0570 ▪ Project Manager: Keisha Harris-Stokes, (850) 491-5433 ▪ Project Transportation Planner – Philip Betheil, (212) 545-5438	
Prior to Work and Travel To/From Job Site - Coronavirus (COVID-19)	▪ Team member with high risk or with symptoms of COVID-19 ▪ Increased exposure potential to COVID-19 ▪ Inadequate social distancing for COVID-19	▪ Provide adequate supplies for the task and access for all team members (hand washing and sanitation stations, PPE (gloves, face shields, masks, as applicable), etc.). ▪ Follow hygienic practices to reduce the spread of germs: o Wash hands regularly and thoroughly with soap and water, for a minimum of 20 seconds. While in the field keep hand sanitizer (containing at least 60% alcohol) and/or disinfectant wipes easily accessible. o Wash hands frequently with soap and water or use hand sanitizer if there is no soap or water available. o Avoid touching your nose, mouth, and eyes and sanitize hands before and after eating.	▪ COVID-19 specific training ▪ Hand sanitizer, disinfecting wipes, gloves (as necessary) ▪ Face covering ▪ DAWSON COVID-19 Pre-Planning AHA ▪ DAWSON COVID-19 Screening Questionnaire and Log ▪ DAWSON COVID-19 Travel Logistics Form

Safety Analysis			
Work Element(s)/Sub Tasks:	**Hazard Description**	**Hazard Control/Accident Prevention**	**Specific Training & PPE Required**
		○ Cover coughs and sneezes with a tissue, or cough and sneeze into upper sleeve if tissues are not available. ○ Properly dispose of tissues immediately after use (do not place used tissues on desk surfaces or in clothing pockets). ○ Wash hands or use hand sanitizer after coughing, sneezing or blowing your nose. ○ Wipe-down frequently touched work surfaces, tools, and equipment with sanitizing wipes. ○ Use disposable gloves if handling tools and equipment that may be contaminated or there is a need for direct contact with potentially contaminated surfaces and access to handwashing or hand sanitizer is not immediately available ○ Avoid using other employees' work tools and equipment. ▪ Avoid close contact with others; maintain social distancing when possible (defined by the CDC as	

Safety Analysis			
Work Element(s)/Sub Tasks:	**Hazard Description**	**Hazard Control/Accident Prevention**	**Specific Training & PPE Required**
		remaining out of congregate settings, avoiding mass gatherings, and maintaining distance (approximately 6 feet/2 meters) from others). ▪ Avoid handshakes. Always wash/sanitize hands after physical contact with others ▪ Screen field team for risk and symptoms in accordance with CDC recommendations (symptomatic personnel should stay home and report condition to their Supervisor): o In the last 14 days have you or anyone you have been in close contact with had a confirmed case of COVID-19? o Have you, or anyone in your family, been in close contact with a person that is in the process of being tested for COVID-19? o Have you traveled internationally, been on a cruise ship, or been to any domestic location categorized as Level 3 by the CDC in the last 14 days? o Have you had a fever of over 100.4 degrees in the last 72 hours, without the	

Safety Analysis			
Work Element(s)/Sub Tasks:	**Hazard Description**	**Hazard Control/Accident Prevention**	**Specific Training & PPE Required**
		use of fever reducing medication? ○ Are you currently, or in the past 72 hours experienced coughing or shortness of breath? ○ If you start experiencing symptoms of COVID-19 or other illness, notify your field team leader and supervisor ▪ Avoid public transportation when possible. ▪ If driving with two people, the passenger should sit in the back seat to create maximum separation or use multiple vehicles as necessary. ▪ Wear a face covering in shared vehicles. ▪ Carry sanitizing wipes to use on hands and surfaces you could frequently make contact with during travel. (Uber/Lyft, or rental cars)	

1.5 IMPLEMENTATION/REVIEW WITH WORK FORCE

Implementation / Review with Work Force					
Print Name	**Signature**	**Date**	**Print Name**	**Signature**	**Date**

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APPENDIX B

TRUCK COUNTS BY OBSERVATION LOCATION

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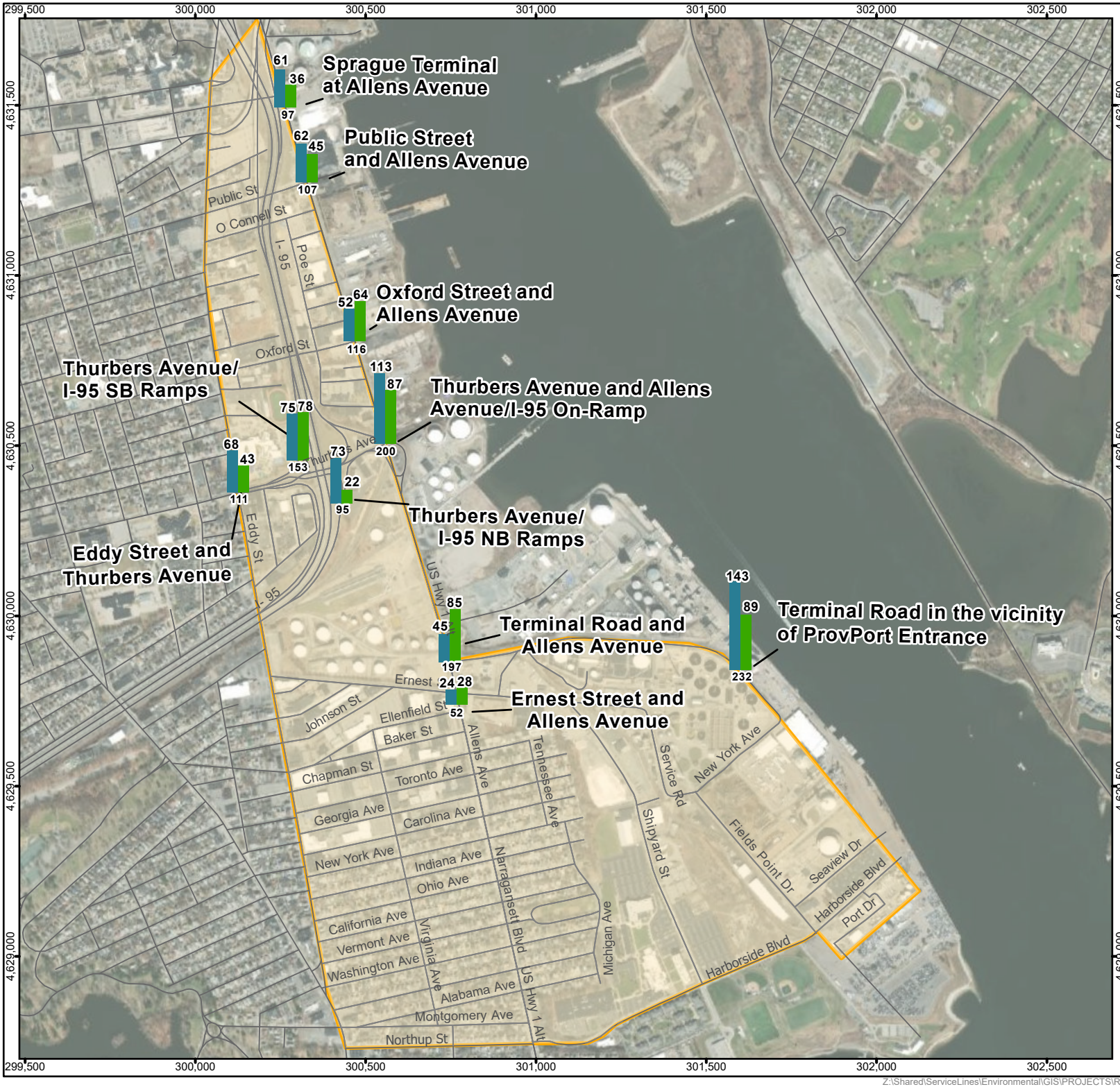

Truck Counts at Observation Intersections
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	2

KEY

Truck Counts

AM Count

PM Count

Working Port Study Area

Additional Source(s)
EPA, DAWSON, Esri

Projection
NAD 1983 HARN UTM Zone 19N

N W E S

0 500 1,000 Feet

DAWSON

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APPENDIX C

TRUCK CLASSES BY OBSERVATION LOCATION

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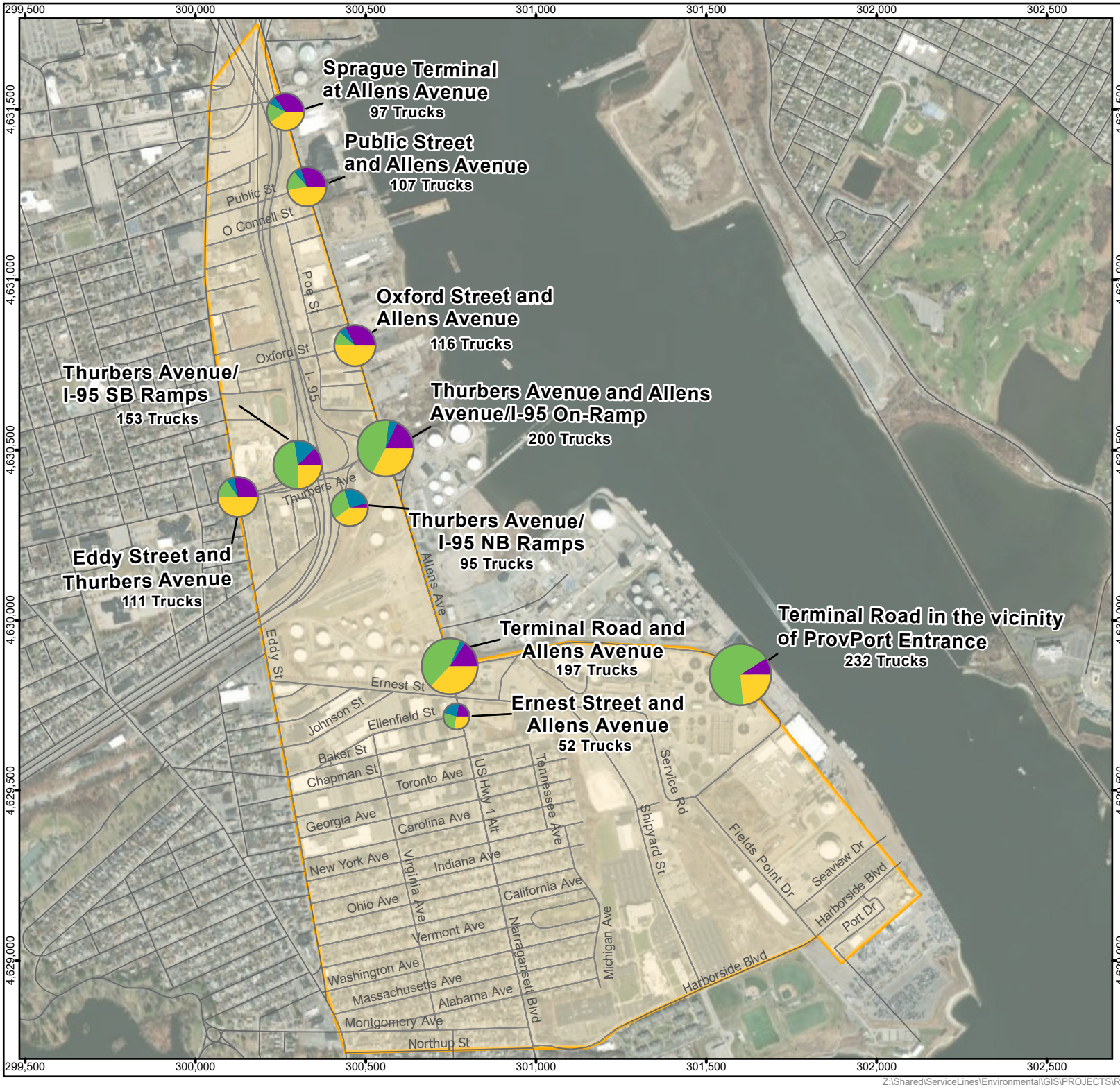

Truck Classes at Observation Intersections
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	3

KEY

- Class 5
- Class 6
- Class 7
- Class 8
- Working Port Study Area

Additional Source(s)
EPA, DAWSON, Esri

Projection
NAD 1983 HARN UTM Zone 19N

N W E S

0 500 1,000 Feet

DAWSON

APPENDIX D

TRUCK VOLUMES BY OBSERVATION LOCATION (with movement)

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Truck Volume / Hour at Observation Intersections
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	4

KEY

Observations / Hour

- ≤17 Trucks
- ≤26 Trucks
- ≤36 Trucks
- ≤47 Trucks
- ≤60 Trucks
- Working Port Study Area

Additional Source(s)
EPA, DAWSON, Esri

Projection
NAD 1983 HARN UTM Zone 19N

N W E S

0 500 1,000 Feet

DAWSON

Z:\Shared\ServiceLines\Environmental\GIS\PROJECTS\RI_ProvPort Truck Count\RI_ProvPort Truck Count.aprx | 9/8/2020 | KKeith

Truck Movement at Observation Intersections
Terminal Road and Allens Avenue
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	5

KEY

Count Per Hour

- ≤3
- ≤11
- ≤18
- ≤35

Total Trucks Observed

AM Truck Volume per Hour: 27
PM Truck Volume per Hour: 30
Total Truck Volume per Hour: 30

Additional Source(s)

EPA, DAWSON, Esri

Projection

NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON

Truck Movement at Observation Intersections
Eddy Street and Thurbers Avenue
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	6

KEY

Count Per Hour

- ≤3
- ≤11
- ≤18
- ≤35

Total Trucks Observed

AM Truck Volume per Hour: 41
PM Truck Volume per Hour: 43
Total Truck Volume per Hour: 45

Additional Source(s)

EPA, DAWSON, Esri

Projection

NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON

Truck Movement at Observation Intersections
Sprague Terminal at Allens Avenue
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	7

KEY

Count Per Hour

- ≤3
- ≤11
- ≤18
- ≤35

Total Trucks Observed

AM Truck Volume per Hour: 18
PM Truck Volume per Hour: 17
Total Truck Volume per Hour: 18

Additional Source(s)

EPA, DAWSON, Esri

Projection

NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON

Truck Movement at Observation Intersections
Oxford Street and Allens Avenue
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	8

KEY

Count Per Hour

- ≤3
- ≤11
- ≤18
- ≤35

Total Trucks Observed

AM Truck Volume per Hour: 52
PM Truck Volume per Hour: 62
Total Truck Volume per Hour: 61

Additional Source(s)

EPA, DAWSON, Esri

Projection

NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON

Truck Movement at Observation Intersections
Thurbers Avenue and Allens Avenue/I-95 On-Ramp
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	9

KEY

Count Per Hour

→ ≤3

→ ≤11

→ ≤18

→ ≤35

Total Trucks Observed

AM Truck Volume per Hour: 57
PM Truck Volume per Hour: 63
Total Truck Volume per Hour: 62

Additional Source(s)

EPA, DAWSON, Esri

Projection

NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON

Truck Movement at Observation Intersections
Thurbers Avenue/I-95 SB Ramps
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	10

KEY

Count Per Hour

→ ≤3

→ ≤11

→ ≤18

→ ≤35

Total Trucks Observed

AM Truck Volume per Hour: 35
PM Truck Volume per Hour: 43
Total Truck Volume per Hour: 40

Additional Source(s)
EPA, DAWSON, Esri

Projection
NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON

Truck Movement at Observation Intersections
Thurbers Avenue/I-95 NB Ramps
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	11

KEY

Count Per Hour

- ≤3
- ≤11
- ≤18
- ≤35

Total Trucks Observed

AM Truck Volume per Hour: 72
PM Truck Volume per Hour: 27
Total Truck Volume per Hour: 50

Additional Source(s)
EPA, DAWSON, Esri

Projection
NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON

Truck Movement at Observation Intersections
Public Street and Allens Avenue
ProvPort Truck Count and Assessment
Providence, Rhode Island

Project Number	Date	Figure
10738	SEPTEMBER 2020	12

KEY

Count Per Hour

- ≤3
- ≤11
- ≤18
- ≤35

Total Trucks Observed

AM Truck Volume per Hour: 28
PM Truck Volume per Hour: 42
Total Truck Volume per Hour: 35

Additional Source(s)

EPA, DAWSON, Esri

Projection

NAD 1983 HARN UTM Zone 19N

N W E S

0 37.5 75 Feet

DAWSON