CITYWIDE TRUCK STUDY

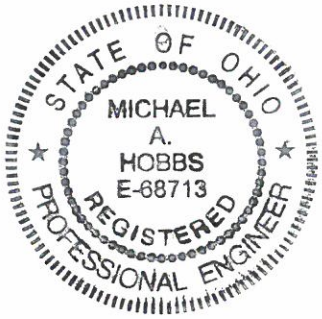
City of Hudson, Summit County, Ohio

Prepared For:

City of Hudson
Engineering Department
115 Executive Parkway
Suite 400
Hudson, OH 44236

June 2014

Engineer's Seal



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I. Executive Summary:

This Traffic Study is being prepared at the request of the City of Hudson. Due to concerns of truck traffic volume and travel speeds through the downtown area along with their potential impact to pavement degradation and increased noise levels, the existing truck traffic volumes have been collected and analyzed in an effort to identify any specific routes that may be experiencing higher than expected truck traffic. At this point, all data analysis is based solely on truck traffic volumes and speeds as an origin-destination study of truck traffic was not performed as a part of this assessment.

The ADT volumes along the primary roadway segments within the City of Hudson range anywhere from under 1,000 to over 20,000 vehicles per day with truck percentages ranging from 3% to 13%. State Route 91 was found to carry between 15,200 and 20,800 vehicles per day with truck percentages ranging from 4% to 7% while State Route 303 carries between 8,500 to 19,600 vehicles per day with truck percentages ranging between 6% and 9%. In terms of number of trucks, both routes carry relatively the same truck volume with the percentages along State Route 303 only being slightly higher due to the lower ADT volumes. Other routes experiencing higher truck percentages include Seasons Road and Boston Mills Road which provide access to State Route 8 as well as Terex Road, Stow Road and Hudson Drive which provide access to the industrial area located in the southern section of the City. When reviewing historical traffic volume data along State Route 303 and State Route 91, traffic volumes have remained relatively constant along both routes. Each segment has experienced minor spikes and drops at different points in time which are likely a result of the various roadway improvement projects that have occurred in the area that have led to shifts (both temporary and permanent) in local traffic patterns. It is worth noting that each segment included in the comparison has lost volume since 2007 which follows the general traffic trends of northeast Ohio.

When evaluating the truck traffic, the volumes and percentage of trucks utilizing State Route 91 have increased over the last twelve (12) years while the volumes and percentages along State Route 303 have generally decreased. The most likely reasoning for the decrease along State Route 303 is the construction and increased use of the State Route 8/Seasons Road interchange which now serves as an alternative east-west route into the southern side of the City. The City of Hudson had implemented an alternate truck route in February 1999 to detour truck traffic to the south and around the downtown area. Unlike State Route 303, a parallel or alternative route to State Route 91 does not currently exist that could encourage a bypass of downtown Hudson. Subsequently, the increased growth of businesses throughout the City and in the downtown (specifically First & Main) correlates with an increase in the amount of truck volume utilizing this primary north-south thoroughfare.

The data collection performed as part of this study has indicated that truck volumes and percentages were typically found to be within reasonable ranges for each roadway segment. While speeding concerns have been identified along several roadways, the truck speeds were generally found to match the overall speed characteristics of that segment indicating that it is not a truck-specific issue. **Based on these findings, no action related to truck traffic within the City of Hudson is recommended at this time.** As always, truck traffic should continue to be monitored as travel patterns have been shown to vary over time with any truck-specific issues or complaints being addressed as they arise.

II. Purpose:

This Traffic Study is being prepared at the request of the City of Hudson. Due to concerns of truck traffic volume and travel speeds through the downtown area along with their potential impact to pavement degradation and increased noise levels, the existing truck traffic volumes have been collected and analyzed in an effort to identify any specific routes that may be experiencing higher than expected truck traffic. Current volume and classification data will be compared against historical data to help determine if truck traffic has increased relative to the overall City of Hudson traffic trends. Historical data was not available on all routes, and as such, this study will set the baseline comparison for future truck volume evaluations on many of the non-state routes within the City. In addition to documenting the vehicular volumes and classification, the data collected will also provide a travel speed evaluation. At this point, all data analysis is based solely on truck traffic volumes and speeds as an origin-destination study of truck traffic was not performed as a part of this assessment.

III. Project Setting:

Study Area

The study area encompasses the entire City of Hudson with data collected for various segments of eighteen (18) different roadways. These primary traffic routes were selected in order to document the existing truck traffic currently found throughout the City while providing a general representation of the preferred travel routes. See **Figure 1** for a map of the study area.

IV. Traffic Data Collection:

Automatic Tube Counts

Automatic tube counters were deployed at forty-four (44) locations within the study area during October and November of 2013 with additional counts being obtained in May of 2014. The count information included volume, vehicle classification and speed data for each road tube installation. The locations of the forty four (44) tube counters are as follows:

- State Route 91 – North Corp Line to Middleton Road
- State Route 91 – Middleton Road to Valley View Road
- State Route 91 – Valley View Road to Prospect Street
- State Route 91 – Prospect Street to Clinton Street / Aurora Street
- State Route 91 – State Route 303 to Veterans Way
- State Route 91 – Veterans Way to Stoney Hill Drive
- State Route 91 – Stoney Hill Drive to Terex Road
- State Route 91 – Terex Road to Corporate Drive

- State Route 91 – Corporate Drive to Georgetown Road
- State Route 91 – Georgetown Road to Norton Road
- State Route 303 – State Route 8 to Terex Road
- State Route 303 – Terex Road to Nicholson Road
- State Route 303 – Nicholson Road to Boston Mills Road
- State Route 303 – Boston Mills Road to State Route 91
- State Route 303 – State Route 91 to Hayden Parkway
- State Route 303 – Hayden Parkway to Stow Road
- State Route 303 – Stow Road to Stone Road
- Barlow Road – Terex Road to Stow Road
- Boston Mills Road –State Route 8 to Lake Forest Drive
- Boston Mills Road – Lake Forest Drive to State Route 303
- Hayden Parkway – Hudson-Aurora Road to State Route 303
- Hayden Parkway –State Route 303 to Ravenna Street
- Herrick Park Drive –State Route 91 to Hudson-Aurora Road
- Hines Hill Road –Walters Road to Valley View Road
- Hines Hill Road – Valley View Road to State Route 91
- Hudson-Aurora Road – East of State Route 91
- Hudson Drive – State Route 91 to Terex Road
- Hudson Drive –Terex Road to Norton Road
- Middleton Road –State Route 91 to Stow Road
- Middleton Road – Valley View Road to State Route 91
- Morse Road – Prospect Street to Owen Brown Street
- Prospect Street – Hines Hill Road to State Route 91
- Ravenna Street – State Route 91 to Stow Road
- Ravenna Street –Stow Road to Stone Road
- Seasons Road –State Route 8 to Hudson Drive
- Norton Road –Hudson Drive to State Route 91
- Norton Road –State Route 91 to Stow Road
- Stow Road – Hudson-Aurora Road to State Route 303
- Stow Road – State Route 303 to Norton Road
- Terex Road –State Route 303 to Barlow Road
- Terex Road –Barlow Road to Hudson Drive
- Terex Road – Hudson Drive to State Route 91
- Terex Road – State Route 91 to Barlow Road
- Valley View Road – North Corp Line to State Route 91

It should be noted that the accuracy of the automatic tube counters declines in high-volume, low speed, congested or stop-and-go conditions. The Federal Highway Administration (FHWA) reports that range of error in pneumatic tube counters ranges from 0.92% - 30.0%. The location of each tube count installation was selected to avoid such low speed and congested areas to the greatest extent possible.

Average Daily Traffic & Classification Data

Using the data obtained from the automatic tube counters, the Average Daily Traffic (ADT) volumes were calculated for each roadway segment. In addition to the volume counts, the automatic tube counters recorded the classification of each vehicle as well. This data was recorded for thirteen (13) vehicle classes. For purposes of this study, vehicles were classified per the Ohio Department of Transportation (ODOT) standard which follows the FHWA vehicle classification scheme F report. Vehicle classes one (1) through three (3) are classified as a car and include all motorcycles, passenger cars, and other two-axle, four-tire single unit vehicles. Vehicle classes four (4) through thirteen (13) are classified as trucks and include all buses, single-unit trucks and trailer trucks. This categorization was applied to the classification data in order to determine the percentages of cars and trucks along each segment. **Table 1** provides a summary of the ADT volumes and vehicle classification percentages for each roadway segment. A map depicting the overall truck percentage for each segment is shown in **Figure 2** while the directional truck percentages are depicted in **Figure 3**. See **Appendix A** for the traffic volume count data and **Appendix B** for the vehicular classification data.

Table 1: 2013 Average Daily Traffic & Vehicle Classification Summary

Roadway Segment	ADT	% Cars	% Trucks
State Route 91 – North Corp Line to Middleton Road	**15,830**	**93.2%**	**6.8%**
Northbound		*96.7%*	*3.3%*
Southbound		*89.8%*	*10.2%*
State Route 91 – Middleton Road to Valley View Road	**15,195**	**92.8%**	**7.2%**
Northbound		*89.9%*	*10.1%*
Southbound		*95.7%*	*4.3%*
State Route 91 – Valley View Road to Prospect Street	**16,330**	**94.4%**	**5.6%**
Northbound		*96.4%*	*3.6%*
Southbound		*92.3%*	*7.7%*
State Route 91 – Prospect Street to Clinton Street / Aurora Street	**17,822**	**94.4%**	**5.6%**
Northbound		*95.7%*	*4.3%*
Southbound		*93.0%*	*7.0%*
State Route 91 – State Route 303 to Veterans Way	**17,487**	**93.7%**	**6.3%**
Northbound		*96.1%*	*3.9%*
Southbound		*90.9%*	*9.1%*
State Route 91 – Veterans Way to Stoney Hill Drive	**20,794**	**95.6%**	**4.4%**
Northbound		*95.5%*	*4.5%*
Southbound		*95.7%*	*4.3%*
State Route 91 – Stoney Hill Drive to Terex Road	**18,893**	**93.2%**	**6.8%**
Northbound		*96.4%*	*3.6%*
Southbound		*89.9%*	*10.1%*
State Route 91 –Terex Road to Corporate Drive	**17,221**	**96.2%**	**3.8%**
Northbound		*96.9%*	*3.1%*
Southbound		*95.4%*	*4.6%*

Table 1: 2013 Average Daily Traffic & Vehicle Classification Summary (Cont.)			
Roadway Segment	**ADT**	**% Cars**	**% Trucks**
State Route 91 – Corporate Drive to Georgetown Road	**18,383**	**94.7%**	**5.3%**
Northbound		*93.0%*	*7.0%*
Southbound		*96.4%*	*3.6%*
State Route 91 – Georgetown Road to Norton Road	**19,724**	**96.0%**	**4.0%**
Northbound		*95.7%*	*4.3%*
Southbound		*96.4%*	*3.6%*
State Route 303 – State Route 8 to Terex Road	**19,639**	**92.7%**	**7.3%**
Eastbound		*92.2%*	*7.8%*
Westbound		*93.5%*	*6.5%*
State Route 303 – Terex Road to Nicholson Road	**14,573**	**92.7%**	**7.3%**
Eastbound		*96.1%*	*3.9%*
Westbound		*89.3%*	*10.7%*
State Route 303 – Nicholson Road to Boston Mills Road	**14,601**	**93.5%**	**6.5%**
Eastbound		*91.2%*	*8.8%*
Westbound		*95.8%*	*4.2%*
State Route 303 – Boston Mills Road to State Route 91	**14,076**	**93.7%**	**6.3%**
Eastbound		*94.1%*	*5.9%*
Westbound		*93.4%*	*6.6%*
State Route 303 – State Route 91 to Hayden Parkway	**10,734**	**92.5%**	**7.5%**
Eastbound		*94.3%*	*5.7%*
Westbound		*90.9%*	*9.1%*
State Route 303 – Hayden Parkway to Stow Road	**8,502**	**92.9%**	**7.1%**
Eastbound		*94.9%*	*5.1%*
Westbound		*90.8%*	*9.2%*
State Route 303 – Stow Road to Stone Road	**10,204**	**91.1%**	**8.9%**
Eastbound		*94.6%*	*5.4%*
Westbound		*87.5%*	*12.5%*
Barlow Road – Terex Road to Stow Road	**7,009**	**92.0%**	**8.0%**
Eastbound		*89.9%*	*10.1%*
Westbound		*94.1%*	*5.9%*
Boston Mills Road – State Route 8 to Lake Forest Drive	**5,954**	**90.2%**	**9.8%**
Eastbound		*93.1%*	*6.9%*
Westbound		*87.5%*	*12.5%*
Boston Mills Road – Lake Forest Drive to State Route 303	**4,770**	**92.1%**	**7.9%**
Eastbound		*89.1%*	*10.9%*
Westbound		*96.2%*	*3.8%*
Hayden Parkway – Hudson-Aurora Road to State Route 303	**3,032**	**91.6%**	**8.4%**
Northbound		*92.0%*	*8.0%*
Southbound		*91.3%*	*8.7%*

Table 1: 2013 Average Daily Traffic & Vehicle Classification Summary (Cont.)			
Roadway Segment	**ADT**	**% Cars**	**% Trucks**
Hayden Parkway – State Route 303 to Ravenna Street	**818**	**94.7%**	**5.3%**
Northbound		*94.3%*	*5.7%*
Southbound		*95.0%*	*5.0%*
Herrick Park Drive – State Route 91 to Hudson-Aurora Road	**1,285**	**95.1%**	**4.9%**
Eastbound		*93.6%*	*6.4%*
Westbound		*96.7%*	*3.3%*
Hines Hill Road – Walters Road to Valley View Road	**3,500**	**96.7%**	**3.3%**
Eastbound		*96.9%*	*3.1%*
Westbound		*96.5%*	*3.5%*
Hines Hill Road – Valley View Road to State Route 91	**1,712**	**95.0%**	**5.0%**
Eastbound		*96.2%*	*3.8%*
Westbound		*93.9%*	*6.1%*
Hudson-Aurora Road – East of State Route 91	**7,208**	**93.7%**	**6.3%**
Eastbound		*95.8%*	*4.2%*
Westbound		*91.5%*	*8.5%*
Hudson Drive – State Route 91 to Terex Road	**2,161**	**94.9%**	**5.1%**
Southbound		*94.9%*	*5.1%*
Hudson Drive – Terex Road to Norton Road	**7,881**	**90.0%**	**10.0%**
Northbound		*87.1%*	*12.9%*
Southbound		*92.9%*	*7.1%*
Middleton Road – State Route 91 to Stow Road	**4,540**	**93.8%**	**6.2%**
Eastbound		*97.1%*	*2.9%*
Westbound		*90.6%*	*9.4%*
Middleton Road – Valley View Road to State Route 91	**2,083**	**92.7%**	**7.3%**
Eastbound		*89.0%*	*11.0%*
Westbound		*96.5%*	*3.5%*
Morse Road – Prospect Street to Owen Brown Street	**3,919**	**95.0%**	**5.0%**
Northbound		*93.6%*	*6.4%*
Southbound		*96.4%*	*3.6%*
Prospect Street – Hines Hill Road to State Route 91	**2,852**	**93.5%**	**6.5%**
Eastbound		*94.5%*	*5.5%*
Westbound		*92.3%*	*7.7%*
Ravenna Street – State Route 91 to Stow Road	**3,231**	**96.0%**	**4.0%**
Eastbound		*96.8%*	*3.2%*
Westbound		*95.1%*	*4.9%*
Ravenna Street – Stow Road to Stone Road	**2,194**	**94.6%**	**5.4%**
Eastbound		*98.5%*	*1.5%*
Westbound		*90.5%*	*9.5%*

Table 1: 2013 Average Daily Traffic & Vehicle Classification Summary (Cont.)			
Roadway Segment	**ADT**	**% Cars**	**% Trucks**
Seasons Road – State Route 8 to Hudson Drive	**11,743**	**92.5%**	**7.5%**
Eastbound		*89.6%*	*10.4%*
Westbound		*95.4%*	*4.6%*
Norton Road – Hudson Drive to State Route 91	**10,591**	**96.5%**	**3.5%**
Eastbound		*96.5%*	*3.5%*
Westbound		*96.6%*	*3.4%*
Norton Road – State Route 91 to Stow Road	**6,167**	**95.0%**	**5.0%**
Eastbound		*98.1%*	*1.9%*
Westbound		*91.7%*	*8.3%*
Stow Road – Hudson-Aurora Road to State Route 303	**8,982**	**96.5%**	**3.5%**
Northbound		*95.9%*	*4.1%*
Southbound		*97.2%*	*2.8%*
Stow Road – State Route 303 to Norton Road	**9,920**	**90.6%**	**9.4%**
Northbound		*96.2%*	*3.8%*
Southbound		*85.4%*	*14.6%*
Terex Road – State Route 303 to Barlow Road	**6,480**	**90.8%**	**9.2%**
Eastbound		*93.6%*	*6.4%*
Westbound		*87.6%*	*12.4%*
Terex Road – Barlow Road to Hudson Drive	**6,438**	**92.5%**	**7.5%**
Eastbound		*92.5%*	*7.5%*
Westbound		*92.4%*	*7.6%*
Terex Road – Hudson Drive to State Route 91	**10,178**	**92.8%**	**7.2%**
Eastbound		*93.4%*	*6.6%*
Westbound		*92.0%*	*8.0%*
Terex Road – State Route 91 to Barlow Road	**7,002**	**87.1%**	**12.9%**
Eastbound		*82.9%*	*17.1%*
Westbound		*91.3%*	*8.7%*
Valley View Road – North Corp Line to State Route 91	**2,022**	**93.7%**	**6.3%**
Eastbound		*97.8%*	*2.2%*
Westbound		*89.5%*	*10.5%*

As shown in **Table 1**, the ADT volumes along these primary roadway segments within the City of Hudson range anywhere from under 1,000 to over 20,000 vehicles per day with truck percentages ranging from 3% to 13%. State Route 91 was found to carry between 15,200 and 20,800 vehicles per day with truck percentages ranging from 4% to 7% while State Route 303 carries between 8,500 to 19,600 vehicles per day with truck percentages ranging between 6% and 9%. In terms of number of trucks, both routes carry relatively the same truck volume with the percentages along State Route 303 only being slightly higher due to the lower ADT volumes. Other routes experiencing higher truck percentages include Seasons Road and Boston Mills Road which provide access to State Route 8 as well as Terex Road, Stow Road and Hudson Drive which provide access to the industrial area located in the southern section of the City.

Vehicle Speed Data

The most significant, accepted, engineering factors used in evaluating traffic speed data are the 85th percentile speed (the speed at, or below which 85% of the samples vehicles are traveling), the pace speed (the 10 mph speed range which contains the highest number of vehicles) and the percentage of total sample vehicles in the pace speed. These are all factors that reflect the comfort range of the motorists driving on a specific roadway and are considered to represent reasonable operating speeds that can typically be expected on that roadway.

In addition to counting and classifying vehicles, the automatic tube counters also obtained travel speeds which can be determined for each vehicle class. **Table 2** summarizes the average truck speed, the 85th percentile truck speed, the 10 mph pace speed for trucks, the percentage of trucks traveling in the pace speed, and the percentage of trucks traveling over the speed limit. See **Appendix C** for the truck travel speed data.

Table 2: 2013 Truck Travel Speed Summary

Roadway Segment	Posted Speed (mph)	Avg. Speed (mph)	85th Speed (mph)	10 mph Pace Speed	% In Pace	% > Speed Limit
State Route 91 – North Corp Line to Middleton Road NB	45	37	40	31-40	73.7%	3.0%
State Route 91 – North Corp Line to Middleton Road SB	45	44	48	41-50	67.5%	35.8%
State Route 91 –Middleton Road to Valley View Road NB	45	47	52	41-50	68.1%	65.5%
State Route 91 –Middleton Road to Valley View Road SB	45	38	42	36-45	72.7%	3.2%
State Route 91 –Valley View Road to Prospect Street NB	35	35	38	31-40	84.3%	33.8%
State Route 91 –Valley View Road to Prospect Street SB	35	40	44	36-45	75.6%	87.3%
State Route 91 –Prospect Street to Clinton Street / Aurora Street NB	35	31	34	26-35	81.7%	11.0%
State Route 91 –Prospect Street to Clinton Street / Aurora Street SB	35	30	37	31-40	60.1%	28.2%
State Route 91 –State Route 303 to Veterans Way NB	25	28	32	26-35	75.3%	77.7%
State Route 91 –State Route 303 to Veterans Way SB	25	30	36	26-35	58.7%	78.9%
State Route 91 –Veterans Way to Stoney Hill Drive NB	35	32	37	31-40	70.2%	30.3%
State Route 91 –Veterans Way to Stoney Hill Drive SB	35	33	37	31-40	70.9%	27.3%
State Route 91 – Stoney Hill Drive to Terex Road NB	35	31	34	26-35	80.1%	8.4%
State Route 91 – Stoney Hill Drive to Terex Road SB	35	37	43	36-45	61.3%	69.9%
State Route 91 –Terex Road to Corporate Drive NB	45	32	38	26-35	60.3%	0.3%
State Route 91 –Terex Road to Corporate Drive SB	45	28	33	26-35	60.3%	0.2%
State Route 91 –Corporate Drive to Georgetown Road NB	45	41	47	41-50	57.8%	56.3%
State Route 91 –Corporate Drive to Georgetown Road SB	45	37	42	36-45	70.0%	1.9%
State Route 91 – Georgetown Road to Norton Road NB	45	34	39	31-40	67.6%	2.1%
State Route 91 – Georgetown Road to Norton Road SB	45	39	44	36-45	62.1%	12.7%
State Route 303 –State Route 8 to Terex Road EB	45	32	38	26-35	58.6%	2.1%
State Route 303 –State Route 8 to Terex Road WB	45	30	38	26-35	50.4%	1.5%
State Route 303 – Terex Road to Nicholson Road EB	45	42	44	36-45	80.7%	13.2%
State Route 303 – Terex Road to Nicholson Road WB	45	49	53	46-55	70.3%	76.6%

Table 2: 2013 Truck Travel Speed Summary (Cont.)						
Roadway Segment	**Posted Speed (mph)**	**Avg. Speed (mph)**	**85th Speed (mph)**	**10 mph Pace Speed**	**% In Pace**	**% > Speed Limit**
State Route 303 – Nicholson Road to Boston Mills Road EB	35	42	48	36-45	61.5%	90.0%
State Route 303 – Nicholson Road to Boston Mills Road WB	35	36	39	31-40	86.2%	58.8%
State Route 303 –Boston Mills Road to State Route 91 EB	25	27	31	21-30	68.9%	66.7%
State Route 303 –Boston Mills Road to State Route 91 WB	25	29	34	26-35	65.8%	78.1%
State Route 303 – State Route 91 to Hayden Parkway EB	35	34	38	31-40	80.3%	32.9%
State Route 303 – State Route 91 to Hayden Parkway WB	35	36	39	31-40	81.7%	54.6%
State Route 303 – Hayden Parkway to Stow Road EB	35	36	39	31-40	80.1%	54.1%
State Route 303 – Hayden Parkway to Stow Road WB	35	40	45	36-45	68.6%	83.7%
State Route 303 – Stow Road to Stone Road EB	45	39	43	36-45	74.0%	4.6%
State Route 303 – Stow Road to Stone Road WB	45	48	53	46-55	62.4%	70.2%
Barlow Road –Terex Road to Stow Road EB	35	40	44	36-45	69.5%	83.7%
Barlow Road –Terex Road to Stow Road WB	35	37	41	31-40	69.4%	70.9%
Boston Mills Road –State Route 8 to Lake Forest Drive EB	35	43	45	36-45	82.7%	97.9%
Boston Mills Road –State Route 8 to Lake Forest Drive WB	35	52	57	46-55	66.2%	100%
Boston Mills Road – Lake Forest Drive to State Route 303 EB	35	44	49	36-45	60.7%	93.4%
Boston Mills Road – Lake Forest Drive to State Route 303 WB	35	34	38	31-40	76.6%	37.5%
Hayden Parkway – Hudson-Aurora Road to State Route 303 NB	25	20	23	16-25	86.6%	5.9%
Hayden Parkway – Hudson-Aurora Road to State Route 303 SB	25	21	29	16-25	67.1%	21.3%
Hayden Parkway –State Route 303 to Ravenna Street NB	25	24	27	21-30	88.6%	27.1%
Hayden Parkway –State Route 303 to Ravenna Street SB	25	23	27	19-28	75.0%	25.0%
Herrick Park Drive –State Route 91 to Hudson-Aurora Road EB	25	30	36	26-35	67.4%	86.0%
Herrick Park Drive –State Route 91 to Hudson-Aurora Road WB	25	25	30	21-30	75.0%	45.0%
Hines Hill Road –Walters Road to Valley View Road EB	45	42	45	36-45	73.1%	17.3%
Hines Hill Road –Walters Road to Valley View Road WB	45	43	47	41-50	71.0%	27.4%
Hines Hill Road – Valley View Road to State Route 91 EB	35	35	43	36-45	50.9%	56.1%
Hines Hill Road – Valley View Road to State Route 91 WB	35	35	40	31-40	61.4%	47.4%
Hudson-Aurora Road – East of State Route 91 EB	25	26	29	21-30	80.1%	50.7%
Hudson-Aurora Road – East of State Route 91 WB	25	30	34	26-35	72.6%	82.5%
Hudson Drive – State Route 91 to Terex Road SB	35	30	34	26-35	81.9%	6.0%
Hudson Drive –Terex Road to Norton Road NB	35	41	45	36-45	68.3%	85.5%
Hudson Drive –Terex Road to Norton Road SB	35	35	39	31-40	73.4%	48.6%
Middleton Road –State Route 91 to Stow Road EB	35	33	37	26-35	67.4%	23.5%
Middleton Road –State Route 91 to Stow Road WB	35	41	46	36-45	65.6%	86.9%
Middleton Road – Valley View Road to State Route 91 EB	35	40	46	36-45	54.8%	73.2%
Middleton Road – Valley View Road to State Route 91 WB	35	34	38	31-40	74.7%	36.0%
Morse Road –Prospect Street to Owen Brown Street NB	25	29	33	26-35	83.0%	88.4%
Morse Road –Prospect Street to Owen Brown Street SB	25	26	29	21-30	90.9%	63.0%
Prospect Street – Hines Hill Road to State Route 91 EB	25	26	30	21-30	74.6%	60.0%
Prospect Street – Hines Hill Road to State Route 91 WB	25	28	34	26-35	53.8%	66.8%

Table 2: 2013 Truck Travel Speed Summary (Cont.)

Roadway Segment	Posted Speed (mph)	Avg. Speed (mph)	85th Speed (mph)	10 mph Pace Speed	% In Pace	% > Speed Limit
Ravenna Street –State Route 91 to Stow Road EB	25	25	30	21-30	66.1%	47.5%
Ravenna Street –State Route 91 to Stow Road WB	25	28	32	26-35	81.5%	84.6%
Ravenna Street –Stow Road to Stone Road EB	35	34	42	36-45	68.8%	68.8%
Ravenna Street –Stow Road to Stone Road WB	35	44	50	41-50	63.0%	92.0%
Seasons Road –State Route 8 to Hudson Drive EB	35	41	45	36-45	68.4%	85.5%
Seasons Road –State Route 8 to Hudson Drive WB	35	35	39	31-40	75.4%	43.0%
Norton Road –Hudson Drive to State Route 91 EB	35	34	38	31-40	72.8%	34.7%
Norton Road –Hudson Drive to State Route 91 WB	35	35	39	31-40	72.7%	51.2%
Norton Road –State Route 91 to Stow Road EB	35	36	39	31-40	79.4%	36.5%
Norton Road –State Route 91 to Stow Road WB	35	42	47	36-45	69.0%	91.3%
Stow Road – Hudson-Aurora Road to State Route 303 NB	35	35	42	36-45	52.6%	58.5%
Stow Road – Hudson-Aurora Road to State Route 303 SB	35	30	38	31-40	45.6%	29.8%
Stow Road –State Route 303 to Norton Road NB	35	37	40	31-40	78.2%	65.3%
Stow Road –State Route 303 to Norton Road SB	35	47	53	41-50	57.8%	98.2%
Terex Road – State Route 303 to Barlow Road EB	45	45	49	41-50	85.8%	48.7%
Terex Road – State Route 303 to Barlow Road WB	45	51	54	46-55	75.1%	89.8%
Terex Road –Barlow Road to Hudson Drive EB	45	49	53	46-55	77.0%	85.0%
Terex Road –Barlow Road to Hudson Drive WB	45	48	52	46-55	71.6%	77.0%
Terex Road –Hudson Drive to State Route 91 EB	45	26	33	21-30	57.4%	0.1%
Terex Road –Hudson Drive to State Route 91WB	45	29	33	21-30	66.6%	0.0%
Terex Road – State Route 91 to Barlow Road EB	45	47	53	41-50	54.7%	60.4%
Terex Road – State Route 91 to Barlow Road WB	45	39	43	36-45	74.5%	4.4%
Valley View Road – North Corp Line to State Route 91 EB	45	36	40	31-40	72.7%	0.0%
Valley View Road – North Corp Line to State Route 91 WB	45	48	54	41-50	54.8%	61.1%

As shown in **Table 2**, the truck speed data indicates that there are wide ranges of travel speeds relative to the currently posted speed limits along each of these segments. The average truck speed was found to exceed the posted speed limit by greater than 5 mph at 13% of the count locations while the 85th percentile speed exceeded the posted speed limit by more than 10 mph at 11% of the locations. Approximately half of the count locations found that 50% or more of the trucks were exceeding the posted speed limit with 31% of the locations experiencing a 70% non-compliance rate or greater. **Figure 4** identifies road segments that were found to experience a high percentage of vehicles that exceed the posted speed limits. While this speed data is truck-specific, it should be noted that 90% of the locations were found to have recorded average speeds and 85th percentile speeds that were within 3 mph of the overall combined speed trends (cars and trucks) for that particular segment. No roadway segment was ever observed having a speed differential of greater than 7 mph. It should be noted that these speeds were not verified by any alternative methods (i.e. radar) and are there susceptible to the same accuracy concerns as discussed previously with regards to the volume and classification.

V. Traffic Analysis:

Traffic Volume Comparison

Historical count data was retrieved from the Ohio Department of Transportation's (ODOT) public website. The ODOT automatic tube counts include ADT and vehicle classification. The ADT recorded from the ODOT automatic tube counters is from the years 2001, 2004, 2007, 2010 and 2013. While 2013 ADT data was also obtained as part of this study, it is not possible to make an applicable comparison as the specific count location for each of the following segments is unknown. **Table 3** details the historic ADT volumes documented by ODOT along both State Route 91 and State Route 303. A trendline analysis was performed to determine the annualized growth rate of each segment. **Figure 5** depicts the annual growth rate for each segment while **Appendix D** provides the historical count data.

Table 3: Historical Traffic Volume Comparison

Roadway Segment	2001 ADT	2004 ADT	2007 ADT	2010 ADT	2013 ADT	Annual % Change
State Route 91 – North Corp Line to State Route 303	13,810	15,460	13,880	14,780	12,640	**-0.75%**
State Route 91 –State Route 303 to South Corp Line	18,200	17,980	22,350	18,140	17,000	**-0.41%**
State Route 303 –West Corp Line to Boston Mills Road	13,130	12,280	14,350	15,270	12,360	**+0.37%**
State Route 303 –Boston Mills Road to State Route 91	20,120	13,660	15,420	16,240	13,960	**-2.33%**
State Route 303 – State Route 91 to East Corp Line	7,260	7,260	8,460	7,710	7,700	**+0.60%**

As shown in **Table 3**, traffic volumes have remained relatively constant along both State Route 91 and State Route 303. Each segment has experienced minor spikes and drops at different points in time which are likely a result of the various roadway improvement projects that have occurred in the area that have led to shifts (temporary and permanent) in local traffic patterns. It is worth noting that each segment included in the comparison has lost volume since 2007 which follows the general traffic trends of northeast Ohio.

Truck Volume and Percentage Comparison

In addition to documenting the ADT for each state route, ODOT also provides the corresponding truck volume for each segment as well. The truck volumes for each of the five (5) segments being evaluated along State Route 91 and State Route 303 were obtained with the truck percentages calculated based on the traffic volumes discussed in the previous section. **Table 4** on the following page provides a comparison of truck volumes and percentages that have been documented by ODOT along these two (2) state routes. See **Appendix D** for the historical count data.

Table 4: Historical Truck Volume & Percentage Comparison						
Roadway Segment	**Truck # 2001**	**Truck # 2004**	**Truck # 2007**	**Truck # 2010**	**Truck # 2013**	**Annual % Change**
State Route 91 – North Corp Line to State Route 303	460 (3.3%)	520 (3.4%)	960 (6.9%)	920 (6.2%)	960 (7.6%)	**+9.64%**
State Route 91 –State Route 303 to South Corp Line	540 (3.0%)	530 (2.9%)	1220 (5.5%)	1120 (6.2%)	620 (3.6%)	**+3.81%**
State Route 303 –West Corp Line to Boston Mills Road	570 (4.3%)	530 (4.3%)	620 (4.3%)	550 (3.6%)	490 (4.0%)	**-0.89%**
State Route 303 –Boston Mills Road to State Route 91	670 (3.3%)	590 (4.3%)	670 (4.3%)	590 (3.6%)	550 (3.9%)	**-1.41%**
State Route 303 – State Route 91 to East Corp Line	400 (5.5%)	400 (5.5%)	470 (5.6%)	310 (4.0%)	310 (4.0%)	**-2.78%**

As shown in **Table 4**, the volumes and percentage of trucks utilizing State Route 91 have increased over the last twelve (12) years while the volumes and percentages along State Route 303 have generally decreased.

The most likely reasoning for the decrease along State Route 303 is the construction and increased use of the State Route 8/Seasons Road interchange which now serves as an alternative east-west route into the southern side of the City. While not permanent, the reconfiguration of the State Route 8/Boston Mills Road/Ohio Turnpike interchange likely also impacted the flow of traffic through the City during construction.

The City had implemented an alternate truck route in February 1999 to detour truck traffic to the south and around the downtown area. The alternate truck route for eastbound traffic along State Route 303 is currently signed to divert trucks onto Terex Road followed by Barlow Road until they turn north onto Stow Road to return to State Route 303. Trucks traveling westbound along State Route 303 will travel south on Stow Road, then west and north along Barlow Road to Terex Road and back to State Route 303. See **Figure 6** for a map of the alternate truck route. This alternative truck appears to be effective as the truck percentages along the alternative route range from 7% to 13% compared to the corresponding section of State Route 303 which maintains a truck percentage from 6% to 7%.

Unlike State Route 303, a parallel or alternative route to State Route 91 does not currently exist that could encourage a bypass of downtown Hudson. Subsequently, the increased growth of businesses throughout the City and in the downtown area (specifically First & Main) correlates with an increase in the amount of truck volume utilizing this primary north-south thoroughfare. A combination of the reduction in ADT volumes and an increase in truck volumes over the last several years has led to the notable rise in truck percentages along State Route 91 and will likely continue in the near future until alternative routes are provided.

In addition to the historical comparison, **Figure 7** provides an additional truck percentage comparison that compares the 2013 truck percentages obtained as part of this study with those obtained as part of the 1997 truck study prepared by Pflum, Klausmeier & Gehrum Consultants, Inc. It should be noted that a review of the traffic data from the 1997 truck

study indicates that the data collection did not utilize the FHWA vehicle classification scheme F report (used in this study) but instead classified vehicles among only four (4) vehicle classes: Passenger Vehicles, Tractor Trailer, 3-Axle (cement, dump, garbage), and Dually (buses, delivery, utilities). While a comparison of the truck percentages between the studies may seem to indicate that the City has experienced a significant increase in truck traffic, the fact that many segments have more than doubled in truck percentage likely indicates that the process used to identify and tabulate truck traffic has changed since the original study was performed. While an increase in downtown development and a reduction in the overall ADT volumes would certainly be expected to result in some truck percentage increases, the magnitude and location of these increases found throughout the City seem to suggest that other factors related to the data collection process are more indicative of the percentage fluctuation between the two (2) studies.

Truck Noise and Pavement Degradation

An increase / decrease in truck traffic volume is directly correlated with an increase / decrease in noise levels and pavement degradation. Heavier trucks will accelerate the rate of wear on roads as well as increase the potential for rutting and cracking along the roadway as compared to lighter passenger cars. While it may be difficult to arbitrarily reduce truck traffic along the public roadway system, there are options to either reduce truck volumes or spread out the impact more evenly throughout the City.

The most common option, which is already in use by the City, is the implementation of alternative truck routes that can help divert heavier truck traffic to lesser traveled roadways. Similar to what is currently being done along State Route 303, trucks are being rerouted from a roadway that typically carries between 8,500 to 14,600 vehicles per day to Terex Road, Barlow Road, and Stow Road which carry anywhere from 6,400 to 10,200 vehicles per day. Not only does this better distribute the pavement impact of the trucks, it helps avoid the at-capacity intersection of State Route 303 and State Route 91 in lieu of roadways and intersections with ample amounts of excess capacity.

VI. Laws and Regulations

Current law regarding truck restrictions are listed in **Table 5** on the following page according to the City of Hudson Code of Ordinances Section 410.08 Schedule VIII – Trucks Prohibited. Trucks are prohibited from using the roads listed in the table with the exception of Norton Road (State Route 91 to Stow Road), Hines Hill Road (State Route 91 to West Corp. Line) and Walters Road (North Corp. Line to Hines Hill Road). Trucks are allowed to use these roads for deliveries and other business uses but are not allowed to use them to pass through. While the intent is obviously meant to help reduce truck volumes on these roadways, it is important to note that the enforcement of such restrictions is near impossible for a law enforcement office as there is typically no way to easily identify trucks attempting to make a delivery versus those just passing through. See **Figure 8** for a map displaying the roadway segments with truck restrictions. And while not a route restriction, it should be noted that the City of Hudson currently prohibits engine braking or "Jake" braking within city limits according to the City of Hudson Code of Ordinances Section 440.12.

Table 5: City of Hudson Truck Ordinance Summary			
Street	**From**	**To**	**Direction**
Baldwin Street	State Route 91	College Street	
Barlow Road	Darrow Road	Terex Road	East to East Terex Road
Sullivan Road	Barlow Road	Seasons Road	
Stone Road	Ravenna Street	State Route 303	North and South
Ravenna Street	East Corp Line	Stow Road	
Norton Road	State Route 91	Stow Road	No Through Trucks
Hines Hill Road	State Route 91	West Corp Line	No Through Trucks Over 5 Tons Gross Weight
Walters Road	North Corp Line	Hines Hill Road	No Through Trucks

The City of Hudson can currently enforce the truck restrictions along the roads listed in **Table 5** based on City ordinance. Based upon previous project experience, it is GPD Group's understanding that all routes which are eligible for Federal funding assistance cannot typically have truck restrictions, except when under special circumstances such as weight restrictions due to poor pavement or bridge conditions. Even for local roadways that would fall outside of this classification and maintained under home rule should likely not have such restrictions unless dictated by the physical limitations of the particular roadway. Furthermore, the implementation of such truck restrictions, when utilized, should be applied equally throughout the municipality to all roadways that exhibit those characteristics requiring such restrictions should they be challenged. According to section 201-9: Truck Restrictions in Municipal Corporations of the Traffic Engineering Manual (TEM), a municipal corporation may restrict truck traffic on State or U.S. routes through the municipal corporation only by regulating weight limits on the route, and only with the approval of the Director of Transportation.

VII. Summary and Recommendations

This Traffic Study is being prepared at the request of the City of Hudson. Due to concerns of truck traffic volume and travel speeds through the downtown area along with their potential impact to pavement degradation and increased noise levels, the existing truck traffic volumes have been collected and analyzed in an effort to identify any specific routes that may be experiencing higher than expected truck traffic. Current volume and classification data will be compared against historical data to help determine if truck traffic has increased relative to the overall City of Hudson traffic trends. Historical data was not available on all routes, and as such, this study will set the baseline comparison for future truck volume evaluations on many of the non-state routes within the City. In addition to documenting the vehicular volumes and classification, the data collected will also provide a travel speed evaluation. At this point, all data analysis is based solely on truck traffic volumes and speeds as an origin-destination study of truck traffic was not performed as a part of this assessment.

In Summary,

1. The ADT volumes along these primary roadway segments within the City of Hudson range anywhere from under 1,000 to over 20,000 vehicles per day with truck percentages ranging from 3% to 13%. State Route 91 was found to carry between 15,200 and 20,800 vehicles per day with truck percentages ranging from 4% to 7% while State Route 303 carries between 8,500 to 19,600 vehicles per day with truck percentages ranging between 6% and 9%. In terms of number of trucks, both routes carry relatively the same truck volume with the percentages along State Route 303 only being slightly higher due to the lower ADT volumes. Other routes experiencing higher truck percentages include Seasons Road and Boston Mills Road which provide access to State Route 8 as well as Terex Road, Stow Road and Hudson Drive which provide access to the industrial area located in the southern section of the City.

2. The truck speed data indicates that there are wide ranges of travel speeds relative to the currently posted speed limits along each of these segments. The average truck speed was found to exceed the posted speed limit by greater than 5 mph at 13% of the count locations while the 85th percentile speed exceeded the posted speed limit by more than 10 mph at 11% of the locations. Approximately half of the count locations found that 50% or more of the trucks were exceeding the posted speed limit with 31% of the locations experiencing a 70% non-compliance rate or greater. It should be noted that these speeds were not verified by any alternative methods (i.e. radar) and are there susceptible to the accuracy concerns discussed in this report.

3. When reviewing historical data, traffic volumes have remained relatively constant along both State Route 91 and State Route 303. Each segment has experienced minor spikes and drops at different points in time which are likely a result of the various roadway improvement projects that have occurred in the area that have led to shifts (temporary and permanent) in local traffic patterns. It is worth noting that each segment included in the comparison has lost volume since 2007 which follows the general traffic trends of northeast Ohio.

4. The volumes and percentage of trucks utilizing State Route 91 have increased over the last twelve (12) years while the volumes and percentages along State Route 303 have generally decreased. The most likely reasoning for the decrease along State Route 303 is the construction and increased use of the State Route 8/Seasons Road interchange which now serves as an alternative east-west route into the southern side of the City. The City of Hudson had implemented an alternate truck route in February 1999 to detour truck traffic to the south and around the downtown area. Unlike State Route 303, a parallel or alternative route to State Route 91 does not currently exist that could encourage a bypass of downtown Hudson. Subsequently, the increased growth of businesses throughout the City and in the downtown area (specifically First & Main) correlates with an increase in the amount of truck volume utilizing this primary north-south thoroughfare.

5. While it may be difficult to arbitrarily reduce truck traffic along the public roadway system, there are options to either reduce truck volumes or spread out the impact more evenly throughout the City. A common approach, which is already in use by the City, is the implementation of alternative truck routes that can help divert heavier truck traffic to lesser traveled roadways.

6. The use of truck restrictions should only be implemented for special circumstances such as weight restrictions due to poor pavement or bridge conditions, and when implemented, should be applied equally throughout the municipality to all roadways that exhibit those characteristics requiring such restrictions should they be challenged.

The data collection performed as part of this study has indicated that truck volumes and percentages were typically found to be within reasonable ranges for each roadway segment. Roadways designed to carry larger volumes, provide access to State Route 8, or designated as an alternative truck route were found to have more truck traffic, as would be expected, than those minor roadways carrying fewer vehicles or those serving residential neighborhoods. While some may consider a certain amount of truck traffic to be more than they would prefer, there are no defined truck percentages that would classify any particular amount as being unacceptable. Considering that the truck traffic appears to have a relative even distribution throughout the City and is not confined to any one area, any further attempts to reduce truck traffic on one roadway segment would likely result in increases on other segments. Furthermore, without any origin-destination data, it is unknown at this point whether truck traffic on any particular roadway is occurring as local traffic (school buses, trash haulers, local deliveries, etc.) that will occur regardless compared to 'thru' truck traffic that could be diverted to alternative routes. While speeding concerns have been identified along several roadways, the truck speeds were generally found to match the overall speed characteristics of that segment indicating that it is not a truck-specific issue. **Based on these findings, no action related to truck traffic within the City of Hudson is recommended at this time.** As always, truck traffic should continue to be monitored as travel patterns have been shown to vary over time with any truck-specific issues or complaints being addressed as they arise. The prioritization of pavement rehabilitation projects should also take into account the data contained with this study as the City of Hudson continues their efforts to provide improved roadway conditions for the traveling public.