



WILLETT HOFMANN  
& ASSOCIATES INC  
ENGINEERING ARCHITECTURE LAND SURVEYING

August 9, 2012

Mr. Sam Tesreau, P.E.  
City Engineer  
City of Rochelle  
417 N. Sixth Street  
Rochelle, IL 61068

Re: Overweight Load Fee  
WHA #1173D12

Dear Sam:

We have completed our study to determine a reasonable fee for overweight loads on Intermodal Dr. from UP Global to IL Rte. 251 and Steward Rd. from IL Rte. 251 to the Ogle/Lee county line.

This determination was based on the damage/life lost to the existing roadways due to the overweight loads and the maintenance needed to extend the pavement life. The following data and materials were used for this determination:

1. ADT counts from using TRAX RD automatic traffic recorders designed and built by JAMAR Technologies, Inc. and count data received from the Illinois Department of Transportation.
2. Illinois Department of Transportation Local Roads Manual for Pavement Design.
3. Pavement Technology Advisory – Designing for Heavily Loaded Vehicles – PTA-D1

Attached are various exhibits showing data and calculations used to determine a permit fee for the overweight loads. Since no data was available for the actual number of overweight loads, an assumption of 25% of the loads was used. As shown in Exhibits B and C, the pavement life for a 20 year design with normal traffic would be reduced to 8 to 15 years with overweight loads from 10% over the legal limit up to 120,000 lbs. Using this information, it was determined that removal and replacement of 2" of pavement be done on a 10 year cycle for determining a maintenance cost and permit fee.

Exhibits D and E show the estimated cost for each roadway and a fee of \$5.08 per overweight load needed to cover the cost of the maintenance. Added to this should be administrative costs associated with processing the fees and any costs for policing the roadways by random weight checks.

If you have any questions, please give me a call.

Sincerely,

WILLETT, HOFMANN & ASSOCIATES, INC.

BY   
Michael A. Hielsberg, P.E.

MAH:rv

cc. David Plyman, City Manager w/ encl. ✓  
File 1173D12

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## Definition of Terms Used in Report

Average Daily Traffic (ADT) is the average number of vehicles two-way passing specific point in a 24-hour period, normally measured throughout a year.

Class II Roads and Streets Roads and streets designed as a two-lane facility with structural design traffic greater than 2,000 ADT.

Class III Roads and Streets Roads and streets with structural design traffic between 750 ADT and 2,000 ADT.

Equivalency Factor A numerical factor that expresses the relationship of a given axle load to another axle load in terms of its effect on the serviceability of a pavement structure. In pavement design, all axle loads are equated in terms of an equivalent number of repetitions of an 18-kip, equivalent single-axle load (ESALs)

Existing Traffic Existing traffic is the existing ADT of the facility

Multiple-Unit (MU) Vehicles MU vehicles include truck tractor semi-trailers, full trailer combination vehicles, and other similar combinations

Passenger Vehicles (PV) PVs include automobiles, pickup trucks, vans, and other similar two-axle, four-axle vehicles

Single-Unit (SU) Vehicles SU vehicles include two- or three-axle trucks and buses having six tires

# CITY OF ROCHELLE, ILLINOIS

## INTERMODAL DR. UP Global Entr. to IL Rte. 251 Overweight Load Study

August 7, 2012



Existing Traffic – Intermodal Dr. – Jack Dame Rd. to IL Rte. 251  
(Per IDOT counts on 6/4/2012 to 6/5/2012)

ADT = 1,786 -    PV – 1,150  
                  SU - 200  
                  MU - 436

Class III Road

Yearly Design ESAL's -	PV -	$0.15 \times 0.5 \times 1,150 =$	86
	SU -	$109.14 \times 0.5 \times 200 =$	10,914
	MU -	$384.35 \times 0.5 \times 436 =$	83,788
			<u>94,788</u>

## Existing Traffic w/ Overweight Loads –

Assume 25% of Loads are overweight – ADT = 1,786 - PV – 1,150  
SU - 200  
MU - 327 (Legal)  
MU - 109 (Overweight)

Yearly Design ESAL's (Legal) - PV -  $0.15 \times 0.5 \times 1,150 = 86$   
SU -  $109.14 \times 0.5 \times 200 = 10,914$   
MU -  $384.35 \times 0.5 \times 327 = \underline{62,841}$   
73,841

Yearly Design ESAL'S (Overweight) – 88,000 lb. loading

Equivalency Factor (ESAL's/Veh.) – 3.73  
Yearly ESAL's = #Loads x ESAL's/Veh. x Working Days/Year  
=  $109 \times 3.73 \times (52 \times 5)$   
=  $105,708 \times 0.5 = 52,854$   
Total Yearly Design ESAL's =  $73,841 + 52,854 = 126,695$

Pavement Life (Based on 20 Year Design) –  $\frac{20 (94,788)}{126,695} = 14.96$  (15 Years)

Yearly Design ESAL'S (Overweight) – 120,000 lb. loading

Equivalency Factor (ESAL's/Veh.) – 12.415  
Yearly ESAL's = #Loads x ESAL's/Veh. x Working Days/Year  
=  $109 \times 12.415 \times (52 \times 5)$   
=  $351,841 \times 0.5 = 175,920$   
Total Yearly Design ESAL's =  $73,841 + 175,920 = 249,761$

Pavement Life (Based on 20 Year Design) –  $\frac{20 (94,788)}{249,761} = 7.59$  (8 Years)



Existing Traffic w/ Overweight Loads –

Assume 25% of Loads are overweight – ADT = 2,021 - PV - 1,213  
SU - 202  
MU - 455 (Legal)  
MU - 151 (Overweight)

Yearly Design ESAL's (Legal) - PV -  $0.15 \times 0.5 \times 1,213 = 91$   
SU -  $112.06 \times 0.5 \times 202 = 11,318$   
MU -  $385.44 \times 0.5 \times 455 = \underline{87,688}$   
99,097

Yearly Design ESAL'S (Overweight) – 88,000 lb. loading

Equivalency Factor (ESAL's/Veh.) – 3.73  
Yearly ESAL's = #Loads x ESAL's/Veh. x Working Days/Year  
=  $151 \times 3.73 \times (52 \times 5)$   
=  $146,440 \times 0.5 = 73,220$   
Total Yearly Design ESAL's =  $99,097 + 73,220 = 172,317$

Pavement Life (Based on 20 Year Design) –  $\frac{20 (128,197)}{172,317} = 14.88$  (15 Years)

Yearly Design ESAL'S (Overweight) – 120,000 lb. loading

Equivalency Factor (ESAL's/Veh.) – 12.415  
Yearly ESAL's = #Loads x ESAL's/Veh. x Working Days/Year  
=  $151 \times 12.415 \times (52 \times 5)$   
=  $487,413 \times 0.5 = 243,707$   
Total Yearly Design ESAL's =  $99,097 + 243,707 = 342,804$

Pavement Life (Based on 20 Year Design) –  $\frac{20 (128,197)}{342,804} = 7.48$  (8 Years)

## Maintenance Estimate of Cost -

Intermodal Drive

Maintenance estimate of Cost – Hot-Mix Asphalt Surface Removal (2”) and Resurface with Hot-Mix Asphalt Pavement (2”)

UP Global to Jack Dame Rd. -	\$191,100
Jack Dame Rd. to IL Rte. 251 -	<u>\$ 97,200</u>
	\$288,300
Contingency (10%+/-) -	<u>\$ 28,700</u>
	\$317,000
Engineering - Design (7%) -	\$ 22,200
Construction (6%) -	\$ 19,000
Testing -	<u>\$ 10,000</u>
Total Estimated Cost -	\$368,200

Steward Rd

Maintenance estimate of Cost – Hot-Mix Asphalt Surface Removal (2”) and Resurface with Hot-Mix Asphalt Pavement (2”)

IL Rte. 251 to Caron Rd. -	\$360,300
Caron Rd. to Ogle/Lee Co. Line -	<u>\$276,200</u>
	\$636,500
Contingency (10%+/-) -	<u>\$ 63,500</u>
	\$700,000
Engineering - Design (7%) -	\$ 49,000
Construction (6%) -	\$ 42,000
Testing -	<u>\$ 15,000</u>
Total Estimated Cost -	\$806,000

## Permit Fee for Overweight Loads -

Permit Fee - Assume maintenance to be performed on a 10 year cycle.

Intermodal Drive

Overweight Loads – 109/day

109 Loads/day x 260 days/year x 10 years - 283,400 Loads/10 years

Permit Fee -  $\frac{\$368,200}{283,400} = \$1.30/\text{Load}$

Steward Rd

Existing ADT –

IL Rte. 251 to Main St. - 2,050 (WHA), 2079 (IDOT) -	2,065
Main St. to Caron Rd. – (IDOT)	2,012
Caron Rd. to Ritchie Rd. - (IDOT)	2,465
Ritchie Rd. to Ogle/Lee Co. Line - (IDOT)	<u>2,052</u>
	8,594/4 = 2,150

Existing ADT – Trucks

IL Rte. 251 to Main St. - 31.2% (WHA), 11.93% (IDOT) -	21.57%
Main St. to Caron Rd. - (IDOT)	11.43%
Caron Rd. to Ritchie Rd. - (IDOT)	11.68%
Ritchie Rd. to Ogle/Lee Co. Line - (IDOT)	<u>16.72%</u>
	61.4%/4 = 15.35%

Overweight Loads – 2,150 x 15.35% = 330 Loads x 25% (Assumed Overweight) = 82/day  
 82 Loads/day x 260 days/year x 10 years - 213,200 Loads/10 years

Permit Fee -  $\frac{\$806,000}{213,200} = \$3.78/\text{Load}$

Permit Fee for Loads using both Intermodal Dr. and Steward Rd. –

$\$1.30 + \$3.78 = \$5.08/\text{Load}$