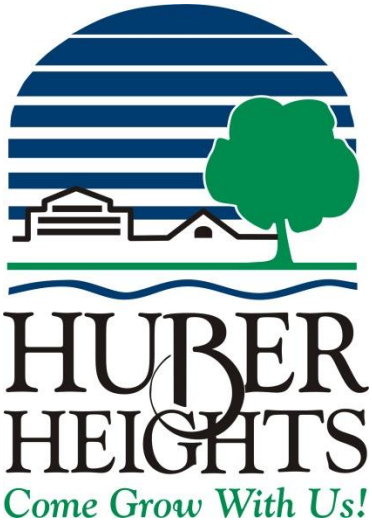

Feasibility Study
Waste Collection Consolidation

October 11, 2012

City of Huber Heights
6131 Taylorsville
Huber Heights, OH 45424
937.233.1423

Introduction

Currently, Huber Heights' residents living in single family homes, have the opportunity to choose their own waste collection provider. There are several companies who service the city and residents can choose the options and services that best meet their needs. The Huber Heights City Council has requested that City Staff look into the feasibility of contracting with one trash hauler to service the entire city.

This report is broken down into sections and at the beginning of each section is a summary of the data contained within that section.

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Summary of the 2012 Waste Collection Survey

When putting the survey together, we decided to ask questions that would help us gather basic information regarding Huber Heights residents' waste collection, recycling, cost, and billing. These questions were multiple choice, we did not give the option for resident comments. The survey was available on the City's website, as well as the Facebook page, during the entire month of August. Overall, the response we received was above and beyond what we expected.

The information we gathered from the survey is that the majority of residents have weekly waste collection, weekly recycling, and they are billed quarterly. The rate they are being billed varies, but most are paying on the high end for the services they receive ($45-$75 per quarter). Attached you will find a copy of the survey and a break-down of responses.

It should be noted that the survey originally did not give a high enough option for the amount the residents were paying per month. After speaking to some residents, a fourth option was added for quarterly billing of $60- $75. Some of the residents I spoke with advised that they selected the $45- $60 option because originally there was not a higher option.

2012 City of Huber Heights Waste Collection Survey

SurveyMonkey

1. Are you a resident of the City of Huber Heights, Ohio?

	Response Percent	Response Count
Yes	**100.0%**	**618**
No	0.0%	0
	answered question	**618**
	skipped question	**0**

2. What type of dwelling do you currently reside in?

	Response Percent	Response Count
Single family	**98.9%**	**605**
Duplex	0.7%	4
3 or more unit building	0.5%	3
	answered question	**612**
	skipped question	**6**

3. Do you live in a neighborhood where your waste collection services are contracted for by a homeowner's association?

	Response Percent	Response Count
Yes	3.3%	19
No	**96.7%**	**561**
	answered question	**580**
	skipped question	**38**

4. Which waste collection company do you currently use?

	Response Percent	Response Count
Allied Waste	6.7%	39
Dempsey	1.2%	7
First Choice Disposal	5.3%	31
Republic Services	0.9%	5
Rumpke	**58.0%**	**339**
Waste Management	24.8%	145
Other	3.1%	18
	answered question	**584**
	skipped question	**34**

5. Are you satisfied with your current waste collection company?

	Response Percent	Response Count
Yes	**88.5%**	**508**
No	11.5%	66
	answered question	**574**
	skipped question	**44**

6. On waste collection day, is your trash toter (large, wheeled garbage can with lid):

	Response Percent	Response Count
Overflowing	10.9%	52
Full	**56.6%**	**270**
1/2 full	23.7%	113
Less than 1/2 full	8.8%	42
	answered question	**477**
	skipped question	**141**

7. If you do not use a trash toter, how many bags and/or cans do you place at the curb?

	Response Percent	Response Count
1	**37.4%**	**76**
2	30.5%	62
3	12.3%	25
4 or more	19.7%	40
	answered question	**203**
	skipped question	**415**

8. Is there an additional charge for your trash toter?

	Response Percent	Response Count
Yes	**52.1%**	**252**
No	47.9%	232
	answered question	**484**
	skipped question	**134**

9. Does your waste collection include recycling services?

	Response Percent	Response Count
Yes	**78.6%**	**441**
No	21.4%	120
	answered question	**561**
	skipped question	**57**

10. How often do you put out your recycling bin for collection?

	Response Percent	Response Count
Once a month	4.3%	24
Bi-weekly	7.5%	42
Weekly	**57.3%**	**319**
Never/not applicable	30.9%	172
	answered question	**557**
	skipped question	**61**

11. On recycling collection day, is your bin:

	Response Percent	Response Count
Overflowing	26.6%	109
Full	**49.8%**	**204**
1/2 full	17.3%	71
Less than 1/2 full	6.3%	26
	answered question	**410**
	skipped question	**208**

12. Does your waste collection include bulk pick-up service?

	Response Percent	Response Count
Yes	**88.9%**	**487**
No	11.1%	61
	answered question	**548**
	skipped question	**70**

13. Is there an additional charge for bulk pick-up service?

	Response Percent	Response Count
Yes	20.1%	104
No	**79.9%**	**413**
	answered question	**517**
	skipped question	**101**

14. How much do you pay for waste collection services?

	Response Percent	Response Count
$10-$12 per month ($30-$36 per quarter)	5.3%	30
$12-$15 per month ($36-$45 per quarter)	14.9%	84
$15-$20 per month ($45-$60 per quarter)	**52.9%**	**299**
$20-$25 per month ($60-$75 per quarter)	18.8%	106
Don't know	8.1%	46
	answered question	**565**
	skipped question	**53**

15. How often are you currently billed?

	Response Percent	Response Count
Monthly	7.7%	43
Quarterly	**92.3%**	**512**
	answered question	**555**
	skipped question	**63**

Summary of the Town Hall Meeting, September 19, 2012

The Town Hall Meeting was held as a way for Huber Heights residents to voice their opinions regarding waste collection. There were approximately 25 residents in attendance and they all expressed the same concerns. Their major concerns were the number of trucks in their neighborhoods several times a week, the safety of children and others in their neighborhoods, and also how unsightly it is to have garbage sitting at the curb almost daily. The general consensus from the residents is that they are in favor of moving to one contracted waste collection company. Attached is a list of resident comments from the Town Hall Meeting.

September 19, 2012 Town Hall Meeting, Resident Comments

Anne Ziegler – She would like to use one carrier. She feels it is a terrific waste using multiple companies and a terrific expense for street repair due to heavy trucks. Current services provided by Rumpke.

Barb Hildebran – She feels one provider would be kinder to our streets. She has three haulers, twice a day on her street. She currently uses Waste Management and receives a discount for paying for the entire year.

Nancy Byrge – She is concerned with having a contract; will there be a way to terminate for non-performance? She currently uses Rumpke.

Bonnie Campbell – She wants to switch to using one provider. She does not like having trash sitting out all week. She is also concerned with safety; trucks backing up, small children, etc. She also does not like the noise.

Monica Rezek – She is concerned with having to pay for service at a vacant property. She is also concerned with whether residents can use own receptacles, use bags, or will residents have to use provider receptacles. She would like to see larger recycle bins.

William West – He is concerned with whether the city will have any control over the raising of rates. He feels that one company would better serve the community.

Larry Campbell – He is tired of multiple trucks, multiple times per day. Trash sitting out each day looks awful.

Name Unknown – He is confused by why the city wants to use one contracted provider. Are residents unhappy with their current service? Unhappy with price? He is happy with his current provider.

Mary Ann Seider – She wants one trash provider. She currently has 5 companies driving on her street. She is concerned with what will happen to the current providers the city will no longer use and will people lose their job.

Jerrie Brion – She wants to make sure the residents have to use containers and not bags, due to animals.

Bonnie Campbell – She wants to make sure in the contract that the city is involved with payments and complaints.

Ron Cattelan – He would like to limit number of trash trucks on the streets. He is concerned with who will be responsible for trash bills at rental properties and for snow birds. He is also concerned with loss of competition and negotiating fees.

Robert Ziegler – He likes the idea of bi-weekly recycling.

Summary of Neighboring Cities

The following is a listing of cities located within Montgomery and Greene Counties. This chart shows who provides waste collection service for each city, the type of service provided, and the amount that is billed. You will also find details regarding the types of recyclables that are taken.

The majority of cities and townships have a contracted provider. Huber Heights and Washington Township are the only two areas that still allow their residents to choose their own provider. Trash service with recycling is being billed $12 to $15 per month ($36-$45 per quarter), with most cities paying the contractor directly.

Revised April 12, 2012

Community Curbside Recycling/Waste Hauling Programs

Phone Numbers: Waste Management- 1-800-343-6047, Rumpke- 461-0004, Allied Waste- 268-8595- City of Dayton-333-8774

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
Brookville, City of John Wright Municipal Manager 301 Sycamore Street Brookville OH 45309 833-2135(Voice) 833-3347-(Fax)	**Self-Hauling. City** provides trash pickup.	Contract with **Rumpke** to pick up recyclables on the day designated by Rumpke Brookville provides blue recycling bins for each household. City pays contractor per resident per month Contract ends 12/31/13	Charge to resident: $36 quarter No additional charges for recycling.	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Butler Township Pam Luke 8524 N. Dixie Drive Dayton OH 45414 898-6735 898-5308-Fax	**Waste Management** Contract ends- 9/1/13 Township pays contractor	**Waste Management** **Bulk Pick-up** **6 tires per year** **Yard Waste** Currently implementing pilot program – approx 600 individuals participating – offering 18 – 96 gal bin	Charge to residents: $44.25 quarter or $40.50 on low end	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Centerville, City of **Public Works** Ken Peters 100 W. Spring Valley Centerville OH 45458 428-4782 435-0286-Fax	**Self-Hauling. City** provides trash pickup.	**Self-Hauling.** City provides a sticker to designate recyclables. Items are picked up the same day as trash pickup. City transports to Rumpke	Charge to residents: $18 month or $54 quarter. No additional charge for recycling.	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
Clayton, City of Gwen Everly Director of Service 6996 Taywood Road Clayton OH 45315 836-3500 836-6773-Fax	Contract with **Allied Waste, bought by Republic** for trash and yard waste pick up. Contract Expires- April 30, 2014 Direct bill to residences, city does NOT pay anything	Contract with **Allied Waste** to provide residents with a blue bin for recyclables.	Charge: Curbside - $34.31 quarter - they have to provide their own trash containers. To rent 90 gal tote - quarterly charge $40.26 and they can rent up to 3 90 gal totes	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Clay Township Phillipsburg, Village of Holly Buchanan, Clerk Clay Township 8207 Arlington Road Brookville OH 45309 833-4015-W Fax:833-6211	Contract with **Allied Waste** for trash and yard waste pick up. 3 Yr- 1 Month with Option for 2- 5 years Twp-pays Hauler	Contract with **Allied Waste** to provide blue bins to residents for recyclables. Includes bulk pick up	Charges to residents: Basic rate per Quarter $44.35 To Rent 90 gal tote: $52.60 Senior 60 or over basic: $38.50 Senior renting tote: $46.75 No additional charge for recycling.	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/ Junk mail
Dayton, City of David Foster Recycling Supervisor 1010 Ottawa Street Dayton OH 45402 333-4832 333-4022-Fax	**Self-Hauling.** City provides trash pickup.	**Self-Hauling.** City provides a blue bin to residents for recyclables. Recyclables are picked up the same day as trash pickup.	Charge to residents: For info call Ruth Richey 333-4829 Waste removal - $140.12 yearly No additional fees for recycling.	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2, #6 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Englewood, City of Janine Cooper Director of Finance 333 W. National Rd. Englewood OH 45322 836-5106 836-7426-Fax	Contract with **Rumpke** With a 4 year option City pays contractor per resident per month	Contract with **Rumpke** Contract just extended - ends 2016	Charges to residents: $23.57 every 2 months without toter With Toter: $6 more every 2 months No additional charge for recycling	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
Germantown, Village of Annie Casto 75 North Walnut St. Germantown OH 45327 855-7255 855-3215-Fax	Contract with **Rumpke** for trash and yard waste pick up. Contract effective- May, 2010 through April, 30 2011 Village pays contractor	Contract with **Rumpke** to provide red plastic bins for recyclables. Items are picked up on the same day as trash pickup.	**Waiting on callback**	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Harrison Township Denise R. Eldridge Office Coordinator 5945 North Dixie Dr. Dayton OH 45414 890-5611 454-4831-Fax	Contract with **Rumpke** Contract May 2008- May , 2011 with an option to renew 1 year. **Twp.** pays per month per resident	Contract with **Rumpke.** Items are picked up on the same day as trash pickup. Bulk pick-up, yard waste, appliance pick-up Contract extended to 5/1/13	Charge to residents: Regular $10.84 – month Low volume – 2 cans or bags $8.06 - month As of 5/1/12 – all prices are going up 10% Regular after 5/1/12: $11.92 Low volume: $8.87 - month	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
City Huber Heights, Alex Hynds Street Superintendent 7020 Brandt Pike Huber Heights OH 45424 233-1562 233-4279-Fax	**Subscription** area. Same procedures apply for trash pickup.	**Subscription** area. Residents contact their own trash hauler to coordinate pickup of recyclables. Haulers include: Waste Management, Allied, and Rumpke.	City hall offers bins thru Rumpke, but they do not offer any trash or recycling pickup services.	**WM:** **1-800-343-6047** **Allied Waste-** **268-8595** **Rumpke:** **461-0004**	
Jefferson Township One Business Park Dr. Dayton OH 45427 262-3591 262-3599-Fax	Agreement signed 2007 between the City of Dayton & Jefferson Twp. for Trash & Recycling Service	Agreement between the City of Dayton & Jefferson Twp. for Recycling Service	The City of Dayton sends the invoices directly to residents. Their contract with the City of Dayton expires 12/31/12. Undecided at this time if contract will be renewed or placed for bid.	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2, #6 plastics	Brown paper bags Cardboard, newspaper Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
Kettering, City of Mark Schweiterman City Manager 3600 Shroyer Rd Kettering, OH 45429 296-2412/296-3321 296-2550-Fax	Contract with **Waste Management** for trash pickup. 5- year Contract – July 2009 - June 2014 resident pays WM direct	Contract with **Waste Management** for curbside recycle. (does not accept yard debris)	Unlimited - $19.77 per month plus fuel charge (variable – based on diesel costs) – house side Limited volume 1 service: less than 2 – 35 gal - $18.29 month plus fuel charge – house side Low volume 2 service – once a month pickup one container – recycling every week - $5.03 plus fuel – house side Qualified Sr. Citizen service: weekly pickup less than 35 gal container – 65 years or older income based less than $30000 - $3.02 no fuel charge Yard waste collection, but they have to purchase waste management bags - $3.00 per bag (curb side)	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Miamisburg, City of Steve Morrison Public Works Dir. 600 North Main Street Miamisburg OH 45342 847-6637 847-6634-Fax	**Self-Hauling.** City provides trash pickup.	**Self-Hauling.** City provides a sticker to designate recyclables. Items are picked up the first and third week of the month on trash pickup. Newspaper bins on city office property also.	Angela Lovelace – Secretary Charge to residents - $12.00 reg trash paid w/water bill – allowed 1 free bulk pickup – add'l $25 each after the 1st Nothing larger and 32 gal (they are allowed 12 items per week) can use regular black bags – weight limit of 50 bags Recycling – no fee Contract thru Rumpke - $15 per ton	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Junk mail

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
Miami Township **Gregory S. Rogers, AICP** Planning and Zoning Director 2700 Lyons Road Miami Twp. OH 45342 433-9969-Voice 433-8709-Fax	Contract with **Waste Management** for trash pickup.) Contract expires- Dec. 31 2009: with a option for 3 years Taking first year of the three year option contract will **expire 12/31/2012** Township pays Contractor	Contract with **Waste Management.** Includes Bulk pick-up Yard Waste- additional fee $11.25 if they subscribe yard waste	Charge to residents: Part of property taxes - trash levy 2.1 mil – unsure how it breaks down per resident Joe Fowler – Finance Director would be able to provide but currently out of office	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Moraine, City of **David Hicks** **City Manager** 4200 Dryden Road Dayton OH 45439 535-1001 535-1275-Fax	5- year Contract with Waste Management for trash pickup Contract Sept 1, 09-Sept 1, 2013 City pays Contractor	Contract with Waste Management. Includes bulk pick-up	No charge to residents	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Oakwood, City of Ken Perkins Public Service Foreman 210 Shafor Blvd. Oakwood OH 45419 298-0777 297-2919-Fax	**Self-Hauling. City** provides trash pickup.	**Self**-Hauling. City offers back-door recycling program to residents.	298-0402 – Finance Dept $12.50 month for single family home	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Riverside, City of Mitch Miller 1791 Harshman Road Riverside OH 45424 937-237-5956 237-5965-Fax	Waste Hauling Contract with **City of Dayton.** 5 yr -Contract starting Jan 1, 2008 ending 2012 City pays contractor	Contract with **City of Dayton** to provide recycling container Includes Bulk, yard waste	Tom Garrett returned call: Charge: $11.50 per month per resident, recycling included.	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
Trotwood, City of Ms. Shively 3035 Olive Rd. Trotwood OH 45426 854-7208 854-0574-Fax	Contract with Rumpke for trash pickup for three year starting August 1, 2010 - July 31, 2013 City pays Rumpke	Contract with Rumpke red bin for recyclables Includes bulk pick up and yard waste	Patricia Shively – left VM/returned call Charge to residents: $12.60	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Union, City of John Applegate 118 North Main St. Union OH 45322 836-8624 836-1240-Fax	Contract with **Rumpke** for trash pickup. New Contract – Starting October 1, 2010 Sept 30, 2015 (5-year) City pays Contractor	Contract with **Rumpke** to provide a red plastic bin for recyclables Includes Bulk, yard waste	Monthly - $15.75 to all residents	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Vandalia, City of John Mitchell Service Dir./ City Engineer 333 James E. Bohanan Memorial Drive Vandalia OH 45377 898-5891 415-2319-Fax	Contract with **Rumpke** for trash and yard waste pick up. Contract: Jan.2009-Expires December 2015 city pays Contractor	Contract with **Rumpke** to provide a red bin for recyclables. Additional fee for yard waste and bulk pick-up	Charge to residents: $12.27 monthly	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Washington Township Jackie Curl Public Info. Tech. 8200 McEwen Road Dayton OH 45458 433-0152 438-2752-Fax	**Subscription** area. Same procedures apply for trash pickup.	**Subscription** area. Residents contact their own trash hauler to coordinate pickup of recyclables. WM will pickup recyclables even though they aren't the *waste* hauler.	Still subscription area. They do not offer trash removal or bill.	**WM:** **1-800-343-6047** **Allied Waste:** **268-8595** **Rumpke** **461-4000**	

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
West Carrollton, City of Rich Norton Service Director 300 East Central West Carr. OH 45449 859-5184 859-3366-Fax	Self-Hauling. City provides trash pickup.	Contract with **Rumpke** to provide a red plastic bin for recyclables.	Charge to residents: $49.40 a quarter, includes recycling	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Western Regional Council of Governments **Farmersville** 316 West Walnut St. Farmersville, OH 45325 V- 696-2020 Fax- 696-2996-	New Contract: Oct 1, 2010 with Rumpke	Contract with **Allied Waste** to provide red bins for recyclables. Items are picked up on the same day as trash pickup.	Charge to residents: $14.00 per month	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Western Regional Council of Governments **German Township** 12102 State Route 725 West Germantown, OH 45327 855-7270 855-4897- Fax	New Contract: Oct 1, 2010 with Rumpke		Charge to residents: $14.00 per month	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Western Regional Council of Governments **Jackson Township** 316 West Walnut St. Farmersville, OH 45325 696-3010 696-2673- Fax	New Contract: Oct 1, 2010 with Rumpke Currently in their 2nd year with yearly renewal/bid.		Charge to residents: $40.50 per quarter	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
Western Regional Council of Governments **Perry Township** 3025 Johnsville-Brookville Brookville, OH 45309 833-3045 833-2940 - Fax	New 3 year contract: 8/1/10 – 7/31/2013 with Rumpke. Provision to extend contract for a year 2 or 3 add'l times after 2013.		Charge : $45.00 per quarter	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Western Regional Council of Governments **Village of New Lebanon** 198 South Clayton Rd. New Lebanon, OH 45345 687-1341 687-1213 - Fax	Contract with Dempsey/Republic Service: New contract in 2010 for 3 years. Can be renewed in May 2012 or placed out for bid.		Charge to residents : $12.25 per month	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Green County Information					
City of Fairborn **City Manager-:** **Debbie McDonald** **754-3030**	Contract with **Waste Management** Contract Ends 2014 3 year contract	Contract with **Waste Management** to provide a blue plastic bin for recyclables Bulk Pick- Up included	Curbside single resident: $16.85 – includes recycle but not yard debris	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail

SWD Community/ Recycling Contact	Waste Hauling	Curbside Recycling	Charges	Types of Recyclables Taken	
City of Xenia City Manager- 376-7230	Contact the City of Xenia For updated information –	Contract with **Rumpke** to provide a red plastic bin for recyclables. Bulk Pick-Up included Yard Waste- $1.50 per bag City Manager only one who can provide agreement timeframe w/Rumpke – he wasn't in.	Charge to residents: $17.01 per month, includes recycling	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
City of Bellbrook City Manager- 848-4321	Contract with **Allied Waste through 2010 with option for 2-years – exp. 2012** City pays contractor	Contract with **Allied Waste** to provide blue bins to residents for recyclables. Bulk Pick-Up included	Charge to residents: $16.00 per month	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail
Village of Yellow Springs 100 Dayton Street Yellow Springs, OH 45387 (937) 767-7202	Contract with **Rumpke** Village pays contractor	Contract with **Rumpke** to provide a red plastic bin for recyclables. Contract ends 12/31/12	Tier system: depends on how much residents sign up for. Up to 1 can - 35 gal - $10.40 + fuel surcharge from Rumpke 60 gal - $11.40 + 90 gal – $12.40 + 120 gal - $22.80 + 23.80 + 24.80 + 35.20 + 36.20 +	Aluminum/tin/steel cans Aluminum foil and pie pans Aerosol spray cans (empty) Glass of any color #1, #2 plastics Newspapers	Brown paper bags Cardboard Drink/milk/juice cartons Phone books Food/cereal boxes Magazines/Junk mail

Effects of Vehicular Weight on City Roadways

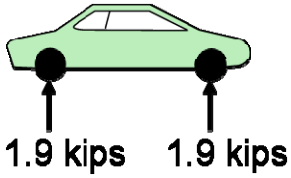
There are many studies done on the effect of heavy vehicles on asphalt roadways. The AASHO (American Association of State Highway Officials) Road Test is one standard that State and Federal Governments follow. Attached are three studies that explain further how heavy vehicles, like trash trucks effect pavements like our City roadways. Some conclusions from these tests are as follows:

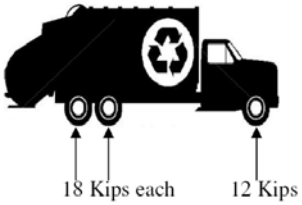
- As weight is added to a vehicle, the damage to a roadway is exponential. For example a vehicle that is twice the weight of a normal car would do 16 times the damage of that original car.
- One trash truck does the equivalent damage of approximately 10,000 cars.
- Trash trucks now account for nearly 25% of the wear and tear on residential roads.
- A typical residential road needs repaved every 22 years; trash trucks reduce that number to approximately 17 years.
- Residential roads cost about $180,000 per mile to repave.
- With 140 miles of residential roads in our city, trash trucks cost the City approximately $340,000 per year. Reducing the number of trips by 2/3 would reduce the City costs of repaving to approximately $114,000 per year by increasing the lifespan of the streets, saving $226,000 annually.

Load Damage from Trash Trucks

The damaging effect of the passage of an axle of any load can be represented by a number of 18,000-pound equivalent single axle load. The load damage factor increases as a function of the ratio of any given axle load raised to the fourth power (1). For example, one application of a 20,000 pound single axle load is slightly less than 8 times as damaging as a 12,000 pound single axle load $(20/12)^4$.

For our example, we will use a passenger car with a total weight of 3,800 pounds (2) or 1,900 (1.9 kips) per axle. The trash truck will be loaded to the maximum weight without needing a permit from CDOT of 48,000 pounds. Typically, the maximum load on the steering axle is 12,000 pounds (12 kips) and the remaining 36,000 pounds will be evenly distributed on the other two axles (18 kips per axle).





In this example, the damage from one combination truck is equal to 9646 cars.

Here is the math:

Front axle = $(12/1.9)^4$ = 1,591 cars
Rear axles = $(18/1.9)^4$ = 8055 cars

References

(1) AASHTO Guide for Design of Pavement Structures 1993 page I-11
(2) Statement of Clarence M. Ditlow Director of the Center for Auto Safety before the Senate Committee on Commerce, Science and Transportation in Washington DC on December 6, 2001.

Pavement Design
Cars versus Trash Trucks

In the structural pavement design process for CDOT, we convert all types of vehicles and various axle configurations to an 18,000 pound equivalent single axle load (18 k ESAL). These conversion values can be found in the appendix D of the AASHTO Guide for the Design of Pavement Structures.

For our example, we used the information for a terminal serviceability of 2.0

2 kip single axle = .0002
Therefore, 1 car = .0004 ESALs

12 kip single(driving) axle = 0.189
36 kip dual axle = 2.76
Therefore 1 trash truck = 2.949 ESALs

1 combination truck = (2.949 / .0004) cars
1 combination truck= 7,372 cars

Pavement Performance Considerations For Heavy Traffic Loads

Buses; Refuse Trucks; Concrete Trucks; Fire Trucks

By
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Capital Programs/GIS Section

August 31, 2004

Scope. The purpose of this paper is to identify and quantify the more significant, heavier vehicular loads to which the city's streets are subjected, and provide a means of visualizing and understanding how the various loads affect the service life of the city's pavement infrastructure – particularly the local access streets.

Background. The development of hard surfaces for paths and roads was borne of the necessity to accommodate and enhance mobility during all climatic conditions. Over the years, practitioners have experimented with many ways to create all-weather roads. Early methods utilized stones, branches and logs, whereas modern methods rely primarily on the use of naturally occurring and processed mineral aggregates, asphalt concrete, and cement concrete – either separately or in combination – to produce smooth, functional, long-lasting surfaces.

Over the years, the methodology for designing suitable pavement structures has evolved from trial and error to the use of computers employing sophisticated numerical methods. The goal was and is to produce a roadway surface that is suitably smooth, and upon which people can travel with a reasonable expectation of being able to do so safely, under all environmental conditions.

A number of factors must be considered when designing modern pavement structures, three of which include: (1) the ability of the underlying soils to support loads, (2) the type and availability of construction materials, and (3) the degree of loading to be accommodated – the traffic loads.

Traffic loading refers not only to the magnitude of the loads – the weight that is being applied to the pavement section – but also the nature or arrangement of the applied loads, and the frequency of the loading, that is, *how many times* that weight is applied, or the *axle load accumulation*. As an example, the design of the frame for a semi-trailer must consider two basic elements: (1) the frame must be strong enough to support the load that the trailer is intended to carry, and (2) the frame must be tough enough to resist the repeated stress fluctuations resulting from the bouncing action as the vehicle travels down the road; that is, the frame must also be fatigue resistant.

Likewise, it is intuitive that the useful life of a roadway section will similarly be affected by the number of applied loadings.

During the late 1950's, the American Association of State Highway Officials (AASHO) – now called the American Association of State Highway and Transportation Officials (AASHTO) – undertook an extensive research effort, called the AASHO Road Test, to "...establish relationships showing how performance of pavements is influenced by structural design, represented by component thicknesses of pavement structure, and loading, represented by the magnitude and frequency of axle loads, for both rigid and flexible pavements of conventional design."

The AASHO Road Test showed that the damaging effect of the passage of an axle of any mass – load – can be represented by a number of 18,000 pound equivalent single axle loads or ESALs. For example, one application of a 12,000 pound single axle was found to cause damage equal to approximately 0.23 applications of an 18,000 pound single axle load; or, conversely about four applications of a 12,000 pound single axle were required to cause the same damage (or reduction in serviceability) as one application of an 18,000 pound single axle.

Further analysis of the AASHO Road Test resulted in the realization that the amount of damage inflicted on a pavement structure by the application of varying axle loads is *non-linear*. That is, the reduction in pavement serviceability index (PSI) – the "damage" to the roadway – for a load that is twice as large as an initial load is far greater than two times that of the initial load. In fact, the damage is exponential; as a rule-of-thumb, roughly the fourth power. So, doubling a load (for a given wheel and axle configuration) will inflict about **sixteen times** the amount of "damage" (reduction in PSI) on a pavement structure. It must be understood that this is an approximation, but that it is also reflective of the generalized relationship observed in the test data.

Load Equivalency Factors. Subsequent work has resulted in the creation of tabular data that are utilized by pavement design engineers to rationally transform traffic number forecasts into the predicted number of ESALs a pavement structure must accommodate over the chosen or designated analysis period. The predicted ESAL count is then used in conjunction with other pertinent information to design a suitable pavement section.

To express varying axle loads in terms of a single design parameter, axle load equivalency factors – LEFs – were developed. It is these numbers that are shown in the various tables. They relate the potential for reduction in PSI for a given load to the potential for reduction in PSI for one ESAL. For example, a loading – load "A" – represented by an LEF of .05 imparts only 5% of the "damage" to a pavement structure as that of a loading – load "B" – represented by an LEF of 1.00 – one ESAL. Conversely, it takes approximately 20 repetitions (1÷0.05) of load "A" to equal the amount of damage imparted by one repetition of load "B".

The total amount of traffic expected over the analysis period is calculated by taking the current traffic volume, applying an appropriate growth model – often an assumed annual growth rate – and then summing up all the traffic over the analysis period. Once the total number of vehicles is known, the mix of traffic – percentage of heavy and light trucks, buses, cars, etc. – is applied, and the total number of each vehicle type is calculated. Then, knowing the axle weights, number

of axles, and axle arrangement (single, dual, triple) for each vehicle type, the ESALs over the analysis period are calculated by applying and summing the appropriate LEFs from the table for each vehicle type.

More recent analysis of the AASHO Road Test Data by the Trucking Research Institute (TRI) suggests that LEFs for both flexible and rigid pavements should be larger for lighter loaded axles and smaller for heavier loaded axles as compared to AASHTO LEFs. This means that the fourth power relationship for reduction in PSI may be less – about the 3.5 power, using the TRI numbers.

There are yet other factors – beyond the scope of this paper – that affect the overall relationship of load magnitude, arrangement and repetition to pavement damage. Nonetheless, the conclusion remains unchanged:

> *For an equal number of applications*, heavier loads produce appreciably more damage to a roadway pavement than do lighter loads.

Or, put another way:

> *For a given period of time,* higher numbers of ESALs produce appreciably more damage to a roadway pavement than do lower numbers of ESALs.

A corollary to the above would be:

> For a given pavement section, an increase in loading applications beyond the assumed design loading model will hasten the deterioration rate of the pavement, thus causing the pavement to reach its terminal serviceability index prematurely.

Vehicle Load Factor. For any vehicle, when the loads on the individual axles or duals/triples are known, then the sum of all the LEFs for each axle or axle group will yield the total number of ESALs for that vehicle. This is also sometimes called the Truck Factor in other literature. For the purposes of this paper, however, the total number of ESALs for any vehicle will be referred to as the Vehicle Load Factor – VLF.

Sample Vehicle Load Factors. Using the tables from Appendix D of the 1993 AASHTO Guide for Design of Pavement Structures, and the actual axle weight data for the indicated vehicles, the following VLFs are calculated for various vehicle configurations found on City of Spokane streets, for average conditions:

Vehicle	VLF	Passenger Cars Equivalent
Passenger car (assumed base line)	0.0004	1
Central pre-mix 7yd^3 concrete truck	1.84	4,600

Central pre-mix 10yd^3 concrete truck		2.03	5,100
STA Boyertown streetcar:	empty	1.35	3,400
	100% full	2.76	6,900
	150% full	3.80	9,500
STA bus, GMC T8H603:	empty	1.15	2,900
	100% full	2.98	7,500
	150% full	3.89	9,700
STA bus, FLXIBLE 870:	empty	1.25	3,100
	100% full	3.49	8,700
	150% full	5.55	13,900
STA bus, MAN articulated – SG310:	empty	0.81	2,000
	100% full	2.45	6,100
	150% full	4.59	11,500
City garbage truck: Front loader	empty	n/a	n/a
	full	5.48	13,700
City garbage truck: Rolloff	empty	1.91	4,800
	full	5.48	13,700
City garbage truck: traditional rear loader	empty	n/a	n/a
	full	3.37	8,400
City garbage truck: residential curbside	empty	2.01	5,000
	full	4.71	11,800
City fire truck: older engines	full	0.21	500
City fire truck: newer engines	full	0.68	1,700
City fire truck: downtown ladder	full	4.37	10,900
City fire truck: new tillered ladder	full	3.45	8,600
City fire truck: L-2 (due 2005)	full	6.87	17,200
	Average	2.74	6,800

In terms of absolute effect (highest VLF) for any single load application, it can be seen that empty buses rank below the average; full buses and garbage trucks rank above average; and fire trucks are mixed, some ranking well below average, others a bit above average about like the buses and garbage trucks; and one (the proposed new fire truck) ranking well above average.

Cumulative Impact. Understanding the one-time impact of these vehicles is only half the story; the overall impact must consider the number of times these vehicles use the streets during the pavement analysis period.

In the case of passenger cars, cumulative impact is essentially moot because of the extremely small VLF associated with passenger cars – pavement deterioration in this case is primarily associated with environmental effects, or perhaps the application of unforeseen low frequency, but very massive loads.

> Consider that during a typical 20-year analysis period, some blocks of residential streets may see fewer than one million passenger cars – around 100 per day – which would equate to only 400 ESALs during the analysis period. Other blocks might see more, depending on the geometric layout of the roadway grid for accessing the arterial network. **In contrast, it is not uncommon to design an average arterial street for millions of ESALs during its analysis period, and tens of millions for busier arterials and highways.**

As for *garbage trucks*, for the most part we would consider that they use a local access street perhaps once a week. For *fire trucks* the usage might even be less than the garbage trucks. For *buses*, the usage is a function of the bus route and schedule. As an example, an inspection of STA's various bus schedules indicates that bus trips vary from fewer than twenty to more than sixty per day (in one direction), depending on the route.

Of course for buses, garbage trucks and fire trucks, the nearer to their main functional nodes, the more concentrated is their traffic, and thus their effect on the roadway system. As an example, for buses we would be interested in the bus operations facility on west Broadway Avenue; the downtown transit plaza; and the various park and ride locations. For garbage trucks we would be concerned with the waste-to-energy plant; the transfer stations; and the Solid Waste yards near Perry Street and Madelia Avenue.

According to STA the Monroe Street Bridge and Monroe Street, proper immediately north and south of the bridge, which feed the downtown bus plaza were accommodating in the neighborhood of ***600 buses per day*** at the time the bridge was shut down to bus traffic just prior to the bridge reconstruction project. The data in the above table suggest that this level of bus traffic would be roughly equivalent to **1.2 MILLION** passenger cars **EVERY DAY**, in terms of the reduction in serviceability index imparted to the pavement structure!

> **OBSERVATION: on a trip-for-trip basis, bus loads are less significant than those for most garbage trucks and fire trucks. However, for those streets utilized by the transit system, when taking trip frequency into account, buses account for perhaps THE most significant loading on the city's streets (see the example, below) – certainly so for local access streets.**

As stated in the Washington State Department of Transportation *Pavement Guide Interactive* – http://hotmix.ce.washington.edu/wsdot_web – "... Although buses are sometimes ignored in truck counts, they can significantly contribute to overall pavement loading - especially in urban areas. Many times, school buses provide the only major loading for residential pavements. Furthermore, buses often inflict more pavement damage than much heavier trucks due to their axle configurations and wheel loads." See Attachment 1, herein.

During the City of Spokane's residential bond resurfacing initiative in the mid-1980s, there were many local access streets that had been in service for 50 years or more, whose major distress was the result of environmental conditions – primarily pavement oxidation resulting from exposure to

the ultraviolet rays contained in normal sunlight. These areas responded well to minimal treatment. However, it was not uncommon to find a local access street that had undergone total structural failure intermingled with other streets that were in reasonably good shape. Invariably, these areas of structural failure were on bus routes. In fact, in at least one case, only one-half of a street had failed structurally and as might be expected, that side of the roadway was located on the return leg of a bus route.

Other Considerations. The above information notwithstanding, the FHWA Vehicle Classifications would classify a "typical" bus as a (FHWA) Class 4 vehicle with 0.57 ESALs per vehicle. In their Pavement Management System, the Washington State Department of Transportation (WSDOT) assigns 0.4 ESALs to their single unit category, which includes the FHWA Class 4 vehicle. However, based on other data WSDOT assigns 1.6 ESALs to non-interstate urban buses.

Example. Assume a new local access street has just been put in service. The analysis period was 20 years, and the anticipated loading was based on a current service level consisting of the occasional delivery truck (assume 10 per day; assume 0.5 ESAL per truck), local single passenger vehicles (assume 200 per day; assume 0.0004 ESAL per vehicle), and 2 garbage trucks per week (assume 3 ESALs per truck). For the ease of calculation, assume that no growth was anticipated.

Over the course of the 20 year analysis period, then the total ESAL count assumed for the design of the pavement structure was about 20*(365*(10*0.5+200*.0004)+52*2*3.0), or only about 43,000 ESALs. This is about 6 ESALs per day.

Now, assume that after, say 2 years the roadway became designated a bus route, with an average of 30 buses per day. Assuming that each bus equated to about 1.25 ESALs, the same 43,000 ESALs would be reached in only about 2+((43,000-(365*2*6))/(6+30*1.25))/365 = 4.4 years!

To be sure, the minimum pavement thickness specified by many jurisdictions can accommodate considerably more than 43,000 ESALs during a 20-year analysis period, assuming average structural and environmental conditions. Typically, then, the minimum pavement thicknesses can be expected to last longer than the normal 20-year analysis period, assuming the normally smaller traffic of local access roads. However, it is readily apparent that the addition of numerous heavy axle loads will significantly reduce the service life of a (local access) roadway.

Conclusions and limitations. It is important that the above information be considered within the paper's intended scope. The fact is, the numbers are based primarily on *empirical data* from the AASHO Road Test of the late 1950's, together with subsequent industry observations and analytical work. **The numbers must not be considered "exact"**. Rather, they must be viewed as being generally representative of the observed performance of numerous past and current pavement systems, and as having been demonstrated suitably appropriate for predicting future pavement performance.

Consideration of the above Vehicle Load Factors and accompanying discussion reveals a number of interesting, even startling relationships concerning the damage – reduction in serviceability index – imparted to the street system by various vehicles:

- The average EMPTY bus in the above data is about equivalent to nearly 3,000 passenger cars in terms of "damage" imparted to the pavement infrastructure.
- Some *empty* buses are about equivalent to a *loaded* 7 cubic yard concrete truck.
- Full buses exceed the "damaging" effect of a loaded 10 cubic yard concrete truck.
- During the course of an **average day**, the pavement "damage" along a typical transit route *that is attributable to the bus traffic alone* is roughly equivalent to that imparted by 60 thousand passenger cars (assuming 30 buses per day) – nearly 200 thousand ESALs during a typical 20-year analysis period – **and that's assuming the lightest, EMPTY bus contained in the above table.**
- Although some garbage and fire trucks may have a larger ESAL total (VLF) than some buses, garbage and fire trucks typically impart nowhere near the "damage" imparted by buses, *for those (local access) streets on a transit route*. This is due to the reduced number of garbage and fire truck trips as compared to the bus trips.
- On probably all residential bus routes and many – if not most – arterial bus routes, bus traffic is arguably the single defining loading for which the pavement section should be designed.

Recommendations. Clearly, heavy traffic – most notably bus traffic – is a major factor in the life of a street, particularly a local access street. Consequently, attention must be paid to how these heavy loads will circulate within and through neighborhoods.

While it is possible to anticipate heavy loads and design pavement sections accordingly, it does not make economic sense to do so if such loads do not subsequently materialize – there is simply too much demand for current money. Perhaps equally important, any consideration to apply heavy loads to a street not appropriately designed therefor – e.g. changing a garbage truck route, or even more seriously changing a bus route – should be made with full knowledge of the ramifications.

Accordingly, it would not be inappropriate to require any agency, jurisdiction or entity that is considering actions that would impart significant heavy loading to a pavement structure not intended for that use – or, for that matter to any pavement structure – to pay into a fund to offset the cost associated with the inevitable accelerated pavement deterioration and related early required maintenance and repair. Perhaps the monetary "damages" could/should be related to the increase in ESALs imparted by the action of the responsible agency or entity. This notion is very similar to the concept of developer impact fees relating to residential or commercial/industrial development, and their effects on the transportation network.

It is especially appropriate that STA take into account these pavement service life factors and associated real – not "soft" – cost implications when considering route changes, particularly if the changes affect local access streets. It is important for the citizens of Spokane to understand the full implications of any decisions that have major effects on their – not "the City's" – infrastructure. If it is subsequently determined that "hard" payment is not appropriate, then the

related costs should be accounted for as social costs or in some other manner so that they appear in the balance sheet, and do not become hidden and thus forgotten.

Attachment 1

From Washington State Department of Transportation, *Pavement Guide Interactive*
Module 4, Section 3.6.1, Additional Information on Trucks and Buses link

Notes on Buses

Although buses are sometimes ignored in truck counts, they can significantly contribute to overall pavement loading - especially in urban areas. Many times, school buses provide the only major loading for residential pavements. Furthermore, buses often inflict more pavement damage than much heavier trucks due to their axle configurations and wheel loads. As shown in Table 3, a heavily loaded, dual powered bus (both diesel and electric power systems) can impart over 6 ESALs per bus. Table 3 tabulates various bus LEFs for King County (WA) Metro.

Table 3: Representative Bus ESALs (Metro, 1987; DeBoldt, 1993)

Bus	ESALs/Bus	Bus	ESALs/Bus
• AM General Diesel		• MAN 60'	
• Empty	1.14	• Empty	0.84
• 50% Full	1.67	• 50% Full	1.42
• 100% Full	2.34	• 100% Full	2.20
• 130% Full	2.85	• 130% Full	2.87
• AM General Trolley		• Flexible Diesel	
• Empty	0.80	• Empty	0.57
• 50% Full	1.22	• 50% Full	0.94
• 100% Full	1.78	• 100% Full	1.50
• 130% Full	2.19	• 130% Full	1.92
• Flyer		• GM Diesel	
• Empty	0.96	• Empty	0.58
• 50% Full	1.45	• 50% Full	0.95
• 100% Full	2.11	• 100% Full	1.46
• 130% Full	2.61	• 130% Full	1.84
• Flyer Diesel		• Breda 60'	
• Empty	0.85	• Empty	2.53
• 50% Full	1.21	• 50% Full	3.63
• 100% Full	1.67	• 100% Full	5.11
• 130% Full	2.02	• 130% Full	6.17
• MAN 40'			
• Empty	1.27		
• 50% Full	1.80		
• 100% Full	2.67		
• 130% Full	3.29		

Note: 130% Full is all seats filled with standing passengers

If no other information is known about a bus route other than the volume of buses, use an ESAL/bus corresponding to 50 percent full. This results in an average ESAL/bus ≅ 1.60.

Table 4 shows the detailed King County Metro numbers used to calculate the values in Table 3.

Table 4: Seattle Metro Bus Data

Bus Type	Total Empty Weight (lb)	Tire Size[3,4]	Seating Capacity	Weight (pounds) and ESAL per Axle											
				Empty			50% Full Pax			100% Full Pax			130% Full Pax		
				1st Axle	2nd Axle	3rd Axle	1st Axle	2nd Axle	3rd Axle	1st Axle	2nd Axle	3rd Axle	1st Axle	2nd Axle	3rd Axle
AM General Diesel[1]	26,600	12.5 x 22.5	45	8,200	18,400	—	9,925	20,200	—	11,350	22,000	—	12,295	23,088	—
				0.04	1.10	—	0.09	1.58	—	0.16	2.18	—	0.21	2.64	—
AM General Trolley[1]	24,740	12.5 x 22.5	45	7,980	16,760	—	9,555	18,560	—	11,130	20,360	—	12,075	21,440	—
				0.03	0.77	—	0.08	1.14	—	0.15	1.63	—	0.20	1.99	—
Flyer[1] 40'	26,300	12.5 x 22.5	47	8,850	17,450	—	10,500	19,325	—	12,150	21,200	—	13,140	22,325	—
				0.06	0.90	—	0.11	1.34	—	0.20	1.91	—	0.29	2.32	—
MAN[1]	37,300	12 x 20	70	12,900	15,100	9,280	14,716	17,226	10,587	16,281	19,226	12,272	17,295	20,464	13,675
60' Articulated				0.27	0.50	0.07	0.45	0.85	0.12	0.68	1.31	0.21	0.87	1.67	0.33
Flxible Diesel[1]	22,770	12.5 x 22.5	51	7,410	15,360	—	9,210	17,310	—	11,010	19,410	—	12,090	20,625	—
				0.03	0.54	—	0.07	0.87	—	0.14	1.36	—	0.20	1.72	—
GM Diesel[1] 35'	21,640	12.5 x 22.5	48	6,020	15,620	—	7,670	17,570	—	9,320	19,520	—	10,310	20,690	—
				0.01	0.57	—	0.03	0.92	—	0.07	1.39	—	0.10	1.74	—
Flyer Diesel[1] 35[1]	24,470	12.5 x 22.5	39	7,420	17,050	—	8,770	18,625	—	10,120	20,200	—	10,930	21,145	—
				0.03	0.82	—	0.05	1.16	—	0.09	1.58	—	0.13	1.89	—
MAN[2]	28,240	12.5 x 22.5	45	10,000	18,240	—	11,215	20,428	—	12,431	22,617	—	13,160	23,930	—
40'				0.09	1.18	—	0.15	1.65	—	0.23	2.44	—	0.29	3.00	—
Breda[2] 60' Articulated	49,330	12.75 x 22.5 (steer)	67	13,257	15,546	20,527	14,207	18,043	22,117	15,156	20,540	23,707	15,726	22,038	24,661
		12.5 x 22.5		0.30	0.56	1.67	0.39	1.01	2.23	0.51	1.69	2.91	0.59	2.20	3.38

Comprehensive Truck Size and Weight (TS&W) Study

Phase 1-Synthesis

Pavements

and

Truck Size and Weight Regulations

Working Paper 3

February 1995

Prepared for

Federal Highway Administration
U.S. Department of Transportation

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Comprehensive Truck Size and Weight (TS&W) Study

Phase 1—Synthesis

Working Paper 3—Pavements and TS&W Regulations

1.0 Technical Relationships of Policy Consequence Concerning Pavements[1]

1.1 Background

Pavement-related effects of changes in truck size and weight regulations include the following:

- Increased traffic loadings require thicker pavements which, in turn, increase the construction cost of pavements. There are, however, considerable economies of scale in designing new pavements for higher traffic loadings. In the AASHTO pavement design procedures used by many states, a given percentage increase in traffic loadings can be accommodated by a much smaller increase in pavement thickness and costs. For example, increasing a rigid pavement from 9 to 10 inches in depth will approximately double the traffic loadings that can be accommodated by the pavement.

- For existing pavements, increases in traffic loadings would affect pavement rehabilitation costs in two ways. First, an increase in traffic loadings would shorten the time interval to the next resurfacing. Moving resurfacing expenditures nearer to the present would increase the real cost for resurfacing because of the time value of money. If the funds required to resurface highways sooner were not available to highway agencies, pavement condition would worsen and, as discussed below, highway users would be subjected to added cost and discomfort. Second, at the time resurfacing is required, higher traffic loadings would either increase overlay thickness or require more frequent resurfacing in the future. However, for asphalt pavements, milling the rough surface can delay the need for resurfacing.

- Costs for routine maintenance might also be affected by changes in traffic loadings. A pavement in new or very good condition requires relatively little expenditure for maintenance. As pavement condition worsens, however, expenditures for activities such as filling cracks and patching potholes increase. The effect of an increase in traffic on costs for routine maintenance

[1]Much of this discussion is drawn from TRB Special Report 225, *Truck Weight Limits: Issues and Options*. That study, which was published in 1990, included an extensive review of the literature on pavements in relation to TS&W policy.

would be relatively insignificant if resurfacing programs were expanded so that there was no change in times between overlays and terminal serviceabilities. However, if resurfacing programs were not expanded, the maintenance workload could be much greater than it was before the increase in traffic.

- If traffic loadings are increased and highway agencies do not increase pavement-related expenditures to compensate for the increase, then pavement condition will deteriorate, in turn forcing users to travel over worse roads. Changes in pavement condition affect highway users by increasing vehicle repair cost and decreasing speed and fuel economy. Driver and passenger comfort are also affected by pavement condition, although there is no generally accepted way to quantify these effects. Further, highway users may suffer time delays during pavement resurfacing, reconstruction, rehabilitation, and maintenance. Such user costs should be included in a life cycle cost analysis of every major investment in pavements.

1.2 Truck Characteristics Affecting Pavements

(a) Axle Weights

Load equivalence factors measure the relative effects of different types of loadings on pavements. Pavement engineers generally use the concept of an equivalent single-axle load (ESAL) to measure the effects of axle loads on pavement. By convention, an 18,000-pound single axle is 1.00 ESAL. The ESAL values for other axles express their effect on pavement wear relative to the 18,000-pound single axle. Stating, for example, that a given vehicle on a given type of pavement is 3.0 ESALs means that one pass by the vehicle has the same effect on the pavement as three passes by an 18,000-pound single axle.

The American Association of State Highway Officials (AASHO) Road Test conducted in the 1950s provided sets of ESAL values for single and tandem axles on various types of pavements. In 1986, the Road Test results were extended by the American Association of State Highway and Transportation Officials (AASHTO) to provide load-equivalence factors for tridem axles (AASHTO 1986). The load-equivalence factors vary sharply with weight, following roughly a fourth-power relationship. On both flexible and rigid pavements, the load-equivalence factor for a 20,000-pound single axle is about 1.5 because $(20/18)^4$ is approximately equal to 1.5. Thus, 100 passes across a pavement by a 20,000-pound axle would have the same effect on pavement life as 150 passes by an 18,000-pound axle.

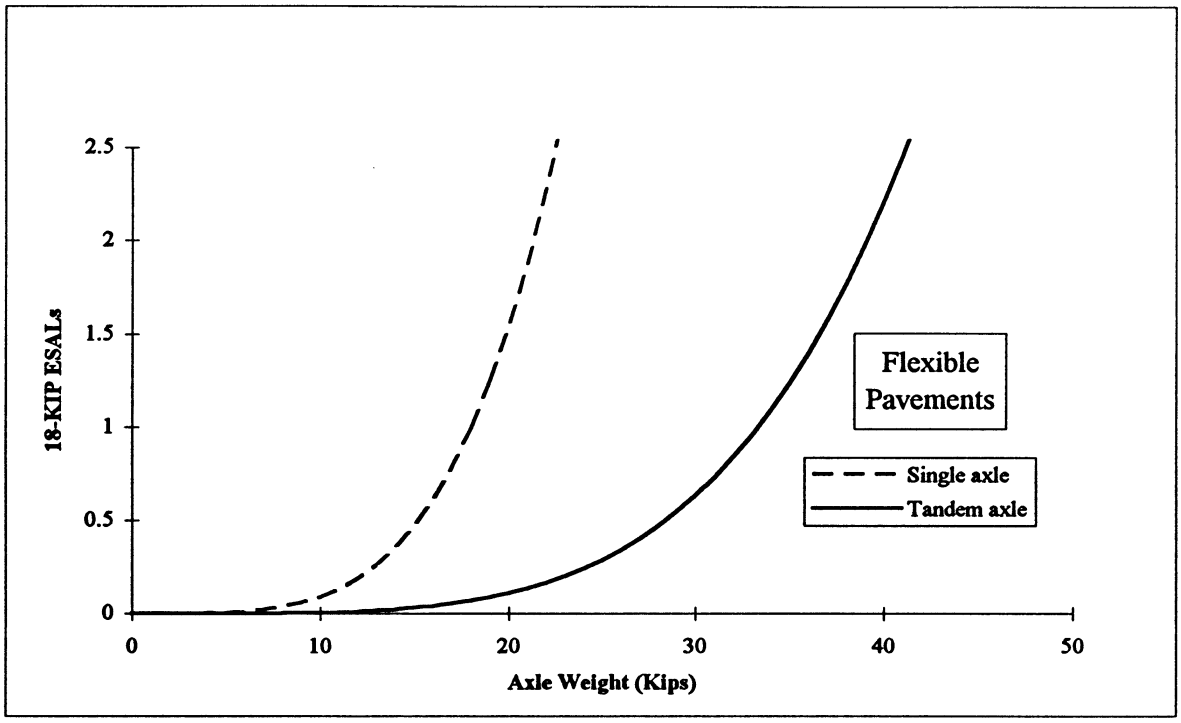
AASHTO provides separate sets of ESAL values for flexible and rigid pavements. The principal difference between the flexible and rigid pavement ESAL values is that tandem axles were found to have a greater effect on rigid pavements (Exhibit 1). For example, a 34,000-pound tandem axle is about 1.1 ESALs on flexible pavement and about 2.0 ESALs on rigid pavements.

The effect of a given vehicle on pavements can be estimated by calculating the number of ESALs for each axle and summing to get total ESALs for the vehicle (Exhibit 2). However, a comparison of vehicles in terms of ESALs would not account for the fact that vehicles with higher weights, assuming more axles, require fewer trips to transport the same amount of freight, thereby offsetting part of the additional pavement wear caused by increased weight. To circumvent this problem, vehicles can be compared in terms of ESALs per unit of freight carried (Exhibits 3 to 6).

Because of the fourth-power relationship from the AASHO Road Test, ESALs increase sharply with vehicle weight. The number of axles is also important: other things being equal, a vehicle with more axles has less effect on pavements. Thus, a nine-axle combination vehicle carrying 110,000 pounds has much less effect on pavements than a five-axle combination vehicle carrying 80,000 pounds.

Average ESALs per ton of payload were examined by Fekpe and Clayton under different assumptions about enforcement. They found ESALs per ton of payload to be lower for a six-axle combination with a rear tridem than for a conventional five-axle combination. They also found lower ESALs for seven- and eight-axle doubles than for five- and six-axle tractor-semitrailers.

Two recent studies have raised questions about the fourth power relationship between axle weight and pavement wear. In *Road Work: A New Highway Policy*, Small, Winston, and Evans present the results of their reanalysis of data from the AASHTO Road Test. Their analysis show a somewhat less steep relationship between pavement life and axle load—closer to a third-power law than the fourth-power law conventionally used to approximate the original AASHTO findings. Similar results are reported by Irick and ARE Inc. in their 1989 study for the Trucking Research Institute (TRI). The TRI Executive Summary notes that "the study refutes the existence of a universal fourth power law of pavement damage. Rather than a fourth power relationship, ARE found significant



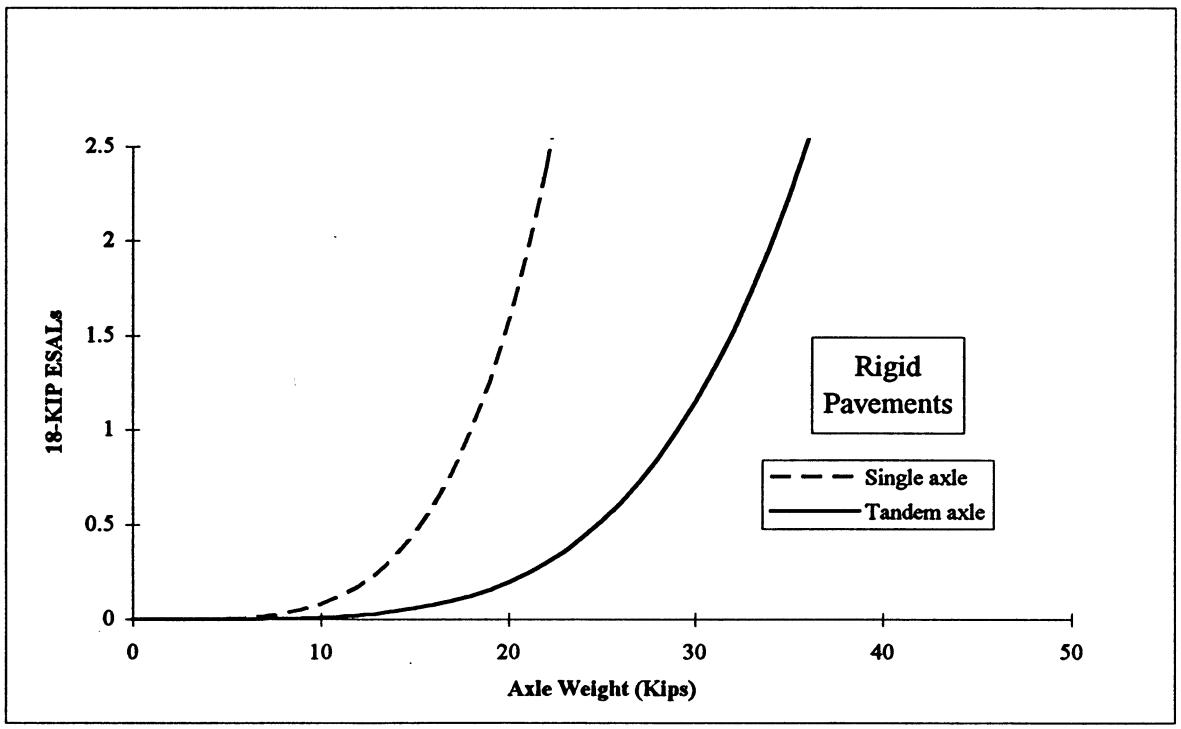
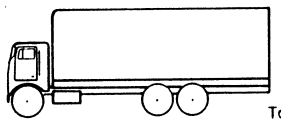


Exhibit 1 Axle load effects on pavements: top, flexible pavements (structural number 5, terminal serviceability = 2.5); bottom, rigid pavements (slab thickness = 10, terminal serviceability =2.5) (AASHTTO 1986).

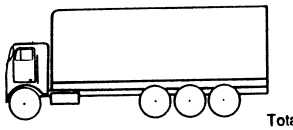
Exhibit 2 Equivalent single-axle loads for various vehicles.

(a) Three-Axle Single-Unit Truck



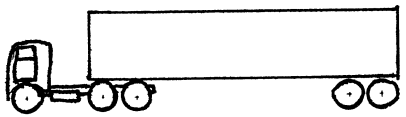
Weight (lb 000s)	16	32	Total 48
ESALs			
Flexible	0.62	0.86	1.48
Rigid	0.60	1.50	2.10

(b) Four-Axle Single-Unit Truck



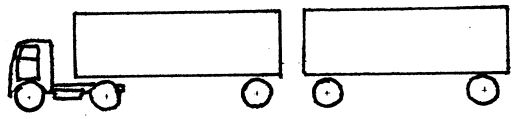
Weight (lb 000s)	16	40	Total 56
ESALs			
Flexible	0.62	0.49	1.11
Rigid	0.60	1.18	1.78

(c) Five-Axle Tractor-Semitrailer (3-S2)



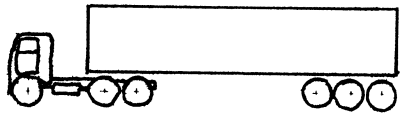
Weight (lb 000s)	12	34	34	Total 80
ESALs				
Flexible	0.19	1.09	1.09	2.37
Rigid	0.17	1.95	1.95	4.07

(d) Five-Axle Double (2-S1-2)



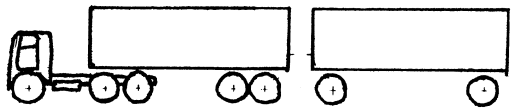
Weight (lb 000s)	9	20	19	16	16	Total 80
ESALs						
Flexible	0.06	1.51	1.24	0.62	0.62	4.05
Rigid	0.05	1.58	1.26	0.60	0.60	4.09

(e) Six-Axle Tractor-Semitrailer (3-S3)



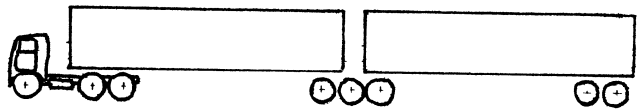
Weight (lb 000s)	12	34	42	Total 88
ESALs				
Flexible	0.19	1.09	0.60	1.88
Rigid	0.17	1.95	1.45	3.57

(f) Seven-Axle Double (3-S2-2)



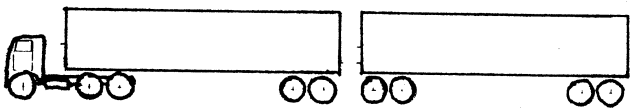
Weight (lb 000s)	9	31	30	16	15	Total 101
ESALs						
Flexible	0.06	0.75	0.66	0.62	0.48	2.57
Rigid	0.05	1.31	1.14	0.60	0.46	3.56

(g) Eight-Axle B-Train Double (3-S3-2)



Weight (lb 000s)	12	34	42	34	Total 122
ESALs					
Flexible	0.19	1.09	0.60	1.09	2.97
Rigid	0.17	1.95	1.45	1.95	5.52

(h) Nine-Axle Double (3-S2-4)



Weight (lb 000s)	12	33	28	28	28	Total 129
ESALs						
Flexible	0.19	0.97	0.50	0.50	0.50	2.66
Rigid	0.17	1.71	0.85	0.85	0.85	4.43

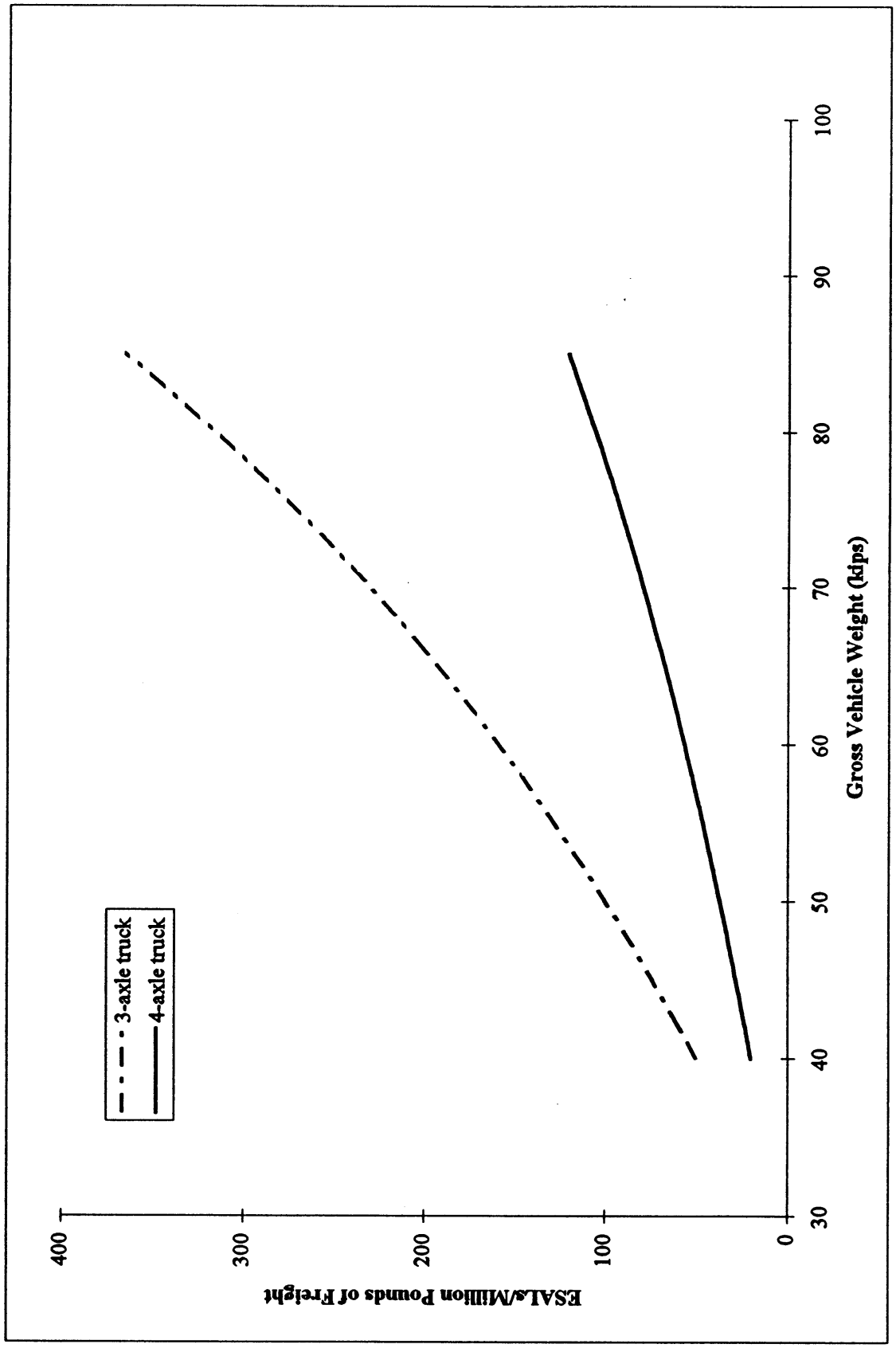


Exhibit 3 ESALs per million pounds of freight on flexible pavements: three- and four-axle trucks.
Source: TRB staff estimates developed using AASHTO load-equivalence factors (AASHTO 1986).

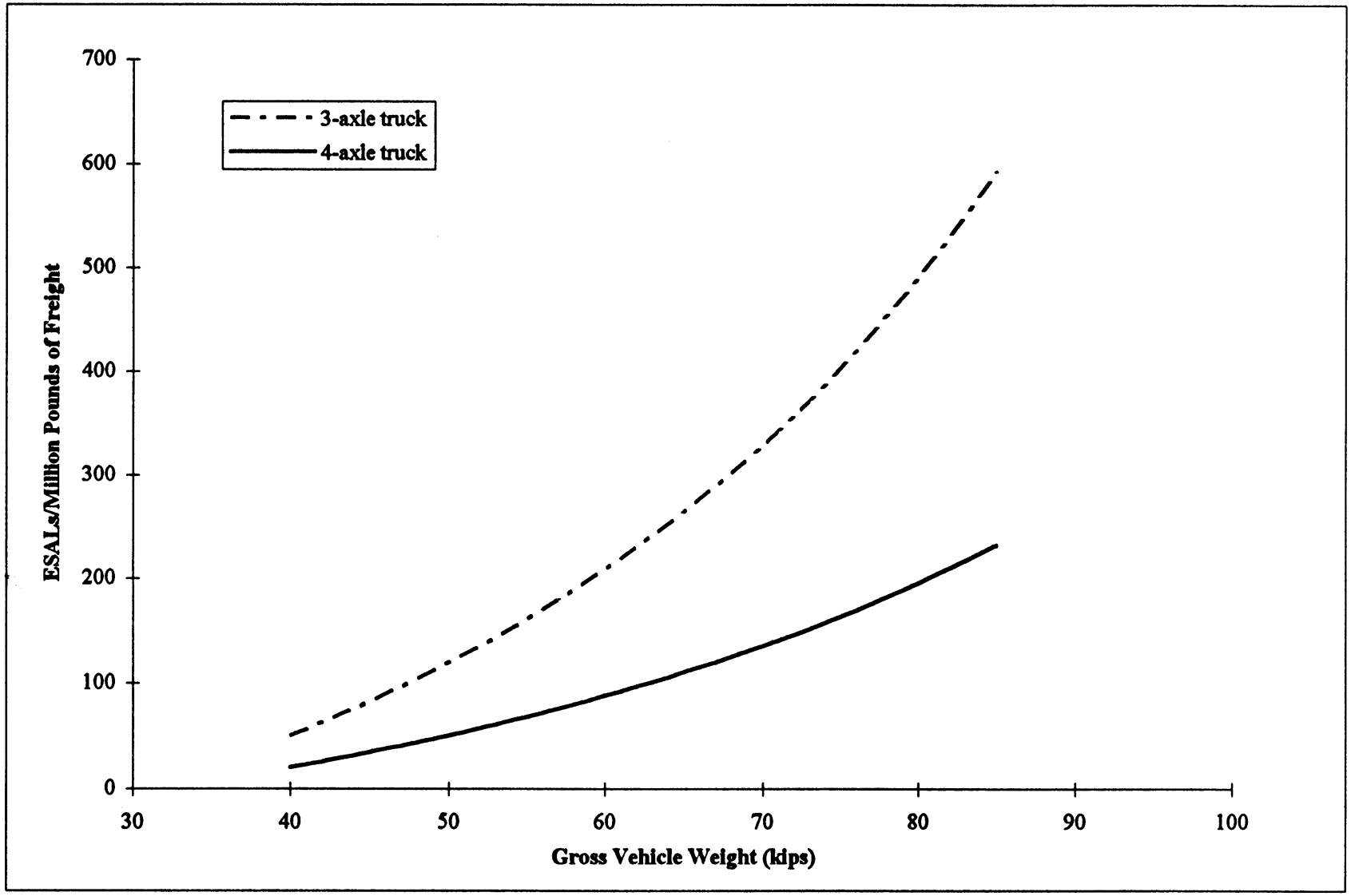


Exhibit 4 ESALs per million pounds of freight on rigid pavements: three- and four-axle trucks.
Source: TRB staff estimates developed using AASHTO load-equivalence factors (AASHTO 1986).

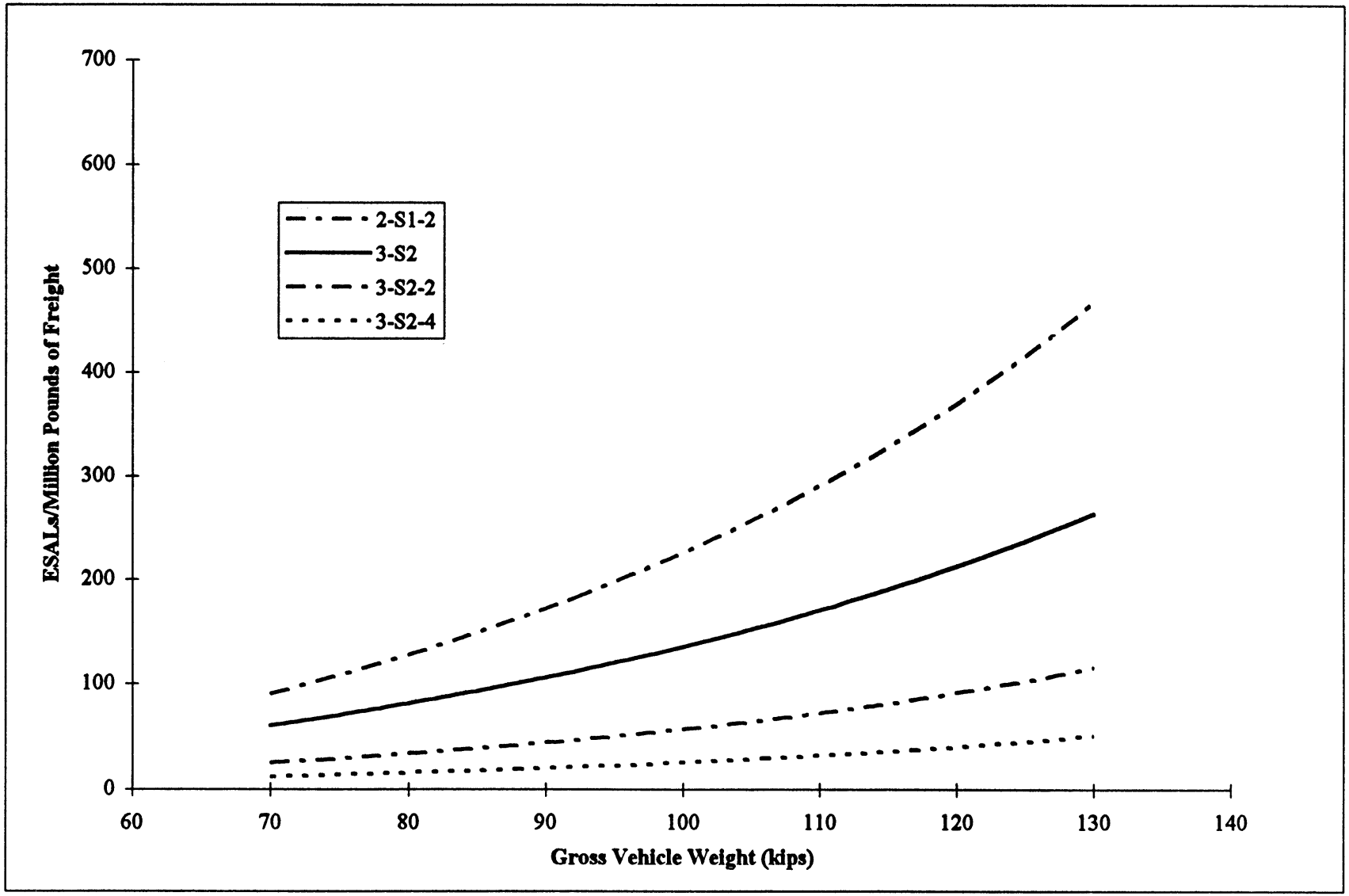


Exhibit 5 ESALs per million pounds of freight on flexible pavements: 3-S2, 2-S1-2, 3-S2-2, and 3-S2-4 trucks
Source: TRB staff estimates developed using AASHTO load-equivalence factors (AASHTO 1986).

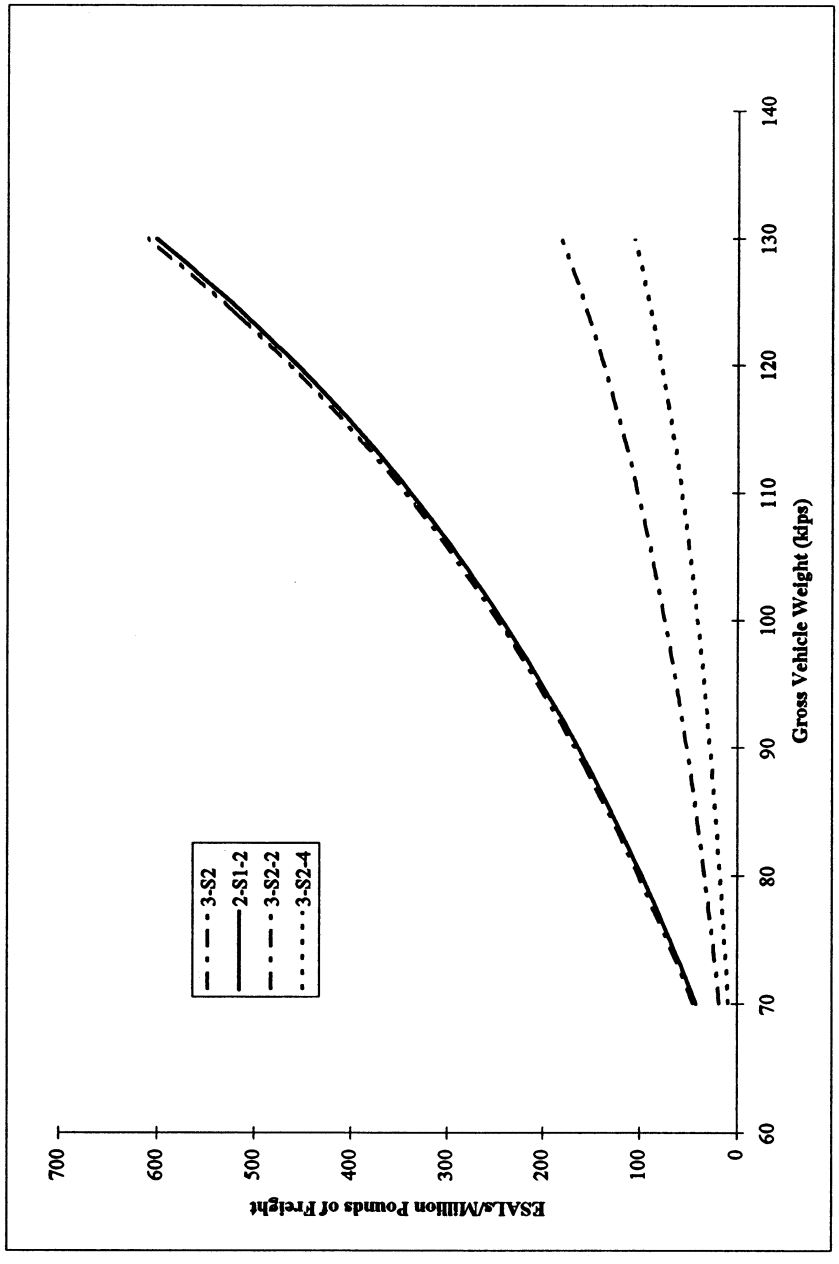


Exhibit 6 ESALs per million pounds of freight on rigid pavements: 3-S2, 2-S1-2, 3-S2-2, and 3-S2-4 trucks
Source: TRB staff estimates developed using AASHTO load-equivalence factors (AASHTO 1986).

scatter in the data depending upon pavement type, pavement thickness, and the type of distress being analyzed. Damage functions were generally found to be less than the fourth power, lying somewhere in the range of the second or third power in most cases."

The increase in pavement costs per added ESAL mile can vary by several orders of magnitude depending upon pavement thickness, quality of construction, and season of the year. Thinner pavements are much more vulnerable to traffic loadings than thicker pavements. Pavements are much more vulnerable to traffic loadings during spring thaw in areas that are subject to freeze-thaw cycles. The literature provides widely varying estimates of the marginal pavement cost per ESAL mile. The 1982 *Final Report on the Federal Highway Cost Allocation Study* estimated efficient pavement damage charges by functional system ranging from 8.7 cents per ESAL mile on rural Interstates to 69.1 cents per ESAL mile on local urban highways. In contrast, Hutchinson and Haas estimated the marginal pavement damage costs for a pavement with 500,000 annual ESALs as 2 cents per ESAL kilometer (3.3 cents per ESAL mile).

Deacon (1988) developed a model using the AASHTO pavement design and performance equations to estimate the changes in pavement rehabilitation costs resulting from increases or decreases in pavement loadings. In this model, each pavement section to be analyzed is described in terms of its thickness, base traffic loadings, and other design and environmental variables such as resilient modulus and drainage coefficient. The model then calculates the remaining life of the existing pavement and the annualized cost of all future resurfacings under base traffic and a ten percent increase in base traffic. The model indicated that there is surprisingly little variation in the additional cost associated with a ten percent increase in loadings under a very broad range of traffic and environmental conditions. Thus, when viewed in terms of cents per ESAL mile, pavement costs are much higher on low traffic roads than on high traffic roads. Very similar results are presented in Hutchinson and Haas. They show average and marginal costs per ESAL on highways with 500,000 to 2,000,000 ESALs per year. The cost per ESAL on highways designed for 500,000 ESALs per year is almost four times as great as the cost per ESAL on highways designed for 2,000,000 ESALs per year. One practical implication of this finding is that a policy which causes heavy trucks to shift from highways with thicker pavements to highways with thinner pavements can have adverse pavement cost impacts. An example of such a policy would be having more permissive axle-weight limits off the National Highway System (NHS), since this policy would encourage trucks with high axle weights to shift from the NHS to non-NHS highways.

(b) Tire Characteristics

Tires mounted on the AASHO Road Test trucks were representative of those in use in the late 1950s: they were of bias-ply construction with inflation pressures of 75 to 80 pounds per square inch (psi). Since then, bias-ply tires have been replaced with radial tires and inflation pressures have increased. A study by Bartholomew (1989) summarized surveys of tire pressure conducted in seven states from 1984 to 1986 and found that 70 to 80 percent of the truck tires used were radials and that average tire pressures were about 100 psi. As a result of these and similar studies, concern has been raised about the possibility of accelerated pavement wear, particularly rutting, as a result of increased tire pressure.

Higher tire pressure reduces the size of the tire "footprint" on the pavement, so that the weight of the wheel is distributed over a smaller area. The increased pressures hasten the wear of flexible pavements, increasing both the rate of rutting and the rate of cracking. During highway operations, the rolling of the tire results in a temperature rise that in turn causes the inflation pressure to increase. Inflation pressures of hot tires can be 10 to 20 psi greater than pressures of cold tires for bias-ply and 5 to 15 psi greater for radials (Sharp 1987). Results from other studies (Southgate and Deen 1987; Bonaquist et al. 1988a, 1988b) suggest that, for 20,000-pound single axles on thicker pavements characteristic of major highways, an increase in tire pressure from 75 to 100 psi increases pavement wear by about 15 percent. Taken together, these results suggest that, other things being equal, pavement wear effects of hot tires are 3 to 12 percent greater than pavement wear effects of cold tires.

The AASHTO load-equivalency factors strictly apply only to axles supported at each end by dual tires. Recent increase in steering-axle loadings and more extensive use of single tires on load-bearing axles have precipitated efforts to examine the effect on pavement wear of substituting single for dual tires. Both standard and wide-based tires have been considered. Past investigations of the pavement wear effects of single versus dual tires have found that single tires induce more pavement wear than dual tires, but that the differential wear effect diminishes with increases in pavement stiffness, in the width of the single tire, and in tire load.

Gillespie (1993) found that a steering axle carrying 12,000 pounds with conventional single tires is more damaging to flexible pavement than a 20,000-pound axle with conventional dual tires. He states further that "road damage from vehicles currently operating at the 80,000-pound gross weight limit would be decreased approximately 10 percent by modifying road use laws to favor a load distribution of 10,000 pounds on the steering axle with allowance for 35,000 pounds on tandems." Without disputing Gillespie's

assessment of the relative pavement costs for steering axles and tandems at different weights, it should be noted that weight-limited five-axle tractor-semitrailers usually have steering axle weights below 11,000 pounds (even though truck weight limits would allow 12,000-pound steering axles). Hence, the practical effect of Gillespie's suggested change in limits for most weight-limited trucks would be to increase tandem axle weights without a compensating decrease in steering axle weights.

Bauer (1994) summarized several recent studies on the effects of single vs. dual tires:

- "Smith (1989), in a synthesis of several studies dealing with the roadway-tire relationship, evaluated at 1.5 on average the relationship of the damage caused by wide base single assemblies and that caused by traditional dual tire assemblies with identical loading at the axle.

- Sebaaly and Tabataee (1992) found rutting damage ratios between wide base and dual tire assemblies varying between 1.4 and 1.6. This was a study carried out at the University of Pennsylvania on two coatings, with 2 types of axle (single and tandem) and four sizes of tire (two dual mounted and two wide based).

- Bonaquist (1992), reporting on results obtained from a study carried out on the road simulator of the Turner-Fairbank Highway Research Center at McLean (Virginia), on two types of roadway, using a dual tire assembly with 11 R 22.5 and a wide base with 425/65 R 22.5, indicates rutting damage ratios varying from 1.1 to 1.5, depending on the layers of the roadway."

In summary, Bauer states that the wide-base single tire would seem to cause around 1.5 times more rutting than the dual tire on roadways that do not possess good resistance qualities to rutting. However, Bauer also noted that one of the wheels in a dual tire assembly is frequently overloaded due to the road. He noted that the average overload for a dual wheel causes an increase in rutting similar to that which exists between a wide-base single and a dual tire assembly, so that the real advantage of dual tire assemblies is therefore undoubtably lower than the theoretical advantage with which they are attributed.

Conflicting results were reported by Akram et. al. They used multidepth deflectometers to estimate the damage effects of dual versus wide base tires. Deflections measured at several depths within the pavement under dual and wide-base single tires were used to calculate average vertical compressive strains. The Asphalt Institute subgrade limiting strain criteria were then used

to estimate the reduction in pavement life that will occur by using the wide-base single tires in place of duals. At a speed of 55 miles per hour and equivalent axle loading, they found that the wide-base single tires (trailer axle) reduced the anticipated pavement life by a factor of between 2.5 to 2.8 over that predicted for standard dual tires.

Molenaar, Huurman, and Naus examined the combined effects of tire pressure and super single versus dual wheel tires on rutting. They found a roughly ten-fold increase in rutting for a super-single with a tire pressure of 1.00 MPa as compared with a dual tire with a tire pressure of 0.60 MPa.

Although it is undoubtedly true that, other things being equal, single tires have more adverse effects on pavements than dual tires, it appears likely that past investigations have overstated the adverse effects of single tires by neglecting two potentially important effects: unbalanced loads between the two tires of a dual set and the effect of randomness in the lateral placement of the truck on the highway.

Unbalanced loads between the tires of a dual set can occur as a result of unequal tire pressures, uneven tire wear, and pavement crown. As with unequal loads on axles within a multiaxle group, pavement wear increases as the loads on the two dual tires become more unbalanced.

The second neglected factor, sometimes termed "wander," is the effect of randomness in the lateral placement of trucks within and sometimes beyond lane boundaries. Less perfect tracking is beneficial to pavement wear: the fatiguing effect is diminished because the repetitive traffic loads are distributed over wider areas of the pavement surface. Because the greater overall width of dual tires naturally subjects a greater width of pavement to destructive stresses, wander is expected to have a smaller beneficial effect for dual than for single tires. Once rutting begins, however, tires—especially radial tires—tend to remain in the rut, thereby greatly reducing the beneficial effects of wander for both single and dual tires.

TRB's Truck Weight Study undertook a special analysis to examine the importance of loading imbalances and wander as part of its examination of vehicle characteristics affecting pavement wear (Deacon 1988b). Two types of pavement wear were considered: surface cracking due to fatigue and permanent deformation or rutting in the wheel tracks. Fatigue was found to be more sensitive to the difference between single and dual tires than rutting, and was selected as the basis for pavement wear comparisons.

Both balance and unbalanced dual-tire loads were considered. In the unbalanced case, one of the tires carried a 5 percent greater-than-average load

and the other carried a 5 percent less-than average load. Wander was described by a normal probability distribution. In the absence of definitive field data, three standard deviations were considered: 4, 6, and 8 inches. For these values, approximately 99 percent of truck operations would track within a 2-, 3-, and 4-foot pavement width, respectively.

Analysis of these data showed that taking wander into account reduced the adverse effects of single tires on pavement wear, but that these effects were still significant (Exhibit 7). Without wander, the ESAL equivalent for an 18,000-pound axle with single tires was estimated to be 2.23. When wander with a standard deviation of 8 in. is assumed, the ESAL equivalent drops to 1.31. At least for the $\pm$5 percent case considered in this study, the effects of imbalance in dual-tire sets on ESALs were found to be very small relative to the effect of wander.

Research summarized by the Midwest Research Institute (MRI) also suggests that dynamic loadings are a consideration in assessing the relative merits of wide-base single vs. dual tires. MRI notes that "the dynamic component of pavement loading arises from vertical movements of the truck caused by surface roughness. Thus, peak loads are applied to the pavement that are greater than the average static load. Gyenes and Mitchell report that the magnitude of the added dynamic components was earlier thought to increase road damage over that of the static loading alone by 13 percent to 38 percent, according to research reported by Eisenmann.

"Many recent studies have pointed out the fallacy in the earlier work, which assumed that the dynamic component of loading was distributed uniformly over the pavement in the direction of travel. What those researchers found, instead, is that the dynamic component is very localized. Because it arises from pavement surface irregularities, the dynamic loading is spatially correlated with these irregularities. Indeed, signs of pavement damage are typically localized, at least initially.

"Because of the localized nature of the dynamic loading, its severity is much greater than thought earlier. Gillespie et al. estimate that damage due to the combination of static and dynamic loading can be locally two to four times that due to static loading. Von Becker estimates that the combined loading produces a "shock factor" from 1.3 to 1.55, depending upon suspension characteristics. applying the fourth power law would translate these figures

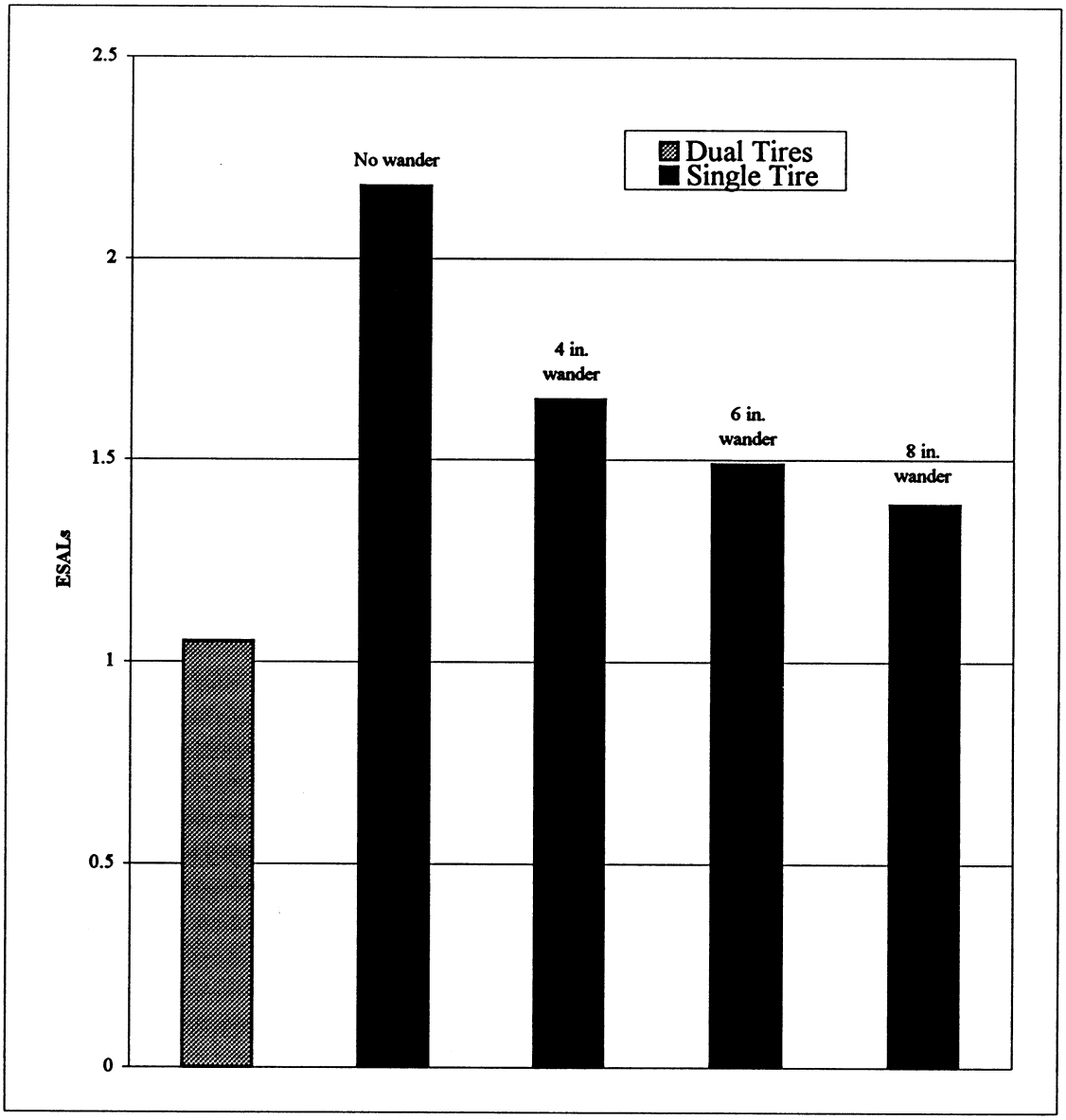


Exhibit 7 Effects of single tires on pavements for 18,000-lb single axles (wander is in standard deviations)
Source: TRB, Truck Weight Limits: Issues and Options, Special Report 225

into relative damage estimates ranging from 2.8 to 4.8 time s the static loading damage. Gyenes and Mitchell suggest impact factors of 1.3 to 1.5, for relative damage estimates of 2.8 to 5.1."

Midwest Research Institute noted further that "parallel research has shown that a wide base tire, having only two sidewalls, is much more flexible than a pair of dual tires with four sidewalls. This flexibility means that the tire absorbs more of the dynamic bouncing of the truck, so less of the dynamic load is transmitted to the pavement."

In summarizing their assessment of wide-base tires, MRI states that "taking all of these findings into consideration suggests that the relative damage potential is much less than commonly believed, and conceivably the wide- base tires might be less damaging than duals."

(c) Suspension Systems

As a heavy truck travels along the highway, axle loads applied to the pavement surface fluctuate above and below their average values. The degree of fluctuation depends on factors such as pavement roughness, speed, radial stiffness of the tires, mechanical properties of the suspension system, and overall configuration of the vehicle. On the assumption that the pavement wear effects of dynamic loads are similar to those of static loads and follow a fourth-power relationship, increases in the degrees of fluctuation increase pavement wear. For example, a 22,000-pound load followed by an 18,000-pound load has 1.06 times the effect of two 20,000-pound loads. Rough estimates of the effects of suspensions assuming that the pavement wear effects of dynamic loads follow a fourth-power relationship support a finding by the Organization for Economic Cooperation and Development (OECD 1982) that reduction in dynamic effects due to improved suspension systems might reduce pavement wear effects by about 5 percent.

Rakheja and Woodrooffe investigated the role of suspension damping in enhancing the road friendliness of a heavy vehicle using a quarter-truck model to estimate the loads transmitted to the pavement by a tire. In this model, suspension effects are represented using a sprung mass, an unsprung mass, and restoring and dissipative effects due to suspension and tire. The tire is modeled assuming linear spring rate, viscous damping, and point contact with the road. They found that an increase in linear suspension damping tends to reduce the dynamic load coefficient and the dynamic tire forces, factors which are related to road wear. They conclude that linear and air spring suspensions with light linear damping offer significant potentials to enhance the road friendliness of the vehicle with a slight deterioration in ride quality.

Sousa, Lysmer and Monismith investigated the influence of dynamic effects on pavement life for different types of axle suspension systems. They calculated a Reduction of Pavement Life (RPL) index of 19 percent for torsion suspensions, 22 percent for four leaf suspensions, and 37 percent for walking beam suspensions (an ideal suspension would have RPL of 0). Similar results were found by Peterson in a study for Road and Transport Association of Canada: under rough roads at 80 kph (50 mph), air bag suspensions exhibited dynamic loading coefficients (DLC) of 16 percent, spring suspensions had a DLC of 24 percent, and rubber spring walking beam suspensions had a DLC of 39 percent. Problems with walking beam suspensions were also noted Gillespie et. al., who stated that on rough and moderately rough roads, walking-beam suspensions without shock absorbers are typically 50 percent more damaging than other suspension types.

(d) Axle Spacing

Two primary load effects on flexible pavement performance are rutting and fatigue. For rutting, bringing axles closer together is unlikely to significantly affect the critical stresses and pavement performance. Thus, the effect of a tandem axle on rutting is expected to be identical to the cumulative effects of the two single axles of which it is composed. For fatigue, when widely separated loads are brought closer together, the stresses they impart to the pavement structure begin to overlap and they cease to act as separate entities. While the maximum deflection of the pavement surface continues to increase as axle spacing is reduced, maximum tensile stress at the underside of the surface layer (considered to be a primary cause of fatigue cracking) can actually decrease as axle spacing is reduced. However, effects of the overlapping stress contours also include increasing the duration of the loading period. Thus, the beneficial effects of stress reduction are offset to some largely unknown degree by an increase in the time or duration of loading. In short, the net effect of changes in axle spacing on pavement wear is complex and highly dependent on the nature of the pavement structure.

Hajek and Agarwal studied the influence of spacing on pavement damage associated with dual and triple axles on thick flexible pavements (SN=5.7). They examined six different measures related to pavement damage and two different axle spacings each for tandems and tridems. For the pavements studied, AASHTO load equivalence factors indicate that two 10,000 kilogram single axles would have the same effect as a tandem axle weighing 21,600 kilograms. For tandems with a 1.0 meter spacing, Hajek and Agarwal found that lower tandem weights would have the same effect: ranging from 14,900 kilograms to 20,600 kilograms depending on the damage measure used. For the pavements studied, AASHTO load equivalence factors indicate that three single axles weighing 10,000 kg. would have the same effect as a tridem axle

weighing 34,300 kg. For tridems with a 2.0 meter spacing (from the first to third axle), Hajek and Agarwal found that lower tridem weights would have the same effect, ranging from 20,300 kg. to 31,000 kg. Based on these results, they concluded that the AASHTO ESAL values appear to understate the damaging effect of dual and triple axles in comparison to single axles.

(e) Liftable Axles

Billing et. al. investigated the use of liftable axles. They found widespread use of these axles in Canada. For example, a 1988 and 1989 surveys in Ontario and Quebec found 17 and 21 percent (respectively) of trucks on the highways had liftable axles. Truckers frequently adopt liftable axles in response to weight limits under which maximum gross weights are higher for trucks with more axles. Also, trucks with multiple, widely spaced axles have difficulty turning on dry roads. Industry has in some cases resolved this difficulty through the use of liftable axles, which can be raised or lowered by the driver, usually with air pressure. The driver raises a liftable axle when a turn is being made and lowers it when the turn is completed. The axles can also be raised when cruising along the highway to improve fuel consumption and reduce tire wear.

On the negative side, liftable axles make compliance with and enforcement of axle weight limits difficult. There are many concerns about the use of liftable axles and damage to roads and bridges. Improperly adjusted liftable axles can be extremely damaging to pavements. The liftable axle can be adjusted to any level by the driver. If the liftable axle load is too high, the liftable axle is overloaded. If it is too low, other axles may be overloaded (Billing et al). For example, under current Federal limits, a four-axle single-unit truck with a wheelbase of 30 feet can carry 62,000 pounds: 20,000 pounds on the steering axle and 42,000 pounds on the rear tridem. This vehicle would produce approximately 2.1 ESALs on flexible pavements. However, if the first axle of the tridem is a lift axle that is carrying no weight, this vehicle would produce approximately 4.0 ESALs.

(f) Tridems

In a paper prepared for The Association of American Railroads, Hudson and Buttler summarized available information about the effect of tridem axles on pavement damage. They note that no tridem axles were used or observed in the AASHTO Road Test and that "to provide an equivalence value for tridem axles, the developers of the AASHTO [Pavement Design] Guide substituted a dummy variable level of three for 'number of axles' in the AASHTO equation. This methodology is incorrect. Note that the AASHTO equation uses a dummy variable for number of axles, 1 for single, 2 for tandem. This was merely a convenience to permit a regression analysis to be made for variables

for which there is no quantitative value, such as axle type. Nothing about the original equation suggests that it is possible to create a third level of the dummy variable for tridem axles. Considering the error it is no surprise that many researchers suggest that the true effects of tridem axles is worse than that listed in the AASHTO Design Guide."

In summarizing the literature and results of their own analyses, Hudson and Buttler conclude that, on flexible pavements, a tridem axle set of 38 to 39,000 pounds equally distributed on three axles has the same damaging effect as one 18,000-pound single axle. In sharp contrast, the AASHTO load equivalence factor for a 38 to 39,000-pound tridem on flexible pavements is roughly 0.4. Hudson and Buttler also conclude that, on flexible pavements, the AASHTO load equivalence for tandems also understated, although by much less than the understatement for tridems. Specifically, they conclude that a tandem axle carrying 30 to 32,000 pounds has the damaging effect of one 18,000-pound single axle. The AASHTO load equivalence for a 30 to 32,000-pound tandem is roughly 0.8. On rigid pavements, Hudson and Buttler conclude that a tridem-axle set carrying 36 to 37,000 pounds evenly distributed on three axles has the same damaging effect as one 18,000-pound single axle. The AASHTO load equivalence factor for a 36 to 37,000 pound tridem on rigid pavements is roughly 0.8.

2.0 Policy Implications

2.1 Axle Weight Limits

Increasing axle weight limits will generally result in higher pavement costs, since pavement costs increase sharply with axle weight. However, past studies of truck size and weight limits have generally found that the increase in pavement costs would be much less than the decrease in goods movement costs associated with higher axle weights.

Conversely, reducing axle weight limits (or eliminating grandfather exemptions to federal axle weight limits) would result in lower pavement costs; however, the savings would be much less than the increase in goods movement costs. The *Truck Weight Study* found that the elimination of all grandfather exemptions would reduce pavement costs by $210 million per year. However, the cost of goods movement would be increased by $7,760 million per year if all grandfather exemptions were eliminated.

Several states have special limits on steering axles. The primary reason for these restrictions was concerns about loss of control due to the blow-out of an overloaded steering axle tire; however, the restrictions do provide some pavement cost savings. When viewed just in terms of AASHTO's load-equivalence factors, the savings are

very small. However, the actual saving will be greater since steering axles usually have single rather than dual tires, and so the AASHTO factors understate their pavement wear impacts. Gillespie et. al. noted the pavement damage caused by a heavily loaded conventional tire on steering axles. For example, single tires on a steering axle carrying 12,000 pounds can be more damaging in fatigue and rutting to flexible pavement than a 20,000-pound axle with dual tires. They indicate that steering axle weights would have to be reduced to about 11,000 pounds to have the same pavement wear impacts as a 20,000-pound axle with dual tires.

2.2 Bridge Formula

The Bridge Formula limits the weight that can be carried on a group of consecutive axles, based on the number of axles and the distance between the first and last axles in the group. For short, heavy vehicles, such as dump trucks, garbage trucks, and cement mixers, the Bridge Formula controls the amount of weight that can be carried, which in turn affects pavement costs.

The Bridge Formula can also affect axle spacing. However, Gillespie et al noted that damage on flexible pavements is largely insensitive to axle spacing down to the limits dictated by conventional tire diameters and that rigid pavements actually benefit from stress interactions between axles and produce less fatigue with closely spaced axles.

2.3 80,000-Pound GVW Cap

The elimination of the 80,000-pound limit on gross vehicle weight would cause a shift of freight from conventional five-axle tractor-semitrailers to combinations with six or more axles and would also result in some diversion of freight from rail to truck, since elimination of the GVW cap would reduce the cost of shipping high-density freight by truck. The first effect would reduce pavement costs, since pavement cost per million tons of freight is less for trucks with six or more axles than for trucks with five axles. The second effect would increase pavement costs. The *Truck Weight Study* examined a scenario that would eliminate the 80,000-pound cap (with no other changes in TS&W limits) and found that these two effects approximately offset one another, so that there would be no significant increase or decrease in pavement costs under this scenario. However, if states also increased length limits, along with the elimination of the GVW cap, more freight would be diverted from rail, which could increase pavement costs.

2.4 Policies to Encourage Tridems

When viewed using the AASHTO load-equivalence factors, combinations with tridem axles generally have much lower pavement costs per ton of freight carried than conventional five axle combinations. As shown in Exhibit 2, a six-axle tractor-

semitrailer with a rear tridem carrying 88,000 pounds produces 1.88 ESALs on flexible pavements and 3.57 ESALs on rigid pavements. The corresponding ESAL values for a conventional five axle tractor-semitrailer carrying 80,000 pounds are 2.37 (flexible) and 4.07 (rigid). Assuming tare weights of 28,000 and 29,500 pounds for the five- and six-axle combinations, ESALs per ton of payload for the trucks shown in Exhibit 2 are as follows:

	ESALs per million pounds of payload	
	Flexible pavement	Rigid pavement
5-axle tractor-semi	46	78
6-axle tractor-semi	32	61

However, much of the pavement benefits shown in the above table disappear if load equivalence factors consistent with Hudson and Buttler's findings (discussed above in Section 1.2.f) are assumed. Specifically, for flexible pavements, the reduction in ESALs per million pounds of payload would drop from 14 to roughly 4. For rigid pavements, the reduction in ESALs per million tons of payload would drop from 17 to roughly 11. Thus, if Hudson and Buttler's conclusions are correct, it appears that there are still pavement cost savings to be realized by promoting a shift to tridems. However, these savings are far less than would be anticipated using the AASHTO load equivalence factors.

2.5 Weight Limits Per Unit of Tire Width

The majority of states restrict the weight that can be carried on a tire based on its width. The limits range from 550 pounds per inch (in Alaska, Mississippi, and North Dakota) to 800 pounds per inch (in Indiana, Massachusetts, New Jersey, New York, and Pennsylvania). Such restrictions result in lower pavement costs; however, the size of the pavement cost savings (either in absolute terms or in relation to the increase in goods movement costs also resulting from these restrictions) have not been estimated.

2.6 Turner Trucks

In 1984, former Federal Highway Administrator Francis Turner proposed a new approach to truck size and weight regulation. The objective of this new approach, which became known as the Turner Proposal, was to reduce pavement wear caused by truck traffic while simultaneously improving the productivity of freight transportation. Truck operators would gain productivity through higher allowable gross weights, but would add extra axles to their vehicles to reduce the weights carried on individual axles.

Turner's original proposal was as follows:

- Reduce legal axle loadings to a maximum of 15,000 pounds for single axles and 25,000 pounds for tandem axles
- Allow greater vehicle lengths
- Raise maximum gross weights to as much as 112,000 pounds.

Turner proposed that these limits apply to all trucks, but that when axle weights could not practically be brought down to the indicated maximums, special permits with higher fees be issued.

The Turner Proposal was the subject of an extensive study by the Transportation Research Board, reported in TRB Special Report 227, *New Trucks for Greater Productivity and Less Road Wear: An Evaluation of the Turner Proposal*. That study retained the basic concept of a truck that would be both more productive and less wearing on pavements. However, rather than Turner's mandatory change applying to all trucks (with limited exceptions), it considered a voluntary system in which each truck operator would choose whether to comply with the new weight regulations or to continue to follow the previously existing rules. The study also broadened the scope of its evaluation beyond Turner's original proposal by considering ranges of possible values for axle weights, length limits, and other vehicle characteristics to find trucks that approach optimum overall performance, considering productivity, pavement, bridges, and safety.

The TRB study estimated that if Turner trucks were introduced on a nationwide basis, 23 percent of the freight carried in existing combinations would divert to these trucks. The most popular Turner configuration would be a nine-axle double with 32- to 34-foot trailers carrying 114,000 pounds maximum weight. Key impacts were estimated as follows:

- $2.0 billion per year reduction in freight costs
- Two percent increase in truck freight due to shift from rail. Rail would lose four percent of ton-miles and five percent of gross revenues
- $729 million per year reduction in pavement costs
- $403 million per year increase in bridge costs if all inadequate Interstate and primary bridges and one-quarter of inadequate non-primary bridges are replaced.

2.7 New Approach Proposed by TRB Truck Weight Study

TRB's Truck Weight Study also developed a new approach for regulating the weights of vehicles over 80,000 pounds. Under this approach, the maximum weight carried on any group of axles over 40 feet in length would be given by W in the following formula:

$$W = 1{,}000 (9 L / 16 + 72)$$

where L is the length of the axle group in feet. Further, for vehicles with gross weights over 80,000 pounds, maximum axle weights would be limited as follows:

- 15,000 pounds for single axles
- 34,000 pounds for tractor drive tandem axles
- 30,000 pounds for other tandem axles.

The idea behind this new approach was to address some potentially negative pavement, safety, and productivity aspects of the current bridge formula:

- Formula B provides a relatively modest incentive for operating trucks with more axles and consequently less pavement impact. According to the formula, adding an axle increases maximum weight by 4,000 to 6,000 pounds. An additional load-bearing axle on a tractor typically adds 2,700 pounds to empty weight, and an additional load-bearing axle on a trailer typically adds 1,500 pounds to empty weight. Hence, the added payload for an extra axle is less than 3,300 pounds for a tractor axle and less than 4,500 pounds for a trailer axle. Adding an axle generally increases operating costs for fuel and tires and increases costs for new tractors or trailers. For some truckers, the opportunity to carry 4,500 pounds (or less) of additional payload is an insufficient incentive to overcome these cost increases. Increasing the added payload allowed for an extra axle would encourage more truckers to adopt vehicles with more axles.

- If the 80,000-pound limit were eliminated, five-axle doubles could operate under Formula B and current axle weight limits of up to 92,000 pound (assuming a practical maximum steering-axle weight of 12,000 pounds and 20,000 pounds on each of the other four axles). These vehicles perform very poorly in terms of pavement wear per ton of freight carried because they have single rather than tandem axles. In carrying high-density, weight-limited freight, five-axle doubles are less efficient than the LCVs with seven or more axles that currently operate under special permits in western states, so five-axle doubles carry little weight-limited traffic in those states. In eastern states with more restrictive length limits, however, elimination of the 80,000-pound limit with gross weights controlled instead by Formula B would cause some

freight to shift from conventional five-axle tractor-semitrailers to five-axle doubles. This shift would adversely affect pavements.

- Formula B provides little incentive to distribute loads evenly among axles. Adding an axle increases maximum permissible weight by 5,000 to 6,000 pounds, even if the axle itself carries no weight. This anomalous feature of the bridge formula can promote the use of non-load-bearing dummy axles. For example, a three-axle dump truck with a wheelbase of 16 feet can carry 48,000 pounds under Bridge Formula B; however, by adding a non-load-bearing dummy axle, this vehicle can operate at 52,500 pounds. Uneven axle weight distributions and the use of dummy axles can worsen pavement wear. For example, a 20,000-pound axle followed by a 10,000-pound axle does 70 percent more damage to pavements than two 15,000-pound axles. Uneven axle weight distribution and the use of dummy axles also degrade vehicle handling and performance, which may have adverse safety consequences.

- Enforcement of the bridge formula can be complex and time consuming, because it involves measuring spacings between individual pairs of axles and applying the formula (usually by use of a table) to different axle groups. Many permanent weigh stations have stripes painted on the pavement to help enforcement officials estimate vehicle lengths. At roadside weight checks with portable scales, however, it is often not practical to test for bridge formula violations.

The new approach would have approximately the same impact on bridges as the current bridge formula, but would help meet the pavement, safety, and enforcement problems outlined above. On the negative side, TRB's Truck Weight Study noted that the equipment and loading practices of many truckers operating vehicles over 80,000 pounds under grandfather exemptions are designed to take advantage of the current federal axle limits. These truckers would be placed at a disadvantage by having to operate under two different sets of limits: current federal limits and the lower limits called for by the new approach. Further, the pavement-related problems with the current bridge formula noted above might be more simply addressed by prohibiting lift axles and limiting five-axle doubles to 80,000 pounds or less.

3.0 Knowledge Gaps and Research Needs

Research is needed to develop improved load-equivalence factors for use in truck size and weight analyses, highway cost allocation studies, and other policy studies. The AASHTO load-equivalence factors that are currently used in most TS&W studies in the U.S. were developed using data from the AASHTO Road Test conducted in the 1950's. Since the primary purpose behind the development of these factors was to provide measures of total

traffic loadings for use in pavement design, relatively little attention was paid to the quantifying the relative impacts of different truck characteristics on pavements.

The development of improved load-equivalence factors should address the following issues:

- The relative impacts of single axles, tandem axles, and tridem axles
- The effects of tire type, width, and pressure
- The effects of different types of suspensions
- Axle weight (AASHTO's 4th power relationship vs. the results of recent work by TRI and Brookings).

The research should provide the following:

- The best possible set of load-equivalence factors based on available data
- Some indication of the level of uncertainty associated with these factors
- A plan for how information from ongoing data collection activities (such as SHRP) might be used to update these factors
- Identification of new data collection activities that should be initiated.

Research on load-equivalence factors should build upon recent work by Kenis (1990) and Hudson (1992). Kenis used the VESYS 5 computer program to conduct "computer road tests". After verifying that the program could be used for this purpose, Kenis estimated the damage produced by steering axles at the AASHTO Road Test, in order to quantify the error caused by the fact that these axles were neglected when equivalencies were originally developed. Kenis then used VESYS 5 to estimate equivalence factors for conditions not present in AASHTO Road Test, such as tridem axles. Finally, equations relating pavement deflections and strains to load equivalencies based on cracking and rutting were developed.

Hudson (1992) evaluated alternative "primary response equivalency factor methods". These methods use stresses, strains, and deflections to estimate pavement damage. The research effort included a comprehensive review and evaluation to identify equivalency relationships and select several promising methods. Then, field testing of instrumented pavement sections was conducted to evaluate the selected methods. Hudson concluded that primary pavement response based load equivalency factors are a reasonable method to estimate the equivalent damaging effects of various load parameters, as compared to a standard loading condition. Of the methods tested, the deflection method proposed by

Hutchinson was found by Hudson to be the most viable of the methods that were analyzed in detail.

In addition to better load-equivalence factors, research is needed to identify and assess the potential merit of alternative approaches to regulating tire pressure and other tire characteristics. For each approach identified, the investigation should

- Assess the feasibility and costs of enforcement
- Estimate benefits in terms of reduced pavement costs
- Estimate costs to the trucking industry of complying with the regulations
- Identify and estimate other potentially important benefits and costs.

Consideration should also be given to the development of performance specifications for truck suspension systems to reduce dynamic loading impacts on pavements.

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Options for Service and Billing

There are several options that are available for waste collection service. Some of these options include:

- Weekly waste collection
- Weekly or bi-weekly recycling
- Vacant house service cancellation
- Snow Bird service stoppage
- Bulk pick-up
- Curbside pick-up
- Low volume pick-up
- Dumpster service to City property
- Trash removal at RTA stops
- Company supplied toters
- Yard waste removal

There are three billing options to consider:

- Place the fees on property tax- This is the simplest method of billing; however it also has some adverse impact on the property owners. Property tax bills will increase to reflect the trash bill. If the City should decide that it wants to give the option for landlords to stop service when rentals are vacant this option will make it more difficult to track. Landlords will also be responsible for paying the trash bill instead of the renters who are using the service.
- The City doing the billing- United Water was asked if they could supply a cost for the billing and collection service and they estimated that it would cost approximately $50,000 to $60,000 dollars a year to provide that service. If this option is chosen the residents would receive their trash bill with their water bill.
- Trash hauler billing the residents- This option would be the recommendation of staff. The residents would pay the trash hauler directly.

Summary of Sample RFP

The following is a sample RFP that could be used, should Council decide to proceed with the Waste Consolidation Project. Please note - **This is only a sample and changes can be made.** This sample RFP addresses the concerns that were expressed at the Town Hall Meeting. Each company, as part of their bid, must include the following:

- Weekly waste collection and recycling pick-up
- Bulk item pick-up
- Yard waste pick-up (if placed at the curb)
- A dedicated phone number for resident complaints and/or concerns
- Option to suspend service for vacant rental properties
- Option to suspend service for “snow-birds” who are away for 30 days or longer
- Dumpster service to City properties
- Trash removal at all RTA stops located within the city
- All billing done by contracted provider

Again, this is just a sample of an RFP that could be used. After being reviewed by Council and the Legal Department, changes can be made and may be necessary.

REQUEST FOR PROPOSALS

SOLID WASTE COLLECTION AND DISPOSAL INCLUDING SERVICES FOR TRASH, RECYCLING AND YARD WASTE

FOR THE

CITY OF HUBER HEIGHTS, OHIO

PROPOSAL DUE DATE:
AT
CITY OF HUBER HEIGHTS CITY HALL
6131 TAYLORSVILLE ROAD
HUBER HEIGHTS, OH 45424

CONTACT PERSON:

PRE-PROPOSAL MEETING WILL BE HELD ON _____AT CITY HALL,
6131 TAYLORSVILLE ROAD, HUBER HEIGHTS, OH 45424
THIS MEETING IS MANDATORY

PROPOSAL DOCUMENT

GENERAL CONDITIONS, INSTRUCTIONS TO CONTRACTORS, INFORMATION

Sealed Proposals will be received by the City Manager of the City of Huber Heights, Ohio, in accordance with all provisions contained in this Proposal document including the specifications. Special conditions or instructions in the specifications shall take precedence over the general conditions.

Submission of Proposals

a. Proposals shall be submitted on the printed blanks provided for that purpose and bound herewith and must be signed. Proposal forms are to be completely filled out and shall not be detached from this binding. Removal of any part thereof may invalidate the Proposal.

b. Proposals by partnership should include the names of the partners composing the partnership and must be signed by one or more of the partners in the following manner: "John Jones and James Smith, dab Smith-Jones Company, by John Jones, a partner".

   Proposals by corporations must be signed with the name of the corporation, followed by the signature and designation of the president, vice-president, or person authorized to bind the proposal.

   The names of other parties interested in the proposal must be listed.

c. Each Proposal shall be sealed and addressed to the City Manager of the City of Huber Heights, Ohio, and shall bear on its face the name of the Contractor and the subject of the Proposal.

d. Proposals received after the date and time specified will not be considered.

e. Erasures or corrections may invalidate a Proposal unless properly noted over the signature of the Contractor.

Pre-Proposal Meeting

There will be a pre-proposal meeting _____, at the City of Huber Heights City Hall, located at 6131 Taylorsville Road, Huber Heights, OH 45424. This is a **mandatory** pre-proposal meeting.

Surety

a. Proposal Bond - each Proposal must be accompanied by a Proposal bond, deposit of cash, certified check or bank cashier's check, drawn on a solvent bank and in the case of a bond, one issued by a surety licensed by the State of Ohio as a surety, payable to the City of Huber Heights, Ohio, in the amount of ten per cent (10%) of the Base Proposal amount as a guarantee that if the Proposal is accepted, a contract will be entered into and the performance of the same properly secured. The City will determine the sufficiency of the surety. Proposal bonds, checks or cash will be returned to Contractors as soon as the purpose for which given has been fulfilled.

b. Performance Bond - the Contractor to whom an award is made shall furnish a bond or certified check drawn on a solvent bank and in the case of a bond, one issued by a surety licensed by the State of Ohio as a surety, payable to the City of Huber Heights, Ohio, in the amount of one hundred percent of the Proposal price for one year as a guarantee for the faithful performance of the contract. The bond shall be renewed each year thereafter and submitted to the City no less than thirty-days (30) prior to the start of the new term. The City will determine the sufficiency of the surety.

Rejection of Proposals

The City reserves the right to waive informalities, to reject any or all Proposals, or to accept any Proposal, which may be deemed to be in the best interest of the City of Huber Heights.

Evaluation of Proposals

The City shall use, but will not be limited to, the “lowest and best” criteria as stated in the Ohio Revised Code. However, the City may take into consideration other factors not listed in the Ohio Revised Code or contained within this Proposal’s specification. The Contractor is encouraged to respond to all aspects of this RFP and provide any additional information or programs that the contractor deems appropriate for the City to consider during the evaluation process.

Withdrawal of Proposals

No Proposal shall be withdrawn within One hundred twenty (120) days after the scheduled time for opening of the Proposals.

Infringements and Indemnification

The Contractor, if awarded an order or contract, agrees to protect, defend and save the City harmless against any demand for payment for the use of any patented material, process, article, or device that may enter into the manufacture,

construction or form a part of the work covered by either order or contract and he further agrees to indemnify and save the City harmless from suits or actions of every nature and description brought against it, for or on account of any injuries or damages received or sustained by a party or parties, by or from any of the acts of the contractor, his servants, or agents.

Default Provisions

In case of default by the Contractor, the City of Huber Heights may procure the articles or services from other sources without further advertising and may hold the Contractor responsible for any excess costs occasioned thereby.

Pricing

Where unit prices are requested and there is a discrepancy in the total amount of the Proposal, the unit prices shall govern. All pricing is to include disposal at the Montgomery County Transfer Station(s) ("MCTS"). No exceptions shall be granted to this provision unless the MCTS is closed.

Interpretation of Proposal Document

If any person contemplating submitting a Proposal is in doubt as to the true meaning of the plans and specifications, he/she may submit to the City Manager of the City of Huber Heights a written request for interpretation thereof. Any interpretation of the proposed specifications will be made only by addenda duly issued, and a copy of such addenda will be mailed to each person receiving a set of specifications. The City Manager shall not be responsible for other explanations of the plans and specifications. All parts of these specifications are intended to be explanatory of each other, but in case of misunderstanding or doubt, the interpretation of the City will be final.

Taxes

The City is generally exempt from Federal Excise and Ohio State Sales Taxes. Prices shall not include taxes. If taxes of any kind are applicable, they shall be listed separately on the Proposal form or in an attachment. Exemption forms, when required, will be executed by the City.

Specifications

Unless otherwise stated by the Contractor, the proposal will be considered as being in strict accordance with the specifications outlined in the Proposal Document.

Discounts

Any discounts offered in connection with a Proposal shall be indicated in the space provided or by appropriate notation attached to the Proposal.

Award of Contract

A contract shall be awarded to the lowest and best Contractor as soon as practicable after the opening of the Proposals, subject to the reservations as stated hereunto and the Contractor to whom award is made shall enter into a written contract with the City of Huber Heights within ten (10) days of the notification of award. It is the City's intention to have the ability to negotiate any additional services, terms and conditions not covered within this Proposal as long as it does not increase the pricing per unit submitted by the Contractor in compliance with the Proposal documents.

GENERAL SPECIFICATIONS AND INFORMATION

SECTION 1

It is the intent of this Proposal to solicit responses from Contractors for the collection and disposal/processing of solid wastes and recyclables generated within the corporate limits of the City of Huber Heights being more specifically defined within this Proposal. It is also the City's intent to request pricing for containerized service for both solid waste and recyclables.

SECTION 2

The Contractor shall propose a route schedule in its proposal. This route schedule may be modified before it is finalized by the City of Huber Heights. If, after the route schedule is finalized, for any reason the contractor requires a change in the schedule, it will be the contractor's responsibility to notify the residents or businesses affected after first receiving the written approval of the City of Huber Heights.

SECTION 3

All waste materials collected by the contractor shall be legally disposed of outside the corporate limits of the City of Huber Heights at one of the Montgomery County Transfer Stations. The charge for disposal **shall** be included in the rate set forth in the Proposal for each residential unit serviced by the contractor.

SECTION 4

Contractor's employees shall not at any time exhibit improper or abusive language or unacceptable or improper conduct to the public, or such offender will be removed from the City's route by the contractor upon request by the City. The Contractor will be required to have all employees wear uniforms and all OSHA required Personal Protection Equipment ("PPE"). Uniforms will identify the company and at a minimum the drivers first name.

SECTION 5

The Contractor shall provide an adequate number of vehicles for regular collection services. All vehicles and other equipment used by the contractor for the collection and removal of waste material shall be kept neat, clean and sanitary and shall be licensed by the local Health Department having jurisdiction within the City.

SECTION 6

Contractor agrees to handle all containers without abuse and to return all emptied containers to the location where the owner set them. Containers destroyed or removed by the Contractor shall be replaced by the contractor and at the Contractor's expense.

SECTION 7

Contractor shall indemnify, hold harmless and defend the City, its officers, employees, agents and volunteers against any and all liability, loss, costs, damages, expenses, claims or actions, including attorney's fees which the City, its officers or employees may hereafter sustain, incur or be required to pay, arising wholly or in part due to any act or omission of Contractor, its agents, servants or employees, in the execution, performance or failure to adequately perform Contractor's obligations pursuant to this contract.

SECTION 8

Contractor will be held liable for any damage, injury (including death) or destruction based upon, connected with, or related to contractor's waste removal personnel or equipment while performing services for the City. (See Section 18. Contractor's Insurance).

SECTION 9

Should the City feel compelled to mobilize its own workers to correct problems created by non-compliance with specifications, the contractor will be required to reimburse the City for such funds necessary to complete the work as guaranteed by the contract. The City shall determine such reimbursement and equipment costs necessary to rectify the problem and shall be paid by the contractor within thirty-days (30) of the City's request for reimbursement.

SECTION 10

The City shall not to be responsible for any problems arising at the disposal site as a result of solid waste collected in the City or any other place.

SECTION 11

Contractor shall agree that if any premises or collections are missed, the contractor shall return to make pickup on that regularly scheduled day, or at the beginning of the next day's route if contractor was notified after that day's route was completed.

SECTION 12

The City shall be given the name and phone number of the single appropriate person within the contractor's employment with whom complaints can be aired and remedied. The City shall also be given the name and phone number of the foreman or other assigned representative of the contractor who is responsible for all collections (residential solid waste and recycling).

SECTION 13

If the City feels that the work is not being performed in a satisfactory manner, then the City will so notify the Contractor, who will then immediately rectify the problem area. Excessive complaints or failure to rectify the source of such complaints will be grounds for revocation of the contract.

SECTION 14

Contractor shall adhere to all laws, ordinances, and other policies that pertain to actions performed for and within the City of Huber Heights.

SECTION 15

Contractor shall maintain an office or such other facilities through which it can be contacted. It shall be equipped with sufficient telephones and shall have a responsible person in charge from 8:00 a.m. to 5:00 p.m. on regular collection days. Contractor shall maintain 1-800 or other toll free telephone service if said calls would otherwise require long distance telephone service.

SECTION 16

Contractor shall obtain all licenses and permits (other than the license and permit granted by the Contract) and promptly pay all taxes required by the City (earnings tax, etc.).

SECTION 17

Contractor shall at all times during the Contract maintain in full force and effect Employer's Liability, Workmen's Compensation, Commercial Liability and Property Damage Insurance, including contractual liability coverage for the provisions of Section 7. All insurance shall be by insurers and for policy limits acceptable to the City and before commencement of work hereunder the

Contractor agrees to furnish the City certificates of insurance or other evidence satisfactory to the City to the effect that such insurance has been procured and is in force. The certificates shall contain the following expressed obligations:

1) "This is to certify that the policies of insurance described herein have been issued to the insured for whom this certificate is executed and are in force at this time. In the event of cancellation or material change in a policy affecting the certificate holder, thirty (30) days prior written notice will be given the certificate holder."

2) "The following are Additional Insured: The City of Huber Heights, Ohio, its elected and appointed officials, all employees, agents, volunteers, all boards, commissions and/or authorities and board members, including employees, agents and volunteers thereof. Coverage shall be primary to the Additional Insureds and not contributing with any other insurance or similar protection available to the Additional Insureds whether other available coverage be primary, contributing, or excess."

For the purposes of the Contract, the Contractor shall carry the following types of insurance in at least the limits specified below:

Coverage	Limits of Liability
Employer's Liability	$500,000
Bodily Injury Liability	$500,000 each occurrence
Except Automobile	$1,000,000 aggregate
Property Damage Liability	$500,000 each occurrence
Except Automobile	$500,000 aggregate
Automobile Bodily Injury	$500,000 each person
Liability	$1,000,000 each occurrence
Automobile Property Damage	$500,000 each occurrence
Liability	
Excess Umbrella Liability	$5,000,000 each occurrence

As an alternative to the above, Contractor may insure the above commercial liability and property coverage under a plan of self-insurance. Each insurance policy with respect to public liability insurance may provide for a self-insured retention of an amount of $250,000 with the result that the Contractor is its own insurer to that extent. The Contractor's parent corporation may provide the coverage.

SECTION 18

No assignment of the Contract or any right accruing under this Contract shall be made in whole or in part by the contractor without the express written consent of the City, which consent shall not be unreasonably withheld; in the event of any assignment, the assignee shall assume the liability of the contract and the Contractor shall guarantee performance by the assignee.

SECTION 19

Contractor shall have the franchise, license and privilege to provide waste collection, removal and disposal services for residential and City facilities as specified within this RFP within the corporate limits of the City.

SECTION 20

Either the City or the Contractor may terminate with cause the contract within 120 days by registered or certified mail notification to the other party. If the City determines that the work is not being performed in a satisfactory manner, then the City will so notify the Contractor, who will then immediately rectify the problem areas. Excessive complaints or failure to rectify the source of such complaints will be grounds for revocation of the contract.

The City reserves the right to terminate this contract immediately upon written notice by registered or certified mail to the Contractor if the Contractor is adjudged as bankrupt, makes a general assignment for the benefit of its creditors, has a receiver appointed on account of its insolvency or Contractor is unable or unwilling to provide the services required of this agreement due to closure or lack of accessible landfills, labor disputes or any other action that prevents delivery of services.

In case of default by the Contractor, the City may procure the articles of services from other sources without further advertising and may hold the Contractor responsible for any excess costs occasioned thereby.

SECTION 21

Contractor shall be required to keep records and submit reports to comply with the Montgomery County Solid Waste Management District's Annual District Reporting Requirements. These reports will serve as a means to apprise City staff and the Montgomery County Solid Waste Management District of the status of solid waste, recycling, and yard waste composting activities and expenditures. Reporting requirements include, but are not limited to:

A. Quarterly Project Status Report

The contractor shall provide quarterly project status reports. These reports shall be due within thirty (30) days of the close of the quarter being reported. At a minimum, the reports shall include:

1. Tons of each type of recyclable material collected and recycled and location of processing facility.

2. Tons of Solid Waste collected and disposed and location of disposal facility.

3. Number or percentage of residents participating in the curbside recycling and yard waste programs.

4. Quarters to be reported shall include:
   1st Quarter = January, February, March
   2nd Quarter = April, May, June
   3rd Quarter = July, August, September
   4th Quarter = October, November, December

B. Annual Reports

Contractor shall provide year-end annual reports for each year the project is in operation. These reports will be due within 45 days of the end of the Calendar year. At a minimum, the report shall include the information included in the quarterly project status reports.

PROPOSAL SPECIFICATIONS

SECTION 1

The City of Huber Heights' household count for 2011 was estimated at:

- approximately 15,000 households (Planning and Development data)

The above listed number is for reference only. Contractor should base monthly fee on the average population in the City and take normal vacancy rates into consideration when bidding.

As part of the Base Proposal, it is the City's intent for the Contractor to provide weekly pickups of refuse and recycling. It should be noted that the City intends to continue its annual leaf collection program with in-house staff. The Contractor shall be required to provide for all other special/bulk pick up items as well.

SECTION 2

The contract to be awarded shall cover:

A. A period of five (5) years, with the City reserving the right to request new proposals after the five-year period. The City shall also have the right to extend the contract at one-year intervals for up to a maximum of three (3) years;

B. This Contract shall be effective upon its execution and performance of such Contract shall begin on or about DATE??

C. The three, one-year options shall be mutually negotiated and agreed upon at least 180 days prior to the expiration of the term. At the end of the initial 5-year term, the Contractor shall be permitted to provide an alternate proposal for the remaining three years instead of renegotiating at the end of each option year;

D. The proposal price is for a per month charge for the entire City which includes trash collection and disposal and curbside recycling collection and processing for all residences, regardless of occupancy. This proposal price shall be consistent and will not be adjusted for vacancy. The proposal price per unit shall also include bulk item pick-up (including appliances containing CFC's, which the contractor will be responsible for removing), designated City facilities (see list).

E. Proposal prices shall include all applicable existing and anticipated Federal, State, District, and other related fees.

SECTION 3

Each Contractor must satisfy itself by its own observation as to the quantity of proposed work to be performed and with the proposed requirements and limitations listed. The submission of a Proposal shall be considered evidence that the Contractor has made such observation and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the specifications and information contained therein.

SECTION 4

Prior to executing a contract, the Contractor shall be required to present satisfactory evidence that it has been regularly engaged in the business of solid waste removal (including recycling). The City shall also require the Contractor to present satisfactory evidence that it is fully prepared with the necessary capital, material, insurance, machinery, and equipment to conduct the work to the satisfaction of the City of Huber Heights and to begin promptly when so ordered after the contract is awarded.

SECTION 5

Contractor shall comply with all applicable requirements of the Montgomery County Solid Waste District Solid Waste Management Plan and any amendments if and when they are adopted.

SECTION 6

Contractor shall be responsible for the collection of all payments. City residents shall be billed quarterly. Property owners shall also have the option to suspend service for vacant rental homes. NEED TO VERIFY OPTIONS/COST SAVINGS Residents may stop trash service when residence will be vacant thirty days or longer.

SECTION 7

The contractor shall list educational resources and opportunities available to the City of Huber Heights and to City residents and community groups. This information will be attached to the proposal.

Furthermore, the Contractor shall develop, in cooperation with and subject to approval by the City, comprehensive literature explaining how the refuse collection and curbside recycling will work, scheduled pick-up routes, holiday information, a thorough description of the recyclable materials that will be accepted, etc. This brochure shall be mailed or delivered by the Contractor to all residential customers at least two weeks prior to implementation of the program and annually thereafter. Additional copies of the literature shall be provided to the City for their distribution.

SECTION 8

All vehicles that provide collection of trash and recyclables shall have labeling that identifies which of the materials that are being collected. The labeling shall be affixed to the vehicle and must be readily visible to anyone who observes the collection of trash, recyclables, and yard waste. The materials being deposited into the vehicle must match the labeling on that same vehicle.

Any dumpsters/containers provided must also be labeled. The materials being deposited into the vehicle from the dumpster/container must match the labeling on that same vehicle.

SPECIFICATIONS
SOLID WASTE

SECTION 1

The term "waste material" shall include all municipal solid waste originating from the use of property situated only within the corporate limits of the City of Huber Heights, Ohio, and more specifically being identified in the following categories:

A. All solid waste material that size will allow to be placed in a standard rear load or side load hopper.

B. Large trash items, including, but not limited to, refrigerators, dishwashers, dryers, sofas, chairs, carpet and mattresses; (provisions to remove CFC's shall be made by the waste generator from all appropriate appliances prior to disposal by the waste hauler).

C. Garbage as defined as organic waste of animal, fish, fruit, or vegetable matter arising from or attendant to the storage, dealing in, preparation or cooking of food for human consumption.

D. Cold ashes placed in a separate container. Hot ashes will not be accepted.

E. All brush in small piles or tied in bundles not more than 4 feet in length. Grass clippings, leaves, and other yard trimmings placed in suitable disposable or reusable rigid type containers will be accepted.

SECTION 2

Collection of waste material shall be provided once each week on announced days, for which containers are placed at the curb, edge of street or right-of-way. Contractor shall collect and remove an unlimited amount of waste material once each week on the regularly scheduled trash collection day from all residences.

SECTION 3

All residential garbage shall be placed for collection in plastic bags or watertight metal or plastic containers with lids with a maximum capacity of 90 gallons. Waste material other than garbage may be placed in open containers with handles or in bundles set at the curb.

SECTION 4

All wooden and paper boxes broken down and/or tied in small bundles will be accepted.

SECTION 5

Whole waste tires are not to be accepted per current Ohio EPA regulations.

SECTION 6

Lead acid batteries are not to be accepted per current Ohio EPA regulations.

SECTION 7

Contractor must remove all materials and contents set out by residents, avoid spilling waste material, and clean up the collection area if the waste is spilled.

SECTION 8

Collections for residential units shall be made at least once a week, no earlier than 7:00 a.m. and no later than 6:00 p.m., Monday through Friday. The following shall be holidays for purposes of this Contract: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. Collections for the Holiday and the following days of the week shall be delayed by one (1) day.

SECTION 9

The following City of Huber Heights facilities shall be provided with collection services as follows with no additional fee to the City. These facilities, locations, and container descriptions are subject to change and are intended as an estimate of said services:

City Facility	Description of Container	# Times per week service in summer	# Times per week service in winter
City Hall/Police Dept., 6131/ 6121 Taylorsville Road	8 yd. Container	1	1

Montgomery County Municipal Courts Building, 6111 Taylorsville Road	8 yd. container	1	1
Thomas Cloud Park 4707 Brandt Pike	8 yd. container	2	n/a
Fire Station 22 7014 Brandt Pike	6 yd. container	1	1
Fire Station 23 7435 Old Troy Pike	4 yd. container	1	1
Division of Taxation	8 yd. container	1	1
Division of Water and Wastewater	8 yd. container	1	1
Senior Center, 6428 Chambersburg Road	4 yd. container	1	1
Public Works Department 7020 Brandt Pike	8 yd. container	2	2
16 RTA trash cans at 14 locations throughout the City	Size container?	1	1

Summer service will commence the first of April and conclude at the end of October. Winter service will commence the first of November and conclude the end of March.

The City reserves the right to add other City facilities that will require like or similar service.

SPECIFICATIONS
CURBSIDE RECYCLING

SECTION 1

Contractor shall collect and remove an unlimited amount of recyclable materials once each week on the regularly scheduled trash collection day from all residences.

SECTION 2

Contractor proposal price shall include the collection of unlimited amounts of residential curbside recyclables. The Contractor is to include the cost of providing the resident with a sticker for their container that indicates that their container is for recycling.

SECTION 3

Contractor shall also provide each residence with a recycling bin (minimum 20 gallons). An additional bin shall be provided at the request of the resident at no additional cost. Drainage holes will be in the bottom of recycling bin to allow rainwater to drain out of bin. Color of the recycling bin shall be the discretion of the City. All pricing shall include delivery, maintenance and replacement of containers and bins for the life of the contract.

Recyclable materials to be collected shall include, but not be limited to, newspapers, magazines, catalogs, telephone books, junk mail, paper cartons, #1, #2, and #6 plastics, and all glass food and drink containers (clear or colored), and aluminum and bi-metal beverage cans.

SECTION 4

The contractor shall transport the recovered recyclable materials to a central processing site and retain responsibility for the brokering of these materials to their respective markets. At no time shall recovered materials be disposed of in a landfill or incinerator.

PROPOSAL FORMS

See the following attachments. All forms MUST be completed and signed where signatures are required.

PROPOSAL GUARANTY AND CONTRACT BOND

(SECTION 153.571 OHIO REVISED CODE)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned

_____as Principal (Name and Address) and

_____(Name of Surety) as Surety, are hereby held and firmly bound unto CITY OF HUBER HEIGHTS, OHIO hereinafter called the Obligee, in the penal sum of the dollar amount of the Proposal submitted by the Principal to the Obligee on _____ to undertake the Project known as:

Solid Waste Hauling and Disposal Services

The penal sum referred to herein shall be the dollar amount of the Principal's Proposal to the Obligee, incorporating any additive or deductive alternate proposals made by the Principal on the date referred to above on the Obligee, which are accepted by the Obligee. In no case shall the penal sum exceed the sum amount of _____ dollars ($_____).
For the payment of the penal sum well and truly to be made, we hereby jointly and severely bind ourselves, our heirs, executors, administrators, successors, and assigns.

The CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named Principal has submitted a Proposal on the above referenced Project:

NOW, THEREFORE, if the Obligee accepts the Proposal of the Principal and the Principal fails to enter into a proper contract in accordance with the plans, specifications, and contract documents; and in the event the Principal pays to the Obligee the difference not to exceed ten percent (l0%) of the penalty hereof between the amount specified in the Proposal and such larger amount for which the Obligee may in good faith contract with the next lower Contractor to perform the work covered by the Proposal; or in the event the Obligee does not award the contract to the next lower Contractor and resubmits the Project for proposals, the Principal will pay the Obligee the difference not to exceed ten percent (l0%) of the penalty hereof between the amount specified in the Proposal, or the costs, in connection with the resubmission, of printing new contract documents, required advertising and printing and mailing notices to prospective Contractors, whichever is less, then this obligation shall be void, otherwise to remain in full force and effect. If the Obligee accepts the Proposal of the Principal and the Principal within twenty (20) calendar days after the awarding of the contract, enters into a proper contract in accordance with the plans, specifications, and contract

documents which said contract is made a part of this bond the same as though set forth herein; and

IF THE SAID Principal shall well and faithfully perform each and every condition of such contract; and indemnify the City of Huber Heights against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, specifications, and contract documents therefore; and shall pay all lawful claims of subcontractors, materialmen, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any materialman or laborer having a just claim, as well as for the Obligee herein; then this obligation shall be void otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said contract or in or to the plans and specifications therefore shall in any way affect the obligations of said Surety on this bond, and it does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

SIGNED AND SEALED this day of _____, 2012

PRINCIPAL:

_____

BY:_____

TITLE:_____

WITNESS: _____

SURETY: SURETY COMPANY ADDRESS

_____

BY:_____

Attorney-in-fact City State Zip

WITNESS:_____

SURETY AGENTS' ADDRESS:

_____

Agency Names

_____

Street

_____

City State Zip

CITY OF HUBER HEIGHTS
WASTE COLLECTION AND DISPOSAL SERVICES
PROPOSAL

NOTE: All Proposal prices shall include any and all applicable Federal, State, Solid Waste Management District and other related fees in the Proposal price.

BASE PROPOSAL

Residential Solid Waste Material & Recycling Collection and Disposal

Contractor to provide unlimited weekly collection and disposal of residential recyclables and waste material including solid waste, large trash items, garbage, brush, and yard debris. Individual residents shall provide containers (except recycling containers) and/or bags. Also includes collection at listed City facilities. Pricing shall include all fees, tipping fees, dumping fees, or charges of any nature or description to Montgomery County, Ohio for the disposal of all materials collected under the terms of this Contract.

Contract Year 2013 - 2014 **$**_____per month

Contract Year 2014 - 2015 **$**_____per month

Contract Year 2015 - 2016 **$**_____per month

Contract Year 2016 - 2017 **$**_____per month

Contract Year 2017 – 2018 **$**_____per month

The undersigned signatory represents and warrants that he has full and complete authority to submit this proposal to the City and to enter into a contract if this proposal is accepted.

_____	_____
Company	By (Signature)
_____	_____
Street Address	Name (Please Print)
_____	_____
City, State, Zip Code	Title
_____	_____
Telephone	Date

OPTIONAL PRICING

The Contractor shall provide any pricing discounts to the above pricing that have not been discussed, including but not limited to, discounts for change in route days, one-day service, etc. While the City may consider any option, the Contractors are to keep in mind that the City has the right to negotiate any program changes with the Contractor it deems to be the lowest and best. The award, if any, shall be made based on the "lowest and best" criteria and on the base and alternate proposals required above. The Contract shall also include any statements or terms it would want the City to consider e.g. rates, fees or house counts adjustments, etc.

QUALIFICATIONS

The Contractor shall submit with its response to this RFP information regarding its qualifications. Information shall include, but not be limited to: company history; last year's annual report (must include companies financial information); list of officers; management team assigned to this contract; current and past customer lists; including names and phone numbers of key contacts, dates of contract and estimated annual revenue of contract; and any additional information that demonstrates the companies qualifications.

EDUCATION AND AWARENESS

The Contractor shall submit any information that demonstrates its ability to assist the City with education and communication of the program.

EQUIPMENT AND MATERIALS

The Contractor shall submit copies of literature for the equipment and materials it will use during the term of this contract, including: trucks; two wheeled mobile carts; recycling stickers and containers; etc.

ADDITIONAL SERVICES OR PROGRAMS

The contractor shall submit any additional information on services or programs that could or will be offered to the City during the term of this contract. If responding to this section, all pricing terms shall be submitted with the services and or program.

Legal Summary

Gerald McDonald from the Law Director's Office, was asked specific questions regarding the contracts that residents currently have and the passing of legislation. Mr. McDonald advised that legislation by the City does not necessarily void any contract that City residents have, but the contracts may not be enforceable going forward. Mr. McDonald recommends giving as much lead-time as possible to our citizens prior the legislation going into effect.

The following is an email exchange between the City Manager and Mr. McDonald.

Borland, James

From: McDonald, Gerald <GMcDonald@pselaw.com>
Sent: Tuesday, October 02, 2012 10:44 AM
To: Borland, James
Cc: Schaeffer, Alan
Subject: FW: Trash hauling

Follow Up Flag: Follow up
Flag Status: Flagged

Jim, expanding a bit on my email, there are many-many complicating factors that can apply with a single trash hauler ordinance. Will it apply only to single family, will it apply to commercial, will there be exceptions to the requirement to use the single hauler or paying the fee, will it go into immediate effect or have a period of transition? Depending on these answers the legislation may or may not present challenges. While the City generally has legal protection when it enacts such legislation, citizens may still have problems with their trash haulers that you may want to consider and try to minimize. One way to help avoid problems is to give lead time before the single trash hauler ordinance takes place. I am not aware of the details on the single trash hauler plans for Huber, but am ready and willing to discuss this matter with you if you like.

From: McDonald, Gerald
Sent: Monday, October 01, 2012 1:56 PM
To: 'Borland, James'
Cc: Schaeffer, Alan
Subject: RE: Trash hauling

Jim, once the City passes legislation requiring all residential residents to use the City's single trash hauler, the existing contracts do not necessarily become "void", but they may no longer be enforceable going forward, meaning, the residents would still have to pay for services provided, but would not necessarily need to pay for the future services which no longer would be provided (even though they may a contract extending into the future). This is based on the concept that a resident cannot be held to an illegal contract, and using a different trash hauler would be illegal in the City. Yes, the City must pass the legislation.

From: Borland, James [mailto:JBorland@hhoh.org]
Sent: Thursday, September 27, 2012 10:04 AM
To: McDonald, Gerald
Subject: Trash hauling

I have a couple of questions about trash hauling contracts. The City is looking into going to one trash hauler for the entire City. Currently every resident is contracting separately with a trash hauler of their choice. Some of the HOA's also have contracts for their plats. The question is, if the City goes to one trash hauler does it automatically void all the other contracts? Also will the City have to pass legislation requiring residents to go with the City's trash hauler?

Thanks

James M. Borland
City Manager
City of Huber Heights
6131 Taylorsville Road
Huber Heights, Ohio 45424
937-233-1423

Staff Recommendation

Consideration should be given to the following areas:

- Billing - Billing the property owners by property assessments or quarterly billings may place a hardship on rental property owners and not on the actual users of the service. It is staff's recommendation that the actual resident of each property be made responsible for paying for trash service.

- Suspending service - Vacant homes, empty rentals and snow birds should have the ability to suspend service.

- Billing services - Staff recommends that all bids must contain two (2) quotes; one quote where all billing is done directly by the waste collection company and the other quote where all billing is done by the City.

Staff recommends that the sample RFP be refined with input from City Council and the Law Director and be distributed to interested trash haulers. Within the RFP, Council may request several options that can be quoted separately so that the price impact can be evaluated. Council may then choose the lowest and best bid, or may reject all and continue with the current structure.