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September 18, 2009

City of Bloomfield Hills
45 East Long Lake Road
Bloomfield Hills, Michigan 48304

Attn: Mr. Jay Cravens & City Commission

Re: Road Deterioration Due to Large Truck Traffic
City of Bloomfield Hills

HRC Job No. 20090525

Dear Mr. Cravens:

Hubbell, Roth & Clark, Inc. (HRC) was requested to provide information about the deterioration of the City's local roads and the contribution to this deterioration by large trucks specifically waste haulers. Currently, there are seven (7) waste haulers providing service to the residents of Bloomfield Hills with no set days or times for refuse pick-up. Theoretically, this means that on any given day of the week there could be up to seven (7) different garbage trucks present on the local subdivision roads performing waste hauling duties or 35 +/- trips per week.

Washtenaw County Department of Planning and Environment completed a report regarding the effects of heavy trucks on the deterioration of local roads, which is partially enclosed with this letter and is summarized herein. The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Design of Pavement Structures provides calculations using Equivalent Single Axle Load (ESAL) factors to equate a single truck trip (i.e. garbage truck) to car trips. This information can then be used to identify the expected traffic damage on the design life of the chosen pavement. For example, a single trip of a typical waste hauler/garbage truck with 3 axles and approximately 18,000 lbs per axle, equates to approximately 1,400 car trips based on the ESAL factor calculations. However, many state agencies use a more conservative ESAL number of one (1) waste hauler equating to 1,000 car trips. This means that the damage to any given road for one (1) garbage truck/waste hauler equals the amount of damage created by approximately 1,000 cars on that same road per trip. In the City of Bloomfield Hills, with potentially seven (7) different waste haulers on any local subdivision road on any day of the work week, this equates to approximately 35,000 additional car trips per week. This does not take into consideration other large trucks like landscaping vehicles, lawn care services, school buses, mail carriers, delivery trucks, etc.

The same Washtenaw County report included the results of a University of Michigan Transportation Research Institute study, which concluded that in addition to the increased impacts from heavier weights attributed to the waste haulers/garbage trucks, there was an increase in damage to local roads from the regular starting and stopping action of these vehicles. Depending upon the speed of the vehicle and the weight of the vehicle load, the starting and stopping of vehicles increases damage to streets by 50-100%. Considering the amount of stopping due to one (1) waste hauler/garbage truck and then multiply that by up to seven (7) different waste haulers per work day, this adds up to a significant amount of damage attributed to these types of vehicles.

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The majority of the damage from these heavily loaded vehicles like waste haulers, school buses, landscaping trucks, etc. is seen specifically along the edge of the road. These types of vehicles travel, start, and stop along the edge of the road. The edge of the road is particularly vulnerable to deterioration and damage for several reasons. Frequently, the edge of the pavement is weakened due to a saturated road base which can often be attributed to the over irrigation of lawns. Road side parking of all types of vehicles including heavily loaded vehicles also causes damage to the edge of the road when they drive off the edge of the road to park half on the lawn and half on the road. These factors together contribute to the edge of the pavement being the weakest, which is further damaged by the typical operation of some of the heaviest vehicles allowed on the road (i.e. starting/ stopping, parking, and loading/unloading).

The City and HRC have taken several steps to address this issue with the Road Improvement Program. This includes designing a thicker and stronger pavement cross section than is typically used on local subdivision roads, undercutting the road base to eliminate the poor subgrade material, and extending the road base out beyond the edge of the pavement to address the parking concerns. In addition, the City has held public information meetings where the issue of over irrigation of lawns is discussed. However, even with all of these road design improvements, the frequency and weight of heavy vehicles such as waste haulers/garbage trucks, delivery trucks, school buses, etc. is still a cause for concern.

HRC has enclosed a copy of the report from Washtenaw County and other references in support of the above findings regarding road deterioration attributed to heavy vehicle loads including waste haulers.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

James F. Burton, P.E.
Environmental Engineering Department Manager

pc: City of Bloomfield Hills; Ms. Amy Burton, Chief Matott
HRC; M. Waring, B. Shepler, File

WASHTENAW COUNTY RECYCLES

Residential Solid Waste Profile & Assessment Report

May 2005

Washtenaw County
Department of Planning and Environment
Solid Waste Program
705 North Zeeb Road
P.O. Box 8645
Ann Arbor, MI 48107-8645
P: 734-222-6889 F: 734-994-2459

http://recycle.ewashtenaw.org

Findings and Recommendations

The county revenues collected from the Arbor Hills Landfill have fallen by 45% over the last five years. A portion of these revenues had been utilized to fund local recycling programs. These revenues funded about 50% of the recycling programs costs in rural and suburban communities and about 5% of programming costs in urban communities. The loss of funds from the county has resulted in the discontinuation of recycling programs in York Township and Northfield Township.

The urban communities with single hauler and preferred hauler systems have been more resilient to funding losses because solid waste and recycling services are provided for in their hauler contracts.

> **Recommendation 3.3.2: Local units of government with subscription-based systems should consider moving to a preferred or single hauler system to ensure the provision of both solid waste and recycling services.**

3.4 – Transportation/Hauling Issues

Not only are there direct cost and services differences between subscription-based and single hauler systems, but also an indirect cost difference. Several subscription-based communities have as many as 6 solid waste service providers (haulers) operating which means up to 12 collection vehicles are on the roads in a given week.

A typical 3-axle garbage truck has an axle weight of roughly 20,000 pounds per front axle and 44,000 pounds on the rear pair of axles. An Equivalent Single Axle Load (ESAL) factor is used to calculate the impact of different types of vehicles on roads. A standard passenger car has an ESAL of 0.0007 while a truck with 18,000 pounds per axle (i.e. garbage truck) has a factor of 1.0. What this means is that a single truck trip (18,000 pounds per axle) is equal to 1429 car trips. The Minnesota Department of Transportation (MDT) uses a conservative ESAL factor that states one garbage truck trip is equivalent to 1000 car trips.

Using the MDT factor, it can be estimated that the local road network of a Washtenaw County community with 6 haulers operating experiences an equivalent of 6000 extra car trips per week. (The number of car trips experienced may be higher depending on the number of vehicles utilized to collect trash and recyclables.) In addition to axle weight impacts to roads, a University of Michigan Transportation Research Institute study reveals that regular starting and stopping (especially stopping) will increase the damage to streets by 50% to 100%. This damage depends in the speed of the truck and the weight of the load being carried. Considering the weight and starting and stopping nature of garbage trucks local roads are vulnerable to accelerated deterioration.

Frequent axle and wheel loading from heavy vehicles such as garbage trucks on our local road network accelerates the rate of road deterioration. According to James Harmon, Washtenaw County Road Commission (WCRC) Assistant Director of Engineering, our local road network

with few exceptions is not designed, constructed or maintained to handle significant axle and wheel loading.

The WCRC receives funds each year from the state to maintain our local roads. The projected Fiscal Year 2005 funding is $1677 per road mile for non-urban local roads and $2215 per road mile for urban local roads. When local roads deteriorate to a condition where the costs to maintain the roads exceed the amount of funds provided by the state, the local roads become no longer safe and desirable for resident travel. The only way to improve the condition of the roads would be for local units of government to provide the road commission with additional funds from their general fund for maintenance.

In single hauler systems, the number of collection vehicles in operation is limited, thereby reducing the local road impacts experienced in the subscription-based systems.

Findings and Recommendations

Under subscription-based systems, communities with up to 6 haulers operating can experience an equivalent of 6000 extra car trips per week. In addition to axle weight impacts to roads, regular starting and stopping (especially stopping) of heavy trucks will increase the damage to streets by 50% to 100%. Considering the number, axle weight and starting and stopping nature of garbage trucks local roads are vulnerable to accelerated deterioration.

Recommendation 3.4.1: Local units of government with subscription-based system should implement a single hauler system to reduce the potential of local road impacts.

Section 4: System Findings and Recommendations

A summary of system findings and recommendations by section is presented below. Development of an efficient and effective solid waste management system focused on waste diversion requires action at the local and county level. Recommendations from this report have been customized for each local unit of government (LUG) and are contained in their Community Solid Waste Profile (Appendix 1).

The LUG-specific recommendations are based on a LUG's:

- Existing solid waste management system and data
- Demographic data
- Landscape (Current Land Use)
- Proximity to solid waste infrastructure
- Neighboring communities management systems and programs
- Best management practices

Section 2: Waste Generation and Recovery Data

There is a lack of solid waste data for subscription-based systems. While single hauler and preferred hauler systems have better solid waste data than subscription-based systems, there are no uniform reporting standards.

> **Recommendation 2.1: The County should develop uniform reporting standards and local units of government should consider requiring haulers to report solid waste collection data.**

Subscription-based systems have substantially lower waste diversion rates than single hauler and preferred hauler systems

> **Recommendation 2.2: Subscription-based communities should evaluate implementing a single hauler or preferred hauler system to increase waste diversion rates.**

> **Recommendation 2.3: All local units of government should incorporate waste volume control measures (such as limiting the amount of trash set-out per household) in their system to increase participation in waste diversion programs.**

Section 3: Current Residential Solid Waste Management System Services and Costs

3.2 – Collection System Services and Cost

In Washtenaw County, residents pay 35% to 50% higher rates under a subscription service than they do under a single hauler or preferred hauler system. In addition to lower rates, preferred and single hauler systems provide additional services to residents including, but not limited to, data

reporting, bulk item collection, educational services, Pay-As-You-Throw options, roadside litter collection and free township hall services.

Recommendation 3.2.1: Local units of government with subscription based systems should implement a single hauler or preferred hauler system that will cost 35-50 % less and provide more residential and community services and benefits.

Recommendation 3.2.2: Local units of government with single hauler and preferred hauler systems should explore a regional single hauler system to leverage customer base to further drive down costs and obtain additional services.

3.3 – County Funding to Support County-wide and Local Programs

The county revenues collected from the Arbor Hills Landfill have fallen by 45% over the last five years. A portion of these revenues had been utilized to fund local recycling programs. These revenues funded about 50% of the recycling programs costs in rural and suburban communities and about 5% of programming costs in urban communities. The loss of funds from the county has resulted in the discontinuation of recycling programs in York Township and Northfield Township.

The urban communities with single hauler and preferred hauler systems have been more resilient to funding losses because solid waste and recycling services are provided for in their hauler contracts.

Recommendation 3.3.2: Local units of government with subscription-based systems should consider moving to a preferred or single hauler system to ensure the provision of both solid waste and recycling services.

3.4 – Transportation/Hauling Issues

Under subscription-based systems, communities with up to 6 haulers operating can experience an equivalent of 6000 extra car trips per week. In addition to axle weight impacts to roads, regular starting and stopping (especially stopping) of heavy trucks will increase the damage to streets by 50% to 100%. Considering the number, axle weight and starting and stopping nature of garbage trucks local roads are vulnerable to accelerated deterioration.

Recommendation 3.4.1: Local units of government with subscription-based system should implement a single hauler system to reduce the potential of local road impacts.

Sources:

City of Falcon Heights. Solid Waste Commission. Organized Collection Study: Final Report. Falcon Heights, MN: City of Falcon Heights Solid Waste Commission, 2004.

Gillespie, Thomas D., et al., University of Michigan Transportation Research Institute. Effects of Heavy Vehicle Characteristics on Pavement Response and Performance: Final Report. Ann Arbor, MI: University of Michigan Transportation Research Institute, 1992.

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Washtenaw County. Dept. Planning and Environment. "Cost of Service Inquiry of private haulers conducted by the Solid Waste Program Staff." Telephone Survey: September 2004.

Washtenaw County. Dept. Planning and Environment. A Comprehensive Plan for Washtenaw County: A Sense of Place, A Sustainable Future. Ann Arbor, MI: Washtenaw County Dept. Planning and Environment, 2004.

Resource Recycling Systems, Incorporated. Washtenaw County Solid Waste and Recycling Profile. Ann Arbor, MI.: October 10, 2004.

Washtenaw County. Dept. Planning and Environment. Annual Municipal Solid Waste, Recycling and Composting Reports: FY 1999-2003. Ann Arbor, MI.: Washtenaw County Department of Planning and Environment, 2004.

Harmon, Jim. Washtenaw County Road Commission. Telephone Interviews. Ann Arbor, MI.: December, 2004.

www.co.ramsey.mn.us/recovery/public_collection.htm

Final Report: Study on Public Collection

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Final Report: Study on Public Collection

Executive Summary

Introduction [see page 8 of the Report]

This is a report of a study about public collection in Ramsey and Washington Counties, Minnesota. It includes a description of current problems in solid waste management in the Counties, methods used, a description of public collection, results of a public engagement process, analysis of four options, conclusions and recommendations.

Cities, townships and counties are charged by the State of Minnesota with protecting public health, safety and welfare, and protecting the environment. Garbage collection is a necessary public service to assure those charges, much as proper handling of sewage, provision of safe drinking water, providing safe roads, and fire and police protection services. Public collection of waste is when a city, township or county provides or arranges for collection services on behalf of residential, commercial and/or multifamily housing waste generators. The services can collect a wide range of wastes, including garbage, recyclables, compostables (such as yard waste or food waste), bulky items (such as major appliances), household hazardous wastes, and tree and shrub waste.

This report has been prepared by the Ramsey/Washington County Resource Recovery Project in response to County Board resolutions directing a full exploration of a public collection system for solid waste. This study has its roots in a crisis that emerged in early 2001 related to waste deliveries to the Ramsey/Washington County Resource Recovery Facility. During several workshops and meetings in 2001 the Ramsey and Washington County Commissioners came to recognize that the problems at the Resource Recovery Facility were but a symptom of overall problems in waste management, and that the current market for solid waste collection and disposal is preventing achievement of environmental, health and safety goals. In June 2001 the Ramsey and Washington County Boards each adopted resolutions to conduct a study of public collection. The Boards appropriated funds and authorized contracts to complete the work. The initial timeline, which called for the study to be complete at the end of 2001, was extended into 2002 to provide more time for public engagement.

Problem Statement [See page 9 of the report]

Minnesota law on solid waste establishes the policy of the state to protect the environment and public health and conserve resources by managing waste in a variety of ways. State law provides a hierarchy of preferred waste management methods, including reduction, recycling, composting, recovery of energy from waste, and landfilling being the least preferred. In response to State law, Ramsey and Washington Counties have State-approved solid waste management plans with clear long-term goals. These goals aim to 1) manage waste to protect the environment and public health, and to conserve resources; 2) use a variety of methods according to the State's hierarchy, in order to minimize landfilling; 3) manage waste cost-effectively and minimize potential liability for citizens, businesses, and taxpayers; 4) encourage

waste generator responsibility for environmentally sound waste management; and 5) allocate costs fairly to waste generators and users of the solid waste system.

The reason for the study of public collection is that the current system of solid waste collection and management is not moving the Counties toward the long-term goals. The report finds:

- Waste generation is increasing;
- Recycling is stagnant or decreasing as economic incentives to recycle have diminished;
- Resources that could be put to a higher use through recycling are disposed in processing facilities or landfills;
- Key decisions are made with a focus on short-term cost or profits;
- Illegal dumping of wastes and associated environmental concerns continues in several areas;
- Municipal concerns on truck traffic continue;
- Resource recovery costs are subsidized to compete with landfilling costs; and
- Resource Recovery capacity is not consistently utilized.

Public Collection Study [See page 14 of the Report]

The study on public collection consisted of two main elements: 1) research to better understand public collection, and 2) public engagement, to inform the public about the solid waste system, challenges related to it, and to get input on the concept of public collection.

Research consisted of case studies, development of a municipal database, interviews resulting in city/town histories, a summary of public surveys about waste management, a resident survey, considerable legal review of waste issues, a review of illegal dumping issues, research into the advantages and disadvantages of public collection, and development of a Preliminary Public Collection Framework. The research is summarized beginning on page 14 of the study, with research results found in several appendices.

A framework for public collection was developed based on input during the first phase of public engagement, and the research conducted. The framework is found in Appendix 16 of the Report. The framework identified seven components that would guide how public collection would be implemented:

- Protect the environment, health and safety of the community by managing the waste stream and using waste as a resource;
- Individual communities are provided options for the design of the system in their community;
- Healthy competition between haulers is maintained;
- Local/independent haulers can stay in business;
- Offer a choice of haulers where the community desires it; fewer haulers on the street where the community desires it;

Appendix 2E
Truck Traffic Issues

Among the comments heard during the public engagement work were complaints related to truck traffic. These stem form concerns about the number of garbage trucks in an alley or on a street during a week, and the reasons for concern included noise, wear and tear on streets, safety, and pollution.

The following data were gathered on the issue of garbage trucks and traffic. References cited are at the end of the summary.

Reduced wear and tear on streets

- Reduction of road impacts of overweight vehicles, especially during spring road restrictions when roads are the most vulnerable to damage as the frost moves out of the ground.
  - "As they fill up on the route, many refuse collection vehicles operate overweight, especially during the spring months when waste generation rates increase but road weight limits may be at their lowest...Further, the number of overweight vehicles using roadways increases the potential for paving damage." (GBB, pg V-2)
  - "The damage that garbage trucks inflict on City streets is magnified in the spring when road restrictions typically restrict other trucks from using the same streets." (Bonestroo)
  - "During the road restriction period, most refuse vehicles exceed the allowable axle load limits. Because of the variable nature of refuse, these vehicles are rated by volume capacity rather than by weight. Minnesota is said to have some of the lowest allowable load limits when road restrictions are in effect; therefore refuse vehicle manufacturers are not inclined to design vehicles to meet Minnesota standards. Haulers generally acknowledge in some cases when road restrictions are in effect, their fully loaded vehicles exceed the allowable load limits. Tertiary (tag) axles and duel wheels are available on some refuse vehicles of more recent design, but they are not generally used in this area. Although these auxiliaries reduce the load on a road, they do not guarantee compliance with road restrictions....Mn/DOT will issue special permits to haulers who apply for such permits. These permits increase the allowable limit by 2,000 pounds/axle. Certain communities that enforce road restrictions may grant exemptions to refuse trucks operating on their residential streets. This practice is most common in cities with organized collection." (Roseville, pg 21)
  - "The number of exceptions to weight limits has direct bearing on the potential for damage to pavement. An increase in the frequency of overweight vehicles increases the risk of damage." (Chanhassen, pg 22)

- Reduction of relative impact on local streets of collection vehicles
  - "According to research conducted as part of the City of Chanhassen Organized Collection Study, MSW collection vehicles have road impacts

equivalent to 1,125 automobiles. Recycling vehicles represent the same impact as 525 automobiles." (GBB, pg V-2)

- Residential use of a typical cul-de-sac may generate 700-1,400 vehicle trips. A single hauler serving the cul-de-sac exceeds the weekly residential usage with an equivalent of 1,650 automobile trips. Five haulers serving the cul-de-sac in one week create the impact of 8,250 automobiles."
  - Minor residential street: 4,200-7,000 trips/week; five haulers 8,250
  - Local residential collector 7,000-21,000; five haulers 8,250
  - City collector street (MSA 9 ton roadway), 21,000-70,000 trips/wk
  - The pattern is clear. With exception of the MSA streets, solid waste collection vehicles currently serving the City create a significant portion of the relative impact of vehicles on local streets. "(Chanhassen, pg 21) [Note: presumably they are assuming each hauler does both MSW and recycling]
- "In general, garbage trucks are the heaviest vehicles that regularly use City streets. The impact that one garbage truck has on a City street equates to roughly 830 cars." (Bonestroo)
- "The expected life of any street or alley surface is related to the traffic which is carried by the street or alley. The roadway surface is particularly affected by heavy wheel loads. The effect on a roadway of one refuse truck is equivalent to 1,500 automobiles. This document has been documented by the Research Section of Mn/DOT and is currently used by Mn/DOT in street and highway design." (Metro Council)
- "Garbage collection vehicles are perceived to be very destructive to the roads, especially in the neighborhoods. Yet, there are only estimates of an equal number of car loads for every run of a garbage vehicle. We have not been able to find data which would reflect a "real" monetary savings to the community by the elimination of competitive haulers through organized collection. The weight of the vehicle which results in a negative impact to the road surface is based on the weight per sq. inch of wheel base that meets the road surface. Today all haulers are using third axle or flotation tires which would lessen the impact of weight per sq. inch of wheel base meeting the road surface." (Maplewood haulers' draft proposal, 1996)
- Haulers serving Maplewood in 1996 offered an alternative plan, which included: a) city would require haulers to use third axles or flotation tires on their equipment to reduce roadway wear and tear, and b) routing to be cognizant of load-sensitive streets, so that trucks are as empty as possible when service accounts on them
- Haulers in Roseville commented: "the number of trucks/vehicles on a street is not the cause of wear and tear on the streets; vehicle weight is the determining factor." (Roseville, pg 17)
- Soils: "The cost of constructing and maintaining roadways is generally higher in Chanhassen than in some communities, due to the clay soils prevalent in the community. Protecting the integrity of the local street network may, correspondingly, be a higher priority in Chanhassen than in other communities." (Chanhassen, pg iii)

- Champlin implemented organized collection in 1987 in conjunction with installation of sewers and new streets throughout the City; organized collection was implemented to reduce street wear from the start (per JoAnne Brown, City staff)
- Pavement design manuals give load factor values to vehicle typed
  - Car load factor - .0007
  - Truck 18,000 lb/axle – 1.0 load factor
  - Garbage truck can be as high as 1.6 load factor

  Another equivalency that design engineers use is 1 garbage truck trip = 1,000 car trips in terms of damage to pavement. Residential streets have average daily traffic counts of 200 – 500 vehicles. (Roseville Public Works 2001)

Bonestroo = Memo to Rick Getschow, City Administrator, Lauderdale, from Paul Heuer, Bonestroo Rosene Anderlik & Associates, Engineers & Architects, 4/9/01

Chanhassen = City of Chanhassen Organized Collection Study, Final Report, 9/93, Resource Strategies Corporation

GBB = Comparative Economic Analysis of MSW and Recycling Collection in the Twin Cities Metropolitan Area, prepared for Metro Council by GBB, 9/94; data from late summer through fall, 1993

Metro Council = Study of Organized Collection in the Twin Cities Metropolitan Area, 1985

Roseville = Options for Residential Waste Collection and Recycling for Roseville, a report to the Roseville City Council, prepared by Roseville's Citizen Advisory Committee for Residential Solid Waste Management, 4/91

Roseville Public Works 2001 = Impact of Heavy Trucks on Low Residential Streets, presented by Duane Schwartz, Roseville Public Works Director, 10/11/01 to Roseville Solid Waste Commission.

Saint Paul = An Integrated Solid Waste Management System for the City of Saint Paul (1990)