Trow Consulting Engineers Ltd.

1595 Clark Boulevard
Brampton, Ontario
L6T 4V1

Telephone: (905) 793-9800
Facsimile: (905) 793-0641

Reference: BRWM0064447D

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Mr. Mathew Hough
City of Iqaluit
Building 901, Ring Road, City Hall
Iqaluit, NU
XOA OHO

Dear Mr. Hough:

Municipality of Iqaluit – Waste Audit

This letter is a preliminary report on the findings from the solid waste audit undertaken at the Iqaluit Landfill from September 16th to September 20th, 2002. The data presented include vehicle weights for an additional week ending September 28th, 2002.

Audit Methodology

The composition of the waste stream was determined in accordance with the sampling and measurement protocols contained in the *ASTM Standard Method for Determination of the Composition of Unprocessed Municipal Solid Waste* (ASTM: D 5231-92).

During each of the audit days a minimum of two (2) and a maximum of four (4) vehicles (depending on the number of private mixed solid waste trucks entering the landfill) were audited. Samples were taken from residential, commercial, and private waste entering the landfill. Five auditors were employed from the local workforce and provided with training on the first day of the audit.

On each of the audit days, samples were taken from the municipal residential collection truck and the commercial collection truck. The remaining samples were taken randomly from private trucks entering the landfill. Samples from the municipal residential and commercial trucks were taken from the compactor loads after being dumped. Depending on the size of the load, a 133 L wheeled bin was filled four (4) to (6) times, constituting one (1) sample. Waste was taken from the bottom to the top of each load in order to obtain a representative sample. The 133 L wheeled

bin was weighed empty each day to determine the tare weight. Samples from private trucks were taken in the same fashion depending on the load size. In total, 13 samples were analysed from the Iqaluit landfill. The materials on the sorting table were sorted manually into 24 material categories as listed in Table 1.

Table 1 Waste Material Categories

Cardboard	**Fiber Paper (newspaper and office paper)**	**Polycoat (tetra)**
Other Paper (tissues, etc.)	**Plastic Film**	**PETE (#1) Containers**
HDPE (#2) Containers	**Other Plastics**	**Packaging (styrofoam, etc.)**
Clear Glass	**Coloured Glass**	**Other Glass**
Ferrous Metal (steel)	**Aluminum**	**Other Metals**
Food Waste	**Disposable Diapers**	**Textiles**
Rubber (tires, other rubber products)	**Wood from Construction**	**Rubble from Construction**
Hardgoods (furniture, etc.)	**Hazardous Waste (batteries, oil, paint, pesticides)**	**Unclassified**

Materials were sorted into 77 L plastic bins for each category. Each of the bins was weighed empty to determine the tare weight. After each sample was finished, the bins, with waste in them, were weighed and recorded on audit sample sheets. When a bin became full before the sample was completed, the bin was weighed and the weight and type of material was recorded. All bins were emptied away from the sample, to be disposed of properly in the landfill. All accumulated weights were added.

A digital scale was used, with a capacity of 220 lbs and an accuracy of 0.1 lbs. All members of the audit team were required to wear polypropylene coverall suits, steel toed boots, latex and leather gloves, dust masks, and safety glasses.

Vehicle Weight Data Collection

During the waste audit, most vehicles entering the landfill were logged and weighed using portable weigh scales on loan to the municipality. The weigh scale operator recorded logged data manually. The information that was to be collected for each vehicle being weighed is illustrated in Table 2. Over the 12-day weighing period a total of 353 vehicles were recorded. Weights were obtained for 267 vehicles, which represent 75% of the overall traffic. The 86 entries in the log that were not weighed were due primarily to scale downtime. The final Audit report will attempt to average weights based on vehicle type to account for the missing data.

Table 2 Vehicle Waste Log Data

Date	Vehicle Owner	Vehicle Type	Weight (kg) (inbound)	Waste Source	Waste Type
License#	☐ Municipal		Weight (kg) (outbound)	☐ Domestic	☐ MSW (mixed solid waste)
	☐ Private			☐ IC&I	☐ Construction/demolition
				IC&I Source _____	☐ Other _____

It has been recommended that the weighing and logging of all vehicles entering the landfill be undertaken for as long as possible following the waste audit in order to obtain sufficient data for waste quantities. It is unclear due to the nature of the scales the accuracy of the weights and tares. However, we feel confident that the results will aid in future quantity considerations. This confidence is supported by a projected annual waste generation of approximately 6000 tonnes, which is reasonable for a population the size of Iqualuit's.

Waste Quantities and Composition

The waste at the City of Iqaluit landfill is generated from a number of sources, namely residential dwellings, commercial businesses (e.g. restaurants, hotels), industrial businesses (e.g. construction companies), and institutions (e.g. schools, the hospital).

The total analysed mass of waste over the week was 4380.78 lbs (1987 kgs) from an approximate total of 110,276 kgs received. Over the two-week period 244,879 kgs were recorded over the scales, although this number will be higher once the missing weights are factored in.

From the weigh scale logs it was determined that approximately 17% of the waste consisted of construction and Demolition materials. This may not be consistent over the year and will be addressed in the final analysis. Based on the two weeks of scale data the annual waste projection (300 days) is between 5000 to 6000 tonnes.

Waste audited from the residential collection was generally high in organics, paper, and plastic content. The paper content consisted largely of cardboard, fiber paper, and other paper (mostly Kleenex and paper towel). This waste did contain some recyclables such as plastic (PETE and HDPE containers), aluminum, and steel. It was also noted during the audit that there was a number of hypodermic needles found in the waste stream.

The waste from the commercial collection was generally wet and high in organic content as well as paper and plastic waste. This waste contained recyclables such as plastic (PETE and HDPE containers), aluminum, and steel. It was also noted that there is a large number of beer bottles within the commercial waste stream.

Waste audited from the private vehicles entering the landfill consisted largely of paper. This paper content was mostly in the form of cardboard, fiber paper, and other paper (mostly paper towel). A significant amount of organic waste was also found in the audited private waste.

To summarize, the waste audited from the landfill could be characterized as organic rich waste (approximately 35%) and paper waste (approximately 34%), followed by approximately 18% plastics, including PETE and HDPE recyclable containers, with glass, metals (including recyclable aluminum and steel), other waste (i.e. rubber, wood, construction rubble) and unclassified waste (mostly table scrapings and seal pelts) making up the balance. The majority of the paper waste was composed of cardboard, largely resulting from the packaging of shipped goods. The results of the audit are attached on an excel spreadsheet.

Preliminary Conclusions

Since paper and organic waste represent as much as 70% of the waste being disposed of at the landfill it is obvious that these waste categories should be the focus **of** future waste diversion initiatives. While organic materials do demand significant landfill space they are the primary cause of bird scavenging and odour. Not all of the paper may be easily recyclable however a portion of the paper could be used as an amendment in a organics processing facility such as vermicomposting or anaerobic digestion. If a 50% capture and recovery rate were established as a goal for planning purposes the annual waste stream could be reduced by up to 1,750 tonnes.

It was also noted that plastic film is a significant component of the waste stream. This is a more problematic material to divert however, its contribution to windblown debris at the landfill necessitates a look at management alternatives in the longer term

One area that is not addressed in this preliminary report is the recovery rate of recycleble materials. In order to estimate the recovery rate of recyclables from the residential collection program it will be necessary to obtain the number of bales, by commodity, processed from the recyclables stored in the sea lift containers. Ideally the average weight of the baled material would aid in projecting overall recovery rates although this number can be estimated if actual bale weights are not available.
It is recomended that the weight and or volume of recyclables collected be tracked over a 6 month period to assist in estimating diversion rates.
It was observed that recyclable beverage containers (glass, in particular beer bottles) are prominant in certain commercial loads. This glass material could be diverted and crushed as a granular substitute rather than take up space in the landfill.

In closing, we plan to have a final report for your review by October 24th. Any comments you have on the information presented herein are welcomed.