Review of the
CUPE Waste Management Plan
for the City of Toronto

1.0 Background

Enviros RIS (RIS) is part of the consulting team involved in the evaluation of the TIRM proposals for Proven Waste Diversion Capacity (recycling and composting). The evaluation will address the overall impacts of the proposals on the City's waste management system. As such, the proposed processing facilities and operations will be assessed in the context of the City's waste collection and haul system.

In October, 1999, Toronto received a proposal entitled "Green Jobs and a Green Future" from the Toronto Civic Employees Union Local 416 – CUPE and the Toronto Environmental Alliance. The proposal outlined CUPE's plan for implementing a wet dry recycling system similar to that now operating in the City of Guelph) throughout Toronto.

In February, 2000, the Commissioner of Works and Emergency Services authorized a study to conduct a two phase analysis of the CUPE plan. The first phase would consist of an examination of the assumptions used and their accuracy with respect to Toronto's waste management situation. The results of the Phase 1 evaluation are to be reported back to Works Committee in April. At that time, options will be determined for conducting the second phase of the CUPE evaluation, namely, preparing a comparative analysis of the CUPE plan in relation to the waste management system options that evolve from the TIRM proven diversion RFP submissions.

This report fulfils the Phase 1 requirements of the CUPE evaluation. It should be noted that CUPE submitted a revised copy of their plan to Toronto on March 17, 2000. RIS met with CUPE representatives and their consultant on March 9th to review their approach and the clarify questions that we had at that time. CUPE kindly provided RIS with the revised portions of the plan on March 10th, allowing us to evaluate the up-to-date version of the plan.

2.0 Analysis Approach

This report presents our analysis and discussion section by section, according to the section numbers and headings used by CUPE. ***Significant findings are highlighted in bold, italics.***

Section 3.0 Waste Quantities and Composition

The CUPE waste management plan encompasses the entire waste stream over which the City currently has control. This includes waste from most residential premises, including both single-family households collected curbside and apartment buildings, some of which are collected curbside and some of which receive a bulk collection.

The figures CUPE has used are based on weigh scale reports generated by the City of Toronto and previous strategy documents and represent reasonable planning figures. However, a number of assumptions are not entirely accurate.

The figures for residential waste are similar to those adopted for the TIRM evaluation:

	CUPE	TIRM
• Single-family (curbside)	594,000 tonnes	599,400 tonnes
• Apartment	280,000 tonnes	276,600 tonnes

However, the figures are for waste collected and do not include on-site management of organic waste (backyard composting and grasscycling) as has been assumed in the CUPE proposal (refer to Table 3.1). These quantities are not large (approximately 40,000 tonnes) but would tend to increase the quantity requiring collection and processing.

Also, referring to Table 3.1, the proposal assumes that 77,220 tonnes of separated yard waste is currently collected and would be managed separately under the wet dry system. However, only 57,000 tonnes were collected in 1998, 51,500 tonnes from residential sources.

Combined, these would add about 45,000 tonnes of organic waste to CUPE's collection and processing quantities.

The composition used in the CUPE proposal (Table 3.1) corresponds to the composition listed in Table 3.1 in the RFP issued February 29, 2000. The figures in the RFP were subsequently revised by an addendum issued February 23, but these were not incorporated into CUPE's plan. However, the changes were minor and do not significantly impact the proposed wet dry system.

CUPE's estimates for commercial waste (130,000 tonnes) and ABC&D waste (202,000 tonnes) are reasonable. Generation of these wastes varies considerably from generator to generator, both in quantity and composition. There is no valid waste generation profile for the average generator. Therefore, they typically are not targeted initially for separation and collection of organics, although many can be included in the service after it has been established.

4.0 Project Concept

4.1 Wet dry Recycling

This section describes the two stream wet dry concept and states that the program "is very convenient for residents, businesses and for the collection system". The system is convenient for single-family residents (who have access to curbside collection services), however, it is more difficult to implement and successfully operate for residents of high rise buildings and commercial establishments. This is discussed in more detail in Sections 4.4 and 4.7.

CUPE states that there are many wet dry recycling programs operating in Canada, citing five programs. In fact, Guelph has the only true wet dry program operating in Canada. Northumberland is designed as a wet dry system, but is not composting the wet stream. The others actually are similar in concept to the systems proposed by the proponents to the TIRM proven diversion process. Each of the programs listed by CUPE is described briefly below:

Location	Type	Description
Guelph	Wet dry	• Serves approximately 35,000 single-family hhlds • Does not include apartment wet • Some apartment "enhanced" dry (expanded traditional recyclables)
Lunenburg, N.S.	4 Stream	• Source separated organics, fibres, containers and garbage • Garbage stream also composted
County of Northumberland	2 Stream	• Serves approx 33,000 single-family hhlds • Designed as a wet dry source separation program similar to Guelph • Dry stream is processed • Wet stream not processed • User pay system in place for wet stream • Very few apartments
City of Edmonton	2 Stream	• Source separation of recyclables in blue bag • Remainder of garbage to be processed (not yet operating)
Regional Municipality of Halifax	3 Stream	• Source separated organics in carts • Source separated recyclables • Garbage

Approximately 87% of incoming food and yard waste delivered to the Guelph composting plant is delivered by curbside collection vehicles serving single-family residents. The remainder comes from other non-Guelph residential sources such as the University, small commercial haulers, surrounding townships, etc. ***There is virtually no recovery of wet waste from multi-family households in Guelph at the present time***[1]**.**

Waste collected curbside from single-family dwellings in Northumberland County (including small multi-family apartment buildings containing 5 or fewer units) is separated into both wet and dry streams, similar to that in Guelph. At the present time, only the dry stream is processed - the wet stream is landfilled.

Ninety-five percent of households served in Northumberland are single-family, curbside households (31,326 of the 33,141). Private contractors collect the dry stream from apartments at the same time and in the same vehicle as dry waste from small commercial generators.

4.2 Recycling of Dry Waste

CUPE anticipates that 793,480 tonnes of dry waste will require processing. CUPE's MRF design is based on the Guelph II design[2], a modification of the original Guelph design. The Guelph II design incorporates a revised processing layout and equipment improvements that, according to the author, will result in improved recovery rates over those currently achieved at the Guelph MRF. Although improved recovery may occur, it should be pointed out that this design is theoretical only – it has not yet been implemented. Furthermore, the Guelph II design work did not address anticipated recovery rates or project annual operating costs.

CUPE assumes a 2 shift per day operating schedule, giving a total annual throughput capability of 118,950 tonnes/yr. The Guelph II design was based on a throughput capacity of 125,000 tonnes. Therefore, to fulfill the 793,480 tonnes/yr processing requirement, 6.7 (i.e. 7) MRFs will be required to serve Toronto. If only single-family residential dry waste were processed (344,520 tonnes/yr), 2.9 (i.e. 3) MRFs would be required.

Based on regular operating hours (5 days per week, 2 shifts/day), the facilities have throughput processing capacity for 875,000 tonnes/yr. Our calculations, as follow, show 10.3% excess capacity, not 14% as CUPE states:

Total throughput capacity (7 x 125,000) =	875,000 tonnes	
Total Toronto dry waste =	793,480 tonnes	
Remaining available capacity =	81,520 tonnes	(10.3 % excess)

The annualized capital cost as shown in CUPE's Table B.1 is consistent with that used in the Guelph II design.

[1] Personal communication with Wayne Arndt, Wet Dry Superintendent, Guelph
[2] "Guelph II MRF Design", prepared by Proctor and Redfern Ltd. for First Brands, July, 1998

The Guelph II design identified ranges of sorters required for each processing line and material. The total number of sorters required would range from 23-75 per shift. CUPE has assumed 44 sorting staff would be required for each shift, for a total of 88 sorters at each MRF. In addition, 12 other administrative and support staff would be required at each facility. Other MRF costs are addressed in Section 5.0.

4.3 Composting of Wet Waste

CUPE assumes a total of 305,600 tonnes per year of wet waste (direct delivery from collection vehicles) and an additional 26,300 tonnes of chipped brush (available from the City's leaf and yard waste composting operation) to be used as a bulking agent for the wet plants (Table 4.4). Assuming the wet plants are located at the same 7 sites as the dry MRFs, each plant would require a capacity of approximately 47,400 tpa.

CUPE assumes wet waste will be source separated and collected from multi-family homes in Toronto. This is not done in Guelph, nor is it done to any degree in Northumberland.

In Northumberland, waste from multi-family buildings (over 5 units) are collected by private contractor. Unlike residents in single-family homes, apartment residents are not subject to the $1.50 per bag charge for wet waste, so there is no extra incentive to maximize waste in the dry stream (or minimize the wet stream). Apartment residents typically separate an expanded list of dry recyclables that are collected by private haulers with other dry waste from small commercial customers. The wet stream is currently landfilled.

The difficulties associated with source separation of organics from multi-family households are discussed in more detail in Section 4.7.

In the TIRM Proven Diversion Capacity proposal evaluation, source separated organics options are considered to be recovered only from "curbside eligible" households (essentially all single-family) and do not include any waste from multi-family dwellings, small commercial establishments, or the A,B,C&D generators. There is, therefore, a significant difference between the two approaches.

The proposed composting technology assumed for CUPE's proposed wet waste plants is a channel system, the same as that used at Guelph. Staffing requirements at the proposed plants seem appropriate. Other composting costs are addressed in Section 5.0.

4.4 Recovered Materials

CUPE has generally used Toronto February sales prices for calculating revenue from the sale of recovered materials, supplemented by either Guelph or CSR Sheet prices for those items that Toronto does not currently market. These market prices are currently relatively high compared to historic levels.

For planning and especially budgeting purposes, RIS typically would recommend applying relatively conservative revenue estimates.

There are numerous items of concern in this section of CUPE's plan. These are itemized as follows:

1. The quantity of aluminum in Table 3.1 is identified as 11,466 tonnes, whereas in Table 4.4, the combined tonnage of aluminum cans and foil total only 11,396 tonnes. Therefore, the total throughput to the MRF is underestimated by 70 tonnes in Table 4.4 (793,410 instead of 793,480 tonnes). It is unclear if the missing tonnage is meant to be material recovered or residue and therefore has not been corrected on this table. Other minor variations in extending revenue numbers are shown shaded on the "dry" portion of Table 4.4 (rev).

2. **Dry Recovery** – Experience in recovering source separated recyclables from multi-family residences indicates that effective separation of waste by residents of apartment buildings is considerably lower than from single-family (curbside) households. According to Toronto "Source and Distribution" reports for 1998 and estimates of the number of single-family households and apartments served, the recovery of recyclables from apartments was about 80 kg/unit, while for single-family households it was about 241 kg/hh. These rates do not take into consideration any variations in generation rates between the two types of households.

   Dry waste can be readily source separated from single-family residences, however, the quantity and quality of dry waste that could be recovered from apartments and A,B,C&D dry waste is far more speculative.

   It is difficult to assess how overall dry recovery rates were calculated in the CUPE report for the mix of incoming materials. One would typically estimate recovery levels for each material in each sector using the generation data presented in Table 3.1 and then aggregate the totals. Such calculations are not presented in the report, only the final recovery estimates for the blended dry stream.

   Overall recovery of the dry stream is projected by CUPE at **61%**. In 1998, overall recovery of all material entering the Guelph dry MRF was about **45%.** Approximately 45% of the throughput tonnage in Guelph was collected from single-family residences, while the other 55% originated from commercial, industrial and institutional sources and other source separation programs (e.g. Wellington County blue box, private haulers, etc.)

   Much of the non-residential dry waste received in Guelph was relatively "clean" source separated recyclables, such as cardboard and blue box recyclables. Effective recovery of dry materials from the Guelph residential stream in 1999 was only 25%[3].

   During 1999 in Northumberland, recovery from the dry stream was **68%** and about 82% of this material originated from residential sources. Most of the non-residential dry material received at the Northumberland MRF is comprised of various grades fibre from commercial and industrial generators. CUPE's plan assumes that approximately 65% of the projected incoming dry material would be collected from residential sources.

[3] Solid Waste and Recycling, Feb/March 2000, "Guelph Wet dry Efficiency Examined", Wayne Arndt.

It appears that the CUPE projections were based more on Northumberland's recovery experience than on Guelph's. (note that the Guelph II design did not give estimates of recovery levels). Assuming that Northumberland is more efficient at recovering recyclables from the residential stream than Guelph, a 68% overall recovery rate can be considered an upper end recovery for single-family dry waste. Assuming that dry waste recovered from Toronto single-family households would likely contain more contamination than in Northumberland (due to possible communication difficulties in Toronto's diverse ethnic mix, etc.), it is reasonable to assume that recovery from this sector will likely be lower than 68%. Furthermore, the difficulties inherent with source separation and collection from multi-family households will likely result in a further drop in recovery if these sectors are included.

What is a reasonable recovery projection for this mix of incoming dry waste? It is difficult to accurately project recovery of individual materials within the proposed mix of dry materials (i.e. including multi-family, commercial and A,B,C&D), especially since:

- there is no practical experience in implementing a wet dry system for these streams, and
- the MRF design proposed has not yet been implemented to test performance
- recovery estimates appear to be based on Northumberland experience (which is not the Guelph II MRF).

We believe that it would be more appropriate to consider a MRF (or MRFs) for a Toronto wet dry system that is specifically designed for that purpose. As discussed in Section 5.0, it is difficult to be confident about projecting MRF operating costs using one facility design and operating experience from a different, smaller facility.

4. **Dry Revenue -** One of the major concerns of possibly projecting high recovery rates for these materials is the impact on projected revenues from the sale of the recovered products. For budgeting purposes, RIS believes that it is always better to be conservative with these projections as well as projected material prices.

   The most significant contributor to CUPE's projected sales revenue is aluminum cans, representing approximately 37% of the total projected dry stream revenue. RIS believes that CUPE's projected aluminum revenue is overly optimistic. This high estimate results from:

   - Generation estimates that may be dated – these should be confirmed by new waste audits
   - CUPE's high recovery estimates in all four sectors
   - The use of a per tonne sales price that is historically high (for instance, average aluminum spot prices for 1997, 1998, and 1999 were $1827, $1595 and $1608, respectively, compared to CUPE's **$2055/tonne**[4]).

   As an example of the sensitivity related to aluminum recovery projections, the 70 tonne aluminum error in Table 4.4 amounts to a revenue difference of $143,850 in sales revenue at the projected sales price.

[4] The CSR Sheet

5. **Wet Recovery** – The difficulties associated with source separation and collection of wet waste from multi-family residences is addressed in more detail in Section 4.7. Even assuming that all of the proposed wet waste arrives at CUPE's wet facilities in the same quality as that in Guelph, experience at the Guelph composting plant shows that saleable compost recovered from the process is only about 25% of the throughput tonnage. The remainder is comprised of residue and screenings (33%) and moisture loss (42%).

   CUPE assumes 60% compost product recovery rather than 25% actually achieved in Guelph, using the same composting technology as that used in Guelph. An added implication of producing less product is that there would be an additional 61,965 tonnes/yr of residue generated for disposal.

   Based on Guelph's recovery rate, only 82,975 tonnes per year of compost product would be available from CUPE's proposed operation.

6. **Wet Revenue** – One of the issues not addressed in the CUPE proposal is the issue of availability of market outlets for the compost produced. CUPE states that finished compost "will be in high demand in an urban environment." However, one of the most significant issues regarding the growth in composting is the uncertainty and weakness in markets for compost. Therefore, the marketability of compost from a Toronto wet dry system should not be considered a given. Serious assessment of the potential markets and revenues for the revised 82,975 tonnes per year of compost product (let alone the 183,444 tonnes per year estimated by CUPE) should be a key consideration of any wet dry plan.

   Assuming that locating or developing markets for the product would not be a problem, ***revenue resulting from the sale of the 82,975 tonnes of compost at $25/tonne would amount to $2,074,375. This represents a decrease of $2,675,225 from CUPE's projected revenue in Table 4.4***

4.5 Overall Diversion

CUPE shows a mass balance diagram for the proposed wet dry system. Most of the individual components have already been discussed in previous sections of this report. As previously indicated, our opinion is that both the dry and wet recovery estimates are high for products to be sold, and correspondingly, CUPE's residue projections are low.

Even assuming CUPE's projected dry performance, RIS shows the overall diversion rate of the system would fall to 62% as shown below:

Item	Tonnes	
Dry input	793,480	(100%)
Recovered	-482,709	(61%)
Dry residue	313,113	(29%)
Wet input	331,900	(100%)
Recovered (product)	82,975	(25%)
Moisture loss	139,398	(42%)
Residue	109,527	(33%)
Total input	1,125,380	(100%)
Total residue (landfill)	422,640	38%
Wet dry diversion	702,740	62%

Section 4.6 Collection System

CUPE's proposed collection system involves co-collection of wet and dry streams in two-compartment vehicles with compaction. This would replace the current system of separate collections of garbage and recyclables. Separate collection of yard waste would continue. This approach is appropriate and likely could be implemented in most areas of the City.

However, CUPE's analysis of the impact on collection is not quantified. CUPE suggests that significant savings can be achieved through implementation of the wet dry system. ***Wet dry collection costs should indeed be lower than for the existing collection system. However, the savings are hinged on the co-location of wet and dry processing facilities, the feasibility of which is uncertain. Moreover, many of the potential opportunities for savings apply equally to the existing system and some of these have already begun to be implemented.***

A co-collection system will also be assumed for the evaluation of proposals for processing of source separated organics as part of the TIRM proven diversion process. However, there are a number of CUPE assumptions and statements that warrant further consideration.

The proposal highlights the savings in loads from this system over the current system. The number of loads is primarily a function of the size of the vehicle and the density of the material collected.

Vehicle Size

The proposal assumes that 37 yd^3 vehicles would be used for all curbside collection. Currently, the average size of vehicle used for garbage and yard waste collection in the City is in the order of 25 yd^3. For recycling, it is about 28 yd^3. These vehicles have been selected to balance competing factors of maximizing payload while maintaining manoeuvrability and minimizing congestion. If larger vehicles could be used, the number of loads likely could be reduced. However, there are considerable constraints to increasing the size of vehicles.

As an illustration, if 25 yd^3 vehicles are used throughout Toronto for the wet dry system for single-family households as estimated by CUPE in Table 4.6, the number of loads required would

be in the order of 164,500. This is roughly similar to the figure of 161,774 loads used in the current system and higher than the 130,500 loads estimated to be required using 37 yd^3 vehicles by CUPE.

As in the current system, it is likely that a mix of two-compartment vehicles would be used in a co-collection system in Toronto. These likely would include both rear and side loaders of varying size. As the size of the vehicle is reduced, the number of loads (and number of vehicles) required increases. The appropriate range of co-collection vehicles is now being commercialized and can be expected to be available within the likely timeframe of implementing an enhanced diversion system.

Compaction

Recyclables are currently collected without compaction in parts of the City. However, recyclables are collected with compaction in old City of Toronto and York. Compaction of recyclables could be implemented throughout the City under the current system, without implementing a wet dry system. Thus, the savings are due to compaction and are not specifically related to the wet dry system.

Materials Included

The 161,774 loads currently needed to collect municipal waste includes the separate collection of yard waste, which would be continued in the wet dry system but is not included in the analysis of loads (refer to Table 4.6).

Moreover, where rear packers are currently used, and even with some side-loaders, some bulky items are collected. These likely would have to be managed separately under a wet dry co-collection system because of the reduced hopper size on co-collection vehicles.

Potential Savings

The savings from such a co-collection system would largely arise from savings in driving time. Since all material is being collected in one vehicle (separate yard waste notwithstanding), the time driving the routes and to and from facilities can be reduced. It is expected that some savings could be achieved over the current system, even if the current system were optimized.

The savings will also depend on current service levels in each area. Because the proposed wet dry system is a weekly service, savings would be expected to be lower in areas where recyclables are currently collected bi-weekly (as in East York, Etobicoke, Scarborough and York).

The savings have not been quantified by CUPE. If the wet dry system were to be compared with the TIRM proven diversion proposals the collection cost would be quantified according to a set of assumptions consistent with those of the TIRM evaluations.

Transfer/Processing Facilities

The efficiency of a co-collection system depends on the ability to unload both streams at one location (or in close proximity). Additional travel between facilities to unload offsets savings in on-route driving time and may make such a system inefficient. The proposal assumes that wet and dry processing will be located at the same site, and it is suggested that this will be at the current transfer stations. The feasibility of this is not discussed, but this is critical to the potential efficiency of the collection system (see comments in Section 6.0).

Evaluation of TIRM Proposals

A model of the existing collection system has been established to evaluate the TIRM proposals. The ability to assess the impact of collection of source separated organics has been incorporated. The approach adopts a co-collection system for source separated organics (Refer to "Background Report on Waste Collection Analysis for Evaluation of TIRM Proven Waste Diversion Capacity Proposals" issued March 2, 2000). The model will assess the impact of different processing locations as well.

Therefore, a wet dry collection system can be compared to the collection impacts of TIRM proposals. A wet dry collection component would be developed with assumptions on productivity, vehicle types, waste separation and density, transfer and processing facility location, materials included, etc. The TIRM evaluation includes only residential waste at this time. For the purpose of comparison a wet dry system will be limited to residential waste as well.

A set of assumptions for collection on a similar basis to those used for the TIRM evaluation will be developed in conjunction with City staff.

Collection Assumptions Required

- Mix of vehicle size and type - likely small rear packer in older, denser parts of City and larger side loaders in less dense areas
- Waste separation and set out – details of what materials in each stream
- Collection productivity (kg/hr)
- Vehicle operating costs – similar to those used in TIRM depending on vehicle type
- What materials included – residential waste only
- Unloading locations
- Transfer costs as required depending on processing facility locations

Section 4.7 Apartment Recycling

The CUPE proposal covers implementation of a wet dry system in all apartments in the City. The proposal notes the challenge of implementing recycling systems in apartments but notes that a wet dry system is easier than a conventional system. The proposal states that the Guelph and Northumberland wet dry programs currently service multi-family units with a variety of systems. This is not accurate.

It should be noted that while it was initially envisioned that apartment buildings in Guelph would receive the wet dry service, no large apartment buildings have adopted this system. Instead, an enhanced dry recycling system has been adopted for these buildings. The residual, including wet waste, bypasses the wet facility and is sent directly to landfill.

In Northumberland, there are very few large apartment buildings, in contrast to Toronto, in which almost half the residents live in multi-family buildings. Contrary to the statements in the CUPE proposal, there has been no significant implementation of the wet dry system in apartments to date.

Effective participation and recovery rates for recyclables from apartments are generally much lower than in single-family households because of all of the issues raised in the proposal:

- Convenience of access to waste storage area for residents
- In-unit storage containers and what to do with them after drop-off
- Limited storage space in apartment unit for separation
- Limited storage space
- Lack of control and ownership of material separation and contamination
- Additional odours and potential mess from separated organics
- Responsibility for maintaining system

Moreover, the implementation of recyclables separation is generally considered easier than a system involving the separation of household organics. While there are recyclable and organics separation systems that work well in some buildings, achieving widespread support and adoption of a wet dry system in the thousands of buildings across Toronto would represent a significant challenge and cost that should not be underestimated.

Even if a wet dry service were offered to apartment buildings, building management could opt for a private collection service, unless strict bylaws were introduced requiring them to comply in some way.

5.0 System Costs

Section 5.0 of the CUPE proposal deals with capital and operating cost projections for both the dry and wet facilities.

Dry
As previously stated, the capital costs are based on implementing seven of the "Guelph II" dry plants at existing transfer stations in Toronto (see Section 6.0 "Siting Recommendations" for comments on this concept). Each proposed MRF would process 118,950 tonnes per year, about the same as the stated capacity of the Guelph II design (125,000 tpa) but about 8 times Northumberland's throughput capacity (approximately 15,000 tpa[5]).

As discussed in Section 4.4, it appears that the dry recovery rates projected by CUPE were based on experience at the Northumberland MRF. In any MRF, the processing equipment, its layout and the level of staffing used are key elements in determining processing efficiency and material recovery. Within limits, more sorting staff can be utilized to sort more product, but at increased operating cost.

It is impossible with the information provided to assess how the CUPE MRF staffing (and other operating costs) were developed, given that the Northumberland MRF is a different design and and so much smaller than the proposed Guelph II MRF.

[5] Personal communication with Mary Little, Plant Manager, Northumberland MRF

Wet
CUPE assumes that seven wet plants will be implemented at the same locations as the seven dry MRFs. Each plant will process 47,414 tpa. Guelph currently processes about 16,000 tpa of wet waste.

Table 5.2 (revised) shows original CUPE costs for the wet plant and RIS modifications. The changes include:

- Increasing residue haul costs for the 109,527 tpa of wet residue, and
- Reducing the saleable compost product to 82,975 tpa.

On this basis, the net cost of the wet system increases from $38/tonne to $58/tonne.

At the end of Section 5.0, CUPE presents a 20-year comparison of the costs for "wet dry recycling" with the cost of "waste exporting". In reality, the analysis compares all material projected to be sent through the wet dry plants (including leaf and yard waste used as bulking agent) *and* the same quantity of garbage projected to be exported (including recyclables currently collected separately).

CUPE's analysis is an "apples to oranges" comparison. Since the wet/dry system includes recyclables and some leaf and yard waste as integral components, the waste export option should assess the net cost of processing recyclables, processing the bulking agent and the cost of exporting the remaining waste.

Table C-1 (rev) shows the impact of using the revised net processing costs for the wet and dry operations (as discussed in previous sections of this report) and adding net processing costs for recyclables and the bulking agent to the waste export option. The estimated net recycling costs were provided by Toronto for the year 2000, based on a processing cost of $4.0 million (including both annualized capital and operating costs) and materials sales revenue of $10.8 million, for a net revenue of $6.8 million (i.e. revenue from material sales exceeds processing costs). For leaf and yard waste, projected processing costs are $1.5 million, with no sales revenue. The updated results are plotted on Figure 5.1 (revised).

In effect, since recyclables processing generates a net revenue and the quantity to be exported is less than that shown in the CUPE plan, the cumulative cost of the waste export system becomes less than that of the wet/dry system.

For such a comparison to be more useful, it should compare the total system cost of each alternative, including collection costs. Although wet/dry collection costs should be less than existing collection costs, it remains to be seen how total system costs will compare.

6.0 Siting Recommendations

A key component of the CUPE proposal (and perhaps the most difficult to implement) is that seven wet dry facilities be located, if possible, at existing City of Toronto transfer stations. Each wet dry site will require the following area:

Component	Area Required (m^2)
MRF	10,285
Organic processing	7,680
Curing	12,800
Site roads, parking	5,100
On-site buffer	76,400
Total Proposed	**112,265**
Total (without curing)	**99,465**

There are two significant problems with this plan:

1. the open channel composting technology proposed relies on outdoor curing of the compost for stabilization (p.11). Not only does each site require sufficient space to contain both a wet and a dry processing facility, but each would require an outdoor curing pad. Public opposition from adjacent neighbours (regardless of odour abatement precautions) and difficulties in amending current Certificates of Approval at these facilities would seriously hinder implementation of the proposed scheme.

   This was recognized in the RFP for Proven Waste Diversion Capacity which stated "Toronto-provided sites are not appropriate locations for curing/conditioning organic material. Respondents are required to provide the curing/conditioning sites elsewhere".

2. CUPE projected that the total land requirement at each wet dry site would be 112,265 m^2, or 11.23 hectares.

   Assuming off-site curing of the compost would be necessary, this requirement would fall to 9.9 hectares. It is also speculated that some of the large buffer area proposed by CUPE is related to on-site curing. If off-site curing is assumed, presumably the total land requirement would then be 9.9 hectares.

   The following table shows the size of each of the existing Toronto transfer stations sites and buildings:

Transfer Station	Site Size (ha)	Transfer Station Building Size (m^2)*
Bermondsey	7.2	4,650
Commissioners	2.4	2,323
Disco	6.8	4,685
Dufferin	**23.8**	2,610
Ingram	7.4	6,539
Scarborough	6.9	6,500
Symes	0.6	2,120
Victoria Park	2.3	4,160

* Note: does not include other buildings that already exist, are being commissioned or may be implemented through on-going proposals

Clearly, even assuming a requirement for off-site curing and that each of the sites are entirely vacant (which they are not), only the Dufferin site is a suitable size for consideration of the proposed wet dry processing operations. If a wet dry system were to serve only single-family households in Toronto, some portion of the existing transfer stations would still be required to serve the multi-family, commercial and A,B,C&D sectors for which Toronto has control.

The identification of potential sites for processing dry recyclables remains a key issue in implementing any wet dry system. Any possible advantage to be gained by co-collection both the wet and the dry streams in the same collection vehicle may be lost if offloading of both streams is not at the same site.

7.0 PHASE 2 – COMPARISON OF WET DRY RECYCLING TO TIRM PROPOSALS

This evaluation is intended to provide information to Council on the feasibility, background assumptions and merits of the CUPE proposal. Council also can consider the options for preparing a comparative analysis of the CUPE plan in relation to the waste management system options that evolve from the TIRM proven diversion RFP submissions.

The following notes are intended to indicate the basis on which the CUPE wet dry system could be compared to the TIRM systems.

- The wet dry system would be evaluated using the same criteria as used for the TIRM diversion systems: cost per percent diversion, jobs created, greenhouse gas emissions impacts, and traffic impacts

- The Stage 2 evaluation will include processing and as well the impacts on the collection system. The CUPE proposal does not project wet dry collection costs

- For processing, a MRF design specific to Toronto's waste stream would be required detailing appropriate costs, productivity and recovery levels (as noted in this review, the CUPE assumptions are not specifically tailored to Toronto's waste stream and should be modified depending on other processing considerations, such as the number and size of potential facilities to be implemented)

- For collection, the model developed to evaluate the TIRM proposals would be extended to include a wet dry system

- The Stage 2 evaluation would require establishing the following specific information and assumptions:

  - ➢ The wet dry system would serve only residential single-family ("cubside-eligible") households

  - ➢ It is anticipated that additional processing capacity would be provided for dry recyclables and wet waste from individual generators within the multi-family, IC&I and A,B,C&D sector, but collection from these sources would not be part of the Stage 2 evaluation.

Processing

- ➢ Number and size of facilities
- ➢ Location of facilities
- ➢ Productivity and staffing levels
- ➢ Capital and operating costs
- ➢ Recovery rates and residual rates
- ➢ Material sales revenues

Collection

- ➢ Co-collection (depending on unloading locations)
- ➢ Unloading locations
- ➢ Separation and set out levels
- ➢ Mix of vehicle size and type consistent with TIRM systems
- ➢ Collection productivity consistent with TIRM systems
- ➢ Vehicle operating costs consistent with TIRM systems