TRANSFER STATIONS IN THE 21ST CENTURY

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1. INTRODUCTION

Over the last two decades, transfer stations have replaced local landfills as the waste residue service centre provided by Councils. Small quantities of waste from customers are consolidated into economic payloads for transport to a remote landfill. The Resource Management Act has been a major factor in this change.

The NZ Waste Strategy will enhance the transformation. It aims to:

- close most remaining small landfills within 10 years
- achieve significant waste minimisation
- achieve full cost recovery from customers

This paper considers the changing role and requirements for transfer stations in response to the Strategy. It updates a paper presented to the 1996 WasteMINZ Conference (Rowden, 1996).

2. PRIMARY FUNCTIONS OF A TRANSFER SYSTEM

The essential components/functions of a transfer system are:

a) A service centre for accepting waste from the community
b) Customers depositing their waste
c) Loading waste into a container of some kind, possibly a vehicle
d) Loading the container, if any, onto a haulage vehicle
e) Haulage of the waste to the disposal site
f) Unloading of waste at the disposal site

3. SECONDARY FUNCTIONS AT A WASTE SERVICE CENTRE

The following features may be provided at a transfer station to meet policy requirements or improve efficiency. They are listed roughly in order of the frequency they are encountered:

g) Charging of customers
h) Controls over hazardous waste
i) Waste diversion, e.g. recycling, separation, recovery
j) Separate greenwaste management
k) Shelter of some operations
l) Weighbridge
m) Compaction of waste

The big change is that waste minimisation will become the focus of the facility with residue transfer being the final "process" of the wastestream.

4. NEW ZEALAND EXAMPLES FOR TRANSFER STATIONS

Options and examples of New Zealand practice for the functions outlined above are:

Site
The features of a suitable site and the design of transfer stations are beyond the scope of this paper. A useful reference is EcoRecycle Victoria's *Guide to Best Practice at Transfer Stations* (1998).

Customer Deposit of Waste
Customers can deposit their waste:

- into containers
- onto a tipping floor
- into a tipping or service pit

Large stations require a service pit for the public and this is sized primarily on the number of client parking spaces, which is itself linked to the operating hours. Where the transfer station is staffed more hours means a higher operating cost.

We can expect to see more containers for customers to separate and deposit recoverable materials. We can also expect to see confined service pits replaced by tipping/sorting floors.

Loading Waste into Haulage Container
The haulage container can be loaded directly by the public but for larger facilities it is loaded by mechanical plant. In New Zealand this is typically mobile plant, a wheeled item with a blade for pushing or, less frequently, a front end loader for loading trucks. Grapples are also now used. These can sort waste for loading and for diversion.

Loading the Haulage Vehicle
The method of loading is a major factor in the design and cost of structures. In some cases, the vehicle may be filled with waste by customers, or by loader (truck/trailer), or stuffed by a compactor. In other cases a full container is lifted onto the haulage vehicle. The HIAB truck and hook lift "huka" truck are both common in New Zealand, the former being used only for small bins. Since they carry their own cranes these trucks are particularly useful for servicing a number of small transfer stations which do not have the throughput to justify fixed cranage. Their use also enables separate containers to be provided for various waste materials. The disadvantage is that the crane weight reduces the potential payload and this may be important for long hauls. Another way of servicing many small transfer stations is a truck with a grapple for loading waste.

Haulage of Waste
In New Zealand practically all waste is hauled by road although this could change. Standard ISO 20 feet containers are commonly used for loose waste; compacted waste containers are also common. Truck and trailer combinations and large semi-trailers are used where throughputs are larger and/or haul distances are longer.

Unloading Haulage Vehicles
The most common method of unloading is by tipping with a hydraulic hoist (tip-truck). Moving floors and ejector rams are less common.

Control Over Hazardous Waste
There is a widespread view that staffing or supervision of transfer stations is needed in order to control hazardous waste. However, it can never be guaranteed to be 100% successful. Education and management in the community is likely to be more effective.

Fee Collection
It is now common to charge customers. Unstaffed sites are now rare.

Weighbridge
A weighbridge is usual except for small transfer stations. It provides equitable charging and data for contract payment and long-term planning. With increasing costs of disposal there is a move to weighing all vehicles. In this case a second weighbridge is normally needed.

Shelter
While a roof over the public unloading area is optional it is becoming increasingly popular and with larger transfer stations it is a functional feature because it increases client throughput and keeps waste and haulage loads dry. Shelter from wind can also be desirable.

Compaction
Static compactors are justified only if they result in lower haulage costs through higher payloads. With greenwaste excluded, adequate payloads can be achieved without a static compactor. Baling combines "packaging" and compaction and can avoid the use of special haulage vehicles.

5. WHICH TRANSFER SYSTEM IS BEST?

Unless there are special circumstances, the preferred system is likely to be the least expensive one, and this depends on the particular situation. There is no universal solution although several typical ones are described below.

The cost of a transfer system will include some or all of the following:

- construction of the transfer station
- cost of all equipment
- cost of loading waste into transfer container/trucks
- cost of loading containers, if used
- cost of haulage and unloading

Any experienced municipal waste manager could specify an effective system. Few, however, have the detailed knowledge or operating experience to specify the least-cost solution with certainty.

If operation by contract is intended then the optimal solution can be achieved by defining objectives and minimum requirements and invite tenders, so that the waste management industry is free to use its resources and expertise to offer solutions at fixed prices. This will eliminate uncertainty over the cost of various options, e.g. whether a compactor is appropriate. Contracts need to be five to ten years long so that new equipment can be justified.

The tenderers will nominate the methods they intend to use and the Principal can then estimate the construction cost of the facilities which match the nominated method. An economic analysis can then be carried out to determine which tender will lead to the lowest overall life-cycle cost.

The concept can be extended to the maximum in DBOOT contracts where the contractor Designs, Builds, Owns, Operates and Transfers ownership of the facility to the Principal at the end of a contract period.

6. RESOURCE RECOVERY CENTRE

Early transfer stations usually provided some facilities for recycling at the entrance but now stations usually have some of the following features:

- separation of greenwaste
- separation of various materials as they are deposited, e.g. cleanfill, topsoil
- diversion or recovery of materials from the mixed wastestream
- sales of recovered articles
- sales of compost and other garden products

Increasingly the focus is turning to waste minimisation and the sites are being styled resource recovery centres or parks rather than transfer stations.

The introduction of resource recovery to existing transfer stations often results in:

- several small storage sheds for recovered material
- bins placed in service pits
- recovered articles in or beside service pits
- bins and stockpiles of various materials on the perimeter of paved areas
- crowded, untidy sites and/or inefficient operations

To achieve better results, new facilities should have, or be able to be extended, to provide the following activities:

- fee collection
- separate deposit of various materials
- waste reception

- waste sorting
- waste load out
- storage of recovered materials

This list pre-supposes that recyclables will be accepted free. This is not sustainable and an ideal layout will be suitable or adaptable for charging for these materials. An associated problem outside the scope of this paper is how we change society's expectation that all recycling is self-funding.

A new site will need to be larger than existing sites or it will be restrictive. It may actually be an industrial park or subdivision with the transfer facility being only a small part of the overall complex.

7. OPERATIONAL LINKAGES

It is suggested above that there is a link between the loading and haulage systems and that these should not be separated. There is also a potential overlap between the loading and the waste residue reception and handling because typically the same staff and same plant can be used for both. Indeed, this is so common that transfer station operations are often combined with haulage in a single contract.

Resource Recovery or diversion has similar characteristics to station operation, but with the addition of sorting. It follows that on most sites the same staff and plant can be used for both waste transfer and waste diversion to avoid duplication of resources. The characteristics of the staff and plant, however, need to be broader than if they only carry out waste transfer. Tenderers will need to consider this when they select their plant and methods.

Transfer contracts are associated with the transport and waste disposal industries. These are essentially materials handling industries and this roughly means that more waste means better business. The waste disposal industry is progressively widening its interest to include resource recovery but, given its primary focus, waste managers might well question whether they should look from the waste industry to the recycling industry as the prime contractors on "waste service sites".

8. CONTRACT INCENTIVES

Contract payments for transfer stations typically comprise two types of payments:

- fixed payment for a fixed service such as transfer station operation for fixed hour;
- variable (or "measurable") payment for a service whose effort depends on the quantity of material handled e.g. the tonnage throughput. (A typical example is for haulage where payments depend on tonnage and distance hauled.)

Incentives are suggested as essential if transfer station operators are to divert waste rather than transfer it to landfill. Once all recycling opportunities have been utilised (composting, recyclable, drop-off etc.) and customers pay fees for disposal of their residue, then fee revenue is received by the Council or transfer station owner. Against that revenue there are costs for:

- operating the transfer station (fixed cost)
- haulage (variable cost)
- landfill fees (variable cost).

The Council will avoid the haulage and landfill costs if waste is diverted. This cost saving can be used to pay for diversion. Councils can maximise diversion, at no additional cost, by paying the transfer operator for tonnage diverted at the same rate as for tonnage hauled and landfilled. This should be a powerful incentive to divert waste.

9. CONCLUSION

There are many ways to handle and transport wastes from transfer stations and using the market will probably achieve a better result than by specifying a particular method.

However, it is now necessary to positively strive for waste minimisation and this may mean it is appropriate to specify some aspects to enable, and/or to widen, the scope to include both waste transfer and waste diversion within the same contract operation.

Where Councils do not own their own landfill, it is possible to incentivise diversion without incurring additional cost.

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References

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