

CANTERBURY REGIONAL
LANDFILL

ASSESSMENT OF REMOTE
DISPOSAL AT WESTPORT

FINAL DRAFT - FOR COMMENT

CONFIDENTIAL – FOR THE ADVICE OF
LEGAL COUNSEL

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PREPARED FOR: CANTERBURY WASTE SERVICES LTD

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EXECUTIVE SUMMARY

As a result of the option being raised by the Mayor of Buller District, Canterbury Waste Services has assessed the viability of remote disposal of waste to the Milburn Cement Ltd quarry at Westport.

In summary, the proposal was to use the trains currently hauling coal from the West Coast to Lyttleton to back-haul refuse and to use part of Milburn NZ Ltd's quarry void at Cape Foulwind as the site for a landfill. The concept developed by the scheme's proponents was to both optimise the use of the rail facility and utilise the apparent quarry void. However, there are significant technical commercial and practical issues associated with such a scheme.

Use of Coal Trains for Back-Haul of Refuse

The coal wagons are inherently unsuited to use for hauling waste. Problems are evident with loading, unloading, waste covering and containment, and wagon cleaning. Loading and unloading of waste is likely to give rise to odour problems and the cycle time for the trains will be significantly affected, in turn affecting transport cost.

The only viable rail-based system would be a dedicated container system, but this is technically difficult, has high capital and operating costs in this instance and appears to offer no advantage over a Canterbury-based option.

Transport Economics

The cost of transport for the West Coast disposal option is assessed as being some \$30/tonne more than for a Canterbury-based landfill. This is a very significant cost penalty.

Competition

The cost disadvantage that applies to the West Coast disposal option would result in CWS being exposed to future competition from Canterbury-based disposal initiatives. Without legal controls or a transport subsidy the West Coast option is unlikely to remain economically viable long-term.

Technical Viability of Site

The nominated site at Milburn NZ Ltd's quarry at Cape Foulwind is poorly suited to establishing a parallel landfilling operation. A suitable area for filling will not be available on the site in the foreseeable future and the site's owners are not in favour of pursuing such an option.

The site is located in a sensitive receiving environment and significant site management and consent issues could be expected.

Conclusion

The proposal presents very significant technical, commercial, transportation and economic difficulties. The proposal is therefore not considered viable in commercial or practical terms.

1.0 Introduction

1.1 Background

During the course of assessing landfill site options for the Canterbury Region, Canterbury Waste Services Ltd (CWS) became aware of interest by His Worship the Mayor of Buller District, Mr P. O'Dea, of utilising a known quarry void located near Westport, as a waste disposal site for Canterbury. This potential disposal option was raised in the media, although no details of its nature or location were provided at the time. Briefly, the concept expressed was one of backloading waste from Canterbury to Westport on the regular coal trains that traverse Arthur's Pass and utilising a local quarry pit for landfill purposes.

As part of its expressed open mindedness to all possible options, CWS agreed to carry out an initial assessment of the proposal to gauge its merit.

1.2 Objectives

The objectives of the assessment were to:

1. Visit the proposed landfill site and get more details of the proposal from its proponent.
2. Assess the proposed site in terms of its suitability for landfill purposes.
3. Assess the technical viability and cost of the transportation component of the proposal.

4. Summarise other issues affecting the viability of the proposal.
5. Assess the viability and relative merit of the proposal so it could be considered together with other siting options.

This initial assessment was necessarily not exhaustive. The assessment focused on the fundamental technical and commercial issues related to the proposal. Other ancillary issues related to both the landfill site and waste transfer, such as consent status/landuse zoning, historic, ecological, community and tangata whenua issues, were not addressed during the assessment.

1.3 Nature of Assessment

The assessment comprised a site visit to Westport by Mr Gareth James of CWS and Mr Tony Kortegast of Tonkin & Taylor Ltd (T&T) on 20 July 1999.

Following initial discussions with His Worship, Mr O'Dea, and the Chief Executive of Buller District Council, Mr Warwick Isaacs, a visit to the subject site and local rail and barge off-loading facilities was undertaken. This report summarises findings from the site visit, together with further data and comment sourced from Tranz Rail Ltd (TRL), the owner/operator of the railway system.

1.4 Issues Relevant to Remote Waste Disposal

Remote disposal of waste on the West Coast using rail haul raises a number of related issues, all of which are critical to the viability of any such option. These can be summarised as:

- i) Transport Logistics and Economics

- ii) Competition Issues
- iii) Technical Suitability of the Subject Site

Each of these issues is discussed in subsequent sections of this report.

1.5 Input to Report

This report was prepared by T&T, with CWS providing Sections 2 and 3 following consultation with TRL.



2.0 Transport Logistics and Economics

2.1 Coal Train System

TRL currently operates coal trains that haul the coal mined on the West Coast, to Lyttelton. These trains utilise purpose-built, sectional coal wagons which unload through several gates in the floor of each wagon.

At present, the coal wagons return empty to the West Coast. One of the thoughts behind the West Coast disposal proposal was to utilise these empty wagons to carry waste to the West Coast as back-haul in the coal trains.

While this idea sounds simple, the issues involved with such a use prove to be quite complex.

2.2 Key Issues

2.2.1 Waste Transfer and Loading

The first issue is that waste would arrive at the railhead from the transfer stations in containers. A facility to enable containers to be emptied and waste reloaded into coal wagons would be very expensive, both in capital cost and operating terms. In addition, the 60 to 70 containers of waste per day arriving from collection or transfer stations would require a full-time shunting engine to shift the wagons under the loading hopper.

There would be discharge difficulties with the waste as the wagon partitioning, together with the hopper clear arrangements make it likely that waste would not discharge from the coal wagons uniformly or unassisted.

2.2.2 Waste Covering/Containment

It is not considered feasible to carry loose waste in the coal wagons due to odour and litter concerns. The wagons would therefore need to be modified to accommodate covers (which are not required for coal). This adds a further technical and cost complexity to the haulage operation.

2.2.3 Wagon Cleaning

Every wagon would require cleaning after each load of waste is emptied before it could accept further coal. This would require a washdown facility to do this efficiently, and would result in contaminated water requiring treatment. This facility would need to be located away from areas where odour might cause problems.

2.2.4 Cycle Time

There would also be major impacts on the time of wagon turnaround. TRL estimates a loss of 12 hours for each coal train cycle, requiring an increase in train numbers of 50% or more over current levels.

2.2.5 Alternative Containerisation of Waste

An alternative to transport of loose waste in the coal wagons, would be to use some form of sleeve to separate the waste from the wagon, or to use purpose-built containers which fit into the coal wagon itself.

Both of these options are made more complex by the internal layout of the coal wagons. The wagons have dividing baffles to prevent the coal shifting during transport. Each wagon has three compartments, each with its own bottom gate doors. This makes it difficult to design a container that suits both efficient truck transport and the coal wagon "piggy-back" concept.

A “plastic bag sleeve” arrangement could possibly avoid most of the cleaning costs and delays. However, a purpose-built unloading system would inevitably be needed as the width of the unloading doors would still be a major problem for efficient discharge of waste. These bags would need to be loaded in and out of each wagon for every load of waste. The sleeve bags would ultimately become waste themselves as they would likely have limited life.

If re-usable containers of some form were used, these would still require transport back to Canterbury, either in conjunction with the full coal wagons, or by road. Therefore, either additional rolling stock would have accompany the waste (in order for wagons to be available to carry containers back), or supplementary truck transport would be required.

2.2.6 Unloading

Unloading waste at either Westport or Greymouth onto trucks for final haulage to the landfill site would present further problems. Waste may take two or three days to get to the West Coast from the time it is dumped at a transfer station. This would include up to a day of haulage across the alps. At times this will be in hot weather. Both railheads are close to the centre of town, and significant odour problems could be expected to occur from “aged” waste being unloaded or offloaded.

Coupled with these difficulties are the turnaround delays that TRL would experience at both ends of the line. Loading the waste at the Christchurch end, and unloading at the West Coast end, both will result in delays to the turnaround of wagons.

2.3 Dedicated Rail Haul System

The conclusion reached from the above is that the only practical option for hauling waste to the West Coast would be using the Tranzact Acts¹ system or similar, with fully containerised waste on dedicated wagons, and using dedicated trains. Such a system could be based on the following operating scenario:

- The waste would move in 6 m long, end-opening boxes.
- At the Canterbury end, containers would be transferred to truck at the transfer station, then transferred from the truck on to an IC² wagon at Christchurch.
- Each IC wagon can carry 3 x 6 m containers.
- At the destination (which is assumed to be Reefton), containers would be transferred to truck for final haul to the landfill and tipping. A swinglift operation for each of the transfer points needs to be assumed.
- For 240,000 tonnes of waste per annum, one waste train per day with 19 wagons on a 24 hour turnaround would provide sufficient capacity. For the purposes of this operating scenario we have assumed 12 tonnes per container on the understanding a 6 m container can carry more waste than the 10.5 tonnes of the ACTs bins.
- The number of 6 m containers required will depend on the operation (for example the distance of the tipping site from the Reefton siding). However, it is likely that at least 2 or more "rakes" or sets of 57 (19 wagons x 3 containers) containers would be required.

¹ A proprietary road/rail container-based haulage system using purpose-built road trailer and rail bogey units

²

2.4 Economics

2.4.1 Dedicated Container

For the operating scenario described in s2.3, TRL has provided an indicative rate of \$19.80 per tonne (plus GST) (refer also to Appendix A). This rate is based on the following assumptions:

- Average tonnage of 240,000 tonnes per annum.
- Rail origin is Christchurch.
- Rail destination is Reefton.
- The service provided is rail siding to rail siding.
- Operations are for 350 days per year with one 19 wagon waste unit train.
- Each wagon carries 3 x 6 m end-opening containers, each carrying 12 tonnes.
- Provision of wagons and locomotives is included.
- Provision of 6 m containers is excluded.
- Transfer to/from rail siding is excluded.
- CWS to transfer and reload containers on to wagons at Reefton
- Costs for establishment of transfer facilities, including rail siding(s) at Reefton have not been included.
- Container transfer to train to take place at TRL's Christchurch freight facility in Middleton, with the costs of transfer being the responsibility of CWS.

Recent experience shows that a new 6 m container of the type required costs approximately \$8,000-\$10,000. Timing of the trains and loading and unloading times have not been investigated in detail. However, it is reasonable to assume a 24 hour turnaround of a waste unit train from Christchurch to Reefton can be achieved.

TRL has indicated it does not have any spare equipment - wagons or locomotives, for this traffic and would have to fund this as a project, so a minimum commitment term of 10 years would be required.

2.4.2 Overall Transport Costs

Assuming a suitable landfill site could be found within 75 km of Reefton, the overall transport costs (including additional capital costs for containers) for the rail option described above have been assessed by CWS as follows:

Transfer station to rail head in Christchurch	\$11
Rail to Reefton	\$20
Reefton to site	\$18
Total transport cost per tonne	\$49

Thus a unit cost of approximately \$50/tonne for waste transport is indicated.

This is approximately a \$30 per tonne more than the most expensive transport option being investigated within Canterbury. This makes the West Coast disposal option, even under the most favourable operating scenario, significantly more expensive than any disposal option within the Canterbury region.

3.0 Competition

3.1 The Commercial Environment

A practical reality in New Zealand today is the open, competitive business environment. The government reforms of the last 15 years have had, as a clear aim, the maximising of competition across all areas of the economy. Reform of the public sector has opened up new areas of business for the private sector where previously government or council monopolies dominated. This is the case in the waste industry.

The waste industry is one where this shift from totally public sector to extensive involvement of the private sector has occurred over the past 10 years. Competition now occurs in the collection, recycling, and disposal areas of the industry, making it one of the most competitive in the country.

Any waste disposal solution for Canterbury which costs more for users than the lowest cost solution able to gain consents, will create an opportunity in the market for an alternative supplier of disposal services.

As around 75% of the waste stream in Canterbury requiring final disposal is outside the control of the local authorities, the final disposal options for this waste is at the discretion of the businesses and residents who wish to dispose of it. There is no particular allegiance to any council disposal system, and the tendency is for disposers to send the waste to wherever is the cheapest.

3.2 Implications For Transwaste

If the Transwaste developed and owned system involves excess or additional expense, then there is the potential for competitors to develop cheaper solutions and compete for the waste. With such a large volume of waste able to shift readily to alternative disposal systems or sites, the continued viability of the Transwaste system would be questionable if a significantly cheaper option were available.

In considering the West Coast as a potential option for disposal of Canterbury waste, the additional cost of transporting the waste becomes a serious factor in assessing the long-term viability of this option. It is evident that several potential landfill sites have been identified in Canterbury. A private operator developing a landfill on one of these sites or some other site, in competition with a West Coast site operated by Transwaste would have a huge financial advantage, and would thus be able to offer lower disposal costs to Canterbury businesses and residences.

Under such a scenario, The only way that a West Coast disposal site could compete would be if the cost of transport was subsidised, either by the government, or by the councils. In today's environment, this seems most unlikely.

An alternative would be to request the Government to pass a law banning competition with the Transwaste site. This is even more unlikely, although such arrangements are common in Europe. The USA used to have "flow control" laws which amounted to the same protection against competition to Council-owned facilities, but this was declared illegal by the US Supreme Court in 1994.

Any decision by Transwaste to develop a waste disposal system which is not the lowest cost option able to obtain consents could

result in competition from some other lower cost option. If this occurred, then as Transwaste lost waste volume to the competitor, its cost of disposal would rise, making it even less able to compete. The long term scenario would be financial failure and loss of public investment value, or the requirement for expensive subsidies from rates.

A political decision to avoid local opposition to a Canterbury landfill by taking waste to the West Coast, could therefore “backfire”, both through financial loss and by ending up with a landfill located in Canterbury anyway, but potentially with no Council involvement.

It is still quite possible that a Transwaste landfill in Canterbury will face future competition. However, its landfill should be established on the basis of its having the same or a similar cost structure to potential competitors, thus enabling it to compete on a sound footing.

4.0 Technical Suitability of Subject Site for Landfill Purposes

4.1 General

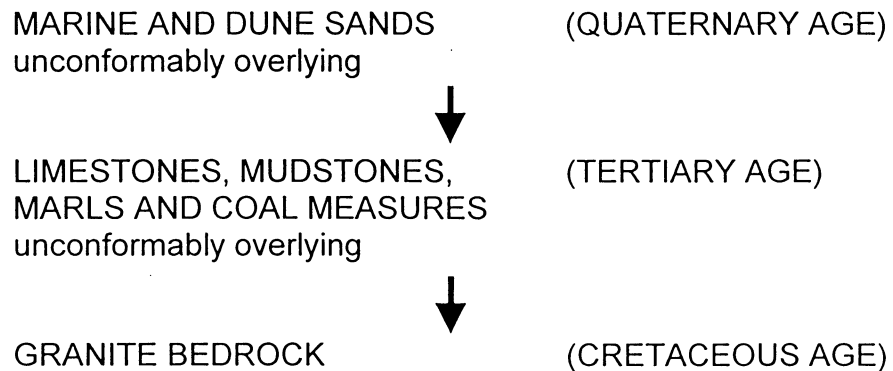
The site proposed by the Buller District Council proponents for landfilling is part (or ultimately all) of the quarry void resulting from limestone mining operations by Milburn Cement Ltd at Cape Foulwind, approximately 10 km west of the township of Westport.

In assessing the technical suitability of the subject site for landfill purposes, the following fundamentals are relevant:

- the inherent suitability of the site in terms of providing suitable containment geology (i.e. a low permeability soil/rock environment)
- the availability of a suitable footprint area or void providing the required landfill capacity either immediately, or over time
- the availability on site of suitable cover soils, and preferably liner soils as well
- the compatibility of the proposed landfill use with existing and ongoing quarrying operations
- the availability of sufficient buffer distance within the site to minimise effects on neighbours
- locally sensitive land uses or ecological areas
- options for leachate treatment and disposal
- access

4.2 Inherent Geological Suitability

The Milburn Cement quarry extracts limestone and calcareous marl for use in its nearby cement works. The geology of the site in simple summary terms is as follows:



The Tertiary sequence in which mining takes place overlies a irregular granite surface, the edge of which dips steeply to the south east. The granite itself is relatively unfractured and massive.

The limestone sequence, however, is highly variable ranging from calcareous mudstone (marl) through to fractured crystalline limestone (Waitakere Limestone unit). The basal units to the sequence, (i.e. beneath the limestone and above the granite) are variable with some zones of coarse quartz sand. Inspection of the principal units on the site indicates they vary from low to relatively high permeability. Lower units are generally mudstones or marls of low permeability, but in places these are highly shared and subject to defects developing into fractures due to stress relief on quarrying.

Overall the rockmass is assessed as being less than ideal in terms of containment, with significant further work necessary to define the detailed geology and geohydrology for any proposed landfill footprint.

4.3 Availability of Suitably Sized Footprint or Void

Inspection of the site indicated that quarrying was ongoing in various areas, all spread over a wide area, and with no significant areas within the quarry yet fully worked out. In its southern part the quarry is being deepened and is to be significantly extended to the north east in future. The nature of the quarrying/cement making operation is one of continuously mining a mix of materials from within the footprint. These materials are then blended (on a day-to-day basis) to optimise the cement-making operation.

It was very evident from inspection of the site that no suitable footprint areas were available (or likely to be for some years) within the quarry area, without sterilising significant limestone resource. It was clear that even the quarrying operation itself was experiencing "space" problems and was having difficulty finding areas to stockpile stripped overburden.

4.4 Availability of Cover and Liner Soils

4.4.1 Cover

Waste overburden materials (predominantly sand, residual limestone and granite-derived soils [clays and silts] and mudstone) are all theoretically available for use as cover and significant stockpiles of these materials exist on the site. There is likely to be sufficient quantity overall.

4.4.2 Liner

Some of the mudstones or marls available on the site are likely to be suitable for compaction to form a low permeability soil liner provided that suitable sub-liner grades were able to be engineered. This latter aspect would require further research and confirmation by way of laboratory testing.

However, formation of suitable basegrades, particularly in the main quarry pit is a more problematic issue given the steep quarry faces currently being cut.

4.5 Compatibility of Landfilling with Quarry Operations

The nature of quarrying as explained during the site visit is such that the two activities (quarrying and landfilling) appear inherently incompatible on this site. This is because there is presently no fully worked out area (irrespective of other technical considerations), that would allow a suitably configured, separate landfill operation to be established on site. The establishment of a landfill cell on the site would currently seriously affect ongoing quarry operations and presently does not appear viable.

CWS understands that the proposal was not discussed in any detail with the site's owners by the proponent of the proposal prior to CWS' assessment. Subsequently the site owner has made it clear to CWS that it is not in favour of the use of the site for landfilling.

4.6 Buffer Distance

Buffer distance to site boundaries appears relatively limited in parts of the site. This issue has not been looked at in detail, but further consideration of it is likely to result in further restrictions applying to the area which could potentially be considered for landfilling.

4.7 Locally Sensitive Land Uses/Ecology

The site is located close to Tauranga Bay and the Cape Foulwind seal colony. Both are significant local natural resources and tourist

attractions. Any potential for odour, litter, or leachate-related impacts from a landfill operation would undoubtedly be closely scrutinised by interest groups and related design and site management procedures would need to be very robust.

Similarly stormwater discharges would enter the coastal environment very soon after leaving the site (a current proposal is for pre-treated quarry drainage to be discharged via a small stream draining to the northern end of Tauranga Bay. This is very close to the sensitive receiving environment of, moreso due to the established seal colony in the Tauranga Bay/Siberia Bay. Any proposal for adding landfill stormwater discharge to the quarry water discharge would undoubtedly also attract close scrutiny. Compounding the problems is the apparent lack of space in which to construct suitably large stormwater holding and pre-treatment ponds and possibly the ancillary wetland treatment areas that would be needed to achieve appropriate discharge water quality.

4.8 Options For Leachate Treatment

These appear limited, with no local reticulated sewerage system into which untreated or pre-treated leachate could be discharged. On-site treatment would thus be required, likely supplemented with spray irrigation either on site or on suitable accessible adjacent land. The area has high rainfall (average 1,970 mm/yr), and low average annual temperatures (12°C), so leachate generation would be relatively high. This issue would therefore require further detailed assessment.

4.9 Access

External road access does not appear to pose any significant difficulty. Internal road access and conflict with quarry operations/cement works bulk haul traffic is, however, likely to be a significant issue.

5.0 Summary Assessment

The proposal presents significant technical, commercial, transportation and economic difficulties.

Not the least of these are the high transport costs actually associated with the proposal, the unavailability at the proposed site of a void suitable for filling, and the recent expressed unwillingness of the site's owners to further consider the proposition. These problems when combined with the inherent geological unsuitability of the site, the complexities of the ongoing quarry operation, the practical engineering and consent difficulties the site poses and the major transportation logistics, community impact and commercial difficulties posed, all lead to the conclusion that the site is a very poor option for a major landfill development for the Canterbury Region.

6.0 Applicability

This report has been prepared for the benefit of Canterbury Waste Services Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

TONKIN & TAYLOR LTD
Environmental and Engineering Consultants

Report prepared by:

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PROJECT CO-ORDINATOR

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13 September, 1999



APPENDIX A

TRANZ RAIL LTD CORRESPONDENCE



1st September 1999

Mr Gareth James
General Manager
Canterbury Waste Services Ltd
Christchurch

Dear Gareth,

Thank you for your phone call and subsequent e-mail. You have asked that Tranz Rail consider transporting waste from Canterbury to the West Coast.

We have given consideration to backloading the export coal wagons with waste from Christchurch to West Coast. There are some operational difficulties which eliminates this as a practical option.

I understand that CWS would prefer to put containers of waste directly on to the empty coal trains. This would not be possible unless the bins were made to fit inside the bottom dump wagons. Even then, this would be difficult as the bottom dump wagons are partitioned to about one third or half way up the wagon. By far the biggest problem with this option would be getting the empty containers back to Canterbury.

If the waste were to be carried directly in the bottom dump wagons, there would be discharge difficulties, as the bomb bay doors on the wagons are not very wide making it likely that the waste would not discharge cleanly unassisted. Carrying the waste directly in the bottom dump wagons would also slow wagon turnaround significantly. The additional time required to divert the coal trains to load waste, discharge, then clean the wagons would probably add 12 hours to the turnaround. This would mean a requirement for an increase in trains in the order of 50% or more.

As you have suggested, we have considered moving waste to the West Coast on other freight services. The option outlined below is similar to but not exactly the same as the UKW operation in Helensville. We have elected not to go with the UKW option as the trade-off between intermodality and the number of wagons required shows a conventional approach would be more efficient for an operation of this magnitude.

In this operating scenario:

- The waste would move in 20' end opening boxes.
- At the Canterbury end, containers would be transferred to truck at the transfer station, then transferred from the truck on to an IC wagon at Christchurch.
- Each IC wagon can carry 3x20' containers.

- At the destination, (which we have assumed for the time being to be Reefton), containers would be transferred to truck for tipping. We have assumed a swinglift operation for each of the transfer points.
- For 240,000 tonnes per annum, one waste unit train per day with 19 wagons on a 24 hour turnaround would provide sufficient capacity. For the purposes of this operating scenario I have assumed 12 tonnes per container on the understanding a 20' box can carry more waste than the 10.5 tonnes of the ACTs bins.
- The number of 20' containers required will depend on the operation, (for example the distance of the tipping site from the Reefton siding), however it is likely that at least 2 or more "rakes" or sets of 57 (19 wagons x 3 containers) containers would be required.

For this operating scenario to transport waste from Canterbury to the West Coast, I can give you an indicative rate of \$19.80 per tonne (plus GST). This rate is based on the following criteria:

1. Average tonnage of 240,000 tonnes per annum.
2. Rail origin is Christchurch.
3. Rail destination is Reefton.
4. The service provided is rail siding to rail siding.
5. Operations are for 350 days per year with one 19 wagon waste unit train.
6. Each wagon carries 3x20' end opening containers, each with 12 tonnes.
7. Provision of wagons and locomotives is included.
8. Provision of 20' containers is excluded.
9. Transfer to/from rail siding is excluded.
10. CWS to transfer and reload containers on to wagons at Reefton
11. Costs for establishment of transfer facilities, including rail siding(s) at Reefton have not been included.
12. Container transfer to train to take place at Tranz Rail's Christchurch freight facility in Middleton, with the costs of transfer the responsibility of CWS.

Our recent experience shows that a new 20' container of the type required is in the vicinity of \$8,000-\$10,000 per container. Timing of the trains and loading and unloading times have not been investigated in any great detail, however it is reasonable to assume a 24 hour turnaround of a waste unit train from Christchurch to Reefton can be achieved.

Please note this price is indicative only. If any of the assumptions above change, then the price will be similarly affected.

We do not have any spare equipment - wagons or locomotives, for this traffic and would have to fund this as a project, so a minimum commitment term of 10 years would be required.



I hope this provides you with enough information to complete your assessment and submissions. Please give me (04) 498-3148 or Craig Bullivant (025) 744-290 a call if you require clarification. Alternatively, Craig can meet with you if you prefer, as he is based in Christchurch.

Yours sincerely,

Maureen Sue
Tranz Link

