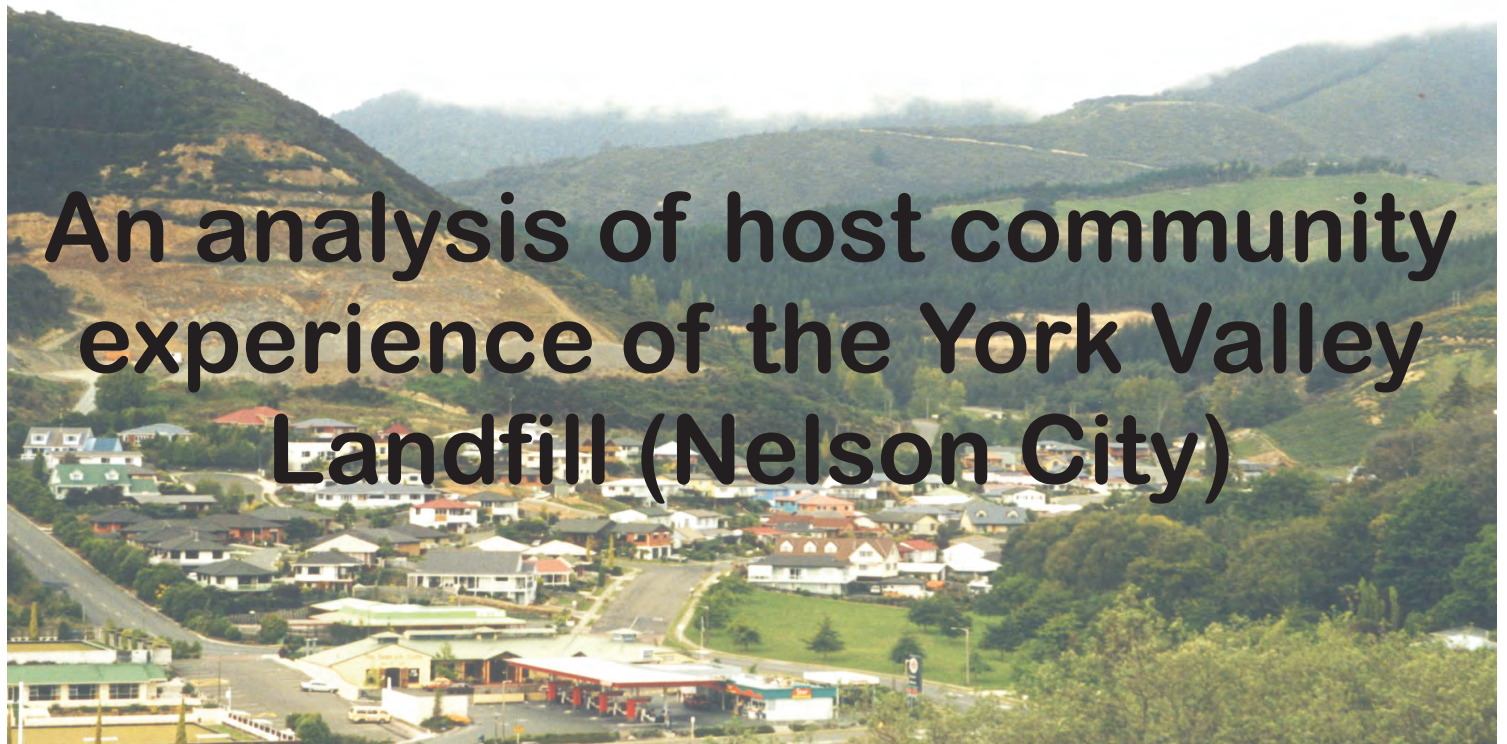




Host Communities: siting and effects of facilities



An analysis of host community experience of the York Valley Landfill (Nelson City)



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By

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Acknowledgements

This case study has contributed considerable knowledge that is important to a better understanding of the effects which host communities can expect to experience from the operation of a sanitary landfill. The research would not have been possible without the co-operation of all those who were interviewed. The level of willingness to co-operate is worthy of acknowledgement - the research team met with very few refusals.

The research team wishes to express its gratitude to all those who participated in this case study - the residents, businesses and those enjoying recreational opportunities in the host community of York Valley; also to the other key informants in the host community, administrators in the Nelson City Council as well as the supervisor of the landfill.

It is to be hoped that this case study will further enhance the positive working relationship which exists between those responsible for operating and overseeing the facility and members of its host community.

The research team also expresses its gratitude to the Foundation for Research, Science and Technology for its financial support of the research programme.

Acknowledgement is also due to Mr Erik Norder for his considerable effort and initiative in producing this publication.

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A: Introduction to this case study

Public Good Science Fund Research

The research team at Taylor Baines & Associates was contracted by the Foundation for Research Science and Technology to carry out a piece of social research concerning the siting of Solid Waste facilities. The research has been funded out of the Public Good Science Fund.

Spread over three financial years - 1997 to 2000 - the research programme aims to assist the processes of urban and rural planning (as it applies to future waste disposal infrastructure) by developing a body of knowledge on key social factors that are relevant to the siting and operation of solid waste facilities.

This case study addresses part (Questions 2 & 3 below) of the overall research objectives. In total, the research programme is intended to answer three core questions -

1. Is there a systematic pattern of solid waste facilities siting in NZ. If so, how would you characterise this historical pattern from the social perspective of host communities?
2. How do actual effects compare with effects that were projected at the time of siting?
3. What have been the longer-term effects on host communities of solid waste operations?

This research on solid waste facilities is part of a longer-term research programme currently being funded by the Public Good Science Fund into the siting and social impacts of a range of facility types. During the period 1997 to 2000, research has been carried out on solid waste facilities - landfills and transfer stations. During 1998 to 2001 other research has focussed on waste water facilities. From 2000 to 2002, additional types of facilities are being investigated (Please refer to the TBA website - www.tba.co.nz - for more information).

The research programme has received the strong endorsement of Local Government New Zealand, the New Zealand Water and Wastes Association, the Ministry for the Environment, as well as several territorial local authorities.

Reasons for this research programme on facilities and their host communities

It is a common experience that assessing the effects of solid waste facilities at the time of site selection is a contentious process. The debates that surround such assessment activities are often informed more by prejudice and a strategic selection of hearsay information than by well-founded evidence.

This research aims to address both questions of possible social bias in site selection and lack of experienced-based information relevant to New Zealand communities. It is to be hoped that these objectives will be served by carrying out the research in a setting which is quite removed from the tensions of resource consent applications, and by a team of independent researchers who have no organisational affiliation with either the developers of such facilities (usually but not always territorial local authorities) or the host communities involved.

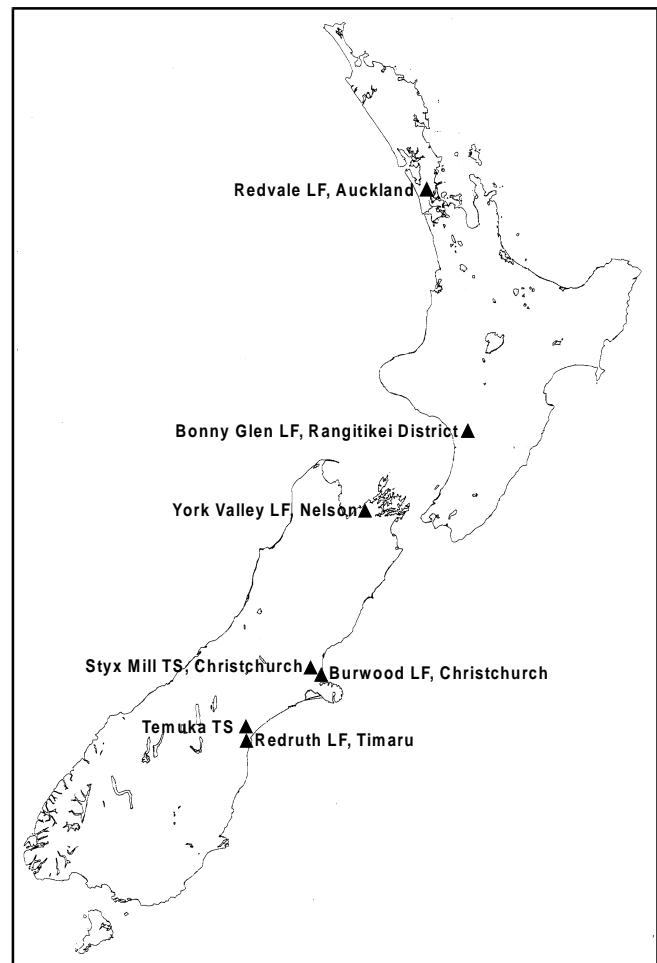
Purpose of the case studies

This case study on the York Valley landfill is one of seven such case studies being undertaken as part of this research programme¹, as shown in Figure 1. The case studies were selected to provide a range of relatively recent facilities, from large metropolitan landfills and a transfer station, to the kinds of facilities more familiar in smaller cities and rural areas. As a result, the experience documented in these case studies should provide useful insights into contemporary New Zealand experience.

Each case study has been conducted at a time which avoids conflicts with active resource consent proceedings. Care has been taken in the social assessment research method to provide accurate² and useful descriptions of the effects experienced by host communities, by canvassing a wide range of local observations, by accessing other relevant data sources where possible to corroborate the observations of neighbours, and by engaging in a process of feedback preliminary findings for checking and validation by the research participants. As a result, the experience documented in these case studies should neither overstate nor understate the experience of the host communities involved. This is important, if the research is to assist participants in future planning.

Nevertheless, the case studies each represent experience at a particular point in time. The research process itself, and the case studies resulting from the research, have the potential to trigger changes in the way the facilities are operated and managed. Thus it is important to interpret the findings of each case study in the context of the way the facility was operated and managed at the time of the case study fieldwork³.

Figure 1: New Zealand Case Studies



¹ The full list of case studies includes -

- Burwood landfill (Christchurch City) - Working Paper FS4
- Redruth landfill (Timaru District) - Working Paper FS5
- Bonny Glen landfill (Rangitikei District) - Working Paper FS6
- Redvale landfill (Waste Management NZ Ltd, Auckland Region) - Working Paper FS8
- York Valley landfill (Nelson City) - Working Paper FS9
- Styx Mill transfer station (Christchurch City) - Working Paper FS3
- Temuka transfer station (Timaru District) - Working Paper FS7

² The use of percentage figures in this case study is not intended to imply statistical analysis. Rather it should be interpreted for comparative purposes merely as indicating the proportion of respondents in any particular area of interviewing who gave a specified response.

³ The fieldwork dates are noted explicitly in the case study report. Furthermore, the report attempts to describe as fully as possible the operating regime at the time of the case study.

It is also important to keep in mind the perspective of this research - the host community perspective. Primary emphasis has been put on capturing the experience of members of the host community - the community of residents and businesses in relatively close proximity to the York Valley Landfill. It is their experience of the off-site effects such as odour, dust, litter and noise, and the impacts of such effects, that will be useful to others contemplating the siting of a new solid waste facility. By the same token, there are likely to be some off-site effects such as risks to groundwater quality that will not necessarily be informed by a focus on neighbours' experience, simply because such phenomena are not often readily detectable to casual observation, even if they do occur.

Methodology for the case studies

The research method drew on the practical and theoretical approach to social assessment described in Chapter Four of "Social Assessment: theory, process & techniques" (Taylor et al., 1995). Stages in the research included scoping the particular cases to clarify the appropriate time frame and communities of interest, community profiling, a structured survey of nearby residents and business people, in-depth key informant interviews, and accessing a range of existing data sources.

A structured questionnaire was developed to gather detailed information about the experience of many individuals living in the host community. The questionnaire explored people's experience of day-to-day operational effects of the landfill, their perceptions of how the presence of the landfill has impacted on the longer-term development of the host community, and their knowledge of what has happened in their community during the years prior to and since the landfill was established. The detailed analysis is descriptive and sometimes quantitative, but not statistical in nature⁴.

In carrying out the comparative case assessments, the assessment team had to address several issues relevant to interpreting the results and their usefulness in providing valid comparative information. These included the debate about 'perceived' or 'real' effects, the need for corroboration, and the importance of timing or context as a potential influence on individual responses.

The assessments focussed on people's experiences of living or working near waste management facilities. The results are therefore based on a large body of individual perceptions of effects. In some feedback discussions, the distinction was made that these effects are "only people's perceptions; they're not necessarily real." The question arises therefore as to what is the difference between a 'perceived' effect and a 'real' effect. Can 'perceived' effects ever become 'real' effects? In practical terms, the assessments identified clearly the proportions of those interviewed who experienced certain types of effects. Furthermore, wherever possible, the assessment sought to investigate these effects from other respondents and from independent sources (e.g. local key informants; secondary data records) or different perspectives (e.g. the facility operator)⁵. As researchers, it was pleasing to note how, in the great majority of cases, neighbours' experience was strongly corroborated by the perceptions and experience of the facility operator.

⁴ A statistically-based analysis would have increased the scale of field work and cost several fold.

⁵ As a matter of assessment methodology, we have adapted the stance that unless more than two individual neighbours reported and corroborated the same effect, or unless a neighbour's observation could be corroborated by an independent source, the effect would not be reported in detail, but simply noted. This reflects the stance that, while social assessment acknowledges the importance of individual observations, such observations still need to be subject to verification.

A number of factors have a bearing on individual experiences. Different people have different thresholds for noticing effects depending, for example, on their ability to hear or to smell, or on their perception of what is 'exceptional'. Increasing sample size addressed this factor. Different living or recreational patterns are likely to influence people's experience of effects - whether they are on the property all day, every day, or working off the property. Day-time interviewing addressed this factor by increasing the likelihood of including individuals with a relatively high rate of occupancy. People get used to effects after a while - they can seem less exceptional. Following unprompted questions with prompted questions addressed this factor, by allowing interviewees 'a second chance' to respond.

Does the distinction between 'perceived' and 'real' effects matter? The primary purpose and value of comparative case assessment is to answer two types of questions - (i) if neighbours around a facility are experiencing certain effects, and finding that they have unacceptable impacts, what can be done to reduce or eliminate the effect, or make it less likely to happen? and (ii) if neighbours around Existing Facility A experienced certain effects and impacts from its operation, what is the likelihood that neighbours around Potential Facilities B, C or D will experience similar effects and impacts? In either situation, whether such effects are labelled as 'perceived' or 'real' is probably immaterial. However, from a "technical" perspective, replication of reported effects is important to their validation, while from a "political" perspective, the perceptions of just a few people affected can be sufficient to galvanise social action.

It is also important to remember that technical experts are not necessarily in a position to offer any more than assessments of 'perceived' effects. In the case of technical experts, their perceptions are derived with the aid of technical lenses (i.e. frameworks for analysis used by the technical expert). For example, an acoustical engineer can provide measures and predictions of likely noise levels at certain distances away from the source of the noise. The acoustical engineer is not usually in a position to draw any inferences as to likely social impacts associated with these levels of noise.

The tendency for potentially affected parties to distort or exaggerate the likelihood of effects when participating in EIA activities is not an uncommon experience for SIA practitioners. Indeed, in one of the comparative case studies, background documentation from an environmental tribunal declared this point explicitly. In these comparative case assessments, this factor was addressed by ensuring that all the case studies were carried out on facilities which had no consent applications or reviews in progress.

Outputs of this research programme

Outputs from this research have taken the form of public presentations and discussion sessions, as well as a range of hard copy formats.

The latter include a series of research Working Papers, conference papers, and an abbreviated summary document for each case study. All are available from Taylor Baines & Associates⁶ on request. Full case study reports (Working Papers FS3-FS9) are available for the cost of reproduction and postage, while conference papers and abbreviated summary documents for each case study are available free of charge.

⁶ Taylor Baines & Associates, PO Box 8620, Riccarton, Christchurch. www.tba.co.nz, ph/fax (03) 3433-884

The research provider - Taylor Baines & Associates

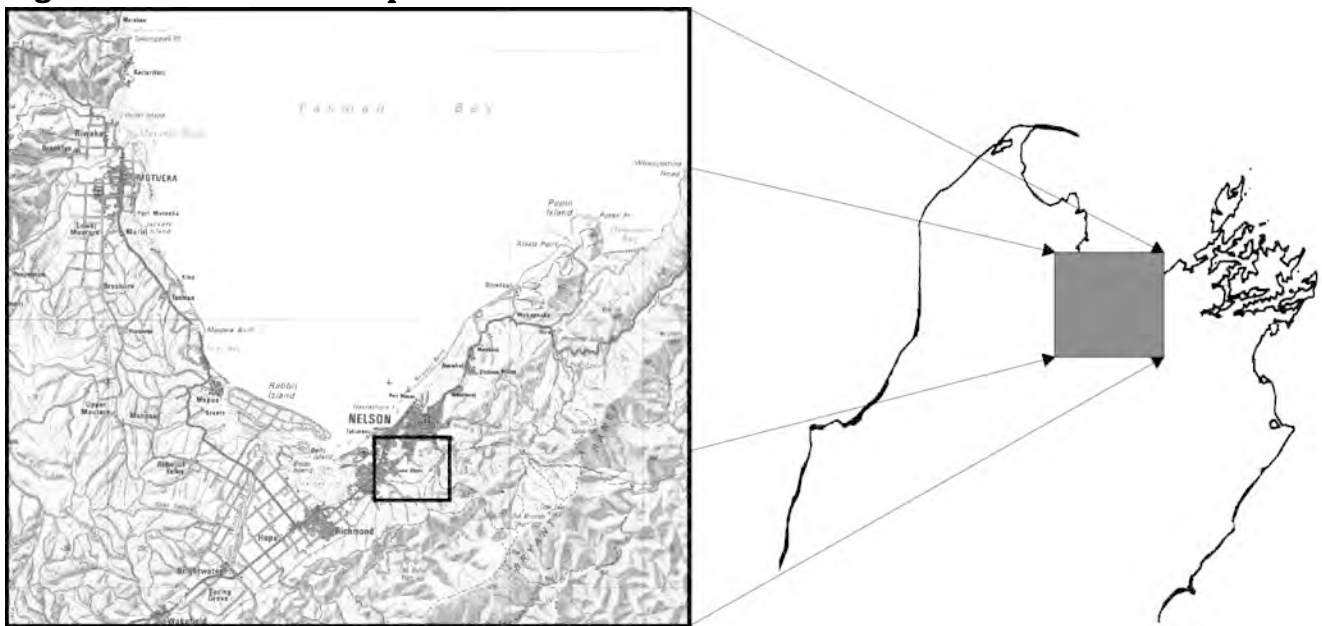
Taylor Baines & Associates has been a private provider of research, consulting and training services since 1989. The firm specialises in social research and the application of social assessment methods to a wide variety of issues in community development.

B: History and description of the facility

Location

The York Valley landfill is now the only Nelson City Council landfill in use, and has been operating since 1987. The landfill is located just outside the southern boundary of Nelson City near the suburb of Bishopdale (see Figure 2), with access gained via Market Road off Waimea Road (refer to Figure 3).

Figure 2: Location Map



Planning

The concept for the solid waste facility went through several phases. At one time it was envisaged that a transfer station would be built at the entrance to the landfill site⁷. Ultimately, the main city transfer station was located in a totally different part of the city, near the airport.

The York Valley landfill has an expected life of at least 30 years. The gully which is presently being used is expected to be filled by 2030. The present resource consents apply until 31 December 2034. There is scope for extending the landfill into several adjacent gullies in the same valley, on land owned by the Nelson City Council. However, no resource consents have been applied for in respect of these gullies (see Figures 4 and 5).

⁷ A transfer station at the entrance to the landfill would have resulted in much higher traffic volumes along Market Road, since householders with trailer loads of garden and domestic rubbish visit such a facility.

Figure 3: Street layout for Bishopdale sub-division and York Valley access

Original planning for Nelson City's landfill at the York Valley site took place in the late 1970s under the Town & Country Planning Act regime⁸. Much more recently (in 1997) applications were made to renew resource consents under the Resource Management Act (1991). These consents were finally decided in November 1999.

Original planning documentation⁹ mentions the following environmental and social effects and issues that can generally be expected for a landfill operation -

- a site that is removed from the view of residential areas and public roads
- a site which will not lead to any future landslip or undue subsidence
- a site where the risk of polluting stream waters, underground waters or estuaries is reduced to a minimum
- a site that avoids conflict with the extent and amenity values of planned future residential, recreational and rural environments
- avoid the need for vehicles to pass through quiet, local residential streets
- avoid the risk of birdstrike to aircraft

Specific assessment¹⁰ for York Valley discussed the environmental effects -

- it is not expected that there would be any significant leachate problem
- vehicles travelling up York Stream Valley do not have to traverse any of the internal residential streets in the Bishopdale sub-division

The assessment of effects carried out on behalf of the Nelson City Council for the 1997 applications for resource consents¹¹ records the following environmental and social effects and issues projected for the continued operation of the York Valley site -

- as the York Valley Landfill has been in existence for many years, the current proposal will not cause any significant increase in traffic above existing levels
- the effects of noise (traffic and operating machinery) on residential properties are considered insignificant in view of their distance (at least 350 m) from the active landfill area
- the current landfill is well screened from York Valley itself and is not visible from the entrance gate. Screen planting has already been established between the site access road and the residences and further landscaping is proposed at the turn around area

⁸ Expectations or requirements of the assessment (projection) of effects were generally less demanding under the T&CPA than they have become under the RMA

⁹ Gabites, Alington and Edmondson, 1979: Nelson City Refuse Disposal Investigations. First Report - Options for Future Disposal, February 1979

¹⁰ Gabites, Alington and Edmondson, 1980: Nelson City Refuse Disposal Investigations. Second Report - Recommended Disposal Scheme, February 1980

¹¹ Montgomery Watson (1997): Resource Consent Application and AEE, May 1997.

Figure 4: Land referenced in consent

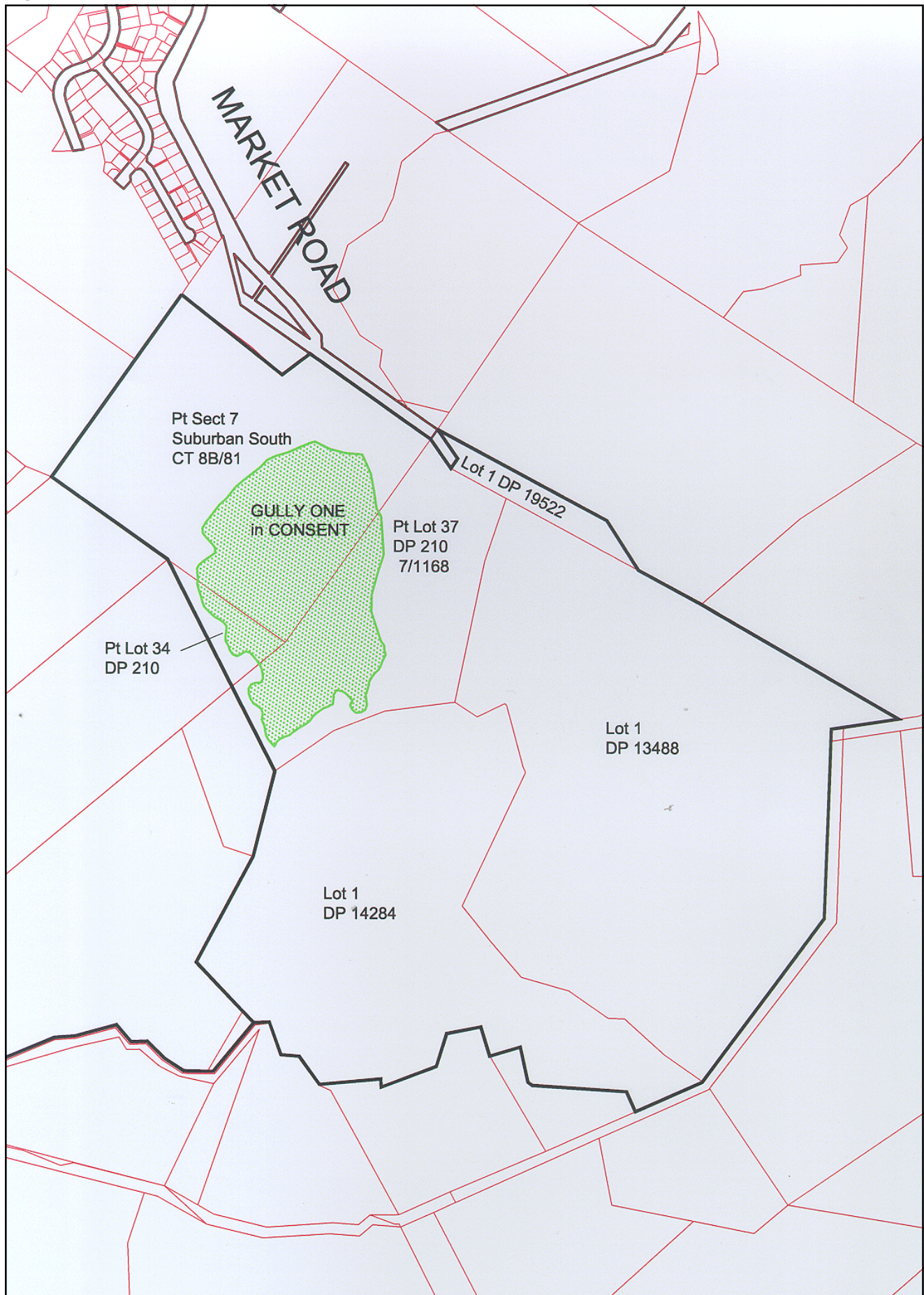


Figure 5: Aerial photo of York Valley landfill



- the burning of refuse at the landfill or acceptance of smouldering waste loads (leading to smoke) is not permitted due to the risk of explosion or fire
- the regular covering of wastes with inert materials reduces nuisance from odours
- dust generation at the site has only a minor impact on the immediate environment
- where landfill gases are able to build up in confined spaces, they represent a potential hazard to human life¹². Odours from the site have on occasion spread down the valley in certain conditions and caused a nuisance. The likely source of these odours is from the minor trace compounds in landfill gas¹³
- litter spread will be minimised through the compaction and covering of wastes and that which does escape the confines of the immediate tipping area is picked up on a weekly basis
- refuse disposal at the site currently attracts only a few seagulls which are dispersed by shotgun control by the landfill operator. The issue of birdstrike is not considered to be a problem for aeroplanes in the area. Other bird nuisances such as noise and fouling do not cause a problem at the site but on occasions seagulls are sometimes noticed roosting close to the site at the local quarries
- the presence of vermin has not been identified as a significant problem
- the low permeability of the site geology, landfill lining and leachate underdrains, location of the landfill in a ground water discharge area and the absence of downstream groundwater abstractions at the site indicate no significant threat to groundwater
- that there is no significant leachate contamination of the York Stream downstream of the site has been demonstrated by previous monitoring by Nelson City
- the suspended solids content in stormwater will be reduced prior to discharge to the York Stream

Site development and access (refer to Figure 6)

The site for the York Valley landfill occupies approximately 2.8 hectares and is situated in a steep-sided gully facing in a northerly direction. Across the valley immediately north of the site is the Grampians Reserve. The hillside around and above the landfill was planted some years ago in pine trees, and mixed plantings were established ten years ago on the downhill side to provide a visual screen, which is now evident. Settling ponds (Figure 7) were created to remove sediment from the landfill stormwater runoff before it is discharged into York Valley Stream. Many years before the landfill was opened, a flood retention dam had been constructed at a point just below the entrance to the present facility.

¹² Carbon dioxide is an asphyxiant and toxic hazard, whilst methane presents a potential explosive threat.

¹³ Namely organo-sulphur compounds and esters derived from bio-chemical processes especially in the recently deposited wastes. Volatile aromatic compounds and mercaptans (sulphur containing organic compounds) are often responsible for gas odour.

Machinery on the site includes a compactor and a small tractor with front-end loader. A small bull-dozer/excavator truck is brought to the site on occasions, as required. The only building on site is the weighbridge office near the entrance.

Given its elevated location, leachate from the landfill is fed by gravity directly to the city's sewage reticulation system (Gabites et al., 1980). Connection is made at the end of Westley Place.

Facility infrastructure development

Council staff acknowledged that there had been a period of poor landfill management in the past, much of which was linked to the way the landfill structure had been organised. For example, there was at one time a large open pit for coal tar disposal from the city's gas works site - this distorted the development of the landfill cell structure; it also contributed to the problems of excessive leachate and odour. This has now been capped and surrounded by a clay bund. Another feature was the septage pit - an area for receiving loads from contractors who service septic tanks in rural areas and grease traps in commercial premises in the city. This used to receive between 3,000 and 4,000 tonnes of such wastes each year. In the past, the pit was left open for months, giving rise to odour and seagull problems, as well as contributing to the generation of excessive leachate by allowing infiltration of rainfall. Most of these wastes are now diverted to the regional waste water treatment facility at Bell's Island in the Waimea Estuary.

Initially poor landfill shape and excessive stormwater runoff into the landfill resulting from inadequate cut-off drains above the site caused excessive leachate formation within the site, leading ultimately (1997-98) to serious overloading problems in the sewerage network in the Bishopdale sub-division. These problems were remedied during 1998 and 1999 with the installation of new cut-off drains higher up the hillside above the landfill, the re-shaping of the landfill slopes and better covering of disposal areas aimed at meeting the newly agreed maximum leachate flow of 11 litres/second¹⁴. These remedial works above and on the landfill surface were accompanied by other changes at the leachate discharge end, prior to the leachate entering the city sewerage system. A leachate overflow basin has been constructed with a capacity for eight hours maximum flow. It has no outflow pipes and must be pumped out by a septic tank contractors. A truck-wash facility (Figure 8) was also constructed, with wash water directed into the leachate/sewer line.

Until November 1998, landfill gas from the York Valley landfill was vented unburnt. It is now flared (see Figure 9) twenty-four hours per day¹⁵, with positive extraction of landfill gas provided by fans and a network of buried pipes.

Tip-face management and controls on wastes to be disposed

Categories of waste accepted into the landfill are controlled. With the exception of asbestos and medical wastes, the resource consents prohibit acceptance and disposal of hazardous waste materials at the landfill. Testing procedures for hazardous characteristics are the responsibility of individual businesses generating the waste materials. Testing and certification is required prior to transportation of the waste materials to York Valley (see Appendix I). Acceptance of asbestos and medical wastes is permitted, subject to conditions specified in regulations and standards. Household hazardous materials are held at the city transfer station, from where they are collected by a commercial enterprise

¹⁴ Agreed under the resource consents finally approved in November 1999.

¹⁵ The landfill operator reported that engineers responsible for installing the gas extraction and flare equipment had advised him that on the basis of current waste volumes in the landfill, and using positive extraction, he could expect to be flaring for four hours each day. In practice, flaring began with two 2-hour periods each day, soon increased to two 4-hour periods, and within three months of its installation, the flare was burning 24 hours per day.

Figure 6: Site development and access

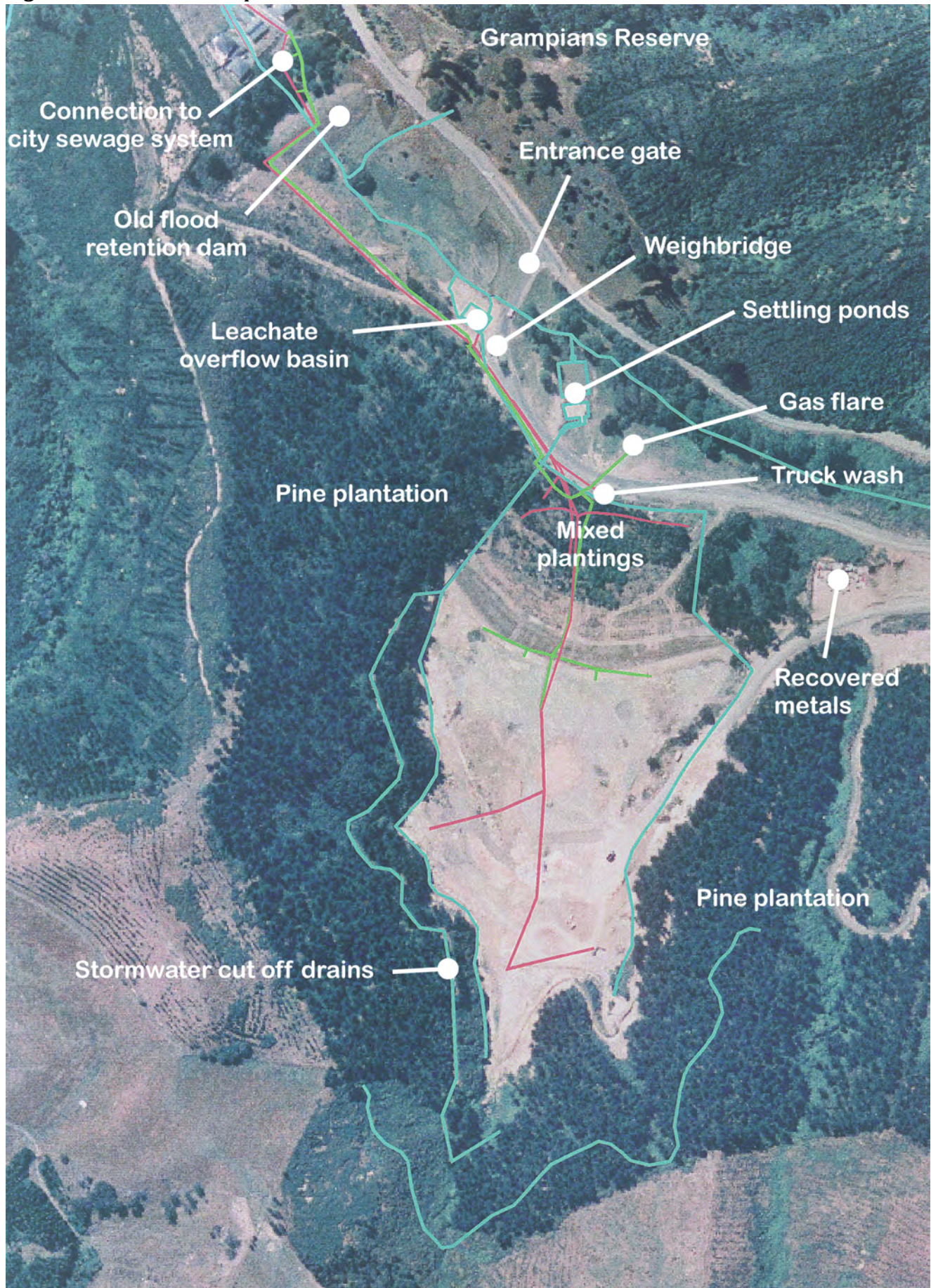


Figure 7: Settling ponds



Figure 8: Truck- wash



Figure 9: Gas flare



which operates nationwide. Similar controls apply to the acceptance of liquid wastes (see Appendix II). Vehicle bodies are accepted for temporary storage on site, until collected by a scrap metal merchant, provided certain conditions are met (see Appendix III).

The timing and extent of applying cover materials to the working tip face and to other disposal areas in the landfill (see above) have been improved within the past two years.

Access

No public access is permitted to the York Valley landfill. To gain entry, commercial operators carry weighbridge cards issued by the Nelson City Council.

The present situation (2000)

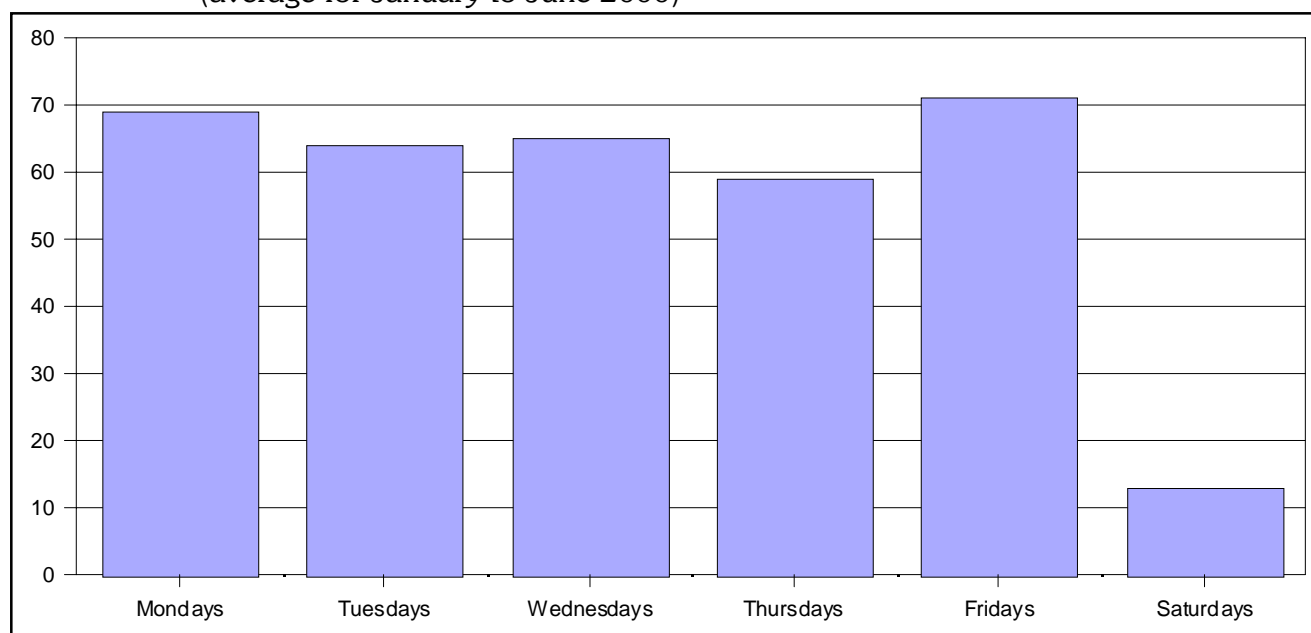
The York Valley landfill is operated by Works Infrastructure under a renewable, 3-year contract to the Nelson City Council. One full-time staff person - the landfill supervisor - is on site during operating hours, which are 8:00 am to 4:30 pm on weekdays and 2:00 pm to 4:30 pm on Saturdays. The contract is up for renegotiation in 2001.

Weighbridge records for the first six months of 2000 show the following numbers of waste-carrying vehicles visiting the York Valley landfill -

1,450 average per month
66 average per weekday
13 average per Saturday

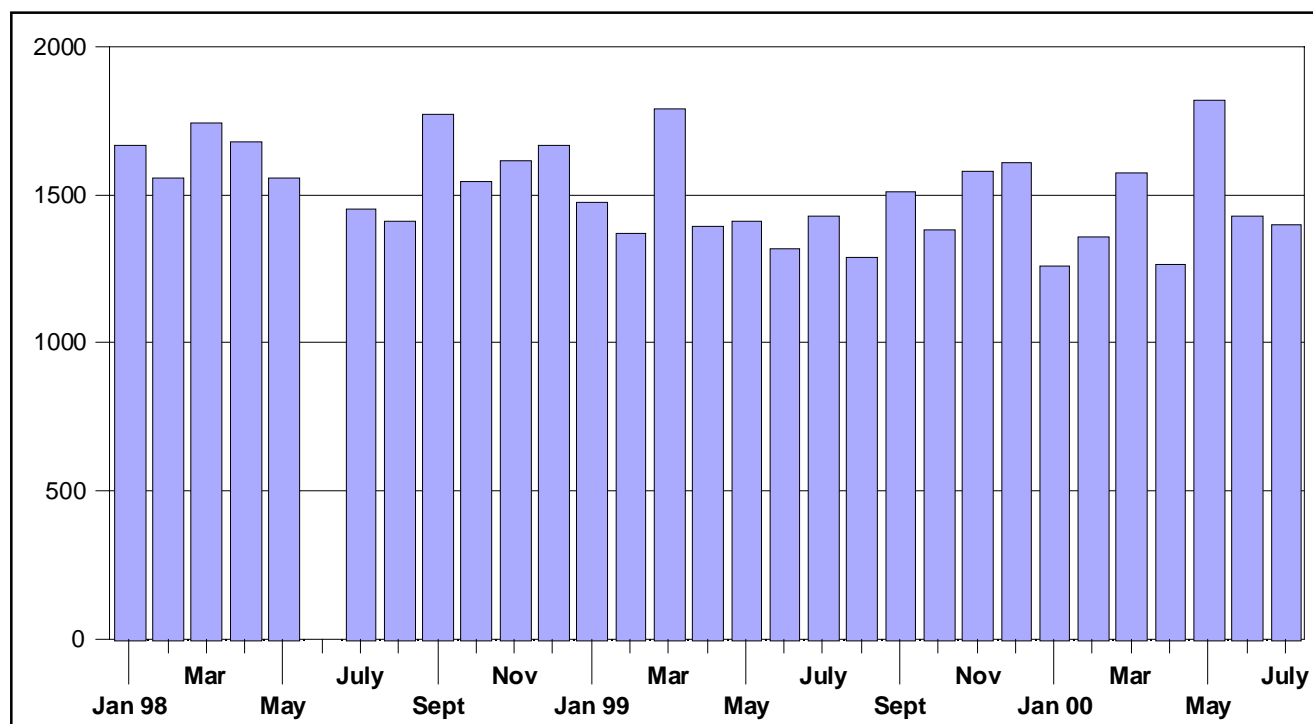
Figure 10 shows the average weekly pattern over the same period, while Figure 11 shows the monthly records for the past two-and-a-half years.

Figure 10: Daily vehicles carrying waste to York Valley landfill
(average for January to June 2000)



In addition to the vehicles carrying waste into the landfill, there are typically six traffic movements a day from service vehicles that bypass the weighbridge.

Figure 11: Monthly vehicle counts to the York Valley landfill
(January 1998 to July 2000)



Liaison between the facility and the host community

In the early years of operation - no formalised community liaison mechanism existed between the landfill supervisor and the immediate neighbours of the site. Under the old procedures, neighbours could call the City Council. Some residents' correspondence with the Council suggests that this was not an effective communications mechanism - too many answer phone responses and very few returned calls. From October 1998, after-hours calls were diverted to Call Care, based in Blenheim.

Local residents (represented by the sub-division developer) became involved in the resource consent process during 1998 and 1999. The City Council invited residents to participate in a month-long odour monitoring exercise in 1998. A few have continued to keep their own logs and submit these to the Council administrators responsible for overseeing landfill operations.

A "sniff committee" was set up under the new resource consent regime (November 1999) as a result of the call for improved responsiveness to community concerns about odour by nearby residents. It is unlikely that these new arrangements would have occurred without the initiative of the residents.

The new procedures appear to be targeted primarily at addressing odour complaints. Calls are referred immediately to the Environmental Health Officer who is responsible for alerting the "sniff committee" which comprises representatives from the Bishopdale residents, Nelson City Council's

Technical Services Group¹⁶, the Council's regulatory arm, and a community health professional from the Public Health Service. The "sniff committee" is required to respond to a complaint within 30 minutes of the call being received.

At the time of the case study field work, no such calls had been lodged. Between the case study fieldwork (February 2000) and the feedback visit (July 2000) two calls were received from a resident in Bishopdale¹⁷.

The current landfill supervisor expressed the view that he would like neighbours to approach him directly if they observed undesirable off-site effects or had complaints to make - but they do not. The supervisor indicated that if any member of the public did raise a complaint with him, contractual procedures would require him to notify the Technical Services Group of the NCC. He has some NCC complaint forms in his site office, but no one has ever used these.

Monitoring

The Nelson City Council is required to monitor environmental conditions for a range of off-site effects. These include groundwater quality and freshwater quality in the York Valley Stream. An independent consultant for the NCC monitors stormwater flows coming into the settling pond and leachate levels and flow-rates.

¹⁶ i.e. the group within the Council responsible for landfill management.

¹⁷ NCC staff indicated that these two calls related to the same incident.

C: The host community

Overview

York Valley has significant elements of residential, recreational and industrial use, all in very close proximity with each other. All have been present for some time. Residential use is represented by the suburban development of Bishopdale. Recreational use is represented by the walking tracks over the Grampians which have access points near the end of Market Road. Industrial use is represented by two working quarries and more recently the City's landfill.

There is a small amount of other commercial activity mainly at the entrance to York Valley. This comprises a petrol service station, a tavern and bottle store and a school¹⁸. Further up the residential neighbourhood, a residential facility for the elderly was established in 1992.

Land use on the hills to the south overlooking the landfill site involves a mix of recent forestry plantation and pastoral farming. One rural residential property is located on the hill top overlooking the landfill, on land now owned by the Nelson City Council.

Residential development

The lower end of York Valley has been the site of extensive residential sub-division over the past two decades, beginning in the early 1980s. While the sub-division had not actually begun when the landfill site was selected (1980) and purchased by the City Council, it was well into its planning stages. The sub-division has proceeded in stages, with Stage I completed by the time the landfill opened in 1987. Further stages of residential sub-division are continuing at this time.

Several real estate agents interviewed described the Bishopdale area as “an affordable place for people moving up”. Other attributes described were “safe and close to town” and “not flat like a lot of Nelson - it has an outlook” in a northerly direction. Many houses have views of the nearby Bishops Park reserve area, through which the York Valley Stream passes after emerging from its channel under Westley Place and Clifford Avenue. Because of the steepness of the valley sides, particularly the eastern side in the form of the Grampians, one relative handicap mentioned was the lack of sunshine, most noticeable in winter months.

Population change 1986-96

Table 1 summarises trends in usually resident population between 1986 and 1996, and compares these for the source community of Nelson City, the host community in the vicinity of York Valley, and the relatively recent residential sub-division of Bishopdale within this host community. The table illustrates the development of the local sub-division and its contribution to growth of the host community population. Whilst the wider host community grew very little during the first four years of the landfill's operation (1987-91) and considerably more slowly than Nelson as a whole, this trend has been reversed in the most recent inter-censal period when the population of the sub-division almost trebled in size and the host community grew by one third.

¹⁸ The school was established in 1999 on the corner of Market Road and Bishopdale Avenue, on premises previously occupied by a garden centre.

Figure 12: Quarry sites in York Valley



Figure 13: Quarry overlooking Bishopdale



Table 1: Trends in Usually Resident population

Area	1986 census	1991 census	1996 census	% change 86-91	% change 91-96
Source community - Nelson City	35,160	36,456	40,239	+3.7%	+10.4%
Host community - Grampians	1,389	1,395	1,884	+0.4%	+35%
Bishopdale sub-division	27	126	345	+467%	+274%

Source: Statistics NZ (1997)

Industrial development

Two quarries have been operational in York Valley since the 1970s (see Figure 12). One quarry at the top (eastern) end of the valley is a source of roading aggregate. An area in it is also used for dumping sawmill and demolition wastes, as well as quarry overburden. Another aggregate quarry is located adjacent to Market Road at the western entrance to the valley, immediately overlooking the residential sub-division (see Figure 13). Both are now operated by the same private contractor. Quarry operating hours are between 7 am and 5 pm, Monday to Friday. In March 2000 a weighbridge was installed on the site of the western quarry.

Recreational development

Nelson has numerous tracks on the hills immediately adjacent to major residential areas of the City. Many of these tracks are popular with recreational users - walkers, runners, mountain bikers. The Grampians is one such reserve area immediately north of York Valley. The tracks at the southern end of the Grampians are too steep and stepped to permit mountain biking, so that users are limited to walking and running.

No data were available on levels of recreational use of these tracks over the past two decades.

Changes in land use - 1986-96

Apart from converting open farmland into residential sub-division, no other notable changes in land use have occurred in the vicinity of the York Valley landfill. During this period, residential sub-division has moved progressively up the valley to the boundary of the landfill property (i.e. adjacent to the landfill boundary fence and no more than 300 m from the landfill working area).

Note the long-established flood control structures that were necessary to protect the city from excessive stormwater events in York Valley. These structures are located at a point that is now the northern boundary of the landfill property, just below the new leachate overflow basin (refer to Figure 6).

D: Coverage of consultation and Interviews

Numbers and categories of interviewee

In all, 84 interviews were conducted for this case study. The structured interview schedule was applied to 65 interviews with residents and businesses in the vicinity of the York Valley landfill. In addition, ten abbreviated interviews were used for 'rapid' assessment of residential properties on the west side of Waimea Road, while nine other key informants were interviewed using a semi-structured format.

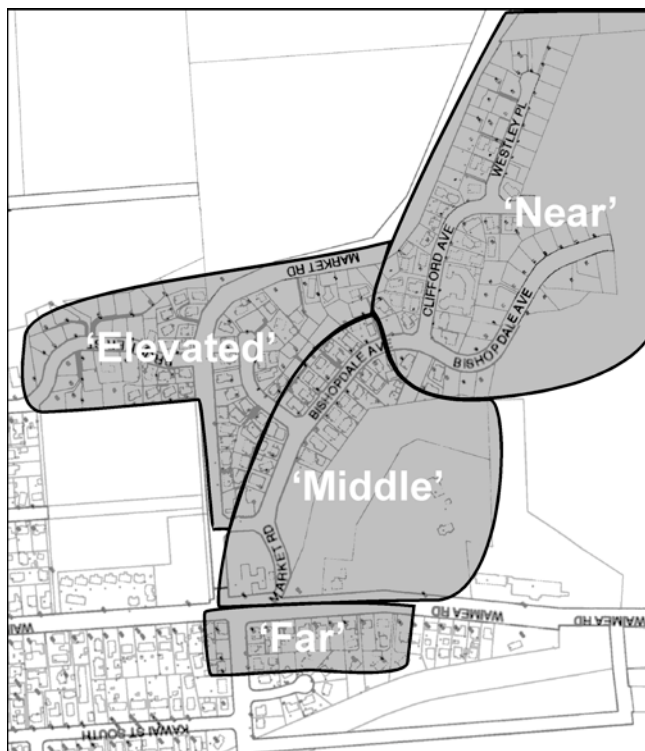
All interviews were conducted during the period 7 to 11 February 2000.

Areas of interviewing

Interviews with neighbours of the landfill were structured to provide responses from different areas within York Valley and across a range of separation distances. The four areas are shown in Figure 14 and designated respectively 'near', 'middle', 'far' and 'elevated'. Information about these four designated areas is also summarised in Table 2 below. The greatest emphasis was on properties near the axis of the valley ('near' and 'middle'), since these areas are directly downhill and downstream from the landfill in the prevailing wind. Properties on the north side of Market Road (Brunner St) were also targeted to ensure that possible traffic-related effects were assessed.

The nearest residential properties are found at the southern end of Westley Place, where residential sub-division has progressed as far as the northern boundary of the landfill property.

Figure 14: Areas of interviews



List of other key informants

- Representatives from Gibbons Holdings, the company responsible for residential sub-division in York Valley during the past 15 years
- two real estate agents operating in the locality
- the landfill supervisor (contractor)
- the Nelson City Council's Technical Services (road/traffic/refuse) supervisor and Technical Services Contract Supervisor/investigator
- a representative from Nelson City Council's Parks and Recreation section
- a representative of the Civil Aviation Authority at Nelson Airport
- a representative of the company which operates two quarries in York Valley
- a representative of NZ Police (traffic enforcement section)
- the regional engineer for the Land Transport Safety Authority

Table 2: Summary information for interviews

Sub-group	Interviews	Area description	Distance to landfill operational boundary	Length of occupation ¹⁹
"Near"	28 total 27 res. 1 bus.	Both sides of Westley Place and Clifford Avenue, and Bishopdale Avenue above #45 and #36	0-400 m from landfill boundary fence	24/28: <5 years 2/28: 5-13 years 2/28: d.k.
"Middle"	23 total 20 res. 3 bus.	Both sides of Bishopdale Avenue below #51 and #38; both sides of lower part of Flaxmore Place, below #5 and #6; businesses bounded by Market Road and Gardiner Place	400-800 m from landfill boundary fence	5/23: <5 years 12/23: 5-13 years 1/23: >13 years 5/23: d.k.
"Far"	10 total 10 res.	East side of Waimea Road directly opposite park area and businesses, down to Boundary Road	800-900 m	
"Elevated"	14 total 14 res.	Southern end of Brunner St; both sides of upper part of Flaxmore Place, above #3 and #4; south side of Market Road	400-800 m from landfill boundary fence	11/14: <5 years 3/14: 5-13 years
Total	75 total			

Feedback meetings

Two feedback meetings were held in Nelson on Tuesday 25 July 2000 for the purposes of discussing the preliminary findings of the field research.

The first meeting involved two representatives of the Nelson City Council's Waste Management Unit, while the second meeting involved nine residents of Bishopdale as well as the principal of the school which operates at the entrance to Market Road.

The community meeting endorsed the preliminary findings as accurate and reflecting an appropriate balance. A few, very minor comments have been added into the discussion provided in Section E, particularly relating to the "sniff committee", truck noise and road safety.

¹⁹ The time frames used in this analysis reflect the date when the landfill began operating (1987: i.e. 13 years ago) and the period during which its operation was reported as being relatively trouble-free (1987-1995: i.e. 5-13 years). The difference in times of residence between those living in "near" and "middle" areas is evident, reflecting that the "near" area has seen the most recent residential development.

E: Operational effects of the landfill on neighbours

Main conclusions

The only off-site effects experienced during the first eight years of operation (1987-95) were linked to traffic noise. The landfill manager was experienced as being very co-operative, and the City Council delivering on their commitments to provide visual screening.

From 1995-97 several problems emerged associated with excessive stormwater intrusion and leachate volumes in excess of the sewer main's capacity. These took the form of sewer overflows in the nearest street below the landfill, escapes of landfill gas and related odours. At about this time (1997) there was a perceived deterioration in landfill management and lack of responsiveness to mounting community concerns over off-site effects.

These issues were addressed in some detail during the resource consent hearings between 1998 and 1999, which culminated with the granting of new consents associated with new conditions. Modifications to the facility appear to have remedied neighbours' major concerns.

In addition to the significant effects of off-site odour and traffic noise, several other effects have been experienced to a relatively minor extent, including road safety effects, bird nuisance, surface water effects and dust.

In unprompted questioning, 36% of respondents had observed no effects at all, while in prompted questioning 27% still recalled no effects.

The following table provides a summary analysis of the effects reported during the community-based fieldwork, and compares neighbours responses with expert projections.

Table 3: Effects projected and reported

Effects identified during planning ²⁰	Effects reported unprompted	Effects reported after prompting	Effects identified but not reported or without corroboration ²¹	Effects reported but not identified during planning
<ul style="list-style-type: none"> • odour, incl. LFG • traffic noise(*) • traffic volumes and road safety effect(*) • bird nuisance • surface water effects(*) • dust • visual effects(*) • litter spread • aviation hazard(*) • groundwater effects(*) • vermin • smoke nuisance • land instability(*) • operating noise 	<ul style="list-style-type: none"> • odour, incl. LFG • traffic noise(*) • traffic volumes and road safety effect(*) • bird nuisance • surface water effects(*) • dust 	<ul style="list-style-type: none"> • odour, incl. LFG • traffic noise(*) • traffic volumes and road safety effect(*) • bird nuisance • surface water effects(*) • dust • visual effects(*) 	<ul style="list-style-type: none"> • litter spread • aviation hazard(*) • groundwater effects(*) • vermin • smoke nuisance • land instability(*) • operating noise 	

In unprompted questioning, 36% of respondents had observed no effects at all, while in prompted questioning 27% still recalled no effects²².

Structure for reporting the effects experienced

Detailed analysis of each effect experienced by neighbours of the York Valley landfill is reported under the following sub-headings:

What effect do they notice? Source of the effect? Timing, frequency and trends?

Mitigation?

Impacts?

Summary evaluation

²⁰ Planning documents refer to two episodes in planning. The first episode occurred during initial site selection activities in 1979 and identified a limited range of potential effects, marked in the list with a (*). The second episode occurred during applications for resource consent renewals in 1997 and identified a much wider range of effects, some of them based on actual experience.

²¹ Corroborated observations means cases where there are observations from more than two individual local observers, or where an individual observation can be corroborated by other sources of data.

²² This suggests that interviewing generally reached the boundaries of observed effects.

Odour

A pattern emerged from the analysis of responses on odour. As shown in Table 4 below, odour effects were definitely more noticeable closer to the landfill. The percentage figures in Table 4 (which are shown also in the mini-maps) indicate the proportion of those interviewed in each specific area who discussed odour, whether unprompted or prompted. These percentage figures do **not** indicate proportions who reported significant impacts from the odours. Within each sub-heading, mini-maps identify the specific areas first discussed in Figure 14 and Table 2.

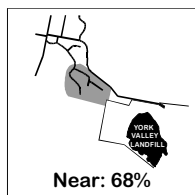
There was also a shift in perceived odour source as distance from the landfill increases. For several reasons, it is important to recall the narrow valley contours when interpreting this pattern. Firstly, the valley acts as a channel for the slow drift of air and odours. Secondly, residential development has generally followed along the bottom of the “V” of the valley, but spreads higher up the eastern side of the valley in its lower sections (near Flaxmore Place and Brunner St - the area designated ‘elevated’ in this sample). Thirdly, the mains piping infrastructure generally follows the bottom of the “V” of the valley (i.e. down Westley Place, Clifford Avenue and Bishopdale Avenue).

Table 4: Percentage of residents (sampled) who experience odour from the York Valley landfill

Interview sample	% Unprompted + Prompted	Comments
Whole sample	43	
Near	68	50/50 split between the strong odours from the leachate and LFG passing through the sewer main, and the milder smell of general rubbish, particular loads, or odours from opening up the landfill, drifting down the valley from the landfill
Middle	48	Less evidence of leachate-related odours in the sewer mains, but not totally absent; some odour from smelly loads on trucks passing along Market Road
Far	0	No reports of odour at all
Elevated	14	Low level of reporting - specific sources uncertain.

Note: Figure 17 shows the estimated odour catchment, indicating the area in which observations were reported and the area in which any discernible negative impacts were reported.

What effect do they notice? Source of effect? Timing, frequency and trends?



Occupying land closest to the landfill boundary, residents in the “near” area were just as likely to report one of two sources of odour - a general refuse smell, or a more pungent and unpleasant smell linked to toilets and the sewer main. The latter has been traced to excessive flows²³ of leachate during and after rainfall events, and the entrainment of landfill gas in these leachate flows, and corresponds with neighbours observations that “rain made it worse” or that it often occurred “after rain” and “usually in winter”. Figures 15 and 16 illustrate these conditions, both within the landfill property (Figure 15) and further downhill in the residential sub-division of Bishopdale (Figure 16). In contrast, the general refuse smell was associated with “a more southerly wind”, “a breeze coming down the valley”, or a general drift of air down the valley in calm conditions. Five respondents were unsure of the source.

Those observing a general refuse smell were inclined to describe it as “a dump smell”, “a rotten rubbish smell”, “a whiff - not totally unpleasant”, “just noticeable”. The leachate/gas-related smells

²³

‘Excessive’ in terms of flows being above the physical capacity of the sewer main.

Figure 15(a): Leachate and stormwater during heavy rain



Figure 15(b): Leachate and stormwater during heavy rain



Figure 15(c): Foam from leachate line at connection with city sewer



Figure 16(a): Discharge from sewer manholes in Clifford Ave and Westley Place



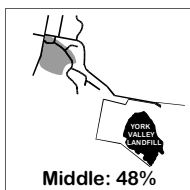
Figure 16(b): Discharge from sewer manholes in Clifford Ave and Westley Place



were described as “a real bad stench - like something dead”, “foul, like rotten eggs”, “a sulphur smell”, “a foul toxic smell”, or “a sewerage smell”. The latter cases were also sometimes associated with other symptoms such as gas bubbles “hissing” in toilets²⁴ and foam coming out of sewer manholes in the street (see Figure 16, for example). The experience of such odours has not been confined to outdoors, with eight out of the 22 observations noting indoor experience. Furthermore, with one exception, all these observations about odour came with no prompts.

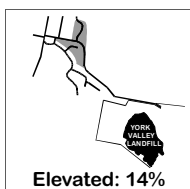
No single pattern emerged regarding time of day or season, although leachate-related odours appear to be associated with wetter winter weather. However, distinct patterns were discernable regarding frequency for general landfill odours and leachate-related odours. The latter began to be very frequent by 1996 and up till 1999²⁵ - “over the past four years, three times a week”, “every day in 1998”, “daily”, “a lot, but not every day”. In contrast, general landfill odours have been experienced on a much more occasional and sporadic basis - “once in three months”, “occasionally - twice a month”, “once at night”, “sporadic - maybe on five occasions”, “some times in the year”.

A very high proportion of those who reported odours of any kind also reported a marked improvement - “improved with complaints”, “improvement over time”, “much improved this year”, “getting less with other houses being built around”, “since they put in the flare and increased topsoil and vegetation - it has improved”, “not noticed recently”, “it is getting better - not smelt it for a while”.



Eleven residents (9 unprompted) living in the “middle” part of the host community commented on odours emanating from the landfill. Five described experiencing “a general refuse smell”, “a stink; it lingered for an hour or more”, “a yukky rubbish smell in the air”, “a silage type of smell - pungent” and “putrid”. Two thought the smell to be that of sewage in the pipes whilst another two were certain that the unpleasant smell came from “smelly loads on their way to the landfill, and spillages on Market Road”. Two were unsure of the source. In only one case was the smell experienced indoors.

As reported above, no consistent time-of-day pattern emerged for odour experiences by these residents. With one exception (“can be very frequent”), the frequency of incidents was reported as being either occasional or very occasional - “not even once a month”, “once in seven months”, “occasional - comes and goes”, “just once”, “approximately five times”. Experience of smelly loads in transit has been very occasional - “irregular incidents with the dumping of smelly offal”, “twice in eleven years”. Six of the unprompted responses reported that their odour problems had improved markedly in 1999 - “not so aware”, “not noticed of late”, “haven’t smelt it for a while”, “not so bad in the last few months”, “not noticed since”.



Two residents (one unprompted) in the “elevated” part of the host community noticed odours, and in one of these cases the experience occurred only when visiting other homes in the neighbourhood - “over a period of a month, made visits to go house hunting; occasionally caught a whiff”. These residents did not comment on frequency as it was so infrequent and no trends were described. The quarry operator indicated that quarry staff had never reported any unpleasant odours from the landfill.

²⁴ NCC staff reported that there were some instances where the problems were tracked down to non-complying domestic sewer vents. However, they did not suggest that this was the cause in all cases.

²⁵ This will reflect partly the length of residence of those in newer parts of the sub-division. However, several of the longer-term residents in the upper parts of the valley reported trends consistently.

According to one key informant between 1987 and 1995 there were no problems experienced from the York Valley Landfill. However problems of odour and leachate began to emerge in late 1995 which were addressed in 1999 due to public pressure for improvements, at the time new resource consents were required.

Five residents of Bishopdale²⁶ participated in an odour-recording programme between October 1997 and May 1998²⁷. Two of the “Near” participants averaged four to five observations of odour per month, with a peak frequency of eight/month and a lowest frequency of two/month. The other three participants averaged between zero and one observation per month, with a peak frequency of five/month and a lowest frequency of zero/month. During this period, several of the participants recorded discrete odour episodes of four to five observations in one week. The possible source of the odours was not recorded.

The observations of landfill neighbours reported above are corroborated by comments from the landfill supervisor, who described six distinct sources of odour -

- a “sweet smell” coming down off the landfill “on still frosty mornings”, which does not last long
- particularly smelly loads from seafood processing factories²⁸, the sewage treatment plant²⁹, and loads of bentonite clay from apple processing factories; sometimes these loads are difficult to handle and can take 2-3 hours to achieve complete cover; believes that fish wastes are probably noticeable as they pass up the valley; he reported some days when trucks “dribble onto the road” on their way into the landfill
- the operation of a septage pit which used to be left open for months
- the un-staffed truck-washing facility 200 m above the entrance gate to the landfill, where the drivers clean down their own vehicles before leaving; the first trucks use this at about 8:10 am, but it is not usually until about 4 pm that the supervisor has the chance to get down there to clean it up, resulting in very localised problems with seagulls, odour and flies. The liquid content of the sump drains into the sewer line while the solid content is buried in the landfill
- the present landfill supervisor could smell landfill gas at his office near the entrance before gas flaring was installed; with 24 hours/day flaring he reports noticing no more LFG odours
- manhole covers lifting and discharging smelly effluent onto the street when there has been an influx of stormwater into the landfill, increasing the quantities of leachate produced; the landfill’s leachate collection system is connected directly into the City’s sewer network at the highest point in this area; the leachate leaving the landfill tends to entrain landfill gas which then escapes at various points as it passes down through the network; rainfall events produce quantities of leachate beyond the capacity of the piping network resulting in “lids popping off” both within the landfill site and in the streets below

The ‘record of noticeable odours’ for the month of March 1998 records observations by nine residents³⁰, although only six provided consistent records. These records generally reinforce the distance-related pattern of effects, the experience of particular episodes, the linkage between odour and wind direction and the range of different sources of odour - smelly loads of waste, insufficient

²⁶ Four of the five came from the “Near” area of interviewing and one from the “Middle” area. Only one of the five households was included in the sample of residents interviewed for this case study.

²⁷ A period which did not include a winter season.

²⁸ During the hoki season, between May and Sept./Oct., typically two shipments of fish processing wastes are delivered each day; and between three and seven loads of mussel processing waste per day all year round.

²⁹ Screenings from the sewage treatment plant are brought to the landfill every Friday.

³⁰ Six residents from the “near” area, one from the “middle” and two from the “elevated” area.

cover, opening up old sections of landfill, landfill gas escapes and problems with the sewerage system during rainfall events.

Mitigation?

In some respects, the passage of time both generated and mitigated certain odour effects. For example, leachate-related odour problems took some years to emerge as a result of accumulating volumes of leachate. On the other hand, a number of residents living close to the landfill suggested that the increased plantings and growth of vegetation around the landfill has helped prevent odour drift. Two of the respondents expressed the view that the increase in new housing in the area has acted as a screen.

However, the most significant improvements in off-site odour effects are attributed to deliberate improvements in the facility and local sewerage infrastructure, and to improvements in landfill management practices. Improvements in the facility made during 1998 and 1999 include the provision of more effective cut-off drains above the landfill (May 1999), better capping and clay bunding leading to improved stormwater management³¹, installation of a leachate overflow basin³², and installation (December 1998) and 24 hour/day operation of a gas flare to remove landfill gas from the leachate stream. In early 2000, an additional return gas pipe was installed to recycle any remaining landfill gas out of the leachate stream before it enters the sewer main, back to the flare. The capacity of the local sewerage infrastructure within the neighbouring sub-division has been restored and improved by the re-alignment of a section of sewer pipe at the corner of Westley Place and Clifford Avenue and the removal of accumulated shale build up within the pipe³³. Added precautions were taken with the installation of anti-siphon valves on the terminal vents of all properties in Westley Place (late 1998), although some faulty ones were later removed. The effectiveness of these changes in eliminating the leachate-related problems is reflected not only in the neighbours' comments described above, but also by the fact that, despite the abnormally wet summer of 1999/2000, there have been no repetitions of the sewer manholes 'popping', which would suggest that the flowrates are now within the capacity of the sewer main.

Despite these improvements, NCC's Technical Services staff noted there had been two occasions since May 1999 when the overflow basin itself was a possible source of off-site odour; also that the valve which diverts excess leachate to the overflow basin had been jammed with debris and a couple of occasions when the sewer line in the sub-division had become blocked with items of clothing (i.e. not from the landfill operation).

Improvements in the landfill management practices aimed at reducing off-site odour problems include better cover practices as a result of re-contouring the landfill slopes and imposing a 3 pm daily deadline for deliveries of smelly wastes, diverting loads of septage³⁴ to the Bell's Island WWTP, the establishment of a Sniff Committee³⁵ to monitor odour incidents, and a general commitment by

³¹ This reduces the amount of stormwater entering the landfill working area and reduces the volumes of leachate produced after rainfall events. The landfill is permitted a maximum flowrate of 11 litres/second for leachate.

³² Where leachate surpluses are limited to eight hours overflow and now have to be tankered off site by a septic tank contractor, thus avoiding overloading the sewer main in the residential sub-division below.

³³ Shale refers to the accumulated solid encrustation on the inside of the sewer pipe which has the effect of reducing the flow capacity of the pipe. NCC contractors indicated that they also encountered some construction-related debris when cleaning out the sewer main.

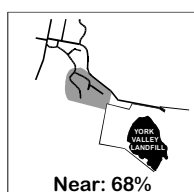
³⁴ Septage is a term used to refer to the contents of septic tanks which has to be pumped out periodically for treatment and disposal.

³⁵ The Sniff Committee has two local residents as representatives of the host community.

the landfill supervisor to improving the operating standards of the facility. Although future leachate capacity is still a concern to some of the locals, these same residents *“now have confidence for the future development of the Bishopdale area”*.

One of the residents who attended the community feedback meeting commented on *“the efficiency of the Sniff Committee in action”*, describing the prompt response in investigating a reported incident.

Impacts?



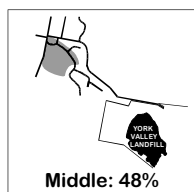
The impacts of the various odour effects expressed by residents in the “near” part of the host community reflect a broad spectrum of experience, ranging from no impacts at all to relatively severe impacts during the worst period between 1997 and 1999. The spectrum can be described in the following terms, based on neighbours’ responses -

Spectrum of impact severity for odour effects

Level	Description	Representative comments
0	No observations reported	
1	No impact at all	
2	Noticeable, but not unbearable	- you get used to it
3	Loss of personal residential amenity; very unpleasant	- have to retreat indoors - have to close windows - have to plug the sinks
4	Social discomfort or embarrassment	- visitors notice/comment
5	Impacts on personal health and well being	- headaches - feelings of nausea - loss of sleep

Analysis also reveals that those who reported observing general landfill odours tended to experience less severe impacts (most were at levels 1 and 2, with none at level 5) while those who reported observing leachate-related odours tended to experience more severe impacts³⁶ (none at level 1, with most at levels 3 and 5).

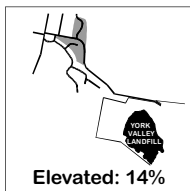
Nevertheless, the majority of residents had never themselves complained to anyone or any agency about the effects. Of the five interviewees who indicated they had complained, four had complained about the leachate-related effects.



Two-thirds of those who observed off-site odours in the “middle” part of the host community described Level 1 impacts - *“not at all”*, *“not a bother”*, with the remaining one-third describing Level 2 impacts - *“just annoying; doesn’t particularly worry me”*, *“just unpleasant”*, *“wondered where it came from”*. In this case, no one had ever complained about odour.

³⁶

Furthermore, one resident who reported leachate/LFG-related incidents noted that the smoke alarms had been triggered, and reported that the plumber who visited attributed this to gas fumes entering via the sewer line.



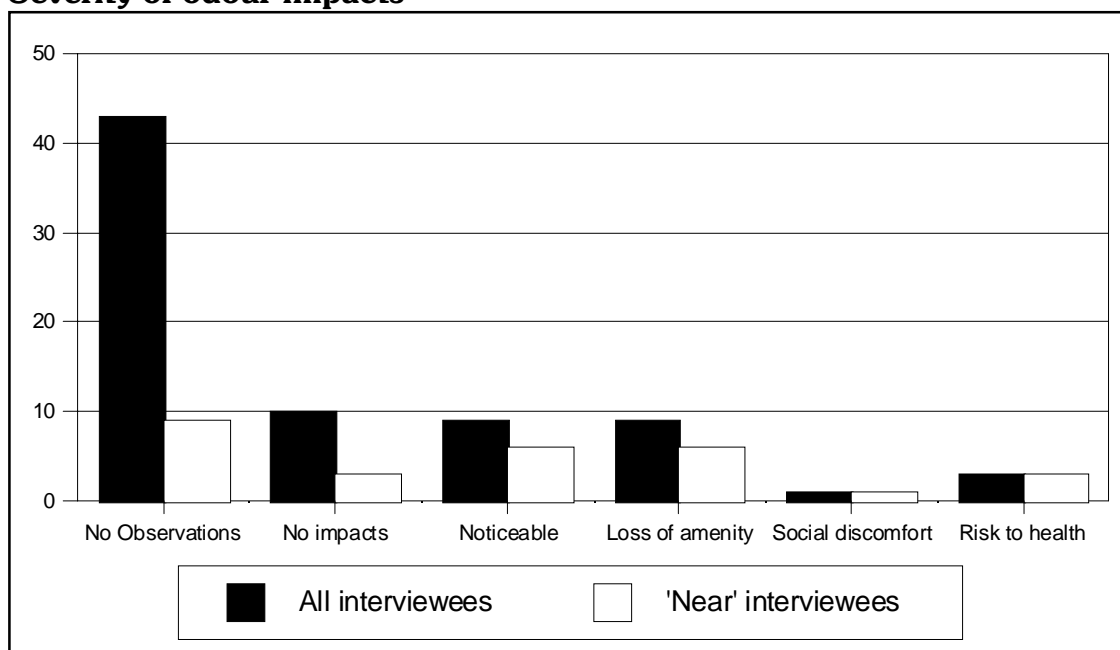
No significant impacts were reported from this part of the host community.

There is a clear spatial pattern evident in the experience of odour effects within the host community. This is shown in Figure 17, which indicates the area in which observations of odour were reported, and also the area in which significant negative impacts were reported.

Figure 17: Odour catchment



This map is complemented by Figure 18 which indicates the distribution of the severity of impacts experienced. Corresponding data for the 'near' area are included for comparison.

Figure 18: Severity of odour impacts

Summary evaluation

Off-site odour effects have been experienced within the host community from a range of sources associated with the York Valley landfill operation. By far the most significant of these resulted from unplanned and excessive flows of smelly leachate and entrained landfill gas through the sewerage reticulation network in the Bishopdale sub-division over a period of several years. Other sources of off-site odour experienced occasionally have been decomposing rubbish at the tip face, particularly smelly loads in transit, the practice of opening pits in old landfill areas for the disposal of certain wastes, and the contents of the leachate overflow basin. Significant negative odour impacts have been experienced only within a distance of about 600 m from the landfill boundary fence. While the current arrangements (February 2000) have not eliminated off-site odours entirely, they appear to have reduced them to very occasional incidents, where the impacts on the host community are no more than minor. A community liaison mechanism has been established recently which should enable the landfill management and the community to co-operate in reducing the frequency of incidents even further. Past experience suggests the need for constant vigilance in maintaining high operating standards.

Traffic noise

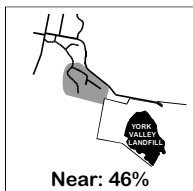
As with odour effects, there is a distinct spatial pattern regarding the experience of traffic noise. The pattern is related to proximity to various sections of Market Road, the only access route for vehicles visiting the landfill. It also serves as the access route to two operational quarries up York Valley, the public carpark area at the southern end of the Grampians Reserve walkway system, and its first one hundred metres forms the entrance to the Bishopdale residential sub-division off Waimea Road.

Table 5: Percentage of residents (sampled) who experience traffic noise associated with the use of Market Road

Interview sample	% Unprompted + Prompted	Comments
Whole sample	32	
Near	46	(60% unprompted/40% prompted) Gibbons quarry and landfill trucks on section of road that is above most houses in Clifford Avenue and Westley Place; also after-hours 'drag strip' at top end of Market Road
Middle	4	
Far	0	
Elevated	64	(60% unprompted/40% prompted) both quarries and landfill trucks on steeper gradient at the bottom end of Market Road

Note: Figure 19 shows the estimated traffic noise catchment, indicating the area in which observations were reported and the area in which any discernible negative impacts were reported.

What effect do they notice? Source of effect? Timing, frequency and trends?



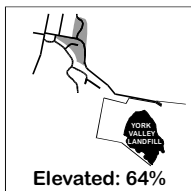
Thirteen residents (8 unprompted) living in the “near” part of the host community made observations of truck noise, describing the noise of loaded trucks “*grinding on the hill*”, “*airbrake noise*” and “*vibrations*” as trucks passed close by. It should be noted that, along the upper section of Market Road, all dwellings in Westley Place are no more than 100 m from the landfill and quarry access road. Indeed, some dwellings on the eastern side of Westley Place are within 10-15m of the road. Furthermore, the road passes above the height of most dwellings, and there is no effective noise screening, although there is well established visual screening in the form of roadside trees. The noise is heard from within residents’ homes, as well as out of doors. These residents make little distinction between landfill and quarry trucks. At this point, the road is relatively level so that the direction of load carrying (‘in’ for landfill trucks and ‘out’ for quarry trucks) is less important. One respondent referred to the use of this section of Market Road as “*a race track*” occasionally for youths, after the trucks have left for the day.

While all of the “near” respondents experienced the noise numerous times daily, several perceived Saturday as the noisiest day of the week for traffic on Market Road as they were at home all day and more likely to notice it. Another suggested that Monday seemed noisiest (busiest) because it was “*the main Envirowaste rubbish day*”. However, this perception of Monday as the busiest for traffic on Market Road is not supported by traffic counts conducted for the Nelson City Council in February 1999 and July 2000. (For further discussion of these surveys, refer to Appendix IV.) Several expressed the view that the truck noise was more noticeable in the later afternoons when other sources of ambient noise were less. Also this was described as another busy period when “*the downhill trucks would brake to allow for the loaded ones to pass on their way up to the landfill*”.

While one unprompted response described an increase in the noise over the past five years, and another claimed that *“with the weighbridge, it’s got worse”*³⁷, no others mentioned such a trend.



Two respondents reported the noise from the trucks, one unprompted and one prompted, with no distinguishing between quarry and landfill trucks. Noise was experienced both inside and outside nearby buildings. These two respondents noted no particular daily pattern, but one described the noise as occurring *“in short bursts of five to ten seconds”*.



Truck-related effects such as truck noise are probably the dominant effect for this part of the host community, since it straddles the main access road for the landfill and the quarries, Market Road. Noise is further accentuated by the relative steepness and the sharp corners requiring braking in this section of Market Road. Thus nearby residents reported - *“lowest gear, full loads - grinding up the hill”*, *“airbrakes noise on downhill runs, when they’re empty (landfill) or full truck and trailer units from the quarry”*, *“the speed of empty trucks with mufflers broken and not replaced”*. It is difficult to differentiate between the effects of quarry traffic and landfill traffic. It is plausible that quarry traffic generally might travel at greater speeds, since quarry trucks are empty when going up hill and loaded when travelling down hill, the reverse situation for landfill trucks. Those in this area particularly noted the early truck visits each day, with half of them referring to 7 am or even 6.30 am truck noise. Since the quarry opens at 7 am and the landfill at 8 am, these early truck visits are unlikely to be associated with landfill activity³⁸. They also noted a *“constant flow tailing off on Saturday afternoons.”* Whilst one resident noted a build up in traffic noise over the years, others were not aware of such a trend.

The traffic data for Market Road accessed for this research were week-long traffic counts conducted for the Nelson City Council during the first week in February 1999 and the last week in July 2000. Results are summarised in Appendix IV.

Neither survey supports the perception that Monday is the busiest day for traffic on Market Road. Nor is Saturday, despite a few residents’ experiencing more traffic noise on Saturdays because they are there for more of the time.

Weekend data are consistent with the use of Market Road for non-industrial purposes, such as access to the walking tracks over the Grampians.

At busy times during the week, there can be about one medium or heavy vehicle movement per minute along Market Road (counting both directions). A typical frequency³⁹ is in the range of one movement every two minutes to one every five minutes.

Mitigation?

One resident suggested that the resealing of Market Road had helped to lessen the noise of the trucks (although this was probably not the reason for the sealing).

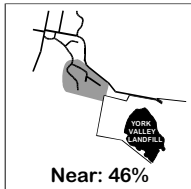
³⁷ A weighbridge was installed at the first quarry in March 2000. A weighbridge had been present within the landfill property since its opening.

³⁸ On a very few occasions, trucks with special wastes go to the landfill before normal opening hours in order to facilitate special disposal arrangements.

³⁹ i.e. typical on weekdays between 7 am and 7 pm.

One key informant described the “reckless driving of hoons” along Market Road, which compounded the noise problem and suggested a gate be installed to prevent vehicular use of the road after hours. It should be noted that where the public road ends, there are already gates at the entrances to the quarry and the landfill which are closed after working hours.

Impacts?



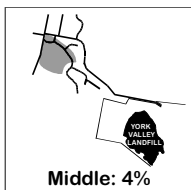
Near: 46%

As with odour effects, the impacts described cover a broad spectrum from ‘no impact’ to ‘intrusive’. The spectrum can be described in the following terms, based on neighbours’ responses -

Spectrum of impact severity for noise effects

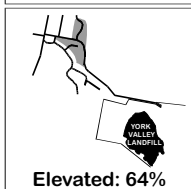
Level	Description	Representative comments
0	No observations reported	
1	No impact at all	
2	Noticeable, but not unbearable	- you get used to it/immune - no irritation
3	Loss of personal residential amenity; very unpleasant	- have to close windows - feel inconvenienced
4	Social discomfort or embarrassment	- visitors comment
5	Impacts on personal health and well being	- curtail rest and sleeping - affect study/distracting

Residents in the “near” part of the host community reported impacts from both extremes of the spectrum - (level 1) “not a problem”; (level 2) “getting used to truck noise now”; (level 4) “the baby’s sleep time is affected”, “stops us sleeping in”, “can wake the children”, “worries the boarder - affects his study”. Responses were spread evenly across all three categories. None of these residents had ever complained about truck noise.



Middle: 4%

One respondent described occasional intrusions from truck noise⁴⁰ - “don’t notice it so much, but children do occasionally comment ... not a high impact ... sometimes close the doors ... occasionally have to repeat themselves ... never a stress factor ... never have to stop doing something”.



Elevated: 64%

Responses from this “elevated” part of the host community were evenly spread across levels 2 to 4 - (level 2) “notice it, but not a cause for irritation”, “get immune to it after a while”; (level 3) “sometimes makes us close the windows”, “sometimes get a bit of a fright - a bit of an inconvenience”; (level 4) “noise is a bit of a pain”, “noise is very distracting”. None of these residents had ever complained about truck noise.

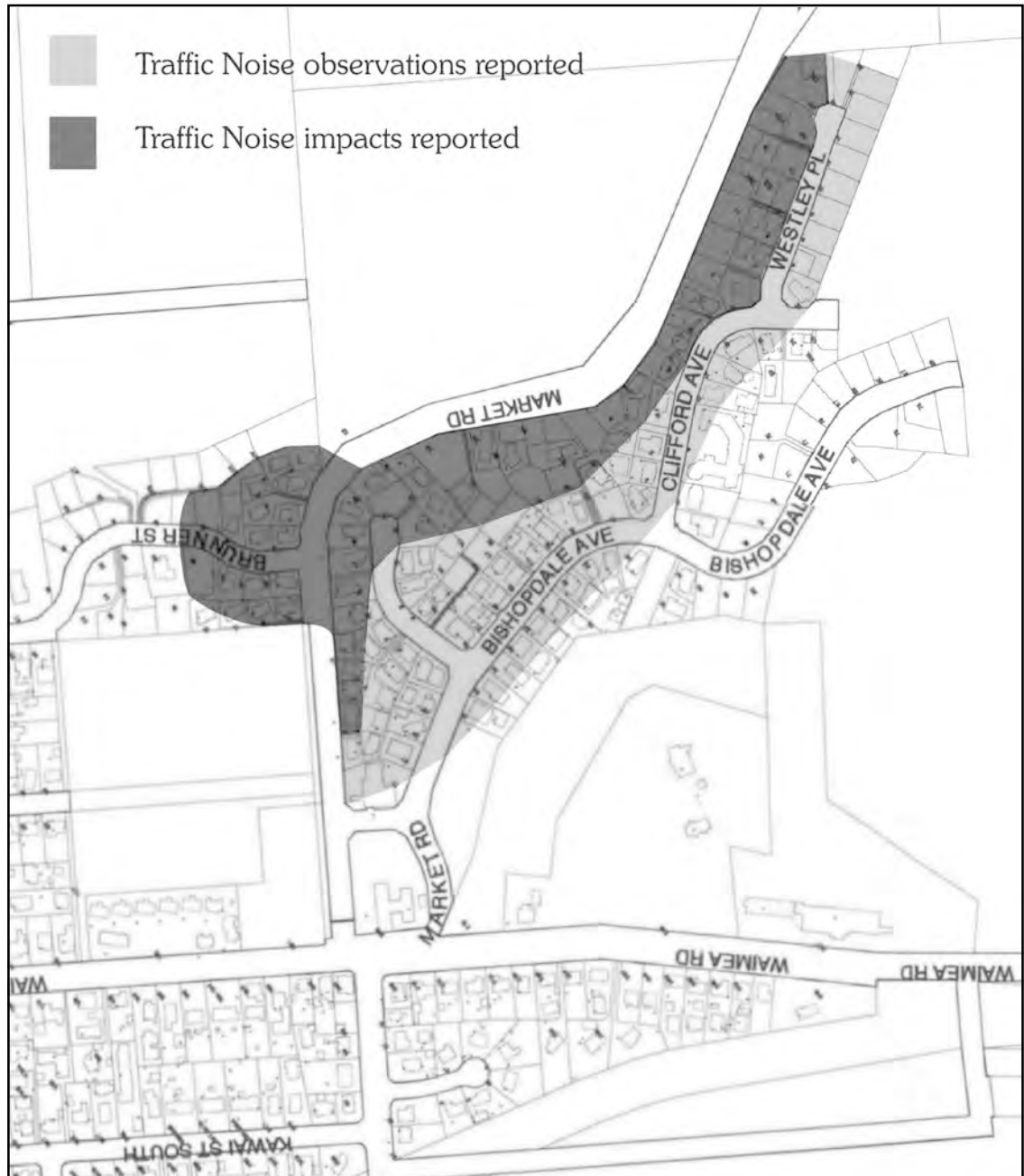
⁴⁰

This building was immediately adjacent to Market Road, and close to two corners.

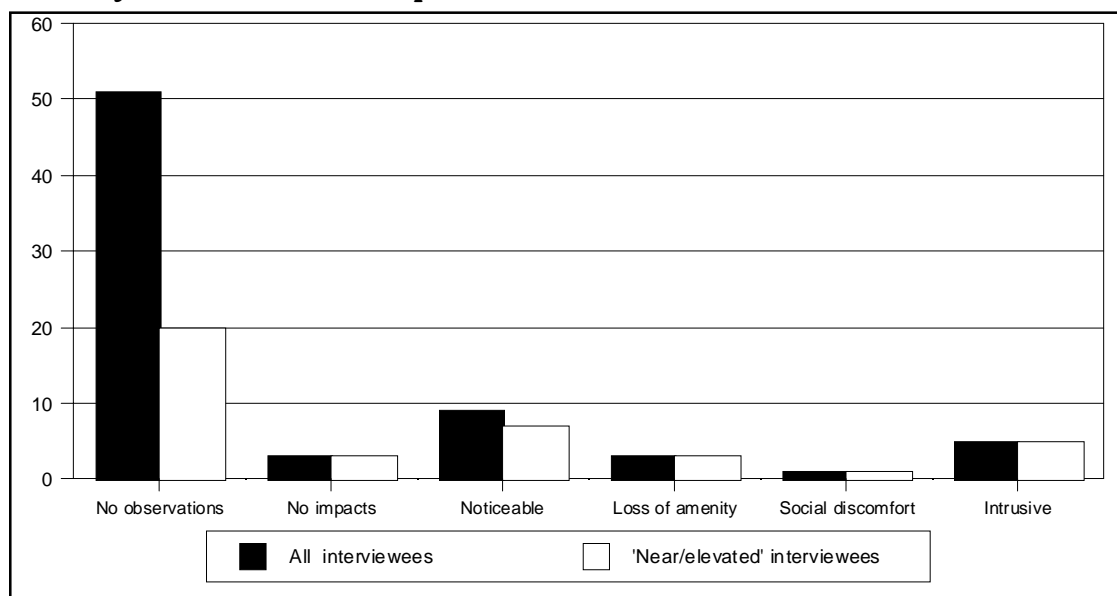
Several real estate agents noted that they were still selling homes on Market Road despite the noise from the trucks during the daytime. The prospective buyers were aware of the daytime truck noise.

Figure 19 shows the area in which observations of traffic noise were reported, and also the area in which significant negative impacts were reported.

Figure 19: Traffic noise catchment



This map is complemented by Figure 20 which indicates the distribution of the severity of impacts experienced. Corresponding data for the 'near' and 'elevated' areas are included for comparison.

Figure 20: Severity of traffic noise impacts

Summary evaluation

Noise from trucks on Market Road is experienced regularly by local residents, for some of whom it is intrusive. The noise comes from quarry trucks as well as landfill trucks, and residents make no distinctions. These trucks however also have other negative associations - for example dust off the trays of quarry trucks⁴¹, and road safety effects. Nevertheless, this level of truck noise has always been an existing condition for many residents of Bishopdale. The particular impacts experienced are unlikely to extend beyond Market Road and the immediate confines of Bishopdale, since Waimea Road has always been a main arterial route between Stoke and Nelson.

⁴¹

Landfill trucks are generally hosed down at the truck-wash facility after depositing their loads.

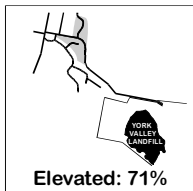
Road safety

As shown in the following table, this is an effect which impacts only those people who make direct use of Market Road.

Table 6: Percentage of residents (sampled) who experience road safety effects associated with the use of Market Road

Interview sample	% Unprompted + Prompted	Comments
Whole sample	13	
Near	0	
Middle	0	
Far	0	
Elevated	71	Excessive truck speed, poor lines of vision, debris left on Market Road

What effect do they notice? Source of effect? Timing, frequency and trends?



More than two-thirds of those interviewed in the “elevated” part of the host community registered concerns over road safety issues connected with the use of Market Road by heavy vehicles. Almost without exception they made no distinction between trucks on landfill or quarry business. Their concerns focussed on a variety of contributing factors, including -

- the speed of the trucks - *“speed of trucks in both directions”, “travelling downhill at speed”*
- the size of the vehicles combined with the narrowness of the road in some parts - *“very big trucks”, “they’re all big”, “using the middle of the road”, “a hazard for people on scooters or bikes”*
- *“poor lines of vision coming up Market Road”* (see Figure 21), *“blind corners in both directions”, “a bit dodgy at the corners”, “blind corners at the bottom of Market Road and also at the Brunner Street intersection”*
- the absence of any pedestrian crossing or the lack of a footpath along the top section of the road, and
- the loose and slippery debris which is sometimes left on the road - *“chunks of stones and clay; sometimes just shingle”, “insecure loads, and no nets on some trucks”, “rubbish trucks leaving a trail of sludge on the road”*.

There is a broad consensus among responses that these effects are experienced primarily during working hours on weekdays and Saturdays. The effects related to deposits of rubbish or sludge are less frequent, perhaps weekly rather than daily. No change over the years was reported.

One resident also noted that there is no protective railing between the houses and Market Road (at the top end) and referred to a recent incident when a vehicle overturned into the embankment. NCC Technical Services staff confirmed that a car left the road in this area in 1999; it was stopped by the shrubs below the road.

Residents' observations of excessive vehicle speed are confirmed in the vehicle count survey discussed in the previous section and reported in Appendix IV. Results from February 1999 suggest that at the point the measurements were made⁴², typically -

- fewer than 10-15% of vehicles were travelling within the legal speed limit of 50 kph,
- fewer than 50% were travelling under 60 kph,
- more than 10-15% were travelling over 70 kph.

These results apply for vehicles travelling in either direction along Market Road.

Results from July 2000, for medium and heavy vehicles, indicate that at the point these measurements were made⁴³, typically -

- about 6% were travelling uphill faster than 50 kph,
- about 44% of medium weight vehicles were travelling downhill faster than 50 kph,
- only 5% of heavy weight vehicles were travelling downhill faster than 50 kph.

Data from the Land Transport Safety Authority (Appendix V) show that one injury accident occurred on the upper section of Market Road during the period 1980-86, i.e. before the advent of the landfill, but that there were no accidents during a six-year period after the landfill opened.

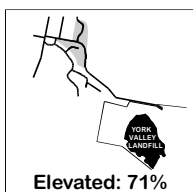
Mitigation?

The footpath on Market Road was recently extended around the corner near Brunner Street, but still goes only as far as No. 30, which is near the entrance to the first quarry.

As noted under traffic noise, one key informant described the *“reckless driving of hoons”* along Market Road, and suggested a gate be installed to prevent vehicular use of the road after hours.

Enquiries with the Traffic Police in Nelson revealed that they were unaware of the vehicle surveys discussed above. However, they have received three complaints about traffic speed and safety during the past three years. As a result, they placed unmarked police vehicles on Market Road with speed detectors. These observed no trucks speeding, only private vehicles.

Impacts?



Those who expressed concern about road safety generally referred to the sense of intimidation they experience both when actually confronted by a much larger vehicle, particularly one travelling at speed, or simply when considering the risk of such an event. It seems particularly acute for those on foot (walking or exercising their pets) or on bicycles or motorcycles. Some go so far as to avoid using the road during working hours - *“wouldn't be able to enjoy the walk - it's a pleasant walk in the evenings and at weekends”*; *“I deliberately avoid walking along Market Road during the week time”*. Even those in cars experience difficulties - *“I have to be particularly careful backing out”*. One person even went so far as to *“come home using the north end of Brunner St and Tukuka Place to avoid the trucks”*.

⁴² In February 1999, vehicle speed was measured at a point on the level section of Market Road (identified as being 805 m from the entrance to Market Road), above the residential area of Bishopdale.

⁴³ In July 2000, vehicle speed was measured at a point on the steep section of Market Road (identified as being 253 m from the entrance to Market Road), just below the junction with Brunner St.

A recreationalist interviewed at the beginning of the walking track commented on the steepness of the walking track car-park and the need for care when exiting because of the trucks.

One reported seeing “*close shaves, but no actual accidents*” and another confirmed that they had never seen any accidents. Several people expressed concerns not just for themselves but also for their children - “*will become more of a concern as my child grows up*”, “*I won’t let my daughter cross the road*”.

One person reported having contacted the City Council about their road safety concerns, while another made the observation that “*there are a lot worse road hazards around*”.

Summary evaluation

Most residents are keenly aware of the safety issues on Market Road, and some experience constraints on their recreational choices. Nevertheless, they have learnt to adapt to the situation. Their comments suggest that the situation on Market Road probably presents no greater road safety risks than other thoroughfares through residential areas. However, there are probably measures⁴⁴ that could be taken to reduce the level of hazard.

⁴⁴ e.g. installing mirrors on the blind corners, extending the footpath further along the top section of Market Road, speed enforcement measures, etc.

Figure 21: Blind corner on Market Road



Figure 22: Stormwater network



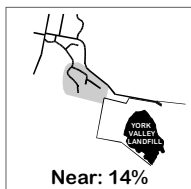
Bird nuisance

Levels of response on this effect were relatively low, with almost half the responses prompted.

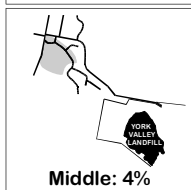
Table 7: Percentage of residents (sampled) who experience bird nuisance from the York Valley landfill

Interview sample	% Unprompted + Prompted	Comments
Whole sample	11	
Near	14	
Middle	4	
Far	0	
Elevated	21	Local resident feeding; noise more noticeable

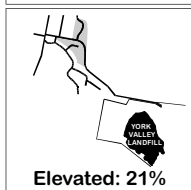
What effect do they notice? Source of effect? Timing, frequency and trends?



All of the respondents described large numbers of gulls - flocks and swarms of seagulls on their flight path or wheeling around over the tip.



One respondent noted the flight of seagulls each morning and night as they leave or return to the landfill. Their flight path is down the valley.



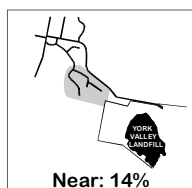
Two aspects distinguish comments from this “elevated” area - an emphasis on the noise of the seagulls, and several claims that, while the landfill is the primary feeding place attracting the birds, they are also being fed by a local resident. One reported having had a wounded gull land on their roof one day, and also fouling by birds overhead.

Residents in all three areas of interviewing did not indicate any trends in the presence of the seagulls over a period of years. However all of them noted the morning and evening flight pattern. Landfill administrators reported flocks of seagulls at the landfill from time to time, with an increase in bird numbers over the summer due to the arrival of younger birds.

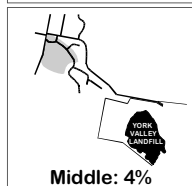
Mitigation?

The landfill operator is aware of the seagulls and if necessary uses a shotgun to scare them either in the evenings or during morning tea break. Changes in applying cover material at the tip-face have improved the management of bird nuisance on the site itself. However, while it remains permissible to bring loads of fish waste and other similar smelly and edible materials to be disposed at the York Valley landfill, it is virtually impossible to eliminate the attraction for seagulls, now that they are established.

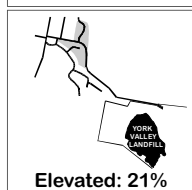
Impacts?



One respondent described visits from the passing seagulls to eat bird food; another noted that the seagulls tended to make their pet birds very excitable - *“squawk when they arrive”*.



One respondent, although not directly impacted upon, interpreted the presence of the birds as a sign of poor landfill management - *“makes you think the tip is not being well covered up”*.



The two residents living in the “elevated” area had noticed bird droppings on their parked vehicles - *“biting into the paintwork”* - but did not hold the landfill responsible for the presence of the birds. It was as a result of a nearby neighbour encouraging the birds by feeding them. One resident noted that the noise of the birds was sometimes loud enough to wake them up if they were having a sleep in.

None had ever been inclined to lay a complaint.

Summary evaluation

The flocks of seagulls flying above are noticeable to many neighbours in the study area, although they drew relatively little comment. Their nuisance appears to be regarded as very occasional and minimal, and not worthy of complaint.

Surface water effects

What effect do they notice? Source of effect?

Three residents of Bishopdale (4%) made unprompted observations about various aspects of water quality in the York Valley Stream, rising to 8% with prompting.

Several commented on visual aspects such as a periodic milkiness in the stream below the culvert near the intersection between Bishopdale Avenue and Clifford Avenue, and froth in the stream - *“never clear”, “sometimes clear and sometimes smells like a sewer”, “dogs come back smelly from playing in the creek”, “the stream has a dirty colour if high”*.

One commented on the loss of small fish from the stream - *“kids used to catch koura”*.

When asked about the sources for these effects, the landfill operation was only one of a number of sources. Indeed, its main effect may now have passed (see later discussion).

Particular sources of stream water discolouration noted were -

- the mud and dirty water on Market Road - *“a combination of water, mud and stones after heavy rain”* - i.e. mainly the quarry;
- residential discharges (e.g. from a pottery);
- occasional contamination from spillages onto Market Road off landfill trucks, particularly during wetter weather;
- seepage from the front face of landfill - *“paddocks below were always wet, noticed it when walking the dog in the last two years”*;
- overflow from the flood retention dam; and
- leachate overflow from manholes in the street - during past heavy rainfall events.

There is no dispute that, during 1998 and 1999, overflows from the sewer mains have mixed with stormwater flows on the streets and entered the stream (see Figure 15) - *“overflow came up out of the manholes along the streets; stained the road brown; produced a nasty smell and brown froth”*. However, during normal operations now (with previous excessive stormwater and leachate volumes from the landfill site being eliminated or diverted), any continuing effects observed in the York Valley Stream below the culvert by Bishopdale Avenue are most likely to be coming from the quarry and local street stormwater.

City Council staff also pointed to several other sources -

- stormwater from the nearby quarry; there are three entry points into the channelled section of York Valley Stream;
- the bare hillside, particularly on the western side of the valley around the new sub-division; and
- section clearing prior to residential construction in the Bishopdale sub-division from time to time.

There are several discharge points into the stormwater system above the point where the stream re-emerges (see Figure 22).

Timing; frequency; trends?

Over half of the responses pointed to the correspondence between occasional heavy rain events and the worst stream pollution - *“once a month”, a few times a year* - but two also reported *“continuous”* signs of froth in the stream.

Only one resident reported a decline in the incidence of stream pollution - *“hasn’t done it this year as yet”*.

Mitigation?

The landfill’s contribution to these effects in the York Valley Stream are linked directly to the problems of excessive leachate previously generated on the landfill site. Remedies for this have been described in detail in the earlier section on odour mitigation. These measures are complemented with regular monitoring of surface water quality associated with stormwater from the landfill - i.e. the quality of the water in the landfill stormwater settling pond, as well as the quality of the stream water above and below the discharge point from the settling pond into the stream.

Impacts?

The various discharges into the York Valley Stream from time to time have resulted in constraints on young children playing in the stream, due to concerns about the possible health risks, and a similar need to restrain dogs from playing in the water. This concern was particularly associated with the sewage system leachate overflows although it also applies if there is uncertainty as to the source of the pollution. One resident with a stream boundary claimed he *“would not have a vege garden and eat from it”*.

The other impact described was the visual unsightliness of a polluted stream.

Summary evaluation

It would appear that there have been two main sources of surface water pollution entering the York Valley Stream - the intended stormwater flows⁴⁵ and the unintended leachate overflows (which have already been discussed at length because of their association with unpleasant odours). The latter were linked directly with the landfill operation, and should now have been eliminated. The former are mainly associated with the quarry operation and pollution sources from the street and footpath surfaces (e.g. vehicle oil, dog soil, etc.).

⁴⁵ Indeed, York Valley Stream is an integral part of the stormwater network in Bishopdale.

Dust

What effect do they notice? Source of effect?

Two unprompted responses (3%) and three more prompted responses (7%) all came from the vicinity of Market Road (only from residents in the “elevated” area of interviewing). While the comments mainly reflected observations made when residents are out walking - dust on Market Road itself - two of the five respondents noted excessive levels of dust inside their homes. They variously described fine layers of “drifty dust”, “a fine layer of dust and grit”.

The primary source of dust was held to be from quarry operations - particularly noticeable after periodic blasting (see Figure 13). Dust was also reported from quarry and landfill trucks - “hardfill trucks”. However, residents were unable to differentiate between dust from quarry vehicles and dust from landfill vehicles.

No dust was reported as being wind-borne from the landfill site itself .

Timing; frequency; trends?

Those residents for whom dust is an issue were aware of airborne dust only during daylight hours when the landfill and quarry vehicles were operating. Two residents described the presence of the airborne dust as “continuous” and one believed it had increased over the past five years. They were aware of it out of doors six days a week and not on a Sunday or on rainy days.

Mitigation?

Council staff indicated that Market Road is swept weekly, each Tuesday.

Impacts?

Whilst several residents had to dust inside their houses more frequently, they did not consider the effect significant - “not that serious”, “aware of it - a minor nuisance”, “not making myself irritable over it”.

Summary evaluation

Dust is a continuous but minor effect for residents living adjacent to Market Road, and for those who use Market Road for walking. It is attributed mostly to the nearby quarry operation and its trucks, but also occasionally to the landfill trucks.

Visual effects

What effect do they notice? Source of effect?

Four respondents (5%) made generally positive comments about the visual effects of the landfill. One noted that the landfill had been “*a bare scar early on*” but was now well screened. Two residents in the ‘near’ area commented on the visibility of the landfill. Whilst one was well screened, the other reported the landfill as visible “*all the time*” from the windows of their home.

Timing; frequency; trends?

One resident in the middle of the study area noted the landfill planting had “*improved over time*”. Another noted it was only visible on a clear day and during daylight hours.

Mitigation attempts?

One key informant noted that the planting around the landfill was in accordance with the consent and that the screening was working well.

Impacts?

No negative comments were reported.

Summary evaluation

The Nelson City Council has planted the landfill in order to screen its operations from neighbours. Planting began soon after the landfill was first established. There is a strong consensus that the planting has been successful.

Other effects observed

The presence of litter on the roadside drew comment from two residents. A single, uncorroborated observation about operational noise was not analysed any further.

Litter

Two residents commented on the presence of occasional plastic bags and paper on the roadside - “*not a great deal of it, but noticeable*”, “*nothing ever blows down from the landfill itself*”.

‘Old’ litter was observed by members of the research team along the verges on Market Road.

Summary of neighbours responses

The following two tables (8 and 9) provide a summary of the proportions of those interviewed who discussed particular effects in their responses to the structured questionnaire. It is important to note that these percentages do not represent the proportions of neighbours who experienced significant off-site impacts.

Table 8: Summary table of responses by neighbours of York Valley landfill (N=75)

Effect noticed	% Unprompted	% Unprompted + Prompted
Odour	37	43
Traffic noise	17	32
Road safety	9	13
Bird nuisance	7	11
Surface water effects	4	8
Dust	3	7
Visual effects	-	5

In some cases, there are spatial patterns to the observation of off-site effects such as odour and traffic noise

Table 9: Spatial distribution of observations reported

Effect reported	% Unprompted + Prompted				
	Total sample (N=75)	Near (N=28)	Middle (N=23)	Elevated (N=14)	Far (N=10)
Odour, incl. LFG	43	68	48	14	0
Traffic noise	32	46	4	64	0
Road safety	13	0	0	71	0
Bird nuisance	11	14	4	21	0

F: Longer-term effects on the landfill on settlement patterns and development in the locality

Main conclusions

Three times as many local residents expressed the view that the landfill operation has not had a negative influence on local development, as expressed the opposite viewpoint.

Census data between 1986 and 1996 confirm the rapid growth in local population numbers. No data are available for the period since 1996. However, present indications are that this trend is continuing.

Apart from the very significant residential development in Bishopdale, there has been no other significant change in the host community in the past 13 years.

In exploring the longer-term effects of the York Valley landfill, residents of the host community were asked for their observations on -

- the major changes that have occurred in settlement pattern in the locality over recent years, and
- whether the location of the landfill had influenced the way in which the community had developed.

Major changes in land use and settlement pattern

While changes between census years (1986, 1991, 1996) indicate the growth in residential population over that time, no statistical data exists for the period since 1996. With one exception⁴⁶, resident's comments suggest that the growth in residential development has persisted unabated.

Several observers point to the frequency with which some houses have changed hands or changed occupants - *"the buying and selling in Westley Place is incredible"*, *"quite a lot of moving on"*. One observer suggested that a relatively high level of *"spec. building"* has led to high rental occupancy, if the new dwelling does not sell quickly. However, dwelling statistics (Statistics NZ, 1997) do not show above-average rental housing in the immediate area⁴⁷. Several other residents also commented on their perception of *"slow sales"*.

⁴⁶ One resident in Westley Place expressed the view that "development stopped for the last three years, and the sections next door have not sold".

⁴⁷ For the whole of Nelson City, 26% of private dwellings were rented in 1996, compared with 16% in the Bishopdale sub-division. The broader surrounding area of the Grampians did however exhibit above-average rental accommodation, at 36% of all dwellings.

Overall, there have been no major changes in land use in York Valley in the past decade; simply a continuation of the Bishopdale residential sub-division through several stages, increasing the occupation of land that had previously been converted from rural to residential use.

The influence of the landfill on the way in which the community of Bishopdale has developed

Analysis of responses to the question on whether or not the presence of the York Valley landfill has influenced the development of Bishopdale residential community indicated exactly half who believe the facility has not had any negative influence. If non-responses are removed from the sample, then these views outnumbered perceptions of a negative influence by 3-to-1, as shown in the following Figure.

Figure 23: Landfill's influence on community development

When the responses are analysed separately for “near and middle” and “far and elevated” areas of interviewing, a greater proportion of “near and middle” respondents expressed negative perceptions.

Of those who expressed a viewpoint, the largest proportion (51%) held the view that the landfill operation has not had a negative influence on local development -

“Friends and acquaintances never seriously link Bishopdale with the landfill”

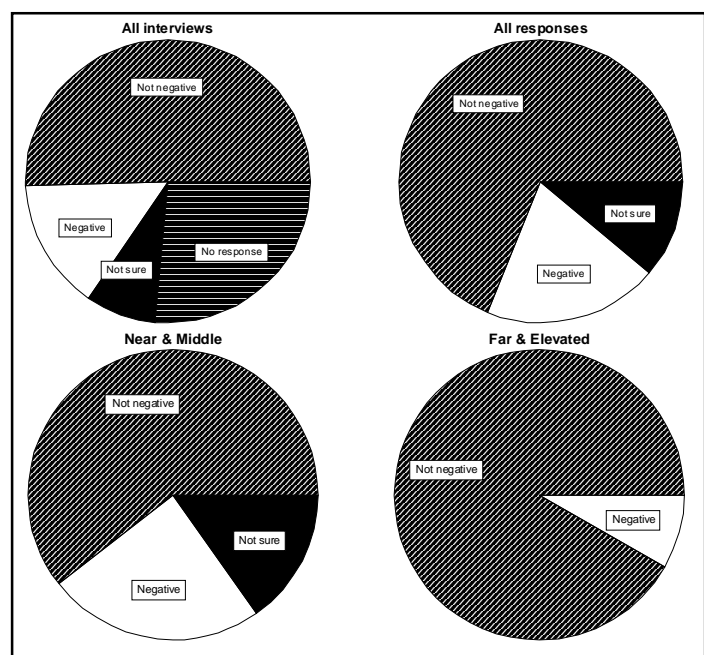
“The quarry is by far the bigger problem”

“No - seems to have gone ahead quickly and well”

“No effect - all properties up Bishopdale have sold”

“It’s a very nice area to live”

“Developed as a middle upper community”.



Negative perceptions were expressed by 15% of respondents -

“Has detracted from the value of properties ‘up near the tip’; probably the effect spreads half way down”

“Did notice unsold and unbuilt sections at the far end - guess people are put off”

“Might have slowed it down; affected house sales and prices; has made it more difficult to sell”

“There is a slight stigma in Bishopdale”

“Used to be a freshwater creek which would have crayfish in; it’s a shame the way the waterway has gone”⁴⁸

⁴⁸

In fact the channelling of the stream is the result of the residential sub-division rather than the landfill.

The developers of the residential sub-division in Bishopdale do not believe that the landfill operation has detrimentally affected their development plan. Census data up to 1996 indicates rapid growth in this locality compared with the City at large. However, no population trend data is available yet for the period since the most acute problems were experienced (i.e. post 1996). Nevertheless, both the developer and local real estate agents interviewed believe that sections in most parts of Nelson have been slow to move over the past four years. The real estate agents suggested that “*lack of sun*” has been a more significant factor for Bishopdale than the presence and operation of the landfill.

The developers expressed the view that “*since the new consent and the recent changes, we now have confidence for the future development of the Bishopdale area, but we still have concerns about the future capacity of the infrastructure to deal with the growth in leachate accumulation*”⁴⁹.

Council Technical Services staff responded that flow measurements in October and November 2000 showed that average dry-weather leachate flows were 0.4 l/s, with a range of 0.3 to 1.9 l/s. They expressed the view that the current arrangements, which have been designed to cater for maximum leachate flows of 11 l/s are adequate to cope with future growth, given the contingency arrangements that are in place for extreme events⁵⁰.

⁴⁹ Based on current leachate flows in no-rain conditions.

⁵⁰ These involve the leachate overflow/detention pond, from which any occasional overflows will be pumped and trucked off site to the waste water treatment plant, rather than be allowed to overload the local sewer network.

REFERENCES

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- Montgomery Watson. 1997. Resource Consent Application and AEE, May 1997.
- Taylor, C. Nicholas; Goodrich, Colin G. and Bryan, C. Hobson. 1995. Social Assessment: theory, process and techniques. 2nd Edition. Taylor Baines & Associates, Christchurch, New Zealand.

APPENDIX I: Hazardous waste - letter to contractors

File Ref:

EG.0303

When calling
please ask for:
Direct Dial Phone:
Email:

KN.cb
Kevin Nilsen
03 546 0262

NELSON CITY COUNCIL

PO BOX 645 NELSON NEW ZEALAND PHONE 03-546 0200 FAX 03-546 0239

8 December 1999

Dear Sir/ Madam

YORK VALLEY LANDFILL - HAZARDOUS WASTE

Nelson City Council has been granted a Resource Consent to continue operating the York Valley Landfill subject to a number of conditions.

In particular discharge consent 975261-D stipulates conditions relating to the acceptance and disposal of Hazardous waste.

The consent will allow us to accept Asbestos and Medical wastes providing they meet the following criteria.

1. Asbestos wastes shall only be accepted in accordance with the Asbestos Regulations 1983, and subsequent amendments to the regulations.
2. Medical wastes shall only be accepted in accordance with NZS 4304:1990 "Health Care Waste Management" or subsequent amendments to the standard.

To dispose of Asbestos and Medical wastes an application shall be made to the City Council on the Hazardous Waste Manifest Form with supporting documentation. The Hazardous Waste Manifest Forms can be obtained from the Technical Services counter on the first floor, Civic House, Trafalgar Street.

The following is copied from the resource consent. Additional information is in the appendices.

1. *With the exception of Medical and Asbestos wastes, no hazardous waste shall be accepted for disposal at the landfill. The definition of "Hazardous waste" shall be:*
 - i. *Wastes which exhibit one or more of the following characteristics:*
 - *Explosive*
 - *Gas*
 - *Ignitable (as defined in USEPA 40 CFR Part 261) Refer Appendix A*
 - *Liable to spontaneous combustion*

- *Emit flammable gases on contact with water*
 - *Oxidising*
 - *Organic peroxides*
 - *Infectious*
 - *Radioactive*
 - *Corrosive (as defined in USEPA 40 CFR Part 261) Refer Appendix B*
 - *Liberates toxic gases in contact with air or water*
 - *Capable, by any means after disposal, of yielding another material, e.g. leachate, which possess any of the above characteristics.*
- ii. *Wastes which exhibit one or more of the following characteristics, which following testing using the US EPA Toxicity Characteristic Leaching Procedure (TCLP) results in maximum concentration of contaminants in excess of TCLP criteria Refer Appendix C.*
- *Poisonous substances*
 - *Toxic Substances (chronic or delayed effects)*
 - *Eco-toxic substances*

Where TCLP limits do not exist for a substance for which a disposal request is made, the TCLP limit shall be set at 100 times the drinking water standard for the substance.

Businesses intending to continue disposing of any hazardous material including treated sawdust at York Valley Landfill are to comply with the conditions of the consent. Analytical tests using the US EPA Toxicity Characteristic Leaching Procedure (TCLP) refer to section D:7 are to be carried out on the hazardous treated material at a recognised laboratory. The analytical results are to be attached to a Nelson City Council Hazardous Waste Manifest Form and sent to Mr K Nilsen for approval prior to disposal. **The analysis should be carried out on suspected hazardous material “in-situ” prior to transportation to York Valley.**

To comply with the consent all empty Hazchem containers including Flammable 3 are required to be washed three times, the Hazchem sticker is to be written over with the words “washed three times” and the container crushed or cut in small portions.

To enable us to comply with conditions of the consent we have to stringently enforce the new requirements. Your company and staff can help by observing the consent conditions, please advise your customers of the new conditions.

The landfill operator or representative of the council may ask you to take non-conforming hazardous waste back to where you picked it up from or back to your premises, please do so immediately. Failure to do so will result in cancellation of the weighbridge card. Any costs associated in returning the hazardous waste and any associated legal fees shall be met by the cartage firm who brought the hazardous waste into the landfill.

For further information on disposal of material to York Valley please telephone Kevin Nilsen 546-0262 or Tony Bowe 546-0260.

Attached is a form, which we require to be signed and returned to Nelson City Council in the prepaid envelope by Wednesday 22 December 1999. You will see that there are two copies, only one copy needs to be returned.

Yours faithfully



A A Bowe
Roading/Traffic/Refuse Supervisor

YORK VALLEY LANDFILL – HAZARDOUS WASTE**PLEASE SIGN ONE COPY AND SEND BACK IN THE PRE-PAID ENVELOPE:**

We hereby confirm we have read and understood your letter of 8 December 1999 detailing conditions for disposal of hazardous waste. We further agree to abide by those conditions.

We acknowledge that failure to comply with these conditions will result in cancellation of our card.

We have advised all staff and commercial customers of the information contained in this letter.

CUSTOMER NAME: _____

DATE: _____

Print Name: _____

Signature: _____

Schedule 2**TCLP Criteria for Waste Acceptance**

Constituent	TCLP Acceptance Limit (mg/l)	Screening Level (mg/kg)
Inorganics		
Bromine ¹	5	100
Flouride ¹	5	100
Cyanide ¹ – weak acid dissociable (as CN)	5	100
Metals		
Antimony ¹	10	200
Arsenic ¹	5	100
Barium ¹	10	200
Beryllium ¹	0.005	0.10
Boron ¹	5	100
Cadmium ¹	0.5	10
Chromium ¹	5	100
Cobalt ¹	10	200
Copper ¹	10	200
Lead ²	5	100
Mercury ²	0.2	4
Molybdenum ¹	10	200
Silver ¹	2	40
Nickel ¹	10	200
Selenium ²	1	20
Thallium ¹	10	200
Tin ¹	20	400
Zinc ¹	10	200
Volatile Organics		
Benzene ²	0.5	10
Carbon Tetrachloride ²	0.5	10
Chlorobenzene ²	100	2000
Chloroform ²	6	120
1,2- Dichloroethane ²	0.5	10
1,1 – Dichlorethylene ²	0.7	14
Methyl Ethyl Ketone ² (MEK)	200	4000
Tetrachloroethylene ²	0.7	14
Trichloroethylene ²	0.5	10
Vinyl Chloride ²	0.2	4

¹ NZS 9201² USEPA 40 CFR I 261³ Health and environmental Guidelines for Selected Timber Treatment Chemicals

Constituent	TCL(Acceptance Limit (mg/l)	Screening Level (mg/kg)
Semi- Volatile Acid Fraction		
o-Cresol ²	200	4000
m-Cresol ²	200	4000
p-Cresol ²	200	4000
Cresol Total ²	200	4000
Pentachlorophenal ³	1	20
2,4,6-Trichlorophenol ²	2	40
Semi-Volatile Base Fraction		
1,4-Dichlorobenzene ²	7.5	150
2,4-Dinitrotoluene ²	0.13	2.6
Hexachlorobenzene ²	0.13	2.6
Hexachlorobutadien ² e	0.5	10
Hexachloroethane ²	3	60
Nitrobenzene ²	2	40
Pyrdine ²	5	100
Pesticides		
Chlordane ²	0.03	0.6
Endrin ²	0.02	0.4
Heptachlor ²	0.008	0.16
Lindane ²	0.4	8
Methoxychlor ²	10	200
Toxaphene ²	0.5	10
Organosphosphate pesticides ¹	0.1	2
Pesticides (other) = (includes insecticides, herbicides, fungicides and excludes organophosphate, organochlorine and any pesticides not registered for use in New Zealand) ¹	0.2	4
Herbicides		
2,4,5-TP (Silvex) ²	1	20
Organics		
Formaldehyde (as HCHO) ¹	50	1000
Phenols ¹ -excluding chlorinated phenols	50	100
Chlorinated phenols ¹	0.02	0.40
Halogenated aliphatic compounds ¹	1	20
Monocyclic aromatic hydrocarbons ¹	5	100
Polycyclic (aromatic hydrocarbons) (PAHs) excluding naphthalene ¹	0.05	1

¹ NZS 9201² USEPA 40 CFR I 261³ Health and environmental Guidelines for Selected Timber Treatment Chemicals

APPENDIX II: Liquid waste - letter to all customers

File Ref:

EG 0303

When calling
please ask for:
Direct Dial Phone:
Email:

Kevin Nilsen
03 546 0262

29 November 1999

Address: click here or press F11

Dear Addressee: click here or press F11

YORK VALLEY LANDFILL – LIQUID WASTE

Our Application to operate the landfill at York Valley has been heard by the Consent Hearing Commission Mr Fowler. He has made his decision that allows us to operate the landfill within the existing gully site until 31 December 2034.

The new consent conditions have imposed new conditions upon us, one being the disposal of hazardous waste.

The consent will allow us to accept Asbestos and Medical wastes providing they meet the following criteria.

1. Asbestos wastes shall only be accepted in accordance with the Asbestos Regulations 1983, and subsequent amendments to the regulations.
2. Medical wastes shall only be accepted in accordance with NZS 4304:1990 "Health Care Waste Management" or subsequent amendments to the standard.

To dispose Asbestos and Medical wastes an application will have to be made to the City council on the Hazardous Waste Manifest Form with supporting documentation. The Hazardous Wastes Manifest Forms can be obtained from the Technical Service counter on the first floor, Civic House, Trafalgar Street.

1. With the exception of Medical and Asbestos wastes, no hazardous waste shall be accepted for disposal at the landfill. The definition of "Hazardous waste" shall be:
 - i. Wastes which exhibit one or more of the following characteristics:
 - Explosive
 - Gas
 - Ignitable (as defined in USEPA 40 CFR Part 261)
 - Characteristic of ignitability
 - (a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

- 1) It is a liquid other than an aqueous solution containing less than 24 percent alcohol by volume and has flash point less than 3°C(140°F) as determined by a Pensky-Martens Closed Cup Tester, using the test method specified in ASTM Standard D-93-79 or D-93-80 (incorporated by reference, see §260.11), or a Setaflash Closed Cup Tester, using the test method specified in ASTM Standard D-3278-78 (incorporated by reference, see §260.11), or as determined by an equivalent test method approved by the Administrator under procedures set forth in §§260.20 and 260.21.
- 2) It is not a liquid and is capable under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.
- 3) It is an ignitable compressed gas as defined in 49 CFR 173.300 and as determined by the test methods described in that regulation or equivalent test methods approved by the Administrator under §§260.20 and 260.21.
- 4) It is an oxidiser as defined in 49 CFR 173.151.
- (b) A solid waste that exhibits the characteristic of ignitability has the EPA Hazardous Waste Number of D001.

[45 FR 33119 May 19,1980, as amended at 46 FR 35247, July7, 1981; 55FR 22684, June 1, 1990]

- Liable to spontaneous combustion
- Emit flammable gases on contact with water
- Oxidising
- Organic peroxides
- Infectious
- Radioactive
- Corrosive (as defined in USEPA 40 CFR Part 261)

§261.22 Characteristic of Corrosivity.

- (a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties.
 - (1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846 as incorporated by reference in §260.11 of this chapter.
 - (2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35mm (0.250 inch) per year at a test temperature of 55°C (130 °F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) Standard TM-01-69 as standardised in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846 as incorporated by reference in §260.11 of this chapter.
- (b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

[45 FR 33119, May 19 1980, as amended at 46 FR 35247 July 7 1981; 55FR 22684, June 1 1990; 58 FR 46049, Aug 31, 1993]

- Liberates of toxic gases in contact with air or water
- Capable, by any means after disposal, of yielding another material, e.g. leachate, which possess any of the above characteristics.
- ii. Wastes which exhibit one or more of the following characteristics, which following testing using the US EPA Toxicity Characteristic Leaching Procedure (TCLP) results in maximum concentration of contaminants in excess of TCLP criteria detailed in Schedule 2, attached to this consent:
 - Poisonous substances
 - Toxic Substances (chronic or delayed effects)
 - Eco-toxic substances

Where TCLP limits do not exist for a substance for which a disposal request is made, the TCLP limit shall be set at 100 times the drinking water standard for the substance.

The definition of “hazardous waste” shall not include small quantities of waste products containing potentially hazardous components that are not expected to have adverse effects on the environment, such as can reasonably be expected to be contained in the municipal waste stream.

Businesses intending to continue disposing treated sawdust at York Valley Landfill are to comply with the conditions of the consent. Analytical tests using the US EPA toxicity Characteristic Leaching Procedure (TCLP) refer to section D:7 are to be carried out on the treated sawdust at a recognised laboratory. The analytical results are to be attached to a Nelson City Council Hazardous Waste Manifest Form and send to Mr K Nilsen for approval.

To comply with the consent all empty Hazchem containers including Flammable 3 are required to be washed three times, the Hazchem sticker to be written over (washed three times) and the container crushed or cut in small portions.

To enable us to keep within the conditions of the consent we have to stringently enforce the new requirements. Your company and staff can help by obeying the consent conditions, please advise your customers of the new conditions.

The landfill operator or representative of the council may ask you to take non-conforming hazardous waste back to where you picked it up from or back to your premises, please do so immediately. Failure to do so will result in cancellation of their weighbridge card and any cost associated in removal, storage, transport, destruction and legal fees shall be met by the cartage firm who brought the hazardous waste into the landfill.

For further information please telephone Kevin Nilsen 546-0262.

Yours faithfully

A A Bowe
Roading/Traffic/Refuse Supervisor

Businesses intending to continue disposing liquid waste at York Valley Landfill are to comply with the conditions of the consent. Analytical tests using the US EPA Toxicity Characteristic Leaching Procedure (TCLP) refer to section D:7 are to be carried out on the liquid wastes your business intends to dispose of. The analytical tests are to be carried out at recognised laboratory. The analytical results are to be attached to a Nelson City Council Hazardous Waste Manifest Form and sent to Mr K Nilsen for approval.

To comply with consent conditions each visit to the landfill to dispose liquid waste will require you to fill in a declaration form; the following information is required:

Name: (Contractors Name) _____

Date: _____

Quantity: (Tonnes) _____

Type: (Septic Tank – Oil Traps etc) _____

Source: _____

(Name the business and location where the waste is coming from) _____

When the 150 tonnes have been reached, no further liquid waste shall be accepted until the next year's allocation starts.

We are to actively encourage liquid waste contractors to find alternative means in disposing of their liquid wastes.

Please only use Code 2 for liquid waste (weighbridge card). If you have only a code 2 on your weighbridge card (liquid waste) and you intend taking in solids or refuse.

Please contact Kevin Nilsen 546-0262 to adjust your card to the appropriate code number.

For further information please ring Kevin Nilsen at the above telephone number.

APPENDIX III: Disposal of vehicle bodies - letter to all customers

File Ref:

EG 0303

When calling
please ask for:
Direct Dial Phone:
Email:

KJN:cb
Kevin Nilsen
03 546 0262

8 December 1999

Address: [click here](#) or press F11

Dear Customer

YORK VALLEY LANDFILL DISPOSAL OF VEHICLE BODIES

The scrap metal merchant has advised us that their cost to dump non-metal scrap is going to increase by over 100% in the near future.

To keep costs down to those disposing of vehicles and make the scrap metal recycling cost effective, they have advised us that they are unable to take non-metal scrap implanted in the vehicles.

This means that all vehicles are to be stripped of non-metal parts, as set out in the acceptance criteria before entry to the York Valley Landfill. The non-metal parts are to be disposed of as general refuse in the landfill or at the Pascoe Street Transfer Station at your cost.

EXISTING ACCEPTANCE CRITERIA

1. All oil and fuel to be drained from sumps, reservoirs etc.
2. All other liquids to be drained – radiators etc.
3. LPG or other gas tanks to be removed.
4. All tyres to be removed (Tyres are to be cut into quarters and disposed as general refuse, or they can be disposed of at the Transfer Station for a fee.
5. Remove all registration plates and return them to an LTSA agency.

ADDITIONAL ACCEPTANCE CRITERIA TO APPLY FROM 1 JANUARY 2000

1. All seats, glass, carpet, and refuse to be removed.
2. Your card number (weighbridge card) has to be painted on the vehicle.
3. All hazardous waste to be removed.

Attached is a form, which we require to be signed and returned to Nelson City Council in the prepaid envelope by Wednesday 22 December 1999. You will see that there are two copies, only one copy needs to be returned. For further information please ring Kevin Nilsen 546-0262.



Yours faithfully

A A Bowe

Roading / Traffic / Refuse Supervisor

Encl

APPENDIX IV: Vehicle count data for Market Road

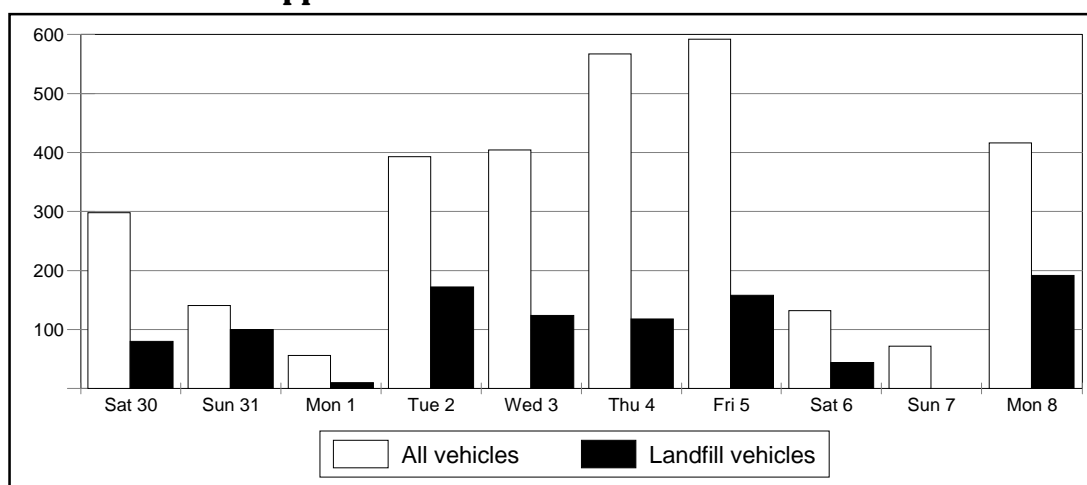
The traffic data for Market Road accessed for this research were week-long traffic counts conducted for the Nelson City Council during the first week in February 1999 and the last week in July 2000. The two surveys were carried out at different points along Market Road so that results are not totally comparable. In February 1999, measurements were taken at a point on the level section of Market Road (identified as being 805 m from the entrance to Market Road), above the residential area of Bishopdale. In July 2000, measurements were taken at a point on the steep section of Market Road (identified as being 253 m from the entrance to Market Road), just below the junction with Brunner St.

Traffic counts in February 1999

The February 1999 survey covers all vehicles travelling along the top section of Market Road just beyond the first quarry, but before the landfill entrance. The survey also provides a distribution of vehicle speeds in 10 kph bands, travelling in each direction (separately) along Market Road between Saturday 30 January and Monday 8 February¹ 1999.

The figure below summarises daily vehicle movements (i.e. summing movements in each direction) for all vehicles travelling along the top section of Market Road. These data are compared with total landfill vehicle movements, calculated from weighbridge records over the same period.

Figure A: Vehicle Counts - upper Market Road - all vehicles



Information provided by the operator of the quarries indicated peak quarry truck visits (both quarries) at 120 per weekday. However, it should be noted that the 1999 Market Road traffic survey occurred during a period when quarry trucks were particularly busy providing material for constructing the Stoke by-pass road which opened in February 2000. These exceptional circumstances are reflected in the data contained in the figure above. During this period of vehicle monitoring, landfill vehicles typically accounted for between 25% and 35% of all vehicle movements, and never more than 50%.

Time-of-day analysis for the five normal weekdays indicates that typically 97% of all traffic movements along the upper section of Market Road occur between 7 am and 7 pm. Outside these hours,

¹ The Monday of the chosen week was Nelson's Anniversary Day, when the landfill was closed.

typically fewer than five vehicles travel along the road each day. Some of these may be vehicles associated with the quarry arriving early in the morning, while others are likely to be recreational users of the area arriving and leaving later in the summer evenings.

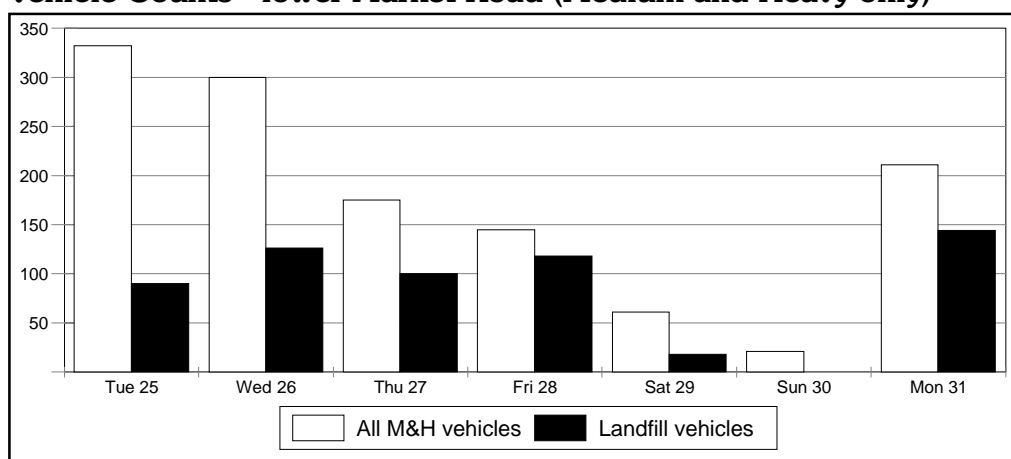
The maximum number of vehicle movements recorded in any single hour during the period was 79, occurring between 11 am and 12 noon on the Thursday. This corresponds to more than one vehicle movement per minute. The average number of vehicle movements per hour during 7 am till 7 pm weekdays ranged from 32 to 48. Hourly comparisons for weekdays suggest fluctuations during the day with either two or three peak hours occurring between 9 am and 4 pm.

Traffic counts in July 2000

The July 2000 survey covers all vehicles travelling along the lower section of Market Road, just below the junction with Brunner St. It therefore includes significant numbers of private cars moving in and out of Bishopdale via either Market Road or Brunner St. The survey provides a more limited analysis of vehicle speeds in three speed bands, travelling in each direction (separately) along Market Road between Tuesday 25 July and Monday 31 July 2000. To provide comparable insights with those from the February 1999 survey, analysis of this survey focusses primarily on medium-weight and heavy-weight vehicles.

The figure below summarises daily vehicle movements (i.e. summing movements in each direction) for Medium and Heavy vehicles only, just below the junction with Brunner St. These data are compared with total daily landfill vehicle movements, calculated from weighbridge records over the same period. In contrast to the February 1999 period, when quarry activity was boosted by the needs of nearby highway construction at the Stoke by-pass, landfill vehicles typically accounted for between 50% and 75% of all medium and heavy vehicle movements.

Figure B: Vehicle Counts - lower Market Road (Medium and Heavy only)



As previously, time-of-day analysis for the five weekdays indicates that typically 97% of all medium and heavy traffic movements along Market Road occur between 7am and 7pm.

The maximum number of vehicle movements recorded in any single hour during the period was 51, occurring between 1 pm and 2 pm on the Thursday. This corresponds to just under one vehicle movement per minute. The average number of vehicle movements per hour during 7 am till 7 pm weekdays ranged from 12 and 27. The difference between these figures and those for February 1999 can be explained by the higher level of quarry activity in the earlier period.