



Whakatu Arterial Link

Productive Land Use Impact Assessment

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1.0 Executive Summary

This report describes the impact the Whakatu Arterial Link road (WAL) and its construction will have on adjacent horticultural and agricultural properties through which it passes.

Possible mitigation measures are discussed.

It is noted that this report focuses on the impacts on those horticultural and agricultural properties directly impacted by the WAL. The broader economic impacts and benefits associated with the WAL are considered in the Economic Assessment (Bevin, 2014).

1.1 Potential Effects

The WAL will result in the loss of approximately 20 hectares of land currently used for horticultural or agricultural purposes. This figure includes the road footprint and an additional set back from the WAL required for the provision of new headlands. 13.6 hectares of this total number is located within the Planes Zone, with the remaining 6.4 hectares located within the Industrial Zone but currently used for horticultural or agricultural purposes. In addition, there are severance effects where severed blocks may no longer be useful for productive purposes. It is noted that potential severance losses are not factored into the calculation of total direct losses, as future intended use of the severance areas is unknown.

Soil types crossed are largely the free draining Oamaru Sandy Loam.

The main impacts on the land owners are:

- Severance effects
- Property access during construction of the road.
- Spray application – spray drift issues.
- Increased orchard working costs.
- Damage to orchard infrastructure:
 - Wells and irrigation systems.
 - Omahuri Orchard cherry cage.
 - Tree support trellises.
 - Orchard buildings.
 - Drainage systems.
- Possible increased vulnerability to frost and wind injury to crops.
- Loss of valuable crop impacting on packhouse throughput.

- Potential dust hazards during construction.
- Property security during and after construction.

1.2 Assessments Undertaken

Site visits were made to determine the nature of horticultural businesses being impacted.

Detailed measurements of areas involved were obtained from GHD Whakatu Arterial Project Land Requirement Plan Drawings (provided as Schedule One to the Notice of Requirement application, HDC 2014a).

Soil maps of the Heretaunga Plains Plan No 2683 Sheet Numbers 3 and 5 were consulted to determine the soil types crossed by the WAL.

1.3 Results of Assessments

The WAL will impact adversely on all properties it touches.

Potential effects for all horticultural or agricultural properties include loss of security; reverse sensitivity effects associated with spray drift affecting road users; dust during constructing affecting crops and equipment; impacts on infrastructure such as wells, irrigation lines and other structures; and exacerbation of adverse effects at certain times of the year due to the seasonal nature of operations.

Specific effects on the following properties are noted:

Wedd properties (Plains Zone) – 3.87 hectares of cropping land lost, plus isolation of 2.82 hectares from the remainder of their land.

Omahuri Orchards (Plains Zone) – very significant infrastructure disruption including cherry cage, irrigation well and main lines, and orchard access. Loss of 1.395 hectares of productive orchard.

Mr Apple New Zealand (Plains Zone) – removal of some 4.14 hectares of orchard from production including 1.47 hectares which will be isolated by the WAL without access from the main block.

ENZA Group Services Ltd (Industrial Zone) – significant infrastructure disruption including trellis support end assemblies, irrigation main lines and relocation of a frost machine. Loss of about 4 hectares of highly productive modern intensive orchard area. Isolation of 3.2 hectares of orchard on the other side of the WAL in need of access.

Apollo Pack Ltd (Industrial Zone) – traffic movement relating to inward bins, and gatehouse will need to be reconfigured on the site, as will bin storage and parking.

Dillon (Plains Zone) – WAL runs along the north side of the property, 0.96 hectares lost.

Lucknow Holdings Ltd (Plains Zone) – Significant infrastructure disruption including orchard shedding, irrigation well and main lines. WAL dissects property, 1.8 hectares lost and remaining portions of the property become marginal in size. Access will likely be required from the WAL for the severance block.

1.4 Suggested Approach for Effects Identified

Property infrastructure disrupted by the WAL construction will need to be restored to working order in time to avoid any adverse effects on orchard performance.

Solutions to potential spray drift problems onto the WAL will need to be worked through with the affected property owners or their lessees. A number of possible solutions are suggested in this report, with the establishment of live shelterbelts considered the best option.

Solutions to property access and the timeframes required also need to involve affected property owners or their lessees.

Title amalgamation or the provision of access onto the WAL may solve some severance effects. Two severance areas (Lucknow Holdings Ltd and small part Dillon) appear to no longer be appropriate for horticultural use. A further severance area of orchard (ENZA) within the Industrial Zone is likely to be developed for industrial purposes rather than continue as a productive use.

Some loss of productivity from recently planted intensive orchards could be mitigated by transplanting the trees to new orchard sites.

Orchard husbandry practices are seasonal in nature. Least disruption would occur if disruption of their infrastructure and repair were carried out over the April to August period.

During construction, dust hazard management will be critical within four to six weeks of crop harvest.

2.0 Brief

This report was commissioned by Environmental Management Services to:

- a. identify the issues that the WAL will create for the horticultural or agricultural properties through which it passes, and
- b. consider and recommend measures required to mitigate any adverse effects the new road and its construction will have on the surrounding land holders.

3.0 Background

The location and route of the WAL was developed through an Enquiry by Design process run by the Hastings District Council in 2012. Minimising impacts on productive land was one of the objectives set by the Enquiry by Design Working Group. A recommendation was also made by that group to Council that further effort be made through the final detailed design process to minimize these effects.

It is acknowledged that the design of the WAL minimises impacts on productive land as far as possible for a road in this location. For example, the design approach taken through the Omahuri Orchard and Mr Apple properties is to straddle property boundaries and hug the Karamu Stream as much as possible, thereby reducing impacts on individual properties and reducing severance effects. This design has resulted in a reduce speed limit for the WAL as a result of the geometrics required.

However, to achieve the objectives of the WAL (i.e. to provide a strategic link between SH2 and Pakowhai Road), productive land must be traversed and there are unavoidable effects associated with this. This report assesses those impacts.

4.0 Land Zoning and Soil Types

The road route will pass through and remove from productive use approximately 13.6 hectares of established orchard including provisions for new headlands and shelter belts, and 6.3 hectares of cropping land or pasture. As well as this horticultural land 0.94 hectares of an industrial site and 0.019 hectares of a residential site will become part of the road. In addition, about 2.5 ha of orchard will be isolated by the WAL and likely to require rezoning.

It is estimated that approximately 13.6 hectares of the land taken out of production is Heretaunga Plains Zone land. The remaining 6.4 hectares is zoned for industrial use.

Note: these estimates include allowances for the land required to establish new headlands where the roadway will travel across productive land. In the case of orchards, allowance has been made for a 10 metre headland with a 5 metre headland for cropping land.

The soil type involved is predominately 4, Oamaru Sandy loam, which is a versatile free draining soil well suited to tree crops such as apples.

The proposed Pilcher Road diversion crosses a small sliver of 14, Hastings silt loam, but the majority is 71, Mangateretere silt loam on clay. Both these are high quality soils, once well drained and suited to a wide range of crops as well as orcharding.

5.0 Loss of Productive Land

The development of a major roading link such as the WAL in a rural zone will inevitably remove productive land along the route chosen.

It is estimated that the WAL will remove from the Plains Zone the following areas of land:

Road footprint	10.2470ha
Additional area for headlands	3.3528ha
Total Amount of Plains Zone land lost directly	13.5998ha

In addition, the WAL will remove the following areas of Industrial Zone land that are currently utilised for farming productive purposes:

Road footprint	5.3549 ha
Additional area for headlands	1.0006ha
Total Farmed Industrial zone land lost	6.3555 ha

In addition to these direct land area losses, severance effects will result from the WAL dissecting some properties. A significant proportion of this land would be able to retain productive use through title amalgamation with adjoining properties. These losses are assessed as:

Potential severance losses – Plains Zone	8.31ha
Total severance losses following predicted title amalgamation – Plains Zone	2.74ha
Potential severance losses – Farmed Industrial zone land	3.31ha

Severance effects are further discussed in 5.1 below. It is noted that potential severance losses are not factored into the calculation of total direct losses, as future intended use of the severance areas is unknown.

6.0 Effects of the Road on Land Owners

In our opinion the road could potentially impact on landowners in a number of ways, as follows:

- Severance Effects.
- Spray application.
- Loss of stand-alone viability.
- Increased orchard working costs.
- Damage to orchard infrastructure.
- Increased vulnerability to weather related problems e.g. wind damage.
- Property security.
- Construction hazards.

6.1 Severance Effects

The WAL will be largely a limited access road. This means that where the road divides properties' access between the main portion of the property and a severance area on the other side of the WAL will be limited and in some cases no longer possible. Depending on the size and shape of the severance area, it may also be impractical to continue to work it for horticultural or agricultural purposes. In total, 8.31ha of Plains zone land (a significant proportion of this land would be able to retain productive use through title amalgamation with adjoining properties) and 3.31ha of farmed Industrial land, totalling 11.62ha is potentially impacted in this way.

Properties that will be impacted in this manner are discussed below. These properties may be identified by their 'Property ID' in the Land Requirement Plans provided as Schedule One to the Notice of Requirement application, HDC 2014a.

Wedd Properties (Plains Zone) – identified as 3 4 and 5 on the land requirement plan

2.5ha approximately north of the WAL will be isolated from the remaining Wedd properties to the south. This area will be difficult, but not impossible, to continue to be cropped. Its triangular shape further limits utilisation for cropping purposes.

There does not appear to be an opportunity to amalgamate this isolated area with any adjacent title to increase title area on this side of the WAL.

It is noted that a rental cottage fronting State Highway 2 will need to be relocated as a result of the WAL. If this is to be relocated within the Wedd property, the location (in consultation with the landowner) should minimize any further impacts on the productive capability of the property.

Mr Apple (Plains Zone) – identified as 7 on the land requirement plan

1.45ha approximately between the WAL and the Karamu creek will be isolated without direct access from the remaining Mr Apple property which is approximately to the east of the WAL.

Amalgamation of this small area with the adjacent Omahuri Orchards Limited property (6 on the land requirement plan) appears to be the only practical solution.

ENZA Group Services Limited (Industrial Zone) – 10 on the land requirement plan

Approximately 3.25ha of the property to the south-west of the WAL will be isolated from the remainder of the property to the north-east. Once the WAL is built, this area will be very difficult to service as an orchard. The land is already zoned Industrial so it is probable that it will become an industrial site rather than an orchard. It is also noted that direct access to the WAL from this severance area has been proposed, facilitating industrial uses.

Lucknow Holdings Limited (Industrial Zone) – 13 on the land requirement plan

This title is dissected into two portions by the WAL. Approximately 0.65ha between present Whakatu Road and WAL and approximately 5.53ha north of the WAL between existing industrial properties and the Karamu Stream.

Where this block fronts onto Whakatu Road a fuel filling station has been established meaning that once the WAL is built the balance of this property will no longer have direct access to a public road.

It is a long narrow block tapering down in width towards the northern end. At present it is being used for grazing and because of size, area and access it would seem that in the future it is doubtful if it would be utilised for higher value cropping or orcharding purposes. As it is zoned industrial and adjacent to established industrial properties it would seem logical that this title also become industrial.

Dillon and Lucknow holdings Limited (Plains Zone) – 19 and 20 on the land requirement plan

The WAL dissects both these properties leading to approximately 3.75ha of severance area between the WAL and Karamu stream, with approximately 6.63ha to the southwest of the WAL if the land on that side was consolidated into a single title.

Direct access from the WAL to the severance area is proposed. It would be sensible from a land management point of view to amalgamate this land adjacent to the Karamu stream into a single title. However, the site will be of triangular shape making it rather expensive to farm in its present orchard form because of short rows and the angled boundary with the WAL requiring much wider headlands to enable machinery to turn out the rows. It is therefore considered that this land would be more suitable for purposes other than horticultural following construction of the WAL.

In addition to the areas shown above small portions of established industrial or residential use will also be taken for WAL construction purposes.

7.0 Spray Application

The primary effect of the WAL will be to expose properties to an additional boundary fronting onto public land. The affect of this is to reduce the ability of the properties to manage spray drift by the need to confine spray application as much as possible to weather conditions which minimise spray drift in the direction of the WAL.

Management of spray drift involves the following options:

- Establishment of shelter belt barriers and buffer zones.
- Application under weather conditions which minimise drift towards sensitive areas.
- Spraying methodology.
- Modification of spray equipment to minimise off target drift.
- Choice of less hazardous pesticides.

Each of these options is discussed below.

7.1 Shelterbelt Barriers and Buffer Zones

7.1.1 Buffer Zone Guidelines

It is recommended that consideration should be given to establishing buffer zones between the areas of properties which undertake spraying and the WAL, to avoid reverse sensitivity effects. Table 1 shows suggested minimum distances (i.e. widths of the buffer zone) between the downwind edge of the spray target area and the WAL.

Table 1: Spray Application Buffer Distances

Spray Application Method	Width of Buffer Zone	
	With Shelterbelt (m)	Without Shelterbelt (m)
Boom spray	2	10
Orchard sprayer	10	30
Aerial spraying	100	300

AgFirst Consultants consider that if orchard spraying shelterbelts are used to enable the width of spray application buffer zones to be reduced (as shown in Table 1) the shelterbelts need to be at least 5-6 metres high and 1 metre wide.

7.1.2 Shelterbelt Barriers and Buffer Zones

The preferred and most practical solution to the problem of spray drift onto the WAL would be to establish live shelter belt barriers between the property on which spray application is occurring and the adjacent road.

Studies which have been done in recent years on the amount of spray which passes through a live shelter belt indicate substantial reductions in both deposited spray and airborne drift during spraying. Trimmed, well managed shelter belts have the capability of filtering out in excess of 75% of airborne drift and in excess of 95% of deposited spray. Well managed shelter belts are highly effective for control of spray drift.

Levels of drift measured down wind of shelter belts while orchard spraying is occurring are at least several levels of magnitude below published allowable levels. When it is considered these are the safe levels for continuous working day exposure, lasting up to eight or more hours, the fleeting exposure to typical drift concentrations experienced by someone passing along the road while spraying is occurring would be minute compared to that experienced in the allowable workplace exposure.

The following points need to be considered in regard to boundary shelter belt establishment:

- depending on species it takes four to five years from planting or longer for live shelter belts to become effective barriers.
- shelter belts take up productive land and also compete with adjacent crops thereby reducing effective use of the land.
- shade and loss of sight lines from shelter belts may impact on road safety.
- shelter belts require regular maintenance and therefore require machinery access to both sides for trimming.
- shelter belt shade can create access problems during winter.

As little spraying is done during the dormant period, deciduous shelter belts would create less shade problem during the wet winter months and would be preferred over evergreen varieties.

On the basis, if shelter belts are to be used, it is recommended that *Alnus cordata* (Italian Alder) or similar suitable species is used. Trees should be planted at 1.5 – 1.6 m spacings and be between 0.75m and 1m in height at time of planting. This is recommend as a practical approach to balancing speed of establishment with reducing transplanting shock (by using younger trees) and plant cost.

7.2 Application Under Weather Conditions Which Minimise Drift Towards the Road

Many orchardists adjacent to sensitive areas manage the problem of spray drift towards these areas by choosing to spray near to them at times when drift is away from, rather than towards, the sensitive areas.

In the case of the WAL, this approach will be more difficult for some landowners to implement than at present because it means another orchard boundary adjacent to a sensitive area will be introduced.

Furthermore, weather conditions and weather event patterns sometimes make it necessary for spray application to be made in less than ideal conditions for management of drift towards sensitive areas. While spray operators have a responsibility to recognise the impacts of weather conditions on spray drift and endeavour to avoid spraying in conditions when drift towards a sensitive area may occur, their capability of adhering to this principal will become diminished once the WAL comes into existence due to the increased number of orchard boundaries which may be adjacent to it.

7.3 Spray Equipment

Some preliminary investigation work has been carried out to measure off target spray drift from various types of orchard sprayer. All types of sprayers investigated emit small amounts of spray capable of drifting off target.

As a general rule, sprayers which direct spray upwards, e.g. axial fans, carry greater risk than sprayers which direct spray downwards or to the side.

Those orchard sprayers which have to direct spray upwards towards the target can be expected to generate greater amounts of off target spray drift than tower sprayers which direct spray downwards towards the target.

Used in conjunction with live shelter belts of greater height than the height of spray release, a tower sprayer could minimise the spray drift risk from orchard sprayers.

While the adoption of tower sprayers may result in more manageable control of the spray drift risk, adoption of this type of sprayer does not give large improvements over other types of sprayer used with care and for the landowner, drift is only one of the things to consider when choosing an orchard sprayer.

Annual cropping farmers can almost eliminate significant spray drift by using boom sprayers which release spray down onto the crop. This may not be the preferred choice of spray equipment by affected cropping land tenants because at present aerial spraying by helicopter is widely used by this group.

Helicopter spraying is also used at times by orchardists.

The “Growsafe” guidelines concerning helicopter spraying indicate that recommended buffer zones between sensitive areas and the sprayed zone should be 100 metres or more. It is clear that due to the small property size, establishment of 100 metre buffer zones between the WAL and sprayed areas would be totally impractical. Research scientists working in the field of spray application and spray drift also have doubts about the need for a buffer zone of this size (Dr David Manktelow, pers comm). It should be noted that some properties which regularly use helicopter spray application are within 100 metres of sensitive residential areas.

The benefits associated with helicopter spraying such as timeliness, rapidity and convenience need to be balanced against the possible increased drift risk which may occur for a very much shorter duration than could be the case when conventional ground based equipment is used.

7.4 Choice of Less Hazardous Pesticides

In recent years considerable progress has been made in the development of less hazardous pesticides.

The New Zealand fruit industry has a policy of moving towards pesticides with lower toxicity and also adopting integrated fruit production (IFP) practices.

IFP relies on careful crop monitoring by stage of development for pests and disease then applying pesticides when defined threshold levels occur. This approach makes spraying practice more accountable.

While these developments do not directly affect the level of drift, any drift which does occur will be potentially much less hazardous.

8.0 Damage to Infrastructure

The WAL will have a significant impact on orchard infrastructure on the properties through which it crosses.

Below is a list of infrastructure that will be impacted on each property, starting at the Pilcher Road end of the WAL.

Wedd Properties – identified as ‘2-5’ on the Land Requirement Plan

There is no obvious infrastructure associated with cropping that appears to be impacted by the road. Mangateretere soil is not free draining so it is possible that soil drainage could be adversely affected. This aspect will need to be checked with the landowners as part of the ongoing consultation process.

Omahuri Orchards Ltd – identified as ‘6’ on the Land Requirement Plan

Infrastructure that will be impacted by the road development on this property includes:

- road end of the Cherry Cage – this will need to be rebuilt;
- orchard well, irrigation head works and water distribution mains; and
- spray material shed; and
- loss of shelterbelt where the WAL joins the highway, which will open up a wind corridor until new shelter belts are established.

Mr Apple New Zealand – identified as ‘7 and 9’ on the Land Requirement Plan

Impacts on orchard infrastructure to these properties are likely to be minor as the WAL is largely confined to the margin of these properties.

ENZA Group Services Ltd – identified as ‘10’ on the Land Requirement Plan

There will be significant disruption to orchard infrastructure on this property with respect to the following:

- Row trellis support systems – the orchard is planted intensively on dwarf root stocks which require robust support structures. Each row requires strainer assembly structures at each end. All rows impacted by the WAL will require their strainer assembly structures to be rebuilt. Where rows are being divided into two by the roadway this will mean two new strainer assembly structures for each row.
- A Frost control machine will require relocation.
- Irrigation header pipes and main lines will require relocation. The main line from the pump house to the orchard area on the Karamu Stream side of the WAL will need to pass under the roadway.

Apollo Pack Ltd – identified as ‘12’ on the Land Requirement Plan

The road development would appear to take out their inward bin driveway, gate house, empty bin, storage areas and possibly some car parking area. These functions will need to be relocated elsewhere on the site.

Lucknow Holdings Ltd – identified as ‘13’ on the Land Requirement Plan

A fuel stop recently constructed on the site will be disrupted by the WAL and will require reinstatement however there does not appear to be any horticultural / agricultural infrastructure disruption on this property.

Dillon – identified as ‘19’ on the Land Requirement Plan

There will be isolation of the irrigation infrastructure on the Karamu Stream side of the WAL from its header pipe and water source. It may be possible to supply irrigation water from the adjacent property.

Lucknow Holdings Ltd – identified as ‘20’ on the Land Requirement Plan

The WAL appears to encroach on orchard shedding, irrigation well and irrigation main lines and header pipes. The area of orchard on the Ruahapia Road side of the WAL will be isolated from its irrigation water supply source.

Silver Fern Farms – identified as ‘25’ on the Land Requirement Plan

This property will need to relocate a stock holding paddock.

It is noted that these issues will be addressed as part of the Public Works Act process and do not require specific mitigation under the Resource Management Act 1991, however are noted here as part of a broader consideration of effects.

9.0 Increased Vulnerability to Weather Related Problems

Areas of concern include:

- Disruption of drainage patterns within properties.
- Increased frost incidence.
- Altered direction of or increased wind velocity.

Apart from the Wedd properties, the soil types on properties traversed by the WAL are considered to be free draining. The road design includes storm water drains to remove excess water rapidly at times of heavy rain, so it is not envisaged that there will be any significant effect on property drainage (refer Stormwater Management Plan GHD 2014g and Erosion and Sediment Control Plan GHD 2014h) .

The road will be elevated to a similar height as the present stopbanks that it borders. Where it is adjacent to the existing Karamu Stream stopbanks, there should not be any effect on frost severity or incidence.

Where the road diverges from the stopbanks, there is potential for cold air to pond that may increase frost. Most likely areas for this to occur are the rear of Omahuri Orchards and the adjacent Mr Apple land between the road and Karamu Stream, ENZA between the road and Karamu Stream, and the Dillon and Lucknow orchards between the road and present Ruahapia Road. This is a possible risk that may require discussion with land owners.

The parts of the orchards through which the WAL will run do not have any shelterbelts, with the exception of the shelterbelt fronting State Highway 2 where the WAL enters the Fullford property. There will, therefore, be no adverse wind exposure effects on the orchard properties associated with the creation of wind funnel gaps from the removal of shelterbelts.

The WAL, however, will be elevated and will form a solid barrier to wind which could cause wind dumping deflection from the WAL in strong winds that may marginally increase the potential for wind damage to fruit growing near the road. Shelterbelts are proposed to mitigate spray drift effects and these would also reduce adverse wind exposure effects.

In general, these effects are considered to be minimal.

10.0 Property Security

Additional road boundaries reduce privacy and, unless satisfactory security fencing is provided between the public roadway and adjacent properties, incidence of theft and petty pilfering may increase. This is of concern to many property owners. This issue is discussed further in Section 11.4 below.

11.0 Construction Issues

During the construction of the WAL the main property issues will be:

- Access to portions of properties adjacent to the WAL to enable the necessary crop husbandry tasks, such as spraying and harvesting, to be accomplished when required.
- Restoration of critical infrastructure.
- Dust.
- Security.

These issues are discussed below.

11.1 Property Access

Timing of pesticide and fungicide application relative to weather events is critical for the production of clean fruit crops. Often there are only short windows of time available for spray application, so a delay in access to affected areas of the orchard for as little as half a day could result in heavy losses from disease.

Properties most at risk during construction of the WAL are the ENZA, Dillon and Lucknow orchards adjacent to the Karamu Stream.

The critical pest and disease control period commences in August, with intensive time-critical spraying over the September to November period, then further spraying through to harvest.

Worker access, often on foot, is necessary for hand thinning and harvest periods. Hand thinning is usually undertaken in November and December. The harvest period is variety dependent and usually takes about three weeks per variety. Harvest commences late January to February for early varieties, extending through to April for late varieties.

The ENZA orchard is a single variety, Envy™, which is harvested end of March into early April. This will be the orchard most affected by access during road construction.

Over the harvest period, orchards will be moving large numbers of harvest bins into and out of their blocks. The number of bins required per hectare can be up to 250 or more. Ready access for trucks or tractors and trailers will be necessary over the harvest period. Post-harvest cool chain requirements make it necessary to remove harvested fruit from the orchard on a daily basis.

Machinery access is also required for orchard mowing, however, this is not time-critical and occurs much less frequently than spray application for pest and disease control.

11.1.1 Apollo Packhouse Access

Good access for incoming crops to be packed will be required over the period late January through to early May.

Outward flow of packed product will cover the period February through to August or later, with peak movement of packed product from mid to late February through to end of June.

Inward flow of packing materials, parts for machinery upgrading and maintenance can occur outside these periods.

The Apollo business headquarters is located on site and would require all year vehicle access to enable full time staff to continue to work there.

Over the packing season, Apollo employs high numbers of casual staff, often doing shift work, so vehicle access and parking for these people also needs to be allowed for.

11.2 Restoration of Critical Infrastructure

Most of the restoration of orchard infrastructure affected by the WAL (identified in Section 8.0) will need to be carried out over the winter period while the trees are dormant and site activity is reduced.

The critical infrastructure to be restored is discussed below.

11.2.1 Omahuri Orchard cherry cage

As cherry harvest is usually completed by January, dismantling and restoration could be done over the autumn/winter following cherry harvest.

To avoid disruption of critical cherry crop husbandry practices, the restoration needs to be completed by late August. Orchard access for harvesting of the other orchard crops passes the front of the cherry cage, so it may not be practical to repair the cherry cage until apple harvest is complete.

11.2.2 Irrigation infrastructure

New wells, irrigation mains and header pipes that will be affected by the WAL will need to be restored by mid-December. Where well water is required for domestic supply or filling spray vats, it will be necessary to have the new well commissioned prior to destruction of the old well.

To enable new replacement wells to be developed it will be necessary to seek new permits from Hawke's Bay Regional Council, and there may also be a requirement for changes to be made to water allocations to recognize the reduction in area cropped due to the WAL.

11.2.3 Trellis support systems – ENZA Orchard

Restoration can only be done over the post-harvest and dormant period. It would be desirable to have the job completed by the end of August at the latest.

11.2.4 Tree Salvage – ENZA Orchard

The ENZA Orchard stands to lose in excess of 5 hectares of productive trees planted intensively on dwarf rootstocks. These trees are only four to five years old, relatively small, and could be easily transplanted. In excess of 10,000 trees will need to be removed for the WAL road to pass through the property.

ENZA packhouse staff have expressed concern about the loss of crop from these trees and the effect it will have on their packhouse throughput. However, as fruit supply from other packhouse suppliers is continuing to increase, it is the opinion of the author that loss of crop from these trees will not be of great material significance to ENZA's packhouse, coolstorage and marketing business.

Experience with transplanting established orchard indicates that the cost is similar to purchasing new trees, but provided a good transplanting and tree management technique is used, transplanted trees will come into good production two years sooner than planting new trees, not including any delay in the supply of new trees for the replacement planting. Transplanting would have to occur over the June-July period. Root pruning trees to be transplanted immediately after harvest would make removal easier, and make establishment in the new site better.

There may be small areas of recently planted trees on other orchard properties that could also be salvaged in this way.

11.2.5 Frost Machine Relocation ENZA Orchard

This machine will need to be relocated and in place by mid-August to combat spring frosts that could injure the new crop.

11.3 Dust

Anywhere that earth moving is being undertaken, dust generated from the construction site can become a hazard to crops on adjacent properties if construction activities are not managed appropriately. Its main impact on fruit crops are surface deposits with potential to lower perceived quality and downgrade fruit showing dust deposit.

Dust deposit creates serious cosmetic problems for fuzzy skinned fruits such as peaches, and once present is almost impossible to remove.

The Lucknow Orchard has a small area of Golden Queen peaches that could suffer dust contamination problems.

Peaches are vulnerable to dust contamination from October to March, with the last four to six weeks running into harvest much more critical than earlier in the season.

Cherries and nectarines are smooth skinned, so less affected by dust than peaches. There are small areas of these crops on Omahuri Orchard.

The majority of fruit crops on properties adjacent to the WAL are apples.

In recent years the apple industry has developed high pressure apple washers for its packing lines for the purpose of removing passenger insects likely to cause phytosanitary entry barriers in importing countries. It is probable that these apple washers would also remove any dust deposits.

Nonetheless, it is important that the WAL construction activities are managed to ensure that apple orchards do not suffer excessive dust exposure from road construction through the period from December to completion of harvest, which for practical purposes would be the end of April.

11.4 Security

Security fencing will need to be established once property boundaries are exposed to road construction.

The existing security fencing established along the Hawke’s Bay Expressway appears to be adequate.

Post and wire “deer fence” type netting fences, at 1.8 – 2.0m in height are considered a minimum requirement.

Where there are privacy or spray drift issues, planting of live shelter belts on the boundary would be the best long term solution. Live shelter belts will take four to five years to become fully effective, and comes with loss of additional productive land, and ongoing maintenance costs.

Preferences of the property owners in regard to security fencing and shelter belt planting should determine the mitigations measures adopted.

12.0 Land Owner Consultation

There needs to be good and regular communication with the land owners and their tenants where properties are leased, so that they are kept abreast of progress with the WAL construction.

Where disruption of their infrastructure is likely, ample warning is required as to timeframes involved, in order that the infrastructure be restored to working order by the time it is required for crop husbandry purposes.

In areas where the WAL will have long-term impacts on businesses, such as security, property access and management of spray drift issues onto new sensitive areas adjacent to properties, it is important that the affected horticultural businesses are actively involved in solving any problems that arise and can therefore accept some ownership of the solutions.

13.0 Summary and Recommendations

13.1 Summary

The WAL affects 10 horticultural and intensive cropping properties, three industrial properties and one residential property. These properties will be adversely affected by the WAL during its construction and also in the longer term.

The WAL will result in the loss of approximately 20 hectares of land currently used for horticultural or agricultural purposes. This figure includes the road footprint and an additional set back from the WAL

required for the provision of new headlands. 13.6 hectares of this total number is located within the Plans Zone, with the remaining 6.4 hectares located within the Industrial Zone but currently used for horticultural or agricultural purposes.

The main impacts on land owners are:

- Severance effects
- Property access during construction of the road.
- Spray application – spray drift issues.
- Increased orchard working costs.
- Damage to orchard infrastructure:
 - Wells and irrigation systems.
 - Omahuri Orchard cherry cage.
 - Tree support trellises.
 - Orchard buildings.
 - Drainage systems.
- Possible increased vulnerability to frost and wind injury to crops.
- Loss of valuable crop impacting on packhouse throughput.
- Potential dust hazards during construction.
- Property security during and after construction.

13.2 Recommendations

The adverse effects caused by disruption of property infrastructure during construction can be minimized by careful work scheduling for dismantling and restoration to ensure that critical crop husbandry practices can continue to be carried out as required. Ideally, this work needs to be carried out during the dormant period from late April to end of August.

The schedule below summarises the work required for each property.

Wedd Properties – identified as 2-5 on the Land Requirement Plan

Land use here is annual cropping and pasture. Realignment of Pilcher Road reduces area available for cropping in Plot 1, DP14513 north of Pilcher Road extension to a size that will be marginal for cropping.

The WAL construction period needs to be compatible with cropping schedules. Negotiation with the land owners, or their lessees, is required to clarify the impact on their land use.

Omahuri Orchards – identified as 6 on the Land Requirement Plan

Very significant infrastructure disruption:

Cherry cage – will need to be dismantled and restored between May and August.

Irrigation well, irrigation header pipes – must be restored by end of July after dismantling after end of spraying season, which lasts until leaf fall complete (end of May, early June).

New access track into the orchard as the WAL will cover the present orchard access track. Needs to be restored by the end of July to enable summer fruit spraying.

Privacy, property security, and potential spray drift issues associated with WAL. Best long-term solution live shelter belt – will take five years to be effective. In the short term, a security fence.

Possible dust hazard during construction – end of November to late April.

Mr Apple New Zealand – identified as 7 and 9 on the Land Requirement Plan

No obvious infrastructure disruption.

Property security and potential spray drift issues. Security fencing and live shelter belts may be necessary.

Loss of access to approximately 1.7 hectares between WAL and Karamu Stream – no longer practical for Mr Apple to farm this area. Perhaps amalgamation with adjacent title can solve this issue.

Dust hazard during construction – December to mid-April.

ENZA Group Services Ltd – identified as 10 on the Land Requirement Plan

Although Industrial Zones, the WAL will cause very significant orchard, infrastructure and property access disruption in terms of current orcharding activities.

The WAL slices through the middle of the orchard.

Approximately 3.0 ha of orchard isolated from the main block between the WAL and Karamu Stream. This area needs secure access for orchard machinery and orchard workers and harvested crop, both during and after WAL construction.

In total, ENZA stands to lose about 4 hectares of very productive high value orchard production. Transplanting is an option to salvage the trees. Mid-May to end of June is the optimum time to relocate these trees.

Irrigation main line to the isolated orchard between the WAL and the Karamu Stream will need to pass under the road.

End assemblies for tree support trellis will need to be rebuilt – May to August is the optimum time frame for this work.

Relocation of frost machine needs to be completed by end of August.

Property security and potential spray drift issues. Security fencing and live shelter belts may be necessary.

Dust hazard during construction, February to late April.

Apollo Pack Ltd – identified as 12 on the Land Requirement Plan

Inward bin access and gatehouse, parking and bin storage will need relocation.

This will occur over the June – December period.

During WAL construction, continuous access to the site will be necessary.

Security fencing required.

Dust during construction a potential hazard over the fruit packing season, which runs from January to August.

Dillon – identified as 19 on the Land Requirement Plan

WAL runs along the north boundary of the property.

Remaining orchard area of marginal size. Amalgamation of titles with adjacent Lucknow Holdings property may solve these problems.

Security and spray drift issues. Security fencing and live shelterbelts may be necessary.

Dust hazard January to April during construction.

Lucknow Holdings Ltd – identified as 20 on the Land Requirement Plan

Property dissected by WAL.

Orchard shedding, well and irrigation infrastructure will be lost.

Orchard area between WAL and present Ruahapia Road will become marginal in size. Amalgamation with adjacent Dillon property needs to be considered.

Orchard area remaining to north of WAL will also become very marginal in size, lacks direct access to adjacent orchard properties. Consideration needs to be given to rezoning for industrial use.

Security and spray drift issues. Security fencing and live shelter belts may be necessary.

Silver Fern Farms – identified as 25 on the Land Requirement Plan

Stock holding paddock will need relocation.