



**Water and Rivers
Commission**



**Department of
Environmental Protection**



*Grape Growers Association of
Western Australia Inc*

Environmental Management Guidelines for Vineyards

2002

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Contents

1. Introduction	5
2. Development of vineyards in Western Australia	5
3. Scope	5
4. How to seek approval and legislative requirements	6
4.1 Horticultural development application	6
4.2 Water allocation and protection	6
4.3 Land clearing proposals	6
4.4 Wine industry investment kit	9
5. Site selection to optimise land use compatibility	9
5.1 Minimising adverse impacts on water resources	10
5.2 Minimising effects of noise and spray drift on neighbours	11
5.3 Tourism and vineyards	12
5.4 Resolving conflict issues	12
5.5 Herbicide spray drift from broadacre farms	14
6. Establishing the vineyard	15
6.1 Soil, climate and topography	15
6.2 Planting material	15
6.3 Irrigation	16
6.4 Drainage	16
6.5 Trellising	17
7. Vineyard management	17
7.1 Cultivation practices and weed control	17
7.2 Nutrition	17
7.3 Pruning and training	18
7.4 Crop control and canopy management	18
7.5 Pest and disease management	18
7.6 Off-site impacts (night time noise, spray drift, security lighting)	19
8. Occupational safety and health	20
9. Glossary	21
10. References	22
11. Appendices	23
Appendix 1 – Relevant legislation	23
Appendix 2 - List of government agencies	27
Appendix 3 - List of Western Australian grape grower and winemakers' associations	30
Appendix 4 - Handling of harmful chemicals	31
Appendix 5 - HortGuard™	35
Appendix 6 - Biosecurity protocol	36

Foreword

These environmental management guidelines are intended to provide guidance on the best management practices for the viticulture industry in Western Australia.

Adopting good management practices will limit any potential impact vineyards may have on the environment, such as chemicals and fertilisers contaminating the soil, groundwater and watercourses. Selecting a suitable location to site a vineyard may minimise or reduce any adverse impact to water quality, the environment and community amenity, particularly from nutrient-rich runoff, odour, dust, noise and spray drift.

It is anticipated that this document will be reviewed within three years from the date of publication to consider new technology and improved management practices resulting from the industry implementing these guidelines.

1. Introduction

The impetus to increase viticulture production both on new sites and in currently established vineyard areas in Western Australia has placed greater pressure on the natural resources. It is essential that practices adopted will protect natural resources and the environment in order to sustain a profitable future for grape and wine production.

The guidelines are intended to assist the vineyard enterprise to be environmentally responsible and a good neighbour.

The recommended management practices are based on the understanding that other land uses in close proximity will give due consideration to the management of their activities (such as residential or tourist accommodation), to minimise the likelihood of conflict with adjacent vineyards. The guidelines recommend management practices intended to mitigate adverse effects "over the fence", however, in reality, the technology that will adequately contain night time noise or chemical spray drift may not exist or is impractical to implement.

It is accepted that to conduct a viable business most vignerons will use chemical sprays and may carry out many activities at night and in the early hours of the morning.

The management of vineyards on which tourist facilities are located needs to ensure vineyard practices do not adversely impact on public facilities or visitors.

These environmental guidelines encourage growers to use the latest information and technology available in all aspects of grape and wine production, to produce high-quality products in an environmentally friendly way and set the industry on the path to sustainable agriculture.

2. Development of vineyards in Western Australia

In 2000-01 there were more than 7,000 hectares of wine grape, table grape and dried vine fruit vineyards in Western Australia. The major production centres include the Swan Valley and the west coastal and south west areas of the State extending from Gingin in the north, south through Harvey, Margaret River, Manjimup, Pemberton, Frankland River and to the Porongurups east of Mount Barker.

Production in 2000-01 reached more than 60,000 tonnes of grapes worth about \$90 million. There are more than 800 vineyards, many of which are less than 10 hectares in size. The wine produced is worth almost \$175 million annually at farm gate prices.

The State's viticulture industries are undergoing a period of rapid expansion, in traditional areas and in some new areas already showing promise, e.g. table grapes at Carnarvon and wine grapes at Chapman Valley, Wandering, Boyup Brook and Esperance.

The spread of residential or tourist accommodation close to vineyards may compromise the viability of the vineyards as restraints on spraying and night time activities will restrict the normal operation of the vineyards. The close proximity of incompatible land uses may lead to conflict and adversity. This is particularly relevant in areas such as the Swan Valley and Perth Hills where the growing region is made up of numerous small lots.

Tourist accommodation and the operations associated with vineyards may be incompatible but, despite this, grape growing and tourism can be mutually beneficial; vineyards with wineries are often dependent upon tourism. The most positive means of ensuring that the impact of agricultural activities on amenity and health in new residential areas is minimised and complaints from residents regarding the use of agricultural chemicals are reduced, is by adoption of sound management practices and reasonable separation distances.

However, once high value viticultural land is transferred to tourist accommodation or residential development, it may be lost for the long term.

3. Scope

These guidelines cover best management practices and approval processes for vineyards and those who interact with the industry. The intended audience includes all table, dried vine fruit and wine grape growers, allied industries, planners and government decision-makers.

Effluent Management Guidelines for Australian Wineries and Distilleries have been prepared as part of the National Water Quality Management Strategy guideline series.

These guidelines are advisory, not statutory. The guidelines indicate conditions that may be applied if water, environmental or other government permits are required. Planning and management decisions should be based on the recommended best management practices contained in these guidelines. Decisions which do not take heed of the advice are likely to lead to incompatible land uses and future conflict.

Vineyards management is now embracing quality assurance programs and these guidelines provide an overview of best management practices that would form the basis for an Environmental Management Systems approach to environmental accreditation.

Vignerons in the Swan Valley should be aware of legislation, such as the *Swan Valley Planning Act 1995*.

Special circumstances which need to be considered in the Swan Valley and Perth Hills include small block sizes, memorials to titles, effects of increased public access and traffic, urban pressures and the increased tourist activity which may take precedence over these guidelines.

4. How to seek approval and legislative requirements

A proponent seeking approval for a new vineyard or expansion of an existing vineyard should contact the relevant local government office at the earliest possible stage to discuss the proposed location of the vineyard or expansion to ensure it is consistent with local by-laws and planning provisions. Proponents of new or expanding vineyards should also contact the relevant government agencies as early as possible.

Table 1 shows the approvals needed and lists the government agencies that can provide advice. A summary of the applicable legislation is included in Appendix 1 and a list of contacts for the relevant government agencies is in Appendix 2.

4.1 Horticultural development application

A Horticultural Development Application (HDA) kit is available from the Water and Rivers Commission, Department of Agriculture or Department of Environmental Protection and contains guidance notes for seeking the necessary approvals.

The HDA kit contains applications for the clearing of native vegetation, abstracting groundwater and surface water and the establishment of a horticultural industry required by the various government agencies. The relevant forms should be completed then submitted to the appropriate local government authority for consideration and distribution to the relevant government agencies. The application may be rejected or approved, with or without conditions.

The following supporting details should be included with the Horticultural Development Application:

- A map showing any areas of remnant native vegetation.
- Proximity to water bodies and watercourses. Provide a map showing any wetlands, surface water bodies, drain or watercourse within 200 metres of the proposed vineyard, and wells or water reservoirs within 500 metres.
- Identification of whether the proposed vineyard is within a proclaimed public drinking water source area. Water and Rivers Commission should be contacted for this information.
- Soil profile description and types.

- The size of the land holding (on which the vineyard is to be established or expanded) and areas of initial and proposed future planting.
- A map of the property on which the vineyard is to be located including, where practical, contours, structures, lot numbers and road names.
- Identification of any Aboriginal archaeological sites or other cultural or scientifically significant areas (the Department of Aboriginal Affairs should be consulted for further information).
- Existing land uses in the vicinity (within a 3 kilometre radius). The proponent should consult with local government planning officers on future changes in land use and strategies to identify possible future constraints.

This is not an exhaustive list. Additional information may be required by the relevant decision making authorities.

4.2 Water allocation and protection

If the proponent is considering drawing water from a well, lake or stream he or she should contact the Water and Rivers Commission to find out their statutory obligations and if sufficient water is available. Approvals for drawing water from a well, lake or stream are necessary. Applications for a groundwater well or surface water licence are contained in the HDA kit.

Developments occurring within an Underground Water Pollution Control Area (UWPCA) need a permit application (Appendix 1). A groundwater or surface water abstraction licence for development in a UWPCA cannot be issued until a water quality protection permit is issued.

4.3 Land clearing proposals

Clearing of native vegetation and removal of natural habitats for fauna is a significant environmental issue in Western Australia. As such, clearing of native vegetation in particular parts of the State is restricted. If the clearing of more than one hectare of vegetation is likely, the proponent must contact the office of the Commissioner for Soil and Land Conservation (phone number 08 9368 3282) as soon as possible to seek advice on land clearing approvals. Under the *Soil and Land Conservation Act* and Regulations, owners or occupiers of land are required to advise the Commissioner for Soil and Land Conservation of their intention to clear more than one hectare of vegetation, or where there is a change in land use, at least 90 days prior to the expected commencement of that clearing. Approval for clearing native vegetation for dams must also be obtained, as for the clearing of vegetation for other purposes.

The Commissioner then determines if approval to clear native vegetation can be granted. If the Commissioner considers the proposal to clear vegetation is likely to have a significant impact on the environment, the Commissioner can refer the proposal to the Environmental Protection Authority (EPA) for impact assessment. The EPA is of the opinion that further clearing for agricultural purposes is no longer acceptable and will consider proposals in light of this opinion.

In addition, a proposed vineyard that appears likely to have a significant effect on the environment may be referred, by local government, members of the public, or other bodies to the Environmental Protection Authority and may be assessed under Part IV of the *Environmental Protection Act*.

For more information on clearing native vegetation, proponents should refer to the “Memorandum of Understanding for the protection of remnant vegetation on private land in the agricultural regions of Western Australia” (see Appendix 1).

Table 1: Approvals which may be required when establishing a vineyard

Approval required	Comments	Agency	Relevant Acts
Development	Must be consistent with Town Planning Scheme and local by-laws.	Local Government	<i>Town Planning and Development Act 1928</i> <i>Swan Valley Planning Act 1995</i>
Environmental	An Environmental Impact Assessment may be required under Part IV of the Environmental Protection Act.	Department of Environmental Protection	<i>Environmental Protection Act 1986</i>
Development near prescribed water resources such as public drinking water source areas or waterways management areas	A permit is required for Priority 2 & 3 Underground Water Pollution Control Areas. Vineyards are unacceptable in Priority 1 source protection areas, wellhead protection zones, reservoir protection zones and within buffers to designated waterways and wetlands.	Water and Rivers Commission	<i>Metropolitan Water Supply Sewerage and Drainage Act 1909</i> <i>Country Areas Water Supply Act 1947</i> <i>Waterways Conservation Act 1976</i>
Licence to draw water from water resources	Required to draw water from a proclaimed Groundwater Area (which is the case for most of the State) or if drawing from a confined aquifer.	Water and Rivers Commission	<i>Rights in Water and Irrigation Act 1914</i>
	Required to draw water from a proclaimed Surface Water Catchment.	Water and Rivers Commission	<i>Rights in Water and Irrigation Act 1914</i>
Development in a Swan River Trust Management Area	Development approval required from Minister for Water Resources.	Swan River Trust	<i>Swan River Trust Act 1988</i>
Land clearing (for clearing >1 hectare of land)	Commissioner of Soil Conservation has responsibility to issue approvals to clear land.	Department of Agriculture	<i>Soil and Land Conservation Act 1945</i>
Aboriginal Heritage (especially in high risk areas such as native bush or near watercourses)	Aboriginal sites must be protected.	Department of Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i>

4.4 Wine industry investment kit

A person new to the industry proposing to establish a new vineyard would be wise to obtain a copy of "Viticulture - A Wine Industry Investment Kit", published by the Department of Agriculture. This publication is a comprehensive guide for prospective investors in the WA wine industry. It includes background information on the WA industry, financial considerations including budgets and an investment analysis, the suitability of WA regions for wine grape growing, site selection, Acts and Regulations that impact on the industry, services available to help investors getting started and the outlook for the industry.

The kit is regularly updated to ensure the information is current.

A person new to the industry is also likely to benefit from approaching the regional grape or wine industry association. A list of industry groups, with current contacts, appears in Appendix 3.

5. Site selection to optimise land use compatibility

Careful site selection is vital if grape production is to have a minimal impact on the environment.

In addition to the potential effects on the site itself, care must be taken to identify and avoid areas where there are nearby sensitive environmental areas, e.g. native vegetation, drinking water sources, wetlands and waterways.

A vineyard should not be established close to an existing or proposed residential or rural-residential zone. Similarly, rural land should not be rezoned to residential or rural-residential, including tourist accommodation, close to established vineyards or to any area set aside as having prime agricultural/horticultural potential. Advice can be sought from local planning authorities, the Environmental Protection Authority and Water and Rivers Commission regarding appropriate separation distances.

This recommendation is based on the principle of compatible land use.

Compatible land use means that the vineyard activities are not located to conflict with, or disadvantage, the occupiers of neighbouring land and, conversely, the presence of the occupiers on neighbouring land should not restrict the practices necessary for the vigneron to maintain a viable operation employing good land use practice. In addition, compatible land use ensures the environmental protection of the vineyard property as well as the adjacent environment.

There are a number of environmental issues that grape growers and the community should be aware of.

Major issues that should be considered at the planning stage across the property boundaries or onto environmentally sensitive areas include:

- Noise from night time activities, such as night time harvesting of wine or table grapes and noise from bird scaring devices, especially gas guns.
- The need to adapt management plans to minimise the effect of wind drift of chemical spray residues across the property boundaries or onto environmentally sensitive areas.
- Clearing vegetation and changes to drainage may require the approval of the Commissioner of Soil and Land Conservation under the Soil and Land Conservation Act 1945.
- Broadacre farming practices may be restricted within distances of up to 10 kilometres from commercial vineyards as the use of hormone herbicides is controlled under the Agriculture and Related Resources Protection (Spraying Restrictions) Regulations 1979.
- Proximity/position of the proposal to important ecological areas such as wetlands and waterways.

Other issues that warrant careful consideration are:

- Excessive runoff from cultivated land can lead to the erosion of fine soil fractions which is likely to cause excessive sedimentation and turbidity in surface water bodies. Dissolved nutrients and phosphorus bound to the surface of soil particles may cause excessive algal growth in surface waters.
- Adequate water supply may be a limiting factor in most viticultural regions of Western Australia. Irrigation systems should be properly designed, installed and maintained to make efficient use of available water.
- It is recommended that for vineyards planned for relatively steep slopes (>1 in 10), expert advice should be obtained to develop a soil conservation plan for the site.
- Measures need to be considered to prevent leaching of applied chemicals such as fertilisers and pesticides into water resources (groundwater or surface waters).

5.1 Minimising adverse impacts on water resources

Separation distances to water resources are created to provide barriers to limit the passage of contaminants during normal land use activities or as a result of chemical spills or similar emergencies (see Tables 2 and 3).

Water bodies are likely to be contaminated by materials including sediment (soil particles), nutrients, salts, litter, agricultural chemicals and microbes. These could be carried via surface runoff into waterways and wetlands and some can also move through the soil and contaminate groundwater.

Well vegetated strips such as native grasses and reeds, trees and woody debris, between vineyards and wetlands and waterways, can filter out sediment and reduce contamination from nutrients. The selection of appropriate plants for vegetated strips will determine how much sediment and nutrients are filtered. The Land and Water Resource Research Development Corporation have prepared a number of issue sheets on the management and restoration of rivers and riparian lands. These issue sheets cover topics such as managing riparian land, water quality, streambank stability, river ecosystems and land-based ecosystems and can be accessed at the following web address:

http://www.lwrrdc.gov.au/html/commissioned_programs/commissioned_programs.htm.

Recent studies in Australia have shown that both natural vegetation and grassy filter strips can trap around 90% of the sediment moving from upslope land (Land and Water Resource Research Development Corporation). These strips can be equally effective in trapping or absorbing nutrients. It is recommended that prior to forming or restoring a vegetated filter strip, Water and Rivers Commission are consulted.

Separation distances are established for a number of purposes including:

- Maintenance of ecological processes and major food chains.
- Protection from nutrient inputs that could lead to eutrophication.
- Protection from increased salinity from the ingress of saline water.

The separation distance required depends on the purpose of the buffer and should take account of:

- Soil type and infiltration rate of the soil.

- Type and density of vegetation and how effective it is at stabilising ground.
- Slope of the land.
- Nutrient retention ability, e.g. Phosphorus Retention Index of the soil.
- Functions of the buffer, e.g. habitat protection, nutrient attenuation.
- Contaminant travel time (for groundwater systems).
- Intensity of land use development.
- Environmental values of the downstream water resources (water quality range required to maintain current use, dependent ecosystems and ambient water quality attributes).

Adequate separation distances should be established to protect any wells or reservoirs used for drinking water supplies and environmentally sensitive wetlands.

Separation distances may not always be a strip of set width along a watercourse or wetland. The distance should match the risk and needs of the local environment considering the above factors.

The separation distances in Tables 2 and 3 are the required and minimum recommended for new and/or expanding vineyards proposed in the vicinity of water resources. Where the vineyard is close to drinking water supplies, the separation distances are set by legislation.

Separation distances may vary on a case by case basis according to the proposed use, the environmental values and beneficial uses of the water resources. It is the responsibility of the proponent to demonstrate that proposed distances are sufficient to minimise the risks to groundwater and surface water bodies.

It should be noted that the recommended minimum separation distances have been empirically derived and are thought to provide adequate protection of water resources, recognising the beneficial use of the resource.

The Water and Rivers Commission realises that in practice it may not be possible to achieve these separation distances in all cases. Smaller buffers may be negotiated where environmental conditions and/or management of the land use activity could reduce the impact of the activity on nearby water resources.

Table 2: Required separation distances for new and/or expanding vineyards to sensitive water resources

Water Resource	Separation Distance	Comments
Bores, wells, soaks and dams used for private drinking water supply	100 metres	This separation distance has been set to protect water resources used for public water supply. Under the <i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i> by-laws, a minimum separation distance of 100 m is allocated.
Well used for public water supply	300 metres	This separation distance has been set to protect water resources used for public water supply. Under the <i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i> by-laws, for Wellhead Protection Zones in Priority 2 and 3 public drinking water source areas a separation distance of 300m is allocated.

Table 3: Recommended minimum separation distances for new and/or expanding vineyards to sensitive water resources

Water Resource	Separation Distance	Comments
Wetlands and estuaries (including Conservation Category, EPP and Resource Enhancement wetlands)	200 metres	Recommended separation distance to reduce nutrient inputs and sediment transfer and to preserve the conservation value of these wetlands.
Banks of permanent streams and rivers	100 metres	Recommended separation distance to reduce nutrient inputs and control turbidity from potential sources.
Banks of natural watercourses that flow intermittently	50 metres	Recommended separation distance to reduce nutrient inputs from potential sources.
Groundwater table (historical maximum level water table to ground surface)	1.5 metres	This separation distance has been recommended to reduce nutrient inputs from potential sources.

In addition, as part of the environmental assessment of project proposals the Environmental Protection Authority requires adequate separation distances for the protection of conservation wetlands.

Nutrient stripping basins may be used where irrigation and stormwater runoff from the vineyard is likely to enter any watercourse or drainage lines.

Planners should be aware that the planting of trees is not always an acceptable alternative to separation distance, as the trees harbour birds which may cause severe crop losses and possible additional costs for netting.

5.2 Minimising effects of noise and spray drift on neighbours

Normal farm practice on vineyards may involve the night time use of tractors and mechanical harvesting equipment, chemical sprays for pest and disease control and dust creation from cultivation or traffic movement.

These practices are likely to create noise that may exceed the background noise level and prove annoying

to householders and tourists if residing too close to the vineyards.

Background noise levels vary considerably from area to area. For example, background noise levels in parts of the Swan Valley will be relatively high, due to road traffic and aircraft, while in the Margaret River area background noise levels may be extremely low. In the Swan Valley, because of the higher background noise levels, people may be accustomed to or accept the intermittent noise from night time activities in vineyards. Similarly, most people accept the activities of their neighbours and will move into areas provided they are made aware of the nature of such activities. This should be formalised by an appropriate memorial on the land title.

Noise levels fall as the distance from the source increases. As an example, noise emissions from a typical tractor will be 85 -90 dB(A) (about the same sound level as average street traffic) when measured at 7.5 metres from the tractor (this is the specified measurement distance in ADR 28), and 50 - 55 dB(A) (about the same sound level as close conversational speech) when measured at 500 metres.

At 500 metres, a noise emission of 50 - 55 dB(A) from a tractor operating in a normally quiet rural area will be clearly audible during the day and most likely be intrusive at night time.

Where a problem with noise may be evident, the vigneron may need to seek technical advice on noise or sound level measurement from a suitably qualified person.

The Environmental Protection (Noise) Regulations 1997 recognise the need for some farming activities to be carried out at night. Vineyards are classified as rural premises under the Regulations and noise emissions from certain farming activities are bound by the requirements of the Regulations (see also Section 7.6 Off-site Impacts).

On many rural properties, including vineyards, night time activities are occasional and thus can be tolerated provided they are kept to a minimum. Gas guns and other means for bird scaring may generate intrusive noise in the early hours of the morning and their use may affect neighbours.

The spraying of crops with chemicals in windy conditions may cause wind borne spray drift creating harm or nuisance on adjacent properties or impact on water resources. Research and subsequent modelling has indicated negligible chemical drift at a range 300 metres downwind from the release point of a chemical spray application (Spillman, 1988). Sprays acceptable to organic farming practices, such as sulphur, can be carried relatively long distances in

stronger winds. Sulphur blown into human or animal eyes or deposited on clothes hanging on a clothes line, is likely to cause annoyance, irritation and/or burning.

Most local governments in broadacre farming areas do not distinguish between horticultural and broadacre farming activities within the general land use designated "rural" in their Town Planning Scheme. The introduction of a commercial vineyard into a cereal growing area may severely restrict normal farm practices on the cereal farm and risk severe damage to the vineyard from herbicide sprays.

Local governments may wish to consider the impact of vineyards being established in broadacre farming areas and amend Town Planning Schemes where possible to protect normal farming practices (see Section 5.5).

5.3 Tourism and vineyards

New tourist facilities should only be approved where they are unlikely to be adversely impacted upon by vineyards or themselves impact on existing vineyards. Tourist accommodation and restaurants located within a vineyard are likely to be more compatible where the tourist facility and vineyard are under the same management.

Any potentially disruptive vineyard management activities can then be scheduled when visitors are not likely to be present. The vineyard manager has responsibility to the visitors as well as to the business to ensure that the vineyard activities do not adversely affect the facilities or the visitors.

This common sense approach is made more difficult when the tourist facility is on an adjoining property and not under the same management as the vineyard and conflict is possible. Conflict may be averted by cooperation between vineyard and tourism managers.

5.4 Resolving conflict issues

Noise, pesticide spray drift, dust and odour can cause conflict between vineyard operators and residents or tourists living close to vineyards. The challenge is to acknowledge these issues and evolve management and planning practices to resolve and avoid conflict.

However if complaints do happen, specific complaints about smell, dust, noise or chemical spray drift from a rural property may be referred to the Agricultural Practices Board, established under the *Agricultural Practices (Disputes) Act 1995*. The Board has a wide range of expertise in local government, environment, agriculture and law. The legislation is based on the principle that farmers must have the right to farm, while other rural people have the right to be protected from nuisance caused by unacceptable farming practices.

Under the Act, an agricultural practice is considered to be normal if it is:

- Consistent with proper and accepted customs and standards, as established and followed in similar agricultural operations under similar circumstances.
- In compliance with the requirements of a code of practice made or approved by the Department of Environmental Protection or under any written law.
- Normal farm practice may include the use of innovative technology and management practices.
- The Board may declare that an existing agricultural practice is a normal farm practice, even if it does not comply with existing environmental laws, however such laws can only be waived for a maximum of two years.
- If a person carrying on an agricultural operation fails to comply with an order of the Board, that practice may not be considered a normal farm practice.

When a dispute is referred to the Board, the Board will appoint a suitably qualified mediator to ensure both parties become fully cognisant of all the issues and sort out any misunderstandings, and resolve the conflict.

If mediation is unsuccessful, the Board may convene a formal hearing to determine if the "nuisance" constitutes normal farm practice. If the Board considers the practice is normal, there is no further involvement from the Board. If the practice is considered not to be normal, the Board may ask the farmer to alter the practice or cease it completely. The Board's decisions are not legally binding, however they are admissible as evidence in civil proceedings.

Table 4 sets out potential conflict issues and possible measures to mitigate adverse effects.

Under some weather conditions, bird scaring devices, such as gas guns, may cause an early morning noise nuisance up to several kilometres away.

The conflicts of existing incompatible land uses can be reduced or made more acceptable by:

- Effective consultation and planning before beginning the development.
- Establishing effective topographic or vegetation barriers.
- Modifying normal farm practices by adopting effective new technology such as hooded spray equipment, avoiding night time activities that generate intrusive noise and the use of netting instead of noisy bird scaring devices.
- Undertaking an independent study, if there is uncertainty, to demonstrate the likely area of influence of a specific farm practice. This may suggest the need to modify the proposed farm practice or introduce a separation distance or buffers between the potentially conflicting land uses.
- Consulting neighbours before night time harvesting or spraying.

Placing a covenant or memorial on the title of any land within the area of influence that is rezoned to residential, stating that the area may be subject to chemical spray drift, noise, dust and odour from nearby vineyards carrying out normal farm practices. Similarly, a covenant or memorial can be placed on the title of any vineyard opting for organic status or abstaining from certain activities (such as night time use of tractors or harvesters). This should ensure the operations do not revert to normal farm practice at any time without consultation with surrounding property owners.

Table 4: Potential impacts of vineyards on residential areas

Potential adverse effects to residential zoning	Activity in vineyard likely to cause problems	Possible measures to mitigate adverse effects
Wind borne dust consisting of soil and organic matter.	Weed control by cultivation, mowing and flailing with tractor operated equipment.	Ensure cultivation, mowing and flailing with tractor operated equipment is carried out on moist soil and only in light winds.
Unpleasant odour.	Use of unconditioned organic manures.	Ensure use of conditioned organic manures.
Nuisance noise.	Day time operation of mechanical equipment.	Use of appropriate silencing where available (e.g. an efficient muffler).
Possible adverse effects from pesticide spray drift on people and animals.	Spraying of vines and weeds with pressurised low volume spraying equipment.	Avoid spraying during windy conditions if possible. Use of hooded spray systems should be considered where appropriate.
Possible anxiety and adverse health effects from pesticide spray drift.	Spraying of vines with high volume air blower spray equipment.	Avoid spraying during windy conditions if possible.
Night time noise.	Tractors and mechanical harvesters operating at night.	Use best available silencing technology and advise neighbours of scheduled activity.
Algal blooms in waterways and wetlands.	Poor nutrient management, excessive nutrient application.	Develop nutrient management strategies and address drainage issues.
Midge/mosquito problems.	Poor nutrient management, excessive nutrient application.	Develop nutrient management strategies and address drainage issues.

It may be possible for adjacent land holders to negotiate reduced separation distances. This may involve the use of physical buffers or some modification of management practices that may include the adoption of new technology. The continued use of such practices or technology would be ensured by a covenant attached to the title of the vineyard land.

Technology exists to mitigate noise and spray drift from vineyards but in many cases the costs are uneconomical or impractical. For example, the equipment necessary to “silence” a tractor may make it unwieldy and unsuitable for use in vineyards.

Netting vines to negate the need for noisy bird scarers may require a significant capital outlay and needs to be budgeted for over many years. Netting vines can be costly and inconvenient if out of season rain occurs. The nets may have to be removed before extra fungicide spraying is possible and replaced again on completion of the spraying.

New spray technology is being developed for grape growers, involving covered spray systems that enclose the vines being sprayed and most, if not all, of the over spray is collected and returned to the spray tank. This represents a considerable saving in chemical costs. This type of equipment limits the type of vine trellises that can be used. Vineyards adopting this new technology are unlikely to have any significant impact on the surrounding environment.

5.5 Herbicide spray drift from broadacre farms

Under the *Agriculture and Related Resources Protection (Spraying Restrictions) Regulations 1979* the use of hormone herbicides is controlled within close proximity to commercial vineyards. Amine, sodium and potassium salt and low volatile ester formulations may be used within specified distances (see Appendix 1).

Land holders and spray contractors in districts where there are commercial vineyards, need to consult the Regulations for more specific information in these restricted spraying areas.

Any person wishing to spray herbicides within exclusion distances specified within the Regulations must seek prior approval from their local Department of Agriculture before they spray.

Any person considering establishing a vineyard near or in broadacre farming areas should contemplate the effect on their vines of amine, sodium and potassium salt and low volatile ester formulations used in weed control by broadacre farmers.

6. Establishing the vineyard

6.1 Soil, climate and topography

- Soil type and local topography can influence management practices, vine performance and fruit quality. Although generally less significant than regional climate, the influence of site characteristics and local weather patterns needs to be understood and taken into account in the planning stage.
- Grapevines can adapt to a wide variety of soils from infertile coastal sands to loamy clays, however poor soils are likely to require more attention to water and fertiliser use to ensure the protection of the environment. Grapevines perform well on well drained loams and loamy gravels.
- Poor soil preparation and management can lead to future problems of poor drainage, restricted root penetration due to the formation of hard pans, and ploughing up of chemically or physically undesirable soil layers.
- It is recommended that the suitability of the soil for grapevines should be confirmed by soil profile studies. Some duplex soils are particularly prone to degradation and may need specific management practices.
- Heavy soils or sites liable to temporary water logging require drainage (e.g. slotted pipes) to encourage aeration of the soil.
- Use of tractors and other implements traversing the prepared vineyard soil should be kept to a minimum as the action can cause soil degradation. If soil compaction occurs, measures should be taken to maintain aeration and infiltration of soils.

- Inadequate control of vineyard drainage can cause excessive nutrient losses and soil movement in heavy rain, leading to eutrophication and turbidity in water resources.
- Vines should be established in areas with suitable topography and soil, so as to minimise soil erosion.
- On steep terrain, vineyard rows should, where practical, be aligned just off the contour to prevent rapid erosive drainage from the vineyard.
- It is recommended that vegetated drainage paths be included in the vineyard design for steep terrain (slope greater than 1 in 10). Vegetated drainage paths should have the capacity to carry a flow generated from 25 mm of rain falling in one hour without causing erosion damage to the site.
- In cooler areas, vine exposure (north or south facing) may influence fruit ripening.
- Exposed sites can lead to increased management costs and reduced productivity. For example, varieties with early bud burst can be damaged by spring winds when grown on exposed sites.
- Vineyards should be laid out so that the row direction, planting width, training system and canopy management optimise air movement and sunlight exposure to facilitate disease control and improve fruit quality.
- The characteristics of the local terrain may determine the potential to mechanise vineyard operations.

6.2 Planting material

The best quality planting material available (preferably certified by the Western Australian Vine Improvement Association (WAVIA)) should be used when establishing a vineyard. The goal of the Western Australian Vine Improvement Association is to promote the propagation and use of healthy approved vine material that will require less intervention from management, potentially reducing the impact on the environment.

The Western Australian Vine Improvement Association is an industry based, voluntarily run organisation that has the responsibility of facilitating the access, production and distribution of improved planting material to the State's viticulture industry. Through its two main activities, to provide "A Class" propagation material to industry and to establish varietal source blocks on growers' properties throughout the regions, the Association aims to

significantly improve the quality of vine planting material used to establish vineyards.

The contact details for the Western Australian Vine Improvement Association are listed in Appendix 3.

WAVIA has appointed representatives in each of the major viticulture regions in WA to assist the wine, table and dried vine fruit industries.

Cultivars vary in their growth habit, growth cycle, disease susceptibility and need for chemical application (e.g. setting and sizing sprays, growth promoters etc.), all of which may impact on product yield and quality.

Rootstocks can provide major benefits in overcoming the effects of soil pests (e.g. nematodes, phylloxera) and can reduce the impact of negative environmental conditions (salty soil/water, drought etc.).

In selecting rootstock factors like scion-stock compatibility and vigour effects should be considered.

6.3 Irrigation

Where it is planned to draw water from a well, lake or stream prior approval should be sought from the Water and Rivers Commission. The applicant should refer to "Taking Water from Streams and Lakes" Water Facts No.5, published by Water and Rivers Commission.

Where dams are planned, the location should be very carefully considered to minimise breaks in vegetation continuity. Meanders and riffles in watercourses are just as important as vegetation and proponents should be encouraged not to convert watercourses into drains.

Poor irrigation practices can cause environmental problems including water logging, salt build up and excessive loss of nutrients. In most vineyard areas, water is limited. It is important to prevent nutrients, sediment and organic matter from reaching surface water irrigation supplies and blocking low flow bypass pipes, which will impact on downstream riparian rights and other irrigation users.

The most efficient irrigation practices should be adopted wherever possible. Advice on the most suitable equipment and design for vineyards can be obtained from the Department of Agriculture, irrigation suppliers or private consultants.

Practices which address these issues include:

- Design of the irrigation system should be appropriate for the region and soil conditions and be installed and maintained to ensure water is distributed effectively and efficiently to all the vines.

- Trickle or dripper systems are recommended unless blockages in the system are likely to be a problem. Overhead sprinklers may be beneficial in frost-prone areas.
- The irrigation system should be properly maintained to ensure accurate and uniform delivery of water to the vines at all times.
- Irrigation should be scheduled in accordance with soil moisture characteristics (retention), physiological stage and age of the vines, and prevailing weather conditions (e.g. evaporation rate).
- Soil moisture measuring equipment can be used as a tool for irrigation scheduling to improve efficiency of water use and grape quality.
- Equipment (e.g. tensiometers, gypsum blocks, US Class A evaporation pan) used to measure or estimate soil moisture should be properly maintained and calibrated.
- Fertigation (soluble nutrients added to the irrigation system) can be used to accurately apply nutrients to vines. The system should be designed to meet local conditions. This includes adjusting rates of application to prevent nutrient losses through excessive irrigation on coarse textured soils. The likelihood of acidifying the soil can be minimised by using calcium nitrate in preference to ammonium nitrogen.
- Where freshwater supplies are limited the use of stored storm water or winery wastewater can be a worthwhile option. The use of wastewater must comply with government standards.
- Dams constructed on-stream should ensure that a spillway and low flow bypass mechanism is incorporated within the proposed design and construction. Dams constructed off-stream should be designed to store enough water during high stream flows, normally in winter, to meet the summer irrigation demands including losses due to seepage and evaporation.

6.4 Drainage

Runoff from the vineyards should be controlled to trap and treat nutrients, organic matter and suspended soils before entering any watercourses or drainage lines. Tailwater dams are recommended downstream of vineyards where practicable, to collect and recycle unused nutrient-rich runoff. However, construction of these dams close to watercourses should be avoided to ensure that potential overflows from dams do not contaminate downstream water resources.

To avoid excessive runoff during an unusual storm event, effort should be made to prevent pollutant export and land erosion by using vegetated drainage paths and vegetated buffers. Vegetated drainage paths and vegetated buffers remove a majority of nutrients exported off-site and should be used where runoff from the vineyards is an issue.

The maintenance of vegetated drainage paths and vegetated buffers between the vineyard and any water body will help to trap sediments and reduce the flow of nutrients and organic matter into the water body. Where runoff occurs upstream of dams or excavations, then management of the nutrient stripping areas is essential to maintain water quality.

6.5 Trellising

Well planned and properly maintained trellising together with effective canopy management can reduce the frequency of spraying and the amount of chemicals used.

Adopting contemporary trellis designs and vine configuration will facilitate mechanisation as well as reduce disease infection and its spread, through more effective application of control measures.

New technology like enclosed spray systems that capture the over spray may be available at reasonable cost in the future. The type of trellis chosen may make adoption of this technology easy.

7. Vineyard Management

7.1 Cultivation practices and weed control

The value of proper soil preparation can be lost later by inappropriate physical cultivation or chemical application. Constant machinery movement and cultivation can lead to soil degradation. Cultivation in dry conditions creates dust that can cause nuisance as well as significant loss of topsoil and soil structure. A wind velocity greater than 10 kilometres an hour can exacerbate the problem.

The application of mulch down vine rows is becoming a more accepted practice. Mulching the rows helps to conserve moisture, reduces soil temperatures during the growing season, improves weed control reducing the need for chemicals, and improves soil organic matter content and water penetration.

Mechanical cultivation of the vine row and the inter-row area should be kept to a minimum as this can cause root damage and breakdown of soil structure, erosion and damage to vine roots. Mechanical methods like mowing and slashing (flails) or mulching are preferred. The growing of natural or cover crops in the inter-row area is recommended. This leads to

improved working conditions by reducing dust generated by machinery movement.

Sound soil management involving minimal cultivation and restricted traffic movements combined with a build up of organic matter (either applied or grown) would enhance biological activity. This in turn will improve soil structure, aeration and drainage and assist nutrient recycling.

Hooded and directed spray nozzles should be used whenever possible when applying herbicides. The effects of herbicides should be well understood before application, for example some herbicides are not registered for use in young vineyards. Suppliers of herbicides should be consulted to ensure the appropriate herbicide is selected.

7.2 Nutrition

Grapevines have a relatively low demand for nutrients, however in infertile soils balanced vine nutrition is essential for optimal growth, crop load and grape quality. Excessive application of some nutrients (e.g. nitrogen) can lead to excess vine vigour, dense canopies, increased susceptibility to disease, delayed ripening and a reduction in grape quality. Combined with over irrigation this will lead to leaching of nutrients into groundwater and surface waters. Untimely application of fertilisers just prior to heavy rain can lead to nutrient flushing from the vineyard into water resources.

Nutrient leaching from horticultural/viticultural production on gravels and sandy soils has a high potential for polluting groundwater and surface water. Most of the soil types supporting vineyards are generally heavier, containing more than 25% iron-rich clays or silts, and effectively retain phosphorus. Vegetation between rows is encouraged to reduce soil erosion runoff (using grasses as a minimum). Vignerons should identify appropriate planting for the strips between rows.

It is essential to ensure adequate nutrients are applied to meet the needs of both the vine and the cover crop. Small quantities of fertiliser frequently applied when needed will assist the plant to grow and will minimise contaminant leaching.

Soil and/or plant tissue analysis carried out prior to applying nutrients, especially the major elements nitrogen, phosphorus and potassium, will help to avoid over fertilising and identify nutrient imbalances. Soil analysis can also assist in building up a picture of the nutrient status of a vineyard and ensure that the application of nutrients, especially phosphorus, is carefully managed to meet actual plant needs.

Sandy soils with the potential to leach nutrients should be amended with clay, loam or organic matter to minimise leaching.

In addition, pump failures or reverse flows from irrigation systems which distribute fertilisers could result in the contamination of water resources. It is recommended that systems are fitted with back flow preventative measures or preferably storage systems incorporating mechanisms such as air gaps such that the system is not hydraulically linked to natural water resources.

7.3 Pruning and training

In addition to vine health status achieved through nutrition and soil water management, the pruning and training systems adopted will determine potential vine vigour, crop load, air movement, fruit exposure and efficacy of crop protection.

Appropriate practices include:

- The pruning system is designed to enhance vine structure, particularly shoot spacing and the attainment of the desired number of fruitful buds per hectare, to achieve optimal fruit yield and quality.
- The vine training system ensures good distribution of shoots and leaves for optimum leaf exposure. It aims for optimum bunch exposure so as to maximise quality and crop load potential and, reduce chemical demand.
- Care should be taken to ensure that large pruning wounds do not lead to infection of the vine leading to dieback. The application of an appropriate fungicide soon after the wound has been created reduces the risk of infection of the vine.
- Vertical shoot positioning with either single or divided canopies usually provides satisfactory vine configuration and fruit exposure. Horizontally divided canopies should be adequately separated (up to 1 metre).

7.4 Crop control and canopy management

Poor canopy management and crop control may lead to disease and insect infestation requiring additional chemical spraying, increased irrigation demand and fertiliser use.

Appropriate practices include:

- Healthy grapes of good quality are obtained from vines where vigour (shoot growth) and crop load

are balanced. Over-cropping may lead to poor quality fruit.

- Preliminary crop control for optimal results can be achieved by pruning to retain the optimal number of buds, depending on variety, region and anticipated vine vigour. Bunch or crop thinning later in the season can improve crop quality, however it can be time-consuming and expensive.
- Summer pruning (hedging), leaf removal and shoot positioning can all complement winter pruning in ensuring the proper balance is achieved in the vineyard leading to optimum fruit quality. These practices are most effective (essential) in high vigour situations where dense canopies are likely to be formed, leading to losses in fruit quality or increasing the chances of disease proliferation.

7.5 Pest and disease management

Like all horticultural crops, grapevines are susceptible to pests and diseases. Fortunately, Western Australia has remained free of many of the world's serious vine pests and diseases.

Under the Commonwealth *Quarantine Act* and the State *Plant Diseases Act*, entry of grapevines (including those tissue cultured) is controlled into Western Australia from overseas and other States. Entry is subject to issue of a "Permit to Import Quarantine Material", followed by a growth period in post-entry quarantine to allow screening for diseases before release.

Contacts for information on quarantine requirements are listed in Appendix 2 under "Quarantine Legislation".

The Department of Agriculture in collaboration with industry has developed the Viticulture Industry Protection Plan under the Hortguard™ Program. This program is committed to improved agricultural industry protection through strengthened risk assessment, quarantine and incident (emergency) response. Further information on the key strategic areas of Hortguard™ is found in Appendix 5 and on the website www.agric.wa.gov.au. Biosecurity is an important issue within the vineyards industry. The Department of Agriculture has developed a standard biosecurity protocol for staff to follow (as outlined in Appendix 6).

Generally, commercial viticulture cannot be carried out without the use of chemicals. However, every effort must be made to use chemicals safely and for the purpose and in a manner for which they were intended and to minimise their use.

The viticultural industry has adopted a policy of striving for low (chemical) input practices. Integrated Pest Management (IPM) employs management practices to control pests and diseases without the use of chemicals (as far as is practical). IPM is becoming more widely adopted in viticulture. To succeed it requires comprehensive monitoring of pests and their natural enemies and the judicious and effective application of chemicals only when essential.

Treating pests and diseases involves spraying the vines with chemicals and/or active organic substances that will provide control to an acceptable level. Spray equipment designed to atomise or reduce the spray to fine droplets so that they will penetrate the foliage can lead to the fine spray being easily carried considerable distances by the wind.

Spray equipment is being developed that allows the over spray to be collected and returned to the spray tank. This minimises the potential for wind borne spray drift to affect neighbours or the adjacent environment. Although this type of equipment can only be used on open trellis systems, closed canopies used mainly in the production of table grapes will reduce spray drift.

In catchments used for public drinking water supply, the Water and Rivers Commission may apply special controls. See Water and Rivers Commission Statewide Policy *Pesticide use in Public Drinking Water Source Areas* (WRC, 2000). The use, application, storage, mixing and disposal of pesticides within Public Drinking Water Source Areas should be consistent with this policy.

Pesticide formulation/concentrate should not be stored/mixed or diluted within Reservoir Protection Zones, Wellhead Protection Zones, Priority 1 Source Areas or within 200 metres of wetlands and waterways or other surface water bodies without prior approval of the Water and Rivers Commission.

Any person handling chemicals must have appropriate training both in the setting up and calibration of application equipment and in the proper safe use of chemicals. ChemCert WA is an approved course, with an optional follow-up course for vineyards. See Appendix 4 for best management practices for handling of harmful chemicals, spraying practices and safe disposal of empty pesticide containers as well as contact information for the ChemCert and DrumMuster programs.

In addition, the use of irrigation systems to distribute chemicals for weed, pest and fungi control has the potential to contaminate water resources. It is recommended that irrigation systems are fitted with back flow preventative measures or preferably storage systems should incorporate mechanisms such as air gaps such that the system is not hydraulically linked to natural water resources. Rinsate from pesticide use should be disposed of in accordance with the Health Department of Western Australia's Code of Practice. The Code of Practice also contains design criteria for washdown areas and is available from the Pesticide Safety Section of the Health Department of Western Australia.

7.6 Off-site impacts (night-time noise, spray drift, security lighting)

Several activities in grape growing have the potential to create noise and affect neighbours. In the vineyard, bird scaring devices and machinery, particularly mechanical harvesters can create noise levels that may be offensive.

It is essential that when planning new vineyards or expanding vineyards, the potential for noise pollution is considered and controlled near dwellings and similar sensitive environments (see Section 5.2.).

Vineyards are classified as rural premises under the Environmental Protection (Noise) Regulations 1997 and noise emissions from some farming activities must comply with the requirements of the Regulations.

Schedule 12 of these Regulations applies to farming vehicles. It requires that:

- Farming vehicles used for specified farming activities on rural premises must meet the relevant requirements of Australian Design Rule (for motor vehicles) ADR 28 at all times.
- For farming activities between sunset and sunrise, the occupier of the premises must also be able to show that it was reasonably necessary to operate any farming vehicle at night time.

Where the noise source is not a farming vehicle, schedules 7, 8 and 9 of the Regulations apply. These Regulations apply to pumps, including tractors to power pumps, refrigeration plant at wineries or cool rooms and other stationary plant which can normally be housed in a noise control enclosure.

These Regulations specify maximum allowable noise levels for different times of the day. In most farming areas these Regulations will allow:

- 35 to 38 dB(A) overnight;
- 40 to 43 dB(A) during the evenings, Sundays and public holidays; and
- 45 to 48 dB(A) during daytime, Monday to Saturday inclusive.

Barriers can reduce noise by 10 to 15 dB(A). To achieve these reductions the barrier must be situated close to either the source or receiver of noise. Thus a barrier can be effective for stationary sources when installed close to the source, but a barrier to protect against noise from a moving source, such as a tractor, must be sited close to the receiver. Where the receiver is situated on an adjacent property, such an arrangement is unlikely to be acceptable.

Tractor exhaust systems, mufflers and other machinery should be well maintained to minimise noise.

Noise devices, for example recorded sounds (e.g. Audio Visual alarms), humming wires and other scaring devices (kites etc.), generally have limited or short term impact in reducing damage by birds. They have had some success in minimising crop losses to birds if frequently relocated. The noise produced by audible bird scarers can impact negatively on the welfare and amenity of neighbours.

Gas guns generate about 120 dB(A) at 7.5 metres and at 500 metres this will still be in the order of 85 dB(A). Therefore gas guns should only be used in remote areas well removed from urban development or tourist facilities.

Noise from night time harvesting is also an issue. In winemaking, especially for premium wines, it is essential to harvest grapes as close to optimal ripeness as possible, and to harvest them as cool as possible. Cool harvesting conditions (at night and early morning) limit the chance of flavour loss and reduce power usage (refrigeration) in the wine making process.

Regulation 12 of the Environmental Protection (Noise) Regulations 1997 provides for the occupier of rural premises to operate a farming vehicle between sunset and sunrise, providing the occupier of the premises can show that it was reasonably necessary for the vehicle to be operated at night time, such as for 24 hour seeding after rain or grape harvesting.

Mechanical harvesting significantly reduces costs, is quicker which means more grapes can be picked at optimal maturity, and can be carried out in the cool of night.

Noise created by mechanical harvesting at night has the potential to cause conflict where vineyards and homes are close to each other. Other vineyard activities, such as spraying, may also be carried out at night where prolonged periods of wet and or windy conditions prevent this activity during the day. Many vignerons choose to spray regularly at night when wind speeds are minimal and pesticides are often more effective than when exposed to sunlight.

In Western Australia several bird species (e.g. Silver eyes) can cause significant economic loss to grape crops, particularly in seasons when the natural environment can not support bird populations (e.g. poor native gum blossom, excessively dry conditions, large increases in bird populations). Grape crops are most susceptible to bird damage for only a few weeks of the season when the grapes are ripening.

The most effective way to minimise bird damage is to use protective nets. However, these are expensive and often large areas would have to be covered to prevent damage. Currently with the high value of grape crops small vineyard operators should look closely at the economic and environmental benefits of using protective nets.

Audible bird scarers need to comply with the noise regulations under *the Environmental Protection Act 1986* and the *Occupational Safety and Health Act 1987*.

Building and security lights should be sited and shaded to minimise the likelihood of illuminating nearby residences. Machinery used in mechanical harvesting carry strong lights that can be a nuisance to neighbours.

8. Occupational safety and health

For advice on occupational safety and health, the vigneron should refer to the *Western Australian Wine Industry Occupational Safety and Health Code of Practice*. A copy of this document is available from the Wine Industry Association of Western Australia.

9. Glossary

ADR	Australian Design Rule.
Cultivar	A variety of a cultivated plant distinguishable from other cultivars of the same species. For example cultivars of <i>Vitis Vinifera</i> (the European grape vine) include Chardonnay and Shiraz.
Public Drinking Water Supply Areas (PDWSAs)	Refers to all Water Reserves, Catchment Areas and Underground Water Pollution Control Areas that have been established under the Metropolitan Water Supply, Sewerage and Drainage Act 1909 (MWSSD Act) and the Country Areas Water Supplies Act 1947 (CAWS Act).
Rootstock	A vine that does not bear fruit onto which fruitful scion material is grafted. The rootstock provides tolerance to pests like nematodes and phylloxera, and conditions including drought, salinity and other soil imbalances.

10. References

Agriculture and Related Resources Protection (Spraying Restrictions) Regulations 1979.

Agriculture and Resource Management Council of Australia and New Zealand & Australian and New Zealand Environment and Conservation Council, 1998, *National Water Quality Management Strategy Effluent Management Guidelines for Australian Wineries and Distilleries*, Commonwealth of Australia, Canberra.

AVCARE (National Association for Crop Production and Animal Health), *Preparing Farm Chemical Containers for Safe Disposal*.

Department of Agriculture, Farmnote No. 61/99, *Hormone Herbicides - What you should know before you spray*.

Department of Natural Resources, Queensland and Department of Local Government and Planning, Queensland. 1997, *Planning Guidelines - Separating Agricultural and Residential Land Uses*.

Government of Western Australia, 1997, *Memorandum of Understanding for the protection of remnant vegetation on private land in the agricultural regions of Western Australia*.

“*Land Clearing Proposals for Rural Zoned Land in Western Australia*” in accordance with the Memorandum of Understanding.

Spillman, J. 1988, *A rapid method of calculating the downwind distribution from aerial atomisers*, *EPPO Bulletin* 13 (3): 425 – 431.

Water and Rivers Commission, Water Facts No.5, *Taking Water from Streams and Lakes*.

Water and Rivers Commission 2000, *Pesticide Use in Public Drinking Water Source Areas*, Water and Rivers Commission, Statewide Policy No 2.

Wine Industry Association of Western Australia, *Western Australian Wine Industry Occupational Safety and Health Code of Practice*.

WorkSafe Western Australia, Guidance Note: *The General Duty of Care in Western Australian Workplaces*.

Appendices

Appendix 1 – Relevant legislation

The following is provided as a guide only and it is the responsibility of the proponent to ensure that their proposal and practices comply with the relevant legislation. Please refer to the relevant Act and/or agency administering the Act for more information.

1. *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislation for the protection of the environment and control of pollution.

It is specifically “...an Act to provide for an Environmental Protection Authority, for the prevention, control and abatement of environmental pollution, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing.”

The EP Act provides a number of mechanisms for preventing and controlling pollution:

- Part III of the Act enables Environmental Protection Policies to be established for the “prevention, control or abatement of pollution”;
- Part IV of the Act requires the environmental assessment of proposals “likely, if implemented, to have a significant effect on the environment”; and
- Part V of the Act provides for the licensing of the activity as a “prescribed premises” and addresses specific issues such as limits on waste disposal.

The EP Act may apply to the establishment and running of a vineyard (not including wineries) through Part IV (assessment) and/or Part V (pollution and offences).

2. *Water and Rivers Commission Act 1995*

The *Water and Rivers Commission Act 1995* (WRC Act) is administered by the Water and Rivers Commission and contains a number of subsidiary Acts and by-laws to protect water resources.

Under the WRC Act, the Commission has responsibility for the conservation, protection and management of the State’s water resources. The Act assigns to the Commission the responsibility for administering the following acts:

- *Country Areas Water Supply Act 1947* (CAWS Act).

- *Metropolitan Water Supply, Sewerage and Drainage Act 1909* (MWSSD Act).
- *Rights in Water and Irrigation Act 1914* (RIWI Act).
- *Waterways Conservation Act 1976*.

Public Drinking Water Source Areas (PDWSAs)

Proclaiming Underground Water Pollution Control Areas, Catchment Areas and Water Reserves under the MWSSD and CAWS Acts protects the quality of public drinking water sources. These proclaimed areas are collectively referred to as Public Drinking Water Source Areas (PDWSAs).

The by-laws under the MWSSD and the CAWS Acts enable the Water and Rivers Commission to regulate potentially polluting activities and land use, inspect premises and take steps to prevent or clean up pollution.

In PDWSAs, the Water and Rivers Commission has defined three levels of priority classification employing different management strategies as follows:

Priority 1 (P1) source protection areas are managed in accordance with the principle of *risk avoidance*. The source protection objective for P1 areas is to ensure no degradation of source water quality. Land is generally in public ownership and development is generally precluded from P1 areas. Vineyards are an incompatible activity in P1 areas.

Priority 2 (P2) source protection areas are managed in accordance with the principle of *risk minimisation*. The source protection objective for P2 areas is to ensure that there is no increased risk of water pollution to the water resources. Land is generally in private ownership and typically supports low intensity rural and rural lifestyle uses. Urban and industrial land uses are precluded. Vineyards are a restricted activity in P2 areas, where individual assessment is needed and specific conditions designed to protect water resources are applied. The best management practices outlined in these guidelines will generally provide that protection.

Priority 3 (P3) source protection areas are managed in accordance with the principle of *risk management*. The source protection objective for P3 areas is to maintain water quality within health guidelines. Land is generally in private ownership and may include urban, light industrial and rural uses. Heavy industry and processing/treatment of animal wastes are

precluded. Vineyards are a compatible activity in P3 areas. They would be acceptable to the Water and Rivers Commission provided they adhered to the water quality protection recommendations in these guidelines.

In addition to priority classification areas, wellhead protection zones and reservoir protection zones are defined to protect the water source from contamination in the immediate vicinity of production wells and reservoirs. Additional restrictions apply within these zones. The Water and Rivers Commission will be pleased to provide advice on the locations and restrictions applying in these zones.

3. *Waterways Conservation Act 1976*

The Water and Rivers Commission has planning and pollution prevention powers under this Act within declared areas to ensure the conservation and management of waterways and associated lands.

The Water and Rivers Commission is responsible for the management of all waterways and has active programs to manage the following - Avon River, Peel Inlet, Leschenault Inlet, Albany Waterways, Wilson Inlet and adjoining land in management areas declared under the Act. This adjoining land extends to the entire catchments of the Avon River, Albany Waterways and Wilson Inlet. Detailed assessment and site specific conditions to protect water resources apply in these management areas.

4. *Rights in Water and Irrigation Act 1914*

This Act makes provision for the regulation, management, use and protection of water resources to provide for public schemes and for irrigation purposes. The Act covers the licensing and construction of wells drawing water from aquifers and the taking of water from proclaimed rivers and streams. Licences are required for commercial water supplies in proclaimed groundwater and surface water catchment areas and from all artesian sources.

5. *Swan River Trust Act 1985 (SRT Act)*

The Swan and Canning Rivers are administered under the *Swan River Trust Act*. The Swan River Trust (SRT) has the overall planning, protection and management responsibility for the Swan and Canning Rivers. The SRT assesses development referrals and makes recommendations on development and land use applications that may affect water in its management area.

6. *Town Planning and Development Act 1928*

The *Town Planning and Development Act 1928* gives local government the responsibility to prepare town planning schemes (TPSs) and local planning strategies for areas within its municipal boundaries. TPSs may vary between local governments and councils who may have different requirements for establishing and operating vineyards.

A TPS which includes a zoning map and land use planning requirements provides an indication where vineyards may be located and developed.

7. *Soil and Land Conservation Act 1945*

The *Soil and Land Conservation Act 1945* is administered by the Department of Agriculture and provides for the conservation of soil and land from the effects of erosion, salinity, flooding and eutrophication.

Land degradation is the main cause of loss of production capacity. Land degradation includes the removal or deterioration of natural or introduced vegetation, soil erosion, flooding where these impacts may be detrimental to the present or future use of the land, and eutrophication of water bodies.

In 1995 State Cabinet directed that:

...existing controls on clearing under the Soil and Conservation Act and the Country Areas Water Supply Act be augmented by a system to ensure that other natural resource conservation issues are considered before any further clearing occurs on private land.

and that

...in Shires with greater than 20% total remnants the Commissioner of Soil and Land Conservation will decide on the need to inform the Environmental Protection Authority of any clearing proposal, in accordance with an agreed Memorandum of Understanding.

This Memorandum of Understanding implements those directives.

The “Memorandum of Understanding for the protection of remnant vegetation on private land in the agricultural regions of Western Australia, March 1997” recognises that the retention of existing native vegetation is of vital importance. In particular to support private and public efforts to reverse land degradation and biodiversity loss and to prevent these problems worsening while solutions are found and implemented.

The following entities are signatories to this Memorandum:

- Commissioner for Soil and Land Conservation.
- Environmental Protection Authority.
- Department of Environmental Protection.
- Department of Agriculture.
- Department of Conservation and Land Management.

This memorandum applies to proposals to clear more than one hectare of native vegetation on rural zoned land in southern Western Australia, south or west of the eastern boundaries of the main agricultural areas. In areas where more than 20% of the original vegetation remains, the process will follow the four-level evaluation procedures implemented through the memorandum.

In local government districts where less than 20% of the original vegetation remains within the main agricultural area, the Commissioner for Soil and Land Conservation already considers further clearing carries an unacceptable risk of increased land degradation, as defined in the *Soil and Land Conservation Act*. In these areas the Commissioner will object to any clearing unless the proposal has been assessed by the Environmental Protection Authority and approved by the Minister for Environment. Landholders will be expected to provide all information needed for that evaluation.

The over-riding philosophy is that as the development of a vineyard proceeds, there should be no net loss of native vegetation, or of the condition or extent of that vegetation.

The booklet "Land Clearing Proposals for Rural Zoned Land in Western Australia" in accordance with the Memorandum of Understanding deals principally with clearing proposals on rural zoned land.

1. If the land to be cleared is zoned "**rural**", it is assessed under a single evaluation process according to the 1997 Memorandum of Understanding and subsequent policy statements.
2. If the land to be cleared is zoned **other than "rural"**, it is assessed by the Commissioner under the 1994 procedures for the assessment of clearing proposals. Other relevant agencies may be notified of the proposal.

Soil and land conservation depends on appropriate land management practices to maintain the stability of

that land in perpetuity. Soil and land conservation is the opposite of exploitive land use.

Where a land holder causes land degradation and this is brought to the attention of the Commissioner, the Commissioner, after consultation with the land holder, may issue a Notice directing the land holder to rectify the situation.

8. *Agricultural Practices (Disputes) Act 1995*

The *Agricultural Practices (Disputes) Act 1995* provides for the resolution of disputes related to the carrying on, or management, of agriculture. It is administered by the Agriculture Protection Board of Western Australia established under section 7 of the Act.

The objectives of the Act are to ensure that normal farm practices are not impeded by unnecessary litigation. It also enables the establishment of the Agriculture Protection Board and terms of reference, and provides a referral process for inquiries and mediation of disputes. The Board assumes the power to determine whether an agricultural practice is "normal farm practice".

The Act applies to disputes in which the issue is a complaint relating to odour, dust, noise, smoke, fumes, fugitive light, or spray drift, emanating from an agricultural operation.

9. *Agriculture and Related Resources Protection (Spraying Restrictions) Act 1981*

The use of hormone herbicides is controlled within close proximity to commercial vineyards.

Within a 5 kilometre radius of commercial vineyards only amine, sodium and potassium salt formulations are approved for spraying under permit.

Between a 5 and 10 kilometres radius of these crops both amine, sodium and potassium salt and low volatile ester formulations can be used without a permit.

Outside a 10 kilometre radius all formulations, such as amine, sodium and potassium salts, low volatile and volatile ester formulations can be used without a permit.

10. *Quarantine Act 1908 (Commonwealth)*

In summary, grape plant material, machinery and equipment are prohibited entry into Australia except by permit. A permit for planting material allows its entry subject to screening for pests and diseases in post-entry quarantine for at least 2 years. A machinery and equipment permit allows importation subject to inspection on arrival for freedom from soil and plant material, however state legislation prohibits its entry into Western Australia.

11. *Plant Diseases Act of Western Australia 1914 as amended by the Plant Diseases Amendment Act 1993*

Under the above legislation, the import of grapevines (including those tissue cultured) from overseas and other States is controlled into Western Australia.

The Act has the powers to:

- Ensure only disease free plants are introduced into Western Australia.
- Destroy infected plants.
- Destroy plants in neglected orchards or vineyards.

12. *Health Act 1911*

This Act provides for regulation of waste, nuisances, poisons, pesticides, food and infectious diseases and is administered by local government. Under this Act, operators who apply pesticides for gain or reward require a license from the Health Department of Western Australia. In addition, pesticide residues in food produce from the vineyards must comply with the maximum residue levels under the Food Standards Code.

Appendix 2 - List of government agencies***Department of Agriculture***

<p>Perth 3 Baron-Hay Court SOUTH PERTH WA 6151 Phone (08) 9368 3333 Fax (08) 9368 1205</p> <p>Postal address: Locked Bag 4 Bentley Delivery Centre WA 6983</p>	<p>Carnarvon South River Road (PO Box 522) CARNARVON WA 6701 Phone (08) 9956 3333 Fax (08) 9941 8334</p>
<p>Albany 444 Albany Highway ALBANY WA 6330 Phone (08) 9892 8444 Fax (08) 9841 2707</p>	<p>Esperance Private Mail Bag 50 ESPERANCE WA 6450 Phone (08) 9083 1111 Fax (08) 9083 1100</p>
<p>Bunbury North Boyanup Road (PO Box 1231) BUNBURY WA 6231 Phone (08) 9780 6100 Fax (08) 9780 6136</p>	<p>Geraldton 283 Marine Terrace (PO Box 110) GERALDTON WA 6530 Phone (08) 9956 8555 Fax (08) 9921 8016</p>
<p>Karratha Suite 3, 18 Hedland Place (PO Box 1618) KARRATHA WA 6714 Phone (08) 9144 2065 Fax (08) 9185 3380</p>	<p>Katanning 149 Clive Street KATANNING WA 6317 Phone (08) 9821 3333 Fax (08) 9821 1028</p>
<p>Kununurra Durack Drive (PO Box 19) KUNUNURRA WA 6743 Phone (08) 9166 4000 Fax (08) 9166 4066</p>	<p>Manjimup Rose St MANJIMUP WA 6258 Phone (08) 9771 1299 Fax (08) 9771 2544</p>
<p>Merredin Great Eastern Highway (PO Box 432) MERREDIN WA 6415 Phone (08) 9081 3111 Fax (08) 9041 1138</p>	<p>Narrogin 10 Doney Street NARROGIN WA 6312 Phone (08) 9881 0222 Fax (08) 9881 1950</p>
<p>Moora 20 Roberts Street (PO Box 16) MOORA WA 6510 Phone (08) 9651 1302 Fax (08) 9651 1008</p>	<p>Northam Lot 12, Old York Road (PO Box 483) NORTHAM WA 6401 Phone (08) 9690 2000 Fax (08) 9622 1902</p>

Department of Conservation and Land Management

Head Office

Department of Conservation and Land Management
 17 Dick Perry Avenue
 KENSINGTON WA 6151
 Phone (08) 9334 0333

Department of Environmental Protection

<p>Head Office PO Box K822 PERTH WA 6842 Phone (08) 9222 7000 Fax (08) 9322 1598</p>	<p>Geraldton Office 5 Burgess Street GERALDTON WA 6530 Phone (08) 9964 3844 Fax (08) 9964 3681</p>
<p>Kwinana – Peel Region Parmelia House 165 Gilmore Avenue (PO Box 454) KWINANA WA 6167 Phone (08) 9419 5500 Fax (08) 9419 5897</p>	<p>Kalgoorlie Office Viskovich House 377 Hannan Street KALGOORLIE WA 6430 Phone (08) 9021 3243 Fax (08) 9021 3529</p>
<p>North West Region Chiratta Road KARRATHA WA 6714 Phone (08) 9144 2000 Fax (08) 9144 2610</p>	<p>South West Region Unit 2 Leschenault Quays Austral Parade BUNBURY WA 6230 Phone (08) 9721 0666 Fax (08) 9721 0600</p>

Health Department of Western Australia

Head Office

Environmental Health Service
 PO Box 8172
 Perth Business Centre
 PERTH WA 6849
 Phone (08) 9388 4999
 Fax (08) 9388 4955

Quarantine Legislation

<p>From interstate: Western Australian Quarantine and Inspection Service PO Box 1410 CANNING VALE 6410 Western Australia Phone (08) 9311 5329 Fax (08) 9456 0206</p>	<p>From overseas: Australian Quarantine and Inspection Services PO Box 1410 CANNING VALE 6410 Western Australia Phone (08) 9311 5332 Fax (08) 9455 3052</p>
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Water and Rivers Commission

<p>Head Office Level 2, Hyatt Centre 3 Plain St EAST PERTH, WA 6004 Phone (08) 9278 0300 Fax (08) 9278 0585</p>	<p>South Coast 5 Bevan Street ALBANY WA 6330 Phone (08) 9842 5760 Fax (08) 9842 1204</p>
<p>Swan-Goldfields-Agricultural 7 Ellam Street VICTORIA PARK WA 6100 Phone (08) 6250 8000 Fax (08) 6250 8050</p> <p>254 Fitzgerald St NORTHAM WA 6401 Phone (08) 9690 2821 Fax (08) 9622 7155</p>	<p>North West Chiratta Road KARRATHA WA 6714 Phone (08) 9144 2000 Fax (08) 9144 2610</p> <p>Lot 225 Bandicoot Drive KUNUNURRA WA 6743 Phone (08) 9168 1082 Fax (08) 9168 3174</p>
<p>South West Unit 2 Leschenault Quays Austral Parade BUNBURY WA 6230 Phone (08) 9721 0666 Fax (08) 9721 0600</p> <p>‘Sholl House’ 21 Sholl St MANDURAH WA 6210 Phone (08) 9535 3411 Fax (08) 9581 4560</p>	<p>Mid-West Gascoyne Pass Street GERALDTON WA 6530 Phone (08) 9964 5978 Fax (08) 9964 5983</p> <p>82 Olivia Terrace CARNARVON WA 6701 Phone (08) 9941 4921 Fax (08) 9941 4931</p>
<p>Swan River Trust Level 3, Hyatt Centre 87 Adelaide Terrace EAST PERTH WA 6004 Phone (08) 9278 0400 Fax (08) 9278 0401</p>	<p>Kwinana – Peel Region Parmelia House 165 Gilmore Avenue (PO Box 454) KWINANA WA 6167 Phone (08) 9419 5500 Fax (08) 9419 5897</p>

WorkSafe Western Australia

<p>Westcentre 1260 Hay Street WEST PERTH WA 6005 Phone (08) 9327 8711 Fax (08) 9321 1277</p>	<p>Worksafe W.A.- Bunbury Regional Office Bunbury Tower Floor 8, 61 Victoria St BUNBURY WA 6230 Phone (08) 9791 7211 Fax (08) 9701 8047 Email: bunbury@bigpond.com Website: www.wt.com.au/safetyline</p>
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Appendix 3 - List of Western Australian grape grower and winemakers' associations

<p>Wine Industry Association of WA (Inc)</p> <p>PO Box 83 CLAREMONT WA 6910 Phone (08) 9385 1699 Fax (08) 9385 1538</p>	<p>Grape Growers' Association of WA (Inc)</p> <p>PO Box 15 MIDLAND WA 6056 Phone (08) 9296 4993</p>
<p>Western Australian Vine Improvement Association</p> <p>PO Box 941 MARGARET RIVER WA 6285 Phone (08) 9757 9330 Fax (08) 9757 9331</p>	<p>Western Australian Dried Vine Fruit Improvement Group</p> <p>Secretary/Treasurer Old Gingin Road MUCHEA WA 6501 Phone (08) 9571 4150</p>

For information regarding the local regional associations, please contact the Wine Industry Association of Western Australia (Inc) or the Grape Growers' Association of WA (Inc).

Appendix 4 - Handling of harmful chemicals

Generally, viticulture cannot be carried out without the use of chemicals. However, every effort must be made to use chemicals safely and for the purpose and in a manner for which they were intended.

- Only registered pesticides or crop regulators should be used and the action of the chemical should be well understood before application. All chemicals must be used in the manner and for the purpose prescribed on the label and in accordance with the Health (Pesticide) Regulations. To do otherwise is an offence and may harm operators, neighbours and the environment.
- All chemicals should be stored securely and safely (i.e. in a properly ventilated lockable shed) to minimise contamination of other goods or the surrounding environment and limit access to authorised persons only. The storage area should be constructed of non-flammable materials on hard stand flooring, isolated from nearby fire hazards and located away from low lying areas subject to flooding. It should be sited and constructed so that any spillage will be contained by bunding and will not contaminate any nearby drainage or watercourse.
- Protective clothing, including face guards, should be worn when decanting and mixing chemicals. Refer to the specific chemical Material Safety Data Sheets for details. Suppliers of chemicals have the Material Safety Data Sheets for each chemical they sell.
- Pesticide mixing should be done in a bunded containment area or off-site, away from watercourses or drains. If on-site mixing or storage cannot be avoided then it is recommended that the storage and mixing of chemicals should be completed in bunded areas that are designed not to overflow (i.e. weatherproofed and with a capacity greater than the volume of the largest storage container). The bunding should incorporate a facility that enables chemical spills to be collected and returned to the storage containers. The areas where these facilities are located shall be separated from any water resource, floodplains and dam irrigation pump sheds. Empty chemical containers should not be stored near watercourses or groundwater resources.
- Spill kits should be located in the vicinity of the chemical storage or mixing areas. 20 litres of “kitty litter” is suitable to soak up any spillage and a 40-60 litre clean container should be available in which to place the litter or absorbent material containing the chemical. Advice should be sought from the local government environmental health officer on how to

dispose of the contaminated litter or other absorbent material. Refer to details of spill management in the Material Safety Data Sheets.

- If the chemical spill occurs in a public place (e.g. on a road or in a town), or otherwise is likely to endanger public health and safety, then the local government authority (LGA) should be advised so that they can manage the clean up. In the event of a large spill the LGA will contact the Fire and Rescue Service, and experts from the Health Department, Department of Environmental Protection and the Water and Rivers Commission.
- If the spill is on a vineyard and public safety is not threatened, the vigneron is responsible for the spill clean up. The actual treatment depends on the chemical, how much has spilled and where the spill occurs. If serious environmental pollution is a likely result, then the Department of Environmental Protection should be alerted. If residues in agricultural produce are a possible outcome, then the Department of Agriculture should be alerted, as the Agricultural Produce (Chemicals Residues) Act 1983 may need to be invoked. If a licensed Pest Control Operator caused the spill, then under the terms of their licence, they must notify the Health Department.
- Records of chemical purchases, chemicals stored, their usage and disposal should be kept for a minimum of 2 years. Producers should maintain up to date and informative spray diaries, which record such information as date of spraying, rate and type of chemicals used, crop sprayed, etc. This should help in analysing the effectiveness of chemical applications.

Spraying practices

- All spray equipment should be properly set up and calibrated before chemicals are applied. Trial runs with equipment (using water) are recommended to ensure the rate of application is even and correct.
- Some spraying equipment produces large amounts of very fine droplets and in moderate breezes off-site spray drift is likely. The spray pressure, nozzle type and nozzle dimensions should be selected to ensure that the generation of very fine spray droplets is avoided. A droplet size in the range 300 - 500 microns should ensure good coverage and minimise spray drift.
- Wetting agents (e.g. special oils, detergents) have been shown to reduce spray drift. Under some conditions, they can improve the effectiveness of sprays in controlling diseases.

- Protective clothing, including face guards, should be worn when handling and applying chemicals. Refer to the specific chemical Material Safety Data Sheets for details.
- Vignerons who regularly using agricultural chemicals should undergo annual medical examinations for pesticide residues, to guard against over-exposure.
- Due care should be taken by the persons applying chemicals in the vineyard.
- It is often difficult to accurately apply sprays to a diverse and changing canopy. Equipment should be calibrated regularly to reduce the amount of over spray leading to possible off-site contamination. Retailers and/or manufacturers can also be contacted to ensure the spray equipment is calibrated properly.
- High volume mist sprayers should not be used in wind velocities likely to cause spray drift that could affect the applicator or other staff working in the vicinity or off-site situations.
- All chemicals in the spray tank should be used up or recycled and the spray tanks washed out and the diluted residue sprayed out into the vineyard. Concentrated residues should not be allowed to run to waste on the ground or into water systems.
- Grapes should not come into contact with unregistered chemicals at any time during the season.
- Vignerons should be aware before spraying any chemical of the recommended withholding periods prior to harvesting. Vignerons should liaise with the winery and AWRI to ensure the appropriate withholding periods are met prior to the fruit sent to market.
- When preparing sprays, operators should empty the container into the sprayer mixing tank and drain for at least 30 seconds until empty. Recommended practice is to fill emptied containers at least 1/10th full with water and rinse out. Repeat at least three times. Add the rinse water to the chemical tank in the place of an equivalent quantity of make-up water.
- The brochure "Preparing Farm Chemical Containers for Safe Disposal" by AVCARE (National Association for Crop Protection and Animal Health), should be followed.
- Operators should contact their local council for details of the DrumMuster program. DrumMuster is the collection scheme for non-returnable rigid metal and plastic containers used in the packaging of crop production products and animal health products. This Industry Waste Reduction Scheme has been developed by the National Farmers Federation (NFF), AVCARE (the National Association for Crop Protection and Animal Health), the Veterinary Manufacturers and Distributors Association (VMDA) and the Australian Local Government Association (ALGA) as the solution to safe disposal of cleaned chemical containers.
- Since February 1 1999, farmers pay DrumMuster a levy of 4 cents per litre or kilogram levy on crop protection and on-farm animal health products sold in non-returnable chemical containers over 1 litre or kilogram in content. Containers that are designed for multiple use or to minimise waste (such as water soluble packaging that dissolves in the spray tank) are not subject to the DrumMuster levy.
- It is illegal to burn pesticide containers. Empty pesticide containers should not be buried on the farm or vineyard. In PDWSAs all used pesticide containers should be removed from the premises to an approved waste facility.

Safe disposal of empty pesticide containers

- Empty pesticide containers must be disposed of correctly in accordance with the Health (Pesticide) Regulations. If they are left lying around with chemical residues, contamination or even poisoning of people, stock or crops may occur.
- For further information on disposing of empty pesticide containers, contact your local Agriculture Protection Board or Department of Agriculture.

Contacts for ChemCert

ChemCert WA
 88 Westview St
 Scarborough WA 6019
 Phone/Fax (08) 9341 5325

List of Shires with DrumMuster programs in place.

Position	Shire	Mailing Address	Phone Number
Chief Executive Officer	Shire of Augusta-Margaret River	PO Box 61	MARGARET RIVER WA 6285 9780 5255
Chief Executive Officer	Shire of Beverley	PO Box 20	BEVERLEY WA 6304 9646 1200
Chief Executive Officer	Shire of Boyup Brook	PO Box 2	BOYUP BROOK WA 6244 9765 1200
Chief Executive Officer	Shire of Bridgetown-Greenbushes	PO Box 271	BRIDGETOWN WA 6255 9761 1555
Chief Executive Officer	City of Bunbury	PO Box 21	BUNBURY WA 6230 9780 8222
Chief Executive Officer	Shire of Busselton	PO Box 84	BUSSELTON WA 6280 9781 0444
Chief Executive Officer	Shire of Capel	PO Box 369	CAPEL WA 6271 9727 2030
Chief Executive Officer	Shire of Chittering	PO Box 70	BINDOON WA 6502 9576 1044
Chief Executive Officer	Shire of Collie	Throssell Street	COLLIE WA 6225 9734 1000
Chief Executive Officer	Shire of Corrigin	PO Box 221	CORRIGIN WA 6375 9063 2203
Chief Executive Officer	Shire of Dardanup	1 Council Drive	EATON WA 6232 9724 0000
Chief Executive Officer	Shire of Donnybrook-Balingup	PO Box 94	DONNYBROOK WA 6239 9731 1106
Chief Executive Officer	Shire of Dumbleyung	PO Box 99	DUMBLEYUNG WA 6530 9863 4012
Chief Executive Officer	Shire of Harvey	PO Box 163	HARVEY WA 6232 9729 0300
Chief Executive Officer	Shire of Jerramungup	PO Box 92	JERRAMUNGUP WA 6337 9835 1022
Chief Executive Officer	Shire of Kent	Richmond Street	NYABING WA 6341 9829 1051
Chief Executive Officer	Shire of Manjimup	PO Box 1	MANJIMUP WA 6258 9771 1366
Chief Executive Officer	Shire of Merredin	PO Box 42	MERREDIN WA 6415 9041 1611
Chief Executive Officer	Shire of Nannup	PO Box 11	NANNUP WA 6275 9756 1018
Chief Executive Officer	Shire of Nungarin	PO Box 8	NUNGARIN WA 6490 9046 5006
Chief Executive Officer	Shire of Quairading	PO Box 38	QUAIRADING WA 6383 9645 1001
Chief Executive Officer	Shire of Wagin	PO Box 200	WAGIN WA 6315 9861 1177

List of Shires with DrumMuster agreements but which do not have the complete program in place.

Position	Shire	Mailing Address		Phone Number
Chief Executive Officer	Shire of Coorow	PO Box 42	COOROW WA 6515	9952 1103
Chief Executive Officer	Shire of Cuballing	PO Box 13	CUBALLING WA 6311	9883 6074
Chief Executive Officer	Shire of Cunderdin	Lundy Avenue	CUNDERDIN WA 6407	9635 1005
Chief Executive Officer	Shire of Dalwallinu	PO Box 141	DALWALLINU WA 6609	9661 1001
Chief Executive Officer	Shire of Dowerin	PO Box 11	DOWERIN WA 6461	9631 1202
Chief Executive Officer	Shire of Esperance	PO Box 507	ESPERANCE WA 6450	9071 0666
Chief Executive Officer	Shire of Gnowangerup	28 Yougenup Road	GNOWANGERUP WA 6335	9827 1007
Chief Executive Officer	Shire of Katanning	PO Box 130	KATANNING WA 6317	9821 4200
Chief Executive Officer	Shire of Kellerberrin	PO Box 145	KELLERBERRIN WA 6410	9045 4006
Chief Executive Officer	Shire of Kondinin	PO Box 7	KONDININ WA 6367	9889 1006
Chief Executive Officer	Shire of Kulin	PO Box 125	KULIN WA 6365	9880 1204
Chief Executive Officer	Shire of Lake Grace	PO Box 50	LAKE GRACE WA 6353	9865 1105
Chief Executive Officer	Shire of Mingenew	PO Box 120	MINGENEW WA 6522	9928 1102
Chief Executive Officer	Shire of Moora	PO Box 211	MOORA WA 6510	9651 1401
Chief Executive Officer	Shire of Mukinbudin	PO Box 67	MUKINBUDIN WA 6479	9047 1102
Chief Executive Officer	Shire of Narembeen	1 Longhurst Street	NAREMBEEN WA 6369	9064 7308
Chief Executive Officer	Shire of Perenjori	PO Box 22	PERENJORI WA 6620	9973 1002
Chief Executive Officer	Shire of Pingelly	17 Queen Street	PINGELLY WA 6308	9887 1066
Chief Executive Officer	Shire of Tambellup	Norrish Street	TAMBELLUP WA 6320	9825 1140
Chief Executive Officer	Shire of Tammin	PO Box 53	TAMMIN WA 6409	9637 1101
Chief Executive Officer	Shire of Three Springs	PO Box 117	THREE SPRINGS WA 6519	9954 1001
Chief Executive Officer	Shire of West Arthur	Burrowes Street	DARKIN WA 6392	9736 1003
Chief Executive Officer	Shire of Wickepin	PO Box 19	WICKEPIN WA 6370	9888 1005
Chief Executive Officer	Shire of Williams	PO Box 96	WILLIAMS WA 6398	9885 1005

Appendix 5 - HortGuard™

Under the banner of HortGuard™ all sectors of Western Australia's horticultural industry are working together to maintain maximum freedom from major pests, diseases and weeds and to minimise risk of chemical residues in produce. The overall goal of HortGuard™ is to maintain the productivity and marketability of WA horticulture. The Viticulture Industry Protection Plan has been developed under the HortGuard™ program and is available on the Department of Agriculture's website <www.agric.wa.gov.au> or by contacting the Department of Agriculture.

HortGuard™ focuses on the following key strategies:

Threat identification and risk assessment

A primary task under HortGuard™ is to coordinate identification of threats to productivity, sustainability and marketability, and assessment of the potential impact on local industries. HortGuard™ strengthens work already being done in State, interstate and international threat identification and risk assessment programs.

Barrier quarantine

Improved threat identification and communication under HortGuard™ assists the Australian Quarantine & Inspection Service (AQIS), Department of Agriculture and viticulturists to ensure that the entry, establishment and spread into Western Australia of exotic plant pests, diseases and weeds is minimised.

Surveillance

Under HortGuard™, targeted surveillance programs are identified for serious threats. Horticulturists and the community have an important role in reporting new or unusual weeds, pests and diseases.

Incident response

Industry specific incident response plans are developed incorporating valuable lessons learnt from previous outbreaks of pests and diseases. These plans enable Department of Agriculture and industry to respond more effectively during an incident.

Containment, eradication and management

Through HortGuard™, recommendations are made regarding improved control and eradication activities for pests, diseases and weeds. Priority is given to those threats with the greatest threat on investment to industry and government.

Research and development

HortGuard™ helps identify priority areas for research relevant to the protection of the horticultural industry and encourages national development and integration of protection-based research.

Communications and training

A HortGuard™ communication plan is used to promote key messages to those who can contribute to the protection of the horticultural industry. It also identifies training needs and develops training programs.

Appendix 6 - Biosecurity protocol

All persons should follow the following protocol when entering agricultural/horticultural properties, to minimise the risk of spreading plant pathogens or weeds.

- Always notify the grower that you will be on site.
- Limit driving of vehicles to the main tracks on farm, never enter paddocks with a vehicle. If a paddock is out of the way it may be preferable to ask the grower to transport you to the site.
- When leaving the vehicle designate a clean zone into which all your clean gear can be placed. Do not enter this area with dirty footwear.
- Wear a separate set of disposable overalls for each paddock you enter. Wear rubber boots to allow easier cleaning (essential when operating in an emergency incident).
- When you have finished in a paddock return to the vehicle and begin clean down, remembering not to enter your clean zone.
- Spray down your overalls with a solution of Farmcleanse (10%). Spray and scrub down boots with a stiff brush to ensure all loose dirt is

removed. If boots have a lot of soil on them it may be necessary to first wash with water before spraying Farmcleanse. It is essential that you ensure that your footwear is thoroughly drenched in the Farmcleanse solution.

- Remove disposable overalls and place in garbage bag for disposal on return to the office. Spray down the garbage bag and place in the clean zone.
- Spray any other equipment taken into the paddock before placing in the clean zone.
- Avoid wearing the same clothes for more than one day unless they have been washed.

Your biosecurity kit should include:

- Scrubbing brush.
- Farmcleanse (5% ethanol can be used as a substitute) in a spray bottle (a 5 L pump up spray tank is preferable).
- Foot bath.
- Water.
- Disposable overalls.

YOU MUST DECONTAMINATE BEFORE LEAVING THE FARM, ALWAYS