JOHNSON & STASZEWSKI

TOODYAY ABATTOIR

PUBLIC ENVIRONMENTAL REVIEW FOR A PROPOSED UPDATING AND REOPENING OF THE TOODYAY ABATTOIR

OCTOBER 1990

ENVIRODATA
Environmental Consultants
239 Heytesbury Road,
Subiaco, WA, 6008

PUBLIC COMMENT INVITED

TOODYAY ABATTOIRS
TOODYAY ABATTOIRS
UPDATING

PUBLIC ENVIRONMENTAL REPORT

G. Johnson & V. Staszewski proposes updating Toodyay Abattoirs situated approx 14 klm from Toodyay. The environmental aspects of the proposal are being assessed by the Environmental Protection Authority as part of the environmental impact assessment. Envirodata has prepared a report on the likely environmental impacts and proposals for their management. This report is being made available for public review. If you have any comments about the environmental impacts of the proposal and their management please submit them in writing to the Environmental Protection Authority. A Guide for Preparing Submissions is included in the Public Environmental Review which can be examined from Monday 15th October to Friday, 7th December at:

Environmental Protection Authority Reading Room
Ground Floor 1 Mount Street
PERTH WA 6000

Environmental Centre of WA Inc
794 Hay Street
PERTH WA 6000

J. S. Battye Library
Alexander Library Building
Perth Cultural Centre,
James Street
PERTH WA 6000

Kalamunda Meats
6a Laurence Road
Walliston WA

Shire of Toodyay
Toodyay WA

Toodyay Library
Toodyay WA

Copies of the document may also be purchased for $10.00 and $2.00 for package and postage from Kalamunda Meats, 6a Laurence Road, Walliston WA.
Interested persons are invited to submit written comments on the proposal by the 7th December, 1990 to:

The Chairman
Environmental Protection Authority
1 Mount Street Perth WA 6000
Attention Dr Victor Talbot

If you have any queries about preparing your submission or the Environmental Protection Authority's assessment process,

Telephone E.P.A. on (09) 222 7000

An on-site information and question day will be held on site at Lot 89 Church Gully Road, Toodyay on Wednesday, 31st October between 10am and 4.00pm.

West Australian
Saturday 13-10-90

JOHNSON & STASZEWSKI

PROPOSAL TO UPDATE AND REOPEN THE TOODYAY ABATTOIR

PUBLIC ENVIRONMENTAL REVIEW

The Environmental Protection Authority (EPA) invites individuals and other interested parties to make a submission on this proposal.

The Public Environmental Review (PER) for the development of the updating and reopening of the Toodyay Abattoir has been prepared on behalf of George Jeffery Johnson and Valentine Staszewski, proponents, following the guidelines set out by the Environmental Protection Authority (EPA) for that purpose. The PER is available for comment for eight weeks, beginning on 15th October 1990 to 7th December, 1990.

Comments from Government agencies and from the public will assist the EPA in preparing its Assessment Report, in which it will make recommendations to Government.

At the end of the public review period the EPA will present all the questions raised by the public to the proponents for their response. During this phase the EPA may require of the proponents further information so as to complete its assessment. Both the questions raised and the proponent's responses will appear in an appendix in the EPA's Assessment Report which will be made public.

Why write a submission?

A submission is a way to provide information, express your opinion and put forward your suggested course of action including any alternative approach. It is useful if you indicate any suggestions you believe may improve the proposal.

All submissions received will be acknowledged by EPA with a copy of the Assessment Report.

Developing a submission

You may agree with, disagree with, or comment on, the general issues or specific proposals discussed in the PER. It helps if you give reasons for your conclusions, supported by relevant data.

You may make an important contribution by suggesting ways to make the proposal more environmentally acceptable.

When making comments on specific proposals in the PER:

- clearly state your point of view;
- indicate the source of your information or argument

if this is applicable; and
- suggest recommendations, safeguards or alternatives.

Points to keep in mind

It will be easier to analyse your submission if you keep in mind the following points:

- Attempt to list points so that the issues raised are clear. A summary of your submission is helpful;
- Refer each point to the appropriate section, chapter or recommendation in the PER;
- If you discuss different sections of the PER, keep them distinct and separate, so there is no confusion as to which section you are considering;
- Attach factual information you wish to provide and give details of the sources. Make sure your information is accurate.
- Please indicate whether your submission can be quoted, in part or in full, by the EPA in its Assessment Report.

Copies of the PER can be obtained from Kalamunda Meat Wholesalers, 6a Laurence Road, Walliston (ph 2919493) at a cost of $10.00 plus packaging and postage.

Remember to include:

NAME

ADDRESS

DATE

The closing date for submission is December 7, 1990

Submissions should be addressed to:

The Chairman
Environmental Protection Authority
1 Mount Street
PERTH WA 6000

ATTENTION: Dr Victor Talbot

PUBLIC ENVIRONMENTAL REVIEW
FOR A PROPOSED UPDATING AND REOPENING OF THE TOODYAY ABATTOIR

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1. SUMMARY

This Public Environmental Review (PER) has been prepared to describe to the Environmental Protection Authority (EPA) and the public the environmental issues of the proposed updating and reopening of the Toodyay Abattoir at Lot 590 Church Gully Road (also known as Lot 89 Coondle Estate) in the Shire of Toodyay.

The abattoir commenced operation in March 1974 and ceased operating in May 1987 as it became subject to a Works Order from the Health Department of Western Australia for upgrading to meet the current Australian Code of Practice for Construction and Equipment of Abattoirs (Department of Primary Industry, 1986).

The proponents, Johnson and Staszewski, purchased the operation in February 1988. The proponents propose to update the abattoir to meet all Local, State and Federal Government requirements to export standards. This update will include meeting all EPA, Health Department, Water Authority and Shire of Toodyay's requirements.

It is proposed to slaughter up to 500 sheep/day eventually, although the abattoir will be operated initially at a slaughter rate of 300 sheep/day. The proponents are environmentally committed to treating and disposing all liquid and solid waste to the satisfaction of all relevant Government and Local Government agencies. Abattoir wastewater will be treated using a standard biological treatment lagoon system. The system will consist of filter screens and anaerobic and facultative lagoons. Disposal of treated water will be via irrigation onto the proponents' property (64 ha) and an adjacent property (688 ha). All abattoir solid waste will be removed by Talloman, a rendering works, on a daily basis. Lairage from holding pens will be sold off site as fertilizer.

The wastewater treatment and disposal system incorporates what is believed to be the most appropriate technology currently available. Should new technology for effluent treatment or disposal be developed which proves to be more efficient than that proposed, the proponents will undertake a feasibility study on the incorporation of it into the abattoir operations. The proponents are committed to using the alternate wastewater treatment technology if EPA finds the performance of the proposed wastewater treatment system to be unsatisfactory.

The proposed treatment process is appropriate because the site is located on clay rich soils which are very suitable for biological treatment lagoons and wastewater disposal. The slope of the site allows for a well engineered gravity feed lagooning system.

The wastewater treatment system and wastewater disposal by irrigation will be monitored to the satisfaction of the EPA

to ensure against environmental impacts. As groundwater surfaces at the lower end of the property, potential leakage from the lagooning system can be easily monitored and remedial action be undertaken well before any environmental problem would occur.

Results of monitoring will be made publicly available. If, in the unlikely event an environmental impact were to occur, the proponents would implement remedial action immediately and would carry it out to the satisfaction of the EPA. The proponents would also change its pollution control procedures and management at any time, if directed by EPA, and would do so to the satisfaction of the EPA.

2. INTRODUCTION

2.1 The proponents

The proponents for the proposed works are Johnson and Staszewski of 6a Laurence Road, Walliston, WA.

2.2 The existing Toodyay Abattoir

The Toodyay Abattoir is located at Lot 590 Church Gully Road (also known as Lot 89 Coondle Estate) in the Shire of Toodyay. The site is approximately 14 km north of Toodyay (Fig. 1a and 1b) and covers an area of 64 ha. A number of buildings and three wastewater treatment lagoons were constructed on the site to facilitate previous operations (Fig. 2).

The abattoir commenced operation in March 1974 and ceased operating in May 1987 as it became subject to a Works Order from the WA Health Department for upgrading to meet the current Australian Code of Practice for Construction and Equipment of Abattoirs (Department of Primary Industry, 1986). While operating, the abattoir was never in breach of its Local and State Government requirements. During its operation the abattoir operated under a non-conforming use right. The Shire is presently considering rezoning the site from "Rural 6" to "Special abattoir use".

The proponents purchased the abattoir in February 1988 and propose to update it to comply with Local, State and Federal Government requirements. This update will include meeting all EPA and, Water Authority environmental requirements as well as those of the WA Health Department.

Until its temporary closure in 1987, it had a capacity to process up to 500 sheep/day. During its operation it had no environmental complaint from the EPA, Water Authority, the Shire of Toodyay or the public.

2.3 The proposal

The proposal is to update the existing abattoir to meet the current Australian Code of Practice for Construction and Equipment of Abattoirs (Department of Primary Industry, 1986).

This is a very small abattoir by Western Australian standards. The proposed abattoir will have a maximum slaughter capacity of 500 sheep/day. Initially, however, the abattoir will only slaughter an average of 300 sheep per day. This will be achieved by extensively renovating several existing buildings so they meet all statutory regulations. The abattoir is expected to operate for 300 days per year and provide up to 20 permament jobs.

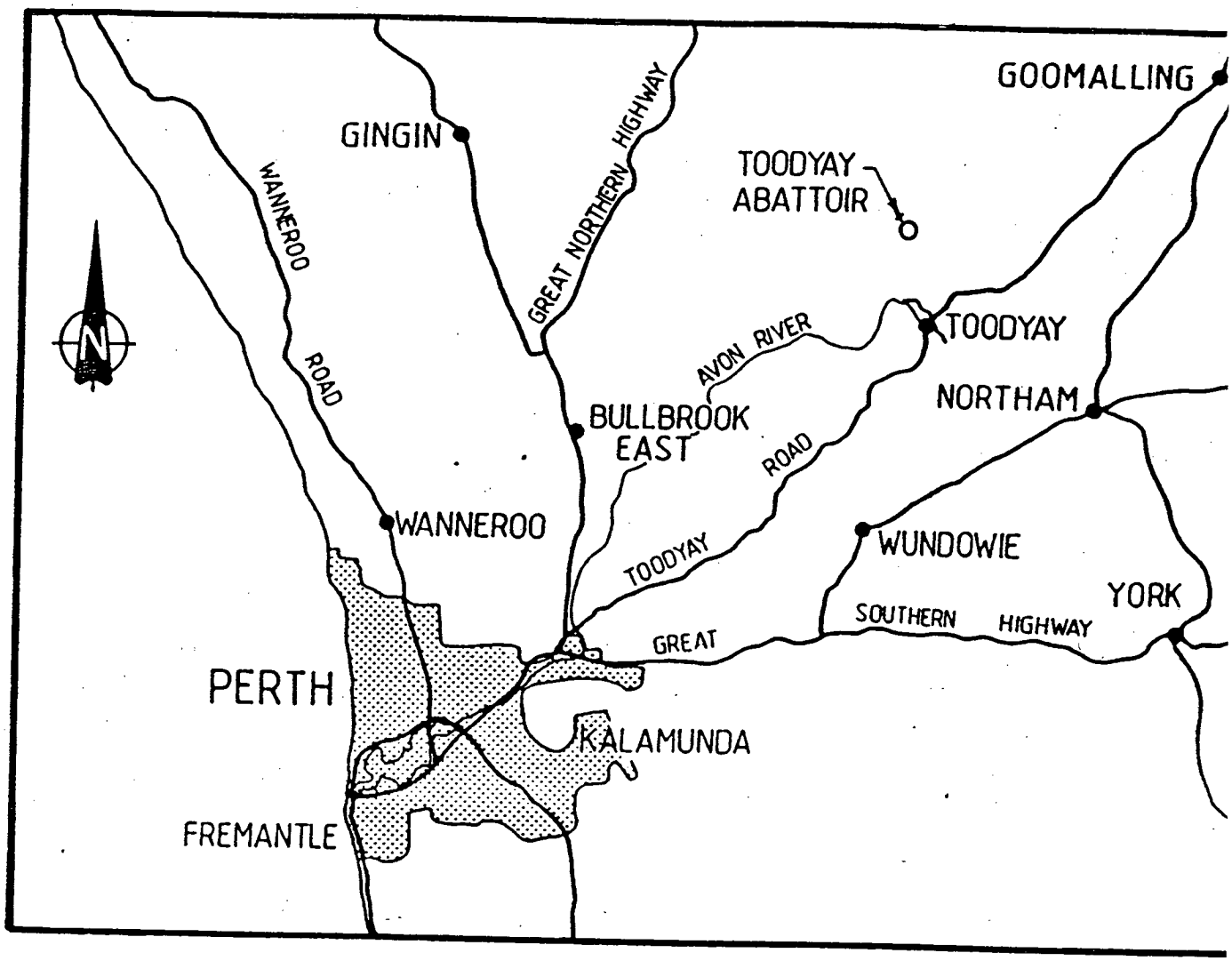


FIGURE 1a. REGIONAL LOCATION OF THE TOODYAY ABATTOIR

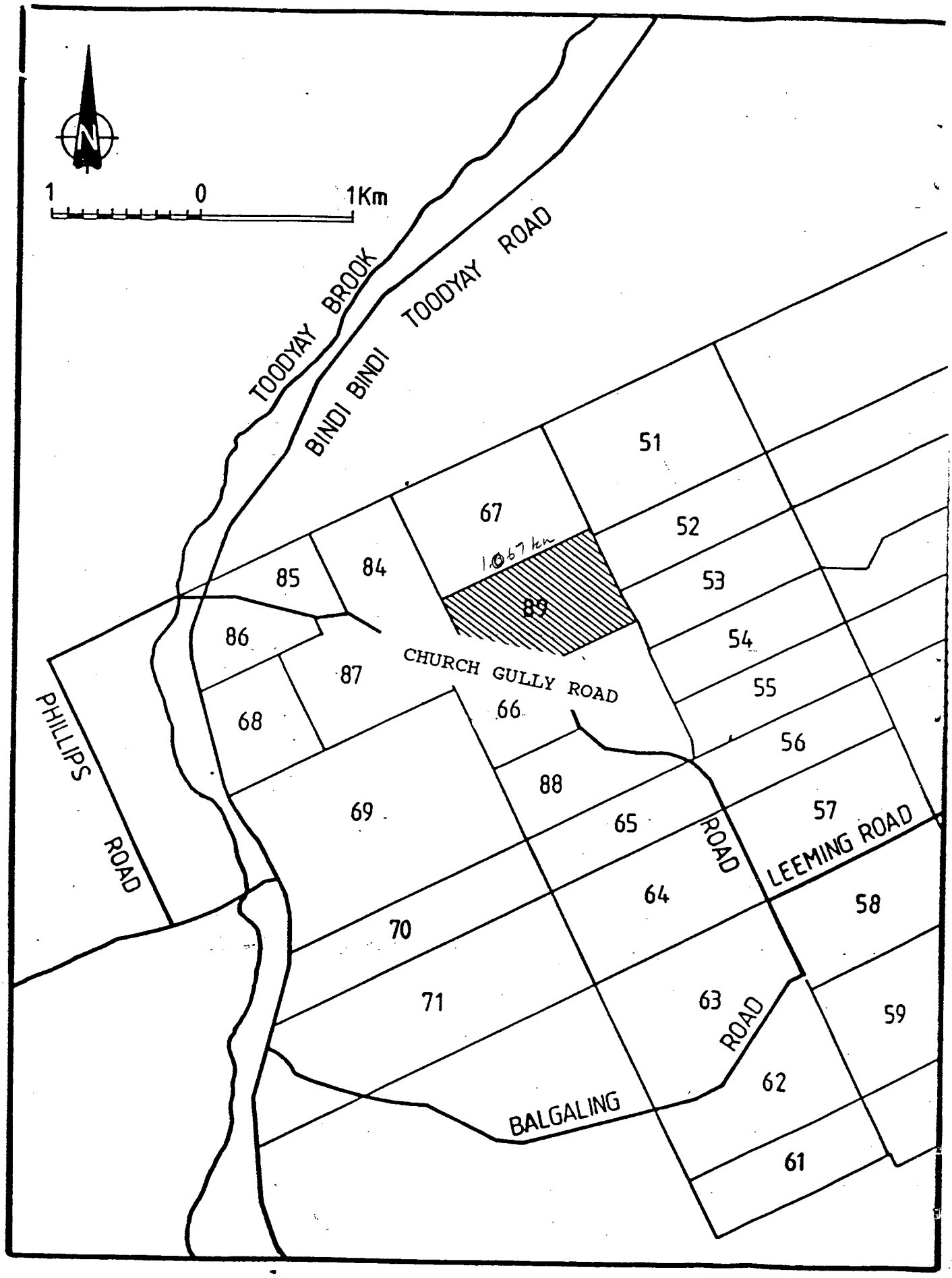


FIGURE 1b. LOCATION OF TOODYAY ABATTOIR (LOT 89) ON CHURCH GULLY ROAD

20.95 = 1.067 Ls.

20cm ⇒ 1km

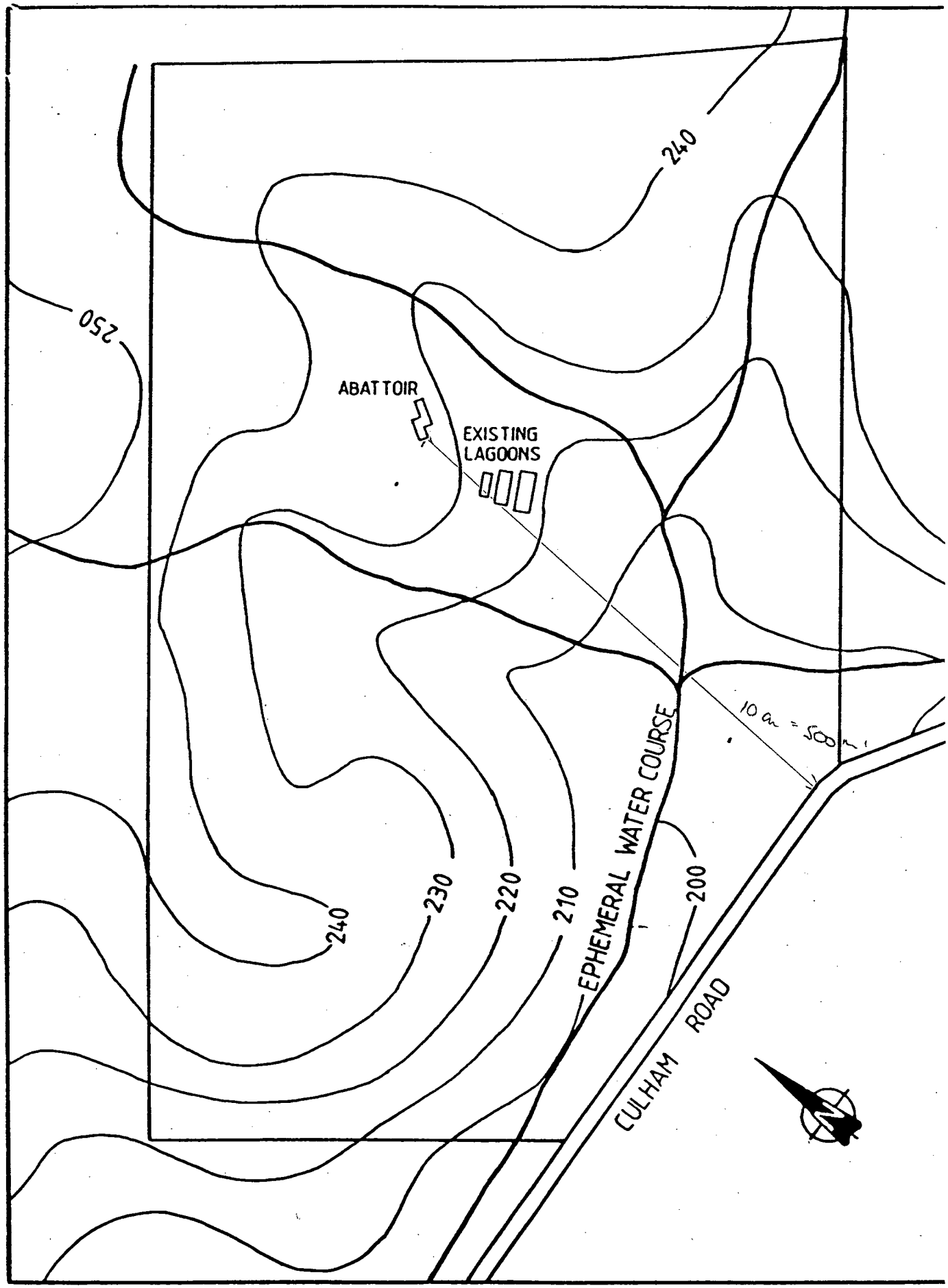


FIGURE 2. TOPOGRAPHY THE TOODYAY ABATTOIR SITE AND LOCATION OF THE EXISTING LAGOONS

The renovations will not increase the previous maximum capacity of the abattoir but will make it acceptable to all Decision Making Authorities (DMA's).

Sheep will be unloaded and held in a concrete-floored and roofed area. Slaughtering will consist of stunning, stickling, bleeding, dressing and chilling. All wastes including wastewater will be streamed so they can be disposed of with the greatest efficiency. Skins will be sold green on a daily basis. Edible and inedible offal will be removed offsite on a daily basis. The proponents have made a legally binding commitment to remove offal offsite on a daily basis and this will be carried out to the satisfaction of the EPA (Appendix 1: commitments 14-16).

The abattoir will produce wastewater and solid waste. The wastewater will be treated using a standard biological wastewater treatment lagooning system. Treated wastewater will be disposed of by irrigation onto the proponents' property and/or an adjacent property. All solid waste will be removed offsite. The proponents have made a legally binding commitment to remove all solid waste offsite on a daily basis and this will be carried out to the satisfaction of the EPA (Appendix 1: commitments 16-18).

The proposal, when implemented, will be managed and monitored to the satisfaction of all relevant government agencies through input into the EPA assessment process and the setting of Ministerial Conditions. To ensure that the proposal is acceptable, the proponents makes the legally binding commitment to operate the abattoir to the satisfaction of the EPA (Appendix 1: commitments 1-2).

2.4 Works programme

The proponents intend to commence upgrading the abattoir immediately all relevant approvals have been received.

2.5 Statutory requirements and approvals

The abattoir will require approvals to operate from several Government Departments. These departments are described in the Environmental Protection Act 1986 as Decision Making Authorities (DMAs). The DMAs for the proposed abattoir are as follows:

- Shire of Toodyay - the Local Authority which approves land uses under its Town Planning Scheme;
- Water Authority of Western Australia - licences abstraction of groundwater;
- Environmental Protection Authority - works approval and environmental licences and drafting Ministerial Conditions;

- Department of Health - controls operation of abattoirs as noxious industries, and disposal of solid waste under the Health Act; and

- Export Inspection Services of the Department of Primary Industry & Energy- approves site, condition of buildings, abattoir operations.

The proponents have already approached all the DMAs through the EPA to find out their requirements for upgrading the abattoir. As a consequence, the EPA set the level of assessment of this proposal at PER and issued guidelines for the preparation of this review. The EPA guidelines form the basis of the layout of this report and the approach taken to manage all the environmental issues associated with this proposal (Appendix 2).

2.6 Objective of a PER

Under the Environmental Protection Act 1986, proposals which may have a significant effect on the environment must be referred to the EPA by DMAs, although proponents or members of the public may also refer proposals.

The proponents referred this proposal to the EPA by letter on the 14 November 1988 (see Appendix 3). Because of the potential for public interest in the proposal, the EPA set the level of assessment at Public Environmental Review Level (PER) to ensure adequate public comment.

The PER is intended to describe to the EPA and the public the potential environmental impacts which could arise from the operation of the abattoir and the steps which will be taken to ensure the potential for any impact is eliminated. The PER also discusses backup treatment and disposal systems which will ensure no adverse environmental impact will result from any equipment breakdown.

The PER will provide the EPA and the public sufficient information to determine the acceptability of the proposal and the Minister for the Environment to set conditions for the operation of the abattoir. Whilst the proposed technology to be employed to eliminate the potential for environmental impacts can only be described in technological terms, the proponents have made every effort to describe the proposal in a manner understandable to the layman. To assist with this understanding, a glossary of technical terms is included as Appendix 4.

3. REASONS FOR SELECTING THE PROPOSED SITE

Before selecting the site the proponents looked at sites in the Shire of Murray, Owen Anchorage-South Fremantle Area, Midland, Shire of Northam, Shire of Gingin and the Shire of Toodyay. Whilst the proposed abattoir is environmentally well designed and self contained, the proponents were aware

of the rationalisation taking place in the industry over the past five years.

In the Shire of Murray, the phosphorus pollution problems of the Peel Harvey System are such that it would have been environmentally irresponsible to propose an abattoir on the Sandy Coastal Plain. This has been amply demonstrated by problems due to poor agricultural practices and piggeries.

With the WA Government owned Abattoir at Robbs Jetty (Owen Anchorage) being directed by EPA to discharge its effluent to sewer, the general pressure on industry in this area to review its operations, and the potential for changing the Owen Anchorage area along the coast to a different landuse, the proponents decided that this area was not suitable as it could not offer appropriate tenure for such a proposal. The Midland area was eliminated as the removal of the sale yards indicated a general trend towards dense residential development. Additionally, it appears that some existing noxious industries in the Midland area have limited tenure because of the nature of their operations, future development and existing pollution problems because of the sandy soil.

The Shire of Gingin was eliminated because much of the land available was on the Sandy Coastal Plain and the proponents are aware of the potential to pollute wetlands in such an environment.

The two most suitable sites were in the Shire of Northam at Wooraloo and the proposed site at Toodyay. Both areas were very suitable as they contain copious amounts of clay soil which is excellent for building well designed anaerobic, facultative and aeration biological wastewater treatment ponding systems. Such soil is also excellent for a well designed and managed treated wastewater irrigation system. The climate is also suitable for wastewater disposal via evaporation. The problem with the Shire of Northam site was that no existing abattoir was small enough to meet the proponents requirements, hence the proponents would have had to construct an entirely new abattoir.

The major advantage of the proposed site is that an abattoir is located on it. This abattoir, whilst not operating at present, has proved itself environmentally acceptable over a 14 year period. The site has non-conforming use rights for the purpose of operating an abattoir and it has its own water supply which has been proven over a 14 year period. It also has an additional 688 ha of land on the neighbouring property to dispose of its treated wastewater. It is also on the same side of a valley as farmers who support the existence of the abattoir and recognise the value of keeping agricultural industries in an area where agricultural product originate.

4. PROPOSED LOCATION

The proposed works are located 14km from Toodyay, on Lot 590 Church Gully Road (also known as lot 89 Coondle Estate). The site is located in a rural area but approximately 0.5km from a farmlet subdivision which was rezoned long after the abattoir commenced operation. The Shire of Toodyay is presently reviewing the zoning of the property from "Rural 6" to "Special Abattoir Use", as the abattoir has been operating under non-conforming use rights since it began operating in March 1974 (Appendix 5).

The proponents' site should not be viewed in isolation as the farmer on an adjacent property will permit his 688 ha farm to be used for disposal of properly treated wastewater.

All of the site has been cleared. Much of it is sloping towards a gully. The EPA has viewed the site during summer and winter. Whilst reserving its judgement until a full assessment has been carried out, the EPA's officers visiting the site did not specify any problems to the proponents which could not be responsibly managed.

The site is located in a large sub-catchment of the Avon River catchment system which is brackish and only suitable for stock purposes.

The native soils in the region are kaolinite clays derived from granitic bedrock. These clay rich soils have a permeability in the order of 10^{-9} metres/ second (Appendix 6). This is one order of magnitude better than required to classify the soil as being impermeable and hence is most suitable for the establishment of secure biological treatment ponds. The soil depth ranges 0-7m and is adequate for engineering secure biological wastewater treatment ponds. Additionally, the high adsorptive phosphorus capacity of the underlying clay will ensure against any problems in the downstream water coarses. No phosphorus problems occured when the abattoir operated in the past.

The site has the necessary services already. No off-site drainage will be required.

5. PROCESS DESCRIPTION

An outline diagram of the abattoir process is presented in Figure 3.

5.1 Sheep Holding facility.

Sheep will be unloaded onto a concrete floor which will drain to a liquid collection sump. The area will be roofed to avoid rainwater overloading the liquid collection facility and to minimise stormwater runoff and dust generation.

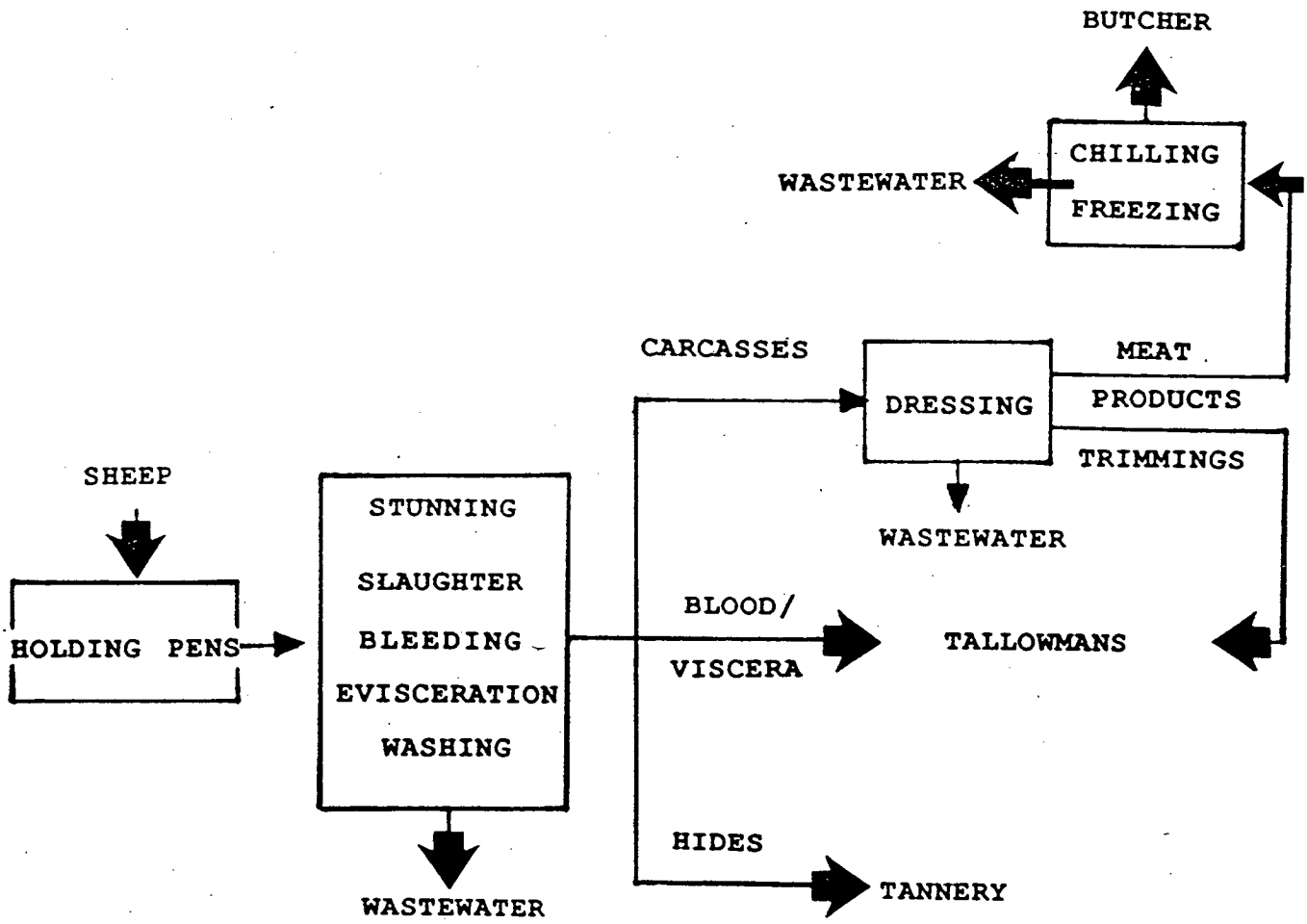


FIGURE 3. ABATTOIR PROCESS

Sheep will be held in roofed pens with kerbed concrete floors and elevated slatted floors to provide proper collection of all floor wastes.

5.2 Slaughtering

The slaughtering process will consist of stunning, stickling, bleeding, dressing and chilling. All blood from the bleeding area will be directed to a dedicated sump and removed on a daily basis to Talloman, a byproducts processor (Appendix 7). Skins will be sold green on a daily basis because the receiving tannery will need them in good condition. Ageing skins deteriorate because of bacterial action. This has the advantage of ensuring no odour is produced. The proponents have made the legally binding commitment to control odours at all time to the satisfaction of the EPA (Appendix 1: commitment 19).

Edible and inedible offal will be collected in a separate dedicated sump and will be removed offsite on a daily basis to avoid any potential for the generation of odour. The proponents have made a legally binding commitment to remove offal offsite on a daily basis and will be carried out to the satisfaction of the EPA (Appendix 1: commitments 16 and Appendix 7).

The proponents emphasise that the proposed updated abattoir will be much more environmentally sensitive than the previous operation, albeit, being environmentally acceptable. Virtually all of the equipment in the abattoir will be new and will be designed to minimise water use and hence will keep wastewater volume to a minimum. For example:

- all hoses will be fitted with "spring loaded guns" to ensure that they cannot remain running and produce excessive water;
- spray sterilisers will be fitted with switches controlled by infrared lights so that they operate only when required ;
- the abattoir will use the modern compressed air and water technique to wash down the carcases to minimise water use;
- all floor drains will be fitted with grates to prevent large solids from reaching the wastewater biological treatment lagoons; and
- the abattoir has been designed to allow for easy cleaning by dry broom and scraper before washdown. It is likely that stockyard washdown will be carried out using recycled treated wastewater.

All of the environmental issues noted above will be discussed in detail in Sections 6-8. These include solid

waste and water management, odour, dust and noise control, traffic and aesthetics.

The above improvements on traditional abattoir operations in conjunction with the streaming of waste products and their disposal management, and new building design will result in a highly environmentally acceptable and self contained unit with minimal impact on its surroundings.

After slaughter the carcasses will be processed to chilled and frozen meat. Hides will be removed from the site for curing on a daily basis. No rendering will take place in the abattoir.

The abattoir will be designed to maximise recovery and offsite distribution of materials during processing. Those measures to be adopted will include:

- blood will be collected from the killing floor by using specially designed floor lay out which drains to a dedicated sump which will be cleaned out on a daily basis and sent to Talloman;

- all floor drains will be fitted with grates and screens (1-10 mm or as otherwise directed) to minimise solids reaching the lagoons. Solid material recovered will be collected by Talloman on a daily basis;

- the abattoir has been designed to allow for easy cleaning by broom and scraper before washdown. All dry solids will also be disposed of on a daily basis to the satisfaction of the EPA (Appendix 1: commitments 16-18).

Adoption of these techniques will have the duel benefits of reducing the abattoir's demand for groundwater and minimising the volume and biologically oxygen demand (BOD) concentration of wastewater to be treated.

6 WASTEWATER TREATMENT AND MANAGEMENT

6.1 The Objective

The significance of estimating the water disposal volumes for a small country abattoir is to ensure that the biological treatment lagoons are designed to cope with the maximum loadings. If the ponds are undersize the wastewater would have to be disposed of before treatment is complete and this would be unacceptable to the proponents. There would be no significant problem with oversize ponds and it is the proponents' intention to over design the lagoon system for environmental security. The design, particularly the depth of the lagoons, is most important to ensure that odour is not produced.

6.2 Volume and sources

An outline of the wastewater sources and pathways is shown in Figure 4. With the exception of water usage for domestic purposes, the volume of water usage will approximate the wastewater production in the abattoir. Wastewater will comprise washwater (mostly recycled) from the sheep holding area, boilers, the abattoir floor, dressing and chilling areas. Based on experience from previous operations at this abattoir up to 1987, and two other abattoirs of similar size in Western Australia, it is estimated that the volume of water consumed ranges between 2.1 and 2.8 m^3/tonne of live weight killed (LWK: live weight killed is the weight of the animal immediately after it is killed but before any part of the animal is removed). This range includes water used for domestic purposes and has been estimated from abattoirs using old continuous water flow systems. The proposed system is an automatic shut-off system and only delivers water as required. Additionally these two abattoir use water for wash down of pens and lairage. This will not be the case in this proposal as scrapers and broom will be used. The water usage and associated practices has been discussed at length with Dr V Talbot of the EPA.

The proponents note that the use of water saving devices stated in section 5.2 means a likely saving of over 50% water from the value of $5m^3$/tonne of live weight killed (LWK) as sometimes quoted elsewhere.

Domestic wastewater from toilets and showers will be segregated from the abattoir wastewater and discharged to a septic tank. The septic tank will be built and managed to comply with all State and Local Government requirements.

The LWK for lambs range 22-27 kg, for mature sheep range 22-45 kg and hoggets range 30-70 kg. The average LWK would be less than 40 kg (J. Reilly, Health Department, pers. comm.). Given that an average LWK approximates 40kg/sheep and the initial slaughter rate will be 300 sheep/day, then the tonnes of LWK/day will approximate 12 tonnes of LWK/day. Therefore, the water consumption per day will be:

$$300 \text{ (sheep)} \times 0.04 \text{ (tonnes LWK/sheep)} \times 2.5m^3 \text{ (average water use)}$$

$$= 30m^3$$

Given that the domestic use of water accounts for approximately 10% of water use ($30m^3 \times 0.1 = 3m^3$), then the wastewater production per day will approximate $27m^3$. This rationale has been discussed with Dr Talbot, EPA; Mr Munyard, Shire Health Inspector, Shire of Northam and Mr Reilly, Health Department of WA (from communications with Dr Talbot) who believe that the estimated values are realistic if the abattoir is managed satisfactorily. In this respect, the proponents reiterate that they have made a legally binding commitment to manage the abattoir to the satisfaction of all relevant Government and Local Government Agencies (Appendix 1: commitment 1).

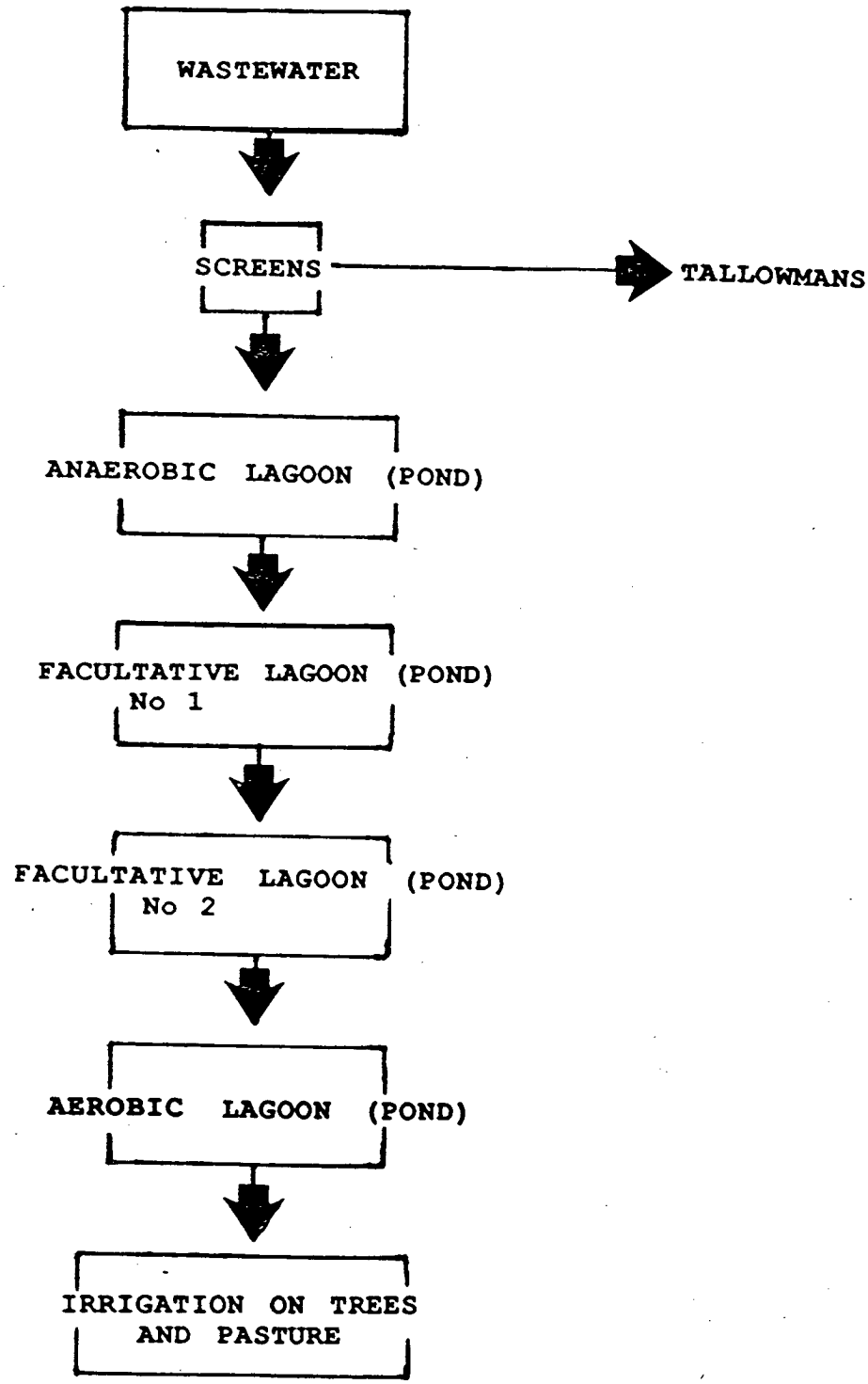


FIGURE 4. OUTLINE OF WASTEWATER PATHWAYS

The proponents are fully committed to water conservation as the Health Department requires that all water supply for slaughtering, dressing, chilling and domestic use be chlorinated for health reasons. Chlorination is costly, hence, water conservation is imperative. Other practices which the proponents will employ to conserve water have already been discussed in Section 5.2.

Table 1 shows a breakdown of the wastewater production in percentage (%) and volume (m^3/day)

Source	% Mean	% Range	Volume
Boilers/washdown*	7	6-8	1.9
Slaughtering	5	3-7	1.4
Dressing	48	39-58	13
Offal Cleaning	40	34-46	11
Stockyard**	No Wastewater		
Cooling Water from Refrigerants#	"	"	
Domestic+	"	"	to lagooning system

* Byproducts will not be processed on site
** Treated wastewater will be used for washdown of stock holding area
\# Coolant water will evaporate and not enter the waste stream
\+ Water used for domestic purposes will be discharge to a standard septic tank as for the farmlet subdivision across Culham Rd.

6.3 **Characteristics**

A range of wastewater characteristics are described in the literature (e.g. Sandford 1978, US EPA 1977a, Graham 1978). Table 2 lists the variations in concentrations suggested for the principle constituents, together with the wastewater composition assumed to be applicable to the Toodyay Abattoir. In view of the proponents legally binding commitments and proposed management practices (Appendix 1), there is no reason why these values can not be achieved. The wastewater will require treatment before disposal. This is discussed in the following section.

Table 2: Wastewater Constituent Concentrations Found in Abattoir Wastewater Effluent and Predicted Values for the Toodyay Abattoir After Screening and Primary Settling.

Constituent	Minimum Value (mg/L)	Maximum Value (mg/L)	Predicted Value (mg/L)
Biochemical Oxygen Demand (BOD_5)	830	2,500	1,500
Suspended Solids (SS)	670	2,000	1,000
Oil and Grease	360	800	600
Total Nitrogen	36	160	100
Total Phosphorus	12	40	20

Table 3: Predicted Loads (kg/day) of Constituents in Untreated Wastewater (effluent). Value have been derived using an average flow rate of $27m^3$/day and predicted values quoted in Table 2.

Constituent	Load (Kg/day)
BOD	40.5
SS	27.0
Oil and Grease	16.2
Total Nitrogen	2.7
Total Phosphorus	0.5

6.4 **Biological Treatment**

Wastewater from the abattoir will be treated in anaerobic and facultative lagoons. This is a standard treatment system which has been employed at most abattoirs in Australia which do not use ocean outfalls. This type of treatment has been employed successfully, and without complaint at the existing abattoir until 1987.

6.4.1 Anaerobic pond

The updating design of the treatment lagooning system will follow closely or be more conservative than that recommended by the United States Environmental Protection Authority's (USEPA). The proponents point out that it will use a depth of at least 4m because increased depth is a critical parameter in ensuring that odour is eliminated: odourous gases produced at the bottom of the anaerobic pond have to migrate to the surface before they can enter the

air and cause an odour problem. The greater distance between the bottom and the top of the pond gives gas a longer retention time in the lagoon. This allows the upwardly migrating odourous gases to be metabolised by bacteria, hence eliminating the potential for odour problems.

Table 3 shows that an average BOD_5 load entering the anaerobic lagoons will be 40.2kg/d. The USEPA recommends that organic loading should be 0.1-0.35kg/d per cubic metre and the depth should be 3-4m for the anaerobic pond. To achieve an average loading of 0.2kg/d per m^3 requires an anaerobic lagoon volume of $200m^3$. This volume would be well provided for in one lagoon of 24m x 11m (surface) x 4m (depth) with a freeboard of 0.5m and a retention time in excess of 20 days. Alternatively, the same volume could be provided in two lagoons of half the volume but retaining similar depths. This is similar to the existing lagooning configuration which has been successful.

To provide greater operational flexibility, two new anaerobic lagoons will be constructed. The new lagoons will be situated closer to the abattoir than the existing lagoon to take advantage of a natural fall in ground levels (Fig.2). This will also result in the lagoons being located further away from Cullum Road. The exact dimensions of the lagoons will be finalised with EPA during the works approval stage. The lagoons will be constructed to provide an operating volume (allowing for a freeboard of 0.5m) of at least $200m^3$ in the first instance. Additional ponding will be constructed as production increases towards a maximum.

Anaerobic lagoons generally achieve BOD_5 removals of 50% to 90% depending on organic loading and temperature (USEPA, 1977b). In view of the reasonably low design loading and the warm climate compared with North America and Europe where most of the data have been generated, BOD_5 removals are expected to be near the top of the published range. Assuming that 75% removal will be achieved, the organic load discharged from the anaerobic lagoons will be 10 kg/d. or a concentration of 368 mg/L.

6.4.2 Facultative lagoons

Facultative lagoons should be 1-2m deep and have an organic loading of 25-250kg BOD_5 per day (Vernick and Walker, 1981), with the optimum loading from 100 to 150kg/ha/d. Adopting a loading of 125kg/ha/d, the facultative lagoons will require a surface area of 800m2.

The existing facultative lagoons have dimensions of 34m x 16m x 1.7m and 37m x 16m x 1.8m. Whilst this is more than adequate for treatment, the proponents are prepared to build new ponds of similar dimensions. The new lagoons will be 1.8m deep with a freeboard of 0.3m and a retention time exceeding 25 days. As with the anaerobic lagoons, the exact dimensions of the facultative lagoon(s) will be finalised

at the works approval stage after discussions with the EPA so as to take into account the local topography. However, the ponding system will be closer to the abattoir compared with the existing ponds which are about 50m distant.

BOD_5 reduction in facultative lagoons is generally 75% to 95% (Vernick & Walker, 1981), with final BOD_5 concentrations of about 50mg/L. Assumming a BOD_5 removal of 85%, the effluent BOD_5 concentration will be 55 mg/L. The facultative lagoon(s) will also result in significant reductions in the number of bacteria. Retention times of 5-16 days are recommended to achieve a median level of 1,000 faecal coliforms per 100mL, at which level the wastewater is suitable for irrigation of pasture for sheep, horses and other grazing animals (NH&MRC and AWRC, 1987). Hence the 30 days detention time available in the facultative lagoon(s) will be ample for reducing bacteria to the required numbers. To be conservative, however, the proponents will either irrigate the water onto timbered and gardened areas which have no human health implications or allow three days to elapse before irrigated pasture is available to stock. Regardless of which option is chosen, it will be carried out to the satisfaction of the EPA (Appendix 1: commitment 23).

Aerobic lagoon ?

6.4.3 Storage Lagoon

The treated wastewater will be disposed of by irrigation, as discussed below in Section 6.4. However, there may be short periods during winter when the ground is too wet to irrigate. If necessary, an additional lagoon will be constructed to store the wastewater during such times. The lagoon will have sufficient volume for three month's wastewater, ie, 1,755m^3. It should be recognised, however, that excess storage space would already exist in the proposed anaerobic and facultative ponds.

A lagoon 40m x 22m x 2m will have volume of 1,755m^3 at a freeboard of 0.3m and a total volume of 2,024m^3. Based on average evaporation and rainfall, with a factor of 0.78 for lagoon evaporation compared to Class A pan evaporation (Luke, Burke and O'Brien, 1988), this lagoon will provide sufficient storage for 3 month's volume of wastewater with a freeboard of over 0.3m at the end of the three month period. This freeboard is more than twice the depth of rain resulting from a 100-year 72 hour storm (Institute of Engineers, Australia, 1987). Hence the lagoon will provide adequate storage for normal climatic variations.

The long retention time of the storage lagoon (75 days when the lagoon is full) will provide additional treatment, resulting in small reductions in BOD_5 and suspended solids plus significant reductions in numbers of bacteria.

6.5 Disposal

6.5.1 Disposal Criteria and location

The treated wastewater will be disposed of by irrigation of pasture owned by the proponents and that of a neighbour. The total area owned by the proponents is 64ha while the neighbouring property covers about 688ha.

The area required to irrigate the treated wastewater depends on a number of loading criteria discussed with the EPA, and are as follows:

- organic loading (BOD_5) =30kg/annum/ha
- nitrogen loading =500kg/annum/ha
- phosphorus loading =60kg/annum/ha

As discussed above, the BOD_5 concentration is expected to be reduced to about 55mg/L as the wastewater passes through the series of lagoons. Small reductions in nitrogen due to ammonia being evolved from the ponds to the atmosphere and precipitation/ settlement of suspended solids, and phosphorus due to settlement of suspended solids will be ignored in calculating the required area as they are minimal. The areas required to satisfy the loading criteria are shown in Table 4. The limiting criterion is the BOD loading criterion, which requires an area of about 13ha. Hence the area available on the proponents' property, alone, is very adequate for disposal via irrigation.

Table 4: Irrigation Areas Required to Satisfy Loading Criteria for Wastewater Flow of $27m^3/d$

Criterion Area	Limit	Concentration (mg/L)	Required (ha)
Organic loading	30kg/ha/a	55	13
Nitrogen Loading	500kg/ha/a	100	1.6
Phosphorus Loading	60kg/ha/a	20	3

there is no direct runoff to the surrounding watercourse. The groundwater table will be at least 1m below the irrigated areas.

On average, about 1/3 of the annual volume of wastewater will evaporate from the facultative and storage lagoons during the period September to May. Hence the volume to be disposed of by irrigation is 5,400m^3/annum.

The salinity of the wastewater will be determined by the salinity of the groundwater used in the abattoir, the rainfall into the ponds and the rate of evaporation. Two groundwater samples have been analysed (Appendix 8). The measured TDS concentrations is elevated for irrigation water. However, the groundwater is currently used for irrigation of pasture on adjoining properties without any detrimetal effects being observed. Additionally, no problem was detected when the abattoir was operating previously. If irrigation proved to be a problem on 13ha, which is highly unlikely, the proponents have made a commitment to either increase the area to be irrigated to reduce the load/ha or to build an evaporation pond. If such action was to be necessary it would be carried out to the satisfaction of the EPA (Appendix 1: commitments 12 and 23).

7. SOLID WASTE

7.1 Load and Sources

Solids waste will be generated in the sheep receival and holding areas, offal, screened washings from paunch collection, and solids accumulated in screens and floor grates.

For most of the time, solid waste on concrete holding areas will be dry and hence its volume will be at a minimum. Given that most sheep will be slaughtered on the day of arrival, it is estimated from other abattoirs experience that the maximum load of solids from this area would be 200kg/day (moist weight) (approximately 1-2m^3).

The amount of offal which will be generated will be 500kg. All this material will be collected in moving offal trays/tables to ensure minimum loss.

Solids collected from paunch would not exceed 6 tonnes/day (wet weight). About 60% of this solid will be collected from the paunch stream using moving trays/tables, screens and floor grates.

Solids will build up in the lagoon system, especially in the anaerobic lagoon over a ten year period. This is not a problem in terms of management. The actual time will depend on the loading of suspended solids to the system, the operating temperature of the water and the design of the lagoons. It is worth noting that as very fine solids settle to the bases of the lagoons they help to complete the seal and give extra environmental security against leakage.

7.2 Disposal

Solid waste from lairage will be dry to moist and will be disposed of on a daily basis for sale as fertilizer. Solids collected from the floor of the offal area will be moist to wet. They will be disposed of with the offal to a Tallowman on a daily basis. Solids recovered from screens and grates will be disposed of with offal. Solids from cleaning the pond system every 5 to 10 years will also be disposed of to Tallowmans because of its high fat content.

With the exception of solid in the lagooning system, the proponents have made a commitment that it will dispose of all solid waste off site on a daily basis and will carry it out to the satisfaction of the EPA (Appendix 1: commitment 16-18). The significance of this commitment is that it will prohibit the generation of offsite odour: most odour is generated from bacterial action during the degrading of solid biological material.

8. POTENTIAL ENVIRONMENTAL IMPACTS

8.1 Wastewater

The major potential environmental impacts of the wastewater ponding system are: volume overload/ spillage, leakage to surface or groundwater, BOD overload leading to reduced efficiency of treatment or the generation of odour.

Other potential environmental impacts from wastewater disposal are nutrient enrichment of the receiving soil (pasture) and odour if the water is not properly treated.

These issues have been conservatively addressed in section 6 which indicated that the potential for environmental impacts is minimal. The proponents have committed themselves not to apply nitrogen or phosphorus to their site or adjacent site in quantities exceeding those recommended by the EPA and/or the Department of Agriculture for normal standard agricural practices.

The proponents points out that all issues associated with wastewater are also covered by legally-binding commitments (Appendix 1)

8.2 Solid Waste

The potential environmental impacts from solid waste are odour and disease. Both are a result of bacterial action during the degradation of biological material. The proponents do not intend to stockpile solid waste but rather to dispose of it on a daily basis to be sold as fertilizer or to be sent to Tallowman.

The issue of waste management has been addressed previously in section 7 above which indicated that the potential for an environmental problem was minimal.

The proponents point out that all issues associated with solid waste are also covered by an extensive number of legally-binding commitments (Appendix 1).

8.3 Odour

All the abattoir operations will be carried out within buildings, therefore the only potential sources of air emissions and odours will be from lairage and the anaerobic lagoons.

The potential for odour is probably the main issue with regards to public perception. Odour is generated when moist to wet biological material is degraded by bacteria producing odourous gases. There are several ways of managing this problem and they include:

- eliminating the biological waste material;
- keeping the biological waste material as dry as possible;
- intermitting washing of all facilities with chlorinated water;
- frequent washing of slaughtering facilities with chlorinated water;
- good design of the anaerobic ponds;
- avoid overloading the anaerobic pond with BOD;
- giving the anaerobic pond every opportunity to form a crust and stabilise before maximum production is reached; and
- building a new pond system well before the operating system is to be cleaned out. This will allow the moisture content to greatly decrease when the lagoon is cleaned out during summer.

All these issues have been addressed in sections 6 on wastewater, 7 on solid waste disposal and again above in section 8.1 and 8.2. Each issue is covered with a legally-binding commitment (Appendix 1).

8.3.1 Lairage

Live sheep will be held on site temporarily in a concrete-paved, roofed lairage. As required by the Department of Health, the lairage will be cleaned daily to prevent accumulation of faecal material. Hence, it is not expected that there will be an odour nuisance from lairage at the site boundaries. It is important to note that lairage is common to most farms housing animals and its presence has never been questioned in agricultural areas.

8.3.2 Anaerobic pond

The poor reputation of anaerobic ponds is due to poor management, over loading with BOD, and poor construction. Usually odour is associated with anaerobic ponds built for piggeries and not abattoirs. This is because piggery waste has a lower fat content and it is difficult to form a crust

on the surface of the pond. Cattle and sheep abattoir effluent has a sufficiently high fat content to rapidly form a crust which seals in odourous gases.

The anaerobic pond is, however, that part of the system which is most likely to have a potential to cause odour. The potential is greatest over the first six months of operation while the pond is filling up, stabilizing and forming a surface crust. Without a crust to seal the pond, odours could be produced if the BOD loading is too high. The proponents intend to ensure that every assistance is given to forming a crust as quickly as possible by using a barrier arrangement. This will stop the wind blowing the crust around the surface of the lagoon, thus preventing the crust breaking up. The proponents also intend using sawdust on the surface of the pond to accelerate the growth of the crust.

The proponents point out that a woolscour using a similar anaerobic lagooning system was commissioned last summer at Bakers Hill. The woolscour is within 800m of the townsite and about 300m from the nearest resident. Since its comissioning no complaint has been received by the EPA regarding odour generated from that plant.

Given that the lagoons are located more than 400m from the nearest boundary (at Church Gully Road), it is unlikely that odour emission from the lagoons will cause a nuisance at the site boundaries, let alone the nearest resident who is 500m further away.

The proponents point out that all issues associated with odour are covered by numerous legally binding commitments (Appendix 1)

8.4 **Noise**

Noise from the abattoir will not exceed levels set by the Neighbourhood Annoyance regulations. These are:

Monday	- Friday	0700 - 1900 hours 40dBA
Monday	- Friday	1900 - 2200 hours 35dBA
Public Holidays		0700 - 2200 hours 35dBA
Always		2200 - 0700 hours 30dBA

The proponents points out that they, being environmentally and socially aware, consequently, do not intend to regularily receive stock during the hours of 1900 to 0700 nor on public holidays. The proponents stress once gain that the updated abattoir will be very small by normal standards.

All machinery with a potential to cause nuisance noise levels will be contained within buildings. It is not expected that noise will reach nuisance levels at the boundaries of the site.

The proponents point out that all issues associated with noise are also covered by legally-binding commitments (Appendix 1).

8.5 **Traffic**

The abattoir will employ up to 20 people working from Monday to Friday only. Hence there may be up to 20 small vehicles entering the property at about 7.00am and leaving at about 3.00pm (1500 hours). The proponents points out that the employees are likely to be local residents if the skills required are available, hence this traffic probably exists in the neighbourhood at present in one form or another.

Stock trucks will deliver live sheep once per day. One truck will be required arriving at around 4.00pm - 5.00pm (Monday to Friday).

One truck will remove dressed meat for delivery to Kalamunda Meat Wholesalers at around 6.00am or 4.00pm. The remaining traffic will be to remove offal to Tallowmans.

The proponents point out that all issues associated with traffic are also covered by legally binding commitments (Appendix 1).

8.6 **Aesthetics**

The proponents believe that the public have the right to feel comfortable in their domestic surroundings. The proponents are very aware of the public's perception that abattoirs are socially unacceptable. This perception was created by shoddy abattoir practices in the past which are now unacceptable and the industry is trying to rid itself of.

The proponents intend to landscape the property so that the casual viewer would be unaware of the existance of an abattoir.

8.6.1 Tree planting

It is proposed to landscape the site with trees and schrubs. This would include planting a wide band of Tasmanian bluegum (Eucalyptus globulus) or similar around the abattoir and the wastewater treatment ponds. Apart from aesthetics, these trees will have other purposes: interception of nutrients contained in the groundwater if lagoon leakage were to occur, uptake of treated wastewater after irrigation and subsequent transpiration of the water to the atmosphere, and lowering the groundwater table to ensure against soil salinity and soil erosion.

When the trees mature they will be exported offsite thus exporting all materials uptaken during growth (treated

wastewater constituents). The first harvest of the trees would occur after they have grown to maturity in about 15 years. During that 15 years, the trees would be expected to accumulate 3 kg phosphorus per hectare per year apart from all the carbon they require for their bulk. Assuming that an area of about 13 ha were planted on the irrigated area the trees would take up 78 kg phosphorus per year from the soil and groundwater. This coupled with the large area available for irrigation, and the fact that the area will be grazed, will ensure only good quality groundwater leaves from under the site.

Second and third harvests from the trees would be obtained at intervals of less than fifteen years because of the established root system.

Additional trees will be planted along the Culhum Road boundary of the site to improve the visual amenity and provide a buffer to assist in noise and odour control.

The proponents point out that all issues associated with tree planting are also covered by legally-binding commitments (Appendix 1).

9 MANAGEMENT AND MONITORING

Before discussing the methods and procedures to be employed for management and monitoring, the proponents believes it is important to indicate the objectives of management and monitoring in this PER. The objectives include:

- that the abattoir meet all environmental requirements of the EPA, Health Department, Water Authority and the Shire of Toodyay;
- that the abattoir does not pollute groundwater to be used for human or stock purposes;
- that the abattoir does not emit socially unacceptable odours outside the boundary of its property;
- that noise levels are kept within all State and Local Government requirements and noise be further minimised where possible so that residents are unaware of the abattoirs operations; and
- the aesthetics of the abattoir be such that it is largely concealed from public view, with the view from the road appearing rural.

Like most forward looking proponents, the proponents are aware of the economic and environmental costs of pollution or carrying out any operation that the public holds an adverse perception about. Consequently, the proponents have made legally-binding commitments to design a monitoring and management programme to the satisfaction of the EPA (Appendix 1: commitment 14-15). The proponents also make a

legally binding commitment to carry out remedial work to the satisfaction of EPA, if any pollution is detected (Appendix 1: commitment 27).

As discussed above, the abattoir will be upgraded with new equipment selected because of its efficient water use. The proponents will carefully manage the collection of solid wastes to maximise the value of material sold to Tallowman and to minimise the load of BOD to the treatment lagoons.

A monitoring programme will be undertaken to ensure that the wastewater treatment and disposal system is operating properly and not causing significant adverse environmental impacts. Samples will be collected from the wastewater, groundwater and surface water at intervals satisfactory to EPA (Appendix 1: commitment 14-15). All samples will be submitted to a laboratory acceptable to the EPA for analysis. Initially the proponents propose to collect wastewater samples quarterly from the inlet to the anaerobic lagoons and have them analysed for acidity/alkalinity (pH) and organic matter (BOD_5), total dissolved solids (TDS), nitrates (NO_3), total kjeldahl nitrogen (TKN: Organic nitrogen plus ammonia) and total phosphorus (P). This will help to characterise the waste leaving the abattoir. The same set of analysis will be carried out on the treated wastewater to ensure its acceptability for irrigation and to define the efficiency of the treatment lagoon system.

Groundwater samples will be collected quarterly from one of the two bores supplying water to the abattoir. Samples will be analysed for pH and organic matter (using the total organic carbon (TOC) test because of the expected low concentrations), total dissolved solids, nitrate, and phosphorus.

Surface water samples will be collected twice annually from the watercourse on the eastern side of the lagoons. Samples will be collected during the onset of winter flow and at the end of September and analysed for pH, TDS, NO3-N and P.

Copies of the results from the monitoring programme will be forwarded to the EPA as soon as possible after their receipt from the laboratory. All results will be made publicly available through the EPA.

10 REFERENCES AND SUGGESTED READING

1 Department of Primary Industry 1986, Australian Code of Practice for Construction and Equipment of Abattoirs, AGPS, Canberra.

2 Eckenfelder, W.W., 1979. Principles of Water Quality Management. CBI Pub.Co., Massachusetts

3 Environmental Protection Authority, USA, 1977a. Federal Guidelines: State and Local Pretreatment Programs. EPA-430/9-76-017c, Volume III, Appendix 8, Jan. 1977.

4 Environmental Protection Authority, USA, 1977b, Upgrading Lagoons, EPA Technology Transfer Seminar Publication, June 1977.

5 Environmental Protection Authority, USA (1977c), "Wastewater Treatment Facilities for Sewered Small Communities", Report EPA - 625/1-77-009, October, 1977.

6 Funke, J.W. 1969, A Guide to the Industrial Water and Effluent Management in Abattoirs and the Meat Packing Industry, National Institute for Water Research, Council for Scientific and Industrial Research, Guide K10, Pretoria, South Africa.

7 Graham, A. 1978, Possibilities for a Reduction in the Use of Water by the Australian Meat Industry, Seminar Proceedings, Australian Meat Technology Group of the AIFST, Brisbane.

8 Institution of Engineers, Australia 1987, Australian Rainfall and Runoff, Revised Edition, Canberra.

9 Luke G.J., Burke K.L. & O'Brien T.M. 1988, Evaporation Data for Western Australia, WA Department of Agriculture. Technical Report 65, March 1988.

10 National Health and Medical Research Council Australian Water Resources Council 1987, Guidelines for Use of Reclaimed Water in Australia, Agps, 1987.

11 Sandford, I.C. 1978, Wastewater as a Useful Resource, Seminar Proceedings, Australian Meat Technology Group of the AIFST, Brisbane.

12 Vernick A.S. & Walker E.C. (ed) 1981, Handbook of Wastewater Treatment Processes, Marcel Dekker Inc., New York.

APPENDIX 1

List of Commitments. Those that can be administered under part 5 of the EP Act 1986 has an asterisk against them. The remainder can be implemented using Ministerial Conditions.

GENERAL COMMITMENTS

1. The proponents will adhere to the proposal as assessed by the Environmental Protection Authority and will fulfil the commitments made below.

2. The abattoir will be constructed and operated according to all relevant Government statutes and agencies' requirements, and to the satisfaction of the EPA:

WASTEWATER MANAGEMENT COMMITMENTS

3.* The proponents will build a fully integrated wastewater, solid waste, noise and odour treatment and disposal system which will be designed and installed by a recognised water/wastewater treatment contractor to the satisfaction of the EPA. The system will be operated by the proponents and monitored by the consultant to the satisfaction of the EPA and all relevant Authorities.

4. Prior to construction of the wastewater treatment ponds, the proponents will supply to the EPA and the Water Authority of Western Australia details of their exact location and design and have those details approved by the EPA and the Water Authority of Western Australia.

5.* Prior to commissioning the plant, evaporative lagoons will be constructed to dispose of treated wastewater and will be operated subsequently to the satisfaction of the EPA.

6.* In the event of pond leakage, the proponents, upon direction from either the EPA or the Water Authority of Western Australia, will immediately line the leaking pond with a plastic liner to the satisfaction of the EPA and the Water Authority of Western Australia.

7. All wastewater treatment lagoons will be constructed to have at least 0.3m freeboard so as to be able to cope with a "once in thirty year storm event".

8.* The proponents will ensure that the water level in the wastewater treatment ponds will be maintained to the satisfaction of the EPA and the Water Authority of

Western Australia.

9.* The proponents will take immediate remedial action should failure of the wastewater treatment system occur and will carry out such action to the satisfaction of the EPA and all relevant Authorities.

10.* To cope with equipment failure, the proponents will keep sufficient spares for immediate repair to the aerators, the electrical system and other key elements of the system. In such an event the proponents will advise the EPA and will take steps in the event of major failure to construct holding lagoons to the satisfaction of the EPA and relevant authorities as quickly as possible.

11. The proponents will ensure that stormwater runoff from areas adjacent to the ponds will not enter the wastewater treatment pond system.

12.* If, due to some unseen circumstance, the disposal of treated wastewater by irrigation did not meet the EPA's requirements, the proponent will build an evaporation pond for wastewater disposal and this will be done to the satisfaction of the EPA.

13 The proponent will ensure that any treated wastewater will only be irrigated onto the site if it complies with the EPA requirements for phosphorus and nitrogen.

MONITORING

14.* Prior to construction, the proponents will submit and subsequently implement a monitoring programme to the satisfaction of the EPA and on the advice from the Water Authority of Western Australia.

The monitoring programme will include:

- initial baseline sampling period to determine whether impacts are presently occurring;
- parameters to be measured;
- sampling sites and times;
- reporting times to EPA, and
- a commitment to modify the environmental management programme , if necessary, to reduce the impact of pollution, to the satisfaction of the EPA.

15.* All samples taken in the monitoring programme will be analysed in a laboratory acceptable to EPA.

In the event that the monitoring programme indicates that an adverse environmental impact is occurring or developing, the proponents will alter the abattoir operation or introduce additional environmental management controls as necessary to reduce the impact to an acceptable level.

SOLID WASTE

16. The proponents will dispose of all solid wastes off-site, and will obtain the approval of the EPA for the method and location of solid waste disposal prior to commissioning the plant.

17. The proponents will, three months prior to commissioning, submit a solid waste disposal plan to the EPA to the satisfaction of the EPA. This plan will nominate a Gazetted landfill site which will accept abattoir waste and be to the satisfaction of EPA.

18.* The proponents will have a permanent member of staff living on site. If dead animals are delivered to the abattoir they will be removed from the site within 24 hours and disposed of to the satisfaction of the EPA.

DUST, ODOUR AND NOISE

19.* The proponents will ensure that dust, odour and noise will be controlled at all times to the satisfaction of the EPA.

20.* The proponents will seal any area used by traffic including the access road to the abattoir if it is deemed by the EPA that traffic is causing a dust problem.

21.* The proponents will monitor noise at night and weekends and will take appropriate action, if necessary, to minimise noise to the satisfaction of EPA.

22. All machinery with a potential to cause nuisance noise levels will be enclosed to ensure that noise levels satisfy the Neighbourhood Annoyance Regulations

IRRIGATION OF WASTE WATER: NUTRIENTS AND DISEASE

23.* Before the proponents irrigate wastewater onto its property it will provide EPA with chemical analysis of the treated water and have it approved for irrigation by the EPA. Additionally, the proponent will have approved by EPA, the area of land to be irrigated, prior to commissioning the plant.

OTHER COMMITMENTS

24. The proponents will not use treated wastewater for any purpose relating to the dressing of meat. Before it uses such water for washing down stock holding areas, approval would be sought from the Health Department and the EPA. All such wash down water would be recycled back into the wastewater treatment system.

25. The proponents will control insects and weeds around the wastewater treatment system, including the lagoons, any sludge drying facilities or temporary stock holding areas, to the satisfaction of the EPA, the Health Department of Western Australia and the Shire of Toodyay.

26. The proponents will, three months before commissioning the plant, submit a landscaping plan (tree planting) to the EPA, and have it approved by the EPA, with the purpose of retaining the amenity of the area.

27.* The proponents will modify its pollution control operations, if it cannot meet its licence conditions , so that environmental impacts are reduced to a level acceptable to the EPA.

28. The proponents will be responsible for decommissioning the plant and rehabilitating the site and its environs, to the satisfaction of the Environmental Protection Authority.

29. The proponents will, at least six months prior to decommissioning, prepare a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority.

30. The proponents will not transfer ownership, control or management of the project, without prior consultation and arrangements being made which are to the satisfaction of the EPA and The Hon. Minister for Environment.

GUIDELINES FOR THE PUBLIC ENVIRONMENTAL REVIEW ON THE PROPOSED ABATTOIR, LOT 89 CHURCH GULLY ROAD TOODAY

The guidelines identify issues that should be addressed within the Public Environmental Report (PER). They are not intended to be exhaustive and the proponent may consider that other issues should also be included in the document.

The PER is intended to be a brief document: its purpose should be explained, and the contents should be concise and accurate as well as being readily understood. Specialist information and technical description should be included where it assists in the understanding of the proposal. It may be appropriate to include ancillary or lengthy information in technical appendices.

Where specific information has been requested by a Government Department or the Local Authority, this should be included in the document.

1. SUMMARY

The PER should contain a brief summary of:

- salient features of the proposal;
- alternatives considered;
- description of receiving environment if any and analysis of potential impacts and their significance;
- environmental monitoring and management programmes, safeguards and commitments; and
- conclusions.

2. INTRODUCTION

The PER should include an explanation of the following:

- identification of proponent and responsible authorities;
- background and objectives of the proposal;
- brief details of, and timing of the proposal;
- relevant statutory requirements and approvals; and
- scope, purpose and structure of the PER.

3. NEED FOR THE PROPOSAL

The PER should examine the justification for the proposal, especially in its relationship to the development on the existing site. Broad costs and benefits of the proposal at local and regional levels could also be discussed.

4. EVALUATION OF ALTERNATIVES

A discussion of alternative sites and scales (sizes) of the proposal should be provided. Given the existing nutrient problems in groundwater and estuaries in WA, and the potential environmental problems associated with abattoirs, a rationale, on environmental grounds, should be presented to show that the proposed site is suitable for the proposal.

5. PROPOSED LOCATION

The proposed location is to be described, including:

- cadastral information;
- adjacent land uses, including urban;
- soil type;
- location of structures etc on the site;
- location of structures to be built on the site; and
- provision of services, including drainage.

6. PROCESS DESCRIPTION

There should be a clear description of each stage of the abattoir process using diagrams where appropriate. An indication of the ultimate capacity of the plant should be provided. Operational times should also be outlined.

7. EFFLUENT TREATMENT AND DISPOSAL

The PER should discuss the treatment and disposal of effluent from the abattoir. Given that the abattoir is relatively close to dwellings, it is very important to describe how wastewater treatment will be carried out and how it will be disposed. To this end the PER should include:

- a description of the nature of the waste and effluent, including volume and composition;
- a description of the treatment of the waste and effluent, including the design basis used to determine the size of each component of the treatment process and the rationale for selection of the particular treatment process;
- a review of alternative effluent disposal methods and strategies considered, leading to the rationale for the selected option;

- a description of the method of disposal of waste and effluent, including the frequency of disposal, location of disposal and composition of effluent at final treatment;
- an indication of the ultimate volume of waste and effluent to be treated and disposed;
- an indication of the extent to which waste and effluent will be recycled;
- an outline of any backup treatment and disposal system; and
- disposal of solid waste off-site including sludge buildup in the pond system.

8. SITE AND EFFLUENT IMPACTS AND MANAGEMENT

Having described the wastewater treatment system, it is important to identify likely impacts on the environment, including implications to surrounding land uses and the effluent receiving environment if leakage occurs. The PER should also indicate approaches that will be adopted to ameliorate and manage the identified impacts. Issues that should be addressed include:

- impact of the effluent on the receiving environment;
- procedures to be adopted in the event of plant or effluent disposal system breakdown;
- procedures used to ensure that the effluent treatment system operates efficiently and effectively;
- methods of ensuring that other potential environmental problems, such as noise and odour factors, are minimised and managed; and
- consideration of related site management, such as stormwater disposal etc.

9. MONITORING

The effluent treatment and disposal system will require monitoring to ensure that it is operating efficiently and does not leak. The specification of any monitoring system should be given and responsibility for the operation of that system should be assigned.

10. CONCLUSION

GUIDELINES

A copy of these guidelines should be included in the document.

REFERENCES

All references should be listed.

APPENDICES

Where detailed technical or supporting documentation is required, this should be placed in appendices.

COMMITMENTS

Where an environmental problem has the potential to occur the proponent should cover this potential problem with a commitment to rectify it. Where appropriate, the commitment should include (a) who will do the work, (b) what is the nature of the work, (c) when the work will be carried out and (d) to whose satisfaction the work will be carried out to, and if relevant, where will the work be carried out.

APPENDIX 3

LETTERS OF REFERRAL AND FROM NEIGHBOUR

George Jeffery Johnson & Valentine Staszewski
Re: Toodyay Abattoirs
C/O Lot 97 Talbot Road
SWAN VIEW WA 6056

14 November 1988

The Director
Pollution Control Division
Environmental Protection Authority
57 Mary Street
PERTH WA 6001

ATTENTION: DES SYKES

This is a letter of "intent":

Dear Sir

We namely George Jeffery Johnson and Valentine Staszewski intend to carry out a works programme to extend and upgrade what is known as Toodyay Abattoirs.
Architectural drawings of the extensions have at this time been processed and approved by the relevant authorities being the shire of Toodyay. To support these drawings a comprehensive floor layout and working drawings to conform with the code of practice have been prepared by Torrance Design Co-Ordination, a consultant in Abattoir Design which have been approved and stamped by the Health Department of Western Australia.
May we point out that both the representatives from those government bodies have inspected the progress of the extensions and upgrading and have conveyed to us that they are most happy with the standard and progress of work being carried out.
This letter of intent will be set out in report form for the convenience of all parties to enable any specific areas relating to the working of the Abattoirs to be segregated and analysed.

Areas of Working are namely

1. Stock cartage & unloading
2. Lairage Hygiene
3. Kill floor
4. Blood drain and blood save-all
5. Drainage of general effluent
6. Effluent ponds and maintenance
7. Effluent distribution of third pond
8. Water quantity, quality and samples
9. Control of smell pollution
10. Noise and vehicle pollution
11. Lagoons sizes and layout
12. General summary

12. GENERAL SUMMARY

We feel that Toodyay Abattoir renders no significant threat to the general environment. This particular works is situated approximately 14 kilometers from Toodyay town site and on the north side of a small holdings of hobby farmers of which are mainly weekenders. The Toodyay abattoirs property is adjacent to larger farm holding creating absolutely no threat to the environment. The amount of stock intended to pass through Toodyay Abattoirs is for below the numbers which would be normally associated with the size property for example the abattoirs, numbers would be 400 per day, 5 days a week approximately 50 weeks of the year, a total of 100,000 units per year. A property of that size could enjoy 4 to the acre and Toodyay Abattoir property being 158 acres would render 4 units x 158 acres x 7 days per week x 52 weeks of the year totalling 230,000 units per year.
Further to the significant point is the virtually all solid waste will be removed from the property and the fact that we have incorporated a blood save-all indicates that we are health and health pollution orientated Toodyay Abattoir is undergoing an extensive renovations programme which was not only to control smell, noise, dust, and ground contamination, but to render an acceptable aesthetic look together with the tree planting programme should result in an asset to the area.
Toodyay Abattoir has full backing from the local shire naturally for a certain amount of revenue but most important, the work force factor. Toodyay Abattoir should employ approximately twelve people plus other associated trades which would be a large boost to the Toodyay economy. May we finalise this letter of intent by saying that both myself and Valentine Staszewski are most willing to cooperate with any relevant authority and abide to any requirements set down in their prospective acts.

In anticipation of your cooperation

Yours faithfully

GEORGE JEFFERY JOHNSON

J. Candeloro
c/o P.O. Box
TOODYAY

14.07.90

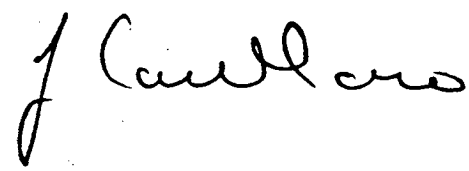
Environmental Protection Authority
Head Office
1 Mount Street
PERTH 6000

ATTENTION: Victor Talbot

Dear Sir,

I the undersigned acknowledge the fact that the proponents of Toodyay Abattoir have discussed the possibility of stock grazing on my property which is situated north of Lot 89 Church Gully Road and comprises of approximately 1,300 acres. I have consented provided that at the time of grazing it is at a mutual advantage. Further more I am prepared to allow all excess effluent from the third or finnishing pond to be broad irrigated over the level areas of my property under my supervision.

Signed

J. Candeloro 

APPENDIX 4

GLOSSARY OF TERMS

Terms	**Explanations**
Adsorption	Attraction to the surface of a solid.
Aerobic	Conditions in which free oxygen from the air is available.
Anaerobic	Conditions in which oxygen is not available.
BOD_5	Biochemical Oxygen Demand, 5-day. The amount of oxygen required by bacteria while stabilising decomposable organic matter under aerobic conditions. The organic matter serves as food for the bacteria, which derive energy from its oxidation. The test is carried out over a five-day period.
Eutrophication	Prolific growth of micro-organisms leading to detrimental quality changes in lake waters.
Freeboard	Distance between the surface of the liquid in the lagoon and the top of the bank around the lagoon.
Impermeable	Of very low permeability; effectively, not permeable.
Organic material	Material based on carbon, usually (but not essentially) derived from plants and animals.
Paunch	Stomach of sheep.
Permeability	A measure of the ease with which water can pass through the soil. A permeable sand might have a permeability of 10-4m/s while an impermeable clay might have a permeability of 10-8m/s.
pH	A way of expressing the concentration of hydrogen ions in a liquid which describes the intensity of its acid or alkaline condition. pH 7 is described as neutral pH, acids have pH values less than 7 and alkalis have pH values more than 7. In wastewater treatment employing biological processes (such as lagoons), it is important to control pH within a range favourable to the particular organisms involved.
Rendering	Separation of fats and water from tissu by cooking and screening.
SS	Suspended Solids - undissolved substances present in suspension. An important parameter in determining the efficiency of treatment units.
Tallow	**Substance got by melting the harder and less fusible kinds of (especially animal) fat.**

Viscera	Interior organs, especially in the abdomen (eg the intestines).

Symbols:

ha	hectare
kg	kilograms
kg/d	kilograms per day
km	kilometres
m	metres
m^3	cubic metres
m3/d	cubic metres per day
m3/t	cubic metres per tonne
mg/L	milligrams per litre
ML/d	megalitres (millions of litres) per day
mm	millimetres

APPENDIX 5

STATE AND LOCAL GOVERNMENT CORRESPONDENCE

ENVIRONMENTAL PROTECTION AUTHORITY
1 MOUNT STREET, PERTH, WESTERN AUSTRALIA 6000
Telephone (09) 222 7000

Messers Johnson, Stanzewski & Borger
Church Gully Road
TOODYAY WA 6566

Your Ref:
Our Ref: 175/88
Enquiries: Dr V Talbot

Dear Messers

REDEVELOPMENT OF ABATTOIR, LOT 89 CHURCH GULLY ROAD, TOODYAY

Further to my letter of 4 July 1988 regarding the level of assessment for the above proposal, the Minister for Environment has reviewed the matter and directed the Environmental Protection Authority to formally assess the proposal at the level of Public Environmental Report.

The Environmental Protection Act requires that no decision should be made to implement this proposal until the Environmental Protection Authority and the Minister has authorised implementation.

The Authority's contact officer with regard to the assessment, will be Dr Victor Talbot whose direct line is 222 7073.

Yours faithfully

Seen by
R.A.D. Sippe

R A Sippe
DIRECTOR
EVALUATION DIVISION

24 August 1989

0236JMABA:lt

H1.2

DEPARTMENT OF MIN

GEOLOGICAL SURVEY
OF WESTERN AUSTRALI

MINERAL HOUSE
100 PLAIN STREET CNR ADELAIDE
PERTH WESTERN AUSTRALIA

TELEPHONE 09 22
TELEGRAMS "WAMINES"
TELEX AA95791 MI
FACSIMILE 09 22

Your Ref: CT:KW H1.2
Our Ref: GS149/75 ATL:CA
Enquiries to: A T Laws
Telephone: (09) 222 3197

Shire Clerk
Shire of Toodyay
P O Box 96
TOODYAY WA 6566

Attention: Mr C Tink

Dear Sir

I refer to your letter of July 25, 1989, and to your request for advice on the groundwater conditions near the Toodyay Abattoir, and to the effect groundwater withdrawal by the Abattoir could have on the adjoining special rural holdings.

The abattoir is located in the northern part of a large catchment covering the rural subdivision as shown in the attached figure. This large catchment can be further subdivided into northern and southern subcatchments. The abattoir is in the northern part of the northern subcatchment. Any groundwater used by the abattoir will have no effect on that part of the rural subdivision in the southern subcatchment and this area need be considered no further.

The northern subcatchment is bisected by Church Gully Road, which follows the main drainage. The rural subdivisions are south of the road, the abattoir to the north.

Bore data held by the GSWA for this area are limited to three bores in this northern subcatchment (Bores 20, 31 and 32 in Table 1). These bores have yields of less than 18.2 m^3/d and are generally brackish. There may be other bores within the rural subdivision but no data are available for them.

Anticipated groundwater flow directions are shown schematically in the attached figure, and are based on hydrogeological interpretation. The area is underlain by granitic bedrock with a weathering profile that can range from 0 - 20 m in thickness; within this profile groundwater availability is very poor.

.../2

In the rural subdivision part of the northern subcatchment, groundwater flow is generally to the north towards the main drainage line. In the area of the abattoir groundwater flow is to the south and southwest also towards the main drainage line. Any groundwater extracted from beneath Lot 89 to the north of the main drainage line is derived from a different area to that in the rural subdivision, and should have no effect on groundwater levels, yields or quality in the latter area.

However, if a bore is constructed in the southernmost part of Lot 89, on the drainage line, there could be an effect on groundwater availability in the rural subdivision. The main drainage line can be regarded as a 'sink' towards which groundwater will flow from north and south in the northern subcatchment. A bore in this 'sink' will draw water from groundwater flow from the whole subcatchment upstream of the bore site. In doing so it may affect bores in the rural subdivision. On the other hand, if a bore is sited well up-slope in Lot 89, it will have little effect on the rural subdivision.

It should be noted that groundwater availability in this area is very poor. Large supplies of good quality water are unlikely to be found anywhere in the rural subdivision or the abattoir area.

Yours faithfully

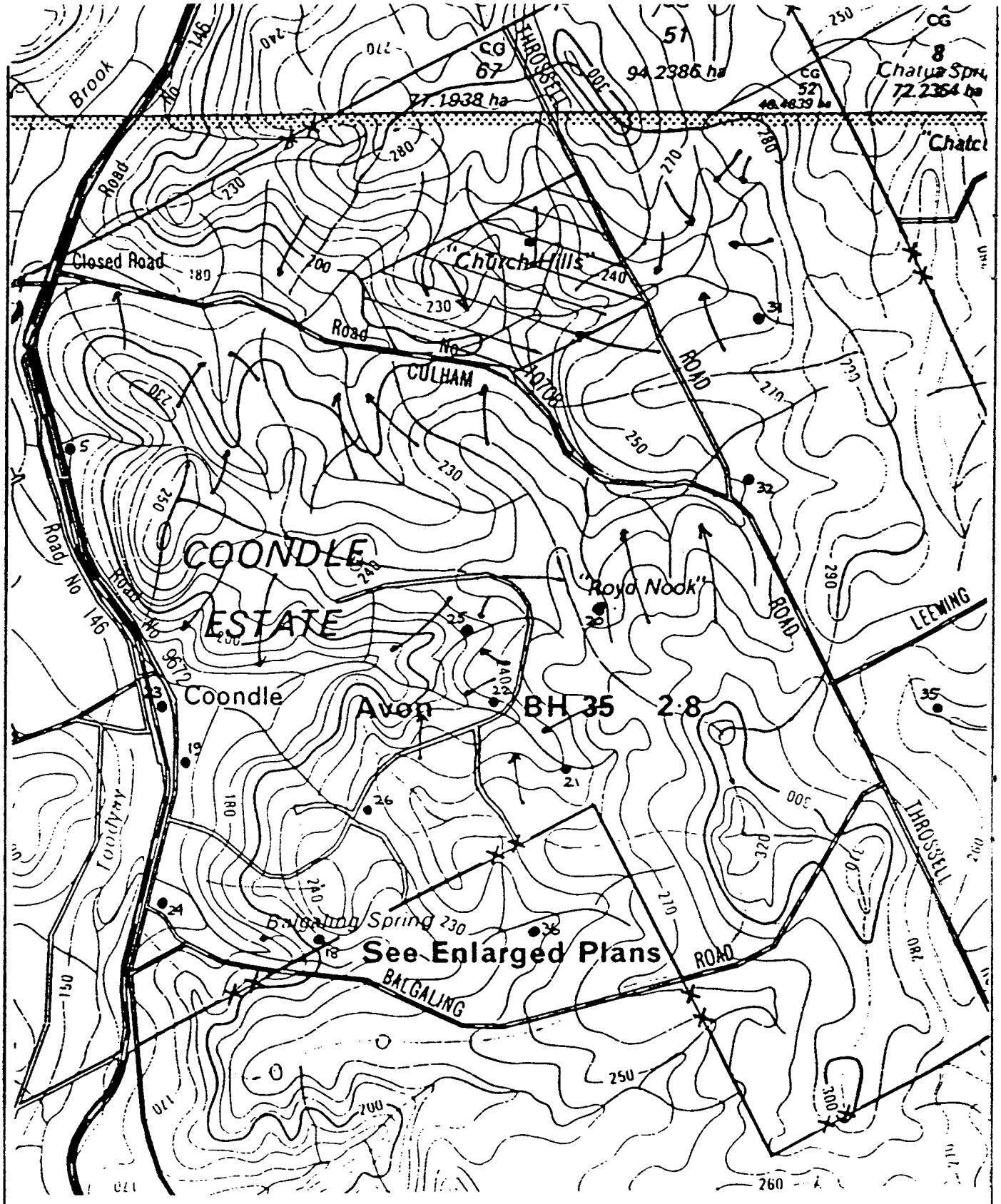
L C Ranford
ACTING DIRECTOR

10 August 1989
GE800VYR269,17-18

TABLE 1 BORE DATA

	TOTAL DEPTH (m)	STATIC WATER LEVEL (m)	YIELD (m^3/d)	QUALITY (mg/L)
5	13.6	10.0	26.2	n.i.
18	18.3	9.1	18.2	858
19	15.2	6.1	22.7	572
20	17.7	9.1	18.2	1287
21	21.3	9.1	90.9	1430
22	18.3	5.5	54.5	1430
23	33.5	7.6	150.0	1400
24	12.2	7.6	22.7	715
25	18.3	ni	54.5	1859
26	27.4	12.2	n.i.	n.i.
31	28.9	16.3	6.8	1050
32	15.2	4.6	11.4	1750
35	13.7	9.1	136.4	900
36	14.9	2.6	n.i.	n.i.

GE800VYR269,19



Subdivision

- Main Catchment Boundary
- Sub-Catchment boundaries
- Watercourses
- ●26 Bores, with reference no.
- General direction of groundwater flow

Abattoir : Location 89

N

Scale 1: 25000

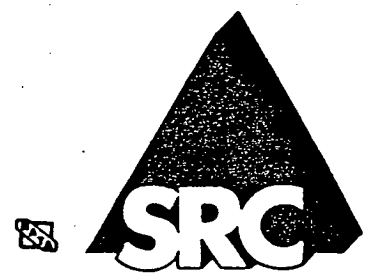
APPENDIX 6

SOIL ANALYSIS

SRC Laboratories (W.A.) Pty. Ltd.

A Subsidiary of Sunmark Corporation Ltd.

Correspondence: P.O. 184, Doubleview W.A. 6018.
34 Walters Drive, Herdsman Business Park
Osborne Park W.A. 6017
Phone: (09) 244 1199. Telex: AA197099
Facsimile: 244 1457



Ref: S3990/JO:rm

28th March, 1989

BINNIE & PARTNERS PTY LTD
P.O. Box 7050
Cloisters Square
PERTH W A 6000

Attention: Mr. J. Summers

Dear Sir

RE: TOODYAY ABATTOIRS

Attached are the following documents of report for work required by you on the above project :

2	PLATES	Falling Head Permeability Summary
2	PLATES	Particle Size Distribution Summary
2	PLATES	Modified Compaction Summary

If we can assist further, please advise.

Yours faithfully
JOHN OLIVER

Technical Manager
for SRC LABORATORIES (WA) PTY LTD

Enc.

CLIENT:	BINNIE & PARTNERS PTY LTD	SHEET No.: 1	OF: 6
PROJECT:	TOODYAY ABATTOIRS	JOB No.:	S3990
		DATE TESTED:	21/3/89 22/3/89

FALLING HEAD PERMEABILITY SUMMARY

SAMPLE IDENTIFICATION:	Hole No. 1
VISUAL CLASSIFICATION:	sandy silty CLAY (CH)
SAMPLE PREPARATION:	The material was remoulded to 90% Modified Maximum Dry Density and Optimum Moisture Content.
COEFFICIENT OF PERMEABILITY:	3×10^{-9} m/sec

TESTED BY: NS & DW CHECKED BY: DW DATE: 28/3/89

* Denotes use of Rock Colour Chart

SRC

CLIENT:	BINNIE & PARTNERS PTY LTD	**SHEET No.:**	2 **OF:** 6
PROJECT:	TOODYAY ABATTOIRS	**JOB No.:**	S3990
		DATE TESTED:	21/3/89 22/3/89

FALLING HEAD PERMEABILITY SUMMARY

SAMPLE IDENTIFICATION:	Hole No. 2
VISUAL CLASSIFICATION:	sandy silty CLAY (CH)
SAMPLE PREPARATION:	The material was remoulded to 90% Modified Maximum Dry Density and Optimum Moisture Content
COEFFICIENT OF PERMEABILITY:	3×10^{-9} m/sec

TESTED BY: NS & DW **CHECKED BY:** DW **DATE:** 28/3/89

* Denotes use of Rock Colour Chart

CLIENT: BINNIE & PARTNERS PTY LTD

PROJECT: TOODYAY ABATTOIRS

SHEET No.: 3 OF: 6

JOB No.: S3990

DATE TESTED: 8/3/89

PARTICLE SIZE DISTRIBUTION TEST RESULT

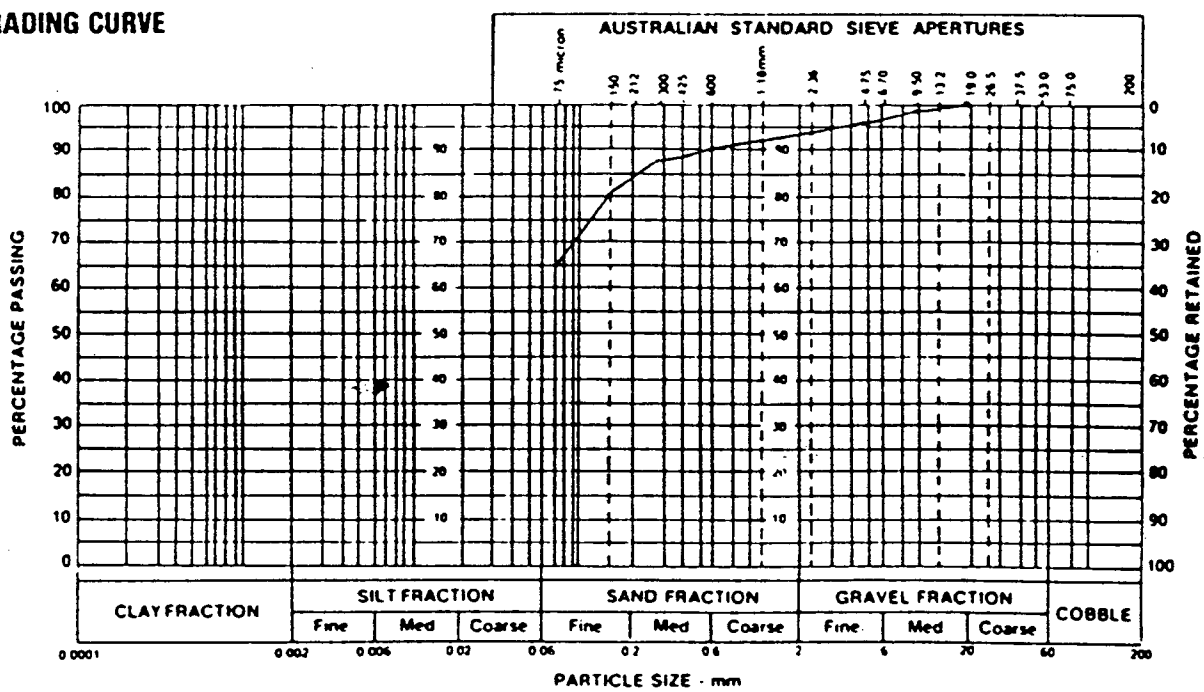
VISUAL CLASSIFICATION (A.S.1726)

SAMPLE IDENTIFICATION/DEPTH	DESCRIPTION	SYMBOL
Hole No. 1	sandy silty CLAY	CH

PARTICLE SIZE DISTRIBUTION (A.S. 1289) C6.1.

SIEVING				HYDROMETER			
SIEVE SIZE	% PASSING	SIEVE SIZE	% PASSING	DIAMETER	% FINER	DIAMETER	% FINER
75.0mm	-	1.18mm	92				
37.5mm	-	600 micron	90				
19.0mm	100	425 micron	89				
9.5mm	98	300 micron	87				
4.75mm	96	150 micron	80				
2.36mm	94	75 micron	65				

GRADING CURVE



TESTED BY: NS CHECKED BY: DW DATE: 28/3/89

★ Denotes use of Rock Colour Chart

CLIENT: BINNIE & PARTNERS PTY LTD

PROJECT: TOODYAY ABATTOIRS

SHEET No.: 4 OF: 6

JOB No.: S3990

DATE TESTED: 8/3/89

PARTICLE SIZE DISTRIBUTION TEST RESULT

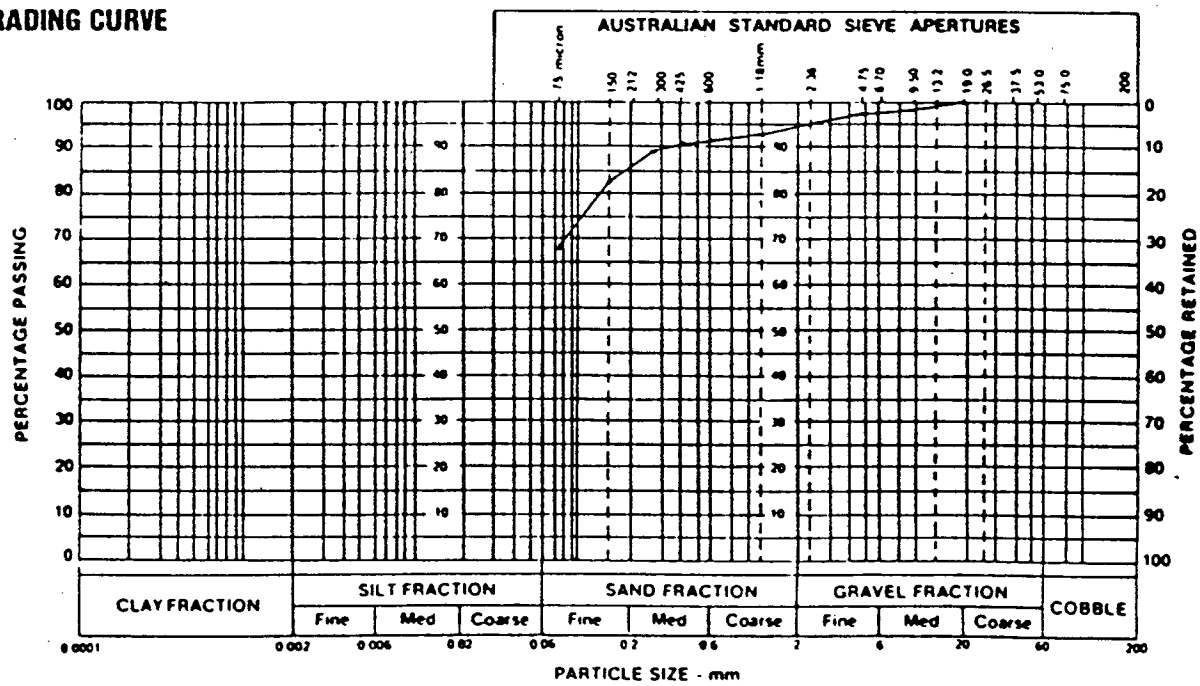
VISUAL CLASSIFICATION (A.S.1726)

SAMPLE IDENTIFICATION/DEPTH	DESCRIPTION	SYMBOL
Hole No. 2	sandy silty CLAY	CH

PARTICLE SIZE DISTRIBUTION (A.S. 1289) C6.1.

SIEVING				HYDROMETER			
SIEVE SIZE	% PASSING	SIEVE SIZE	% PASSING	DIAMETER	% FINER	DIAMETER	% FINER
75.0mm	–	1.18mm	93				
37.5mm	–	600 micron	92				
19.0mm	100	425 micron	91				
9.5mm	98	300 micron	89				
4.75mm	97	150 micron	83				
2.36mm	95	75 micron	67				

GRADING CURVE



TESTED BY: NS CHECKED BY: DW DATE: 28/3/89

* Denotes use of Rock Colour Chart

CLIENT: BINNIE & PARTNERS PTY LTD

PROJECT: TOODYAY ABATTOIRS

SHEET No.: 5 OF: 6

JOB No.: S3990

DATE TESTED: 4/3/89

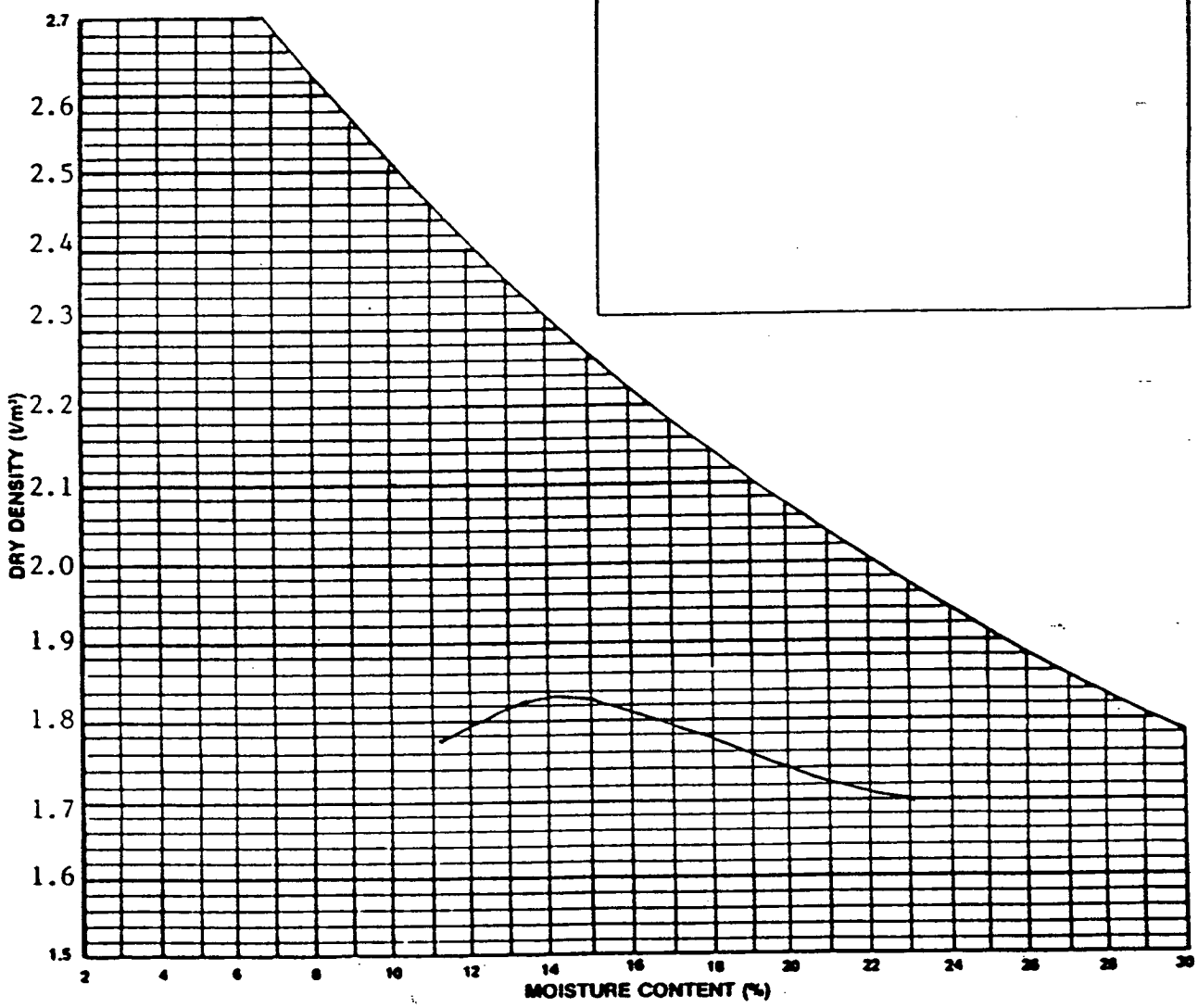
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP SUMMARY

VISUAL CLASSIFICATION (A.S.1726)

SAMPLE IDENTIFICATION/DEPTH	DESCRIPTION	SYMBOL
Hole No. 1	sandy silty CLAY	CH

COMPACTION RESULTS (A.S. 1289 E1.1/E2.1)

METHOD OF COMPACTION	Modified	SOIL RETAINED ON 19mm SIEVE (%)	NIL
MAXIMUM DRY DENSITY (t/m³)	1.94	EQUIVALENT REPLACED (%)	N.A.
OPTIMUM MOISTURE CONTENT (%)	13.0	REMARKS:	



DRY DENSITY MOISTURE CONTENT CURVE

TESTED BY: AC CHECKED BY: DW DATE: 28/3/89

* Denotes use of Rock Colour Chart

CLIENT: BINNIE & PARTNERS PTY LTD

PROJECT: TOODYAY ABATTOIRS

SHEET No.: 6 OF: 6

JOB No.: S3990

DATE TESTED: 4/3/89

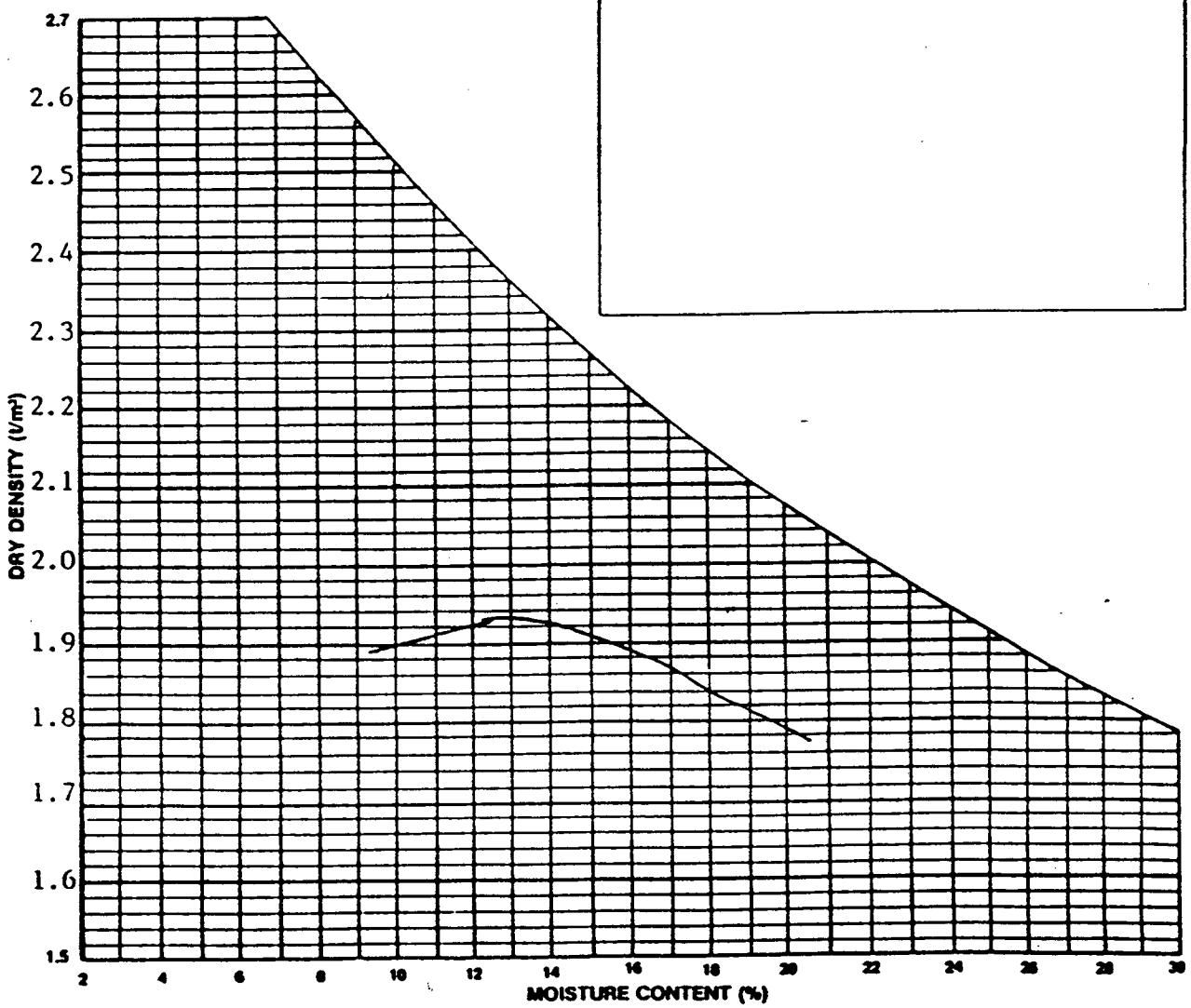
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP SUMMARY

VISUAL CLASSIFICATION (A.S.1726)

SAMPLE IDENTIFICATION/DEPTH	DESCRIPTION	SYMBOL
Hole No. 2	sandy silty CLAY	CH

COMPACTION RESULTS (A.S. 1289 E1.1/E2.1)

METHOD OF COMPACTION	Modified	SOIL RETAINED ON 19mm SIEVE (%)	NIL
MAXIMUM DRY DENSITY (t/m³)	1.93	EQUIVALENT REPLACED (%)	N.A.
OPTIMUM MOISTURE CONTENT (%)	12.5	REMARKS:	



DRY DENSITY MOISTURE CONTENT CURVE

TESTED BY: RH CHECKED BY: DW DATE: 28/3/89

* Denotes use of Rock Colour Chart

APPENDIX 7

LETTER FROM TALLOWMAN

TALLOMAN
A DIVISION OF
DERBY INDUSTRIES PTY LTD
INCORPORATED IN WESTERN AUSTRALIA

Lakes Road. Bushmead. Western Australia.
Telephone: (09) 274 3755 or 274 3756

10 August 1990

Mr Dick Langford
EPA Pollution Control Division
57 Mount Street
PERTH WA 6000

Dear Sir

I am writing to you on behalf of Messrs Johnson /Staszewski owners of the Toodyay Abattoir Complex.

They propose to process in the vicinity of 500 sheep per day which should yield between 4.5 to 6.0 tonnes of offal.

Talloman will install a floor screw and bin beneath the kill floor for the removal of offal on a daily basis. The owner will ensure that this basement is kept enclosed and fly proofed in accordance with Health Department requirements.

Mr Johnson informs me that steam will be provided to coagulate blood for easy removal of same to Talloman in order to keep it from the lagoon system.

As mentioned before, all material will be removed daily in a fresh state.

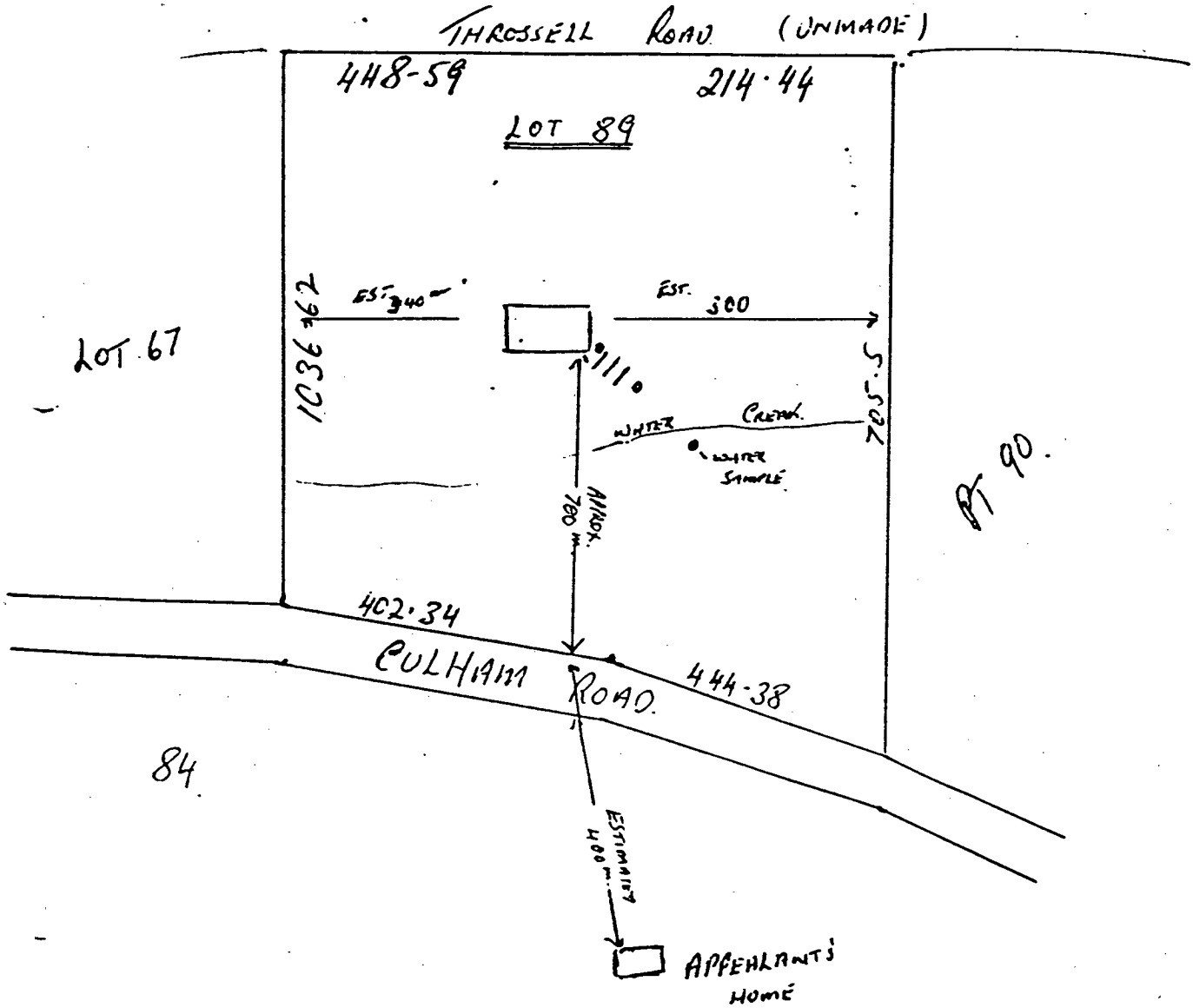
Yours sincerely

AS BENNETT
Manager

AS:DMCG

APPENDIX 8

GROUNDWATER ANALYSIS



- SOIL SAMPLE NO 1
- SOIL SAMPLE NO 2
- WATER SAMPLE

ANALABS

Chartered Chemists

52 Murray Road
Welshpool
W.A.
Tel: (09) 458 7999

CERTIFICATE OF ANALYSIS

For : Binnie & Partners Pty. Ltd.
Consulting Engineers
Attn: Mr. J. Summers
267 St. Geoges Terrace
Perth W.A. 6000

Our ref: 1769.0.01.652
Your ref:
Date :26.04.89

Sample description

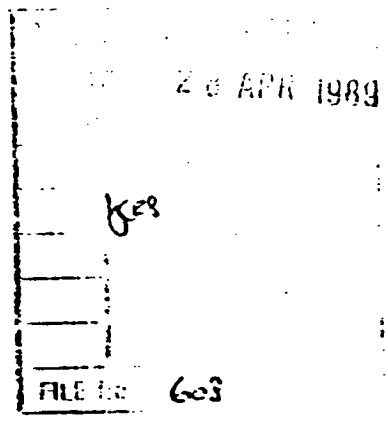
One water sample was received on the 01.03.89 for analysis.

Sample : Toodyay Abbatoirs

Chemical Data

pH	7.85
Total Dissolved Solid dried @ 180 C (mg/l) (gravimetric)	2950

	(mg/l)
Nitrate - Nitrogen	0.19
Nitrite - Nitrogen	0.01
Ammonia - Nitrogen	<0.05
Total Kjeldahl Nitrogen	0.85
Total Phosphorous	<0.1
Total Organic Carbon	5.5



Analyst: T.R. STAKER B.Sc. A.R.A.C.I.
Chartered Chemist

Analabs
A division of Inchcape Inspection and Testing Services, Aust.Pty.Ltd.

P.O. Box 210
Bentley, W.A., 6102

Account enquiries - Phone (09) 4587999

INVOICE

Binnie & Partners Pty Ltd
Consulting Enginers
267 St Georges Terrace
Perth WA 6000

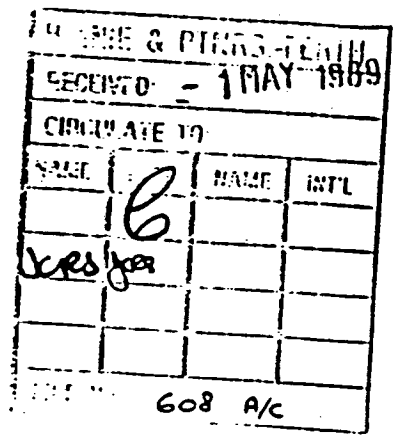
Invoice No: 01-81084
Job ref: J 1414.01.65294
Date: 28/04/89

Page: 1 of 1
Order No:
Project:

Spec	Qty	Code	Description	Unit Price	Extended Total
	1	1000	Miscellaneous Water Analysis	122.00	122.00
			TOTAL DUE		$ 122.00

02MAY89

Requested Analabs to send a/c direct to George Johnson.



NET PAYMENT 7 DAYS

All prices quoted in Australian dollars

A Member of the Inchcape Group

ANALABS

Chartered Chemists

52 Murray Road
Welshpool
W.A.
Tel: (09) 458 799

CERTIFICATE OF ANALYSIS

For : Binnie & Partners Pty. Ltd.
Consulting Engineers
Attn: Mr. J. Summers
267 St. Geoges Terrace
Perth W.A. 6000

Our ref: 1769.0.01.65
Your ref:
Date :26.04.89

Sample description

One water sample was received on the 01.03.89 for analysis.

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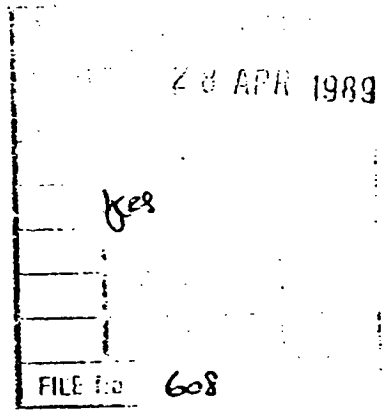
Ammonia - Nitrogen	<0.05
Total Kjeldahl Nitrogen	0.85
Total Phosphorous	<0.1
Total Organic Carbon	5.5



Analyst: T.R. STAKER B.Sc. A.R.A.C.I.
Chartered Chemist

File 608

ANALABS

FACSIMILE TRANSMISSION

If any portion of this transmission is missing please advise - Tel: (09) 458 7999

TO: JULIEN SUMMERS COMPANY: BINNIE+PART. FAX No.: 329 147

FM: GRAHAM LEPPARD COMPANY: WELSHPOOL FAX No.: (09) 458 2922

SUBJECT: WATER ANALYSIS No. OF PAGES: 1 CODE:

MESSAGE: DATE: 23/3/89

Results obtained for the water sample from Toodyay abbatoirs are as follows:-

pH	7.85
conductivity	5450 µmhos/cm
TDS (Grav.)	2950 mg/L
$NO_3 - N$	0.85 mg/L
P (total)	<0.1 mg/L
$NO_2 - N$	0.01 mg/L
TKN	0.85 mg/L
$NH_3 - N$	<0.05 mg/L

Regards

Graham Leppard

NB:- TOC to follow

E&OE

REQUEST / REPORT : BACTERIOLOGICAL EXAMINATION OF WATER

B

23

DRINKING WATER – Source to Consumer

FOOD PRODUCTION/HANDLING-PLANT WATERS

STATE HEALTH LABORATORY SERV
QUEEN ELIZABETH II MEDICAL CEN
NEDLANDS W.A. 6009
G.P.O. BOX F312, PERTH, W.A. 6001
TELEPHONE : 380 1
SENIOR TECHNOLOGIST EXT : 2583
LABORATORY / OFFICE EXT : 2171

SENDER'S AUTHORITY AND ADDRESS FOR REPORT RAILWAY (see over)	TOODYAY SHIRE COUNCIL Box 96 TOODYAY, 6566

Indicate ☑ Routine ☑ Faecal Strept ☑ Total Count 35° ☐ 22° ☐

Other Microbiological Investigations: FAECAL STREPT

Date Collected: 19/5/86 Signed:

SENDER'S COMMENTS: STORAGE TANK IS NOW BEING CLEANED OUT AS RESULT OF PREVIOUS SAMPLES. See Over ☐

SAMPLE DETAILS T.M.

LABORATORY REPORT

LABORATORY No.	SENDER No.	POINT OF COLLECTION	Chlorinated YES/NO	ppm Cl_2	MEMBRANE FILTRATION / 100 ML: COLIFORMS 35°	ESCH. coli 44°	FAECAL STREPT	PER ML: TOTAL COUNT 35°	TOTAL COUNT 22°	OTHER
28699	(1)	BORE AT SOURCE	NO		0 ##	0 ##	0	5		
28700	(2)	BORE WATER ENTERING STORAGE TANK	NO		0 ##	0 #	0	7		
	(3)									
	(4)									
	(5)									
	(6)									
	(7)									
	(8)									
	(9)									
	(10)									

FURTHER REPORT (All samples will be investigated for presence of Salmonellae if indicated by Laboratory findings.)

SIGNED: Peterson

DATE RECEIVED: 20, MAY, 1986

DATE REPORTED: 21 MAY 1986

LABORATORY COMMENT (Salmonellae identification – positive results only will be reported.)

Copy SHS Northam

SIGNED:

DATE: / /

REQUEST / REPORT : MICROBIOLOG OF WAT

A

EXAMINATI

TREATED RECRE

SERVICE RESERV

CONSUMER SUPPLY

CHRISTMAS - NEW YEAR HOLIDAY

The Water Examination Laboratory will be closed for the rec of routine water samples from 1100 hours, Thursday 20 Decer until 0815 hours Wednesday 2nd January, 1985. Urgent repe samples may be submitted on Thursday 27 December prior to 1500 hours.

SENIOR TECHNOLOGIST EXT : 2583

LABORATORY / OFFICE EXT : 2171

SENDER'S AUTHORITY AND ADDRESS FOR REPORT (see over)	- TOODYAY SHIRE COUNCIL TOODYAY PO BOX 96 TOODYAY 6566
Indicate Examination	Routine ☑ Pseudomonas ☐ Follow-up ☐
Other Microbiological Investigations:	
Date Collected:	29 / 11 / 84 Signed: Ron Woodward
SENDER'S COMMENTS	ROUTINE SAMPLE See Over ☐

SAMPLE DETAILS (A Samples - Ambient Temperature)					LABORATORY REPORT			
					MEMBRANE FILTRATION/ 100 ML			
LABORATORY No.	SENDER No.	POINT OF COLLECTION	Chlorinated YES/NO	ppm Cl_2	COLIFORMS 35°	PSEUDOMONAS/ ESCH coli	TOTAL COUNT 35° per ml	Faecal strep OTHER per 100
11117	(1)	ABATTOIR ABLUTIONS	NO	NIL	8 †††	5 †	—	0
11118	(1A)	"	"	"				
							Date / /	
	(2)							
	(2A)						Date / /	
	(3)							
	(3A)						Date / /	
	(4)							
	(4A)						Date / /	
	(5)							
	(5A)						Date / /	

PROVISIONAL REPORT

DATE RECEIVED: 29 / 11 / 84

FILE NO:

-3 DEC 1984

SIGNED:

DATE REPORTED: 30 / 11 / 84

LABORATORY COMMENT AND FURTHER REPORT

S/C

ADMIN

RATES

H/BLDG

RANGER

SIGNED:

DATE / /

REQUEST / REPORT : **BACTERIOLOGICAL EXAMINATION OF WATER**

B

DRINKING WATER — Source to Consumer

FOOD PRODUCTION/HANDLING-PLANT WATERS

WATER EXAMINATION LABO
STATE HEALTH LABORATOR
QUEEN ELIZABETH II MEDIC
NEDLANDS W.A. 6009
G.P.O. BOX F312, PERTH, W.A.
TELEPHONE
SENIOR TECHNOLOGIST EXT
LABORATORY / OFFICE EXT

SENDER'S AUTHORITY AND ADDRESS FOR REPORT (see over)

TOODYAY SHIRE COUNCIL
PO BOX 96
TOODYAY
6566

Indicate ☑ Routine ☑ Faecal Strept ☑ Total Coun

Other Microbiological Investigations:

Date Collected: 3/6/86 Signed: [signature]

SENDER'S COMMENTS: FOLLOW UP. PLEASE CHECK FAECAL STREPT. See (

SAMPLE DETAILS T.M.

LABORATORY REPORT

LABORATORY No.	SENDER No.	POINT OF COLLECTION	Chlorinated YES/NO	ppm Cl_2	MEMBRANE FILTRATION / 100 ML COLIFORMS 35°	ESCH. coli 44°	FAECAL STREPT	PER ML TOTAL COUNT 35°	22°	OT
29539	(1)	STORE TANK TOODYAY ABATTOIR	NO		0	0	0	10		
29540	(2)	ABLUTIONS AS ABOVE	"		0	0	0	12		
29541	(3)	MAIN FLOOR TAP AS ABOVE	"		0	0	0	9		
	(4)									
	(5)									
	(6)									
	(7)									
	(8)									
	(9)									
	(10)									

FILE No. 9 JU

FURTHER REPORT (All samples will be investigated for presence of Salmonellae if indicated by Laboratory findings.)

Light stain all samples

S/C
ADM
RATE
H/S
RANG

SIGNED:

DATE RECEIVED: 4 JUN 1986

DATE REPORTED: 5 JUN 1986

LABORATORY COMMENT (Salmonellae identification — positive results only will be reported.)

SIGNED:

DATE:

File 608

ANALABS

FACSIMILE TRANSMISSION

If any portion of this transmission is missing please advise - Tel: (09) 458 7999

TO: JULIEN SUMMERS COMPANY: BINNIE+PART. FAX No.: 32474

FM: GRAHAM LEPPARD COMPANY: WELSHPOOL FAX No.: (09) 458 2922

SUBJECT: WATER ANALYSIS No. OF PAGES: 1 CODE:

MESSAGE: DATE: 23/3/89

Results obtained for the water sample from Toodyay abbatoirs are as follows :-

pH	7.85
conductivity	5450 µmhos/cm
TDS (Grav.)	2950 mg/L
$NO_3 - N$	0.85 mg/L
P (total)	<0.1 mg/L
$NO_2 - N$	0.01 mg/L
TKN	0.85 mg/L
$NH_3 - N$	<0.05 mg/L

Regards

Graham Leppard

NB:- TOC to follow

E&OE