- Ensure that all washdown water is directed into the effluent drainage system using the minimum amount of water and less than .... litres per week.

3.9.4 Improvement Program

- Cargill plans to duct the fumes from a small batch cooker currently operating in the rendering plant to the air pollution control system.
- The procedure of dry cleaning the maximum amount of solid waste from this area will be instituted.
- Water use in this area will be metered and controlled to ..... litres per week.
- All water hoses must have a hand activated valve.

3.9.5 Monitoring

- The temperature of the fume incinerator is continuously monitored. A built in alarm system has been installed to alert operators if the incinerator temperature falls below 760°C.
- Washdown water use will be monitored on a weekly basis.

3.10 Storage and Transport of By-products

3.10.1 Process

The tallow is held in storage tanks located on the southern side of the by-products building (see Figure 17). Tallow is loaded out daily, with up to eight tankers each transporting approximately 27 tonnes of tallow off site each week.

The meal is stored as a solid in bins (see Figure 17). Approximately 30 tonnes of meal is transported off site daily.

The dried blood, or blood meal, is packed in bags and transported off site to be used primarily as animal feed.

Once the cattle hides have been drained they are stored in bins before being transported to a tannery.

3.10.2 Waste Disposal

Any washdown water directed into the effluent disposal system.

3.10.3 Procedures

The following procedures are to be employed as part of the storage and transport of the by-product to ensure minimisation of environmental impact:

- Any tallow or meal which is spilt during the storage or loading operations is allowed to solidify scraped from the ground and the remnants washed down and directed into the main effluent disposal system.

- The transport of tallow off site should be undertaken between 6:00 pm to 7:00 pm daily. If any transportation operations are carried out after hours, on Sundays or public holidays, noise must be kept to a minimum. All hide transportation operations are undertaken at night so again, noise generated during these operations should be kept to a minimum.

- All trucks transporting by-products such as meal and hides off site, should be covered.

- Vehicle movement on site should be limited to clearly defined areas.

- All above ground liquid storage ie. tallow, must be provided with bunds which are to be well maintained.

- When tallow is being filled into the tankers to be transported off site, the truck driver should stand near the truck at all times to ensure overfilling does not occur. Marking on the tanker at 10t, 20t and 30t should be visible. Tankers should not be filled past approximately 27t to allow some safety margin.

3.10.4 Improvement Program

- In order to comply with Cargill's internal insurance requirements, Cargill plan to install bunds around all tallow storage tanks to prevent its migration to other areas in the event of leakages or overfill.

- All tallow tanks will be fitted with overfill alarms.

3.10.5 Monitoring

- All accidental spills must be recorded including the clean up details.

3.10.6 Contingency Plan

In the event that a tallow tank fails or tallow is spilt, a contingency plan has been developed to minimise the possibility of environmental damage,

Tallow is a viscous substance, so it is unlikely that it will flow very far if spilt. However, if a spill does occur, the tallow is to be sprayed with cold water to prevent further migration of the substance and then shovelled and put back through the inedible rendering system.

3.11 Storage and Transport of Fuel, Chemicals and Oils

3.11.1 Process

All fuels, chemicals and oils stored on site are listed in a central register for identification and certification purposes. Storage areas for these materials are built to WorkCover specifications (see Figure 10).

The waste oil is stored in 200 litre drums outside the workshop at the northern end of the abattoir.

There are two underground tanks on site, an oil tank which is empty and not being used and a leaded petrol tank still in use.

3.11.2 Waste Disposal

Any waste oils, sludges from used oils and greases, oils removed from ammonia oil system, oil purged from the refrigeration systems, are decanted into one of four 200 litre drums stored outside the workshop. Once full, these drums are transported to the western side of the complex for removal off site.

Washdown water from the cleaning of any sludges , spills, engine room areas etc, are currently flowing directly into the stormwater system. Stormwater from the roofs of the workshop is directed into the effluent disposal system.

3.11.3 Procedures

The following procedures are to be employed as part of the storage and transport of fuels, chemicals and oils to ensure minimisation of environmental impact:

- Any clean up operations in the vicinity of fuel, chemical and oil storage areas should be dry cleaned as much as possible to avoid contaminants reaching the stormwater system, followed by washdown to the effluent system.
- All above ground fuel, oil and chemical storage must be provided with bunds which are to be well maintained.
- Vehicle movement on site should be limited to clearly defined areas.
- All waste oil or chemicals removed from the site will be carried out by a reputable contractor.

3.11.4 Improvement Program

- Cargill plan to remove the underground oil and petrol storage tanks located on site.
- In order to comply to internal insurance requirements, Cargill plan to install bunds around all above ground storage tanks to prevent migration of chemicals, fuels and oils to other areas in the event of leakages or overfill.
- Currently the stormwater runoff from the roofs of the work shop area run onto the ground via downpipes and into the waste water disposal system. In order to separate uncontaminated stormwater from waste water and therefore reduce the amount of effluent to be treated, Cargill plan to collect as much stormwater as possible. Stormwater from roof runoff will be collected, stored and either discharged directly into the stormwater system or stored for recycling purposes.
- Encouraging as much dry cleanup prior to washdown in order to reduce than amount of effluent to be treated.

3.11.5 Monitoring

- All waste oil or chemicals removed from the site will be recorded and the disposal method, site and contractor will be noted.

3.12 Boiler

3.12.1 Process

The boilers used to generate steam for the cooking and drying processes are two gas fired boilers which are located to the northern end of the plant, adjacent to the refrigeration plant room (see Figure 10). The gas is supplied from a branched line off the main council gas line.

3.12.2 Waste Disposal

Exhaust from the boilers is vented through a .... m stack.

The waste boiler blow down is directed into the main effluent disposal system. Any washdown water or stormwater from the roofs of the boiler room is also directed into the effluent disposal system.

3.12.4 Improvement Program

Currently the stormwater runoff from the roofs of the boiler room run onto the ground via downpipes and into the waste water disposal system. In order to separate uncontaminated stormwater from waste water and therefore reduce the amount of effluent to be treated, Cargill plan to collect as much stormwater as possible. Stormwater from roof runoff will be collected, stored and either discharged directly into the stormwater system or stored for recycling purposes.

3.13 Waste Water Treatment

3.13.1 Process

There are two major streams entering the primary treatment system.

Stream A is treated by piping to a separate section of the save all from there it is pumped to an elevated screen to remove solids (manure and paunch material). The solids are discharged to a bin and then transported to the paunch material storage area. The liquids are returned to the main section of the save-all.

Stream B is first passed to the contraschere, then to a dissolved air flotation (DAF) system and then to the main section of the save-all. The solids from the contraschere and the DAF are taken to a small cooker for rendering. The liquid is passed to the main section of the save-all.

All the liquid in the main section of the save-all is pumped to the treatment ponds (see Figure 18). For description of the treatment pond system, see **Appendix C.**

Stream A contains the following:

- washdown from cattle yard and paunch room;

Stream B contains the following:

- stickwater from the blood plant
- boiler blowdown
- condensate from rendering condenser
- contaminated stormwater
- spent liquor from hide treatment, and

- washdown water from:
  - slaughter and dressing
  - boning and packing
  - storage of product
  - hide processing
  - blood processing
  - rendering
  - storage of by-products
  - any other contaminated areas.

3.13.2 Procedures

3.13.3 Improvement Program

- Refurbish the DAF unit.
- Reduce flow to the wastewater treatment ponds to 1400 kilolitres per day.
- Reduce BOD in treated effluent to 100 mg/L.

See Appendix C.

3.13.4 Monitoring

- BOD at effluent form pond No. 4 monthly.

3.13.5 Contingency Plan

The primary treatment plant save-all has an overflow system directed to sewer to ensure that no wastewater escapes the treatment system. If, however, a situation arises that there is a possibility that the entire system will overflow to the environment, because of:

- heavy rain
- water main leak
- blockage of wastewater pipe
- breakdown of pumps
- sewer blockage, or
- any other reason,

the plant must immediately cease operation and not resume until the fault is rectified.

If there is a spill, the EPA must be immediately notified (see Section 2.4)

3.14 Irrigation

See Appendix D.

3.15 Stormwater

3.15.1 Process

All stormwater from rooves runs to council stormwater system. All stormwater on uncontaminated ground also runs to council drains. Contaminated stormwater drains to the effluent system (see Figures 18 and 19).

3.15.2 Procedures

- Council drains to which stormwater from the abattoir property drains are to be checked after each rain event of more than 5 mm.

3.15.3 Improvement Program

- All stormwater, other than from contaminated areas is to be directed to council stormwater drains.
- Add monitoring of stormwater drains after 5 mm of rain to audit pro forma.

3.15.4 Monitoring

- Check stormwater drains after each rain event of more than 5 mm. This protocol is to be incorporated in the twice a day audit pro forma.
- Measure and record rainfall every day at 9.00 am.

3.16 Solid Waste and Site Sewage

3.16.1 Process

- **Paunch storage and disposal** - The paunch material collected in the save-all area is transported by contractors to a storage area located adjacent to the treatment ponds, west of the abattoir. The paunch storage area is currently approximately 15,000 m^2. The paunch material is stored for approximately one year before being transported off site to be used for fertiliser (see **Section 3.16.3**).
- **Dead animals** - On average, approximately one animal dies per week whilst in the holding pen. Dead animals are either sent to the rendering operation or, on the weekends, to the council tip.
- **Manure** - any manure is disposed of in the paunch storage area.
- **Sludge** - Sludges from the effluent system are discharged into the first anaerobic pond.
- **Old machinery/metal** - any old machinery or scrap metal is removed from site and generally deposited in the council tip or recycled.
- **Asbestos;** - Although most asbestos has been removed from site, there is still some asbestos remaining, particularly in the boiler room.
- **General garbage** - general garbage is recycled or sent to the council tip.

An old disused sheep and cattle burial area is located to the south of the paunch storage area.

Site sewage, bath house waste and washdown water from amenities is directed straight into the council sewage system.

3.16.2 Procedures

- Dead animals must be dealt with as soon as possible.
- Paunch material may be temporarily stored in an area within the controlled drainage area (see Section 3.14) but must be finally stored in the paunch storage area.
- Any spillage of paunch material during transport to the storage area is to be cleaned up by the contractor.
- Paunch sump must be pumped out after every rain event.
- Sludges from the plant and the waste treatment plant must be discharged to the first anaerobic pond, No. 1.

3.16.3 Improvement Program

Paunch Storage Area
Leachate and runoff from the paunch storage area is currently not controlled at source. Cargill plans to divert all runoff from the paunch storage area into a collection sump to be located on the eastern side storage area. The existing gradient of the area will naturally direct most runoff into the proposed sump. The whole of the paunch storage area will be bunded to isolate uncontaminated stormwater from paunch runoff. When the sump gets full, the water will be pumped into treatment pond two. Excess stormwater will discharge to the irrigation area and will be picked up in the terminal ponds (see Section 3.14).

Cleaning Operations
Cargill intend to install a centralised foam and sanitising system that will replace the existing manual cleaning operation. Currently there are a total of 15 cleaners on site who have to decant chemicals into a 20 litre bucket and carry the cleaning product through out the plant. The new system will provide the centralised supply of pre-mixed detergent and sanitiser solutions to multiple outlets through out the plant. Each outlet will allow cleaners to source a detergent foam or sanitiser dedicated hose and nozzle assemblies. The new system will have the following benefits:

- will reduce handling of hazardous chemical products
- will have data logging capabilities which will allow the control of the volume of chemical used
- will insure meat products against microbial spoilage due to low strength chemicals
- eliminate the lifting of heavy drums
- reduce the incidence of chemical drum pump failure
- reduce plant corrosion by metering correct chemical concentrations
- ability to audit daily chemical cost and usage by digital readouts
- ability to measure the effect chemicals are having on the environment

3.17 Services

3.17.1 Process

- **Water** - the abattoir operations currently require approximately 2 ML of water per day. All the water, both potable and process, is supplied directly by the city supply.

- **Gas** - the abattoir operations currently require gas which is supplied from a branched gas line off the Councils main line.

- **Electricity** - All Electricity is supplied directly by the city supply.

3.17.4 Improvement Program

See water minimisation program (Section 7)

3.17.5 Monitoring

Cargill are planning to install water usage meters at individual operations in order to control the volume of water used and thus reduce the amount of effluent to be treated (see Section 7).

3.18 Noise Environment

The majority of the noisy operating equipment is located inside buildings so has little affect on neighbouring residences. The evaporative condensers which are located on the engine room roof are thought to generate the most noise during operating hours.

The majority of trucks transporting products and by-products off site operate during the day. The transportation operations that are undertaken out of hours are kept to a minimum.

No noise complaints regarding operating equipment or trucks entering or leaving the abattoir have been received by Cargill. If any complaints are received monitoring and surveys will be carried out to determin the extent of the noise and check compliance with EPA licence limits.

4.0 ENVIRONMENTAL IMPROVEMENT PROGRAM

This section should summarise all the Improvement Programs outlined in Section 3. They should be presented in tabular form as follows:

Process	Activity	Improvement	Date of Completion	Cost
Cattle Receival 3.1.4	Water Use Cleaning Truck Wash	Reduce to ~ Litres per week. Hand activated hose. Dry clean manure. Refurbish		
Cattle Holding 3.2.4	Water Use Cleaning Stormwater	Reduce to ~ Litres per week. Hand activated hose. Dry clean manure. Clean spoiled feed. Remove manure from holding pens. Redirect to tail dams		
Preparation of Cattle 3.3.4	Water Use	Reduce to ~ Litres per week. Hand activated hose.		
Slaughter and Dressing 3.4.4	Cleaning Paunch Water Use	Central cleaning system. Dry clean solids. Separate paunch in dry state. Reduce in ~ Litres per week. Hand activated hose.		
Boning and Packaging 3.5.4	Cleaning Water Use	Central cleaning system. Dry clean solids. Reduce to ~ Litres per week. Hand activated hose.		
Storage and Transport of Product 3.6.4	Cleaning Water Use Defrost Water	Central cleaning system. Reduce to ~ Litres per week. Hand activated hose Remove from stormwater	1 Dec 96	

Environmental Management Plan - Bomen Abattoir, Wagga Wagga

Process	Activity	Improvement	Date of Completion	Cost
Hide Processing 3.7.4	Cleaning Blood	Dry clean solids. Recover maximum blood.		
Blood Processing 3.8.4	Cleaning Water Use Processing	Dry clean solids Reduce to ~ Litres per week. Hand activated hose. Obscuration meter on blood drier stack.	31 Aug 96	
Rendering 3.9.4	Fume Control Cleaning Water Use	Duct small cooker to fume control plant. Dry clean solids. Reduce to ~ Litres per week.	30 Sep 96	
Storage and Transport of By-Products 3.10.4	Bunds Overfill Alarms	Install bunds on tallow tanks. install overfill alarms on tallow tanks.		
Storage and Transport of Fuel, Chemicals and Oils 3.11.4	Underground Storage Tanks Bunds	Report on status Remove tanks. Install bunds in all storage areas.	31 Jul 96	
Waste Water Treatment 3.13.3	Primary Treatment Secondary Treatment	Refurbish DAF unit. Install aerators if necessary. Document Procedures.		
Irrigation 3.14.3	Irrigation Area	Refurbish and enlarge irrigation area.		
Stormwater 3.14.3	Stormwater Disposal	Direct all uncontaminated stormwater to stormwater drains.	31 Jul 96	
Solid Waste and Site Sewage 3.16.3	Paunch Storage Contamination	Refurbish paunch storage area. Report on status	31 Dec 96 31 July 96	
Waste Minimisation	Plan	Complete	30 Sep 96	

5.0 ENVIRONMENTAL MONITORING

5.1 Monitoring

Cargill Foods Australia currently holds a Pollution Control Licence (No. 002262) which was granted by t Environment Protection Authority.

The solo authorised water discharge point is the existing utilisation via spray irrigation. The dischar classification is "discharge to waters during or immediately after rain from a land application system".

5.1.1 Water Usage Monitoring

Cargill are planning to install water usage meters at individual operations in order to control the volume of water used and thus reduce the amount of effluent to be treated. All water use will be monitored on weekly basis.

5.1.2 Discharge Monitoring

The discharge monitoring carried out includes:

- BOD on samples collected monthly from effluent to be irrigated.
- BOD on sample collected from defrost water discharged to stormwater.

5.1.3 Soil Monitoring

Soils within the effluent utilisation paddocks are required to be monitored annually. The soil sample collected from the irrigation area are analysed for the following:

- pH
- exchangeable potassium
- exchangeable calcium
- exchangeable sodium
- total nitrogen
- extractable phosphorus
- phosphorus sorption capacity
- total soluble salts (salinity)
- organic carbon
- hydraulic capacity (infiltration rates)
- clay dispersion
- aggregate stability
- porosity
- surface characteristics (eg. hard settling, cracking or self mulching)
- colour
- structure

If soil pH is acidic then exchangeable aluminium is also be determined. The soil monitoring program has been expanded to cater for the additional effluent disposal area.

5.1.4 Groundwater Monitoring

Three monitoring wells have recently been installed at the site. One well (P3) is located in the existing effluent disposal area. The remaining wells (P1 and P2) are located in the proposed effluent application area.

To record standing water levels and water quality at these sites, a groundwater monitoring programme has been formulated. This program is shown in **Appendix D.**

5.2 Internal Auditing

Internal auditing of sensitive processes takes place on a twice daily basis. A typical results sheet and pro-forma check lists are included in **Appendix E.**

5.3 External Auditing

An external Environmental Audit was undertaken on 16 January 1996 by Mr Tony Mitchell of HLA-Envirosciences Pty Limited. A copy of the audit is included in **Appendix F.**

A three monthly review of the internal auditing program will be undertaken to ensure all operations are conducted in a manner that promotes environmental quality.

6.0 TRAINING PROGRAM

6.1 Procedures

Each existing employee will be issued with the environmental procedures for their job, starting with employees who deal with waste, including cleaners on both day and night shift.

6.2 New Employment Training

As part of the induction training given to employees additional training emphasis will be placed on responsibility in respect of environmental matters. Issues to be covered will include:

General:

- Statutory requirements
- Minimisation of water usage
- Noise control
- Odour control
- Stormwater and waste water systems

Specific:

- Each new employee will be issued with job description which will include the procedures included in this EMP.

7.0 WASTE MINIMISATION

The waste minimisation report is at the **Appendix G.**

8.0 RECORD KEEPING

It is important that records are kept for all activities associated with environmental management. This ca be initially in the form of a diary at each centre which carries out work of an environmental nature. As this EMP develops, the record keeping system will evolve into a more formal system which can be used t ensure procedures required by the EMP are carried out. It should be noted that it is a statutory requiremen of licence issued by the environmental authority to keep certain records; it is vital that these be kept in the manner described in the licence.

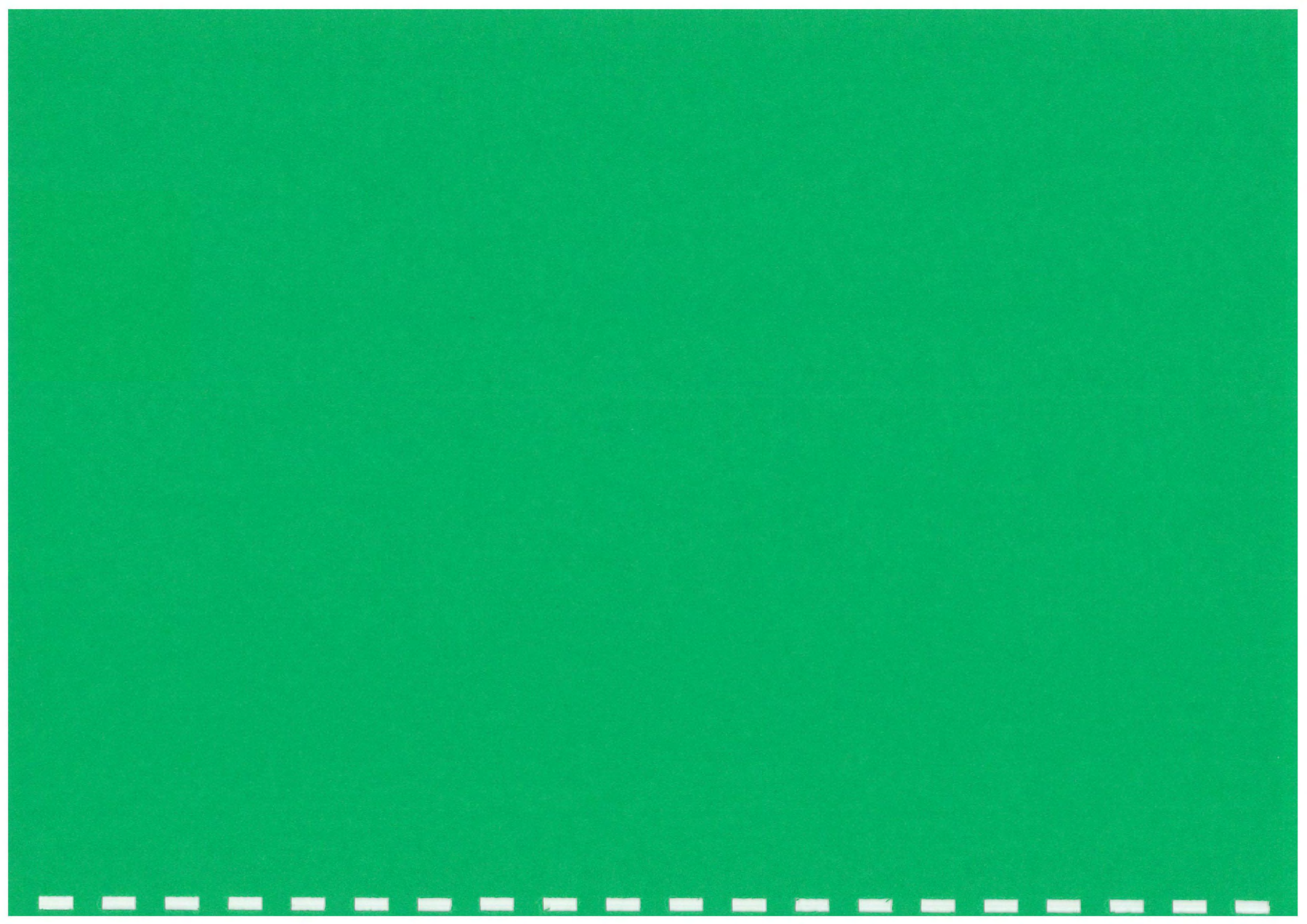
The table below shows what records are to be kept and the person responsible:

Person	Record
Plant Engineer	Pollution complaints including date and time of complaint, method by which complaint was lodged, personal details of complainant, and nature of complaint.
Plant Engineer	Response to complaints (action taken by the licensee in relation to complaint and any follow up contact with the complainant).
Plant Engineer	Meteorological parameters including rainfall, windspeed and direction.
Head Stockman	Holding pen inspection, maintenance and cleaning and disposal of manure.
Plant Engineer	Drain inspection and maintenance.
Plant Engineer	Effluent system data including volume, quality, operational information, inspection and maintenance, sludge disposal.
Farm Manager	Irrigation volume, dates, sites.
Farm Manager	Farm data such as plantings, harvesting quantity, sales, soil monitoring, groundwater monitoring.
Plant Engineer	Noise monitoring.
Plant Engineer	Insect control and monitoring.
Plant Engineer	Spills and cleanup.
Plant Engineer	Dust suppression.
By-Products Manager	Air pollution monitoring, including obscuration, temperatures.
Plant Engineer	Audit results.
Plant Engineer	Water use in each area.
Training Officer	Procedures issued.
Training Officer	Training given.

The records must be kept for at least 3 years after the monitoring or event to which they relate took place.

APPENDIX M

EFFLUENT IRRIGATION EMP



Bomen Abattoir Effluent Irrigation Environmental Management Plan (Operation) Bomen Abattoir, Wagga Wagga February 1998

Prepared For

Cargill Foods Australia
Dampier Street,
Bomen via Wagga Wagga NSW 2650

HLA-Envirosciences Project No. W448
Version 1.0

HLA-Envirosciences Pty Limited
Environmental Consultants

prepared by

Eric Claus
Manager, Construction Environmental Management

HLA-ENVIROSCIENCES PTY LTD
55-65 Grandview Street
PYMBLE NSW 2073
AUSTRALIA

Tel: (02) 9988-4422
Fax: (02) 9988-4441
E-Mail pymgen@s054.aone.net.au

This Environmental Management Plan for the Bomen Abattoir Effluent Irrigation System is suitable for implementation by Cargill Foods Australia.

Signed: _____

Managing Director, Cargill Foods Australia.
Date:

Table of Contents - Operation EMP

1.0 RECORD OF AMENDMENTS

1.1 EMP Amendments - Bomen Abattoir Effluent Irrigation

Following the final approval of the Environmental Management Plan for the Bomen Abattoir effluent utilisation project, the following amendments were made and are now required to be implemented along with the other environmental mitigation measures for this project.

Page	Amendment	Reason for amendment	Responsibility	CFA Verification	Completed (Initials/Date)

Distribution:

Master	HLA-Envirosciences Pty Ltd
Copy1	Cargill Foods Australia - Technical Manager
Copy 2	Cargill Foods Australia - Irrigation Manager
Copy 3	Wagga Wagga Council

1.2 Potential List of Approvals For Bomen Abattoir Effluent Irrigation

Subject	Administering Authority	Controlling Act
Notice of Completion	Wagga Wagga Council	Local Government Act, 1993
Borehole registration	Department of Land and Water Conservation	Soil Conservation Act 1938
Pollution Control	Environment Protection Authority (NSW)	Pollution Control Act, 1970 Clean Waters Act, 1970
Removal of Trees	Wagga Wagga Council	Local Government Act, 1993
Application for earthworks on the floodplain	Wagga Wagga Council	Local Government Act, 1993
Trade Waste Agreement	Wagga Wagga Council	Local Government Act, 1993

2.0 ENVIRONMENTAL POLICY

Cargill Foods Australia are committed to the implementation and execution of environmental construction practices which fully comply with the relevant statutory regulations and meet both community needs and project requirements.

To achieve this objective CFA undertakes to:

- comply with all relevant legislation;
- maintain knowledge of laws and regulations;
- ensure that compliance is achieved; and
- minimise waste

This commitment will be actioned by the development of an Environmental Management Plan and carried out by the General Manager, who is responsible for the implementation, monitoring and adjustment of environmental controls.

The Environmental Management Plan will be based on the identification and recognition of environmental concerns and sensitivities, controls and precautions, communications, environmental awareness and the strong involvement of managers and employees.

Our environmental objectives will be achieved by the commitment we show in our work and, above all, by our genuine attitude and respect for the environment. Part of this commitment involves Ecological Sustainable Development which will be an essential aspect of the Bomen Abattoir Effluent Utilisation project.

2.1 Ecologically Sustainable Development

2.1.1 General

Ecologically Sustainable Development (ESD) has been defined by the Commonwealth Government (AGPS 1992) as: "*using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased*".

The proposed effluent utilisation plan adheres to the concept of ESD as all potential adverse environmental impacts have been determined and thoroughly investigated to ensure any impacts are minimal. In addition, reuse of the organic matter, the nutrients and the water in the effluent will be operated in a sustainable way, which is clearly preferable to such practices disposal to sewer.

2.1.2 The Precautionary Principle

The Precautionary Principle as set out in Schedule 2 of the Environmental Planning and Assessment Regulations 1994 states that "*if there are threats of irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation*".
All possible sources of environmental impact as a result of the construction of the proposed sewage scheme have been investigated. All potential harmful effects identified have been systematically evaluated using conservative methodologies. No environmental impact has been assessed as possibly causing serious or irreversible environmental damage.

Management plans incorporating monitoring and impact measures are currently in place and will be continued to minimise environmental degradation. The EMP calls for constant revision and updating of these plans.

2.1.3 Inter-Generational Equity

This principle is defined in Schedule 2 of the Environmental Planning and Assessment Regulations 1994 as follows: "*the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations*".

The environmental impacts of the proposed sewerage treatment plant will not pose any threat during operations, nor, following the cessation or irrigation activities and the rehabilitation of the area, to the health of future generations as a result of the proposal.

2.1.4 Biological Diversity and Ecological Sustainability

The principle of the above is referred to in Schedule 2 of the Environmental Planning and Assessment Regulations 1994 in the following terms: "*Conservation of biological diversity and ecological integrity*". Biological integrity of the site has already been affected by past uses. The proposed development will not cause any further impacts on the biological integrity of the site.

2.1.5 Improved Valuation of the Environment

If we are to improve the prospects for future generations a value must be placed on the environment, so as to value the cost to the environment in terms of cost of production and/or use of the resource. This would potentially lead to a reduction in exploitation of the environment. Hence those who deliberately pollute the environment, or breach environmental licences will be held responsible and accountable for restoring the environment to its previous natural condition.

Valuation and pricing as defined by schedule 2 of the Environmental Planning and Assessment Regulation 1994 is: "*improved valuation and pricing of natural resources*".

Whilst operating in a confined area, the proposed development will not diminish the existing environmental resources of the area or region. The development will add value to what was previously waste material by converting it to a useful product, that is irrigation water, creating a closed loop system. The land to be irrigated will also increase in value.

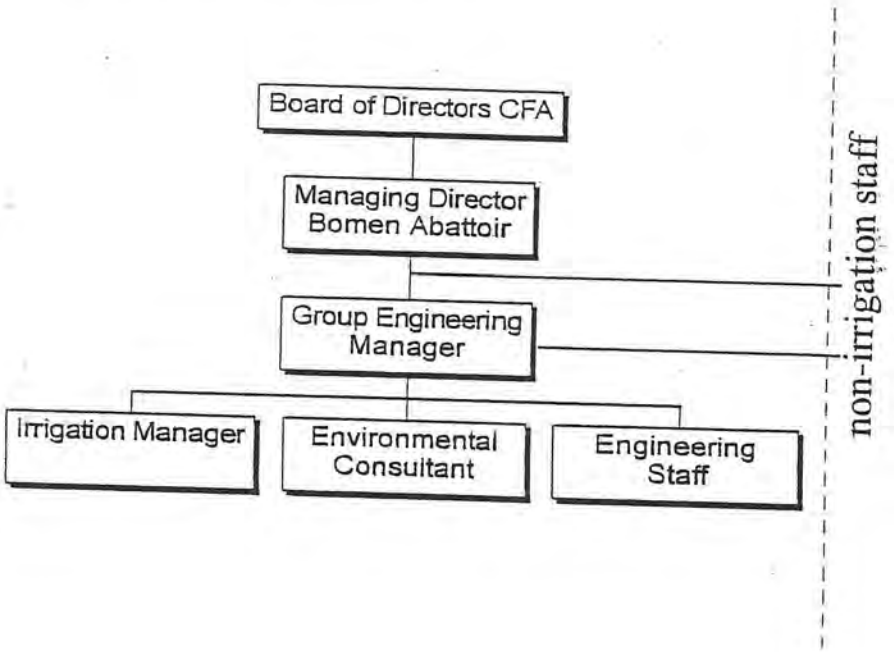
3.0 ENVIRONMENTAL MANAGEMENT SYSTEMS

This Environmental Management Plan (EMP) is a draft document that will be updated following consultation with the Environmental Protection Authority (EPA), Department of Land and Water Conservation (DLWC) and Wagga Wagga Council

The environmental management system is a dynamic process which includes, but is not limited to the following elements.

- Environmental Monitoring
- Organisation
- Reporting and Recording
- Non-conformance
- Procedures
- Standards
- Audits
- Complaint Handling
- Community Awareness

3.1 Environment Management Organisation Chart



3.2 Environment Management Job Statements and Reporting Functions

The Environmental Management Plan will be approved by the Group Engineering Manager and Managing Director and will be administered by the Group Engineering Manager and the Irrigation Manager.

In recognition of the high priority given to environmental management, a well defined management structure will be maintained.

Managing Director

- Reports directly to the Board of Directors
- Responsible for all environmental aspects of abattoir construction and maintenance.

Group Engineering Manager

- Reports directly to the Managing Director
- Supervises the Irrigation Manager
- To liaise with Authorities such as EPA.
- To keep and update the environmental complaint register.
- To liaise with Wagga Wagga Council officers regarding complaint resolutions.
- Obtaining Statutory Licences and approvals as required and/or specified.
- To prepare submissions to various regulatory authorities regarding environmental approvals and licences.
- To manage the Environmental Management Plan.
- To resolve minor environmental complaints with major environmental complaints being referred immediately to the Manager.
- Review and analysis of all investigation and design information for likely environmental interaction before construction commences.
- Supervises soil, groundwater and effluent monitoring and reports findings.
- Completes the inspections and reports, and provides advice on erosion/soil conservation.
- Completes the installation of the groundwater monitoring boreholes.

Irrigation Manager

- To report directly to the Group Engineering Manager on all environmental matters.
- Assist the Group Engineering Manager on environmental management in accordance with the Quality Management Process.
- To advise and take necessary action on environmental protective measures for change of climatic conditions and on the basis of monitoring/survey data.
- To assist in the preparation of submissions to various regulatory authorities regarding environmental approvals and licences.
- To assist in resolving minor environmental complaints with major environmental complaints being referred immediately to the Group Engineering Manager.
- To assist in soil, groundwater and effluent monitoring and reporting.
- To assist in inspections and reports, and provide advice on erosion/soil conservation.

Environmental Consultant

- Reports to Group Engineeering Manager
- Provides soil, groundwater and effluent monitoring as required
- Provides advice on water balance, nutrient loading, groundwater, waste water treatment and other environmental issues as required.

Engineering staff

- Reports to Group Engineering Manager
- Provides miscellaneous services for Group Engineering Manager such as equipment maintenance, minor earthworks, etc

3.3 Audits

- Audits of the CFA Operation EMP will be performed in accordance with the CFA auditing procedure.
- One of the critical elements of audits will be review of groundwater records. Records of groundwater levels, nutrients, salinity and cations will be audited regularly to insure that there is no significant impact on ground water.

3.4 Corrective Action

Corrective Actions are raised as a result of an audit of contractors agreed/approved procedures or method statements.

3.5 Non Conformance's

A Non Conformance report will be issued when a departure from agreed/approved procedures or method statements is observed. These observations will usually be made during routine site inspections by the Irrigation Manager or his representative.

4.0 OPERATION PROCEDURES AND INSTRUCTIONS

A number of environmental control procedures are to be put in place to ensure that minimal environmental impact occurs during operational activities.

4.1 Irrigation Operations Procedures

- The Group Engineering Manager, the Irrigation Manager or his representative will be aware of the short term and long term weather forecast, each day. This includes temperature, wind speed and direction and probability of rainfall. A weather station will be set up to measure and record wind speed and direction and will be maintained by the irrigation manager and wind sock will be set up on the top of the hill on the O'Rourke property.

- Monday through Saturday the irrigation equipment must be made ready to irrigate from 7:00am to 6:00pm, if required.

- The Group Engineering Manager, the Irrigation Manager or his representative will check the status of the abattoir, likely number of cattle to be processed, status of water saving measures and the volume of effluent likely to be produced.

- The Group Engineering Manager, the Irrigation Manager or his representative will check the wastewater treatment system to insure that good quality effluent is being produced.

- The levels in the 100 ML storage dam and the smaller runoff control dams must be checked, as well as the status of pond maintenance.

- When a decision about where to irrigate is made, the volume to be irrigated in the time allowed will be estimated.

- A decision about whether the effluent is to be taken from the storage pond, one of the runoff control ponds or directly from the effluent of the fourth wastewater treatment pond, will be made. As a general rule, the ponds will be emptied before effluent is taken straight from the discharge from the fourth wastewater treatment pond. The 100 ML storage pond will act as an additional treatment if effluent is left in the pond for any period of time. If one of the ponds is to used, the volume of water in the pond will be estimated.

- When the irrigation is under way, the flowrate will be checked and the irrigator will be checked to insure that it is working properly. The volume of effluent applied and the location of the irrigation will be recorded for every day that effluent is irrigated.

- Whenever irrigation on the O'Rourke area is done the wind speed and direction will be checked regularly to insure that there is no possibility of spray drift.

- If some flow is being diverted to sewer, the flowrate will be checked to insure that the flow is being diverted properly to sewer.

- The quality of crop growth on each irrigation area will be considered with the farm manager at regular intervals to help determine if irrigation methods may need to be reviewed to maximise crop production.

- Any necessary planning regarding weather, soil moisture levels, new irrigation areas, wind, volumes of flow, equipment maintenance and monitoring will be done.

- Any necessary planning regarding plans of the farm manager such as harvesting or sowing a new crop will be done.

- All water collected in the retention basins is to be returned for irrigation.

- No grazing shall be permitted at any time on any of the irrigation areas.
- All crops are to be harvested and removed from the irrigation areas.
- The Irrigation Manager or his representative will complete the daily log, when irrigation is being done.
- A sampling point will be provided on the irrigation line for the taking of an audit sample by an authorised officer of the EPA.

Operational requirements following rainfall include:

- The mm of rainfall will be checked and recorded.
- If the rainfall has been heavy, the soil moisture will be checked and recorded, the runoff control ponds will be checked and the volume of runoff in them, estimated.
- The weather forecast will be considered and planning will be done for the next few days based on the weather, soil moisture and storage volume information available.

4.2 Group Engineering Manager / Irrigation Managers Procedures

As part of the management of the Irrigation system the following duties will be performed.

- ensuring all licence conditions are met,
- movement of the irrigation equipment to the appropriate irrigation areas as required,
- checking the moisture levels in each area,
- checking the windsock and weather station,
- maintaining the irrigation equipment including the pumps and valves,
- maintain the storage dam and the runoff control dams,
- evaluating erosion or ponding on any of the paddocks,
- evaluating the crop growth with the farm manager,
- soil sampling and water sampling as required by the EPA Approval and Licence, and
- record keeping including irrigation volumes on each area, groundwater levels, soil moisture levels, soil sampling and water sampling results, weather.

4.3 Odour Management Procedures

A buffer zone of 100-150 metres will be maintained at the Byrnes Road side of the O'Rourke area. Irrigation will take place only during daylight hours (0700 to 1800) and not at all on Sundays

Although the effluent water has no odour there have been complaints about odour from the abattoir. The following procedures will be implemented in order to try to meet community concerns:

- Low level irrigators will be used on the O'Rourke land.
- No extraneous ponding of irrigation or tail water will be allowed to occur thereby reducing any possibility of the accumulation of pockets of odour producing material.
- No irrigation of untreated or partially treated wastewater will occur thereby ensuring that all irrigated effluent has had maximum treatment to minimise odour.
- Prior to the commencement of irrigation, odour emissions shall be sampled and analysed. This should be completed to the satisfaction of the Council prior to irrigation.

4.4 Soil Management Procedures

The irrigation area soils will be protected by carefully applying the procedures developed in this Environmental Management Plan. Monitoring of nutrients, exchangeable cations and moisture levels in each irrigation area will be part of the regular duties of the Group Engineering Manager and the Irrigation Manager. These will serve as a guide in the operation of the system. If levels are above sustainable or recommended levels then irrigation practices will be changed so that the goal of sustainability can be achieved. Sustainable use of the effluent is the primary goal of the management plan.

4.5 Air Quality and Dust Management

Activities carried out on site will be such as to ensure that all equipment used and all facilities erected are designed and operated to control the emission of smoke, dust, fume, spray drift and other objectionable matter into the atmosphere. Precautions will be taken to minimise any nuisance arising from airborne dust caused by these activities.

4.6 EPA Licence Requirements

A copy of the EPA Approval and licence will be kept at the Group Engineering Managers office, or another readily visible location, ready to be presented to an EPA field officer if requested.

4.7 Wet Weather Procedures

During wet weather all irrigation will cease. Effluent flows will be shifted to the 100ML storage dam or sewer. The following day after rain the following procedures should be undertaken:

- Check runoff control ponds
- Ensure that drainage protection facilities are in good condition
- Check any damage on site

4.8 Noise and Vibration

The level of noise emitted from the premises shall not exceed 5dB(A) above the background 'A' weighted sound pressure level when measured or calculated at a distance of 5 metres from any residence in the area.

Noise and Vibration is not anticipated to cause any significant impact on the nearest affected premises. Calculations made in the EIS show that there will be no noise impact at the nearest affected premises, associated with the spray irrigator guns, as the distance to the nearest affected premises is considerable and there will be a buffer zone of at least 100 metres between the nearest affected premises and the spray irrigator guns. The low level sprays will be quieter than the spray irrigator guns.

All operations will comply with the requirements of the Noise Control Act.

4.9 Landscaping and Rehabilitation

Following the completion of the use of each of the areas, management practices will need to be maintained, so that no damage to the environment results. It is unlikely that there could be any environmental damage from the use of the irrigation areas. The areas are planned to be used sustainably, so there should not be excessive phosphorus, nitrogen, organic matter or salinity in the soil. Phosphorus or nitrogen will not be allowed to build up in the soil because the land will be cropped and the lucerne and other crop that is taken off the site will remove sufficient amounts of phosphorus and nitrogen. Salinity will be controlled through careful control of application rates and percolation. Erosion will be controlled though the use of diversion banks, grading and maintenance of ample cover crops.

Following closure of the O'Rourke Land it is likely that it will be subdivided or continue as agricultural land. In either case no remediation will be needed. If the Council Lake Land is taken out of the irrigation scheme it will probably be used for the new Northern Lake project. In this case the land will be returned to Council in a similar condition to its condition today.

A landscaping plan will be prepared and implemented for land not within the floodplain. Native tree planting, including the River Red Gum (*Eucalyptus camaldulensis*) and the White Box (*Eucalyptus albens*), particularly around the perimeter of the properties to be irrigated. This plan is to be prepared in consultation with the Director of Recreation and Cultural Services and Director of Environmental Services, and based on the recommendations on page 15 of the Land Use Management Study, Appendix 2 of the EIS.

No trees are to be removed from the site without first obtaining written permission from Council as the land is covered by Council's Tree preservation Order.

Weed infested topsoil, as identified by a qualified bush regeneration officer, shall not be used in rehabilitation works where native vegetation has been removed unless it is sterilised or treated as specified by the EMR. Measures to control invasion of weeds during operation of the proposal, including aquatic weed species, shall also be addressed in consultation with NPWS and Wagga Wagga Council. Weed spraying on or near waters shall only be conducted by a licensed operator.

4.10 Waste Disposal and/or recycling

As part of the EMP, CFA shall prepare a detailed Waste Management Procedure to address the management of wastes during both the construction and operation stages. The Procedure shall be prepared prior to construction and operation as appropriate and shall identify requirements for waste avoidance, reduction, re-use and recycling. It shall also detail requirements for handling, stockpiling and disposal of wastes specifically spoil, concrete, contaminated soil or water, demolition material, cleared vegetation, oils, greases, lubricants, sanitary wastes, timber, glass, metal etc. It shall also identify any site for final disposal of any material and any remedial works required at the disposal site before accepting the material. Any waste material which is unable to be re-used, reprocessed or recycled shall be disposed at a landfill licensed by the EPA to receive that type of waste.

CFA shall comply with Council and EPA requirements for off-site disposal of solids to Council's landfill. All odorous solids are to be immediately buried at the landfill in a specially prepared trench.

4.11 Complaint Resolution

All environment related complaints received will be documented and remedial action, as appropriate, will be taken. This information is also to be included in the Annual Operational and Environmental Monitoring Report. The Irrigation Manager or his representative will be available during all working hours of the project to advise the Group Engineering Manager and the Managing Director on irrigation issues.

4.12 Emergency Procedures

Emergency procedures on site will cover actions to be taken when catastrophic events occur. Catastrophic events may include but not limited to:

- small scale oil or other contaminant spillages
- large scale oil or other contaminant spillages
- failure of construction structures
- failure of single control structures
- failure of a number of control structures
- earthquake
- Flood
- Fire
- Drought
- Industrial Accident

In order to ensure that the environmental impact of unavoidable catastrophic events is minimised, emergency procedures are to be followed.

1. It is important to remember that the first priority must always be the safety of any persons either workers or others involved in the events.

2. The second priority must be to quickly minimise the environmental damage. All emergency action should take place as soon as possible after the event.

Actions to be taken may include:

- The containment of any pollution by booms, haybales or other means.
- The temporary re-establishment of the control structure.
- The taking of appropriate samples to determine the extent of the problem.

All work must cease and no work can re-commence prior to a clearance from the EPA and/or client representative.

3. In the event of an emergency situation arising, the Group Engineering Manager should be contacted immediately after any persons are safe and any possible immediate actions to control the pollution have been taken. If unavailable, the telephone numbers listed below will be used until a representative is contacted.

   The Group Engineering Manager, or his nominated representatives may be contacted on telephone No.0269 383 053 during works hours. Out of hours contact numbers are:
   1)
   2)
   3)

4. The Group Engineering Manager will contact the following:
   - The Environment Protection Authority (EPA) on 0260 414 963
   - The appropriate Council officer on:-0269 235 499
   - The Police or Fire Brigade (000) if necessary.

5. The Group Engineering Manager, in association with the EMR will take whatever action is necessary to make good the situation.

6. Following rectification of the situation, a full report and clearance certification will be presented to the CFA Managing Director by the Group Engineering Manager within 24 hours. The CFA Managing Director will arrange for appropriate authorities such as Council and EPA to be contacted without delay.

4.13 Utilities and Services

It is unlikely that any services or utilities will be disturbed during the operation.

In the event that services or utilities must be affected CFA shall identify services potentially affected by construction activities to determine requirements for diversion, protection and/or support. This shall be undertaken in consultation with the relevant service authority. Any alterations to utilities and services shall be carried out to the satisfaction of the relevant authority(s). Unless otherwise agreed to by the service/utility authority affected, the costs of any alterations shall be borne by CFA.

CFA shall be responsible for minimising any disruption to services resulting from such work and shall be responsible for advising local residents and businesses on disruption to services.

4.14 Fire Protection Procedures

The following fire protection procedures will cover actions to be taken when fire events occur on site.

- Clear road access will maintained to allow fire vehicles access at any time.
- Any gates that might be used for fire trucks must not be locked.
- Weeds will be suppressed in order to reduce fire hazards.
- Lucerne will be cleared immediately after harvesting.
- Access to dams for water supply to fire trucks will be maintained.
- Access for fire vehicles will be two way.
- Flame resistant trees and shrubs will be considered as part of the Landscaping plan.
- CFA will keep informed on when it is a total fire ban.
- All irrigation areas have been established away from buildings thereby helping to minimise risk from fire.

4.15 Crop Management

A farm manager (currently Bill O'Rourke) will work with the Group Engineering Manager and the Irrigation Manager to determine the timing and method of planting and harvesting the lucerne and any other crops to be grown.

The farm manager will also help evaluate the crop health and give advice on irrigation frequency and volume to the Group Engineering Manager.

4.16 Security

The Bomen Abattoir site is fenced and signage will be constructed and maintained indicating that trespassing is not allowed to insure that the site is secure and there is no danger of incidents around the 100ML storage dam.

Adequate notices, warning the public not to drink or otherwise use the treated wastewater, will be erected on the site. These notices will be in legible English and in any other languages as may be necessary, and will indicate at least that the water in use is "Recycled Waste Water - Unfit for Drinking"

5.0 MAINTENANCE PROCEDURES

A routine maintenance program will be carried out by the Irrigation Manager.

A schedule of dates reflecting manufacturers guidelines for maintenance of equipment will be prepared by the Irrigation Manager. As equipment is purchased and installed its location and maintenance requirements will be added to this section.

A preliminary list is as follows:

Piezometers:

- Piezometers will be examined monthly to insure that they have not been damaged or vandalised.

Pumps and Valves:

- Pumps and valves will be maintained according to manufacturers guidelines. Valves will be exercised and maintained regularly. A record will be kept of date, time and person doing the maintenance.

Berms:

- Diversion banks; channels and berms will be inspected at least monthly to insure that they have not eroded, clogged, or become overgrown. If they cannot function properly they will be maintained and a record will be kept of the date, time and person doing the maintenance.

Dams:

- Dams will be inspected regularly to insure that they are not eroding, cracking or being damaged in any other way.
- When the 100ML dam is more than 50% full it will be inspected at least weekly and following any storm event greater than 10mm in 24 hours.

Weather Station:

- The weather station will be maintained to the manufacturers specifications. Inspections will be done weekly to insure that the station has not become damage or vandalised.

Flowmeters:

- Flowmeters will be inspected at least weekly while irrigation is being done and maintained according to manufacturers guidelines.

Spray Irrigators:

- Spray irrigators will be inspected at least once per week while irrigation is being carried out. A record of inspection and maintenance including date, time and the person involved will be kept.

6.0 ENVIRONMENT MONITORING PROGRAM AND REPORTING

An environmental monitoring program will be instituted to ensure that all activities undertaken on the Bomen Abattoir effluent utilisation site will comply with relevant control limits and standards. The monitoring program will have the following components:

- Effluent sampling
- Soil Monitoring
- Groundwater Monitoring
- Air Quality Monitoring
- Runoff Control Monitoring
- Weather Monitoring

Nutrient loading levels of the proposed irrigation area will be verified prior to irrigation of effluent, to ensure the soil will absorb the optimum nutrient load whilst not impacting on the floodplain of the Murrumbidgee River.

6.1 Wastewater Treatment System Effluent Sampling

Effluent contaminants ,including Boron, heavy metals (Al, As, Cd, Cu, Fe, Pb, Ni, Se, Zn) and organochlorines (chlordane, DDE, Heptachlor, Lindane) will be recorded as a one-off analysis to demonstrate compliance with modern environmental practices for effluent irrigation.

CFA will sample the effluent from the fourth wastewater treatment pond at least monthly for the following:

- Day Biochemical Oxygen Demand
- Total Suspended Solids
- Electrical Conductivity
- Total Phosphorus
- Total Kjeldahl Nitrogen
- Nitrate and Nitrite

6.2 Soil Sampling

Soil nutrient, salinity and cation levels will be measured at least every six months. Soil in each of the irrigation areas will be sampled and analysed for:

- Exchangeable Cations: Magnesium, Calcium, Sodium and Potassium
- Extractable Phosphorus
- Phosphorus Sorption Capacity
- Total Nitrogen
- Total Soluble Salts
- Organic carbon
- Hydraulic capacity (infiltration rates)
- Clay Dispersion
- Aggregate Stability
- Porosity
- Surface Characteristics (eg: hard setting, cracking or self mulching)
- Colour and Structure

This list will be modified if further requirements are made by the EPA.

6.3 Groundwater monitoring

The bores drilled as part of the EIS investigations shall be maintained for monitoring purposes and checked six monthly for presence of groundwater. Should groundwater be found in any of them a water sample(s) shall be taken and analysed for the following:

- Electrical Conductivity
- Total Phosphorus
- Total Kjeldahl Nitrogen

- Nitrate and Nitrite
- Magnesium, Calcium, Sodium and Potassium, or any other parameters as required by licence conditions.

The water level in each base shall also be measured. The EPA and DLWC shall be notified of the results of any sampling and CFA shall undertake any requirements of the EPA and/or DLWC to rectify any potential problems indicated by the samples which can be attributed to the project.

6.4 Runoff Control Monitoring

A minimum of once every three months if the runoff control ponds are overflowing or more than 80% full a water sample will be collected and analysed for Total Phosphorus, Total Kjeldahl Nitrogen, Nitrate and Nitrite and Total Suspended Solids.

6.5 Weather Monitoring

6.5.1 Wind

A weather station will be established to measure and record wind speed and direction. The data will be downloaded monthly and kept on file in either electronic or hardcopy form.

A windsock will also be established on a pole near the O'Rourke land. The direction of the windsock will be recorded at least twice per day when the O'Rourke land is being irrigated.

6.5.2 Rain

Rainfall will be checked and recorded daily.

6.6 Reporting

Reporting will follow the requirements set forth by Council and EPA. CFA will report the effluent water quality data to Council monthly. An annual report will be prepared for Council and the EPA, to be submitted for the calender year soon after 1 January, showing the following:

- Results of monthly sampling of the effluent from the final wastewater treatment pond.
- Results of the twice yearly groundwater monitoring if water is found in any of the bores.
- Results of the twice yearly soil sampling from each of the irrigation areas.
- Summary of the flow volumes applied to each irrigation area
- Summary of effluent volumes sent to sewer
- Summary of any complaints received during the year.

It is also anticipated that Council may require a special report on the status of the Council land at a time when consideration of the Northern Lake project is to be debated in Council. CFA will provide an interim report showing whatever data has been collected up to that time, whenever it is requested by Council.

6.7 Environmental Management Records

6.7.1 Environmental Records

All environmental records are stored and maintained in the CFA filing system such that they are readily retrievable.

6.7.2 Daily Log

A daily log as shown on the following page will be completed by the Irrigation Manager. The log will be reviewed and updated on a three monthly basis for the first 12 months of operation.

Daily Log
Bomen Abattoir Irrigation Area

Date: .....

Weather: .....

Weather Forecast for next 5 days: .....

Estimated volume to be irrigated: .....

Irrigation water draw from:
- Final wastewater pond ☐
- Retention Dam ☐
- 100ML storage ☐

Flow diverted to sewer .....

Areas Irrigated
- CFA High ☐
- O'Rourke ☐
- No irrigation ☐
- CFA Low ☐
- Council ☐

Comments: .....

.....

O'Rourke Windsock Direction: .....

% 100ML Storage Dam Full: .....

Comments on Dams, Berms: .....

.....

Comments on Irrigators: .....

.....

Comments on Crops: .....

.....

Ponding or Runoff from Irrigation Areas: .....

.....

Maintenance carried out
- Berms ☐
- Dams ☐
- Irrigators ☐
- 100ML storage dam ☐
- Weather station ☐

Comments on Mainenance .....

.....

Signature .....

Name: .....

6.8 Monitoring Schedule

Weekly or more frequent monitoring of weather, soil moisture, irrigation flow, wastewater flow and flow to sewer will be undertaken. All sample collection and analysis will be undertaken in accordance with Australian Water and Waste Water Association standard procedures.

Monitoring Schedule		
Month	**Assumed**	**Monitoring**
1	March	Effluent, Odour (one off)
2	April	Effluent, runoff
3	May	Effluent, Soil
4	June	Effluent, Groundwater
5	July	Effluent, runoff
6	August	Effluent
7	September	Effluent
8	October	Effluent, runoff
9	November	Effluent, Soil
10	December	Effluent, Groundwater
11	January	Effluent, runoff
12	February	Effluent

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