

Effluent Expo 2018

24 May 2018, Togari Community Centre

The Moo Poo Kit



Contacts and resources for effluent management on Tasmanian dairy farms



Your Levy at Work

Quick Guide to Effluent Contacts and Resources in Tasmania

DairyTas Sustainable Farming Adviser, Rachel Brown, can assist with general queries and direct you to specific resources ph. 0409 333 381. DairyTas Office can also assist with queries ph. 03 6432 2233.

For technical assistance with design of effluent systems, contact the accredited Effluent Designers below. There is no legal requirement to use one of these designers, but they have undertaken the industry training and have access to the Effluent Design Toolkit software, which is useful for correctly sizing storages, stone traps and other design features.

Accredited effluent designers, current at May 2018, in alphabetical order:

- Robin Badcock, based in central North. 0418 133 737
- Alistair Brooks, Macquarie Franklin, based in south. 0438 476 215
- James Curran, Macquarie Franklin, based in North. 0407 622 483. Certified Irrigation Designer.
- Sam Dingemanse, CBM, 03 6332 6988
- Laurie Hooper, AgriTech, based in NW. 0418 560 417
- Scott Livingston, based in central North. 0438 951 021
- Peter Poke, based in Circular Head. 0427 522 291. Accredited building designer.
- Steven Smith, AgriTech, based in NW. 0418 594 521

Please contact designers directly for quotes. Most work statewide.

No matter how good the system design, maintenance is the solution to good effluent management! Plan and budget for effluent system maintenance.

**Machinery contractors with gear to handle effluent
Contractors with slurry tankers:**

- Richard Murrell 0418 142 518 statewide.
- Andrew Wylie 0418 140 678 statewide.

Contractors with muck spreaders:

- Kris Davis 0428 561 386 Marrawah to Burnie.
- Michael Nichols 0409 451 430 Woolnorth to Deloraine.
- Andrew Wylie 0418 140 678 statewide.
- Jason Aitken 0417 377 259 statewide.

Dairy installation and maintenance technicians and irrigation dealers can provide advice, quotes and installation/maintenance services for effluent systems, pumps, pipes and irrigators.

Fert\$mart Advisers

- Sandra Bennett 0435 945 605
- Bill Cotching 0458 876 368
- Peta Davies 0408 259 739
- Seona Findlay 0428 922 106
- Luke Taylor 0409 963 201

Tasmanian Dairy Industry Authority (TDIA) inspects effluent systems on Tasmanian dairy farms as part of dairy licensing. You will need to have a CURRENT copy of your Effluent Management Plan. TDIA has copies of Effluent Management Plans on record for many farms in Tasmania - request a copy from TDIA, update document to ensure it reflects your current system (especially cow numbers and what you've put in place to manage extra numbers) and keep an updated copy with farm records. Below are some example screen shots of pages in the Effluent Management Plan document.



1. Property Information

Address	
Location	
Current herd size	1000000
Basic type	
Milking system	
Current effluent Red line	

2. Farm specific values

Milksaver	
Water treatment	
Water storage	
Water management	
Water treatment	
Water storage	
Water management	

3. Catchment Information

Soil type	
Water table	
Water table	
Water table	
Water table	

4. Current effluent system

Effluent storage tank name	
Construction Year (day)	
Peak collection volume	
Depth and ground level	
Soil and ground water clearing frequency	
Water treatment	
Water treatment method	
Effluent storage	
Storage volume (m ³)	
Storage period	
Effluent produced or dairy per year	
Water volume of water use per year	
Food recycling	
Food recycling method	
Food	
Recycling area (ha)	
Recycling volume	
Recycling period (hr)	
Storage volume	
Storage period	
Storage volume	
Storage period	
Storage volume	
Storage period	

6. Emergency management and contingency

Do you have spare parts/stock on hand to replace in case of pump breakdown?	Yes	No	NA	Comments
Do you have spare parts/stock on hand to replace in case of pump breakdown?				
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Please note: This site is covered by the Environment Management and Pollution Control Act 2004 in respect of any spill that occurs over property in your farm district as well as principles and at least a third of the farm.

As a licensor you have a legal responsibility to take all practical steps to prevent the discharge of pollutants into waterways, lakes, groundwater, wetlands or **subsoils**.

Emergency Contacts

Emergency Contact	Phone	Address
Local Council		
Local Council		
Local Council		

Concerns about effluent compliance

Ring Tasmanian Dairy Industry Authority (TDIA) ph. 6478 4125 for queries or concerns re effluent compliance of dairy premises. You can also contact the Environmental Health Officer at your local Council, or ring the EPA pollution report number 1800 005 171.

Important websites for information:

Tasmanian Dairy Industry Authority (industry regulator, responsible for dairy licensing and enforcing Effluent Code of Practice)

www.tdia.tas.gov.au

Full copy of Farm Dairy Premises Effluent Code of Practice - see extract on following pages.

www.tdia.tas.gov.au/resources/regulation

DairyTas has fact sheets and effluent resources at www.dairytas.com.au/nrm/nutrients

DairyAustralia has videos, fact sheets and effluent resources at www.dairyingfortomorrow.com.au/tackling-specific-issues/effluent

The “effluent encyclopaedia” for Australia is **The Effluent and Manure Database for the Australian Dairy Industry**

www.dairyingfortomorrow.com.au/tools-and-guidelines/effluent-and-manure-management-database-for-the-australian-dairy-industry/

OUTCOME 1

Dairy premises effluent must not leave the farm boundaries or enter surface waters or groundwater, unless treated and discharged in a manner approved by the relevant regulatory authorities.

MINIMUM REQUIREMENTS

Dairy premises effluent must not leave the farm boundaries or enter surface waters or groundwater, unless treated and discharged in a manner approved by the relevant regulatory authorities.

Dairy premises effluent must not enter surface waters, except artificial surface water bodies wholly contained within the farm boundaries.

OUTCOME 2

There must be an appropriately designed and operated system for the responsible management of dairy premises effluent.

MINIMUM REQUIREMENTS

All dairy sheds, and animal holding yards and feed pads in the vicinity of the dairy shed where stock are regularly held for extended periods must have concrete or other impervious flooring.

The floors of all dairy premises areas must have bunds around the perimeter or are otherwise designed so that all effluent is directed to a sump or holding pond.

Appropriate contingencies must be in place to contain all effluent, regardless of adverse weather conditions and/or component breakdowns.

Holding ponds are constructed and/or managed to reduce risk of groundwater contamination.

A Dairy Premises Effluent Management Plan must be developed for each dairy premises and submitted for approval to the TDIA. The dairy premises must operate in accordance with a plan approved by the TDIA for those premises.

OUTCOME 3

Spray irrigation or distribution of dairy premises effluent is carried out in an environmentally sound manner.

MINIMUM REQUIREMENTS

The effluent application schedule and rates are appropriate to the farm.

ATTACHMENT 1 – This Attachment does not form part of the code.

MANAGEMENT MECHANISM FOR CODE OF PRACTICE

LEGAL ACTION

Compliance with this Code of Practice is a condition of licence for all dairy farmers in Tasmania, and licences can be suspended or revoked for failure to comply. Compliance will be assessed as part of routine TDIA audit inspections, which may be announced or unannounced.

The Environment Protection Authority and local Municipal Councils are responsible for administering EMPCA, and various legal options are available under this Act. One course of action may involve serving an Environment Protection Notice (EPN) on the responsible person concerned whereby:

- The dairy could be closed down if compliance is not achieved within a specified time frame;
- A charge may be imposed for issue of the notice;
- Ongoing reports of the effluent management system may be required to be prepared by a suitably qualified person. A fee may be charged for each inspection;
- A penalty can be incurred for failure to comply with a requirement of an EPN – the maximum fine is currently \$120,000 for a company with a daily fine of \$60,000 for each day the offence continues, and \$60,000 for an individual with a daily fine of \$12,000. These maximums are subject to change annually in line with the Fee Units Act 1997;
- A right of appeal against the issue of the EPN can be lodged for a fee of \$50.

Fines can also be incurred where an incident that may cause environmental harm or environmental nuisance has not been reported to the appropriate governing body (local Council or Environment Division). These fines can be up to \$120,000 for a body corporate, and up to \$60,000 for an individual, at current rates.

Effluent as a Fert\$mart Fertiliser

- Reuse of effluent as a fertiliser can be easy if you have an efficient and simple system – try to avoid high maintenance systems with breakdowns which can be costly. Look at good systems on other farms or seek design advice if needed.
- **READY TO GO, KEEP IT LOW** is a good motto for effluent. Keep the effluent pond as empty as possible, especially coming into winter, so nutrients out on the paddock growing grass and there is maximum storage capacity for winter storage and in event of breakdowns.
- Allow sufficient land area to apply effluent at an **agronomically** sensible rate to meet the crop or pasture nutrient requirements. Aim to spread effluent as far as possible across the farm. A minimum of 10% farm area or 5 ha/100 cows milked.
- A lighter rate over a larger area is preferable to overloading a small area
- Dairy effluent typically contains relatively large amounts of readily plant available nutrients, particularly nitrogen (N) and potassium (K). The nutrient that requires the largest reuse area is normally potassium and this sets the application rate. A nutrient analysis of your effluent taken at the paddock end of the system is useful for calculating application rates.
- Depending on the farm, the effluent can also be quite saline. Effluent can be shandied with irrigation water to reduce the salinity levels. Effluent should not be applied to young seedlings or to irrigate a crop up due to the risk of burning. Run effluent in a separate line through your pivot or flush with fresh water at the end of the season to prevent corrosion of irrigation equipment.
- Total potassium per application should be no more than **60 kg K/ha**, and no more than **120 kg K/ha** per year. This applies for both liquid effluent and sludge. Soil K levels in paddocks that have been repeatedly used for effluent disposal often have very high K levels and will not require application of potassium fertiliser (subject to a soil test). Effluent paddocks can be cut for hay or silage to remove excess potassium and prevent overloading.
- Avoid applying effluent to paddocks used to calve down the herd as the excess potassium can lead to grass tetany with cows going down due to induced magnesium deficiency.
- For liquid effluent, the total nitrogen application should be no more than **50 kg N/ha**.

How to work out how much nutrient you are applying in irrigated effluent:

1. Collect an effluent sample for analysis. *This must be as applied to the paddock via the irrigator.* It is pointless to take a sample from top of the pond. A good way is to put out buckets while irrigator is going. Measure the amount that irrigator is applying (mm), remembering that 100 mm/ha is equivalent to 1 ML per ha.
2. Keep effluent sample cold and get to lab for analysis asap.
3. Look at the analysis for nutrients in ppm and convert to kg nutrient per ML. For example:
ammonium 8.58 ppm = 8.58 kg in 1ML
phosphorus 18.71 ppm = 18.71 kg in 1 ML
potassium 58.43ppm = 58.43 kg in 1ML
4. Convert kg per ML to total annual application based on total effluent irrigation for the year

For example:

Effluent irrigator applies 4 mm/ha each application, with 30 applications per year to same paddock. 4 mm x 30 = 120 mm/ha/year = 1.2 ML/ha per year.

Effluent analysis shows potassium (K) at 58.43 ppm = 58.43 kg in 1 ML, which is 70.11 kg in 1.2 ML.



Clean rivers and Tasmanian dairy farms

Tasmanian dairy farmers have a strong history of working to protect the environment. We want to proudly show that Tasmania is the dairy region with the best water quality in the world.

Every dairy farmer should be happy to fish, swim and drink the water downstream from their farm.

“We spend so much time here – the children have grown up playing in the river, fishing, swimming, picnics. It is also the water that drives our business.”

Rosie Davenport.



Atkins and Howe families fishing on the Mersey River



Rosie and Bailey Davenport on the Ringarooma River

Tips for Clean Rivers

Keep single N application rates at 50 kg/ha or below (100 kg urea/ha). 50+ years of N fertiliser research on pasture has shown that this is where the cost benefit plateaus – more than this and \$ are wasted. Applying 0.5-1.0 kg N/ha per day grazing rotation is likely to be the most profitable and keeps N out of waterways and minimises nitrous oxide greenhouse gas emissions.

> fertsmart.dairyingfortomorrow.com.au

> dairytas.com.au/nrm/nutrients

“Fertsmart is the future - improve your fertiliser efficiency by utilising soil and effluent testing and the 4 R's (right product, rate, time and place), to have a more profitable, efficient and sustainable farm.”

Seona Findlay Fert\$mart agronomist.



Seona Findlay, Fertsmart Agronomist

The Tasmanian Effluent Code

(Compliance audited by Tasmanian Dairy Industry Authority) states effluent must remain within farm boundaries, there must be an appropriately designed and managed effluent system and effluent must be distributed around the farm in an environmentally sound manner (rule of thumb is minimum 10% of farm area).



Effluent storage for 900 cow herd at end of calving. Liquids through pivots and solids composted with woodchips from calving pad and spread on worked paddocks. 'Janefield' Meander.

Enjoy your river this summer!



Sophie Lawrence on the Meander

Fertilise right

- ✓ Product
- ✓ Rate
- ✓ Time
- ✓ Place



Meander River fenced off on 'Beaufield'

Keep cows out of creeks and maintain a good buffer to waterways

This is the single most important thing dairy farmers do to protect water quality.

Keep it clean



Bill Chilvers on the South Esk

Effluent is a Fert\$mart nutrient – too valuable to lo\$e

Have a great effluent system and recycle nutrients.

See back for contractor details.



Soil moisture monitoring is used on 'Oakdene'

Irrigate Smart

Over irrigating increases power bills, leaches nutrients, causes runoff and complicates management. Good irrigation management produces more pasture per unit of fertiliser and reduces nitrogen losses.



Atkins children and friends enjoy life on Lobster Creek

Water quality science

- > Allowing cows in creeks puts pathogens and nutrients in the waterway and stirs up sediment. Young stock are more likely than adult animals to spread *E.coli* and *Cryptosporidium*, which are human pathogens. Stock management is easier if animals are drinking from water troughs and using dedicated stock crossings.
- > Nitrogen (N), phosphorous (P) and sediment are the main impacts on environmental water quality. Excess nutrient and sediment in waterways can cause algal blooms and reduce dissolved oxygen levels (impacting fish and aquatic life). This is called eutrophication



VanBrecht family fishing on the Ringarooma



Contractors with slurry tankers

Andrew Wylie
0418 140 678
Statewide.

Richard Murrell
0418 142 518
Statewide.



Contractors with muck spreaders

Kris Davis
0428 561 386
Marawah to Burnie.

Michael Nichols
0409 451 430
Woolnorth to Deloraine.

Andrew Wylie
0418 140 678
Statewide.

NCDEA Accredited effluent system designers in Tasmania

Current at May 2018, in alphabetical order:

Robin Badcock
0418 133 737
Based in central North

Alistair Brooks
0438 476 215
Macquarie Franklin, based in South

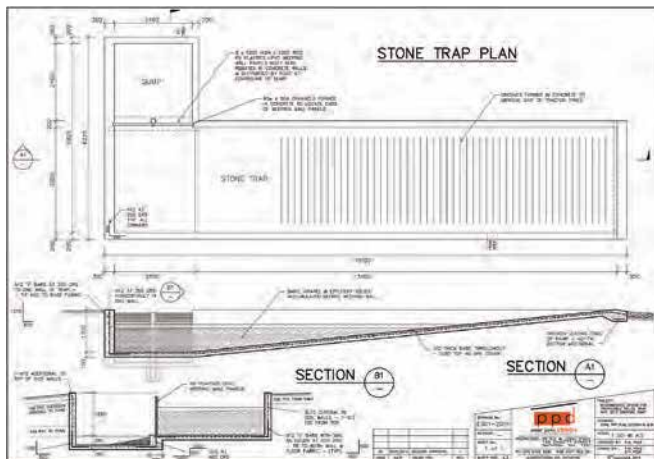
James Curran
0407 622 483
Macquarie Franklin, based in central North

Sam Dingemane
03 6332 6988
CBM, based in North

Laurie Hooper
0418 560 417
AgriTech, based in North West

Scott Livingston
0438 951 021
Based in central North

Peter Poke
0427 522 291
Peter Poke Design, based in Circular
Head Accredited building designer



Spreading S#iT



Desludging effluent ponds is an important dairy farm maintenance job

Benefits of desludging:

- Average of \$6,000 per ML of nutrients out on the paddock (May 2017 fertiliser prices). Save \$ on conventional fertiliser.
- Improve fertility and grow more grass on your least productive areas.
- Target nutrients to where they are needed based on soil testing. It is quicker and cheaper for a once-off application with the slurry tanker, compared to investing in upgrading pumps, pipes and irrigators to get effluent to areas furthest from the dairy.
- Keep your effluent system working efficiently and compliant with the Tasmanian Effluent Code of Practice. Your effluent system will be inspected as part of your annual dairy license inspection.

Right product, right rate, right time and right place

Follow the Fert\$mart principles of right product, right rate, right time and right place when applying sludge to paddocks. Soil test so you can target your lowest fertility paddocks - even if it does cost a bit more in spreading costs up front, the improved fertility and additional production will be worth it within the year.

Ready to Go, Keep it Low

“Ready to Go, Keep it Low” is a good motto for all of your effluent system. Don’t let solids or liquids build up to the extent that they become difficult to manage. First ponds can be scooped out with an excavator if sufficiently solid and left to dry next to the pond prior to spreading in paddocks when much drier. Getting in a slurry tanker and stirrer is a better good option if your first pond needs cleaning out and you’ve got paddocks that would benefit immediately from the nutrients in sludge.

When is best time to apply effluent sludge?

- Generally ponds are best desludged in summer and early autumn so they are empty going into winter and ready for next milking season
- Apply when pasture or crops are actively growing so they can use the nutrients. Sludge application ideally takes advantage of ground preparation for high yield crops such as maize
- Applications should be timed to follow grazing to ensure pastures are palatable in the next rotation
- Stock should be kept off the area for a minimum of 6-8 weeks after sludge has been spread, to avoid problems with nitrate levels.

What nutrients are in sludge?

Results from analyses of 14 slurry samples from pond desludging across Tasmania in April 2017 are shown below. There was significant variation between ponds, but some key results are noted below:

Analysis	Unit (Note that mg/kg is equivalent to kg/ML)	Average level in 14 Tas sludge samples	Comment/Observation
Moisture Content %	%	87	Total solids and nutrient content varies on time since desludging, cow numbers, feed intake, design of yards including feed pads, pond design and how/when sludge sample is taken from the pond. Best to sample directly from slurry tanker after pond well stirred.
Dry Matter %	%	12.7	
Organic Matter %	%	5.0	
Organic Carbon %	%	2.5	
Phosphorus	mg/Kg	473	Relatively high P and K levels mean that it is critical to target sludge applications to paddocks with low fertility.
Potassium	mg/Kg	589	
Total Nitrogen	mg/Kg	2312	Most of this is in organic form so not immediately available for use by plants (or in form that can be lost to the environment) until it is mineralised to ammonium. Rates of mineralisation vary.
Sulphur	mg/Kg	791	
Calcium	mg/Kg	1101	Calcium, organic matter and trace elements contribute to the “extra effect” farmers see from spreading sludge, compared to spreading equivalent conventional fertiliser.
Chloride	mg/Kg	366	
Magnesium	mg/Kg	383	
Sodium	mg/Kg	136	
Boron	mg/Kg	1.6	
Copper	mg/Kg	17	
Iron	mg/Kg	2307	Farms on red soils (high iron content) typically have high iron levels in the sludge
Manganese	mg/Kg	49	
Zinc	mg/Kg	41	
Conductivity	dS/m	3.9	
pH (water)		7.6	Sludge tends to be saline, particularly in coastal environments or farms with reuse systems. Avoid spreading on areas already prone to salinity.

- Rates of mineralisation of organic nitrogen are not constant throughout the year and vary depending on C:N ratios, temperatures, microbial populations and rates of release from organic matter.
- Comparison of Tasmanian results to sludge from SW Vic and Central NSW shows that typically Tasmanian sludge has proportionally more total N. This could relate to our high protein pastures or lower rates of microbial activity/volatilisation with lower temperatures.

If you want to properly monitor nutrients being applied through sludge, you will need to analyse your own sludge and do follow up soil tests in areas where sludge has been applied. It is important that samples are collected consistently and analysed consistently at the laboratory. There can be confusion around how slurry samples are analysed – results differ greatly depending whether analysed as a solid or a liquid in the lab. Seek professional advice before submitting samples.

Value of fertiliser in effluent sludge?

Pricing of major nutrients and trace elements in effluent sludge in May 2017 showed that typically Tasmanian sludge has approximately \$6,000 of nutrients per ML of sludge. Based on valuing N at \$1 per kg, P at \$2.50, K at \$1/kg, S at \$1/kg (when N deducted from DAP and S from SSP). Trace elements valued at wholesale prices.

*Solids trench for 1000 cow farm, measuring 50 m x 4 x 1.8m (0.36 ML).
This is desludged twice a year and sludge spread on lower fertility paddocks at the back of the farm.*



Spreading costs?

As a rough rule of thumb, spreading sludge costs around \$5000 per ML within 1 km of effluent pond. So the cost of spreading is less than the value of fertiliser you are spreading. Spreading this amount of conventional fertiliser would require multiple spreadings at a cost of \$10-12/ha. Effluent sludge contains nutrients in organic form, which act as slow release fertilisers over time. Once you've spread ground with effluent sludge, the effect will be longer lasting than with conventional fertiliser.

Don't be a cowboy:

- Tasmanian sludge typically has high nutrient levels, especially if ponds have not been desludged for years. You may exceed recommended nutrient application rates if you apply sludge over too small an area. Talk to your contractor about reducing application rates if you are concerned about nutrient overloads.
- Don't apply sludge close to waterways and drains where it could runoff with rainfall events.
- Avoid applying slurry to calf-rearing paddocks or paddocks used for calving.

Animal health considerations when using effluent as fertiliser

Bacteria that cause diseases can be found in manure, urine and milk. These include

- Johne's disease
- Salmonellosis
- Leptospirosis
- Mastitis
- Enzootic bovine leucosis

Worm eggs, coccidial eggs, clostridium organisms and tetanus spores are also passed in manure.

WHEN IRRIGATING EFFLUENT - In most cases, the period of time before application to pasture and the dilution effect of the washdown water tend to reduce the risk to stock grazing paddocks that have been treated with effluent.

To further reduce the risk to animal health, the following precautions should be taken:

- Do not allow young stock (less than 12 months old) to graze or have access to treated areas.
- Do not allow drains from treated areas to flow into areas where young stock are being kept.

- During summer, do not graze areas to which irrigated effluent has been applied for at least 2 weeks. If you can safely irrigate effluent in the winter, do not graze treated areas for at least 3 weeks.
- Do graze areas just prior to effluent application to allow increased sunlight penetration to kill organisms and to extend the period before the area is ready to be regrazed.
- Do spread effluent during the warmer, drier months to reduce survival chances of disease organisms.
- High K levels can cause grass tetany (blood magnesium Mg levels fall below a critical level). It is important to regularly soil test areas that are being loaded with effluent and avoid applying more than 60 kg K/ha in one application of effluent or sludge.

Safe pumping from ponds

- Ponds must be fenced from people and stock: - be especially careful that small children can't access effluent ponds. Ideally, ponds should have signage stating:
 - dangerous areas
 - location of flotation devices at the pond in case someone falls in
 - procedures for "what if" something goes wrong: e.g. person fell in, tractor fell in.

Typically, contractors will come with a tractor and slurry tanker and they will request the farmer to set up a second tractor on the edge of the pond with a PTO driven stirrer.

- Ensure there is safe and easy access to the pond for all large machinery
- Ensure all earthworks around the pond are stable under heavy loads
- All tractors have PTOs guarded, and are in good condition

Please keep in mind:

- It may be difficult to identify the pond surface area if ponds are heavily overgrown
- The water line should be carefully marked before backing any machinery up to the pond.
- Floating debris may cause blockages or be flung into the stirrer
- Ideally, there should be bump stops for tractors – even a heavy timber chock is better than nothing
- People driving tractors in the vicinity of effluent ponds need to be very experienced. People have died when tractors and stirrers have fallen into deep ponds
- There needs to be a clear line of sight between all people working around an effluent pond
- Wear Personal Protective Equipment (PPE) and be highly visible
- Establish clear procedures for immediate communication
- Ensure the contractor is briefed about routes to be used for slurry carting and any potential hazards.



Many thanks to AgriContracting and Moonlake (VDL Farms) for helping collect sludge samples from Tasmanian farms in April 2017. Funding for analysis provided by DairyTas. Sample analysis and interpretation through EnProve www.enprove.com.au



Don't get in the s#!t....empty it!

Ready to go, keep it low

Empty effluent ponds during the irrigation season. Get the nutrients out growing grass!

Keeping it low is peace of mind in winter and in event of breakdowns or staff issues. The Effluent Code of Practice states effluent must be contained within farm boundaries.

Effluent is a Fert\$mart fertiliser. Better use of nutrients means buying less fertiliser, protecting water quality and tackling greenhouse gas emissions.



Don't get in the \$#@%, empty it!



Ready to go, keep it low tips

- › Spread effluent over as much of the farm as possible ... minimum area is 1 ha/20 cows milked or approximately 10 per cent farm area
- › If you are increasing herd size, assess your storage volumes.
- › If you need effluent system design advice, see accredited designer list on DairyTas website dairytas.com.au/nutrients
Aim for a low maintenance system, using gravity where possible.
- › Good effluent storage gives peace of mind and additional irrigation water in a dry season.
- › If there is no room near the dairy shed for a good storage, consider constructing at a suitable location to supply the irrigation system over summer.

Talk to your dairy technician or irrigation dealer about pumps, pipes and irrigators to spread effluent further. Certified Irrigation Designers can give independent advice.



For more information contact:
Rachel Brown on 0409 333 381
dairytas.com.au/nutrients

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