

Costs

Guideline No 18



This guideline aims to provide an insight to the costs associated with the purchase and installation of various parts of a dairy effluent management system.

*This guideline should be used in conjunction with **Guideline No. 19**, which provides further information of the sources used in providing these costs.*

*Costs are all estimates as of **August 2006** (Prices exclude GST) and may vary amongst distributors.*

The referencing numbers in this fact sheet refer to suppliers listed in 'Guideline 19 – Sources of Information.' This enables the reader to identify the source of the cost estimates.

Trafficable solids trap (TST)

Recommended sizing parameters for TST:

- ❑ 2 days effluent production from the dairy (wash down water + cow excreta)
- ❑ Run-off produced from a 1 in 10 Year storm falling on areas contributing to the effluent management system

Input parameters for the TST example:

- ❑ Herd size: 180 cows
- ❑ Surface area contributing to the effluent management system: 370 m²
- ❑ 2 days effluent production: 28,120 L
- ❑ Stormwater run-off volume: 27,890 L

Volume of trap: 56,010 L (56.0 m³)

The following table shows the estimated cost of the trap.

Referencing No.	Materials Required	Materials Measurements	Unit Cost	Extended Cost
37	Concrete (40 MPa)	18m ³	\$166/m ³	(Delivered within 20km) \$2,988
38	Reinforcing F72	9 sheets	\$62.70/sheet	\$ 564
	Y12	177	\$2.00/m	\$ 354
39	Formwork			\$ 810
	Excavation			\$ 250
TOTAL COST				\$4966

Manure pumps

Referencing No.	Materials Required	Cost
21	Yardmaster 10 HP 3-phase	\$ 430
	Reeves 10 HP 3-phase	\$4200
	Upper and lower float switch (for 10 HP motor)	\$ 450
	Yardmaster pond/pit stirrer (10 HP 3-phase, 1500mm shaft)	\$6800

Piping

Referencing No.	Materials Required	Cost
25	50 mm polyethylene (Rural B)	\$ 1.51/m
	150 mm PVC (PN6)	\$ 9.68/m
	200 mm PVC (PN6)	\$20.10/m
	300 mm PVC (PN6)	\$44.40/m

Sprinklers

Referencing No.	Type of Sprinkler	Cost
21	Manurain sprinkler	\$1500
	Effluent traveller	\$4000 - \$5000

Flood wash

Referencing No.	Item	Cost
41	Most popular selling tank; 22,500 Lt (5000 gall)	
	For a yard width of 12 – 14m; with 375 mm diameter downpipe and fittings	\$10 000
	For a yard width of 25 – 30m; with 450 mm diameter downpipe and fittings	\$10 700

The price includes the tank, installation piping, flumes, valves and stand. (Concrete footings and connection to services is an additional expense). The system comes with a 10 year warranty. Commercial grade tanks are used. They also offer a do-it-yourself kit, which could save up to \$2000 on the prices quoted above.

Mechanical Solids Separator (FAN Press Screw Separator)

Referencing No.	Items Required	Cost
10	Collection pit	\$10,000 – 15,000
	Stirrer	\$ 5,000
	Stirrer installation	\$ 2,000
	Pump	\$ 6,500
	Pump installation (includes access winch)	\$ 2,500
	FAN separator	\$39,000
	Separator housing and platform	\$20,000 – 22,000
	Plumbing	\$ 3,500
	Electrical fittings and installation	\$ 5,000
TOTAL COST		\$93,500

Additional requirements for recycling separated liquid effluent

Item	Cost
Storage tank (60 – 90 kL)	\$15,000
Pump	\$ 5,000
Plumbing	\$ 2,000
Electrical fittings and installation	\$ 2,000
TOTAL COST	\$24,000

Mechanical Solids Separator (Wedge-wire run down screens)

The RP Ultra separator has an automated screen washing system, which operates after each effluent pumping cycle. The RP Express separator screen requires manual cleaning.

RP Ultra Dairy Effluent Management System

Referencing No.	Items Required	Cost
12	RP Effluent Separator Treatment capacity: up to 22 L/sec	16,990
	RP Effluent Separator stand	12,900
	Reinforcement basket	910
	Submersible vortex pump + guide rails and support arm	7,209
	Submersible mixer + guide rail	6,835
	Lifting davits for pump and mixer	1,942
	Electrical controller + mounting post	5,760
	Tank level sensor, mounting bracket and cover	307
	Installation materials	4,379
	Installation labour and expenses	4,250
	Installation of 50,000 litre collection tank, 5.4 m pool fence around tank, delivery line to separator, discharge line to edge of concrete.	
TOTAL COST	*** \$61,482	

RP Express Dairy Effluent Management System

Referencing No.	Items Required	Cost
12	RP Effluent Separator Treatment capacity: up to 14 L/sec	10,690
	RP Effluent Separator stand	5,613
	Submersible vortex pump + guide rails and support arm	5,984
	Submersible mixer + guide rail	6,835
	Lifting davits for pump and mixer	1,942
	Electrical controller + mounting post	5,510
	Tank level sensor, mounting bracket and cover	307
	Installation materials	2,777
	Installation labour and expenses	3,400
	Installation of 40,000 litre collection tank, 5.0 m pool fence around tank, delivery line to separator, discharge line to edge of concrete.	
TOTAL COST	*** \$43,058	

*** The above quote does not include earth works, concrete work, crane hire, electrical supply and connection, pipe between tank and separator, freight and travelling, and water supply to separator stand.

The quotes are subject to change. They were supplied in September 2006.

Laboratory Analysis

Referencing Number	Type of Testing	Parameters Tested	Cost Per Sample
27	Water Testing	Salinity, total suspended solids, pH, major metals and salts (Fe, Mg, Na Cl) and nutrients (N and P).	\$38.00
	Soil Testing	pH, extractable P:K:S:Al:B, organic carbon, salinity, free lime, texture, nitrate, chloride, exchangeable cations and EDTA extractable Cu:Zn:Mn:Fe	\$117.00
33	Liquid effluent	BOD, COD, TOC, total dissolved solids, suspended solids, and N,P and K.	\$170.00
33	Solids/Sludge	TOC, and N,P and K	\$120.00

Earthworks

Referencing No.	Type of Service	Type of Equipment	Cost
15	Excavation and compaction for a clay lined pond, 600 mm lining	Bulldozer, scraper and water	* \approx \$4.00/m ³

Linings for Effluent Ponds

Referencing No.	Material Required	Cost
34	High Density Polyethylene (HDPE; 1.5mm)	** \$8.50m ²
	Geosynthetic (Bentofix)	*** \$10.00 m ²
15	20 mm crushed rock	\$20.50/tn
	Screened filling sand	\$20.00/tn

* In-ground pond construction, assuming on-site clay is suitable for lining. Cost based on 5.0 ML pond volume

** Supplied and laid; excludes trenching around perimeter to secure the liner.

*** Supplied and laid, plus placement of a protective layer of crushed rock. Does not include the cost of the rock.

Storage Ponds

Winter Storage

SCENARIO 1

- Based on 180 cows, 120 day storage
- 12,600 litres of effluent produced per day
- Yard washed using freshwater
- Daily wash down volumes:
 - 12,600 L of freshwater
 - 0 L of recycled effluent

Two Pond System (Clay lined)

Referencing No.	Item	Volume x Cost	Total Cost
15	Solids pond (excavation & compaction)	300 m ³ x \$ 4.0/m ³	\$ 1,200
	Storage pond (excavation & compaction)	3,028 m ³ x \$ 4.0/m ³	\$ 12,112
TOTAL COST			\$ 13,312

SCENARIO 2

- Based on 180 cows, 120 day storage,
- 12,600 litres of effluent produced per day
- Yard washed using recycled effluent
- Daily wash down volumes:
 - 4,000 L of freshwater
 - 8,600 L of recycled effluent

Two Pond System (Clay lined)

Referencing No.	Item	Volume x Cost	Total Cost
15	Solids pond (excavation & compaction)	300 m ³ x \$ 4.0/m ³	\$ 1,200
	Storage pond (excavation & compaction)	1,300 m ³ x \$ 4.0/m ³	\$ 5,200
TOTAL COST			\$ 6,400

Waste Spreading

Liquid Spreaders – Tractor Drawn

Referencing No.	Size Range	Price Range
	5,000 – 19,500 Lt	\$20,000 – 80,000

Most common system purchased is the 10,500 litre tanker. The price varies according to type of injection/nozzle system fitted.

Suitable applications:-

Tankers are capable of spreading a range of slurries, from liquid wash water to effluent with a viscosity similar to wet concrete.

Referencing No.	Liquid Spreader Specifications	Outputs
13	10,500 Lt tanker	≈ \$43,000
	Filling time	3 – 4 minutes
	Spreading time	3 – 6 minutes
	Average output	42,000 L/hr

***Contract rate @ \$100 – 140/hr** (depends on method of application).

Liquid Spreaders – Truck Mounted

Trucks are AS 1210 compliant; registered with WORK COVER and WORK SAFE; and are equipped with automated loading arms.

Referencing No.	Item	Cost
13	Truck Hire, 12,500 litre tanker Filling time approx. 4.5 mins Unloading time approx 3 – 5 mins	\$140/hr
	Pond stirrer	\$65/hr
	Excavator (surface cleaning)	\$95/hr (no float fee)
	Travel fee	*** \$1.40/km

*** The travel fee is split between the individual farms. For example, a truck cleans out two ponds for separate clients in the same area. The truck travels a total of 100 kilometres, therefore each property pays a \$70 travel fee in addition to truck hire.