AN ROINN TALMHAÍOCHTA AGUS BIA
DEPARTMENT OF AGRICULTURE & FOOD

S146
September 2004

MINIMUM SPECIFICATION FOR WINTERING FACILITIES FOR SHEEP

The receiving of this specification does not imply approval of a grant application. However, if written approval is issued, then this specification becomes part of the contract between the applicant and the Department of Agriculture and Food.

This is a minimum specification. Where the word "SHALL" is used, then that standard (at least) **must** be followed in grant-aided buildings. Where a procedure is "RECOMMENDED", this is advice only on good practice.

Note that all references to other Department Specifications are to the current edition of that specification [available on the Department of Agriculture and Food Website (www.agriculture.gov.ie) under Farm buildings]. Similarly, references to Standards are to the current edition of the Irish, British or European Standard, as appropriate.

This specification covers the design and internal layout of wintering facilities for sheep. **For the design and construction of a building's superstructure, Department Specification 'S101: Minimum Specification for the Structure of Agricultural Buildings' shall be read and followed alongside this specification. For the design and construction of reinforced concrete tanks and slurry channels, Department Specification 'S123: Minimum Specification for Bovine Livestock Units and Reinforced tanks' shall be read and followed alongside this specification.**

1. SAFETY

1.1 Responsibility for Safety

Applicants are reminded that they have a duty under the Safety, Health, and Welfare at Work Act 1989 to provide a safe working environment on the farm, including farm buildings, for all people who may work on that farm. There is a further duty to ensure that any contractor, or person hired to do building work, provides and/or works in a safe environment during construction.

1.2 Safety during Construction

Farmer/Applicant Responsibility: Please note that neither the Minister nor any official of the Department shall be in any way liable for any damage, loss or injury to persons, animals or property in the event of any occurrence related to the development and the applicant shall fully indemnify the Minister or any official of the Minister in relation to any such damage, loss or injury howsoever occurring during the development works.

Dangers: Where the applicant/farmer is undertaking any part of the above work, it is his/her responsibility to seek competent advice and to undertake all temporary work required to ensure the stability of excavations, superstructure, stanchion foundations, wall foundations, to guard against possible wind damage and to avoid any other foreseeable risk. It is also his/her responsibility to ensure that any drains, springs or surface water are diverted away from the works.

Power lines: Farm buildings shall not be constructed under or nearer than 10m to an overhead power supply. If advice is required, or if power lines need to be diverted, it is the applicant's responsibility to contact, in writing, the local ESB supervisor before construction commences and then to follow the ESB conditions.

Danger to children: It is the applicants responsibility to prevent children from playing or spending time in the vicinity of any construction work.

1.3 Safety Notices

It is recommended that at least one safety notice should be put on the side of a building next to which a slurry agitation/emptying point is situated. The notice should be as close to the agitation/emptying point as possible. [Notices are available from most farm supply outlets and Teagasc].

1.4 Toxic Gases and Agitation

Harmful gases are generated in slurry stores and these have been responsible for both human and animal deaths. Good ventilation in slatted buildings is always important, and is vital during agitation or emptying of the tanks. Where silage effluent has been added to the slurry there can be a danger of more concentrated gases. Therefore:

1. Tanks shall always be agitated and/or emptied from the external agitation points, and never from openings within the house.
2. All doors, and any feed-flaps, shall be fully opened before agitation/emptying begins and kept open until completion of tank emptying.
3. No person shall enter the house during agitation or emptying. It is strongly recommended that animals be removed from the house before agitation. It is also recommended that animal holding pens are installed close to the house to facilitate this removal.
4. Some poisonous slurry gases are heavier than air. No person should climb down into an emptied or part-emptied tank without breathing apparatus. Such apparatus requires full training before it can be used.

1.5 Maintenance

All farm buildings require regular maintenance to ensure the health and safety of personnel and animals. Fittings such as slats, electrical fittings, drinking arrangements, etc., should be periodically checked, and all defective items replaced.

2. GENERAL

Sheep may be housed in purpose built sheds or in existing farm buildings provided:-

- These buildings are structurally sound and suitably located.
- Can be re-developed to meet requirements for ventilation, floor space, trough length, and feeding passages.
- Facilities for the collection, storage and subsequent removal of animal wastes and effluents can be installed.

As sheep are normally housed for a relatively short period, consideration should be given to the possible other uses to which housing may be put. For example, temporary use for grain, straw or hay storage may require additional eave and door heights. Where a concrete floored house is also used to house calves, a covered floor channel shall be provided. Provision shall be made for storing effluent run-off.

3. DESIGN CRITERIA

3.1 Floor Space

The recommended pen floor space for housed in-lamb ewes, unshorn is as follows;

Type of ewe	**Slats m^2**	**Bedded m^2**
Large (body weight 90kg)	1.2	1.4
Medium (body weight 70kg)	1.1	1.2
Small (body weight 50kg)	1.0	1.1

Where sheep are shorn up to 20% less floor area is required. A ewe with one lamb requires 30% additional floor space, 60% extra for 2 lambs.

3.2 Feeding Space

The recommended feeding space is as follows;

Type of Ewe	***Meal Feeding mm**	**Roughage (hay rack)**	**Easy Feed Silage**
Large (90kg)	600	200	200
Medium (70kg)	500	200	200
Small (50kg)	400	175	175

Lambs up to 45kgs on ad-lib concentrates require 100mm feeding space and on restricted feeding require 300mm.

*It is essential for all sheep to be able to feed meals together.

3.3 Depth of Pens

Pen depth is limited by the trough space. Ideally the pen depth should be such that all sheep can be fed from feeding passages. In practice, particularly where existing buildings are adapted, trough space may be required on two sides of the pen.

The ideal pen depth = $\frac{\text{Floor space per Ewe}}{\text{Trough Space Available per Ewe}}$

Example: Floor space per ewe - l.2m^2

Meal feeding space 450 mm per ewe

Pen depth 1.2 / 0.45 = 2.6m

3.4 Passages

Feeding passages shall be at least 2.5m wide. Recommended minimum widths are:-

Feed wagons excluding troughs - 4.0m

Tractor/trailer or block cutters - 3.0m

Tractor and front loaders - 2.5m

In conversions of existing buildings for small flocks the minimum width of passage shall be 1.2m

3.5 Group Size

Group size of 25 ewes per pen is recommended for small flocks, and 40 to 50 ewes per pen for large flocks. No pen should be designed for more than 60 ewes.

3.6 Floor Type

The choice of floor, either concrete or slatted, depends on management and straw availability. Unless straw is readily available, slats shall be installed.

The dry straw requirement to absorb urine produced is as follows;

Type	Feed	Dry Straw Requirement
Average Ewe	Silage	72kg (4 Std. Square Bales) /100 days
	Hay	45kg (2.5 Std. Square Bales) /100 days
Store Lamb	Concentrates	24 kg (1.5 Std. Square Bales) /70 days

4. BUILDING SUPERSTRUCTURE

The general superstructure of the building shall be constructed to the current edition of **Specification S101: Minimum Specification for the Structure of Agricultural Buildings.**

The use of a **Simple Steel Frame Structure** as specified in S101, is the strongly recommended option for sheep housing. Houses may also be built to the other designs given in S101. If trusses are being installed, they require a high standard of protection and ongoing maintenance in the aggressive livestock environment. If other structural designs not specified in S101 are used, then a full set of design drawings and full structural calculations shall be prepared by a chartered engineer, and given to this Department for prior approval before the start of construction.

4.1 Tank Gases

To maximise ventilation during agitation of slurry, and to reduce gas build-up in the house, sliding doors, unsheeted gates, or unobstructed openings shall be provided to both ends of the passageway in houses which exceed l5m in length. The minimum opening size at each end shall be 3 metres wide by 3 metres high.

4.2 Ventilation of Structure

Permanent open ventilation shall be provided, as **specified in Specification S101**, as a strict condition of grant-aid, in order to protect animal health and the working life of

the structure. Full ventilation shall also be provided in any conversion or extension of existing buildings.

Spaced sheeting for the roof is strongly recommended, and shall be installed as per S101.

5. TANKS UNDER SLATTED FLOORS

Tanks under slatted floors shall be constructed in accordance with S123. Where it is proposed to remove manure in slurry form, tanks shall always be extended outside the sheep house. As tanks are normally shallow, not more than 1.2m deep, a sump about 1.2m x 1.2m and 1.8m to 2.0m deep shall be provided in the tank extension, to facilitate agitation of slurry with added water. Where the length of the tank exceeds 16.0m, sumps shall be provided at both ends.

Where it is proposed to remove manure in solid form, tank depth shall not be less than 450mm. Provision shall be made to facilitate entry for machinery to empty the tank. The tank may be constructed overground with a ramp access to raised feeding passage.

6. SITE

Particular attention shall be paid to the siting of a sheep house in relation to access, other existing and proposed livestock housing, feed stores, and possible extension of the house. In all cases, care shall be taken to avoid endangering rivers, streams or wells by pollution. All surface water draining on to the site from higher ground, or any under-drainage passing through the site shall be intercepted and diverted.

The site shall be carefully chosen with a view to minimising operational and constructional problems. It shall be well separated from potential fire hazards and sheltered if possible. As a general guide, a storage facility for silage effluent/slurry/soiled water shall be located not less than 50m from any waterbody in the case of new farmyards, and not less than 10m in the case of extensions/modifications to an existing facility. The minimum distance between a storage facility and a public/private water supply source, either surface or ground, shall be 60m. In vulnerable situations this distance shall be increased up to 300m.

7. FLOORS

7.1 Slatted Flooring

7.1.1 Timber Slatted

Timber slatted floors shall be made up in sections to size that can be readily handled, generally not more than $5m^2$ to $6m^2$.

The timber slats shall be at least 50 x 22mm fixed at 20mm spacings with the framing and infill timbers at 600mm centres. Suitable sizes for framing and infill timbers are as follows:- Up to 1.6m span - 44 x 100mm.

Up to 2m span 44 x 125mm.

Up to 3m span 44 x 150mm.

Sections shall have minimum 100mm bearing on support walls and shall be laid parallel to the entry openings to pens.

7.1.2 Expanded Metal

Hot dipped galvanised expanded metal mesh shall be fixed with 50mm galvanised staples to timber framing as for timber slats but with infill timbers at 450mm centres. Suitable sizes for framing and infill timbers are as follows:-

Up to 2m span - 44 x 100mm.

Up to 3m span - 35 x 150mm.

Note: The standard dimensions of expanded metal "Empamet" 2088 is 2440 x 1220mm.

7.1.3 Solid Plastic Slats

Solid plastic sheep slats shall require prior Departmental acceptance, and shall be supported as per manufacturer's instructions.

7.1.4 Concrete Slats

As there is no Irish Standard for concrete slats suitable for sheep housing, approval of manufacturers specification for slats is required. Slats shall have a support of at least 150mm at each end on level walls and shall be assembled flat and parallel to each other.

7.2 Solid Flooring

7.2.1 Concrete Pen Floor

Concrete pen floors shall be 125mm thick laid to a smooth finish on 150mm compacted hardcore on solid foundation incorporating 1000 gauge polythene DPC.

7.3 Feed Passages

Feed passages shall be solid or suspended as the design dictates. A solid passage shall consist of a 125mm concrete slab laid on 150mm compacted hardcore on solid foundation incorporating 1000 gauge polythene DPC. A suspended passage shall be designed and built as per S. 123.

8. FIXTURES AND FITTINGS

8.1 Pen Divisions

Pen divisions, normally 0.9m to 1.2m high, shall be made of timber, tubular or box section steel, or a combination. It is recommended that neck-rail feeding barriers are rounded and that these rails are adjustable to suit large and small breeds. Provision shall be made for the movement of sheep in and out of pens by making sections of feed fence removable along passages or by using gates.

Feed troughs shall be of metal or timber or a combination. Where silage is easy fed along passages troughs may be omitted. If using a trough for silage and meals, it shall be 300mm high and up to 500mm wide, fixed at floor level.

Where the feeding face is limited along passages 'walk through' troughs between pens shall be provided.

8.2 Water Supply

At least one drinker shall be provided to each pen. Drinkers shall be raised above floor level, preferably at a height (about 600mm) so that the animal must stand on a raised platform 150mm - 200mm in order to drink. It is recommended that open drinkers are fitted with a safety guard frame to protect young lambs. All supply pipes shall be insulated and so placed to avoid mechanical damage.

8.3 Lighting

Lighting shall be at least 70 lux (approx. 5 to 7 W/m^2 for fluorescent lights). Adequate power points to facilitate power washing shall be provided.

9. CONCRETE SPECIFICATION

9.1 Certificates

Concrete shall be produced in an audited plant only: It shall not be produced on site.

A numbered certificate, signed and stamped, shall be required for all concrete delivered to site. The certificate, the "Concrete Manufacturers' Specification Certificate", is produced in triplicate. **The top certificate, printed on light blue paper, shall be retained by the applicant** and given to and retained by the local AES Office of the Department of Agriculture for inspection upon completion of the works.

9.2 Concrete

For all sheep facilities concrete shall be purchased on the basis of a characteristic 28 day crushing strength of $35N/mm^2$. Minimum cement content shall be 300 kg/m^3. Slump of unplasticised concrete shall not exceed 90mm, and maximum aggregate size shall be 20mm.

The concrete shall be ordered by requesting '35N concrete to be certified to the grant-aid standard of the Department of Agriculture and Food'.

If the Concrete Supplier requires further information the following shall be quoted to them:

- The concrete is to be to I.S. EN 206-1:2002: Strength Class: C28/35, 300 kg cement, maximum water cement ratio of 0.60, Exposure classes: XC4, XF3, XA1 (20 year life), Slump class: S2 (unplasticised), maximum aggregate size 20mm.

If plasticised concrete is desired, the slump class shall not exceed S3.

Polypropylene fibres may be incorporated into the concrete mix to improve the properties of concrete. Only fibres which have been tested and approved by National or European approval authorities may be used. The use of fibres helps to reduce

plastic cracking and improve surface durability but they are not a substitute for structural reinforcement. Fibres shall be used in strict compliance with manufacturer's instructions and shall only be added at the concrete manufacturing plant. The concrete certificate (Clause 9.1) shall clearly show the amount and type of fibre added. The mix design, compacting, and curing of fibre concrete is the same as concrete without fibre.

9.3 Materials

Cement used in concrete and concrete products shall be certified to IS EN 197-1, and shall bear the Irish Standard Mark, or shall be certified by NSAI to be equivalent to IS EN 197-1. All aggregates shall be to IS 5 1990. Plasticisers and other admixtures shall be to EN 934. All admixtures shall be used in strict accordance with manufacturer's instructions, and shall be added only by the concrete-mix manufacturer.

9.4 Tests

The Department reserves the right to require that concrete should be tested in accordance with BS1881.

9.5 Compaction of Concrete

All concrete shall be compacted by either vibrating screed or poker vibrator depending upon the position of the concrete. Poor compaction leads to entrapped air, which will weaken the concrete and may cause premature failure. All concrete can be easily placed and compacted when using a vibrating screed or poker vibrator which helps ensure the concrete achieves its full strength.

9.6 Curing of Concrete

All concrete shall be cured by keeping it thoroughly moist for at least seven days. Wetted floor slabs and tank walls shall be protected by polythene sheeting, kept securely in place. Alternatively proprietary curing agents may be used in accordance with manufacturer's instructions. When frost is a danger, straw bales shall be placed over the polythene on slabs. Concrete shall be at least 28 days old before being subjected to full load or slurry.

10. TIMBER QUALITY AND TREATMENT

All timber shall comply with recommendation SR 11: 1988 and shall be stress graded and marked SCA (Strength Class A). It is recommended that all timber to timber slatted floors is pressure treated in accordance with Irish Standard Specification IS 131: 1964.

Note: where timber slats are installed it is recommended that Larch or Douglas Fir is used rather than spruce for better durability.

11. ELECTRICAL INSTALLATIONS

Wiring and fittings shall be installed, and all work shall be carried out in accordance with the Second Edition of the National Rules for Electrical Installations, ET 101/1991 and Amendment A1:197, and specifically Section 705 - Electrical

Installations for Agricultural and Horticultural premises. An ETCI completion certificate shall be required, signed by the Electrical Contractor(s) or a person duly authorised to act on his/her behalf to certify that the electrical installation has been constructed and/or has been tested according to the National rules of Electrical Installations and has been found to be satisfactory. An associate certificate, specifically for agricultural work, the "Supplementary Agricultural Certification Form" shall also be signed by the Electrical Contractors or authorised persons and the number of the main ETCI completion Certificate clearly marked on it. If no valid numbered ETCI Certificate is available for the completed installation, then the Electrical Contractor shall complete a new numbered ETCI Certificate indicating that the new installation has been tested for safety and compliance, and note that number on the Supplementary Form. The signed printed "Supplementary Agricultural Certification Form" together with a copy of the ETCI Completion Certificate shall be given to the Department before grant-aid can be finally certified.

12. DRAWINGS

The outline drawings, on the following pages show different layouts to combine adequate feed space with floor area.

13. REFERENCE TO OTHER DAF SPECIFICATIONS

The current edition of the specifications listed below shall also be followed as required:-

1) 'S101: Minimum Specification for the Structure of Farm Structures' for all superstructures.
2) 'S102: Cladding Materials' for all roof and side cladding.
3) 'S123: Minimum Specification for Bovine Livestock Units and Reinforced Tanks', for all slurry storage tanks.
4) 'S129: Farmyard Drainage'

Copies of these and other relevant Department specifications are available on the department website at: www.agriculture.gov.ie under farm buildings or by contacting one of the local offices of the Department of Agriculture and Food.

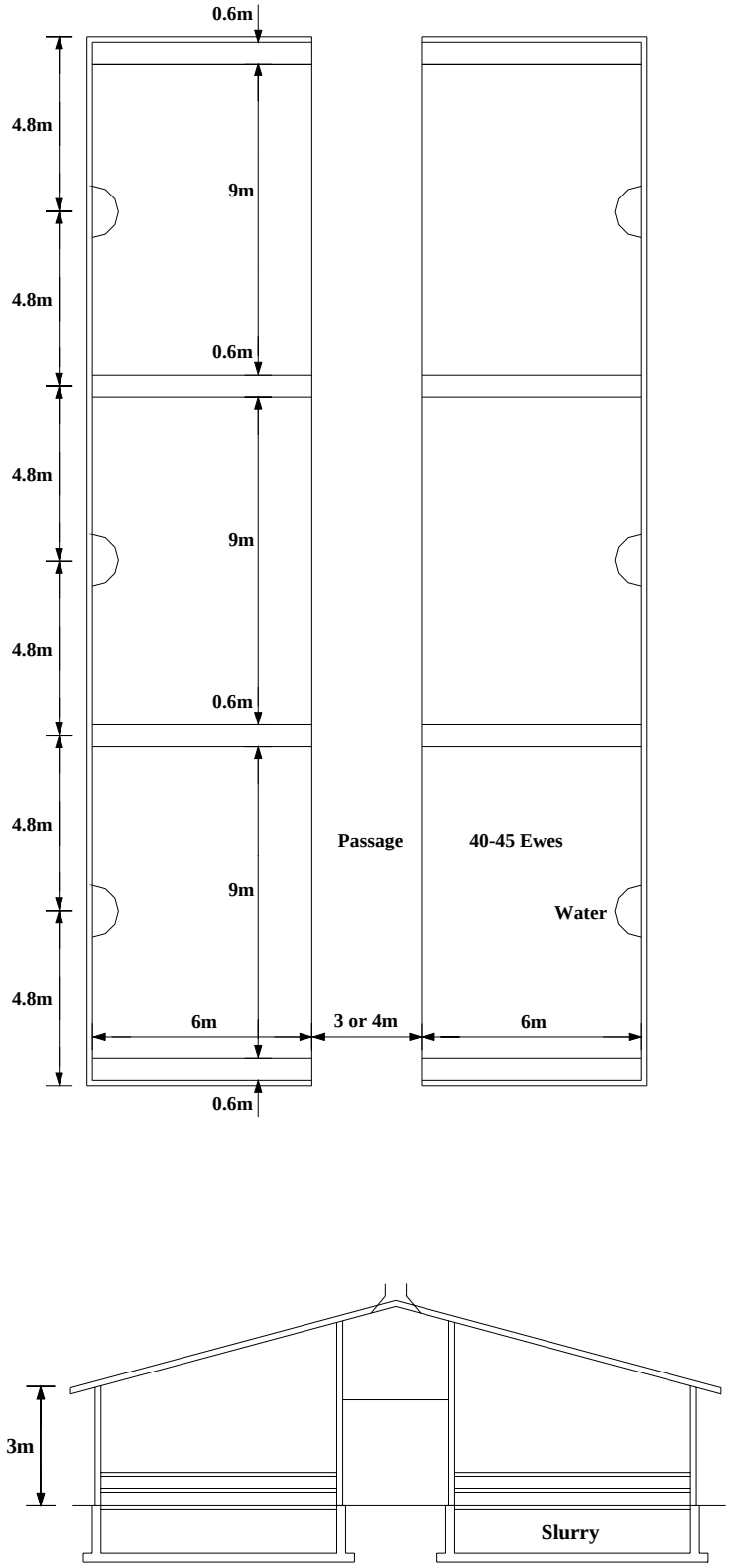
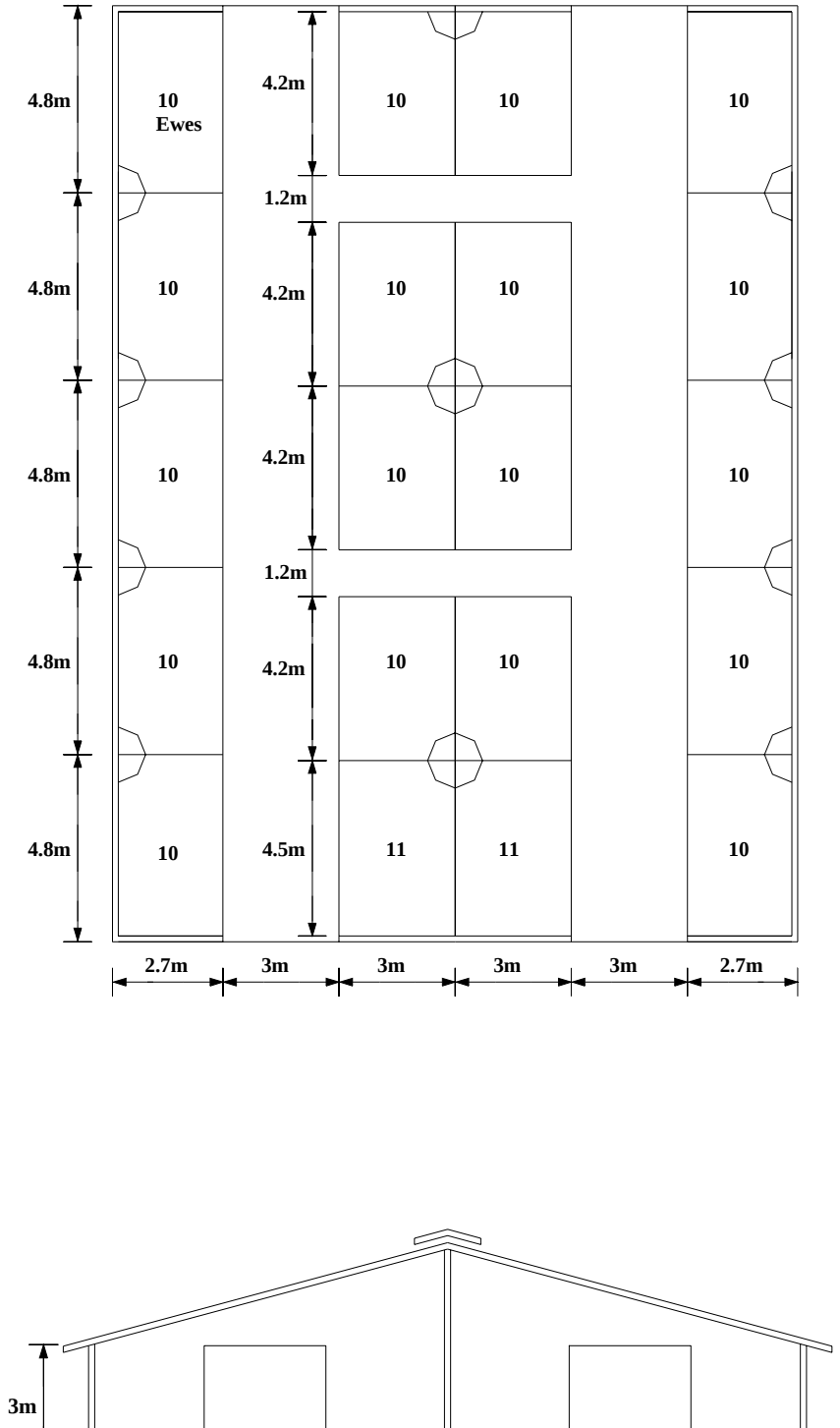


Figure 1 45 Ewes per Pen, 200mm Silage Feed Face


4.8m
4.8m
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Ewes
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Figure 2

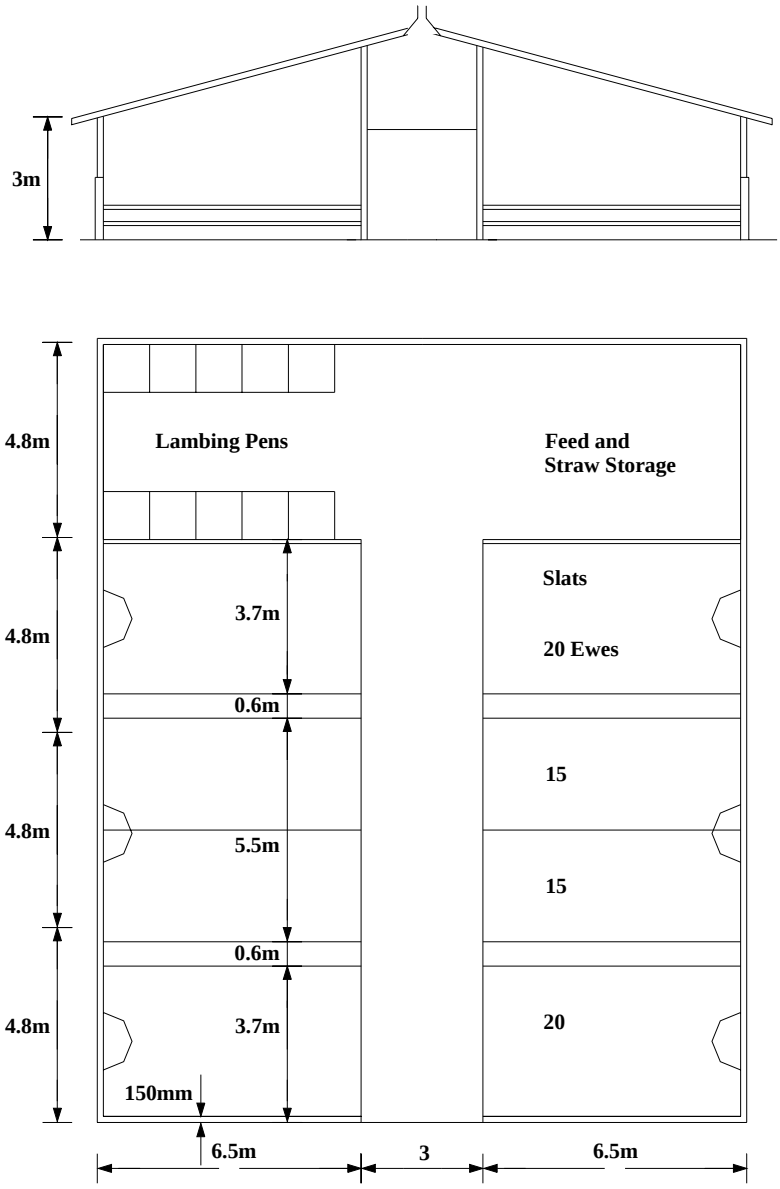
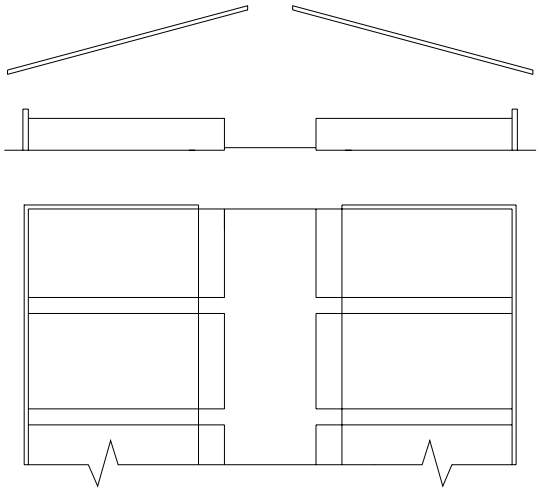
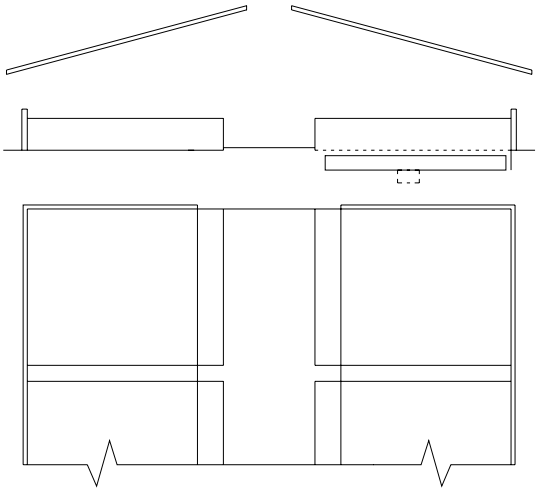

3m
4.8m
Lambing Pens
Feed and
Straw Storage
Slats
4.8m
3.7m
20 Ewes
0.6m
15
4.8m
5.5m
15
0.6m
4.8m
3.7m
20
150mm
6.5m
3
6.5m

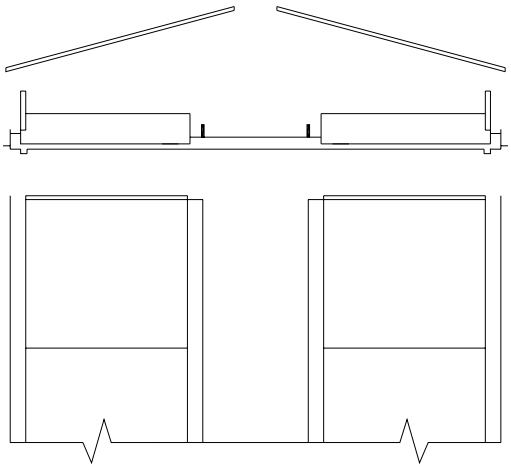
Figure 3



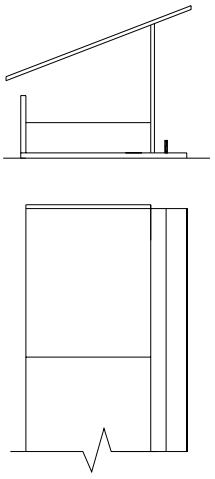
Silage or hay fed ad-lib. Concentrates fed in walk through troughs and along central passage



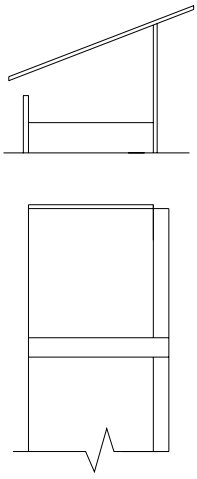
Silage or hay fed ad-lib along central passage. Concentrates fed on top of silage / hay



Silage or hay fed ad-lib along central passage. Concentrates fed in internal and external troughs



Narrow span open fronted shed for small flock. All sheep fed along front



Wide span open fronted shed. Silage or hay fed along front. Concentrates fed in walk-through troughs and along front

Figure 4

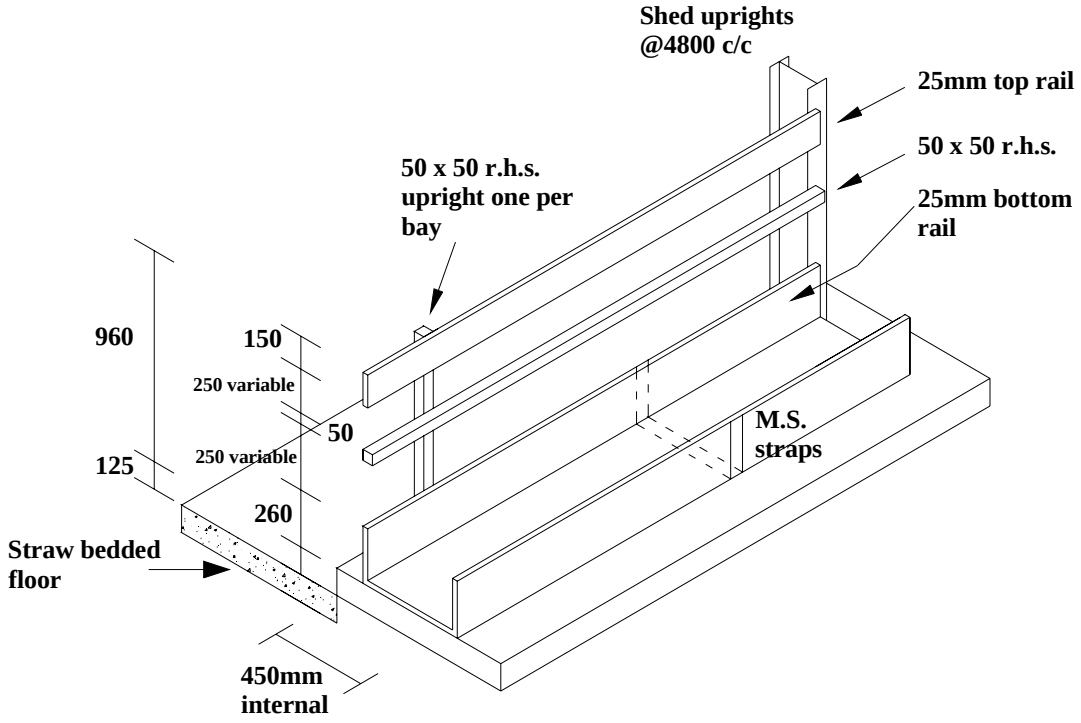


Figure 5 Single Sided Silage Trough - fixed to shed uprights

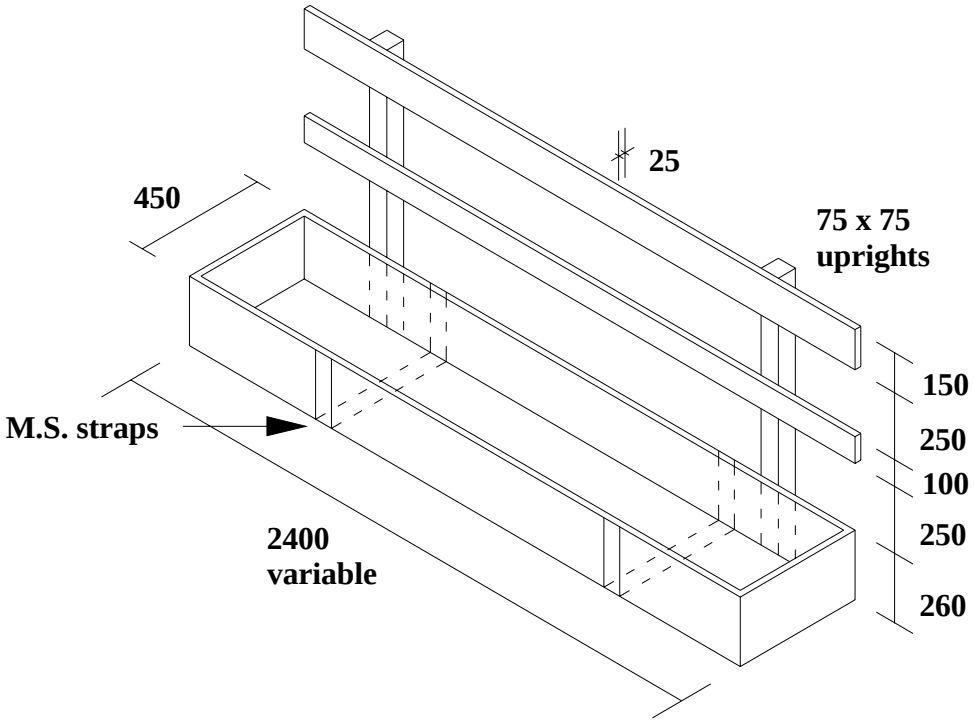


Figure 6 Single Sided Silage Trough - moveable

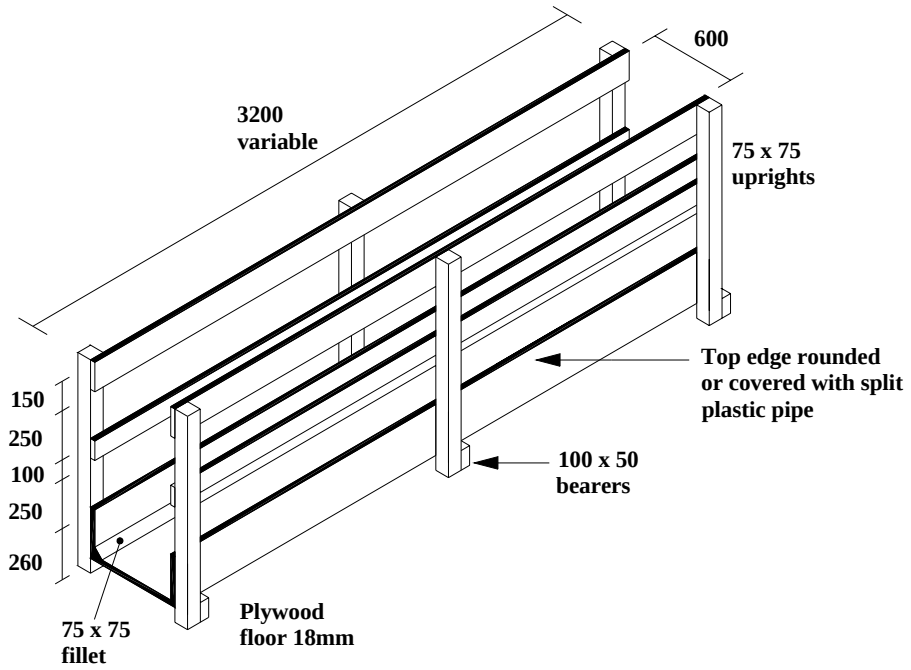


Figure 7 Walk-through Feed Trough - timber

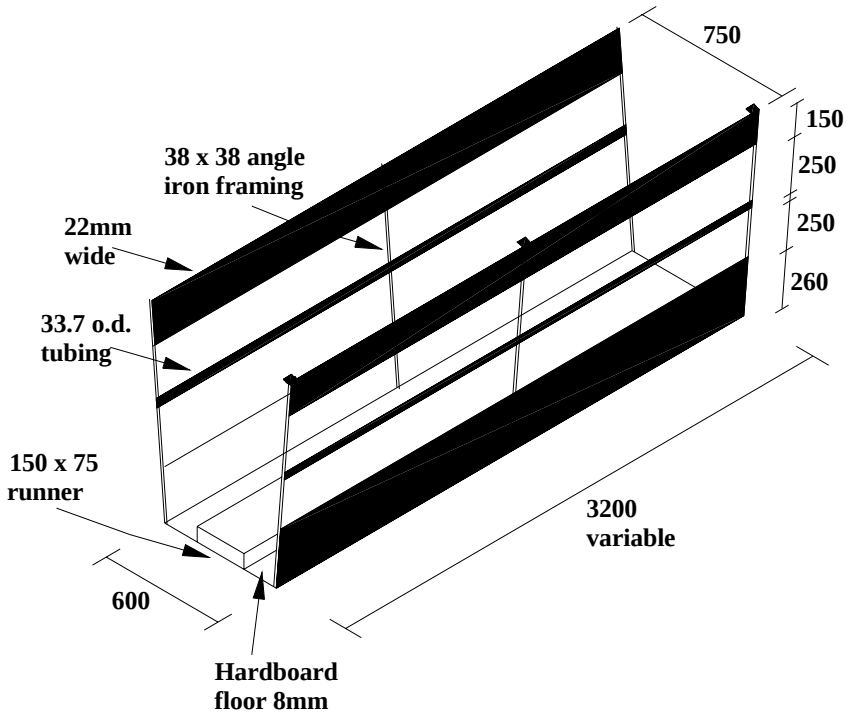


Figure 8 Walk-through Feed Trough - angle iron