AN ROINN TALMHAÍOCHTA, BIA AGUS MARA
DEPARTMENT OF AGRICULTURE, FOOD AND THE MARINE

MINIMUM SPECIFICATION FOR CATTLE CRUSH, RACE AND ENCLOSURE

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, Food and the Marine.

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, Food and the Marine 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.

1. Safety

APPLICANT'S RESPONSIBILITY FOR SAFETY

Applicants are reminded that they have a duty under the Safety, Health, and Welfare at Work Act 2005 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. It is the farmer's responsibility to provide a construction stage project supervisor.

SAFETY DURING CONSTRUCTION

Farmer/Applicant Responsibility: Certain construction dangers may be encountered in the course of building or conversion work. Neither the Minister or any official of the Department will 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: If any or all of the work is undertaken by the applicant/farmer he/she should seek competent advice and undertake all temporary work required to ensure the stability of excavations, superstructure, stanchion foundations and wall foundations, also to divert any drains, springs or surface water away from the works, and to guard against possible wind damage, or any other foreseeable risk.

Power lines: Due to the complex criteria involved, where buildings are proposed within 35 metres of the centre of any overhead power line, the landowner shall contact ESB Networks in advance to ascertain the specific minimum building clearance requirement. It is a requirement on landowners under The Electricity Supply Acts to notify ESB Networks, at least, two months before commencement of any construction works near overhead lines. As a guide, table 1 below sets out the usual minimum clearance distances required, however, ESB Networks shall be contacted and their advice followed for any structure within 35m of the

centre line of an overhead power line. ESB will provide landowners with written confirmation of the required clearances. Landowners can contact ESB through phone numbers provided on their electricity bills.

Where building work is undertaken near power lines there is also a safety issue regarding Machinery, Tipper Trucks and Elevators operating without proper safety measures in place. When landowners contact ESB they will be provided with relevant safety literature.

Table 1: In general the following clearances apply to various voltage levels.

Voltage	**Clearance**
Low Voltage	0.5 to 3 Metres
Medium Voltage	3 to 6 Metres
38KV Lines	10 to 17 Metres
110kv Lines	23 Metres
220KV Lines	30 Metres
400KV Lines	35 Metres

Note:

- ESB overhead lines consist of lines at various voltage levels and require specific safety clearances from buildings depending on voltage level and construction type.
- Clearances are specific to the line voltage, building height, location in line span and ground levels.

Danger to children: It is the applicant's responsibility to prevent children from playing or spending time in the vicinity of any building work.

2. Concrete Specification

2.1 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. A signed and dated copy of the concrete manufacturer's EN206 Factory Production Control Certificate shall be supplied to the Department along with the Concrete Manufacturers' Specification Certificate.

2.2 Curing of Concrete

Concrete produced and supplied is fit for purpose ONLY IF proper curing procedures are adhered to and the structure is not put into service until an adequate curing time (usually a minimum of 28 days) has elapsed. The curing regime shall take account of best practice appropriate to the concrete binder composition and prevailing climatic conditions at time of placing.

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.

For further information on curing, see the website of the Irish Concrete Society.

2.3 Concrete

All concrete for cattle handling facilities shall be purchased on the basis of a characteristic 28 day cube crushing strength of 37N/mm^2 (strength class C30/37). Minimum cement content shall be 310 kg/m^3. The maximum water to cement ratio will be 0.55. The specified slump class shall be S2 or S3. The maximum aggregate size shall be 20mm.

The concrete shall be ordered using the appended form for 'S.100 Mix B' or by requesting '37N concrete with 310kg cement minimum, 0.55 water cement ratio maximum, and slump class S2 **or** S3, certified to IS EN 206, for use to Specification S.100'.

In the case of exposed yard slabs where freeze/thaw action is a concern, 'S.100 Mix B' shall be used with 3.5% minimum air entrainment. Alternatively 'S.100 Mix A' may be used.

2.4 Materials

Cement and other materials used in the production of concrete shall be in accordance with Department of Agriculture, Food and the Marine specification S.100.

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.

2.5 Tests

The Department reserves the right to require that concrete should be tested in accordance with EN 12390 and EN 12504.

3. Siting

The crush and race may be free standing, located alongside a mass concrete wall, at the side of a suitable building, in an animal house or in a feed passage. Consideration shall be given for use of animal penning divisions when located in houses and feed passages. Cattle crushes shall not be located alongside walls constructed of concrete block. The walls shall be reasonably smooth and adjacent roofs must have functional gutters. Where a cattle crush is sited within a building, the crush shall face towards light.

Where it is possible that crushes may be used for caesarean sections on cows and the crush runs alongside a mass concrete wall it is strongly recommended that it runs from right to left as it is necessary to access the left side of the animal for undertaking a caesarean section.

There shall be a minimum of 4.0 metres and preferably at least 6.0 metres between the front end of the cattle crush and any facing wall, solid barrier or door (less than 3.0m wide) to allow cattle space to exit the crush easily. Where a door greater than 3.0m wide is in front of the crush, the door must be fully open when the crush is in use.

4. Dimensions

Crush length	1.4m with a skulling gate	
Crush length	1.8m with a plain gate	
Race length	3.4m minimum	Recommended >5.4m Note: • 9m will hold 5/6 animals • Long races holding 12 or more adult cattle are not recommended.
Width	650mm – 700mm standard	Variations are permitted to suit type of animal: • Calf 500mm • Dairy 650mm – 700m • Beef 750mm
Height	1.4m above floor level	

5. Structure

5.1 Posts and Rails

All uprights shall be tubular steel at least 76.1mm OD x 5mm thick or hollow section steel 80 x 80 x 4mm thick. They shall be fitted in a 300mm x 300mm x 450mm concrete base at no more than 2.4 metre centres. It is strongly recommended that the skulling gate section posts be at not more than 1.8m centres and preferably 1.4m centres. The provision of a post at 1.4m / 1.8m enables the provision of a small swing gate as per clause 5.3, which is strongly recommended.

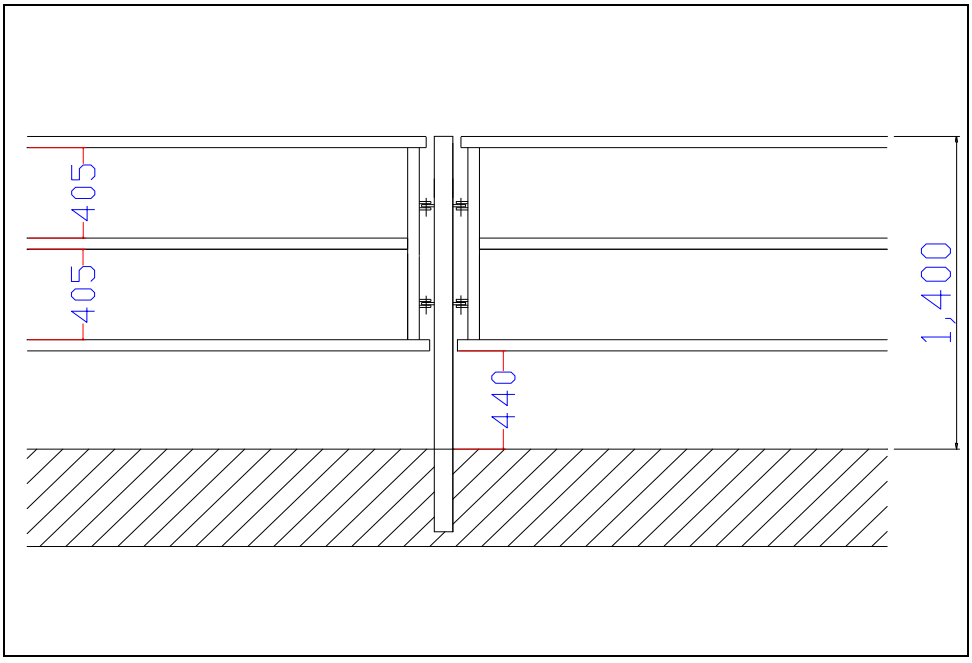

Figure 1 Rail spacing and height for a three-rail crush and race

All side rails, retaining bars and steel sections used in gates shall be, at least, tubular steel 48 mm OD x 3mm thick, or 50mm OD x 2.0mm, or hollow section steel 50mm square x 2.5mm thick. A minimum of three rails shall be provided equally spaced with the bottom rail 440mm off the ground. See Figure 1 above.

5.2 Crush

Exit gate may be a skulling gate not less than 1.6m high of suitable design and construction or of proprietary make and incorporating a quick release mechanism. Where operational requirements do not demand a skulling gate a plain gate at least 1.4m high constructed from tubular steel not less than 42 mm OD x 3mm thick securely hinged and fitted with a quick release mechanism may be used.

It is recommended that a sliding or hinged backing gate may be installed at the rear of the crush, see Figure 5. This can be used in conjunction with the gate at the front of the race to access the animal, see 5.3 below.

A tailbar or rump bar of proprietary or non-proprietary nature shall be fitted at the rear of the crush, not more than 1.8m from the crush gate. The sliding or hinged gate may also be installed as an alternative.

For safety purposes a removable panel(s) / rails shall ~~can~~ be installed at the side of the crush to release any animal that may have fallen or for veterinary access to the animal.

5.3 Race

A hinged or sliding gate may be installed at the front of the race, see Figure 5. The hinged gate will swing back and lock securely in place allowing access to the user and preventing the other animals moving up the race.

The middle rails of the race shall have suitable notches to hold the retaining bar or if a wall forms one side it shall have suitable sockets. Alternatively, an anti-backing bar / system shall be provided that can be secured at a range of distances along the race.

All rails or sections in the race shall be fitted with a quick release mechanism so that they can be removed safely in the event of an animal becoming trapped. In double sided races, only one side needs to be fitted with a quick release mechanism, though it is recommended to be fitted on both sides.

It is recommended that races have a sliding or hinged gate at the back to prevent animals from reversing back into the forcing pen. A sliding gate is shown in Figure 4 and a hinged gate in Figure 6.

5.4 Floor

The floor of the crush and race and an area outside it extending to a minimum of 600mm shall be a concrete slab 125mm thick over a 150mm hardcore base. The concrete shall be finished with a non-slip finish or diagonal grooves at 100mm intervals to prevent animals slipping. A slope of 1 in 60 shall be incorporated into the floor to prevent water build up. The slope shall be directed to suitable drainage channels (see section 7.4 for details).

5.4.1 Footbaths

Mass concrete footbaths may be installed in the race. Where they are installed they shall be sized at min 2500mm x (Race Width) x 150mm. The floor and walls of the footbath shall be 150mm thick concrete with a 150mm hardcore base. See Figure 2. There shall be a slope of 1 in 5 into and out of the footbath so as to avoid step-downs, which could distress the animal. The ramps shall also have a non-slip finish or horizontal grooves at 100mm intervals. The foundations for the steel uprights at the wall of the footbath shall be 150mm deeper than advised in section 5.1. Proprietary made footbaths are permitted subject to certification by the manufacturer that they are suitable for cattle and have a minimum working life of 20 years. Such footbaths may require prior Departmental acceptance.

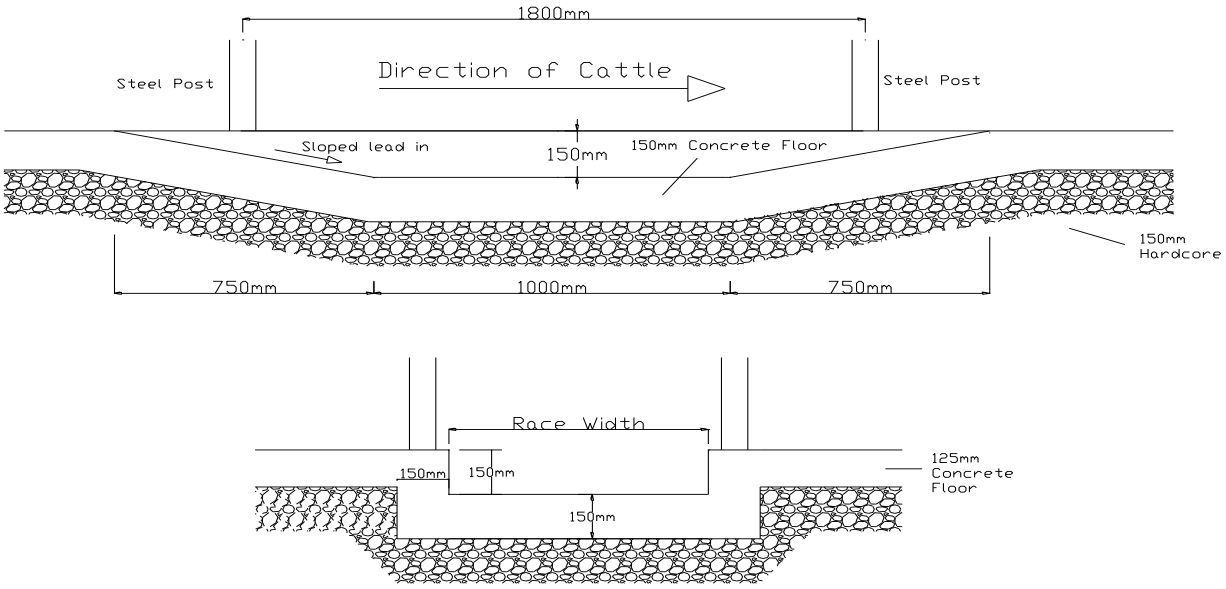

Figure 2 Footbath

5.4.2 Weighing Scales

Weighing scales may be installed in the race. They shall be of proprietary construction and must be installed according to the manufacturers' instructions.

5.5 Catwalk

It is recommended that catwalks are installed to run alongside the race to enable access to animals in the crush. Where they are provided they shall be 300-400mm high and not less that 1.1m wide to facilitate a safe working area. Variable height catwalks are also permitted.

5.6 Finish

All steel shall be either painted or galvanised to the Department's specification S101, section B3-Protection of Steel. Open ends of tubular steel shall be capped off and sealed.

Where mass concrete walls are present they shall have a smooth finish and be free of any blemishes, tie-bar holes, or honeycombing, walls shall be filled/repaired with an accepted, non-shrink proprietary cement mortar.

5.7 Roof

A roof or an external overhang may be installed over the crush area to a maximum width of 2.5m. This shall conform to the Departments specification S101. The minimum eave height acceptable is 3m.

5.7.1 Lighting

Where a roof is constructed over a crush and race, lighting shall be installed as per specification S101. A minimum of 100 lux shall be provided over the crush area and a minimum of 50 lux over the race.

6. Proprietary Crushes

Crushes of proprietary nature are permitted subject to certification by the manufacturer that they are suitable for the specified animals it is designated for. The manufacturer must provide a guarantee for the crush to have a minimum working life of 20 years. Such crushes may require prior Departmental acceptance.

7. Enclosure

7.1 Forcing Pen

The forcing pen shall be funnel shaped with one side of the funnel being straight. The other side shall be at a 30° to the race to facilitate the ease of movement for the cattle (See Figure 4 and Figure 6).

It is strongly recommend that at least 1.2m width of area along either side of the crush and race is excluded from any enclosure so as to provide a safe working area along the crush and race.

7.2 Surrounds

Existing walls or fences may form any part of the enclosure as long as they are, at least, 1.4m high. All new surrounds shall be at least 1.4m high and shall be constructed of:-

a) 150mm reinforced mass concrete wall with foundation 150mm deep.

b) Steel posts and rails. The posts shall be spaced at no more than 2.3m centres, and there shall be at least three rows of rails between each post. The posts and rails shall be sized be sized as per section 5.1 above.

c) All gates as part of the enclosure surround shall be of, at least, circular hollow section steel 48.3mm OD x 3mm thick, or square hollow section steel 50mm x 50mm x 3mm thick. All gates shall be fitted with a heavy closing bolt able to withstand the pressure of the cattle within the pen. The bolt should be designed that it can be fully retracted into the gate frame, when the gate is open. No gate as part of the surround of a cattle pen shall be greater than 4.6 metre long and it is recommended that gates are not more than 3.0m long. Hanging posts for gates shall be of, at least, 114.3 mm outside diameter

by 3.6 mm thick tubing and closing posts shall be of, at least, 88.9mm outside diameter by 3.0mm thick tubing or as per clause F3.9 of S.148.

d) Other equivalent structures and materials if approved (solid or hollow core blocks are not acceptable).

7.3 Floor

The floor of the enclosure shall be a concrete slab 125mm thick over a 150mm hardcore base. The concrete shall be finished with a non-slip finish or diagonal grooves at 100mm intervals to prevent animals slipping. A slope of 1 in 60 shall be incorporated into the floor to prevent water build up.

7.4 Drainage Channels

In cases where the enclosure and race are not cleaned following each use, drainage channels shall be positioned in suitable locations throughout the enclosure. The slope of the enclosure shall be such that it directs all effluent to the drainage channels.

The channels shall be 75mm wide and 75mm deep with the edges of the channel tapering inwards slightly. Care shall be taken when forming the channel to ensure that adequate depth and fall is maintained during construction and that sufficient concrete is provided at the sides and under the invert of channel as shown. The foundation for the channel shall be 150mm (from the base of the channel) concrete on top of a 150mm hardcore base.

A clean water diversion system shall be installed for runoff after the enclosure has been cleaned and not in use. A diversion plug of a short length of pipe shall be used to block the flow to the effluent tank. Pipe joints shall be carefully constructed and shall be watertight. All effluent or soiled water shall be collected in an approved effluent tank or other approved storage facility and only clean water runoff shall be diverted from the storage facility. The flow directions shall be designed so that if diversion plugs (which shall extend at least 500mm up from the finished base level when in place) are missing or damaged, the effluent/soiled water shall flow to the storage facility. The tank shall be, at least, able to hold the effluent from one days use of the cattle handling facility.

For tank specifications refer to S123 Minimum Specification for Bovine Livestock Units and Reinforced Tanks.

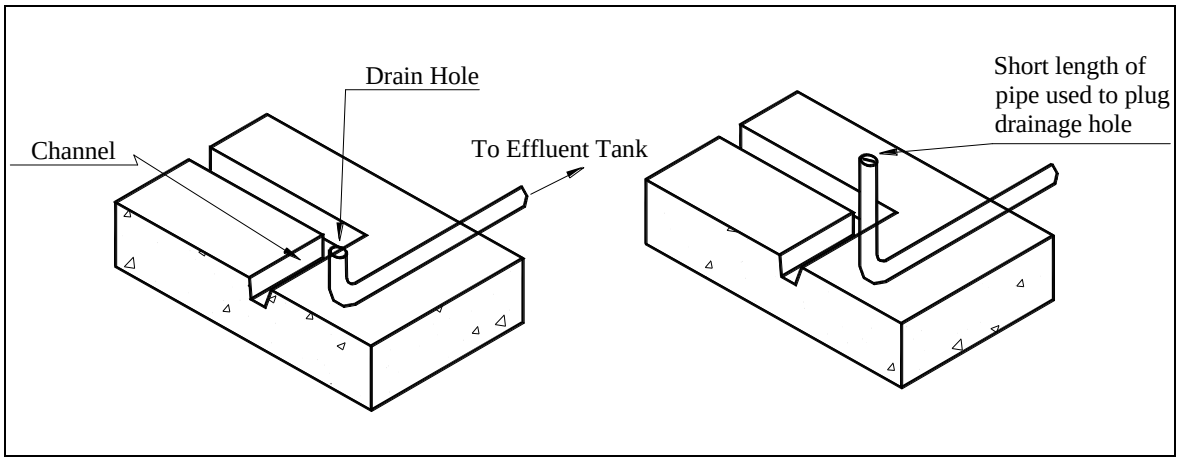

Figure 3 Diversion Trap for Cleanwater Run-off

7.5 Side Panels

These may be installed in the race and/or forcing pen. This is to prevent the animals from distractions outside the pen and facilitate ease of movement through the race and crush. The sheeting can be made of black plastic PVC or other proprietary material. It is only necessary to install the sheeting between the top and bottom rail of the pens.

7.6 Slip Through

At least one slip through shall be provided in all holding pens. The slip through shall be no more than 325mm wide. This can improve labour efficiency (i.e. not having to open and close gates) and improve safety conditions by avoiding falls when climbing over side rails. It can also be considered, as an emergency exit should the handler need to exit the pen quickly.

In addition, it is recommended that a narrow (600mm wide) self closing gate is installed in each holding pen to provide personnel access to the pen.

8. Batch AI Crush

These may be either fixed width or adjustable width. These are designed for use with dairy cows only. These shall always be double sided and shall not be constructed against a wall.

The crush shall be designed so that cows stand at an angle across the crush, in a similar manner to a cow stand in a herringbone milking parlour. The unit shall consist of a rump rail, breast rail with neck rail and front and rear gates in a manner similar to a cow stand in a herringbone milking parlour.

The floor of a Batch AI Crush shall be as per section 5.4, with suitable drainage channels as per section 7.4. The Batch AI Crush shall have a plain front gate and plain back gate angled to match the alignment of the cows in the crush. The front and rear gates shall be the same height as the rump side of the crush. The floor shall extend at least 1.2m out from the rump rail side of the Batch AI Crush. The width of the crush depends upon the size of cows.

The rump rail shall be at least 1.28m high and consist of at least 3 fixed rails and one drop rail (a total of 4 rails). The three fixed rails shall be located from 440mm above floor level to 980mm above floor level. The top rail (drop rail) shall be a rail that may be fixed on hinges so that the rail may be dropped out of the way while the AI procedure is being undertaken. The rails shall be of, at least, 48.0mm OD tubing with 3.0mm thick wall, with supporting uprights of, at least, 60mm OD tubing with 5mm thick wall at no more than 2.0 metre centres, or 80x80x4mm box at 2.3m centres.

The breast rail side shall consist of a breast rail at least 810mm high with the underside of the neck rail supported at no more than 1.430mm high. There shall be no vertical elements between the breast rail and neck rail for the entire length of the Batch AI crush, except one may be permitted at the entrance end of the Batch AI Crush. The breast rail shall consist of at least 2 rails, in a lattice form, of minimum 60OD tubing with a 3.0mm wall for adjustable width Batch AI Crushes and of at least 2 rails of minimum 48.0mm OD tubing with 3.0mm thick wall for fixed width Batch AI Crushes. The neck rail shall consist of at least 90mm OD tubing and shall be supported such that the cows head cannot be caught against the vertical elements.

9. Certificates

The following certificates shall be given to the Department before grant-aid will be paid:

1. "Concrete" Certificate
2. Certificate of Protection of Structural Steel. (only applicable if roofed).
3. "Electrical" Certificate (only applicable if roofed).

Appendix I: Date of clause revisions and additions

All changes from the previous version are highlighted in red.

Version: May 2018 (published 21st May 2018)

New Clauses: 8

Clauses modified: 2.1, 3, 4, 5.1, 5.2, 5.3, 7.1, 7.2

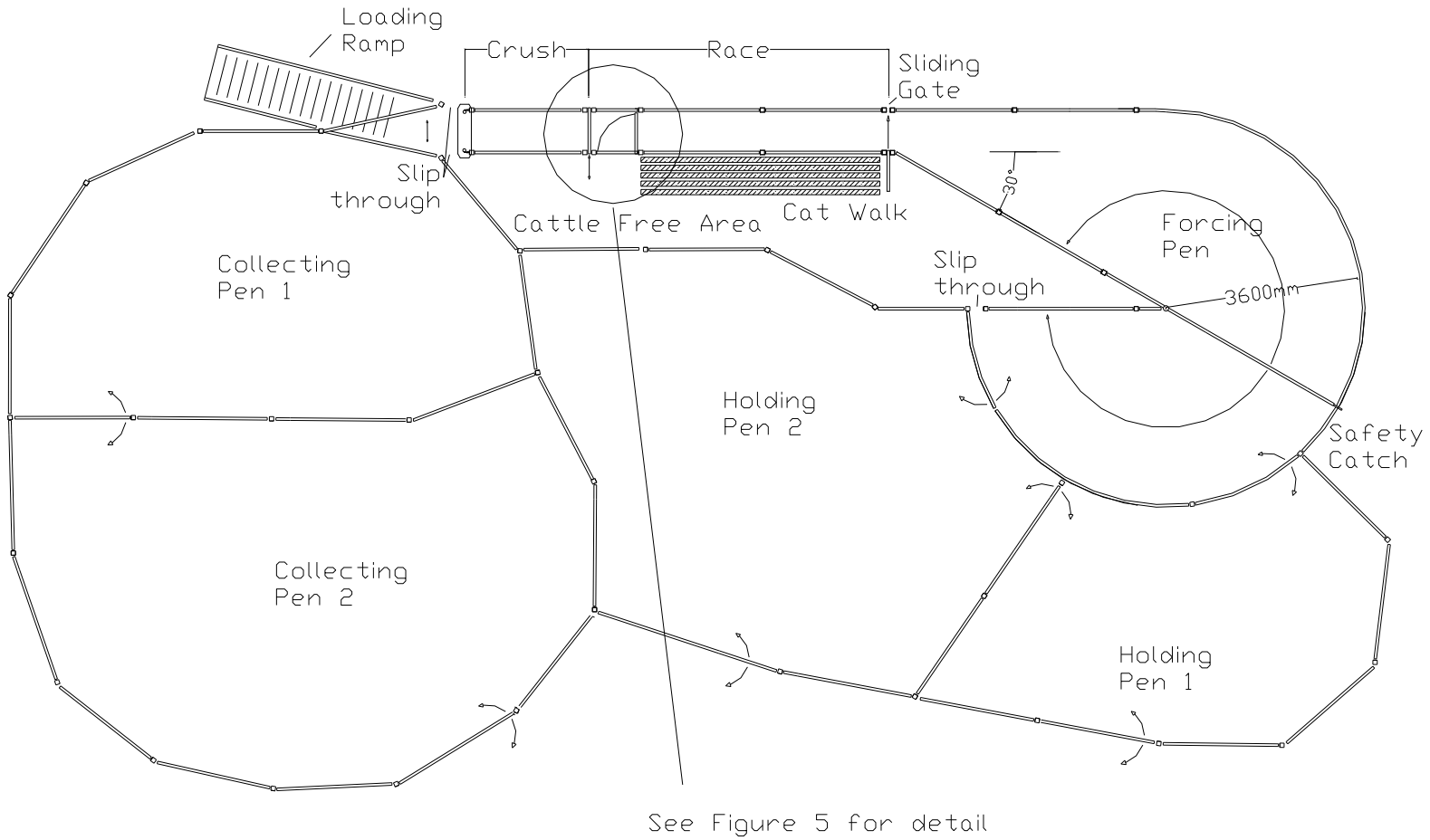

Figure 4 Modern Cattle Handling Unit

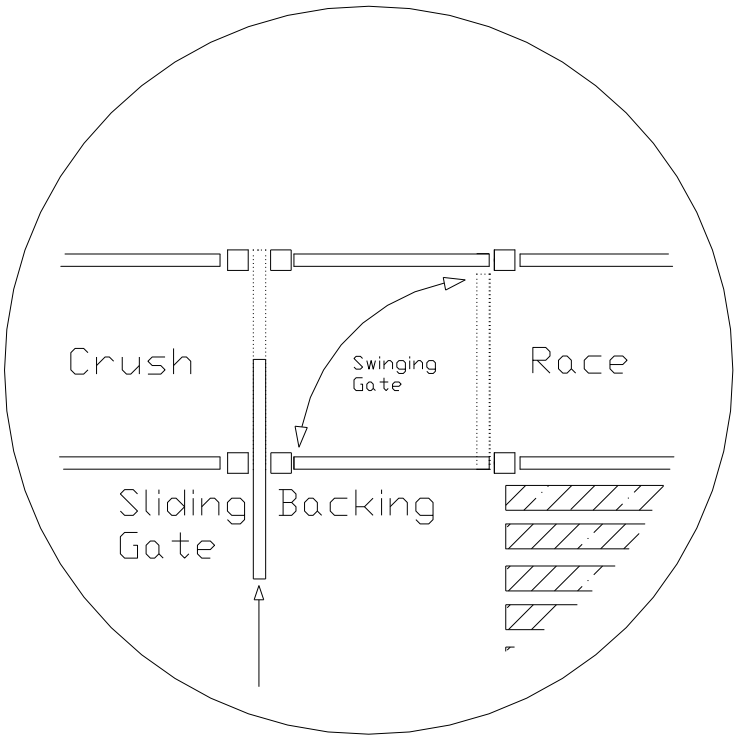

Figure 5 Sliding Gate at Rear of Crush & Swinging Gate at front of Race.

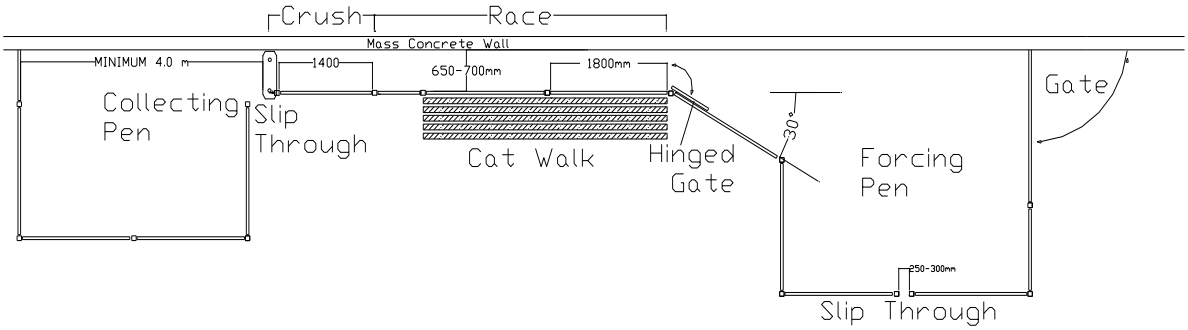

Figure 6 Typical Crush & Race