



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

MINIMUM SPECIFICATION FOR FARM ROADWAYS

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’s 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.

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1. Safety

1.1 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. **Applicants are advised of the need to acquaint themselves with the provisions of the Safety, Health and Welfare at Work Act 2005 and the regulations made hereunder, in particular the Safety Health and Welfare at Work (Construction) Regulations 2013. General guides to this Act and regulations, prepared by the Health and Safety Authority, are available at www.hsa.ie.**

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. It is the applicant’s responsibility to provide a



construction stage project supervisor. **Farmer/Applicant's are reminded that under the Safety Health and Welfare at Work (Construction) Regulations 2013 and under Section 17 of the Safety, Health and Welfare at Work Act 2005 that they have significant responsibilities in relation to any construction works that they are planning or undertaking. It is the farmer/applicant's responsibility to appoint, in writing, a competent Project Supervisor for the Design Process (PSDP) before design work starts, and to appoint, in writing, a competent Project Supervisor for the Construction Stage (PSCS) before construction begins.**

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: 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 Clearances applying 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 construction work.

2. Avoidance of Direct Runoff of Soiled Water from Farm Roadways to Waters – Compliance with Regulations - S.I. No. 605 of 2017

Under the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2017 (S.I. No. 605 of 2017), Article 17 (20) states: *“There shall be no direct runoff of soiled water from farm roadways to waters from 1 January 2021. The occupier of a holding shall comply with any specification for farm roadways specified by the Minister for Agriculture, Food and the Marine pursuant to this requirement.”*



Definitions for “waters” under these regulations include:

- a) any (or any part of any) river, stream, lake, canal, reservoir, aquifer, pond, watercourse, or other inland waters, whether natural or artificial,
- b) any tidal waters, and
- c) where the context permits, any beach, river bank and salt marsh or other area which is contiguous to anything mentioned in paragraph (a) or (b), and the channel or bed of anything mentioned in paragraph (a) which is for the time being dry, but does not include a sewer;

The aim of this measure is to prevent overland sediment and nutrient runoff from farm roadways to waters, thereby protecting and improving water quality therein. Options to prevent such direct runoff include but are not limited to the following: the cambering of the roadway directing water to one side and away from the watercourse; earth bunding (wall of soil) along the side of the roadway and piping to a sediment trap/pond or directly onto land; and relocation of roadways away from fields containing watercourses. The requirement to divert runoff from farm roadways away from ditches shall not apply where a drainage ditch is managed as a natural water retention feature or sediment trap to mitigate sediment and nutrient runoff.

3. Alternative Options not included in this Specification

This specification gives details of the main options available for upgrading and installing roadways in compliance with the regulations (S.I. No. 605 of 2017). **However, if alternative roadway designs are thought to be suitable for a given location, then a full set of design drawings (scale 1:200 and 1:2500 as appropriate) and full details, including reasoning for the alternative design shall be prepared by a Chartered Engineer or Chartered Surveyor, and given to this Department for prior approval before the start of construction, at the following address:** Engineering Unit, Nitrates, Biodiversity & Engineering Division, Department of Agriculture, Food and Marine, Johnstown Castle Estate, Co. Wexford, Y35 PN52.

4. Roadway Layout and Configuration

4.1 General Requirements

The roadway layout should be designed to service the entire grazing area and different orientations/configurations may serve this purpose. The optimal layout is one that facilitates reasonably direct access from all parts of the farm to the farmyard on clean well drained road surfaces. **Avoid sharp turns at corners and junctions by using sweeping bends.** Remove excessive shade that will leave roadways in a dark, wet and dirty state. Locate water troughs away from paddock gateways and farm roadways and at least 20m away from ‘waters’. This will shorten the walk to water, prevent bottlenecks, and reduce the wear and tear at gateways. Align the roadway to let livestock enter the farmyard efficiently.

4.2 New Farm Roadways

A well-designed, carefully built and properly maintained farm roadway system has many benefits, including, less lameness, better general animal health, faster and easier stock movement, more efficient paddock access and prevention of runoff to dry ditches or watercourses. For dairy farms, additional benefits include, less mastitis and cleaner cows and milk. For better herd management, consideration can be given to widening the road at the entrance to the farmyard in the form of a Y shape to improve movement of livestock and reduce dunging. The maintenance of roadways near the farmyard is often challenging; concreting a section of the roadway in this area is sensible.

While it may not always be possible, the positioning of new roadways adjacent to watercourses should be avoided. However, where a new farm roadway way runs adjacent to a stream, a fence on



both sides of the roadway shall be erected to ensure livestock cannot access the watercourse. See **Figure 1**.

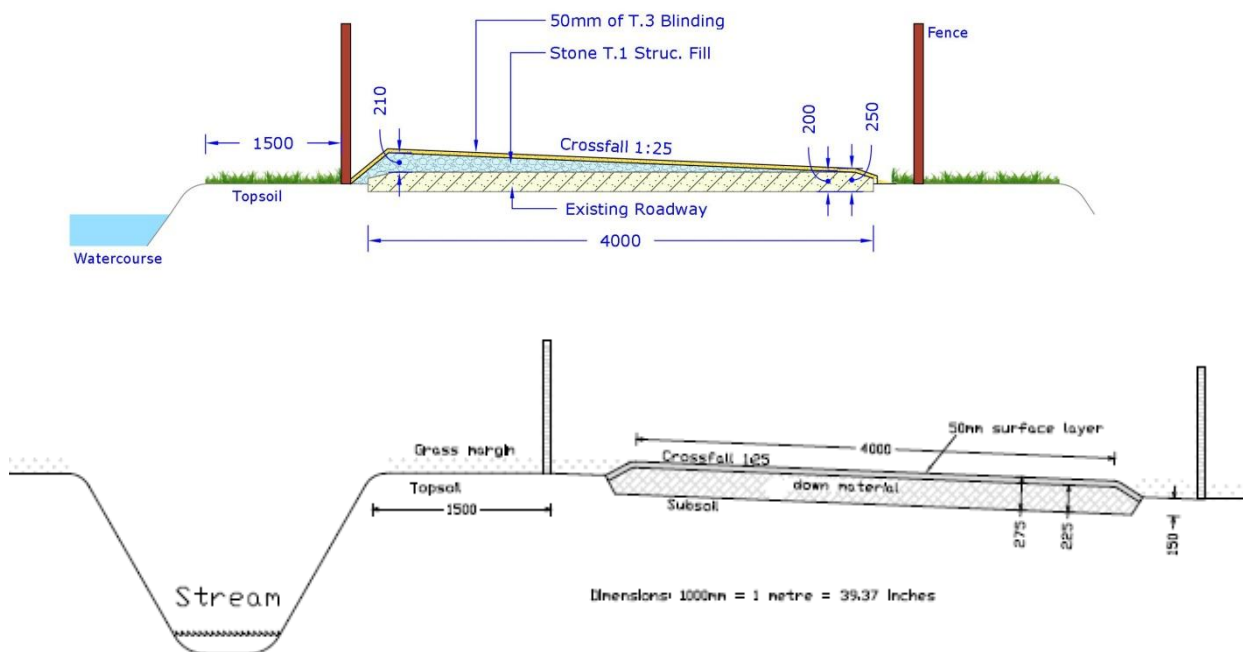


Figure 1 New Farm Roadway adjacent to a Watercourse

4.3 Crossfalls

Removing water off the roadway quickly will extend the life of the surface and reduce the cost of maintenance. Potholes will also be less likely to develop. To remove water quickly from roadways they should slope to one or both sides. A roadway that slopes to one side is easier to construct. However, livestock apparently spread out better on a roadway that slopes to both sides from the centre. Roadways on steeply sloping ground can be subjected to a stream of water running the length of a section of roadway during heavy rainfall. In this situation ramps, shallow channels or cut-off drains at intervals across the roadway will divert water before it builds up volume and momentum.

4.4 Roadway Width

The width of roadways depends on the number of livestock in the herd. Guidance on standard sizes is given below.

Table 2 Farm Roadway width (hard surface) guidelines for various herd sizes

Herd Size	Roadway Width (m)
50	3.5
100	4.0
200	4.5
>250	5.0 +



Add 1m of width for the stretch of roadway nearest the farmyard. The fence should be positioned about 0.5m from the edge of the roadway. This will allow livestock to utilise the full width of the roadway while at the same time prevent them from walking along the grass margin. Dairy farms using automatic milking systems (AMS or ‘robotic milking’) can ignore this table. A cow track in the grass margin usually means that the fence is too far from the roadway edge, and the surface of the roadway is also likely to be poor.

4.5 Construction of a new Farm Roadway adjacent to a Watercourse

Where it is the only feasible option to install a new roadway adjacent to a watercourse, a minimum grass margin of 1.5m shall be maintained between the roadway fence and the top of the watercourse. See [Figure 1](#) for more details.

4.6 Protection of Fisheries during Construction Works

It is an offence under the Fisheries Acts to disturb the bed or gravel of streams from mid-September to mid-May where fish may spawn or have already spawned.

Concerning the protection of fisheries during construction of farm roadways in and adjacent to waters, contact should be made with **Inland Fisheries Ireland** at the earliest possible stage in the planning and design process where works such as road construction, installation of culverts and bridges, the crossing of rivers/streams with pipelines and works on and in the environs of waters are planned. Such consultation will enable those concerned to comply with the provisions of the Fisheries Acts and Habitats Regulations.

It is important to identify at an early stage all watercourse locations. Roads should not follow watercourses, crossings shall be kept to a minimum and crossing structures (bridges, fords, etc.) shall not impede the waterflow. Prior identification of watercourses allows planning for the most appropriate road drainage and dispersal of road surface water in a manner that will prevent pollution.

Roads should be located at least 50m from an aquatic zone (defined as a permanent or seasonal river, stream or lake shown on an ordnance survey 6” map) wherever possible. Road crossings of aquatic zones shall be kept to a minimum and wherever they are necessary, an appropriate bridge or culvert must be constructed.

Where bridges are constructed, they shall be designed to have a clear span over the water course, i.e. they shall be supported on either side of the watercourse only. Where culverts are used to cross a watercourse only a single pipe should be used, to prevent blockage of the culvert by debris. The culvert shall be embedded at least 200mm into the stream bed, to prevent pools being formed down stream of the culvert and blocking fish passage. All bridges and culverts shall be designed to take the maximum flood flow of the watercourse. Bridges and culverts shall not be designed to allow for overtopping during flood events.

5. New Farm Roadway Construction

5.1 Preparation of Site

All topsoil and soft material shall be excavated to a minimum depth of 150mm or down to a solid stratum and the excavated material shall be suitably disposed of.

5.2 Roadway Construction

New farm roadways shall be laid in good weather when soil conditions are dry. This is primarily to ensure that the roadway material does not mix or get pressed into soft soil. **The finished level of the roadway shall be above the level of the field, otherwise drainage will be onto the roadway instead of off it.**



This foundation layer is made up of granular fill material. The usual depth is about 200-300mm. The biggest stones should be no bigger than about one third of the thickness of this layer. The intended crossfall should be formed in the foundation layer. This means that the surface layer will have the same slope and an even thickness, see **Figure 1**.

Compact with a vibrating road roller before the surface layer is spread. Compaction interlocks the material to give a stronger roadway and helps prevent loose stones from mixing with the surface layer. See Figures 1,2 & 3.

Note: All aggregate materials sourced from outside the farm for roadway construction shall be quality certified material in accordance with S.R. 21:2014+A1:2016 – Guidance on the use of I.S. EN 13242:2002+A1:2007 – Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction. (*Note: Annex E of S.R. 21:2014+A1:2016 provides guidance on aggregates for use as hardcore under concrete slabs and footpaths*).

Alternatively, material sourced on site or reused from on farm sources e.g. rubble, old roads being moved, small quarry etc. is acceptable, as is crushed rubble or graded stone mixed with dust.

5.3 Surface layer

The roadway shall be completed with about 25 - 50mm of a fine material on the surface. If the surface is poor most of the benefits of having a farm roadway are gone. The surface layer shall be laid evenly and compacted, to produce a uniform surface. Spread it out to the slope formed in the foundation layer. Many different types of fine material can be used for the surface layer e.g. shale dust, quarry dust, etc.

Table 3 Key Roadway Design Specifications

Cross fall/ slope	1:25 or 2.3° (whether from the centre to both sides or just one side)
Construction	Geotextile (optional) 200 – 300mm hard core plus 25-50 mm fine material
Road slope (along length)	Max of 1:3 or 18°
Fencing	0.5m from edge of road

A kerb or nib wall, about 0.5m from the collecting yard may be useful. This will encourage small stones to drop off the hooves of livestock. This should break farmyard connectivity to roadways and ditches. Maintaining a good depth of surface dust in this area will also help to absorb small stones.

5.4 Geotextile

Consider using a geotextile membrane between the road materials and the soil. A geotextile is a synthetic porous fabric used to separate the foundation layer from the ground underneath. It prevents the stones from becoming mixed with the soil and vice versa. The geotextile keeps the roadway foundation material clean, free-draining and therefore dry and strong. Farm roadways can suffer considerable deformation in use and the role of the geotextile in this situation is to provide physical support, as well as separation.

A geotextile is highly recommended where soil is heavy or wet. It won't solve drainage problems; therefore, any necessary drainage should be tackled beforehand. A geotextile is also highly recommended on roadways used by heavy machinery.

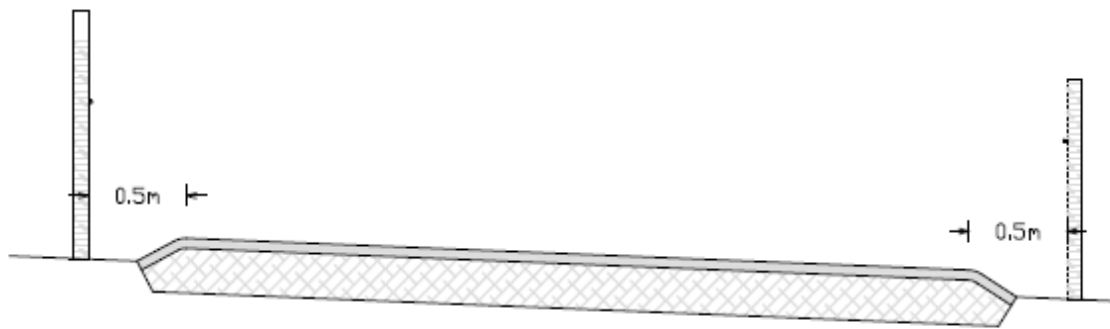


Figure 2 New Farm Roadway Profile (cross section) with camber to one side including fence

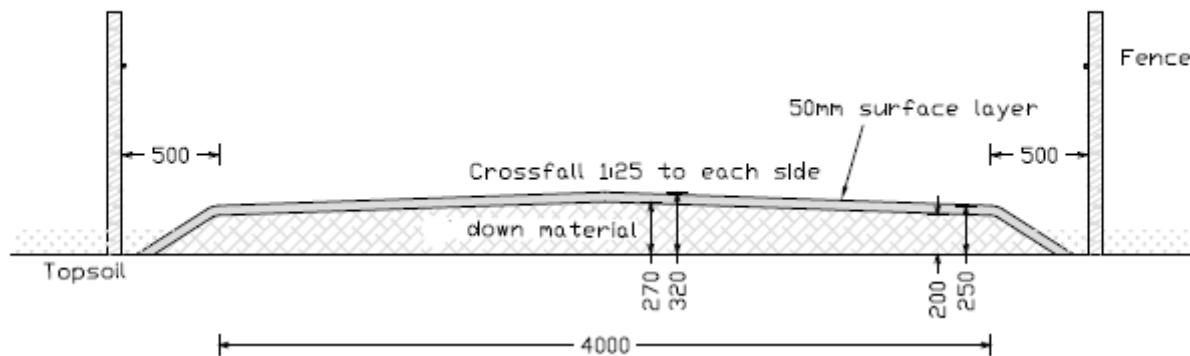


Figure 3 New Farm Roadway with Camber from the centre

5.5 Cow tracks

Cow tracks can be installed as extra roadways, as spur roadways off normal wider roadways or at the end of the main farm roadway. They are generally only suitable for short runs. They are useful for getting access to out of the way paddocks, to silage ground and making grazing management easier early and late in the season. They can make up for gaps in the main roadway network and are a useful and cheap alternative to standard roads in less trafficked areas.

A depth of about 150mm of material is laid on the surface of the ground. This should be compacted and topped off with a fine surface layer and the surface layer should be compacted also. The width should range between 1.8 m and 2.5m.

5.6 Concrete Farm Roadways

Concrete roadways on farms are less suitable as they may give rise to an increase in the incidence of lameness, due to a higher risk of loose gravel or pebbles (either sharp or round) lying on the roadway surface. Concrete roads shall be regularly cleaned by using a tractor mounted brush and bucket (or other suitable means). Refer to Department of Agriculture, Food and the Marine Specification S129 on the requirements concerning the laying down of concrete.



5.6.1 Preparation of Site

Remove all topsoil and soft material to a minimum depth of 150mm or down to a solid stratum and dispose off site. Lay hardcore and compact in 150mm layers using a suitable vibrating or heavy roller. Consolidation with wheeled or tracked plant is not adequate. The area shall be blinded over with sand or lean mix concrete. It is recommended that light gauge polythene sheet is placed under the concrete slab.

5.6.2 Thickness of Concrete

Thickness of concrete shall not be less than 125mm at any point. Particular care shall be taken to maintain the thickness under dished channels.

Where concrete paved areas are subject to heavy mechanised traffic, reinforced paving should be provided. The design should meet the requirements of specific loading. In the absence of specific design data A393 mesh to BS 4483 [10mm @ 200mm centres: 6.16kg/m²] shall be placed 40mm below the finished paved surface.

5.6.3 Placing of Concrete

Strong formwork shall be accurately levelled and fixed to the correct falls for the site and to the predetermined drainage points. Concrete shall be placed in alternate bays not more than 4.5m wide and 6.0m long where there is no fibre additive and not more than 8m long where there is fibre additive. In the case of mesh reinforced paving joint spacing can be extended to 12m by 8m. Alternatively, for larger areas, it is more efficient to lay the concrete in alternate continuous strips 3m to 4m wide with a contraction joint at 5m intervals and in line with joints in adjacent bays, if possible.

The contraction point shall be formed by using a 6mm steel bar to press a 100mm wide polythene strip into the freshly laid concrete. Expansion joints shall be provided where the area of concrete is large (more than 90m in any direction). A 12mm strip of soft fibreboard extending the full depth of the concrete is suitable for this purpose. On completion the top 20mm of the board should be cut out and the cavity filled with a proprietary expansion joint sealer. Alternatively, a bitumen impregnated fibreboard or the equivalent may be used.

Concrete shall be spread uniformly between the forms and compacted with a tamper or vibrating beam. Finish may be either notched or brushed. Concrete shall not be poured under 4°C in a falling thermometer.

5.6.4 Concrete Specification - Certificates

Concrete shall be produced in a plant audited to I.S. EN 206-1: 2002 by a certified body accepted by The Department of Agriculture, Food and the Marine (e.g. N.S.A.I., B.S.I., Q.S.R.M.C). 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.**

5.6.5 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 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 roads 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.

5.6.6 Concrete

For farm roads concrete 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 farm roads 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.

5.6.7 Fibres

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 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.

5.6.8 Concrete Workmanship

It is strongly recommended that contractors employed to undertake concrete works on farm structures have completed and passed the "Concrete Ticket" course. This course provides guidance on the correct handling, finishing and curing of concrete on site. It also provides essential information on the properties of concrete and the requirements for ordering and delivery of ready-mixed concrete.

6. Existing Farm Roadway Remediation

6.1 Roadway Condition

The condition of farm roadways should be checked for defects that may be causing problems. These defects can include, potholes, a roadway that is level or almost level, wheel track depressions, a raised hump of soil under the fence at either side and (single file) cow tracks made between the fence and the roadway or on the roadway.

Problems are caused by; pebbles and loose stones on the surface, a bumpy surface with secure stones, lodged/trapped water on the surface, very dirty section near the farmyard, and a roadway level with or lower than the field. The reasons for these defects are many but may be due to flawed construction methods, unsuitable materials and lack of maintenance. The appearance of a roadway may bear little resemblance to what it looked like when it was initially constructed.

The surface of the roadway has a big influence on the level of lameness in a herd. The surface needs to be smooth, fine and strong enough to support animals but with a little give in it also. Ideally, footprints from livestock should be visible across the roadway, but not so much to damage the



watercourse, it will be necessary to orient the crossfall of the roadway away from the watercourse. See Figure 4 for more detail. Existing roadways where the crossfall is inclined towards the watercourse will have to be readjusted such that the crossfall is away from the watercourse. Where an existing roadway is effectively level, and adjacent to a watercourse, an option is to resurface it with 804 grade stone and dust to a 1 in 25 fall away from the watercourse, see Figure 4.

7.4 Sediment Traps / Silt Traps / Settlement Ponds and Roadway Drainage Facilities

In most cases it will be sufficient to just let the water run off the roadway at regular intervals (e.g. 25 to 50m intervals) onto the field. There is likely to be very little runoff unless there is prolonged heavy rainfall. During the grazing season evaporation will reduce runoff considerably. In certain situations, for example if it is not possible to slope a roadway away from a watercourse and runoff is to be piped away, it may be necessary to incorporate a sediment trap or settlement pond. These ponds may also be useful on heavy or poorly drained land. Such facilities acting as soakage areas will cater for **the slow attenuation of waters by means of drainage through the soil**.

Suggested design details of a typical settlement pond are shown in **Figure 5**. **The sizing of the pond is dependent on the topography of the site.**

Settlement ponds need to be adequately fenced for safety while providing for access for occasional cleaning by a mechanical digger. **Figure 5** details buffer zones which could be installed where animals enter a paddock adjacent to a stream. Effectively the gateway into the paddocks in this situation shall be moved at least 6m from the top of the bank of the stream or ‘waters’ as defined. These zones shall be fenced off, but they may be grazed occasionally or devoted to wildlife.

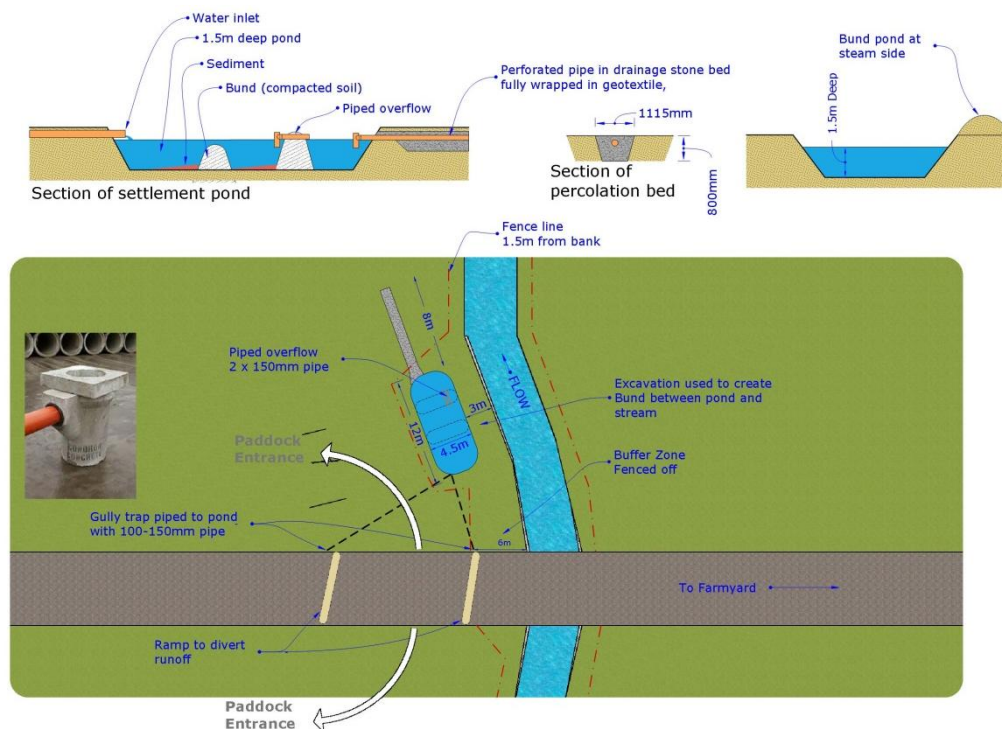


Figure 5 Farm Roadway incorporating Settlement Pond

Dry **closed** drains with no outfall to other waters (standalone drains) could also accommodate runoff water as suitable soakage areas (this does not include piped drains). **A percolation drain/stone filled ditch along entire edge of road can be considered (with baffles at regular intervals to prevent longitudinal flow).**



The use of soakaways is an option where the soil conditions do not allow for surface percolation areas to work effectively (see Figure 6). If there is no land available for attenuation of road water then full capture (10 days capacity) and land spreading may be the only option.

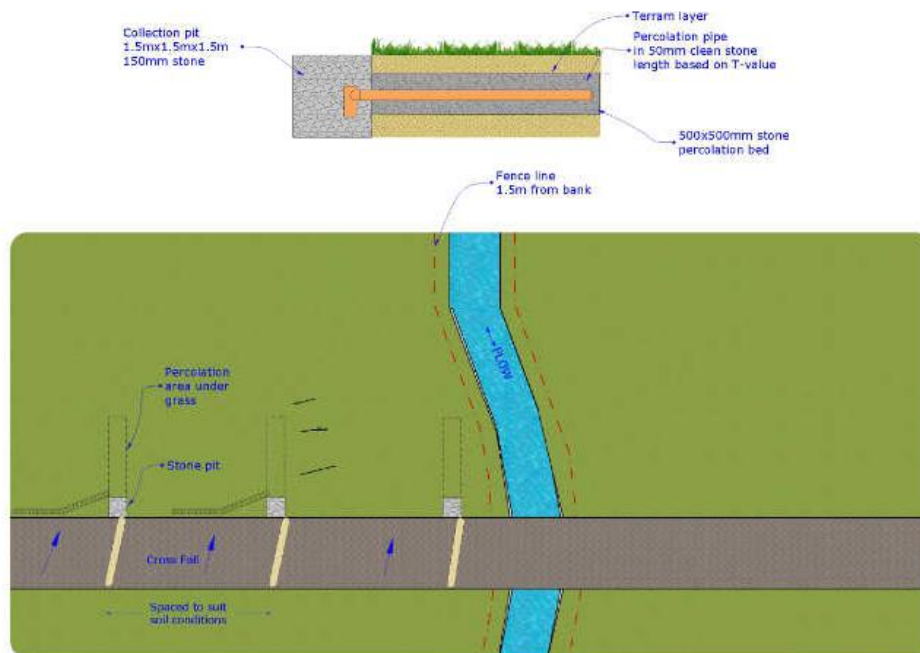


Figure 6 Farm Roadway incorporating Soakage Areas

7.5 Construction of Berms and Earthen Banks adjacent to Roadways

An alternative to installing a cross-fall on an existing road as per 7.3 above, is the instalment of berms or earthen banks on the watercourse side of a roadway. Where this arises, it may be necessary to convey the runoff water to a settlement pond or to an area of ground where the water can soak away.

Where such facilities already exist, any existing cuttings in the berms or earthen banks at intervals will have to be closed, to prevent runoff water from the roadway accessing the watercourse.

7.6 Watercourse and Public Road Scenarios

Where a farm road slopes down towards a public road and where there are waters running parallel with the public road, provisions shall be taken to ensure that soiled water from the farm roadway does not enter the watercourse. Steps shall be taken to convey the soiled water to a suitable soakage area. This also applies to roadways that are traversing a watercourse.

7.7 Herd management

Herd management options are recommended, such as rousing/stirring up the animals prior to traversing the road, can encourage defecation in the field where it can be utilised by the crop rather than risking runoff from the roadway.

For some holdings, livestock may have to cross a public road (where there is no underpass). In this situation cows for example shall be retained in the farmyard until milking is complete. The full herd can then be moved to the grazing area. This will reduce the time cows spend on the farm roadway and consequent soiling. Large herds maybe split up into groups for management purposes. Once a group is milked it is appropriate to transfer them to the grazing area (without waiting for the whole herd to be milked). The farm roadway and the public road shall be maintained as clean as possible.



Appendix I: Date of clause revisions and additions

All changes from the previous version are highlighted in red.

Version: July 2020 (published 20th July 2020)

Clauses modified: 1.1, 1.2, 4.6, 5.6.4, 7.4

New Figures: Figure 6.

Figures modified: Figure 1; Figure 4; Figure 5.