Rialtas na hÉireann
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Technical Standard

Design of Forest Entrances onto Public Roads

Technical Standard for the Design of Forest Entrances from Public Roads

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Irish Forestry and Forest Products Association (IFFPA)
Irish Farmers Association (IFA)
Woodlands Group

1) Introduction

The purpose of this Technical Standard is to set out the required design and construction standards for forest entrances from public roads. The Technical Standard is based on the TII Publications (Standards) published by Transport Infrastructure Ireland (TII), in particular the TII Publications (Standards) DN-GEO-03060. The Technical Standard is intended to be a design manual for all new and upgraded forest entrances from regional and local roads.

This technical standard covers both new forest entrances and improvement works to existing forest entrances and covers all types of forest entrances, including longitudinal loading bays for the loading of timber. This technical document is for forest entrances only and shall not be applied to other entrances. This technical standard incorporates the requirements of TII Publications (Standards) DN-GEO-03060 *Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated, and compact grade separated junctions)*. If there any ambiguities or situations not covered by this technical standard, then TII Publications (Standards) DN-GEO-03060 shall be consulted for clarity and the requirements of that document followed.

Any forest entrance designed and built in accordance with this technical standard will be considered as being compliant with best practice.

Any forest entrance designed in accordance with the sections on Relaxations from Technical Standard and Departures from Technical Standard can be considered to be designed in accordance with this Technical Standard.

2) Forest Entrances from National Primary and National Secondary Routes

Construction of forest entrances from National Primary and National Secondary routes shall be avoided where possible. Such entrances are not covered under this technical. They will only be allowed in very exceptional cases and will require planning permission in every case. National primary routes are routes with numbers between 1 and 50 (e.g.: N10, N14, N25, etc.) as designated by S.I. 53 of 2012 (as amended by S.I. 434 of 2018) and any subsequent revisions. National secondary routes are routes with numbers between 51 and 99 (e.g.: N52, N59, N80, etc) as designated by S.I. 53 of 2012 (as amended by S.I. 434 of 2018) and any subsequent revisions.

The design of forest entrances from all National Routes shall be in full compliance with TII Publications (Standards) DN-GEO-03060 *Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions)*. For the design of forest entrances on to National Routes TII Publications (Standards) DN-GEO-03060 shall be consulted directly.

Picture 1: Forest Road Entrance

3) Longitudinal Loading Bays (lay-bys for loading timber)

Longitudinal Loading bays constructed in accordance with the COFORD forest road manual are not generally permitted. They will only be allowed in very exceptional cases and will

require planning permission in every case, as once built they may become part of the public road.

In cases where the longitudinal loading bay is separated from the public road by a bank or ditch and there are is an entrance at both ends, then longitudinal loading bays may be allowed. Both entrances must be in full compliance with this technical standard.

4) Junction Locations

In designing a forest road system and forest entrance, the designer must take care to ensure that it causes least impact to the public road network. Forest road entrances should be kept to a minimum and where multiple public roads can provide access, junctions should be located wherever possible on the safer, better quality public roads while avoiding, where possible, national roads and strategic regional roads. A balance needs to be obtained between the strength and the activity level on the public roads, while having least negative impact on the safe use of the public road network.

All forest entrances shall be sited so as to have the least possible impact on the public road network and designed to maximise safety during use. Where possible, junctions on regional roads and busy local roads shall be located so that vehicles can access and egress from the forest entrance without crossing any traffic lanes; i.e. left turn in, left turn out.

Picture 2: Potential for suitable sightlines.

An entrance to a forest road should not be constructed directly opposite any other access to the public road (e.g. not opposite a dwelling) or opposite a road junction. Where there are multiple access points along a stretch of public road there should be a desirable minimum distance of 50 m between entrances on opposite sides of the road and a desirable minimum distance of 100 m between entrances on the same side of the public road. If it is necessary to locate the forest road entrance within the above desirable minima, then the Designer of the entrance shall record the fact that this has been undertaken in the design and the corresponding reasons why it cannot be appropriately located must be given as part of the application for permission / consent. Also, the proposals must be developed to minimise the risks associated with the location of the forest entrance.

5) Sight Lines

When locating an access point for a forest road, full consideration must be given to the ability to see traffic travelling along the public road. The operators of vehicles exiting forest roads must be able to see a sufficient distance along the public road so that they can exit the forest road in a safe manner. Further the users of the public roads must have sufficient visibility to see any vehicles exiting the forest road and have time to react to any potential hazard (e.g. a lorry turning onto the public road). All forest road entrances are deemed to be “stop controlled” for design and operational purposes.

To achieve these safety features the minimum sight lines required at forest road junctions with public roads are set out in Table 1, for the various classes of public roads. The sight line is measured from a distance of ‘X’ in from the edge of the public road, along the centre line of the forest road, to a point that is distance ‘Y’ along the edge of the public road as shown in Figures 1, 2 and 3. The sightline is a clear line of sight without any obstacles blocking it. The sightline must be kept clear at all times when the entrance is being used.

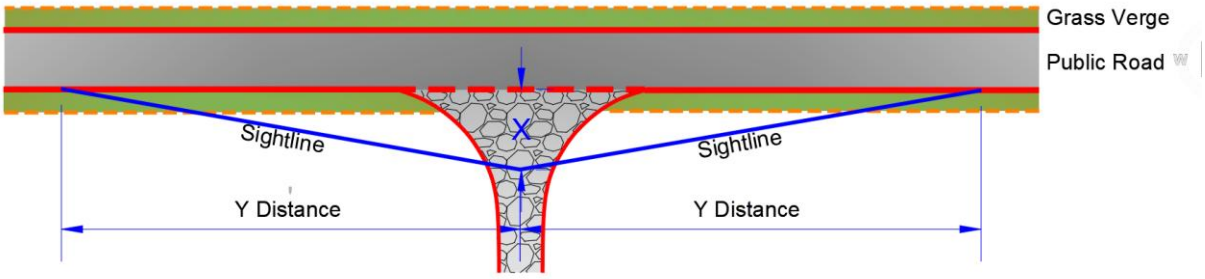


Figure 1 – Measurement of sightlines along a narrow road with grass verge

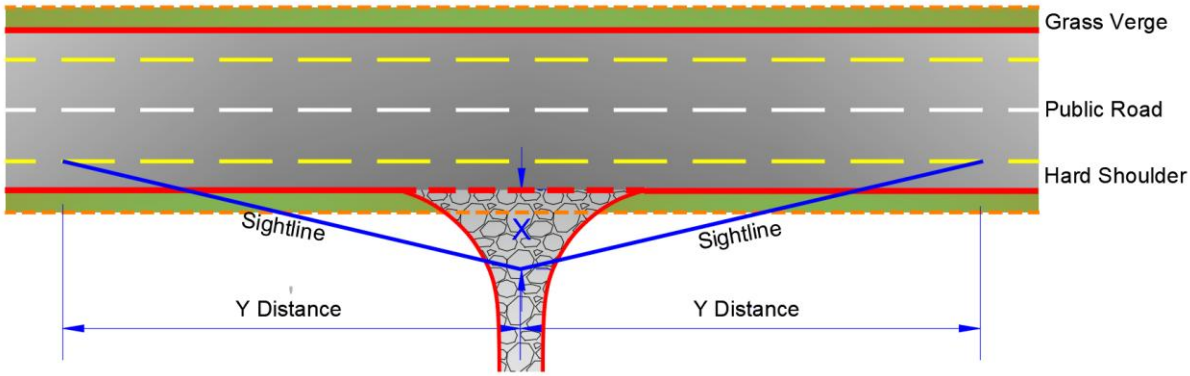


Figure 2 – Measurement of sightlines along a road with hard shoulder

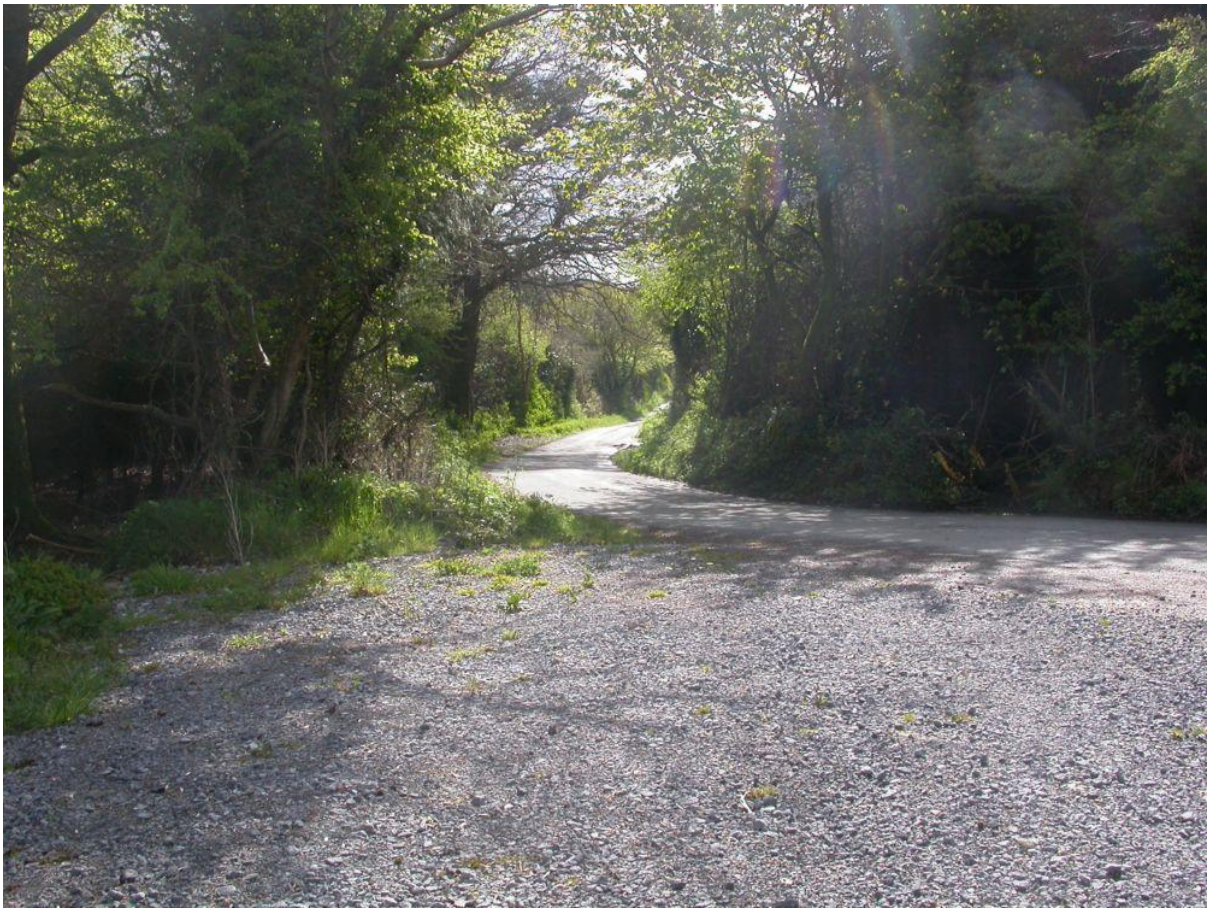
The X-distance is measured to the edge of the roadway, while the Y-distance is measured to the edge of the carriageway (see Fig. 2). The carriageway does not include any hard shoulder or grass verge that may be present.

The sightlines are measured from a height of 1.05m above the surface level of the finished forest road to a height of 0.26m above the edge of the public road.

Table 1: Required minimum sight lines for forest road access to public roads.

Public Road	**Speed Limit (Km/h)**	**Max Design Speed (Km/h)**	**'Y' Distance, metres**	**'X' Distance metres**
National Primary	100	100	Apply for planning permission.	
National Secondary	100	100	As per TII Publications (Standards) DN-GEO-03060	
Regional	80	85	160	3.0
Local	80	85	160	3.0

In cases where the forest entrance is on the outside of a bend in the public road the sight lines (y-distance) are measured along the curve of the road as per Figure 3, however, the line of sight must be both tangential to the outer edge of the public road and in the standard straight line, as shown in Figure 3, to ensure that the entire road can be seen from the entrance. In addition, at entrances on curved sections of roadway, it is necessary to ensure that there is sufficient rear visibility, equivalent to Stopping Sight Distance, available to a vehicle approaching a right-turning vehicle either from behind or ahead. These Stopping Sight Distances are equivalent to the Y-distances outlined in Table 1. In such instances, there may be a requirement for junction improvement measures to be undertaken to ensure the required stopping sight distances are achieved. This may included the widening of the public road and provision of ghost islands. Any additional junction improvement works shall only be undertaken in consultation with the Road Authority.



Picture 3: Potential for sightline along a curved road section.

It may be necessary to remove portions of hedgerows along the line of the road so that the sight lines can be achieved (this is not classified as difficult conditions), however, this should only be undertaken in consultation with the Local Authority. Where hedgerow removal is undertaken, then the forest owner / agent is expected to ensure that sight lines are maintained during periods of forest road use. Hedge row removal may result in increased traffic speeds along the public road and the Y-distance achieved must be suitable for the increased speed on the public road.

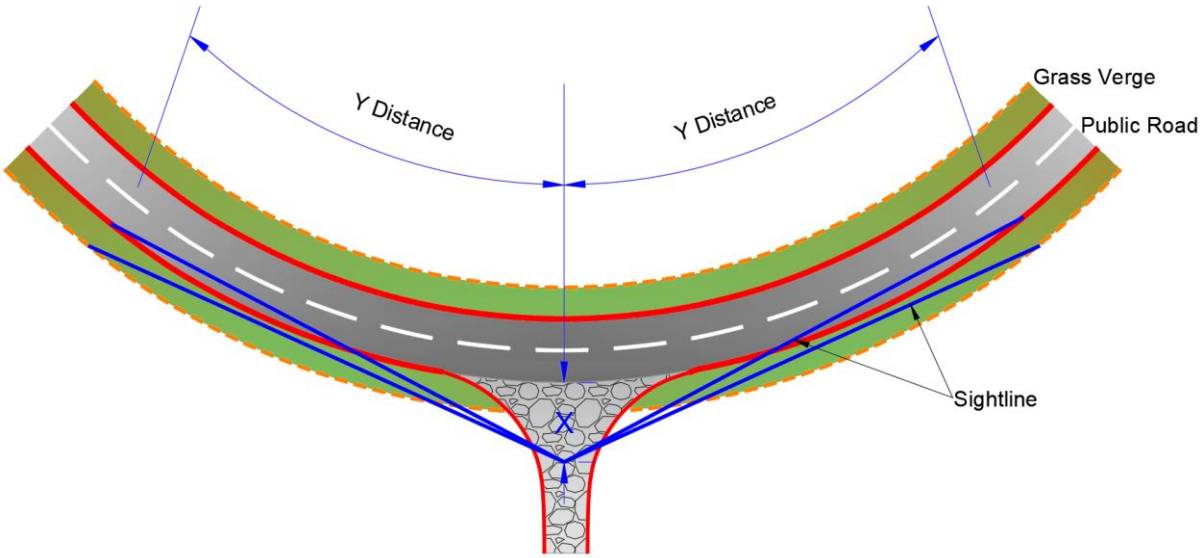


Figure 3 – Measurement of sightline along a curved road with grass verges

It is good practice to install "Warning" signs to alert other road users to potential hazards when the forest entrance is in use. The use of these signs, such as their location and times of operation shall be in accordance with the requirements of the Local Authority and the Traffic Sign Manual.

6) Relaxations to Technical Standard

In every case the designer of the entrance shall attempt to achieve, as close as possible, the requirements of section 5.

In difficult circumstances, the forest entrance Designer may relax the standard set out in section 5 of this document, where specifically provided for within this section. The Designer shall record the fact that a Relaxation has been used in the design and the corresponding basis for it. Relaxations shall be endorsed by the Designer responsible for the scheme and shall be submitted as part of the consent process. The Designer shall report all Relaxations incorporated into the design (including their basis) as part of the application process for consent for the forest road entrance.

Before any Relaxations are sought, full consideration must be given to the relocating of the entrance to a site where the entrance could be built without the need for Relaxations.

It should be noted that it is the objective of all road authorities to bring Regional Roads up to a standard that reflects the posted limit. As such it is important that in cases where Relaxations from standard are used for forest entrances on to regional roads, that these relaxations do not hinder the local authority objectives in relation to the public road.

In cases where it can be shown that the use of reduced sightlines will not affect the safe operation of the public road and forest entrance, it may be permitted for a reduced length of sightline or other relaxation below to be applied.
Reduced sightlines may be used in cases where the design speed on the public road is lower than the speed limit. The Y-distance may be reduced in accordance with Table 2 in cases where it can be demonstrated that there is a reduced design speed. The design speed of a section of public road can be assessed either, in accordance with the TII Publications (Standards) and in particular TII Publications (Standards) DN-GEO-03060, or for Regional and Local Roads by determining the 85th percentile approach speed. The design speed used shall be acceptable to the local authority.

Table 2: Sightlines for reduced design speeds on public roads

Design Speed of public Road (km/h)	**'Y' Distance (m)**
42	50
50	70
60	90
70	120
85	160

In difficult circumstances the low height at the outer end of the visibility triangle may be increased to 0.6m. The outer end is defined as being the outer 1/3 of the Y distance.

The desirable minimum X distance shall be 3.0m for all entrances. In difficult circumstances, the X distance may be taken as a Relaxation from 3.0m to 2.4m for simple junctions in a stop controlled situation. On regional and local roads a further relaxation of the X distance to 2.0m may be considered in difficult circumstances. This further relaxation may only be used for lightly used forest entrances, excluding forest entrances where it can be reasonably expected that agricultural vehicles will also use the entrance. In cases where the Y-distance has been reduced, it will not normally be permitted to also reduce the X-distance as a relaxation.

In cases where the X-distance is achieved through the cutting back of a hedge, as opposed to hedge removal, no reduction in the X-distance below 3.0m is permitted.

In certain circumstances such as, where traffic volume or speed is a particular concern, additional junction improvements may be necessary to ensure road safety at forest entrances.

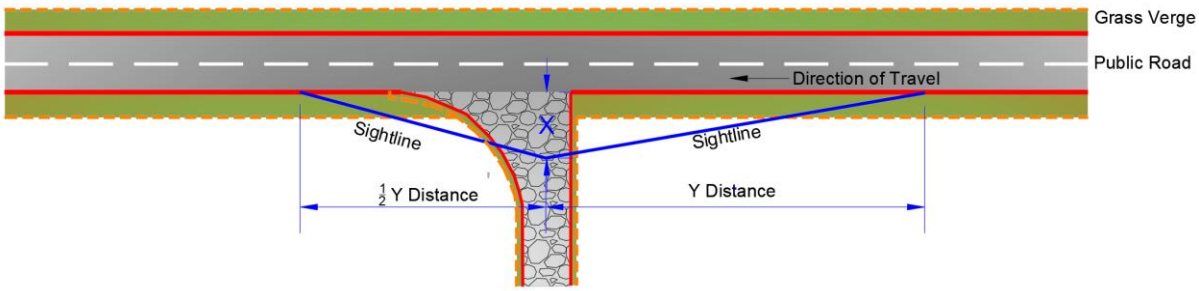


Figure 4 – Signtlines when exiting to left only

In cases where vehicles are restricted to only turning left from the forest road, the public road is not a national secondary road or strategic regional road, the public road has central markings, and the forest road bellmouth has been constructed to this end, then the sight line to the left hand side of the forest road (direction of travel) may be reduced by up to 50% as per Figure 4. However, both the X-distance and Y-distance to the right must be as per Table 1 (i.e., Table 2 cannot be used with the 50% reduction).

7) Departures from Technical Standard.

There will be locations where the requirements in sections 4, 5 and 6 cannot be achieved due to factors such as restricted road frontage or public road alignment. In these cases alternative access to the forest should be sought, where possible. Where it is not possible to relocate the forest entrance, it may be permitted in exceptional cases for alternative solutions to be used.

In these exceptional situations, the Road Authority may be prepared to agree to a Departure from the Technical Standard where the standard, including permitted Relaxations, is not realistically achievable. Forest entrance Designers faced by such situations and wishing to

consider pursuing this course shall discuss any such option at an early stage in design with the Road Authority. Proposals to adopt Departures from the Technical Standard must be submitted by the Designer to the Road Authority and formal approval received BEFORE incorporation into a design layout.

Picture 4: Forest road approaching a public road

The Designer shall record the fact that a Departure has been used in the design and the corresponding basis for it. Departures shall be endorsed by the Designer responsible for the scheme and shall be submitted as part of the consent process. The Designer shall report all Departures incorporated into the design (including their basis) as part of the application process for permission / consent for the forest road entrance.

A possible solution for such sites involves the application of appropriate traffic management to control traffic movements at the substandard entrance/exit for all hours of entrance/exit use/operation and for the access to remain closed at all other times. Depending on the location, this may or may not be acceptable to the Local Authority.

Relaxations and Departures will be assessed in terms of their effects on the economic worth of the scheme, the environment as well as Road Safety and Engineering.

8) Forest Road Standard Approaching the Entrance

At the forest entrance a bellmouth, in accordance with the COFORD forest road manual as per Figure 5, shall normally be constructed. Alternatively, if traffic is to be restricted to a single direction of approach and departure, a half bellmouth or skew junction (conforming to the COFORD forest road manual) shall be provided. This shall be constructed up to the edge of the hard shoulder or carriageway of the public road. In all cases the full junction shall be visible to a driver from at least 15m back, along the line of the forest road, when approaching the public road.

The forest road should preferably have a gradient of less than 2.5% (1 in 40) for the final 15 metres of the forest road ("dwell" area) leading to the edge of the public road and shall not exceed 10% (1 in 10) for the preceding 30m under any circumstances. In difficult circumstances, the forest road shall have a gradient of not more than 4% for the final 10m of forest road leading to the edge of the public road and shall not exceed 10% (1 in 10) for the preceding 35m.

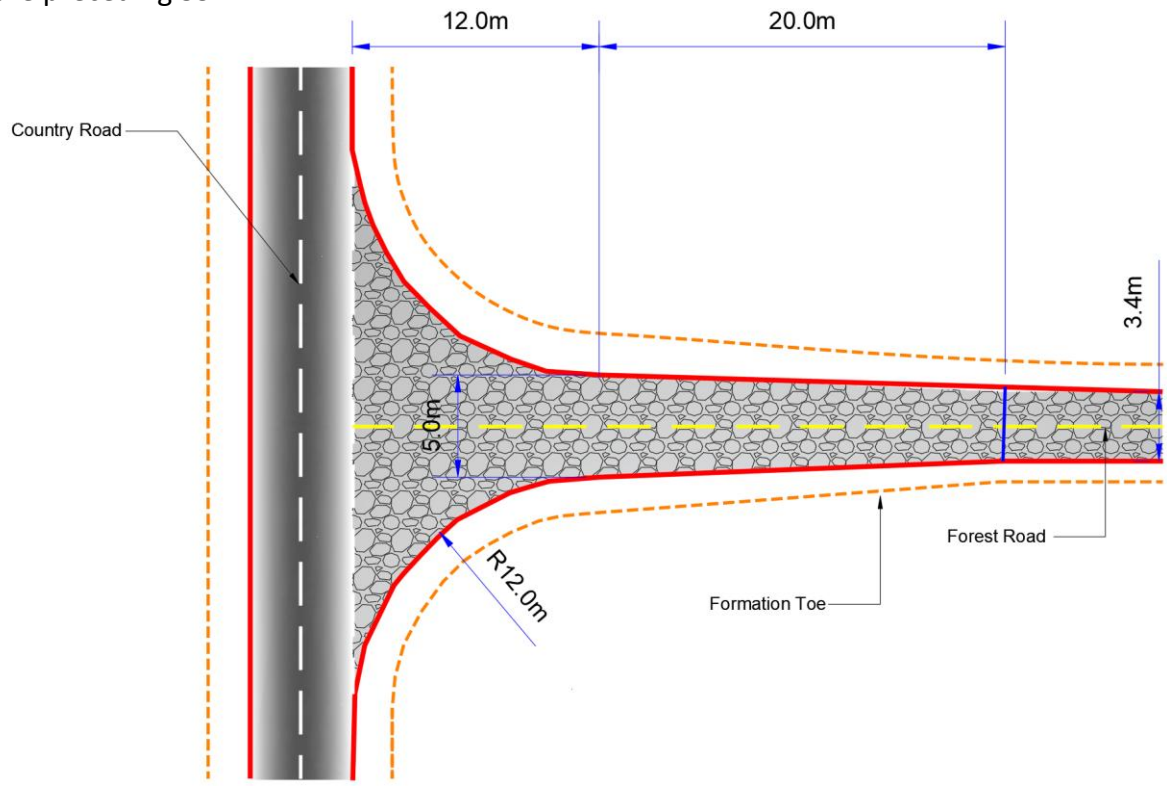


Figure 5 – Standard forest road bellmouth

In cases where the gradient of the forest road is greater than 2.5% at the entrance, in order to improve traction and also to reduce damage to the edge of the public road, the first 5m of the forest road shall be finished with a 250mm deep layer of C28/35 (35N cube strength) concrete finished with a non-slip surface, across the full width of the bellmouth or with an alternative material agreed in writing with the Local Authority (e.g.: tar-macadam material). The concrete shall be produced to IS EN 206.

In all cases, the surface of the forest road adjoining the public road shall be finished such that no loose stones or debris are dragged on to the public road by vehicles exiting the forest road. The owner / operator of the forest road has an obligation to ensure that the public road is kept free of any loose debris due to the operation of the forest entrance.

Picture 5: Gates set back across entrance to forest road

Entrance gates should be provided and shall be kept closed when the access is not in use. Where installed, gates shall be located where they do not cause a road safety issue. In some cases this will be along the edge of the public road, while in others cases the gates shall be set back at least 19.0m so as to accommodate one articulated lorry fully onto the forest road while the gates are closed. All gates must open in towards the forest road. Any piers/pillars etc supporting a gate must not be located within the sightlines for the forest entrance.

The presence of any water mains or other services under the proposed forest entrance location shall be determined in consultation with the Local Authority and other statutory undertakers (e.g.: ESB Networks, Bord Gais, etc). If services are located under the proposed forest entrance, then all necessary work shall be undertaken to ensure that the construction and use of the proposed forest entrance does not damage the buried services.

9) Drainage of Entrances

Rainwater runoff from forest roads shall not be permitted to discharge onto a public road. The existing public road-side drainage shall not be blocked under any circumstances. If there is a drainage ditch present a culvert shall be constructed under the bellmouth of the forest road and shall be sized in accordance with the, *Department of the Environment, Heritage and Local Government (DEHLG) Guidelines for Road Drainage* to maintain the existing capacity. Under no circumstances should the existing capacity of the public road drain be reduced. Full drainage shall also be maintained along the sight lines where it has been necessary to remove hedgerows to provide the required Y-distance. The Designer should consult with the Road Authority engineer when sizing any culverts under a forest entrance.

Picture 6: Drainage under a forest road entrance.

In cases where the forest road is either level or slopes down away from the public road for the final 15m, the finished surface of the forest road shall be dished as per Figure 6 to a level minimum 75mm below the public road at a distance of between 2 metres and 5 metres from the edge of the public road, so as to prevent any water on the forest road from entering the public road. The drainage dip shall run across the full width of the bellmouth and be graded to prevent water flowing onto the road or ponding of water on the bellmouth.

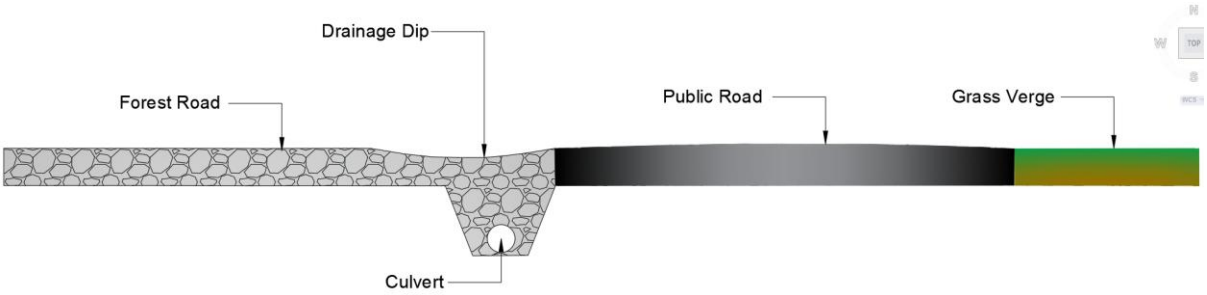


Figure 6 – Drainage Dip at junction of forest road & public road

In cases where the forest road slopes down to the public road, a drainage block, as per Figure 7, may be required to installed along the side of the public road for the full width of the forest entrance to prevent any runoff from forest road flowing onto the public road. The drainage block shall have a dip of at least 75mm and shall be set in concrete. The concrete shall be, at least, C28/35 strength (35N concrete) and shall be, at least, 150mm deep under the drainage block. The concrete shall be brought up round the sides of the drainage block for a width of 125mm.

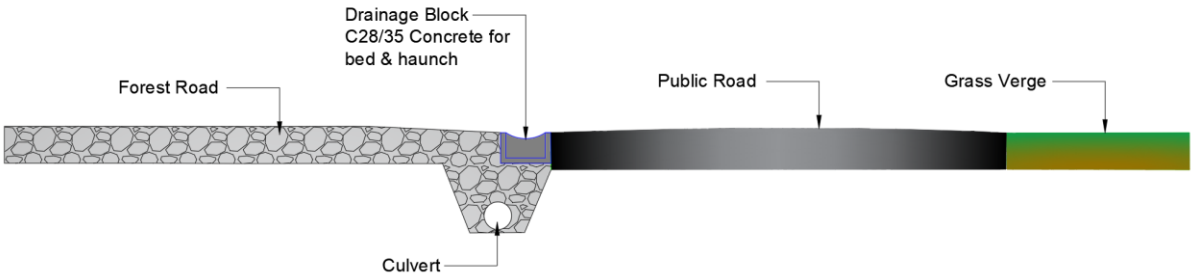


Figure 7 – Drainage Block at junction of forest & public road

The forest road drains shall be designed to have the least possible impact on the public road drains, in terms of additional flow, due to the construction of the forest entrance. In cases where it is necessary to have forest road drains entering the public road drain, attenuation and slit traps shall be constructed in the forest road drains, so as to prevent additional flows or slit being carried into the public road drain. In all cases, the forest road drains shall be designed so as to have the least amount of runoff entering the public road drain.

10) Definitions

For the purpose of this Technical Standard, except where the context otherwise requires

"Forestry activity" means all activity from the preparation of a site for the planting of trees to the clear felling of the mature trees, but excludes the processing of timber. The types of activity that are covered, include but are not limited, to the following: Planting of trees, application of fertiliser to forest site, weed control around trees, thinning of forest, clear felling of forest, cutting trees to suitable lengths for transport of round timber from forest site, evaluation of trees for size and condition, construction of forest roads, construction of harvesting tracks.

"Development" means the carrying out of any works, on, in, over or under land, or the making of any material change in the use of any structure or other land.

"Structure" means any building, structure, excavation or other thing constructed or made on, in, or under any land or any part of a structure so defined and where the context so admits, includes the land on, in or under which the structure is situate.

"Works" includes any act or operation of construction, excavation, demolition, extension, alteration, repair or renewal.

"Departure from Standard" means any reduction in standard from the requirements of sections 4, 5, 8 and 9 of this document.

"Relaxation from Standard" is a departure from standard that will normally be deemed acceptable.

11) References

Department of the Environment, Heritage and Local Government. 2004. *Guidelines for Road Drainage.* DEHLG, Dublin.

Ryan, T., Philips, H., Ramsay, J., and Dempsey, J. 2004. *Forest Road Manual. Guidelines for the Design, Construction and Management of Forest Roads.* COFORD, Dublin.

TII. 2017. DN-GEO-03060 *Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions). TII, Dublin*