Standards for Felling & Reforestation

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Bia agus Mara
Department of Agriculture,
Food and the Marine

Contents

1. Introduction

This document sets out the universal standards that apply to all felling (thinning, clearfelling) and reforestation projects on all sites throughout Ireland, undertaken under a felling licence issued by the Department of Agriculture, Food & the Marine under the Forestry Regulations 2017 (S.I.191 of 2017). Additional measures that might apply on specific sites in response to specific sensitivities may also arise, but such measures are outside the scope of this document.

The following standards are contingent with on health and safety considerations, as set out in the Health & Safety Authority's (HSA) *Code of Practice for Managing Safety & Health in Forestry Operations*, available at https://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Code_of_Practice_Forestry.pdf

2. Harvest Plan

- The Harvest Plan and associated maps must clearly state and illustrate the harvesting and, where applicable, reforestation operations that are planned onsite, and must also detail proposed measures to protect various social and environmental features.
- See Appendix A & B for the Harvest Plan template and sample. Where submitted, the Harvest Plan forms part of the application itself.
- Depending on the nature and scale of the operation, it may be advisable to liaise with various statutory bodies during the development of the Harvest Plan, to identify key issues to be considered during the development of the application. Key bodies include Inland Fisheries Ireland, the County Council and the National Parks & Wildlife Service.
- The Harvest Plan is to be based on a survey of the site. It shall describe the following, *via* written proposals and accompanying maps (ensure that all maps are clear and concise, and accompanied by suitable legends – see Section 18 of *Forestry Standards Manual* for mapping standards):
  - Project area (including ancillary activities, e.g. haulage route)
  - Environmental receptors – water features (including aquatic zones, relevant watercourses, hotspots, water abstraction points and crossing points[1]), biodiversity

[1] Definitions of water features as follows:

- **Aquatic zone:** Any natural river, stream or lake (but not an artificial drain) illustrated on an Ordnance Survey 6 inch map. (Note: The EPA water layer on iNET may not capture all aquatic zones onsite.)
- **Relevant watercourse:** Any other watercourse that has the potential to act as a pathway for the movement of significant amounts of sediment and/or nutrients from the site to an aquatic zone.

  Relevant watercourses are existing drains and channels that may contain flowing water during and immediately after rainfall.

  Note, not every watercourse is a 'relevant watercourse'. For example, a well-vegetated agricultural drain or ditch draining a small area of moderately sloping ground may not be a relevant watercourse, as there will be little or no potential for it to carry significant amounts of sediment/nutrients.
- **Hotspot:** An area that is a potential source of sediment and/or nutrient loss during afforestation works and/or future harvesting. Examples include pockets of soft wet ground, flushes and springs.

(including hedgerows and other habitats), archaeology and historical & cultural features, nearby dwellings and public roads, important landscape features and viewpoints.

- Existing and planned forest road to and from the public road, including associated features such as landings, turntables and bridges.
- Infrastructural features such as overhead and underground utility lines (electricity, gas, telephone and water), public and private water supplies, rights-of-way.
- The location of machine exclusion zones and proposed water crossing points.
- Details of the felling and extraction system and machinery to be used.
- Operation details such as extraction routes, landing bays for harvested material, location of machine maintenance, refuelling and repair areas and storage areas for fuel, motor oils, lubricants and chemicals.
- Reforestation details such as proposed environmental setbacks, the reforestation objectives proposed for the site, species selection and distribution, and windrowing, drainage and cultivation details. Details should be supplied for each plot. Felling coupes can be merged or subdivided at reforestation stage, to take account of site features.
- As far as possible, an overview of post-operation works, e.g. repairs to forest infrastructure, cleaning sediment traps, correct disposal of hazardous materials, and the removal of log bridges and other temporary structures.

3. Key considerations (to be reflected in Harvest Plan)

3.1 Selection of felling & extraction system and machinery

Match the felling and extraction system and machinery suited to crop and site conditions, based on inventory and terrain classifiction, and other site factors (e.g. forest road density).

3.2 Clearfell coupe size and greening-up requirement

The maximum allowable size for any single clearfell coupe is 25 ha.

No other coupe within 120 m can be clearfelled until the original coupe has greened up, and no less than 12 months after the completion of felling.

The above applies generally, unless an overriding consideration such as crop stability applies.

- **Abstraction point:** An abstraction point of any surface water, borehole, spring or well used for drawing water for human consumption in a water scheme.
- **Crossing point:** A point where a machine crosses an aquatic zone or relevant watercourse.

3.3 Landscape considerations

- Select coupe sizes which reflect the scale of the landscape.
- Landscape issues favour asymmetric and irregularly shaped coupes which follow landform, with edges diagonal to the contour, rising in hollows and descending on spurs.
- Skylines need to be treated on a large scale, with the forest either left standing or cleared fully to reveal the shape of the underlying landform.
- Narrow belts of perimeter trees on the skyline tend to accentuate the negative visual impact of harvesting operations and generally, should not be retained.
- For reforestation, the landscape considerations set out in the EnvReqsAffor apply, specifically Section 2.7 and accompanying sections.
- Refer to the County Development Plan, which may contain particular references to landscape sensitivity in respect of forest development or operations such as clearfelling.

3.4 Onsite habitats

Ensure that important wildlife habitats that have been identified on the site are retained for biodiversity purposes and are protected during harvesting, and that effective exclusion zones are established prior to the commencement of operations, to exclude machine traffic. Ensure that these exclusion zones are clearly mapped and made known to operators.

4. Pre-commencement awareness

Before the commencement of any works, all machine drivers and other operators should be fully aware of any environmental sensitivities onsite, and the relevant standards that apply. For example, operators must be made aware of the location of any exclusion zones for water, onsite habitats and biodiversity features, and archaeological features, and what they entail for operations. All operators must also be familiar with the content of the Harvest Plan and the Contingency Plan (see below).

5. Contingency plan

- Ensure that an adequate contingency plan is prepared, kept up-to-date, and made readily available onsite.
- This plan must clearly inform all machine drivers and other operators how to act and who to contact, should an unexpected event arise that may create a risk to the environment. Examples include an accidental fuel spillage or the discovery of an unidentified archaeological site or artefact.
- The contingency plan must specify that all works cease, where operations contravene the conditions of the Tree Felling Licence.
- Appendix C sets out, for possible use, a template Contingency Plan for Forestry Operations. Other equivalent formats are also acceptable.

6. Exclusion zones

Before operations commence, clearly define on a site map, all exclusion zones adjoining water features, onsite habitats and biodiversity features, and archaeological features. Note, exclusions zones differ from environmental setbacks, in that exclusion zones relate to operation phase of the felling and extraction, while environment setbacks relate to the reforestation phase (see later).

In addition to the following, machinery should not operate along unplanted ridelines, utility wayleaves or similar features, unless through documented agreements.

6.1 Water exclusion zones

- Before operations commence, identify a 10 m wide exclusion zone along the edge of all aquatic zones, hotspots and water abstraction points, and mark this clearly on a site map.
- Ensure all operators are aware on this exclusion zone and its purpose, through the pre-commencement awareness process and throughout operations.
- Machine traffic and timber stacking are not permitted within these zones.
- Trees within the reach of the harvester arm should be felled by harvester, and snedded and bunched outside the exclusion zone.
- Trees outside machine reach to be felled manually by chainsaw operators. Felled trees to be winched out of the exclusion zone where appropriate and safe to do so, or removed by extended harvester arm, for subsequent snedding and processing outside the exclusion zone.
- In all cases, fell trees away from the water feature.
- Retain existing native broadleaves present within these water exclusion zone, where safe to do so. However, if these are in danger of windthrow post-clearfell, consider pollarding them at an approximate height of 4 metres.
- Regarding aquatic zones, ensure banks remain undisturbed. No branches or debris are to enter the aquatic zone during operations. Immediately and with care, remove any branches that do fall in.
- Prevent the accumulation of brash, logs and debris in drains and aquatic zones.

6.2 Habitat exclusion zones

Provisions in the above section relating to water exclusion zones also apply to exclusion zones for onsite habitats and biodiversity features. The extent of such exclusion zones depends on the habitats and biodiversity features in question.

6.3 Archaeology and built heritage exclusion zones

Exclusion zones at harvesting stage, where not otherwise specified as an archaeological condition of the felling licence, will be the minimum setbacks for archaeological sites, monuments, important built heritage structures or features as set out in the Table 5 (page 26) of the *Environmental Requirements for Afforestation* (December 2016).

Felling licence conditions may also include a requirement that a pre-works inspection is undertaken by an archaeologist and a more detailed plan prepared for the removal of trees from, on and around any specific site, monument, or structure, and with prior approval by the Forest Service of DAFM and the National Monuments Service of DCHG.

The treatment and reporting of the discovery of archaeological finds at Harvest Plan stage should be as per the specifications in Section 2.6.4 (page 19) of the *Environmental Requirements for Afforestation* (December 2016).

7. Silt & sediment control

- Prior to the commencement of operations, install silt traps within existing forest drains that connect with aquatic zones, either directly or indirect through other relevant watercourses.
- Silt traps should be staggered along the length of the drain, and not only at the lower reaches towards its outflow.
- Silt trap design can vary, from depressions added to the drain bed, to log sections laid lengthways into the drain, to the use of geotextile barriers (e.g. see Appendix D).
- Apply silt fences where necessary, to block pathway for silt in areas where overland flow is possible.
- Once silt traps and silt fences become functional, check regularly and maintain as necessary, in order to ensure continued effectiveness throughout operations.

8. Temporary water crossings

Permanent water crossings are dealt with COFORD *Forest Road Manual* and roading sections of the *Forest Harvesting & the Environmental Guidelines* (2000).

8.1 Forest drains

- Minimise the crossing of drains during felling and extraction, and restrict machine activity to brashed extraction racks and haulage routes.
- Where a drain crossing is needed, select a method that prevents the breakdown and erosion of drain sides.
- Where necessary, deploy a heavy-duty plastic culvert lengthways into the channel and cover with brash material. The culvert must be of a diameter approximating the depth of the drain, to avoid any unnecessary undulation along the extraction route.
- Where required, a solution for smaller drains is to temporarily lay log sections lengthways into the channel and overlay with brash. Again, select logs that approximate the depth of the channel to be crossed.

8.2 Aquatic zones and larger relevant watercourses

- Minimise the crossing of aquatic zones and larger relevant watercourses during felling and extraction.
- Direct crossing over the stream bed is not permitted.
- When installing and removing the temporary crossing, ensure that no work is carried out within the aquatic zone, and that the stream bed and bankside remain undisturbed.
- Avoid crossing points in hollows where surface water gravitates towards, or in areas of the site more prone to sediment release, as indicated by terrain classification.
- Ensure the feature is crossed at a right angle to the flow of water.
- Where needed, any necessary crossing shall be *via* an appropriate structure that spans proud of the flow of water and prevents the breakdown and erosion of the banks.
- Typical solutions include the laying down of a bridge comprising logs overlaid with geotextile and brash to intercept soil falling off wheels.
- Alternatively, utilise prefabricated drop-in bridging.

9. Managing extraction

- Illustrate proposed extraction routes in Harvest Plan map. Extraction routes should not break through existing hedgerows or stone walls on site, but instead, utilise existing gaps. Where no gaps exist, crossing such features should be in documented crossing points only clearly identified on site maps.
- Plan extraction routes to avoid exclusion zones for water, archaeology and onsite habitats.
- Position to avoid excessive tracking along individual routes and through areas with erodible soils, steep slope, difficult terrain, etc.
- The junctions of extraction paths must be located on stable ground, avoiding hollows where water tends to drain.
- Avoid hotspots and minimise the crossing of water features, especially larger relevant watercourses and aquatic zones.
- Create and maintain dense mats of brash and branch wood on all machine routes, to avoid soil damage, erosion and sedimentation. Concentrate brash mats on primary routes and in sections crossing soils with a low bearing capacity. The junction of extraction paths and landing sites should also be supplied with a protective brash cover. Brash mats should be renewed when they become heavily used and worn, and no longer function effectively.
- Harvesting and extraction machinery must not operate on unprotected or unbrashed routes, regardless of weather conditions.
- During extraction, forwarders must not exceed load sizes specified in the harvest plan or recommended by manufacturers. Overloading will damage extraction machinery and will increase the risk and severity of soil compaction and rutting. It is advisable to reduce loads when traversing difficult terran.

- Maintain extraction routes throughout operations, taking account of ground conditions. Ensure that that overuse of individual routes does not happen, as this leads to subsequent soil disturbance, rutting and the mobilisation of silt. Deploy extract brash as needed or redirect extraction to alternative routes, if necessary.
- Locate timber landing bays at least 50 m from the nearest aquatic zone.
- Limit the use of forest roads and public roads by extraction machines to unloaded traffic gaining access to or exiting from the harvesting site. No forwarding or ground haulage operations are to take place on either forest or public road surfaces. There should be no carrying over of soil or debris onto public roads. Keep roadside drains and culverts free of logs, debris and obstructions.
- Carefully remove temporary crossings as they become no longer needed. Any brash padding used must be peeled back carefully away from the water feature, to avoid dislodging collected sediment.

10. Other measures

- Retain existing hedgerows and mature broadleaves onsite, where it is safe and appropriate to do so.
- In order to promote stability, consider pollarding (at a height of approximately 4 m height) retained broadleaf trees drawn up by the conifer canopy and left spindly and top-heavy as a result of the felling operation. This can be a useful option, particularly alongside aquatic zones.
- When fallen trees with exposed root plates are being cut during tree felling, the exposed root plates can be manoeuvred back into their original positions, where appropriate and safe to do so, in order to eliminate possible sources of silt.
- Urea should be applied immediately after felling to all conifer stumps. Do not apply to stumps within 10 metres of any relevant watercourse or aquatic zone.
- Where felling operations adjoin public roads, appropriate safety signs should be in place to alert the public, including road users. Close off the forest (or parts of, if large) to users, if utilised for recreation. See the Health & Safety Authority's (HSA) *Code of Practice for Managing Safety & Health in Forestry Operations*, available at https://www.hsa.ie/eng/Publications_and_Forms/Publications/Agriculture_and_Forestry/Code_of_Practice_Forestry.pdf

11. Timing operations

- Cease all felling and extraction and other machine operations onsite (or redirect to more stable areas of the site) during and after periods of rainfall which result in the possibility of the surface mobilisation of silt.
- Include clear provisions for the above in the contingency plan. Ensure that all operators are aware of these provisions.

12. Monitoring

- Regularly check silt traps and silt fences, and maintain as required, to ensure their continued effectiveness throughout works.
- Undertake regular visual checks of relevant watercourses (primarily at their outflow from the site) and adjoining aquatic zones, to confirm (or otherwise) that no sediment or silt discharge is arising from site works.
- Keep a record of the above monitoring, and retain for possible inspection. Appendix E provides an example of a monitoring record.

13. Reforestation

- In all case, minimise the level of input needed to ensure successful reforestation.
- As part of the Harvest Plan, complete the reforestation map, illustrating the Reforestation Objectives to be pursued, and the location and extent of any environmental setbacks. Provide an accompanying description in the Harvest Plan.
- Minimum required setbacks at reforestation to adhere to the specifications set out in Section 13, below.
- Regarding windrowing, undertaken to prepare the ground for reforestation, avoid parallel windrowing on highly visible sites, where the regular lines may be unsightly.
- In relation to water, undertake measures that result in the creation of an uninterrupted setback along adjoining aquatic zones. For example, insert slow-water dams into existing forest drains, before they cross into the newly-created water setback. Slow-water dams can comprise logs dropped length-ways onto the channel at various points outside of the setback. In addition, it may be appropriate to divert drains into soakage areas outside the water setback. These measures will allow normal drainage to take place through soakage from outside the water setback, and all exceptional drainage (arising from heavy rainfall) to be directed to overland flow across the full width of the buffer.
- Adhere to the reforestation specifications for each Reforestation Objective proposed for the site, as set out in Appendix E.
- Drainage and cultivation operations associated with reforestation must be planned and implemented to minimise flow rates after rainfall. The standards set out in Section 3.7.1 of the *Environmental Requirements for Afforestation* and in the *Forestry Standards Manual* apply.
- Where site conditions allow, localised areas where water collects naturally, should be incorporated into the drainage system, left unplanted and allowed to develop as pocket wetland habitats.
- If fertiliser application is proposed, adhere to the following:
    - Only apply if needed, based on a soil analysis by an accredited labratory. Match fertiliser type and application rate to specific plots.
    - Use granular formulations.

- Do not apply fertiliser within the water setback of an aquaic zone, or within 20 metres of the aquatic zone, whichever is greatest. Manual application only is permitted from this point back to 50 metres from the aquatic zone.
- Do not apply fertiliser within the water setback of all other water features.
- Do not apply fertiliser if heavy rainfall is predicted, or during heavy rainfall and / or high winds. Following heavy rainfall, commence application only after the site has dried out sufficiently for runoff not to pose a risk.

➢ The following applies in relation to the use of herbicide to manage competing vegetation:

- Herbicide use and application should only ever be carried out by fully trained operators and with full personal protective equipment (PPE).
- Minimise herbicide use to site requirements. Do not apply if not required.
- Do not apply herbicide if heavy rainfall is predicted, or during heavy rainfall and / or high winds. Following heavy rainfall, only recommence application after the site has dried out sufficiently.
- Fully adhere to the manufacturer's instructions.
- Do not apply herbicides within the following areas, relying instead on non-herbicide methods such as trampling, mulches and mats:
    - within the water setback of an aquatic zone, or within 20 metres of the aquatic zone, whichever is greatest;
    - within the water setback of a relevant watercourse or hotspot;
    - within specified distances from different types of water abstraction points, as prescribed by S.I.155/2012;
    - within 15 metres of a landscape feature known to be a groundwater vulnerable area, including karst areas, sinkholes and collapse features; or within a utilised building setback created for a dwelling.

Regarding pesticide use:

➢ The use of pesticides is governed by the European Communities (Sustainable Use of Pesticides) Regulations 2012 (S.I.155/2012). Users of pesticides should familiarise themselves with these Regulations and adhere to them.

➢ Any pesticide to be used during the reforestation phase must be approved for forestry use in Ireland. Details of approved products can be checked on the Pesticide Control Service section of the DAFM website (see www.pcs.agriculture.gov.ie).

➢ Only a registered professional user can apply pesticides authorised for professional use. A professional user is any person who applies / sprays professional use products (regardless of the quantity or method of application), including operators, technicians, employees and self-employed people, both in the farming and other sectors.

- All professional users must be fully trained in the safe and responsible use of pesticides, and must wear full PPE at all times during use.
- All users of pesticide products registered for professional use must follow the principles of Good Plant Protection Practice, available for download at www.pcs.agriculture.gov.ie/sud/professionalusersprayeroperators/
- Appendix I to the above Good Plant Protection Practice document sets out general principles of integrated pest management, which all professional users are required to follow. Appendix II sets out other legal requirements relating to the safe use of plant protection products.

- In situations where the necessity for pine weevil control is predicted, utilise nursery-dipped plants. Alternatively, undertake 'hot planting', whereby the trees are planted as soon as possible after the harvesting and extraction of the original crop. In the case of extreme outbreaks, top-up sprays of approved insecticide may be applied, in which case, a 50 m exclusion zone from any aquatic zone is required.
- Throughout the reforestation stage, maintain all silt traps and silt fences previously installed, until the site has greened over with new ground vegetation.

14. Minimum setbacks at reforestation

The following are the minimum required setback regarding water, archaeology, etc., to apply during reforestation.

14.1 Water setbacks

Water feature	**Slope leading to the aquatic zone (vary to reflect changes in slope over the site)**	**Water setback width, as measured from water feature's edge**
Aquatic zone	Moderate (even to 1-in-7 / 0-15%)	10 metres
	Steep (1-in-7 to 1-in-3 / 15-30%)	15 metres
	Very steep (1-in-3 / >30%)	20 metres
Relevant watercourse		5 metres
Hotspot		5 metres
Abstraction point		20 metres

The above represent the minimum water-related setbacks required. Setbacks can be increased in localised areas to reflect field topography, to incorporate wet areas and to avoid unnatural straight lines. The establishment of native trees along the edge of the future canopy, either as a separate

native woodland plot or as single or small groups of trees, is encouraged. **Note, no planting to be undertaken within the water setback.**

14.2 Habitat setback

Assign unplanted setback areas to existing habitats and biodiversity features that were previously the subject of exclusion zones. Such setbacks may need to be increased in order to avoid excessive shading from the emerging woodland. Setback width depends on the identified habitat. Apply careful design, e.g. focus the habitat setback mainly on the south-western, southern and south-eastern side of the habitat, where possible, to maximise exposure to sunlight as the adjoining woodland canopy emerges.

Note that the retained habitat itself must remain undisturbed (unless otherwise agreed or prescribed).

The establishment of native trees along the edge of the future canopy, either as a separate native woodland plot or as single or small groups of trees, is encouraged.

Note, no planting to be undertaken within the habitat setback.

14.3 Archaeological setback

The purpose of an archaeological setback is:

a) to physically separate the archaeological site or monument or other important built heritage structure or feature from reforestation, the emerging forest, and future forest operations; and

b) To protect the amenity of the archaeological site or monument or other important built heritage structure or feature and where relevant, its wider landscape setting, in particular, its relationship with other roughly contemporary or determinably linked site, monument, structure or feature.

Archaeological setbacks, where not otherwise specified as an archaeological condition of the felling licence, will be the minimum setbacks for archaeological sites, monuments, important built heritage structures or features as set out in the Table 5 (page 26) of the *Environmental Requirements for Afforestation* (December 2016).

Felling conditions may also include requirements that at reforestation stage:

- Access routes to an archaeological site or monument or other important built heritage structures or features are established or re-established;
- Unplanted lines of sight are established or re-established; and/or
- Archaeological monitoring of ground works for replanting is undertaken in specified areas.

The treatment and reporting of the discovery of archaeological finds during harvesting or at reforestation stage should be as per the specifications in Section 3.8 (page 44) of the *Environmental Requirements for Afforestation* (December 2016).

14.4 Public road setback

Minimum setback, as measured from the surfaced edge of the public road*:	**Additional design:**
For broadleaf plots: 10 m unplanted setback along the public road For conifer plots: include a 10 m wider broadleaf strip between the 10 m wide unplanted setback and the edge of the conifer planting All widths are average, to allow for additional design	Based on the immediate landform / topography, vary the setback to avoid artificial lines and to create a naturally undulating forest edge. Retain locally important views from the public road, where possible, by leaving open spaces through the reforested area without compromising the stability of the new forest. Also consider introducing open spaces that highlight natural features visible along the roadside. Increase unplanted setback, where appropriate, to allow for greater visibility at bends in the road.

14.5 Utilised building setback

Minimum setback, as measured from the outer wall of the roofed building:	**Additional design:**
➢ Dwelling houses: 60 metre minimum. Smaller setback allowable (to a minimum of 30 metre), if written agreement of the neighbouring dweller is provided at Felling Licence application stage ➢ Roofed farm buildings: 10 metres ➢ Temporary buildings (e.g. timber sheds, kennels & buildings less than 25 m^2): No setback required	➢ Setback distance is most critical when a building is surrounded by woodland on two or more sides. ➢ Based on the immediate landform / topography, vary the setback to avoid artificial lines and to create a naturally undulating forest edge. ➢ Consider retaining locally important views from the dwelling, by introducing open spaces through the reforestation. Also introduce open spaces that highlight natural features visible from the dwelling. ➢ In relation to setbacks from dwellings, the establishment of single and small groups of native trees and scrubs (up to 20% of the setback area) is encouraged within the 30 m to 60 m zone, if agreed to by the neighbouring dweller.

14.6 Landscape setback

The purpose of this setback is to disrupt artificially straight lines and sharp angles along visible sections of the outer edge of the new forest, and to create stronger visual 'tie-in' with adjoining hedgerows and other semi-natural / natural features.

Setback width will vary, according to site details and design considerations. Consider establishing single and small groups of diverse conifers and / or native trees and scrubs long the future canopy edge and within the setback itself, to reinforce the desired visual effect.

15. Preparation, storage and use of potentially hazardous material

The following apply throughout both felling and reforestation

- Store and prepare all chemicals, urea, fuel and machine oils at a dry, elevated location onsite at least 50 metres from the nearest aquatic zone and at least 20 m from the nearest relevant watercourse. Do not utilised water, habitat or archaeological setbacks for this purpose.
- Similarly, undertake all machine refuelling, maintenance and repair at a dry, elevated location onsite at least 50 metres from the nearest aquatic zone and at least 20 m from the nearest relevant watercourse. Do not utilised water, habitat or archaeological setbacks for this purpose. Collect spent oils and remove for correct offsite disposal.
- Do not, under any circumstance, discharge chemicals, fuel or machine oils into an aquatic zone, relevant watercourse, hotspot, or into any drain or sediment trap created during the site works.
- Never rinse out chemical, fuel or oil containers onsite.
- Do not clean equipment within 50 metres of an aquatic zone, or within 20 metres of a relevant watercourse or hotspot. All wash waters must be disposed of carefully.
- Collect and retain spent machine oil for appropriate disposal off-site.
- Remove all chemical, fuel and oil containers, machine parts, empty transplant bags, and all general refuse, from the site during and after site works, for appropriate disposal off site.
- Contingency plan to cover accidental spillage. The relevant Local Authority and Inland Fisheries Ireland must be informed promptly of an accidental spillage of any potential contaminant that threatens an aquatic zone.

16. Post-operation works

The standards below apply particularly to the felling and extraction operation, but also to reforestation operations.

- As above, remove and correctly dispose of all hazardous and waste materials.
- Carefully remove all remaining temporary crossings installed onsite (e.g. log bridges). Take care to prevent the release of any built-up material. E.g. any brash padding used must be peeled back carefully away from the water feature, to avoid dislodging collected sediment.
- Remove harvesting debris from drains, sediment traps and culverts.
- Carry out any necessary repairs to forest infrastructure.

Appendix A. Template Harvest Plan

Harvest Plan Submitted in Support of Felling Licence Application – TFLXXXXXXX

Proposed Felling & Reforestation Methods	
Thinning (incl. CCF)	☐ N/A ☐ Harvester ☐ Chainsaw ☐ Forwarder ☐ Tractor/Quad ☐ Skyline ☐ Other (specify):
Clearfelling	☐ N/A ☐ Harvester ☐ Chainsaw ☐ Forwarder ☐ Tractor/Quad ☐ Skyline ☐ Other (specify):
Reforestation	☐ N/A ☐ Windrowing ☐ Pit planting ☐ Mounding ☐ Scrap mounding ☐ Scarification ☐ Other (specify):
Site access (i.e. via forest road)	☐ Present ☐ Planned ☐ Not required ☐ Other (e.g. temporary roading/forest track):

Social & Environmental Features & Considerations		
Social	**Habitat & Biodiversity**	**Soil & Water**
☐ Recreational usage	☐ Designated area (SAC, SPA, etc.)	☐ Aquatic zone(s) on/adjoining site
☐ Adjoining dwelling(s)	☐ Broadleaves/diverse conifers	☐ Relevant watercourse(s)
☐ Right(s)-of-way present	☐ Hedgerows	☐ Water-related 'hotspots'
☐ Utilities (power lines/water main)	☐ Old/veteran trees	☐ Water abstraction point
☐ Sensitive landscape	☐ Large scale deadwood	☐ Peaty or peaty/gley
☐ Important viewpoint(s)	☐ Badger sett, rookery, etc.	☐ Steep slope(s)
☐ Archaeological site(s) & feature(s)	☐ Protected fauna	☐ Water setback(s) present & intact
☐ Cultural feature(s)	☐ Protected flora	☐ Supply of brash limited
☐ Anti-social (dumping, fire, etc.)	☐ Wetland habitat	☐ Other:
☐ Other (specify):	☐ Other (specify):	☐ Other:

Proposed Measures to Protect Social & Environmental Features & Considerations	
☐ Consult with local residents	☐ Establish excl. zones around arch. sites/features
☐ Erect safety signage	☐ Temporary bridging points (TBPs) required
☐ Onsite briefing of all operators, pre-commencement	☐ Install water setback at refor.
☐ Carefully selected refuelling/repair/storage depot	☐ Install dwelling setback at refor.
☐ Measures to protect right(s)-of-way	☐ Install public road setback at refor.
☐ Measures to protect service features	☐ Install archaeological setback at refor.
☐ Measures to protect habitats & biodiversity features	☐ Install biodiversity setback at refor.
☐ Limit operations to dry weather	☐ Install landscape setback at refor.
☐ Daily visual monitoring of ground conditions	☐ Inclusion of Refor. Objective 'CCF'
☐ Daily visual monitoring of water	☐ Inclusion of Refor. Objective 'BIO'

Proposed Measures to Protect Social & Environmental Features & Considerations (Cont..)	
☐ Water sampling	☐ Forest edge planting
☐ Install silt traps/barriers	☐ Environmental setback planting
☐ Drain blocking/slow-water dams	☐ Other (specify)
☐ Utilise brash mats along extraction routes	☐ Other (specify)
☐ Exclude machinery in areas adjoining aquatic zones, water abstraction points & water-related 'hotspots'	☐ Other (specify)

Ancillary Information (include relevant information to expand on above & to detail important aspects such as the sequencing of operations, the width of environmental setbacks & contingency planning. Ensure accurate cross-referencing and consistency with maps)*

***See also Felling & Reforestation Standards for further information**

Appendix B. Sample Harvest Plan

Harvesting & Restock Plan Submitted in Support of Felling Licence Application – TFLXXXXXXX

Proposed Felling & Reforestation Methods	
Thinning (incl. CCF)	☒ N/A ☐ Harvester ☐ Chainsaw ☐ Forwarder ☐ Tractor/Quad ☐ Skyline ☐ Other (specify):
Clearfelling	☐ N/A ☒ Harvester ☒ Chainsaw ☒ Forwarder ☐ Tractor/Quad ☐ Skyline ☐ Other (specify):
Reforestation	☐ N/A ☒ Windrowing ☒ Pit planting ☒ Mounding ☐ Scrap mounding ☐ Scarification ☐ Other (specify):
Site access (i.e. via forest road)	☒ Present ☐ Planned ☐ Not required ☐ Other (e.g. temporary roading/forest track):

Social & Environmental Features & Considerations		
Social	**Habitat & Biodiversity**	**Soil & Water**
☐ Recreational usage	☐ Designated area (SAC, SPA, etc.)	☒ Aquatic zone(s) on/adjoining site
☒ Adjoining dwelling(s)	☐ Broadleaves/diverse conifers	☒ Relevant watercourse(s)
☐ Right(s)-of-way present	☒ Hedgerows	☒ Water-related 'hotspots'
☒ Utilities (power lines/water main)	☒ Old/veteran trees	☐ Water abstraction point
☐ Sensitive landscape	☒ Large scale deadwood	☐ Peaty or peaty/gley
☐ Important viewpoint(s)	☐ Badger sett, rookery, etc.	☒ Steep slope(s)
☐ Archaeological site(s) & feature(s)	☐ Protected fauna	☒ Water setback(s) present & intact
☐ Cultural feature(s)	☐ Protected flora	☐ Supply of brash limited
☐ Anti-social (dumping, fire, etc.)	☒ Wetland habitat	☐ Other:
☐ Other (specify):	☐ Other (specify):	☐ Other:

Proposed Measures to Protect Social & Environmental Features & Considerations	
☒ Consult with local residents	☐ Establish excl. zones around arch. sites/features
☒ Erect safety signage	☒ Temporary bridging points (TBPs) required
☐ Onsite briefing of all operators, pre-commencement	☒ Install water setback at refor.
☐ Carefully selected refuelling/repair/storage depot	☒ Install dwelling setback at refor.
☐ Measures to protect right(s)-of-way	☒ Install public road setback at refor.
☐ Measures to protect service features	☐ Install archaeological setback at refor.
☒ Measures to protect habitats & biodiversity features	☒ Install biodiversity setback at refor.
☒ Limit operations to dry weather	☐ Install landscape setback at refor.
☒ Daily visual monitoring of ground conditions	☐ Inclusion of Refor. Objective 'CCF'
☐ Daily visual monitoring of water	☒ Inclusion of Refor. Objective 'BIO'

Proposed Measures to Protect Social & Environmental Features & Considerations (Cont..)	
☐ Water sampling	☒ Forest edge planting
☒ Install silt traps/barriers	☐ Environmental setback planting
☐ Drain blocking/slow-water dams	☐ Other (specify)
☒ Utilise brash mats along extraction routes	☐ Other (specify)
☒ Exclude machinery in areas adjoining aquatic zones, water abstraction points & water-related 'hotspots'	☐ Other (specify)

Ancillary Information (include relevant information to expand on above & to detail important aspects such as the sequencing of operations, the width of environmental setbacks & contingency planning. Ensure accurate cross-referencing and consistency with maps) *

Harvesting

Harvesting and extraction to be carried out in late spring or during the summer/autumn period. Proposed machinery will comprise a harvester and a low-ground pressure forwarder with a 14 tonne bunk capacity. Temporary bridges will be used where machine routes cross relevant watercourses (see Temporary Bridge Points 'TBP' on the attached Harvest Plan Map). In addition, brash mats will be used along all extraction routes, with corduroy rafts deployed to reinforce short sections of soft ground subject to high traffic usage. The extraction directions are marked with red arrows on the Harvest Plan Map. Timber Stacking Areas to be located greater than 100 m from all nearby dwelling houses (see 'SA' on the Harvest Plan Map). Note that there are no potable water sources within or adjacent to the boundaries of the proposed site.

Sediment traps will be installed within relevant watercourses before harvesting commences, at locations indicated on the Harvest Plan Map. Onsite supervision will be present during operations to ensure that felling, extraction and windrowing operations are carried out appropriately and that water protection measures are adequate and remain effective throughout, and also to trigger contingency measures, if necessary (e.g. to cease operations if rainfall creates a risk of sediment mobilisation and runoff). Sediment traps will be monitored and maintained (i.e. cleaned out and/or added to, as appropriate) throughout felling, extraction and reforestation, and periodically thereafter, until the site stabilises and greens up.

All hedgerows to be retained. Veteran broadleaf trees to be retained, where windfirm and safe to do so. Younger broadleaf trees left unstable after conifer felling will be pollarded at a height of 3 to 4 m, where these are located alongside or within planned setback.

Due to existing water 'hotspots', harvesting within Plot 3 will be confined to the removal of small areas of mature spruce and some individual spruce trees, with existing broadleaves and natural vegetation to be left undisturbed.

Reforestation

Plot 1 to be windrowed, mounded (using shallow mound drains running across slope) and replanted in the next planting season after harvesting. Birch and alder to be planted in a 10 m (5-row) strip inside a 10 m public road setback. No mound drains to be located within 5 m of any relevant watercourse.

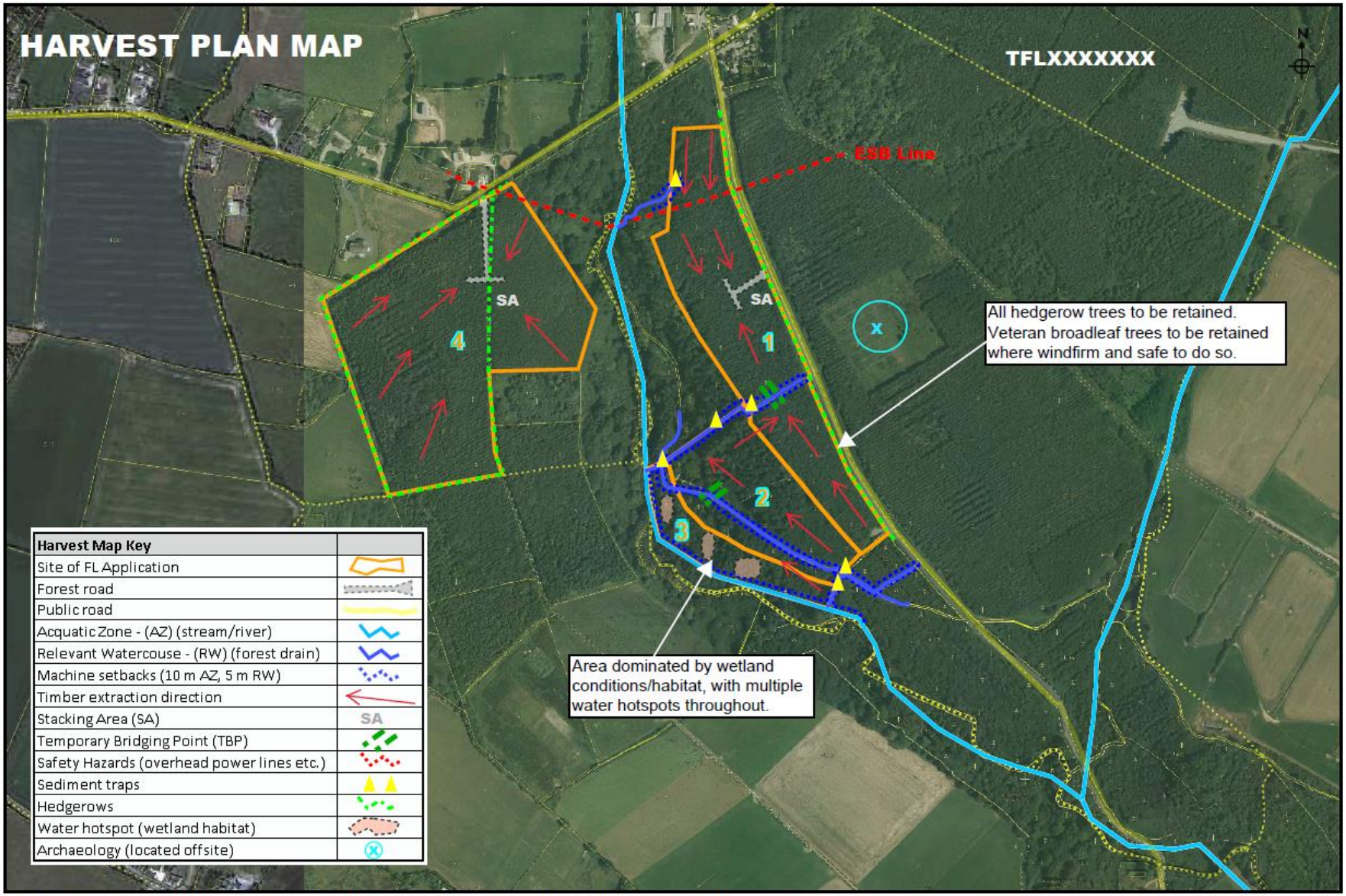
Plot 2 to be pit-planted immediately after harvesting and windrowing. No other site cultivation deemed necessary.

Plot 3 to be treated according to the 'BIO' Reforestation Objective (Felling & Reforestation Policy, 2017), incorporating broadleaves retained during harvesting. Plot 3 to also contain a 20 m wide water setback adjoining the stream, within which, ground cultivation and tree planting will be excluded.

Plot 4 to be windrowed, mounded (involving shallow mound drains running across slope) and replanted in the next planting season after harvesting. Plot 4 will contain 30 m unplanted setbacks measured from the adjacent dwelling houses.

Open space will represent c.10% of the total project area, post-reforestation.

*See also Forest Harvesting and the Environment Guidelines for further information



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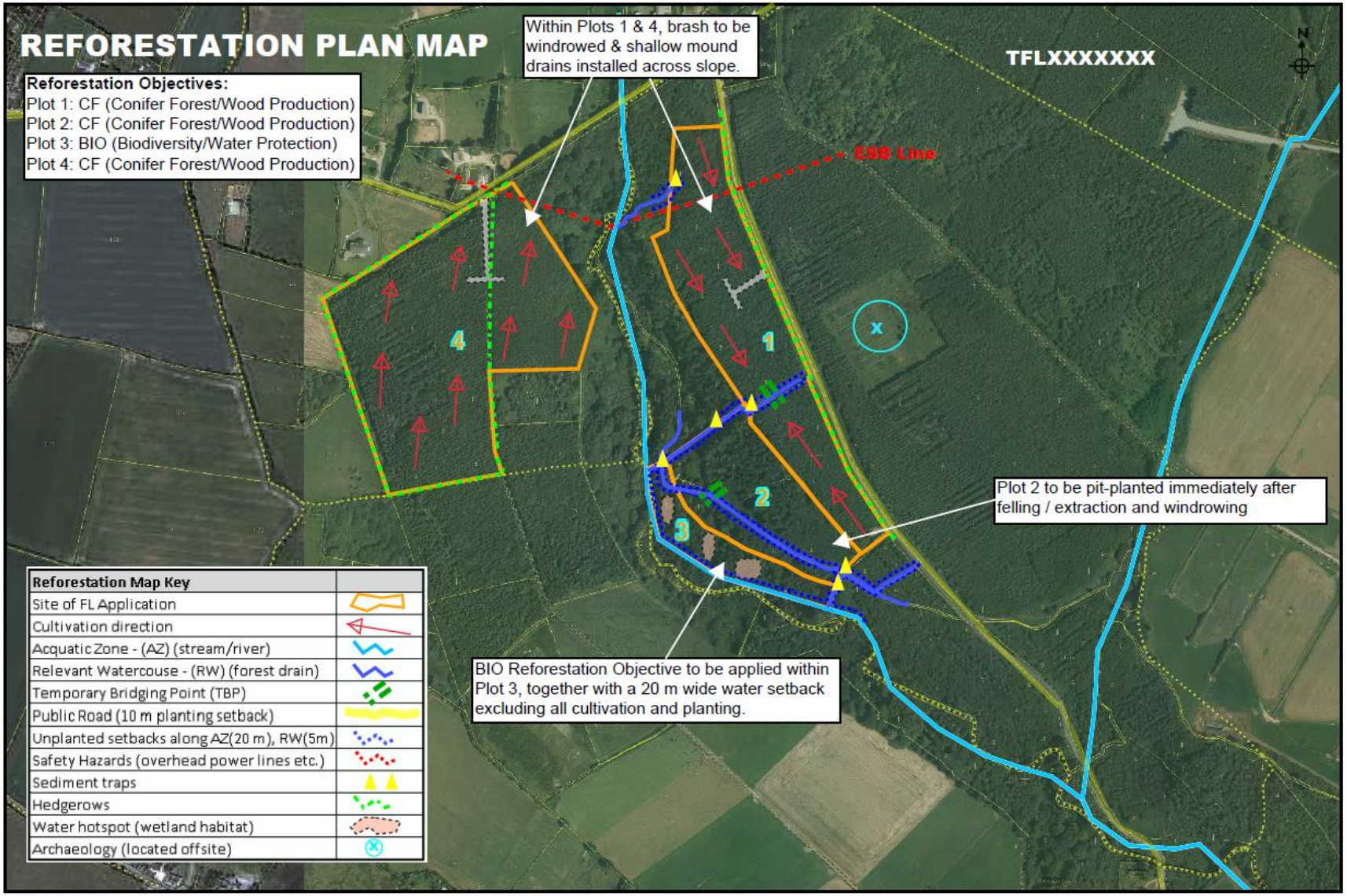

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Appendix C. Template Contingency Plan for Forestry Operations

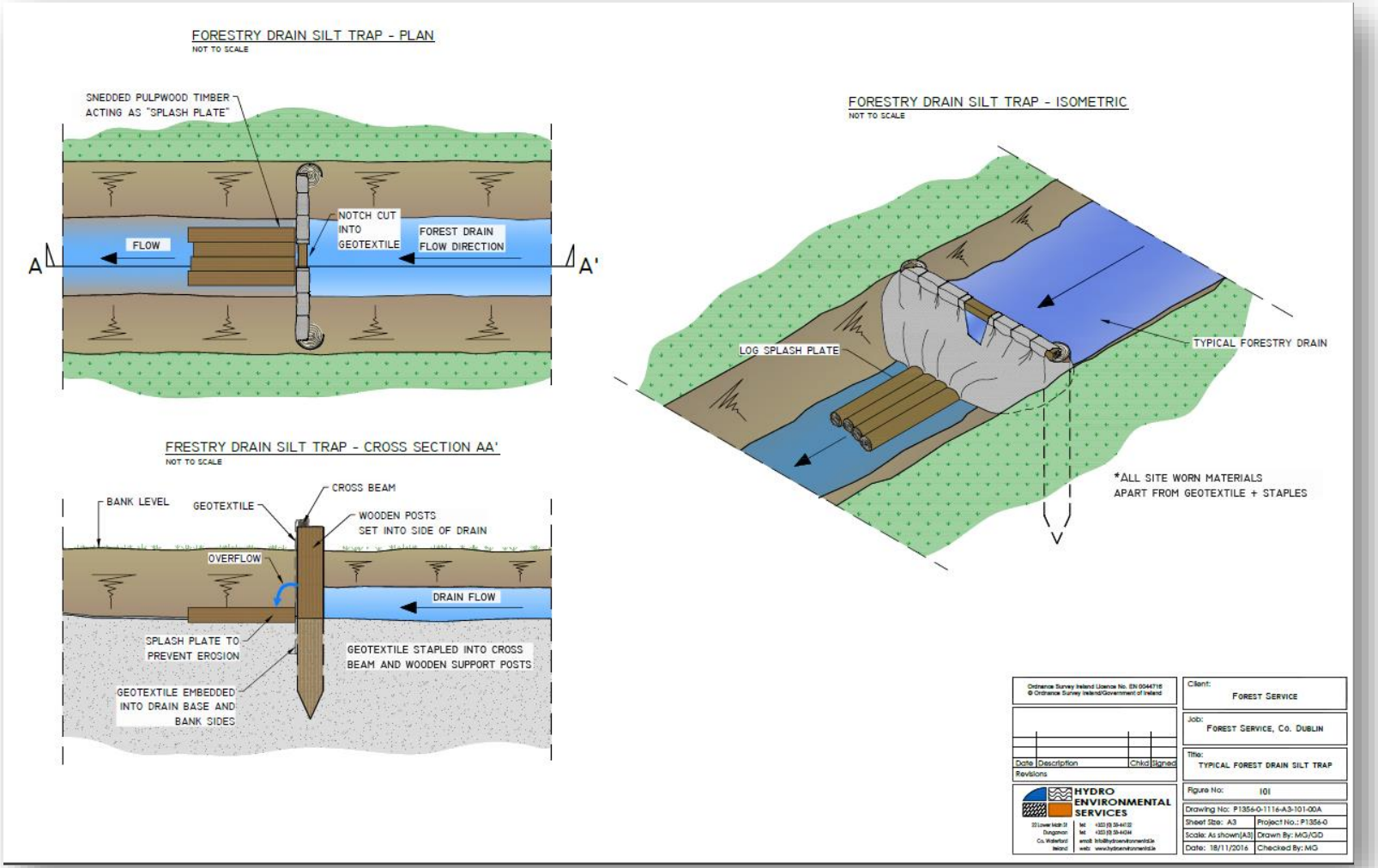
Note: Other equivalent formats are also be acceptable.

Site location: _____ **Townland:** _____ **County:** _____ **Forest Service Contract Number:** _____	**Contact details (input actual names and telephone numbers, as relevant):** ➢ Applicant: _____ ➢ Registered Forester: _____ ➢ Forest Service District Inspector: _____ ➢ Inland Fisheries Ireland: _____ ➢ National Parks & Wildlife Service: _____	*Continued...* ➢ Local Authority: _____ ➢ National Monuments Service: _____ ➢ National Museum of Ireland: _____ ➢ Adjoining landowner(s): _____ ➢ An Garda Síochána: _____
Potential risk scenario (describe)	**First action, should this scenario occur or becomes imminent (outline)**	**Contacts to be notified immediately (see above for contact details), should this event occur or becomes imminent (outline)**
1.		
2.		
3.		
(Add further scenarios, as necessary)		
Contingency sheet completed by: Name of Registered Forester: _____ Completion date of Contingency Sheet: _____		

(v.04Sept19)

Appendix D. Example of a barrier site trap

Note: The following is an example of a barrier site trap, based on staked geotextile. Other types of silt traps may be suitable, including depressions added to the drain bed, or log sections laid lengthways into the drain. Specify in the Harvest Plan, the type of silt trap(s) being proposed. Note, depending on site conditions, forest drains may require two or more silt traps to be installed along their length.



Appendix E. Example of a monitoring record

Presented overleaf is an *example* of a form that can be used to record: (i) checks on silt traps and silt fences, and the maintenance of same; and (ii) checks on relevant watercourses (primarily at their outflow from the site) and adjoining aquatic zones, undertaken to confirm (or otherwise) that no sediment or silt discharge is rising from site works. The example below is based on a daily monitoring regime. Other formats are also acceptable.

Monitoring Record for [Project type, reference number, Applicant's name, Townland(s)]

Monitoring based on a daily visual monitoring of relevant watercourses (at the outflow from the site) and adjoining aquatic zone, to confirm that no sediment or silt discharge is occurring during site works.			**Monday** DD / MM / YYYY	**Tuesday** DD / MM / YYYY	**Wednesday** DD / MM / YYYY	**Thursday** DD / MM / YYYY	**Friday** DD / MM / YYYY	**Saturday** DD / MM / YYYY	**Sunday** DD / MM / YYYY
TO BE COMPLETED EACH DAY, BEFORE OPERATIONS COMMENCE ONSITE	1.	Is the current weather suitable for operations?							
	2.	Is the forecasted weather suitable for operations?							
	3.	Is there any discolouration in discharged water?							
	4.	Is there any silt / sediment in the discharged water?							
TO BE COMPLETED AT THE END OF EACH DAY AFTER OPERATIONS CEASE, OR BEFORE DAYLIGHT FADES	5.	Is there any increased discolouration in discharged water?							
	6.	Is there any increased silt / sediment in the discharged water?							
	7.	Detail any silt trap / fence checks and maintenance work undertaken during the day							

Signed:	Date:

Appendix F. Reforestation Objectives

Use of the following Reforestation Objective classification system is required to provide clarity regarding the objectives of the forest owner in relation to the subsequent rotation following clearfelling. It also sets out the required standards that apply in relation to each objective.

Detail and map the intended Reforestation Objective to be pursued in each plot, with the FL application (and Harvest Plan). Minimum plot size is 0.1 ha. Setback requirements apply to each Reforestation Objective.

Reforestation Objective and possible applications	**Standards**
Conifer Forest for Wood Production (CF) ➢ The standard option for reforesting with conifer species, where suitable. This objective is generally not appropriate if the current forest to be felled mainly comprises broadleaf species. However, a change to conifers may be considered if reforestation with broadleaves is impractical, due to high deer pressure or some other site factor(s).	➢ Minimum planting density 2,500 stems / ha, planted at 2 m x 2 m spacing. ➢ Site conditions (e.g. soil, elevation) permitting, broadleaf and / or conifer species other than Sitka spruce and Lodgepole pine (e.g. Scots pine) should be planted adjoining setbacks installed alongside aquatic zones, archaeological features, dwellings, public roads and non-forest habitats. Such species can also be used along outer-facing edges of the plot to 'break-up' artificially straight lines, as viewed from the surrounding landscape. The level of planting, either as single trees or as groups, should be at a scale large enough to have the desired effect. Species selection should also reflect the sensitivity involved (e.g. native riparian species should be considered alongside water setbacks). Apply appropriate protection against grazing. ➢ Appropriate vegetation management and filling-in are required to achieve a minimum of 90% stocking of free-growing trees evenly distributed throughout the plot by Year 4 after planting. It is recognised that certain species and sites may take longer to establish.

Broadleaf Forest for Wood Production (BF) Option for reforesting with commercially-focused broadleaf species	➢ Minimum planting density, 3,300 stems / ha, planted at 2 m x 1.5 m spacing. Can include an intimate mixture of up to 10%, comprising appropriate conifer species added to provide silvicultural nursing during the initial years. (Note, nurse conifers to be targeted for removal, to release the broadleaf component of the forest.) ➢ Appropriate vegetation management and filling-in are required to achieve a minimum of 90% stocking of free-growing trees evenly distributed throughout the plot by Year 6 after planting.
Mixed Forest for Wood Production (MF) Standard option for reforesting with a mixture of broadleaf and conifer species, with each component representing at least 20% of the canopy at maturity.	➢ Mixture must be silviculturally sustainable. ➢ minimum initial planting density, 2,500 stems / ha (at 2 m x 2 m spacing) for conifers and mixtures, and 3,300 stems / ha (at 2 m x 1.5 m spacing) for broadleaves. ➢ Appropriate vegetation management and filling-in are required to achieve a minimum of 90% stocking of free-growing trees evenly distributed throughout the plot by Year 6 after planting.
Reforestation for Continuous Cover Forest (CCF) This objective applies to situations where reforestation of the clearfelled site is intended to create permanent woodland cover to be managed under CCF (as opposed to a subsequent rotation ending in another clearfell). Reforestation species can be conifer and / or broadleaved. Any mixtures used must be silviculturally compatible. This objective is generally suitable for sites where timber production will be sought but where other forest objectives (e.g. amenity, biodiversity, water protection, landscape) favour a continuous cover approach.	➢ Where planting is undertaken, the minimum initial planting density required is 2,500 stems / ha (at 2 m x 2 m spacing) for conifers and mixtures, and 3,300 stems / ha (at 2 m x 1.5 m spacing) for broadleaves. ➢ Natural regeneration (NR) may also be acceptable as a component of reforestation under this objective, but only where viable – see Section 4.10. Where NR is being proposed, management details are required regarding safeguards (i.e. maintenance and supplementary planting, if needed) to achieve the required stocking rate at Year 6 (as defined below), should NR prove inadequate. ➢ Appropriate vegetation management and filling-in are required to achieve a minimum of 90% stocking of free-growing trees evenly distributed throughout the plot by Year 6 after planting and / or initial site preparation for NR.

Reforestation for Biodiversity and Water Protection (BIO) This objective applies to situations where the objective is to create a mixture of native woodland and open habitat. This objective involves the creation of woodland cover comprising native broadleaf species and Scots pine, through: • planting, • planting supplemented by natural regeneration, or • natural regeneration alone. Note, Objective BIO is generally limited to plots no greater than 1 ha in size, and can be used adjoining unplanted setbacks installed alongside watercourses. In general, wood production is not a management objective under BIO. However, small scale wood production may be appropriate, e.g. the occasional felling of individual trees by chainsaw, for domestic firewood use. Objective BIO may be pursued *where specific case-by-case justification is presented to, and accepted by, the Forest Service*.	➢ Where planting is undertaken, the minimum initial planting density required is 1,100 stems / ha, planted at 3 m x 3 m spacing, using planting stock derived from sources within Ireland. ➢ Natural regeneration may also be acceptable as a component of the reforestation, but only where viable – see Section 4.10. Where NR is being proposed, the required management plan must detail safeguards (i.e. maintenance and supplementary planting, if needed) to achieve the required stocking (defined below), should NR prove inadequate. ➢ Projects may include measures to reinstate natural hydrological conditions onsite. ➢ Appropriate vegetation management and filling-in are required to achieve a minimum of 90% stocking of free-growing trees evenly distributed throughout the plot by Year 6 after planting and / or initial site preparation for NR. ➢ The application of Objective BIO over areas larger than 1.0 ha may be pursed *where specific justification is presented to, and accepted by, the DAFM*.

Alternative as detailed by the Applicant (OTHER) This objective applies to situations where specific types of forestry are proposed for reforestation after clearfell, e.g. ➢ Agro-forestry, coppicing and short rotation systems (e.g. eucalyptus) ➢ Conifer regeneration ➢ On low productivity sites, where the costs associated with managing existing forests are no longer viable, alternative courses of action can be proposed. For example: ▪ fibre production, e.g. Lodgepole pine planted at 1,600 – 1,800 stems / ha; ▪ the provision of minimum forest cover, e.g. Lodgepole pine planted at 1,100 stems / ha, evenly spaced (this may also be an option on environmental grounds).	Objective OTHER may be pursued *where specific justification is presented to, and accepted by, the DAFM*. Harvest Plan to detail the specific approach being proposed, the justification for selecting this approach, site preparation and fencing details, the proposed species composition and planting density, details of the future management regime, and other information relevant to the approach being proposed.

Forest Removal (DEFOR)

Objective DEFOR may be pursued *where specific case-by-case justification is presented to, and accepted by, the Forest Service*. In all cases, forest land is converted to non-forest land. The objective applies to situations where the forest area is being converted to another land use, for reasons set out in Section 5 of the *Felling and Reforestation Policy* document.

Note on natural regeneration

Natural regeneration (NR) is the establishment of new trees from seed arriving naturally (by animals, wind, water, etc.) onto the plot from overhead, adjoining or nearby seed sources. Areas on the plot where NR is to be actively pursued (primarily under Objective BIO) are to be clearly identified on the reforestation map, and relevant operations described. The following applies:

- Such areas must be limited to where there is a realistic expectation of successful natural regeneration (in terms of area, seed source, etc.) achieving the required restocking target of the Reforestation Objective involved (as set out under 'Prescription'). This assessment should be based on, for example, evidence of advanced regeneration or the presence of suitable parent trees in the overhead canopy or adjoining hedgerows. (A typical approach on a particular site would involve a mixture of planting and NR, the latter focused in areas nearest to adjoining seed sources.)
- Preparatory operations associated with these NR areas can include scarification, fencing and vegetation control.
- Monitor closely, and undertake supplementary planting, if needed, in order to achieve the required restocking target for the Reforestation Objective involved.

end