

APPENDIX 6.4

Invasive Species Management Plan

LITTELTON WIND FARM

Invasive Species Management Plan

Prepared for:
Littleton Wind Farm DAC



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Invasive Species Management Plan

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Abstract: This document provides an Invasive Species Management Plan to provide guidance and strategies for the management of invasive plant species at the proposed Littleton Wind Farm, Co. Tipperary

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1. INTRODUCTION

Littleton Wind Farm DAC has commissioned Fehily Timoney & Company (FT) to prepare an Invasive Species Management Plan as part of the proposed Littleton Wind Farm. Fehily Timoney & Company (FT) has prepared this Invasive Species Management Plan (ISMP) to comply with Regulations 49 and 50, Schedule III of the European Communities (Birds and Natural Habitats) Regulations 2011 to 2021 (not to cause the spread of non-native invasive plant species listed in the Third Schedule). This report details a programme for the monitoring and control of invasive species at and adjacent to the proposed project.

One species listed in the Third Schedule, Japanese knotweed, is present at the proposed development.

1.1 Legislative Context

In Ireland, the spread and propagation of species listed in the Third Schedule of S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 to 2021 is an offence. Under Regulation 49 (2) - save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence. Under Regulation 50 it is an offence to transport a vector material listed in Part 3 of the Third Schedule except under licence.

1.2 Site Description

The proposed development comprises the proposed wind farm (The Site), grid connection (GC) and turbine delivery route (TDR).

The Site is located within Littleton and Lanespark Bogs, within the jurisdiction of Tipperary County Council. The closest settlements to the Site are Urlingford (ca. 5 km to the north-east), Gortnahoe (ca. 2.5 km to the east), Twomileborris (ca. 2 km to the west), Littleton (ca. 2.55 km to the west) and New Birmingham (ca. 2 km to the east) and Horse and Jockey (ca. 4.7 km west). The town of Thurles is located approximately 9 km to the west of the Site.

The proposed GC route will exit north of the Proposed Wind Farm Site along the Local Road L4114 and traverse the following townlands within County Tipperary: Longfordpass East, Graiguepadeen, Longfordpass North, Fennor and Longfordpass South. The cable then enters County Kilkenny, and traverses the following townland within the public road, terminating at the Ballyragget 110kV Substation: Freshford Lots, Borrisnoe, Killawardy, Clomantagh Upper, Acragar, Moneenaun, Urlingford, Kilrush, Glenreagh, Kilduff, Borrisnafarney, Barnane, Sweethill, Ridge, Balief Lower, Bohernarude, Kilmacuddy, Killoskehan, Cloncannon, Grange, Moatpark, Barna, Ballybeg, Parksgrove, Baunaniska, Ballyconra, Stook, Graigueswood, Clone, Borrisbeg, Borrismore, Gortagarry, Clomantagh (Mt. Garret), Mountfinn, Barnagrotty, Balief Upper, Clomantagh Lower, Tobernapeastia, Darbyshill, Monabrika, Aghnameadle and Blakefield.



1.3 Relevant Guidance

The methodology and guidance for this management plan has been devised in consideration of the following relevant guidance:

- NRA, (2010) Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. Revision 1, December 2010. National Roads Authority.
- Property Care Association, (2018). Practical Management of Invasive Non-Native Weeds in Britain and Ireland. Packard Publishing Ltd.
- Kelly et al., (2008). Best Practice Management Guidelines Japanese Knotweed *Fallopia japonica*. Prepared for NIEA and NPWS as part of Invasive Species Ireland.
- Tu, (2009) Assessing and Managing Species within Protected Areas. Protected Area Quick Guide Series. Editor J., Ervin, Arlington, VA. The Nature Conservancy, 40 pp.
- Stokes et al., (2004). Invasive Species in Ireland. Unpublished report to Environment and Heritage Service and National Parks and Wildlife Service. Quercus, Queens University Belfast, Belfast.
- AM-SOP-009 Information and Guidance Document on Japanese Knotweed
- RAPID, 2018. Good Practice Management- Japanese Knotweed (*Fallopia japonica*).
- INNSA, 2017. Code of Practice – Managing Japanese Knotweed

1.4 Surveys and Baseline

1.4.1 Invasive and Non-native Species Recorded at the Proposed Development

An invasive alien plant species survey was carried out in parallel with habitat surveys and general ecology site walkovers during July – October 2025 (See EIAR Vol II Chapter 6). Surveys encompassed the Site (including BEMP area), GC and TDR.

One Schedule III non-native invasive plant species requiring control/avoidance measures was recorded near the proposed northern site entrance. This comprises a small growth of Japanese knotweed. It is located >8m from the edge of the proposed access track felling buffer (see Vol. IV Figure 6-16).

Table 1-1: Invasive species recorded at proposed development

Species	Invasiveness Risk	Legal Status
Japanese knotweed (<i>Fallopia japonica</i>)	High	Schedule III

A further four non-native species were recorded (one at both the site and GC, and three along the GC) (see Table 1-2). Due to their non-regulated status and setback from proposed works areas, control/avoidance measures are not required for these species.



Table 1-2: Non-native species recorded at proposed development

Species	Invasiveness Risk	Legal Status	Location
Cherry laurel (<i>Prunus laurocerasus</i>)	High	None	GC
Sycamore (<i>Acer pseudoplatanus</i>)	Medium	None	GC Site
Traveller's-joy (<i>Clematis vitalba</i>)	Medium	None	GC
Wall cotoneaster (<i>Cotoneaster horizontalis</i>)	Medium	None	GC

A number of other non-native species Red osier dogwood (*Cornus sericea*), Snowberry (*Symphoricarpos albus*), Winter heliotrope (*Petasites fragrans*) which are not assessed as invasive were also recorded along the GC.

No invasive or non-native species were found at TDR nodes during site walkovers.

1.4.2 Desktop Records

A desktop record of the Schedule III invasive species giant hogweed (*Heracleum mantegazzianum*) was noted in the vicinity of the grid connection, specifically at Clomantagh Lower within 100m grid square S353633, located c. 450m south of the proposed grid connection. The area in which this plant was recorded in down-gradient of the GC and there is no downstream hydrological connectivity between this area and the GC. The observer noted plants growing along a channel from a groundwater spring to the Nuenna_010 waterbody.

As such, current baseline conditions do not require measures to avoid, contain or eradicate this species. However, due to its high invasiveness risk, legal restriction and human health risks, measures to control this species are provided as a precautionary measure.



2. INVASIVE SPECIES CHARACTERISTICS

The International Union for Conservation of Nature (IUCN) in their 'IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species' 2000 report describes non-native invasive species (referred to as an invasive species) as:

“an alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity”.

Species descriptions for Japanese knotweed (recorded at the Site) and giant hogweed (desktop record c. 450m from GC) are provided in this section.

Accounts of these species, summaries of their ecology, distribution, growth, and management periods are included below.

2.1 Japanese knotweed *Fallopia japonica*

According to the Invasive Species Ireland Project who have carried out a risk assessment of Japanese Knotweed (*Fallopia japonica*), which is distributed throughout the island of Ireland, the species is “one of the highest risk (most unwanted) non-native invasive species in Ireland”. The species poses a risk to open and riparian areas where it spreads rapidly to form dense stands, excluding native vegetation and prohibiting regeneration. This process has been known to reduce diversity and alter semi-natural and locally important habitats for wildlife. Once stands become established, they are extremely persistent and difficult to remove. Japanese knotweed can grow through weaknesses in both tarmac and concrete. Population clusters must be completely removed, under appropriate licencing, before site works or specific projects within the site can commence (Kelly et al., 2008).

2.1.1 Species Ecology

Although Japanese knotweed plants flower, all flowers in Ireland and Britain are female, precluding the possibility of sexual reproduction. The means of spread is entirely through the movement of rhizomes or rhizome fragments in soil or cut stems. Japanese knotweed has an extraordinary ability to spread vegetatively from crown, stem and rhizome (underground root) if disturbed. Even tiny amounts of cut stem, crown or rhizome can produce a new plant.

Controlling the spread of the species is therefore dependent on preventing the spread of the stem, crown or rhizome. Japanese knotweed causes numerous impacts, both ecological and economic. It is capable of outcompeting native plants and blocking commuting corridors of native mammals, and damaging buildings, tarmacadam and concrete. In waterways, it can block and reduce water flow, increasing the risk of flooding. In winter, when it dies back, it can leave riverbanks bare and open to erosion.

Red/purple shoots appear early in spring, which in some cases have an asparagus-like appearance but, as the canes grow, the leaves unfurl, and the plant takes its more characteristic appearance. The mature canes are like bamboo, being hollow, and have a characteristic pattern of purple speckles. The leaves are shield-shaped with pointed tips and a flat base, arranged in a zig-zag formation. The plant can grow to over 3m in height. Flowering occurs in late summer/autumn (End July – typically August) and consists of small creamy white flowers. During the winter the leaves die back and reveal orange/brown woody erect stems. Rhizomes are bright orange inside and can extend to a depth of 3m and a width of 7m around the visible growth above ground.



Source: “Expansion of Japanese Knotweed” by U.S Fish and Wildlife Service – Northeast Region is licensed with CC PDM 1.0 (<https://www.flickr.com/photos/43322816@N08/5951588772>)

Plate 2-1: Characteristic Features of Japanese Knotweed

2.1.2 Timeframe

Japanese Knotweed shoots typically appear between March and April. During this time energy stores from the root system are used to facilitate initial growth. The summer growth period commences in May and lasts until July, typical growth occurs during this time. Flowering begins in August and lasts until October. During this time the pale flowers can be seen.

Plate 2-2 indicates the suitable period for glyphosate herbicide application to treat Japanese Knotweed. It is suitable to use glyphosate herbicide on knotweed between the months of May and October, with August, September and October being the preferred months of use.

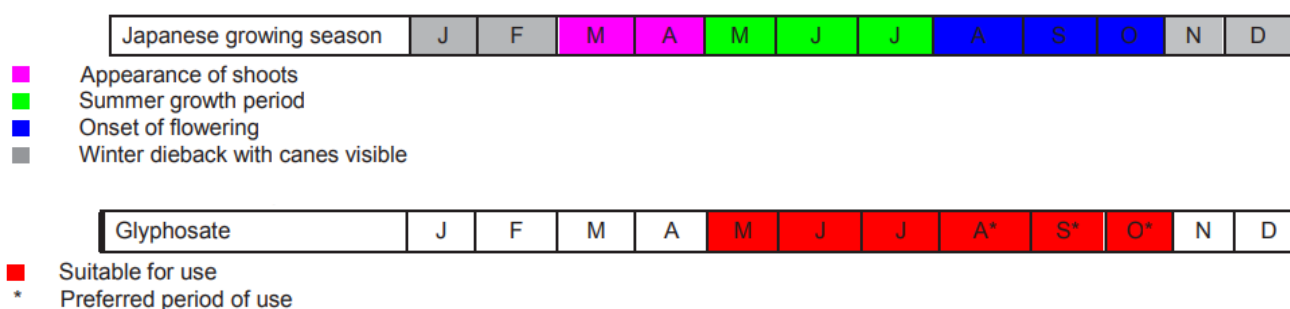


Plate 2-2: Japanese Knotweed Growth season summary (Kelly, et al., 2008).



2.2 Giant hogweed *Heracleum mantegazzianum*

2.2.1 Species Ecology

This is an extremely large (up to 5m tall) perennial herb which lives between 3-5 years. Stems are up to 10cm thick at the base, coloured green with purple blotches; root is pale yellow. Leaves are pinnate (opposite pairs of leaflets with one terminal leaflet) up to 1m length and 2.5m across; 10mm cream-white flowers are borne in umbels (disc-like clusters) up to 50cm in diameter. The mechanism of spread is by seed, with up to 50,000 seeds being produced when the plant reaches maturity (3-5 years), after which it dies. As such the plant may have a low growth form early in the season, as new plants develop from seed.

Giant hogweed produces large seeds which drop from the plant on maturity; they can potentially also be transported by flowing water and wind. The seeds regularly remain dormant in the soil for 1-2 years (5% found to survive 2 years; Nielsen et al., 2005) but may remain viable for up to 15 years (Maguire et al., 2008) and as such removal and eradication efforts must focus on not only the plant itself but also seed banks in the soil.

Its ecological impacts include outcompeting native flora when dense stands produced by prolific seeding colonise areas, and increased riverbank erosion when the plants die back in winter. Seeds usually disperse within the vicinity of the parent plant; there is potential for them to be transported further however by transport on animals, human intervention (e.g. machinery or soil movement) or in flowing water (this species is known to colonise river corridors).

It also poses a serious human health hazard, as contact with the sap can cause a condition called phytophotodermatitis, which causes painful blistering of the skin, which can persist for years with exposure to sunlight re-triggering symptoms.

This species has been assessed by the National Biodiversity Data Centre as having a risk of high impact on native Irish species.



"Giant Hogweed (*Heracleum mantegazzianum*)" by [Jeremy Halls](#) is licensed under [CC BY-SA 2.0](#). (<https://www.flickr.com/photos/33239614@N02/12704706783>)

Plate 2-3: Giant hogweed leaves



2.2.2 Timeframe

The optimum time to control giant hogweed is around April/May, when the first foliage appears and the largest seedlings establish a leaf rosette.



3. PROPOSED MEASURES FOR MANAGEMENT OF INVASIVE SPECIES

3.1 Recommended Measures

While it is extremely important and more efficient to contain invasive species at the point of infestation, care shall also be taken to ensure the management plan (Section 4) is adhered to ensure that invasive species are not spread outside the works area. Furthermore, none of these invasive species will be planted as part of landscaping the proposed project.

Invasive Species Ireland (ISI) notes that invasive non-native species are the second greatest threat (after habitat destruction) to worldwide biodiversity. Invasive species negatively impact Ireland's native species; changing habitats and ultimately threatening ecosystems which impacts on biodiversity as well as economics as they are costly to eradicate.

Through prevention, early detection, rapid response, eradication, and control measures, we can reduce the risk of their introduction, establishment, spread, and impact (Invasives.ie, 2022).

Specific consideration will be given to particular locations, due to their potential for disturbance during works. As a general rule, where invasive species are within the footprint of proposed works, they must be contained and disposed of correctly. Where they are outside the proposed footprint, avoidance can be relied on where feasible to prevent their spread. As such, options for avoidance, control and removal are detailed below.

3.1.1 Prevention of spread within the works footprint

Prevention of the spread of invasive species will be achieved by:

- The full implementation of the invasive species management plan (Section 4) in conjunction with a competent and experienced Invasive Species Specialist Contractor.
- Supervision of control measures and treatment works by an appropriately qualified ecologist or invasive species specialist.
- Raising awareness to site workers via toolbox talks given by a suitably qualified person as part of site inductions; informing workers what to look out for and what procedure to follow if they observe an invasive species.
- Only planting or sowing native species within the proposed project lands will be allowed.
- Where invasive species have been physically removed and soil disturbed, this soil will be seeded or replanted (including 5cm deep mulch) with native plant species. This will prevent erosion and the easy colonisation of bare soil by invasive species in the area.
- Unwanted material originating from the site (including soil, rhizomes and other material) will immediately be transported off site by an appropriately licensed waste contractor and disposed of properly at a suitably licenced facility, in accordance with the (NRA, 2010) guidelines, i.e., where cut, pulled or mown non-native invasive plant material arises, its disposal will not lead to a risk of further spread of the plants. Care will be taken near watercourses as water is a fast medium for the dispersal of plant fragments and seeds. Material that contains rhizomes, flower heads or seeds will be disposed to licensed landfill. All disposals will be carried out in accordance with the Waste Management Acts.
- Signs will warn people working within the site that there is invasive species contamination.
- Ensure appropriate biosecurity measures are in place; these will include the Check Clean Dry method, along with those outlined below:



- Remove the build-up of soil on equipment
- Keep equipment clean
- Do not move fouled equipment from one site to another
- Footwear and clothing of operatives working near invasive species should be checked for seeds, fruits, knotweed rhizomes or other viable material before exiting invasive species control zones and/or the site
- All vehicles exiting the site will be examined to prevent the transport of rhizomes, seeds and other plant material.
- Follow instructions provided for containment of invasive species (Section 3.2).

3.2 Containment

The three most common ways a site can become infected are:

- Importation of infested soil.
- Contamination on vehicles and equipment.
- Illegal dumping.

Containment of invasive species will be achieved by:

- A pre-construction survey to reconfirm the findings of the baseline survey during the growing season immediately prior to the construction phase. This will mark out the extent of invasive plant species. This survey shall inform the finalised draft of the invasive species management plan prior to the commencement of works. Prior to the construction phase, invasive species are to be treated (Section 3.4 for treatment methods).
- A licensed invasive species contractor shall be engaged to remove invasive plant species prior to development.
- Cordoning of invasive species outside the works footprint shall include a buffer of 1m the area of infestation. When larger buffers are required this shall be specified in Section 3.4. This will prevent plants with underground rhizomes being transported to other sections of the site and it will also prevent contact with plants which could result in the transport of seed, fruit or vegetation to other parts of the site. No construction works will occur within exclusion zones prior to the eradication of invasive species.
- No contaminated soil (soil containing non-native invasive species material) or vegetation shall be removed from site unless proper biosecurity (Refer to Section 3.2 above) is observed and removal to a suitably licenced facility is carried out by an appropriately licensed waste contractor.
- New sightings of the invasive plant species identified at the proposed site shall be relayed to the contractor for invasive species control. These areas shall follow the same protocol as the current infected areas.
- It is possible, particularly in the first year of control, that new plants will sprout following the initial removal/treatment, either because shade suppression will be reduced or due to soil disturbance. As such, several additional visits will likely be required. Three visits, during May/June, July/August and September/October should be sufficient to catch all regrowth, although a cautionary approach is advisable and pending the outcome of initial visits, further monitoring and control measures may be required.



3.3 Limitations on Herbicide Use

Due to the potential for significant negative effects on the aquatic environment from herbicides, the prioritisation of physical control over chemical methods must guide management strategies.

It is recommended to avoid spraying as an application method unless essential, instead favouring application using 'weed wipers' or direct injection if herbicides are deemed necessary.

Any herbicides used must be DAFM approved.

3.4 Species-Specific Measures

3.4.1 Giant hogweed *Heracleum mantegazzianum*

A historical record of this species is present c. 450m from the GC. As such, the current baseline does not require measures to be implemented for this species. Measures are included here on a precautionary basis, to be deployed in the event that preconstruction surveys indicate any changes in the baseline which may require their implementation.

The following management considerations should be taken into account:

- Seed can remain viable for up to 15 years; however most will persist for only 1-2 years
- Soil within 4m of parent plants is likely to contain a large number of seeds
- Most seeds are found within the top 5cm of soil
- Plants can regenerate from the central crown of the main root
- Giant hogweed produces phytotoxic sap, which poses a serious human health hazard.

These factors result in a number of basic requirements:

- Follow-up monitoring for regrowth (spring - autumn) will be required for several years following implementation of control/eradication measures.
- No machinery or construction operatives shall enter a 5m exclusion zone around plants.
- Soil from the 5m exclusion zone around plants shall only be moved under controlled conditions, if disposal is required.
- A risk assessment shall be carried out in advance of control/eradication works, and all personnel involved will require adequate PPE to prevent contact of plant material with skin.

One key option is proposed for the treatment of giant hogweed:

3.4.1.1 *Option 1: Physical Control*

- Young plants can be pulled or removed using hand tools.
- Larger plants can be cut back, and the lower stem and main root removed separately.
- The central root crown must be removed to prevent regeneration.



- Ripe seed-heads should be covered with bags and cut separately before digging/cutting to prevent the accidental spread of seed.
- Smaller seedlings should be left to grow for several weeks as larger plants are easier to remove.
- Mechanical cutting devices will not be used, as they can stimulate growth and spray sap onto operators.
- Vector material requiring disposal will be stored in a secure area onsite until it is non-viable or will be transported off site by an appropriately licensed waste contractor to a suitably licenced facility.

3.4.1.2 *Additional Option: Chemical Control*

- Foliar sprays of glyphosate or 2,4-D can be used for large infestations; broad-spectrum herbicides will also kill off non-target species however. Direct application of herbicide (e.g. using a 'weed wiper' or stem injection) should be used in favour of spraying.
- Foliar application should be undertaken in mid spring during dry mild weather, before the stem has fully elongated. If undertaken later in the year, plants should be cut back to ground level and re-growth treated.
- Due to the presence of sensitive aquatic receptors and semi-natural habitats, herbicide shall only be applied by stem injection or using a 'weed wiper'.
- Operatives treating giant hogweed require a valid certificate for herbicide application.

Material (soil, vegetation, etc.) contaminated with giant hogweed can only be transported offsite under the conditions of a relevant licence from the National Parks and Wildlife Service (NPWS). The material can only be removed to a prearranged EPA licenced waste transfer/disposal facility by the licenced haulier.

3.4.2 Japanese knotweed *Fallopia japonica*

One small growth (several stems) of Japanese knotweed is present near the proposed bell-mouth site entrance onto the Longfordpass local road (see Figure 6-16). A buffer of > 8m separates this from the nearest proposed site activity (edge of access track felling buffer). A further 7m buffer lies between the edge of the felling buffer and the proposed access track, providing a buffer of > 15m between the current baseline growth and closest proposed construction area.

In addition, two stands of Japanese knotweed have been recorded within 10km grid square S25, at 52°37'55.87" N, 7°41'33.8" W, respectively. It is noted that the latter is outside of the Study Area. The area in which the former is located was surveyed during 2025 site walkovers; no Japanese knotweed was observed within the proposed development footprint or surrounding area at this location.

As such, it is highly unlikely that either construction or felling activities will interact with growths of knotweed.

However, measures to control/eradicate this species are provided to ensure any potential changes to the baseline are mitigated against.

It may also be preferable to eradicate the growth of knotweed at the northern site entrance in order to avoid the requirement for repeated surveys and control measures during the operational phase.



The following measures to prevent the spread of Japanese knotweed can be implemented during the proposed works:

- Japanese knotweed root systems can extend up to 7m in a lateral direction (but usually only up to 5 m), and 2m deep from the over ground parent plant. This 7m buffer zone and infested area will be fenced off prior to and during works to avoid spreading seeds or plant fragments around or off-site.
- Erection of adequate site hygiene signage in relation to the management of non-native invasive material as appropriate and to inform contractors of the risk.
- All staff shall be made aware of nature of threat via toolbox talks as part of site inductions.
- Ensure all site users are aware of measures to be taken and alert them to the presence of the Invasive Species Management Plan.
- Site works will only be allowed within exclusion zones following the removal of Japanese knotweed and contaminated soil.
- All machinery vehicles, equipment, footwear, and clothing operating within area of infestation to be thoroughly checked and cleaned in appropriately contained area prior to leaving the area to protect against further spreading of Japanese knotweed.
- Avoid if possible using machinery with tracks in infested areas.
- No stockpiling of contaminated soil will occur on-site.
- For soil imported to the site for infilling, the contractor will gain documentation from suppliers stating that it is free from invasive species.

Options proposed for the treatment of Japanese knotweed are described below.

3.4.2.1 *Herbicide Treatment*

Herbicide treatment using glyphosate (Round-up Biactive formulation) has been successfully used by IFI to control Japanese knotweed. This herbicide can be used as a foliar application, through stem injection or as stump cut application where the stems are cut and the herbicide is directly applied immediately after cutting.

Treatment can be carried out between May and October. For best results, it is recommended that foliar treatment is conducted in July, with follow-up treatment in September. For stem injection, treatment is most effective when applied to flowering stems (late summer to October). For stump cut application, treatment is most effective in September / October before senescence occurs.

Stem injection and stump cut application can be used to treat individual knotweed canes when they are interspersed among native vegetation, avoiding effects on non-target species. For stem injection, glyphosate should be injected into the cane between the 1st and 2nd node above the stem base.

For stump cut application, individual stems should be cut 20 cm above their base and 4 cm above a node, and the cut surface should be hollowed out to create a well. The herbicide can then be applied within 15 minutes of cutting with a pipette. For both treatments, a 10 ml dose per stem is recommended (made up of 5 parts water and 1 part glyphosate).

For extensive stands, it may be also necessary to mechanically excavate a 7 m area around the stand to 3 m depth to remove any knotweed rhizomes present. The excavated spoil should be disposed of in a biosecure manner (e.g. removed to a licenced landfill facility). Excavation equipment should be disinfected on site after use to prevent any further spread of the knotweed outside of the treatment area as plants will regenerate from rhizomes fragments remaining in the spoil.



Repeat herbicide treatment will be necessary over a three to four year period to achieve eradication (IFI, 2026).

3.4.2.2 *Physical Control*

Japanese Knotweed root systems can extend up to 7m in a lateral direction (but usually only up to 5 m), and 2-3m deep from the over ground parent plant. The Japanese knotweed stands, in addition to the 7x3m buffer volume, will be excavated.

Following excavation, two disposal methods can be used:

3.4.2.2.1 *Burial Onsite*

This is an option used in situations where there is a pressing development need for the site and time constraints would not allow for in-situ herbicide control over a longer period.

Pre-excavation treatment

The Japanese Knotweed infestation must be treated with a non-persistent herbicide before removing. When sufficient time has been allowed for the herbicide to take effect (at least a fortnight) the canes are to be cut and removed and contained for burial.

Herbicides can be applied using a range of suitable applicators, however 'weed wiping' or stem injection are preferable due to reduced potential for non-target plants and surrounding soil to be affected. Herbicide application must be carried out in calm, dry conditions, also allowing for a dry period following application. Control is easier if dead winter stems are tidied over the winter months to assist with access before growth commences i.e., to prevent tripping interfering with the knapsack lance. It is advised to leave live canes in situ to reduce the risk of spread to other sites. Care must be taken to avoid spreading Knotweed crowns when tidying dead canes. Application in sensitive vegetation areas is best achieved by stem injection or weed wiper.

Stockpiling Japanese Knotweed infested soil prior to burial

If soil containing Japanese Knotweed is stockpiled, the material must be stored in a manner that will not harm the environment. The stockpile will be on an area of the site that will remain undisturbed. The area will be clearly signed and cordoned to prevent interference.

As a precaution, the stockpiled material must be laid on a root barrier membrane to avoid contaminating the site further and covered fully with the same material to avoid dispersal via wind.

Burying the material

Soil containing Japanese Knotweed material may be buried on the site where it is produced to ensure that it is completely eradicated.

It is advisable to apply a non-persistent herbicide at least once to reduce the growth of infective material. The period during which the herbicide is 'active' is described on the product label. Material cannot be buried during that period of activity.

Material must be buried on-site at least 5m deep. The Japanese Knotweed material must then be covered with a root barrier membrane layer before infilling it to 5m deep with inert fill or topsoil.



Root barrier membranes that may have been used to protect clean ground from vehicles involved in excavating Japanese Knotweed must also be buried. This method relies on the depth of burial as the main Japanese Knotweed treatment, rather than the protection from the root barrier membrane.

Where on-site burial is used, the area of deposition must be accurately mapped and the location recorded to prevent potential disturbance and re-infestation, future owners must be advised of its position. Japanese Knotweed is likely to survive for many years, depending on how effective the treatment was before it was buried. It is essential that it is not buried in a location where landscaping, installing services, building foundations are proposed or erosion from a watercourse is likely.

Where the deep burial of the dead Japanese Knotweed material is the preferred method of disposal, it is recommended to use glyphosate formulations. Other persistent herbicides are not allowed for deep burial under various waste regulations and due to a potential risk of pollution of groundwater.

Material, including contaminated soils, rhizome and the crown at the base of the stem, must be buried:

- at least 5 metres deep
- at least 10 metres from the margins of the site or any engineering features, for example drains or bunds, of the site

It is only acceptable to bury Japanese Knotweed material if the soil is otherwise uncontaminated.

3.4.2.2.2 Moving soil and treated Japanese Knotweed off site

Material (soil, vegetation, etc.) contaminated with Japanese knotweed can only be transported offsite under the conditions of a relevant licence from the National Parks and Wildlife Service (NPWS). The material can only be removed to a prearranged EPA licenced waste transfer/disposal facility by the licenced haulier using a truck fitted with a cover to prevent escape of any vector material. During excavation for off-site disposal, great care needs to be taken to avoid excess waste and ensure the excavated Japanese knotweed does not contaminate surplus soil that is currently free from infestation during excavations. When transporting soil infested with Japanese knotweed, it is essential to carry out strict hygiene measures. If proper standards are not followed, this may lead to Japanese knotweed spreading.

Trucks that transport the material will only be filled up to a maximum of 20cm from the top. The void must be sealed with a well-secured membrane.

There must be enough membrane to seal the soil into a temporary cell for transporting. It is very important that the soil is contained to prevent any material being lost when it is moved. To contain the soil in the short-term, you can use a lower specification of membrane.

The final fate of knotweed material transported off-site would be deep burial or incineration at an appropriately licensed facility.

3.4.2.3 Chemical Pre-treatment

Japanese knotweed is highly invasive and physical methods undertaken together with chemical treatment can prevent re-infestation.

At least two weeks prior to excavation, Japanese knotweed can be treated with a non-persistent herbicide e.g. glyphosate. Extreme caution and only approved herbicides will be used when applying herbicide



4. MANAGEMENT PLAN

The management of any invasive species is achieved by the assessment and mapping of the invasive species, containment once found, continual monitoring and record keeping as well as the safe disposal of invasive species material. It is recommended that surveys be carried out periodically at the site to monitor the extent of invasive flora and the success of the control and management measures. These can be carried out by FT, or a contractor specialised in invasive flora treatment. Monitoring shall continue during the construction period and as part of post construction monitoring to ensure successful control has been achieved. All invasive species which occur within the area utilised by people and machinery during the proposed construction works will be controlled/removed from the works area before commencement of works.

4.1 Containment

For the efficient use of resources, namely financial and physical effort, it is important to prevent the further spread of invasive species. Containment will be achieved using measure outlined in Section 3 and those presented below:

- Landholder to be informed of location of the invasive species and the management plan.
- Ensure anyone treating the infestation is a suitably qualified trained professional who follows the management plan.
- The site will be re-surveyed prior to treatment/construction works to confirm the findings of the original survey.

4.2 Schedule

Periodic re-surveying for all invasive species will be required, to ensure that treatment measures were effective, and to trigger further treatment if necessary. Refer to Table 3-2.

Please note that the schedule may require amendment following any given site visit.

Table 4-1: Schedule for Management of Invasive Species

Time	Details of Measures
<i>Pre-construction (isolation of invasive species)</i>	• A pre-construction survey (to reconfirm the findings of the EIAR) will be undertaken during the growing season to mark out the extent of invasive species within the footprint of the project prior to any works commencing on-site. • All invasive species observed shall include a suitable buffer (see Section 3.4) surrounding the area of infestation. This will prevent plants with underground rhizomes being transported to other sections of the site and it will also prevent contact with plants, which could result in the transport of seed, fruit or vegetation. • Treatment of invasive species using one or more of the treatment options proposed in Section 3. • Only once treatment has been completed and invasive species have been removed from within the area of works will works commence. • Toolbox talks on invasive species shall be given to all personnel accessing the site.



Time	Details of Measures
	Disposal of all cut and excavated plant matter, if chosen to be processed off-site, must be done so through a licenced waste processor. Adequate licences may also be required for the transportation of such matter.
<i>During Construction</i>	- Following treatment, site to be monitored for signs of regrowth/spread to new areas. - Toolbox talks shall be given to all personnel accessing the site, informing them of the locations of the invasive species and instructing them not to enter these areas (unless they are licensed invasive species contractors or ecologists). - Designated curtailment areas will be demarcated for the transport of invasive species offsite. - Machinery to be used in the control of invasive species will be itemised, and only that specific machinery will be used for excavation/control measures. - The build-up of soil on equipment will be removed and fouled equipment will not be moved between sites, or between the curtailment area (demarcated areas with invasive species and for transport of invasives)/clean down area and the rest of the site. - Footwear and clothing of operatives working near invasive species will be checked for rhizomes, seeds, fruits, or other viable material before exiting the site. Boot brushes will also be utilised. - All vehicles exiting the site will be examined to prevent the transport of seeds/rhizomes/plant material. - If re-growth of invasive species is discovered, further treatment/control will be completed using the treatment methods detailed in Section 5. - Site to be monitored during works for signs of regrowth of all invasive species.
<i>Post Construction</i>	For 5 years following construction, site to be monitored annually for signs of regrowth of invasive species, triggering further control measures as required. Any maintenance work requiring clearance of vegetation will require an invasive species survey and if required control/eradication measures for the area being accessed prior to works.

4.3 Mapping, Evaluation and Record Keeping

During the preconstruction and construction phases the following will take place before control measures:

- Check that the area of infestation is still cordoned off and a warning/information sign is still in place
- Photographs of the area(s) of invasive species infestation
- Map the extent via recording GPS coordinates and measure the length and width of infestation (including above and below ground rhizome growth) and plot on map
- Evaluate the status/condition of the infestation
- Make sure the above steps are recorded



At the end of each site visit the recorded data should be compared with the findings of this report. Preparation of a short report on the progress of treatment following treatment works, and any subsequent monitoring.

4.4 Appropriate Disposal

4.4.1 Storage

All cut and excavated plant matter will be stored securely in line with the relevant treatment methodology. If invasive species vector material is required to be stored on site, it will be stored in a secure designated area with signage within the site boundary.

4.4.2 Disposal

Disposal of plant matter and infested soil onsite will be undertaken in a manner which ensures no further spread of invasive species occurs.

If transported off site, disposal of plant matter and soil off-site will be completed through an appropriately licenced haulier and waste facility.



5. DISCUSSION AND CONCLUSION

There is a legal obligation not to spread plants listed on the Third Schedule of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 to 2021; the relevant species at the proposed site and therefore the species of principal concern is Japanese knotweed. Additionally, of concern for the invasive species management plan is the presence of a historical record of giant hogweed c. 450m from the GC.

A competent and experienced invasive species management contractor is required to be appointed to treat and control invasive species. A dedicated invasive species survey will be undertaken by the appointed contractor to re-confirm the findings of the previous survey and to identify any new areas of infestation or invasive species.

Both infested and treated areas will be appropriately demarcated and signed to prevent access by unauthorised personnel. Additionally, appropriate biosecurity measures to prevent spread of invasive species are required, as detailed in Section 3.

It is noted that the current baseline poses little or no risk of the spread of invasive species, and measures are primarily included to mitigate against any potential future expansion or invasion of new areas prior to construction. In addition, the eradication of Japanese knotweed is likely to be preferable in order to minimise further survey and control efforts during the operational phase.

5.1 Conclusion

The implementation of this ISMP will prevent the spread of identified non-native invasive species within and from any works areas and reduce the potential risk for the introduction and/or spread of new invasive species within the site prior to, during and after construction.



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