

Invasive Species Management Options Report

Clonburris Phase One

AECOM Ecology

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Clonburris Strategic Zone Development, Co. Dublin



Introduction

Background

AECOM was commissioned by South Dublin County Council (SDCC) to produce an Invasive Species Management Options Report for the Clonburris Phase One planning application (herein referred to as the 'Proposed Development'). The Proposed Development proposes the construction of 263 new dwellings, new community facilities and three large open green spaces which forms Phase One of the development of SDCC lands within the approved Strategic Development Zone (SDZ) at Clonburris, South Dublin County. The location of the Proposed Development is herein referred to as the 'Site'. The Ordnance Survey Ireland (OSi) grid reference of the centre of the Site is O0419132618 and the Irish Transverse Mercator (ITM) coordinates of the centre of the Site are 704133, 732642. The layout of the Proposed Development is shown on the drawing titled *Masterplan – Site Plan for Clonburris Phase One* (produced by Metropolitan Workshop).

This document details the results of a desktop study and field survey completed on 14 April and 20 August 2021 to establish the presence of invasive non-native species within the Site. At this pre-planning stage, this report provides options for management of invasive species within the Site, rather than a prescriptive Invasive Species Management Plan (ISMP), in the absence of detailed discussion with the contractor regarding site construction.

Invasive non-native species surveys have been carried out within the wider Clonburris SDZ lands in July 2015, March 2017, June 2018, and July 2020 (FERS, 2015; FERS, 2018; Minogue & Associates, 2017; and Scott Cawley, 2020b). This report has been prepared as an options report for management of the various invasive non-native species identified during these surveys, and the site-specific survey carried out by AECOM in 2021.

Japanese knotweed *Reynoutria japonica*, butterfly-bush *Buddleja davidii*, cherry laurel *Prunus laurocerasus*, winter heliotrope *Petasites pyrenaicus*, Spanish bluebell *Hyacinthoides hispanica*, and snowberry *Symphoricarpos albus*, all invasive non-native species were identified within the Site. In addition, montbretia *Crocsmia x crocosmiiflora*, an additional invasive non-native species was identified throughout the wider

Clonburris SDZ lands and are therefore presumed to be present within the Site.

Therefore, Japanese knotweed, cherry laurel, butterfly-bush, winter heliotrope, Spanish bluebell, snowberry and montbretia are considered as part of this report. Other invasive non-native species including Himalayan balsam *Impatiens glandulifera*, Canadian waterweed *Elodea canadensis* and Nuttall's waterweed *Elodea nuttallii* were also identified during previous surveys within the Clonburris SDZ lands but were not found to be present within the Site and are therefore not being considered as part of this report.

The location of invasive non-native species present within the Site are presented in Figure 1.

Japanese knotweed

Japanese knotweed is an invasive non-native species, originally introduced as an ornamental garden plant by Victorian plant collectors. It is a perennial plant with vigorous growth and consists of dense stands with extensive underground stems (rhizomes). These rhizomes are responsible for the spread of the plant, which can grow up to 7 m laterally from the parent plant and penetrate 3 m below the ground. However, 3 m laterally is accepted as a likely distance of extent of rhizomes (PCA, 2018a), especially where treatment has been employed on stands of Japanese knotweed or where the surrounding environment presents obstacles to lateral growth.

As Japanese knotweed is outside its native range, it is not exposed to any of the organisms that would naturally limit its spread. Such controlling organisms include bacteria, fungi, viruses, and predators such as invertebrates. The absence of these controls allows rapid and invasive spread of knotweed on sites throughout Ireland. Japanese knotweed out-competes native flora due to the formation of dense stands. If left unchecked, the plant can cause damage to hard surfaces and built structures by exploiting small cracks. Japanese knotweed is easily spread across a site via the movement of soil containing its rhizomes and, to a lesser extent, above ground vegetative material. Japanese knotweed is listed on the Third Schedule of the EC (Birds and Natural Habitats) Regulations 2011 and 2015 (S.I.

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No. 477/2011). The Legislation Section provides further information.

Cherry laurel

Cherry laurel is a shrub or tree, reaching up to 7 m in height, and spreading out widely. The plant is often found in woodland habitats in the wild. Cherry laurel has a native range around the Black Sea but it is now widespread across Ireland. It can form extensive dense shrubberies and has large long, oval, leathery, and shiny leaves, with small teeth along their edges. Long, upright spikes of small pure white flowers are produced abundantly in spring and are followed by small cherry-like fruits. Cherry laurel's rapid growth, coupled with its tolerance of drought and shade, often allow it to out-compete native plant species. The species is listed as a High Impact invasive species listed on the National Biodiversity Data Centre's (NBDC) Prioritisation Risk Assessment.

Butterfly-bush

Butterfly-bush (also known as buddleia) is an invasive non-native species which is native to China but has become common in Ireland as a garden plant due to its flowers, which are known to attract a considerable diversity of butterflies. It favours highly disturbed ground and colonises bare ground rapidly and often forms monotypic stands. It is a multi-stemmed shrub that can reach up to 4 m in height with arching branches, topped with conical panicles of lilac flowers. Each plant can produce up to 3 million seeds that can remain viable in the soil for many years.

Butterfly-bush tolerates very poor soils and can grow on walls, rocks or subsoils. In particular, it poses a threat where such features are left to re-colonise naturally as in rock-cuttings or eskers and can displace native species (NRA, 2010). The species is listed as a Medium Impact invasive species listed on the NBDC Prioritization Risk Assessment.

Winter heliotrope

Winter heliotrope is a rhizomatous perennial plant, native to the Mediterranean region. The plant was introduced to

Ireland for its ornamental value in the 1800s and has since become naturalised. The plant has large and suborbicular (kidney-shaped) leaves and bears racemes of small vanilla-scented flowers in winter.

The species is considered invasive, due to its ability to extensively spread via rhizomes, whilst its large leaves can shade out other plants, outcompeting native biodiversity. The species is frequently found on waste grounds, roadsides, banks, and watercourses. Whilst there is no specific legislation or designation for this species, it has potential to become invasive and is therefore included in this options report.

Spanish bluebell

Spanish bluebell is a spring-flowering bulbous perennial native to the Iberian Peninsula. They have been frequently planted across Ireland and are cultivated as garden plants. Spanish bluebell spreads by seeds and offset (underground runners which form new bulbs). Spanish bluebell is broad-leaved, with pale blue-lilac flowers, which are erect.

Spanish bluebell poses a threat to native common bluebell *Hyacinthoides non-scripta* as the two species can readily hybridise, and the resulting hybrid tends to invade and outcompete native bluebells.

Spanish bluebell is typically found on waste ground, waysides, and woodlands. It is listed on the Third Schedule of the EC (Birds and Natural Habitats) Regulations 2011 and 2015 (S.I. No. 477/2011).

Snowberry

Snowberry is a deciduous shrub that is native to western America. It spreads extensively via suckers and has a white berry-like fruit.

It has been widely planted in Ireland as an ornamental plant and as game cover in woodlands. This species forms dense thickets by suckering which displaces native species.

Whilst there is no specific legislation or designation for this species, it has potential to become invasive and is therefore included in this options report.

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Montbretia

Montbretia is a perennial herbaceous ornamental plant that grows from underground corms that form linear chains. It can reach up to 60 cm in height and is often found along road verges in clusters. Montbretia was originally cultivated in France from parent plants of South African origin. It is usually recognised when in flower by the distinct tubular shape and orange colour of their flower heads. Introduced to Ireland as a garden plant, it has spread rapidly both naturally and through the disposal of garden waste. The corms readily break apart, and the flowers produce viable seed which gives the plant opportunity to spread. It can completely dominate habitat where it grows, sometimes excluding native plant species. Montbretia spreads mainly by rhizomes, and rarely by seed. Whilst there is no specific legislation or designation for this species it has potential to become invasive and is therefore included in this options report.

Invasive Species Management Options Report

The aim of this options report is to identify and prescribe management options based on the overall management objectives of the Site. The report prescribes how invasive plant species within the Site will be controlled and/or removed and prevented from reinfesting. The report provides information and prescriptions on the following aspects in relation to the invasive plant species:

- Legislation;
- Methodology and results of desktop review;
- Management prescriptions including:
 - general measures to prevent spreading invasive non-native species;
 - species specific control plans; and,
- Conclusion.

Once planning consent has been granted, it is recommended that the appointed Contractor prepare a specific ISMP once details of the construction are known and prior to the commencement of works. This would be

based on the options outlined in this options report and relevant guidance.

A site specific ISMP is to be considered as a “living document” and allows for all records related to the future treatment and management of the invasive species to be passed on to future managers / owners of the Site. The specific ISMP should be regularly updated any time treatment of invasive non-native species is performed within the Site and should include photographic evidence of treatment.

Quality assurance

This report was prepared by Alison Donnelly (BSc, MSc (Hons)) Graduate Ecologist with AECOM, reviewed by Jenny Hunter (BSc, MSc (Hons), AMRSB) Senior Ecologist with AECOM and verified by Paul Lynas (BSc (Hons) MRes PhD CEnv MCIEEM) Associate Director (Ecology) with AECOM.

This report has been completed in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, its quality as well as covering all aspects of environmental and Health and Safety management. All staff members are committed to establishing and maintaining our accreditation to the relevant international standards namely BS EN ISO 9001:2008 and 14001:2004 and BS OHSAS 18001:2007. In addition, our IMS requires careful selection and monitoring of the performance of all sub consultants and contractors

Legislation

The Bern Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (herein referred to as the 'Habitats Directive') are international legislation that require the regulation or prohibition of organisms likely to detrimentally affect wildlife or natural biodiversity in the wild. In Ireland, these requirements are reflected in the Wildlife Act 1976 to 2018, as amended by the Wildlife (Amendment) Act 2000 (herein referred to as the 'Wildlife Acts').

A variety of invasive non-native species, such as Japanese knotweed, are listed on the Third Schedule of the EC (Birds and Natural Habitats) Regulations 2011 and 2015 (S.I. No. 477/2011) (herein referred to as the 'Habitats Regulations'), and there are provisions that govern control of such species. It is an offence to release or allow to disperse or escape, to breed, propagate, import, transport, sell or advertise species listed on the Third Schedule. If the species is not controlled, and is allowed to spread into neighbouring properties, the neighbours may be able to pursue the case under: Tort Law (i.e. nuisance law); the Environmental Protection Agency Act 1992, if there has been damage to property; and the EC (Bird and Natural Habitats) Regulations 2011 and 2015. The two Regulations that deal specifically with the Third Schedule list of species are:

- Regulation 49: Prohibition of introduction and dispersal of certain species; and,
- Regulation 50 (yet to be enacted): Prohibition on dealing in and keeping certain species.

Regulation 49

"a person shall be guilty of an offence if they: plant; disperse; allow or cause to disperse; spread or cause to grow the plant in the Republic of Ireland". The list of species in the Third Schedule includes Japanese knotweed, giant knotweed and their hybrid bohemian knotweed".

Regulation 50

"an offence to or intend to; import; buy; sell; breed; reproduce or propagate; offer or expose for sale; advertise; publish a price list; transport; and distribute

any plant species or vector material listed in the Third Schedule".

The offence under Regulation 49(2) is quite serious, if a person commits such an offence then they are liable to:

- *"on summary conviction, to a Class A fine [class A fine" means a fine not exceeding €5,000¹] or imprisonment for a term not exceeding six months, or both"; or,*
- *"on conviction on indictment, to a fine not exceeding €500,000, or imprisonment for a term not exceeding three years, or both"*

Hence it is necessary to highlight that the following is prohibited:

- Dumping invasive non-native species cuttings in the countryside;
- Planting or otherwise causing to grow in the wild (hence the landowner should be careful not to cause further spread);
- Disposing of invasive non-native species at a landfill site without first informing the landfill site that the waste contains invasive non-native species material (this action requires an appropriate licence); and,
- Moving soil which contains specific invasive non-native species, unless a licence from National Parks and Wildlife Service (NPWS) has been obtained.

Furthermore, Regulation (EU) 1143/2014 on Invasive Alien Species (herein referred to as the IAS Regulation) entered into force on 1 January 2015, fulfilling Action 16 of Target 5 of the EU 2020 Biodiversity Strategy, as well as Aichi Target 9 of the Strategic Plan for Biodiversity 2011-2020 under the Convention of Biological Diversity. The core of the IAS Regulation is the list of Invasive Alien Species of Union concern (the Union list). The IAS Regulation provides for a set of measures to be taken across the EU in relation to invasive alien species included on the Union list. The IAS Regulation conveys the rules to prevent, minimise and mitigate the adverse impacts of the introduction and spread (both with and without intention) of invasive alien species, and puts emphasis, in order of preference on:

¹ Section 3 of the Fines Act, 2010

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- Prevention;
- Early identification and rapid response; and,
- Long-term control of existing populations.

In Irish legislation, the Wildlife Acts address invasive non-native species by stating that *“anyone who plants or otherwise causes to grow in a wild state in any place in the State any species of (exotic) flora or the flowers, roots, seeds or spores of (exotic) flora shall be guilty of an offence”* in Sections 52(7) and (8).

The Waste Management Act 1996 as amended and associated regulations must be complied with if Third Schedule species such as Japanese knotweed are, or become, established within the Site. It is a requirement to dispose of this material to a fully licensed waste facility, capable of accepting such contaminated material, with prior agreement in place. This disposal requirement applies to all Third Schedule species material including untreated and treated plant material. It also applies to soil containing the plant material. If the plant material to be disposed of at a licensed waste facility has been treated through chemical means (residual chemicals) that is considered a persistent herbicide, it will need to be classified as hazardous waste and transported and disposed to a fully licensed hazardous waste facility in accordance with Waste Collection Permit Regulations (S.I. No.820/2007 & Amended SI.No.87/2008) and European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations, S.I. No.324/2011. If Third Schedule species contaminated material is removed off Site it will require a licence from the NPWS in advance of any removal, in accordance with the Habitats Regulations.

The use of pesticides is controlled under European Directive 2009/128/EC (the ‘Sustainable Use Directive’) which provides a framework for the sustainable use of pesticides by reducing their risks to human health and the environment. Key points relevant in this instance are listed below:

- Ensure all professional users, distributors and advisors receive proper training;
- Require pesticide application equipment to undergo regular inspections (at least once by 2016, then every five years up to 2020 and every three years thereafter);

- Require professional users to follow safety precautions when handling and storing pesticides and treating their packaging and remnants; and,
- Take all necessary measures to promote low pesticide pest management.

The Sustainable Use Directive is transposed into Irish Law by S.I. no. 155 of 2012, European Communities (Sustainable Use of Pesticides) Regulations 2012.

Methodology

This report has been prepared based on a field survey on 14 April and 20 August 2021 and a desktop study of available ecological data provided in previous reports in relation to the Clonburris SDZ, which includes the Site. The following guidance documents and published reports were consulted during the preparation of this options report:

- *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance*, (TII, 2020a);
- *The Management of Invasive Alien Plant Species on National Roads – Standard* (TII, 2020b);
- *Guidelines on The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (NRA, 2010);
- *The Knotweed Code of Practice: Managing Japanese Knotweed on development sites* (Environment Agency UK, 2013);
- *Invasive Species Ireland Best Practice Management Guidelines for Japanese knotweed* (Kelly et al. 2008);
- *Managing Japanese Knotweed on Development Sites* (version 3, amended in 2013 and withdrawn in 2016): *The Knotweed Code of Practice* (Environment Agency UK, 2010);
- *The Property Care Association's (PCA) Code of Practice for Japanese knotweed management* (PCA (Property Care Association), 2018a);
- *Practical Management of Invasive Non-Native Weeds in Britain and Ireland* (PCA, 2018b);
- *National Biodiversity Action Plan 2017-2021* (NPWS, 2017);
- *South Dublin County Council Development Plan 2016-2022* (SDCC, 2016);
- *Clonburris SDZ Planning Scheme: Strategic Environmental Assessment. Final Environmental Report*. South Dublin County Council (Minogue & Associates Ltd., 2017);
- *Habitat Management Plan. Road infrastructure Development at Clonburris Strategic Development Zone, Clondalkin, Dublin 22*. Clonburris Infrastructure Limited (Scott Cawley, 2020a);
- *Outline Invasive Species Management Plan Clonburris SDZ, Clonburris, Co. Dublin*. South Dublin County Council (Scott Cawley, 2020b);
- *Biodiversity Management Plan to inform the Parks and Landscape Strategy of Clonburris SDZ, Clonburris, Co. Dublin*. South Dublin County Council (Scott Cawley, 2020c);
- *Clonburris SDZ Ecological Survey Report September 2015*. Forest, Environmental Research and Services LTD. (FERS) (FERS, 2015);
- *Ecological Survey of Clonburris Strategic Development Zone, Clondalkin, Co. Dublin* (FERS, 2018);
- *Review of Ecological Data Relevant to Clonburris SDCC Masterplan Lands, South County Dublin*. South Dublin County Council. (Kelleher, 2019); and,
- *Arboriculture Report. Clonburris Infrastructure Works. Clonburris, Co. Dublin* (The Tree File Ltd., 2020).

Results

Description of the Site

The Site is located in Clonburris, Co. Dublin. It is in the townlands of Kishoge and Grange in Co. Dublin and is located to the north of Lynch's Lane, south of the regional Dublin Kildare/Cork railway line, and approximately 70 m west of the outer ring road (the R136). The area of the Site is approximately 11 hectares. The Site is generally flat and is at an altitude of approximately 50 to 60 m above sea level.

The dominant existing habitats within the Site are scrub, recolonising bare ground, dry meadows and grassy verges, and buildings and artificial surfaces. There are existing residential buildings and outbuildings within the Site. Other smaller areas of habitat include hedgerows, treelines, drainage ditches, and mixed broadleaved woodland. The surrounding lands are dominated by meadow fields and residential areas of the wider Lucan, Clondalkin and Liffey Valley communities.

There is a watercourse known as the Kilmahuddrick Stream within the Site, which is not shown in EPA maps and is described as a drainage ditch by Scott Cawley (Stephen Little & Associates, 2020). The Kilmahuddrick Stream is located at the western and southern boundaries of the Site and is culverted underneath the railway line. It flows north-west into the Griffeen River located approximately 720 m downstream of the Site, followed by the River Liffey which outfalls at Dublin Bay more than 18 km east of the Site (AWN Consulting, 2020). The Grand Canal is located approximately 140 m south of the Site, which flows into the Liffey Estuary and then to Dublin Bay.

Invasive species present on Site

Japanese knotweed – a scheduled invasive species – has been identified within the Site. SDCC has recorded Japanese Knotweed in six locations within the Site (Figure 1). This species has been treated between 2017 and 2019 by the SDCC via glyphosate stem injections during this time (AECOM was verbally informed by SDCC during the site visit in April 2021). Three stands of Japanese knotweed were also recorded during invasive

species surveys in July 2020 (Scott Cawley, 2020b), however Japanese knotweed was not identified during the site survey in April or 20 August 2021. The dead stems of this plant though, can be undetected under dense vegetation and the underground rhizomes likely remain present in the Site. Therefore, on a precautionary basis, Japanese knotweed is considered to be present in at least the six locations within the Site where it has been recorded previously by SDCC (Figure 1).

In addition, Spanish bluebell, also scheduled species was identified during the site survey in April 2021.

Cherry laurel, butterfly-bush, winter heliotrope, snowberry, and montbretia (all non-scheduled invasive species) were also either identified during the site survey in April and 20 August 2021, see Figure 1, or from previous surveys on and presumed present on site. (Scott Cawley, 2020b; FERS, 2018; and FERS 2015).

Butterfly-bush was very dense and approximately 5 m in height through the north-east and north-west sections of the recolonising bare ground and scrub mosaic habitat and more scattered in the central northern section of this habitat (mapped these as two different polygons). Cherry laurel was located near the Kilmahuddrick Stream in one location by the entrance of the hardstanding area as single stand approximately 2 m tall and 2 x 2 m in area. It was also located in the south-west of the Site within a treeline. There was one linear stretch of dense winter heliotrope approximately 8 x 1 m in area. Snowberry was located in a small patch (1 x 1 m) in the recolonising bare ground and scrub mosaic habitat in the western section of the Site (Figure 1).

The results of previous surveys for these species are detailed in Table 1.

As mentioned in the Introduction, Himalayan balsam, Canadian waterweed and Nuttall's waterweed were also identified during previous surveys in certain locations within the Clonburris SDZ lands. However, they were all identified to be present outside of the Site and are therefore not being considered as part of this options report.

Results

Table 1. Desktop study findings of invasive non-native species located within the Site.

Common name	Survey date	Species location	Reference source
Japanese knotweed	July 2015	Japanese knotweed was found at numerous locations throughout Clonburris SDZ lands.	FERS (2015)
	March 2017	Located throughout Clonburris SDZ lands, particularly in areas of disturbed ground.	Minogue & Associates (2017)
	June 2018	Identified within the Clonburris SDZ lands but outside of the Site.	FERS (2018)
	13 and 14 July 2020	Three stands of Japanese knotweed were recorded within the Site.	Scott Cawley (2020b)
Cherry laurel	June 2018	Located in hedgerows within the Clonburris SDZ.	FERS (2018)
	16, 17, 31 July 2019 and 13 and 14 July 2020	Recorded throughout the Clonburris SDZ lands, mainly around existing dwellings.	Scott Cawley (2020b)
Butterfly-bush	July 2015	Located in hedgerows within the Clonburris SDZ.	FERS (2015)
	March 2017	Located throughout Clonburris SDZ lands, particularly in areas of disturbed ground.	Minogue & Associates (2017)
	June 2018	Located in hedgerows within the Clonburris SDZ.	FERS (2018)
	16, 17, 31 July 2019 and 13 and 14 July 2020	Butterfly-bush was recorded widely throughout the Clonburris SDZ lands. It has invaded the native hedgerows within the Clonburris SDZ lands.	Scott Cawley (2020b)
Montbretia	June 2018	Located within the Clonburris SDZ.	FERS (2018)
	16, 17, 31 July 2019 and 13 and 14 July 2020	Recorded within gardens of existing buildings within the Clonburris SDZ lands.	Scott Cawley (2020b)

Results

Potential implications of invasive non-native species

Five of the six invasive non-native plant species identified on site fall under the construction footprint of the Proposed Development, this includes both scheduled species, Japanese Knotweed and Spanish bluebell, as well as extensive stands of butterfly bush and a single stand of winter heliotrope and snowberry. Cherry laurel is present within a section of the site to be retained along the Kilmahuddrick Stream.

The presence of invasive non-native plant species within the Site is a potential financial burden, and potentially poses a risk to structures onsite. Once established, they can be difficult and costly to control and eradicate.

Some of the reasons why a landowner and/or client would want to remove the invasive non-native plant species from their property:

- The legal implications of these invasive non-native plant species (e.g. financial fines or imprisonment as described in Introduction and Legislation Sections above);
- The damage invasive non-native plant species have on native biodiversity; and,
- The negative implications that invasive plant species can have on infrastructure.

Options to Control and Prevent the Spread of Invasive Plant Species

This section of the options report outlines general best practice measures for the control and management of invasive non-native species during the construction phase of the Proposed Development. The measures have regard for the guidance documents outlined in the methodology section of this options report.

Overview of management options of invasive species

There are various options for the control and management of invasive species. Removal of invasive species can be done by mechanical means (e.g. excavation) or other control methods such as chemical treatment by application of herbicide. The following sections present an overview of the available management techniques for invasive non-native species. The options presented are indicative only.

Pre-construction surveys

Pre-construction invasive non-native species surveys must be carried out by a suitably experienced ecologist to confirm the presence and extent of any invasive non-native species within the Site prior to construction. Any invasive non-native species identified will be recorded in detail (e.g. including the number of colonies, the approximate size of plant, pattern of growth, and information on other vegetation present).

Biosecurity measures during works

Developing codes of practice, i.e. biosecurity, aim to reduce the risk from, and impacts of, invasive non-native species on sensitive ecological features. Careful planning of the Proposed Development and preparation of the Site will be essential in the control and the spread of invasive non-native species. The species discussed in this options report are highly invasive and are particularly suited to establish on disturbed ground (e.g. construction sites). Invasive species can spread in various ways, with the most common being:

- Site and vegetation clearance, mowing, hedge-cutting or strimming;
- Spread of plant fragments during the movement or transport of soil;
- Importation of soil from off-site sources contaminated with invasive non-native species plant material;
- Spread of plant fragments through the local surface water and drainage network; and,
- Contamination of vehicles or equipment with plant fragments which are then transported to other areas.

Management of invasive species is preferable prior to the onset of construction works. If eradication has not been achieved before construction begins then it is vital to prevent the spread of the plant fragments or seeds by fencing off the affected area(s).

Prevention of spread

Prevention of spread (biosecurity) is a key element of invasive non-native species management, and good housekeeping is of paramount importance.

These measures should include:

- Isolating the infected areas with secure fencing and warning signs to ensure that no unauthorised personnel enter the infested area;
- Prior to any works taking place, a toolbox talk should be given to all relevant site personnel to ensure they can identify and are aware of the location of the invasive species, the impacts of this species and associated risks;
- If any materials are to be imported onto the site, it is recommended that the contractor obtains documentation from suppliers confirming that the material is free from invasive non-native species;
- No new materials should be stored adjacent to the areas of invasive species;
- Ensuring that anyone who enters the infested area (i.e. Contractors) takes measures to ensure there is

Options to Control and Prevent the Spread of Invasive Plant Species

- no spread from the isolated area (e.g. wearing shoe covers within the area and removing when leaving);
- Ensuring that clothing and equipment is cleaned before leaving site, even when just moving between areas within the site;
- If relevant, ensuring that any soil contaminated with invasive non-native plant material is not removed from site; and,
- Monitoring the infested area for new growth.

Offsite disposal of invasive species plant material

Control of invasive non-native species can be carried out by mechanical means which include collecting plant material (e.g. by hand pulling or machine cutting). It is essential that the movement of plant material does not result in the further spread of invasive non-native species. The movement of plant material off site of any plants listed on the Third Schedule requires a licence from the NPWS under Section 49 of the Habitats Regulations.

Invasive non-native species removed off-Site must be transported by a licensed waste carrier and disposed of at a suitably licensed disposal facility (with prior agreement). This method can be completed by the appointed Contractor under supervision of an Ecological Clerk of Works on Site. This method is a relatively time-efficient solution (although it may take time to find a disposal facility that will accept the waste) and is effective in the short-term but is expensive. This will require monitoring by an Ecological Clerk of Works (EcoW) during the excavation. All disposals must be carried out in accordance with the relevant Waste Management legislation (as per legislation and guidance from NRA, 2014).

It is important to note that some invasive non-native species plant material or soil containing residual persistent herbicides may be classified as either 'hazardous waste' or 'non-hazardous waste' under the terms of the Waste Management Acts, and both

categories may require different disposal procedures or permissions. Advice should be sought from a suitably qualified waste expert regarding the classification of waste and the suitability of different disposal measures. As noted above, additional specific measures for the management of scheduled species such as Japanese knotweed cuttings or contaminated soil can be found in the PCA document: *Practical Management of Invasive Non-Native Weeds in Britain and Ireland*. (PCA, 2018b) and Environment Agency document: *The Knotweed Code of Practice: Managing Japanese Knotweed on development sites* (Environment Agency UK, 2013), and further Japanese Knotweed specific measures are outlined in the following Japanese knotweed section.

Herbicide treatment

This is a chemical method used to treat invasive species. This can comprise spraying; stem injection (for mature stands only), or weed-wiping. The type of application used is dependent on factors such as the species and the size of the individual plant or the extent of the stand. This method works best as a long-term solution (approximately 3-5 years), therefore if undertaking this method, long-term assurances would be required to ensure it doesn't return to the Site post-treatment. In order to ensure the safety of herbicide applicators and of other public users of the Site, a qualified and experienced contractor, and qualified Pesticide Advisor, must be employed to carry out all work. This method is not suitable as a sole measure if development is planned to commence in the near future, given the location of this species in relation to the proposed development footprint, however it can be used as an interim measure to help restrict further spread of invasive non-native species.

It is advised that the following documents are referred to during the control of any invasive non-native species as they contain useful information of the identification of species, with details for the timing of chemicals, methodology for chemical control, and for measures to avoid environmental damage during the use of herbicides:

Options to Control and Prevent the Spread of Invasive Plant Species

- Guidelines on The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA, 2010);
- Invasive Species Ireland *Best Practice Management Guidelines for Japanese knotweed* (Kelly *et al.* 2008);
- The Knotweed Code of Practice: *Managing Japanese Knotweed on development sites* (Environment Agency UK, 2013);
- Managing invasive non-native plants in or near fresh water (Environment Agency, 2010); and,
- *Practical Management of Invasive Non-Native Weeds in Britain and Ireland* (PCA, 2018b).

It is recommended that the appointed Contractor prepare a Site-specific ISMP once details of the construction are known, based on this options report and in accordance with the relevant guidelines prior to the commencement of works.

Species specific control plans

This section details the specific control options for each invasive species within the Site as identified in this report.

Japanese knotweed

Prevention of spread

Japanese knotweed can easily spread by the re-growth of cut plant fragments or rhizome. If a plant is broken up or disturbed, it can readily re-grow in new areas to where material is transported. It is important that no Japanese knotweed plants are cut prior to, or during the lifetime of, the treatment programme (assuming mechanical removal is not elected as the preferred option). Infected areas should be isolated with a 7 m buffer zone (or a minimum 3 m), with secure fencing, and the generic prevention of spread measures followed as outlined in the Biosecurity Measures section above.

Japanese knotweed control measures

In the case of Japanese knotweed, physical methods on their own, are unlikely to eradicate Japanese knotweed infestations. In all cases, chemical treatment (as described in Option 1, below), either on its own or in combination with physical treatment (as described in Option 2 and 3, below), will be required (TII, 2020a).

Option 1. Chemical treatment by herbicide

Treatment by herbicide is a suitable, long-term method for management of Japanese knotweed, and can result in the eradication of the species in the long-term.

Herbicide application will reduce the vigour of growth and prevent further spread. If Japanese knotweed has been treated, it may inhibit further underground spread and reduce the amount of soil that needs to be excavated and removed off-Site.

Japanese knotweed should be treated with a systemic herbicide appropriate for use next to water, which will not persist in the environment). The optimal time period for herbicide treatment is late summer/early autumn (September-October, weather depending). Herbicide should be applied in accordance with the instructions supplied with the herbicide, including restrictions on application during periods of rainfall, and wind and spraying both the top side and underside of the leaves for maximum results. Application techniques should involve either spot spraying of leaves using a hand-held knapsack sprayer fitted with a shroud over the nozzle to prevent drift spray and/or a hand-held weed wiper to allow precise application of herbicide on to taller leaves.

In order to ensure the safety of herbicide applicators and of other public users of the Site, a suitably licensed Pesticide Advisor must be employed to carry out all herbicide work and all treatment records should be recorded and kept.

It is recommended that follow-up treatments should be undertaken for a minimum of three growing seasons after control (TII, 2020a). Such a treatment can take up to five years to completely eradicate growth (PCA, 2018b); therefore, further treatment may be required beyond the three years. This will be determined by the results of the annual monitoring. Japanese knotweed does not produce viable seed in Ireland, and therefore seed germination in subsequent years will not be an issue.

Options to Control and Prevent the Spread of Invasive Plant Species

Option 2. Excavation of Japanese knotweed and burial on-Site

If time constraints do not allow for a full programme of herbicide treatment, soil infested with Japanese knotweed may be excavated, and the excavated material can then be buried at a designated area within the Site. Further detail on this method is as follows:

If infested soils must be excavated it is important to determine the extent of rhizome infestation. Excavation must be carried out to a depth where no Japanese knotweed root systems are visible which is generally anywhere from 1 m to 5 m deep, depending on the infestation and soil type.

If excavated material requires transportation, the vehicles containing the excavated material must be confined to designated protected routes and the vehicles must be no more than three quarters full, and sufficiently covered to ensure no material falls out. Vehicles with caterpillar tracks should not be used in infested areas unless appropriate cleaning stations are set up.

Infested soils must be buried to a depth of 3 m covered by a root barrier membrane, or deeper (ideally 5+m) without one. It is important to ensure the root barrier membrane used is protected from damage by placing a layer of sand or plyboard above and below the root barrier membrane, prior to topping with a hard core (or any other suitable material) as specified by the architect or engineer.

It is recommended that material is immediately buried after excavation; however, if this is not possible material should be stored in a designated area and clearly fenced off and sign posted and protected from wind / being blown around Site.

No machinery used during excavation of infested soils should be used for other works until they are fully cleaned down at a designated wash area and visually inspected by a specialist to ensure no fragments of Japanese knotweed are present.

The burial site must be accurately mapped and its location recorded to prevent any potential future disturbance and in turn re-infestation. Any future owners should 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 isn't buried where landscaping, erosion from a watercourse, installing or access to services / utilities or subsequent developments will disturb it.

An ECoW must be present during any Japanese knotweed excavation and should ensure that this options report is followed. A toolbox talk must be provided to ensure their role and authority is understood by everyone working on the Site.

These works will be undertaken in consultation with a professional invasive species expert, under the supervision of the ECoW.

After construction works are complete, follow up surveys will be conducted to survey for regrowth, as described for Option 1, above. If regrowth is observed, then further treatment will be required.

Option 3. Excavation of Japanese knotweed and disposal off-Site

If time constraints do not allow for herbicide treatment and the infested soil cannot be buried within the Site then the excavated material must be transported by a licensed waste carrier and disposed of at a suitably licensed disposal facility (with prior agreement) as hazardous material, under licence by the NPWS. The biosecurity measures described in Option 2 above apply.

Cherry laurel

Although there are no legal provisions associated with growing cherry laurel in the Republic of Ireland, due to the invasive nature of the species it is recommended that it is not included within any planting lists or landscaping designs and that appropriate measures are taken to prevent the spread of cherry laurel throughout the Proposed Development.

Cherry laurel control

Option 1. Mechanical treatment by digging

The stems of cherry laurel should be cut by hand or chainsaw as close to the ground as possible and

Options to Control and Prevent the Spread of Invasive Plant Species

removed. The removal of the above ground parts will not prevent the stumps from regrowing. There are four recommended methods to prevent regrowth of stumps.

Removing the stumps directly by digging can be done manually or mechanically using a vehicle (e.g. excavator). Any stumps that have been dug up should be turned upside down and soil removed from the roots to prevent regrowth.

Option 2. Direct stump chemical treatment

Direct stump treatment involves painting or spot spraying freshly cut stumps immediately with a chemical herbicide. The use and timings of herbicide applications vary according to which chemical is used. It is recommended that vegetable dye is used to mark treated stumps and all stumps should be targeted. A handheld applicator will help avoid spray drift onto surrounding non-target species.

Option 3. Chemical treatment by stem injection

Cherry laurel stumps can alternatively be treated using a 'drill and drop' method. If the main stem is cut and it is large enough for a hole to be drilled into it, the hole can facilitate the targeted application of glyphosate (25% solution).

Option 4. Chemical treatment by spraying herbicide

Spraying regrowth with a herbicide can effectively kill any stump re-growth or seedlings. However, this is not the preferred method as it is not as effective as stump treatment and has the potential to impact on nearby non-target species. As the leaves of cherry laurel are waxy, it is recommended that it is sprayed with herbicide after damp and wet weather, but not during or before rain.

Butterfly-bush

It is recommended that management includes the removal of this species and, if possible, landscape designs to include native species to be planted in its place.

Option 1. Mechanical treatment by physical removal

Physical removal is only applicable where there are only minor infestations at the initial stage of invasion. Young plants may be hand-picked but care should be taken to avoid soil disturbance which could lead to further spread via new seedlings or re-rooting from cuttings. Plants should not be removed when in seed as there is a risk of spreading the seeds further. If removal of mature plants is not immediately feasible, then the flower heads should be removed in June before they go to seed. It is essential to plant the ground with native species immediately following removal to prevent new seedlings taking hold. Excavated material can be incinerated or disposed of to a licensed landfill.

Option 2. Chemical treatment by spraying herbicide

It is recommended that plants are cut back to a basal stump during active growth (in late-spring or early-summer) which is then immediately treated (i.e. brushed on the stump) by systematic herbicide. Foliar application of triclopyr or glyphosate may be adequate for limited infestations of younger plants. However, this should be followed up at 6-monthly intervals.

Do not leave cut stems and branches on the ground as they will re-root and produce new plants.

Winter heliotrope

Winter heliotrope can be eradicated by either mechanical or chemical means. This species is often included in planting lists as an ornamental but as it has the potential to become invasive, it is recommended that this species is not included within any landscape designs for the Proposed Development.

Option 1. Mechanical treatment

Winter heliotrope is susceptible to cultivation. Thorough and repeated digging, rotovating or deep hoeing will eliminate it. Improving drainage will also reduce the plant's vigour. Otherwise, repeated strimming or mowing can eliminate the plant. Repeat visits through the growing season are required to remove seedlings.

Where the infestation is small, the entire stand can be excavated and buried at a depth of 2 m, incinerated or

Options to Control and Prevent the Spread of Invasive Plant Species

disposed of to a licensed landfill. Composting is not recommended.

Option 2. Chemical treatment by herbicide

Herbicide should be applied as spot treatment or sprayed on larger monotypic stands of the plant. Herbicide is most effective when in autumn (October-November) as this is when the species is growing most strongly. Repeat visits through the growing season are required to treat regrowth.

Spanish bluebell

Spanish bluebell can be eradicated by mechanical means. Herbicide is not considered an effective measure for Spanish bluebell. This species is often included in planting lists as an ornamental but as it has the potential to become invasive, it is recommended that this species is not included within any landscape designs for the Proposed Development.

Spanish bluebell can be excavated by hand, however this is only effective for small infestations, as hand digging is time and labour intensive. Mechanical excavation (e.g. digger) to 0.5 m would remove all plant material. Repeat visits through the growing season are required to treat regrowth.

All bulbs and underground parts must be removed. Plants must be disposed of appropriately. Plant material can be disposed of to a licensed landfill as controlled waste. Composting is not a suitable method of disposal. Otherwise, on-Site burial to a depth of 1 m, topped with uncontaminated soil is appropriate to eradicate plants.

An ECoW must be present during any excavation and should ensure that this options report or the specific ISMP is followed. A toolbox talk will be provided to ensure their role and authority is understood by everyone working on the Site.

Snowberry

Snowberry is located in the western section of the Site. It is recommended that management includes the removal of this species and, if possible, landscape designs to include native species to be planted in its place.

Option 1. Mechanical treatment by physical removal

Snowberry is located in the same area as butterfly bush and can be treated similarly. Excavated material can be incinerated or disposed of to a licensed landfill.

Option 2. Chemical treatment by spraying herbicide

A glyphosate-based herbicide can be applied when the plant is in full leaf. However, repeat treatments may be required.

Montbretia

This species is often included in planting lists as an ornamental but as it has the potential to become invasive, it is recommended that this species is not included within any landscape designs for the Proposed Development.

Option 1. Mechanical treatment by physical removal

Physical removal of this plant is difficult as the corms readily break apart and can result in re-infestation and spread. Where the infestation is small, the entire stand can be excavated and buried at a depth of 2 m, incinerated or disposed of to a licensed landfill. The corms are not suitable for composting. A regular monitoring programme should be put in place to record any re-infestation.

Option 2. Chemical treatment by spraying herbicide

Spraying this plant with a suitable herbicide (e.g. glyphosate) during active growth in late spring or early summer is a suitable way to control this species.

Monitoring

Monitoring of invasive non-native species is an important element of management. Monitoring must involve systematically re-surveying the Site to determine if there is any sign of re-infestation. Surveying should be conducted annually in May and again in September (the start and end of the growing season) to assess if further control is required. It is recommended that all locations of excavated infestations must be monitored for a

Options to Control and Prevent the Spread of Invasive Plant Species

minimum of three years following eradication. Monitoring of invasive species should be conducted by an experienced specialist, who can provide advice on spread / reduction of any invasive non-native species and advise on the effectiveness of treatment regimes. Any regrowth or new invasive non-native species identified should be subsequently treated and the options report or the specific ISMP kept updated.

Conclusion

This report provides options to prevent the further spread of invasive non-native species and measures to control these species recorded within the Site. Prior to the preparation of the specific ISMP with the contractor, a re-survey of the Site for invasive non-native species must be carried out to confirm their extent and distribution. Control measures suggested within this report must be implemented by a qualified specialist. The Proposed Development should be monitored after control measures have been implemented and monitoring should take place for a minimum of three years following implementation of control measures. Any regrowth of invasive non-native species should be subsequently treated as detailed in the detailed specific ISMP document.

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Figures

Drawing title *Masterplan – Site Plan* for Clonburris
Phase One (produced by Metropolitan Workshop)

Figure 1 - The location of the Site and invasive non-native species present within the Site



263 Total Units

Site Plan - Ground Floor
1 : 1000

- Key**
- Community
 - Bungalow
 - 2 Storey House
 - 3 Storey House
 - Apartment
 - Duplex
 - Parkside Apartment
 - Services / Bin Store



STAGE 2

Revision	Date	Description	Issued	Checked
P1	15.03.2022	Issued for Pre-Part 8 Planning Application	OB	SC
P2	06.04.2022	Issued for Part 8 Coordination	DK	SC



Notes

Do not scale drawings. All dimensions should be checked on site. Errors to be reported to architect. To be read in conjunction with all relevant architects services and engineers drawings.

Contractors, sub-contractors and suppliers must verify any critical dimensions on site prior to fabrication of any building element. Any discrepancies are to be reported to the architect.

This drawing should be read in conjunction with all relevant specifications, engineers and specialists consultants information. Any discrepancies must be reported prior to installation.

DRAFT

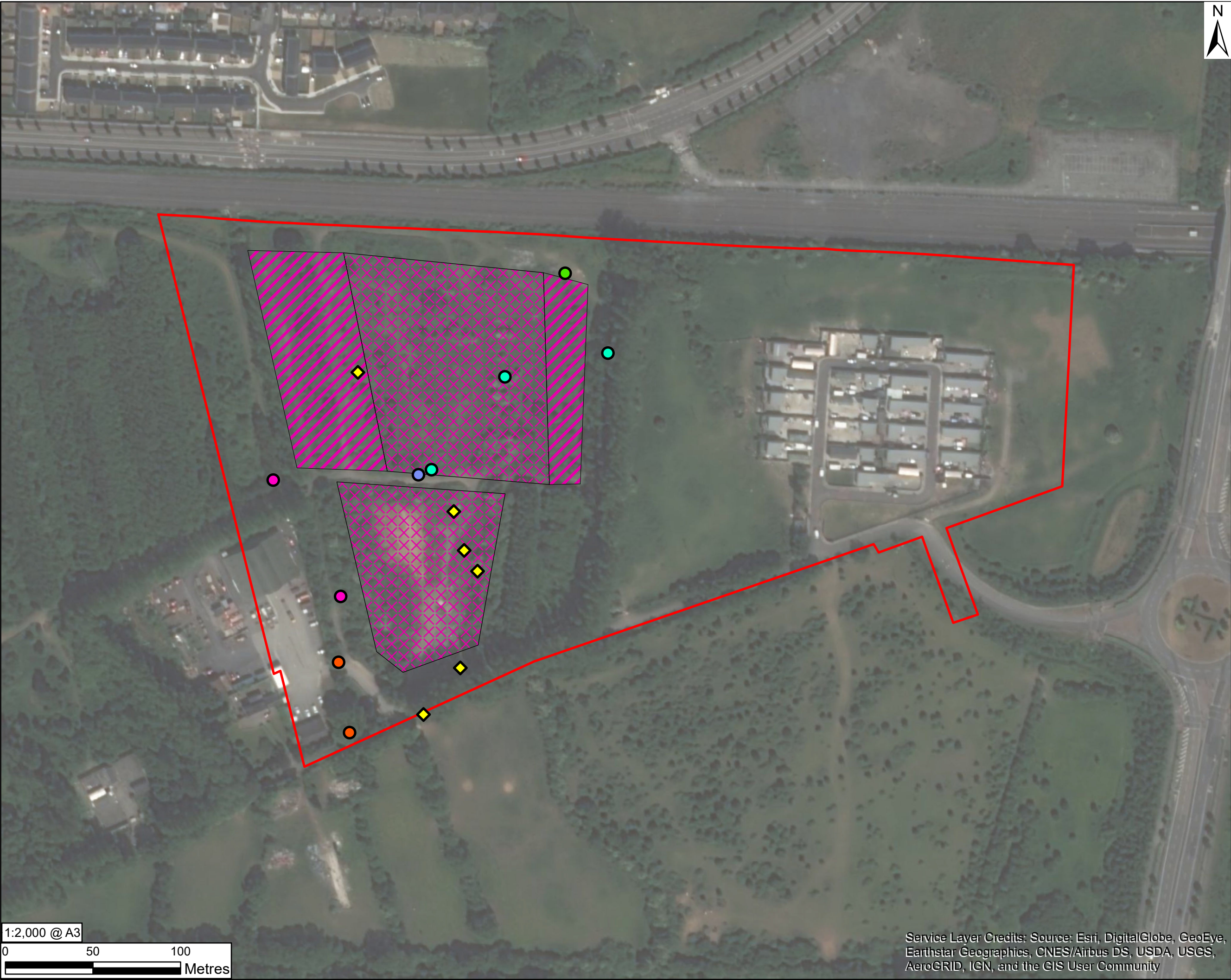
- Site Boundary
- CIL Link Street Planning Application Boundary
- SDCC Lands
- Plot Boundary
- Existing Accommodation Boundary
- Existing Road Line
- Proposed ESB Substation Locations



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Project: Clonburris Phase One
Client: SDCC
Location: Clonburris Co.Dublin
Title: Masterplan -Site Plan
Current Revision Issue Date: 06.04.2022
Scale: As indicated @ A1

Project	Originator	Volume	Level	Type	Reference	Subsidiary	Revision
2015	MET	ZZ	00	DR	A	101101	S2 P2



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AECOM

PROJECT

Clonburris Phase One

CLIENT

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LEGEND

Clonburris Phase One boundary (Site)

Invasive non-native plants (recorded by SDCC)
Point features:

Japanese knotweed (scheduled)

Invasive non-native plants (identified by AECOM in April and August 2021)
Point features:

Butterfly-bush (medium-impact, non-scheduled)

Cherry laurel (high-impact, non-scheduled)

Snowberry (low-impact, non-scheduled)

Spanish bluebell (scheduled)

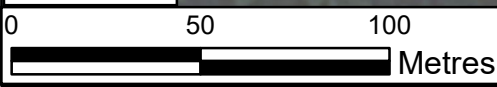
Winter heliotrope (low-impact, non-scheduled)

Polygon features:

Butterfly-bush (dense and continuous)

Butterfly-bush (sparse and scattered)

1:2,000 @ A3



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PROJECT NUMBER

60650394

FIGURE NUMBER

Figure 1