

Visual Impact Provision (VIP)

Peak District (East) Project

Invasive Species Assessment and Biosecurity
Management Plan

January 2020

Quality information

Prepared by	Checked by	Verified by	Approved by
DS Senior Ecologist BSc (Hons) PhD	MF Principal Ecologist BSc (Hons) PhD	CM Associate BSc (Hons)	RP Technical Director BSc (Hons) MSc

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Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

National Grid

Prepared by:

AECOM Limited
5th Floor, 2 City Walk
Leeds LS11 9AR
United Kingdom

T: +44 (0)113 391 6800
aecom.com

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The conclusions and recommendations contained in this Report take into account information provided by the Client about the Proposed Project and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by AECOM has not been independently verified by AECOM, unless otherwise stated in the Report.

The methods adopted, and the sources of information used by AECOM in providing its services are outlined in this Report. The work described in this Report was undertaken in July 2019 and is based on the conditions encountered and the information available during those periods. The scope of this Report and the services are accordingly factual and therefore be subject to minor limitations as detailed in Section 3.3.

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Where field investigations are carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results of any measurements taken may vary spatially or with time and further confirmatory measurements should be made after any significant delay in issuing this Report.

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Summary

AECOM Limited (hereafter referred to as “AECOM”) was instructed by National Grid to conduct an Invasive Species Assessment at Dunford Bridge, South Yorkshire (the ‘Site’) to inform the Visual Impact Provision (VIP) Peak District East Project hereafter termed as the Proposed Project.

During previous ecological surveys undertaken to inform the baseline assessment work, two invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) were identified, within the Site, namely rhododendron (*Rhododendron ponticum*), and Japanese knotweed (*Reynoutria japonica*). The purpose of this report is to determine the specific extent of these two species of plants and provide management options for future treatment and control.

While rhododendron poses the most risk to the Proposed Project due to the scale of the presence at this Site, both Schedule 9 species present have the potential to cause delays, result in control costs (costs which can increase rapidly if the problem is not addressed rapidly) and, if not managed appropriately, result in breaches of legislation. It is therefore important to respond to the presence of these species as quickly as possible and wherever possible commence control action in advance of the Proposed Project works commencing.

The optimal management method for Schedule 9 species on-site involves a combination of avoiding working in the areas where they occur good site hygiene (biosecurity), chemical control and physical removal.

In Section 6 of this report, an actionable management option is provided for both species. The specifications in Sections 6 and 7 can be used to tender for procurement of a suitable supplier to carry out the works. A detailed Method Statement should be produced prior to works by a suitably qualified specialist contractor.

In advance of construction works, action is needed to avoid spreading the seeding plants any further, including fencing off the species and informing personnel who might come into contact with any of the species (e.g. during site investigation, construction and vegetation management) of the requirements to prevent spread. The two initial actions recommended are as follows:

- Where possible, it would be preferable to commence herbicide treatment of Japanese knotweed in advance of commencement of work either pre September 2019 or from April/May 2020 (when plants are in leaf), but at least 3 weeks prior to excavation (late season treatments are optimal), followed by mechanical removal and disposal off site, burial on site, or stockpiling and treatment onsite; and.
- Rhododendron could be felled (with herbicide applied to cut stumps) and chipped onsite prior to December 2019, when seeds are set.

1. Introduction

1.1 The Proposed Project

AECOM Limited (hereafter referred to as “AECOM”) was instructed by National Grid to conduct an Invasive Species Assessment at Dunford Bridge, South Yorkshire (centred approximate Ordnance Survey grid reference 41654 40244). The invasive species surveys were undertaken to inform the Visual Impact Provision (VIP), Peak District East Project (hereafter referred to as the ‘Proposed Project’). The Proposed Project is described in detail in Chapter 2 of the Environmental Assessment Report (EAR) (AECOM, 2019).

1.2 Purpose of this Report

National Grid, and in due course the appointed main works contractor, must ensure that both legal and policy commitments for invasive plant species on the Proposed Project are fully met. As detailed in the EAR and associated Construction Environmental Management Plan (CEMP) (Appendix 2B) and Landscape and Ecology Management Plan (LEMP) (Appendix 2B.3), avoidance and control measures have been embedded into the design and construction of the Proposed Project for invasive species. One of the commitments made in the LEMP was the completion of a pre-construction survey and preparation of a detailed control and removal strategy.

This report presents the findings of an invasive non-native plant survey (also known as an Invasive Species Assessment (ISA)) undertaken by AECOM in order to provide supplementary information to support the LEMP. Whilst not intended to be a specific and final control and removal strategy, it seeks to provide more information to National Grid (and/or the main works contractor) on options and timings of suitable treatment options. Once the most appropriate option has been agreed, the information contained in this report can be used to inform the specific control strategy /method statement.

The presence of two invasive non-native species (INNS), listed on relevant legislation (see Section 2.1 and Appendix A); rhododendron (*Rhododendron ponticum*) and Japanese Knotweed (*Reynoutria japonica*) have been identified within proximity to the Proposed Project during the completion of ecological baseline surveys conducted to inform the Ecological Impact Assessment (EclA) of Chapter 7 of the EAR. As detailed in Chapter 7 of the EAR, these surveys included the initial Phase 1 Habitat Survey and subsequent botanical surveys.

1.3 Defining the Survey Area

The area covered by the INNS survey focussed on the footprint and immediate surroundings of the Proposed Project around the Woodhead tunnel entrance, National Grid compound and along the initial section of the Trans Pennine Trail and Trans Pennine Trail diversion. The Survey Area (see Figure 1) was defined based upon the area where rhododendron and Japanese knotweed had been previously identified during other ecology surveys. These are within proximity to the working areas of the cable installation element of the Proposed Project, Trans Pennine Trail diversion and access routes to pylons to be removed.

The Survey Area did not extend to the entirety of the extent of the Proposed Project based upon the outcome of previous ecological surveys which showed no evidence of invasive plant species within areas outside those covered by the Survey Area.

Natural habitats predominantly comprise those associated with heathland to the south of the Trans Pennine Trail. Within the Trans-Pennine Trail area the dominant habitat type is young broadleaved semi-natural woodland (as detailed in Chapter 7 of the EAR). Within the (Woodhead) tunnel approach areas, the Trans-Pennine Trail and tunnel approaches, habitats, where present, are predominantly composed of scattered heathland species particularly on the rocky embankments which make up the tunnel entrances.

1.4 Aim and Objectives

1.4.1 Aim

The purpose of the survey was to collect the data required to provide a greater level of detail on the location, extent and condition of rhododendron (predominantly) and Japanese knotweed within proximity to the Proposed Project working areas and to provide options on control and treatment.

1.4.2 Objectives

The objectives of the project were to:

- accurately map the position of INNS within the Survey Area.
- provide an options appraisal for the management of identified INNS taking into account the possible requirement to conduct the work in stages, dependent on the phasing of construction works.

2. Relevant Legislation

Within the UK and England, there are several key pieces of legislation which relate to INNS, with the aim of preventing or reducing the negative economic and environmental impacts of these species. A summary of the legislation relevant to INNS in England is presented in Appendix A.

Taken together, the relevant legislation makes it an offence to plant, or otherwise cause to grow (including allowing to spread), listed species in the wild. Additionally, there is a duty of care with regards to the management of waste containing any part of the plant that may facilitate establishment in the wild and cause environmental harm.

If charged with committing an offence, it is a defence against prosecution to prove that all reasonable steps were taken, and that all due diligence exercised in attempting to avoid committing the offence. Therefore, in order to reduce the potential of breaching legislation and fines/prosecution, a management plan should be in place for INNS on a property and property owners should be able to show that they are following it.

3. Methodology

3.1 Site Assessment

A site inspection survey was undertaken on 12th July 2019 by a suitably qualified AECOM ecologist. The primary remit of the survey was to inspect the known location of rhododendron and Japanese knotweed on the Site. The survey also included an assessment of the presence of any other invasive plant species present with a focus on:

- invasive species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended); and
- Invasive Alien Species of Union concern (as per IAS (Enforcement and Permitting) Order 2019).

The survey comprised:

- a walkover of the area;
- an inspection of the immediate surroundings;
- an assessment of features that might affect biosecurity; and
- an assessment of all apparent features that may affect control action.

The location of any invasive species observed was recorded along with:

- the location of all stands/plants;
- the level of establishment; and
- the health of plants.

3.2 Quality Assurance

AECOM ecologists are appropriately qualified and trained and conduct their work using all reasonable skill and care. The fieldwork and reporting presented here was undertaken by AECOM ecologists who follow the Chartered Institute of Ecology and Environmental Management (CIEEM) code of professional conduct when undertaking ecological work. Many senior AECOM ecologists are also Chartered Environmentalists or Ecologists. The ISA was undertaken in accordance with current good practice published by the Environment Agency (Environment Agency, 2013), Royal Institute of Chartered Surveyors (RICS, 2012) and, specifically for Japanese knotweed; the Property Care Association (PCA, 2018). To provide assurance that our Quality and other Management Systems have been consistently implemented and applied, we work closely with external auditors who certify the system and its operation to the standards required by the UK Accreditation Service. All work is subject to verification, and technical review by a qualified person before submission to the client. Part of the technical review includes a review of the work against the proposed scope of works.

3.3 Limitations

Invasive species assessments can be undertaken throughout the year but should preferably be carried out during the active growth season as the winter remains of certain species are inconspicuous (e.g. Himalayan balsam). The optimum survey time is from late May through to October. The current survey was carried out in July and therefore within the optimum survey season.

Within the National Grid compound, where two cuttings which comprise the entrances into the two Woodhead tunnels, there is a high area above the tunnel entrances which is accessible from the upper areas and below the existing pylon. This area could be viewed from ground level but was not access in its entirety due to the steepness and height of the embankment. The rhododendron was easily identifiable from ground level therefore this limitation on access was considered to not be a significant limitation to the survey or determination of the treatment options. However safe working access to this area should obviously be considered during the management and treatment phases.

4. Results

4.1 Site Assessment

Two INNS listed on Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) were identified, see Figure 1 for the location of stands.

Several areas and scattered individual stands/plants of rhododendron (as shown on Figure 1) were identified within (on the central embankment of the tunnel entrance) and in close proximity to the cable installation corridor and the route of the section of the Trans Pennine Trail surveyed. Furthermore, stands are dominant in areas alongside the proposed access track leading to pylon 4ZO162 to the south of the Trans Pennine Trail.

A single stand of Japanese knotweed comprising three separate sets of canes was identified (JK1, Figure 1). The plant is growing out of a raised bund which is highly likely the source of the plant. The stand generally comprised immature specimens and did not appear to have been present for a significant period of time; furthermore, it is highly likely that the plant's rhizome (root) network exists only within the bund which is up to 1m high and 2m wide.

Appendix B outlines details of each of the stands recorded and Appendix C provides indicative photographs of the stands/areas identified.

Relevant traits of species identified are summarised in Table 4.1 below.

Table 4.1: Relevant traits of invasive non-native species identified

Species	Relevant traits
Rhododendron (<i>Rhododendron ponticum</i>)	Rhododendron is a long-lived, evergreen, woody shrub which spreads via seeds and stem layering. The seeds spread by wind and occasionally in contaminated soil. Regrowth will occur from cut stumps. Rhododendron plants produce seeds at age 10 years or more, usually 12 to 20 years (regrowth from mature cut stumps can produce seeds after two years). The seed bank can persist for up to three years; however, seeds rarely remain viable for more than one year (particularly in wetter soil). Rhododendron can spread rapidly through woodlands forming impenetrable thickets, reducing access and amenity. Once populations become well established and mature, control can become extremely difficult and expensive.
Japanese knotweed (<i>Reynoutria japonica</i>)	Japanese knotweed is a long-lived, perennial plant that spreads and persists via an underground rhizome (underground shoots) network. Tiny fragments of rhizome, weighing less than 1 gram, can produce new plants. Rhizome fragments spread in infested soil attached to vehicles, equipment and footwear. Rhizome fragments are frequently carried by water flow, particularly after flood events. Fragments of Japanese knotweed shoot can root and form new plants; however, spread by this means is relatively rare as such fragments required very specific conditions to establish. Japanese knotweed rhizome typically (75th percentile) does not spread horizontally beyond 2.5m from visible above ground plants and downward beyond 2m.

5. Risk Assessment

5.1 General Risks

The primary impacts associated with Schedule 9 invasive plant species, relating to completion of projects involving ground works, are listed below:

- a. Breaches of legislation (failure to observe duty of care), with exposure to prosecution (civil and/or criminal) and fines (unlimited);
- b. Delays (with associated financial implications), particularly if INNS are encountered unexpectedly;
- c. Control costs, which can increase rapidly in the absence of appropriate mitigation;
- d. Spread to other on site land assets;
- e. Spread to neighbouring, or connected, properties or habitats (with potential liability and associated control costs and reputational risk);
- f. Loss of biodiversity;
- g. Loss of amenity;
- h. Damage to built structures;
- i. Landscape management costs/issues;
- j. Health and Safety;
- k. Potential significant waste disposal costs/issues regarding infested substrate;
- l. Reputational risk; and
- m. Reduction in property value.

5.2 Specific Site Risks

All Schedule 9 species present on or near a site have the potential to cause programme delays if not managed appropriately. It is therefore extremely important to respond to infestations as quickly as possible. The risks posed by Schedule 9 species can be divided into the three categories shown in Table 5.1.

Table 5.1: Description of risks ratings

Rating	Description
1	High risk of impact: Concerted and dedicated action is required to prevent spread and reduce control costs. Control action should commence as far in advance of development (Proposed Project) work as is practical.
2	Medium risk of impact: Concerted and dedicated action is required to prevent spread and reduce control costs; however, with forward planning there should be no impact on development (Proposed Project) works.
3	Low risk of impact: Control action can be integrated into other site activities before or at the onsite of development (Proposed Project) works.

The types of general risks and risk ratings that apply to the Schedule 9 species identified are shown in Table 5.2.

Table 5.2: Species, associated risks and risk rating

Species	Associated Impacts	Rating
Rhododendron	a, b, c, d, e, f, g, i, k	1
Japanese knotweed	a, b, c, d, e, f, g, i, k, l, m	1

While typically risks associated with rhododendron are low to medium, given the large quantity of rhododendron present it has been assigned the highest risk rating. This is primarily due to the potential for impacting programme and/or impacts on waste management and that the habitat in the area is clearly suitable for rhododendron invasion (increasing the risk that works could spread the species into the wild).

Japanese knotweed has the highest risk rating due to the issues associated with its presence and spread. Additionally, without appropriate management in place, this species can quickly spread around and off site, with associated liabilities and constraints to development/waste-management which can lead to delays in project programmes.

5.3 Pathway Analysis

The location and the current size of the stand of Japanese knotweed within a bund indicates that the material which led to the growth of the stand was probably transported as part of the bund installation works. It is not possible to say if the rhizome was within the soil or on part or parts of the mechanical plant which was used to install the bund. Soil disturbance is the most likely potential pathway for significant increases in future distribution; however, it will also increase its range slowly via rhizome extension.

The scale of presence of rhododendron would be difficult to speculate on, rhododendron was likely brought to the area as wind borne seed pulled along by trains that used to pass through. It is now very well established within the site and surrounding area. It will continue to spread via seed (primarily via wind up to 500m – more typically 50m) and vegetatively via suckering.

The primary pathways by which these plants can be spread on/around/off the site are summarised in Table 5.3; also see Table 4.1.

Table 5.3: Primary pathways of spread for INNS identified onsite

Spread	Propagules attached to footwear, equipment, etc.	Propagule attached to vehicles	Natural spread (assuming onsite plants are controlled)
Rhododendron	● Low risk	● Low risk	● High risk, via seeds in wind from the surrounding area
Japanese knotweed	● High risk during development, via rhizome infested soil	● High risk during development, via rhizome infested soil	● Low risk during and following development, as the species does not appear to be widespread nearby.

6. Management Plan

This Management Plan has three main objectives:

- Control the risks associated with INNS presence on and near the Proposed Project;
- Reduce the probability of re-infestation following development; and
- Demonstrate that an appropriate management plan is in place, that mitigation is feasible, and how it should be applied.

A range of options are available for the management of invasive species depending on the varying factors of site/ground conditions, timescales possible, cost, spatial constraints and purposes of the management. (see Appendix D for a review of control options and their relative merits and limitations). The various management options have been considered in identifying the most appropriate management regime relevant in the context of this particular site.

The optimal approach to managing the Schedule 9 species recorded involves a combination of avoidance, chemical control and physical removal. Table 6.1 presents an overview of the recommended management options. Subject to the working methodology adopted by the main work contractor, the listed options may need to be reviewed and updated. This is particularly relevant in terms of the implementation of options for the rhododendron located on the rocky embankment subject to the extent and timing of cable installation works.

All works should adhere to Regulator Position Statement 178 - treatment and disposal of invasive non-native plants (Environment Agency, 2016), the managing Japanese knotweed on development sites code of practice (Environment Agency, 2013), and the Property Care Association Code of Practice for the Management of Japanese knotweed (PCA, 2018).

Table 6.1: Overview of management recommendations

Species	(i) Onsite (disturbed)	(ii) Onsite (undisturbed)	(iii) Near site
Rhododendron	Herbicide treatment (cut stump for plants > 1.5m in height; foliar application for plants < 1.5m in height), in advance of development. Fell and chip on site at correct time of year. Or, Implementation of biosecurity where pre-works management is not possible.	Avoidance including buffer zones. To reduce potential seed producing ability and possible future seed spread to areas outside the buffer zone it would be desirable to also subject these plants to herbicide treatment (cut stump for plants > 1.5m in height; foliar application for plants < 1.5m in height) particularly if in combination with herbicide treatment of plants which cannot be avoided by works.	If control in the wider environment is desirable, liaise with local land owners to manage rhododendron strategically in the wider environment. Otherwise, following development, prevent onsite establishment as part of landscape vegetation management.
Japanese knotweed	Herbicide treatment (foliar) followed by mechanical removal of impacted soils at the onset of development.	Herbicide treatment (foliar)	n/a

6.1 Control Programme

All works involving the management of Schedule 9 species should be overseen by an appropriately experienced Environmental or Ecological Clerk of Works who is trained in the management of invasive non-native species.

6.2 Rhododendron

The wider areas around the Survey Area comprised of a significant amount of suitable habitat for this species and, in the absence of control, it will likely continue to spread, over time ultimately dominating the moorland habitats and the understory of the woodland. It is recognised that only small areas of rhododendron and Japanese knotweed are within proximity to the Proposed Project. Whilst avoidance, treatment/removal is required within the areas where works and access is to be undertaken as part of the Proposed Project, there is no legal obligation to extend

the removal and treatment to areas of Rhododendron outside the extent of working areas (subject to ensuring it is not spread). Nevertheless, there may be logistical reason or other benefits for doing so which the client and appointed contractor will need to determine.

The primary aims of control are to kill above ground plants (preventing seed production) and deplete the short-lived seed bank, ideally before specific construction works related to the Proposed Project commence. In order to minimise impacts on the works programme, if the rhododendron could be felled (with herbicide applied to cut stumps) and chipped onsite prior to December 2019, exposure to rain and moisture over the winter would sufficiently mitigate the risk of spread by seed to allow more pragmatic handling of arisings through biosecurity measures during works in the area. This is because once exposed to moisture rhododendron seeds lose their viability quickly, usually within a year.

Rhododendron seeds are likely present in small quantities throughout much of the Survey Area as the wind-borne seeds can spread 50m or more from parent (mature) plants; however, fencing off such a large area would not be practical/feasible. Seeds will be most abundant immediately adjacent to mature plants; as such, rhododendron should be demarcated, creating a 4m buffer zone around visible plants, to prevent the works spreading seeds in excess of the existing baseline level of spread.

In mature rhododendron (seed producing) plants, seeds typically mature in December and are typically dispersed from February through March with up to 1 million seeds per mature plant. Therefore, **clearance should be avoided in this window.**

As the species has a sturdy root system, digging it out can be difficult and overlooked root can sprout new growth. The plant can be controlled effectively with herbicide, which is the preferred option.

Large plants (> 1.5m in height) should be treated with herbicide using the cut stump treatment method (Section 7.1). Trees to be felled should be chipped onsite. Small plants (< 1.5m in height) should be treated with herbicide by foliar application (Section 7.1) or completely chipped and stump treated.

All areas where rhododendron control has taken place must be monitored until one full growth season has passed without re-growth. Any re-growth should be treated by foliar application of herbicide (Section 7.1). Management is considered complete once one full growth season has passed without new seedlings sprouting.

If control is complete once site works commence in the area, then no further precautions are required, otherwise strict biosecurity precautions should be implemented to prevent the movement of soil potentially containing seeds around/off the Site.

Ideally, **the control works specified above should commence prior to seed mature in late 2019**, which will prevent the seedbank being replenished and thus reduce the risk of re-germination moving forward.

If rhododendron seed sources are removed from within 4 m of an area, no specific precautions are required when moving within that area to elsewhere on site. However, a wheel wash should be established at the exit point of the site, to prevent rhododendron seeds from being spread away from site.

Where stands cannot be removed and chipped prior to end of November 2019, and the stands are mature (seed producing), buffer zones would need to be adopted to restrict potential spreading of seeds which could be present within top soil/ground level. Figure 2 has been included to show the location of the rhododendron and Japanese knotweed stand in relation to the Proposed Project working areas. Figure 2 also details which of the Rhododendron stands have been determined to be mature enough to be /potentially seed producing plants and therefore which require the adoption of a 4m precautionary buffer.

Immature rhododendron (identified as non-seed producing on Figure 2) can be managed following standard vegetation clearance protocols (e.g. disposal as green waste) and biosecurity implementation is not required when working in close proximity to such plants. No buffer zones to these stands would be required (assuming works are commenced before 2021).

6.3 Japanese knotweed

A control programme should be initiated as far in advance of commencement of works on Site as possible. The primary aims of control are to kill above ground plants and kill or remove the underground rhizome network. Due to the potential for this plant to grow from small fragments, the only recommended options involve herbicide treatment or mechanical removal. Control is considered complete once two full growth seasons have passed without any re-growth.

Prior to works commencing, the area of Japanese knotweed must be fenced off with appropriate signage installed. Fencing must create a 4m buffer zone around the visible plants due to the potential presence of rhizomes. The indicative buffer zones to each stand are shown on Figure 2.

If the knotweed is located in an area not likely to be disturbed by the proposed works, herbicide treatment alone is sufficient for control. Treatment should be carried out once per year in September following the methods detailed in Section 7 below. The likely duration of herbicide treatment (including monitoring) is three to five years.

If the knotweed is located in land that is required for, or will be disturbed by, the proposed works, the stand should be treated with herbicide as far in advance of Site works as is practicable. This could be undertaken in the growing season from April/May 2020. This will reduce the vigour of the plant and minimise the risks associated with subsequent mitigation works. Subsequently, the stand (including soil containing rhizomes) would then need to be mechanically excavated (as described in Section 7.2 below) and the material could then be in principle be dealt with in one of a number of methods:

- Stockpiled on site but away from working areas and treated with herbicide;
- Buried on site but away from working areas; or
- Disposed of as controlled waste to an appropriately licenced landfill.

The approach taken would be subject to a number of factors including space/location constraints, future management requirements and cost. Further details are provided in Section 7.3.

Areas where Japanese knotweed control has taken place, or where knotweed treated soil has been used in landscaping, must be monitored until two full growth seasons have passed without re-growth, regardless of what control method was used. Any regrowth must be treated with herbicide (see Section 7.1). To establish whether Japanese knotweed has not regrown should involve a monitoring survey carried out twice per year in May and August.

6.4 General Biosecurity Recommendations

Strict biosecurity protocols must be implemented when working in areas with Schedule 9 plants. All works involving the excavation of Schedule 9 species should be overseen by an appropriately experienced Environmental or Ecological Clerk of Works who is responsible for advising on all biosecurity measures with respect to the invasive species on the Site.

All works should adhere to the managing Japanese knotweed on development sites code of practice (Environment Agency, 2013) and the Property Care Association Code of Practice for the Management of Japanese knotweed (PCA, 2018). The following general biosecurity measures should be implemented:

- All appropriate Site personnel should be made aware of the locations of Schedule 9 invasive species and informed of the necessary precautions required to prevent spread;
- Plant and machinery should be prevented from driving within areas which might contain Schedule 9 invasive species contaminated soil;
- Any vehicles, equipment and clothing that may have come into contact with potentially contaminated soils should be inspected and thoroughly cleaned prior to leaving the infested area; and
- Soil brought on Site should only be sourced from a reputable source with a good track record relating to not providing soil contaminated with invasive species propagules.

6.5 Opportunities for Ecological Enhancement

The control of the non-native plant species will have a positive impact on the natural biodiversity of the site.

7. Method Statement

7.1 Herbicide Treatments

7.1.1 General Information

Only an approved herbicide may be used and must be applied in accordance with all directions on the product label. The user is responsible for the risks that arise from use of herbicide products. Any person involved in the professional application of herbicides should possess the appropriate pesticides certificate of competence for the safe use of herbicide and hand-held herbicide applicators, e.g. National Proficiency Tests Council (NPTC) Level 2 award in the safe use of pesticides PA1 and PA6. Herbicide application should be carried out when plants are dry and when there is a high likelihood of no rain in the next six hours (preferably 24 hours) post application. Soft water should be used for the herbicide/adjuvant mix if available.

All appropriate information (i.e. name of operative, qualification of operative, site address, date of application, target species, reason for treatment, method of application, product used, application rate, quantity applied, total product used, any environmental risks identified, start time, finish time, weather conditions, and PPE worn) should be recorded following each herbicide application and these records retained in an approved manner within the recording system for the Site.

Plants should not be disturbed for at least three weeks post herbicide application. It is only after such a time that the plants will show the full effect of the herbicide, i.e. the effect is not immediate. Prior to, and for the duration of, herbicide treatments a disturbance free buffer zone should be maintained around plants. Such a no disturbance zone will:

- Allow any below ground material to be treated or show itself;
- Decrease the probability of inadvertently facilitating spread; and
- Reduce the chance of missing material during control action.

There should be no digging or other disturbance to the ground/ soil within this buffer zone and ideally Site personnel and equipment should not enter this zone.

7.1.2 Foliar Application

An approved systemic glyphosate-based herbicide can be used, specifically Roundup ProVantage 480. The application must be prepared as directed on the product label.

An adjuvant should be added to the mix, specifically Companion Gold (Japanese knotweed) or Mixture B (rhododendron). These should be prepared to the appropriate concentration as stated on the label. This will enhance the amount of herbicide absorbed. All directions on the product label for appropriately mixing these viscous adjuvants must be followed.

Herbicide should be applied generously to both upper and lower surface of leaves and to the stems of herbaceous species. Herbicide should only be applied on windless / low wind days to reduce the extent of impact on non-target vegetation. The recommended treatment schedule is outlined in Table 7.1.

Table 7.1: Herbicide application schedule

Species	Treatments per year	Timing	Likely duration
Japanese knotweed	1	September/October	2 to 5 years
Rhododendron (<1.5m)	1	June	2 to 3 years

¹Application to the lower surface of Japanese knotweed leaves is critical.

7.1.3 Cut Stump Application

An approved systemic glyphosate based herbicide can be used, specifically Roundup ProVantage 480 or EcoPlug Max. The application must be prepared as directed on the product labels.

Stumps should be treated immediately after cutting.

This method may be used between November and March or April. Do not use this method during the period of active sap flow during the spring and summer.

For Roundup ProVantage 480, apply at the time of cutting with a suitably adapted clearance saw such as the Enso attachment to rotary saws, or apply as soon as possible after cutting using a knapsack sprayer, spot gun or paint brush.

7.2 Mechanical Removal

7.2.1 General Information

Where immediate removal is required, for example in a location that is shortly to be developed, the most appropriate control option is likely to be for rhododendron plants chipping where possible followed by mechanical excavation and for Japanese knotweed mechanical excavation. All works involving the excavation, transport and disposal of Schedule 9 species should be monitored and overseen by an appropriately experienced Environmental or Ecological Clerk of Works to reduce the risk of accidental spread.

7.2.2 During Excavation

Mechanical excavation on site of Japanese knotweed and rhododendron should be to a depth and area determined by an experienced Environmental or Ecological Clerk of Works and should continue, subject to ecological, physical, infrastructural, health and safety and other site-specific constraints, until all visible plants material is removed. See Table 7.2 for area/depth requirement relating to identified INNS.

Table 7.2: Excavation area/depth requirements

Species	Depth	Distant from above ground plants
Rhododendron (non-recommended)	30cm will remove all root capable of re-growth and seeds	4m to remove soil with highest abundance of seeds.
Japanese Knotweed	Extremely variable. Rhizome can spread down to 3m; however 1m downwards is more typical.	Extremely variable. Rhizome can spread outward to 7m; however, no more than 2.5m outwards is more typical. The presence of built structures can facilitate spread due to the presence of gaps between walls and soil etc.

Inspection by the Environmental or Ecological Clerk of Works of the area being excavated for plant material that might persist in the soil should take place regularly at the face of the excavation activities. All reasonable precautions should be taken not to facilitate the spread of the species during control action. Tracked vehicles are more likely to facilitate the spread of INNS than tyred vehicles and extra precautions must be taken when they are used in the infestation area (regular inspection of tracks for plant material and cleaning).

Where excavations take place inside Root Protection Areas (RPAs), all appropriate steps must be taken not to damage the root system. Any works in such areas must be undertaken following the guidance provided in British Standard 'BS 5837:2012 Trees in relation to design, demolition and construction', which outlines the regulations regarding RPAs. If excavations are required within an RPA, extra precautions are required, i.e. hand tools should be used to remove the soil around roots and the primary roots should not be damaged.

7.2.3 Post Excavation

Following remediation works, all plant material and potentially contaminated soil should be removed from all equipment/ clothing/ vehicles involved in the control action before leaving the infested area. If contaminated material is being transported elsewhere on the Site or off-Site, a haulage route should be set out in advance and precautions should be taken to prevent the spillage of contaminated soil and the spread of invasive plant material.

7.3 Stockpiling, Burial and Off-Site Disposal

Following excavation, if possible, impacted soils should be retained onsite, e.g. stockpiled or buried. As per Environment Agency and Defra guidance, the amount of waste generated that contains invasive plants, or their seeds and rhizomes, should be minimised.

7.3.1 Stockpiling

Low bunds created with soils containing Schedule 9 invasive species must be no more than 50cm, ideally no more than 20cm, in height, though bunds can be placed in a depression such that the top of the bund is flush to the ground, where this is acceptable on environmental grounds and to the landowner.

Planning permission may be required to create a bund; advice on this should be sought from the local planning authority.

Good bund design is critical. Rhizome/ seed infested soil should be concentrated into the upper surface of the bund, where it will grow and can subsequently be controlled. If rhizome or seeds are buried deeper in the bund, they may become dormant and regrow only if the bund is subsequently disturbed.

Any regrowth from the bund must be treated with herbicide (as detailed in Section 7.1).

The bund should be fenced off to prevent access and banded soils can form the basis of landscaped areas once control is achieved.

7.3.2 Burial

The Environment Agency must be consulted before burying Schedule 9 invasive species waste in order to determine if this is allowed in the particular location. Subsequently, the Environment Agency may need to be contacted a week before burial is to take place to confirm any specified burial requirements will be met.

A non-persistent herbicide should be applied to the material at least once before burial, ideally three weeks before burial. Burial should be carried out in such a way that it prevents the regrowth of the species. See Table 7.3 for burial requirements relating to Japanese knotweed and Himalayan balsam.

The location of any buried Schedule 9 invasive species must be recorded as part of the Site management system and these records must be retained in an approved manner. If large pieces of plant material are being buried, a structural engineer should be consulted to determine if there is a risk of subsidence following burial. Ideally larger pieces of plant material should be removed prior to burial for off-site disposal by a registered waste carrier in accordance with a waste disposal licence.

Table 7.3: Burial requirements

Species	Depth
Rhododendron (not recommended)	Soils containing seeds should be buried with 2m soil on top. Seeds can be safely buried beneath 50cm of soil. The Environment Agency must be consulted and approval must be granted for reduced depth burial; otherwise, the depth above should be used.
Japanese Knotweed	Healthy rhizome/crown should be buried: • With 5m of soil on top; or • Completely encapsulated in a root barrier membrane cell at 2m. Rhizome/crown subjected to an extensive herbicide treatment programme (as validated by a suitably qualified ecologist) can be safely buried beneath 1m of soil under well-constructed hard standing. The Environment Agency must be consulted and approval must be granted for reduced depth burial; otherwise, the depths above should be used.

7.3.3 Off-Site Disposal

All Schedule 9 invasive species plant material and impacted soils due to be disposed off-Site must be taken to a waste disposal facility that is licensed to receive controlled waste (e.g. non-hazardous or green waste, etc.). The waste facility should supply evidence of its licence.

Before any soil waste is moved off-Site, soil samples from the affected area may have to be tested by a suitable laboratory, and the results sent to the receiving landfill site for their approval before they will accept the waste. There is a standard turnaround time of two weeks for laboratories to assess soil samples. The range of contaminants for which testing is required will depend on the existing and previous use of the Site and surrounding area. If the Site contains hazardous waste, then a Waste Acceptance Criteria (WAC) analysis will be required.

All waste material should be removed from Site by a suitably licensed carrier.

All waste removed from Site should be accompanied by a Waste Transfer Note, or, if hazardous, a Consignment Note, which clearly states the presence of the species in the waste's destination.

All tickets should be checked by the Environmental or Ecological Clerk of Works before signing and copies of all Transfer and Consignment documentation should be filed and kept for the legally required time.

All producers, carriers and waste facilities have a duty of care to ensure that the waste is handled and treated properly.

8. References

AECOM (2019) Peak District Visual Impact Provision – Chapter 7 Ecology of the Environmental Assessment Report

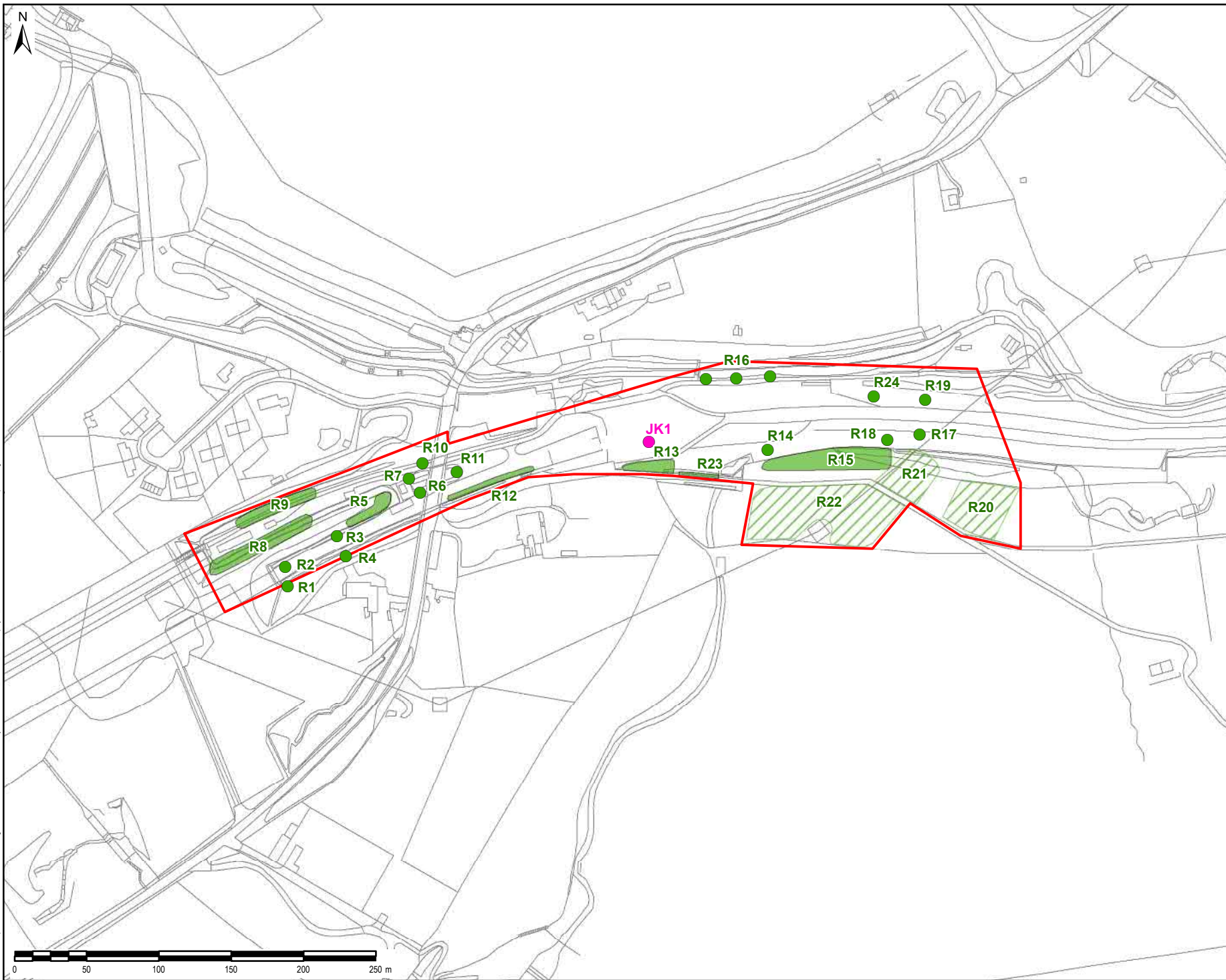
Environment Agency (2013) Managing Japanese Knotweed on Development Sites: The Knotweed Code of Practice. Environment Agency, Bristol.

Environment Agency (2016) Treatment and disposal of invasive non-native plants: Regulatory Position Statement 178

RICS (2012) Japanese Knotweed and Residential Property Information Paper

PCA (2018) Code of Practice for the Management of Japanese knotweed. Property Care Association.

Figure 1: Location of Invasive Non-native Species within survey area.



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ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

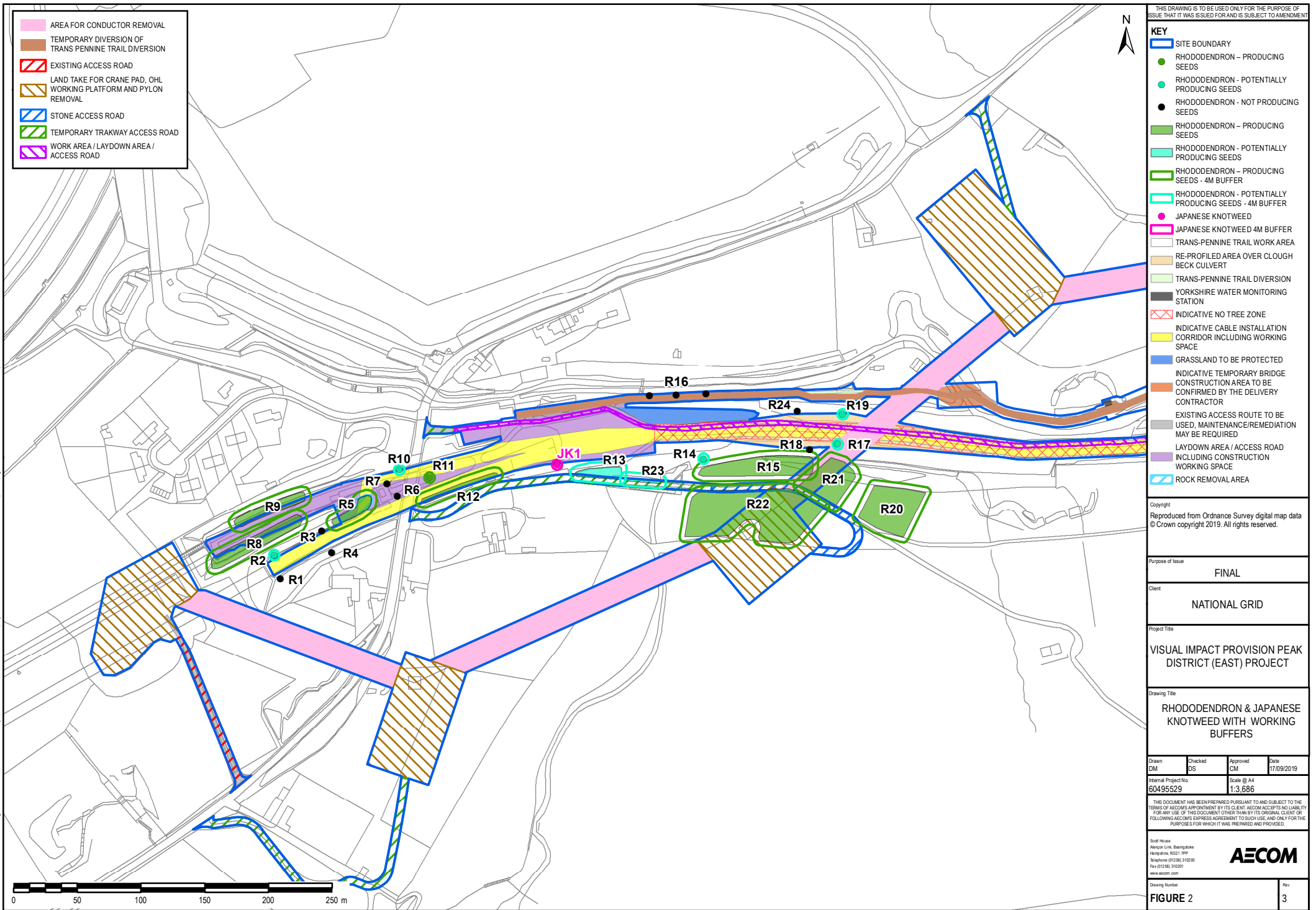
KEY
 Survey Boundary
 Japanese Knotweed
 Rhododendron
 Rhododendron
 Congregation of plants



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Purpose of Issue	FINAL		
Client	NATIONAL GRID		
Project Title	VISUAL IMPACT PROVISION PEAK DISTRICT (EAST) PROJECT		
Drawing Title	LOCATION OF RHODODENDRON & JAPANESE KNOTWEED		
Drawn DM	Checked DS	Approved CM	Date 26/07/2019
Internal Project No. 60495529		Scale @ A4 1:3,500	
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Figure 2: Plan showing Proposed Project layout and working buffer zones to INNS



Appendix A : Summary of relevant INNS legislation

Table B1: Summary of Relevant Legislation for Invasive Non-native Species

Legislation	Summary of Key Aspects
EU Invasive Alien Species Regulation 1143/2014 (EU IAS Regs)	This regulation imposes restrictions on species of animals and plants listed as 'Species of Union Concern'. These are species which pose a risk of adverse impacts across the EU, such that targeted action across EU member states is required. Restrictions applying to these species mean they cannot not be imported, kept, bred, transported, sold, used or exchanged, allowed to reproduce, grown or cultivated, or released into the environment.
Wildlife and Countryside Act 1981 (as amended) Schedule 9, Section 14	It is an offence to plant or otherwise cause to grow in the wild any species listed on Schedule 9.
Infrastructure Act 2015	Environmental authorities may issue control agreements under which landowners can be obligated to carry out species control operations for invasive non-native animal and plant species.
Anti-social Behaviour, Crime and Policing Act 2014 and Community Protection Notices	Local councils and the police have the power to issue Community Protection Notices against "individuals who are acting unreasonably and who persistently or continually act in a way that has a detrimental effect on the quality of life of those in the locality" including for invasive non-native species. Breach of any requirement of a Community Protection Notice, without reasonable excuse, would constitute an offence.
Environmental Protection Act 1990, Sections 33 and 34	If taken away from the site of origin, certain Schedule 9 species and associated material, e.g. soil, may be classified as Controlled Waste and must be disposed following a duty of care. Such waste that is disposed of at a landfill site must be accompanied by appropriate waste transfer documentation.
Town and Country Planning Act 1990	Although this Act does not make specific reference to specific weeds, it provides local authorities with power to serve notices on owners or occupiers of land to control weeds that may be harming the amenity of the surrounding area. If the owners and occupiers fail to remedy the situation, they may be liable to a fine or have to repay the costs of action taken by the local authority to control the weeds.
Common Law	There is provision within Common Law to take civil action against neighbouring landowners where the spread of invasive species is considered to be a private or public nuisance.

Appendix B : Description of Rhododendron and Japanese Knotweed stands identified

Table C1: Description of each stand shown in Figure 1 (see Photos in Appendix C)

Stand	Description	Seed Producing Plant?
R1	A single individual immature plant of rhododendron (<i>Rhododendron ponticum</i>) at the top of the culvert wall.	N
R2	A single individual semi-mature plant of rhododendron at the top of the culvert wall.	Y (potential)
R3	A single individual immature plant of rhododendron which hangs over the topmost part and side of the wall.	N
R4	A single individual immature plant of rhododendron which hangs over the topmost part and side of the wall.	N
R5	A mature stand of rhododendron which covers the extent of the eastern section of the inner raised wall, approx. 30m x 8m. Upper limit of wall and top of ledge and extending to building within culvert.	Y
R6	Two individual plants of rhododendron on south side of rocky outcrop.	N
R7	An individual immature plant of rhododendron between utility building external area and rock outcrop.	N
R8	An extensive and broad, mature stand of <i>R. ponticum</i> which hangs over the side of the walled culvert area and hangs down the side of the wall. Approximately 45m along the top of the wall.	Y
R9	An extensive and broad, mature stand of rhododendron which hangs over the side of the walled culvert area and hangs down the side of the wall, approximately 35m along the top of the wall.	Y
R10	A mature single rhododendron plant situated on a rocky outcrop against the wall of the Dunford Bridge 15 x 15m.	Y (potential)
R11	A mature single rhododendron plant situated on a rocky outcrop under a larger tree.	Y
R12	A mature linear stand of rhododendron 30m x 4m wide running below supporting wall to existing hard standing. Under linear belt of trees.	Y
R13	Three semi-mature stands of rhododendron running between the upper and lower pathways. Each plant is approximately 4 x 5m in diameter.	Y (potential)
R14	A single semi-mature plant of rhododendron 3m x 3m. Partly under existing tree belt.	Y (potential)
R15	A dense mature stand of rhododendron running in a general linear fashion in line with the dry-stone wall, approximately 40m in length and up to 5m wide.	Y
R16	Three individual immature plants of rhododendron	N
R17	A semi-mature plant at the dry-stone wall and on the path side of the dry-stone wall, 2m x 3m.	Y (potential)
R18	A single immature plant 1m x 1m within woodland, flush with the dry stone wall on the path side of the wall.	N
R19	A semi-mature plant within the woodland, 8m x 8m.	Y (potential)

Stand	Description	Seed Producing Plant?
R20	Individual plants scattered over a north facing bank of moorland, the plants are generally spaced between 5 and 10m apart.	Y
R21	Individual plants scattered over the north facing moorland under the existing overhead lines. These are more densely spaced than R20 sometimes within 2m of each other.	Y
R22	Individual plants scattered over the north facing slope below the power cable tower, generally scattered over a linear area to the north of the existing track and around the bottom of the slope.	Y
R23	Four semi-mature plants within the woodland to the south of the existing track over the wall.	Y (potential)
R24	A single immature plant within woodland, 1m x 1m.	N
JK1	Comprising three separate sets of canes growing under and adjacent to a willow tree. The plant is growing out of a raised bund which is highly likely the source of the plant. As this is not a well-established plant and generally immature, it is highly likely that the plant's rhizome network exists only within the bund which is up to 1m high and 2m wide.	N/A Rhizome buffer of 4m to be applied.

Appendix C : Photographs



Photo 1: R1



Photo 2: R2



Photo 3: R3 at topmost part of culvert wall.



Photo 4: General view of south culvert



Photo 5: R5



Photo 5: R5 extending to end of raised area.



Photo 6: R6



Photo 7: R7 Individual plant.



Photo 8: R8



Photo 9: R9



Photo 10: R10



Photo 11: R11



Photo 12: R12



Photo 13: R13



Photo 14: R14



Photo 15: R15 Section to the west towards culverts.



Photo 16: R15 eastern view



Photo 17: R16 -three individuals run to the left of the fence line.



Photo 18: R17



Photo 19: R18



Photo 20: R19



Photo 21: R20



Photo 22: R21



Photo 23: R22



Photo 24: R23



Photo 25: Japanese knotweed growing under Willow and in small bund.



Photo 26: Japanese knotweed growing under willow (*Salix* sp.).

Appendix D : Management Options

As per Environment Agency Guidance in relation to controlling INNS, the available control options should be evaluated prior to implementing control. A range of remediation options are available for the management of invasive plants, as outlined below and detailed in guidance produced by the Environment Agency, the Property Care Association, and various management guidance documents produced by local, regional, and national agencies in a range of countries. The various options can be used in isolation or in combination. The recommended control options are detailed in Sections 6.

Control:

1. **Herbicide treatment:** Spraying the affected area with chemicals, achieving control over a period of around 1 to 5 years (depending on species, maturity and area covered).
2. **Crown removal and herbicide treatment** (Japanese knotweed only): When treating Japanese knotweed with herbicide a large amount of the active chemical is absorbed by this dense crown material (if present), which can reduce the amount of herbicide that reaches buried rhizome and can greatly increase the time required for control. These crowns can be removed prior to herbicide treatment.
3. **Physical removal using hand pulling:** Removal of plant material by gently pulling plants by hand (not suitable for Japanese knotweed).
4. **Physical removal using hand tools:** Removal of plant material using spades and soil forks (generally not suitable for Japanese knotweed).
5. **Physical removal using machinery:** Large scale removal of plant material and associated soils using heavy machinery.
6. **Light exclusion:** Plant material can be covered using a light impermeable barrier (e.g. polythene) or a semi-impermeable physical barrier (e.g. jute matting) resulting in destruction of the plant material or prevention of germination (not suitable for Japanese knotweed).
7. **Draw down:** Water bodies are drained and plant material is left to dry out and die. Can be combined with herbicide application. Water bodies are subsequently re-filled. Only suitable for aquatic plants.
8. **Biological control:** A biological control agent (e.g. fungus or insect) is introduced to a habitat and eats or kills/damages the target species (non-target species are not affected).
9. **Root barrier membrane** (Japanese knotweed only): Prevents the horizontal growth of Japanese knotweed by installing a vertical membrane barrier. This is usually used on site boundaries to prevent underground rhizomatous spread from neighbouring sites. A thin trench is dug and the barrier is installed to a depth of around 3 m. The membrane can be reinforced with plywood before backfilling takes place.

Management of arisings:

10. **Stockpiling:** Moving excavated material to an area of the Site where it can be treated with chemicals over a period of approximately 1 to 3 years. After this, soil can be left in situ or re-used on site.
11. **Screening** (Japanese knotweed only): Excavating the Japanese knotweed stands and screening (sieving) the material through a 25 mm mesh to remove the larger rhizome fragments, which are then incinerated in an approved manner. The material containing the smaller rhizome fragments, which passed through screening, is then spread out onto a controlled area on the Site. The regrowth from these fragments is then treated with herbicide. As the Japanese knotweed is re-growing from small rhizome fragments, the time taken to achieve eradication is reduced.
12. **Burial:** excavating impacted soils and burying the material on site. Some restrictions may apply both where material can be buried and what can happen above the buried area.
13. **Disposal as green waste:** Some plant material (species dependant) can be taken off site and disposed of as green waste for composting or incineration.
14. **Removal to landfill:** Excavating impacted soils stands and removing the material to a landfill registered to receive such waste using covered haulage vehicles.

A summary of the advantages and disadvantages of each of these control options is presented in Table D1 below.

Table D1: Evaluation of the pros and cons of potential mitigation options

Treatment	Advantages	Disadvantages
Screening	• Moderately cost effective • Allows the scheme to progress whilst treatment takes place elsewhere on-site	• Requires incineration to take place – potential issues gaining consent to burn • Only reduces level of infestation, does not rapidly eliminate the plant • Requires set-aside area on-site for spreading out of smaller rhizome fragments
Crown removal	• Removes the vast majority of underground biomass • Increases the effectiveness of herbicide treatment • Reduces the time required for herbicide treatment	• Not suitable for all species • Can be expensive or time consuming, particularly for large infestations • An area to store the removed crown may be required • The area must be left undisturbed • Restrictions remain on site
Herbicides	• Cost effective • Treatment can be carried out in situ without risk of spreading plant further	• Takes 1-5 years • Must be left undisturbed • Restrictions can remain on site • Restricted use near valuable vegetation and waterways
Mechanical Removal (vegetation clearance)	• Removes aboveground biomass	• Rootstock and seeds remain in soil. However, regrowth from such material can be easier to treat with herbicide, reducing the time required for herbicide treatment. • Not suitable for certain species, e.g. Japanese knotweed. • Removed arisings must be disposed of appropriately
Mechanical Removal (excavation)	• Removes above and underground biomass and the seedbank	• Can be expensive or time consuming, particularly for large infestations • Can be difficult to remove all material or seeds. However, regrowth from seeds (where applicable) can be typically be easily treated with herbicide. • Removed arisings must be disposed of appropriately
Stockpiling	• Cost effective • Allows the scheme to progress whilst treatment takes place elsewhere onsite	• Requires undisturbed area • Soil from stockpile must remain on site • Restrictions remain in stockpile area
Burial	• Does not require a set-aside area for control • Work can continue immediately after burial	• Restrictions remain on site • Limits use of area above burial site • Can requires a large hole to receive material
Disposal Off-Site	• No restrictions left on site • Work can continue immediately after removal	• Relatively expensive

