

PBA Solutions

Japanese Knotweed Survey & Management Plan

PBA Ref: Q5853

Property Ref: Land off Nyton Road & Fontwell Avenue, Chichester PO20 3UW

Report Date: 27 September 2017

Client: Taylor Wimpey Southern Counties



PBA Solutions: London, Midlands, Hampshire, Dorset

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About PBA Solutions

PBA offer accurate management plans coupled with bespoke control programmes that include Insurance Backed Guarantees, Escrow/Client Account payment services, third party mediation protection and full public and professional insurance to provide mortgage-compliant invasive weed solutions.

As founder members of the Property Care Association Invasive Weed Group, PBA Solutions has become established as one of the leading companies for Japanese knotweed remediation. Our Japanese knotweed surveyors all hold current CSJK qualifications and work alongside a team of PCA qualified invasive-weed technicians to provide comprehensive Japanese knotweed remediation solutions. These services are backed up by independent Insurance Backed Guarantees of ten years for clients' peace of mind.

PBA Solutions has worked extensively with the Royal Institution of Chartered Surveyors (RICS) as contributors to their paper 'Residential Property and Japanese Knotweed' providing clear guidance on this complex issue. As a result this document has been produced to comply with procedures that PBA has adopted to meet RICS guidelines.

PBA are RICS recognised specialists with £5 million Professional Indemnity insurance & £5 million Public Liability insurance.



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Introduction

PBA Solutions was commissioned by Taylor Wimpey Southern Counties as an invasive weed specialist to complete a Japanese Knotweed Management Plan in relation to a planned development of a plot of land near to the towns of Westergate and Eastergate, West Sussex. The survey was instructed so that a known infestation of Japanese knotweed could be identified, mapped and a Knotweed Management Plan produced.

The aim of this document is to record the findings of the Japanese knotweed surveys, to assess the risk that Japanese knotweed infestation presents to the planned development and to evaluate methodology and control measures that will provide the highest practical level of Japanese knotweed remediation whilst being appropriate to the needs of the development.

Survey Summary

PBA Ref: Q5853

Client: Taylor Wimpey Southern Counties

Property: Land off Nyton Road and Fontwell Avenue, Chichester PO20 3UW

Type of site: ex-nursery glasshouses and adjacent dwelling, fields

Locations of infestations (lat, long): 50.843322, -0.667167 / 50.843014, -0.667397 / 50.842647, -0.667589

Stand information: three stands of Japanese knotweed

Survey Dates: 21 September 2017, 24 September 2015

Qualified surveyor: Phil Cox, CSJK

The site was first surveyed by PBA Solutions in September 2015. During this survey two stands of Japanese knotweed were identified as impacting upon the site.

A second survey was carried out in September 2017. The weather conditions were overcast and mild. A walk-through visual inspection was completed. The survey was undertaken at a favourable time of year for identifying the majority of invasive weed species, including Japanese knotweed. The two stands of knotweed identified in 2015 were recorded as more or less unchanged and one additional stand of Japanese knotweed was recorded.

The site is comprised of land formerly given over to a garden centre/nursery and land used as grazing pasture, occupying a total area of approximately 10 hectares. The glasshouses used by the former nursery business are still standing, occupying an area of approximately 5500 square metres and are situated in the south west corner of the site. A few other structures are situated close to the glasshouses, including storage sheds and a bungalow. A farm/light industrial building is situated approximately 180 metres to the east of the glasshouses. An access road runs from this building to the main road (A29) in an east/south east direction.

The areas of the site formerly given over to pasture are divided into a number of fields. Hedges and lines of trees are found at some of the field divisions. Ground cover, apart from the hedges, trees and where built upon, varies across the site but is mainly comprised of grasses interspersed with native annual and perennial plants.

Adjacent to the southern boundary of the site are the rear gardens of properties along Nyton Road. Approximately half of the length of the western boundary is met by other properties gardens along Northfields Lane. The remainder of the perimeter boundary of the site made up by a further stretch of Northfields Lane, other fields and areas of copse.

Access to the site was afforded by a short access lane off Nyton Road. The majority of land to be surveyed was open and level. Some areas of the site were inaccessible due to the density of vegetation cover. It is estimated that approximately 85% of the site was walked with 90% visible.

Aerial/satellite imagery of the site from the last fifteen years shows no obvious changes in land use that would be deemed relevant to this report.

Survey Findings

Three stands of Japanese knotweed were identified within or close to the site boundaries. All three stands are situated close to the western boundary of the subject site, running as one almost unbroken line in a north-south direction.

The site plan (see appendices) highlights the locations of Japanese knotweed growth that were visible at the time of the 2017 survey. The positions of infestations have been located by a combination of on-the-ground measurements and gps plotting.

Stand 1

Stand 1 is positioned on the left hand side of the access track (if travelling into site from Nyton Road) but also extends past a bend in the track into the rear garden of Nyton Nurseries Bungalow, with visible growth starting approximately 59 metres from the track entrance from Nyton Road. This is the largest stand within the site, occupying an area covering 63 metres in length and up to 5 metres width.

Roughly 20 metres of this stand (the southern end) is growing within and around a low bank and a drainage ditch beside the access track. The middle section of Stand 1 is populated by trees and shrubs as well as Japanese knotweed. The remaining section of Stand 1 (north end) continues along the bank which, at this point, is higher and wider and clear of trees or shrubs.

All knotweed growth within Stand 1 was emergent and/or stunted at the time of the survey with small, thin stems of knotweed peppered throughout the impacted area. Occasional outcrops of larger, denser growth were seen, but nothing that would be classified as typical for an untouched, healthy infestation of Japanese knotweed. Anecdotal evidence points to regular herbicide treatments being applied to the knotweed growth within the boundaries of Nyton Nursery Bungalow. Crowns throughout Stand 1 are well developed and, although decaying in the top layers, severing the crowns from their positions reveals viable rhizome offshoots. Visual evidence suggests that the knotweed growth within the lawn of Nyton Nurseries Bungalow and along the bank next to the track has been mowed regularly.

A telegraph pole and a service cover in the garden of the bungalow are within the area covered by Stand 1.

Visible knotweed growth is, in places, less than half a metre from the boundary line with adjacent properties on Northfields Lane.

Stand 2

Stand 2 is positioned along the right hand side of the access track at the south-west corner of the site, starting approximately 53 metres from the main road (A29). The visible growth within stand 2 occupies an area approximately 2 metres wide by 6.5 metres long, next to the fenced boundary line of the adjacent property, Luakela House. Growth within this stand is patchy, with stunted stems coming up through a layer of pea-shingle and around various shrubs. There is a small amount of knotweed stem growth just inside the boundary of Luakela House within this stand.

Stand 3

Stand 3 is the most isolated of the three, being a single crown (connected cluster of stems) bearing a few reduced height stems. Positioned to the right hand side of the Nyton Road access track (as seen when entering the site), this stand lies approximately 31 metres from the road entrance, close to the exit point of a drainage pipe that empties into a drainage channel. This growth is positioned just within the south west boundary corner of the plot known as 'Luakela House' (i.e. just outside the site boundary line).

General Observations

Stand 1 is comprised of growth within and migrating outwards from a constructed bank or bund. Precisely when the bank was constructed is not known to PBA although anecdotal evidence points to it being created from soil imported into site over twenty five years ago. The presence of mature crowns points to this area of infestation being established, making it highly likely that its origins are not recent.

Nyton Nurseries Bungalow, although within seven metres of migratory knotweed stem growth (Stand 1), is not deemed to be directly impacted by Japanese knotweed rhizome.

The drainage ditch running directly within the west boundary of the site is assumed to be ephemeral, no running or standing water being present in the ditch at the time of the survey.

Aside from the stands of Japanese knotweed already mentioned, no other instances of knotweed infestation were seen when surveying the grounds of the subject property. However, the site is extensive and knotweed can lie dormant for many years. Therefore Japanese knotweed (or hybrid knotweed) may exist in other locations within the site.

Further survey records and site plans can be found within the appendices to this report and management plan.

Japanese Knotweed Management Plan

The main objective of this Japanese Knotweed Management Plan (KMP) is to define the control measures that need to be implemented to safely and effectively manage land impacted by Japanese knotweed infestations, with the ultimate aim of controlling, remediating and, where possible, eradicating the problem. This plan provides for reasonable and appropriate treatment to neighbouring property where necessary; this would be for the sole benefit of the subject site and its development. If adopted, this KMP will allow for the provision of Insurance Backed Guarantees (IBG) of 10 years duration for any properties to be built within or near to areas of the site identified as impacted by Japanese knotweed infestation.

Acceptance of this KMP and permission for its implementation must be given by all freeholders of the subject property.

Ongoing visits to the site will be recorded and documented as part of the management plan process. The management plan document starts at the point of initial survey and will develop as work proceeds.

Site Development and Japanese Knotweed

The overarching aim of the Knotweed Management Plan will be to create the conditions needed for development of the site to proceed without the constraints caused by the presence of Japanese knotweed. As a sub-text to this, attempts must be made to balance the needs of the development against environmental issues.

For the purpose of this Knotweed Management Plan, our client has supplied plan drawings showing the site boundaries and a proposed build layout. Studying these plans indicates that the construction of new dwellings, gardens and improvements to the access track will occur within the areas deemed to be impacted or likely to be impacted by the presence of Japanese knotweed. It is imperative that suitable control measures are put in place to remove fully the threat posed to the development by the presence of Japanese knotweed propagules within and around these areas.

Steps must be taken to ensure that no activity is allowed on site that may contribute to the spread of Japanese knotweed around or away from the development site, either before or during the construction phase. Appointment of a Knotweed Clerk of Works should be a priority for our client; doing so will allow a coordinated and managed approach to be taken from the outset.

Pre-Development Activity

Where it will not be possible to safely remove or kill-off Japanese knotweed propagules prior to physical development work commencing, control activities must be put in place that ensure that Japanese knotweed is controlled to the point of no longer being a threat to the development activities or the completed development.

As a first line of defence, all known areas of knotweed growth should be fenced off without delay in order to prevent any direct contact with or disturbance to the knotweed taking place, until such time as appropriate control measures are under way. Appropriate signage should be placed on the fencing. Note:

migratory knotweed growth has encroached into the rear lawn in the garden of Nyton Nursery Bungalow from the raised bank to the west of the garden. Mowing of this area of lawn (Stand 1) should be prevented permanently and at the earliest opportunity.

Personnel who will be accessing the site should be notified of the knotweed infestations and, as appropriate, prevented from entering knotweed-impacted areas unless supervised. Examples of works needing such supervision include groundworks, service run investigations, tree felling, stump grinding/pulling etc.

In order to weaken the Japanese knotweed prior to any further activity and if timescales allow, an herbicide treatment should be applied to all areas of knotweed growth without delay. Generally speaking, the last opportunity for conducting herbicide treatment is October and certainly before the plant starts to drop its leaves.

Ordinarily, an established knotweed stand positioned close to a boundary line such as Stand 1 would be expected to put out rhizome growth laterally into the neighbouring land. In places, Japanese knotweed growth is visible within half a metre of the site boundary (on the boundary side of the ditch). It will be prudent for our client to gain permission from the relevant property owners for a knotweed survey of those properties to be conducted without delay. Note: if knotweed growth has occurred in adjacent properties, our client may wish to offer a knotweed treatment programme to the owners of those properties.

The visible growth within Stand 3 appears to lie entirely within the boundaries of the adjacent property Luakela House. Our client should check on the position of the site boundary in this area and, if growth is within the adjacent property, apply to the owner of that property for permission to excavate the knotweed and make good. If this was not forthcoming, permission to conduct scheduled herbicide treatments would be the alternative approach.

Knotweed growth (Stand 1) is within a few metres of a service cover. Investigations should be made to discover if knotweed rhizome has made ingress into the service run. If the service run is found to be impacted by knotweed, safe, controlled removal of the service run may need to take place.

Demolition of the bungalow near to Stand 1 can proceed on the proviso that no works are carried out within four metres of knotweed growth and no traffic (machine or otherwise) is allowed within four metres of knotweed growth.

Japanese knotweed rhizome may exist between knotweed stands 1 and 2 beneath the track surface (i.e. the two stands may be connected by rhizome in the soil). Plan drawings show the access track remaining in use as an entrance/exit for the finished development. It is assumed that it would be desirable for our client to keep this route open during the development. Traffic along the track should be kept to a minimum in order to mitigate the threat of spreading knotweed propagules. Appropriate, clean, material could be used to cover the track surface as temporary, protective layer. Heavy site traffic (plant, trucks etc) should not be allowed to use this access point until it has been deemed safe to do so.

A section of Stand 1 is intermingled with trees and shrubs. If any of these trees are to be retained, excavation of knotweed-impacted soil from under the retained tree canopies (within the RPA) will not be possible and control through herbicide application will need to be utilised.

In many cases, invasives such as Japanese knotweed will exploit areas of water build-up along natural and man-made features such as fences or walls, making site boundaries a prime area of growth. Where knotweed excavations take place along site boundaries, the excavation must, for obvious reasons, not go beyond the boundary, leaving knotweed rhizome in the remaining soil profile. Root barrier can be employed along the cut face of the excavation and extending beyond the known impacted area, creating a robust defence against re-ingress by the knotweed. Growth along the boundary edge will still occur, but this can easily be managed and controlled, whilst the site itself remains free from infestation. This reasoning also applies to areas within the site where knotweed rhizome is known to exist but cannot be excavated (e.g. within tree RPA's).

Root barriers are not considered to be a form of treatment for Japanese knotweed in their own right. However, as part of a coordinated treatment programme and where installed correctly, root barriers give an extra level of security in the control of invasives with rhizome systems.

All of the above points are aimed at reducing the possibility of knotweed propagules (parts of the plant that can propagate into new growth) being spread, introduced onto the site or being transported away from the site.

Methods Available to Control Japanese Knotweed

There are several methods of control which are considered below:

1. Chemically treat using herbicide control methods (3-5 year programme)
2. Relocation (only suitable where conditions on site allow)
3. Burial (only suitable where conditions on site allow)
4. Excavation and Removal to licensed landfill (swift but costly, both financially and environmentally)

Option 1, chemical treatment, is a very practical, cost-effective and sustainable method. It should be noted that it can take several years to completely control a serious Japanese knotweed infestation using this method. The process involves treating live Japanese knotweed when in full leaf with a translocating herbicide that will firstly weaken and, over time, decay and kill off the below ground rhizome. In some instances the rhizome will go into a form of temporary dormancy which is why continued monitoring is needed. If this is to be the sole method of treatment (i.e. no excavation and removal/burial/bunding) then during the treatment, monitoring and guarantee period the impacted land must be left alone and cannot be disturbed. Additional control methods can be employed in combination with herbicide treatments in order to make the process more efficient. These include rhizome fragmentation and crown severing.

Options 2 and 3, on-site relocation and on-site cell-burial, can often be employed as a means of finding the middle ground between lengthy but inexpensive herbicide control programmes and swift, but more costly, excavation and removal off-site. This method requires that a suitable location within the subject site can be

found; Japanese knotweed impacted materials can be excavated and safely removed to that area, to be banded or encapsulated at depth. A high water table and/or unacceptable disruption to natural underground drainage may cause cell burial to be discounted as an option. Application to the Environment Agency is necessary prior to cell-burial taking place and permission to proceed with the works must be gained prior to commencement.

Option 4, excavation and removal off-site, can be costly, both in a monetary sense and environmentally. However, it is a swift and effective method of remediating a site from Japanese knotweed infestation, as long as it is carried out to strict hygiene protocols. The excavation itself is directed firstly at known areas of high-density Japanese knotweed growth, from which point more widespread rhizome runs can be chased out, both laterally and vertically. This method avoids removal of excess material, thus helping to keep costs to a minimum.

After implementation and if all rhizome has been removed successfully, this option allows the former area of impacted land to be used without concern of Japanese knotweed returning. In those instances where, for whatever reason, not all rhizomes can be removed, a root barrier will be installed and in this case the barrier must not be breached by later activity.

Follow-up monitoring (with treatment included if necessary) is a normal requirement of any treatment programme (see later section on 'Site Monitoring').

General points to consider when deciding upon the most appropriate course of action include:

- The future use of the Japanese knotweed impacted land. If the area would be subject to excavation, a change of use, or redevelopment then herbicide treatment alone is generally insufficient as a control method. Excavation and either relocation or removal should be considered.
- The compromise between time available and funds available for treatments.
- The time needed for any necessary testing and re-working of plans.
- The availability of space suitable for on-site location of waste materials, either above or below ground.
- Limitations on future development and land use.
- Determining whether a limited level excavation can be implemented to reduce the volume and cost of waste disposal.
- The use of additional methods, such as root barrier installation, rhizome fragmentation crown or cane cutting.

Additional Treatment Methods

Other methods of control can be employed in combination with herbicide treatments in order to make the process more efficient. These include rhizome fragmentation and crown severing which are normally carried out in the winter months when the knotweed is dormant. Used in isolation, these two control methods would have little or no effect and, in some circumstances would even be counter-productive.

Rhizome fragmentation involves digging through the knotweed impacted soil in order to break up rhizome system into smaller sections. When the new growth season begins, each new fragment of rhizome attempts to put out new shoots and stems. This uses up valuable energy reserves within each fragment. When herbicide is applied, the amount absorbed is increased (as a ratio between amount of herbicide to volume of rhizome), thus doing more damage to the rhizome as a whole.

Crown severing is a simple process of separating the knotweed crown from any adjoining rhizome runs. Established infestations, especially those which have been subjected to herbicide treatments, can contain many mature crowns. Under normal conditions, the crowns act as the 'exit point' for new shoots year on year but, during a treatment regime, these exits can become blocked, leading to fewer shoots being produced and limiting the amount of herbicide that can be absorbed. Removal of the crowns stimulates new shoots to appear from the cut ends of rhizome sections, giving a greater surface area for herbicide absorption.

Normally installed as a preventative measure, **root barrier** is used to protect site boundaries from ingress of rhizome/roots outside the site (and therefore not subject to treatments) or to stop existing rhizome within the site growing into sensitive areas that require protection. Root barriers, where installed, must not be tampered with, moved, cut or punctured.

Japanese Knotweed Control Proposal

The conclusion reached for the subject site is that Option 4, excavation and removal off-site should be employed in a modified form, as follows:

Limited level excavation of knotweed impacted soils, removal off site of waste arising, root barrier installation, follow-up herbicide treatments, site monitoring.

Pre-Excavation Activity

- Client to appoint a Knotweed Clerk of Works to oversee the preparations for, and the actual undertaking of, the excavation and removal off site of knotweed-impacted materials.
- Take soil samples from within the knotweed-impacted areas and have the samples analysed for contaminants for the purpose of establishing waste acceptance authorisation at landfill.
- Client to check all knotweed-impacted areas for buried services and draw up plans of any service runs found or suspected to be within or near the knotweed-impacted areas. Make plans available to all personnel as appropriate.
- Client to lay a temporary layer of appropriate material over the existing Nyton Road access track. This layer should be seen as sacrificial as it would be removed along with any soil excavated for the purpose of knotweed removal.
- Client to arrange suitable access into and out of site for haulage trucks and general traffic in preparation for the possibility of excavating into the Nyton Road access track.
- Prepare all knotweed-impacted areas for excavation by removing large shrubs and trees as appropriate and under supervision of the Knotweed Clerk of Works. Stumps and roots must not be removed.
- Client to prepare a provisional area of site for safe waste acceptance to accept any surplus knotweed-impacted waste arisings that cannot be immediately moved off site. Ideally, this will be a flat area of the site (hardstanding if possible), close to the excavation area, that can be fenced off when not in use.

Excavation Process

- Conduct toolbox talks with personnel involved in the excavation and removal process.
- Excavate all known areas of knotweed impacted soil from within and around Stands 1, 2 and 3 (pending permission), avoiding Root Protection Areas of retained trees as appropriate.
- Where possible, remove by hand rhizome from within top 300mm of soil inside any retained tree RPA's.
- Continue excavation across access track (Nyton Road) as far as is necessary to remove knotweed rhizome from beneath track surface. Have material ready for infill as appropriate to return track to useable state within a reasonable timeframe.
- Limit all excavations to approx 600mm below current levels where appropriate.
- Waste arisings to be removed off site immediately by suitable haulage vehicles or to provisional stockpile area if necessary.

- Make preparations for and install root barrier to faces of excavated areas including for oversail and vertical/battered installation where necessary. A blinding layer (50mm sand) may be needed to protect the root barrier in areas where sharp materials/objects exist in the surfaces to be covered. Blinding may also be needed on top of the installed barrier if the backfill materials are thought to contain sharp materials/objects.
- Backfill excavated areas to bring back to desired levels.

Post-Excavation Activity

- Arrange Insurance-Backed Guarantees for all properties to be built within or close to the original knotweed-impacted areas.
- Initiate a scheduled programme of follow-up monitoring and herbicide treatment for knotweed-impacted areas where no excavation was carried out. This will include areas within adjacent properties where knotweed growth has been identified or is suspected.
- Initiate a schedule of whole-site monitoring to be conducted on a yearly basis.
- Continue monitoring of knotweed-impacted areas until two years of no regrowth is achieved.
- Document all visits to the site and update the Knotweed Management Plan with new records.

Herbicide Treatment

A repetitive and structured approach to herbicide treatment is supported by the RICS and the Environment Agency (EA) as being best practice. The herbicides used will translocate to the Japanese knotweed rhizome, steadily killing it off year on year. It is normal for Japanese knotweed growth to reduce in size and volume after treatment has been started. A smaller number of new shoots will normally appear in subsequent years as it tries to out-compete the chemical treatment. Our policy is to keep treating until remediated. The last visit of each year is the optimum time for treatment to stunt and slow growth as at that time plants are drawing energy from photosynthesis into their roots. Herbicide is more easily trans-located to the roots at this time. Japanese knotweed chemical treatments must continue until the knotweed has been brought fully under control, whether or not any form of excavation of knotweed-impacted soil takes place.

The proposed programme allows for planned monitoring visits with treatments included as appropriate after excavation and the root barrier installation are completed, from June/July through to September/October on a yearly basis for two years.

Herbicide treatments will be targeted at areas within the site where excavation and removal could not be carried out, areas where knotweed growth may occur from behind an installed root barrier and for knotweed growth within adjacent properties.

Note

Herbicide treatments (systemic) are only effective when applied to living plant tissue (especially leaf surfaces). If the Japanese knotweed stems are cut back, cut down, or pulled out, the possibility of introducing herbicide into the rhizomes is reduced or prevented completely, depending on the extent of stem/leaf reduction. Therefore it is imperative that knotweed growth is not interfered with in any way by

others during the treatment programme. Our client should contact the person(s) or organisation(s) responsible for the control of vegetation along the path and request that the knotweed-impacted area is left untouched.

Site Monitoring

To fully comply with RICS, lender and insurer's requirements, a minimum two years of monitoring is needed to make sure that the infestation has been fully remediated. The aim is to gain two years where no re-growth occurs and, if re-growth does occur it is herbicide treated without delay. Without this measure in place, insurance backed guarantees (a requirement for selling properties impacted by Japanese knotweed) cannot be provided to our client.

Summary of Works Schedule

Timing	Control Activity	Notes
Asap	Client to apply to owners of other properties close to knotweed-impacted areas for permission to conduct knotweed surveys. Client to appoint Knotweed Clerk of Works.	
2017	One herbicide treatment visit. Take soil samples for testing.	October
2017	Installation of protective fencing.	Asap
Upon instruction	Supervised tree/shrub felling	Ideally no overlap with excavation work
	Excavation of knotweed-impacted materials and removal off-site by 8 wheel tipper. Client to supply appropriate excavator and driver.	Under licence of specialist contractor
	Supply and installation of specialist root barrier (Cutex) to all areas where knotweed rhizome remains in cut surfaces. Blinding and backfill to be conducted as appropriate.	Client to provide materials
Post-excavation	Two years of scheduled herbicide treatment visits. Two visits per year from June to September.	Adjacent properties included for within this item as appropriate.
Post-excavation	Two years (minimum) of site monitoring, making at least one mid/late summer visit per year to inspect the site. Herbicide treatments included if needed.	

Threats and Limitations to the Control Programme

The details of this Japanese Knotweed Management Plan will remain valid for a period of six months. Beyond this period and if not already instructed against by our client, this KMP should be reviewed.

The comprehensiveness of any invasive weed survey may be limited by a number of factors, including physical and/or visual access to and throughout the subject site, the season in which surveys are undertaken and previous activities within the subject site, including activities which have an impact on the visibility of the subject species, intentional or otherwise.

During any control programme it is requested that other parties do not cut, pull out, spray with herbicide or other substances, remove off-site, burn or otherwise interfere with any knotweed growth or rhizome as this will extend the control programme and necessitate the KMP to be revised (at client's cost). All Japanese knotweed growth must be allowed to develop without interference during the growth season.

Please note - Japanese knotweed waste (leaves, stems, rhizome/roots and soils/rubble containing knotweed waste) is classed as Controlled Waste (see 'Supporting Information', page 6) and must not be taken off site under any circumstances unless done under the supervision of an accredited specialist who holds the appropriate waste carriers license.

The instruction to proceed with a control programme must be agreed and accepted by all property owners/freeholders by signing the agreement form in 'Supporting Information and Documents'. PBA will need full correspondence details of, and written permission from, all parties who own or have ownership rights over the land impacted by knotweed prior to starting works.

PBA cannot enter into any discussions or negotiations between client and third parties regarding sharing of costs or any other responsibilities.

Change of Land Use During a Knotweed Control Programme

This section applies to the post-excavation period.

PBA Solutions must be advised in advance of any planned change in land use to the 'no disturbance zone' as shown on the site plan (this being the area extending 7 metres from visible Japanese knotweed growth that which was observed at time of the knotweed survey). A Specific Control Plan must be drawn up by our client as described below and sent promptly to PBA Solutions who then can advise on any special actions that must be implemented in order to retain the integrity of the KMP and associated treatment(s). Such situations may include removal of existing vegetation including trees and roots, landscaping, building, removing/replacing/repairing structures, excavating, installing services, installing/removing/repairing fencing or otherwise disturbing/opening up the ground. Completed SCP applications must be received by PBA Solutions at least two weeks prior to the proposed commencement of the planned works.

Consideration must be given to the following points:

Actions planned (client to advise)	PBA Solutions will provide methodology and scheduling for activities. Example actions include; excavation, services maintenance or boundary fence maintenance. It is normal for other trades to be involved; they would need briefing.
Monitoring	PBA will advise of any monitoring requirements relevant to the actions planned
Resources	Specific machinery and material requirements will be stated
Evaluation	PBA will evaluate outcomes of completed works and adapt the KMP as necessary

Specific Control Plan for actions planned which would result in a change of land use or are seen to require safe co-ordinated methodology (Adapted from the EA CoP 2012).

Land Ownership and Site Boundaries

Prior to any works commencing, it will be important to establish the boundary line of the site at and near to the identified Japanese knotweed infestations. If it is discovered that some knotweed-impacted land lies outside the site boundary, permission for PBA Solutions to access that area and perform excavation/treatments/monitoring will need to be gained from the land-owner prior to any work being undertaken. Proof of permission should be gained in writing and provided to PBA Solutions in a timely manner.

Where permission, if required, cannot be gained, this KMP must be revised to take into account factors such as additional risk, increases in treatment programme duration etc. Additional charges may apply under this type of scenario.

Additional Areas of Infestation

If Japanese knotweed (or a variant of) is found to be growing on site in areas that were not identified as impacted during the site survey, these instances of infestation must be reported to PBA Solutions so that this KMP can be adapted. There is generally an extra charge for treating infestations of Japanese knotweed that are not covered under the original KMP. PBA Solutions cannot be held responsible for future re-ingress of Japanese knotweed from areas of infestation which are, for whatever reason, inaccessible and/or not reported to PBA Solutions.

Guarantees

Guarantees are subject to access and permission being maintained to all knotweed-impacted properties that are included in the control programme for the specified duration of the control programme and guarantee period. It is the client's responsibility to maintain good access and permission for treatment to take place.

Caveats of Guarantees

Where a guarantee has been provided, PBA Solutions will carry out, without further charge, such further herbicide treatments as deemed necessary to control the invasive weed. Such guarantees are subject to PBA Solutions current terms and conditions. The guarantee will be of no validity or effect and will be unenforceable against PBA Solutions in any one or more of the following circumstances;

- A. where the person entitled to the benefit of the guarantee does not give written notice of a claim under that guarantee within three months from the date upon which the existence of such a claim could, with the exercise of reasonable diligence by a continuous occupier of the affected premises, have been discovered;
- B. where all works advised or recommended by PBA Solutions prior to, at the time of, or subsequent to, treatment carried out by PBA Solutions were not fully carried out, or not effectively carried out with good and proper materials and in a workmanlike manner by the client or any other third party;
- C. where the client fails to pay the full price, any properly payable additional costs, and any interest due within six months of the date upon which the same became due;
- D. where the land and property has not been kept in a good and proper state, so as to detect and/or prevent tipping and/or the early detection of growth of Japanese knotweed;
- E. where any recommendation given by PBA Solutions has not been complied with, whether such recommendation was given in the company's report/quotation, or by separate documentation;
- F. where, subsequent to the completion of treatment by PBA Solutions, there has been any disturbance to the treated areas by the client, other organisations, companies or individuals;
- G. where Japanese knotweed has been re-introduced to the specified treatment area adjacent to watercourses or areas that have been subject to flooding, or by tipping or the uncontrolled propagation from adjacent land.



Appendices

1. Legal Framework

Wildlife and Countryside Act 1981

Schedule 9 of the WCA lists plant (and animal) species that are, “not ordinarily resident in and is not a regular visitor to Great Britain in a wild state”.

Section 14(2) of the Wildlife and Countryside Act (WCA) 1981 states that, “if any person plants or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9, he shall be guilty of an offence”. This could include spreading the plant through cuttings, mowing or digging up the roots and disposing of the waste in a bin. Interestingly, the statement “in the wild” refers to residential gardens and parks, not just open stretches of our countryside.

Guidance by Defra states that if, “a landowner who knowingly allows a Schedule 9 species that they did not introduce, to accumulate on his land and create a problem as it spreads to other areas of the wild, and who makes a conscious decision to do nothing about it, is 'causing it to grow' ” under Section 14 of Schedule 9 of the WCA.

Penalties for a Section 14 offence have been modified by the Countryside and Rights of Way Act 2000 for England and Wales. A Magistrates’ Court can now impose a maximum fine of £5000 or a maximum prison sentence of six months, or both. A Crown Court can impose an unlimited fine or a maximum prison sentence of two years, or both.

Controlled Waste

Any materials containing or made up of Schedule 9 Invasive Weeds is considered to have the potential to cause ecological harm and is deemed “Controlled Waste” or “Directive Waste” (Waste Management Licensing Regulations 1994).

Under Section 33(1)(a) and (1)(b) of the Environment Protection Act 1990, it is an offence to deposit, treat, keep or dispose of controlled waste without a licence. Exemptions from licensing are available in certain circumstances as set out in Schedule 3 of the Waste Management Licensing Regulations 1994, as amended.

Section 33 (1)(c) of the Environmental Protection Act 1990 makes it an offence to keep, treat or dispose of controlled waste in a manner likely to cause pollution of the environment or harm to human health. A magistrates’ court can impose a maximum fine of £20,000 or a maximum prison sentence of 6 months, or both. A Crown Court can impose an unlimited fine or a maximum prison sentence of 2 years, or both.

Section 34 of the Environmental Protection Act 1990 places a duty of care on any person who imports, produces, carries, keeps, treats or disposes of controlled waste. Their duty is to ensure that:

- No-one else disposes of the waste unlawfully or in a manner likely to cause pollution of the environment or harm to human health.
- Waste does not escape.

- Waste is only transported by a carrier that is either registered or exempt from registration by the Controlled Waste Registration of Carriers and Seizure of Vehicle Regulations 1991.

Breach of the duty of care under Section 34 of the Environmental Protection Act 1990 is a criminal offence. The Environment Agency is responsible for enforcement and a person found guilty of an offence under this section is liable to a fine not exceeding £5000 in the magistrates' court and to a fine in the Crown Court.

The provisions concerning waste transfer notes are set out in the Environmental Protection (Duty of Care) Regulations 1991 as amended. Failure to comply with these provisions is an offence.

The Environmental Protection Act 1990

Because it is classified as Controlled Waste, invasive plant material must be safely disposed of at an appropriately licensed landfill site in accordance with the Environmental Protection Act 1990 (Duty of Care) Regulations 1991. To ensure safe disposal, contaminated soils must be buried to a depth of at least 5 metres. Section 34 of the Environmental Protection Act 1990 also places a duty of care on all waste producers to ensure that a written description of the waste and any specific harmful properties is provided to the site operator.

Hazardous Waste England and Wales Regulations 2005:

Untreated invasive weed waste materials are not regarded as a "Hazardous Waste" but materials that have been treated with residual herbicides could be. Residual herbicides persist in soil for long periods with the possibility of leaching and causing harm to the surrounding environment. Additionally, excavated invasive weed waste contaminated with high levels of heavy metals or other hazardous materials would be categorised as hazardous and must be disposed of at a licensed hazardous waste landfill site. In other words, 'hazardous' takes precedence over 'controlled'.

Control of Pesticides Regulations 1986

Treatments that use pesticides require that all persons follow The Control of Pesticides Regulations 1986 (amended 1997) and comply with Control of Substances Hazardous to Health Regulations 2002 (COSHH). All reasonable precautions should be taken to protect the health of human beings, creatures and plants, safeguard the environment and, in particular, avoid the pollution of water. Approval from the Environment Agency should be sought before application of pesticides in or near water. People applying herbicides should be trained and qualified to do so.

Community Protection Notices

The government has given both the Police and Local Authorities the power to impose Community Protection Notices on people or organisations who allow invasive weeds to negatively impact others. As part of the Antisocial Behaviour Bill the government now recognise that invasive weeds and, in particular, Japanese knotweed are often the cause of disputes. The downside is that these powers are not mandatory so some authorities may opt out.



Nuisance Claims

Allowing Invasive Species to spread onto neighbouring land could be considered to be a private nuisance but not a statutory nuisance. “Unreasonable interference with the enjoyment of land” could be claimed within UK courts.

Selling Property with Japanese Knotweed

Property vendors have to complete a Law Society Form (TA6) which legally requires them to honestly answer questions about their property. The form now requires vendors to disclose information relating to Japanese knotweed previously or currently present within or the curtilage of the property. Failure to correctly answer questions relating to Japanese knotweed would make the vendor liable to claims from the buyer if they subsequently find out the vendor misled them.

2. Japanese Knotweed in Context

Over a couple of centuries, many non-native plants have been introduced to the UK and, whilst many of these have enhanced our habitat, some have a negative impact on the natural and built environment and are listed in Schedule 9 of The Wildlife and Countryside Act (1981). Indeed, there is increased focus on promoting bio-security and regulation of non-native invasive species within the UK and EU. Because invasives can wreck our native ecosystems, they require specialist control and, in some cases, eradication. Common amongst these invasive weeds are Japanese knotweed, Himalayan balsam and giant hogweed but it's important to note that aquatic invasives are placed at the same level on the Schedule 9 'hit list'.

Non-native invasive plant species can:

- Take over large swathes of land or water bodies, out-competing native flora and altering or reducing the natural biodiversity of local ecologies, in some cases replacing a diverse ecosystem with a monoculture.
- Change the food web in an ecosystem by replacing native food sources, whilst providing little to no food value for wildlife.
- Reduce the suitability for habitation of many species of local fauna.
- Cause, or contribute to, riverbank erosion and/or flooding along waterways.
- Cause actual physical damage to built structures.
- Cause hazards to the health and safety of users of infested sites (species such as giant hogweed).
- Reduce the amenity value of impacted areas of land and waterways.
- Reduce the portfolio value of impacted properties.

This is not a complete list but does give a good indication of the spread and variety of problems associated with non-native invasive species. A pre-emptive approach can mitigate the detrimental effects of invasive species and, in most cases, reduce the costs associated with managing and controlling the problem. This is illustrated in an excerpt from The Invasive Non-Native Species Framework Strategy for Great Britain 2008, which states,

"This importance of early detection and action is evident and the pace at which country-wide eradication can become untenable is illustrated with Japanese knotweed – one of the best known established invasive non-native plant species that continues to impose costs on many sectors. Research has estimated that in Wales alone, it would have cost £53.3 million for a three year eradication programme had it started in 2001, but the cost would have been £76 million for such a programme starting in 2007.

...the emphasis in this Strategy on preventative measures and more rapid, targeted action involves investment now to reduce or avert far larger future pressures and costs from invasive non-native species."

The information contained within this document should be read in conjunction with the government Regulatory Position Statement and Environment Agency's Knotweed Code of Practice (Managing Japanese knotweed on development sites, amended 2013), documents which are designed to help developers choose the most appropriate strategy for dealing with Japanese knotweed infestations.

3. Method Statement: Controlling & Preventing the Spread of Japanese Knotweed

3.1 Summary of Method Statement

If Japanese knotweed is found, either by an invasive plants specialist or by others,

- the accepted method statement must be followed as outlined in section 3.2 of this document including the production of a Knotweed Management Plan (KMP) by the contracted specialist and,
- the impacted area must be fenced off without delay, positioning the fence seven metres from any point of visible growth,
- signage must be displayed, including text along the lines of, “Knotweed Control Area”,
- an herbicide treatment should be performed at the earliest possible opportunity,
- the knotweed impacted area must be surveyed by a specialist invasive weed contractor prior to any works commencing within that phase area,
- upon agreement to the KMP being actioned, the client is to instruct the contracted specialist to begin remediation works.
- Remediation works must be carried out, following the KMP in accordance with the EA Code of Practice.
- After remediation works are completed, scheduled monitoring surveys of the site must be carried out.
- All relevant documentation must be reviewed, updated and retained by the contracted invasive weed specialist and, as necessary, supplied to the client for their own records.

3.2 Methodology for Surveying and Reporting

If an infestation of Japanese knotweed is discovered, a report on the survey findings for that phase area must be produced and submitted summarizing the findings of that survey, with any necessary recommendations specific to that phase included, a Knotweed Management Plan (KMP) specific to that phase area and infestation should be prepared and supplied to the relevant bodies and the design and construction plans revised, if necessary, to take into account the recommendations within the KMP. This would form a point-in-time reference for the developer, providing a baseline against which other development activities could be assessed, agreed and/or permitted.

In order for the KMP to be constructive and meaningful, the contracted invasive weed specialist should be provided with all documentation relevant to land use, vegetation cover and proposed development within that phase area prior to the survey taking place.

The survey must include,

- The production of a photographic record
- GPS location information
- Dimensions of knotweed stand(s)
- Growth habits of knotweed stand(s)
- Distance of knotweed from visible built structures

- Recording of land use or type in the location of knotweed stand(s)
- Recording of locations of visible services within or near to knotweed stand(s)
- Knotweed Location Plans
- Knotweed locations must be plotted to sub 5 metre accuracy
- Knotweed locations must be marked up onto a scale plan drawing
- Plan drawings must distinguish between visible knotweed growth and potentially knotweed-impacted land
- Services, structures/buildings should be referenced or clearly identifiable on plans

3.3 Actions to follow the identification of Japanese knotweed during design and construction phases

In order to lower the risk of contamination by Japanese knotweed, the following protocol and procedures should be followed in each instance where Japanese knotweed is identified or suspected. That identification could be through contracted site surveys or by personnel on/around the site or by members of the public. The developer should be ready to action these recommendations in any of these cases.

If Japanese knotweed has been identified, or is suspected, all works within and near to the impacted area must stop and the contracted invasive weed specialist informed.

A set of photographs of the area under suspicion should be sent without delay to the contracted invasive weeds specialist. Contextual photos of the area, as well as close-up views, should be sent if possible.

The specialist invasive plants contractor will then examine the photographs and state whether or not the photos depict plant(s) that resemble Japanese knotweed.

In the event that Japanese knotweed is confirmed as growing in the phase area, the infestation must be fenced off immediately (e.g. Heras fencing) at a minimum distance of seven metres from any point of growth.

The site of infestation must be visited by the specialist contractor, who will survey the area and its surroundings and record the findings as set out in 3.2 of this document.

Prior to the commencement of any works involving the treatment of Japanese knotweed by any means, the developer shall make every effort to inform all site personnel and visitors of the existence of the knotweed infestation, its location and procedures to follow in order to minimize the risk of cross-contamination of the site.

A Knotweed Management Plan will then be produced by the specialist contractor and passed to the developer and must be implemented.

Prior to the commencement of any works involving the treatment (by any means) of Japanese knotweed infestations, the developer or their approved representatives will pass on formal instruction to the specialist contractor for the specified works to take place. Such works must be supported by a Knotweed Management Plan.

The developer will provide and maintain good and clear access to the knotweed infestation(s) for the specialist contractor, in order to enable efficient delivery of treatments as scheduled. This access must be maintained for the duration of the treatment programme and any associated monitoring and/or guarantee period.

To enable project managers to implement the above methodology, toolbox-talk documents and identification sheets are provided for incorporation into all contractual documentation for site-related activities. These can be found in Appendices 6 and 7.

A useful aid to understanding the control of Japanese knotweed can be found in the Environment Agency Code of Practice, presented as a flowchart. A copy of this is included in Appendix 8.

3.4 Knotweed control methodology after construction phase

The developer and all future land owners must maintain monitoring and inspections as prescribed by any Knotweed Management Plan. The developer has an obligation to future land owners to pass on the following information which ordinarily would need to be retained. Such information is normally held within the KMP.

- Documentation relating to any waste removed off site (legal obligation)
- Drawings to show where excavation and or cell burial of knotweed impacted land has occurred (this may be required for title deeds)

4. Method Statement for Importing Soil - Managing the Threat of Invasive Weeds

During almost any development, topsoil will be used as part of the build and landscaping process. Some sites contain the required volume of soil which can be excavated and stockpiled for later use. In many cases, however, the soil must be imported from outside sources. This activity carries its own set of risks that can present the development if not planned for and guarded against, one of these threats being the import of invasive weed species into the development site and the potential for those weeds to then be spread.

Because of this and the fact that top soils will vary widely in their composition, suitability for purpose and availability, topsoil substitutes (manufactured topsoil) are an alternative to be considered.

The advantages of good quality topsoil substitutes include a consistent composition, control over the mix, a greater availability. Where it is desirable to use a manufactured soil it must comply (where relevant) with the implementation guidelines for getting topsoil approved for use on the development.

Careful sourcing of good quality soil from a reputable supplier will minimize any risk. The supplier should be able to offer a guarantee that the soil is not from recycled sources (which can include demolition and skip waste and may be contaminated with toxic elements and compounds), will be happy for inspections, sampling and testing of the soil to be conducted and will have relevant laboratory analysis certification that is no more than 12 months old.

If good quantities of undisturbed, natural topsoil exist in any phase areas that have been surveyed and inspected sufficiently to declare it free of Schedule 9 invasive plants, this resource should be protected and handled with care so that it can be re-used effectively for the new landscape scheme.

It is most likely that there are ecological, environmental and financial benefits of finding a local natural topsoil source. This would require planning at the design stage and policing during the construction phase. Where it is desirable to use a natural soil it must comply with the implementation guidelines for getting topsoil approved for use on the development.

4.1 Criteria for specifying and/or purchasing soil for the development

- The following text must be specified within all works packages where topsoil is required to be used;
“Topsoil should be free of weeds and all viable propagules of invasive non-native species, rhizomes, seeds, corms etc. Always ask for a representative sample and seek guidance on the source. Inspect on delivery. See British Standard number 3882 for the Recognition and Classification of Topsoil”.
- Do investigate the possibility of utilising knotweed-free (or invasive weed free) soils from within the site itself.
- Do investigate the use of soils that are manufactured using by-products of horticultural production such as “British Sugar” soil.
- Do investigate the possibility of utilising natural soil from a local single source.

- Avoid the use soil from multiple sources.
- Do not use green waste or recycled compost.
- Do not use soil that is recycled (soil or similar products mixed together often from multiple sources).

4.2 Implementation methodology for getting topsoil approved for use on the development

Soil provenance must be checked. Initially, ordinance survey grid references should be provided to ascertain where the soil has come from and that it meets all the criteria set for the development.

The supplier must provide supporting documentation to show that there is no knowledge of invasive plant material being present within the soil (it is unreasonable to expect a soil supplier to provide guarantees against the presence of invasive plant material).

The top soil must conform to all relevant standards and be laboratory tested to be fit for purpose and meet the landscape specification requirements.

All top soil imported into site must be “approved soil” regulated through contractual requirements and specification clauses.

4.3 On-site topsoil sourcing and provision

Storage of topsoil should meet current best practice and form part of contractual arrangements and specification requirements.

Monitoring of stockpiled soil for the presence of invasive weed material must be implemented annually and in addition immediately prior to re-use.

Management of stockpiled soil must include regular weed control to prevent general weed growth and seed banks developing and allow for more effective inspection for the presence of invasive species.

5. Toolbox Talk - Japanese Knotweed on Development Sites

Advice for Developers

When developing land that is impacted by Japanese knotweed it is essential that you are aware of the risks posed by this invasive weed to avoid the pitfalls of costly remediation, litigation and resale issues. Any work that is carried out close to or in areas where knotweed is or was growing must be completed in accordance with the Environment Agency's publication 'Managing Japanese Knotweed on Development Sites, The Knotweed Code of Practice' (EA CoP), 2012.

Action to be taken: 5 steps to deal with Japanese knotweed where development is proposed...

1. Excavation of knotweed impacted land should favour on-site solutions such as relocation and/or burial; these must comply with the EA Code of Practice. Removal off-site needs to comply with Waste Management Regulations. Seek specialist invasive weed contractor advice.
2. Investigate and decide upon the best access routes for plant and logistics for the removal of knotweed.
3. Agree a Knotweed Management Plan as recommended by the EA Cop. An outline plan may form the basis of an estimate or quote but should ultimately evaluate methods of remediation against site/development objectives.
4. Implement the Knotweed Management Plan, treating and removing knotweed-impacted land as appropriate. Ensure that the chosen specialist has suitably qualified staff, that the specialist company is financially able to carry out the work and can offer suitable independent insurance backed guarantee's since these may be needed when selling property in the future.
5. Ensure that all remediation work is fully documented and recorded in order to meet all legal obligations. The specialist invasive weed contractor will keep their own records and will have procedures in place to make such information available to their clients.

Why Take Japanese Knotweed Seriously?

- Japanese knotweed is highly invasive and extremely difficult (and costly) to eradicate.
- It is extremely easy to spread knotweed; less than one gram of rhizome (root) will happily create a new plant.
- Knotweed will cause structural damage to walls, foundations, tarmac surfacing and underground service routes
- It out-competes our native plants and causes problems like river bank erosion.
- Knotweed is like an iceberg; the rhizomes (roots) which do the damage, often extend more than 2 metres into the soil.
- It's expensive to dig out and take off site as this must all be done under licence and strictly supervised.
- Mortgage lenders will often refuse a mortgage because of knotweed near a property until a management plan is in place.

Key Considerations where knotweed is identified:

- Knotweed can be spread extremely easily by development activities - strict hygiene is vital.
- If knotweed is within 7 metres of any proposed works you should seek specialist advice.
- Once identified, fence-off the knotweed and use signage to advise site users of the issue.

- Don't excavate or use machinery/vehicles on or near impacted land unless under specialist supervision.
- Don't cut with flails/trimmers.
- Don't pull up knotweed.
- Don't allow any knotweed material to enter water courses.
- Don't put any knotweed material in refuse bins.
- Swift action saves hassle, time and money.

If you are, or have been, working in a knotweed-impacted area:

- You must follow strict hygiene rules.
- Avoid working directly in the knotweed-impacted area if possible.
- All tools, equipment, machinery must be cleaned before it leaves the area.
- Vehicles, especially their tyre treads and tracks, must be cleaned and inspected before leaving the area.
- Workwear, especially boot soles, must be cleaned before leaving the area.

For specific information relating to Japanese knotweed, its identification and the legal issues associated with Japanese knotweed see the EA and PCA Codes of Practice (CoP).

6. Knotweed Management Plans

6.1 About Knotweed Management Plans

The objective of any Knotweed Management Plan (KMP) is to define the control measures that need to be implemented to safely and effectively manage land impacted by Japanese knotweed infestations, with the ultimate aim of controlling, remediating and, where possible, eradicating the problem.

A well written management plan will provide a document with which it can be proved that a responsible approach to the control and management of Japanese knotweed (or invasive weeds) has been taken. This can be an invaluable tool where the threat of litigation against the main contractor rears its head. The management plan should be seen as a living document which will grow over time, as records of new surveys, treatments and other associated activities are supplied over time by the authoring contractor.

A KMP is normally written after a survey of the subject area has been conducted. The survey will usually take the form of a non-invasive walk-through inspection. During the survey, aside from the obvious plotting of invasive plant infestations, records should be made of areas that were inaccessible, land use types, boundaries, vegetation types and water bodies or water courses, where appropriate. GIS/GPS plotting of infestation locations is now so easily achieved that it should be seen as a pre-requisite.

A good KMP will record the findings of the survey(s) undertaken in written and visual forms, giving a concise but accurate description of the findings, before going on to explain the proposed methodology for control and remediation of any infestation found, with the reasoning behind the proposal included.

Treatment and control options may be discussed within the KMP, so that the client has the opportunity to decide on the most appropriate course of action, by balancing financial, ecological, logistical and time constraints.

Additional items for the client's consideration should be included in the KMP if they will benefit the achievement of a positive outcome, such as advice for contractors as to their duty to educate and inform personnel likely to be working close to an infestation.

6.2 Reactive and Pre-Emptive Management Plans

The manner in which a particular site is dealt with in regards to invasive plant infestations and associated management plans will depend upon a number of factors, including the stage and state of development of a site. Where a site is already developed, management plans will normally be reactive in character and designed to work around existing features and alleviate the problems associated with known infestations. Where a site is being developed, the management plan will again be reactive (in response to a known threat) but will also seek to ensure that risk management is high on the agenda within the management plan. This is to ensure that the developer has access to information designed to ensure that the development process is carried out in a manner which minimizes the threat of contamination on site or off site.

The management plan process changes considerably if the development of the subject site is yet to start; instead of being reactive, the management plan will be essentially pre-emptive in character. This approach fits neatly with a growing body of evidence which supports the view that a pre-emptive management plan enables a site to be developed with greater confidence, allowing any problems encountered to be dealt with efficiently. Pre-emptive invasive plant management that is done well increases awareness, improves communication and can prevent high fees being incurred for clean-up operations.

6.3 Pre-Emptive Site Surveys

It should be noted that identifying infestations of any invasive plant species may be hindered by a number of factors. These include the time of year or season, the immediate surrounding physical conditions, changes in land use through human activity, the health of the plant in question and the physical size and shape of the infestation. For example, infestations of rhizomatous plants such as Japanese knotweed can remain hidden from view for a number of years after having received large doses of herbicide. The plant may stop producing above-ground growth if the top-most layer of rhizome has been damaged by the treatment, only for new growth to emerge some years later when deeper rhizome sections manage to push out shoots that reach the surface and begin the growth cycle once again.

Additional to the above points, a phenomenon known as lag time or lag effect can produce false readings in areas surveyed for invasive plants. Many invasive species go through a "lag phase" in which their populations grow slowly until they reach a size large enough for the population to explode and become invasive. This is normally applied to wide geographical areas but can be seen as appropriate on the local level also. The consequence of the lag effect at this scale is that invasive plant infestations may already exist within a given area but have not yet been identified because the population is small in both number and area of coverage. Himalayan balsam, which frequently utilises riparian zones along water courses, can, for example suddenly 'appear' as a large population in a location where previously it had not been seen.

It should be noted that invasive plant types other than Japanese knotweed may be found within the development site area and that identification of any invasive species could occur at any time prior to works commencing or, indeed, during the works. In the case of invasive plants other than Japanese knotweed being discovered within a phase, a management plan specific to that species should be written and submitted.

7. Schedule 9 of the Wildlife and Countryside Act

Plants listed under Schedule 9 of the Wildlife and Countryside Act in England and Wales

Common name	Latin name	Notes
ALGAE		
Hooked Asparagus Seaweed	<i>Asparagopsis armata</i>	
Green Seafingers	<i>Codium fragile</i>	
Japanese Kelp	<i>Laminaria japonica</i>	
Giant Kelp	<i>Macrocystis anagustifolia</i>	
Giant Kelp	<i>Macrocystis integrifolia</i>	
Giant Kelp	<i>Macrocystis laevis</i>	
Giant Kelp	<i>Macrocystis pyrifera</i>	
Californian Red Seaweed	<i>Pilayella littoralis</i>	
Laver Seaweeds	<i>Porphyra</i> spp	(except native species)
Japanese Seaweed	<i>Sargassum muticum</i>	
Wakame	<i>Undaria pinnatifida</i>	
Red Algae	<i>Grateloupia luxurians</i>	
FERNS		
Water Fern	<i>Azolla filiculoides</i>	
Giant Salvinia	<i>Salvinia molesta</i>	
FLOWERING PLANTS		
Few-flowered Leek	<i>Allium paradoxum</i>	
Fanwort	<i>Cabomba caroliniana</i>	
Hottentot Fig	<i>Carpobrotus edulis</i>	
Australian Swamp Stonecrop	<i>Crassula helmsii</i>	
Water Hyacinth	<i>Eichhornia crassipes</i>	
Shallon	<i>Gaultheria shallon</i>	
Giant Hogweed	<i>Heracleum</i>	
Floating Pennywort	<i>Hydrocotyle ranunculoides</i>	
Curly Waterweed	<i>Lagarosiphon major</i>	
Parrot's-feather	<i>Myriophyllum aquaticum</i>	
Water Lettuce	<i>Pistia stratiotes</i>	
Japanese Knotweed	<i>Fallopia japonica</i>	
Giant Knotweed	<i>Fallopia sachalinensis</i>	
Hybrid Knotweed	<i>Fallopia japonica</i> x <i>Fallopia</i>	
False-acacia	<i>Robinia pseudoacacia</i>	
Perfoliate Alexanders	<i>Smyrniolum perfoliatum</i>	
Variegated Yellow Archangel	<i>Lamium maculatum</i>	
Yellow Azalea	<i>Rhododendron luteum</i>	
Himalayan Balsam	<i>Impatiens glandulifera</i>	

Cotoneaster	<i>Cotoneaster horizontalis</i>	
Cotoneaster, Entire-leaved	<i>Cotoneaster integerrimus</i>	
Cotoneaster, Himalayan	<i>Cotoneaster simonsii</i>	
Cotoneaster, Hollyberry	<i>Cotoneaster bullatus</i>	
Cotoneaster, Small-leaved	<i>Cotoneaster microphyllus</i>	
False Virginia Creeper	<i>Parthenocissus inserta</i>	
Virginia Creeper	<i>Parthenocissus</i>	
Hottentot Fig	<i>Carpobrotus edulis</i>	
Three-cornered Garlic	<i>Allium triquetrum</i>	
Water Hyacinth	<i>Eichhornia crassipes</i>	
Few-flowered Leek	<i>Allium paradoxum</i>	
Montbretia	<i>Crocsmia x crocosmiiflora</i>	
Floating Water Primrose	<i>Ludwigia peploides</i>	
Water Primrose	<i>Ludwigia arandiflora</i>	
Water Primrose	<i>Ludwigia uruguayensis</i>	
Rhododendron	<i>Rhododendron ponticum</i>	
Rhododendron	<i>Rhododendron ponticum x</i>	
Giant Rhubarb	<i>Gunnera tinctoria</i>	
Japanese Rose	<i>Rosa rugosa</i>	
Giant Salvinia	<i>Salvinia molesta</i>	
Purple Dewplant	<i>Disphyma crassifolium</i>	
Fanwort (otherwise known as Carolina Water-	<i>Cabomba caroliniana</i>	
Water Lettuce	<i>Pistia stratiotes</i>	
Parrot's Feather	<i>Myriophyllum aquaticum</i>	
Floating Pennywort	<i>Hydrocotyle ranunculoides</i>	
Duck Potato	<i>Sagittaria latifolia</i>	
Stonecrop, Australian Swamp (otherwise	<i>Crassula helmsii</i>	
Curly Waterweed	<i>Lagarosiphon major</i>	
Waterweeds	All species of the genus	

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- PCA - Property Care Association is a recognised trade association for providers of Knotweed Management Plans (KMPs). PBA Solutions are founder members of the PCA Invasive Weed Group. (<http://www.property-care.org/invasive-species>)
- Japanese knotweed - The common type of Japanese knotweed is known as *Fallopia japonica*, but there is a smaller compact variety called *Fallopia japonica* var. *compacta*, which reaches a height of 1 metre. Giant knotweed (*Fallopia sachalinensis*), can grow up to 5 metres tall. A hybrid between Japanese knotweed and giant knotweed, *Fallopia x bohemica*, is also found in the UK.
- Knotweed/Japanese knotweed impacted area/land - phrase used to describe land extending from the original visible stand/location of knotweed which can be regarded as impacted by Japanese knotweed. This includes the rhizome (root) which may extend 7 metres or more beyond any visible growth; rhizomes must be managed as part of a KMP.
- Rhizome - Underground stem which enables Japanese knotweed to survive over winter, when the canes die back. Small sections of rhizome, as little as 0.7g, can re-grow into a new plant.
- Canes - tall, hollow, bamboo-like stems.
- Stands - clumps of Japanese knotweed stems, which may vary greatly in area of coverage.
- Crown - the visible part of the rhizome from which canes grow. Crowns can produce many new canes and, because of their size, can be resistant to burning or drying out.
- Petiole - The stalk or stem that connects the leaf to the plant.
- Knotweed growth - visible above-ground plant material such as stems, leaves, flowers. 'Visible knotweed growth' and 'knotweed growth' are references to above-ground growth while rhizome refers to below-ground stems, shoots or root growths. Typically, below-ground growth will exceed the area of land occupied by above-ground growth.
- Environmental Protection Act 1990 Part II of the EPA 1990 contains a number of legal provisions concerning 'controlled waste'. Any soil or plant material contaminated with Japanese knotweed that a person discards, intends to discard or is required to discard, is likely to be classified as controlled waste. The most relevant provisions are in sections 33 and 34 of the Act.
- Wildlife and Countryside Act 1981 - Section 14(2) of this Act states that, "if any person plants or otherwise causes to grow in the wild any plant which is included in Part II of Schedule 9, he shall be guilty of an offence." Japanese knotweed is one of the plants listed in the Schedule.
- Client; usually the person(s) or organisation(s) responsible for the knotweed infestation and usually the land and/or property owner.