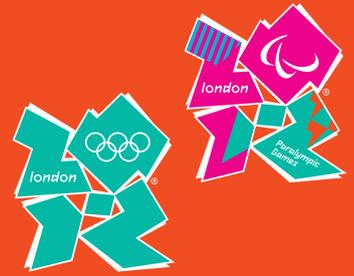


# Learning legacy



## Lessons learned from the London 2012 Games construction project

### Treating Japanese Knotweed on the Olympic Park

The site of the Olympic Park was neglected for many years and the resultant areas of waste ground and river corridors meant that these areas became extensively colonised by invasive weed species, including Japanese Knotweed. An invasive species strategy was formulated to clear the site of these species over a number of years. This strategy used environmentally sustainable techniques and was cost effective.

#### Japanese Knotweed colonies

Around four hectares (or five per cent) of the site contained established Japanese Knotweed colonies at the outset of works. This weed species is the most difficult to treat as it is highly invasive and spreads vegetatively by means of underground roots (rhizomes), or from broken fragments of stem that can exist several metres below ground. It can cause serious damage to infrastructure and outcompetes native species resulting in reduced diversity.

#### Treatments

A range of site specific treatments were developed in close liaison with the Environment Agency, the London Development Agency (LDA) and the Olympic Delivery Authority (ODA). Techniques included in-situ spraying with persistent or non-persistent herbicides (dependent upon ground geology and proximity to water), excavation under the supervision of specialist contractors, screening of excavated material, controlled incineration of Knotweed cane, crown and rhizome material and deep burial using proprietary root barriers.

The aim was to manage invasive species remediation within the Park boundary, therefore minimising the carbon footprint and avoiding the transport of Knotweed contaminated material off site to expensive specialist

landfill sites. The strategy was developed in line with the ODA's policy to undertake the preparation and construction of the Park using the most environmentally sound techniques.

#### Chemical treatment and fencing off

Picloram would normally have been the most effective chemical to use throughout the Park as control could be achieved in one to two seasons. However, due to the toxicity of this chemical, it could only be used sparingly in areas that would not be subject to planting nor were within 10 metres of protected aquifers or watercourses. Glyphosate, which is a less harmful water soluble chemical, had to be used, particularly along the river edges. Glyphosate takes a minimum of three seasons to effectively treat Japanese Knotweed and therefore contractors had to work carefully around fenced off stands of this weed to avoid further spread.

#### Incineration, excavation and burial

In areas that required immediate access, Knotweed canes were cut and incinerated a minimum of three days after treatment with glyphosate. These areas were then excavated under specialist supervision to ensure crown and rhizome material had been removed. In some cases, the Knotweed colonies were so extensive that excavations were several metres deep. The material was then securely



Close-up of a Japanese Knotweed, showing leaves and roots



Excavation of Japanese Knotweed in Channelsea Gorge



Hand picking live material from the sorting process

transported to an agreed burial area within the site, where it was placed to a minimum of two metres below the final finished level. Proprietary Knotweed root membrane was installed vertically to a depth of five metres below the finished level. A horizontal section was placed over the Knotweed contaminated fill and welded to the vertical membrane to fully encapsulate it. A minimum two metre layer of suitable fill material was then placed over the membrane. Care was taken:

- a) to select a burial site where no subsequent excavation was planned; and
- b) to avoid the placement of any sharp materials (flints, glass, metal etc) in the backfill placed directly over the membrane.

The inspection and removal of any such objects was undertaken prior to compaction of the initial fill layer.

#### Hand-sorting material to ensure non-viability prior to burial

In subsequent burial sites, the LDA raised concerns that Knotweed could re-emerge, so burial of viable material was refused. To render this Knotweed non-viable, excavated material had to be stockpiled and hand sorted using a specialist segregator machine on site. This machine removed the vast majority of crown and rhizome prior to burial. Knotweed material (crown and rhizome) identified and separated during this process was destroyed under controlled incineration conditions to minimise pollution. Remediated material was again placed in agreed burial areas using the root membrane barrier as before with a minimum of two metres cover of suitable Knotweed free backfill material. Any tiny fragments of buried rhizome remaining in the remediated material would have had insufficient reserves to regenerate to the surface, therefore the material was deemed to be non-viable. This method was approved for implementation within the Park by both the Environment Agency and the LDA.

#### Management of invasive species by follow-on projects

The Enabling Works project was solely responsible for the treatment of invasive weeds across the Park. Follow-on projects were appraised of the issues associated with these species to ensure that contaminated areas were demarcated with appropriate signage to prevent spread to non-contaminated zones. The Enabling Works specialist contractors were also required to supervise excavations in areas contaminated by invasive weeds, including trial pits and the like. Follow-on projects were required to have management plans in place to prevent spread. Toolbox talks were carried out to make staff aware of what invasive species looked like and what they should do to prevent spread. Contractors were fully briefed so that they would know exactly where and how many invasive infestations existed within their sites and that site operatives clearly understood the requirements. Areas of invasives were highlighted in Environmental Constraints Maps and posted in site compounds, as well as within Environmental Management Plans.

#### Liaison with third parties to avoid re-infestation

One of the key lessons learned, is that liaison with third parties surrounding the Park is critical for the control of Japanese Knotweed as well as other invasive species. Network Rail have been effective in co-ordinating treatments with the Park. Local Boroughs have invasive species in many areas adjacent to the site and the ODA have been able to assist and implement treatments as well as providing advice and support. British Waterways have been regularly dredging floating pennywort and duckweed each year from water courses surrounding the Park.

A considerable amount of time was spent liaising with all organisations and landowners to agree a way forward and ensure that areas of invasive species within and immediately surrounding the Park were effectively managed to avoid re-infestation. Ongoing management strategies are in place.



Extracted rhizome material from the sorting process

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#### Project

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