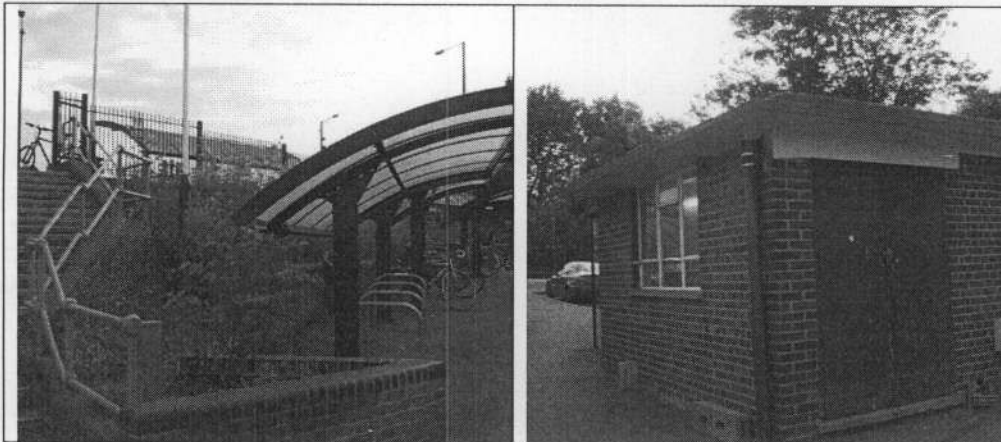


- 13.4.21 A small stand of Japanese knotweed was recorded adjacent to the small building during the 2009 survey (Target Note 13-1). This stand was not evident during this survey; however, Japanese knotweed has the ability to lie dormant for 20 years so unless a known eradication scheme has been undertaken on this stand, it should be presumed as present. Subsequently, this stand has been mapped on the Japanese knotweed plan (see *Appendix H-5 of ES Volume III - Approximate Japanese Knotweed Extent Plan*).

Plates 13-1 & 13-2 View of station building and associated car parking facility.



Plate 13-3 and Plate 13-4 View of bike shed in the north west of the site and View of small building adjacent to bike shed.

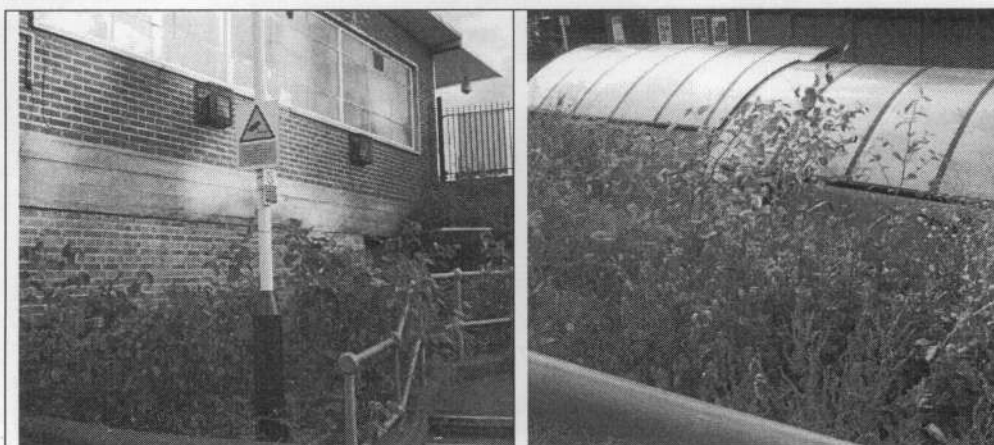


- 13.4.22 There are two footpaths that extend over the River Crane and there were also two small buildings adjacent to the site boundary to the east of the site. One building was inaccessible due to dense vegetation (see Plates 13-9 & 13-10), but it appeared to be of wooden structure with a felt roof. The other was a small, open concrete structure, covered in common ivy (*Hedera helix*).

Tall ruderal

- 13.4.23 Two small vegetated areas (see Plates 13-5 & 13-6) are situated adjacent to the bike shed in the north west of the site. It is presumed that these areas are for amenity purposes; however, Japanese knotweed is the dominant species. Other species present include; common nettle (*Urtica dioica*), mugwort (*Artemisia vulgaris*), dandelion (*Taraxacum officinale*), creeping buttercup (*Ranunculus repens*), field bindweed (*Convolvulus arvensis*), ribwort plantain (*Plantago lanceolata*), broad-leaved dock (*Rumex obtusifolius*) and common tormentil (*Potentilla erecta*).

Plates 13-5 & 13-6 View of small vegetated areas in the north west of the site.

*Semi-improved grassland/tall ruderal mosaic*

- 13.4.24 There is a small (approximately 0.1 hectares) area of semi-improved grassland inundated with tall ruderals and shrubs situated within the west of the site (see Plates 13-7 & 13-8). This area could only be viewed from a distance as it is entirely enclosed by fencing. Common nettle dominated areas of this grassland that also had dandelion, creeping buttercup, field bindweed, ribwort plantain, broad-leaved dock, bramble (*Rubus fruticosus*), greater willowherb (*Epiolobium hirsutum*), common ivy and many young ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) shrubs.
- 13.4.25 A small stand of Japanese knotweed was recorded within this area during the 2009 survey. This stand was not evident during this survey; however, Japanese knotweed has the ability to lie dormant for 20 years so unless a known eradication scheme has been undertaken on this stand, it should be presumed as present. Subsequently, this stand has been mapped on the Japanese knotweed plan (see LO10145/EIA13-2 Approximate Japanese Knotweed Extent Plan).

Plates 13-7 & 13-8 View of enclosed semi-improved grassland/tall ruderal mosaic.



Trees and deadwood

- 13.4.26 Reference should be made to the Tree Constraints Plan (*Appendix H-2 of ES Volume III*) and the Arboricultural Survey Sheets (*Appendix H-3 of ES Volume III*). All trees within the site are situated within a corridor between the station security fencing and the River Crane. This corridor of semi-mature to mature trees, with a scrub and tall ruderal understory, is wider and gradually becomes a small woodland towards the east of the site. Broad-leaved woodland is a LBAP habitat.
- 13.4.27 The majority of the trees within the site are semi-mature. However, several young, mature and dead tree stumps are also present. Seven different species were identified during the survey. Sycamore is the most dominant species followed by ash. Wild cherry (*Prunus avium*), weeping willow (*Salix x sepulcralis*), bay willow (*Salix pentandra*), holly (*Ilex aquifolium*), false-acacia (*Robinia pseudoacacia*), Lombardy poplar (*Populus nigra Italica*), butterfly bush (*Buddleia davidii*) and Lawson cypress (*Chamaecyparis lawsoniana*) were also identified but these are in low numbers or as lone representatives. In addition, there were several unidentifiable dead stumps within the site boundary and horse chestnut (*Aesculus hippocastanum*), English plane (*Platanus x hispanica*) and several ornamental species within the zone of influence.
- 13.4.28 The mature trees within the site are in varying levels of decline and have become inundated by ivy and some have suffered branch loss. As a result, none of the trees within the survey would individually qualify as Category A trees. Collectively however these trees have a high amenity value owing to their age, location and size. They also form a large band of continuous tree cover that has conservational value for birds, bats and invertebrates.
- 13.4.29 In total, 16 individual trees or groups were assessed. One group (WAGF) was awarded the tree retention category A. It should be noted that individually these trees would be rated as tree retention category B and C; however, as a group these trees are important both conservationally and aesthetically. Seven individuals and groups were awarded a retention category B and this was generally due to their conservational value or the screening they provide for the residents to the north of the station. Seven individuals were awarded a retention category C due to their screening value and the large tree stumps were also awarded a retention category C due to their conservational value.
- 13.4.30 Due to the decline of some of the trees on site the understory is littered with deadwood. This deadwood and the tree stumps (standing deadwood) have conservation value for invertebrates.

Japanese knotweed (see Appendix H-5 of ES Volume III) Approximate Japanese Knotweed Extent Plan), bramble, common nettle and ivy were the dominant understory species.

Scrub

13.4.30 13.4.31 There is a large extensive scrub area to the east of the site (see Plates 13-9 & 13-10). Bramble is the dominant species; however, common nettle, field bindweed, common ivy, common hops (*Humulus lupulus*) and common cleavers (*Galium aparine*) were also common.

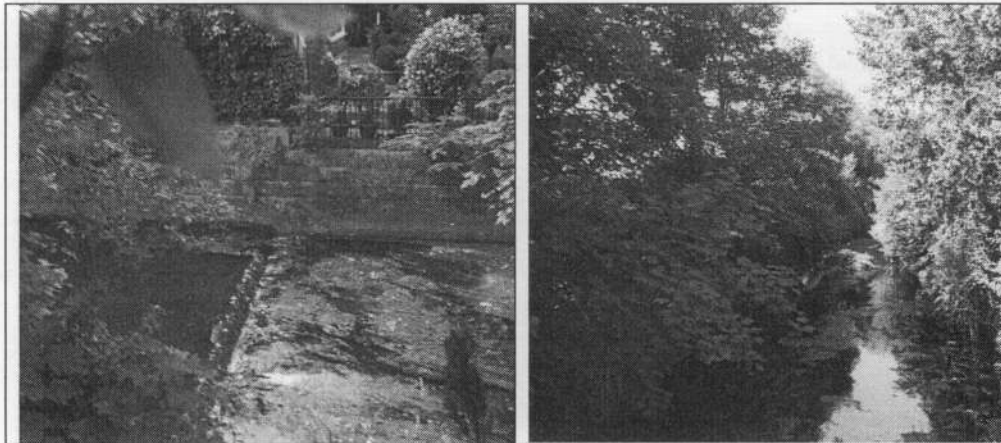
Plates 13-9 & 13-10 View of extensive scrub area to the east of the site. A small wooden structure was situated in the centre of this area.



River Crane

13.4.31 13.4.32 Adjacent to the northern boundary is the River Crane (part of the Crane Corridor SINC). This section of the river was shallow (approximately 10-15cm deep) with tall concrete sides (evident on Plate 13-11) and a concrete base. It flowed from west to east at a moderate speed. Aquatic vegetation was sparse and the majority of its banks were shadowed by tree canopy.

Plates 13-11 & 13-12 Example sections of the River Crane adjacent to the site.



Species within the Zone of Influence

Avifauna

13.4.32 13.4.33 During the field survey the following species were identified within the site and its zone of influence; collared dove (*Streptopelia decacoto*), house sparrow, moorhen (*Gallinula chloropus*), mallard (*Anas platyrhynchos*), blackbird (*Turdus merula*), magpie (*Pica pica*), ring necked parakeet (*Psittacula krameri*) and grey heron (*Ardea cinerea*). All of these species were identified along the River Crane and the river and its associated habitats are considered to provide opportunities for a range of breeding birds.

Badger

13.4.33 13.4.34 During the field survey no signs of badger activity, including setts, prints and latrines were identified. The site is considered to provide very limited potential for badgers and there are no records of badger within 900m of the site. Additionally, it is not considered that the proposed development of the site would have an adverse affect upon any badgers that may be present locally. Badgers are not considered further in this report.

Bats

13.4.34 13.4.35 No evidence of bats was identified during the Extended Phase 1 Habitat survey. However, several mature sycamore trees on the northern boundary and the buildings to the north east of the site were identified as potentially providing suitable habitat for roosting bats and consequently, a bat survey was undertaken. The weather conditions for the survey are summarised in Table 13-10. The survey was undertaken in accordance with the following publications:

- Bat Workers' Manual, 3rd Edition (Ref. 13-6); and
- Surveys: Good Practice Guidelines (Ref. 13-7).

Table 13-10 Bat survey weather conditions

	24 th June 2010 (dusk)	25 th June 2010 (dawn)
Temperature	27.2 - 24.7°C	15.6 - 15.0°C
Wind	Negligible	Negligible
Precipitation	None	None
Cloud Cover	2/8	1/8

13.4.35 13.4.36 During the dusk survey on 24th June, a common pipistrelle bat was recorded at 21.48hrs commuting along the River Crane. From approximately 22.30hrs the River Crane was walked to record foraging activity within the area. Between 22.35hrs and 23.15hrs four common pipistrelle and three Soprano pipistrelle bats were recorded commuting and foraging along the River Crane. During the dawn survey on 25th June no bats were observed or recorded (see Appendix H-6 of ES Volume III - Bat Survey Sheets).

~~13.4.36~~13.4.37 No bat roosts or foraging bats were identified within the site during this survey. The illuminated, anthropogenic nature of the station makes this section of the railway line unsuitable for foraging bats and the buildings associated with the station are considered to provide low bat roosting potential. However, the River Crane and its associated trees, to the north of the site, are of importance to local bat species for foraging and commuting. In addition, bats are highly mobile animals that can use a number of roost sites within and between years. A number of the mature trees to the north of the site may provide potential roost sites for bats.

Herpetofauna

~~13.4.37~~13.4.38 There are a very low number of records for amphibian and reptile species within 2km of the site and the site is considered to provide very limited opportunities for amphibians and reptiles due to the lack of suitable aquatic habitats (for amphibians) and suitable terrestrial habitats (for reptiles). Amphibians and reptiles have particular habitat requirements in order to support viable or ecologically important populations of these species groups. These include the presence of suitable breeding, foraging and over-wintering habitats in the form of ponds/ditches for amphibian breeding, rough grassland and scrub and suitable refuges such as wood and rubble piles. Reptiles are also susceptible to disturbance from noise and movement and require relatively large areas of un-disturbed habitat. The habitats within the site are not considered sufficiently diverse to provide the range of habitat features or conditions required to support reptiles and amphibians and no detailed survey was considered necessary in this case. Furthermore, because habitats adjacent to the River Crane are to be retained, it is not anticipated that development of the site would have any adverse affect upon any amphibians or reptiles, in the unlikely event that these species groups were to be present. Amphibians and reptiles are not considered further in this report. ~~The site is considered to provide very limited opportunities for amphibians and reptiles due to the lack of records, suitable aquatic habitats (for amphibians) and suitable terrestrial habitats (for reptiles). It is not anticipated that development of the site will have any adverse affect upon any amphibians or reptiles. Amphibians and reptiles are not considered further in this report.~~

Invertebrates

~~13.4.38~~13.4.39 During the site survey a solitary female stag beetle was identified just outside the site boundary, along the River Crane (Full Grid Reference: 516187 173750; see Target Note 2). No other notable invertebrates were identified. It is not anticipated that the site has the potential to support any notable pollinators due to the limited floral diversity on site. In addition, the concrete, shallow, un-vegetated nature of the River Crane is considered to limit its potential to support notable aquatic invertebrates. Aquatic invertebrates are not considered further in this report. However, the habitats associated with the River Crane are considered to provide suitable opportunities for a number of invertebrates; particularly those that depend on deadwood, such as the stag beetle.

Water vole

~~13.4.39~~13.4.40 The section of River Crane which is adjacent to the site is concrete, shallow and very sparsely vegetated. It is considered unsuitable for water voles due to the lack of suitable burrowing areas and limited foraging opportunities. Therefore it is not anticipated that development of the site will have an adverse effect on water voles. Water voles are not considered further in this report.

Otter

13.4.40 13.4.41 The section of River Crane which is adjacent to the site is concrete, shallow and very sparsely vegetated. It is considered sub-optimal habitat for otter; however, the 4th National Otter Survey of England & Wales 2000-2002 (Ref. 13-8) states '*it is anticipated that otters will continue to spread from the Upper Thames through Oxford to colonise the middle and lower parts of the catchment*'. Otter may use the stretch of the River Crane adjacent to the site when migrating between more suitable habitat; Moormead Park and the River Thames to the east and Crane Park to the west, in particular. It is not anticipated that development of the site will have an adverse effect on the River Crane's capacity as a wildlife corridor for otter. Therefore, otter are not considered further in this report.

Common dormouse

13.4.42 No signs of common dormice were identified during the site survey. There is no suitable habitat for common dormouse within the site. It is not anticipated that development of the site will have an adverse affect on common dormice. Common dormouse are not considered further in this report.

13.4.4213.4.42 Invasive species

- 13.4.43 Japanese knotweed was identified throughout the site during the site survey (see *Appendix H-5 of ES Volume III - Approximate Japanese Knotweed Extent Plan*). Two small stands of Japanese knotweed identified during the 2009 Extended Phase 1 Habitat Survey were not present during the 2010 survey. Japanese knotweed has the ability to lie dormant for 20 years so this area has been mapped on the Japanese knotweed plan and should be treated as present unless an eradication scheme is known to have been undertaken.
- 13.4.44 By law it is an offence to plant, or cause Japanese knotweed to grow in the wild. Under the Environmental Protection Act (1990), cut Japanese knotweed material and soil containing rhizome material are classified as controlled waste and must be disposed of safely at a licensed landfill site. Landowners may incur costs and damages if they fail to prevent knotweed from spreading to a neighbouring property. Also failure to manage and dispose of Japanese knotweed responsibly may lead to prosecution. Advice on options for the management of Japanese knotweed is given in the mitigation section of this chapter.~~Advice on an appropriate management strategy for Japanese knotweed will be developed and implemented in conjunction with site clearance and construction and is not considered further in this report.~~
- 13.4.45 In addition, Chinese mitten crabs (*Eriocheir sinensis*) were identified within the River Crane. These crabs are highly invasive and are listed on schedule 9 of the Wildlife and Countryside Act (2010), which makes it an offence to release or allow the escape of them into the wild. However, this species will not be affected as part of development and is therefore not considered further in this report.

Wild flora

- 13.4.46 No notable plant species were identified during the site survey. The hard standing nature of the station and competitive nature of the habitats associated with the River Crane are considered to limit the sites potential for notable flora. It is not anticipated that development will have an adverse affect on any protected flora. Wild flora is not considered further in this report.

Nature Conservation Evaluation

- 13.4.47 An evaluation of ecological features which have potential to be directly or indirectly affected by the proposed development is presented in Table 13-11. Those features which are considered unlikely to be affected, either directly or indirectly, by virtue of their distance from the proposed development and the nature of the development are not considered further in this ES chapter. This includes all of the statutory designated sites and the majority of the non-statutory designated sites situated within 2km of the site boundary.

Table 13-11 Nature Conservation Evaluation of Ecological Features

Feature	Discussion	Nature Conservation Value
<i>Non-statutory Sites of Nature Conservation</i>		
The River Crane	<p>There are several SINC's associated with the River Crane and the section that is situated adjacent to the site boundary is named the Crane Corridor. Although the section of the River Crane that lies adjacent to the site is a poor example (i.e. concrete sides and base), the river is thought to be one of the most natural rivers in London and a stronghold for a number of uncommon aquatic plants.</p> <p>Development within this area also has the potential to cause the spread of Japanese knotweed; particularly downstream.</p>	County
<i>Habitats</i>		
Hard standing	No ecological value. However, development within this area also has the potential to cause the spread of Japanese knotweed.	Negligible
Buildings within the site boundary.	The buildings within the site boundary have no intrinsic value or potential to support bat roosts.	Negligible
Buildings within the zone of influence.	The small wooden building situated adjacent to the site in the east was inaccessible. It may provide opportunities for breeding birds and roosting bats.	Potentially County
Tall Ruderal	The two areas of tall ruderals to the west of the site are small, species poor and dominated by Japanese knotweed. This area is considered to provide very little value in terms of biodiversity; –however, development within this area has the potential to cause the spread of Japanese knotweed.	Negligible
Semi-improved grassland/tall ruderal mosaic	Small area of moderately species-rich semi-improved grassland inundated with ruderal and shrubs. Potential value for foraging birds and invertebrates.	Zone of influence

Feature	Discussion	Nature Conservation Value
<u>Trees and scrub and deadwood</u>	Broad-leaved woodland is a LBAP habitat. The mature trees have the potential to support roosting bats. The trees and scrub as a whole provide nesting opportunities for birds and foraging opportunities for bats and birds and are also important for invertebrates including the stag beetle.	District
<i>Species</i>		
Breeding Birds	The site is important for a number of common breeding bird species.	Local
Bats	The site supports relatively low numbers of foraging common and soprano pipistrelle. In addition, the mature trees within the site and the zone of influence may provide opportunities for bat roosts.	Local to District
Invertebrates	The most notable habitats with regards to invertebrates are the standing and lying deadwood. These habitats are likely to support a range of invertebrates including the stag beetle. The remainder of the River Crane and its associated habitats may support a number of common and widespread terrestrial and aquatic invertebrates.	Local

Future Baseline Conditions (Without Development)

- 13.4.48 It is considered that future baseline conditions would not be significantly different to the current baseline in terms of broad habitat types.

13.5 Impact Assessment

- 13.5.1 This section of the Ecology chapter assesses the likely impacts arising from the construction, and operational phases of the proposed development with respect to each ecological receptor of value at Zone of Influence level, or above. Impacts upon features of negligible ecological value, or which are too distant from the site for direct or indirect impacts to occur have not been assessed. This section of the ES assesses impacts without mitigation; mitigation and residual impacts are described in later sections.

Potential Impacts – Construction Phase

- 13.5.2 The proposed riverside walkway has been located to avoid any impact on existing trees and associated wildlife including bats, breeding birds and stag beetle. A short section (approximately 70m) of bramble scrub at the eastern end of the footpath has been cleared to allow for footpath construction. An impermeable timber barrier is proposed along the northern boundary of the site to minimise potential impacts on the River Crane from noise, lighting and dust migration during construction. The proposed timber screen will be located outside of the

root protection zone of adjacent trees (the location of the screen is shown in the construction phasing plans).

13.5.3 It is proposed that existing buildings, station concourse, cycle parking, sculpture, foot bridges, car park, fencing, a small section of scrub and small areas of landscaping will be removed to facilitate the development. There will be some temporary construction compounds created on site; however, it is not anticipated that these will have a significant affect on the local environment as they will be installed away from the northern boundary of the site (i.e. away from the River Crane SINC and associated trees). Small areas of Japanese knotweed will be encountered during site clearance and advice on options for management of knotweed is presented in the mitigation section of this chapter. Areas of Japanese knotweed adjacent to the River Crane will not be disturbed during construction of the footpath.

13.5.4 Additional 'in built' mitigation during construction will take the form of dust control measures (detailed in Chapter 9 Air Quality), removal of contaminated ground from within the site (Chapter 11 Ground Conditions) and pollution control measures to prevent silt laden run-off entering the River Crane (Chapter 12 Water Resources). Measures to safeguard the environment, including ecological receptors will be detailed in a Construction Environmental Management Plan to be prepared in consultation with the Local Authority.

13.5.213.5.5 With this package of 'built in' mitigation in place, it is concluded that potential impacts on ecological receptors during the construction phase will be avoided and the impact would be **negligible**. This impact is considered as **negligible**.

Potential Impacts – Operational Phase

13.5.413.5.6 The site development proposes the construction of approximately 165 residential units, a new train station ticket office and 734 sqm of commercial floor space in a series of buildings rising to 8 storeys in height. In addition, a new station concourse, areas of public space, a public footpath, a new taxi rank and undercroft commuter parking spaces will be installed.

River Crane

13.5.7 Potential impacts to the River Crane have been considered with respect to shading of the channel, lighting and wind.

13.5.8 Potential effects on river habitats resulting from shading are to reduce water temperatures and reduce daylight levels reaching the channel with a subsequent reduction in rates of photosynthesis. The effect of this is to decrease the extent of aquatic and marginal vegetation along shaded sections of channel and the abundance of invertebrates dependent upon this vegetation. This can be observed, for example, beneath bridge structures and along tree-lined sections of rivers. The loss of vegetation can also increase risks of bankside erosion due to lack of root structure to stabilise the banks. In this case, the River Crane is subject to natural shading from adjacent trees and there is a lack of in-channel and bank side vegetation. It is considered unlikely that the additional partial shading of the river channel associated with the new buildings and additional tree planting would result in any significant change to the quantity of river channel vegetation because of the relatively high levels of shade already cast by riverside trees. With regard to the trees themselves, the partial shading caused by the new development is considered unlikely to adversely affect the health of the trees (as might be expected if they were subject to permanent shadow). The effect of shading on the River Crane is concluded to be **negligible**.

13.5.9 With regard to lighting effects, the increased elevation and intensity of the new buildings has the potential to increase light pollution on the River Crane and its associated trees. It is noted that the River Crane is already subject to moderate amounts of lighting from on-site lighting

and light spill from adjacent residential properties and street lights. The development of this site will therefore take advantage of the opportunity to reduce levels of artificial lighting by keeping proposed lighting to a minimum. A Lighting Strategy has been developed which incorporates the use of low pressure sodium lights directed where it is needed with minimal light spill towards the River Crane. Lighting would be provided in the Lower Plaza area only (refer to Lighting Strategy drawing) where low-level bollard style lighting will be used to direct the light downwards and away from the river. No lighting would be installed on the eastern segment of the riverside walk, i.e. between the existing pedestrian bridge over the railway and the entrance at Moor Mead Gardens. Gates would be installed at both ends of the walk to be opened during daylight hours only (details of these gates will be in agreed in consultation with the Local Authority). It is concluded that the proposed lighting scheme would result in an impact on ecology which is negligible.

13.5.10 Potential effects associated with wind on the River Crane have been considered in additional wind assessment work carried out for this ES. This work has concluded that the wind microclimate during a worst-case season along the River Crane would be expected to be suitable for standing, and during the summer months, suitable for sitting because of lighter winds that occur during this period. The predicted wind microclimate is not anticipated to result in a negligible effect on stability of riverside trees, on bat foraging activity or on levels of bird activity.

~~13.5.9 Although it is not anticipated that development will have any adverse impacts upon the Crane Corridor SINC, the River Crane and its associated habitats are also valued at County level. It is considered that the relatively small scale of impacts (in terms of extent of low value habitat affected) during development is unlikely to result in an overall adverse effect on the integrity of the river and its habitats. Therefore, without mitigation, direct impacts upon the River Crane are considered to be negligible. However, light pollution and increased pedestrian disturbance may adversely affect species that reside within the zone of influence. Without mitigation these impacts are considered to be a long term moderate adverse impact within the zone of influence.~~

Habitats

13.5.11 The riverside footpath has been located to avoid the need for removal of riverside trees and to avoid areas of Japanese knotweed. It is also been located at the maximum possible distance from the River Crane to minimise disturbance to river corridor habitats and associated wildlife as result of pedestrian movements. No deadwood habitats will be removed. Impacts on riverside habitats are therefore considered to be negligible.

~~13.5.10 It is not anticipated that any habitats of value will be lost as a result of development. Therefore impacts associated with habitats are not significant. However, it should be noted that although the loss of the hard standing and tall ruderal areas within the site are considered to be negligible with regards to nature conservation, Japanese knotweed is present within these areas and this should be taken into consideration.~~

Trees

13.5.12 No riverside trees will be removed (see comments above) and the proposed timber screen and metal security fence to the north of the development site boundary will be located to avoid the root protection area of existing trees. Thus potential impacts to trees and tree roots associated with compaction of ground, access and movement of machinery, crown damage from high-sided vehicles and excavations for foundations or covering root areas with impervious surfaces will be avoided. The impact of the proposed development on trees is therefore considered not significant.

~~13.5.6~~ It is not anticipated that any trees will be lost or adversely affected as a result of development. Therefore impacts associated with trees are not significant.

Avifauna

~~13.5.12~~ 13.5.13 It is not anticipated that any habitats of value to breeding birds will be lost or adversely affected as a result of development. Therefore impacts associated with avifauna are not significant.

Bats

~~13.5.13~~ 13.5.14 It is not anticipated that any habitats of value to foraging or roosting bats will be lost or adversely affected as a result of development. Therefore direct impacts associated with bats are not significant.

~~13.5.14~~ However, increased artificial lighting onto the River Crane and its associated trees has the potential to disturb bat roosts and foraging bats. In addition to direct disturbance, artificial light has the potential to delay bats from emerging thus shortening available foraging time. The main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. The presence of lit conditions is also thought to increase the rate of predation on bats by birds. The proposed lighting strategy has been designed to minimise light spill to the River Crane, and the proposed footpath will be unlit at night, with gated accesses to prevent pedestrian access at night for safety/security reasons. The potential impact of lighting on bats is thus considered to be negligible. Without mitigation, the affect of increased lighting onto the River Crane and its associated habitats is considered to be a long term major adverse impact at a local level.

13.5.15

~~13.5.10~~ *Invertebrates*

~~13.5.15~~ 13.5.16 It is not anticipated that any habitats of value to notable invertebrates (particular deadwood and stag beetles) will be lost or adversely affected as a result of development. Therefore direct impacts associated with stag beetles are not significant.

Invasive Species

13.5.17 Areas of Japanese knotweed adjacent to the River Crane will not be disturbed during the operational phase of development and knotweed will have been removed from the development site at the construction phase; there will therefore be no impact on invasive species.

Summary

~~13.5.16~~ 13.5.18 Table 13-13 summarises impacts associated with the construction and operational phase of development.

13.6 Mitigation and Residual Impacts

13.6.1 The mitigation strategy aims to minimise any adverse impacts upon the biodiversity within the site and its zone of influence and to remediate for any adverse impacts to ensure a net increase in biodiversity as a result of development. Mitigation measures to be adopted during the construction phase have already been taken into account at the impact assessment stage and will comprise dust control measures, ground remediation to removal potential contaminants

and use of timber screening between the development site and the River Crane to minimise noise and lighting effects during construction.

~~13.6.1~~13.6.2 In addition, best practice methods of construction (in particular PPG 1 and PPG 5 regarding working near water; see *Appendix H-7 of ES Volume III*) will be implemented during the development of the scheme to reduce the likelihood of accidental spillages occurring and to ensure any spillages are remediated effectively.

River Crane

~~13.6.2A~~ lighting strategy has been developed to minimise lighting effects on the River Crane and associated wildlife during the operational phase of development. The River Crane and its associated habitats are already subjected to a moderate amount of artificial light by on-site lighting and light spill from the adjacent residential buildings and street lights. Development of the site will be used as an opportunity to reduce the level of artificial lighting by keeping it to a minimum. Lighting that is proposed for security and safety reasons will use low pressure sodium lights of no greater than 2000 lumens (150 W), directed to where it is needed with minimal light spillage onto the River Crane and its associated habitats.

13.6.3

~~13.6.3~~ ~~13.6.4~~ Where lighting is needed to meet health and safety requirements (to be employed in the lower plaza area only – refer to revised lighting strategy), impacts will be overcome by using low level bollard style lights directed away from the River Crane and, access to the footpath will be prevented at night by a gated access; this will avoid the need for lighting at night. ~~column lights, angling the lights downwards and placing shields over them so that the light is directed downwards.~~ Where areas of habitat that are of value to bats require lighting (i.e. the riverside footpath), ~~low level bollard lighting will be used.~~ Artificial lighting will not directly illuminate any mature trees or the River Crane. Furthermore, additional trees will be planted along the River Crane to provide screening and reduce light spillage. The location of the footpath has been specifically chosen to minimise disturbance to habitats associated with the River Crane and a fence line will be installed to define the footpath that will prevent pedestrians straying into adjacent habitats; thus, minimising pedestrian disturbance along the River Crane. With the implementation of these mitigation measures the impacts of development upon the River Crane are considered to be negligible.

Habitat Loss

~~13.6.4~~ ~~13.6.5~~ The position of the proposed footpath has been specifically chosen to ensure that no valuable habitats are lost or disturbed during development. This will also ensure that any disturbance to the wildlife that resides along the River Crane is kept to a minimum. As a result, it is proposed that no trees or deadwood will be removed or adversely impacted upon during development. The footpath will be installed along a disused hard standing platform edge with a short section (approximately 70m) at the eastern end passing through an area of cleared bramble scrub. In addition, trees of local provenance will be planted along the River Crane to provide screening and reduce light spillage. With the implementation of these mitigation measures the impacts associated with habitat loss are considered to be negligible and probably beneficial in the long term.

Trees

~~13.6.5~~ ~~13.6.6~~ No trees will be removed to facilitate development and site development has been specifically designed to ensure limited impacts upon any existing trees. With the implementation of these mitigation measures the impacts associated with trees are considered to be negligible.

~~13.6.6~~ ~~13.6.7~~ A tree protection plan would normally be produced to fulfil the requirements of an Arboricultural Impact Assessment. The trees along the River Crane are protected from development from existing hard standing and security fencing; therefore, it is considered that no plan is required for this scheme.

Avifauna

~~13.6.7~~ ~~13.6.8~~ There are no anticipated impacts associated with breeding birds. However, with the implementation of tree planting, in the long term, development has the potential to be beneficial for locally breeding birds.

Bats

~~13.6.9~~ There are no direct impacts associated with bats anticipated during development. Bats are identified as a priority species within the LBAP and key actions described within the BAP include proposals to increase the number of roost sites within London as well as improve the quality of bat feeding sites across London. Although there are no direct impacts associated with bats

anticipated during development, potential habitat enhancements for bats that could be considered for inclusion within the final redevelopment design plan are described below.

13.6.10 It is proposed that a number of general purpose bat boxes are installed within the development site and positioned on the south east and eastern faces of the existing mature trees and new buildings. Pipistrelle bats were recorded foraging along the River Crane. These bats are crevice roosters and by incorporating bat bricks (such as, Schwegler 2FR tubes) and/or hanging tiles or weather boarding with bat access within some of the new buildings the opportunity for these species to roost on site will be created. Bat boxes (such as, Schwegler woodcrete 2FS, 2F, 2FF, FN 1FW bat boxes) will also be installed onto trees adjacent to the River Crane.

13.6.813.6.11 Following the implementation of this mitigation and those discussed above regarding light pollution and tree planting, the impact of these works on bats would be negligible and potentially beneficial in the long term.

~~13.6.9 Following the implementation the above mentioned mitigation, regarding light pollution and tree planting, the impact of development on bats is anticipated to be negligible and potentially beneficial in the long term.~~

Invertebrates

~~13.6.10~~ There are no anticipated impacts associated with invertebrates. However, with the implementation of tree planting, in the long term, development has the potential to be beneficial for invertebrates, including stag beetles.

13.6.12 In addition, stag beetle loggeries and artificial breeding boxes for stag beetles will be installed to increase opportunities for stag beetles within the site; thus meeting UK and London BAP targets. Table 13-12 provides information regarding stag beetle loggery and breeding box design. Following the implementation of this mitigation and those discussed above regarding minimising the disturbance adjacent to the riverside footpath, the impact of these works on invertebrates would be negligible and potentially beneficial in the long term.

Table 13-12 Stag Beetle Loggery and Artificial Breeding Site taken from the London Wildlife Trust (Ref: 13-9)

	<p>Loggery <u>Large logs (10-50cm diameter) of hardwood (e.g. oak, beech, sycamore, ash) with bark still attached sunk approximately 60cm into the ground, in partially shaded areas.</u></p>
	<p>Artificial Breeding Box <u>Made of hardwood timber, 2cm thick, a box 49 X 21.5 X 21.5cm open at each end, covered on the four sides with 61 X 7 X 2cm slats, leaving <1cm gaps between (to allow access to beetles and larvae) to make total length of 61cm.</u></p> <p><u>One end covered with fine wire mesh to enable drainage, the other open. Filled with damp hardwood sawdust and fine woodchips, sunk 45cm into the ground with open end standing approximately 7cm above soil level.</u></p>

Invasive Species

13.6.13 Suitable options for the management of Japanese knotweed are in-situ herbicide treatment or digging and off-site burial. It is anticipated that the selected site contractor will develop a preferred method for management of this species in consultation with the Local Authority. The preferred solution is likely to be dependent on timescales for site clearance and development. The strategy for knotweed control will be developed and implemented in accordance with Environment Agency guidelines for Japanese knotweed control. It is expected that the development of a suitable management strategy will be subject to planning condition.

Securing Enhancements

~~13.6.11~~13.6.14 The ecological enhancements identified above will be secured through planning condition. Planting and the provision of bat boxes can be secured through submission of a detailed landscaping scheme under condition. A lighting scheme will be secured under planning condition. Any scheme will prioritise the principles of Secured by Design, but adopt the recommendations identified above where feasible.

Monitoring

~~13.6.12~~13.6.15 Bat monitoring surveys should be undertaken to determine the impacts of development, in particular to assess the effectiveness of the proposed ecologically sensitive lighting strategy, upon bats foraging along the River Crane and to determine the success of the bat box installation. These surveys should be undertaken after 1, 3 and 5 years of development and will record bat activity along the River Crane to enable a comparison of activity levels with pre-development activity. These surveys will provide the opportunity for additional remediation works, should they be required. ~~Bat monitoring surveys should be undertaken to determine the impacts of development upon bats foraging along the River Crane. These surveys should be undertaken after 1, 3 and 5 years of development and will record bat activity along the River Crane. These surveys will provide the opportunity for additional remediation works, should they be required.~~

13.6.16 It should be noted that no trees or limbs were recommended for removal during the arboricultural report. However, as a public footpath is being installed, an updated arboricultural survey should be undertaken to assess the likelihood of public harm by falling limbs before the footpath is opened to the public.

Summary

~~13.6.13~~13.6.17 Table 13-13 summarises impacts associated with the construction and operational phase of development.

Table 13-13 Summary of Construction and Operational Impacts (without Mitigation)

Receptor	Characterisation of Unmitigated Impact and Significance	Proposed Mitigation	Significance with Mitigation and Confidence
River Crane	Effects to Crane Corridor SINC. No effect: certain.	Footpath to be installed away from the River Crane and associated trees on a disused, hard-standing station platform and through a small section of scrub. Installation of impermeable timber barrier to minimise potential impacts from noise, lighting and dust migration during construction. Suite of 'in built' mitigation during construction such as; dust control measures, removal of contaminated ground from within the site and pollution control measures to prevent silt laden run-off entering the River Crane.	No effect: certain.
	Effect to the integrity of the River Crane and its associated habitats. Negligible: likely.		Negligible: likely/certain.
	Light pollution and increased pedestrian disturbance. Moderate adverse effect within the zone of influence: probable.	Artificial lighting kept to a minimum and in Lower Plaza area only. Low-level bollard style lighting will be used to direct the light downwards and away from the river. No lighting installed on the eastern segment of the riverside walk (i.e. between the existing pedestrian bridge over the railway and the entrance at Moor Mead Gardens). Gates to be installed at both ends of the walk to be opened during daylight hours only.	Negligible: probable/certain.

	<p><u>Tree planting to increase screening.</u></p> <p><u>Installation of fenceline to prevent pedestrians straying into adjacent habitats. Lighting directed to required areas through appropriate angling and use of directional shields.</u></p> <p><u>Use of low light columns.</u></p> <p><u>Tree planting to increase screening.</u></p> <p><u>Installation of fenceline to prevent pedestrians straying into adjacent habitats</u></p>	
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Receptor	Characterisation of Unmitigated Impact and Significance	Proposed Mitigation	Significance with Mitigation and Confidence
Habitats	Effect of loss of scrub Negligible effect: certain.	The location of the proposed footpath has been specifically chosen so that only a short section of habitats of limited value will be lost.	Negligible: certain.
<u>Trees and deadwood</u>	Effects to trees with TPO's. Effects to aesthetic and screening value of trees as a whole. Effects to conservational value of trees as a whole. Effects to individual mature trees. Effects to semi-mature trees as individuals. Effects to standing deadwood as individuals. Effect of accidental damage of trees to be retained. Negligible effect: certain.	No trees or deadwood to be removed or adversely affected during development <u>Proposed timber screen will be located outside of the root protection zone of adjacent trees.</u>	Negligible: Certain

Receptor	Characterisation of Unmitigated Impact and Significance	Proposed Mitigation	Significance with Mitigation and Confidence
Avifauna	<p>Loss of breeding habitat. Loss of foraging grounds. Effects to breeding birds if works are undertaken within the breeding bird season. Negligible effect: certain.</p>	<p>No habitats of value to breeding birds to be removed or adversely impacted upon during development.</p>	<p>Negligible: certain.</p>
Bats	<p>Potential loss/disturbance of roosts. Potential loss/disturbance to foraging grounds and potential to kill or injure individuals. Potential to disturb individuals. Negligible effect: likely.</p>	<p>No habitats of value to foraging or roosting bats to be removed or adversely impacted upon during development. Lighting mitigation described above. <u>Installation of artificial bat boxes.</u> Monitoring proposed to determine impacts of development.</p>	<p>Negligible: likely certain.</p>

Receptor	Characterisation of Unmitigated Impact and Significance	Proposed Mitigation	Significance with Mitigation and Confidence
Invertebrates	<p>Potential loss/ disturbance to foraging grounds and potential to kill or injure individual stag beetles.</p> <p>Potential loss/ disturbance to foraging grounds and potential to kill or injure other invertebrates.</p> <p>Negligible effect: certain.</p>	<p>No habitats of value to invertebrates to be removed or adversely impacted upon during development.</p> <p><u>Installation of loggers and breeding box for stag beetles.</u></p>	<p>Negligible: certain.</p>
<u>Invasive species</u>	<p>Potential spread of Japanese knotweed into the <u>wild.</u></p> <p>Negligible effect: <u>likely.</u></p>	<p><u>Development of a suitable management strategy within development area.</u></p> <p><u>Avoidance of species along the River Crane.</u></p>	<p>Negligible: <u>certain.</u></p>

13.7 Conclusions

- 13.7.1 It is not anticipated that the proposed development will adversely affect any statutory or non-statutory designated sites for nature conservation. In addition, the integrity of the River Crane and its associated habitats will be maintained throughout development. This is in line with paragraph 12 of PPS9, policy 4C.22 of the London Plan and policy CP4 of the London Borough of Richmond Upon Thames LDF.
- 13.7.2 No trees will be lost or adversely affected as a result of development and the proposed diverse planting of trees of local provenance will maintain and enhance the woodland within the site; in line with policy 3D.15 of the London Plan.
- 13.7.3 Artificial light spillage and pedestrian disturbance will be kept to a minimum within the River Crane and its associated habitats.
- 13.7.4 No significant impacts are anticipated towards bats; bat monitoring surveys will be undertaken to confirm this. In addition, the mitigation proposed may be beneficial to foraging and roosting bats in the long term. This is in line with policy 3D.14 of the London Plan.
- 13.7.5 There are no significant impacts anticipated on any other species; however, mitigation proposed for stag beetles may also be beneficial in the long term.
- 13.7.6 On balance, the overall impact on site ecology and the River Crane is anticipated to be negligible and probably beneficial in the long term as steps will be taken to increase its biodiversity. This is in line with policy 3D.14 of the London Plan and policies CP4 and CP12 of the London Borough of Richmond Upon Thames LDF.

13.8 Cumulative Impact

- 13.8.1 The Design and Access statement for the Regal House Extension states that the 'site itself has no ecological or biodiversity value as it is hard standing tarmac car park. The trees and bushes along the boundary between Regal House and residential properties in Cheltenham Avenue and those on London Road will be unaffected by the proposals'. It is considered that through the construction phase of Regal House there is the potential for minor impacts on bat and bird nesting and foraging habitat through disturbance from plant equipment and machinery and light spillage. Providing similar mitigation is implemented as detailed in *Chapter 6: Site Preparation and Construction* the noise air quality and light spillage effects of the Regal House extension on ecological receptors are anticipated to be negligible.
- 13.8.2 The cumulative impact remains the same as the impact of the proposed Development in its own right.

13.9 Reference

- Ref: 13-1 IEEM (2006) 'Guidelines for Ecological Impact Assessment in the United Kingdom'.
- Ref: 13-2 JNCC (1993) 'Handbook for Phase 1 habitat survey: A technique for environmental audit', English Field Unit, Nature Conservancy Council.
- Ref: 13-3 British Standard 5837 (2005) 'Trees in relation to construction', British Standards Institution.
- Ref: 13-4 Ratcliffe. D. (1977) 'A Nature Conservation Review', Cambridge University Press.
- Ref: 13-5 DETR (1998) Guidance to the New Approach to Appraisal.
- Ref: 13-6 Mitchell-Jones, A.J, & McLeish, A.P. (2004) 'Bat Workers' Manual 3rd Edition', Joint Nature Conservation Committee
- Ref: 13-7 Bat Conservation Trust (2007) 'Bat Surveys – Good Practice Guidelines'. Bat Conservation Trust, London
- Ref: 13-8 Crawford. A. (2003) Fourth Otter Survey of England 2000 – 2002 Environment Agency
- Ref: 13-9 London Wildlife Trust (2000). 'Stag Beetle: an advice note on its conservation in London'.