TAG Landscape Impacts Worksheet

	Step 2	Step 3				Step 4
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**
Pattern	**Landscape** The site ranges in level from 38.09m AOD to 42.40m AOD. It is surrounded to the north by the flat landscape of Reading Marina and the River Thames. Land rises slightly to the east and south east towards Earley, with a high point of around 62m AOD some 1.4km away to the south-east (Woodlands Avenue/ University of Reading Campus) and 62m AOD some 1.4km away to the east (Water Tower at Little Gogs), beyond Thames Valley Business Park. Land to the north, west and south-west are located at a similar level to the Site, being located along the River Thames flood plain. The Site is surrounded to the north by the river Thames and Reading Marina, with the Kennet and Avon canal to the south-west and joining the River Thames immediately to the west of the Site. The Site has a semi-enclosed almost rural feel due to the unmanaged vegetation, and being located adjacent to the River Thames with views across water towards a further tree filled landscape. Whilst views from certain areas of higher ground are more extensive, the strong pattern of hedges and hedgebanks, as well as roadside vegetation, tends to limit widespread visibility within the area. **Visual** High sensitivity visual receptors within the study area include people occupying residential properties, users of public rights of way (PRoW), and those using recreational facilities for the enjoyment of the countryside. The Site is generally only visible from short-distance views, including upper storey windows from properties off Liverpool Road. Recreational receptors include visitors to the Redgrave Pinsent Rowing Lake; Wokingham Waterside Centre; Thames & Kennet Marina; the River Thames and River Thames Long Distance Path. Other visual receptors in close proximity to the Site include users of Thames Valley Park; Suttons Business Park; Oracle Scotland Ltd office block (Thames Valley Business Park) and users of the A3290 and railway line.	Locally important	Locally common	Locally important	Trees / hedgerows could be reinstated or relocated in a reasonable period. The changes to the character of the landform through the introduction of earthworks and additional hard standing (car parking) would be permanent, although relatively minimal.	The proposed Site includes areas of vegetation and scrub, including trees. When complete the new Park and Ride facility will open the area up for vehicles, remove flytipping and scrub but retain boundary vegetation. A number of trees will be lost through the development but these are considered to have limited visual presence or contribution to local character. There are likely to be some adverse visual effects from receptors to the immediate north, east and west of the Site, principally from adjacent footpath/ trails and the Waterside Centre due to proximity. Slight Adverse Effect
Tranquillity	Periods of relative tranquillity are obtained but interrupted by traffic noise in the south-east (A3290), railway noise in the south (mainline railway), maritime noise (motorboats to the north) and by aviation noise across the Site due to the proximity to Heathrow airport. Views are also partially interrupted by large electricity pylons and the elevated railway infrastructure. The eastern boundary of the Site is the least tranquil, along with the southern boundary. Further north towards the River Thames the tranquillity, or perception of, increases, with the tranquillity disrupted periodically by aviation noise, rail noise from passing trains and from boat engines. The thick vegetation cover within and surrounding the Site helps provide some visual screening and particularly in summer, rustling leaves enhances the perception of noise screening.	Locally important	Locally common	Locally important	Not substitutable.	The slight increase in traffic, noise and visual appearance of the scheme will slightly reduce the tranquillity of the area, albeit one which is already low in tranquillity. Slight Adverse Effect.
Cultural	There are no statutory designated heritage assets located within the Site but there are three Grade II listed buildings located within 500m of the Site boundary (Newton School, St Bartholomew's Church Hall and Railway Bridge And Attached Accommodation Bridge Over River Kennet). The Proposed Development will not directly impact upon any statutory designated heritage asset or their setting. The Grade II designated Reading Cemetery is located approximately 545m to the south of the Site and is on the English Heritage Register of Parks and Gardens of Special Historic Interest. There are no Public Rights of Way (PRoW) located within the Site itself but there are a number located adjacent to or surrounding the Site, including Sustrans National Cycle Route No. 4: Thames Valley (Section 2: Putney /bridge to Reading), Sustrans National Cycle Route No. 5: Thames Valley; and a National Trail Footpath all located within 220m of the Site. The Chilterns Area of Outstanding Natural Beauty is located approximately 4.5km away to the north-west of the Site but is not considered likely to have any intervisibility with the Site. There are no Local Nature Reserves or blocks of ancient woodland located within 500m of the Site and there are no national nature reserves, country parks, Sites of Urban Landscape Value or Areas of special character located within 1km of the site.	Locally important	Locally common	Locally important, although rowing lakes of national importance	Substitutable	There are few designated cultural features in close proximity to the Site but the River Thames, recreational paths and marinas are important local features, with the nearby Redgrave-Pinsent rowing lake of national importance for rowers. Slight adverse effect
Landcover	The c1.9 hectare Site is bordered by the River Thames to the north and north-west, Thames Valley Park Drive to the east, parkland to the west and the railway line to the south. The general landscape is urban to the south, west and east, with open water and more rural land to the north-east, with natural habitats along the water's edge. The Site itself is predominantly thick scrubland with scattered trees. The north - eastern section of the Site is well maintained, containing a clearing of mown grass, timber edged steps, seating and surrounded by trees. The clearing contained a pitched tent. The south - eastern section of the Site contains a derelict area of hard standing, piles of rubbish and debris and edged by encroaching trees and scrub. The central and western section of the Site contains largely scrub vegetation and trees, not readily accessible, but with small clearings and informal paths and evidence of camping and informal use present. The Site is also littered with debris, including metal sheeting, barbed wire, concrete blocks and litter. A total of 24 individual trees and 19 Groups of trees, almost exclusively within Categories B (Moderate Quality) and C (Low quality) are located within the Site. The 6 trees that need to be removed have little merit as individuals and they are not of sufficient value to constrain Site development.	Locally important	Locally common	Locally important	Trees are substitutable over time, and the anticipated trees to be removed are of limited visual value. The changes to the character of the landform through earthworks associated with the Propsoed Development would be permanent but with limited changes.	Loss of some green space, albeit some of it poor and degraded condition, including scrub vegetation, trees and hedges; the creation of retaining walls, large area of hard-standing and lighting. Slight Adverse Effect
Summary of character	The Site, lying at a level of between 38.09m AOD and 42.40m AOD contains a mixture of scrub vegetation and scattered trees, with elevated railway line and highways to the south and the Waterside Centre to the north. The study area lies wholly within NCA 115: Thames Valley and at a District level within Landscape Character Type B: Lower Valley Floor, sub area B4 Hurley Thames. The overall landscape character of the site and to the south of it is one of a semi-urban/urban-fringe character, strongly influenced by adjacent transport corridors including the A4, A3290 and the Great Western Railway. Land to the north, north-west and north-east are characterised by the wooded, flat landscape of the River Thames flood plain and both the canal, River Thames and Reading Marina significantly contribute to the immediate setting and local character of the Site.	Locally important	Locally common	Locally important	Some elements, such as trees and hedgerows could be re-established but the introduction of earthworks, additional hard-standing and lighting would cause permanent, although minor, changes to the immediate character of the locality.	The urban fringe character of the landscape will be heightened in the immediate vicinity of the Site due to the introduction of additional hard standing, lighting and traffic. However, this will be largely in character with surrounding built form and infrastructure surrounding the Site. Slight Adverse Effect

Reference Sources

WebTAG: TAG unit A3 environmental impact appraisal, November 2014. Department for Transport (2014)
Guidelines for Landscape and Visual Impact Assessment Third Edition (2013).
IAN 135/10 Department for Transport (2010).
Landscape Character Assessment Guidance for England and Scotland. The Countryside Agency & Scottish Natural Heritage, 2002.
An Approach to Landscape Character Assessment. Natural England (2014)
MAGIC website: http://www.magic.gov.uk/MagicMap.aspx

Step 5 - Summary Assessment Score

Slight Adverse Effect

Qualitative Comments

A semi-urban landscape of generally local importance. The dominance of transport corridors and associated infrastructure reduces the tranquillity of the Site, which is otherwise surprisingly well screened from surrounding noise and visual pollution. Vegetation and elevated infrastructure elements surrounding the Site tends to limit views of the Site from the surrounding landscape, thus minimising the potential effects of the proposed development on landscape and visual receptors. Impact on landscape quality through the introduction of additional hard-standing and lighting and the loss of some trees and vegetation will result in adverse effects on site character although this is likely to affect the immediate surroundings only.

TAG Historic Environment Impacts Worksheet

	Step 2	Step 3			Step 4
Feature	**Description**	**Scale it matters**	**Significance**	**Rarity**	**Impact**
Form	No designated heritage assets are recorded within the Site. Three non-designated heritage assets are recorded on the Site by the HER. These are Prehistoric flint flakes (MWK11335); a Railway notice (MWK15472), and a Lamp post at Kennet Mouth(MWK15473). The latter both ascribed to the late Poste-Medieval/ Modern period. The setting of the Dreadnought P.H. and boating club house (not designated or recorded as a heritage asset)is likely to be affected. The Dreadnought is a double pile, 3 bay, red brick building with out-buildings and wall to boundary. It is located on the Sites northern edge adjacent to the river side path. The development is located above the valley of the River Thames and its floodplain on the urban fringe of Reading, which has, and is, expanding out from its core to the south and west. Where not urban the wider historic landscape supports a mixture of arable and pastoral farmland, generally set within a partially wooded context creating a semi-enclosed landscape, made up of rural, extractive and communication historic landscape character areas. The Site is separated from the urbanising effects of the expansion of Reading by a raised railway line, resulting in a separate character area dominated by trees, and scrub vegetation and its proximity to the river and valley floor. There is potential for archaeological remains from the Prehistoric, Roman, Early Medieval, Medieval, Post-Medieval and Modern periods.	The 3 non-designated heritage assets are of local importance, with the discovery of flint flakes possibly indicative of local to regional archaeological interest. The Dreadnought P.H. is of local importance. There is no evidence that the historic landscape or potential archaeological remains are of greater than local or regional importance.	The significance of the form of the 3 non designated heritage assets is low for the Railway notice and lamp post, and higher but still low for the flint flakes. The significance of the form of the Dreadnought P.H. is low. The significance of the form of the historic landscape character is low to medium. The significance of the form of the potential archaeology is unknown.	The rarity of the form of the 3 non-designated heritage assets for the railway notice and lamp post is unknown specifically, but based on the period attributed to them and their lack of designation is likely to be low. The rarity of the form of the flint flakes is likely to be medium. The rarity of the form of the Dreadnought P.H. is low. The rarity of the form of the historic landscape character is low. The rarity of the form of the potential archaeology is unknown.	The Site of the proposed scheme was historically partially exploited for gravel extraction. This is likely to have had a significant impact on the potential survival of surface and below ground archaeological remains, where effected. The proposed scheme itself will require the construction of surface car parking, the introduction of services, re-profiling of the current topography and land surfaces and landscaping. It will also require lighting. These works have a potential to have a short term temporary effect on heritage assets (i.e. the survival of below ground archaeological remains) and an ongoing long term effect on setting (i.e. lighting/ change to landscape character). The impact of the proposed scheme on the form of the 3 non-designated heritage assets is likely to be high. The impact of the proposed scheme on the physical form of the Dreadnought P.H. is neutral and potentially high for its setting. The impact of the proposed scheme on the form of the existing historic landscape character is high. The impact of the proposed scheme on the form of potential archaeology is unknown, but likely to be medium to high where below ground / earth work archaeology survives.
Survival	The survival of the 3 heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is unknown. The survival of the Dreadnought PH and its setting is good. The survival of potential archaeological remains is unknown, but due to gravel extraction on site is likely to be partial. The survival of the established Historic Landscape Character is moderate to good.	The 3 non-designated heritage assets are of local importance, with the discovery of flint flakes possibly indicative of local to regional archaeological material. The Dreadnought P.H. is of local importance. There is no evidence that the historic landscape or potential archaeological remains are of greater than local or regional importance.	The significance of the survival of the 3 non-designated heritage assets is low for the Railway notice and lamp post, and higher but still low for the flint flakes. The significance of the survival of the Dreadnought P.H. is low (to medium). The significance of the survival of the historic landscape character is low to medium. The significance of the survival of the potential archaeology is unknown.	The rarity of the survival of the 3 non-designated heritage assets is likely to be low for the Railway notice and lamp post, and medium for the flint flakes. The rarity of the survival of the Dreadnought P.H. is low (to medium). The rarity of the survival of the historic landscape character is low to medium. The rarity of the survival of the potential archaeology is unknown.	The impact of the proposed scheme on the survival of the 3 non-designated heritage assets is likely to be high. The impact of the proposed scheme on the survival of the Dreadnought P.H. is neutral, and high for its setting. The impact of the proposed scheme on the survival of the established historic landscape character is high. The impact of the proposed scheme on the survival of the potential archaeology is unknown, but likely to be medium to high where below ground / earth work archaeology survives.
Condition	The condition of the 3 heritage assets defined on the HER (flint flakes, Railway notice, and Lamp post) is unknown. The condition of the Dreadnought is good. The condition of potential archaeological remains is unknown. The condition of the established Historic Landscape Character is medium to good.	The condition of the 3 non-designated heritage assets is unknown, but there is no evidence of it being greater than local importance, with the flint flakes having been found and apparently removed from Site. The condition of the Dreadnought P.H. is of local importance. There is no evidence that the condition of the historic landscape or potential archaeological remains on Site are of greater than local or regional importance.	The significance of the condition of the 3 non-designated heritage assets is unknown. But there is no evidence of them being greater than low significance. The significance of the condition of the Dreadnought P.H. is low but of high local importance. There is no evidence that the significance of the condition of the historic landscape being greater than low or medium importance. The significance of the condition of potential archaeological remains on Site is unknown.	The rarity of the condition of the 3 non-designated heritage assets is unknown. But there is no evidence of the rarity of their condition being greater than low to medium importance. The rarity of the condition of the Dreadnought P.H. is medium to low. The rarity of the condition of the historic landscape is low. The rarity of the condition of potential archaeological remains on Site is unknown.	The impact of the proposed scheme on the condition of the 3 non-designated heritage assets is likely to be high. The impact of the proposed scheme on the condition of the Dreadnought P.H. is likely to be low and high for its setting. The impact of the proposed scheme on the condition of the historic landscape is likely to be high. The impact of the proposed scheme on the condition of potential archaeological remains on Site is unknown.
Complexity	The complexity of the 3 heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is unknown, but likely to be low. The complexity of the Dreadnought is low. The complexity of potential archaeological remains is unknown. The complexity of the established Historic Landscape Character is medium to complex.	The complexity of the 3 heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is unknown, but likely to be of local importance. The complexity of the Dreadnought is of local importance. The complexity of potential archaeological remains is unknown. The complexity of the established Historic Landscape Character is likely to be of local importance.	The significance of the complexity of the 3 heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is likely to be low. The significance of the complexity of the Dreadnought is low. The significance of the complexity of the established Historic Landscape Character is low. The significance of the complexity of potential archaeological remains is unknown.	The rarity of the complexity of the 3 heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is low. The rarity of the complexity of the Dreadnought P.H. is low. The rarity of the complexity of the established Historic Landscape Character is likely to be low to medium. The rarity of the complexity of potential archaeological remains is unknown.	The impact of the proposed scheme on the complexity of the 3 non-designated heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is likely to be high. The impact of the proposed scheme on the complexity of the Dreadnought P.H. is neutral and high for its setting. The impact of the proposed scheme on the complexity of the established Historic Landscape Character is likely to be high. The impact of the proposed scheme on the complexity of potential archaeological remains is unknown.
Context	The immediate context of the 3 heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is unknown. The wider context is defined by the location of the Site and its relationship to the railway line, gas holders, river and the semi-scrub vegetation and managed landscape associated with the proposed site. The context of the Dreadnought P.H. is defined by its relationship with its plot and associated structures, the river and riverside path, and its location amongst the surrounding treed/ vegetated landscape. Despite the close association with activities undertaken along the water front this setting creates an impression of timeless remoteness and tranquillity. The context of the historic landscape has evolved to include communication, industrial and urban fringe development. The predominant immediate context still retains a close association with the river valley, and an enclosed rural, recreational character. Since the potential archaeological remains are unknown it is difficult to comment on their context.	The immediate context of the 3 heritage assets identified on the HER (flint flakes, Railway notice, and Lamp post) is of local importance. The context of the Dreadnought P.H. is of local importance. The context of the historic landscape character is of local importance. The context of possible archaeological remains is unknown, and therefore the scale of its importance currently unquantifiable.	The significance of the context of the 3 heritage assets identified on the HER is likely to be low. The significance of the context of the Dreadnought P.H. is low but of high local importance. The significance of the context of the historic landscape character is medium but of high local importance. The significance of the context of possible archaeological remains is unknown, and therefore the scale of its importance currently unquantifiable.	The rarity of the context of the 3 heritage assets identified on the HER is low. The rarity of the context of the Dreadnought P.H. is low to medium. The rarity of the context of the historic landscape character is low. The rarity of the context of possible archaeological remains is unknown.	The impact of the proposed scheme on the context of the 3 non-designated heritage assets identified on the HER is high. The impact of the proposed scheme on the context of the Dreadnought P.H. is likely to be high. The impact of the proposed scheme on the context of the historic landscape character is high. The impact of the proposed scheme on the context of possible archaeological remains is unknown.
Period	The heritage assets identified on the HER relate to the Prehistoric Period (flint flakes), and late Post Medieval and Modern Periods for the Railway notice, and Lamp post. The Dreadnought PH, walling and out buildings are Post Medieval to Modern in date. The potential archaeological remains on Site may relate to the Prehistoric, Roman, Early Medieval, Medieval, Post-Medieval and Modern periods. The established historic landscape character on site is predominantly a product of the Post Medieval and Modern periods.	In so far as 'importance' can be ascribed to particular periods and transcribed to known and unknown elements related to this Site, that do or may existing in various forms and extent, within the current context the following is proposed. The period relating to the flint flakes identified on the HER is of national importance. The late Post Medieval and Modern periods relating to the Railway notice, and a Lamp post identified on the HER is of local and regional importance. The Post Medieval and Modern periods relating to the Dreadnought P.H. are of local to regional importance. The Post medieval and Modern periods associated with the established historic landscape character on the Site are of local to regional importance. The important for the potential archaeological remains on Site varies from high (Prehistoric, Roman, Early Medieval to Medium (Medieval to Post Medieval), to low (Modern).	The significance of the Prehistoric period relating to the flint flakes identified on the HER is of national importance. The significance of the late Post Medieval and Modern periods relating to the Railway notice, and a Lamp post identified on the HER is of low and medium importance. The significance of the Post Medieval to Modern periods relating to the Dreadnought P.H. is of of low to medium importance. The significance of the Post Medieval to Modern periods associated with the established historic landscape character on the Site is of low to medium importance. The significance of the periods associated with the potential archaeological remains on Site varies from high (Prehistoric, Roman, Early Medieval to Medium (Medieval to Post Medieval), to low (Modern).	The rarity of the Prehistoric period relating to the flint flakes identified on the HER is high. The rarity of the late Post Medieval and Modern periods relating to the railway notice, and a Lamp post identified on the HER is medium to low. The rarity of the Post Medieval and Modern period relating to the Dreadnought P.H. is medium to low. The rarity of the Post Medieval and Modern periods associated with the established historic landscape character on the Site is medium to low. The rarity of the periods associated with the potential archaeological remains on Site varies from high (Prehistoric, Roman, Early Medieval) to Medium (Medieval to Post Medieval), to low (Modern).	In so far as the 'impact' on a 'period' can be determined with reference to the known and unknown heritage assets on the Site in question, the following is considered reasonable. The impact of the proposed scheme on the Prehistoric period relating to the flint flakes identified on the HER is low. The impact of the proposed scheme on the Post Modern to Modern periods relating to the railway notice, and a Lamp is low. The impact of the proposed scheme on the Post Medieval to Modern period relating to the Dreadnought P.H. is low. The impact of the proposed scheme on the periods associated with the established historic landscape character on the Site is low. The impact of the proposed scheme on the periods associated with the potential archaeological remains on Site is unknown.

Reference Sources

Thames Valley Park and Ride HEDBA oct 2015 and HER data

Step 5 - Summary Assessment Score

The potential surface and below ground archaeological resource has not been determined. The impact of the scheme on this element of the historic environment can not therefore be adequately determined. A programme of archaeological evaluation is therefore recommended. The effects of the wider scheme are likely to result in a slight to moderate adverse effect to the setting of a non-designated local heritage asset and the established historic landscape charcater.

Qualitative Comments

There are no designated heritage assets within the Site. 3 non designated heritage assets are recorded on the HER. One non designated local heritage asset (the Dreadnought P.H) has been identified. An Anglo-Saxon cemetery site is recorded as having existed adjacent to the south-eastern corner of the Site.

TAG Biodiversity Impacts Worksheet

Step 2		Step 3				Step 4	Step 5
Area	**Description of feature/ attribute**	**Scale (at which attribute matters)**	**Importance (of attribute)**	**Trend (in relation to target)**	**Biodiversity and earth heritage value**	**Magnitude of impact**	**Assessment Score**
Henley Road Gravel Pits - Local Wildlife Site (LWS)	A non-statutory designated site (Local Wildlife Site) that is a large former gravel pit and is designated for the range of wintering wildfowl it supports, including gadwall *Anas strepera* (a bird of conservation concern). Some nationally scarece invertebrates have also been recorded here. It is located 150m from the Site, on the north of the River Thames.	Local (County)	Medium- LWS designated for conservation value at the County scale.	LWS are locally abundant (8% Berkshire in comparison to 5% nationally), Gadwall have undergone a 'strong increase' in population in the UK between 1978 and 2013.	Medium	Minor Negative	Slight Adverse
Foraging and commuting bats	Habitat on the Site regularly supports foraging and commuting bats. The species recorded are predominantly common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* bats, as well as noctules *Nyctalus noctula* (and other less frequently recorded species). Static detectors recorded an average of 228 passess per night in one location, in comparison to 36 and 17 per night in other locations on the Site. The greatest percoentage was soprano pipistrelle with 77% of the calls. This species group are European Protected Species (EPS), and as such are affordted a high level of protection, and several, including soprano pipistrelle are also Species of Principal Importance (SPI) under the NERC Act (2006).	Local	Low- the Site can be considered important at the local level for foraging and commuting bats as it contributes to the River Thames corridor within this area.	Decline in bat species (such as soprano pipistrelle) nationally, however increase in common pipistrelle nationally. No information on local abundance or trend available. Assumed locally frequent.	Low	Minor Negative	Slight Adverse
Reptiles (slow worm *Anguis fragilis*)	A medium breeding population of slow worm (peak 4 juveniles, with atleast 1 adult also identified) present on the Site. Slow worm are protected under the Wildlife and Countryside Act, and are also an SPI.	Local	Low- 'the Site supports a medium population of slow worm', however this species is relatively widespread within southern England, and within the region.	Declining nationally (JNCC and BTO) (and in few key areas), and act as a habitat indicator for this species group. No information locally on abundance, however assumed to be locally frequent.	Low	Minor Negative	Slight Adverse
Breeding Birds	Habitat on the Site supports breeding robin *Erithacus rubecula* , probable breeding long-tailed tit *Aegithalos caudatus* , and fourteen species of possible breeding birds will be lost. A further eight species of non-breeding birds were identified. Species of possible breeders include Red and Amber listed Birds of Conservation Concern (Eaton et al, 2009) and SPI.	Negligible	Low- the Site is relatively small, and is not likely to constitute a key area of habitat for breeding birds within the area. In the landscape context the Site is located within close proximity to the River Thames and other larger areas of associated habitat that have suitability for birds during the breeding season.	Multiple species under consideration, however generally common residents in the UK, or common visitor (winter). Locally assumed to follow national patterns with a few exceptions.	Negligible	Minor Negative	Neutral
Hedgehogs *Erinaceous europaeus*	Habitat on the Site is suitable for hedgehogs; this is an SPI under the NERC Act.	Local	Low- this species 'may nest or rest up in areas of dense scrub and forage across the Site', but suitable habitat for this species is available elsewhere within the local area.	Nationally abundant but declining. No local information on abundance available, assumed locally abundant.	Low	Minor Negative	Slight Adverse
Terrestrial Invertebrates	Habitat on the Site is suitable for terrestrial invertebrates such as stag beetle *Lucanus cervus* and cinnabar moth *Tyria jacobaeae* ; both species are SPI. Further invertebrate species are also likely to be present.	Local	Low- whilst SPI, stag beetle are relatively common within the local area, and habitat suitable for both species is present locally and nationally.	Stag beetle: unknown national population information, however locally abundant. Cinnabar moth declining nationally, no local information available.	Low	Minor Negative	Slight Adverse
Badger	Habitat is suitable for badgers, however surveys did not identify any setts. There is a low risk that badgers could move into the area, or are currently undetected (due to the dense scrub) and become exposed or disturbed during the site clearance activities.	Negligible	Low- badgers are not protected for reasons of rarity, and are common within the region.	Locally and nationally abundant.	Negligible	Minor Negative	Neutral
Hedgerows HPI	The hedgerow on Site is a species rich hedgerow with trees, and is an HPI. The hedgerow is dominated by privet *Ligustrum vulgare* and hawthorn *Crataegus monogyna* with ash *Fraxinus excelsior* , horse chestnut *Aesculus hippcastanum* and lombardy poplar *Populus nigra 'italia'* also present.	Local	Low- this hedgerow is described as overgrown and hard to define, given graduation into adjacent dense scrub.	Assumed locally abundant. No local information on abundance, however 84% of UK's hedgerows estimated to be HPI, which is likely to be reflected within Berkshire.	Low	Intermediate Negative	Slight Adverse
Broadleaved Plantation Woodland (and HPI)	The broadleaved woodland on Site comprises HPI habitat; there are three main parcels, with lime *Tilia cordata* , privet, field maple Acer campestre, ash, sycamore *Acer pseudoplatanus* and hawthorn dominating within the various parcels. The woodlands are planted in nature, and there is butterfly bush *Buddfleia davidii* (an invasive species) present within areas of the woodland.	Local	Low- broadleaved woodland is not uncommon within this area, and habitat present is of generally low quality (plantation), however the resource contributes to providing an importance corridor along the River Thames, and within the wider region.	Locally abundant (7% HPI woodland in Berkshire (approx. 50% of all woodland within the area), in comparison to 12% UK total of woodland (unknown extent of HPI).	Low	Intermediate Negative	Slight Adverse
Unimproved Calcareous Grassland HPI	There are two main areas of this grassland within the Site, one of which will be removed completely. The other will be retained in part, through the installation of a retaining wall. Both areas are small, with the total area of this habitat type less than 25% of the total Site area which is 1.9ha in total, i.e. the unimproved grassland comprises approximately 0.5ha or less. This habitat qualifies as HPI and is described as having a approximately 50% or more forbes content. This habitat type is rare, however the threshold size for LWS based on this habitat type in Berkshire is 3.1ha, and therefore the habitat on site is too small to qualify for LWS selection or be considered of importance at greater than a local scale according to this set of criteria.	Local	Low- the areas to be lost are becoming gradually encroached by dense scrub, with the partially retained area spatially distinct. Given the small size of these parcels of grassland on the Site, it is of limited overall value, however the areas could act as a seed bank for the establishment of nearby areas, and as suitable habitat (foraging, basking, breeding or encompassing) for invertebrates, reptiles, hedgehogs, bats and badger.	Assumed locally frequent. No local information on abundance, however nationally this habitat type is declining, with roadside verges potentially providing a significant resource for this habitat since inclusion within this category since 2007.	Low	Minor negative	Slight Adverse
Scattered Trees	ere are a number of scattered trees within the Site, of a range of species, such as elder *Sambucus nigra* sycamore and hawtho	Negligible	Low- none of the trees were highlighted as being very mature or of high ecological value. Scattered trees are common and widespread within the region.	No specific target information available, however habitat locally and nationally abundant.	Negligible	Intermediate Negative	Neutral
Introduced Shrub Planting	Spindle *Euonymus europaea* and field maple are present, with other planted species within the parcel of introduced shrub planting surrounding the Waterside Centre.	Negligible	Low- this habitat is of low ecology value due to the non-native nature of this habitat type.	No specific target information available, however habitat locally and nationally abundant.	Negligible	Neutral	Neutral
Dense Scrub	This habitat is present across the majority of the Site and provides habitat suitable for a number of protected or notable species; it is dominated by bramble *Rubus fruticosus agg* , with species such as dog rose *Rosa canina* and butterfly bush also present.	Local	Low- although dense scrub provides suitable habitat for a number of species, this habitat type is of low distinction and is common and widespread as a habitat.	No specific target information available, however habitat locally and nationally abundant.	Low	Intermediate Negative	Slight Adverse
Bare Ground	This habitat is present as a storage area for the existing road maintenance, it has a concrete base.	Negligible	Low- the bare ground within the Site is a low value given it has a concrete base and widespread.	No specific target information available, however habitat locally and nationally abundant.	Negligible	Minor negative	Neutral
Amenity Grassland	This habitat is present mainly in association with the campsite for the adjacent water sports centre, the habitat is regularly mown and used as a camping facility.	Negligible	Low- the amenity grassland represents a low value and low distinction habitat that is widespread and abundant.	No specific target information available, however habitat locally and nationally abundant.	Negligible	Minor negative	Neutral

References:

CA Ecology, Preliminary Ecological Appraisal- Broken Brow, October 2015
CA Ecology, Ecology Surveys - Broken Brow, November 2015
WSP | PB, Thames Valley Park Park and Ride Scheme: Breeding Bird Report
Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. & Gregory, R.D. (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108: 708-746.
Thames Valley Environmental Records Centre (TVERC) Local Wildlife Site Designation Criteria (Henley Road Gravel Pit)
TVERC Website: http://www.tverc.org/cms/content/local-wildlife-sites
Berkshire Local Nature Partnership Website: http://www.berkshirelnp.org/index.php/nature-is-at-risk/key-habitats
UK Biodiversity Action Plan: http://jncc.defra.gov.uk/page-5155
RSPB State of Nature Report: http://www.rspb.org.uk/Images/stateofnature_tcm9-345839.pdf
TVERC LWS Criteria: http://www.tverc.org/cms/sites/tverc/files/LWS%20criteria%20Nov%2009.pdf
National Bat Monitoring Programme Report: Bat http://www.bats.org.uk/pages/nbmp_annual_report.html
Wild Bird Populations in the UK, 1970 to 2014: Annual statistical release https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/471745/UK_Wild_birds_1970-2014__2_.pdf
Status of British Reptile and Amphibian species: http://www.bto.org/volunteer-surveys/gbw/gardens-wildlife/garden-reptiles-amphibians/status-britain

Summary Assessment Score

Slight Adverse

Qualitative Comments

The Proposed Development will result in the loss of a majority of the semi-natural habitat on the Site, to include predominantly dense scrub, hedgerows, grassland and scattered trees / plantation woodland. The value of the majority of the habitats on the Site are however of low inherent botanical value or ecological distinction, with their value heavily influenced by their location along the River Thames (hence their contribution towards the wider river corridor and connected landscape), and their potential to support protected or notable species. Species which currently utilise the Site include slow worm, nesting birds, foraging and commuting bats, with hedgehog, stag beetle and cinnabar moth likely to utilise the Site. The Proposed Development has allowed for the retention of some of the broadleaved woodland, retention of a section of the unimproved calcareous grassland and creation of a habitat connection east-west across the Site (broadly parallel to the River Thames) where replacemnt of habitat on a like for like basis has been proposed. On this basis, the overall value of the Site as a connecting habitat can be maintained, provided measures outlined within reporting to avoid effects during construction and operation, associated with for example, lighting and pollution prevention, can be adhered to (i.e. provision and implementation of an Environmental Management and Mitigation Plan (EMMP)). Measures have also been provided to enhance the retained / created areas to the benefit of the legally protected, or species of conservation concern known or considered likely to use the Site to ensure that the Site does not affect the conservation status of these species within the local area in the long term. The LWS to the north of the Site will be protected and retained through the implementation of the EMMP.

TAG Water Environment Impacts Worksheet

Description of study area/ summary of potential impacts	Key environmental resource	Features	Quality	Scale	Rarity	Substitutability	Importance	Magnitude	Significance
Reduced quality of surface water Polluted run-off from leaks or spills of oil/other materials; heavy metal contamination and presence of PAHs; increased suspended solids from particulates.	River Thames	Water Supply	No surface water abstractions are recorded within 1km of the site. There is a large sized surface water abstraction point approximately 2km northeast of the site. There are numerous surface water abstraction points further downstream on the river. Under the WFD, the chemical water quality of the watercourse is classified as 'Good', which is not be improved in the future. The watercourse is predicted to have a good ecological status by 2027. The overall quality is assessed as moderate.	Regional	Medium	Medium	Medium	Negligible	Insignificant
		Recreation	Thames Valley Park Rowing Club and Wokingham Waterside Centre are located to the north of the site on the southern bank of the River Thames. The Thames Path national trail runs along the southern bank of the River Thames to the north of the site. The Thames is navigable from this point downstream to the North Sea, and upstream to Lechlade. In addition immediately upstream of the site is the confluence with the Kennet and Avon Canal network. The overal quality is assessed as moderate to high	Local and Regional	Medium	Medium	Medium	Negligible	Insignificant
		Biodiversity	Under the WFD, the ecological water quality of the watercourse is moderate, which is not be improved in the future. The overall quality is assessed as moderate.	Local	Low	Medium	Low	Negligible	Insignificant
Reduced quality/ quantity of groundwater Operational run-off and risk of spillage: Infiltration of leaks or spills of oil/other materials; heavy metal contamination and presence of PAHs. Changes to groundwater distribution and flow from earthworks; reduction in water table; reduced groundwater recharge from decreased infiltration.	Groundwater	Public Water supply	The western part of the study area is within a Zone 3 (total catchment area) for public water supply (Groundwater Source Protection Zone). The site is within a surface water safeguard zone with respect to Drinking Water as defined by the EA. According to BGS data, the abstraction takes place in the Chalk Major Aquifer at approximately 2.2km south of the site boundary. The site is located on a high vulnerability zone of a major aquifer, according to the available data from the EA. Under the WFD, the current chemical quality and quantitative quality of the groundwater body is poor. In addition, the quantitative quality is deteriorating. The waterbody is predicted to have a good overall status by 2027 (Both good chemical and quantitative quality). The overall quality is assessed as Moderate.	Regional	High	Low	High	Negligible	Insignificant
		Transport and Dilution of Contaminants	There is a potential risk for infiltration of oil/hydrocarbons or other contaminants due to leakage or spillage from the proposed Park and Ride into the aquifer below the site. Contaminants could be mobilised due to a rise in groundwater. The potential impact of groundwater contamination due to high groundwater is currently considered to be moderate, because of the current poor status of the groundwater quantity and quality under the WFD. However, this interpretation must be treated with caution as it is temporally biased because the water body must show improvement in quality and quantity, irrespective of its current status. The overall quality is assessed as Moderate.	Local	Low	Low	Medium	Negligible	Insignificant
		Local Use of the Groundwater / Value to Economy	Implementation of the proposed Park and Ride site could affect local hydrodynamics. It will introduce impermeable areas and generate more surface runoff. Therefore there could be a mild local decrease in the water table as a consequence of the reduction of the direct groundwater recharge area. The potential impact of a decrease in the amount of infiltration, due to the presence of impermeable areas, is considered to be low. Therefore it is unlikely that the local groundwater abstractions would be significantly affected. The overal quality is assessed as moderate.	Local	Low	Low	Medium	Negligible	Insignificant
Physical impact on watercourses – effects on flow	River Thames	Conveyance of flow and materials	The River Thames is located 25m to the north of the site and the River Kennet joins the River Thames to the west of the site. The River Thames is the second largest river in the country and therefore is a highly important feature of the water environment. The overal quality is assessed as High.	Regional	High	Low	High	Negligible	Insignificant
	River Thames Floodplain	Conveyance of flow and materials	Slightly beyond the northern boundary of the site land is located within Flood Zones 2 and 3. Land in Flood Zone 2 has an annual probability of flooding from rivers or the sea between 1 in 100 years and 1 in 1000 years (1% - ≥0.1% AEP), while land in Flood Zone 3 has an annual probability of flooding from rivers or the sea greater than 1 in 100 years (≥1% AEP). This land forms the floodplain of the River Thames. The River Thames Floodplain allows conveyance of flood flows, but is limited in size at this location. The overal quality is assessed as Medium.	Regional	Low	Low	High	Negligible	Insignificant

Reference Sources

EA Map (Risk of Flooding from Rivers and Sea), EA Map (Risk of Flooding from Surface Water), EA Map (Flood Map for Planning (Rivers and Seas)), EA Map (Groundwater), EA Map (Water Abstraction Licenses)

Summary Assessment Score

Neutral

Qualitative Comments

The impacts of the proposed park and ride car park on the water environment without mitigation would be negative impacts on water quality and increased flow to the River Thames. However with the proposed surface water drainage system these potential negative impacts will be mitigated such that there will be no negative impacts on water quality or increase in flood risk.

Regional Air Quality Assessment Results Summary

	NOx Emissions
	50% Pay
2017 Do-Minimum	44041
2017 Do-Something	44018
2017 Change	-23
2017 % Change	-0.05%
2032 Do-Minimum	48055
2032 Do-Something	48030
2032 Change	-25
2032 % Change	-0.05%

(kg/yr)
80% Pay
44041
44004
-36
-0.08%
48055
48015
-40
-0.08%

Local Air Quality Assessment Results Summary

NO_2 Summary Table		
	50% Pay	80% Pay
Do-Minimum NO_2 Assesment Score	91906.4	91906.4
Do-Something NO_2 Assessment Score	91864.8	91839.9
Net Total NO_2 Assessment Score (Change)	-41.6	-66.5
Number of Properties with an Improvement	263	374
Number of Properties with No Change	3449	3338
Number of Properties with a Deterioration	0	0

Qualitative Comments:

Net decrease in overall exposure to NO_2.
Overall local air quality in relation to annual mean NO_2 concentrations improves (i.e. overall concentrations decrease).
No properties are predicted to experience a deterioration (when results considered to one decimal place). It should be noted that traffic flow information was only available for the A4 and the A3290 which are the key roads affected by the scheme. It is likely that the operation of the proposed park and ride will alleviate traffic on key other key roads into Reading that were not included within the assessment area. It is therefore likely that more properties are likely to experience an improvement in annual mean NO2 concentrations as a result of the scheme than are presented within this assessment.

Reference Sources:

Traffic data supplied by WSP | PB.

PM_{10} Summary Table		
	50% Pay	80% Pay
Do-Minimum PM_{10} Assesment Score	70597.3	70597.3
Do-Something PM_{10} Assessment Score	70590.4	70586.2
Net Total PM_{10} Assessment Score (Change)	-6.9	-11.1
Number of Properties with an Improvement	0	100
Number of Properties with No Change	3712	3612
Number of Properties with a Deterioration	0	0

Qualitative Comments:

Net decrease in overall exposure to PM_{10}.
Overall local air quality in relation to annual mean PM_{10} concentrations improves (i.e. overall concentrations decrease).
No properties are predicted to experience a deterioration (when results considered to one decimal place). It should be noted that traffic flow information was only available for the A4 and the A3290 which are the key roads affected by the scheme. It is likely that the operation of the proposed park and ride will alleviate traffic on key other key roads into Reading that were not included within the assessment area. It is therefore likely that more properties are likely to experience an improvement in annual mean PM10 concentrations as a result of the scheme than are presented within this assessment.

Reference Sources:

Traffic data supplied by WSP | PB.
Concentrations predicted using ADMS Roads, EFT (v6.0.2) and DEFRA 2014 background concentrations

Department for Transport

Air Quality Valuation Workbook

TAG Reference

TAG Unit A3 - Environmental Impact Appraisal

Notes

This tool should be used to value changes in air quality in conjunction with TAG unit A3.

To use this tool, the following are required:

1. Year of appraisal
2. Opening year and further forecast year of the analysed scheme/policy
3. The PM10 assessment scores and NOx emissions for the with and without scheme cases for the openir
4. NOx emissions in areas exceeding EU limit values in the with and without scheme cases for each year

Cells requiring user inputs on the 'inputs' sheet are shaded light green. The user inputs required are:

1. Scheme name
2. Scheme opening year
3. Further forecast year
4. Scheme type (road, rail or road/rail)
5. Current year - the year the appraisal is undertaken to ensure the correct profile of discount rates
6. With and without scheme NOx emissions in the opening and forecast years
7. With and without scheme PM10 assessment scores in the opening and forecast years
8. The method used to estimate Nox emissions in areas exceeding EU limit values (where the custom opti exceeding limit values is required).

The other standard inputs are taken from the TAG data book / guidance:

1. Nox abatement and damage costs and PM10 damage costs
2. Standard 60-year appraisal period
3. Standard DfT base year for present values and prices
4. HMT profile of discount rates
5. GDP deflator series from TAG data book (if results are required for a different base year)
6. Real GDP/cap and GDP/HH series for uprating values over time

The 'outputs' sheet produces 'Worksheet 2' as described in TAG Unit A3 and 'Worksheet 3' which summarises the res

Version Control

Date	Description
Mar-15	Revised workbook structure released as forthcoming change
Nov-14	Updated GDP/cap and GDP/HH forecasts
Spring 2014	Updated GDP/cap and GDP/HH forecasts following Budget 2014
Jan-14	Definitive release
17/10/2013	Release of restructured guidance

Contact

Transport Appraisal and Strategic Modelling (TASM) Division
Department for Transport
Zone 2/25 Great Minster House
33 Horseferry Road
London
SW1P 4DR
tasm@dft.gsi.gov.uk

ıg and forecast years.
of the appraisal.

on is used, a profile of the percentage of emissions in areas

ults of the air quality appraisal.

Air Quality Valuation Workbook - Inputs

Scheme details

Scheme name	Thames Valley Park and Ride	*Scheme_name*
Opening year	2017	*Opening_year_in*
Forecast year	2032	*Forecast_year_in*
Scheme type (select from list)	road	*Scheme_type*
Current year	2015	*Current_year_in*

NOx emissions & PM10 concentrations

NOx emissions (tonnes)

	Opening year	
Without scheme	44.04	*Opening_year_without_scheme_NOx_emissions_in*
With scheme	44.02	*Opening_year_with_scheme_NOx_emissions_in*

	Forecast year	
Without scheme	48.06	*Forecast_year_without_scheme_NOx_emissions_in*
With scheme	48.03	*Forecast_year_with_scheme_NOx_emissions_in*

PM10 concentrations (assessment scores)

	Opening year	
Without scheme	70597.3	*Opening_year_without_scheme_PM10_concentrations_in*
With scheme	70590.4	*Opening_year_with_scheme_PM10_concentrations_in*

	Forecast year	
Without scheme	70796.6	*Forecast_year_without_scheme_PM10_concentrations_in*
With scheme	70789.1	*Forecast_year_with_scheme_PM10_concentrations_in*

Exceedances

Select the method used to calculate emissions on links exceeding EU limit values (i.e. urban, national or rail defaults or 'custom' modelled emissions) from the drop-down in cell C38.
If using the 'custom' method, enter the appropriate percentages in row 46.

Exceedance method: Urban — *Exceedance_method_in*

Percentage of emissions exceeding limit values (all vehicles)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Urban (Road)	59.9%	55.2%	50.5%	45.7%	41.0%	36.3%	30.5%	24.8%	19.1%	13.3%	7.6%	6.4%	5.2%	3.9%	2.7%	1.5%	1.3%	1.1%	0.8%	0.6%	0.4%	*Urban_emissions_exceedance_in*
National (Road)	17.1%	16.0%	14.9%	13.8%	12.7%	11.6%	9.8%	8.0%	6.1%	4.3%	2.5%	2.1%	1.7%	1.3%	0.9%	0.5%	0.4%	0.3%	0.3%	0.2%	0.1%	*National_emissions_exceedance_in*
Rail	8.4%	7.7%	7.1%	6.4%	5.8%	5.1%	4.3%	3.5%	2.6%	1.8%	1.0%	0.8%	0.7%	0.5%	0.4%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	*Rail_emissions_exceedance_in*
Custom	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	*Custom_emissions_exceedance_in*

source: Defra analysis

Emissions and concentrations values

Income base year	2010	*Income_base_values_in*
Price base year	2010	*Price_base_values_in*

NOx damage base values

Central	955	*NOx_damage_base_value_central_in*
Low	744	*NOx_damage_base_value_low_in*
High	1,085	*NOx_damage_base_value_high_in*

NOx abatement base values

Central	29,000	*NOx_abatement_base_value_central_in*
Low	27,000	*NOx_abatement_base_value_low_in*
High	73,000	*NOx_abatement_base_value_high_in*

PM10 damage base values

Central	92.7	*PM10_damage_base_value_central_in*
Low	49	*PM10_damage_base_value_low_in*
High	105.4	*PM10_damage_base_value_high_in*

source: TAG data book Table A3.2 (v1.3 November 2014)

Appraisal period and discounting

Appraisal period (years)	60	*Appraisal_period_length_in*
PV base year	2010	*PV_base_year_in*
Outputs price year	2010	*Price_base_outputs_in*
Discount period 1	30	*Discount_period_1_in*
Discount period 2	75	*Discount_period_2_in*
Discount period 3	125	*Discount_period_3_in*
Discount rate 1	3.5%	*Discount_rate_1_in*
Discount rate 2	3.0%	*Discount_rate_2_in*
Discount rate 3	2.5%	*Discount_rate_3_in*

source: TAG data book Autumn 2015 FINAL (v1.4 December 2015). A1.1.1

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
GDP deflator	100.00	102.10	103.76	105.81	107.62	108.91	110.66	112.65	114.79	117.08	119.66	122.32	125.07	127.92	130.86	133.87	136.95	140.10	143.32	146.62	149.99	153.44	156.97	160.58	164.27	168.05	171.92	175.87	179.92	184.05	188.29	192.62	197.05	201.58	206.22	210.96	215.81	220.78	225.85	231.05	236.36	241.80	247.36	253.05	258.87	264.82
Real GDP per household	120.90	122.50	122.99	125.45	128.91	130.58	132.42	134.47	136.43	138.30	140.22	142.32	144.49	146.73	149.14	151.62	154.14	156.74	159.40	162.14	164.97	167.84	170.82	173.89	177.65	181.33	185.10	188.97	192.93	196.96	201.09	205.33	209.66	214.09	218.61	223.22	228.22	233.10	238.08	243.17	248.37	253.51	258.76	264.12	269.58	275.17
Real GDP per capita	135.85	137.38	138.09	140.19	143.21	145.59	148.05	150.71	153.31	155.83	158.42	161.22	164.09	167.04	170.23	173.51	176.88	180.35	183.91	187.58	191.35	195.22	199.20	203.28	207.68	211.98	216.38	220.91	225.53	230.25	235.07	240.03	245.10	250.27	255.55	260.95	266.79	272.49	278.32	284.27	290.34	296.35	302.49	308.75	315.15	321.67

source: TAG data book Autumn 2015 FINAL (v1.4 December 2015). Annual parameters tab.

2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	
270.91	277.15	283.52	290.04	296.71	303.54	310.52	317.66	324.97	332.44	340.09	347.91	355.91	364.10	372.47	381.04	389.80	398.77	407.94	417.32	426.92	436.74	446.78	457.06	467.57	478.32	489.33	500.58	512.09	523.87	535.92	548.25	560.86	573.76	586.95	600.45	614.26	628.39	642.84	657.63	672.76	688.23	704.06	720.25	736.82	*GDP_deflator_in*
280.93	286.81	293.11	299.54	306.41	313.46	320.66	328.02	335.23	342.60	350.08	357.72	365.54	373.52	381.68	389.95	398.41	407.04	415.87	424.89	434.09	443.49	453.09	462.90	472.92	483.21	493.71	504.44	515.41	526.62	538.10	549.85	561.86	574.13	586.67	599.48	612.58	625.96	639.64	653.62	667.90	682.49	697.40	712.64	728.21	*GDP_household_in*
328.41	335.29	342.64	350.16	358.19	366.43	374.85	383.46	391.89	400.50	409.24	418.18	427.31	436.64	446.18	455.85	465.74	475.84	486.15	496.70	507.45	518.44	529.66	541.13	552.85	564.87	577.15	589.70	602.52	615.62	629.04	642.78	656.81	671.16	685.82	700.80	716.11	731.75	747.74	764.08	780.77	797.83	815.26	833.07	851.28	*GDP_capita_in*

Air Quality Valuation Workbook - Calculations

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Appraisal period																																			
NOx emissions																																			
PM10 concentrations																																			
Without scheme																																			
Opening year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70597.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forecast year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70796.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interpolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70610.59	70623.87	70637.16	70650.45	70663.73	70677.02	70690.31	70703.59	70716.88	70730.17	70743.45	70756.74	70770.03	70783.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extrapolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70597.30	70610.59	70623.87	70637.16	70650.45	70663.73	70677.02	70690.31	70703.59	70716.88	70730.17	70743.45	70756.74	70770.03	70783.31	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60
With scheme																																			
Opening year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70590.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forecast year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70789.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interpolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70603.65	70616.89	70630.14	70643.39	70656.63	70669.88	70683.13	70696.37	70709.62	70722.87	70736.11	70749.36	70762.61	70775.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extrapolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70590.40	70603.65	70616.89	70630.14	70643.39	70656.63	70669.88	70683.13	70696.37	70709.62	70722.87	70736.11	70749.36	70762.61	70775.85	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10
Change in PM10 net total assessment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-6.90	-6.94	-6.98	-7.02	-7.06	-7.10	-7.14	-7.18	-7.22	-7.26	-7.30	-7.34	-7.38	-7.42	-7.46	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50

Opening year PM10 concentrations: 2017 — 70597.3 *Opening_year_without_scheme_PM10_concentrations*

Forecast year PM10 concentrations: 2032 — 70796.6 *Forecast_year_without_scheme_PM10_concentrations*

Difference: 199.3 *Difference_without_scheme_PM10_concentrations*

Opening year PM10 concentrations: 2017 — 70590.4 *Opening_year_with_scheme_PM10_concentrations*

Forecast year PM10 concentrations: 2032 — 70789.1 *Forecast_year_with_scheme_PM10_concentrations*

Difference: 198.7 *Difference_with_scheme_PM10_concentrations*

Opening year net route assessment: -6.90 *Opening_year_net_route_assessment*

Emissions and concentrations valuations

Income and price adjustment

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
GDP deflator index	100.00	102.10	103.76	105.81	107.62	108.91	110.66	112.65	114.79	117.08	119.66	122.32	125.07	127.92	130.86	133.87	136.95	140.10	143.32	146.62	149.99	153.44	156.97	160.58	164.27	168.05	171.92	175.87	179.92	184.05	188.29	192.62	197.05	201.58	206.22
Real GDP per household index	120.90	122.50	122.99	125.45	128.91	130.58	132.42	134.47	136.43	138.30	140.22	142.32	144.49	146.73	149.14	151.62	154.14	156.74	159.40	162.14	164.97	167.84	170.82	173.89	177.65	181.33	185.10	188.97	192.93	196.96	201.09	205.33	209.66	214.09	218.61
Real GDP per capita index	135.85	137.38	138.09	140.19	143.21	145.59	148.05	150.71	153.31	155.83	158.42	161.22	164.09	167.04	170.23	173.51	176.88	180.35	183.91	187.58	191.35	195.22	199.20	203.28	207.68	211.98	216.38	220.91	225.53	230.25	235.07	240.03	245.10	250.27	255.55

Income base for emission/concentration values: 2010 *Income_base_values*
GDP per capita index - values: 135.85 *GDP_capita_base_values*
GDP per household index - values: 120.90 *GDP_household_base_values*

Price base for emission/concentration values: 2010 *Price_base_values*
GDP deflator index - values: 100.00 *GDP_deflator_base_values*

Price base for outputs: 2010 *Price_base_outputs*
GDP deflator index - for outputs: 100.00 *GDP_deflator_outputs*

Price base adjustment: 1.00 *Price_adjustment*

NOx damage costs (£/tonne)

Low base value: 744 *NOx_damage_base_value_low*
Central base value: 955 *NOx_damage_base_value_central*
High base value: 1085 *NOx_damage_base_value_high*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Low	744	752	756	768	784	797	811	825	840	853	868	883	899	915	932	950	969	988	1007	1027	1048	1069	1091	1113	1137	1161	1185	1210	1235	1261	1287	1315	1342	1371	1400
Central	955	966	971	985	1007	1023	1041	1059	1078	1095	1114	1133	1154	1174	1197	1220	1243	1268	1293	1319	1345	1372	1400	1429	1460	1490	1521	1553	1585	1619	1652	1687	1723	1759	1796
High	1085	1097	1103	1120	1144	1163	1182	1204	1224	1245	1265	1288	1311	1334	1360	1386	1413	1440	1469	1498	1528	1559	1591	1624	1659	1693	1728	1764	1801	1839	1877	1917	1957	1999	2041

NOx abatement costs (£/tonne)

Low base value: 27000 *NOx_abatement_base_value_low*
Central base value: 29000 *NOx_abatement_base_value_central*
High base value: 73000 *NOx_abatement_base_value_high*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Low	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000
Central	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000
High	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000

PM10 damage costs (£/HH/1µgm-3)

Low base value: 48.6 *PM10_damage_base_value_low*
Central base value: 92.7 *PM10_damage_base_value_central*
High base value: 105.4 *PM10_damage_base_value_high*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Low	49	49	49	50	52	52	53	54	55	56	56	57	58	59	60	61	62	63	64	65	66	67	69	70	71	73	74	76	78	79	81	83	84	86	88
Central	93	94	94	96	99	100	102	103	105	106	108	109	111	113	114	116	118	120	122	124	127	129	131	133	136	139	142	145	148	151	154	157	161	164	168

High	105	107	107	109	112	114	115	117	119	121	122	124	126	128	130	132	134	137	139	141	144	146	149	152	155	158	161	165	168	172	175	179	183	187	191
NOx emissions benefits not in areas of exceedance																																			
(positive values represent a benefit - an improvement in air quality)																																			
Low (£)	0	0	0	0	0	0	0	12	14	16	18	19	20	21	22	24	25	26	27	29	30	31	33	33	34	35	36	36	37	38	39	39	40	41	42
Central (£)	0	0	0	0	0	0	0	16	18	20	23	24	26	27	29	30	32	33	35	37	38	40	42	43	44	45	46	47	48	49	50	51	52	53	54
High (£)	0	0	0	0	0	0	0	18	20	23	26	27	29	31	33	35	36	38	40	42	44	46	48	49	50	51	52	53	54	55	56	58	59	60	61
NOx emissions benefits in areas of exceedance																																			
Low (£)	0	0	0	0	0	0	0	134	106	77	45	39	32	26	18	10	9	8	6	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central (£)	0	0	0	0	0	0	0	144	114	82	48	42	35	27	20	11	10	8	7	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High (£)	0	0	0	0	0	0	0	362	287	207	122	105	88	69	49	28	24	21	17	12	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 concentrations benefits																																			
Low (£)	0	0	0	0	0	0	0	373	381	388	396	404	412	421	430	440	450	460	470	481	492	503	515	524	535	547	558	570	582	594	606	619	632	645	659
Central (£)	0	0	0	0	0	0	0	712	726	740	755	771	787	803	821	840	858	877	897	918	939	960	983	1000	1022	1043	1065	1087	1110	1133	1157	1181	1206	1231	1257
High (£)	0	0	0	0	0	0	0	809	825	841	858	876	894	913	933	954	975	997	1020	1043	1067	1091	1116	1137	1161	1185	1210	1235	1261	1287	1314	1342	1370	1399	1429

Discounting and present values

Discount period

Current year	2015	*Current_year*
PV base year	2010	*PV_base_year*
discount period 1	30	*Discount_period_1*
discount period 2	75	*Discount_period_2*
discount period 3	125	*Discount_period_3*

Masks																																			
Discount period 1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Discount period 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Discount period 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Discount rates and factors

discount rate 1	3.5%	*Discount_rate_1*
discount rate 2	3.0%	*Discount_rate_2*
discount rate 3	2.5%	*Discount_rate_3*

Discount rate profile		0.0%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Discount factor	1	1.00	1.04	1.07	1.11	1.15	1.19	1.23	1.27	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	1.73	1.79	1.86	1.92	1.99	2.06	2.13	2.21	2.28	2.36	2.45	2.53	2.62	2.71	2.81	2.91	3.01	3.11	3.22

Discounted benefits for NOx emissions not in areas of exceedance

(positive values represent a benefit - a reduction in noise)

Low (£)	0	0	0	0	0	0	0	10	11	12	13	13	13	13	14	14	14	15	15	15	15	15	15	15	15	15	15	14	14	14	14	14	13	13	13
Central (£)	0	0	0	0	0	0	0	13	14	15	16	16	17	17	18	18	18	19	19	19	19	20	20	19	19	19	19	18	18	18	18	17	17	17	17
High (£)	0	0	0	0	0	0	0	14	16	17	18	19	19	20	20	21	21	21	21	22	22	22	22	22	22	21	21	21	21	20	20	20	20	19	19

Discounted benefits for NOx emissions in areas of exceedance

Low (£)	0	0	0	0	0	0	0	105	81	56	32	27	21	16	11	6	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central (£)	0	0	0	0	0	0	0	113	87	60	34	29	23	18	12	7	6	5	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High (£)	0	0	0	0	0	0	0	284	218	152	86	72	58	44	30	17	14	11	9	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Discounted benefits for PM10 concentrations

Low (£)	0	0	0	0	0	0	0	293	289	285	280	277	273	269	266	263	259	256	253	250	247	244	242	238	235	231	228	225	222	219	216	213	210	207	205
Central (£)	0	0	0	0	0	0	0	559	551	543	535	528	521	514	507	501	495	489	483	477	472	466	461	453	448	441	435	429	424	418	412	407	401	396	390
High (£)	0	0	0	0	0	0	0	636	627	617	608	600	592	584	576	569	562	556	549	542	536	530	524	515	509	501	495	488	481	475	468	462	456	450	444

NOx damage costs NPV estimates

(positive values represent a benefit - an improvement in air quality)

Low (£)	748	*NOx_damage_NPV_low*
Central (£)	960	*NOx_damage_NPV_central*
High (£)	1,091	*NOx_damage_NPV_high*

NOx abatement costs NPV estimates

Low (£)	372	*NOx_abatement_NPV_low*
Central (£)	400	*NOx_abatement_NPV_central*
High (£)	1,007	*NOx_abatement_NPV_high*

Total present value of change in NOx emissions

Low (£)	1,121	*NOx_NPV_low*
Central (£)	1,360	*NOx_NPV_central*
High (£)	2,098	*NOx_NPV_high*

PM10 damage costs NPV estimates

Low (£)	12,597	*PM10_damage_NPV_low*
Central (£)	24,037	*PM10_damage_NPV_central*
High (£)	27,314	*PM10_damage_NPV_high*

Total present value of change in air quality: £NPV

Low (£)	13,717	*NPV_low*
Central (£)	25,397	*NPV_central*
High (£)	29,412	*NPV_high*

2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	70789.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085
210.96	215.81	220.78	225.85	231.05	236.36	241.80	247.36	253.05	258.87	264.82	270.91	277.15	283.52	290.04	296.71	303.54	310.52	317.66	324.97	332.44	340.09	347.91	355.91	364.10	372.47	381.04	389.80	398.77	407.94	417.32	426.92	436.74	446.78	457.06	467.57	478.32	489.33	500.58	512.09	523.87
223.22	228.22	233.10	238.08	243.17	248.37	253.51	258.76	264.12	269.58	275.17	280.93	286.81	293.11	299.54	306.41	313.46	320.66	328.02	335.23	342.60	350.08	357.72	365.54	373.52	381.68	389.95	398.41	407.04	415.87	424.89	434.09	443.49	453.09	462.90	472.92	483.21	493.71	504.44	515.41	526.62
260.95	266.79	272.49	278.32	284.27	290.34	296.35	302.49	308.75	315.15	321.67	328.41	335.29	342.64	350.16	358.19	366.43	374.85	383.46	391.89	400.50	409.24	418.18	427.31	436.64	446.18	455.85	465.74	475.84	486.15	496.70	507.45	518.44	529.66	541.13	552.85	564.87	577.15	589.70	602.52	615.62

1429	1461	1492	1524	1557	1590	1623	1657	1691	1726	1762	1799	1836	1876	1918	1962	2007	2053	2100	2146	2193	2241	2290	2340	2391	2443	2496	2551	2606	2662	2720	2779	2839	2901	2964	3028	3093	3161	3229	3300	3371
1834	1875	1916	1956	1998	2041	2083	2126	2170	2215	2261	2309	2357	2409	2461	2518	2576	2635	2696	2755	2815	2877	2940	3004	3069	3136	3204	3274	3345	3417	3492	3567	3644	3723	3804	3886	3971	4057	4145	4235	4328
2084	2131	2176	2223	2270	2319	2367	2416	2466	2517	2569	2623	2678	2737	2797	2861	2927	2994	3063	3130	3199	3268	3340	3413	3487	3563	3641	3720	3800	3883	3967	4053	4141	4230	4322	4415	4511	4609	4710	4812	4917

27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000
29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000
73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000

90	92	94	96	98	100	102	104	106	108	111	113	115	118	120	123	126	129	132	135	138	141	144	147	150	153	157	160	164	167	171	174	178	182	186	190	194	198	203	207	212
171	175	179	183	186	190	194	198	203	207	211	215	220	225	230	235	240	246	252	257	263	268	274	280	286	293	299	306	312	319	326	333	340	347	355	363	371	379	387	395	404

195	199	203	207	212	216	221	225	230	235	240	245	250	255	261	267	273	279	286	292	299	305	312	319	326	333	340	347	355	362	370	378	386	395	403	412	421	430	440	449	459
43	44	45	46	47	48	49	50	51	52	53	54	55	56	58	59	60	62	63	64	66	67	69	70	72	73	75	77	78	80	82	83	0	0	0	0	0	0	0	0	0
55	56	57	59	60	61	62	64	65	66	68	69	71	72	74	76	77	79	81	83	84	86	88	90	92	94	96	98	100	103	105	107	0	0	0	0	0	0	0	0	0
63	64	65	67	68	70	71	72	74	76	77	79	80	82	84	86	88	90	92	94	96	98	100	102	105	107	109	112	114	116	119	122	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
673	688	703	718	733	749	764	780	796	813	829	847	865	883	903	924	945	967	989	1010	1033	1055	1078	1102	1126	1150	1175	1201	1227	1254	1281	1308	0	0	0	0	0	0	0	0	0
1284	1313	1341	1369	1399	1429	1458	1488	1519	1551	1583	1616	1650	1686	1723	1762	1803	1844	1887	1928	1971	2014	2058	2102	2148	2195	2243	2292	2341	2392	2444	2497	0	0	0	0	0	0	0	0	0
1459	1492	1523	1556	1589	1623	1657	1691	1726	1762	1798	1836	1875	1916	1958	2003	2049	2096	2144	2191	2239	2288	2338	2389	2441	2495	2549	2604	2660	2718	2777	2837	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
3.33	3.43	3.54	3.64	3.75	3.86	3.98	4.10	4.22	4.35	4.48	4.61	4.75	4.90	5.04	5.19	5.35	5.51	5.68	5.85	6.02	6.20	6.39	6.58	6.78	6.98	7.19	7.40	7.63	7.86	8.09	8.33	8.58	8.84	9.11	9.38	9.66	9.95	10.25	10.56	10.87
13	13	13	13	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0
17	16	16	16	16	16	16	16	15	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	0	0	0	0	0	0	0	0	0
19	19	18	18	18	18	18	18	18	17	17	17	17	17	17	17	16	16	16	16	16	16	16	16	15	15	15	15	15	15	15	15	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
202	200	199	197	195	194	192	190	189	187	185	184	182	180	179	178	177	175	174	173	172	170	169	167	166	165	163	162	161	160	158	157	0	0	0	0	0	0	0	0	0
385	382	379	376	373	370	366	363	360	356	353	350	347	344	342	339	337	335	332	330	327	325	322	320	317	315	312	309	307	304	302	300	0	0	0	0	0	0	0	0	0
438	434	431	427	424	420	416	413	409	405	401	398	394	391	388	386	383	380	378	375	372	369	366	363	360	357	355	352	349	346	343	340	0	0	0	0	0	0	0	0	0

2

2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	*year*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Opening_year_without_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Forecast_year_without_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Interpolation_without_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Extrapolation_without_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Total_without_scheme_PM10_concentrations*

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Opening_year_with_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Forecast_year_with_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Interpolation_with_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Extrapolation_with_scheme_PM10_concentrations_mask*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Total_with_scheme_PM10_concentrations*
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*Change_in_PM10_net_total_assessment*

2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	
535.92	548.25	560.86	573.76	586.95	600.45	614.26	628.39	642.84	657.63	672.76	688.23	704.06	720.25	736.82	*GDP_deflator*
538.10	549.85	561.86	574.13	586.67	599.48	612.58	625.96	639.64	653.62	667.90	682.49	697.40	712.64	728.21	*GDP_household*
629.04	642.78	656.81	671.16	685.82	700.80	716.11	731.75	747.74	764.08	780.77	797.83	815.26	833.07	851.28	*GDP_capita*

3445	3520	3597	3676	3756	3838	3922	4007	4095	4184	4276	4369	4465	4562	4662	*NOx_damage_costs_low*
4422	4518	4617	4718	4821	4926	5034	5144	5256	5371	5489	5608	5731	5856	5984	*NOx_damage_costs_central*
5024	5134	5246	5360	5477	5597	5719	5844	5972	6102	6236	6372	6511	6653	6799	*NOx_damage_costs_high*

27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	*NOx_abatement_costs_low*
29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	*NOx_abatement_costs_central*
73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	*NOx_abatement_costs_high*

216	221	226	231	236	241	246	252	257	263	268	274	280	286	293	*PM10_damage_costs_low*
413	422	431	440	450	460	470	480	491	501	512	523	535	547	558	*PM10_damage_costs_central*

469	479	490	500	511	522	534	545	557	570	582	595	608	621	635	*PM10_damage_costs_high*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_not_in_exceedance_low*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_not_in_exceedance_central*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_not_in_exceedance_high*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_in_exceedance_low*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_in_exceedance_central*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_in_exceedance_high*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*PM10_benefits_low*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*PM10_benefits_central*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*PM10_benefits_high*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*Discount_period_1_mask*
1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	*Discount_period_2_mask*
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	*Discount_period_3_mask*
3.0%	3.0%	3.0%	3.0%	3.0%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	*Discount_rate_profile*
11.20	11.54	11.88	12.24	12.61	12.92	13.24	13.58	13.91	14.26	14.62	14.98	15.36	15.74	16.14	*Discount_factor*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_not_in_exceedance_discounted_low*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_not_in_exceedance_discounted_central*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_not_in_exceedance_discounted_high*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_in_exceedance_discounted_low*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_in_exceedance_discounted_central*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*NOx_benefits_in_exceedance_discounted_high*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*PM10_benefits_discounted_low*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*PM10_benefits_discounted_central*
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*PM10_benefits_discounted_high*

Air Quality Valuation Workbook - Worksheet 2

Regional Air Quality

Scheme name: Thames Valley Park and Ride **Opening year:** 2017 **Forecast year:** 2032

		Without scheme		With scheme		Change in emissions	
		Opening year	Forecast year	Opening year	Forecast year	Opening year	Forecast year
NOx emissions in tonnes per year	Areas not exceeding limit values	33.12	48.06	33.11	48.03	-0.02	-0.03
	Areas exceeding limit values	10.92	0.00	10.91	0.00	0.00	0.00

Qualitative comments: In both the opening year and forecast year, the total emissions of NOx in tonnes per year reduces as a result of the operation of the scheme. It should be noted that traffic flows were only available for the A4 and A3290 which are the key routes likely to be affected by the scheme. It is likely that the operation of the park and ride scheme will result in reduced passenger car movements on other arterial routes into Readling which were not captured by the modelling. It is therefore likely that the operation of the park and ride scheme will have a greater improvement in total emissions of NOx than is presented by the above figures.

Data sources: Traffic Data supplied by WSP | PB, Total Emissions of NOx calculated using the Defra EfT

Air Quality Valuation Workbook - Worksheet 3

Scheme Name: Thames Valley Park and Ride

Present Value Base Year	2010
Current Year	2015
Proposal Opening year:	2017
Project (Road/Rail or Road and Rail):	road

Overall Assessment Score:

Present value of change in NOx emissions (£):	£1,360
Present value of change in PM10 concentrations (£):	£24,037
Total value of change in air quality (£):	£25,397

*positive value reflects a **net benefit** (i.e. air quality improvement)

Quantitative Assessment:

Net total route assessment (opening year) for PM10 : (between 'with scheme' and 'without scheme' scenarios)	-7
Change in NOX emissions over 60 year appraisal period: (between 'with scheme' and 'without scheme' scenarios)	-2

Qualitative Comments:

The operation of the proposed park and ride scheme has been assessed and is determined to result in a net improvement in air quality in the local area.

Sensitivity Analysis:

Upper estimate net present value of change in air quality (£):	£29,412
Lower estimate net present value of change in air quality (£):	£13,717

Data Sources:

Traffic Data supplied by WSP | PB, Total Emissions of NOx calculated using the Defra EfT spreadsheet version 6.0.2, modelling was completed using the ADMS-Roads version 4.0.1.0

Department for Transport

Air Quality Valuation Workbook

TAG Reference

TAG Unit A3 - Environmental Impact Appraisal

Notes

This tool should be used to value changes in air quality in conjunction with TAG unit A3.

To use this tool, the following are required:

1 Year of appraisal
2 Opening year and further forecast year of the analysed scheme/policy
3 The PM10 assessment scores and NOx emissions for the with and without scheme cases for the openi
4 NOx emissions in areas exceeding EU limit values in the with and without scheme cases for each year

Cells requiring user inputs on the 'inputs' sheet are shaded light green. The user inputs required are:

1 Scheme name
2 Scheme opening year
3 Further forecast year
4 Scheme type (road, rail or road/rail)
5 Current year - the year the appraisal is undertaken to ensure the correct profile of discount rates
6 With and without scheme NOx emissions in the opening and forecast years
7 With and without scheme PM10 assessment scores in the opening and forecast years
8 The method used to estimate Nox emissions in areas exceeding EU limit values (where the custom opti
exceeding limit values is required).

The other standard inputs are taken from the TAG data book / guidance:

1 Nox abatement and damage costs and PM10 damage costs
2 Standard 60-year appraisal period
3 Standard DfT base year for present values and prices
4 HMT profile of discount rates
5 GDP deflator series from TAG data book (if results are required for a different base year)
6 Real GDP/cap and GDP/HH series for uprating values over time

The 'outputs' sheet produces 'Worksheet 2' as described in TAG Unit A3 and 'Worksheet 3' which summarises the res

Version Control

Date	Description
Mar-15	Revised workbook structure released as forthcoming change
Nov-14	Updated GDP/cap and GDP/HH forecasts
Spring 2014	Updated GDP/cap and GDP/HH forecasts following Budget 2014
Jan-14	Definitive release
17/10/2013	Release of restructured guidance

Contact

Transport Appraisal and Strategic Modelling (TASM) Division
Department for Transport
Zone 2/25 Great Minster House
33 Horseferry Road
London
SW1P 4DR
tasm@dft.gsi.gov.uk

ıg and forecast years.
of the appraisal.

on is used, a profile of the percentage of emissions in areas

ults of the air quality appraisal.

Air Quality Valuation Workbook - Inputs

Scheme details

Scheme name	Thames Valley Park and Ride	*Scheme_name*
Opening year	2017	*Opening_year_in*
Forecast year	2032	*Forecast_year_in*
Scheme type (select from list)	road	*Scheme_type*
Current year	2015	*Current_year_in*

NOx emissions & PM10 concentrations

NOx emissions (tonnes)

	Opening year	
Without scheme	44.04	*Opening_year_without_scheme_NOx_emissions_in*
With scheme	44	*Opening_year_with_scheme_NOx_emissions_in*

	Forecast year	
Without scheme	48.06	*Forecast_year_without_scheme_NOx_emissions_in*
With scheme	48.02	*Forecast_year_with_scheme_NOx_emissions_in*

PM10 concentrations (assessment scores)

	Opening year	
Without scheme	70597.3	*Opening_year_without_scheme_PM10_concentrations_in*
With scheme	70586.2	*Opening_year_with_scheme_PM10_concentrations_in*

	Forecast year	
Without scheme	70796.6	*Forecast_year_without_scheme_PM10_concentrations_in*
With scheme	70783.8	*Forecast_year_with_scheme_PM10_concentrations_in*

Exceedances

Select the method used to calculate emissions on links exceeding EU limit values (i.e. urban, national or rail defaults or 'custom' modelled emissions) from the drop-down in cell C38.
If using the 'custom' method, enter the appropriate percentages in row 46.

Exceedance method	Urban	*Exceedance_method_in*

Percentage of emissions exceeding limit values (all vehicles)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Urban (Road)	59.9%	55.2%	50.5%	45.7%	41.0%	36.3%	30.5%	24.8%	19.1%	13.3%	7.6%	6.4%	5.2%	3.9%	2.7%	1.5%	1.3%	1.1%	0.8%	0.6%	0.4%	*Urban_emissions_exceedance_in*
National (Road)	17.1%	16.0%	14.9%	13.8%	12.7%	11.6%	9.8%	8.0%	6.1%	4.3%	2.5%	2.1%	1.7%	1.3%	0.9%	0.5%	0.4%	0.3%	0.3%	0.2%	0.1%	*National_emissions_exceedance_in*
Rail	8.4%	7.7%	7.1%	6.4%	5.8%	5.1%	4.3%	3.5%	2.6%	1.8%	1.0%	0.8%	0.7%	0.5%	0.4%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	*Rail_emissions_exceedance_in*
Custom	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	*Custom_emissions_exceedance_in*

source: Defra analysis

Emissions and concentrations values

Income base year	2010	*Income_base_values_in*
Price base year	2010	*Price_base_values_in*

NOx damage base values

Central	955	*NOx_damage_base_value_central_in*
Low	744	*NOx_damage_base_value_low_in*
High	1,085	*NOx_damage_base_value_high_in*

NOx abatement base values

Central	29,000	*NOx_abatement_base_value_central_in*
Low	27,000	*NOx_abatement_base_value_low_in*
High	73,000	*NOx_abatement_base_value_high_in*

PM10 damage base values

Central	92.7	*PM10_damage_base_value_central_in*
Low	49	*PM10_damage_base_value_low_in*
High	105.4	*PM10_damage_base_value_high_in*

source: TAG data book Table A3.2 (v1.3 November 2014)

Appraisal period and discounting

Appraisal period (years)	60	*Appraisal_period_length_in*
PV base year	2010	*PV_base_year_in*
Outputs price year	2010	*Price_base_outputs_in*

Discount period 1	30	*Discount_period_1_in*
Discount period 2	75	*Discount_period_2_in*
Discount period 3	125	*Discount_period_3_in*
Discount rate 1	3.5%	*Discount_rate_1_in*
Discount rate 2	3.0%	*Discount_rate_2_in*
Discount rate 3	2.5%	*Discount_rate_3_in*

source: TAG data book Autumn 2015 FINAL (v1.4 December 2015). A1.1.1

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
GDP deflator	100.00	102.10	103.76	105.81	107.62	108.91	110.66	112.65	114.79	117.08	119.66	122.32	125.07	127.92	130.86	133.87	136.95	140.10	143.32	146.62	149.99	153.44	156.97	160.58	164.27	168.05	171.92
Real GDP per household	120.90	122.50	122.99	125.45	128.91	130.58	132.42	134.47	136.43	138.30	140.22	142.32	144.49	146.73	149.14	151.62	154.14	156.74	159.40	162.14	164.97	167.84	170.82	173.89	177.65	181.33	185.10
Real GDP per capita	135.85	137.38	138.09	140.19	143.21	145.59	148.05	150.71	153.31	155.83	158.42	161.22	164.09	167.04	170.23	173.51	176.88	180.35	183.91	187.58	191.35	195.22	199.20	203.28	207.68	211.98	216.38

source: TAG data book Autumn 2015 FINAL (v1.4 December 2015). Annual parameters tab.

2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
175.87	179.92	184.05	188.29	192.62	197.05	201.58	206.22	210.96	215.81	220.78	225.85	231.05	236.36	241.80	247.36	253.05	258.87	264.82	270.91	277.15	283.52	290.04	296.71	303.54	310.52	317.66	324.97	332.44	340.09	347.91	355.91	364.10
188.97	192.93	196.96	201.09	205.33	209.66	214.09	218.61	223.22	228.22	233.10	238.08	243.17	248.37	253.51	258.76	264.12	269.58	275.17	280.93	286.81	293.11	299.54	306.41	313.46	320.66	328.02	335.23	342.60	350.08	357.72	365.54	373.52
220.91	225.53	230.25	235.07	240.03	245.10	250.27	255.55	260.95	266.79	272.49	278.32	284.27	290.34	296.35	302.49	308.75	315.15	321.67	328.41	335.29	342.64	350.16	358.19	366.43	374.85	383.46	391.89	400.50	409.24	418.18	427.31	436.64

2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	
372.47	381.04	389.80	398.77	407.94	417.32	426.92	436.74	446.78	457.06	467.57	478.32	489.33	500.58	512.09	523.87	535.92	548.25	560.86	573.76	586.95	600.45	614.26	628.39	642.84	657.63	672.76	688.23	704.06	720.25	736.82	*GDP_deflator_in*
381.68	389.95	398.41	407.04	415.87	424.89	434.09	443.49	453.09	462.90	472.92	483.21	493.71	504.44	515.41	526.62	538.10	549.85	561.86	574.13	586.67	599.48	612.58	625.96	639.64	653.62	667.90	682.49	697.40	712.64	728.21	*GDP_household_in*
446.18	455.85	465.74	475.84	486.15	496.70	507.45	518.44	529.66	541.13	552.85	564.87	577.15	589.70	602.52	615.62	629.04	642.78	656.81	671.16	685.82	700.80	716.11	731.75	747.74	764.08	780.77	797.83	815.26	833.07	851.28	*GDP_capita_in*

Air Quality Valuation Workbook - Calculations

Appraisal period

| | | |

Without scheme forecast year	0.00	*Without_scheme_forecast_year_exceedance*
With scheme forecast year	0.00	*With_scheme_forecast_year_exceedance*
Change	0.00	*Change_forecast_year_exceedance*

NOx emissions not in areas of exceedance

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Without scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.12	35.87	38.64	41.45	42.24	43.04	43.85	44.66	45.48	45.85	46.23	46.60	46.97	47.35	47.79	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06
With scheme	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.09	35.83	38.61	41.41	42.20	43.00	43.81	44.63	45.45	45.82	46.19	46.56	46.93	47.31	47.75	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02
Change in emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04

Without scheme opening year	33.12	*Without_scheme_opening_year_not_in_exceedance*
With scheme opening year	33.09	*With_scheme_opening_year_not_in_exceedance*
Change	-0.03	*Change_opening_year_not_in_exceedance*

Without scheme forecast year	48.06	*Without_scheme_forecast_year_not_in_exceedance*
With scheme forecast year	48.02	*With_scheme_forecast_year_not_in_exceedance*
Change	-0.04	*Change_forecast_year_not_in_exceedance*

PM10 concentrations

Without scheme

2017

Opening year PM10 concentrations	70597.3	*Opening_year_without_scheme_PM10_concentrations*

2032

Forecast year PM10 concentrations	70796.6	*Forecast_year_without_scheme_PM10_concentrations*

Difference	199.3	*Difference_without_scheme_PM10_concentrations*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Opening year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70597.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forecast year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70796.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interpolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70610.59	70623.87	70637.16	70650.45	70663.73	70677.02	70690.31	70703.59	70716.88	70730.17	70743.45	70756.74	70770.03	70783.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extrapolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70597.30	70610.59	70623.87	70637.16	70650.45	70663.73	70677.02	70690.31	70703.59	70716.88	70730.17	70743.45	70756.74	70770.03	70783.31	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60

With scheme

2017

Opening year PM10 concentrations	70586.2	*Opening_year_with_scheme_PM10_concentrations*

2032

Forecast year PM10 concentrations	70783.8	*Forecast_year_with_scheme_PM10_concentrations*

Difference	197.6	*Difference_with_scheme_PM10_concentrations*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Opening year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70586.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forecast year	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70783.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interpolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70599.37	70612.55	70625.72	70638.89	70652.07	70665.24	70678.41	70691.59	70704.76	70717.93	70731.11	70744.28	70757.45	70770.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Extrapolation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70586.20	70599.37	70612.55	70625.72	70638.89	70652.07	70665.24	70678.41	70691.59	70704.76	70717.93	70731.11	70744.28	70757.45	70770.63	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80
Change in PM10 net total assessment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-11.10	-11.21	-11.33	-11.44	-11.55	-11.67	-11.78	-11.89	-12.01	-12.12	-12.23	-12.35	-12.46	-12.57	-12.69	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80

Opening year net route assessment	-11.10	*Opening_year_net_route_assessment*

Emissions and concentrations valuations

Income and price adjustment

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
GDP deflator index	100.00	102.10	103.76	105.81	107.62	108.91	110.66	112.65	114.79	117.08	119.66	122.32	125.07	127.92	130.86	133.87	136.95	140.10	143.32	146.62	149.99	153.44	156.97	160.58	164.27	168.05	171.92	175.87	179.92	184.05	188.29	192.62	197.05	201.58	206.22	210.96	215.81	220.78	225.85	231.05	236.36	241.80
Real GDP per household index	120.90	122.50	122.99	125.45	128.91	130.58	132.42	134.47	136.43	138.30	140.22	142.32	144.49	146.73	149.14	151.62	154.14	156.74	159.40	162.14	164.97	167.84	170.82	173.89	177.65	181.33	185.10	188.97	192.93	196.96	201.09	205.33	209.66	214.09	218.61	223.22	228.22	233.10	238.08	243.17	248.37	253.51
Real GDP per capita index	135.85	137.38	138.09	140.19	143.21	145.59	148.05	150.71	153.31	155.83	158.42	161.22	164.09	167.04	170.23	173.51	176.88	180.35	183.91	187.58	191.35	195.22	199.20	203.28	207.68	211.98	216.38	220.91	225.53	230.25	235.07	240.03	245.10	250.27	255.55	260.95	266.79	272.49	278.32	284.27	290.34	296.35

Income base for emission/concentration values	2010	*Income_base_values*
GDP per capita index - values	135.85	*GDP_capita_base_values*
GDP per household index - values	120.90	*GDP_household_base_values*

Price base for emission/concentration values	2010	*Price_base_values*
GDP deflator index - values	100.00	*GDP_deflator_base_values*

Price base for outputs	2010	*Price_base_outputs*
GDP deflator index - for outputs	100.00	*GDP_deflator_outputs*

Price base adjustment	1.00	*Price_adjustment*

NOx damage costs (£/tonne)

Low base value	744	*NOx_damage_base_value_low*
Central base value	955	*NOx_damage_base_value_central*
High base value	1085	*NOx_damage_base_value_high*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Low	744	752	756	768	784	797	811	825	840	853	868	883	899	915	932	950	969	988	1007	1027	1048	1069	1091	1113	1137	1161	1185	1210	1235	1261	1287	1315	1342	1371	1400	1429	1461	1492	1524	1557	1590	1623
Central	955	966	971	985	1007	1023	1041	1059	1078	1095	1114	1133	1154	1174	1197	1220	1243	1268	1293	1319	1345	1372	1400	1429	1460	1490	1521	1553	1585	1619	1652	1687	1723	1759	1796	1834	1875	1916	1956	1998	2041	2083
High	1085	1097	1103	1120	1144	1163	1182	1204	1224	1245	1265	1288	1311	1334	1360	1386	1413	1440	1469	1498	1528	1559	1591	1624	1659	1693	1728	1764	1801	1839	1877	1917	1957	1999	2041	2084	2131	2176	2223	2270	2319	2367

NOx abatement costs (£/tonne)

Low base value	27000	*NOx_abatement_base_value_low*
Central base value	29000	*NOx_abatement_base_value_central*
High base value	73000	*NOx_abatement_base_value_high*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Low	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000
Central	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000
High	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000

PM10 damage costs (£/HH/1µgm-3)

Low base value	48.6	*PM10_damage_base_value_low*
Central base value	92.7	*PM10_damage_base_value_central*
High base value	105.4	*PM10_damage_base_value_high*

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Low	49	49	49	50	52	52	53	54	55	56	56	57	58	59	60	61	62	63	64	65	66	67	69	70	71	73	74	76	78	79	81	83	84	86	88	90	92	94	96	98	100	102
Central	93	94	94	96	99	100	102	103	105	106	108	109	111	113	114	116	118	120	122	124	127	129	131	133	136	139	142	145	148	151	154	157	161	164	168	171	175	179	183	186	190	194
High	105	107	107	109	112	114	115	117	119	121	122	124	126	128	130	132	134	137	139	141	144	146	149	152	155	158	161	165	168	172	175	179	183	187	191	195	199	203	207	212	216	221

| | | |

2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	48.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	48.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	70796.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	70783.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
247.36	253.05	258.87	264.82	270.91	277.15	283.52	290.04	296.71	303.54	310.52	317.66	324.97	332.44	340.09	347.91	355.91	364.10	372.47	381.04	389.80	398.77	407.94	417.32	426.92	436.74	446.78	457.06	467.57	478.32	489.33	500.58	512.09	523.87	535.92	548.25	560.86	573.76	586.95	600.45	614.26	628.39	642.84	657.63	672.76	688.23	704.06	720.25
258.76	264.12	269.58	275.17	280.93	286.81	293.11	299.54	306.41	313.46	320.66	328.02	335.23	342.60	350.08	357.72	365.54	373.52	381.68	389.95	398.41	407.04	415.87	424.89	434.09	443.49	453.09	462.90	472.92	483.21	493.71	504.44	515.41	526.62	538.10	549.85	561.86	574.13	586.67	599.48	612.58	625.96	639.64	653.62	667.90	682.49	697.40	712.64
302.49	308.75	315.15	321.67	328.41	335.29	342.64	350.16	358.19	366.43	374.85	383.46	391.89	400.50	409.24	418.18	427.31	436.64	446.18	455.85	465.74	475.84	486.15	496.70	507.45	518.44	529.66	541.13	552.85	564.87	577.15	589.70	602.52	615.62	629.04	642.78	656.81	671.16	685.82	700.80	716.11	731.75	747.74	764.08	780.77	797.83	815.26	833.07

1657	1691	1726	1762	1799	1836	1876	1918	1962	2007	2053	2100	2146	2193	2241	2290	2340	2391	2443	2496	2551	2606	2662	2720	2779	2839	2901	2964	3028	3093	3161	3229	3300	3371	3445	3520	3597	3676	3756	3838	3922	4007	4095	4184	4276	4369	4465	4562
2126	2170	2215	2261	2309	2357	2409	2461	2518	2576	2635	2696	2755	2815	2877	2940	3004	3069	3136	3204	3274	3345	3417	3492	3567	3644	3723	3804	3886	3971	4057	4145	4235	4328	4422	4518	4617	4718	4821	4926	5034	5144	5256	5371	5489	5608	5731	5856
2416	2466	2517	2569	2623	2678	2737	2797	2861	2927	2994	3063	3130	3199	3268	3340	3413	3487	3563	3641	3720	3800	3883	3967	4053	4141	4230	4322	4415	4511	4609	4710	4812	4917	5024	5134	5246	5360	5477	5597	5719	5844	5972	6102	6236	6372	6511	6653

27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000
29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000	29000
73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000	73000

104	106	108	111	113	115	118	120	123	126	129	132	135	138	141	144	147	150	153	157	160	164	167	171	174	178	182	186	190	194	198	203	207	212	216	221	226	231	236	241	246	252	257	263	268	274	280	286
198	203	207	211	215	220	225	230	235	240	246	252	257	263	268	274	280	286	293	299	306	312	319	326	333	340	347	355	363	371	379	387	395	404	413	422	431	440	450	460	470	480	491	501	512	523	535	547
225	230	235	240	245	250	255	261	267	273	279	286	292	299	305	312	319	326	333	340	347	355	362	370	378	386	395	403	412	421	430	440	449	459	469	479	490	500	511	522	534	545	557	570	582	595	608	621

| | | |

2100 *year*

0 *Opening_year_mask*

0 *Forecast_year_mask*

0 *Interpolation_mask*

0 *Extrapolation_mask*

0 *Appraisal_period*

0.00 *Opening_year_without_scheme_NOx_emissions_mask*
0.00 *Forecast_year_without_scheme_NOx_emissions_mask*
0.00 *Interpolation_without_scheme_NOx_emissions_mask*
0.00 *Extrapolation_without_scheme_NOx_emissions_mask*
0.00 *Total_without_scheme_NOx_emissions*

0.00 *Opening_year_with_scheme_NOx_emissions_mask*
0.00 *Forecast_year_with_scheme_NOx_emissions_mask*
0.00 *Interpolation_with_scheme_NOx_emissions_mask*
0.00 *Extrapolation_with_scheme_NOx_emissions_mask*
0.00 *Total_with_scheme_NOx_emissions*

0.00 *NOx_emissions_TOTAL_change*

0.0% *Urban_emissions_exceedance*
0.00 *Urban_without_scheme_emissions*
0.00 *Urban_with_scheme_emissions*
0.00 *Urban_difference*

0.0% *National_emissions_exceedance*
0.00 *National_without_scheme_emissions*
0.00 *National_with_scheme_emissions*
0.00 *National_difference*

0.00% *Rail_emissions_exceedance*
0.00 *Rail_without_scheme_emissions*
0.00 *Rail_with_scheme_emissions*
0.00 *Rail_difference*

0.0% *Custom_emissions_exceedance*
0.00 *Custom_without_scheme_emissions*
0.00 *Custom_with_scheme_emissions*
0.00 *Custom_difference*

2100
0.00 *Without_scheme_NOx_emissions_in_exceedance*
0.00 *With_scheme_NOx_emissions_in_exceedance*
0.00 *Change_NOx_emissions_in_exceedance*

2100

0.00 *Without_scheme_NOx_emissions_not_in_exceedance*
0.00 *With_scheme_NOx_emissions_not in_exceedance*
0.00 *Change_NOx_emissions_not_in_exceedance*

0.00 *Opening_year_without_scheme_PM10_concentrations_mask*
0.00 *Forecast_year_without_scheme_PM10_concentrations_mask*
0.00 *Interpolation_without_scheme_PM10_concentrations_mask*
0.00 *Extrapolation_without_scheme_PM10_concentrations_mask*
0.00 *Total_without_scheme_PM10_concentrations*

0.00 *Opening_year_with_scheme_PM10_concentrations_mask*
0.00 *Forecast_year_with_scheme_PM10_concentrations_mask*
0.00 *Interpolation_with_scheme_PM10_concentrations_mask*
0.00 *Extrapolation_with_scheme_PM10_concentrations_mask*
0.00 *Total_with_scheme_PM10_concentrations*

0.00 *Change_in_PM10_net_total_assessment*

2100

736.82 *GDP_deflator*
728.21 *GDP_household*
851.28 *GDP_capita*

4662 *NOx_damage_costs_low*
5984 *NOx_damage_costs_central*
6799 *NOx_damage_costs_high*

27000 *NOx_abatement_costs_low*
29000 *NOx_abatement_costs_central*
73000 *NOx_abatement_costs_high*

293 *PM10_damage_costs_low*
558 *PM10_damage_costs_central*
635 *PM10_damage_costs_high*

0 *NOx_benefits_not_in_exceedance_low*
0 *NOx_benefits_not_in_exceedance_central*
0 *NOx_benefits_not_in_exceedance_high*

0 *NOx_benefits_in_exceedance_low*
0 *NOx_benefits_in_exceedance_central*
0 *NOx_benefits_in_exceedance_high*

0 *PM10_benefits_low*
0 *PM10_benefits_central*
0 *PM10_benefits_high*

0 *Discount_period_1_mask*
0 *Discount_period_2_mask*
1 *Discount_period_3_mask*

2.5% *Discount_rate_profile*
16.14 *Discount_factor*

0 *NOx_benefits_not_in_exceedance_discounted_low*
0 *NOx_benefits_not_in_exceedance_discounted_central*
0 *NOx_benefits_not_in_exceedance_discounted_high*

0 *NOx_benefits_in_exceedance_discounted_low*
0 *NOx_benefits_in_exceedance_discounted_central*
0 *NOx_benefits_in_exceedance_discounted_high*

0 *PM10_benefits_discounted_low*
0 *PM10_benefits_discounted_central*
0 *PM10_benefits_discounted_high*

Air Quality Valuation Workbook - Worksheet 2

Regional Air Quality

Scheme name: Thames Valley Park and Ride **Opening year:** 2017 **Forecast year:** 2032

		Without scheme		With scheme		Change in emissions	
		Opening year	Forecast year	Opening year	Forecast year	Opening year	Forecast year
NOx emissions in tonnes per year	Areas not exceeding limit values	33.12	48.06	33.09	48.02	-0.03	-0.04
	Areas exceeding limit values	10.92	0.00	10.91	0.00	-0.01	0.00

Qualitative comments: In both the opening year and forecast year, the total emissions of NOx in tonnes per year is predicted to reduce as a result of the operation of the scheme. It should be noted that traffic flows were only available for the A4 and A3290 which are the key routes likely to be affected by the scheme. It is likely that the operation of the park and ride scheme will result in reduced passenger car movements on other arterial routes into Readling which were not captured by the modelling. It is therefore likely that the operation of the park and ride scheme will have a greater improvement in total emissions of NOx than is presented by the above figures.

Data sources: Traffic Data supplied by WSP | PB, Total Emissions of NOx calculated using the Defra EfT

Air Quality Valuation Workbook - Worksheet 3

Scheme Name: Thames Valley Park and Ride

Present Value Base Year	2010
Current Year	2015
Proposal Opening year:	2017
Project (Road/Rail or Road and Rail):	road

Overall Assessment Score:

Present value of change in NOx emissions (£):	£2,100
Present value of change in PM10 concentrations (£):	£40,622
Total value of change in air quality (£):	£42,722

*positive value reflects a **net benefit** (i.e. air quality improvement)

Quantitative Assessment:

Net total route assessment (opening year) for PM10 : (between 'with scheme' and 'without scheme' scenarios)	-11
Change in NOX emissions over 60 year appraisal period: (between 'with scheme' and 'without scheme' scenarios)	-2

Qualitative Comments:

The operation of the proposed park and ride scheme has been assessed and is determined to result in a net improvement in air quality in the local area.

Sensitivity Analysis:

Upper estimate net present value of change in air quality (£):	£49,575
Lower estimate net present value of change in air quality (£):	£23,037

Data Sources:

Traffic Data supplied by WSP | PB, Total Emissions of NOx calculated using the Defra EfT spreadsheet version 6.0.2, modelling was completed using the ADMS-Roads version 4.0.1.0