

Edinburgh Airport Rail Link



Badger Report February 2006



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Sections have been removed from this report due to the sensitivity of the information contained and the protection provided to badgers under the Badger Act 1992 and the Nature Conservation (Scotland) Act 2004.

1 INTRODUCTION

1.1 BACKGROUND

The Edinburgh Airport Rail Link (EARL) Bill involves new railway lines or 'chords' (which are short sections of railway that connect main railway lines) leading to a new sub surface (below ground level) station at Edinburgh Airport. The new station and railway lines will connect with the existing railway lines between:

- Edinburgh and Glasgow, at Winchburgh and Roddinglaw;
- Edinburgh and Fife, at Gogar and Dalmeny; and
- Fife and Glasgow (Dalmeny Chord), north of Kirkliston.

The new lines will offer services to Edinburgh Airport from towns and cities throughout Scotland and beyond, including Fife, Aberdeen, Inverness, Dunblane, Stirling, Glasgow, Edinburgh and the south, and the opportunity to change between these services and the proposed tram service at the airport. Overall, between 14 and 15 km of new rail routes and junctions will be provided.

ERM was commissioned by Scott Wilson Halcrow Joint Venture (SWHJV), on behalf of *tie Ltd*, to undertake an Environmental Impact Assessment (EIA) of the proposed EARL route and all associated works in accordance with the EIA Regulations. ERM produced an Environmental Statement (ES) in December 2005 which will be introduced to Parliament with the Bill in March 2006.



Badgers and their setts are protected in the United Kingdom under the *Protection of Badgers Act 1992* and the *Nature Conservation (Scotland) Act 2004* as described in *Section 2*. Where disturbance is unavoidable, a licence is required from Scottish Natural Heritage (SNH) to undertake works that could disturb badgers.

1.2 AIM OF THIS REPORT

This report has been produced to inform SNH of the badger interest in the area of the proposed EARL scheme and to highlight any issues that will need addressing during the detailed design development. The report describes the badger interest in the area of the proposals, reports the impacts that are likely to occur to badgers during the construction and operation of EARL and

provides an indication of the proposed measures that will be undertaken to minimise the impacts to badger to an acceptable minimum.

This report will be developed further as more information becomes available on the badger social groups and the detailed design of the works and the full construction methodology are progressed. The eventual Badger Mitigation Plan will describe in detail the physical layout and construction specifications for badger protection measures, provide detailed method statements for construction work within 30 m of setts and specify long term management for the protection of badgers and their movement.

This report has been prepared for review and discussion with SNH and the Edinburgh and Lothians Badger Group (ELBG) and their comments will be taken into account in developing the mitigation plan. They will also be invited to continue to be involved in its further development.

1.3

STRUCTURE OF THE REPORT

The remainder of this report is structured as follows:

- *Section 2* describes the legislation relating to badgers and development;
- *Section 3* describes the surveys undertaken to date and summarises the badger interest in the area of the proposals;
- *Section 4* reports the predicted impacts on badgers that could occur during the construction and operation of EARL;
- *Section 5* outlines the mitigation measures that will be implemented to minimise disturbance to badgers; and
- *Section 6* provides recommendations for further work to progress the mitigation plan.

2.1 BADGERS AND THE LAW

Badgers are protected in Scotland under the *Protection of Badgers Act 1992* and the *Wildlife and Countryside Act 1981* as amended by the *Nature Conservation (Scotland) Act 2004*. The purpose of the *Protection of Badgers Act 1992* is to protect badgers from incidental effects of lawful activities and deliberate attempts to inflict injury or kill badgers. Under the Act it is illegal to:

- wilfully kill, injure, take, possess or cruelly ill treat a badger or attempt to do so;
- interfere with a badger sett by damaging or destroying it;
- obstruct access to, or any entrance of, a badger sett; and
- disturb a badger when it is occupying a sett.

A badger sett is defined as '*any structure or place which displays signs indicating current use by a badger*'. This can include culverts, pipes and holes under sheds, piles of boulders, old mines and quarries etc. Current use does not relate to '*current occupation*' and for licensing purposes it is defined as '*any sett within an occupied badger territory regardless of when it may have last been used*'. A sett in an occupied territory is classified as '*in current use*' even if it is only used seasonally or occasionally by badgers, and is therefore afforded the same protection in law.

2.2 BADGERS AND DEVELOPMENT AND LICENCE REQUIREMENTS

Under the *Protection of Badgers Act 1992*, any activity causing disturbance of badgers when they are occupying a sett is an offence unless it is undertaken in accordance with the terms of a disturbance licence from SNH.

The Act does not highlight what constitutes disturbance, however, SNH have produced guidelines on the disturbances at which they consider some activities to have upon badgers and active badger setts. Licences issued cover any form of disturbance that would otherwise be prohibited. These disturbances are summarised as:

- all work within 10 m of the nearest sett must be licensed;
- all machinery work should be licensed within 10 and 20 m, however hand digging can be undertaken unless sett tunnels are breached;
- only the largest machinery is required to be licensed between 20 and 30 m; and
- distances greater than 30 m, all possible uses of explosives need to be licensed.

Badger licences for disturbance and interference are not generally issued between the period 1 December to 30 June due to the following:

- badgers are markedly less active during the winter months and actions such as exclusion are unlikely to be effective against disturbance; and
- pregnant and lactating females, and dependant cubs, are likely to be found underground between mid January and the end of June.

Licensed works must be undertaken under the supervision of an appropriately qualified person and follow a detailed mitigation method statement complying with any licence conditions. *Section 5* describes the proposed mitigation measures that will be adopted to reduce the level of disturbance to badgers.

Annex A

Badger Biology

Badgers live in groups and the members of each group jointly defend a territory. Other badgers are more or less excluded from this land, which will encompass sufficient foraging areas to support the group throughout the year. Badgers defecate in pits termed 'dung pits' and aggregations of these pits are called 'latrines'. The largest 'latrines' tend to be found close to setts and along territorial boundaries, with smaller aggregations of 'dung pits' at path intersections and within important feeding areas. Badgers tend routinely to use a network of well-worn paths to access different parts of their territory. The territory may include a number of setts of different sizes and functions:

Main setts

These are in continuous use they are large, well-established, often extensive and may have large spoil heaps outside the entrances. There are likely to be well-worn paths leading to the sett. It is where the cubs are most likely to be born. There is generally only one main sett per social group of badgers. Main setts are usually built in very specific positions, where there is the right combination of soil (to facilitate drainage and ease of digging), aspect, slope and cover. Since suitable sett sites are at a premium, main setts are usually long-established, and may have been in use for decades or even centuries. The average number of holes is 15.

Annexe setts

These occur in close association with the main sett (usually within 150m), and are linked to the main sett by clear well-used paths. Annexe setts consist of six holes on average, but they are not necessarily in use all the time, even if the main sett is very active. If a second litter of cubs are born, this may be where they are reared.

Subsidiary setts

These comprise five holes on average, but are not in continuous use and are usually some distance from the main sett (50m or more). There is no obvious path connecting them to the main sett and their 'ownership' can often only be determined by bait-marking.

Outlying setts

These consist of only one or two holes. They can be found anywhere within the territory and usually have small spoil heaps, indicating that they are not very extensive underground. There are no obvious paths connecting them to other setts, they are only used sporadically and often used by foxes or rabbits when not occupied by badgers.

The size, status and level of activity of each sett can be assessed by counting the number of entrance holes. The degree of use of each entrance hole can be classified as follows:

Well-used holes

These are clear of any debris or vegetation, are obviously in regular use, and may or may not have been excavated recently.

Partially-used holes

These are not in regular use and have debris such as leaves and twigs in the entrance, or have moss and/or other plants growing in or around the entrance. They could be in regular use after a minimal amount of clearance.

Disused holes

These have not been in use for some time, are partially or completely blocked, and could not be used without a considerable amount of clearance. If the hole has been disused for some time, all that may be visible is a depression in the ground where the hole used to be, and the remains of the spoil heap, which may be covered in moss or plants.

In addition to their setts, badgers occasionally lie-up above ground in small depressions lined with dry grass and leaves, usually under a fallen log or dense patch of bramble. These are termed 'day nests', although it is uncommon for badgers to occupy them during the day; the animals more often use them as shelter for short periods during the night. These structures are not usually given the legal protection afforded to setts (see below).

Annex B

Artificial Sett Specification

B1 **SPECIFICATION FOR PROPOSED ARTIFICIAL SETT**

B1.1 **DESIGN**

The artificial sett will be designed to recreate the following critical features of natural badger setts as closely as possible.

B1.1.1 ***Spoil Heaps***

Spoil heaps are the first elements of the new sett the badgers will encounter, and creating spoil heaps of the correct size and shape has been found to be critical in determining whether or not they investigate it at all. Reference will be made to existing spoil heaps from the relevant social group.

B1.1.2 ***Entrance Holes***

The sett will be provided with a sufficient number of entrances to provide adequate choice, taking into account aspect, wind direction and local drainage and allowing for other unknown factors relating to the animals' individual preferences. Entrance holes will be sited at differing heights to enable warm air produced within the sett to vent through the upper holes, drawing cool air in through the lower ones and thus maintaining air-flow within the sett.

B1.1.3 ***Tunnels***

Bends will be installed in the tunnels shortly after the entrances and entrances to the chambers will be staggered to reduce draughts. To mimic natural setts, a number of blind-ending tunnels will be created, some of which will represent workfaces where badgers are extending their setts. Badgers are instinctive diggers and provision will be made for this by directing their digging activities.

B1.1.4 ***Chambers***

Chambers will be constructed in a range of dimensions similar to those found in natural setts and to fulfil requirements for insulation and defence. Natural setts are often found to contain several more or less separate tunnel and chamber systems, connected to the remainder of the sett by only one or two linking tunnels. This may be particularly important when there are young cubs within the sett and allows individuals within the social group to avoid contact with other group members. It is worthwhile, therefore, trying to recreate this feature by constructing separate tunnel and chamber systems. The artificial sett for Social Group 2 will therefore be designed with approximately 15 chambers and three or four entrances laid out to provide two separate tunnel and chamber systems (eg a series of nine and a separate series of six chambers).

B1.2 *OVERALL DIMENSIONS*

Most natural badger setts are substantial structures, providing their occupants with security from disturbance and variations in temperature partly by virtue of their size alone. It will therefore be important to create a structure with an adequate depth of soil above the chambers and tunnel systems and which reflects, as far as it can, the bulk of a natural badger sett.

B1.3 *MATERIALS*

B1.3.1 *Tunnels*

Tunnels will be formed using plastic pipe with an internal diameter of 300 millimetres (mm) and external diameter of 350 mm. This material is light and therefore easy to handle and transport, and it can be cut to the required length using a handsaw. Unperforated pipe will be used to prevent ingress of water into the tunnels.

B1.3.2 *Nesting Chambers*

These will be built to recreate as closely as possible the size and shape of those found in natural setts. The sides will be constructed using treated, well weathered, half-round wooden posts; the roofs using exterior grade plywood; and the floors left as bare earth. The chambers will measure between 450 and 750 mm square (or similar sized rectangles) and 300 to 400 mm high. These materials will create conditions within the chambers not dissimilar from those found in a natural sett, for example, many natural tunnels and chambers are built within the root systems of large trees and hence badgers routinely encounter wood underground. The wood will break down over years and, by that time, if the sett is still occupied, the surrounding soil will have become compacted and the sett remodelled beyond recognition.

B1.3.3 *Entrance Chambers*

These will mimic the widened tunnel junctions that occur relatively close to the entrances of natural setts. They will be constructed in the same manner as the nesting chambers.

B1.4 *CONSTRUCTION*

Once a chamber is excavated to the required depth, the sides will be created using the half-round posts. Each post will be firmly driven into the ground to an equal depth. The tops will then be trimmed to form a level platform for the roof. Bends will be included in the tunnels leading to the exterior of the sett to prevent wind from blowing in or through the sett, and the tunnels leading into the entrance chambers will be staggered for the same reason. Where a T-junction or sharp bend in the tunnel is envisaged, several half-round posts will be used to retain the soil where necessary and to support the tunnels. If required, an off-cut of plywood will be used as a small roof.

As construction proceeds, the level of the soil will gradually be built up around the tunnels and chambers and any gaps or joins plugged with soil or stones to retain loose earth. This may require imported soil to supplement what has been excavated. Soil will also be thrown in to line the base of the tunnels. The roofs, having been cut to the size and shape necessary, will be fitted.

Once the roofs have been fitted, a mechanical digger will be used to bury the sett. The soil used for most of this task need not be high-grade topsoil, but the final layer will be of reasonable quality. The final depth of compacted soil will be at least one metre above each of the chambers and internal tunnels. This will help to insulate the sett during the winter.

Lastly, the spoil heaps will be constructed by hand in as natural manner as possible. It is usually best to construct these with some spoil taken from the spoil heaps of setts used by the relevant social group of badgers (see below).

B1.5

PLANTING

Sett construction will be carried out with minimum loss of existing vegetation and immediately following construction native fruit and nut producing species (including a large proportion of spiny native species) will be planted to allow the badgers to emerge inconspicuously and young cubs to play near the sett entrances without being visible to people or potential predators. The use of spiny species will help deter members of the public from approaching the new sett.

B1.6

MONITORING AND AFTERCARE

Once the artificial sett has been constructed, various methods will be employed to encourage badgers into the new sett. Bait will be provided regularly in the vicinity of the artificial sett to encourage badgers to locate and explore the new sett. At each feeding visit, several handfuls of peanuts will be thrown down the artificial sett entrances along with trails of peanuts laid to link the new sett with the nearest signs of badger activity. In addition, bundles of bedding collected from Social Group 2's main sett will be left near to the entrances of the artificial sett to encourage the badgers to take this material into the new sett. Earth, taken from the spoil heaps of the above main sett, will also be deposited regularly on the spoil heaps outside the artificial sett to maintain the appearance of a sett in regular use. This should encourage the badgers to investigate as both the bedding and spoil from Group 2's main sett would be saturated in badger scent and hence provide a familiar olfactory cue at the artificial sett.

Annex C

Bait Marking

Bait marking techniques rely upon the well-established phenomenon that badgers mark the boundaries of their territories with dung pits (or aggregations of these known as latrines). These are regularly maintained by a large proportion of the badger social group, although most of the marking activity is thought to be undertaken by adult males.

The principle of the technique is that indigestible markers are fed at the badgers' main sett will then be deposited in dung pits throughout their range, including other setts used by that group and at the territory boundaries. An accurate delineation of territory boundaries requires that the study be undertaken at the correct time of year (ideally during spring, but possibly during autumn, see below); that several adjacent groups are included; that baiting continue for an adequate period; that re-surveys are undertaken where necessary; and that the results are interpreted by a person with appropriate expertise (*i.e.* someone who already has expertise in the implementation and assessment of bait marking studies). Badger social organisation is not always straightforward (*e.g.* certain adult males have been recorded as using more than one otherwise separate social group) and this can confuse the bait marking results.

Badgers show considerable seasonal variation in their use of territorial dung pits. It is generally held that there is a peak in marking activity in the spring and a secondary peak in the autumn. The months in which dung pit use (in terms of number of faeces) reaches a maximum in each season are April and September. The secondary (autumn) peak in marking activity is relatively short-lived and bait marking must be undertaken between early September and mid October to take advantage of it. The timing of bait marking around the spring peak is a little less critical; any time from late February to late April should yield useful results. In general, spring bait marking studies generate the best results particularly if the aim is to delineate all territory boundaries accurately and wherever possible this work should be undertaken in the spring.

Bait marking investigations clearly rely on the repeated use of boundary latrines in order to delineate territory boundaries. Where territorial marking behaviour is less intense, the technique will generate less accurate results. In particular, badgers in some urban areas have been shown to be far less territorial. Dung pits in these situations tend to be clustered around setts rather than range boundaries, and range overlap is frequent and can be considerable, as can movements between groups. For these reasons bait marking investigations, which attempt to delineate territory boundaries, are often not appropriate in urban, suburban or urban fringe situations. In addition, it is often not possible to attempt to locate dung pits scattered through large numbers of private gardens. Badgers living at particularly low densities or populations that have been artificially reduced in size may also show variations in territorial behaviour and, once again, bait marking investigations may be inappropriate or may require extended baiting periods or repetitions.