

BIODIVERSITY MONITORING STRATEGY

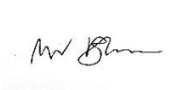
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Castlefield Viaduct Urban Park
Castlefield,
Manchester

**U R B A N
G R E E N**



QUALITY MANAGEMENT

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1 Introduction

1.1 Background to the Scheme

The National Trust are proposing to develop land at Castlefield Viaduct in Castlefield, Manchester (hereafter referred to as ‘the site’). The proposals include the construction of an urban park that is open to the public. Urban Green have been appointed to develop a Biodiversity Monitoring Strategy for this site.

The author of the report is Mark Blacker, MSc, ACIEEM, Senior Ecologist at Urban Green. Mark has experience providing ecological consulting services for a range of development schemes across the UK, including residential, commercial, and large infrastructure schemes.

1.2 Site Context

The site is located at National Grid Reference SJ 83013 97624 and comprises a total area of approximately 0.59ha (see Figure 1).

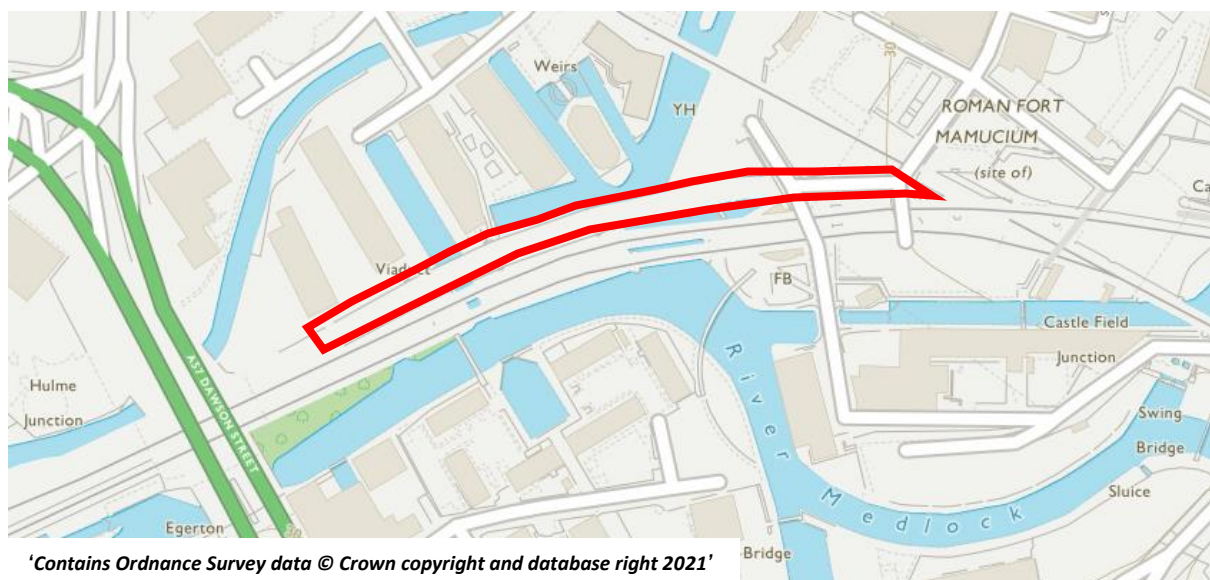


Figure 1 – Site Extent

The site is located in a densely urban area of Manchester city centre, adjacent to an active tram line. The site is also located above the Bridgewater canal and approximately 260m east of the River Irwell. Buildings surrounding the site are mostly commercial offices to the north and high-density residential apartments to the south. Due to the site's location close to the city centre, there is a high level of disturbance present from main roads such as the A635 (M) present approximately 75m west of the site.

1.3 Purpose of this Report

Phase 1 of the development only includes development of the eastern section of the viaduct. This provides the opportunity to compare biodiversity between the developed eastern section and the undeveloped western section of the viaduct; therefore monitoring will be carried out across the whole viaduct site.

This report has been produced to set out the methods for a robust biodiversity monitoring strategy, including methods for analysis and reporting of results, for the Castlefield Viaduct.

This report has been produced to discharge Condition 15 of the application reference 131621/FO/2021 which states:

“No development shall take place, until a biodiversity monitoring strategy has been submitted to and approved in writing by the City Council as local planning authority. The purpose of the strategy shall be to monitor bat foraging activity across the site. The content of the strategy shall include the following:

- a) Aims and objectives of monitoring to match the stated purpose;*
- b) Identification of adequate baseline conditions prior to the start of development;*
- c) Appropriate success criteria, thresholds, triggers, and targets against which the effectiveness of the various conservation measures being monitored can be judged;*
- d) Methods for data gathering and analysis;*
- e) Location of monitoring;*
- f) Timing and duration of the monitoring*
- g) Responsible persons and lines of communication;*
- h) Review and, where appropriate, publication of results and outcomes.*

A report describing the results of monitoring shall be submitted to the City Council as local planning authority at intervals identified within the strategy. The report shall set out (where results from monitoring show that conservation aims and objectives are not being met) what contingencies and/or remedial action shall be taken so that the development still delivers the fully functioning biodiversity objectives of the originally approved scheme and shall be agreed in writing by the City Council as local planning authority.

The monitoring strategy shall be implemented in accordance with the approved details.

1.4 Monitoring Objectives

In order to achieve the aims of this monitoring strategy appropriate data will be gathered to meet the following objectives:

1. Identify and assess changes in activity levels of bats at defined ‘listening points’ across the scheme.
2. Identify and assess changes in activity levels of bats within habitats created, maintained and / or enhanced in relation to this scheme;
3. Identify and assess changes in activity levels of bats within the known roosts located at the base of the Viaduct;

This monitoring strategy provides an excellent opportunity to monitor all aspects of urban biodiversity that may be present on or utilise the Castlefield Viaduct. Therefore, this monitoring strategy will contain recommendations on methods for monitoring plants, invertebrates, birds, and other urban mammals. Therefore, data will also be gathered to meet the additional following objectives:

4. Identify plant species distribution, diversity, and abundance within the retained habitat areas of Phase 1 and Phase 2 and assess changes throughout the year;

5. Identify invertebrate species present on site and assess changes in distribution, diversity, and abundance throughout the year;
6. Identify bird species present on site and assess changes in distribution, diversity, and abundance throughout the year;
7. Identify other urban mammal species that utilise the site and assess changes in distribution, diversity, and abundance throughout the year.

It should be noted that this monitoring strategy is designed to evaluate the effectiveness of ecological mitigation measures and does not attempt to provide sufficient data to reach conclusions on populations trends for the local area.

1.5 Baseline

In order to achieve the aims and objectives of the monitoring strategy, bat activity transect surveys, automated static detector surveys, and dusk emergence surveys were undertaken in 2021 to establish an ecological baseline for this site. The results of these baseline surveys have been reported within the Bat Survey Report produced for this scheme (Urban Green, 2021b) and will form the baseline against which the results of future monitoring surveys will be compared to.

The Preliminary Ecological Appraisal (PEA; Urban Green, 2021a) produced for this site contains information on the botanical species present on site at the time of survey. This data will be used as a baseline for what is known to be present on site at that time of year and will provide a comparison for how the flora present on the viaduct changes throughout the year.

No baseline data currently exists relating to invertebrate, bird, and other urban mammal species that use the site. Therefore, the data collected during the operational phase of this project will form the baseline for these species' groups.

1.6 Success Criteria

Currently, baseline data to compare monitoring results to is only available for bat activity, bat roosts, and plant species distribution and abundance. Therefore, it is only possible to provide success criteria for these aspects of the monitoring strategy.

1. No decrease in levels of bat activity recorded at listening points within the developed section of the Viaduct.
2. No decrease in levels of bat species diversity recorded within the developed section of the Viaduct.
3. No decrease in number of bats recorded using the identified roost.
4. No decrease in number of plant species recorded on site within the retained sections of the Viaduct habitat.

1.7 Reporting results

The Castlefield Viaduct is proposed to be open to the public from June 2022 until July 2023.

For the majority of the species group identified for monitoring, survey can be conducted throughout this operational period, except for bat activity and bat emergence surveys which are seasonally constrained.

It is therefore proposed that a monitoring report is produced after six months of the site being operational i.e. in December 2022, using data gathered up until November 2022, which will include pre-construction data where applicable.

A further report will then be produced in July 2022 comprising all data collected during the pre-construction and operational phases of the site.

2 Plants

2.1 Habitats on site

The viaduct has a long history of industrial use; however, it has been disused since the 1960's. Therefore, plant species on site must be tolerant of the poor-quality soil present and also able to tolerate any pollutants that are present from the urban environment.

During the PEA (Urban Green, 2021a) that was conducted on site in 2021, the following habitats were identified as being present on site:

- Bare ground
- Scattered scrub
- Ephemeral/short perennial vegetation
- Semi-improved neutral grassland
- Broadleaved tree

The viaduct itself mostly consisted of a mix of bare ground, with scattered scrub, and ephemeral/short perennial vegetation present. A small area of semi-improved neutral grassland was present at the western end and a single multi-stemmed goat willow (*Salix caprea*) was present at the eastern end.

The majority of the habitats on site will be retained within the development, with some habitat loss anticipated to allow for areas of horticultural planting to be installed.

The habitats identified and described within the PEA (Urban Green, 2021a) will form the baseline, with the information regarding species diversity and abundance recorded during the initial site survey used as a comparison for further monitoring surveys.

2.2 Monitoring Strategy

To understand the success of plant species included within the horticultural planting, as well as monitor the species that are already present within the site, the viaduct should be subject to monthly surveys to record plants that are present on site in the natural habitat sections, as well as to monitor what plants are flowering within the installed horticultural sections. Due to the range of species that are likely to be planted on site and therefore the extended flowering seasons, these surveys should be conducted every month from the installation of the horticultural planting.

This information can be supplemented with data collected by visitors or staff to show which species are flowering, and additionally which species have successfully produced seeds/fruit. This will be limited to the developed section of the viaduct and will inform planting decisions for further works.

Monitoring of the undeveloped sections of the viaduct should also be conducted monthly, with a species list and relative abundance recorded each time, to monitor the level of colonisation of the site since previous surveys and to also understand what plant species are naturally succeeding within this habitat.

Non-native invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were identified on site during the initial site survey, namely rockspray cotoneaster (*Cotoneaster horizontalis*). Surveyors carrying out the monitoring of this site should be aware of how to identify this

species and other species listed on Schedule 9. If any of these species are identified on site they should be immediately reported to the site staff and the National Trust project lead.

3 Invertebrates

3.1 Habitats on site

The habitats identified on site and listed in Section 2, although of low ecological quality, are likely to be relatively scarce within the surrounding urban environment. Therefore, the flowering plants found on site are likely to provide an important resource for the local invertebrate population.

The development will lead to increased areas of planting on site, involve a range of species which are both native and non-native and therefore are likely to be of high value to invertebrates.

Brownfield sites are known to be of high value to invertebrate populations, and the location of the Castlefield viaduct within a dense urban environment will increase its value.

Invertebrates are a diverse group of organisms which occupy many habitats. For ease of survey, it is considered appropriate that the monitoring effort will focus on two groups that are well known and often easily visible, butterflies and moths.

3.2 Monitoring Strategy

3.2.1 Butterflies

To monitor for butterflies, a walk of the site, including both the developed and undeveloped sections of the viaduct should be undertaken, following guidance set out by the UK Butterfly Monitoring Survey (UKBMS). Surveys should be carried out once per week, starting at the beginning of April and continuing until the end of September. The survey should cover the entire viaduct and therefore enable the surveyor to observe all habitats present.

The survey should be undertaken in weather that is suitable for butterflies i.e. warm (13°C or above and sunny), windspeed no greater than 5 (Beaufort Scale) and not raining. The surveyor should walk the same pre-determined route at a standard pace and record any species of butterfly that are observed, including any important behaviours i.e. feeding, or in a pair, as well as the location of the sighting. The same route as to be used within the bat activity transect surveys

If butterflies are recorded on a particular plant on site then the species of plant should be identified and recorded. These results should then be collated and used to analyse the areas of the site that are used most by butterflies and which plant species on site are of greatest value to this group.

3.2.2 Moths

Monitoring for moth species that use this site should be undertaken at the same frequency that butterfly monitoring is carried out. However, a different methodology is to be employed and takes place at night. A moth trap is set up and left running for approximately 3 hours after sunset, after which the species that have been attracted to the trap are identified and removed.

Strong weather conditions should be avoided for trapping i.e. nights with heavy rain or wind predicted, however light rain can be beneficial to trapping. Moth trapping should be carried out at the same frequency as butterfly transect described in Section 3.2.1 are conducted to provide equivalent data.

These surveys should also be conducted over the same time period as butterfly transect surveys i.e. April – September.

4 Birds

4.1 Nesting on site

The site provides limited opportunities for nesting birds due to the lack of dense stands of vegetation present and the exposed nature of the site. It was assessed to provide limited potential to support ground nesting birds, such as a black redstart (*Phoenicurus ochruros*), which is listed on the Greater Manchester Biodiversity Action Plan.

The development will introduce additional planting and a wider range of habitats into the site than are currently present, as well as enhancing the level of nesting provision available through the installation of bird nesting boxes on the structure to be included within the western extent of the site.

4.1.1 Monitoring Strategy

There is currently limited nesting habitat on site, therefore it is recommended that the nest boxes to be installed on site are regularly checked for activity by the use of cameras so that disturbance to the box itself is limited. The nesting bird season lasts from March – September (inclusive). It was also noted that the viaduct structure itself provided some suitable habitat for nesting birds, with feral pigeons (*Columba livia domestica*) seen on the structure.

The usage of the viaduct for nesting should also be monitored, with checks of the overhead structure to be undertaken on a weekly basis and to include both the developed and undeveloped sections of the viaduct. Any additional nests discovered can then be subject to further monitoring to measure success of the brood. If a nest is discovered within the developed section of the viaduct, then a suitable buffer may need to be set up around the nest to avoid disturbing it until the chicks have fledged.

4.2 Foraging on site

During the PEA conducted on site in April 2021, limited bird species were observed to be present, limited to feral pigeon and wren (*Troglodytes troglodytes*). However limited suitable habitat for foraging and shelter was present on site. The addition of horticultural planting on site will increase the number of species present within the site boundaries and will provide an increased level of habitat diversity which could make the site more desirable to passing birds.

4.2.1 Monitoring Strategy

Level of bird activity on site will vary throughout the year. It is therefore recommended that monthly surveys of the developed and undeveloped sections of the viaduct are conducted to assess any changes in distribution of bird activity across the site. The surveys should be undertaken for approximately one hour and involve recording the species that are seen on the viaduct and any notable behaviours i.e., carrying nesting material, or in a pair. These surveys should commence in March and continue until August, following guidance within the Breeding Bird Survey methodology produced by the British Trust for Ornithology.

The survey effort outlined here can also be supplemented by visitors to the Viaduct recording any species seen on site and a record made of all species seen each month.

5 Mammals

5.1 Bats

Bat surveys conducted at the site in 2021 identified two bat roosts within the supporting structure of the Castlefield Viaduct. These roosts were located close to the base of this structure and are therefore not anticipated to be impacted by the proposed development. The roosts were found to support low numbers of common pipistrelle (*Pipistrellus pipistrellus*).

The viaduct itself was subject to bat activity surveys and identified as providing value to the local bat populations as a regular commuting and foraging route within the urban environment, enhanced by its proximity to the canal. Bat species identified using the viaduct structure were majority common pipistrelle, with low numbers of noctule (*Nyctalus noctula*) and an unidentified *Myotis* species also recorded.

The information collected during surveys carried out on the site in 2021 will provide a baseline for which the results of further monitoring surveys will be compared against. These baseline conditions are reported within the Bat Survey Report produced for this site (Urban Green, 2021b).

5.1.1 Monitoring Strategy

It is proposed that emergence and re-entry surveys are carried out at the confirmed roosts in the viaduct supporting structure to monitor the level of usage post development. These will be carried out three times over the course of the summer, following guidance within Collins (2016).

Dusk emergence surveys should start approximately 15 minutes prior to sunset and continue for at least 1.5 hours after sunset; dawn emergence surveys should start 1.5 hours prior to sunrise and continue for approximately 15 minutes after sunrise. It is recommended that at least two surveys are conducted between May and August. The number of bats recorded using the roost (either being recorded emerging or returning to the roost) will then be compared to the 2021 baseline surveys.

To understand the level of bat activity using the site and any changes that have occurred post-development, bat activity transects should be carried out once per month on site, including both the developed and the undeveloped section of the viaduct. One transect route was determined to be appropriate for this development and the route used is provided within the Bat Survey Report for this scheme (Urban Green, 2021b).

The transect will be surveyed by a pair of surveyors and will be completed once per month from April through to October. Surveys will be carried out using heterodyne bat detectors and all transect surveys will be undertaken during suitable weather conditions including having sunset temperatures of 10°C or above, no rain or strong wind in accordance with Collins (2016). Weather conditions will be recorded at the start and end of each survey, and if conditions deteriorate significantly during the survey, it will be abandoned and repeated on a suitable night. Listening points were established along the length of the transect route and surveyors will record bat activity for five minutes at each location. The level of bat activity recorded at listening point can be compared with the level established during the 2021 baseline to assess changes.

Automated static detectors will be deployed in two locations within the viaduct, one in the undeveloped western section and one in the developed eastern section. Each detector will be deployed for approximately one week and five nights of data will be selected per deployment period for each static detector for analysis. Static detectors will be deployed once per month from April through to October.

This data will then be compared to data collected during the 2021 baseline to assess any changes to the level of bat activity as a result of the scheme.

5.2 Urban mammals

The site is within a dense, urban environment that is busy and well-lit throughout most of the night. The site, by contrast, offers a dark corridor which could provide shelter and a foraging resource for many urban mammal species such as grey squirrel (*Sciurus carolinensis*) or hedgehog (*Erinaceus europaeus*). The current level of usage of this site by other urban mammal species is currently unknown, however there is potential for them to be present.

5.2.1 Monitoring Strategy

To monitor the usage of the site by urban mammals, it is proposed that motion activated cameras are to be installed on site. One to be installed close to the entrance within the developed section of the viaduct, whilst one should be installed close to the far eastern extent of the viaduct. These cameras should be installed on a semi-permanent basis and be checked weekly throughout the construction and operational stages of the development.

6 Summary

6.1 Monitoring Strategies

This report has laid out the proposed monitoring strategies for each species / species group that is anticipated to be within the Castlefield area. A summary of these monitoring strategies is laid out in Table 1.

Data collected relating to each species group should be saved in duplicate by both Urban Green and the National Trust to ensure transparency and act as a backup. The point of contact at Urban Green regarding the monitoring surveys will be Mark Blacker, with the main point of contact from the National Trust being Sophie Wardell.

Once data for each species group has been collected, it is proposed that a report detailing the findings is compiled by Urban Green and submitted to the City Council for review. This report will be completed

All data collected will also be submitted to the Greater Manchester Ecology Unit for inclusion within their records as this area of Manchester represents an under recorded part of the city centre.

Monitoring Group	Specific group	Monitoring Method	Frequency	Timing	Responsible Group
Plants	Horticulture	Walkover survey	1x monthly	June 2022 – June 2023	National Trust
	Pre-existing habitat	Walkover survey	1x monthly	March 2022 – June 2023	Urban Green
Invertebrates	Butterflies	Transect	1x weekly	April 2022 – September 2022	National Trust / Urban Green
	Moths	Moth trapping	1x weekly	April 2022 – September 2022	National Trust / Urban Green
Birds	Nesting birds	Camera trap deployment	1x weekly	Continual monitoring of cameras. Weekly inspections of viaduct structure and retained habitat for nests from March – September	National Trust
	Foraging/Passing Birds	Vantage point surveys	1x weekly	Vantage point surveys of bird using the site to be conducted monthly from March - September	National Trust / Urban Green
Mammals	Bats	Activity transects Static detector deployment	1x monthly	Activity transects and automated static detectors to be deployed April - October	Urban Green
	Urban Mammals	Camera trap deployment	1x weekly	Deployed at the start of operation and monitored	National Trust

7 References

Breeding Bird Survey (2018) Breeding Bird Survey Instructions. BTO, JNCC, RSPB.

Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust, London.

Fry, R. & Waring, P. (2021) A Guide to Moth Traps and Their Use. The Amateur Entomologist. Volume 24.

UK Butterfly Monitoring Scheme (2021) Field Guidance Notes for Butterfly Transects. Butterfly Conservation, Centre for Ecology & Hydrology, BTO, JNCC.

Urban Green (2021a) Preliminary Ecological Appraisal of Castlefield Viaduct. Ref: UG_922_ECO_PEA_01

Urban Green (2021b) Bat Survey Report for Castlefield Viaduct. Ref: UG_922_ECO_BSR_01