# ECOLOGICAL MONITORING AND SUPERVISION REPORT

# LONGITUDE OUTDOOR CONCERT 2019

# MARLAY PARK, RATHFARNHAM, CO. DUBLIN.

Produced for Dún Laoghaire-Rathdown County Council

| Project No. | Draft | Status | Author | Reviewed By | Approved By | Issue Date |
|---|---|---|---|---|---|---|
| 190087 | I01 | Final | LS | CC | AS | 26.06.20 |

Scott Cawley, College House, 71-73 Rock Road, Blackrock, Co. Dublin, A94 F9X9

Tel+353(1)676-9815 Fax +353(1) 676-9816

**TABLE OF CONTENTS**

# 1. INTRODUCTION AND SCOPE

## 1.1. OVERVIEW

Scott Cawley Ltd. were commissioned by Dún Laoghaire-Rathdown County Council to undertake ecological monitoring and supervision services within Marlay Park (see Figure 1) to facilitate the protection of ecological features during concerts at Marlay Park in 2019.

The ecological monitoring and supervision services were undertaken to comply with recommendations made in 2018 and included within *Ecological Monitoring and Supervision Report Marlay Park Concerts 2018* (Scott Cawley, 2018). The services were also undertaken to ensure compliance with legislation protecting wildlife and minimise any potential impacts arising from the event.

## 1.2. SCOPE

The scope of the monitoring and supervision services in 2019 comprised the following:

1. Undertaking breeding bird checks at the Main Lake prior to the installation of pontoons crossing the lake;
2. Ongoing monitoring of nesting birds within the Main Lake before, during and after the concerts;
3. Supervision of the installation and removal of pontoons crossing the Main Lake;
4. Inspection of flood lighting orientation, and organisation of re-orientation where necessary;
5. Monitoring of bat activity before, during and after concerts by undertaking manual transect surveys; and,
6. Checks of potential mammal resting places (badger setts and/or otter holts) for signs of activity and provision of recommendations to avoid any potential disturbance.

***Figure 1: Event boundary in the context of Marlay Park and its surroundings.***

## 2. BACKGROUND

Scott Cawley Ltd. ecologists have monitored the event area of previous summer concerts within Marlay Park in 2015, 2016, 2017 and 2018. Monitoring occurred prior to concert set-up, during concert set-up, during the concerts, during decommissioning, and post decommission to ensure all environmental measures relevant to the ecological features were delivered.

Specifically, the following services have been carried out by Scott Cawley Ltd. since 2015:

- Carried out baseline surveys over four years (2015 to 2018 inclusive) to establish the key ecological receptors of Marlay Park;
- Held meetings with the event organisers prior to the concerts to provide input to the design of the events to avoid significant impacts on the key ecological receptors;
- Advised site staff of existing / new constraints each year;
- Provided recommendations in relation to protecting the key ecological receptors (which have been implemented by Dún Laoghaire-Rathdown County Council and the event organisers);
- Provided monitoring of the key ecological receptors pre- and post-events on an ongoing basis;
- Carried out assessments of impact of the events on the key ecological receptors.
- Consulted with NPWS in relation to the assessments and monitoring.
- Liaised with Dún Laoghaire – Rathdown County Council staff including Marlay Park staff.

The following recommendations with regards to event management, supervision and monitoring were made after the completion of monitoring surveys of Marlay Park Concerts in 2018 (Scott Cawley, 2018):

- Any further expansion of the events will be in open grassed areas rather than woodland to minimise the need to fell trees or erect safety lighting close to previously undisturbed areas;
- Where an event requires lighting, an ecologist will be consulted for recommendations on suitability of lighting schemes at the pre-licencing stage. During the event set-up, an ecologist will be on-site to inspect lighting orientation and liaise with organisers to re-orient luminaries if required. Timing of lighting will be a consideration, and it is recommended that lighting be switched off outside of event hours. These measures are proposed in order to minimise potential impacts of lighting on bats within the park;
- While there does not appear to be any adverse significant effects on bat activity during concerts, there may be some benefit to continuing manual surveys along the East Woods, West Woods and Car Parks transects to gain long-term data on bat activity within the park;
- Breeding bird checks will be undertaken at least twice in advance of the set-up of any future events;
- The location of bird's nests within the Main Lake will inform the design and location of pontoons within the lake;
- Monitoring of breeding birds will be undertaken over the course of any future events;

- Consideration will be given to trimming back overhanging trees and removing aquatic plants near the pontoons to reduce the risk of waterfowl establishing nests in proximity to the pontoons;
- Opaque screening material will be erected along the sides of each of the pontoon fencing to prevent concert goers being seen from the lake.
- Checks and video monitoring of holes in riverbanks adjacent to works areas will be undertaken in the months prior to the commencement of events. It is recommended that these checks be undertaken at least one month in advance of any event to allow enough time to monitor for otter or badger activity; and
- No works will be permitted within 50m of the resting place of a mammal protected under the *Wildlife Acts (as amended)* and/or the *Birds and Habitats Regulations (2011)*.

## 3. MONITORING OF LOCAL BAT POPULATIONS

Bats, and their breeding and resting places, are protected under the Wildlife Acts. All bat species are also listed on Annex IV of the EU Habitats Directive (with the Lesser horseshoe bat also listed on Annex II) and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011.

### 3.1. SURVEYS OF POTENTIAL ROOST SITES

During the 2015, 2016 and 2017 survey seasons, internal inspections and roost presence/absence surveys were undertaken on several buildings within the vicinity of the concert events, including Marlay House, Laurelmere Cottage, and the Coffee Shop at the entrance to the Regency gardens. No evidence of roosting bats was identified during these surveys.

During the 2018 survey season, pre-dawn roost presence/absence surveys were undertaken on Marlay House as well as on other buildings within the park, namely Marley Grove House, Smith's Lodge, Stud Lodge and the Council Depot, and two stone bridges east and south of the Main Lake. High levels of activity of Daubenton's bat *Myotis daubentonii* was noted at the stone arch bridge at the south-eastern corner of the Main Lake in June 2018. While bats were not observed returning to the bridge on this occasion, the high levels of activity close to sunrise indicated that the bridge may be used as a roost by this species. This bridge was outside the footfall of concerts and was not illuminated by artificial lighting for the duration of the events. No evidence of roosting bats was noted at any other structures or buildings within the Park in the 2018 season.

The stone arch bridge at the south-eastern corner of the Main Lake, which was identified as a potential roost structure in 2018, was outside of the footfall of the 2019 concerts and was not illuminated by artificial lighting during the concert. Due to the absence of any evidence of roosting bats within any other structures or buildings during the previous four survey seasons (2015-2018), it was not deemed necessary to re-survey the buildings/structures within Marlay Park in 2019.

### 3.2. LIGHTING CHECKS

Bats are sensitive to increased illumination (Bat Conservation Ireland, 2010) and may avoid foraging in areas of strong lighting or may react adversely to lighting near roosts. In accordance with recommendations, an ecologist undertook inspections of lighting arrangements for the event in order to ensure minimisation of light pollution in potential foraging habitats (*i.e.* in woodlands and close to watercourses).

Lighting inspections were undertaken during set-up on 3rd July 2019. The directionality of the lighting on, and adjacent to, the pontoon was positioned to ensure minimal light spill over the Main Lake. It was noted that light spill over the Main Lake had been even further reduced in 2019 in comparison to previous years.

Foraging activity of Daubenton's bats was monitored on the Main Lake prior to the lighting set up (during the bat activity transects on 25th and 26th June 2019) and immediately following the installation of the lighting at the pontoon (on 3rd July 2019). The results showed no perceptible change in the foraging behaviour of the Daubenton's bats on the Main Lake, with bats still flying within 2m of the pontoon when all lighting was on. It was not deemed necessary to monitor the Daubenton's bats using infra-red cameras (as in the case of previous years) as the results of the manual surveys showed that the lighting setup for the 2019 concerts was not adversely impacting their behaviour.

### 3.3. MANUAL TRANSECT SURVEYS

As per previous years of ecological monitoring, manual transects of bat activity were undertaken within Marlay Park before, during, and after concerts to determine if bats are active within the same areas as previous years, and to determine if the event is resulting in displacement of bats during concert nights.

Manual transect surveys were undertaken along two routes within the park. The routes were identical to those undertaken in 2016, 2017 and 2018, and are illustrated in Figure 2: Pre-event bat manual transect survey results – 26th June 2019

- Figure 10. along with point data for surveys. The routes comprise the following:

1. Eastern Route:
    - East Woods – A 1km route beginning at the "Duck Pond" adjacent to the Grange Road car park in the north of the park, moving southwards past the Lower Lake, and skirting the Main Lake before ending in woods just west of the dog park in the southern part of the park.
2. Western Route:
    - West Woods – An 800m route beginning just south of Marlay House, passing through woods past Laurelmere and the Main Lake, before ending just south of the Main Lake; and,
    - Car Parks – A 700m route beginning south of the entrance to the model train track, passing west to the western boundary of the park, skirting this boundary and that of the current playground before ending north of the entrance from the College Road.

Surveys commenced 30 minutes after sunset and were walked at a slow and steady pace (less than 3km/hour). The transects were undertaken by Lauren Shinkwin, Shea O'Driscoll, Aoife O'Rourke and

Niall McHugh, all of Scott Cawley Ltd. Surveyors used Elekon Batlogger M detectors, which record bat calls in addition to GPS information and temperature data. Surveyors recorded qualitative data along the transect routes, including observations of bat activity. Surveys were carried out in optimum weather conditions for bat activity surveys i.e. dry, mild (above 10°C), and minimal wind.

Surveys were undertaken on the following dates:

- Pre-event: 26th and 27th June 2019
- During the event: 5th, 6th and 7th July 2019
- Post-event: 17th and 18th July 2019
- Post-event: 28th and 29th August 2019

The results for each transect have been summarised below in **Error! Reference source not found.**.[1]

***Table 1: Results of manual transects in Marlay Park 2019.***

| Location | Pre-Event | | Event | | | Post-event | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **26th June** | **27th June** | **5th July** | **6th July** | **7th July** | **17th July** | **18th July** | **28th August** | **29th August** |
| **Eastern Route** | 5 species<br>20 passes | 4 species<br>12 passes | 4 species<br>38 passes | 3 species<br>32 passes | 4 species<br>10 passes | 4 species<br>60 passes | 4 species<br>19 passes | 4 species<br>30 passes | 4 species<br>14 passes |
| **West Route** | 4 species<br>31 passes | 4 species<br>32 passes | 3 species<br>6 passes | 3 species<br>7 passes | 1 species<br>11 passes | 5 species<br>39 passes | 3 species<br>38 passes | 5 species<br>22 passes | 6 species<br>30 passes |

Transect results have been organised by timing and illustrated in Figure 2: Pre-event bat manual transect survey results – 26th June 2019

- Figure 10. Results are described in detail as follows:

1. Pre-event nights
    - Eastern Route (East Woods)
        - 26th June 2019: A minimum of five species[2] were recorded, with a total of 20 passes. Daubenton's bat *Myotis daubentonii* was the most frequently encountered species and accounted for eight bat passes. Activity of the species was concentrated at the eastern end of the Main Lake where they were observed foraging over the lake. Common pipistrelle *Pipistrellus pipistrellus* was the second most frequently encountered bat species and accounted for seven passes. Of these passes, one with accurate GPS coordinates was located in the East Woods. Three passes of soprano pipistrelle *Pipistrellus pygmaeus* were recorded, of these passes, one with accurate GPS coordinates was located in the eastern end of the Main Lake. One bat pass was attributed to the genus *Pipistrellus*. Whilst this call could not be identified to species level, it is highly likely to be common pipistrelle calls as they were recorded within seconds of the other common pipistrelle calls in the East Woods. One bat pass was

[1] A bat pass is defined as one recording of a bat echolocation call.

[2] Natterer's bat *Myotis nattereri* and whiskered bat *Myotis mystacinus* are difficult to distinguish to species level based on call analysis and are therefore grouped together as 'bat species of the genus *Myotis*'.

attributed to species of the genus *Myotis* (unidentified to species level), which was located at the Main Lake.

- 27th June 2019: A minimum of four species[3] were recorded with a total of 12 passes. Six of the passes were attributed to common pipistrelle. Four bat passes were attributed to species of the genus *Myotis* (unidentified to species level), which were located by the Lower Lake. One pass was attributed to soprano pipistrelle, and one pass to the genus *Pipistrellus.* Whilst this call could not be identified to species level, it is highly likely to be common pipistrelle calls as they were recorded within seconds of the other common pipistrelle calls. Only accurate GPS points were for three of the Myotis species records.

- Western Route (West Woods and Car Parks)
  - 26th June 2019:
  - A minimum of four species[4] were recorded with a total of 31 passes. 24 of the passes were attributed to soprano pipistrelle, which were concentrated at the West Woods, the western end of the Main Lake and south of the Car Parks. Five passes were attributed to common pipistrelle, which were located south of the Car Parks and the eastern end of the Main Lake. One pass was attributed to Leisler's bat *Nyctalus leisleri*, which was located in the West Woods. One pass was attributed to the genus *Pipistrellus.* Whilst this call could not be identified to species level, it is highly likely to be common pipistrelle calls as it was recorded within seconds of the other common pipistrelle calls by the College Road car park.
  - 27th June 2019: A minimum of four species were recorded, with a total of 32 passes. Soprano pipistrelle was the most frequently encountered species, accounting for 16 passes. Activity of this species was concentrated in the West Woods, to the west of the Main Lake and south of the Car Parks. Common pipistrelle accounted for 10 passes with activity most frequently recorded along the southern end of the Car Park transect (along the entrance road). Five bat passes were attributed to Daubenton's bat, those with accurate GPS coordinates were recorded along the Main Lake. One bat pass was attributed to species of the genus *Myotis* (unidentified to species level), which was recorded at the western end of the Main Lake.

2. Nights of the event
   - Eastern Route (East Woods)
     - 5th July 2019: A minimum of four species were recorded with a total of 38 passes. Soprano pipistrelle was the most frequently recorded species with 14 passes. Soprano pipistrelle activity was recorded at the Duck Pond by the Grange Road car park as well

[3] In some instances, it is not possible to distinguish between a soprano pipistrelle *Pipistrellus pygmaeus* call and a common pipistrelle *Pipistrellus pipistrellus* call i.e. when the call is on the frequency threshold between the two species (50kHz). In these instances, the call is described as being of the genus *Pipistrellus.*

[4] In some instances, it is not possible to distinguish between a soprano pipistrelle *Pipistrellus pygmaeus* call and a common pipistrelle *Pipistrellus pipistrellus* call i.e. when the call is on the frequency threshold between the two species (50kHz). In these instances, the call is described as being of the genus *Pipistrellus.*

as along the Lower Lake and the eastern side of the Main Lake. 10 passes were attributed to common pipistrelle, which were recorded at the eastern side of the Main Lake and at the Duck Pond by the Grand Road car park. Eight passes were attributed to Leisler's bat *Nyctalus leisleri*, which were located at the eastern end of the Main Lake and at the Duck Pond by the Grange Road. Six bat passes were attributed to species of the genus *Myotis* (unidentified to species level), which were recorded at the eastern end of the Main Lake.

- 6th July 2019: A minimum of three species were recorded with a total of 32 passes. 19 of the passes were attributed to soprano pipistrelle, the majority of which were concentrated along the eastern side of the Main Lake, with two passes noted at the southern end of the East Woods. Eight bat passes were attributed to the genus *Myotis* (unidentified to species level), which were located within the East Woods along the eastern side of the Lower Lake. Five passes were attributed to Leisler's bat, which were located at the eastern side of the Main Lake and the southern end of the East Woods.
- 7th July 2019: A minimum of four species were recorded with a total of 10 passes. Four of these passes were attributed to soprano pipistrelle, which were located at the eastern end of the Main Lake. Three passes were attributed to Leisler's bat, which were located at the eastern end of the Main Lake and by the Duck Pond by the Grange Road. Two passes were attributed to species of the genus *Myotis* (unidentified to species level). Both of these passes were recorded along the eastern end of the Main Lake. One pass was attributed to common pipistrelle, which was located along the south-eastern end of the Lower Lake.

- Western Route (West Woods and Car Parks)
  - 5th July 2019: Three species were recorded with a total of six passes. Two passes were attributed to soprano pipistrelle, two passes were attributed to Leisler's bat and two passes were attributed to Daubenton's bat. The activity of soprano pipistrelles and Daubenton's bats were located along the south-eastern and eastern end of the Main Lake, whereas Leisler's bats were located in the West Woods.
  - 6th July 2019: Three species were recorded with a total of seven passes. Soprano pipistrelle was the most frequently recorded species with three passes. Soprano pipistrelle activity was recorded at the northern end of the West Woods and along the southern edge of the Main Lake. Two calls were attributed to common pipistrelle, both of which were located at the northern end of the West Woods. Two passes were attributed to Leisler's bat. These were recorded along the southern edge of the Main Lake and to the northwest of the Car Parks.
  - 7th July 2019: One species were recorded, with a total of 11 passes. Soprano pipistrelle was the only species recorded. The majority of soprano pipistrelle passes were recorded along the southern edge of the Main Lake, with one pass recorded at the northern end of the West Woods.

3. Post-event nights
   - Eastern Route (East Woods)

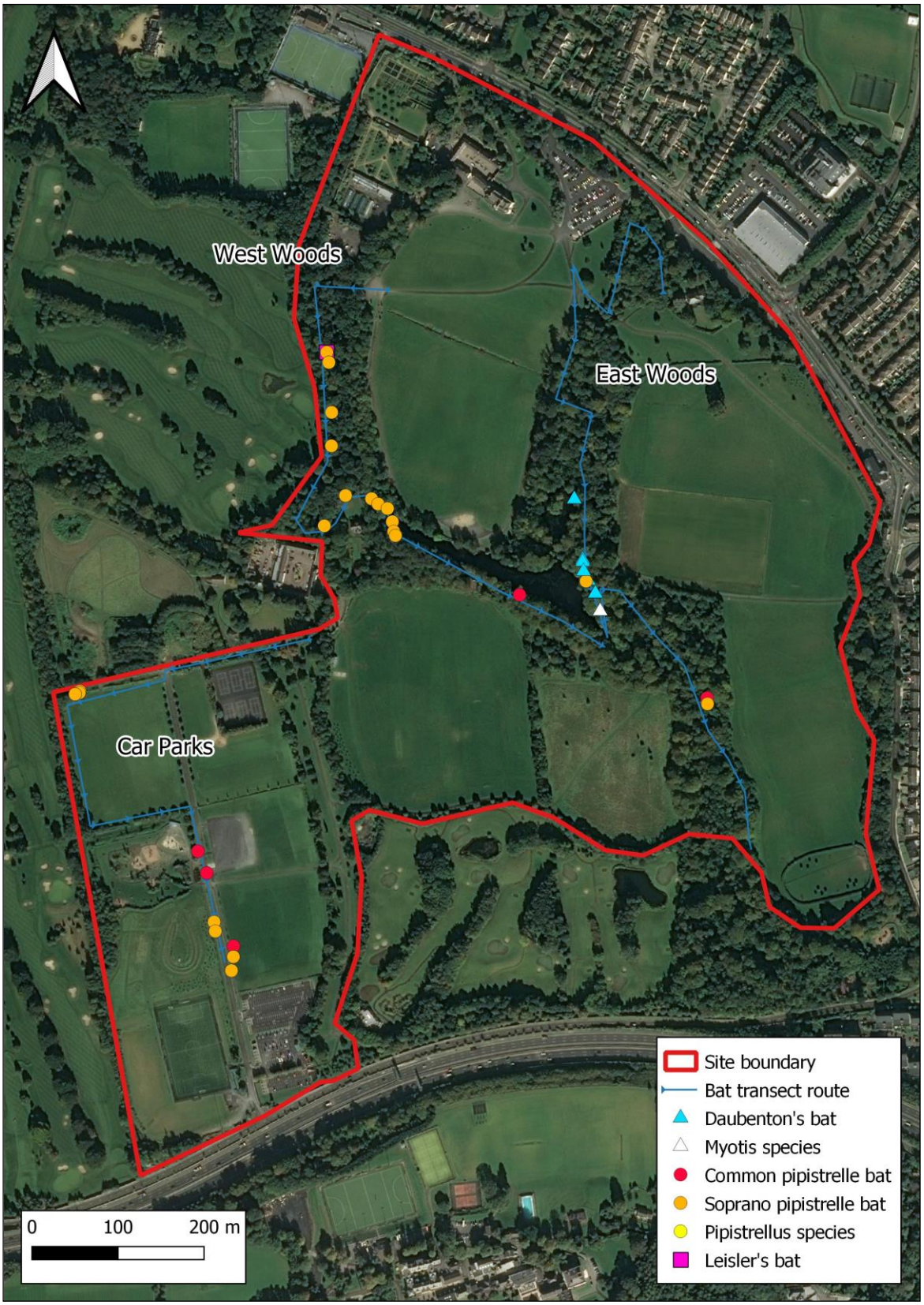
- 17th July 2019: A minimum of four species were recorded with a total of 60 passes. Soprano pipistrelle was the most frequently recorded species accounting for 47 passes. These passes were spread out across the entire length of the eastern transect route, with three passes recorded at the northern end adjacent to the Duck Pond and Grange Road car park, six passes recorded towards the centre of the transect route along the eastern side of the Lower and Main Lakes, nine passes were recorded in the eastern end of the Main Lake and the remaining 11 passes recorded at the southern end of the transect route within the East Woods. No GPS coordinates were recorded for the remainder of the passes. Leisler's bat accounted for eight of the pass recordings. Five of the passes were recorded at the eastern end of the Main Lake and two passes between the Grange Road car park and the Duck Pond. There were no accurate GPS coordinates for one pass. Four bat passes were attributed to Daubenton's bat. All four of these passes were recorded to the immediate east of the Main Lake. One pass was attributed to common pipistrelle bat, which was located by the Duck Pond by the Grange Road.
- 18th July 2019: A minimum of four species were recorded with a total of 19 passes. Soprano pipistrelle was the most frequently recorded species with five passes recorded by the Duck Pond, four passes recorded within the woodland area between the Duck Pond and the Lower Lake, three passes recorded immediately east of the Main Lake and one pass recorded in the woodland southeast of the Main Lake. Two passes were attributed to Leisler's bat, both of which were recorded directly west of the Duck Pond, and two passes were attributed to Daubenton's bat, both of which were recorded at the north east edge of the Main Lake. Two passes were attributed to species of the genus *Myotis* (unidentified to species level). These passes were recorded northeast of the Main Lake..
- 28th August 2019: A minimum of four species were recorded with a total of 30 passes. Soprano pipistrelle was the most frequently recorded species with 17 passes, recorded along the eastern transect route from the northern end to the southern ends within the East Woods. Ten passes were attributed to Daubenton's bat, all of which were recorded within a small area along the eastern edge of the Main Lake. Two passes were attributed to Leisler's bat, and one pass to common pipistrelle. The Leisler's bat passes were recorded at the northern side of the East Woods and along the eastern edge of the Main Lake. Common pipistrelle bat pass was recorded at the western side of the Duck Pond.
- 29th August 2019: A minimum of four species were recorded with a total of 14 passes. Ten of these passes were attributed to soprano pipistrelle. Of these 10 passes, five were recorded at the southern end of the East Woods, two were recorded along the eastern edge of the Main Lake and one was recorded within the middle of the East Woods, north of the Lower Lake, and one, east of the Duck Pond. There was no accurate GPS point for one pass. Two calls were attributed to common pipistrelle, all of which were located adjacent to the Duck Pond. One pass was attributed to Leisler's bat. This pass was recorded in the East Woods east of the Main Lake. The one

remaining passes was attributed to species of the genus *Myotis* (unidentified to species level), located at the eastern end of the Main Lake.

- Western Route (West Woods and Car Parks)
  - 17th July 2019: A minimum of five species were recorded with a total of 39 passes. 21 of these passes were attributed to Leisler's bat. 10 Leisler's bat passes were recorded within the woodland area, west of the Main Lake, five passes were recorded along the walkway between the Main Lake area and the Car Parks area, and three passes were recorded along the hedgerow at the western boundary of the Car Parks area. No accurate GPS points were recorded for the remainder of the calls. Seven passes were attributed to soprano pipistrelle and were recorded within the woodland area, west of the Main Lake. Six passes were attributed to Daubenton's bat. These passes were located at the western end and along the southern edge of the Main Lake. Four passes were attributed to common pipistrelle and were recorded along the hedgerow at the western boundary of the Car Park area. One pass attributed to the genus *Myotis* was recorded at the western side of the Main Lake.
  - 18th July 2019: A minimum of three species were recorded with a total of 38 passes. 24 passes were attributed to Leisler's bat, nine passes were attributed to common pipistrelle and five passes were attributed to soprano pipistrelle. Of the 24 Leisler's bat passes, six were recorded along the western hedgerow of the Car Park area and the remaining 18 were recorded within the woodland to the east of the Main Lake. Four of the passes attributed to common pipistrelle were recorded at the western end and along the southern edge of the Main Lake, and one was recorded within the Car Park area towards the end on the western transect route. There were no accurate GPS points for four common pipistrelle passes. Four of the soprano pipistrelle passes were recorded at the south side of the Main Lake and one pass in the West Woods.
  - 28th August 2019: A minimum of five species were recorded with a total of 22 passes. Soprano pipistrelle was the most frequently recorded species accounting for seven of the passes. There were accurate GPS point data for four passes, and these were located along the southern edge of the Main Lake and at the Car Parks areas at the end of the western transect. Six passes were attributed to Nathusius' pipistrelle *Pipistrellus nathusii*, located along the southern edge of the Main Lake. Five bat passes were attributed to Leisler's bat, these were recorded along the southern edge of the Main Lake and within the Car Parks area. Two Daubenton's bat pass was recorded at the western side and along the southern edge of the Main Lake. The two remaining passes were attributed to species of the genus *Myotis* (unidentified to species level). Both of these passes were recorded along the southern bank of the Main Lake.
  - 29th August 2019: A minimum of six species were recorded with a total of 30 passes. Eight passes were attributed for soprano pipistrelle, six of which were recorded within a relatively small area along the southern edge of the Main Lake, with one pass recorded in the West Woods. There was no accurate GPS point for one pass. Eight passes were also attributed to Nathusius' pipistrelle. Five of the passes were recorded along the southern edge of the Main Lake and one along the hedgerows towards the

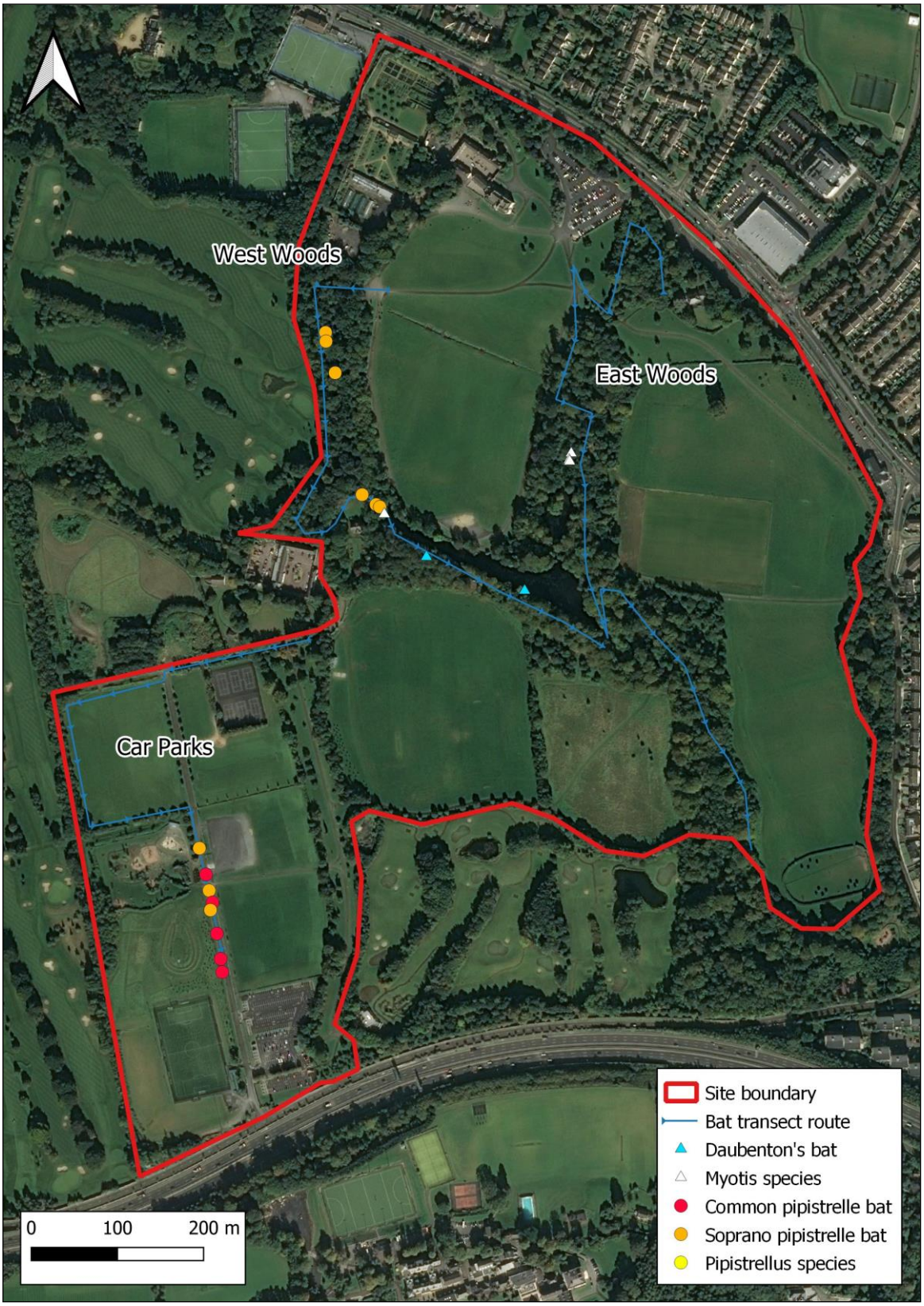
Car Parks area. Six passes were attributed to common pipistrelle bat, all of which were located along the hedgerows in the Car Parks area. Four passes were attributed to Leisler's bat. One of these passes was recorded within the Car Parks area towards the end of the western transect route, while three passes were recorded at the western end and southern side of the Main Lake. One pass was attributed to Daubenton's bat. This was located along the southern side of the Main Lake. Three passes were attributed to the genus *Myotis*, with one pass recorded along the southern bank of the Main Lake and two passes at the northern end of the West Woods.

***Figure 2: Pre-event bat manual transect survey results – 26th June 2019*** [5]



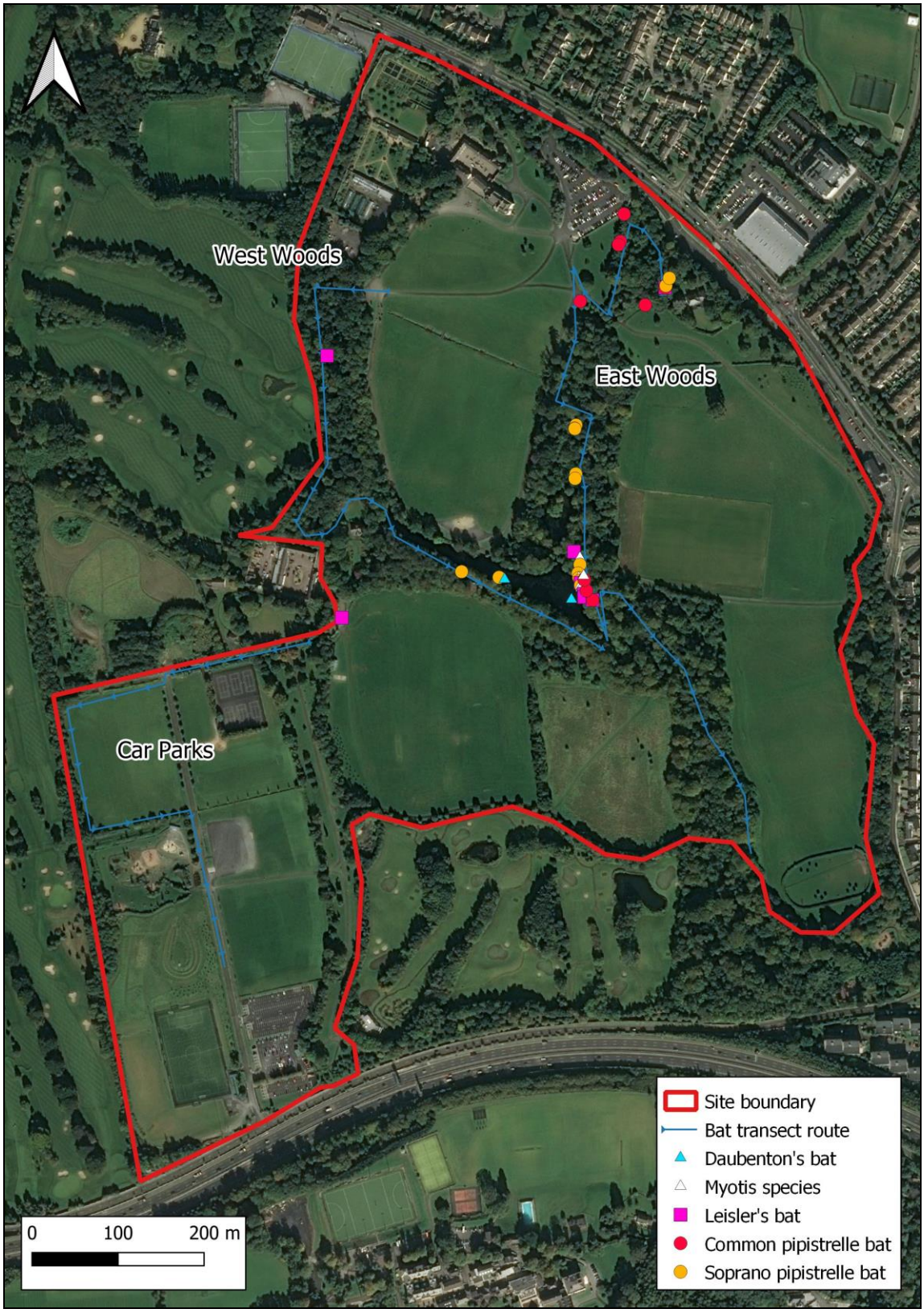

[5] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

***Figure 3: Pre-event bat manual transect survey results – 27th June 2019*** [6]



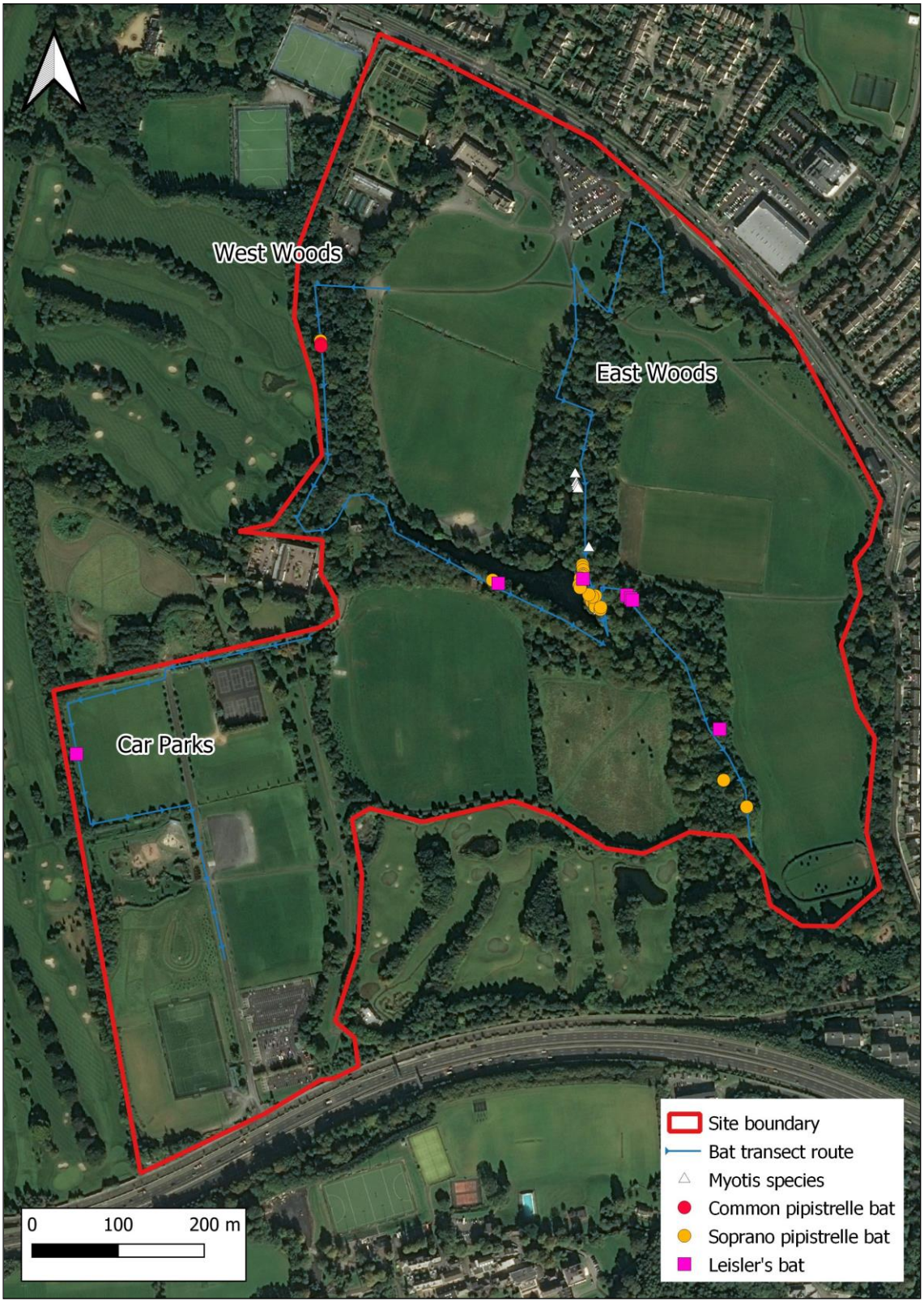

[6] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

***Figure 4: Bat manual transect survey results - first night of concerts 5th July 2019*** [7]



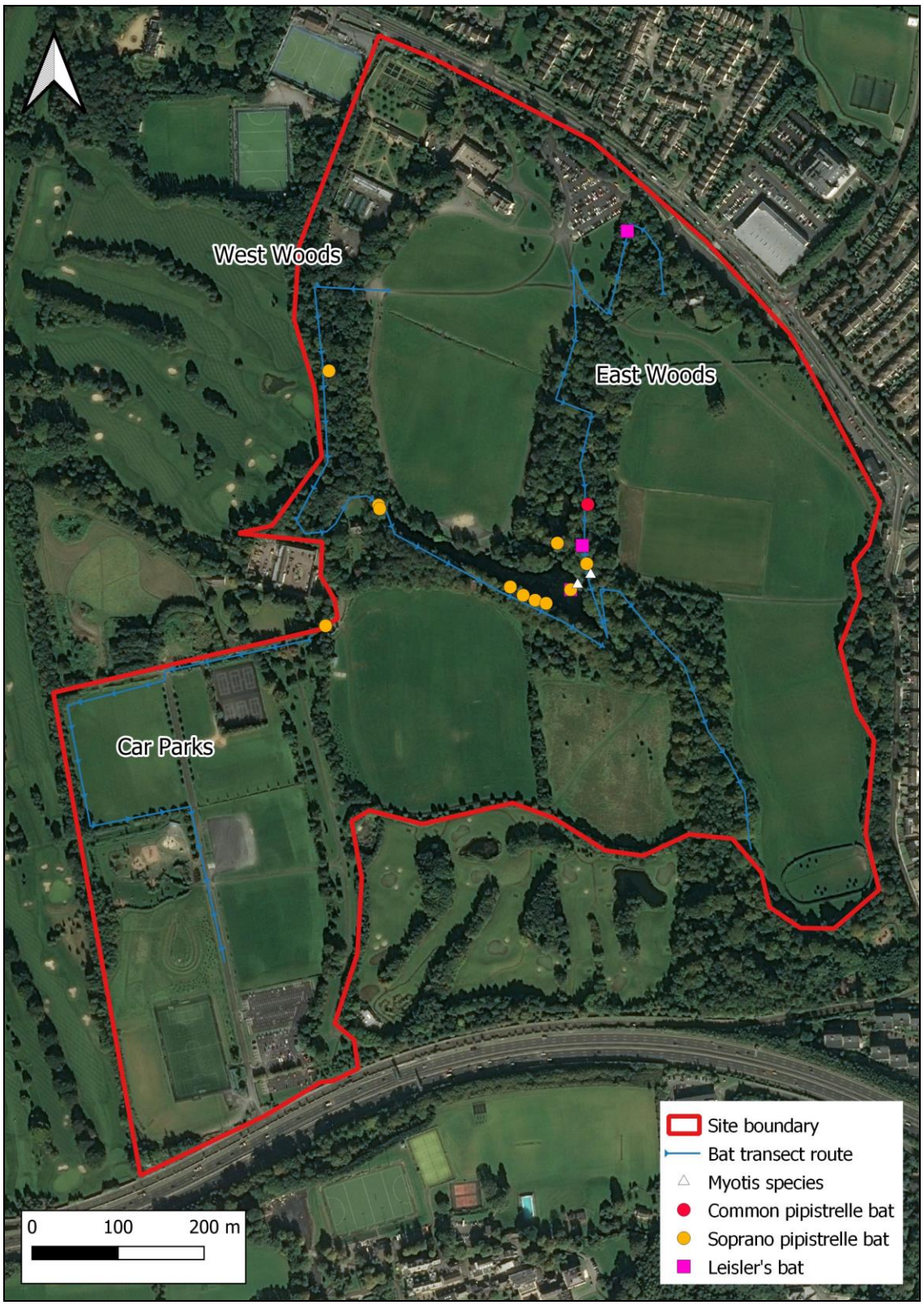

[7] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

***Figure 5: Bat manual transect survey results – second night of concerts 6th July 2019*** [8]



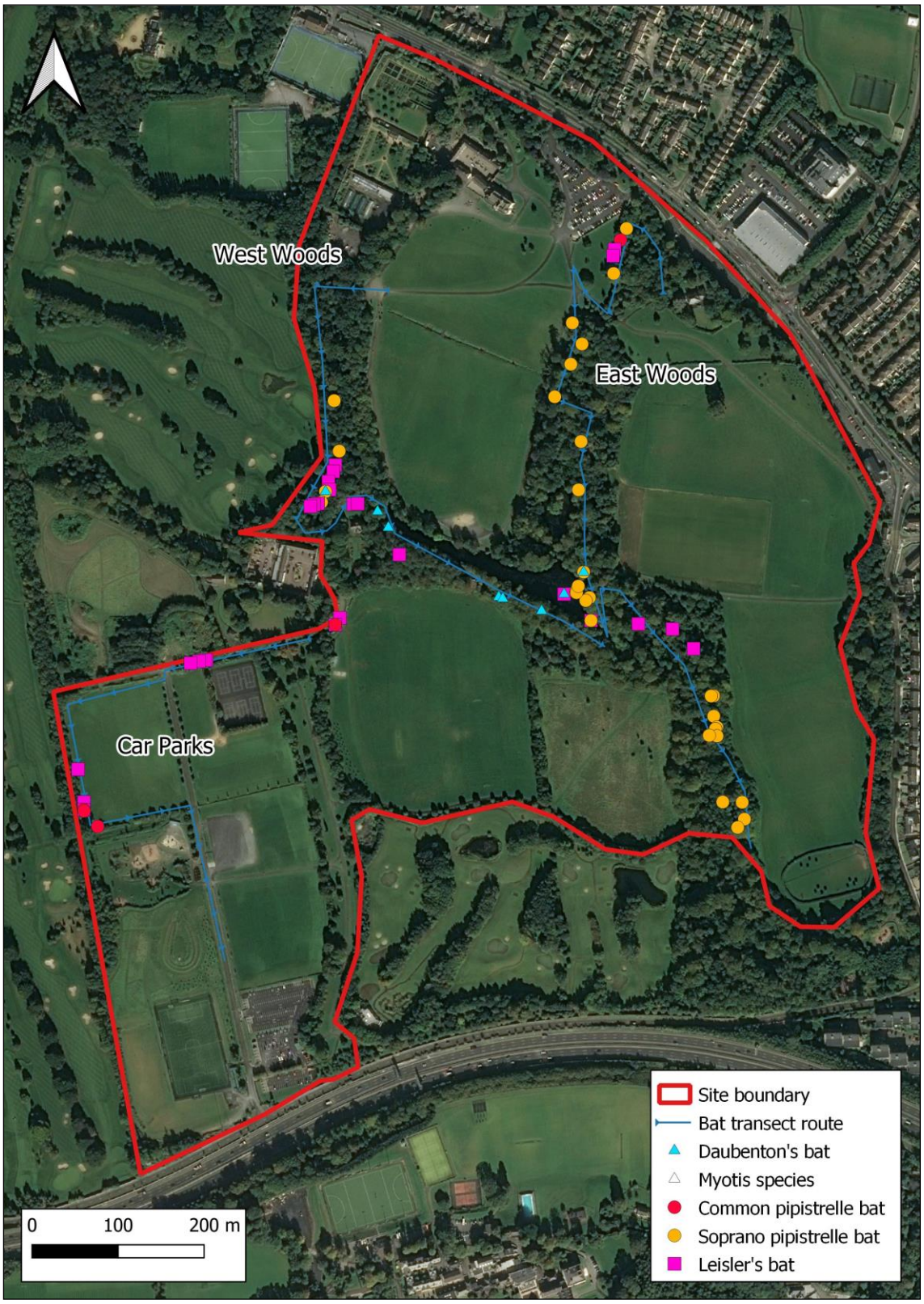

[8] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

***Figure 6: Bat manual transect survey results – third night of concerts 7th July 2019*** [9]



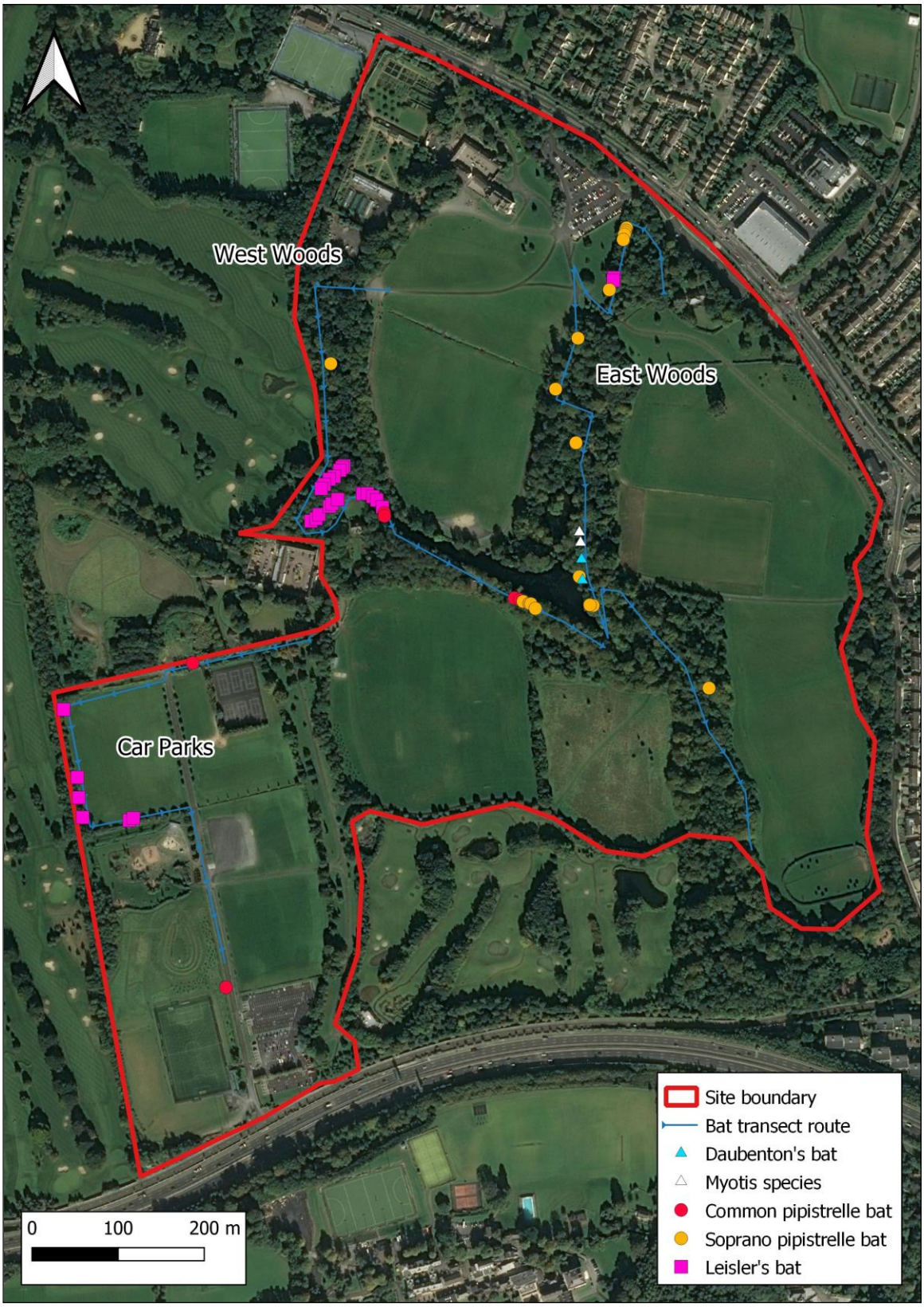

[9] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

*Figure 7: Post-event bat manual transect survey results – 17th July 2019* [10]



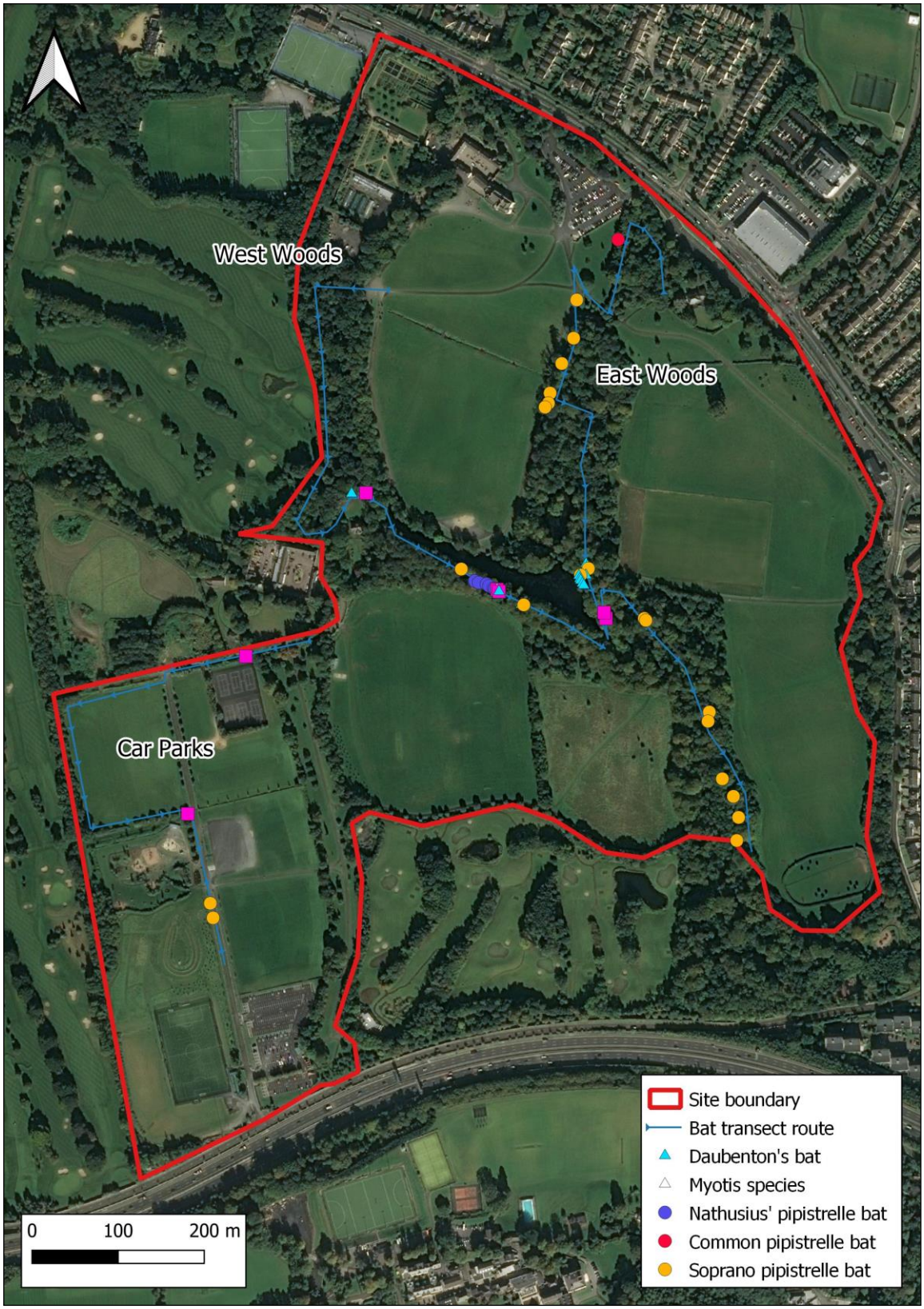

[10] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

***Figure 8: Post-event bat manual transect survey results – 18th July 2019*** [11]



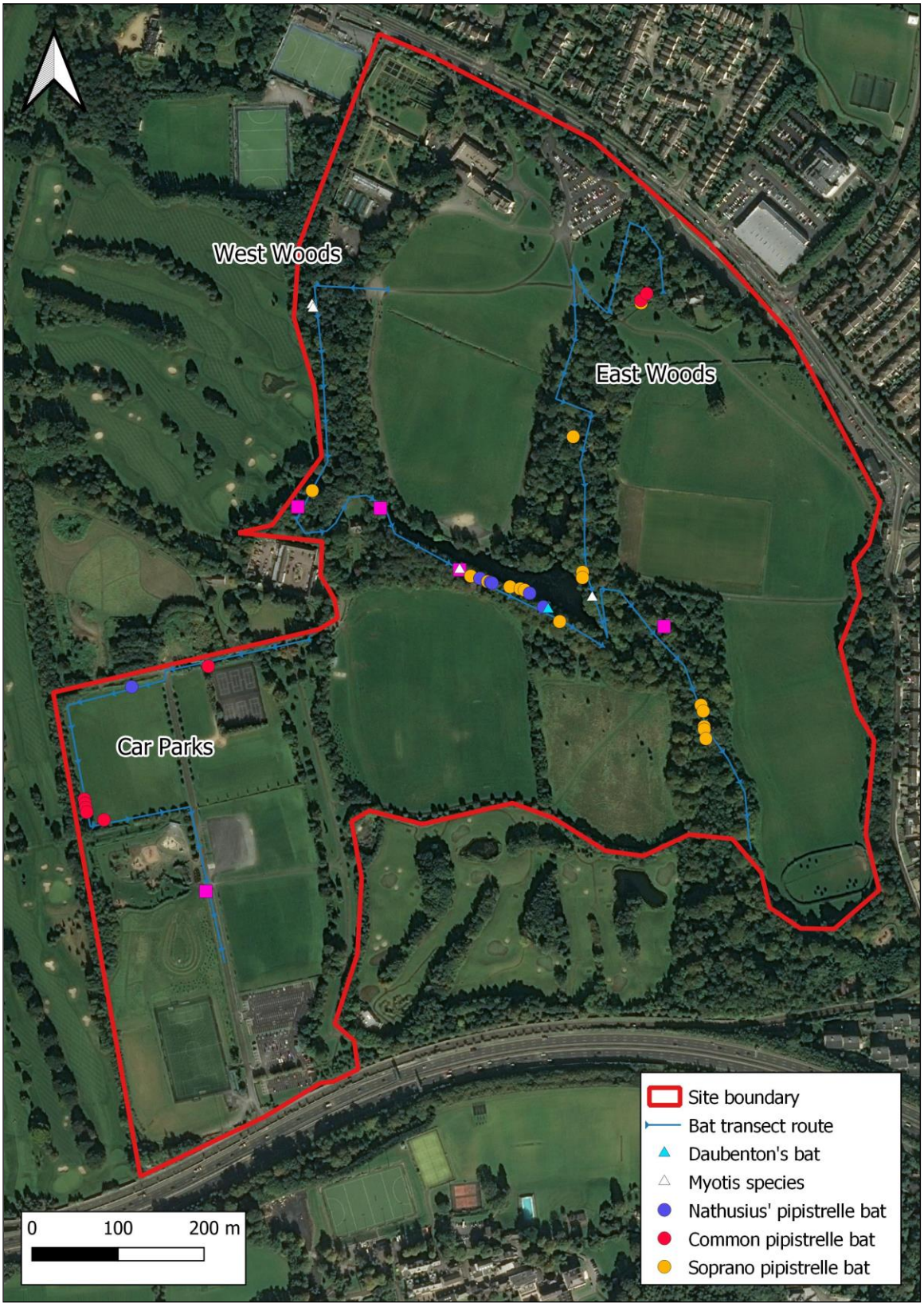

[11] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

*Figure 9: Post-event bat manual transect survey results – 28th August 2019* [12]




[12] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

***Figure 10: Post-event bat manual transect survey results – 29th August 2019*** [13]




[13] It should be noted that some records are unmapped due to lack of GPS data accompanying point records.

### 3.4. CONCLUSION ON IMPACT OF CONCERTS ON BATS

Based on the results of bat activity surveys, there is no evidence of the concerts having an observable negative effect on bat activity within Marlay Park. Bats were noted foraging in similar areas of the park along the transect routes before, during and after the concerts. Whilst the bat activity maps during the concert nights (Figures 4 -6) show a reduction in bat activity along the Car Parks area, surveyors observed bats foraging along the treelines/hedgerows within this area during the concert nights (not all calls recorded have GPS coordinates and therefore do not appear on the maps).

Surveys of the park undertaken in previous years have not identified the presence of any bat roosts within the concert area, *i.e.* roosts which could potentially be negatively impacted by lighting or other activities associated with the concerts. As concerts ceased at approximately 23:00 in 2019 and in previous years, and as the concerts occur close to the summer solstice, the amount of overlap between the active period for bats and the concerts is relatively short – approximately one hour. Furthermore, both acoustic and observational evidence of bats foraging in areas close to the events indicate a degree of tolerance to the changes in lighting and noise associated with the events.

Recommendations have been made in Section 7 for any potential future events in the park to ensure that the risk of causing disturbance to bats will be minimised and that no significant impacts on the local bat populations occur.

## 4. MONITORING OF BIRDS

Marlay Park hosts a range of bird species, including wetland species that forage and/or nest in the vicinity of the two artificial lakes in the centre of the park. Little grebe, moorhen, mute swan, mallard, tufted duck and coot are resident or frequently occur on the lakes in the park and all except for tufted duck and mute swan breed with regularity in the park (mute swan attempted to breed in 2019 for the first time in several years).

All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the EU Birds Directive.

### 4.1. PRE-EVENT SURVEYS

It was a recommendation of previous monitoring programmes that an ecologist undertake breeding bird checks at least twice in in advance of the set-up of any future events. This recommendation was made to inform the positioning of infrastructure at the Main Lake for the 2019 event, and in light of the timing of works within the bird breeding season. Pre-event bird activity at the Main Lake was recorded using a combination of direct sightings and identification of songs and calls on 21st June, and 27th June to 4th July inclusive.

As per previous years, three little grebe pairs were identified on the Main Lake in 2019. Their territories are divided into the eastern, middle and western sections of the Main Lake (as illustrated in Figure 11) and are aggressively defended by each pair.

- The western pair of little grebes were observed tending to two chicks throughout the pre-event surveys.

- The eastern pair of little grebes were observed tending a nest platform (location illustrated in Figure 11) in the earlier pre-event surveys and were confirmed to be incubating three eggs on the 28th June 2019. The eastern pair lost these three eggs between the 2nd July and 3rd July (suspected predation). A fledged juvenile was also observed in the eastern territory during the pre-event surveys indicating that the eastern pair had breeding success earlier in the season.
- The middle pair of little grebes were also observed tending a nest platform (location illustrated in Figure 11) in the earlier pre-event surveys and were confirmed to be incubating one egg on 2nd July 2019. The middle pair also lost their egg overnight between 2nd July and 3rd July (suspected predation). The middle pair also had a well-advanced juvenile within their territory which they tolerated, indicating that the pair had also successfully bred earlier in the year.

Three pairs of moorhens were observed on the Main Lake during the pre-event surveys tending to at least five chicks. Observations included: a pair of moorhen in the middle section of the lake tending to three chicks on 21st June 2019; a large moorhen chick present in the middle section of the lake and a smaller chick present at the western end on 27th June; moorhen pairs tending to at least three chick (two well grown and one smaller chick) on the Main Lake on 28th June; moorhens tending to three chicks at the western end of the lake on 30th June; and four well-grown chicks and one smaller chick foraging at the western end of the lake on 3rd July 2019.

A pair of mute swans attempted nesting on a concrete culvert at the western end of the Main Lake in May/June 2019. This was the first time they had been recorded nesting in several years. The swans were observed incubating two eggs. Surveyors were advised by members of the public (who were monitoring the swans prior to surveys commencing) that the first egg was laid on 20th May 2019. In response to the swans nesting, park workers installed black sheeting adjacent to the nesting site along the northern side of the main like and along the adjacent footbridge to reduce visual disturbance to the nesting swans. However, the swan eggs disappeared from the nest on the 18th-19th June (dates were given by members of the public who were also monitoring the swans). The cause of the eggs' disappearance is unknown, however, it is a possibility that predation may have been the cause. To note, a remote infrared motion-triggered camera was set up close to the nest site after the eggs disappeared (from 27th June – 3rd July 2019) but there were no sightings of otter or any other potential predators recorded during this time frame. The pair of mute swans did not attempt to breed again. All further observations during the pre-event surveys recorded the swans at the eastern end of the Main Lake (opposite end to the nest).

A pair of tufted ducks were observed at the Main Lake throughout the pre-event surveys (non-breeding). Mallard duck were also observed throughout the pre-event surveys, with peak counts ranging between 33 and 49 ducks. No mallard chicks were noted on the Main Lake in any of the pre-event surveys, however, a member of the park security personnel reported seeing a rat snatching a mallard chick and dragging it under a bush adjacent to the middle section of the lake on 26th June 2019 (no mallard chicks present during the survey on the 27th June).

Other species observed at the Main Lake during the pre-event surveys included two grey herons feeding at the eastern end of the lake on the 21st June and a kingfisher hunting on the western end of the late on 28th June.

A jackdaw (*Corvis mondelua*) and rook (*Corvus frugilegus*) roosting site was identified in the trees on either side of the pathway adjacent to the western end of the Main Lake in 2018. However, surveyors did not note this roost as being present during the 2019 surveys.

*Pontoon Construction*

As previously recommended, ecologists supervised the installation and removal of temporary pontoons installed at the Main Lake to ensure the protection of birds and their nests. The installation of the pontoons across the Main Lake commenced on the 27th June at 6.20pm (location illustrated in Figure 11). The construction of the pontoons consisted of eight pontoon 'rafts' loosely placed in the Main Lake which were then secured together forming two bridge crossings. A breeding bird survey was carried out at the Main Lake immediately prior, during and immediately after the construction of the pontoon. The middle pair of little grebes showed no observable negative reactions during the pontoon construction process. The position of the pontoon crossing was similar to that of 2018 and previous years, but the location of the middle pair of little grebe's nest was partially out of sight of the pontoon in 2019.

***Figure 11: Location of Little Grebe territories and nests in Marlay Park in 2019.***

### 4.2. MONITORING DURING THE EVENT

Ecological monitoring during the event consisted of observations of activity on and adjacent to the lakes considering the presence of nesting birds close to the pontoon crossing location.

On the first day of the event (5th July), there were no observable disturbance impacts to the middle pair of little grebes, despite being the closest nesting pair to the pontoon (*c.* 20m). The middle pair were both observed tending to the nest platform and resting on it throughout the concert. Whilst occasionally they appeared more alert, the middle pair did not abandon their nest at any stage as a result of increased activity. The western pair of little grebes continued to tend to their two chicks at the western end of the lake and the eastern pair of little grebes continued to hold their territory and tend to their nest platform at the eastern end. The mallard flock and pair of mute swans immediately moved towards the farthest end of the eastern section of the Main Lake in response to the increase in noise and human traffic. They largely remained at the eastern end for the duration of the concert. The mallard numbers decreased slightly with a peak count of 32 at 2.05pm.

On the second day of the event (6th July), the middle pair of little grebes continued to tend to their nest platform. The western pair of little grebes continued to tend to their two (now well-developed) chicks and came within 10m of the western edge of the west pontoon bridge, appearing to be unperturbed by human traffic over the pontoon. The western pair were also observed constructing a nest platform towards the south side of the western section of the lake. The eastern pair of little grebes were observed continuing to tend to the nesting platform. The mallard peak count was 44 at 4.06pm, indicating that the mallards may have acclimatised to the change in disturbance levels. The pair of tufted ducks were still present at the eastern end of the lake, along with the pair of mute swans and two foraging grey herons throughout the day. Four moorhen chicks (one fledged and three smaller chicks) were present at the western end of the lake and were being tended to by parents with no signs of discernible stress as a result of concert activity.

On the third day of the event (7th July), all three pairs of little grebes were discovered to have laid eggs within the previous 24hours (almost certainly during the concert hours). The middle pair of little grebes were observed incubating two eggs, the eastern pair were observed incubating one egg, and the western pair were incubating two eggs whilst occasionally still tending to their existing two fledged young. The mallard peak count was 41 at 5.37pm. The pair of tufted ducks were located at the western end and the mute swan pair at the eastern end. A buzzard was observed soaring 30m over the main stage at 1.40pm.

### 4.3. POST-EVENT SURVEYS

Post-event surveys were carried out immediately following the event on 8th July for five days continuously until the 12th July, and an additional follow up survey was later carried out on 25th July.

All three pairs of little grebes were observed incubating their nests successfully in the three days following the event (8th July - 10th July) with the two juvenile little grebes still present within their parents' territory at the western end of the lake. On the 11th July the middle pair of little grebes was noted as having an empty nest, most likely as a result of predation. A lot of grey squirrely activity was noted in the trees over and adjacent to the nest, with one branch reaching very close to the nest itself. Brown rats were also observed within the vicinity too. On the 25th July, all little grebe pairs had

abandoned breeding attempts, indicating that the eastern and western pairs were not successful with their final attempt at nesting.

During the post-event surveys, at least four moorhen chicks were observed in the Main Lake being tended to by adult moorhens. Observations included: three moorhen chicks at the western end of the Main Lake being tended to by parents on 8th July; moorhen pairs tending to four well-advanced chicks on 9th July; two well-advanced chicks observed on the western end of the lake on 10th July; three well-advanced and one young moorhen chicks at the western end of the lake on 11th July; and four juvenile moorhen chicks at the western end of the lake on 12th July.

The pair of mute swans did not attempt to breed again. They were observed at the eastern end of the Main Lake during the earlier post-event surveys and at the western end during the last post-event survey on 25th July 2019. Mallard peak counts were between 38 and 47 individuals during the post-event surveys. One tufted duck was observed on the Main Lake from 8th July – 10th July. Grey herons were also recorded at the eastern end of the Main Lake during the post-event surveys; 1 heron on 8th July, two herons on 12th July, and three herons on 25th July.

*Pontoon Deconstruction*

The pontoon deconstruction commenced at 9.50am of 10th July. The top decking and railings were removed by 4pm with no significant observable disturbance responses by the birds. The only disturbance noted during the deconstruction was to the middle pair of little grebes who were observed briefly leaving their nest at 2.40pm due to loud hammering. However, they returned to the nest within 3 minutes and were otherwise observed nesting throughout the removal of the pontoon. As they were observed on the nest up until 5pm on 10th July, the deconstruction activities are not considered to be a contributing factor to the unsuccess in their breeding attempt. Predation was most likely the cause as previously explained.

The pontoon base was removed on the 12th July from 10am to 2pm (the pontoon base was removed in sections and hoisted out of the lake). No significant disturbance issues were noted. The middle little grebe pair remained within their territory and both the eastern and western pairs of little grebes continued to incubate their nests.

### 4.4. CONCLUSION ON IMPACT OF CONCERTS ON BIRDS

Following the outcomes of bird monitoring surveys, there is no evidence of the concerts having any observable negative effect on nesting waterfowl in Marlay Park. During the first day of the concerts, the mallard flock and mute swans were observed moving away from the pontoon in an immediate response to the increased noise levels over the pontoon. However, whilst they continued to keep a distance from the pontoon during the concert hours they acclimatised quickly and showed no signs of stress at the eastern end of the lake.

Prior to the concerts, of particular concern was the potential reaction of the little grebes to the insertion of the pontoon and the associated human traffic along the pontoon during the concert days. However, the little grebes showed no significant observable signs of disturbance as a result of the concerts. All three little grebe pairs laid eggs during the concerts and both the middle and western pairs were recorded as having successfully bred at the lake in 2019. Whilst some little grebe nesting attempts were unsuccessful, this was not attributed to the increase in disturbance during

the concerts. The mute swan pair were unsuccessful in their nesting attempt, however, the loss of eggs occurred prior to the concerts.

Recommendations have been made in Section 7 for any potential future events in the park, which will further reduce the risk of causing disturbance to nesting bids.

## 5. MONITORING OF OTHER MAMMALS

Scott Cawley Ecologists have recorded signs of otters within Marlay Park including sprainting posts (territorial scent marking locations) and recordings of otter on camera between the Main Lake and the Lower Lake in 2016, 2017 and 2018.

Active badger setts (underground resting places) are known from three locations within the park and feeding signs have also been recorded in the park.

Both species are afforded protection in Ireland under the *Wildlife Acts (as amended)*, and additionally through the *Birds and Habitats Regulations (2011)* in the case of otter.

### 5.1. VIDEO MONITORING OF OTTERS

To assess use of the site by otter over the concert period and in accordance with previous recommendations, passive video monitoring of otter activity was undertaken between the Main Lake and the Lower Lake before, during, and after the concerts.

Remote infrared motion-triggered cameras were deployed at the following locations within the park:

1. 21st June - 27th June 2019: Under the eastern concrete bridge in the East Woods, north of the Lower Lake;
2. 21st June - 27th June 2019: Along the river south of the eastern concrete bridge in the East Woods (north of the Lower Lake);
3. 27th June - 3rd July 2019: Under the western concrete bridge in the East Woods, north of the Lower Lake;
4. 27th June - 3rd July 2019: Beside the concrete culvert at the western end of the Main Lake (where the mute swans attempted to nest in 2019);
5. 3rd July – 12th July 2019: Under the western concrete bridge in the East Woods, north of the Lower Lake; and,
6. 3rd July – 12th July 2019: Under the bridge separating the Main Lake and the Lower Lake (weir).

Cameras were deployed for a total of 21 nights between 21st June 2019 and 12th July 2019. No otter activity was recorded at any of these locations and no otter holts (underground resting places) were confirmed from within the park, as in the case of recent years.

Based on evidence from 2016, 2017 and 2018, when cameras were deployed for an extended period, otter appear to only occasionally visit sprainting posts within the Park. The *Dublin City Otter Survey* (Dublin City Council, 2019) shows records of otter spraint along the Little Dargle River in Marlay Park but no otter holts. As stated in the *National Otter Survey of Ireland* (Reid *et al*., 2013), in Ireland, the territory of female otters in mesotrophic rivers (i.e. those with an intermediate level of productivity) is approximately 7.5 ± 1.5km in length (Ó Néill et al. 2008) and 6.5 ± 1.0km in coastal

environments (de Jongh et al. 2010). The territory of male otters in mesotrophic and oligotrophic rivers (i.e. those with a low level of productivity), is approx. 13.2 ± 5.3km in length with a high degree of variability as territorial males respond quickly to social perturbation (O'Neill et al. 2008). As such, it is possible that the territory within the park represents a small part of an otter territory within which otter are only intermittently active.

### 5.2. Supervision of Works in Relation to Protected Mammals

Security barriers inserted in-stream were checked by an ecologist to ensure that they were passable for otter. The temporary bridge in the East Woods was also checked by an ecologist during construction and upon completion of construction to ensure that there were no impediments to passage along the stream below.

Checks for badger setts prior to the event were also undertaken to verify that no new resting places were present and that no works would be undertaken within 50m of any badger setts. No new setts were identified within the park and all works within the park were in excess of 50m of previously identified badger setts.

### 5.3. Conclusion on Impact of Concerts on Other Mammals

Based on the results of the otter and badger surveys, there were no holts or setts present within 50m of the concert footprint. There was no impediment to passage along any of the rivers/streams either. As such, there was no potential for significant impacts to either badger or otter as a result of the concerts. Recommendations have been made in Section 7 for any potential future events in Marlay Park to ensure that there will be no significant impacts to protected mammal species.

## 6. OVERALL CONCLUSION

The ecological surveys and supervision services undertaken complied with the recommendations included within *Ecological Monitoring and Supervision Report Marlay Park Concerts 2018* (Scott Cawley, 2018). They ensured compliance with legislation protecting wildlife and minimised any potential impacts arising from the event.

As a result of the pre-event baseline surveys and implementation of mitigation measures before and during the event in Marlay Park in 2019, it is concluded that there were no significant adverse effects on the biodiversity within the Park. Temporary impacts were recorded at a localised scale (i.e. restricted to birds in the main lake) with certain waterfowl temporarily negatively reacting to concert goers. It was clear that after the event had finished there was a swift restoration to normal behaviour and distribution of birds. Similar to previous years, bat populations did not appear to be adversely affected with bats feeding and flying in similar areas before, during and after the event.

The diversity of bird and mammal species using the Park (several of which would be sensitive to disturbance) suggests that there are no long-term impacts on the Park's ecology arising from annual concerts in the park.

## 7. RECOMMENDATIONS

Whilst it was concluded that there were no significant adverse effects on the biodiversity within the Park, it was considered appropriate that a set of recommendations be made in relation to any future events to be undertaken within the park in order to further protect wildlife. In particular how short-term acute disturbance during specific times in the events can be minimised or avoided altogether.

### 7.1. PROTECTION OF BATS

Monitoring surveys undertaken in 2019 found that bats continued to use the park throughout the concert nights, including Daubenton's bat, which was observed foraging on the Main Lake adjacent to a temporary illuminated pontoon. The following recommendations are considered appropriate for the protection of bats during future events at the Park:

- Any further expansion of the events will be in open grassed areas rather than woodland to minimise need to fell trees or erect safety lighting close to previously undisturbed areas;
- Where an event requires lighting, an ecologist will be consulted for recommendations on suitability of lighting schemes at the pre-licencing stage. During the event set-up, an ecologist will be on-site to inspect lighting orientation and liaise with organisers to re-orient luminaries if required. Timing of lighting will be a consideration, and it is recommended that lighting be switched off outside of event hours. These measures are proposed in order to minimise potential impacts of lighting on bats within the park;
- While there does not appear to be any adverse significant effects on bat activity during concerts, there may be some benefit to continuing manual surveys along the East Woods, West Woods and Car Parks transects to gain long-term data on bat activity within the park.

### 7.2. PROTECTION OF BREEDING BIRDS

Pre-event surveys of the park in 2019 identified several birds nesting within the Main Lake, including a pair of little grebes which nested within 20m of the pontoon crossing constructed for the 2019 event. Notwithstanding their proximity to the pontoon, the activity associated with the concerts did not appear to have an adverse effect on the nesting grebes. Nonetheless, and considering the protected status of birds and their nests, the following recommendations are made:

- Breeding bird checks will be undertaken at least twice in advance of the set-up of any future events;
- The location of bird's nests within the Main Lake will inform the design and location of pontoons within the lake;
- Monitoring of breeding birds will be undertaken over the course of any future events;
- Consideration will be given to trimming back overhanging trees and removing aquatic plants near the pontoons to reduce the risk of waterfowl establishing nests in proximity to the pontoons; and,
- Opaque screening material will be erected along the sides of each of the pontoon fencing to prevent concert goers being seen from the lake.

### 7.3. PROTECTION OF OTHER MAMMALS

Surveys of the park undertaken in 2019 found no evidence of otter resting places, and no changes to badger resting places. The following recommendations are considered appropriate for continued compliance with legislation protecting mammals and their resting places during future events:

- Checks and video monitoring of holes in riverbanks, or new potential setts, adjacent to works areas will be undertaken in the months prior to the commencement of events. These checks should be undertaken sufficiently in advance of any event to allow enough time to monitor for otter or badger activity;
- No works will be permitted within 50m of the resting place of a mammal protected under the *Wildlife Acts (as amended)* and/or the *Birds and Habitats Regulations (2011)*;

### 7.4. ADDITIONAL RECOMMENDATIONS

The following measures are recommended for any future concerts at Marlay Park, and have been formulated based on consultations between Scott Cawley, the NPWS and the Council Biodiversity Officer.

- Early engagement with an Ecologist prior to deciding upon the pontoon location/design as this would allow input from an Ecologist into other potential options for the pontoon in the event that waterfowl nest close to the proposed pontoon location e.g. if the pair of mute swans chose to nest within close proximity to the proposed pontoon location, an alternative option to the pontoon may be necessary. Early engagement would allow for a 'Plan B' to be agreed upon in the early planning stages.
- A buffer zone of 10m should be set between the northern side of the main lake and the machinery/toilet area adjacent to the northern side of the main lake. This would minimise noise disturbance to nesting waterfowl e.g. mute swans. Whilst the pathway/access road within the buffer zone could remain in use for vehicles, the machinery/toilets would ideally be set back on the far side of the pathway/access road.

## 8. REFERENCES

**Dublin City Council (2019).** *Dublin City Otter Survey. An Action of the Dublin City Biodiversity Action Plan 2015-2020.* Prepared by Triturus Environmental Ltd. for Dublin City Council.

**Reid, N. Hayden, B., Lundy, M.G., Pietravalle, D., McDonald, R.A., and Montgomery, W.I. (2013).** *National Otter Survey of Ireland 2010/12*. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

**Roche, N., Aughney, T., Marnell, F., and Lundy, M. (2014).** *Irish bats in the 21st Century*. Bat Conservation Ireland.

**Scott Cawley (2018).** *Ecological Monitoring and Supervision Report. Marlay Park Concerts 2018, Marlay Park, Rathfarnham, Co. Dublin.* Report produced by Scott Cawley on behalf of Dún Laoghaire-Rathdown County Council.

**Scott Cawley (2017).** *Pre-event Ecological Survey Report: Longitude Outdoor Concert, Marlay Park, Rathfarnham, Co. Dublin*. Report produced by Scott Cawley on behalf of Dún Laoghaire-Rathdown County Council.

**Scott Cawley (2016).** *Monitoring of Ecological Impacts of Outdoor Concerts in 2016. Marlay Park, Co. Dublin*. Report undertaken on behalf of Dún Laoghaire-Rathdown County Council.

**Scott Cawley (2015).** *Ecological Impact Assessment: Effects of Outdoor Concerts in 2015 on Bats and Waterfowl, Marlay Park, Co. Dublin.* Report undertaken on behalf of Dún Laoghaire-Rathdown County Council

**Snow, D.W., and Perrins, C.M. (1998).** *The Birds of the Western Palearctic*. Concise Edition. ISBN 0-19-854099-X