



BJ Collins
PROTECTED SPECIES SURVEYORS

PHASE II BAT SURVEYS 2024

PROPOSED ARTIFICIAL FOOTBALL PITCH

BURGESS HILL TOWN FOOTBALL CLUB
HOME CALL CARPETS COMMUNITY STADIUM
MAPLE DRIVE
BURGESS HILL

A report to:

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Report to:	Surfacing Standards Limited
Report Title:	Phase II Bat Survey for the Proposed Artificial Football Pitch

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Surveyed by:	Barry J Collins MSc MCIEEM

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RELIANCE - The report describes the conditions and ecological features on the site (and possibly its environs) at the time of survey and that this may (is likely to) change over time. Reliance upon the findings of this report should be determined in accordance with the Chartered Institute of Ecology and Environmental Management guidance on the longevity of ecological surveys, see Advice Note (April 2019) On the Lifespan of Ecological Reports and Surveys CIEEM.

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SUMMARY

The attached report provides the results of phase II bat activity surveys, specifically a 25-night static monitoring study supported by a single night-time bat walkover and vantage point survey, in support of the installation of an artificial football pitch with a replacement modern floodlighting scheme. The site is located at Burgess Hill Town Football Club, Maple Drive, Burgess Hill.

The survey effort within this document was designed by a licensed bat ecologist with over two decades of experience and considering the proportionality of survey effort as described by Clause 4.1.2 of BS42020 and section 2.2.5, 7.1.8 and 8.2.7 of best practice guidelines (reference 4), with regards to the operating times and mitigation proposal of the replacement floodlighting scheme.

The surveys comprised of a single cycle of survey within the peak bat survey season of June 2024. The conclusions of this report with regards to foraging and commuting bats are therefore as follows:

- The remote monitoring detector positioned along the northern boundary of the stadium and boundary of the adjacent Bedelands LWS recorded the highest abundance of bat activity, dominated by common and soprano pipistrelles, as would be expected in this urban setting.
- In contrast, *Myotis* and *Plecotus* (light sensitive bats) passes were recorded in the greatest numbers on the south boundary with the residential properties compared to the north boundary with the LWS.
- However, the *Myotis* and *Plecotus* bats were extremely rare in the dataset. Over 25 nights of monitoring, approximately 212 hours, there were only 56 sonograms noted compared to 3767 from bats which are tolerant of artificial lighting. If the extent of activity on each sonogram was summed together then at most that would equate to 14 minutes of activity in the 212 hour monitoring period. These statistics demonstrates the scarcity of 'light averse' bats in the dataset.
- The closest record of a long-eared bat roost is 431 m to the east. The closest record of a *Myotis* species roost is 1.3 km to the south, no roosts are known within the vicinity of the Stadium.
- The lighting curfew for the Stadium floodlights is 22:00 hours daily. Peak activity by 'light tolerant' bats on the northern boundary was between 21:30 hours and 23:00 hours. During this period 1,830 of the 3,767 sonograms from Pipistrelle bats were recorded.
- However, for the 'light sensitive bats' only one sonogram was recorded before 23:00 hours and the remainder were all recorded at least 60 minutes after the floodlights are extinguished on a nightly basis. Demonstrating that light sensitive bats were absent from the area during operating hours over this June 2024 study.
- The data search from the biological record centre contained an abundance of invertebrate records. These were plotted onto a heat map and the proposed location for the sports pitch does not sit within a known important centre for scarce nocturnal invertebrates.
- The existing sports floodlights, whilst operating over fewer nights than the replacement scheme, are an old-fashioned design with significant light spillage. The revised mitigated floodlighting scheme will significantly reduce light spillage, although operating every day of the week under the same curfew.

Considering the above bullet points, the conclusion is that with the scarcity of 'light averse' bats in the survey results, the extent of light spillage from the existing provision and ecological benefits of the proposed mitigated floodlight design for the artificial pitch, it is likely that there will be a significant environmental benefit from the new proposed floodlights. This is only slightly offset in that the current lights operate for 3 nights of the week and the new floodlights will be operating for 7 nights of the week, with the 22:00 hour curfew being retained.

In this instance the mitigation, forming the basis of the assessment within this document, will result in an environmental gain whilst at the same time increasing the provision for sporting activity on the site. It is recommended that a planning condition is framed to ensure that this specification is delivered on the ground as specified. It is recommended that a planning condition is framed to ensure that this specification is delivered on the ground.

1. INTRODUCTION

This report has been prepared by BJ Collins – Protected Species Surveyors Limited for Surfacing Standards Limited. It provides the results of phase II bat surveys, triggered from the preliminary ecological walkover of the site, with regards to the proposed installation of an Artificial Football Pitch, with an associated upgraded modern floodlighting scheme. The site is located at Burgess Hill Town Football Club, Home Call Carpets Community Stadium, Maple Drive, Burgess Hill at postcode RH15 8DL.

The surveys were carried out to inform the potential ecological impact upon bat species from the installation of the football pitch, and in particular the associated floodlighting.

The aim of the survey was twofold: 1. To document the bat species which use the boundaries of the proposed facility, and identify any that are sensitive to floodlighting. 2. To assess the abundance of bat activity on the boundaries of the stadium and to identify the key times that activity is occurring, to allow an assessment of the potential impact on foraging and commuting bats.

The legislation with regards to the target species relevant to the survey is listed below.

1.1 Legislation applicable to bats

All species of British bat and their roosts are protected under British law by the Wildlife and Countryside Act 1981 (as amended), and bats are classified as European Protected Species under the Conservation of Habitats and Species Regulations 2017 ('the 2017 Regulations'). This has recently been amended by the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations (2019) which continue the same provision for European protected species, licensing requirements, and protected areas after Brexit.

The legislation makes it an offence to kill, injure or disturb a bat and/or to damage or destroy a breeding site or resting place for a bat. It is also an offence to disturb the animals such that it impairs their ability to survive, to reproduce, to nurture their young, or such that it impairs their ability to hibernate or migrate. Under this legislation development work that could affect a bat or bat roost can only be permitted under a licence from Natural England.

Licences in respect of European Protected Species affected by development can be granted under Section 55(2) (e) of The Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations (2019), for the purpose of preserving public health or public safety or other imperative reasons of overriding public interest including those of social or economic nature and beneficial consequences of primary importance for the environment.

Under Section C Regulation 55(9) of the Regulations licences can only be issued if Natural England is satisfied that:

- There is no satisfactory alternative to the work specification and
- The action authorised will not be detrimental to the maintenance of the population of the species at a favourable conservation status in their natural range.

Natural England aim to process EPS licence applications within 35 working days of receipt and Low Impact Class licenses are typically registered within 14 working days of receipt.

Lighting in the vicinity of a bat roost, which may cause disturbance and even a potential abandonment of the roost, may be classed as an offence both to a population and/or individuals.

2. SITE DESCRIPTION

2.1 Location of Burgess Hill Football Club

Burgess Hill Football Club is located to the north-west boundary of Burgess Hill. Located to the south, west and east are areas of urban development consisting of housing with gardens. The northern and east boundary of the stadium is surrounded by the Bedelands Farm Local Nature Reserve (LNR) and Bedelands Local Wildlife Site (LWS), this is an area site comprising of woodland blocks surrounding fields of open grassland. The lowland mixed deciduous woodland is also ancient woodland to large areas.

The proposed location is an existing floodlit football stadium managed intensively and located adjacent to the northern boundary of the town. The survey area is centred upon the OS grid reference, TQ31812031.

Photographs showing the general layout of the survey area are provided overleaf.



Figure 1 - location of Burgess Hill the in relation to the town of Burgess Hill, courtesy of Google Earth



Photograph 1 - showing the north and east boundary of the football stadium.



Photograph 2 - showing part of the west and the south boundary of the football stadium

3. SURVEY METHODOLOGY

3.1 Desktop Study

A desktop study which comprised a request for records of non-designated wildlife sites, wildlife species and, considering the scope of works, records of bats and bat roosts, was commissioned and is described throughout the preliminary ecological appraisal report for the site (reference 5).

The relevant sections with regards to bats and bat roosts, and nocturnal invertebrates, is included within this document.

3.2 Night-time bat walkover (NBW) and Vantage Point Survey

To allow the physical observation of bat activity and to assess bat activity over the peak foraging period a single NBW and combined Vantage Point Count (transect) were undertaken. The transect route was specifically designed to assess the impact from the required floodlighting on habitats surrounding the playing field and compare bat activity around the existing stadium and the surrounding boundary of the adjacent local wildlife site.

The route was designed by firstly carrying out a daylight walkover of the site and secondly by examination of aerial photography before attending site. With this information the NBW was designed to sample the habitats which were considered to have value to foraging and commuting bats and those that could be affected by the proposal.

The survey was designed and implemented by BJ Collins MSc MCIEEM, a licensed bat ecologist with two decades of experience assessing habitat use by bats.

The NBW and Vantage Point survey was also designed to sample within the peak activity period for bats, namely a period of up to approximately 90 minutes following sunset.

The methodology for sampling bat activity followed the methodologies designed by the Bat Conservation Trust NBMP Field Survey and those recommended within national best practice guidelines (Collins, 2023). This involved recording bat activity via a combination of static vantage points and counts between, the NBW. The surveyor was static for a five-minute period at each of the designated stop points (point count) but then continued to record bat passes for a three-minute walking period between. All bat activity being counted and recorded for the entire walked transect.

The transect route is shown overleaf. There were 9 vantage points.

The transect was undertaken on the 5th of June 2024. The survey began 22 minutes after sunset, to coincide with bat activity. The transect was undertaken by one surveyor, who was equipped with a Full Spectrum detector, continuously recording bat echolocation calls throughout the surveys. All bat activity/passes were counted and attributed to species (where possible) during the transect, with species identification confirmed by sonogram analysis using Anabat Insight and Kaleidoscope pro software.



Figure 2: The survey area and the bat survey Vantage Points 1 – 9 and location of static detectors A and B, courtesy of Google Earth.

3.3 Static/automated bat survey

A period of remote monitoring was undertaken with the objective of establishing the species affected by the lighting associated with the proposed Artificial Pitch, the extent and duration of bat activity in that location, and to establish the peak foraging and commuting times, to allow an assessment of impact from the proposed floodlighting.

To facilitate this, two Wildlife Acoustics Mini-Bat full-spectrum detectors were placed around the sports ground, the first was placed on the boundary with the local nature reserve at NGR TQ31822036, fixed to an upright of a steel fence post. The second was placed attached to a ball catch fence post on the southern boundary of the site at approximately NGR TQ31792027. Both were positioned approximately 2 metres above ground level, and positioned to record bat activity along the linear boundary.

To operate the units were set to switch on 30 minutes before sunset and run continually until 30 minutes after sunrise and were left operating until the batteries were exhausted. On completion, the units were collected, and sonograms analysed. The detectors were set to operate on 5 June 2024 and were operating until 30 June 2024, collected on 3 July. This extended period amounts to a 25 night period in the peak activity period for bat activity described by best practice guidelines. This duration was greater than the specified duration within national best practice guidance, of a 5-night survey period per survey cycle or 3 cycles of 5 nights for sites categorised as being of 'low suitability habitat' for bats.

The categorisation of proportionality of survey effort is described within chapter 3.5.

3.4 Categorisation of bat species to light tolerance

In this analysis bats are grouped together depending upon the impact upon the species from artificial lighting, as described by research and technical publications from 3 sources (references 8, 9 and 10), and also as displayed in Guidance Note 08/23: Bats and Artificial Lighting At Night, see below:

Table 1: Summary of the effect of ALAN on UK bat species.

Species	Roost	Flight Corridor	Foraging Area	Drinking Site	Migration	Landscape Level	Habitat Type
Greater Horseshoe <i>Rhinolophus ferrumequinum</i>		na	na	na	na	na	clutter
Lesser Horseshoe <i>Rhinolophus hipposideros</i>			na	na	na		clutter
Brown Long-eared <i>Plecotus auritus</i>					na		clutter
Grey Long-eared <i>Plecotus austriacus</i>	na	na	na	na	na	na	clutter
Bechstein's <i>Myotis bechsteinii</i>	na	na	na	na	na	na	clutter
Natterer's <i>Myotis nattereri</i>		na	na		na	na	clutter
Daubenton's <i>Myotis daubentonii</i>	na			na	na		edge
Whiskered <i>Myotis mystacinus</i>	na	na	na	na	na	na	edge
Brandt's <i>Myotis brandtii</i>	na	na	na	na	na	na	edge
Alcathoe <i>Myotis brandtii alcathoe</i>	na	na	na	na	na	na	edge
Western Barbastelle <i>Barbastella barbastellus</i>					na		edge
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	na				na		edge
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>				na			edge
Nathusius' Pipistrelle <i>Pipistrellus nathusii</i>	na	na	na	na			edge
Common Noctule <i>Nyctalus noctula</i>	na			na	na		open
Lesser <i>Nyctalus leisleri</i>	Please say that again	na	na		na		open
Serotine <i>Eptesicus serotinus</i>	na	na	na	na	na		open

	Positive effect
	No effect
	Negative effect
na	No data available

Data in table is indicative only, is drawn predominantly from European studies (where data available) and shows numerous data gaps due to lack of research data, therefore bat behaviour within the UK may vary and needs assessing on a site by site basis.

3.5 Survey effect

The survey effort was designed by a licensed bat ecologist with over two decades of experience and considering the proportionality of survey effort as described by Clause 4.1.2 of BS42020 and section 2.2.17 and 8.2.7 of best practice guidelines (reference 5). Specifically considering the following factors:

- The limited area of impact and size of the proposal. Including taking into account the ecological impact from the existing old-fashioned floodlighting scheme, with significant spillage.
- The predicted impact of the proposed floodlighting with a nightly curfew representing only part of the night time period each night.

3.6 Weather conditions

The weather for the NBW on the 5th of June 2024 was dry with 100% cloud cover. Ambient temperature at the beginning of the survey was 17.3° C (and 17.1° C at the close), wind speed was Beaufort 1, flying insect abundance was moderate. Sunset was at 21:18 hours.

3.7 Surveyor Details

The walking transect was designed and carried out by Mr B J Collins MSc MCIEEM, the surveys were carried out by Mr Barry J Collins MSc MCIEEM, Bat Licence: 2015-13152-CLS-CLS and Registered Consultant RC110 and B32RC002.

The remote monitoring units were set up and deployed by Mr B J Collins.

3.8 Limitations to Survey

There were no constraints to the survey, with full access available to the site.

4. SURVEY RESULTS

4.1 Desk Study

There are 99 records of bats from the survey area. These comprise the following:

- 22 records of Myotis bats with 16 records of Natterer's bat, 1 record of Daubenton's bat, 1 record of Brandt's bat, 1 record of Whiskered bat and 3 records of Whiskered/Brandt's.
- 16 records of Plecotus bats, the bulk of those being attributed to the Brown long-eared bat.
- 41 records of Pipistrellus bat with 37 of those for common pipistrelle for soprano pipistrelle.
- 2 records of Serotine bat and 1 record a Noctule bat
- 17 records attributed to species or pipistrelle species only

There are at least 5 bat species which are categorised as being sensitive to artificial lighting in their commuting and foraging phases.

There were no bat roosts of light-sensitive species within close proximity to the football ground.



Figure 3 - records mapped from the desktop study provided with 8 outlying roosts removed from the figure, to aid display and interpretation - the approximate location of the proposed pitch is shown by the yellow square.

4.2 Static/automated bat survey – Northern boundary of Stadium

The first detector was placed on the northern boundary on the fence line in line with the tree canopy of the adjacent Bedelands LNR site. The location is shown below:



Photograph 3 - showing the northern boundary of the existing football pitch. Inset is the location for the remote monitoring unit with the yellow arrow indicating its approximate position on this boundary, on the edge of the tree canopy.

As anticipated this detector recorded the greatest extent of bat activity on the site with a total with 3,781 registrations over the 25-night monitoring period. Of these some 3,767 were from Pipistrelle bats (3,565 - Common pipistrelle, 195 – Soprano pipistrelle) and only 4 passes by a Noctule bat. This was a combined total for the bats categorised as being 'light tolerant' species (as per good practice guidelines, 2023) of 3,771.

There was then 10 passes over the entire period by bats that are categorised as sensitive to light in their foraging and commuting phases. This comprised of 7 sonograms typical of *Myotis* bats and 3 typical of *Plecotus*.

The figure below shows the distribution of registrations recorded over the survey period. The y-axis shows number of registrations with the peak count of 918 and 912 sonograms for the first 105 minutes following sunset (sunset @ 21:15). Activity trailed off following that period.

The first light sensitive bat species recorded was at 22:33 hours, a long-eared bat, with the remaining 9 sonograms occurring after 23:00. This is significant with regards to the lighting curfew proposed.

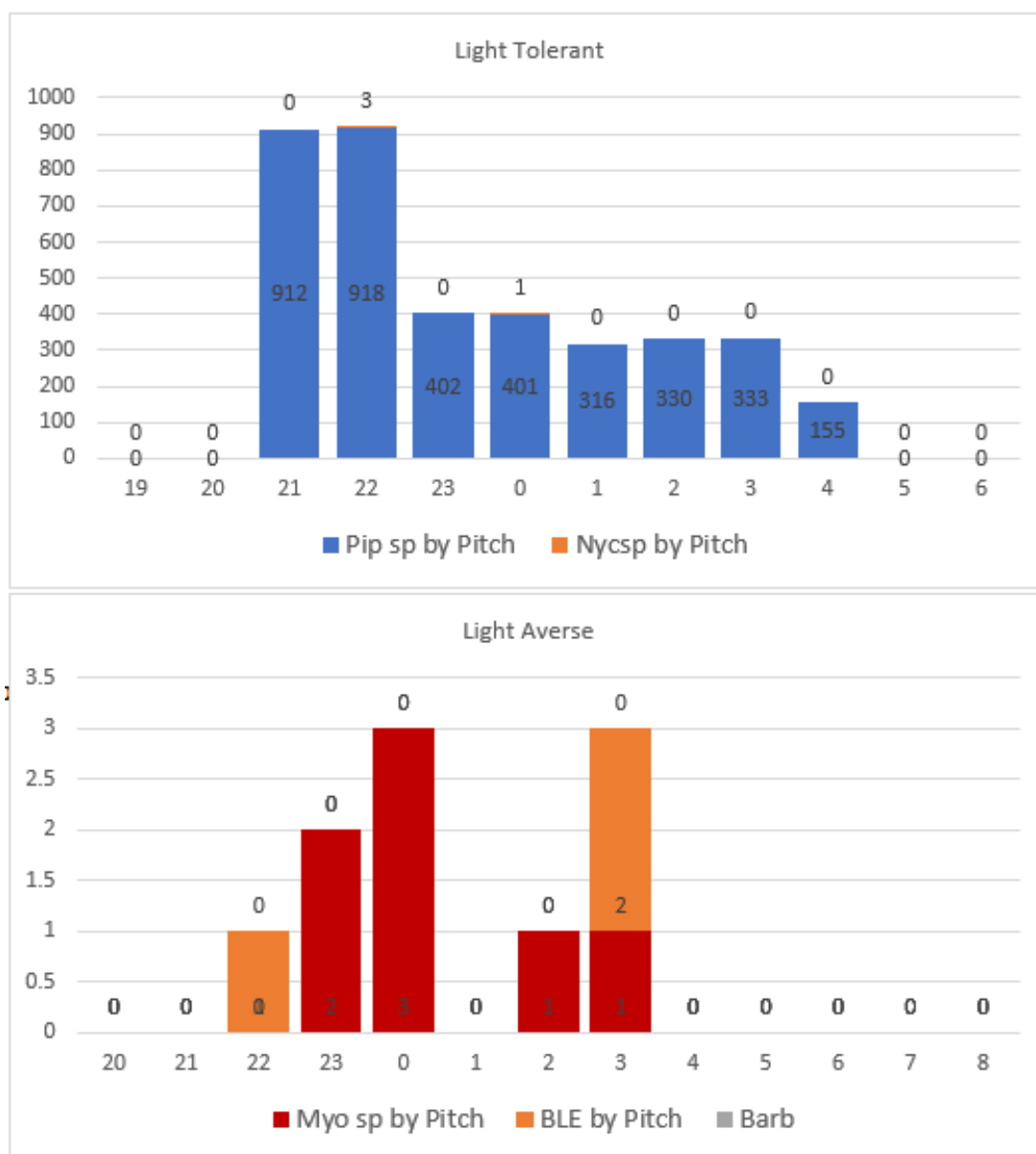


Figure 4: The distribution of sonograms recorded on the northern boundary, displayed as the number of passes over the hour of the night over the combined 25-night monitoring period (Nycsp = Noctule, Pip sp = Common Pipistrelle and Soprano Pipistrelle, Myo sp = all Myotis bats, BLE = long-eared bats).

4.3 Static/automated bat survey – Southern boundary of Stadium

This detector was located on the ball catch fence on the south-east side of the stadium adjacent the boundary fence/residential gardens. As anticipated this detector recorded a lower extent of bat activity compared to the detector positioned on the boundary of the local nature reserve on the northwest side of the stadium.

In this location there was 872 sonograms from Pipistrelle bats compared to 3,767 on the opposite side of the football pitch. Of these there were 863 from Common pipistrelle and only 9 from soprano pipistrelle. There were 5 sonograms from Noctule bat.

There was then a greater extent of bat passes by light sensitive species on the urban boundary than on the boundary of the local wildlife site with a total of 56 sonograms recorded compared to 10 passes adjacent the LWS.

This comprised of 36 sonograms typical of Myotis bats compared to 7 by the LWS and 20 sonograms typical of Plecotus compared to only 3 adjacent to the LWS.

The occurrence of bat passes is again significant given that sunset was approximately 21:15 hours across the monitoring period and the proposed floodlighting curfew is 22:00 hours. Across the 25 night monitoring period the first *Myotis* recorded was a Natterer's bat at 23:34 hours. The first *Plecotus* bat was recorded at 23:45 hours.



Photograph 4 - showing the residential boundary, the southern boundary of the stadium, the bat detector located adjacent to the trees to the far extent. The setting of the bat detector is indicated by the photograph inset.

The figure below shows the distribution of registrations recorded over the survey period. The y-axis shows number of registrations with the peak count of 256 between 22:00 and 23:00, comparable to the opposite detector with 918 sonograms over the same hour.

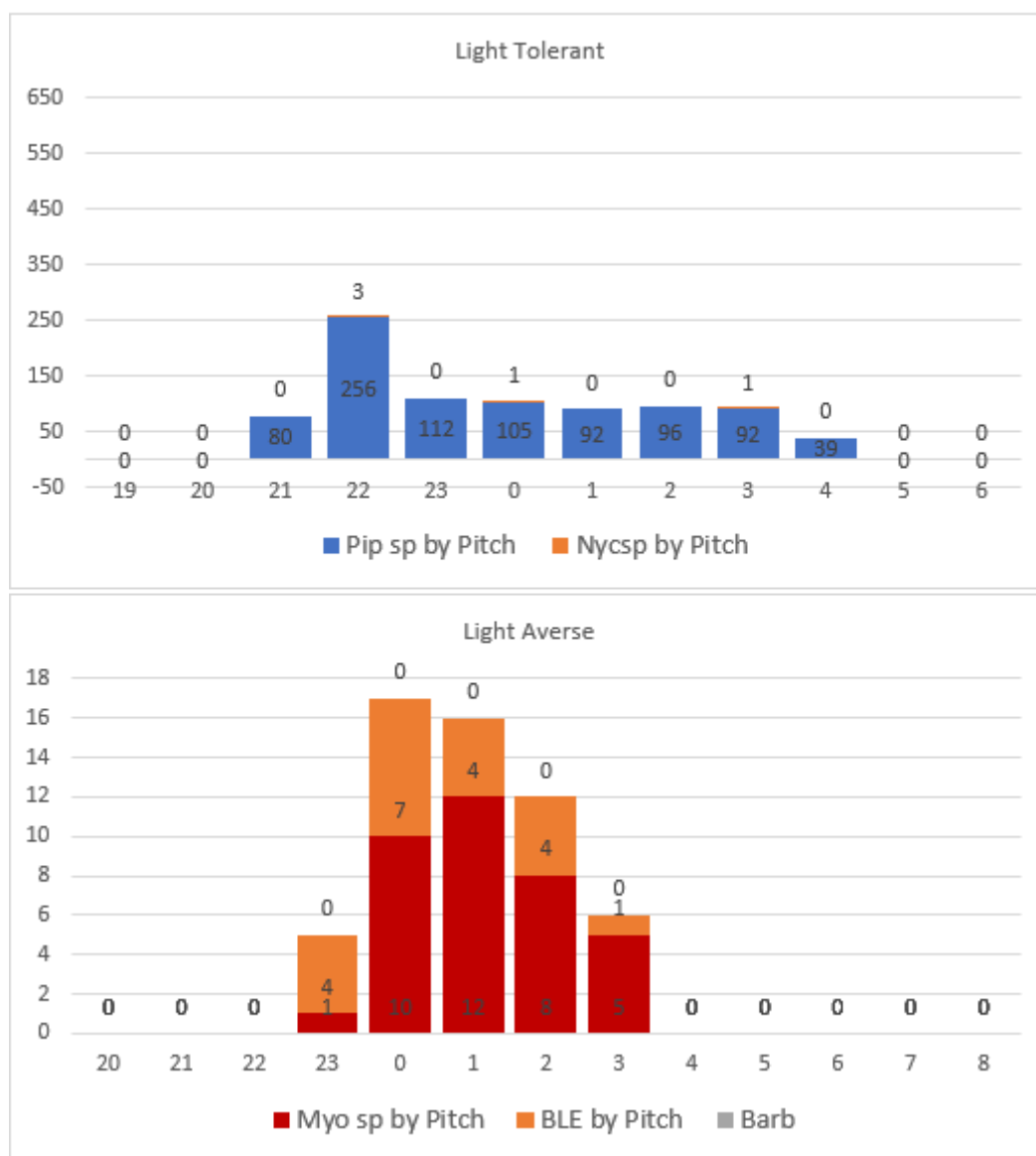


Figure 5: The distribution of sonograms recorded on the south boundary, displayed as the number of passes over the hour of the night over the combined 25-night monitoring period (Nycsp = Noctule, Pip = Common Pipistrelle and Soprano Pipistrelle, Myo = all Myotis bats, BLE = long-eared bats).

4.4 Walking Transect Surveys

There was a single Night-time Bat Walkover (Walking Transect) undertaken at Burgess Hill Town FC, on the 5th of June 2024, within the peak active season for bats. A summary of the results can be seen in Figure 6 overleaf, showing the cumulative total of bat passes at vantage stop points and the walking section between, as well as a differentiation between those species considered to be “Light Tolerant” vs “Light Averse”. Sunset was at 21:18 hours, and the survey began at 21:40, just over 20 minutes later (in line with the approximate emergence time of Pipistrelle bats). The survey was entirely dominated by bats of the *Pipistrellus* genus, first recorded at 21:48 on the south-east corner of the site, adjacent to house and the area of woodland.

The greatest abundance of activity was recorded between vantage point 3 and 4, as anticipated, alongside the woodland edge to the north of the football stadium. In a 5-minute stopped period in the north-eastern corner of the site, the surveyor noted approximately 75 passes by *Pipistrellus* bats, with an almost equal split between Common (*Pipistrellus pipistrellus*) and Soprano pipistrelle (*Pipistrellus pygmaeus*).

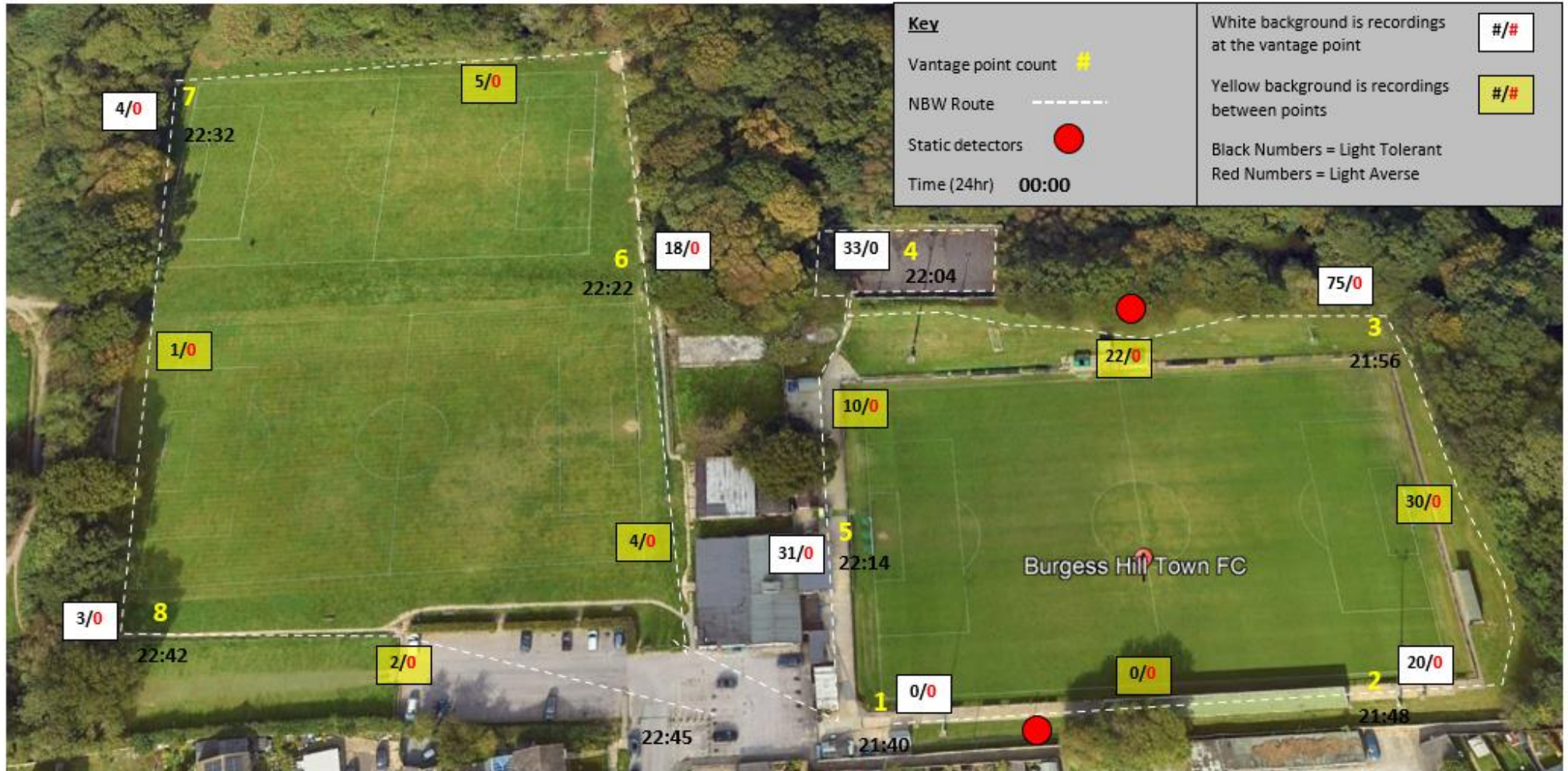


Figure 6 - The cumulative total of the number of passes recorded at the relevant stop point

5. DISCUSSION AND CONCLUSION

5.1 Discussion

The remote monitoring detector positioned along the northern boundary of the stadium and the south-east boundary of the adjacent Bedelands Local Nature Reserve (LNR) recorded the highest abundance of bat activity, dominated by Common and Soprano pipistrelles.

It was noted within the vantage point and night-time bat walkover survey that these two species were foraging almost continuously along the woodland canopy in this location and this is probably the trend resulting in 4 times the extent of bat activity here than on the boundary with the residential dwellings.

What was not expected was the extent of *Myotis* passes recorded on the boundary with the residential properties compared to the boundary of the Local Nature Reserve. Overall, *Myotis* and *Plecotus* bats were extremely rare in the dataset given that there was 25 nights of monitoring, approximately 212 hours (8.5 hours per night) of which there were only at most 56 sonograms noted compared to 3767 from bats which are tolerant of artificial lighting.

Furthermore, 56 sonograms comprises of at most 15 second sound files and therefore 14 minutes of activity in the 212 hour period. This statistic demonstrates the scarcity of 'light averse' bats in the dataset.

Referring to the desktop study, the closest records of long-eared bats were scattered around the 2-km circumference of the centre of the sportsground and are at 431 m to the east, 614 m to the south and 706 m to the north-east. The closest *Myotis* is Whiskered bat at 1.3 km to the south, Daubenton's at 1.79 km to the south and Natterer's at 1.99 km to the southeast. *Myotis* bats are therefore not recorded from the locality but Brown long-eared bats are scattered within a reasonable proximity to the site.

Across the monitoring period the bat activity recorded was dominated by bats which are categorised as being tolerant of artificial lighting in their foraging and commuting phases. Amongst those the greatest extent of activity was from the Pipistrelle bats, and in particular from the Common pipistrelle. There was then a smaller amount of activity by Noctule bats and Soprano pipistrelle.

Peaks of activity of the light tolerant bats on the northern boundary was between 21:30 hours and 23:00 hours. During this period 1,830 of the 3,767 sonograms from Pipistrelle bats were recorded.

The peak activity of 'light averse' bats was between midnight and 04:00 with only 8 of the 66 sonograms outside of that period.

The trend identified within the figures above do not indicate a maternity colony close to the site as there are no peaks of activity at dawn to match the peaks associated with foraging times following sunset.

5.2 Conclusion

The 25 night monitoring period was conducted during June, the peak of the bat activity season. This recorded a paucity of "light averse" bat species despite the proximity of an extensive area of woodland associated with the Bedelands Local Nature Reserve (LNR).

It demonstrated that the vast majority of bat activity in the locality of the football stadium was from the urban bat species and dominated by common pipistrelle, species which are tolerant of floodlighting in their foraging and commuting habits (Zeale *et al*)(reference 11).

There was however limited activity occurring by *Myotis* and *Plecotus* bats and these species are likely to be impacted by the extended daily operation of floodlighting associated with an artificial surface, compared to the existing grass surface. It is therefore recommended that mitigation is implemented.

The following chapter therefore deals with mitigating the potential negative impact of the sports turf artificial lighting.

6. MITIGATING THE FLOODLIGHTING FOR THE ARTIFICIAL 3G PITCH

6.1 Mitigating existing light spillage on site

The existing floodlight arrangement on the site is 'outdated' and lacks technology which controls the extent of light spillage. The light spillage from this system is demonstrated from the lighting contour plan provided by Surfacing Standards Ltd.

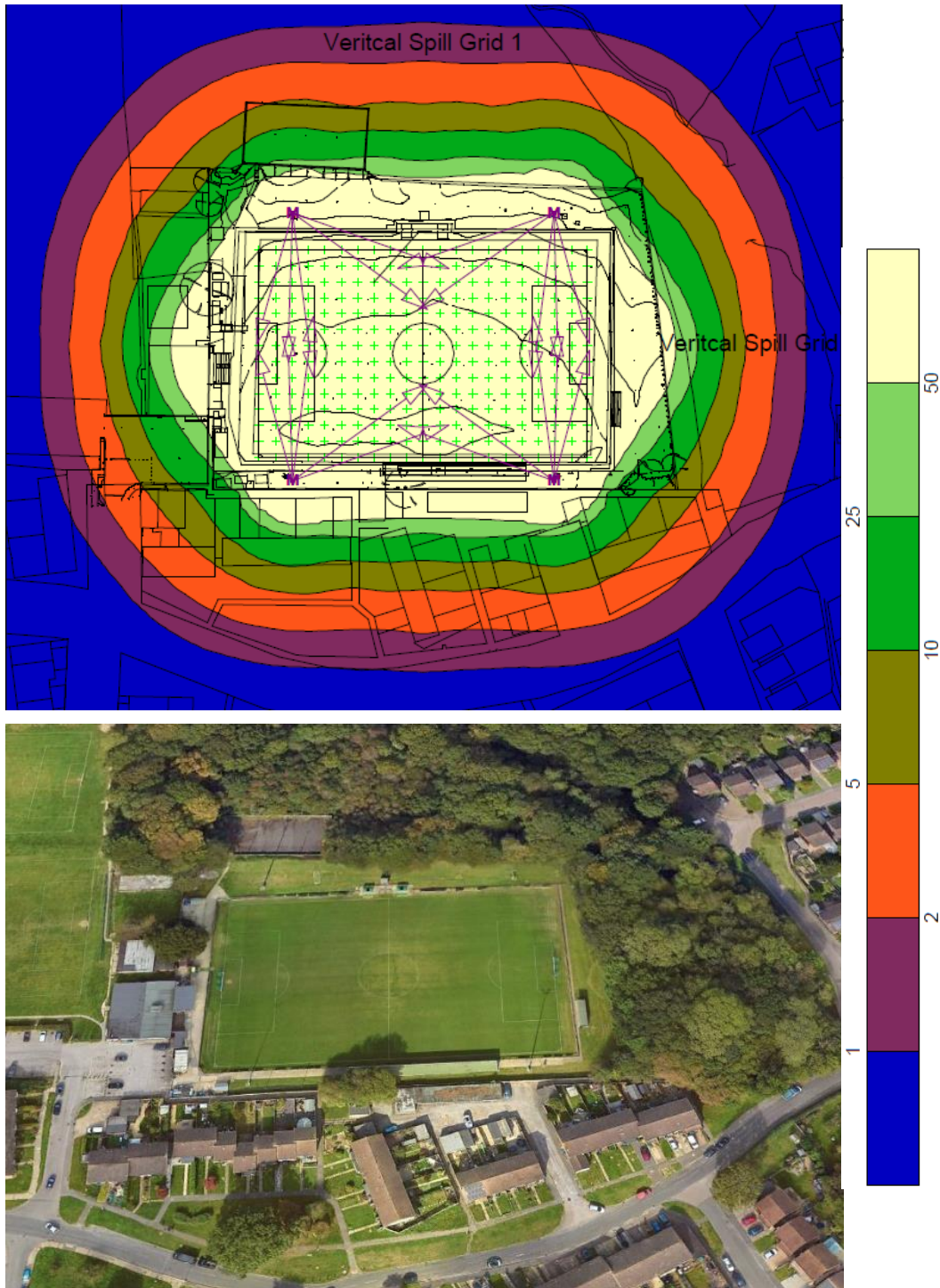


Figure 7 - identifying the extent of light spillage from the existing 'outdated' floodlighting scheme

Currently these floodlights are on in the stadium for 3 nights of the week up to a curfew of 22:00 hours. The extent of light spillage is extensive and identified by figure 7 above.

The installation of the artificial pitch will result in the stadium being in use every night of the week up to the same 22:00 hours lighting curfew. Therefore there will be an increasing the amount of nights that lighting is occurring from 3 nights a week to 7.

However, the extensive light pollution occurring from the existing floodlighting scheme will be significantly mitigated in the first instance by the implementation of the proposed modern floodlight specification. The lensing and fine cut-off control of the beam inherent in the proposed modern LED luminaires results in a sharp cut-off and reduced spillage of lighting. This is demonstrated within the specification for the floodlights for the new artificial pitch at Burgess Hill FC below, showing the proposed likes above compared to the existing below:

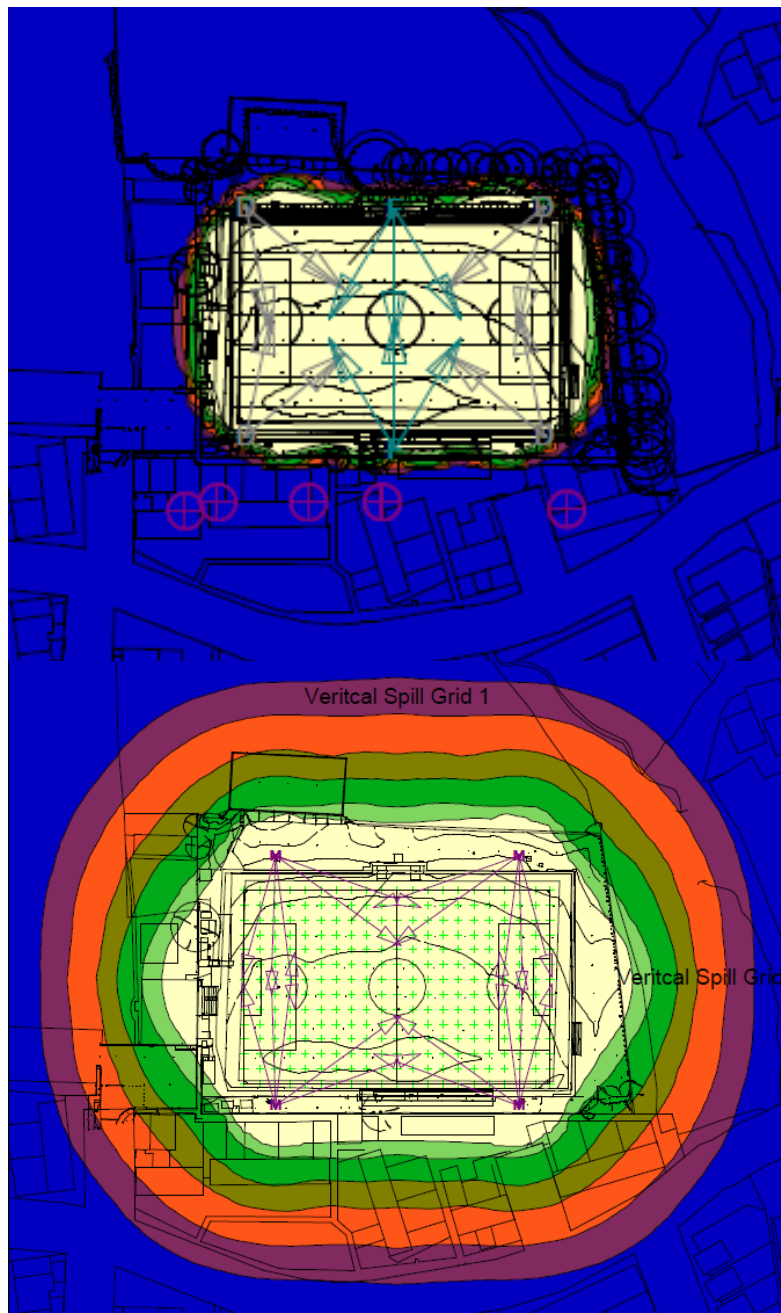


Figure 8 - identifying the extent of light spillage from the mitigated lighting scheme above and the existing 'outdated' floodlighting scheme below.

6.2 The effect of floodlighting on insects and other invertebrates

This study has only partially assessed the potential impact upon nocturnal invertebrates from the floodlighting scheme for the proposed artificial pitch.

Research has demonstrated that artificial light has the potential to disrupt ecosystems of insects and invertebrates. The impact of artificial light on shiny surfaces presents a further problem to aquatic insects and in particular egg laying females attracting them away from water. Artificial light can also attract pollinators reducing pollination rates and rendering them susceptible to predators, such as some of the bat species which are known to focus foraging activity on artificial lighting columns, the species that have been recorded almost exclusively on this boundary.

This is a very small scale development and therefore the impact to any insect and invertebrate populations in the wider countryside area is likely to be limited.

The desktop study reports a total of 58 moth species from the local area, almost all of these are associated with a recording location at least 700 metres to the east.

Many of the records were to 4 figure grid references. Therefore to allow an estimation of the importance of the pitch location for the invertebrate records in the local area these were filtered out leaving records of six-figure grid references and above. Those records were then placed into a batch converter tool by “gridreferencefinder.com” (<https://gridreferencefinder.com/batchConvert/batchConvert.php>) and then a heat map was generated to show the location of the bulk of records compared to the location of the football stadium.



Figure 10 - showing the location of the proposed artificial pitch in relation to a heat map of the invertebrate records for the 2 km circumference of the proposal

7. CONCLUSION

7.1 Summarised Conclusions

The conclusions of this report with regards to foraging and commuting bats are therefore as follows:

- The remote monitoring detector positioned along the northern boundary of the stadium and boundary of the adjacent Bedelands LNR recorded the highest abundance of bat activity, dominated by common and soprano pipistrelles, as would be expected of an urban setting.
- In contrast, *Myotis* and *Plecotus* (light sensitive bats) passes were recorded in the greatest numbers on the south boundary with the residential properties compared to the north boundary with the LNR/LWS, although very rare occurrences.
- *Myotis* and *Plecotus* bats were extremely rare in the dataset. Over 25 nights of monitoring, approximately 212 hours, there were only 56 sonograms noted compared to 3,767 from bats which are tolerant of artificial lighting. If the extent of activity on each sonogram was summed together then at most that would equate to 14 minutes of activity in the 212 hour monitoring period. These statistics demonstrates the scarcity of 'light averse' bats in the dataset.
- The closest record of a long-eared bat is 431 m to the east. The closest record of a *Myotis* species is 1.3 km to the south, so no roosts are known within the vicinity of the Stadium.
- The lighting curfew for the Stadium floodlights is 22:00 hours daily. Peak activity by 'light tolerant' bats on the northern boundary was between 21:30 hours and 23:00 hours. During this period 1,830 of the 3,767 sonograms from Pipistrelle bats were recorded.
- In contrast, for the 'light sensitive bats' only one sonogram was recorded before 23:00 hours and the remainder were all recorded at least 90 minutes after the floodlights are extinguished on a nightly basis. Demonstrating that light sensitive bats are absent from the area during the floodlight operating hours over this June 2024 study.
- The data search from the biological record centre contained an abundance of invertebrate records. These were plotted onto a heat map and the proposed location for the sports pitch does not sit within a known important centre for scarce nocturnal invertebrates.
- The existing sports floodlights, whilst operating over three nights compared to seven under the new scheme, are an old-fashioned design with significant light spillage. The revised mitigated floodlighting scheme will significantly reduce light spillage, operating every day of the week until the existing 22:00 hours curfew.

The 2024 bat monitoring carried out over a 25 night period recorded only one occasion when a single sonogram from a light-sensitive species was recorded before 23:00 hours. Apart from that all of the sonograms were recorded at least 90 minutes after the floodlights are extinguished on a nightly basis. The survey and assessment within this document therefore identifies that even if there were no lighting occurring on this site prior to the installation, that there would likely be no significant impact identified upon bat species from the mitigated artificial lighting scheme proposed. The presence of bats which are sensitive to lighting is rare and occurs after the facility has ceased to operate each night.

Indeed, the extent of light spillage currently occurring over 3 nights of the week in this locality will be significantly reduced by the proposed modern floodlighting scheme. This will have the potential ecological benefit of removing light spillage from off of the woodland canopy of the ancient woodland surrounding the site and the residential properties neighbouring.

Considering the above bullet points, the conclusion is that with the scarcity of 'light averse' bats in the survey results, the extent of light spillage from the existing floodlights and the mitigated floodlight design as part of the new artificial pitch, it is likely that there will be a reduced ecological impact overall than that which is currently experienced.

In this instance the mitigation, forming the basis of the assessment within this document, will result in an environmental gain whilst at the same time increasing the provision for sporting activity on the site. It is recommended that a planning condition is framed to ensure that this specification is delivered on the ground as specified.

8. REFERENCES

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- 2) **Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020)**. *The UK Habitat Classification User Manual Version 1.1* at <http://www.ukhab.org/>
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- 4) **Collins, J. (ed) (2023)** *Bat Surveys for Professional Ecologists: Good Practice Guidelines*, 4th Edition, Bat Conservation Trust, London.
- 5) **Collins BJ (December 2024)** Preliminary Ecological Appraisal and BNG Cover Report for Proposed Artificial Football Pitch at Burgess Hill FC, a report under contract to Surfacing Standards Ltd.
- 6) **Chartered Institute of Ecology and Environmental Management, 2013**. *Guidelines for Preliminary Ecological Appraisal*. CIEEM.
- 7) **Bugg W (2024)** *Sports Turf Floodlighting Design, Burgess Hill Football Stadium*, project code SSL3402, dated 20-11-2024, Surfacing Standards Ltd
- 8) Institution of Lighting Professionals & Bat Conservation Trust (2023) **Guidance Note GN08/23 Bats and Artificial Lighting at Night**, Institution of Lighting Professionals, Rugby.
- 9) **Stone, E.L., Harris, S., Jones, G. (2015a)**. *Impacts of artificial lighting on bats: A review of challenges and solutions*. Mammal. Biol. 80, 213-219.
- 10) **SxBRC (2024)** Ecological data search for land at Burgess Hill Town FC, On behalf of Barry Collins (B J Collins Protected Species Surveyors Ltd) Report reference SxBRC/24/378. Prepared on 20/08/2024
- 11) **Zeale, Matt & Stone, Emma & Zeale, Emma & Browne, William & Harris, Stephen & Jones, Gareth. (2018)**. *Experimentally manipulating light spectra reveals the importance of dark corridors for commuting bats*. Global Change Biology. 24. 10.1111/gcb.14462.

APPENDIX 1: STATIC DETECTOR SONOGRAMS

The following are examples of registrations recorded on the static monitoring equipment.

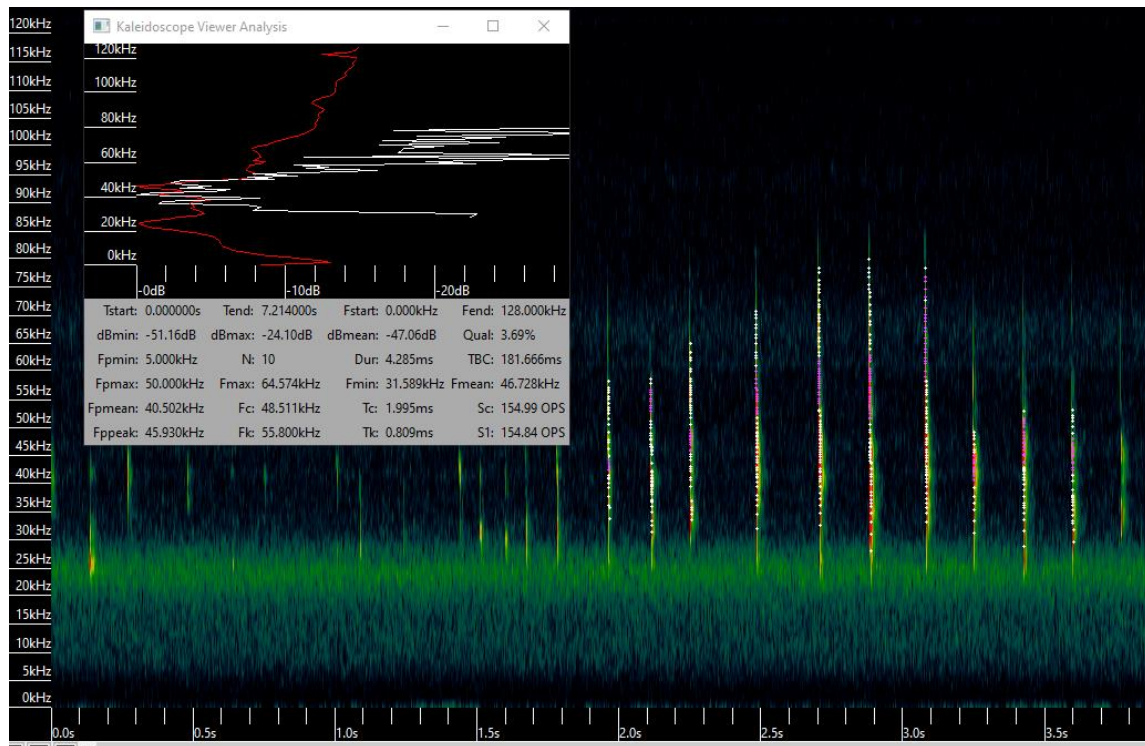


Figure 11: Representative image showing typical Myotis (Daubenton's) sonogram south of the pitch

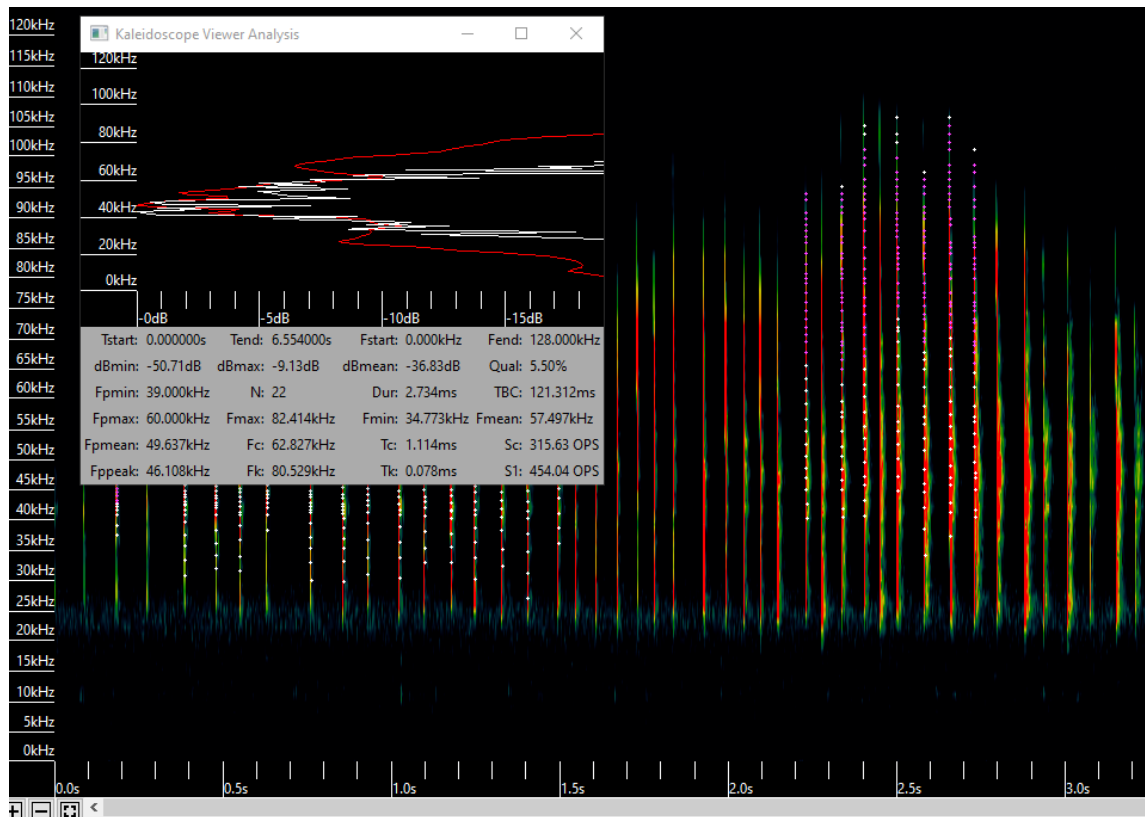


Figure 12: Representative image showing typical Myotis (Natterer's) sonogram south of the pitch

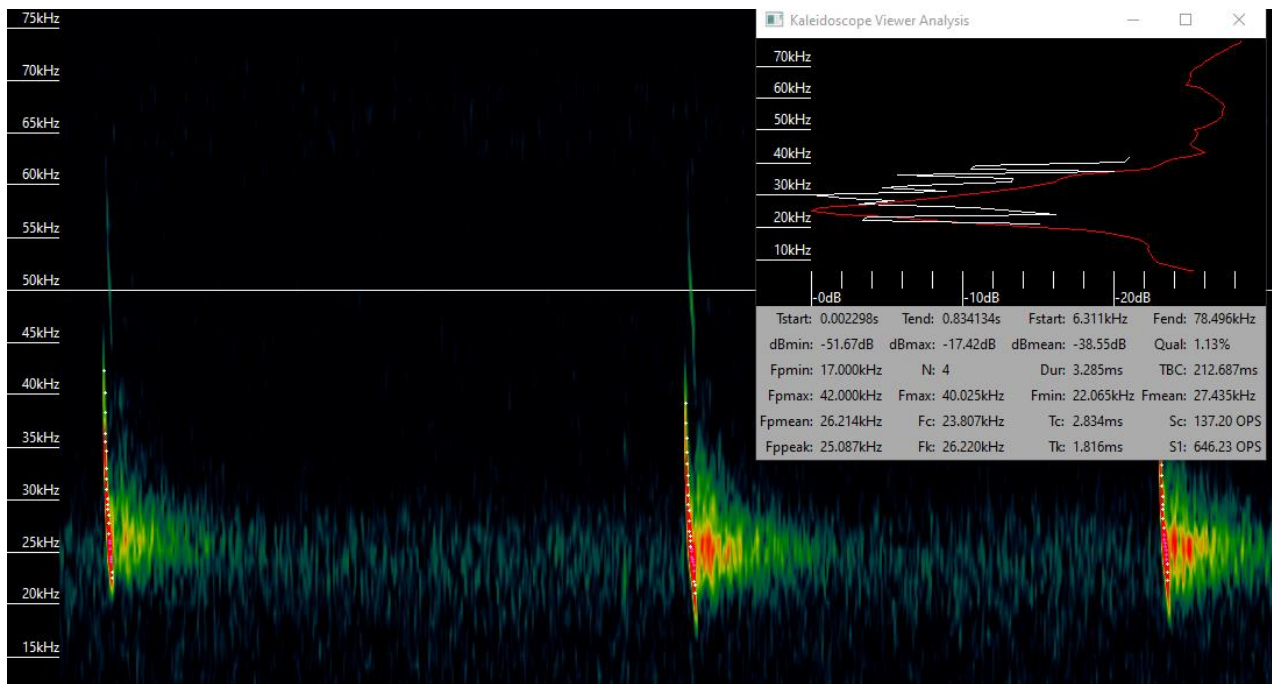


Figure 13: Representative image showing typical Long-eared bat sonogram south of the pitch

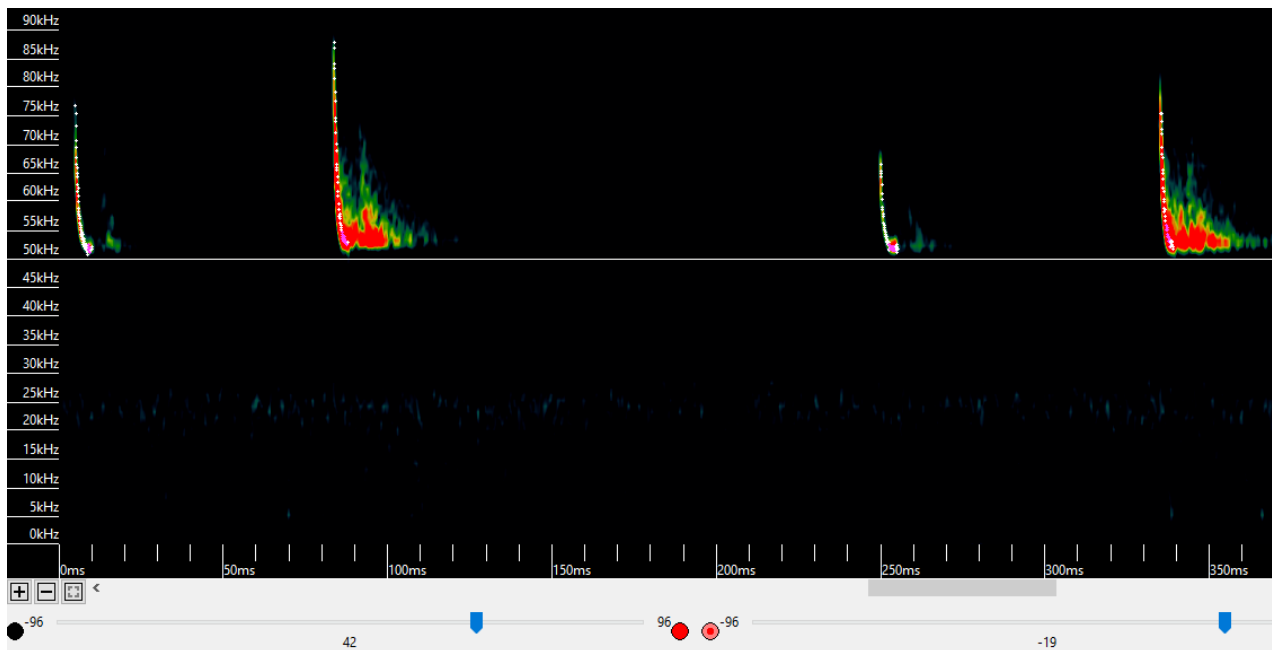


Figure 14: Representative image showing Soprano pipistrelle bat

APPENDIX 2: SPORTS TURF FLOODLIGHTING SCHEME

The proposed mitigated sports turf floodlighting scheme prepared in consultation with Surfacing Standards Ltd is included in full overleaf:

Burgess Hill Town FC

Artificial Turf Pitch

Project code: SSL3402
Date: 20-11-2024

Designer: WB

Description: Match play requirements:
Maintained average illuminance >200 lux
Uniformity Ratio (Ev.min/Ev.ave) >0.60

All luminaires have a zero upward light ratio without the use of additional accessories.

The nominal values shown in this report are the result of precision calculations, based upon precisely positioned luminaires in a fixed relationship to each other and to the area under examination. In practice the values may vary due to tolerances on luminaires, luminaire positioning, reflection properties and electrical supply.

Surfacing Standards LTD

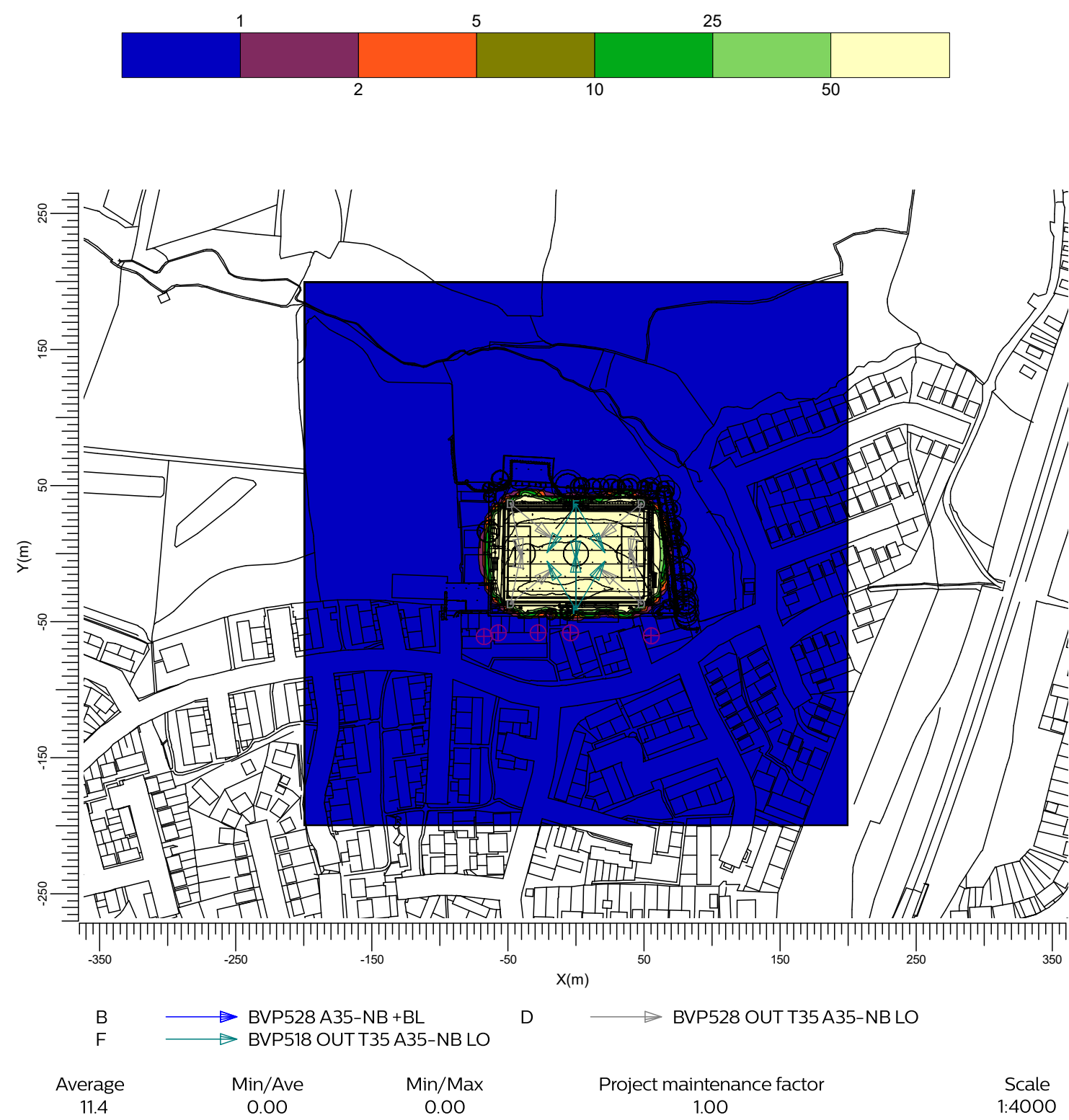
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3.3 Spillage: Filled Iso Contour

Spillage Switching

Grid : Spillage Grid at Z = -0.00 m

Calculation : Surface Illuminance (lux)



Burgess Hill FC

Existing Lighting

Date: 20-11-2024

Description: 200lux

The nominal values shown in this report are the result of precision calculations, based upon precisely positioned luminaires in a fixed relationship to each other and to the area under examination. In practice the values may vary due to tolerances on luminaires, luminaire positioning, reflection properties and electrical supply.

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3.3 Spillage: Filled Iso Contour

Spillage

Grid

Calculation

: Spillage at Z = -0.00 m

: Surface Illuminance (lux)

