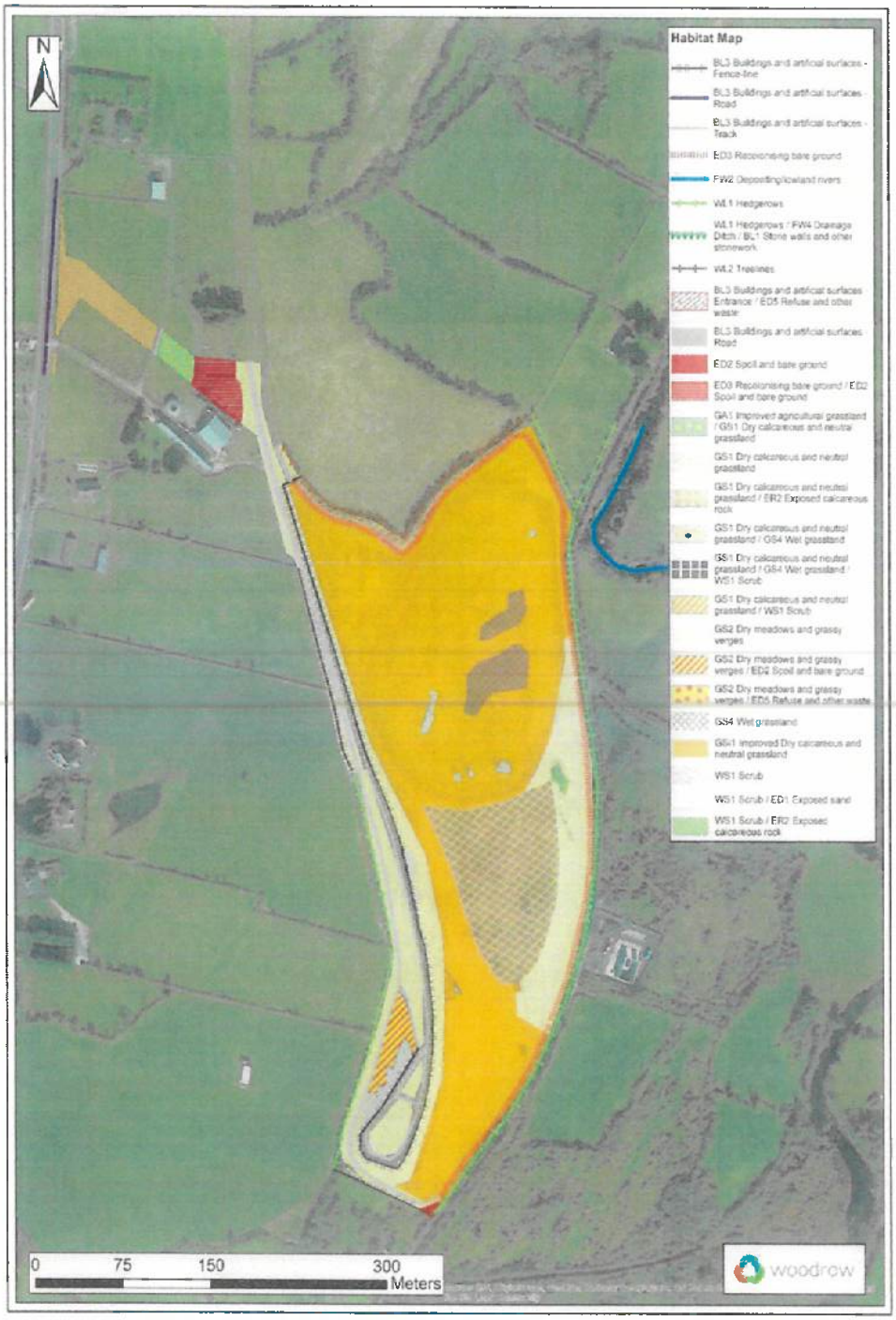
Figure 5.3 Habitat Map



WD5 SCATTERED TREES AND PARKLAND

There are a few, although very limited, immature planted trees in the Application Site, and these included species such as ash (*Fraxinus excelsior)* and hawthorn *(Crataegus monogyna).* One of the ash trees was planted on top of a manmade earth bank which supports rough GS2 Dry meadows and grassy verges grassland.

BL1 STONE WALLS & OTHER STONEWORK

A stone wall exists along the south western part of the site, along the proposed access road. See Plate 5.5 below.

Plate 5.5 A pointed limestone wall along the proposed access road

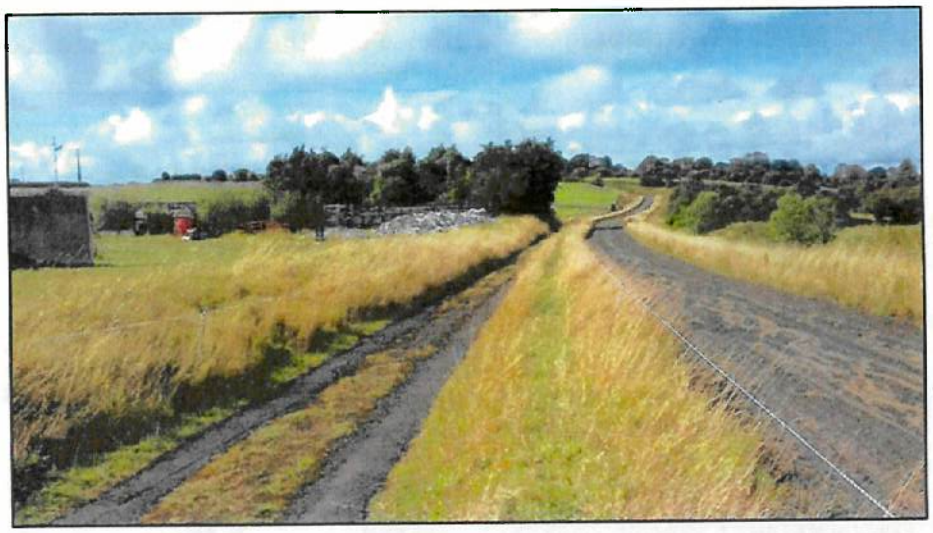
BL3 BUILDINGS AND ARTIFICIAL SURFACES

Farmyard buildings including stables and large barns exist in the north western corner of the site. A derelict house, located off-site but in close proximity to the Proposed EIA Development, south of the Application Site boundary. Although this house lies outside of the red line boundary and is partially boarded up, it was included as it is assessed as having low to moderate potential for roosting bats due to cracks, gaps and chimneys which could support roosting bats (see Section 5.4.2 for further details). Species surrounding the house included hawthorn (*Crataegus monogyna)*, ash and ornamental conifers.

There is a small, old, ivy-covered maintenance hut on the south-western boundary of the Application Site (in the vicinity of Target note 7), adjacent to a historic pipeline (above ground), however these lie outside of the redline boundary and will not be impacted by the proposed works. These features lie along the old townland boundary hedgerow. The shed door was locked, and inaccessible during the survey and there appeared to be no open crevices into the shed making it unlikely to be suitable for roosting bats.

The location of the proposed access track for the biogas plant is an existing, surfaced track, see Plate 5.6. This runs along the site's western boundary and continues around the perimeter of the site along with the eastern edge of the earth bank on the western section of the site. However, the first section of the proposed access track is currently fields and farm buildings.

Plate 5.6 Location where the proposed access road joins the existing track



ED2 SPOIL AND BARE GROUND

An area of concrete rubble existed in the south-east corner of the main site. This was deemed to provide a suitable habitat for hibernating reptiles (Target note 8, see further details in Section 5.4.2). Species here included bramble *Rubus fructicosa agg.*, Yorkshire fog *Holcus lanatus* and cocksfoot grass *Dactylis glomerata*, as well as bryophytes.

ED3 RECOLONISING BARE GROUND

This habitat occurred around the edges of the main proposed site, where the exercise track was becoming overgrown. In addition, recolonising vegetation occurred in places along Kinincha Road where plants were revegetated disturbed ground. Species recorded along the exercise track included clover sp, creeping buttercup *Ranunculus repens*, dock and dandelion. In areas of recolonising ground along the Kinincha road species recorded included Butterfly-bush *Buddleja davidii*, willow *Salix sp.*, Yorkshire fog, black medick *Medicago lupulina* and cocksfoot grass. Ivy *Hedera hibernica* dominated the recolonising habitats in the north of the Application Site.

FW2 DEPOSITING/LOWLAND RIVERS

The Gort River flows in a northerly direction to the east of the Application Site (outside of the Application Site boundary). This river comes in close proximity, *c.*17m, to the north-eastern corner of the site (Target note 1) on the opposite side of the Kinincha road. Species recorded on the hedgerow bank at this point in the road included maidenhair spleenwort *Asplenium trichomanes* and common polypody fern *Polypodium vulgare*. The river banks of the river supported a dense scrub with trees. Species included birch *Betula pendula*, hazel *Corylus avellana*, willow species, while bracken *Pteridium aquilinum*, bramble and ivy were recorded in the field layer. The ground flora included ferns such as

Hart's-tongue fern *Phyllitis scolopendrium*, which grows best on calcareous substrates. Vetch and geranium species were also recorded here within the ground flora assemblage. However, ivy was the dominant species, densely covering the ground within this riparian scrub. Although the bank-side vegetation was dense, there was no instream vegetation noted at this point in the river closest to the site (the survey was conducted outside of the optimal growing season). The river was *c.*20m wide, fast flowing, with karst limestone banks noted in places, and the depth was estimated at more than 1.5m at this point. It was not possible to see the river bed substrate. However, given that the bedrock in the area is karst limestone it is likely to support calcareous rock and gravel substrates.

FW4 DRAINAGE DITCHES

The drainage ditches within the hedgerows on this site were generally shallow (<30-50cm deep), *c.*0.5-1m wide, and wet in places. Many of the drainage ditches on the main site were overgrown with vegetation such as bramble and ivy and fenced off. Wetland plants were not recorded here due to the time of year and high level of shading within the drains.

The drainage ditches within fields along Kinincha road, particularly those within the wetland areas to the east and south-east were deeper, wider and held deeper water. Species recorded along the banks of these wet ditches included creeping buttercup, ribwort plantain *Plantago lanceolata*, willowherb species, dandelion *Taraxacum agg.*, daisy *Bellis perennis*, geranium species and broad-leaved dock *Rumex obtusifolius*. Typical wetland plants recorded in the ditches included dense mats of fools water-cress *Apium nodiflorum*, floating grass species (likely to be floating sweet-grass *Glyceria fluitans),* with stands of reed (likely to be common reed *Phragmites australis* or reed canary-grass *Phalaris arundinacea*).

WL1 HEDGEROWS

Dense, mature hedgerows surrounded the main site for the proposed Biogas plant. The mature hedgerow along the south-west of the Application Site (just outside of the Application Site boundary) is an old townland boundary line (Target note 7). Species here included blackthorn *Prunus spinosa*, hawthorn, bramble and ivy. The hedgerows around the site were dominated by hawthorn and this habitat also supported BL1 Stone walls and shallow FW4 drainage ditches in places. Species here also included hawthorn, blackthorn, bramble and ivy. Ground flora recorded within hedgerows around the site and along the Kinincha road included hart's-tongue fern, bush vetch *Vicia sepium*, ribwort plantain, geranium species, including herb-robert *Geranium robertianum*, self-heal *Prunella vulgaris* and bryophytes.

WL2 TREELINES

A mature hawthorn treeline runs along the northern-most boundary of the Application Site, see Plate 5.7. This is part of an old townland boundary. Although mature, the trunks were narrow and covered in thin strands of dense leafy ivy. The embankment was dominated by ivy, and low cushions of moss.

Plate 5.7 Mature hawthorn hedgerow along the northern boundary of the site

GA1 IMPROVED AGRICULTURAL GRASSLAND / GS1 DRY CALCAREOUS AND NEUTRAL GRASSLAND

This habitat exists to the south of the Application Site (outside of the Application Site boundary) alongside the western extents of the Kinincha Road. Species included Yorkshire fog, Meadow-grass species *Poa sp.*, curled dock *Rumex crispus ssp. crispus*, creeping thistle *Cirsium arvense*, ribwort plantain, cocksfoot grass and false oat grass *Arrhenatherum elatius* along the boundaries of these fields. These fields were notably more improved than the grasslands on the main site, with sheep grazing. They will not be impacted by the proposed works as these fields lie outside of the redline boundary.

GS1 DRY CALCAREOUS AND NEUTRAL GRASSLAND (AND MOSAICS OF THIS HABITAT)

This grassland is of conservation value due to its higher species diversity. At this site, it is likely to be the historic semi-natural grassland habitat that existed here, prior to changes in the levels during the installation of the equine exercise track. More diverse swards of this habitat occur in the central areas of the proposed site (in the vicinity of Target note 5). It also occurs in mosaics with ER2 Exposed calcareous rock, GS4 Wet grassland; and, WS1 Scrub throughout the survey area. Species recorded within the short cropped (horse grazed) sward within the centre of the main site included patches of Devil's-bit scabious (*Succisa pratensis)* (food plant of the protected Marsh fritillary butterfly (*Euphydryas*

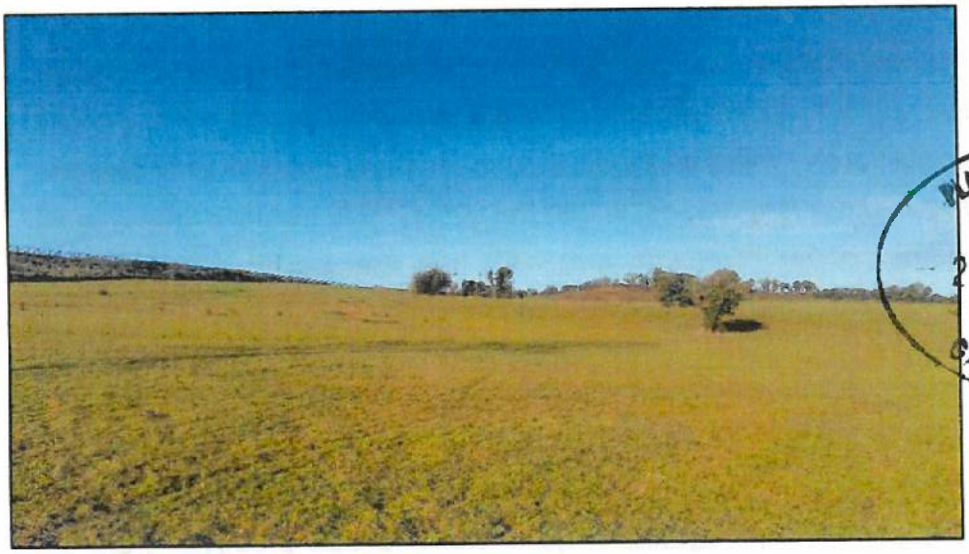
aurinia), ribwort plantain, red fescue (*Festuca rubra)*, fescue grass (*Festuca sp.)*, glaucous sedge (*Carex flacca)*, creeping buttercup, fairy flax (*Linum catharticum)*, common sorrel (*Rumex acetosa)*, primrose (*Primula vulgaris*), silverweed, common mouse ear chickweed (*Cerastium fontanum)*, yellow rattle (*Rhinanthus minor)* and a good cover of pointed spear-moss (*Calliergonella cuspidate)* – many of these species are typical of base-rich habitats. Other species recorded within GS1 grassland within the survey area included kidney vetch (*Anthyllis vulneraria)*, red clover (*Trifolium pratense)* and the grasses creeping bent *Agrostis stolonifera* and crested dog's tail (*Cynosurus cristatus)*.

Relevés were conducted on the short-sward (grazed) grassland habitat within the Application Site (see Plate 5.8 and Table 5.11) and ERICA was applied to analyse the results of these vegetation surveys from percentage cover of all species present within the relevé. The main two community vegetation types which ERICA produced from the analysis were GL3C Red Fescue– Ribwort Plantain grassland[80] and GL3E Red Fescue – Yellow Rattle grassland[81]. GL3C is a grassland community of medium to high species richness to which two Annex I habitats can align with including the priority habitat 6210 Orchid-rich calcareous grassland, on the more base-rich soils, and 6510 Lowland hay meadows. In this case however, the grassland within the Application Site does not correspond to these Annex I habitats. grasslands of this type which is important for pollinators[82]. GL3E Red Fescue – Yellow Rattle grassland is a grassland community of medium species richness. It is the community which corresponds most closely with the Annex I habitat 6510 Lowland hay meadows, but has some minor affinity with the Annex I priority habitat 6210 Orchid-rich calcareous grassland. Both of these swards are managed as grazing land (typically for cattle) and/or mown for hay. Cutting may occur once or twice a year between May and September. The main threats to these grasslands include improvement and abandonment[83].

It is evident from the habitat and relevé surveys that the site has been modified and potentially new soil brought in as the species composition differs significantly between small areas of the site. Details and results of the habitat and vegetation (relevé) surveys are found in **Table 5.11.**

[80] *Red Fescue – Ribwort Plantain grassland http://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/explore/gl3c/ (Accessed October 2019)*
[81] *Red Fescue – Yellow Rattle grassland http://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/explore/gl3e/ (Accessed October 2019)*
[82] *http://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/explore/gl3c/*
[83] *Irish Vegetation Classification Community Synopsis http://www.biodiversityireland.ie/wordpress/wp-content/uploads/GL3C-.pdf*

Plate 14 GS1 Dry Calcareous and Neutral Grassland on the site



A total of 4 1x1m quadrats or "relevés" were completed on the grassland habitat within the application site. All species were recorded within the quadrat and percentage cover recorded. Results of this vegetation survey is shown below in Table 5.11.

Table 5.11 Results of vegetation quadrat surveys conducted within the Application Site.

Quadrat	Grid reference	Location	Species (% cover)
1	-8.814315633 53.07701387		Glaucous sedge *Carex flacca* (20), ribwort plantain *Plantago lanceolata* (13), silverweed *Argentina anserina* (5), red clover *Trifolium pratense* (2), meadow buttercup *Ranunculus acris* (1), feather moss *Pleurozium schreberi* (60), curled dock *Rumex crispus* (1), dandelion sp. *taraxacum agg*. (1), common sorrel *Rumex acetosa* (1), red fuscue *Festuca rubra* (15), white clover *Trifolim repens* (1), birds foot trefoil *Lotus corniculatus* (1), mouse ear chickweed *Cerastium fontanum* (1), creeping buttercup *Ranunculus repens* (1), Yorkshire fog *Holcus lanatus* (2), creeping bent *Agrostis stolonifera*. (60), yellow rattle *Rhinanthus minor* (1)
2	-8.814353297 53.07735841		Ribwort plantain (60), sweet vernal grass (20), crested dogstail (10), glauclous sedge (1), selfheal *Prunella vulgaris* (10), red clover *Trifolium pratense* (1), ragwort *Senecio jacobea* (1), dandelion sp. (2), creeping buttercup (2), yellow rattle *Rhinanthus minor* (3), feather moss (50), meadow vetchling *Lathyrus pratensis* (3), red fescue (5).
3	-8.813959417 53.07802247		Knapweed *Centaurea nigra* (15), silverweed (3), glaucous sedge (25), dandelion sp. (5), red clover (8), crested dogstail (10), creeping bent (5), sweet vernal grass (10), red fescue

Quadrat	Grid reference	Location	Species (% cover)
			(10), feather moss (60), meadow buttercup (1), creeping buttercup(1), yellow rattle (2), selfheal (2).
4	-8.814412314 53.07852102		Red clover (25), silverweed (2), sweet vernal grass (10), crested dogstail (10), red fescue (5), creeping buttercup (7), white clover (2), dandelion sp. (5), hawksbeard sp. (5), curled dock (5), feather moss (40), yellow rattle (2), rye grass (8), meadow vetchling (2).

GSI1 DRY CALCAREOUS AND NEUTRAL GRASSLAND (IMPROVED BUT OF CONSERVATION VALUE)

This habitat occurred across the majority of the main site in areas which appear to have been re-seeded and improved for horse grazing. Species included fescue grass species, Yorkshire fog, meadow grass species, cocksfoot grass, glaucous sedge, ribwort plantain, meadow buttercup, creeping buttercup, broadleaved dock, daisy, creeping thistle, and ragwort *Senecio vulgaris*.

GS2 DRY MEADOWS AND GRASSY VERGES

There is a large man-made earth bank on the Application Site, on top of which the horse track has been installed. Given that there is less grazing occurring on the steeper sections of this embankment, much of the grassland supports a tussocky sward which falls under GS2 Dry meadows and grassy verges. Species here included Yorkshire fog, cocksfoot, false oat grass, clover species, nettle urtica dioica, creeping buttercup, meadow buttercup, broad-leaved dock, dandelion, creeping thistle, ribwort plantain, catsear Hypochaeris radicata. In addition, GS2 grassland occurs in narrow sections alongside the Kinincha Road, and where spoil has recolonised with rough grassland it forms mosaics with ED2 Spoil and bare ground.

This habitat is also important for hunting raptor species such as kestrel and barn owl which have been observed during surveys within and in close proximity to the site.

Plate 5.9 GS2 Dry Meadows and Grassy Verges on a bank along access track

GS4 WET GRASSLAND

Patches of this habitat occur in shallow depressions within the north-east of the Proposed EIA Development. Species included dominant hard rush *Juncus inflexus*, with glaucous sedge, pointed spear-moss and creeping bent – some of which prefer base-rich habitats.

WS1 SCRUB

Stands of dense scrub occur in small patches around the Application Site. This included one area which has formed on top of limestone, ER2 exposed calcareous rock. Scrub also occurred on top of a mound of loose sandy spoil just outside of the site boundary in the south-western corner of the site ED2 Spoil and bare ground (sand). An area of dense scrub exists behind the earth bank/track which is growing beside spoil which has been deposited here. Species within scrub habitats in this survey area included hawthorn, blackthorn, hazel, ivy. Along the Kinincha road elder (*Sambucus nigra)* and snowberry (*Symphoricarpos albus)* were also recorded. Ground flora in areas of scrub included bush vetch, ribwort plantain, herb-Robert, bramble aggregate, gorse (*Ulex europaeus*), nettle and lesser burdock (*Arctium minus*).

5.4.3 Bats

PRELIMINARY HABITAT SUITABILITY ASSESSMENT

A preliminary habitat suitability assessment for roosting bats was carried out across the Application Site on 15 December 2017. An update habitat suitability assessment for bats was carried out on 06 August 2019 and a number of buildings (mainly farmyard buildings and barns) were visually inspected for their potential to hold a bat roost. In addition, all trees within the Application Site were assessed for their potential to support roosting bats. Collins (2016) guidelines were used for assessing the potential suitability of features within

the Application Site to support a bat roost. BCI were also consulted to obtain any roost records in the vicinity of the Proposed EIA Development.

Overall, the Application Site itself was shown to have negligible suitability for roosting bats. An emergence survey was conducted on the derelict maintenance hut in the south west of the Application Site; however, this was not identified as a bat roost.

A preliminary assessment of the potential for foraging and commuting bat activity, and for impacts upon bats resulting from the Proposed EIA Development, was made using consultation with BCI, existing database records (obtained through NBDC), and an analysis of the habitat suitability index of the site and the surrounding area (also obtained through NBDC). The site was deemed to be of High suitability for foraging and commuting bats. The site is in close proximity to known roosts including a roost of international importance within the Kiltartan Cave (Coole) SAC. The site is well connected to surrounding habitat with a river adjacent to the site and hedgerows and treelines connecting the site to the sider landscape (Collins, 2016).

Following a data request submitted to BCI in March 2018 and September 2019, data was received detailing known bat records and roosts in the wider area surrounding the proposal. This is summarised in Table 5.9.

The BCI bat data records, shown in Section 5.3.3, indicate that the following minimum number of 8 bat species are known to occur in the vicinity of this site. These are lesser horseshoe bat *Rhinolophus hipposideros,* common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Leisler's bat *Nyctalus leisleri*, Daubenton's bat *Myotis daubentonii*, Whiskered / Brandt's bat *Myotis mystacinus/brandtii*, Natterer's bat *Myotis nattereri*, and brown long-eared bat *Plecotus auratus.*

HABITAT SUITABILITY FOR BATS

Common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*), Leisler's bat (*Nyctalus leisleri*), Daubenton's bat (*Myotis daubentonii*), Natterer's bat (*Myotis natterri*), Whiskered / Brandt's bat (*Myotis mystacinus/brandtii*) and lesser horseshoe bat (*Rhinolophus hipposideros*) have all been recorded from within a 2 km radius of the Proposed EIA Development (though noting that much of the data provided by BCI is to a 1 km resolution). Notable within the records is a lesser horseshoe roost identified within an *'old mill'* in the same 1 km grid as the proposal. It is assumed that this is likely to be Tuck Mill located some 270 m east of the Application Site boundary, on the eastern side of the Gort River.

The main area of the Proposed EIA Development largely comprises short grazed grassland surrounded to the east, south and north by hedgerow and treeline. The core of the site is considered to be of limited value for species such as lesser horseshoe and brown long-eared bats which favour more enclosed habitats. Such species are more likely to be associated with only the perimeter features of the Proposed EIA Development and linking hedgerows which they may use as commuting corridors (and ways of linking to suitable habitats including wooded river corridors, such as that adjacent to the Gort River). The same may be said, to a potentially lesser degree for *Myotis* species (though noting that some *Myotis* species may occur in grazed areas when gleaning for invertebrates at ground level for example). It is considered that the species most likely to occur within the core of the site are common and soprano pipistrelle and Leisler's bat, with other species more likely to be limited to the use of periphery habitats.

All species noted above as recorded in the wider area are considered to have the potential to occur along the roadside hedgerow habitat that can be found along the Kinincha Road or the riparian corridor adjoining the north east of the Application Site.

No bat roosts were located within the Application Site during the bat surveys, with just a derelict dwelling outside the southern boundary, considered to have some limited potential to hold roosting bats, further discussed below.

All bat species are nocturnal, emerging from daytime roosts after sunset to forage for insects using echolocation to travel and find food. Daytime roost sites include trees, buildings and underground structures such as caves and tunnels, depending on the species. Larger maternity roosts are formed during the summer. Winter hibernation roosts require a location where a stable, low temperature will be maintained.

Individual bat species vary in their exact habitat requirements but generally forage along linear habitat features such as woodland edge, hedges, treelines and watercourses, with which are associated a wide variety of flying insects. The habitat in the general area of the Application Site provides reasonably good foraging and commuting habitat for a number of bat species, consisting of semi-improved grassland intersected by hedges and treelines, with some areas of scrub.

Additional information on the suitability of habitat in the surrounding area for a range of bat species was obtained from the NBDC database, as shown in Table 5.12. This table provides a picture of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species. The index ranges from 0 to 100, with 0 being

least favourable and 100 most favourable for bats[84]. The land in the vicinity of the Application Site has a habitat suitability index of 52.67 (high) for all bats.

Table 5.12 Habitat suitability for all Irish bat species in the vicinity of the Proposed Development Site (Source NBDC, 2018)

Latin name	Common name	Suitability index
Myotis daubentonii	Daubenton's bat	52
Myotis mystacinus	Whiskered bat	61
Myotis nattereri	Natterer's bat	66
Nyctalus leisleri	Leisler's bat	63
Pipistrellus nathusii	Nathusius' pipistrelle	0
Pipistrellus pipistrellus	Common pipistrelle	56
Pipistrellus pygmaeus	Soprano pipistrelle	52
Plecotus auritus	Brown long-eared bat	72
Rhinolophus hipposideros	Lesser horseshoe bat	52

The bat species that are considered likely to be found within the core part of the Application Site (the biogas plant site itself) due to known records in the area and their habitat requirements, are generally common and widespread in Ireland. However, it is considered that the perimeter of the proposal as well as the hedgerow along the minor road connecting the site to Gort has the potential to be used by rarer species such as lesser horseshoe bats for commuting.

Taking into account bats' EU Annex IV protected status, although the bat assemblage likely to occur within the core part of the development site is considered likely to represent a feature of ***Local (Higher)*** importance, the population potentially using the area adjacent to the minor road for commuting, and the area east of the road towards the river, is considered likely to represent a feature of ***County*** importance.

BAT ACTIVITY SURVEYS

Dusk and dawn bat surveys were undertaken in summer 2018 and summer 2019 in the form of walked transects around the site which incorporated emergence and re-entry roost watches at potential roost sites, discussed separately below.

Waked transects

Echo Meter (EM3) bat detectors and Bat Loggers were used during the surveys to detect the species recorded throughout the survey. See Figure 5.4 and Figure 5.5 for the transect routes walked during the 2018 and 2019 bat activity surveys. See Figure 5.6 –

[84] *Lundy M.G., Aughney T., Montgomery W.I. and Roche N. (2011). Landscape conservation for Irish bats and species-specific roosting characteristics. Bat Conservation Ireland.*

Figure 5.12 for the results of all transects, including where bats where recorded along each transect survey.

Roost emergence and re-entry surveys

Dusk and dawn bat activity surveys, including dusk emergence and dawn re-entry surveys, were conducted on 28 and 29 June 2018 and 30 and 31 July 2018. See Figure 5.4 and 5.5 for the location of roost watch surveys conducted during the 2018 and 2019 bat activity surveys.

A dusk and dawn bat activity survey including dusk emergence and dawn re-entry surveys, was also conducted on 06 August 2019 and final dusk activity survey and emergence survey was undertaken on 20 August 2019. As stated in Section 5.2.5, bat surveys were carried out in accordance with recommended guidelines, under specific specifications, weather conditions and safety requirements.

Roost watches were conducted on features deemed to be of moderate to high bat roost potential. A derelict house, located to the south of the Application Site, outside of the redline boundary, was shown to have moderate potential for roosting bats. A total of two emergence surveys and two re-entry surveys were conducted on this building, during the 2018 and 2019 bat surveys, to determine if this structure supported bats and the numbers of bats. The results of these roost surveys are provided below in Table 5.13.

Table 5.13 Bat roost survey results from buildings within the surrounding area of the application site.

Survey Date	Roost survey type	Number of roosting bats observed	Bat species
28/06/2018	Dusk emergence	3 emerging	*Soprano pipistrelle*
06/08/2019	Dusk emergence	2 emerging	*Soprano pipistrelle*
07/08/2019	Dawn re-entry	1 re-entering	*Soprano pipistrelle*
20/08/2019	Dusk emergence	6 emerging	*Soprano pipistrelle* and common pipistrelle

Figure 5.4 **Locations of roost watches and transects conducted during 2018 bat activity surveys.**

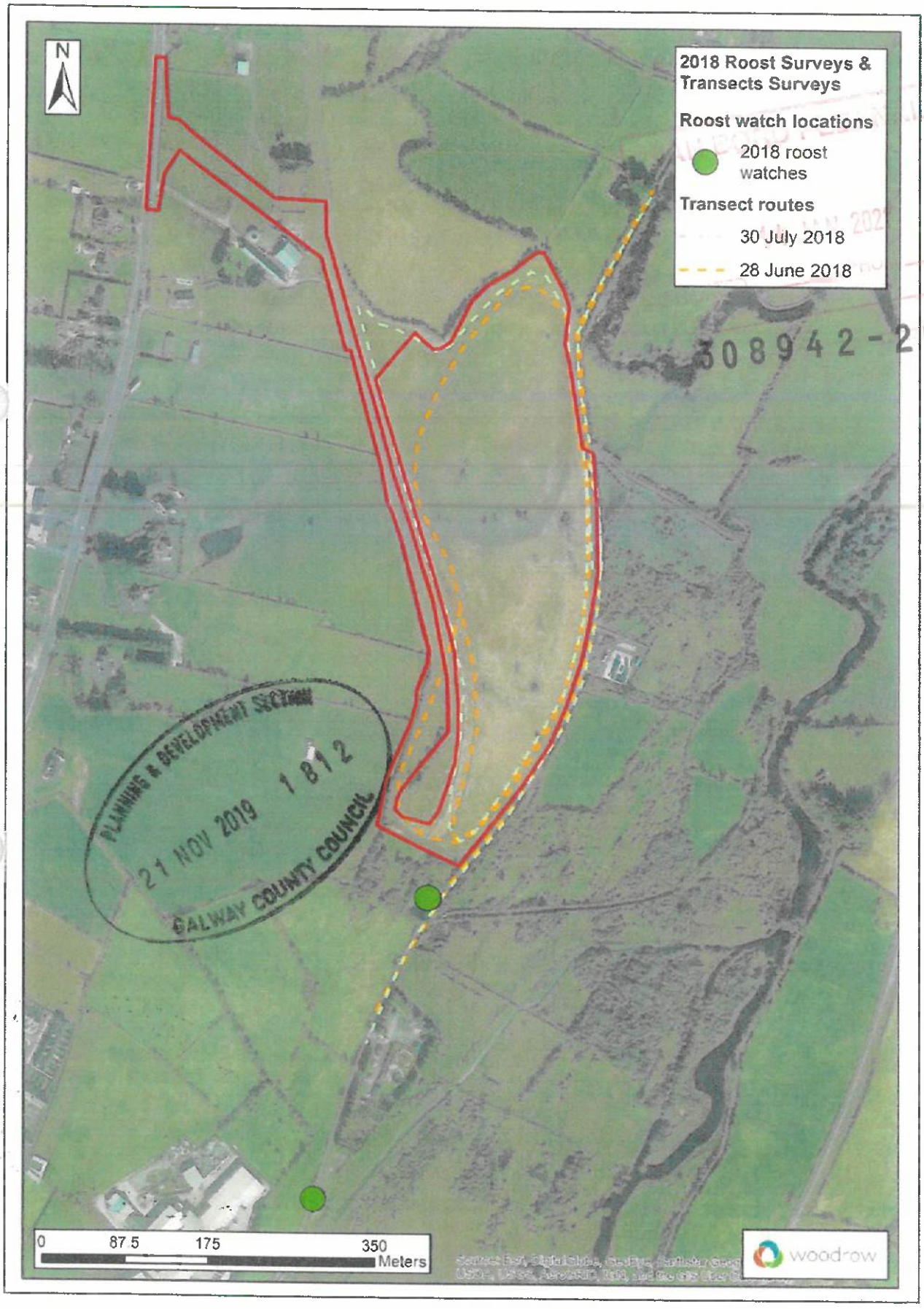



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Figure 5.5 **Locations of roost watches and transects conducted during the 2019 bat activity surveys.**

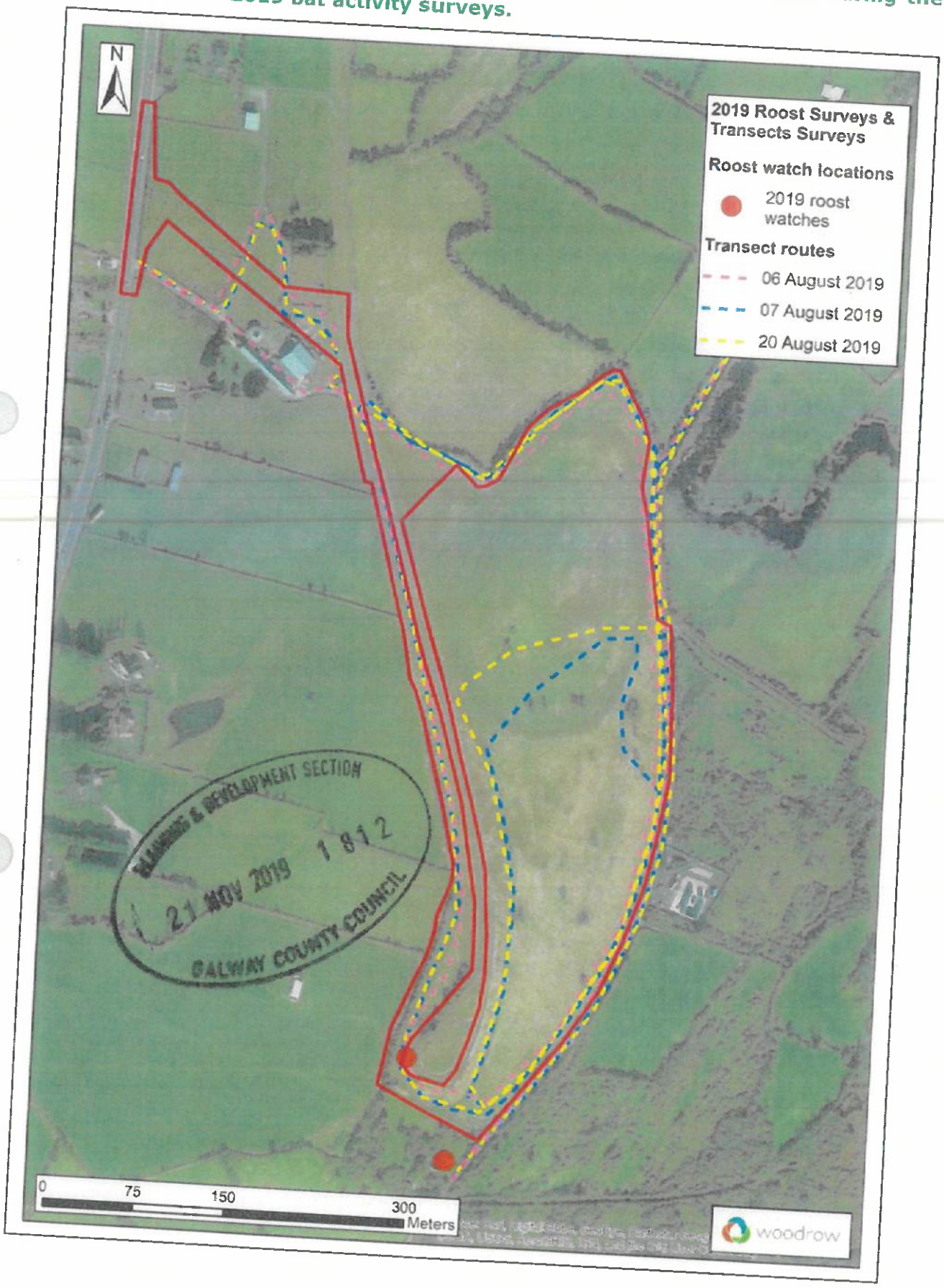


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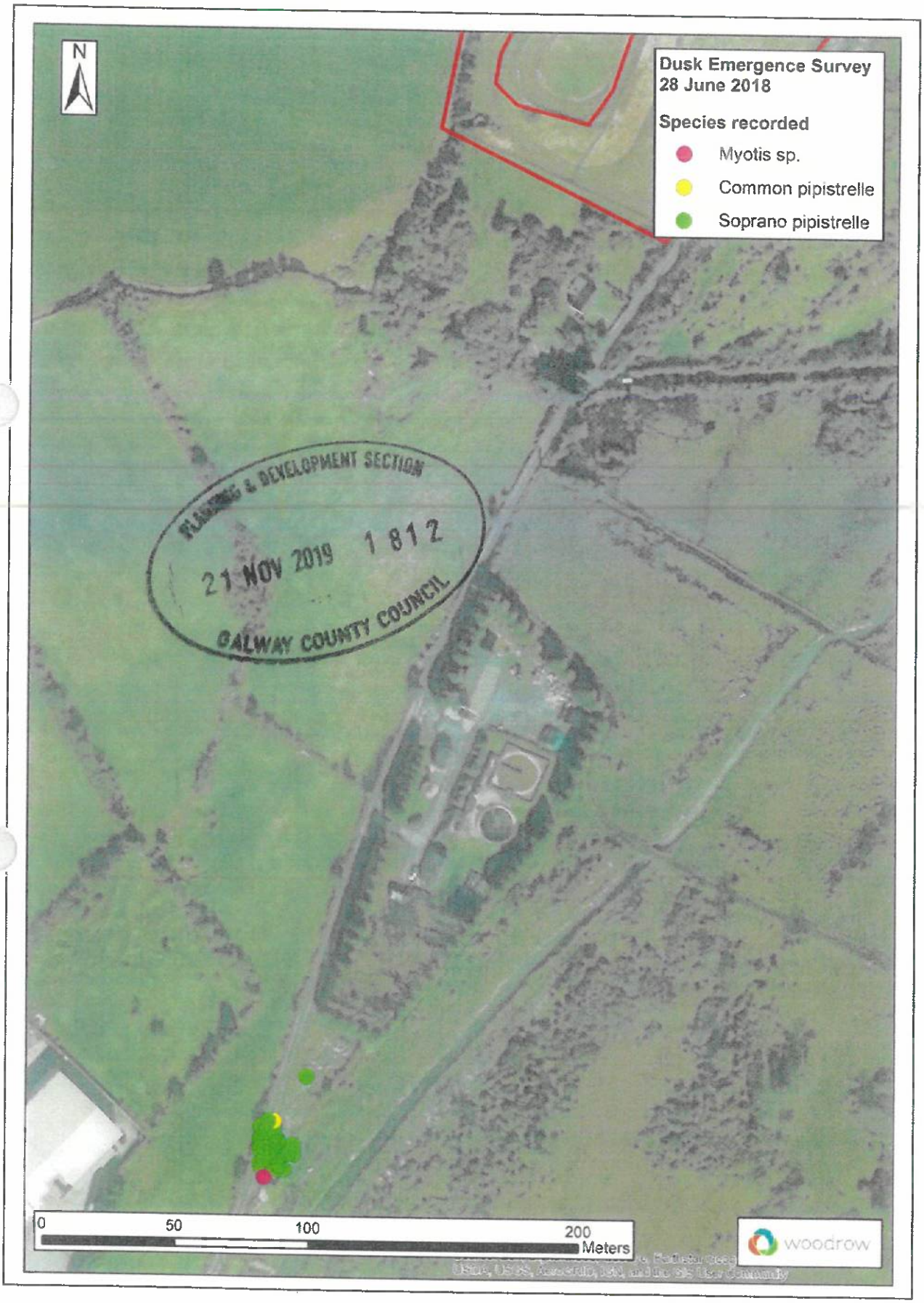
Figure 5.6 **Locations of bats recorded during a dusk emergence survey on 28 June 2018.**



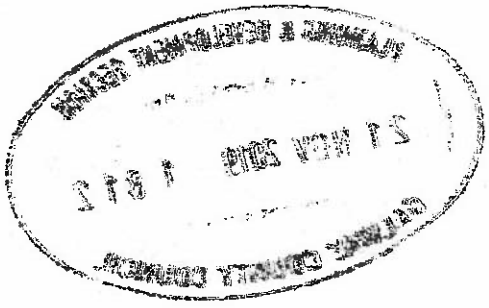


Figure 5.7 **Locations of bats recorded during a dawn re-entry survey on 29 June 2018.**

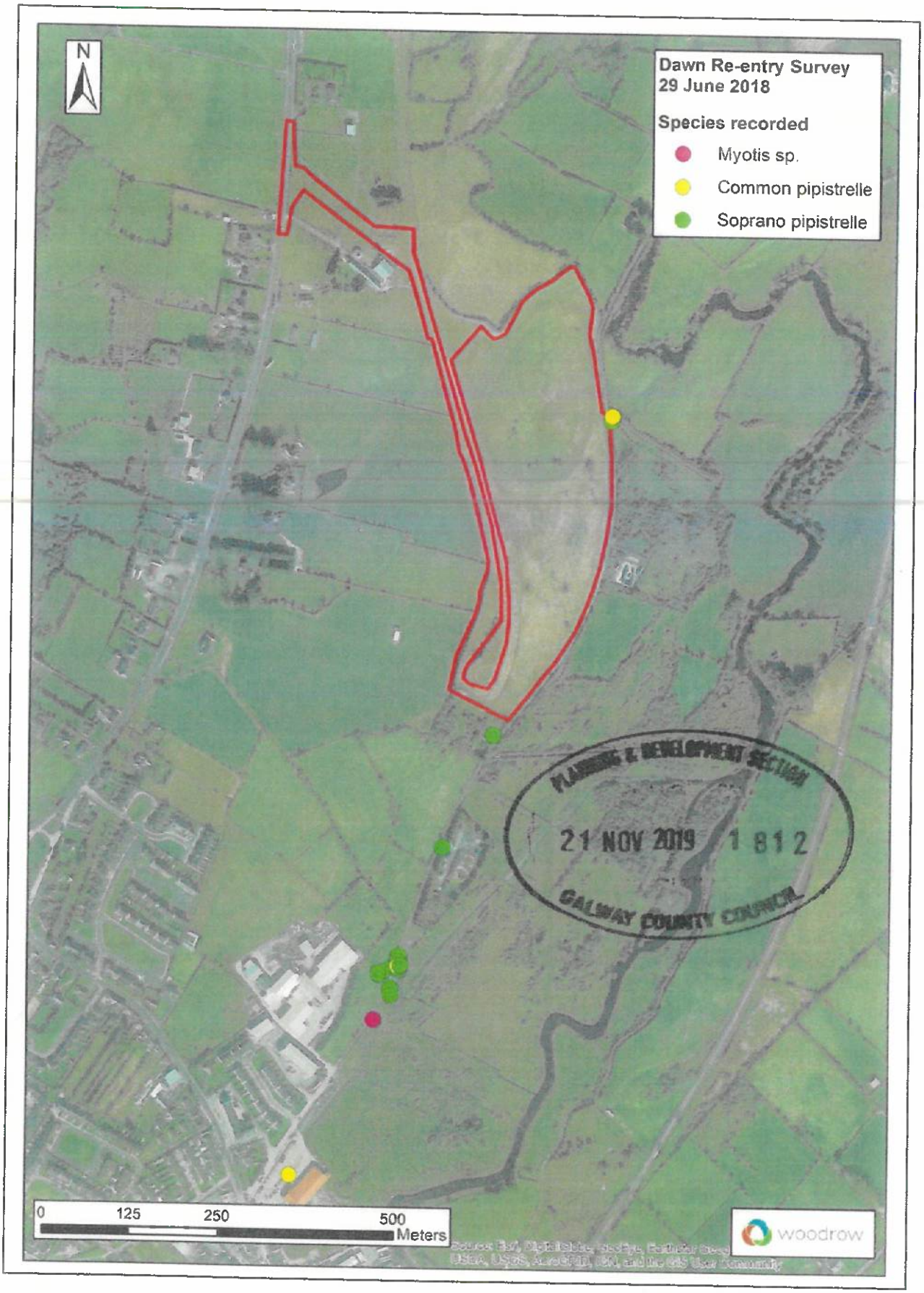



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Figure 5.8 **Locations of bats recorded during a dusk transect on 30 July 2018.**

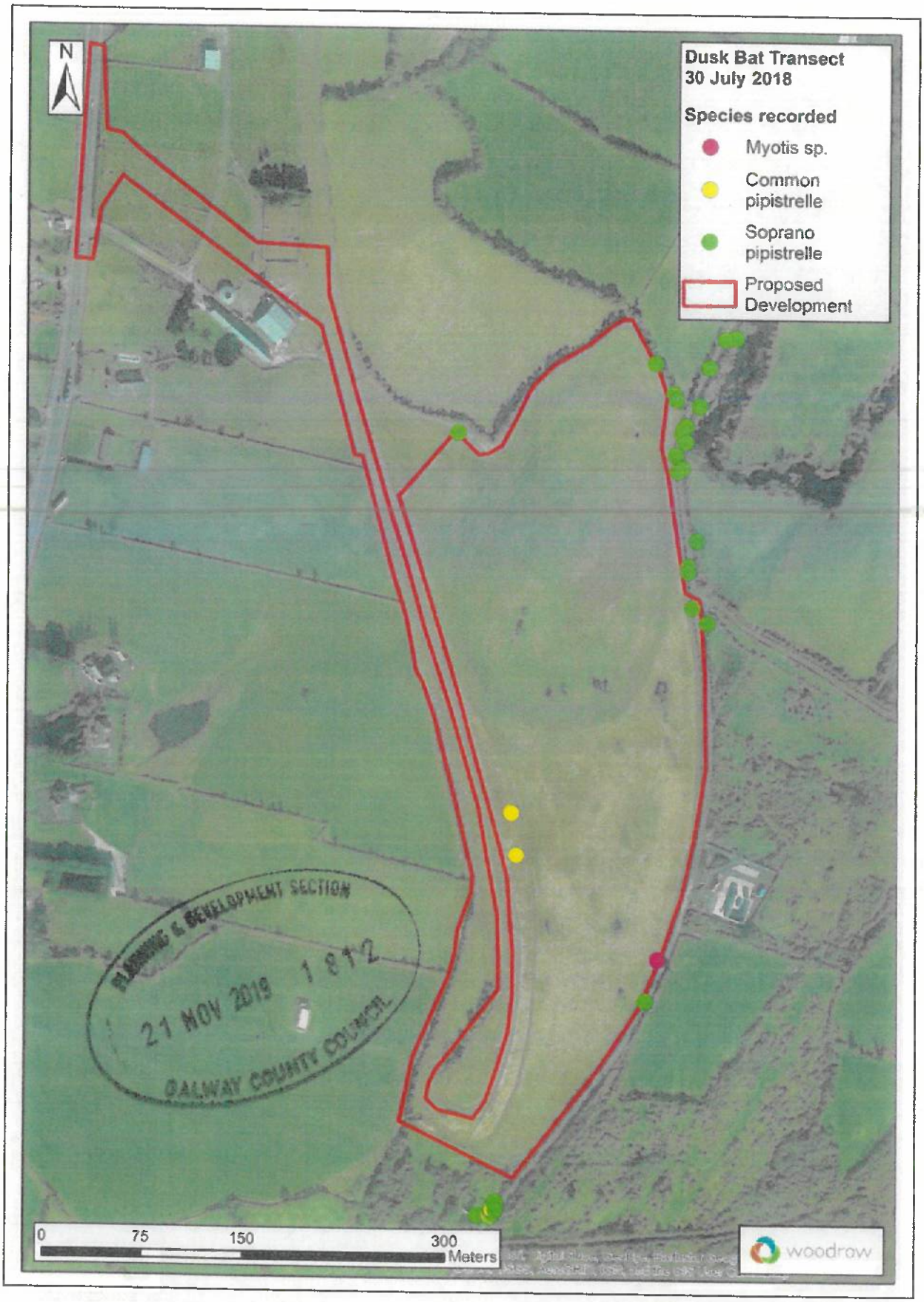


Figure 5.9 Locations of bats recorded during a dawn transect on 31 July 2018.

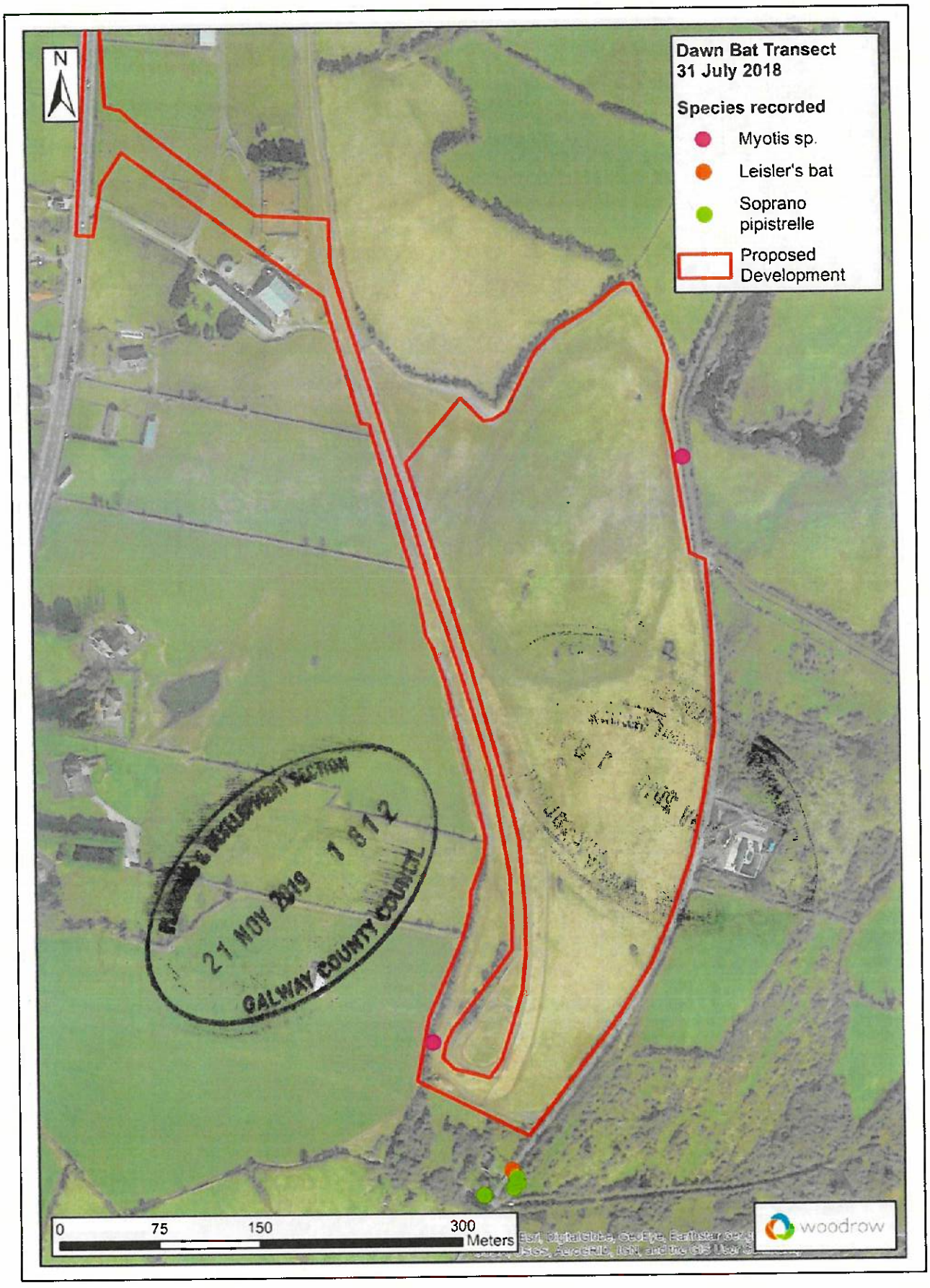


Figure 5.10 Locations of bats recorded during a dusk transect on 06 August 2019.

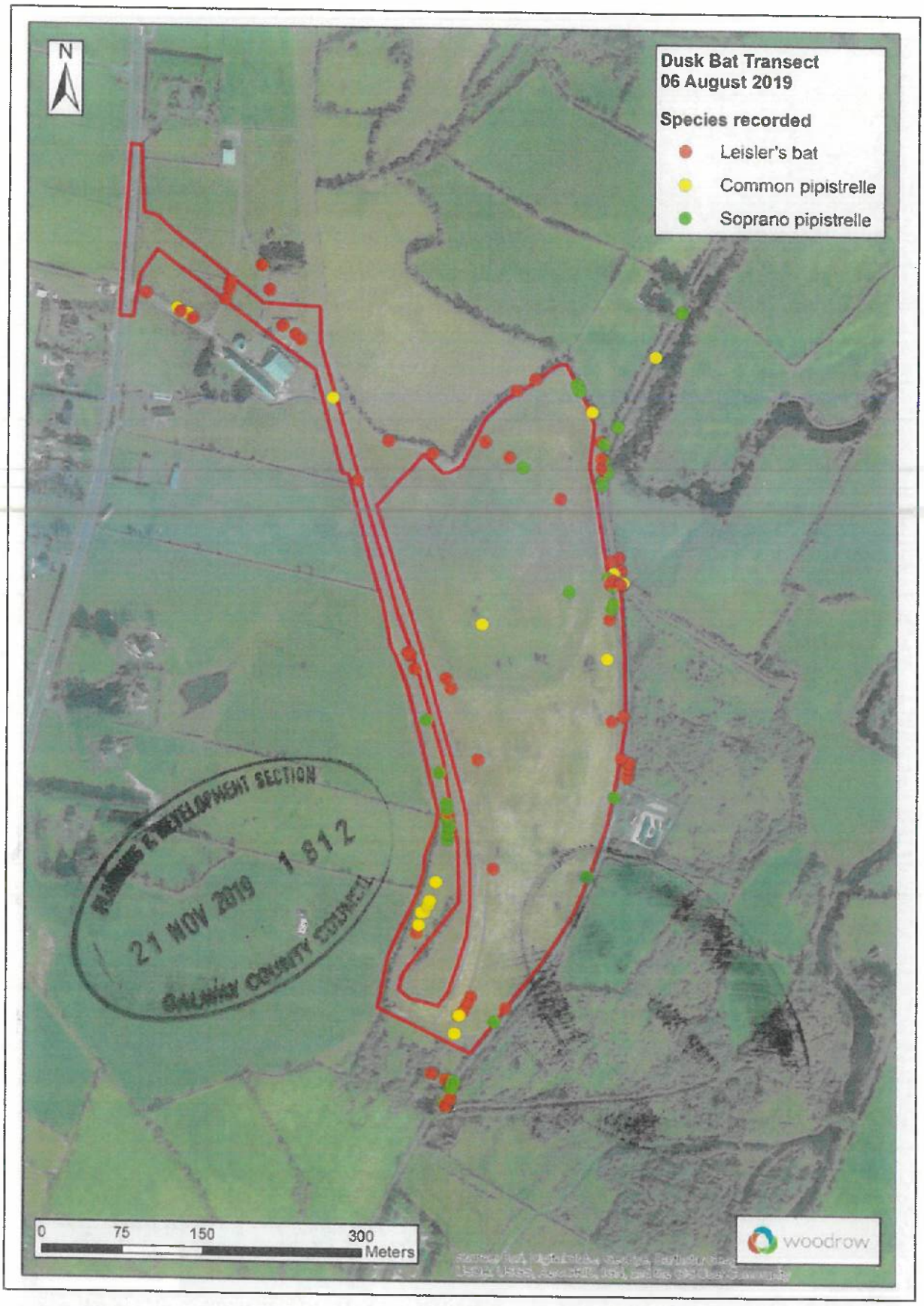


Figure 5.11 Locations of bats recorded during a dawn transect on 07 August 2019.

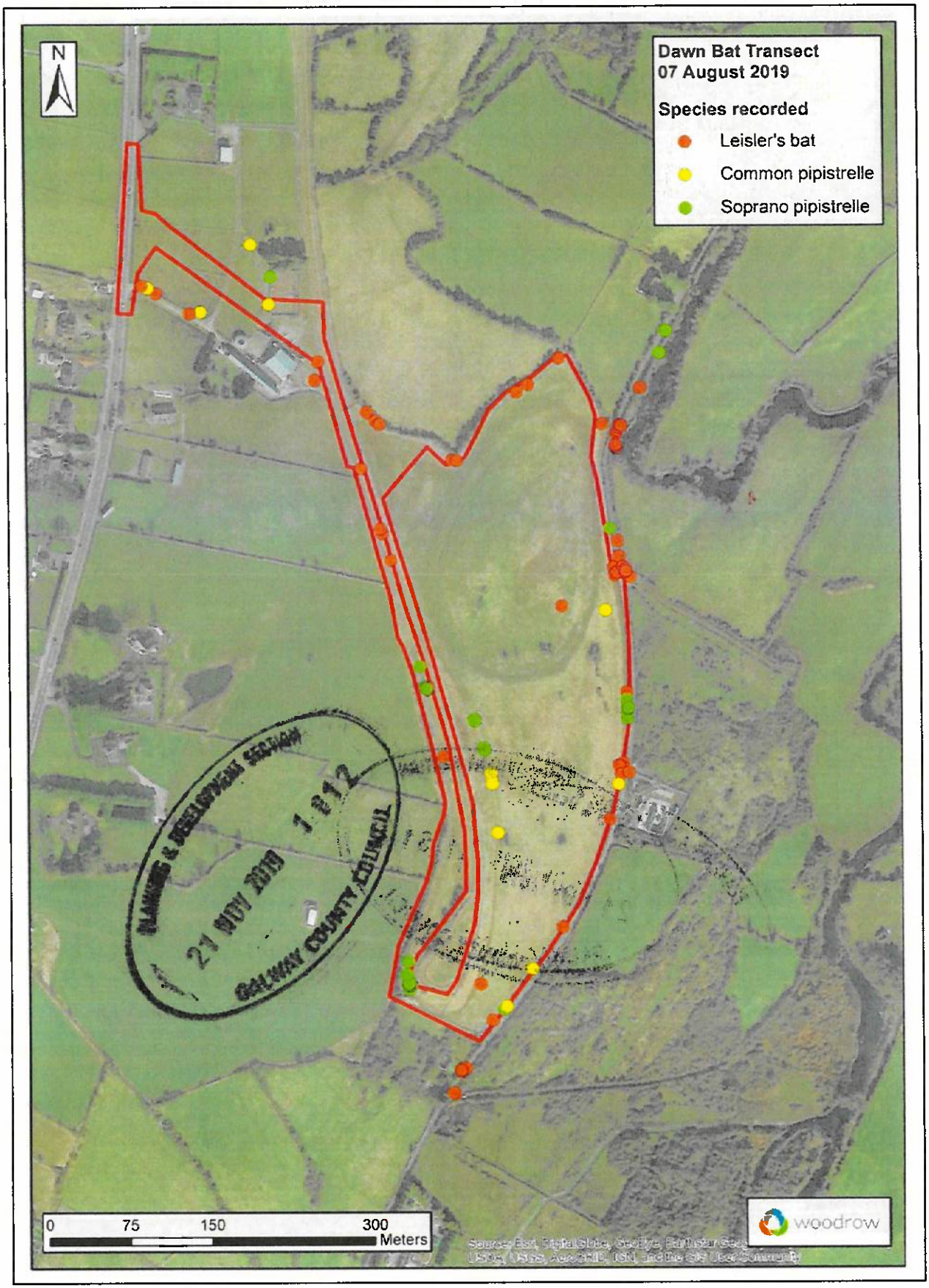
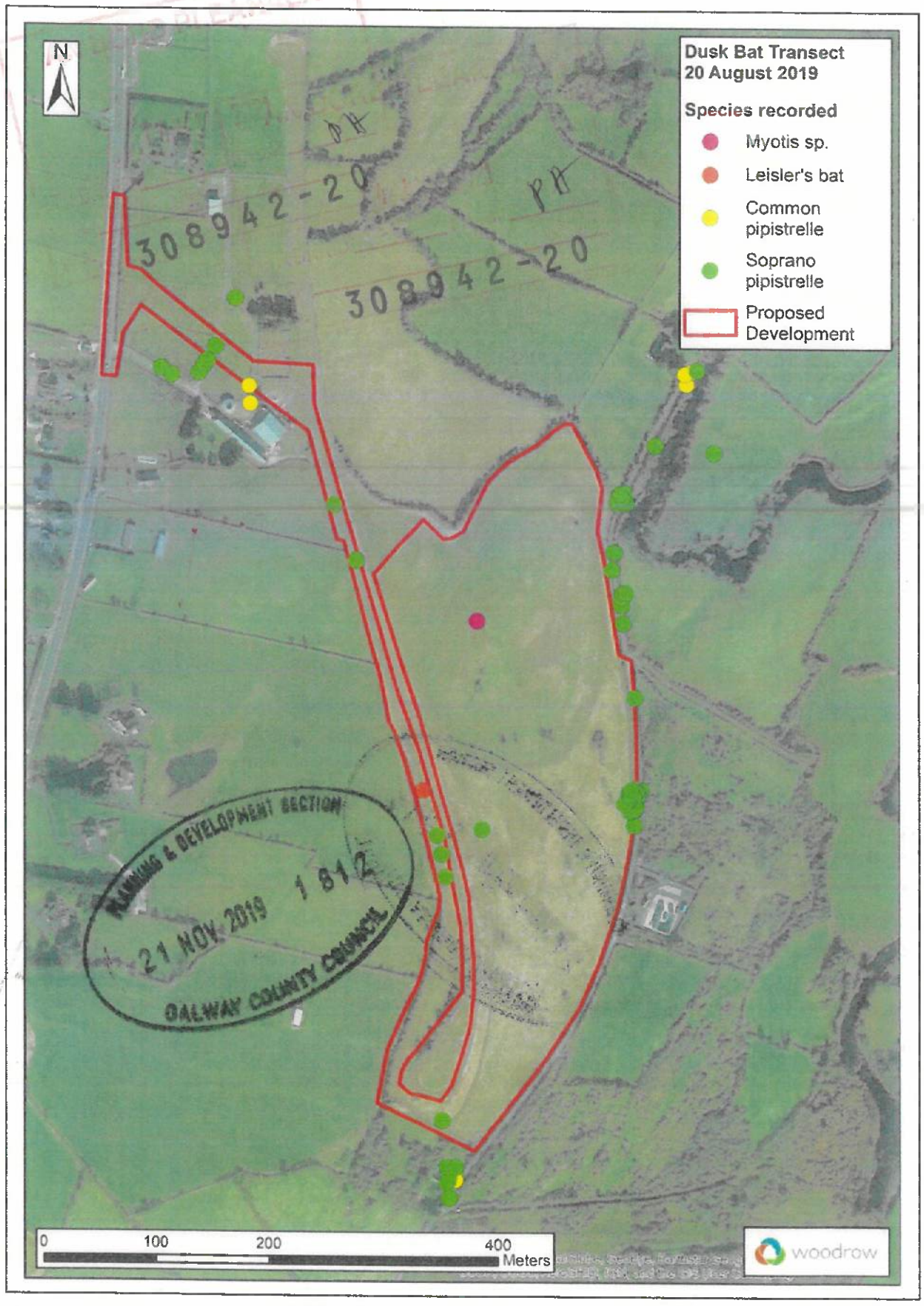


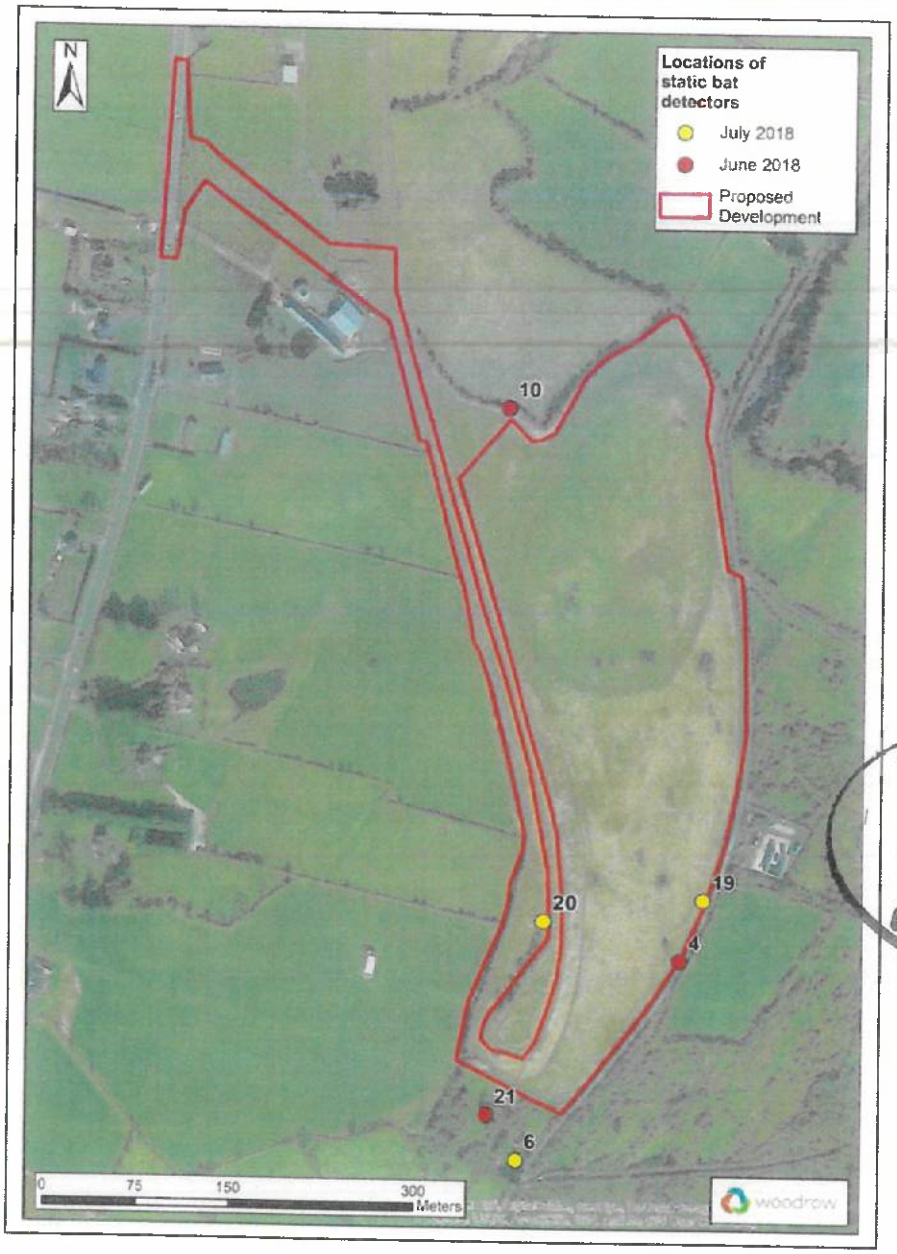
Figure 5.12 Locations of bats recorded during dusk transect on 20 August 2018.



STATIC BAT SURVEYS

Static bat detectors were deployed in 2018 in the form of Song Meter 2 (SM2s) on 29 June 2018 and 27 July 2018. A total of four units were left on site for 2 weeks (14 nights). These were positioned strategically around the site to detect bat activity in all areas of the site and along potential foraging and commuting habitats. See Figure 5.13 below for a map showing locations of all static detectors and Figures 5.13(b)-5.13(i) for the results of the static surveys*[85].

Figure 5.13(a) Static bat detectors deployed within and in the vicinity of the site.



[85] *PIPI- Common pipistrelle, PIPY- Soprano pipistrelle, NYLE- Leisler's bat, MYSO- Myotis sp., RHHI- Lesser horseshoe bat.*

Figure 5.13(b) Bats recorded at Unit 5 deployed in late July 2018.

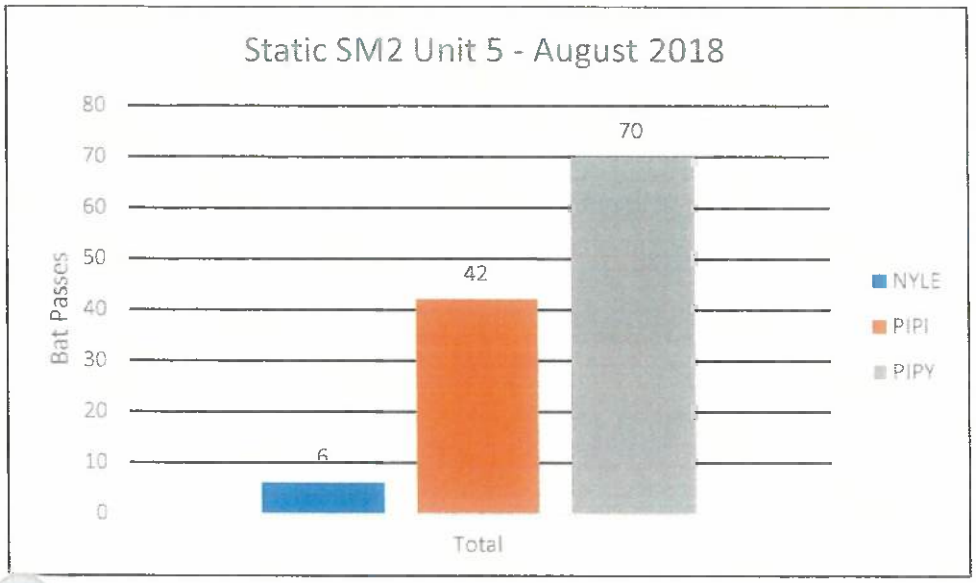


Figure 5.13(c) Bats recorded at Unit 6 deployed in late July 2018.

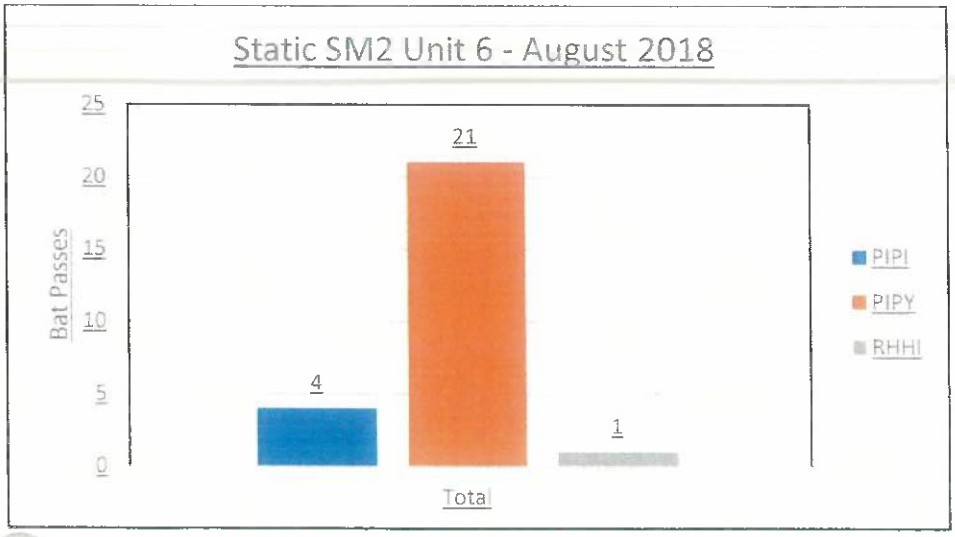


Figure 5.13(d) Bats recorded at Unit 19 deployed in late July 2018.

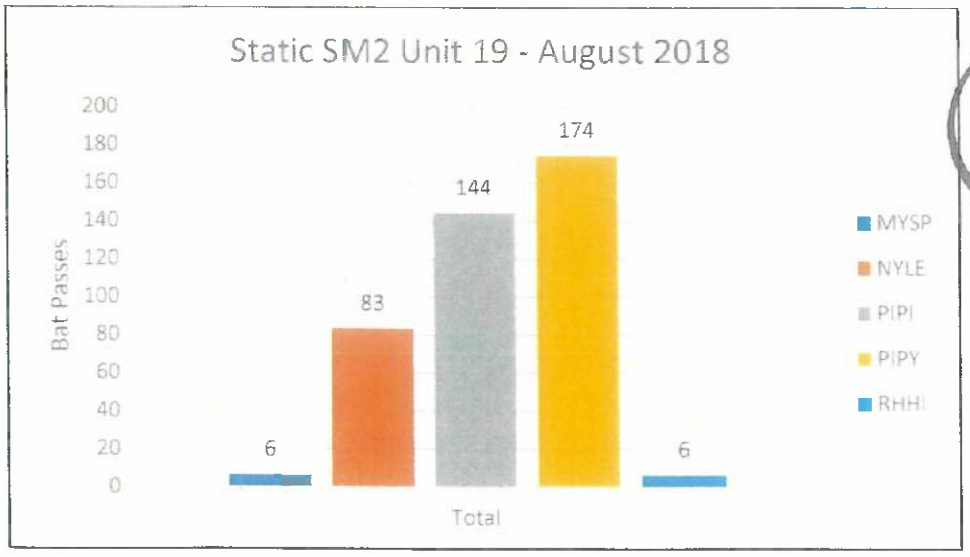


Figure 5.13(e) Bats recorded at Unit 20 deployed in late July 2018.

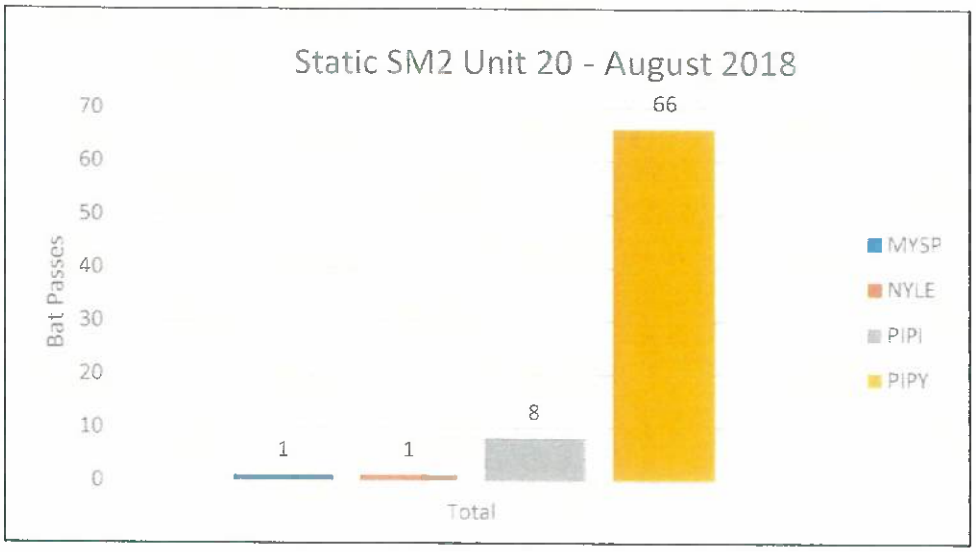


Figure 5.13(f) Bats recorded at Unit 4 deployed in late June 2018.

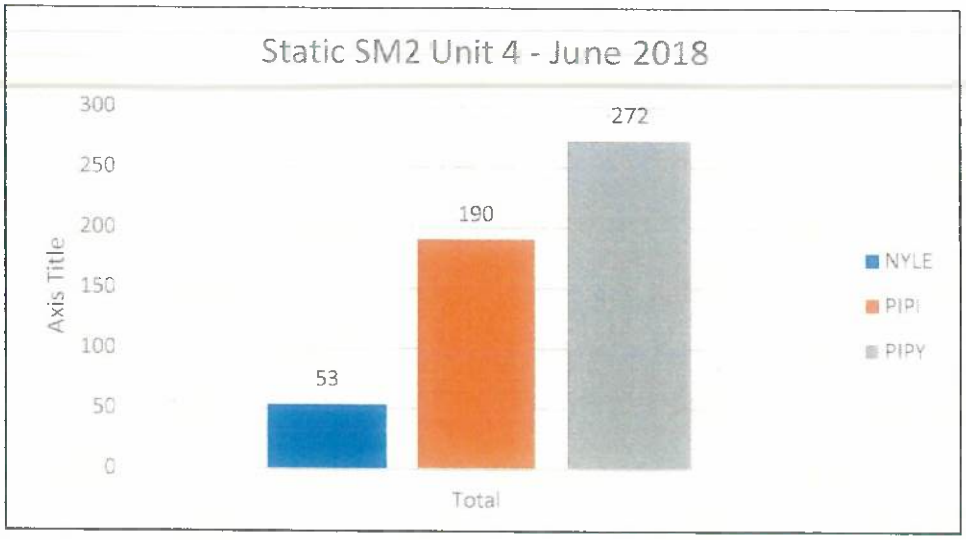


Figure 5.13(g) Bats recorded at Unit 10 deployed in late June 2018.

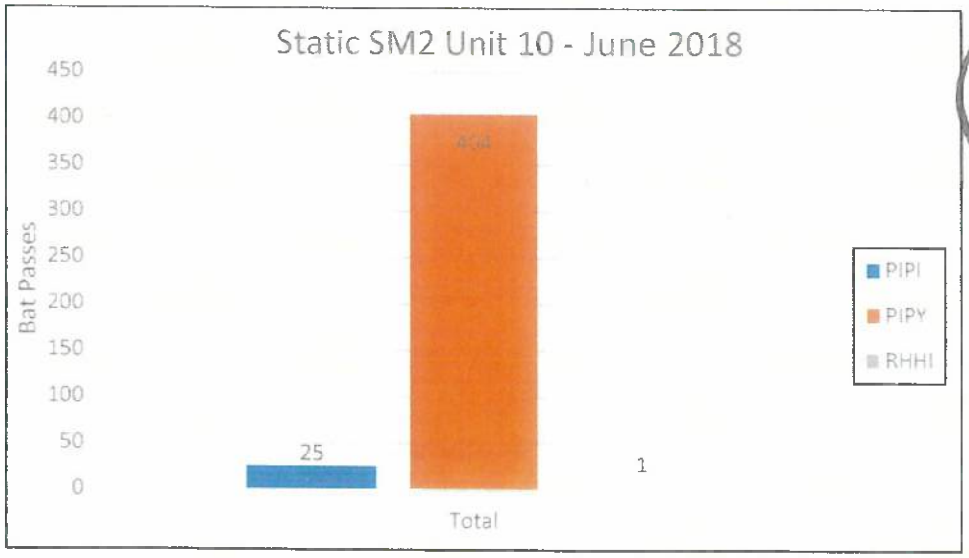


Figure 5.13(h) Bats recorded at Unit 11 deployed in late June 2018.

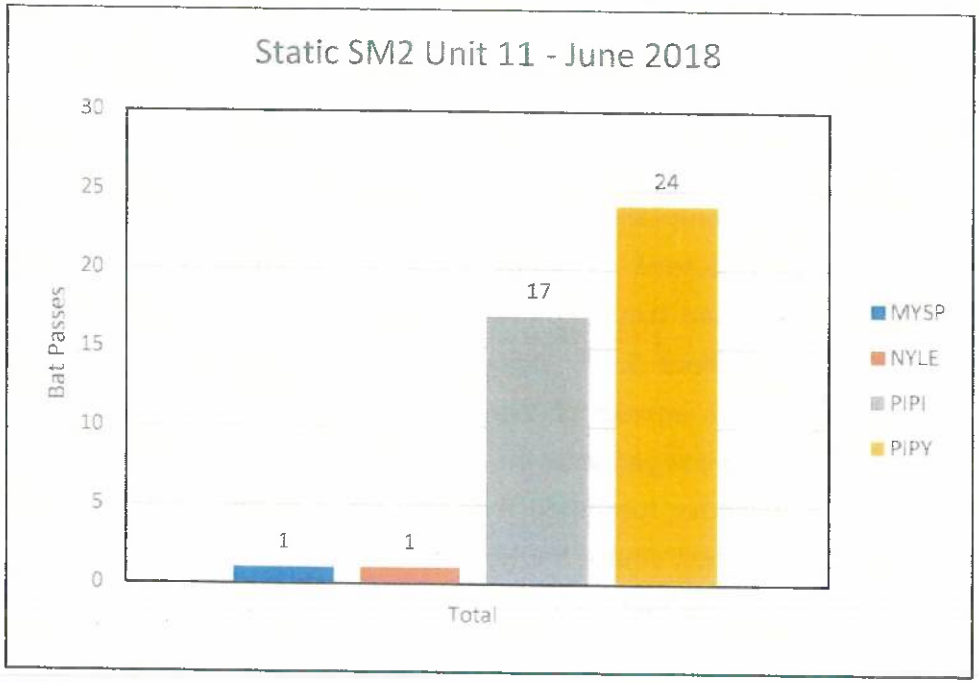
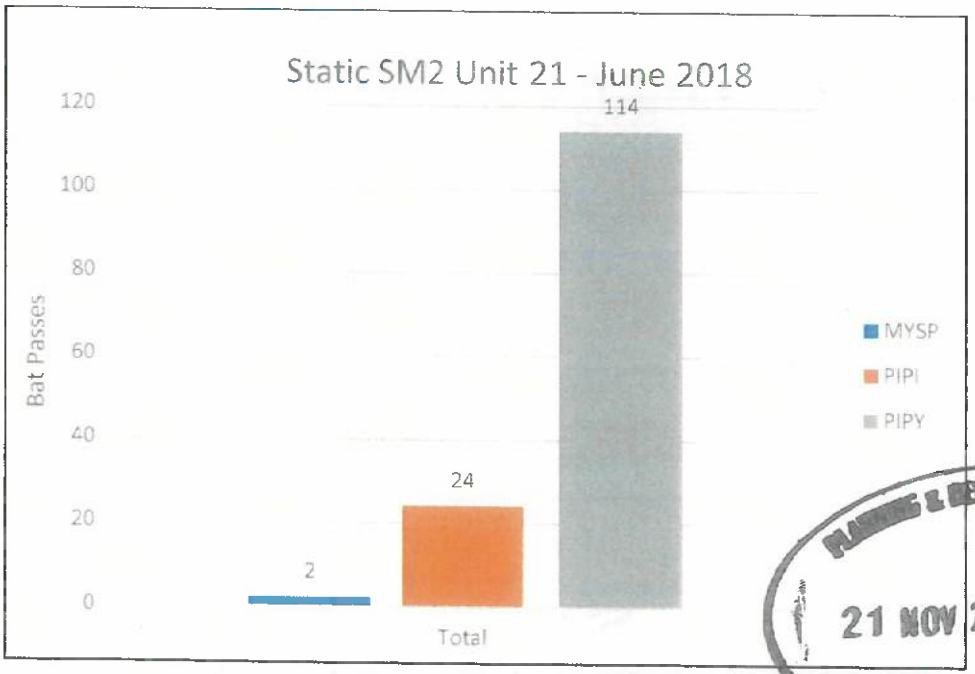


Figure 5.13(i) Bats recorded at Unit 21 deployed in late June 2018.



5.4.4 Badger

Badger signs surveys were undertaken within the Application Site and for a distance of 50 m outside the Application Site boundary, according to standard guidelines. Surveys were extended beyond this distance where signs of badger were observed were recorded.

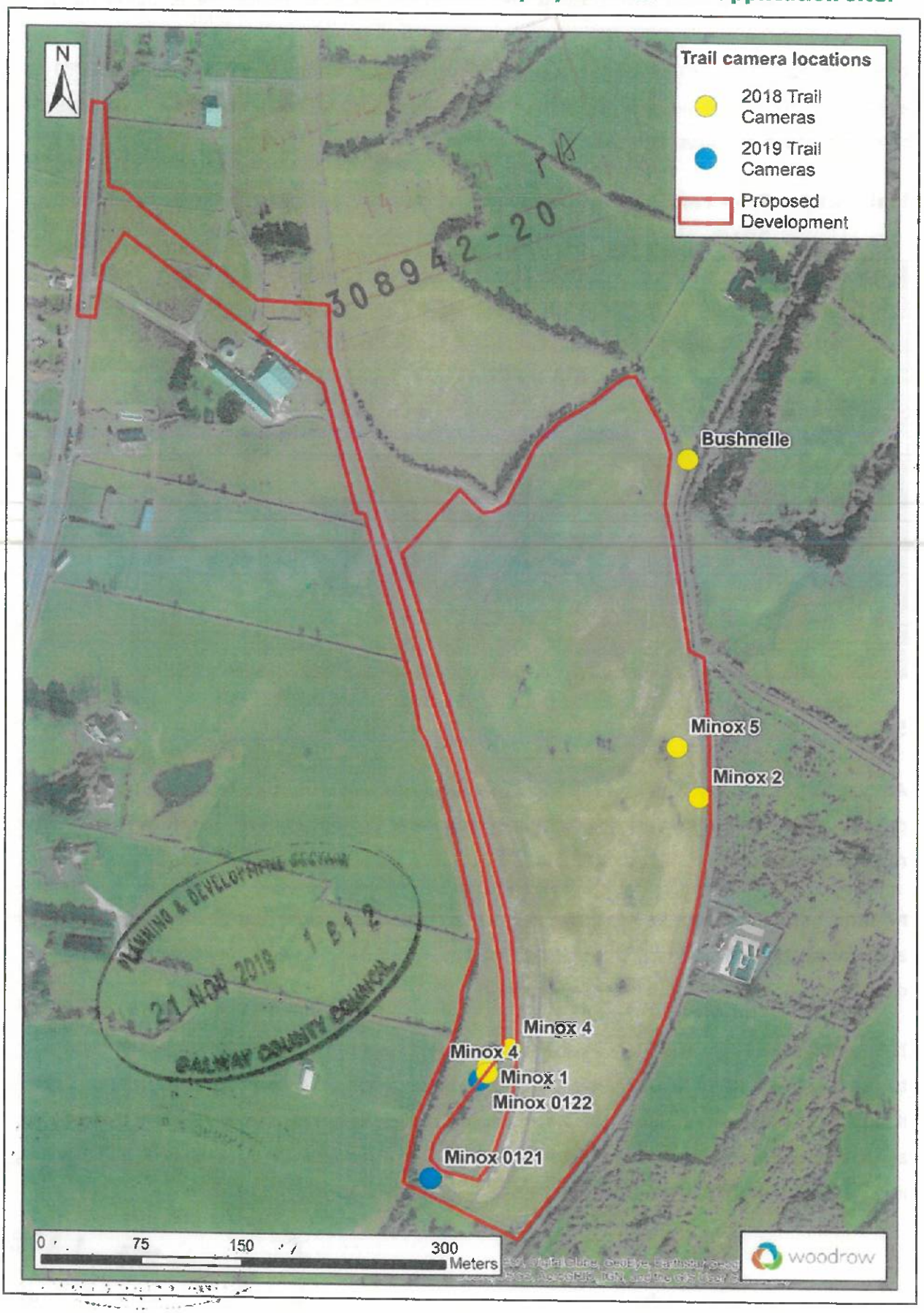
A total of four trail cameras were deployed in 2018 for 2 weeks (15 nights). Further trail cameras were deployed on 30 January 2018 and collected on 15 February 2019 (16

nights). See Figure 5.14 for the location of Trail Cameras deployed within the Application Site. In 2019, two trail cameras were deployed on-site for 2 weeks (14 nights): 6thAugust and collected on 20th August 2019, all to ascertain usage by badgers and other species.

No confirmed active badger sett was located within the Application Site, although some areas within the site and along site boundaries held dense vegetation, in the vicinity of mammal tracks, that could not be accessed. The trail cameras, deployed between 30th January and 15th February 2018, showed two occurrences of badger in the south west of the site from Trail Camera 121, see Plate 5.10. These records showed footage of one badger but no confirmed entrance or egress of the animal from an entrance. It is considered that, although there are no badger setts on site, the site is used by the species for commuting and is likely to be used for foraging. Two trail cameras were deployed on 6th August 2019, one in the same location where badger was previously recorded and one on a mammal burrow in a sand bank (see Plate 5.11). No badger was recorded during this 2-week period in August 2019. However, fox, rabbit and mink were recorded in the vicinity of this burrow.

Plate 5.10 Badger footage from trail cameral surveys in 2018

Figure 5.14 Location of all Trail Cameras deployed within the application site.



The Application Site and surrounding area provides suitable habitat for foraging badger, and usage of the Application Site corresponds with that which would be expected for this type of area. Given that badger is a protected species under the Wildlife Act (1976) as amended (2000) the badger population at the Proposed Development Site is considered to be a feature of ***Local (Higher)*** importance.

Plate 5.11 Trail camera 121 on mammal burrow within a sand bank in August 2019

5.4.5 Otter

An otter signs survey was undertaken in suitable habitat within 100m of the boundary of the proposal. This included a survey upstream and downstream of where the Gort River runs to the north-east of the site.

No otter holts, lie-up areas or slipways were recorded at or adjacent to the site. However, a mammal track recorded at the edge of the river near where it adjoins the site was considered potentially to be used by otters.

It is considered that otters are likely to occur close to the Proposed Development Site due to the existence of suitable riverine habitat but not within the Proposed Development Site itself. Otter has been included as a Key Ecological Receptor for the site as it is likely to be associated with the Gort River, downstream of the Proposed Development Site, where it is considered likely to be a feature of Local (Higher) importance.

5.4.6 Irish Hare

Irish hare was not recorded at the site and no records were found during the desk study of the 2km square. However, the species has been recorded in the wider area and the site holds potentially suitable habitat for the species.

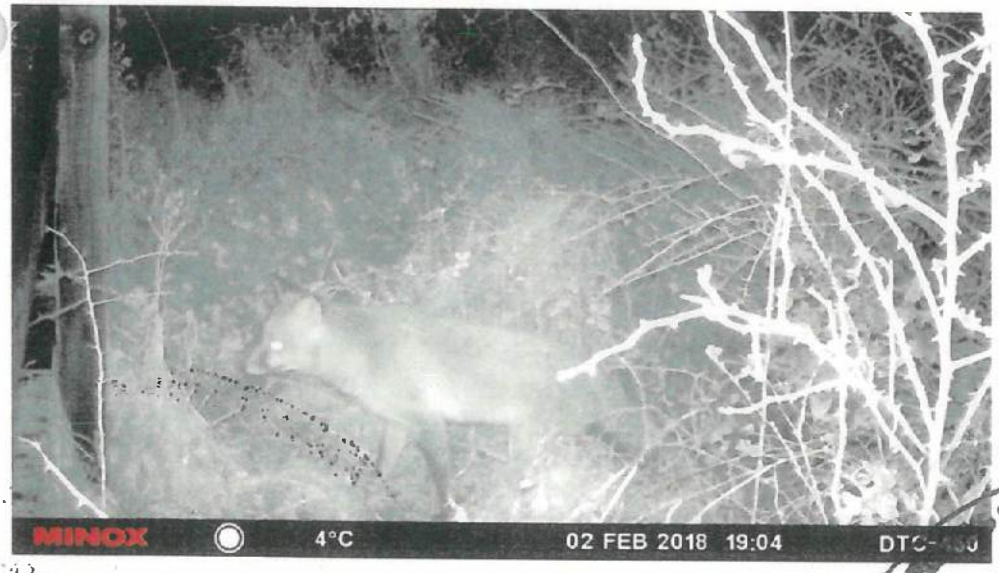
Irish hare is protected under the Wildlife Act (1976) as amended (2000), although it is also cited in this Act as a species that may be hunted in season. The suitability of the habitat at the Proposed Development Site is mixed, with much of the site being fairly close grazed and not optimal for the species. It is considered likely that the Application Site has the potential to support a population of Irish hare that is of Local (Lower) importance.

5.4.7 Fox

Signs of fox (Vulpes vulpes) were recorded within the Proposed Development Site during walkover surveys in December 2018, including fox scat. Hedgerows contained a number of mammal paths though, some of which are likely to be fox. A sand bank also contained a likely fox den in the south west corner of the Application Site. Fox was recorded on two of the trail cameras deployed in 2018 (see Plate 5.12 below) and two of the trail cameras deployed in 2019, one near the likely fox den within the sand bank.

Fox is a common and widespread species which inhabits a range of habitat types and is not specifically protected under wildlife legislation. The wider area provides an abundance of suitable habitat for fox and taking these factors into account fox is not considered to be an ecologically significant feature of the Application Site.

Plate 5.12 Fox recorded on Trail Camera 121 during 2018 surveys



5.4.8 Common frog

A Common frog record was within NBDC output of the desk study; however, this record was from 1970. There is not considered to be any potential for common frog within the main site, with no waterbodies occurring. The eastern side of the minor road from Gort is flanked with a drain in parts (notably in the stretch immediately north of Gort. However, this potentially suitable habitat is separated from the existing road by a bottle bank and a rubble and earth bank. Therefore, frog has not been included as a Key Ecological Receptor for the purposes of this impact assessment.

5.4.9 Common Lizard

There are two historic records of common lizard (Zootoca vivipara) in the vicinity of the Application Site, dating from 1970. However, suitable lizard habitat identified during surveys of the Proposed Development Site was limited to small areas such as rubble in the south-eastern corner of the Application Site. Considering this limited suitability, it is considered likely that the Application Site has very limited potential to support a population of common lizard and it is not included as a Key Ecological Receptor.

5.4.10 Birds

Winter bird surveys and an early spring breeding bird survey were carried out at the Application Site in 2018. These revealed the Application Site itself to support a relatively limited bird assemblage (with much of the site comprising relatively short sward grassland). The bird assemblage however, is enhanced by the existence of flooding and wet meadows to the east of the minor road connecting the Application Site to Gort. A total of three breeding bird surveys were conducted within the site in 2018. Birds were also recorded during walkover surveys in 2019, and during dusk and dawn bat surveys (this included a barn owl hunting within the Application Site). The bird assemblages around the Application Site was similar between 2018 and 2019 bird survey seasons. Birds recorded include six red listed birds and 14 amber listed bird species.

All bird species recorded during surveys undertaken at the Application Site are listed in Table 5.14 below. The results of the desk study search are presented in Table 5.8 which includes bird species. Figure 5.15 shows the location of breeding birds recorded within and around the Application Site and Figure 5.16 shows the locations of the non-breeding birds recorded in close proximity to the Application Site.

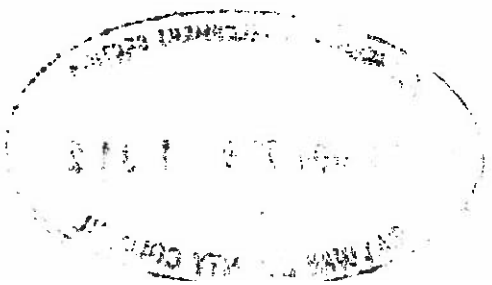


Table 5.14 Bird species observed at the Proposed Development Site

BTO Code	Common Name	Scientific Name	Irish status	Status at Proposed Development Site	EU Birds Directive	Conservation Status (BoCCI)
BH	Black-headed Gull	*Chroicocephalus ridibundus*	Resident	Recorded on land to east of Kinincha Road	Annex II(ii)	Red
HG	Herring gull	*Larus argentatus*	Resident	Recorded on land to east of Kinincha Road		Red
MP	Meadow pipit	*Anthus pratensis*	Resident	Recorded frequently during surveys, including breeding surveys. Likely breeding.		Red
L.	Lapwing	*Vanellus vanellus*	Resident and winter visitor	Regular flock of 100+ birds recorded on land to east of Kinincha Road during winter surveys.		Red
CU	Curlew	*Numenius arquata*	Resident and winter visitor	Small numbers recorded on land to east of Kinincha Road during winter surveys.		Red
BO	Barn owl	*Tyto alba*	Resident	One bird observed during a dusk bat survey hunting along the earth bank in the south west of the site.		Red
SN	Snipe	*Gallinago gallinago*	Summer visitor, winter visitor	2 birds recorded on land to east of Kinincha Road	Annex II(ii)	Amber
S.	Skylark	*Alauda arvensis*	Resident	Recorded within site during winter surveys. Area potentially suitable for breeding.	Annex II(ii)	Amber
R.	Robin	*Erithacus rubecula*	Resident	Recorded within during winter surveys. Singing in early		Amber

BTO Code	Common Name	Scientific Name	Irish status	Status at Proposed Development Site	EU Birds Directive	Conservation Status (BoCCI)
				spring. Likely breeding.		
LI	Linnet	*Carduelis cannabina*	Resident	Recorded within site during winter surveys		Amber
GR	Greenfinch	*Carduelis chloris*	Resident	Recorded within site during winter surveys		Amber
GC	Goldcrest	*Regulus regulus*	Resident	Recorded adjacent to site during winter surveys		Amber
SG	Starling	*Sturnus vulgaris*	Resident	Recorded feeding within site during winter surveys	Annex II(ii)	Amber
CM	Common gull	*Larus canus*	Winter visitor and local breeding species	Recorded on land to east of Kinincha Road	Annex II(ii)	Amber
M.	Mistle thrush	*Turdus viscivorus*	Resident and winter visitor	Recorded within site during winter surveys	Annex II(ii)	Amber
MS	Mute swan	*Cygnus olor*	Resident	Recorded in small numbers on land to east of Kinincha Road		Amber
GB	Great black-backed gull	*Larus marinus*	Resident	Individuals recorded on land to east of Kinincha Road during winter surveys.		Amber
K.	Kestrel	*Falco tinnunculus*	Resident	Recorded hunting along the Kinincha road to the south east of the site.		Amber
LB	Lesser Black-backed gull	*Larus fuscus*	Summer visitor with some staying during winter.	Recorded in the wetland area south east of the Proposed Development off the Kinincha road. Recorded	Annex II(ii)	Amber

BTO Code	Common Name	Scientific Name	Irish status	Status at Proposed Development Site	EU Birds Directive	Conservation Status (BoCCI)
				in January, March and June 2018.		
SM	Sand martin	*Riparia riparia*	Summer visitor	Recorded during a breeding bird survey in June 2018		Amber
SC	Stonechat	*Saxicola rubicola*	Resident	Recorded calling along the proposed access track in August 2019		Amber
H.	Grey heron	*Ardea cinerea*	Resident	Recorded feeding on land to east of Kinincha Road	Annex II(ii)	Green
WR	Wren	*Troglodytes*	Resident	Recorded within site during winter surveys. Singing in early spring. Likely breeding.		Green
CH	Chaffinch	*Fringilla coelebs*	Resident	Recorded within site during winter surveys. Singing in early spring. Likely breeding.		Green
MG	Magpie	*Pica*	Resident	Recorded within site during winter surveys	Annex II(ii)	Green
JD	Jackdaw	*Corvus monedula*	Resident	Recorded within site during winter surveys	Annex II(ii)	Green
RO	Rook	*Corvus frugilegus*	Resident	Recorded within site during winter surveys	Annex II(ii)	Green
WP	Woodpigeon	*Columba palumbus*	Resident	Recorded within site during winter surveys		Green
PW	Pied wagtail	*Motacilla alba*	Resident	Recorded within site during winter surveys		Green
HC	Hooded crow	*Corvus cornix*	Resident	Recorded within site during winter surveys		Green

BTO Code	Common Name	Scientific Name	Irish status	Status at Proposed Development Site	EU Birds Directive	Conservation Status (BoCCI)
BT	Blue tit	*Parus caeruleus*	Resident	Recorded within site during winter surveys. Site holds suitable breeding habitat		Green
GO	Goldfinch	*Carduelis carduelis*	Resident	Recorded within site (flying over only) during winter surveys		Green
GT	Great tit	*Parus major*	Resident	Recorded within site during winter surveys. Site holds suitable breeding habitat		Green
B.	Blackbird	*Turdus merula*	Resident and winter visitor	Recorded within site during winter surveys. Site holds suitable breeding habitat		Green
D.	Dunnock	*Prunella modularis*	Resident	Recorded within site during winter surveys. Singing in early spring. Likely breeding.		Green
LR	Lesser redpoll	*Acanthis cabaret*	Resident	Recorded within site (flying over only) during winter surveys		Green
FF	Fieldfare	*Turdus pilaris*	Winter visitor	Recorded within site during winter surveys		Green
RE	Redwing	*Turdus iliacus*	Winter visitor	Recorded within site during winter surveys		Green
ST	Song thrush	*Turdus philomelos*	Resident and winter visitor	Recorded within site during winter surveys		Green
GE	Green sandpiper	*Tringa ochropus*	Scarce passage and winter visitor	Single bird recorded on land to east of Kinincha during winter surveys		Green

BTO Code	Common Name	Scientific Name	Irish status	Status at Proposed Development Site	EU Birds Directive	Conservation Status (BoCCI)
MH	Moorhen	*Gallinula chloropus*	Common resident and winter visitor in wetland areas	Recorded on land to east of Kinincha Road during winter surveys		Green
SH	Sparrowhawk	*Accipiter nisus*	Resident	Single bird recorded hunting within the Application Site during spring surveys		Green
GO	Goldfinch	*Carduelis carduelis*	Resident	Small numbers recorded flying over Application Site		Green
SK	Siskin	*Carduelis spinus*	Resident	Small numbers recorded flying over Application Site		Green
ET	Little egret	*Egretta garzetta*	Resident	One bird recorded foraging in the wetland area to the east of the site.	Annex I	Green
WH	Whitethroat	*Sylvia communis*	Summer visitor	A total of three birds were recorded singing in hedgerows within the site. One bird in March 2018 and two birds in June 2018.		Green
CD	Collared dove	*Streptopelia decaocto*	Resident			

ANNEX I BIRD SPECIES

Little egret was the only Annex I bird species recorded during the surveys. The little egret is one of approximately 20 regularly breeding species in Ireland subject to special protection under Annex I of the Birds Directive (Fennelly and Cannon, 2015). Little Egret is also one of only two regularly breeding Annex I species which has 'naturally' colonised Ireland in recent history following climatic events (Voisin 1991).

ALL OTHER BIRDS IDENTIFIED AS KEY ECOLOGICAL RECEPTORS

Red listed species (non-Annex I species)

Red listed species are those which are of highest conservation concern where the population is rapidly declining in abundance or range, has experienced a historic rapid decline (without recovery) or are globally threatened.

Black-headed gull (*Chroicocephalus ridibundus*) is red listed due to its declining and localised breeding population in Ireland. It was recorded during winter surveys within wetland areas to the east of Kinincha Road (connecting the Application Site to Gort). The biogas plant site itself is of limited suitability for the species.

Herring gull (*Larus argentatus*) is red listed due to its declining breeding population. It was recorded during winter surveys within wetland areas to the east of Kinincha Road (connecting the Application Site to Gort). The Application Siteitself is of limited suitability for the species.

Lapwing (*Vanellus vanellus*) is red listed due to its small and declining breeding population. It was recorded in small numbers during winter surveys within wetland areas to the east of Kinincha Road (connecting the Application Site to Gort). A flock of around 110 birds were regularly recorded loafing in this wetland area. The Application Siteitself is of limited suitability for the species.

Curlew (*Numenius arquata*) is red listed due to its declining breeding population with a population concentrated in Europe. It was recorded during winter surveys within wetland areas to the east of Kinincha Road (connecting the Application Site to Gort) which is intended for upgrade as part of the works. It is not considered likely to occur within the Application Siteitself.

Meadow pipit (*Anthus pratensis*) is red listed due to sharp breeding declines following the severe winters of 2009/10 and 2010/11, although populations have shown signs of significant recovery since. A common and widespread species in suitable habitat in Ireland it is likely to breed within the Application Site.

Barn owl (*Tyto alba*) is red listed due to severe range declines, a 77% decline in population in 20 years and a 46% reduction in range in over 25 years (Colhoun and Cummins, 2013). This species was recorded once during a dusk bat transect on 06 August 2019. This bird was recorded hunting along the vegetated earth bank in the south west corner of the Application Site.

Amber listed species

Amber listed species are those that have unfavourable European status, occur in internationally important numbers or are moderately declining in abundance or range. Some species may also be Amber listed if population occurs in very small numbers. A number of amber-listed passerines occur within the Application Site, such as skylark (*Anthus arvensis*), starling (*Sturnus vulgaris*), mistle thrush (*Turdus viscivorus*), robin (*Erithacus rubecula*), linnet (*Carduelis cannabina*), greenfinch (*Chloris chloris*), and goldcrest (*Regulus regulus*). A number of these species are considered to have potential to breed within or adjacent to the Proposed Development Site.

Snipe (*Gallinago gallinago*), mute swan (*Cygnus olor*) and great black-backed gull (*Larus marinus*) were recorded in the wetland area to the east of Kinincha Road connecting the site to Gort. Kestrel was also recorded along the Kinincha raod to the south of the site in August 2019. Lesser Black-backed gull (*Larus fucus*) was recorded in January, March and June of 2018. Sand martin (*Riparia riparia*) was also recorded foraging in the area of the Proposed Development. Stonechat was recorded once in August 2019 along the proposed access track.

Green listed species

Green-listed species are those of least conservation priority. Species which are Green-listed generally require little direct conservation action.

Grey heron (*Ardea cinerea*) was recorded during all winter visits, feeding in drains to the east of Kinincha Road. Other species occurring within the site include foraging corvids and thrush species which are likely to feed in the short sward within the site and passerines breeding within the hedgerows and isolated bushes within the Application Site. Summer visiting species such as willow warbler, whitethroat and swallow (feeding only) were also recorded. Little egret is a green listed species in Ireland due to the significant increase in numbers in Ireland, however are afforded Annex I protection within the Birds Directive.

Overall, it is considered that the Application Site supports a general bird assemblage of ***Local (Higher)*** importance.

Plate 5.15 **Bird assemblage within and in close proximity to the Proposed Development (See Appendix II for BTO codes of species).**

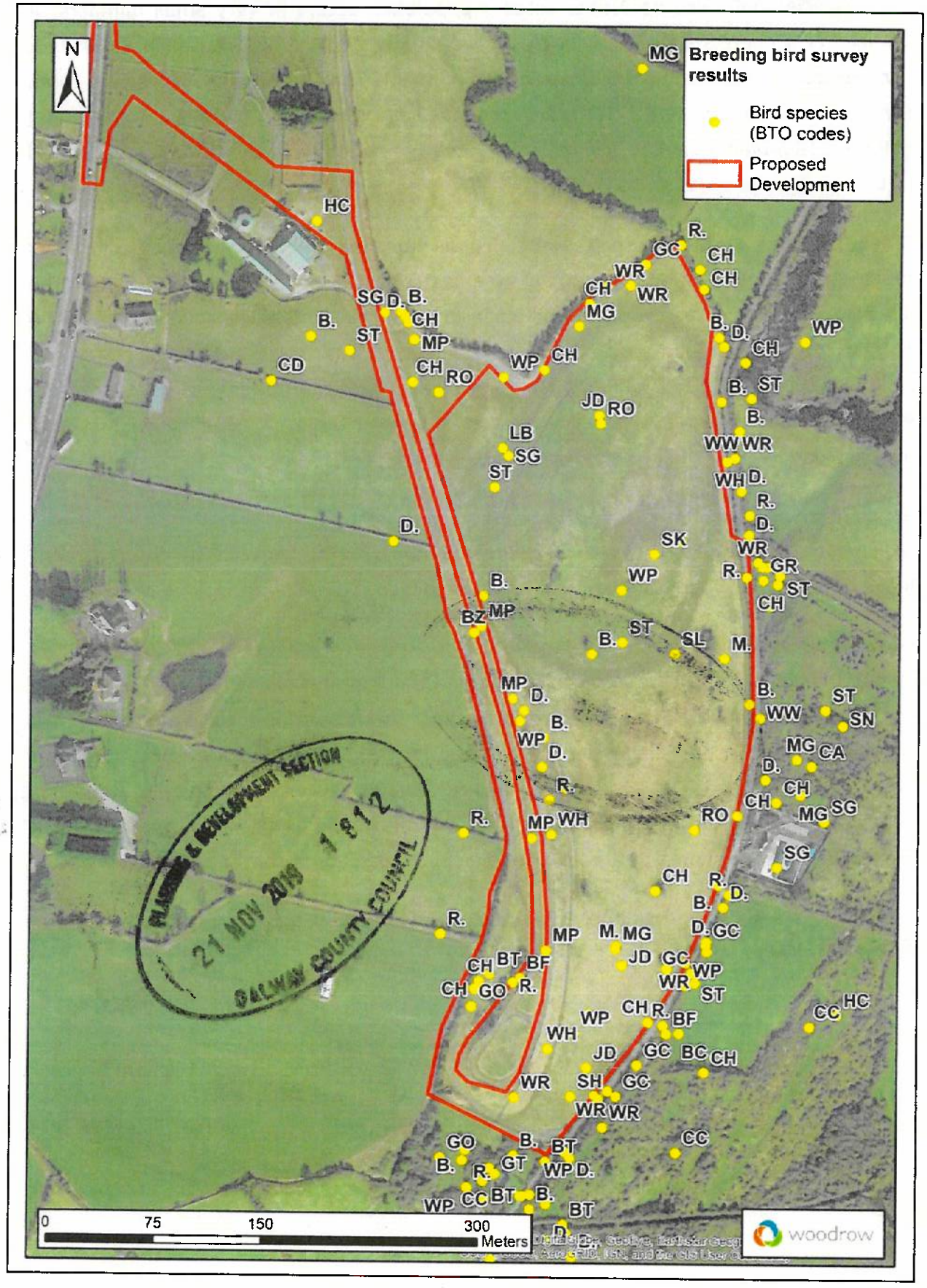
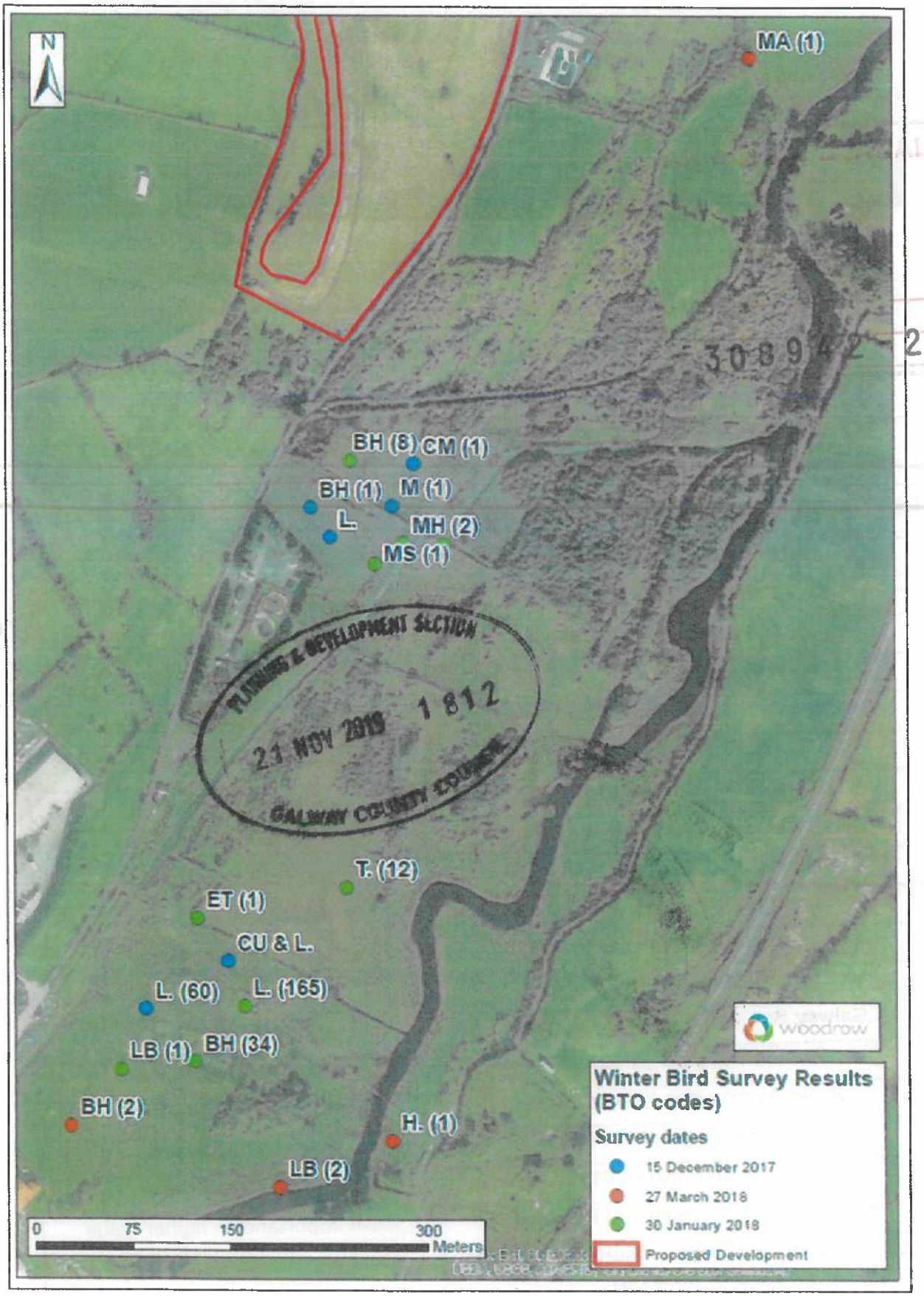


Figure 5.16 Non-breeding bird assemblage within close proximity to the Proposed Development.



SUMMARY OF KEY ECOLOGICAL RECEPTORS

The features considered to be Key Ecological Receptors following their evaluation within this section are summarised in Table 5.15.

Table 5.15 Summary of potential Key Ecological Receptors within the zone of influence of the Proposed Development Site

Key Ecological Feature	Evaluation
Coole-Garryland Complex SAC 000252	International Importance
Carrowbaun, Newhall and Ballylee Turloughs SAC 002293	International Importance
Coole-Garryland SPA 004107	International Importance
Kiltartan Cave (Coole) SAC 000286	International Importance
Coole Lough & Garryland Wood Ramsar Site 000473	International Importance
Eastern Burren SAC 001926	International Importance
Lough Coy SAC 002117	International Importance
Caherglassaun Turlough SAC 000238	International Importance
Termon Lough SAC 001321	International Importance
Galway Bay Complex SAC 000268	International Importance
Sonnagh Bog SAC 001913	International Importance
Rahasane Turlough SAC 000322	International Importance
Rahasane Turlough SPA 004089	International Importance
Glendree Bog SAC 001912	International Importance
Coole-Garryland Complex pNHA 000252	National Importance
Kiltartan Cave (Coole) pNHA 000286	National Importance
East Burren Complex pNHA 001926	National Importance
Lough Cutra pNHA 000299	National Importance
Caherglassaun Turlough pNHA 000238	National Importance
Termon Lough pNHA 001321	National Importance
Galway Bay Complex pNHA 000268	National Importance
Sonnagh Bog pNHA 001913	National Importance
Slieve Aughty Bog NHA 001229	National Importance
Rahasane Turlough pNHA 000322	National Importance
Glendree Bog pNHA 001912	National Importance
WD5 - Scattered trees and Parkland	Local importance – higher value
BL3 - Buildings and artificial surfaces (off-site derelict building)	Local importance – higher value

Key Ecological Feature	Evaluation
ED2 - Spoil and bare ground	Local Importance – lower value
ED3 - Recolonising bare ground	Local Importance – lower value
FW2 - Depositing/lowland rivers	Local importance – higher value
FW4 - Drainage ditch	Local Importance – lower value
WL1 - Hedgerows	Local Importance – higher value
WL2 - Treelines	Local Importance – higher value
GA1 / GS1 Improved agricultural grassland / Dry calcareous and neutral grassland	Local Importance – lower value
GS1 - Dry calcareous and neutral grassland (in mosaic)	Local Importance – higher value
GSi1 - Dry calcareous and neutral grassland (showing signs of improvement but still of ecological value)	Local Importance – lower value
GS2 - Dry meadows and grassy verges	Local Importance – lower value
GS4 - Wet grassland	Local Importance – lower value
WS1 - Scrub	Local Importance – lower value
Bat assemblage	County Importance
Badger	Local Importance – higher value
Otter	Local Importance – higher value
Irish hare	Local Importance – lower value
Bird assemblage	Local Importance – higher value
Black-headed gull Herring gull Lapwing Curlew Barn owl Meadow pipit Little egret* Snipe Skylark Robin Linnet Greenfinch Goldcrest Starling Common gull Mistle thrush Mute swan Greater-black back gull Kestrel Lesser black back gull Sand martin Stonechat	Local Importance – higher value *International Importance – Lower value (Due to little egret being Annex I species). However, little egret is green listed in Ireland due to the increase in range and numbers.

5.5 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

The Ecological Impact Assessment is undertaken in this section. The methodology set out in above on how to undertake impact assessments is applied to Key Ecological Features which have been identified and described in Section 5.3 and Section 5.4.

Within the following sections, only those Key Ecological Receptors considered to be of *local importance – higher value* and identified as having the potential to be affected by each phase of the Proposed EIA Development are discussed. A consideration of the potential impacts of both the proposed core development and the works on the Kinincha Road is given where appropriate.

The nature of the proposal means that potential impacts may arise at both construction and operational stages. The most pertinent sources of impact and potential pathways for such proposals are considered to be:

- Direct habitat loss through land-take;
- Indirect species impact by loss of foraging and commuting features through land-take;
- Water quality degradation (both construction and operational phases) with pathways including surface and groundwater;
- Species disturbance during construction and operational phases; and,
- Air pollution during operational phase.

5.5.1 The 'Do-Nothing' Impact

The Application Site has been described in terms of flora, fauna and birds in the paragraphs above. As described, the Application Site encompasses an equine exercise track, as well as being grazed by low numbers of horses. Hedgerow habitat currently provides the most valuable habitat within the Application Site. There are also pockets of relatively species-rich grassland which are indicative of a recovery of the area since re-grading and re-seeding.

The 'do nothing' option includes the continuation of the use of an area as an equine exercise track, with a typically close-grazed sward. It is considered that, without intervention (or fertilising) the grassland may continue to improve in terms of floral diversity due to the limestone influence and may start to align with Annex I habitat mentioned in the previous section such as priority habitat orchid-rich calcareous grassland (6210) and lowland hay meadows (6510).

5.5.2 Potential Impacts of the Construction Phase

The construction phase will involve disturbance to and removal of existing vegetation. This includes clearing calcareous, semi-improved and wet grassland to facilitate the construction of the Proposed EIA Development access tracks, buildings and ancillary infrastructure. In addition, there is potential for impacts upon ecological features (most notably the potential removal of hedgerow habitat) along the Kinincha Road where modifications are required to facilitate a new embankment along the eastern boundary to enclose the site

Potential impacts during the construction phase encompass both direct impacts and secondary impacts, which are summarised as follows:

Potential sources of direct impacts during the Construction Phase

- Clearance of vegetation, soil, hedgerows, scrub and removal of individual semi-mature trees for infrastructure;
- Placement of material arising from infrastructure works; and,
- Access by construction equipment, including access away from the proposed infrastructure location (compaction and other damage).

Potential sources of secondary impacts during the Construction Phase

- Stockpiling of materials on-site (run-off, erosion etc.);
- Use of potential pollutants (including hydrocarbons, cement and chemicals) during construction;
- Collection / drainage of surface water runoff; and,
- Avoidance by birds and mammals due to disturbance.

DIRECT IMPACTS

Potential direct impacts on designated areas during the construction phase

The nearest designated nature conservation areas to the Application Site are Coole-Garryland Complex SAC and SPA, Coole-Garryland Complex NHA and Coole Lough and Garryland Wood Ramsar Site. The Coole-Garryland Complex SAC and Coole-Garryland Complex NHA in particular are largely contiguous and, at their closest point, are situated 900 m from the Application Site.

However, due to the separation of the Application Site from these SACs and SPAs by distance and topography there is considered to be **no potential for direct impacts** resulting from the construction phase. Potential secondary impacts (such as water quality changes via groundwater connectivity and air pollution) are considered below.

Potential direct impacts on watercourses (depositing / lowland rivers) and associated downstream ecology during the construction phase

The Application Site holds no internal surface watercourses but is situated within a karst area. This means that, uncontrolled, there may be direct connectivity between the Application Site and the adjacent watercourse via a subsurface connection. There is therefore considered to be limited potential for direct impact on water quality on the Gort River (River Water Body Code IE_WE_29K022100). Additionally, there is a network of small vegetated drainage ditches associated with field boundaries in the area immediately east of the Kinincha Road connecting the site to Gort. These drains are connected to a larger drainage ditch which flows north-east to join the Gort River. However, if the eastern section of the Application Site is proposed to be enclosed by earth banks similar to the western side of the site, the potential for any pollution exiting the site, entering the road and entering the drains is low without appropriate mitigation in place. The main threats may arise from sedimentation, fuel spillage or concrete washout.

Other surface water features in close proximity to the Application Site include a small unnamed ponding of groundwater approximately 150 m west of the site and Ballynamantan Lough 360 m north of the site.

Effect without mitigation

It is considered that, without mitigation, there is potential for **Significant** impacts on watercourses and associated downstream ecology at the **Local** scale.

Potential direct impacts on habitats during the construction phase

Table 5.16 outlines the habitat features likely to be impacted by the works and includes an area / linear measurement of habitat directly impacted on by the footprint of the works. This includes all habitat within the core Application Site, excepting boundary features that will not be affected.

Table 5.16 Habitat features associated with each section of infrastructure

(Habitats that are identified as being Key Ecological Receptors for the purposes of this impact assessment are highlighted in green)

Habitat	Importance	Length / Area likely to be affected
WL1 - Hedgerows	Local Importance – higher value	c. 1.9 km
WL2 - Treelines	Local Importance – higher value	c. 283 m in length
WS1 - Scrub	Local Importance – lower value	0.2 ha
WD5 - Scattered trees and Parkland	Local Importance – lower value	<0.01 ha
BL1 – Stonewalls and other stonework	Local Importance – lower value	c. 143 m in length
BL3 - Buildings and artificial surfaces	Local importance – higher value	c. 3.7 km in length
ED2 - Spoil and bare ground	Local Importance – lower value	< c. 0.01 ha
ED3 - Recolonising bare ground	Local Importance – lower value	c. 0.01ha and an additional c. 900 m in length
FW4 – Drainage ditches	Local Importance – lower value	c. 607 m in length of predominantly shallow and dry ditches
GA1 / GS1 Improved agricultural grassland / Dry calcareous and neutral grassland	Local Importance – lower value	c. 0.07 ha
GS1 - Dry calcareous and neutral grassland (in mosaic)	Local Importance – higher value	c. 1.90 ha
GSi1 - Dry calcareous and neutral grassland (showing signs of improvement but still of ecological value)	Local Importance – lower value	c. 5.66 ha
GS2 - Dry meadows and grassy verges	Local Importance – lower value	c. 2.72ha
GS4 - Wet grassland	Local Importance – lower value	c. 0.23ha

POTENTIAL DIRECT IMPACTS ON BOUNDARY FEATURES (HEDGEROWS AND TREELINES) DURING THE CONSTRUCTION PHASE

The construction phase of the Proposed EIA Development is expected to result in the loss of a number of boundary features. This is largely limited to hedgerow habitats adjoining

the eastern side of the minor road connecting the site to Gort. As described in preceding sections, these are dominated by blackthorn and hawthorn with a mixed ground flora. Hedgerows may support a wide range of invertebrate, bird and small mammal species, as well as providing foraging habitat for birds, bats and larger mammals. They also function as wildlife corridors, providing a continuum of habitat along which fauna invertebrates may travel between different foraging and sheltering areas. Consequently, they are likely to be of relatively high local conservation value.

Treelines are not considered likely to be affected by the construction phase of the project.

The Proposed EIA Development, in the worst-case scenario, is likely to result in the loss of up to 1.9 m of hedgerow habitat as a result of construction, if all hedgerow habitat was removed. Although the area of hedgerow to be removed has been kept to a minimum, such habitats enrich the biodiversity and provide valuable feeding, breeding and commuting habitat for local and internationally important bat species in an area that is otherwise largely agricultural in character.

Effect without mitigation

Overall, it is considered that, without mitigation, the Proposed EIA Development has the potential to result in a ***Significant*** effect at the ***Local*** scale upon boundary features.

POTENTIAL DIRECT IMPACTS ON GRASSLAND HABITATS DURING THE CONSTRUCTION PHASE

GSi1 Improved Dry Calcareous and Neutral Grassland

The largest area of habitat to be disturbed by the construction phase is Improved dry calcareous and neutral grassland (GSi1). Although improved, this area is still of conservation value with a diversity of species notably occurring.

The proposal will result in impacts on approximately 5.1 ha of this habitat, with approximately half of that under the direct footprint of the proposal.

Dry calcareous and neutral grassland GS1 (and mosaics)

This habitat comprises the highest conservation value grassland within the Application Site and occurs within the centre of the site. It supports a diversity of plant species representative of calcareous habitats. However, it is noted that the sward has developed since a complete clearance of ground vegetation and re-levelling of the site over 10 years ago. It falls within the footprint of the Proposed EIA Development in entirety. The proposal will result in the loss of approximately 1.9 ha of this habitat under the direct footprint of the Proposed EIA Development.

Effect without mitigation

Overall, taking account of the importance of the grassland habitats at the Application Site it is considered that, without mitigation, the Proposed EIA Development has the potential to result in a **Significant** effect at the **Local** scale on grassland habitats.

Potential direct impacts on breeding bird assemblage during the construction phase

A number of the resident bird species recorded during site surveys and potential summer visitor species have the potential to breed within the Application Site where suitable habitat is present. The areas used by these species would include hedgerows, treelines, scrub and grassland habitats.

It has been detailed above that the EIA Development proposal will, in the worst-case-scenario, result in the loss of approximately 1.9 km of hedgerow, 0.2 ha of scrub and 8.3 ha of grassland habitat (GSi1 and GS1). Each of these habitats has the potential to support breeding bird species. Therefore, removal of such habitats during the bird breeding season is likely to result in loss of, direct disturbance to, breeding birds and active nests and potentially mortality. This has the potential to include impacts on red and amber listed bird species which have the potential to breed within the site.

Construction works have potential to result in direct disturbance, displacement and destruction of breeding bird nests.

Mitigation for potential loss of raptor hunting habitat including for kestrel and barn owl (both recorded hunting on-site during bird surveys) will include the construction of a new embankment on the eastern boundary of the Application Site to be managed for grassy verge habitat. Also, management of the grassy banks and berms around the Application Site including the existing embankments along the northern and south western parts of the site and creation of similar grassy verge habitats on the proposed new embankments along the eastern and western sides of the site. Low fertility spoil should be used on the new berms. These will be maintained appropriately including cutting of grass and vegetation once a year such (after the breeding bird season), for example September to promote suitable hunting habitat for barn owl and kestrel. There will be no application of fertiliser to these grassy embankments.

The area to the south of the Application Site is to be left open for commuting barn owl through the site.

Effect without mitigation

Taking into account the bird population and habitat assemblage in the wider area, without mitigation, potential direct impacts upon breeding birds are concluded to be ***Significant*** at the ***Local*** scale.

Potential direct impacts on non-breeding bird assemblage during the construction phase

Works on the eastern boundary of the Application Site have the potential to cause disturbance impacts upon the wetland bird species who use the wetland area during the winter months. The construction works have the potential to result in direct disturbance and displacement of wintering wetland species including black-headed gull, herring gull, little egret, lapwing and curlew within the wetland to the east of the road.

Effect without mitigation

Taking into account the winter bird populations and wetland habitats present in close proximity to the site, without mitigation, potential direct impacts upon wintering birds are concluded to be ***Significant*** at the ***Local scale.***

Potential direct impacts on bats during the construction phase

Potential direct impacts on bats resulting from construction works are limited to loss of roosts. It is not considered that the site holds potential for bat roosts. A confirmed bat roost (supporting both soprano pipistrelle and common pipistrelle bats) was located to the south of the Application Site in a derelict house, however this structure is outside the Application Site and will not be impacted by the Proposed EIA Development. There is therefore not considered to be any potential impact in this regard.

Potential direct impacts on badger during the construction phase

Potential direct impacts on badgers from construction works are generally limited to loss of setts, although at an extreme level, construction operations directly over or close to a sett have the potential to result in mortality since this species is largely nocturnal.

Effect without mitigation

Although badgers are known to use the Application Site, there were no confirmed, active setts within or in close proximity to the Application Site. However, the recorded activity and the suitability of the Application Site for the species means that they have the potential to occur in future months/ years. It is therefore strongly recommended that pre-construction mammal surveys, particularly for badger, are undertaken to confirm that no active badger setts occur within the footprint of the works. Further details can be found in Section 5.6. Without mitigation or pre-construction badger surveys, potential direct impacts upon badger are concluded to be potentially ***Significant*** at the [illegible] scale.

Potential direct impacts on otter during the construction phase

Although otter was not recorded during the surveys, they are considered likely to occur within the adjacent Gort River corridor. The Application Site itself does not hold suitable habitat of otter or locations suitable for use as holts or lie up areas, direct impacts to these resulting from construction phase disturbance are therefore not likely to occur. Noise disturbance is unlikely to impact on foraging otter as the species is likely to be closely tied to the river corridor and largely active at night.

Effect without mitigation

Overall, it is considered that potential impacts upon otter resulting from the construction phase are ***not significant.***

SECONDARY IMPACTS

Potential secondary impacts on designated areas during the construction phase

Potential secondary impacts on designated areas are largely limited to those arising from water quality and air quality changes. In terms of water quality changes, the potential pathways are via groundwater and surface water and in terms of air quality changes, the pathway is through air movements associated with proximity and wind direction. Chapters within this EIAR relevant to this section are Odour and Air (Chapter 6), Soils and Geology (Chapter 6), and Water (Chapter 7).

Potential secondary impacts upon these areas during construction might include:

Spillage of hydrocarbons and other pollutants and sediment-laden run-off entering the SAC or SPA during the construction period; and,

Increased Nitrogen deposition over and above the current background levels, resulting in potential vegetation or water quality levels.

The nearest designated nature conservation areas to the Proposed EIA Development are Coole-Garryland Complex SAC and SPA, Coole-Garryland Complex NHA and Coole Lough and Garryland Wood Ramsar Site. The Coole-Garryland Complex SAC and Coole-Garryland Complex NHA in particular are largely contiguous and, at their closest point, are situated 1.33 km from the Application Site. However, in terms of water quality changes, it is connectivity that is relevant rather than simply proximity.

Tables 5.6 and 5.7 detail all designated sites and the potential connectivity of the proposal to their qualifying interest features. The karst nature of the area means that groundwater connectivity is uncertain, so those designated areas that fall within or partly within,

same groundwater body of the proposal have been identified as having potential connectivity.

Internationally designated sites with potential hydrological connectivity to the proposal are:

- Coole-Garryland Complex SAC 000252
- Carrowbaun, Newhall and Ballylee Turloughs SAC 002293
- Coole-Garryland SPA 004107
- Kiltartan Cave (Coole) SAC 000286
- Coole Lough & Garryland Wood Ramsar Site 473
- Eastern Burren Complex SAC 001926
- Lough Coy SAC 002117
- Caherglassaun Turlough SAC 000238
- Termon Lough SAC 001321
- Galway Bay Complex SAC 000268
- Sonnagh Bog SAC 001913
- Rahasane Turlough SAC 000322
- Rahasane Turlough SPA 004089
- Glendree Bog SAC 001912

Nationally designated sites with potential hydrological connectivity, (including groundwater connectivity for sites with Turloughs*), to the proposal are:

- Coole-Garryland Complex pNHA 000252
- Kiltartan Cave (Coole) pNHA 000286
- East Burren Complex pNHA 001926
- Lough Cutra pNHA 000299
- Caherglassaun Turlough pNHA 000238
- Termon Lough pNHA 001321
- Galway Bay Complex pNHA 000268
- Sonnagh Bog pNHA 001913
- Slieve Aughty Bog NHA 001229
- Rahasane Turlough pNHA 000322
- Glendree Bog pNHA 001912

Of the sites listed above, the following are also considered to have potential surface water connectivity to the proposal:

- Coole-Garryland Complex SAC 000252

- Coole-Garryland SPA 004107
- Coole Lough & Garryland Wood Ramsar Site 473
- Coole-Garryland Complex pNHA 000252

The odour and air quality impact assessment of the EIAR (Chapter 6) identifies designated sites potentially affected by air quality changes in the vicinity of the proposal. The results of the assessment suggest that the Coole-Garryland Complex SAC (Site code: 000252), Coole-Garryland SPA (Site code:004107), Coole Lough & Garryland Wood Ramsar Site (Site code: 473), and Coole-Garryland Complex pNHA (Site code: 000252) are potentially significantly affected by the proposal in terms of increases in Nitrogen deposition.

A Natura Impact Statement (NIS) has been produced for the proposal. This incorporates a detailed assessment of the above potential impacts. The NIS concludes that, with respect to surface and groundwater impacts, mitigation is required in order to avoid potential impacts on Natura 2000 Sites. This is also true for nationally designated sites within the same locations. With respect to air quality impacts, the NIS concludes that the proposal will not impact on the integrity of any Natura 2000 sSites. This is considered to be equally applicable to nationally designated sites which cover much the same areas.

Effect without mitigation

With respect to designated sites, it is therefore concluded that, without mitigation, potential direct impacts upon designated areas are concluded to be ***Significant*** at the ***International to National*** scales. These are limited to impacts associated with water quality changes. Mitigation is required in terms of appropriate design and working practices to minimise any risk of impact resulting from contamination of surface or groundwater potentially connecting to designated areas and are detailed in Section 5.6.

Potential secondary impacts on watercourses and associated downstream ecology during the construction phase

Potential secondary impacts on downstream ecological receptors are limited to those arising from water quality changes as a result of direct or groundwater connectivity to the adjacent Gort River. The chapters within this EIAR relevant to this section are Soils and Geology (Chapter 8), and Water (Chapter 7).

Receptors are likely to include salmonids (notably brown trout) and otter. Potential secondary impacts upon these receptors during construction might include the release of suspended solids or hydrocarbons into the Gort River during the construction phase either directly (spillage of contaminant into watercourses, or siltation of watercourses through disturbance, vegetation clearance and/or drainage activities clearance) or indirectly

(seepage of pollutants into groundwater). Salmonid species require very high levels of water quality in order to complete their life cycles and increases in contaminated or silt-laden water entering the watercourse to the south of the site are likely to impact upon local fish fauna. Such impacts would be short-term in character but may nonetheless persist beyond the term of construction (see Potential Impacts of the Operational Phase,).

Effect without mitigation

It is considered that potential secondary impacts upon downstream ecology resulting from the proposal considered to be ***Significant*** at the ***Local*** scale. Mitigation is required in terms of appropriate working practices to minimise any risk of localised impact resulting from events such as mobilisation of sediment or pollutants are appropriate and are detailed in Section 5.6.

Potential secondary impacts on terrestrial habitats during the construction phase

There is considered to be **no potential for any secondary impacts** on the terrestrial habitats recorded at the Proposed Development Site resulting from the construction phase of the Proposed EIA Development.

Potential secondary impacts on birds during the construction phase

The construction phase will result in a certain amount of secondary impact on bird species, largely in the form of habitat change and displacement. Timing of the construction works will have an effect on the level and type of impact, since some of the species recorded are known to nest within and adjacent to the Application Site.

The majority of the passerines recorded as occurring at the Application Site or considered likely to occur are associated with open agricultural land and pasture, scrub and hedgerows, and many are likely to be breeding species. Although many of these species have a low level of sensitivity to disturbance and high productivity, the clearance of vegetation and general construction operations are likely to result in disturbance to feeding and breeding passerines, albeit temporary, and in the short-term may impact upon the local bird population. Meadow pipit is a passerine species which was recorded within the site as a potential breeding record and is a red listed bird due to the sharp breeding declines following the severe winters of 2009/10 and 2010/11.

A number of waterbird species (wildfowl and waders) occur in the area east of the Kinincha Road, immediately east of the Application Site. These species occur adjacent to areas that are already subject to significant human disturbance including the existing road, an industrial park and a supermarket car park. However, there is currently some limited screening in these areas, including net fencing, a bund and hedgerow, which will mitigate

the current disturbance to a degree. There is limited potential that these waterbirds could be impacted due to noise from the Proposed EIA Development.

Effect without mitigation

Overall, potential secondary impacts upon the bird assemblage resulting from disturbance during the construction phase are considered to be ***limited*** at the ***Local*** level. This is due to the distance of the wetland habitat from the site and the related noise disturbances during construction works.

Potential secondary impacts on bats during the construction phase

The Proposed Development Site holds a number of hedgerows and connecting features (including treelines) that are known to be used by foraging bats. As detailed above, the EIA Development will result in the removal of approximately 520m of hedgerow, which is likely to be used by commuting and foraging bats, to facilitate the proposal.

In addition, any dusk or night time construction requiring the use of lights has potential to result in disturbance and displacement of bats using the features around the periphery of the site.

Effect without mitigation

Potential secondary impacts of the proposal upon bats are considered, without mitigation, to be ***Significant*** at the ***Local*** to ***County*** scale depending on the level of use by lesser horseshoe bats.

Potential secondary impacts on badger during the construction phase

As detailed in **Section 5.4**, there is a potential badger sett considered to be potentially affected by the proposal, if it becomes active. However, secondary effects of construction are likely to include the loss of habitats used by foraging badger (i.e. grassland and hedgerows).

Effect without mitigation

Without mitigation, secondary impacts of the construction phase upon badger are considered to be ***Significant*** at the ***Local*** level.

Potential secondary impacts on otter during the construction phase

Potential secondary effects on otters are considered to be limited to water quality impacts as discussed in on downstream ecology, as above.

Effect without mitigation

It is considered that potential secondary impacts upon otters resulting from the proposal considered to be ***Significant*** at the ***Local*** scale. Mitigation is required in terms of

appropriate working practices to minimise any risk of localised impact on otter food sources resulting from events such as mobilisation of sediment or pollutants are appropriate and are detailed in Section 5.6.

CUMULATIVE IMPACTS

Cumulative impacts of the construction phase

The potential for cumulative impacts resulting from the construction phase of the Proposed EIA Development is considered to be limited to water quality changes within the Gort River and groundwater aquifer and air quality changes due to stack emissions.

A Natura Impact Statement (NIS) has been produced for the proposal. This incorporates a detailed assessment of the above potential impacts. The NIS concludes that, with respect to surface and groundwater impacts, taking account of potential cumulative impacts, mitigation is required in order to avoid potential impacts on Natura 2000 Sites. This is also considered true for nationally designated sites within the same locations. With respect to air quality impacts, the NIS concludes that the proposal will not impact on the integrity of any Natura 2000 Sites. Air quality impact assessments include the background quality levels and are therefore, by definition, cumulative assessments. This is considered to be equally applicable to nationally designated sites which cover much the same areas as well as downstream ecology within the Gort River.

With respect to designated sites, it is therefore considered that, without mitigation, potential cumulative impacts upon designated areas are concluded to be ***Significant*** at the ***International to National*** scales. It is also considered that, without mitigation, potential cumulative impacts upon downstream ecological features areas are concluded to be ***Significant*** at the ***Local*** scale. These are limited to impacts associated with water quality changes. Mitigation is required in terms of appropriate design and working practices to minimise any risk of impact resulting from contamination of surface or groundwater potentially connecting to designated areas and are detailed in Section 5.6.

5.5.3 Potential Impacts of the Operational Phase

Potential impacts of the proposal during the operational phase are considered to be largely limited to those arising from water quality and air quality changes and operational lighting. In terms of water quality changes, the potential pathways are via groundwater and surface water with the potential receptors being designated areas and downstream ecology associated with the Gort River. In terms of air quality changes, the pathway is through air movements associated with proximity and wind direction and the receptors being designated areas and sensitive habitats in the wider area. In terms of operational lighting

the potential is direct impact on bat populations using the locality for commuting and foraging.

POTENTIAL DIRECT IMPACTS DURING THE OPERATIONAL PHASE

Potential direct operational phase impacts of the operational phase of the proposal includes:

- Impacts on fauna within adjacent watercourses from generation of silt-laden run-off due to bare ground and / or lack of balancing ponds and drainage associated with infrastructure; and,
- Bat disturbance and displacement resulting from lighting disturbance.

Potential direct impacts on watercourses and associated ecology during the operational phase

The project has been designed to be self-contained in water terms, with no direct discharges (of process effluents or dirty storm water) to ground /groundwater or surface water. Process effluents (dirty water generated within the site such as wash down within the waste reception building) will be conveyed by surface drains (within the buildings) and pipework to an underground process effluent tank. A second underground process effluent tank is provided for storage of larger process effluent spills. All such material will be moved off site. The Application Site will also be connected to the Gort foul sewer. All water within the drainage system and the ponds within the Application Site will be derived from run-off from surfaces and roofs and so will not hold contaminants beyond those washed off such surfaces. It is considered that this has the worst-case potential to include small amounts of hydrocarbons. A Stormwater Report has been provided for the proposal (JBA Consulting, March 2018). This details that a by-pass petrol interceptor will be part of the drain infrastructure, prior to the temporary stormwater storage tanks.

Effect without mitigation

Taking account of the above, the potential ongoing direct impact of the EIA Development on watercourses and downstream ecology is considered to be ***Not Significant***.

Potential direct impacts on bats during the operational phase

As different bat species have different foraging behaviours and ecological requirements, infrastructure aspects such as lighting may affect different species in different ways. It is documented that lesser horseshoe bats (a QI species of the Kiltartan Cave (Coole) SAC) are very sensitive to light pollution (NPWS, 2017), with the species being found to avoid commuting routes with artificial light levels as low as 3.7 lux (Stone, *et al*. 2012 *in* NPWS, 2017).

It is known that there are lesser horseshoe bat roosts in the wider locality (with a roost record likely to be some 28 m east of the Application Site) and, although the core part of the Application Site is of low suitability for the species, it is therefore assumed that the species will use the features such as hedgerows and treelines around the site for foraging and commuting, as well as features beyond the application site boundary, such as the Gort River corridor.

The lighting for the biogas plant has the potential to spill out to these features and beyond and result in a reduced level of use by lesser horseshoe and other species of bats. This can have the effect of sterilising areas and resulting in effective habitat loss.

Effect without mitigation

Potential direct impacts of the proposal upon bats during the operational phase are considered, without mitigation, to be ***Significant*** at the ***Local to County*** scale depending on the extent of lighting and the level of use by lesser horseshoe bats.

POTENTIAL SECONDARY IMPACTS DURING THE OPERATIONAL PHASE

Secondary Operational Phase impacts are considered to be limited to impacts on nearby watercourses from continued generation of silt-laden run-off due to bare ground and / or lack of balancing ponds and drainage associated with infrastructure, which can potentially result in low level impacts on downstream aquatic habitats and species, as well as continued air quality impacts, resulting in long term vegetation changes in sensitive habitats.

Potential secondary impacts on designated areas during the operational phase

As with the potential secondary impacts on designated areas identified in relation to the construction phase, those relating to the operational phase are largely limited to those arising from water quality and air quality changes.

It has been detailed previously that the Proposed EIA Development will be self-contained in water terms, with no effluent discharge location to watercourses, a connection to the foul sewer, a fully contained process water system and a surface drainage system for storm water that incorporates an initial petrol-interceptor filter. If such a system is in place and fully operational, there is not therefore considered to be a risk of ongoing water quality impacts. However, it is appropriate that mitigation is in place in order to ensure that, noting the karst nature of the area, surface water drainage and containment systems are fully bunded and separated from any potential contact with the groundwater system.

As detailed previously, the Natura Impact Statement (NIS) has been produced for the proposal. With respect to air quality impacts, the NIS concluded that the proposal will not

impact on the integrity of any Natura 2000 Sites. This is considered to be equally applicable to nationally designated sites which cover much the same areas.

Effect without mitigation

With respect to designated sites, it is therefore concluded that, although the probability is considered to be *Extremely Unlikely*, without mitigation, *Significant* potential secondary impacts upon designated areas cannot be ruled out. These are limited to impacts associated with water quality changes. Mitigation is required in terms of appropriate design and working practices to minimise any risk of impact resulting from contamination of surface or groundwater potentially connecting to designated areas and are detailed in Section 5.6.

Potential secondary impacts on watercourses and associated downstream ecology during the operational phase

As stated in Section 5.4.3, vegetation clearance and drainage activities required for construction have the potential to result in increases in silt-laden water entering the watercourse to the south of the site and impacting on local fish fauna. Post-construction, there is also potential for continued run-off of silt-laden water if disturbed ground is not re-vegetated. A landscape concept has been produced for the proposal and forms part of Chapter 6: Landscape. This concept includes active re-vegetation of all areas outside the infrastructure footprint, including seeding of native calcareous grassland and woodland and hedgerow planting. Any bare areas of soil will therefore be limited to the construction period and are not expected to extend significantly into the operational phase.

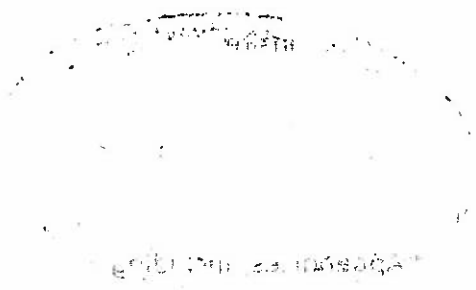
Taking account of the above, the potential ongoing secondary impact of the Proposed Development on watercourses and downstream ecology is considered to be ***Not Significant.***

Potential secondary impacts on birds during the operational phase

Potential secondary impacts associated with the operational phase of the proposal are likely to be mainly associated with disturbance / avoidance at the site. Within the core Application Site, this relates mainly to passerines that use the site for breeding and foraging, and also the waterbirds using the wetland area to the east of the Kinincha road.

Potential secondary impacts on passerine assemblage during the operational phase

Many of the passerine species recorded at the Application Site are common species which often breed close to habitation, e.g. roadsides and gardens. The proposal will not result in significant loud or sporadic noise likely to result in disturbance



It is therefore concluded that potential ongoing disturbance to passerines resulting from the operational phase of the proposal is ***Not Significant.***

Potential secondary impacts on the waterbird assemblage during the operational phase

The potential for secondary impacts on the waterbird assemblage is considered to be very limited as the distance from the construction works to the wetland habitat is *c.* 200-400 m, sufficient to ensure no noise disturbance to these waterbird species.

Effect without mitigation

Potential secondary impacts of the proposal upon birds during the operational phase are considered, without mitigation, to be ***Significant*** at the ***Local*** scale.

CUMULATIVE IMPACTS DURING THE OPERATIONAL PHASE

The potential for cumulative impacts resulting from the operational phase of the Proposed EIA Development is limited to secondary impacts on designated features arising from air emissions. This has been assessed within the NIS, which concludes that, with respect to air quality impacts, the proposal will not impact on the integrity of any Natura 2000 sites. This is equally applicable to nationally designated sites and other key ecological receptors.

It is therefore concluded that potential cumulative impacts resulting from the operational phase of the proposal are ***Not Significant.***

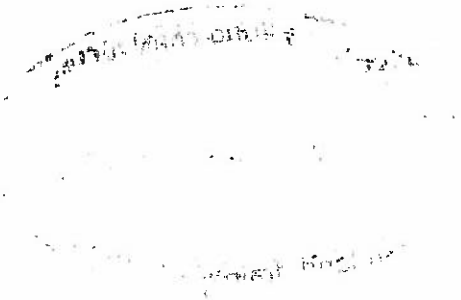
5.5.4 Potential Impacts of the Decommissioning Phase

The decommissioning phase of the development proposal is described in Section 2.12 of this EIAR. Decommissioning phase impacts are likely to be broadly similar to construction phase impacts, in terms of disturbance through increased noise levels, ground clearance works, and reinstatement; and potential surface water quality impacts from ground disturbance, re-fuelling and the storage of potentially hazardous materials.

5.6 MITIGATION MEASURES

The mitigation required to avoid potential impacts on ecological features provided in this chapter draws heavily on mitigation proposed in other chapters and appendices, including the Hydrology Chapter and NIS.

In addition, the Proposed EIA Development I incorporates significant embedded mitigation. This includes no effluent discharge, with a sealed effluent and water system whereby the plant is connected to the Gort foul sewer, process effluent is fully captured and removed from the site where not reused, and storm water is kept within a bunded sustainable drainage system, including swales and attenuation ponds. Landscaping and habitat



creation will include addition of a new hedgerow adjacent to the Kinincha Road as well as habitat creation within the Application Site.

The mitigation set out below details all that required to ensure the proposal will not impact on important ecological receptors including, where appropriate, those set out in other chapters.

5.6.1 Construction Phase Mitigation

MITIGATION BY AVOIDANCE

Protection of watercourses, groundwater and designated areas

Mitigation from Water Chapter:

- Dedicated area of hardstanding for material deliveries separated a minimum of 10m from adjacent watercourses;
- Dedicated area of hard standing for vehicle wash-out;
- Specific areas for oil storage and refuelling, separated a minimum of 10m from adjacent watercourses and comply with legislation, including providing bunds sized 10 contain 110% of fuel storage capacity;
- Use spill kits, fill point drip trays, bunded pallets and secondary containment units;
- Enclosed and secured site and fuel storage areas will be secondarily secured;
- Adhere to and implement the CEMP which includes the Site Waste Management Plan ("SWMP") and Incident Response Plan ("IRP").
- Works involving the use of chemicals which are potentially harmful to the aquatic environment will be undertaken in a contained or lined area;
- Excavation and disposal off-site of contaminated soils (where required)
- A suitable casing will be used where wet concrete is proposed to ensure protection of groundwater until concrete has set.
- Land disturbance is expected to be minimised and quickly re-stabilised during the construction.
- Due to the limited soil and superficial cover present onsite, it is not though that large quantities of soils and superficial deposits will be moved during construction
- During construction, areas where the bedrock aquifer is exposed should be protected from surface activities.

Other mitigation:

- There will be no direct discharge to watercourses, including land drains.
- All outflows from drainage associated with construction will be by diffuse overland drainage at appropriate locations. The karst nature of the area means that there will be no on-site holding of any effluent or construction run-off potentially

containing chemical pollutants or cementitious material excepting within appropriately bunded / contained areas.;

- Disturbed ground within the site will be actively revegetated with appropriate site-typical vegetation immediately post construction, in line with the Landscape Planting Scheme;
- The proposals to control potential pollution detailed within the **Chapter 8: Water** of this EIAR will be implemented in full. These include measures for developing appropriate drainage infrastructure, storage of potentially hazardous materials, de-watering operations, site management and the implementation of a buffer to watercourses (achieved as part of embedded site design);
- Works relating to areas near the Gort river will be subject to the requirements of 'Guidelines on protection of Fisheries during Construction Works in and Adjacent to Waters' (IFI, 2016); and,
- A Construction Environmental Management Plan will be developed for the construction period. This will include details of the implementation and monitoring of environmental control measures to be applied during the construction process to ensure no potential for impact on groundwater or neighbouring watercourses.

Protection of important habitats

Hedgerows and treelines within the site are considered to be habitats of significant local biodiversity value that will be retained, providing commuting corridors for a variety of mammal and plant species. Loss of such features will be minimised where possible by the following measures:

- Where hedgerows and treelines are to be removed, the minimum necessary area will be removed; and,
- Wherever feasible a 5m exclusion zone will be employed adjacent to treelines and hedgerows to protect root systems. There will be no works, vehicular access or storage of materials within these areas.
- A Project Ecologist will be employed for the construction period with roles including:
  - Ensuring exclusion zones are put in place and maintained;
  - Ensuring measures to protect adjacent watercourses and groundwater are put in place and maintained;
  - Undertaking pre-construction surveys for protected mammals /nesting birds as required and determine measures required to avoid potential impact on any protected species during construction works;
  - Input into method statements as require;

- Advise on soil and turve stripping, storage, landscaping, planting and seeding to optimise terrestrial habitat creation (including grasslands, woodland and hedgerow habitats); and,
- In conjunction with SuDS engineers, advise on profiling and any required planting of attenuation ponds to maximise wildlife value.

Protection of important mammal and reptile species

- The commencement of works will be preceded by a due diligence ecological walkover survey of the Application Site within 10-12 months prior to works commencing. The aim of the survey will be to identify any protected species such as common lizards or other protected species within the application site.
- A pre-construction mammal survey, particularly for badger, will be carried out to determine if there are any active badger setts with the Application Site or within 50 m of any proposed construction works. This survey will be conducted in adherence with the NRA guidelines for the treatment of badgers.
- In general, a survey of setts within 50 m of the scheme (150 m where piling or blasting will be undertaken) is required no more than 10-12 months in advance of construction. This will ensure that there will be sufficient time to comply with all licensing requirements and that the necessary actions are undertaken to protect the badger populations prior to the commencement of construction.
- Trail cameras will be placed at potential setts entrances/ inconclusive burrow entrances and left in place for 21 days.
- If a badger sett is confirmed, a 30 m buffer will be put in place between the sett and any construction works.
- If the works or any parts of the scheme occur within this buffer, a derogation licence will be prepared by a suitably qualified ecologist for the closure of the sett. If the NPWS grant the licence, the following steps would be undertaken:
    1. A minimum of two weeks monitoring with trail cameras prior to # 3.
    2. An appropriate number of one-way-gates would be set up on the entrances to the sett for 21 days. Trail cameras would be required throughout this, and regular site visits to check activity at the sett entrances.
    3. To progress, there should be no signs of badgers re-entering the sett. If it is certain badgers are not within the sett, the contractor would need to dig out the sett in the presence of an ecologist immediately after # 3.

Protection of important bird species

- The ground clearance aspects of construction will be timed to commence outside the bird breeding season (which is March to August inclusive).

- Any required trimming of roadside vegetation (hedges and overhanging trees) along Kinincha Road will be undertaken outside the bird breeding season (March to August inclusive). This is in line with restrictions set out in Section 40 of the Wildlife Act 1976, as amended by the Wildlife (Amendment) Act 2000.
- Where construction takes place during the breeding season, and if any vegetation clearance is undertaken within this period, care will be taken to avoid the accidental destruction of birds' nests and an appropriate buffer will be applied to avoid disturbance until any young have fledged. Any works during the breeding season will also be preceded by a breeding bird survey to ascertain the location of active nests.
- A Project Ecologist will be appointed to ensure best practice is implemented during the construction of the Proposed EIA Development and any construction during the bird nesting season will be monitored by them. The Project Ecologists' role will include the application of appropriate buffers to ensure the protection of nesting birds from disturbance in line with current scientific understanding.

Protection of bats

- Night time working during the main active bat season (April to October inclusive) will be minimised. Any necessary working between sunset and sunrise will only be facilitated by lighting rigs that are appropriately baffled to avoid lighting hedgerows and treelines.

MITIGATION BY REDUCTION

Protection of important habitats

- The working corridor will be limited in or near areas of treelines and hedgerows to minimise impact or loss of these habitats. The working corridor is stated within the Construction Environmental Management Plan (CEMP) and agreed with the project ecologist prior to the commencement of works.
- There will be an active approach to silt control within the Application Site. In areas being actively worked, dedicated construction staff will be tasked to place silt fences in areas of risk of overland flow of silt-laden water. Silt fences must be visually checked on a weekly basis for efficacy, and daily in actively worked areas or during wet conditions. An approach to ensuring the above has been incorporated into a CEMP to be adopted by the appointed contractor.

OFFSETTING

Habitat restoration

- Mineral soils, sub-soil and turves will be stored separately in order to facilitate habitat restoration.
- A Project Ecologist will be employed for the construction period with roles including:
  - Ensuring exclusion zones are put in place and maintained;
  - Ensuring measures to protect adjacent watercourses and groundwater are put in place and maintained;
  - Input into method statements as required;
  - Advise on soil and turve stripping, storage, landscaping, planting and seeding to optimise terrestrial habitat creation (including grasslands, woodland and hedgerow habitats);
  - Turves from the neutral/calcareous grassland of the site will be saved and used in grassland creation within the site to minimise the loss of species rich grassland habitat;
  - The ecologist will advise the landscaping of the site to include enhancing the hedgerows around the site, planting native species only, avoiding and actively removing any non-native species;
  - Grassy verges along berms and embankments will be kept and enhanced to avoid loss of hunting habitat for raptor species such as kestrel and barn owl (see Plate 5.9 of where a barn owl was recorded hunting along the grassy verge embankment);
  - Proposed new earth embankments or berms will also be managed to ensure similar grass verge habitats to existing embankments where barn owl, a red listed breeding bird of the wider area, was recorded hunting within the site.
  - In conjunction with SuDS engineers, advise on profiling and any required planting of attenuation ponds to maximise wildlife value.
- Hedgerow lost during construction, including hedgerow removed to facilitate new berms of the access road will be replaced on a like for like basis as far as possible. A bordering hedgerow has been included in the design of the embankment. This will be planted prior to the completion of works in accordance with best practice and will include a mix of blackthorn, hawthorn and spindle. The Project Ecologist will agree the final species mix to be used. Post-construction monitoring of the success of the hedgerow planting will be undertaken and any failed trees / whips will be replaced on a like for like basis for a period of two years following initial planting.
- The Landscape Planting Scheme will be complied in entirety and measures will be executed in conjunction with the project ecologist. The landscape plan will include

the planting of trees and strengthening of new and existing hedgerows with species including field maple (*Acer campestre)*, horse chestnut (*Aesculus hippocastanum)*, alder (*Alnus glutinosa)*, birch (*Betula pubescens)*, wild cherry (*Prunus avium)*, pedunculate oak (*Quercus petraea)*, rowan (*Sorbus aucuparia)* and lime (*Tilia sp.)*.

- The planting schedule shall avoid the use of any alien invasive plants such as the amber listed invasive species cherry laurel (*Prunus laurocerasus)*, montbretia (*Crocosmia X crocosmiflora)* and snowberry (*Symphoricarpos albus)*.
- The landscape concept includes the planting of native calcareous grassland, native woodland species and c. 450 m of hedgerow and treeline appropriately positioned to enhance bat commuting through and feeding within the site.

Protection of important bird species

- The landscape Planting Scheme will be complied and measures will be executed in conjunction with the project ecologist. The landscape concept includes maintaining grassy verge habitat along berms for barn owl, rough grassland for meadow pipit and retaining, planting and strengthening hedgerow habitats within the site.

5.6.2 Operational Phase Mitigation

MITIGATION BY REDUCTION

Protection of bats

- Lighting will be designed for the site to minimise lighting spill to any features potentially used by bats. This includes the existing treelines and hedgerows as well as hedgerow, woodland and pond features comprising the landscape concept.
- As stated in the NIS, lesser horseshoe bats have been found to avoid commuting along routes lit with artificial light at levels as low as 3.7 lux emanating from energy efficient LED lights Stone (2012). Other lamp types producing light at similar levels have also been found to prevent commuting (Stone et al., 2009).
- BCI (2010) [86] will be consulted when drawing up the final lighting plan.
- In order to prevent an impact on bats, including lesser horseshoe bats, the external lighting plan will ensure light levels, particularly along linear features such as hedgerows and treelines, are retained close to darkness (1 lux) to provide suitable foraging and commuting locations for bats along the hedgerows, other linear features and open space. Lighting in open space will use lux levels as low as possible also, ideally 1-2 lux.

[86] *Bats and Lighting Guidance Notes for: Planners, engineers, architects and developers BCI (2010) https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf*

- As such, the site will continue to support habitats in which bats can forage, and some areas will be improved / enhanced due to the planting of scattered trees around this site and the strengthening of linear habitat features.
- Linear foraging features, in particular, the hedgerows to the north and east of the site will be enhanced and a new hedgerow planted on the new berm to the east to ensure suitable foraging and commuting habitats for bats and, in particular, lesser horseshoe bats from Kiltartan Cave (Coole) SAC.

Watercourses

- Active habitat creation, including seeding and planting, will be undertaken as soon as feasible following construction in order to reduce potential for silt-laden water being created and entering watercourses.

Designated areas

- Measures to avoid post-construction impacts on watercourses will also be effective in avoiding post-construction impacts upon downstream designated areas.

OFFSETTING

Restoration of important habitats

- Following implementation of the Landscape Planting Scheme, monitoring of the success of habitat restoration will be undertaken. A monitoring programme, and requirements for remedial measures, will form part of reporting to the Planning Authority for 5 years following construction.

5.6.3 Decommissioning Phase Mitigation

The decommissioning phase is described in Section 2.12 of this EIAR. Due to the similarity of impacts to construction phase (in terms of disturbance through increased noise levels, ground clearance works, and reinstatement; and potential surface water quality impacts from ground disturbance, re-fuelling and the storage of potentially hazardous materials onsite) the implementation of all mitigation measures detailed in the construction phase (including due diligence surveys for protected species) will help ensure that all such impacts are avoided.

The decommissioning plan (as required by the EPA IE Licence) will include a biodiversity section written by a qualified ecologist, will contain specific actions aimed at high quality habitat restoration of areas impacted by the decommissioning works.

5.7 RESIDUAL IMPACTS OF THE DEVELOPMENT

Table 5.17 sets out the residual impacts on Key Ecological Receptors, taking account of mitigation proposed above.

5.8 MONITORING AND FURTHER WORK

A number of monitoring measures are proposed, with the aim of ensuring the continued effectiveness of the proposed mitigation measures.

5.8.1 Habitats

Monitoring of the grassland habitats (created with existing turves from site clearance) will be monitored to ensure no improvement in grassland habitat and ensure retain neutral/calcareous grassland as present on the site currently.

5.9 SUMMARY OF SIGNIFICANT EFFECTS

Table 5.17 provides a matrix which lists the Key Ecological Receptors which are considered to be within the zone of influence of the Proposed EIA Development and an evaluation of their importance. Table 5.17 also provides a summary of potential impacts and effects on these Key Ecological Receptors and the significance of these effects before mitigation. Finally, Table 5.17 provides an outline of proposed mitigation measures relevant to each Key Ecological Receptor and the significance of any residual effects.

Before mitigation there is potential for significant effects on features which range from Local Importance (Higher Value) to International Importance.

Before mitigation there is potential for significant effects on features of **National and International Importance**, namely, pNHAs, NHAs, Ramsar Sites, SPAs and SACs with potential hydrological connectivity to the Development. There is also potential for significant effects on a single feature of **County Importance** (the bat assemblage) as well as potential for significant effects on features of **Local (higher) Importance** including calcareous grassland, hedgerows, the bird assemblage, badger and otter.

Potential significant effects relate to water quality changes, habitat loss, disturbance (birds, bats and otter) and loss of foraging areas (badger, bats and birds).

Measures have been proposed to reduce and avoid potential significant effects. These measures include appropriate working and design approaches to control hydrological impacts and effectively sever any potential hydrological link outside the Application Site

excepting overland flow. They also include minimizing impact on habitats and providing replacement habitats where feasible. A Landscape Planting Scheme is proposed that includes features specifically aimed at enhancing the area for bats, passerines and raptors such as barn owl and kestrel.

Following the implementation of mitigation, it is considered that there is a worst case scenario of a residual impact considered to be significant at a **Local** scale in the case of calcareous grassland and residual short-term impacts (circa 5 years) that are significant at the **Local** scale in the case of hedgerows, with other potentially significant effects being reduced to a level of **Not Significant**.

Table 5.17 Residual Impacts of the EIA Development

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
Coole-Garryland Complex SAC 000252 Coole-Garryland SPA 004107 Kiltartan Cave (Coole) SAC 000286 Coole Lough & Garryland Wood Ramsar Site 473 Eastern Burren Complex SAC 001926 Lough Coy SAC 002117 Lough Cutra SAC 000299 Caherglassaun Turlough SAC 000238 Termon Lough SAC 001321	International	Construction phase	*Direct Impacts* **No potential for direct impact**			There will be no direct discharge to watercourses, including land drains. All outflows from drainage associated with construction will be by diffuse overland drainage at appropriate locations. There will be no on-site holding of any effluent or construction run-off potentially containing chemical pollutants or cementitious material excepting within appropriately bunded / contained areas. Disturbed ground within the site will be actively revegetated immediately post construction. The proposals to control potential pollution detailed within the Chapter 8: Water of this EIAR will be implemented in full. These include measures for developing appropriate drainage infrastructure, storage of potentially hazardous materials, de-watering operations, site management and the implementation of a buffer to watercourses (achieved as part of embedded site design). Works relating to the embankment will be subject to	**Not significant**
			Secondary impacts - pollutants and/or sediment entering watercourses via seepage into groundwater or contamination of land drains	Pollution / siltation of watercourses / groundwater leading to downstream impacts upon designated areas and/or their features of interest	**Significant** at the International scale		
		Operational Phase	*Direct Impacts* **No potential for direct impact**	-	-		
			Secondary impacts - Ongoing run-off of sediment-laden water resulting from lack of revegetation and/or direct drainage connection between worked areas and watercourses.	Pollution / siltation of watercourses leading to downstream impacts upon designated areas and/or their features of interest	**Not significant** Embedded (design) mitigation within the proposal includes an active revegetation landscape concept, waterbodies and swales are bunded, there is no discharge to watercourses		

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin	Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
Galway Bay Complex SAC 000268 Sonnagh Bog SAC 001913 Rahasane Turlough SAC 000322 Rahasane Turlough SPA 004089 Glendree Bog SAC 001912		Decommissioning phase	Potential impacts broadly similar to those of construction phase		the requirements of 'Guidelines on protection of Fisheries during Construction Works in and Adjacent to Waters' (IFI, 2016) A Construction Environmental Management Plan will be developed for the construction period. This will include details of the implementation and monitoring of environmental control measures to be applied during the construction process. Integrity testing of foundations and a severing of any hydrological connection between the works and the surface and/or groundwater.	
Coole-Garryland Complex pNHA 000252 Kiltartan Cave (Coole) pNHA 000286 East Burren Complex pNHA 001926 Lough Cutra pNHA 000299	National	Construction phase	**No potential for direct impact**	-		There will be no direct discharge to watercourses, including land drains. All outflows from drainage associated with construction will be by diffuse overland drainage at appropriate locations. There will be no on-site holding of any effluent or construction run-off potentially containing chemical pollutants or cementitious material excepting within appropriately bunded / contained areas. Disturbed ground within the site will be actively revegetated immediately post construction.	**Not significant**
			Secondary impacts - pollutants and/or sediment entering watercourses via seepage into groundwater or contamination of land drains	Pollution / siltation of watercourses / groundwater leading to downstream impacts upon designated areas and/or their features of interest	**Significant** at the National scale		
		Operational Phase	**No potential for direct impact**	-	-		
			Secondary impacts - Ongoing run-off of sediment-laden water resulting	Pollution / siltation of watercourses leading to downstream	**Not significant** Embedded (design) mitigation within the proposal includes an		

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
Caherglassaun Turlough pNHA 000238 Termon Lough pNHA 001321 Galway Bay Complex pNHA 000268 Sonnagh Bog pNHA 001913 Slieve Aughty Bog NHA 001229 Rahasane Turlough pNHA 000322 Glendree Bog pNHA 001912			from lack of revegetation and/or direct drainage connection between worked areas and watercourses.	impacts upon designated areas and/or their features of interest	active revegetation landscape concept, waterbodies and swales are bunded, there is no discharge to watercourses	The proposals to control potential pollution detailed within the Chapter 8: Water of this EIAR will be implemented in full. These include measures for developing appropriate drainage infrastructure, storage of potentially hazardous materials, de-watering operations, site management and the implementation of a buffer to watercourses (achieved as part of embedded site design). Works relating to the embankment on the eastern boundary of the site will be subject to the requirements of 'Guidelines on protection of Fisheries during Construction Works in and Adjacent to Waters' (IFI, 2016) A Construction Environmental Management Plan will be developed for the construction period. This will include details of the implementation and monitoring of environmental control measures to be applied during the construction process.	
		Decommissioning Phase	Potential impacts broadly similar to those of construction phase				
Watercourses and associated downstream ecology	Local (Higher)	Construction phase	Potential significant direct impacts may include sedimentation, fuel spillage, concrete washout	Pollution / siltation of watercourses leading to downstream impacts upon ecological features e.g. salmonids and	**Significant** at the local scale	There will be no direct discharge to watercourses, including land drains. All outflows from drainage associated with construction will	**Not significant**

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
				other fish fauna, otter		be by diffuse overland drainage at appropriate locations. There will be no on-site holding of any effluent or construction run-off potentially containing chemical pollutants or cementitious material excepting within appropriately bunded / contained areas. Disturbed ground within the site will be actively revegetated immediately post construction. The proposals to control potential pollution detailed within the Chapter 8: Water of this EIAR will be implemented in full. These include measures for developing appropriate drainage infrastructure, storage of potentially hazardous materials, de-watering operations, site management and the implementation of a buffer to watercourses (achieved as part of embedded site design). Works relating to the embankment will be subject to the requirements of 'Guidelines on protection of Fisheries during Construction Works in and Adjacent to Waters' (IFI, 2016) A Construction Environmental Management Plan will be developed for the construction period. This will include details of the implementation and	
			Secondary impacts - pollutants and/or sediment entering watercourses via seepage into groundwater or contamination of land drains	Pollution / siltation of watercourses leading to downstream impacts upon ecological features e.g. salmonids and other fish fauna, otter	**Significant** at the local scale		
		Operational Phase	**Potential significant direct impacts unlikely**	-	-		
			Ongoing run-off of sediment-laden water resulting from lack of revegetation and/or direct drainage connection between worked areas and watercourses	Pollution / siltation of watercourses leading to downstream impacts upon ecological features e.g. salmonids and other fish fauna, otter	**Not significant** Embedded (design) mitigation within the proposal includes an active revegetation landscape concept, waterbodies and swales are bunded, there is no discharge to watercourses		
		Decommissioning Phase	Potential impacts broadly similar to those of construction phase				

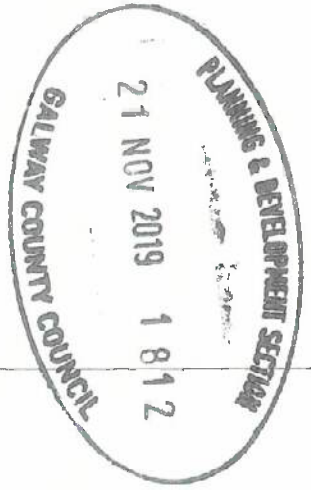
Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
						monitoring of environmental control measures to be applied during the construction process.	
Boundary features – hedgerows and treelines	Local (Higher)	Construction phase	Clearance of areas for infrastructure and access	Loss of up to 1.9 km of hedgerow	**Significant** at the local scale	Hedgerow are being retained during construction, however if any amount of hedgerow is lost during construction, this will be replaced on a like for like basis as far as possible. Hedgerow strengthening and creation and replacement of any hedges removed. Hedges will be replaced as soon as possible after any required removal and in accordance with best practice and will include a mix of blackthorn, hawthorn and spindle. The project ecologist will agree the final species mix to be used. Post construction monitoring of the success of the hedgerow planting will be undertaken and any failed trees / whips will be replaced on a like for like basis for a period of two years following initial planting. The Landscape Planting Scheme includes approximately 430m of hedgerow / treeline planting	**Residual short-term impacts (circa 5 years) that are significant at the local scale** **Long-term impacts Not significant**
			Removal/trimming of individual trees and hedgerow to facilitate construction works and access.	Loss of 1.9 km of hedgerow / treeline (worst-case-scenario) Loss/trimming of individual trees/shrubs along Kinincha Road	**Significant** at the local scale		
		Operational Phase	**No potential for direct impact**	-	-		
			No potential for secondary impacts	-	-		
		Decommissioning Phase	Potential impacts broadly similar to those of construction phase				
GS1 - Dry calcareous and neutral grassland (in mosaic)	Local (Higher)	Construction phase	Direct: excavation of habitat for infrastructure footprint	Loss of 8.3 ha dry calcareous grassland. This is in mosaic with other habitats and, although derived from a previously	**Significant** at the Local Scale	The Landscape Planting Scheme includes the creation of circa 1ha of calcareous grassland, 0.3ha of woodland and 430m of hedgerow / treeline.	**Not significant / Significant** at the **Local** Scale depending

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
				cleared and seeded site, it of conservation value.		Waterbodies (attenuation ponds) within the site will be created to optimise wildlife benefit taking account of their attenuation function requirements.	on success of mitigation
			No potential for secondary impacts	-	-		
		Operational Phase	**No potential for direct impacts**	-	-		
			No potential for secondary impacts	-	-		
		Decommissioning phase	Potential impacts broadly similar to those of construction phase				
Bats	County (if area is used by commuting / feeding lesser horseshoe bats)	Construction phase	**No potential for direct impacts**	-	-		**Not Significant**
			Secondary – light disturbance arising from construction activities. Loss of hedgerow adjacent to the Kinincha Road and	Disturbance to / displacement of commuting and/or feeding bats	Potentially **Significant** at the County scale (lesser horseshoe bats)	No working between sunset and sunrise within active bat season (April – October inclusive). Any necessary working between sunset and sunrise will only be facilitated by lighting rigs that are appropriately baffled to avoid lighting hedgerows and treelines. Hedgerow along the Kinincha road will be reinforced using appropriate native species.	**Not Significant**

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
		Operational Phase	Secondary – light disturbance arising from plant.	Disturbance to / displacement of commuting and/or feeding bats	Potentially **Significant** at the County scale (lesser horseshoe bats)	Lighting will be designed for the site to minimise lighting spill to any features potentially used by bats. This includes the existing treelines and hedgerows as well as hedgerow, woodland and pond features comprising the landscape concept. The aim will be to ensure light levels at these locations do not exceed 3 lux. The Landscape Planting Scheme includes the creation of circa 0.3ha of woodland and 430m of hedgerow / treeline. Waterbodies (attenuation ponds) within the site will be created to optimise wildlife benefit taking account of their attenuation function requirements.	**Not Significant**
		Decommissioning phase	Potential impacts broadly similar to those of construction phase				**Not Significant**
Badger	Local (Higher)	Construction phase	**No potential for direct impacts**	-	-	All hedgerow lost will be replaced on a like-for-like basis using appropriate native species. The Landscape Planting Scheme includes the creation of circa 0.3ha of woodland and 430m of hedgerow / treeline.	**Not significant**
			Secondary – removal of grassland, scrub, treeline and hedgerow habitats	Loss of foraging habitat	**Significant** at the Local Scale		
		Operational Phase	**No potential for direct impacts**	-	-		
			Secondary – reduction in of grassland, scrub,	Loss of foraging habitat	**Significant** at the Local Scale		

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
			treeline and hedgerow habitats				
		Decommissioning phase	Potential impacts broadly similar to those of construction phase				
Otter	Local (Higher)	Construction phase	**No potential for direct impacts**	-	-	-	**Not significant**
			Secondary - noise / physical disturbance arising from construction activities	Displacement or disturbance	**Not significant** (no suitable habitat within the site and unlikely for noise or light disturbance to reach suitable habitat)		
		Operational Phase	**No potential for direct impacts**	-	-		
			Secondary - noise / physical disturbance arising from construction activities	Displacement or disturbance	**Not significant** (no suitable habitat within the site and unlikely for noise or light disturbance to reach suitable habitat – screening planting and berm will reduce potential disturbance further)		
		Decommissioning phase	Potential impacts broadly similar to those of construction phase				
Bird Assemblage	Local (Higher)	Construction phase	Direct -Loss of boundary features and grassland habitats Removal of hedges and trimming	Loss of, or direct disturbance to, breeding birds and active nests.	**Significant** at the local scale	The ground clearance aspects of construction will be timed to commence outside the bird breeding season (March to August inclusive) if feasible.	**Not significant**

Key Ecological Receptor	Evaluation of importance	Potential Impacts and their origin		Potential Effect	Potential Significance without Mitigation	Proposed Mitigation / Compensation	Residual Effects
			overhanging trees associated with works along Kinincha Road			Any required trimming of roadside vegetation (hedges and overhanging trees) will be undertaken outside the bird breeding season (March-August inclusive). Any works during the breeding season will also be preceded by a breeding bird survey to ascertain the location of active nests. A Project Ecologist will be appointed to ensure best practice is implemented during the construction of the EIA Development and any construction during the bird nesting season will be monitored by them. The Project Ecologists role will include the application of appropriate buffers to ensure the protection of nesting birds from disturbance in line with current scientific understanding The Landscape Planting Scheme includes the creation of c. 0.3ha of woodland and 430m of hedgerow / treeline All hedgerow lost will be replaced on a like-for-like basis using appropriate native species, providing screening of area used by non-breeding birds east of Kinincha Road.	
			Secondary - noise / physical disturbance arising from construction activities	Disturbance to feeding and breeding passerines	**Significant** at the local scale		
		Operational Phase	**No potential for direct impacts**	-	-		
			Secondary – Disturbance, of passerines within the site and waterbirds east of the Kichincha road	Displacement of breeding / non-breeding birds	**Significant** at the local scale		
		Decommissioning phase	Potential impacts broadly similar to those of construction phase				



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