Heatons

Planning Environment Design

Biodiversity Net Gain Assessment

in respect of

Land at LEA Castle Farm, Wolverley, Kidderminster

for

NRS Aggregates LTD

Prepared By

Heatons

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Heatons

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1.0 INTRODUCTION

1.1 Heatons have been commissioned to undertake a Biodiversity Net Gain (BNG) assessment to determine the impact on biodiversity of the proposed mineral extraction at Lea Castle Farm, Wolverley, Kidderminster (hereafter referred to as the site).

1.2 Previously a BNG assessment was undertaken within the Ecological Impact Assessment using the Worcestershire Council Metric. However, the Defra 2.0 Metric has since been released and is considered the standard methodology for BNG assessments moving forward. Therefore, the Defra 2.0 metric has been used to complete this assessment.

Appraisal Objectives

1.3 Biodiversity net gain (BNG) is an approach that means changes brought about by development conclude with biodiversity faring better than it did before works took place and replaces the previous policy of 'no net loss'. BNG is strongly referenced in the NPPF and the current planning decision making process.

1.4 BNG encourages developers to provide an increase in natural habitats and ecological features over and above that being impacted on during development and aims to restore ecological networks. This should ideally be at the same location, but where that is not possible may be achieved by improvements for biodiversity in other locations.

Site Location and Description

1.5 The site is located on land to the north of Wolverley Road, Wolverley, Kidderminster. The site is located approximately 2.3km to the north-east of the centre of Kidderminster, Worcestershire. The site is centred at grid reference SO840790.

1.6 The site comprises approximately 45ha of arable farmland with semi-improved and improved grass headlands. A hardstanding track separates the site from south to north that is delineated by standards of beech (*Fagus sylvatica*) and lime (*Tilia* sp.). The field boundaries of the site include post and wire fencing, hedgerows containing native species, woodland edge and estate boundary brick wall. Occasional standard trees were present within the fields, including pedunculate oak (*Quercus robur*), sweet chestnut (*Castanea sativa*) and non-native conifers.

1.7 The surrounding area includes the River Stour approximately 100m to the north-west of the site, as well as extensive arable land to the north, east and west and blocks of broadleaved woodland to the north, west and south. Wolverley lies 1km to the west of the site and Cookley lies 800m to the north.

2.0 NATIONAL LEGISLATION AND PLANNING POLICY

National Planning Policy

2.1 The National Planning Policy Framework (NPPF 2019) paragraphs 170 to 177 set out the Government's policies on protection of biodiversity through the planning system. These policies are expected to be incorporated into development planning documents at regional and local scales and are also of material worth in considering individual planning applications.

2.2 In relation to biodiversity, the NPPF states that '*Planning policies and decisions should contribute to and enhance the natural and local environment by:*

a) *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*

b) *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*

c) *maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*

d) *minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.'.*

2.3 The NPPF advises that the following principles should be applied by the Local Planning Authority when determining planning applications:

a) *if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*

b) *development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that*

make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) *development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and*

d) *development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.*

Biodiversity Net Gain (BNG)

2.4 Biodiversity net gain (BNG) is an approach that means changes brought about by development conclude with biodiversity faring better than it did before works took place and replaces the previous policy of 'no net loss'. BNG is strongly referenced in the NPPF and the current planning decision making process.

2.5 BNG encourages developers to provide an increase in natural habitats and ecological features over and above that being impacted on during development and aims to restore ecological networks. This should ideally be at the same location, but where that is not possible may be achieved by improvements for biodiversity in other locations.

2.6 BNG relies on the mitigation hierarchy of avoidance, mitigation or compensation being applied, and should be used in addition rather than as a replacement.

2.7 Many councils and organisations have implemented their own BNG strategies which includes the use of a metric as a tool to identify the negative impacts rising from a development and calculates how much new or restored habitats is required to deliver BNG.

3.0 ASSESSMENT METHODOLOGY

3.1 The Biodiversity Net Gain calculations for the proposed scheme have been assessed using the DEFRA Biodiversity Metric 2.0 produced by Natural England and the Phase 1 Habitat Map produced as part of the PEA Report. The Biodiversity Metric 2.0 provides an updated way to measure and account for the losses, changes, and gains, in biodiversity as a result of development, or changes in land management, and includes a calculation tool to demonstrate these figures.

3.2 The metric has been used to calculate the baseline biodiversity units within the Site red line boundary. These calculations have then been used to help the scheme follow the mitigation hierarchy of avoidance, mitigation, and compensation, and to inform the post development management.

3.3 Figure 1 and Figure 2 below include the formulae used to calculate the baseline biodiversity units for habitats and linear habitats according to the Biodiversity Metric 2.0 User Guide.

Figure 1 Baseline Habitat Biodiversity Unit Formulae (taken from Biodiversity Metric 2.0 User Guide)

Equation 1: Pre-impact (t_0) biodiversity value

$$t_0\ \textit{Baseline AHBU} = \left(A^{t0} \times Q_D^{t0} \times Q_C^{t0}\right) \times \left(Q_{SC}^{t0} \times Q_{SS}^{t0}\right)$$

A	Area of habitat (hectares)	R_T	Time to target condition (a risk factor)
Q_C	Condition (a quality measure)	R_{OS}	Off-site Risk
Q_D	Distinctiveness (a quality measure)	t0	Before intervention
Q_{SC}	Connectivity (a quality measure)	t1	Post intervention
Q_{SS}	Strategic Significance (a quality measure)	H1	Area habitat type before intervention
R_D	Difficulty (a risk factor)	H2	Area habitat type post intervention

Figure 2 Baseline Linear Habitat Biodiversity Unit Formulae (taken from Biodiversity Metric 2.0 User Guide)

Equation 1: Existing (pre-intervention) (T_0) biodiversity value

$$T_0\ Baseline\ HBU = (L^{t0} \times Q_D^{t0} \times Q_C^{t0}) \times (Q_{SC}^{t0} \times Q_{SS}^{t0})$$

L	Length of hedge (kilometres)	R_T	Time to target condition (a risk factor)
Q_C	Condition (a quality measure)	t0	Before intervention
Q_D	Distinctiveness (a quality measure)	t1	Post intervention
Q_{SC}	Connectivity (a quality measure)	R_{OS}	Off-site Risk
Q_{SS}	Strategic Significance (a quality measure)		
R_D	Difficulty (a risk factor)		

3.4 The metric is then used to calculate the biodiversity units present in the post development proposal. Where the number of biodiversity units is lower/higher than the baseline calculations, an assessment can be made as to whether the scheme will achieve a net gain or a net loss for biodiversity.

3.5 Calculations of biodiversity units remaining following the construction of the proposed development take account of –

- Habitat that is lost due to development;
- Habitat retained post development;
- Retained and enhanced habitats; and
- Habitats created due to the development.

3.6 Post construction assessment is based upon the target state (size and condition) for the habitats that are being enhanced or created.

3.7 Figure 3 and Figure 4, below, includes the formulae used to calculate the post-development biodiversity units for habitats and linear habitats according to the Biodiversity Metric 2.0 User Guide.

Figure 3 Post-development Habitat Biodiversity Unit Formulae (taken from Biodiversity Metric 2.0 User Guide)

Equation 2: Post-impact (t_1) biodiversity value for habitat creation

$$t_1\ Creation\ AHBU = \{[A^{t1} \times Q_D^{t1} \times Q_C^{t1}] \times [R_D \times R_T] \times [\,Q_{SC}^{t1} \times Q_{SS}^{t1}]\} \times\ R_{OS}$$

Equation 3: Post-impact (t_1) biodiversity value for habitat restoration and enhancement

$$t_1\ Enhancement\ AHBU = \Big[[(\{[\{A^{t1} \times Q_D^{t1} \times Q_C^{t1}\} - \{A^{t0} \times Q_D^{t0} \times Q_C^{t0}\}] \times \{R_D \times R_T\}) + \{A^{t0} \times Q_D^{t0} \times Q_C^{t0}\}] \times \{Q_{sc}^{t1} \times Q_{ss}^{t1}\}\Big] \times\ R_{OS}$$

Equation 4: Post-impact (t1) biodiversity value for accelerated succession habitat

$$\mathbf{t1\ Accelerated\ Succession\ AHBU} = \{(\Big[\{\{\mathbf{H1A^{t0} \times H1Q_D^{t0} \times H1Q_C^{t0}}\} \times \{\mathbf{H1Q_{SC}^{t1} \times H1Q_{SS}^{t1}}\}\Big] \times \Big(\mathbf{0.5(1 - H2R_T^{t1})}\Big)\Big] + \{[[\{(\mathbf{H2A^{t1} \times H2Q_D^{t1} \times Q_c^{t1}}) - (\mathbf{H1A^{t0} \times H1Q_D^{t0} \times H1Q_C^{t0}})\} \times \{\mathbf{H2R_D^{t1} \times H2R_T^{t1}}\}) + (\mathbf{H1A^{t0} \times H1Q_D^{t0} \times H1Q_C^{t0}})] \times \{\mathbf{H2Q_{SC}^{t1} \times H2Q_{SS}^{t1}}\}]\})\} \times\ R_{OS}$$

A	Area of habitat (hectares)	R_T	Time to target condition (a risk factor)
Q_C	Condition (a quality measure)	R_{OS}	Off-site Risk
Q_D	Distinctiveness (a quality measure)	t0	Before intervention
Q_{SC}	Connectivity (a quality measure)	t1	Post intervention
Q_{SS}	Strategic Significance (a quality measure)	H1	Area habitat type before intervention
R_D	Difficulty (a risk factor)	H2	Area habitat type post intervention

Figure 4 Post-development Linear Habitat Biodiversity Unit Formulae (taken from Biodiversity Metric 2.0 User Guide)

Equation 2: Post-intervention (T_1) biodiversity value for hedgerow creation

$$T_1\ Creation\ HBU = [L^{t1} \times Q_D^{t1} \times Q_C^{t1}] \times [R_D^{t1} \times R_T^{t1}] \times [Q_{SC}^{t1} \times Q_{SS}^{t1}] \times\ R_{OS}$$

Equation 3: Post-intervention (T_1) biodiversity value for hedgerow restoration and enhancement

$$T_1\ Total\ HBU\ after\ Enhancement = \{[([\{L^{t1} \times Q_D^{t1} \times Q_C^{t1}\} - \{L^{t0} \times Q_D^{t0} \times Q_C^{t0}\}] \times \{R_D \times R_T\}) + \{L^{t0} \times Q_D^{t0} \times Q_C^{t0}\}] \times \{Q_{sc}^{t1} \times Q_{ss}^{t1}\}\} \times R_{OS}$$

L	Length of hedge (kilometres)	R_T	Time to target condition (a risk factor)
Q_C	Condition (a quality measure)	t0	Before intervention
Q_D	Distinctiveness (a quality measure)	t1	Post intervention
Q_{SC}	Connectivity (a quality measure)	R_{OS}	Off-site Risk
Q_{SS}	Strategic Significance (a quality measure)		
R_D	Difficulty (a risk factor)		

3.8 Once the post-development biodiversity units have been calculated, the mitigation hierarchy is further applied; application of the mitigation hierarchy is one of the guiding principles for biodiversity no net loss/net gain proposals. Through its application, the hierarchy highlights action to avoid, minimise or restore biodiversity loses within the Site, and account for unavoidable losses off site.

3.9 The information from the biodiversity unit calculations enables us to identify the habitat types and the areas needed for the ecological mitigation and compensation in line with the mitigation hierarchy. This maximises the onsite compensation, which in turn minimises the offset compensation that would be needed to deliver no net loss or net gain for biodiversity. This is the most efficient and cost-effective way of delivering no net loss or net gain for biodiversity.

3.10 Following the finalisation of the scheme design, and after applying any onsite mitigation proposals, the biodiversity units will be updated to reflect any proposed changes.

3.11 The difference between the baseline biodiversity units and those calculated using the scheme design indicate the number of units that would be required to deliver no net loss or net gain for biodiversity. Using this information we can identify the habitat types and the size that would be needed off site to deliver no net loss or net gain. This in turn will be used to provide rough cost estimates for the potential offsets.

3.12 In the event that sufficient mitigation cannot be included within the scheme design, further work may be required to identify offsite compensation. If required this would be conducted through collaboration with local stakeholders, identifying the best place for habitat creation based on the views of the local experts, the needs for biodiversity and local communities.

3.13 The offsite compensation sites or offsets are then surveyed, and the biodiversity units are calculated for these sites. This provides a clear assessment of the biodiversity gain provided by the compensation.

4.0 RESULTS

4.1 Figure 5 below provides the biodiversity units for the baseline site against the post development site. This gives the unit scores for each individual habitat type. This also provides the onsite unit change from baseline to the post development phase. Figure 6 below provides the overall biodiversity units for the baseline stage, the total net unit change and the overall percentage biodiversity net change.

Figure 5 – Biodiversity unit change for each individual habitat for baseline, post development and the overall change in biodiversity units.

On-site	Baseline		Post development on site		Onsite Change	
Habitat group	Existing area	Existing value	Proposed area	Proposed value	Area change	Onsite Unit change
Cropland	43.3	75.7	30.7	59.8	-12.6	-15.9
Grassland	0.1	1.1	7.4	23.6	7.3	22.6
Heathland and shrub	0.0	0.0	0.0	0.0	0.0	0.0
Rivers and lakes	0.0	0.0	0.4	4.1	0.4	4.1
Sparsely vegetated land	0.0	0.0	0.0	0.0	0.0	0.0
Urban	1.4	0.6	-1.0	-0.6	-2.4	-1.2
Wetland	0.0	0.0	0.0	0.0	0.0	0.0
Woodland and forest	1.3	24.9	3.6	118.8	2.3	93.9
Intertidal sediment	0.0	0.0	0.0	0.0	0.0	0.0
Coastal saltmarsh	0.0	0.0	0.0	0.0	0.0	0.0
Rocky shore	0.0	0.0	0.0	0.0	0.0	0.0
Coastal lagoons	0.0	0.0	0.0	0.0	0.0	0.0

Figure 6 – Biodiversity Net Gain Summary

On-site baseline	*Habitat units*	124.07
	Hedgerow units	2.06
	River units	0.00
On-site post-intervention (Including habitat retention, creation, enhancement & succession)	*Habitat units*	232.28
	Hedgerow units	5.48
	River units	0.00
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation, enhancement &	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention/creation)	*Habitat units*	108.20
	Hedgerow units	3.43
	River units	0.00
Total net % change (including all on-site & off-site habitat creation + retained habitats)	*Habitat units*	87.21%
	Hedgerow units	166.52%
	River units	0.00%

4.2 Based on the results in Figure 5, there is an overall negative change in biodiversity units for cropland and urban areas within this site. This is due to the removal of arable fields, arable field margins and bare ground as part of the proposed works. In addition, a reduction in these habitats is included as part of the proposed restoration works.

4.3 Figure 5 also indicates that there is a positive change in biodiversity units for grassland, lakes and woodland. For grassland, although areas of semi – improved neutral grassland are to be removed during the proposed works in the form of arable field margins, the proposed restoration strategy includes the creation of 7.5 hectares of lowland dry acid grassland. The proposed restoration strategy also includes the creation of 2.79 hectares of broad-leaved woodland and the planting of 170 scattered trees.

4.4 As shown in Figure 6, the existing hedgerow value is 2.06 biodiversity units at the baseline stage. This increases by a total of 3.43 biodiversity units within the proposed restoration strategy. This gives a biodiversity net gain for hedgerow units of 166.52%. This is created through the planting of additional hedgerows as part of the proposed restoration works, in addition there will also be further enhancement to fill gaps within existing hedgerows.

4.5 For habitat biodiversity value, the baseline stage is assessed as 124.07 biodiversity units. This number increases to 232.28 biodiversity units following the implementation of the proposed restoration proposals. This represents a biodiversity net gain of 87.21% for habitat biodiversity units.

4.6 It should be noted that all the proposed habitat creation is located within the existing site boundary and is included within the proposed restoration proposals. There is no additional off-site enhancement proposed as part of the restoration proposals.

5.0 CONCLUSIONS

5.1 Heatons have been commissioned to undertake a BNG assessment to determine the impact on biodiversity of the proposed mineral extraction at Lea Castle Farm, Wolverley, Kidderminster (hereafter referred to as the site).

5.1 The site is located on land to the north of Wolverley Road, Wolverley, Kidderminster. The site is located approximately 2.3km to the north-east of the centre of Kidderminster, Worcestershire. The site is centred at grid reference SO840790.

5.2 The site comprises approximately 45ha of arable farmland with semi-improved and improved grass headlands. A hardstanding track separates the site from south to north that is delineated by standards of beech and lime. The field boundaries of the site include post and wire fencing, hedgerows containing native species, woodland edge and estate boundary brick wall. Occasional standard trees were present within the fields, including pedunculate oak, sweet chestnut and non-native conifers.

5.1 The Biodiversity Net Gain calculations for the proposed scheme have been assessed using the DEFRA Biodiversity Metric 2.0 produced by Natural England and the Phase 1 Habitat Map produced as part of the PEA Report. The Biodiversity Metric 2.0 provides an updated way to measure and account for the losses, changes, and gains, in biodiversity as a result of development, or changes in land management, and includes a calculation tool to demonstrate these figures.

5.2 Based on the assessment conducted using the Defra 2.0 Biodiversity Metric, the hedgerow biodiversity units represent an increase of 166.52% and the habitat biodiversity units represent an increase of 87.21% following the implementation of the proposed restoration scheme.

6.0 REFERENCES

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