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West Sussex Joint Minerals Local Plan Habitats Regulations Assessment

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1 Introduction

1.1 Legislation

1.1.1 The need for Habitats Regulations Assessment (HRA) is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats and Species Regulations 2010. The ultimate aim of HRA is to "maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest" (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

1.1.2 The Habitats Directive applies the precautionary principle to protected areas (Special Areas of Conservation (SAC), and Special Protection Areas (SPA), collectively known as European sites and which comprise the Natura 2000 pan-European network). Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. Plans and projects may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network. As a matter of Government Policy, contained within paragraph 5 of ODPM Circular 06/2005, Ramsar sites are treated as a European site, even though they are not such sites as a matter of law.

1.1.3 In order to ascertain whether or not site integrity will be affected, an HRA should be undertaken of the plan or project in question.

Box 1. The legislative basis for Appropriate Assessment

Habitats Directive 1992

Article 6 (3) states that :

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives."

Conservation of Habitats and Species Regulations 2011, as amended

The Regulations state that:

"*A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives… The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site*".

1.1.4 Over the years the phrase 'Habitats Regulations Assessment' (HRA) has come into wide currency to describe the overall process set out in the Conservation of Habitats and Species Regulations from screening through to IROPI. This has arisen in order to distinguish the process from the individual stage described in the law as an 'appropriate assessment'.

1.1.5 Throughout this report we use the term Habitats Regulations Assessment for the overall process and restrict the use of Appropriate Assessment to the specific stage of that name.

1.2 Scope and objectives

1.2.1 The role of the Natura 2000 sites (SACs, SPAs, Ramsar) is to provide statutory protection for terrestrial and coastal sites that are of European and global importance as a result of habitats or species contained within them.

AECOM has been appointed by West Sussex County Council to assist in undertaking a Habitats Regulations Assessment of the potential effects of the West Sussex Joint Minerals Local Plan (JMLP), on the Natura 2000 network.

1.2.2 The JMLP will supersede the West Sussex Minerals Local Plan (2003) (strategic planning framework for the protection of the environment, sustainable transport priorities, and the scale, pattern and location of waste and minerals development across West Sussex).

1.2.3 The purpose of this current document is to:

- Identify the European sites (Special Areas of Conservation, Special Protection Areas and Ramsar sites) that could potentially be affected by Strategic site allocations within the development document;
- Research and set out details of their European interest features and the environmental conditions that are required to maintain the favourable conservation status of those features;
- Explore the vulnerability of these European sites to potential impacts arising from the West Sussex JMLP and if possible, screen out those European sites that on consideration are unlikely to be affected by the JMLP, based on current knowledge;
- Where possible, identify those Strategic site allocations that may conflict with maintaining the favourable conservation of the European sites, based on current knowledge.

1.2.4 There are 22 Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Ramsar sites that lie wholly or partly within West Sussex and/ or within a 10km sphere of influence of the allocated sites:

- Kingley Vale SAC
- Rook Clift SAC
- Duncton to Bignor Escarpment SAC
- Singleton and Cocking Tunnels SAC
- The Mens SAC
- Ebernoe Common SAC
- Solent Maritime SAC
- Chichester and Langstone Harbours SPA/Ramsar
- Pagham Harbour SPA/European Marine Site/Ramsar
- Arun Valley SPA/ SAC /Ramsar
- Ashdown Forest SAC/SPA
- Wealden Heaths Phase 2 SPA
- Woolmer Forest SAC
- East Hampshire Hangers SAC
- Castle Hill SAC
- Mole Gap to Reigate Escarpment SAC
- Thursley, Hankley & Frensham Commons SPA
- Thursley & Ockley Bogs Ramsar
- Thursley, Ash, Pirbright & Chobham SPA
- Butser Hill SAC
- Portsmouth Harbour Ramsar/ SPA
- South Wight Maritime SAC

1.2.5 Following an initial assessment, the following internationally designated sites were screened out (see Appendix B, Table B for details):

- Rook Cliff SAC
- Ebernoe Common SAC
- Pagham Harbour SPA/European Marine Site/Ramsar
- Castle Hill SAC
- Mole Gap to Reigate Escarpment SAC

- Thursley & Ockley Bogs Ramsar
- Portsmouth Harbour Ramsar/ SPA
- South Wight Maritime SAC

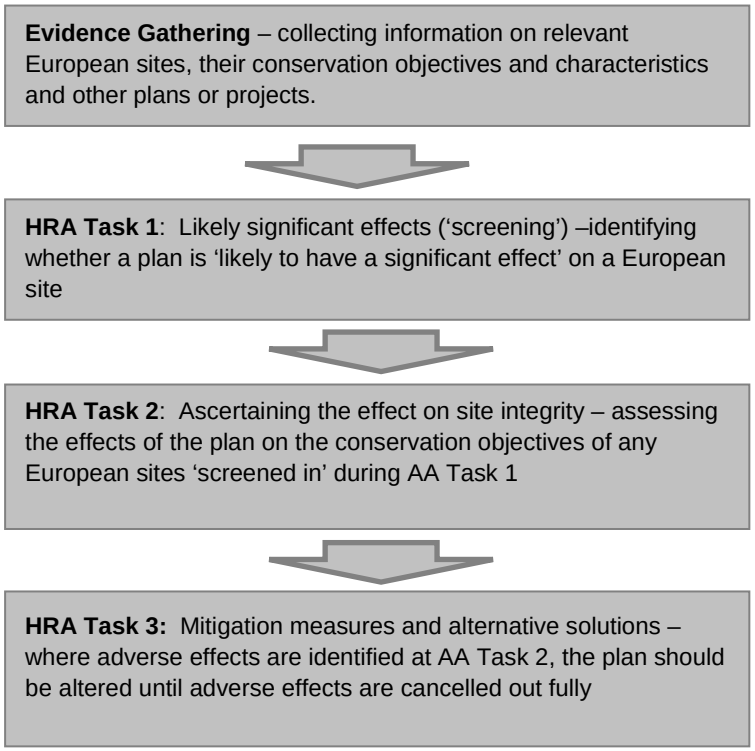
2 Methodology

2.1 Process

2.1.1 The HRA is being carried out in the absence of formal Government guidance. Communities and Local Government released a consultation paper on Appropriate Assessment of Plans in 20061. As yet, no further formal guidance has emerged.

2.1.2 The process diagram below outlines the stages of HRA according to current draft CLG guidance. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations and any relevant changes to the plan until no significant adverse effects remain.

Figure 1 – Four Stage Approach of Habitats Regulations Assessment. Source: CLG, 2006



2.2 Likely Significant Effects (LSE)

2.2.1 The first stage of any Habitats Regulations Assessment (Task 1) is a Likely Significant Effect (LSE) test - essentially a risk assessment to decide whether the full subsequent stage known as Appropriate Assessment (AA) is required. The essential question is: "Is the Plan, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?"

2.2.2 The objective is to 'screen out' those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction with European sites.

2.2.3 In this case, the plan documents have been evaluated in detail within the context of existing knowledge of the various ways in which development can impact on European sites, accumulated from carrying out HRAs across the country at all geographical scales. If it cannot be concluded with confidence that adverse effects are unlikely, we have deferred to the precautionary principle and assumed that they require investigation in the Appropriate Assessment.

2.3 Confirming other plans and projects that may act in combination

[1] CLG (2006) *Planning for the Protection of European Sites*, Consultation Paper

2.3.1 It is neither practical nor necessary to assess the 'in combination' effects of the West Sussex JMLP within the context of all other plans and projects within the South-East of England. For the purposes of this assessment, we have determined that, due to the nature of the identified impacts, the key other plans and projects relate to the additional housing, commercial/industrial allocations, minerals and waste strategies and major infrastructure projects proposed for West Sussex and surrounding authorities over the lifetime of the emerging Joint Minerals Local Plan.

2.3.2 Table 1 below outlines the plans and projects that have been identified as relevant to the pathways for effects upon European sites. These include those that are considered likely to influence:

- Surface water or groundwater dynamics or quality within the catchment of Solent Maritime SAC, Chichester and Langstone Harbours SPA/Ramsar, Pagham Harbour SPA/Ramsar, Arun Valley SPA/Ramsar, Woolmer Forest SAC, and Ashdown Forest SAC/SPA;
- Traffic along roads passing through or close to Ashdown Forest SAC/SPA, Duncton to Bignor Escarpment SAC, Singleton and Cocking Tunnels SAC, The Mens SAC, Ebernoe Common SAC, Solent Maritime SAC, Chichester and Langstone Harbours SPA/Ramsar, Wealden Heaths Phase 2 SPA, and Woolmer Forest SAC;
- Bird or bat disturbance at The Mens SAC, Singleton and Cocking Tunnels SAC, Ebernoe Common SAC, Chichester and Langstone Harbours SPA/Ramsar, Pagham Harbour SPA/Ramsar, Arun Valley SPA/Ramsar, Wealden Heaths Phase 2 SPA and Ashdown Forest SPA;
- Coastal dynamics at Solent Maritime SAC, Chichester and Langstone Harbours SPA/Ramsar, and Pagham Harbour SPA/Ramsar;
- Possible land take or disturbance to important areas for birds using areas outside of the SPAs/Ramsar sites at Chichester and Langstone Harbours SPA/Ramsar, and Pagham Harbour SPA/Ramsar; and
- The overall increase in population and thus recreational pressure and disturbance on European sites within West Sussex and neighbouring authorities.

Table 1 - Other Plans and Projects and Relevant Potential Impacts

Plan/ Project	**Relevance**
The North Solent Shoreline Management (2010)	Development of strategies for coastal management and protection. Potentially relevant in terms of the effects of coastal squeeze on European designated sites
Draft North Solent Shoreline Management Plan (2010)	Development of strategies for coastal management and protection. Potentially relevant in terms of the effects of coastal squeeze on European designated sites
Chichester Harbour AONB Management Plan 2014 - 2019	Sets out the strategy for management of the harbour.
Shoreham Harbour Joint Area Action Plan (in-preparation April 2015)	Will set out detail of spatial strategy in the Shoreham Harbour area; relevant in that it provides detail of development plans
Chichester Pre-submission Local Plan 2014-2029 with Main Modifications	Sets out the spatial strategy for Chichester including housing; relevant in that it provides detail of development plans
Arun Local Plan 2011 – 2031. Publication Version. (April 2014) EiP 2-4th June 2015. Not yet adopted (08/06/15).	Sets out the spatial strategy for Arun.
Horsham LDF Core Strategy (Adopted, 2007) is out of date (although still the adopted local plan)	Sets out the spatial strategy for Horsham including housing; relevant in that it provides detail of development plans
Horsham District Planning Framework	This will replace the above mentioned Horsham LDF CS. It is currently subject to EiP (08/06/15).

Plan/ Project	Relevance
Worthing Core Strategy - Adopted 2011	Sets out the spatial strategy for Worthing including housing; relevant in that it provides detail of development plans
The Crawley Borough Local Plan 2015 – 2030. Submission Modifications Draft (November 2014)	Sets out the spatial strategy for Crawley including housing; relevant in that it provides detail of development plans
Mid Sussex District Plan 2014 – 2031(Pre-Submission Draft. March 2015)	Sets out the spatial strategy for Mid-Sussex including housing; relevant in that it provides detail of development plans
Brighton and Hove City Plan: Part 1 (Submission February 2013)	Sets out the spatial strategy for Brighton and Hove including housing; relevant in that it provides detail of development plans
Wealden District (Incorporating Part of the South Downs National Park) Core Strategy Local Plan (Adopted February 2013)	Sets out the spatial strategy for Wealden including housing; relevant in that it provides detail of development plans affecting Ashdown Forest SAC/SPA
Havant Borough Core Strategy (Adopted, March 2011)	Sets out the spatial strategy for Havant including housing; relevant in that it provides detail of development plans affecting Solent European Marine sites
Adur District Local Plan – 1996 – Adopted	This sets out the spatial strategy for Adur.
Proposed Submission Adur Local Plan 2014	This is the emerging Local Plan. It had been intended that the Local Plan would be submitted to the Secretary of State in March 2015 with a public examination held in the summer of 2015. However, further work is required to address some issues raised in respect to the strategic allocations.
East Hampshire District Local Plan: Joint Core Strategy (Adopted May 2014)	Sets out the spatial strategy for East Hampshire including housing; relevant in that it provides detail of development plans affecting Wealden Heaths Phase 2 SPA and Woolmer Forest SAC
South Downs National Park Partnership Management Plan – 2014-2019	The PMP sets out a vision for the Park to 2050, and policies on the management of pressures within the National Park
Hampshire Minerals and Waste Plan (October 2013)	Includes minerals and waste policies and locations
East Sussex, South Downs and Brighton & Hove Waste and Minerals Local Plan (Adopted February 2013)	Includes minerals and waste policies and locations
Surrey Minerals Core Strategy and Primary Aggregates DPDs (Submission, 2010) and Waste Plan DPDs (Adopted, 2008)	Includes minerals and waste policies and locations
Aviation White Paper (2003)	Strategic framework for expansion of airport capacity in UK; relevant in that it defines airport growth and requires consideration for localised disturbance issues
West Sussex Local Transport Plan LTP3	Sets out road schemes that could potentially affect traffic, and

Plan/ Project	Relevance
(2011-2026)	therefore air quality, close to European designated sites
Local transport Plans for surrounding authorities	Set out transport schemes that could potentially affect traffic passing into and out of West Sussex, close to European designated sites
European site Management Plans (where available)	Set out management strategies for designated sites
Water Resource Management Plans	Define how demand for water resources will be met over the lifetime of the JMLP
Environment Agency Catchment Abstraction Management Strategies	Provide strategies to ensure water resource availability in West Sussex and surrounding areas
Environment Agency Catchment Flood Management Plans	Provide strategies to ensure flood risk management within West Sussex
Environment Agency Stage 3 and 4 Reviews of Consents	Inform licensing strategies to prevent damage to European sites from adverse impacts of water resource depletion or reduction in water quality.
Environment Agency Water Level Management Plans	Provides strategies for water level management at Pulborough Brooks, Waltham Brooks, and Amberley Wild Brooks
River Arun Tidal Abstraction Scheme (Hardham)	Requires consideration of outcomes for water resources and water quality in relation to Arun Valley SPA/Ramsar

2.3.3 In addition to reviewing plans and projects that may interact with the West Sussex JMLP, we will also make use of sources of information that provide information (but not plans) regarding European designated sites, including:

- Nature on the Map and its links to SSSI citations and the JNCC website (www.natureonthemap.org.uk);
- The UK Air Pollution Information System (www.apis.ac.uk); and
- Habitats Regulation Assessments of Core Strategies and Local Plans, where available

2.4 Physical scope of the assessment

2.4.1 There is no pre-defined guidance that dictates the physical scope of a HRA of a Minerals and/ or Waste Development Framework. Therefore, in considering the physical scope of the assessment, we have been guided primarily by the identified impact pathways rather than by arbitrary ‘zones’. However, it was considered advisable to ‘scope in’ all European sites in West Sussex for a first appraisal, plus those that lie close to the borders of the area. Information available from Natural England and the Joint Nature Conservation Committee provides a good introduction to the reasons for the designation of the European sites. This information has informed the designated site descriptions in **Appendix A.**

3 Pathways of impact

3.1 Introduction

3.1.1 This section of the report summarises the various impact pathways that can link minerals development in West Sussex with European sites.

3.2 Atmospheric pollution

3.2.1 Current levels of understanding of air quality effects on semi-natural habitats are not adequate to allow rigorous assessment of the likelihood of significant effects on the integrity of key European sites.

Table 2 - Main sources and effects of air pollutants on habitats and species

Pollutant	Source	Effects on habitats and species
Acid deposition	SO_2, NO_x and ammonia all contribute to acid deposition. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, it is likely that increased N emissions may cancel out any gains produced by reduced S levels.	Can affect habitats and species through both wet (acid rain) and dry deposition. Some sites will be more at risk than others depending on soil type, bed rock geology, weathering rate and buffering capacity.
Ammonia (NH_3)	Ammonia is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but levels have increased considerably with expansion in numbers of agricultural livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4^+)- containing aerosol which may be transferred much longer distances (can therefore be a significant trans-boundary issue.)	Adverse effects are as a result of nitrogen deposition leading to eutrophication. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides NO_x	Nitrogen oxides are mostly produced in combustion processes. About one quarter of the UK's emissions are from power stations, one-half from motor vehicles, and the rest from other industrial and domestic combustion processes.	Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) can lead to both soil and freshwater acidification. In addition, NO_x can cause eutrophication of soils and water. This alters the species composition of plant communities and can eliminate sensitive species.
Nitrogen (N) deposition	The pollutants that contribute to nitrogen deposition derive mainly from NO_X and NH_3 emissions. These pollutants cause acidification (see also acid deposition) as well as eutrophication.	Species-rich plant communities with relatively high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication, due to its promotion of competitive and invasive species which can respond readily to elevated levels of N. N deposition can also increase the risk of damage from abiotic factors,

Pollutant	Source	Effects on habitats and species
		e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions from NO_x and volatile organic compounds (VOCs). These are mainly released by the combustion of fossil fuels. The increase in combustion of fossil fuels in the UK has led to a large increase in background ozone concentration, leading to an increased number of days when levels across the region are above 40ppb. Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	Concentrations of O_3 above 40 ppb can be toxic to humans and wildlife, and can affect buildings. Increased ozone concentrations may lead to a reduction in growth of agricultural crops, decreased forest production and altered species composition in semi-natural plant communities.
Sulphur Dioxide SO_2	Main sources of SO_2 emissions are electricity generation, industry and domestic fuel combustion. May also arise from shipping and increased atmospheric concentrations in busy ports. Total SO_2 emissions have decreased substantially in the UK since the 1980s.	Wet and dry deposition of SO_2 acidifies soils and freshwater, and alters the species composition of plant and associated animal communities. The significance of impacts depends on levels of deposition and the buffering capacity of soils.

3.2.2 The main pollutants of concern for European sites are oxides of nitrogen (NO_x), ammonia (NH_3) and sulphur dioxide (SO_2). NO_x can have a directly toxic effect upon vegetation. In addition, greater NO_x or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to soils. An increase in the deposition of nitrogen from the atmosphere to soils is generally regarded to lead to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats.

3.2.3 Sulphur dioxide emissions are overwhelmingly influenced by the output of power stations and industrial processes that require the combustion of coal and oil. Ammonia emissions are dominated by agriculture, with some chemical processes also making notable contributions. As such, it is unlikely that material increases in SO2 or NH_3 emissions will be associated with mineral extraction activities. NO_x emissions, however, are dominated by the output of vehicle exhausts (more than half of all emissions). Emissions of NO_x could therefore be reasonably expected to increase as a result of greater vehicle use as an indirect effect of the mineral extraction activities

3.2.4 According to the World Health Organisation, the critical NO_x concentration (critical threshold) for the protection of vegetation is 30 μgm^{-3}; the threshold for sulphur dioxide is 20 μgm^{-3}. In addition, ecological studies have determined 'critical loads'[2] of atmospheric nitrogen deposition (that is, NO_x combined with ammonia NH_3) for key habitats within European sites.

3.2.5 Eutrophication of sensitive habitats through atmospheric deposition is a widely acknowledged phenomenon, although it is extremely difficult to measure as its effects are often hidden by changes in local nutrients (i.e. via direct fertilisation) or changes in grazing pressure.

3.2.6 In well-managed sites, the effects of eutrophication may be to some extent counteracted through an increase in grazing pressure. Bobbink et al.[3] suggest that sites with low intensity management may have lower critical thresholds than those in higher levels of management. Reintroducing grazing into ungrazed or under-grazed sites can help to counteract changes in vegetation due to nitrogen deposition; however increasing grazing on sites that are already well-grazed may have a direct adverse impact on the plants for which the site was designated.

3.2.7 Furthermore, air pollution can act synergistically with insufficient grazing to exacerbate management problems and lead to a coarser species-poor sward. A changing climate (i.e. rising temperatures and reduced summer rainfall) is further exacerbating the situation by putting sensitive habitats and species under increasing stress, in turn reducing their competitive ability and increasing susceptibility to pathogens.

[2] The critical load is the rate of deposition beyond which research indicates that adverse effects can reasonably be expected to occur

[3] Bobbink, Ashmore, Braun, Fluckiger and Vanden Wyngaert. 2002. Work on critical loads for natural and semi-natural systems ("*Empirical nitrogen critical loads for natural and semi-natural ecosystems 2002 update*")

3.3 Local Air Pollution

3.3.1 According to the Department of Transport's Transport Analysis Guidance, "Beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant" [4].

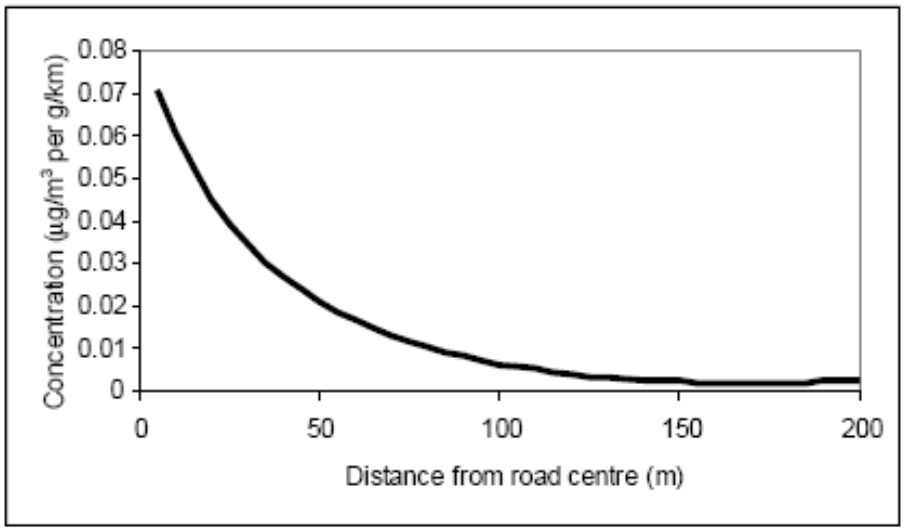


Figure 2 – Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT)

3.3.2 Given the difficulties in accurately determining and modelling likely scales of vehicle usage on sites for which all parameters must necessarily at this stage be wholly theoretical, it is more in line with the precautionary principle to utilise the more cautious 200m figure, rather than smaller figures that may have been derived from site-specific theoretical models. This is therefore the distance that has been used throughout this screening report in order to determine whether European sites are likely to be significantly affected by development under the JMLP.

3.3.3 There are twelve European sites within the scope of the assessment that lie within 200m of a main road that could serve as a transport route for waste or minerals traffic:

- Chichester and Langstone Harbours SPA/Ramsar and Solent Maritime SAC lie within 200m of the A27 (within Hampshire);
- The Mens SAC lies within 200m of the A272 for a considerable distance.
- Ebernoe Common SAC lies within 200m of the A283 for a short distance.
- Singleton and Cocking Tunnels SAC lies within 200m of the A286 for a considerable distance.
- Ashdown Forest SAC/SPA lies within 200m of the A22 and A275 (in East Sussex) for a considerable distance.
- Duncton and Bignor Escarpment SAC lies within 200m of the A285 for a short distance.
- Wealden Heaths Phase II SPA is adjacent to and bisected by the A3 (in Hampshire) for a considerable distance.
- Woolmer Forest SAC lies within 200m of the A3 (in Hampshire) for a considerable distance.
- Butser Hill SAC lies within 200m of the A3 (in Hampshire) for much of its length.
- Thursley, Ash, Pirbright & Chobham SAC is bisected by the A3 (in Surrey) for a considerable length.
- Thursley, Hankley & Frensham Common SPA is bisected by the A3 (in Surrey) for a considerable length.
- Mole Gap to Reigate Escarpment SAC is within 200m of the M25 and the A217 for a short length.

3.3.4 The issue of cumulative vehicle exhaust emissions is clearly a collective one and no single minerals site can be identified as being 'responsible'. As such, the approach we have taken is to assume that air quality issues arising from vehicle exhaust emissions are relevant to the JMLP options covering the whole county, and not to individual minerals sites. They will therefore be picked up in the forthcoming HRA of the Minerals policies, rather than in this sites document.

3.4 Quarries and minerals sites

[4] www.webtag.org.uk/archive/feb04/pdf/feb04-333.pdf

3.4.1 Atmospheric pollutants generated by minerals sites generally resolve themselves into dust and traffic exhaust emissions. Vehicle exhaust emissions have already been discussed. Effects of dust will depend on the prevailing wind direction and the transport distance is related to particle size; large particles (>30um) will mostly deposit within 100m of the source, intermediate particles (10-30um) are likely to travel up to 200 – 500m. Smaller particles (<10um) can travel up to 1km from the source[5]. Dust size and chemical composition is important as smaller particles can enter or block stomata and thus interfere with gas exchange, while sufficient coverage may prevent light penetration to the chloroplasts. In prolonged cases, death can result.

3.4.2 Dust impacts will be considered further in this assessment, but cannot be quantified beyond the broad potential distances identified above for different particle sizes. For the purposes of screening, those minerals sites that lie more than 1km from a European site have been 'screened out' as being unlikely to contribute significant dust impacts even without special mitigation such as 'wetting'.

3.5 Diffuse air pollution

3.5.1 In addition to the contribution to local air quality issues, development can also contribute cumulatively to an overall deterioration in background air quality across an entire region. In July 2006, when this issue was raised by Runnymede District Council in the South East, Natural England advised that their Local Development Framework *'can only be concerned with locally emitted and short range locally acting pollutants'* [6] as this is the only scale which falls within a local authority remit. It is understood that this guidance was not intended to set a precedent, but it inevitably does so since (as far as we are aware) it is the only formal guidance that has been issued to a Local Authority from any Natural England office on this issue.

3.5.2 In the light of this and our own knowledge and experience, it is considered reasonable to conclude that diffuse pan-authority air quality impacts are the responsibility of national government, both since they relate to the overall quantum of development within a region or England as a whole (over which individual districts have little control), and since this issue is best addressed at the highest pan-authority level. Diffuse air quality issues will not therefore be considered further within this HRA.

3.6 Water quality and flows

3.6.1 The quality of the water that feeds European sites is an important determinant of the nature of their habitats and the species they support. Poor water quality can have a range of environmental impacts:

- At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour.
- Eutrophication, the enrichment of plant nutrients in water, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.
- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

3.6.2 Water quality may be adversely affected by waste sites through:

- Pollution through water runoff from hard surfaces carrying oils, heavy metals and/or de-icing compounds. While these effects can be dispersed throughout the downstream water catchment, they will be most visibly manifested within tens of metres to a few hundred metres of the site[7]; and
- Discharges of leachate from landfill sites can add ammonia, other nutrients and chemical pollutants to surface water bodies. Leachate can also penetrate groundwater. Leachate can escape from landfill sites by leakage through a barrier / containment system, 'break out through a cap, or overtopping containment.

3.6.3 There are several ways in which quarrying / mining can affect water quality/resources:

[5] Scottish Environment Protection Agency. 2003. Technical Guidance Note - Habitats Regulations & The Landfill Regulations Guidance
http://www.sepa.org.uk/pdf/guidance/landfill_directive/habitats_landfill_regulations_guidance.pdf
[6] English Nature (16 May 2006) letter to Runnymede Borough Council, 'Conservation (Natural Habitats &c.) Regulations 1994, Runnymede Borough Council Local Development Framework'.
[7] Scottish Environment Protection Agency. 2003. Technical Guidance Note - Habitats Regulations & The Landfill Regulations Guidance.
http://www.sepa.org.uk/pdf/guidance/landfill_directive/habitats_landfill_regulations_guidance.pdf

- Quarries and mines that are below the water table will require dewatering on a regular basis. Dewatering[8] can lead to a reduction in the water table and "draw down" from hydraulically linked groundwater dependent habitats (including streams and rivers);
- The physical presence of a new quarry in the unsaturated zone (i.e. above the water table) can increase the possibility of aquifer contamination and result in a direct reduction in temporary groundwater storage capacity;
- If the water that is pumped from a quarry as a result of dewatering has a high proportion of clays and suspended particles, or is contaminated with metals, it can reduce water quality within those watercourses that receive the water; and
- Backfilling a dormant quarry with overburden or imported fill may cause changes to groundwater levels, quality and flow paths in adjoining areas.

3.6.4 In or near West Sussex there are nine European sites that have a particular hydrological sensitivity:

- Solent Maritime SAC
- Chichester and Langstone Harbours SPA/Ramsar
- Pagham Harbour SPA/ Ramsar
- Arun Valley SAC/ SPA/ Ramsar
- Ashdown Forest SAC/SPA
- Thursley, Hankley & Frensham Commons SPA
- Thursley & Ockley Bogs Ramsar
- Thursley, Ash, Pirbright & Chobham SAC
- South Wight Maritime SAC

3.7 Disturbance

3.7.1 Mineral extraction activities within sites can share many noise and visual disturbance issues (e.g. heavy vehicle movements and loud machinery) with other industrial operations. Birds are the faunal group that is most often considered in relation to disturbance, largely as this is the group on which disturbance impacts have been most studied.

3.7.2 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding[9]. Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the 'condition' and ultimately survival of the birds In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds.[10] Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they are to predators.

3.7.3 Human activity can affect birds either directly (e.g. through causing them to flee) or indirectly (e.g. through damaging their habitat). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to behavioural changes (e.g. alterations in feeding behaviour, avoidance of certain areas etc.) and physiological changes (e.g. an increase in heart rate) that, although less noticeable, may ultimately result in major population-level effects by altering the balance between immigration/birth and emigration/death.[11]

3.7.4 The degree of impact that varying levels of noise will have on different species of bird is poorly understood except that a number of studies have found that an increase in traffic levels on roads does lead to a reduction in the bird abundance within adjacent hedgerows – Reijnen et al (1995) examined the distribution of 43 passerine species (i.e. 'songbirds'), of which 60% had a lower density closer to the roadside than further away. By controlling vehicle usage they also found that the density generally was lower along busier roads than quieter roads[12].

[8] Dewatering is most commonly carried out by intermittent pumping from a sump located in the deepest part of the quarry, to keep pace with the inflow of groundwater.
[9] Riddington, R. *et al*. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279
[10] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72
[11] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.
[12] Reijnen, R. et al. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 32: 187-202

3.7.5 Activity will often result in a flight response (flying, diving, swimming or running) from the animal that is being disturbed. This carries an energetic cost that requires a greater food intake. Relatively little detailed research has been conducted concerning the energetic cost to wildlife of disturbance, but such evidence as exists indicates a significant negative effect.

3.7.6 Quarrying and mining share many noise and visual disturbance issues (e.g. heavy vehicle movements and loud machinery) with other industrial operations; however, quarrying can also result in disturbance through the controlled blasting of rock in order to extract it for processing. This can result in ground vibration that can be perceived a considerable distance from the point of blasting. In addition, the shockwaves will travel through the air (known as overpressure) and, if the blasting takes place near water, the shockwaves can be perceived at even greater distances.

3.7.7 Disturbing activities are on a continuum. The most disturbing activities are likely to be those that involve irregular, infrequent, unpredictable loud noise events, movement or vibration of long duration. Birds are least likely to be disturbed by activities that involve regular, frequent, predictable, quiet patterns of sound or movement or minimal vibration. The further any activity is from the birds, the less likely it is to result in disturbance.

3.7.8 The factors that influence a species response to a disturbance are numerous, but the three key factors are species sensitivity, proximity of disturbance sources and timing/duration of the potentially disturbing activity.

3.7.9 The distance at which a species takes flight when approached by a disturbing stimulus is known as the 'tolerance distance' (also called the 'escape flight distance') and differs between species to the same stimulus and within a species to different stimuli.

3.7.10 Eight European sites in or near West Sussex have been designated at least in part for their bird interest:

- Chichester and Langstone Harbours SPA/Ramsar
- Pagham Harbour SPA/ Ramsar
- Arun Valley SAC/ SPA/ Ramsar
- Ashdown Forest SAC/SPA
- Wealden Heaths Phase 2 SPA
- Thursley, Hankley & Frensham Commons SPA
- Thursley & Ockley Bogs Ramsar
- Portsmouth Harbour Ramsar / SPA

3.7.11 The following SACs were designated at least in part for the presence of maternity or hibernation roosts of bat species, which are also vulnerable to disturbance:

- Singleton and Cocking Tunnels SAC;
- The Mens SAC; and
- Ebernoe Common SAC.
- Mole Gap to Reigate Escarpment SAC

3.7.12 For the purposes of screening we have used the precautionary distance of 1km as a basis on which to screen minerals sites in or out of consideration with regard to the potential for disturbance (i.e. noise and visual) impacts.

3.8 Coastal Squeeze

3.8.1 Rising sea levels can be expected to cause intertidal habitats (principally saltmarsh and mudflats) to migrate landwards. However, in built-up areas, such landward retreat is often rendered impossible due the presence of the sea wall and other flood defences.

3.8.2 In addition, development frequently takes place immediately behind the sea wall, so that the flood defences cannot be moved landwards to accommodate managed retreat of threatened habitats. The net result of this is that the quantity of saltmarsh and mudflat adjacent to built-up areas will progressively decrease as sea levels rise. This process is known as 'coastal squeeze'. In areas where sediment availability is reduced, the 'squeeze' also includes an increasingly steep beach profile and foreshortening of the seaward zones.

3.8.3 Minerals sites can contribute to coastal squeeze as much as any other development by restricting opportunities for managing realignment. This impact is relevant to sections of the Essex coastline, which are designated as SAC, SPA and Ramsar sites. Additionally, minerals sites located near habitats where a balance of saline and fresh water is critical have the potential to affect flows through processes such as dewatering, leading to impacts such as reduced freshwater flows to estuaries and saline intrusion.

3.8.4 The following sites in West Sussex are potentially threatened by coastal squeeze, saline intrusion or altered coastal processes:

- Solent Maritime SAC
- Chichester and Langstone Harbours SPA/Ramsar
- Pagham Harbour SPA/ Ramsar
- Portsmouth Harbour Ramsar / SPA
- South Wight Maritime SAC

3.8.5 There are no minerals sites under consideration in the JMLP that could lead to likely significant effects on the European designated sites listed in section 3.8 through coastal squeeze, saline intrusion or altered coastal processes. Therefore, these processes are not considered further in this report.

3.9 Direct landtake

3.9.1 Issues of direct landtake from terrestrial European sites generally relate to existing permissions (often associated with mineral extraction) that were granted prior to the designation of the site and which have not yet reached completion. In some cases, the process of mineral extraction can be partly responsible for creating the interest of the European site in the first place. This is partly the case with Dungeness SAC and Dungeness to Pett Level SPA and Ramsar site in East Sussex where former mineral workings now form important lagoon habitat. At this stage we have not identified any European sites that may be subject to direct landtake as a result of minerals operations in West Sussex.

3.9.2 In addition to direct landtake from European sites, those sites which are designated for highly mobile species can also be adversely affected by loss of habitat (or in the case of bats disruption of commuting routes) outside the SAC boundary itself. In West Sussex, this applies principally to Singleton and Cocking Tunnels SAC; The Mens SAC; Ebernoe Common SAC, and Mole Gap to Reigate Escarpment SAC.

3.9.3 Ebernoe Common is an exceptional site for both barbastelle and Bechstein bats. Most of what is known about the foraging behaviour of barbastelle bats has been derived by studies carried out over the past ten years, and the studies are able to give detailed information on flight lines surrounding Ebernoe Common of the barbastelle bat:

- Greenaway, F. (2004) Advice for the management of flightlines and foraging habitats of the barbastelle bat *Barbastellus barbastellus*. *English Nature Research Report*, Number 657.
- Greenaway, F. (2008) Barbastelle bats in the Sussex West Weald 1997 - 2008

3.9.4 The Mens SAC is also important for its barbastelle populations and radio-tracking studies have been undertaken to identify core foraging areas. These reports have identified that:

- The barbastelle of The Mens SAC forage to the east of the SAC, principally on the floodplain of the river Arun from close to Horsham in the north to Parham in the south. They also cross to the Adur floodplain. In some cases the bats travelled up to 7km to visit foraging areas;
- The barbastelle at Ebernoe Common SAC had flightlines that followed watercourses, particularly the river Kird, and woodland cover for distances of typically 5km. Flightlines outside the SAC are particularly to the south (the Petworth and Tillington area) but also to the west, north and east.

3.9.5 There has been less study of the Bechstein bat populations. However, those radio-tracking projects which have been implemented for the species have established that the tracked individuals generally remained within approximately 1.5 km of their roosts[13]. These distances do fit with those identified from radio-tracking of Bechstein that has been undertaken at Ebernoe Common SAC from 2001, which identified that the maximum distance travelled by a tagged Bechstein bats to its foraging area was 1,407m, with the average 735.7m[14].

[13] Cited in: Schofield H & Morris C. 2000. 'Ranging Behaviour and Habitat Preferences of Female Bechstein's Bats in Summer'. Vincent Wildlife Trust

[14] Fitzsimmons P, Hill D, Greenaway F. 2002. Patterns of habitat use by female Bechstein's bats (Myotis bechsteinii) from a maternity colony in a British woodland

3.10 Screening distance summary

3.10.1 The table below summarises the screening distances used for each source of impact.

Table 1 – Screening distances used for each source of impact

Pathway	Screening distance
Direct landtake	5km from The Mens SAC or 7km from Ebernoe Common SAC with regard to barbastelle (1.5km for Bechstein bats on Ebernoe Common SAC) and suitable habitat for foraging barbastelle and Bechstein's present on site. Where distances are not available for a specific species at a specific site, a distance of 7km will be used for barbastelle bats and 1.5km for Bechstein bats.
Disturbance (noise/visual)	1km from European site supporting disturbance sensitive species/populations
Air quality - dust	500m from European site
Air quality – vehicle exhaust emissions	200m from European site
Water quality and flows	No standard distance – use Source/Pathway/Receptor approach
Coastal squeeze	No standard distance – evaluate on case by case basis

4 Appropriate Assessment of Minerals Sites

4.1.1 This chapter considers each minerals site that was identified as requiring Appropriate Assessment following initial screening (the screened out sites are summarised in Appendix B). The geographical relationship between internationally designated sites and proposed minerals sites is shown on Appendix C Figure 1 that accompanies this report. Sites are grouped together where the potential impact pathways and European sites identified in the HRA screening report are identical. The outcome of the screening assessment is summarised first and then an Appropriate Assessment is undertaken.

4.1.2 Any quarry extension could lead to drawdown from dewatering operations. It is an issue that is too detailed and site-specific to be considered in depth at this level (as the impacts are entirely linked not only to the location of sites but to their relation to the water table and the volume/rate and timing of de-watering operations which will only be known once an application is made). However, all quarry operators should be aware of this possible issue.

4.1.3 In the following tables, where the HRA Screening column is highlighted in ORANGE, this identifies potential for a likely significant effect, and the site (s) cannot be screened out. Where the HRA Screening is highlighted in GREEN, this identifies no likely significant effect, and the site can be screened out from further assessment.

4.2 M/CH/1A - Woodmancote, M/CH/1B - Common Road West, M/CH/1C - Common Road East, M/CH/1D - Slades Field, and M/CH/1G - Funtington West

Summary of screening

4.2.1 Sites locations are illustrated in **Appendix C Figure 2.**

Table 5 – Screening of Woodmancote, Common Road West, Common Road East, Slades Field, and Funtington West Minerals Sites

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
14	Woodmancote	Chichester	Sharp sand and gravel	These five mineral sites and the Processing Area are considered as a single site as they are in a similar location and will be extracted one at a time, not simultaneously. All are new minerals sites with the exception of the Processing Area. The Processing Area was extracted approximately 20+ years ago. These sites lie more than 2km from Kingley Vale SAC, Solent Maritime SAC and/ or, Chichester and Langstone Harbours SPA/Ramsar. There is no scope for adverse impacts on Kingley Vale SAC. It is assumed quarry traffic will use the A27 close to Solent Maritime SAC and Chichester and Langstone Harbours SPA/Ramsar. It is also considered likely that a portion of the traffic will flow north up the A3. Wealden Heaths Phase II SPA is adjacent to and bisected by the A3 (in Hampshire) for a considerable distance; Woolmer Forest SAC lies within 200m of the A3 (in Hampshire) for a considerable distance; Butser Hill SAC lies within 200m of the A3 (in Hampshire) for much of its length; Thursley, Ash, Pirbright & Chobham SAC is bisected by the A3 (in Surrey) for a considerable length; and, Thursley, Hankley & Frensham Common SPA is bisected by the A3 (in Surrey) for a considerable length. Although Brent geese (for which the SPA/Ramsar is designated) use land immediately adjacent to the A27 as a high tide roost, this land is already subject to considerable vehicle movements and it is unlikely that additional traffic from the working of these minerals sites alone or in combination would significantly alter the disturbance to which
3	Common Road West	Chichester	Sharp sand and gravel	
4	Common Road East	Chichester	Sharp sand and gravel	
13	Slades Field	Chichester	Sharp sand and gravel	
6	Funtington West	Chichester	Sharp sand and gravel	
NA	Processing Area	Chichester	NA	

				the geese are exposed. The possibility of adverse effects due to exhaust emissions requires further consideration and should be informed by estimates of the likely increase in vehicle movements on the A27 and A3.

Appropriate Assessment

4.2.2 The screening exercise identified that air quality was a pathway requiring consideration with regard to these proposed minerals sites due to the potential for increased minerals traffic movements within 200m of European designated sites. However, within West Sussex the Solent Maritime SAC and Chichester and Langstone Harbours SPA/Ramsar do not lie within 200m of the A27 on which vehicle movements are almost certain to occur. The closest distance between the A27 and the SAC/SPA/Ramsar sites is found at the head of Fishbourne Channel, which lies 450m from the road; these designated sites can therefore be screened out.

4.2.3 The background papers to the Joint West Sussex Minerals Local Plan[15] indicate that where material is exported from West Sussex to Neighbouring areas, this is primarily to East Sussex and to Brighton and Hove. The Hampshire Minerals and Waste Core Strategy[16] and Background Papers associated with the Surrey Minerals Plan do not identify any need for importation of sand and gravel from West Sussex into Hampshire and Surrey. During preparatory work on this plan in 2011, discussions between the Council and Natural England identified that a precautionary approach should be taken and it should not be assumed based on this that there is no likelihood of minerals traffic using the A27 or A3 to transport minerals through Hampshire and Surrey, where these roads pass within 200m of designated sites.

4.2.4 A significant increase is defined as an increase of over 200 Heavy Duty Vehicles per day on either road from any minerals site. Guidance provided in the Design Manual for Roads and Bridges[17] indicates that if the increase in vehicle movements is below 200 HGV per day the air quality effect can be considered neutral. Such a large increase is considered unlikely. The anticipated rate of production is 150,000 tonnes per annum. Using a typical HGV payload of 20-22 tonnes and the quarry operating 5.5 days per week this would probably generate no more than 60 HGV movements per day in total and many of those would not travel along the A27 or A3. As such it is expected that the AADT will be considerably less than 200 HGV per day. It is therefore concluded that these proposed minerals sites will not have adverse effects on air quality at any European designated sites within West Sussex due to the relatively small vehicle movements involved. However, the transport assessments for these minerals sites should take into account any impacts on sites in Hampshire and Surrey if there will be a significant increase in vehicle movements on the A27 and A3 of more than 200 HGV/day.

4.3 M/CH/7B - East of West Heath Common

4.3.1 Site location is illustrated in **Appendix C Figure 3.**

Summary of screening

Table 6 – Screening of East of West Heath Common Minerals Site

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
5	East of West Heath Common	Chichester	Sand	This is a new minerals site. It lies approximately 6km from Wealden Heaths Phase II SPA and East Hampshire Hangers SAC. Assuming quarry traffic uses the A3 via A272, there is potential for an impact pathway via traffic emissions to the Wealden Heaths Phase II SPA so this site has been screened in for further consideration. Furthermore this site contains and is adjacent to a

[15] Joint West Sussex Minerals Local Plan (December 2014) https://www.westsussex.gov.uk/media/4152/bp2_v2.pdf
[16] Hampshire Minerals and Waste plan (adopted). October 2013 http://documents.hants.gov.uk/mineralsandwaste/HampshireMineralsWastePlanADOPTED.pdf
[17] Design Manual for Roads and Bridges. Volume 11 Section 3 Part 1 - ha 207/07 - air quality

				watercourse that drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar. There is therefore a potential pathway for sediment to impact this European site.

Appropriate Assessment

4.3.2 The screening exercise identified that air quality was a pathway requiring consideration with regard to this proposed minerals site, due to potential for increased traffic volumes within 200m of European designated sites. However, the only possible impacts on the Wealden Heaths Phase 2 SPA or Woolmer Forest SAC would arise from traffic movements on the A3 in Hampshire. The background papers to the Joint West Sussex Minerals Local Plan [18] indicate that where material is exported from West Sussex to Neighbouring areas, this is primarily to East Sussex and to Brighton and Hove. Hampshire Minerals and Waste Core Strategy[19] and Background Papers associated with the Surrey Minerals Plan do not identify any need for importation of sand and gravel from West Sussex into Hampshire and Surrey. During preparatory work on this plan in 2011, discussions between the Council and Natural England identified that a precautionary approach should be taken and it should not be assumed based on this that there is no likelihood of minerals traffic using the A27 or A3 to transport minerals through Hampshire and Surrey, where these roads pass within 200m of designated sites.

4.3.3 Based on current information there is no reason to conclude that this proposed minerals site will have adverse effects on air quality at any European designated sites but to provide a safeguard it is recommended that transport assessments undertaken for this site should take into account any impacts on Wealden Heaths Phase 2 SPA or Woolmer Forest SAC if there will be a significant increase in vehicle movements (i.e. an increase of over 200 Heavy Duty Vehicles per day) on the A3 within 200m of those European sites. Such a large increase is considered unlikely. With the implementation of the recommendation regarding air quality assessment (which is reproduced in section 4.9) it can be concluded that there are adequate safeguards in place to ensure that the proposed minerals sites will not have adverse air quality effects on any European designated sites.

4.3.4 The screening process identified the potential for impacts on the Arun Valley SPA/Ramsar through reduced water quality as a result of sediment deposition. However, this site lies almost 25km from the Arun Valley SPA/Ramsar, such that any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not.

4.3.5 t can therefore be concluded that there are adequate safeguards in place to ensure that the proposed minerals sites will not have adverse effects on water quality at any European designated sites.

4.4 M/CH/8A - Minsted West

4.4.1 Site location is illustrated in **Appendix C Figure 4.**

Summary of screening

Table 7 – Screening of Minsted West Minerals Site

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
10	Minsted West	Chichester	Soft sand	This is an extension site. It lies approximately 6km from Singleton and Cocking Tunnels SAC. There is no scope for adverse impacts on this European site. However, the site lies within 200m of a watercourse that drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar. There is therefore a potential pathway for sediment impacts so this site has been screened in for further consideration. It has been confirmed that there is not expected to be any change

[18] Joint West Sussex Minerals Local Plan (December 2014) https://www.westsussex.gov.uk/media/4152/bp2_v2.pdf
[19] Hampshire Minerals and Waste plan (adopted). October 2013 http://documents.hants.gov.uk/mineralsandwaste/HampshireMineralsWastePlanADOPTED.pdf

				in traffic flows as a result of the operation of this extension because it will be operated sequentially to the existing works rather than cumulatively.

Appropriate Assessment

4.4.2 The proposed extension to an existing minerals site is approximately 200m from a stream that flows 2-3km into the River Rother. The Rother at this point is 15-20km from the Arun Valley SPA/Ramsar site (the Rother feeds into the River Arun). As such any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not.

4.4.3 It can therefore be concluded that there are adequate safeguards in place to ensure that minerals site CH/8A will not adverse effects on the Arun Valley SPA/Ramsar through reduced water quality.

4.5 M/CH/8D - Severals West

4.5.1 Site location is illustrated in **Appendix C Figure 5.**

Summary of screening

Table 8 – Screening of Severals West Minerals Site

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
12	Severals West	Chichester	Soft. Sand	This is a new minerals site. It lies approximately 6km from Singleton and Cocking Tunnels SAC. There is no scope for adverse impacts on this European site. However, the site includes a watercourse that drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar. There is therefore a potential pathway for sediment impacts so this site has been screened in for further consideration.

Appropriate Assessment

4.5.2 The proposed minerals sites include a stream that flows 500m (CH/8D) into the River Rother. However, the Rother at this point is 15-20km from the Arun Valley SPA/Ramsar site (the Rother feeds into the Arun before this point). It should be noted that the main channel of the River Arun does not form part of the SPA/Ramsar. As such any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not.

4.5.3 It can therefore be concluded that this site will not have any likely significant effects on the Arun Valley SPA/Ramsar through reduced water flows or quality.

4.6 M/CH/11 – Horncroft

4.6.1 Site location is illustrated in **Appendix C Figure 6.**

Summary of screening

Table 9 – Screening of Horncroft Minerals Site

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
8	Horncroft	Chichester	Silica sand	This is a new minerals site. It lies approximately 3km from Duncton to Bignor Escarpment SAC, 4.9km from The Mens SAC and 7km from Arun Valley SPA/Ramsar via water courses (2.5km directly). A watercourse running through to the site drains into River Rother and into Arun Valley SPA/Ramsar. There is therefore a potential pathway for sediment to impact this European site.

Appropriate Assessment

Bats

4.6.2 The Horncroft minerals site is located within 7km of the Mens SAC (designated for barbastelle bats). Greenaway[20] identified that the barbastelle bats of The Mens SAC travel up to 7km from the SAC. It was noted that this was largely in an easterly direction. The Horncroft minerals site is located 4.9km south west of The Mens SAC and south of the A283. The Greenaway (2008) report identifies that no bat flight lines in the study were located south of the A283. As such it is considered that as the Horncroft minerals site is located approximately 2.2km south of the A283, it is not utilised by the barbastelle bat features of The Mens SAC and will not have a likely significant effect upon The Mens SAC.

Water Quality

4.6.3 The proposed minerals site includes a stream that flows 1km into the River Rother. The Rother at this point is approximately 6km from the Arun Valley SPA/Ramsar site (the Rother feeds into the Arun before this point). As such any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not.

4.6.4 It can therefore be concluded that adequate measures are in place to ensure that minerals site CH/11 will not have an adverse effect on the Arun Valley SPA/Ramsar through reduced water quality.

[20] Greenaway, F. (2008) Barbastelle bats in the Sussex West Weald 1997 - 2008

4.7 M/HO/2 – Chantry Lane Extension

4.7.1 Site location is illustrated in **Appendix C Figure 7.**

Summary of screening

Table 2 – Screening of Chantry Lane Extension Minerals Site

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
2	Chantry Lane Extension	Horsham	Soft sand	This is an extension to an existing minerals site. It lies approximately 5km from Arun Valley SPA/Ramsar. A watercourse adjacent to the site drains into River Stor and into this European site. There is therefore a potential pathway for sediment to impact this European site. It has been confirmed that there is not expected to be any change in traffic flows as a result of the operation of this extension because it will be operated sequentially to the existing works rather than cumulatively.

Appropriate Assessment

4.7.2 The River Stor flows from adjacent to this site into the Arun Valley SPA/Ramsar some 5-6km distant. On route the River passes the settlement of Storrington and two treatment works. Input of water from the River Stor onto the SPA/Ramsar is only permitted through opening of sluice gates in very dry conditions as an 'emergency measure,' as the water quality within the River Stor is already poor. It is therefore clear that flows from the River Stor are not essential for the continued maintenance of the integrity of the SPA/Ramsar site.

4.7.3 It can therefore be concluded that minerals site HO/2 will not have an adverse effect on the Arun Valley SPA/Ramsar through reduced water flows or quality.

4.8 M/MS/1 – Land Adjacent to West Hoathly Brickworks

4.8.1 Site location is illustrated in **Appendix C Figure 8.**

Summary of screening

Table 11 – Screening of West Hoathly Brickworks Minerals Site

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
9	Land Adjacent to West Hoathly Brickworks	Mid-Sussex	Wadhurst clay	This is an extension to an existing site. It lies approximately 1.5km from Ashdown Forest SPA/SAC. It is assumed that site traffic will use the A22 and A275 which bisects this SPA/SAC. However, it has been confirmed that there is not expected to be any change in traffic flows as a result of the operation of this extension because it will be operated sequentially to the existing works rather than cumulatively. This site includes a small waterway. This waterway feeds into a number of tributaries, eventually entering the River Medway which reaches the sea at the Medway Estuary and Marshes SPA/ Ramsar site. There is therefore a potential pathway for sediment to impact this European site.

Appropriate Assessment

Water quality

4.8.2 This site includes a small waterway. This waterway feeds into a number of tributaries, eventually entering the River Medway which reaches the sea at the Medway Estuary and Marshes SPA/ Ramsar site. Due to the large distances involved any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not.

4.8.3 It can therefore be concluded that this minerals site will not have any likely significant effects on any European designated sites through changes in water quality.

4.9 Conclusion and Recommendations

4.9.1 All sites have been either screened out or considered to result in no adverse effect on European sites either alone or in combination when subject to appropriate assessment. The exception is East of West Heath Common for which further safeguards are recommended to enable a conclusion of no adverse effect from the plan.

4.9.2 **East of West Heath Common** There is no reason to conclude that this proposed minerals site will have adverse effects on air quality at any European designated sites but as a precaution transport assessments undertaken for this site should take into account any impacts on Wealden Heaths Phase 2 SPA or Woolmer Forest SAC if there will be a significant increase in vehicle movements on the A3 within 200m of those sites in-combination with other projects or plans.

4.9.3 Following transportation modeling, if the development of this site will result in any of the following, further avoidance measures will be required:

- The increase in vehicle movements on the A3 (in close proximity to Woolmer Forest SAC/Wealden Heaths Phase 2 SPA)) will amount to less than 200 Heavy Duty Vehicles/day[21] alone and/ or in-combination; or
- The increase in vehicle movements will result in an increase in nitrogen deposition at the roadside within Woolmer Forest SAC/Wealden Heaths Phase 2 SPA amounting to less than 1% of the critical load[22] for the most sensitive habitat within the site (i.e. an increase of less than 0.1 kgN/ha/yr); or
- If the increase in deposition will be greater than 1% of the critical load further assessment is undertaken to demonstrate that there will be no adverse effect on the integrity of the designated site.

[21] The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1) regarding air quality environmental impact assessment from roads indicates that if the increase in traffic will amount to less than 200 HDV movements per day the development can be scoped out of further assessment.

[22] 1% of the critical load being the criterion that the Environment Agency uses to determine when the contribution of a particular source of pollution will be effectively inconsequential even when considered 'in combination' with other projects and plans

Appendix A. Background on European sites screened in referenced in this document

Site	Area (ha)	Qualifying Features	Key Environmental Conditions to Support Site Integrity
Kingley Vale SAC	208.05	– Yew-dominated woodland – Dry grasslands and scrublands on chalk or limestone	– Maintenance of grazing – The long-term conservation of the yew forest requires the maintenance of nurse scrub habitat and the regulation of numbers of resident deer. – Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification – Absence of direct fertilization – The site is vulnerable to spray-drift (i.e. eutrophication) from surrounding intensive arable land. – Low recreational pressure.
Duncton to Bignor Escarpment SAC	214.47	– Asperulo-Fagetum beech forests	– Minimal atmospheric pollution – may increase the susceptibility of beech trees to disease – Appropriate woodland management
Singleton and Cocking Tunnels SAC	2.45	– Hibernating barbastelle bat – Hibernating Bechstein's bat	– Absence of disturbance. Tunnel entrances are covered by bat grill to prevent disturbance. – Barbastelle require a constant humidity around their roosts; any manipulation of the shrub layer must be carefully considered.
The Mens SAC	203.28	– Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) – Barbastelle bat	– Appropriate woodland management. – Low recreational pressure (because management is minimum intervention and Bridleway degradation by horse riding is a recurring threat) – Minimal air pollution – may increase the susceptibility of beech trees to disease and alter epiphytic communities. – Barbastelle require a constant humidity around their roosts; any manipulation

			of the shrub layer must be carefully considered.
Solent Maritime SAC	11325.09	– Estuaries – Cord grass swards – Atlantic salt meadows – Subtidal sandbanks – Intertidal mudflats and sandflats – Coastal lagoons – Annual vegetation of drift lines – Perennial vegetation of stony banks – Glasswort and other annuals colonising mud and sand – Shifting dunes with marram – Desmoulin's whorl snail	– Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze. – No dredging or land-claim of coastal habitats. – Unpolluted water and high oxygenation. – Absence of nutrient enrichment. – Absence of non-native species. – Maintenance of freshwater inputs. – Balance of saline and non-saline conditions. – Maintenance of grazing
Chichester and Langstone Harbours SPA/ Ramsar	SPA& Ramsar: 5810.03	– Internationally important wintering populations of Brent goose, pintail, shoveler, teal ruddy turnstone, sanderling, dunlin, ringed plover, bar-tailed godwit, black-tailed godwit, red-breasted merganser, curlew, grey plover, shelduck, common redshank. – Internationally important breeding population of little tern, common tern and sandwich tern. – Over winter the area regularly supports 76480waterfowl (5 year peak mean 1998/99-2002/2003) – Internationally important population of wintering waterfowl (Ramsar) including Dark-bellied brent, shelduck, grey plover and dunlin – Two large estuarine basins linked by the	– Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze. – Unpolluted water. – Absence of nutrient enrichment of water. – Minimal recreational and other disturbance – Absence of non-native species e.g. from shipping activity. – Maintenance of appropriate hydrological regime, e.g. freshwater flows at heads of channels are important for birds to preen, drink and feed. – Short grasslands surrounding the site are essential to maintaining interest features as they are now the key foraging resource for Brent goose.

		channel which divides Hayling Island from the main Hampshire coastline. The site includes intertidal mudflats, saltmarsh, sand and shingle spits and sand dunes.	
Arun Valley SAC/ SPA/ Ramsar	528.62 SAC: 487.49	– Ramshorn snail – The area is of outstanding ornithological importance notably for wintering wildfowl and breeding waders, including tundra swan and northern pintail. – The site holds seven wetland invertebrate species listed in the British Red Data Book as threatened. One of these, *Pseudamnicola confusa*, is considered to be endangered. The site also supports four nationally rare and four nationally scarce plant species. – The ditches intersecting the site have a particularly diverse and rich flora. All five British duckweed *Lemna* species, all five water-cress *Rorippa* species, and all three British water milfoils (*Myriophyllum* species), all but one of the seven British water dropworts (*Oenanthe* species), and two-thirds of the British pondweeds (*Potamogeton* species) can be found on site.	– Appropriate ditch management – Control of shade-inducing marginal vegetation is – Maintaining access to the water's edge for livestock. Ensure good water – Appropriate grazing management – Sympathetic management of lowland wet grassland/grazing marsh (including water level management). – Minimal disturbance – Management of the hydrology of the area important. For example, the impact of water abstraction, river maintenance, and ensuring that winter flooding can continue as part of the existing management of the site.
Ashdown Forest SAC/ SPA	SPA: 3207.08 SAC: 2729	– Wet heathland with cross-leaved heath – Dry heaths – Great crested newts – Nationally important breeding populations of nightjar and Dartford	– Minimal air pollution (nitrogen deposition can cause compositional changes over time) – Use of grazing management to prevent succession – Balanced hydrological regime to maintain wet heath. – Minimal recreational disturbance

		warbler	– Absence of fertilisation – Suitable foraging and refuge habitat within 500m of the pond. – Relatively unpolluted water of roughly neutral pH. – Some ponds deep enough to retain water throughout February to August at least one year in every three. – In a wider context, great crested newts require good connectivity of landscape features (ponds, hedges etc.) as they often live as metapopulations in a number of ponds.
Wealden Heaths Phase 2 SPA	2053.83	– Nationally important breeding populations of nightjar, woodlark and Dartford warbler	– Maintenance of grazing and other traditional management practices. – Unfragmented habitat – Minimal recreational pressure and a low incidence of wildfires.
Woolmer Forest SAC	666.68	– Acid peat-stained lakes and ponds – Dry heaths – Depressions on peat substrates – Wet heathland with cross-leaved heath – Very wet mires often identified by an unstable 'quaking' surface	– Maintenance of grazing and other traditional management practices. – Un-fragmented habitat – Minimal recreational pressure and a low incidence of wildfires. – Minimal nutrient enrichment – Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification
East Hampshire Hangers SAC	569.68	– Mixed woodland (ash *Fraxinus excelsior*, wych elm *Ulmus glabra* and lime (mainly small-leaved lime *Tilia cordata* but more rarely large-leaved lime T*. platyphyllos*)) on base-rich soils associated with rocky slopes – Asperulo-Fagetum beech forests – Semi-natural dry grasslands and scrublands on chalk or limestone, including important orchid sites – Yew-dominated woodland – Early gentian	– Low nutrient runoff from surrounding land – being steep and narrow, the Hanger woodlands are vulnerable to nutrient run-off leading to eutrophication. – Maintenance of grazing – Controlled off-track recreational activity (i.e. trampling) – Minimal air pollution – nitrogen deposition may cause reduction in diversity, sulphur deposition can cause acidification – Absence of direct fertilization – Well-drained soils

Thursley, Hankley & Frensham Commons SPA	1870	– Nationally important breeding populations of nightjar, woodlark and Dartford warbler	– Maintenance of grazing and other traditional management practices. – Reduction of water levels due to water abstraction from the Greensand aquifer is affecting the wet heath and bog components of the site
Thursley, Ash, Pirbright & Chobham SAC	5138	– Northern Atlantic wet heaths with Erica tetralix – European dry heaths – Depressions on peat substrates of the Rhynchosporion	– Insufficient grazing or other traditional practices, including bracken control and scrub clearance – Vulnerable to the lowering of water tables as a result of water abstraction or other reasons which could cause loss or damage to wet heath and mire communities. – Recreational pressures, including disturbance to wildlife and fires resulting from arson, pose a serious risk to habitats.
Butser Hill SAC	238.66	– Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) – Yew-dominated woodland	– Vulnerable to spray-drift (i.e. eutrophication) from surrounding intensively-managed arable land

Appendix B. Minerals Sites and Background on European Sites Screened Out

Table A: Mineral Sites Screened Out

Site number in Appendix C: Figure 1	Site name	Location	Mineral	HRA Screening (green= screened out, amber =screened in for Appropriate Assessment)
1	Brick Kiln Farm	Chichester	Sharp sand and gravel	This site lies approximately 4km from Solent Maritime SAC and Chichester and Langstone Harbours SPA/Ramsar, and Kingley Vale SAC. There is no scope for adverse impacts on these or any other European sites.
7	Ham Farm[23]	Horsham	Soft Sand	No European site within 10km of this site. There is no scope for pathways connecting any European sites.
11	Rock Common	Washington	Soft Sand	The Arun Valley SPA/ SAC/ Ramsar site is 7.7km from this site. There is no scope for pathways connecting any European sites.
15	Buncton Manor Farm	Washington	-	The Arun Valley SPA/ SAC/ Ramsar site is 8.1km from this site. There is no scope for pathways connecting any European sites.

The location of the above sites are illustrated in **Appendix C**, Figure 9 (Brick Kiln Farm), Figure 10 (Ham Farm), and Figure 11 (Rock Common and Buncton Manor Farm)

[23] Following the Regulation 18 consultation, the site boundary for Ham Farm has changed. The site is now 9.2ha is size (when assessed in April 2016 the site was 16ha in size). The northern boundary has moved southwards and a small parcel of land towards the west has been incorporated. The mapping in Appendix C, Figure 10 has not been updated accordingly.

Table B: European Designated Sites Screened Out

Site	Area (ha)	Qualifying Features	Key Environmental Conditions to Support Site Integrity	HRA Implications
Rook Clift SAC	10.82	– Mixed woodland (ash *Fraxinus excelsior*, wych elm *Ulmus glabra* and lime (mainly small-leaved lime *Tilia cordata* but more rarely large-leaved lime *T. platyphyllos*)) on base-rich soils associated with rocky slopes	– Appropriate woodland management – Deer grazing needs to be controlled – Planting inside the woodland needs to be tightly controlled.	No HRA implications The nearest minerals site is Minsted West, located 4km from the SAC and East of West Heath Common located 4.3km from the SAC. No impact pathways exist that could impact upon the Qualifying Features.
Ebernoe Common SAC	133.94	– Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion) – Barbastelle bat – Bechstein's bat	– Appropriate management. – Minimal atmospheric pollution – may increase the susceptibility of beech trees to disease and alter epiphytic communities. – Absence of disturbance. – In a wider context, bats require good connectivity of landscape features to allow foraging and commuting. – Both bat species have close association with woodland. Areas of undesignated woodland adjacent to SAC may be of most importance to population – Barbastelle require a constant humidity around their	No HRA implications The nearest minerals site is Horncroft, located 8.6km from the SAC. Due to the distances involved, there are no impact pathways present that could impact upon the Qualifying Features.

Site	Area (ha)	Qualifying Features	Key Environmental Conditions to Support Site Integrity	HRA Implications
			roosts; any manipulation of the shrub layer must be carefully considered.	
Pagham Harbour SPA/ Ramsar	SPA& Ramsar: 636.68	– Internationally important wintering populations of ruff, Brent goose and black-tailed godwit. – Internationally important breeding population of common tern and little tern	– Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze. – Unpolluted water. – Minimal recreational and other disturbance – Absence of nutrient enrichment of water. – Absence of non-native species. – Maintenance of appropriate hydrological regime. – Maintenance of isolated, open, non-vegetated sand and shingle beaches and spits for nesting. – Maintenance of suitable feeding areas in estuarine habitats and inland grazing marshes – Maintenance of suitable feeding areas with winter wheat/grass close to Pagham Harbour	No HRA implications The closest minerals site to Pagham Harbour is Brick Kiln Farm, located 3.7km from the SPA/ Ramsar site. Due to the distances involved, there are no impact pathways present that could impact upon the Qualifying Features.

Site	Area (ha)	Qualifying Features	Key Environmental Conditions to Support Site Integrity	HRA Implications
Castle Hill SAC	114.68	– Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (important orchid sites) – Early gentian	– Grazing levels to conserve and enhance plant (and associated animal) species – Management of scrub encroachment – Leaching and spray-drift of nutrients from surrounding arable land.	No HRA implications The closets minerals site is Ham Farm, located 20.9km from the SAC. Due to the distances involved, there are no impact pathways present that could impact upon the Qualifying Features..
Mole Gap to Reigate Escarpment SAC	887.68	– Stable box scrub, on steep chalk slopes – Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (important orchid sites) – Yew-dominated woodland – European dry heaths – Asperulo-Fagetum beech forests – Great crested newt – Bechstein's bat	– Recreational pressure is high and requires management and monitoring. – Neglect and a lack of appropriate grazing – Absence of disturbance. – In a wider context, bats require good connectivity of landscape features to allow foraging and commuting.	No HRA implications The closets minerals site is Land adjacent to West Hoathley Brickworks, located 22.7km from the SAC. Due to the distances involved, there are no impact pathways present that could impact upon the Qualifying Features.
Thursley & Ockley Bogs Ramsar	265.24	– Supports a community of rare wetland invertebrate species including notable numbers of breeding dragonflies. – Supports all six native reptile	– Maintenance of current hydrological levels and processes – Maintenance of current terrestrial vegetation management	No HRA implications The closets minerals site is Severals West, located 19.2km from the Ramsar site. In addition the road is located more than

Site	Area (ha)	Qualifying Features	Key Environmental Conditions to Support Site Integrity	HRA Implications
		species. – Supports nationally important breeding populations of European nightjar and woodlark		200m from a lorry route. Due to the distances involved, there are no impact pathways present that could impact upon the Qualifying Features.
Portsmouth Harbour Ramsar / SPA	Ramsar: 1284.77	– Intertidal mudflat areas posses extensive beds of eelgrass Zostera angustifolia and Zostera noltei which support grazing dark-bellied brent geese populations. – The mud-snail Hydrobia ulvae is found at extremely high densities, which help support the wading bird interest of the site. – Common cord-grass Spartina anglica dominates large areas of the saltmarsh. There are extensive areas of green algae Enteromorpha spp. and sea lettuce Ulva lactuca. – Locally the saltmarsh is dominated by sea purslane Halimione portulacoides which gradates to varied communities at the higher shore levels. – Saline lagoons hosting	– Coastal squeeze arising from coastal defences and sea level rise – Modification of physical processes through large-scale land-claim, capital and maintenance dredging, sea defences and the knock on effects on the extent and distribution of intertidal habitats – Maintenance and development of both commercial and military ports – Accidental pollution from shipping and heavy industrial activities, former military and waste disposal sites, and re-distribution of contaminated sediments. – High levels of recreational pressure both on shore and offshore which can have disturbance effects upon birds during sensitive (over-	No HRA implications The closets minerals site is Woodmancote, located 13.0km from the Ramsar/ SPA site. Due to the distances involved, there are no impact pathways present that could impact upon the Qualifying Features.

Site	Area (ha)	Qualifying Features	Key Environmental Conditions to Support Site Integrity	HRA Implications
		nationally important species. – Internationally important wintering population of dark-bellied Brent goose, dunlin, black-tailed godwit and red-breasted merganser.	wintering) periods.	
South Wight Maritime SAC	19862.71	– Reefs – Vegetated sea cliffs of the Atlantic and Baltic Coasts – Submerged or partially submerged sea caves	– Existing and proposed coast protection works; – Coastal squeeze of cliff habitats due to erosion, development or intensive agriculture in the hinterland; – Sewage disposal; – Accidental pollution from shipping activity; – Development in the intertidal/subtidal; – Commercial and recreational activities such as dredging and dredged spoil disposal, fishing and boating; – Introduction of non-native species, e.g. from shipping activity; – Marine aggregate extraction (off-site).	No HRA implications The closets minerals site is Woodmancote, located 18.6km from the SAC. Due to the distances involved, there are no impact pathways present that could impact upon the Qualifying Features.

Appendix C. Figures

Figure 1 – Site locations, lorry routes and designated sites

Figure 2 - Woodmancote, Common Road West, Common Road East, Slades Field, and Funtington West

Figure 3 – East of west Heath Common

Figure 4 – Minsted West

Figure 5 – Severals West

Figure 6 - Horncroft

Figure 7 – Chantry Lane Extension

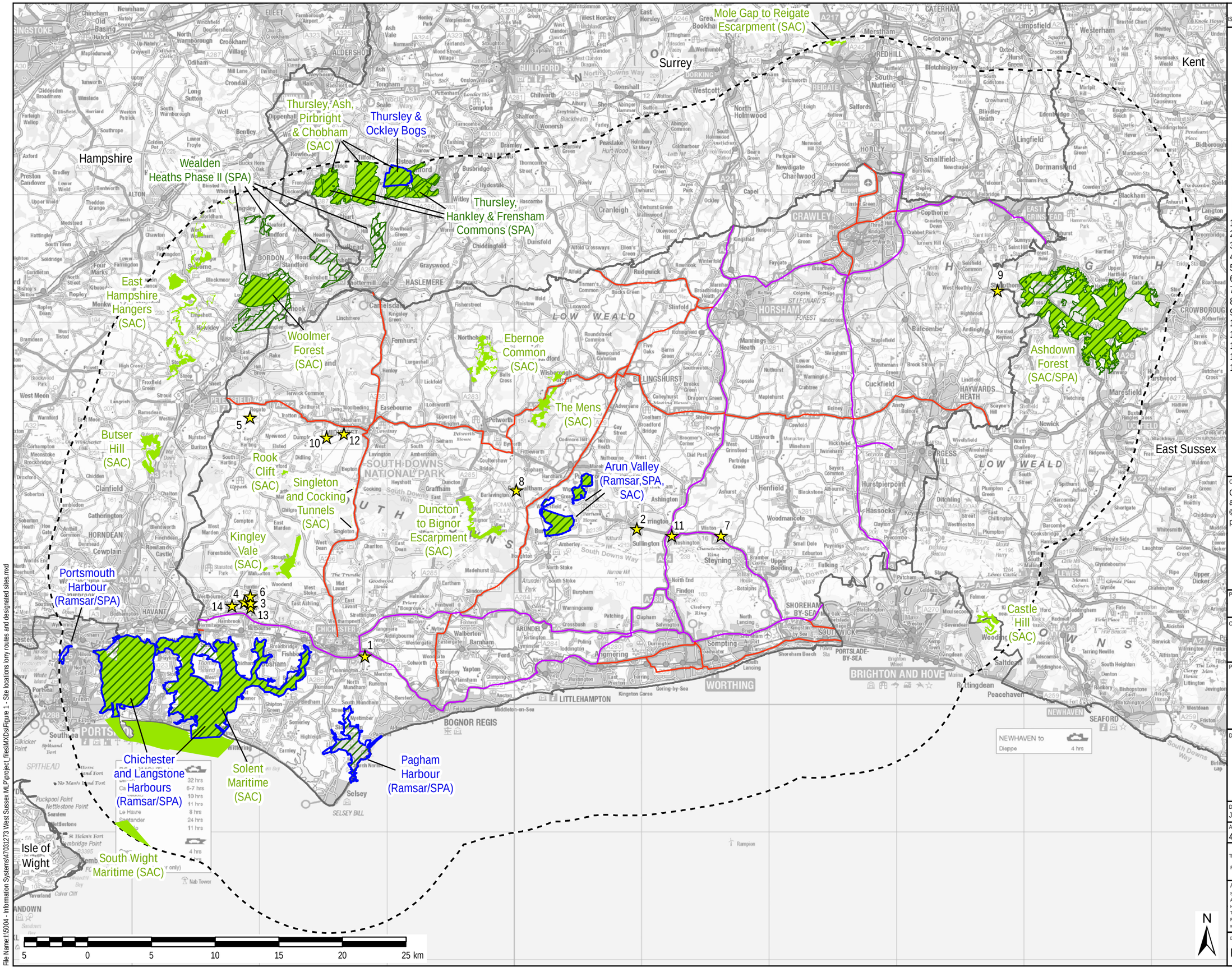
Figure 8 – Land Adjacent to West Hoathley Brickworks

Figure 9 - Brick Kiln Farm

Figure 10 - Ham Farm[24]

Figure 11 - Rock Common, and Buncton Manor Farm

[24] Following the Regulation 18 consultation, the site boundary for Ham Farm has changed. The site is now 9.2ha is size (when assessed in April 2016 the site was 16ha in size). The northern boundary has moved southwards and a small parcel of land towards the west has been incorporated. The mapping in Appendix C, Figure 10 has not been updated accordingly.



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LEGEND

- Potential mineral site
- ALR local lorry routes
- ALR strategical lorry routes
- Special Area of Conservation (SAC)
- Ramsar
- Special Protection Area (SPA)
- 10km area of interest
- Administrative boundary

1. Brick Kiln Farm
2. Chantry Lane Extension
3. Common Road West
4. Common Road East
5. East of West Heath Common
6. Funtington West
7. Ham Farm
8. Horncroft
9. Land Adjacent to West Hoathley Brickworks
10. Minsted West
11. Rock Common West
12. Severals West
13. Slades Field
14. Woodmancote

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Client: WEST SUSSEX CC

Project Title: WEST SUSSEX HRA

Drawing Title: SITE LOCATIONS, LORRY ROUTES AND DESIGNATED SITES

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JW	JR	JR	30/04/2015

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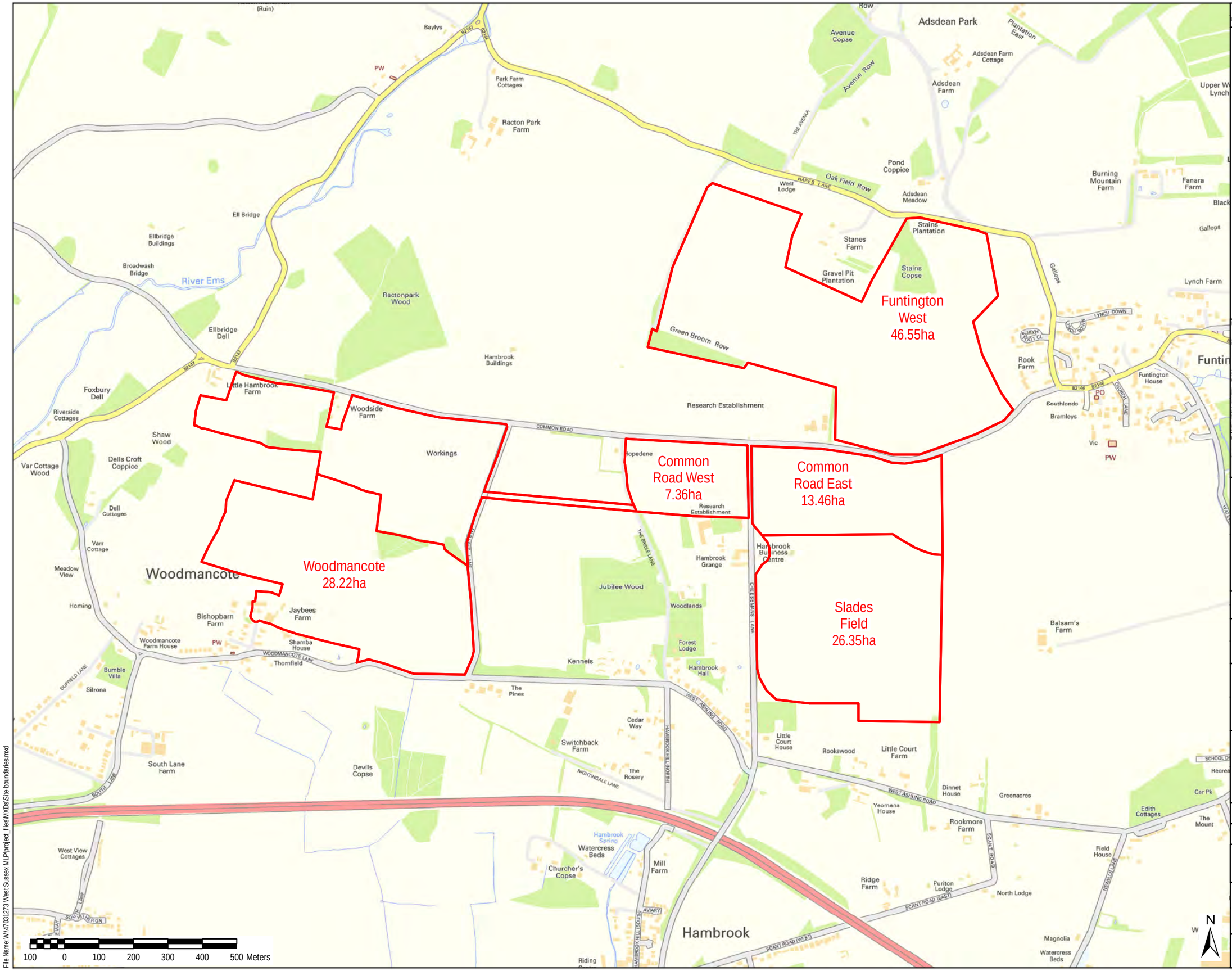
File Name:I:\5004 - Information Systems\47031273 West Sussex MLP\project_files\MXDs\Figure 1 - Site locations lorry routes and designated sites.mxd



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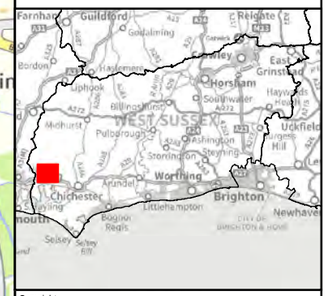
Potential mineral site



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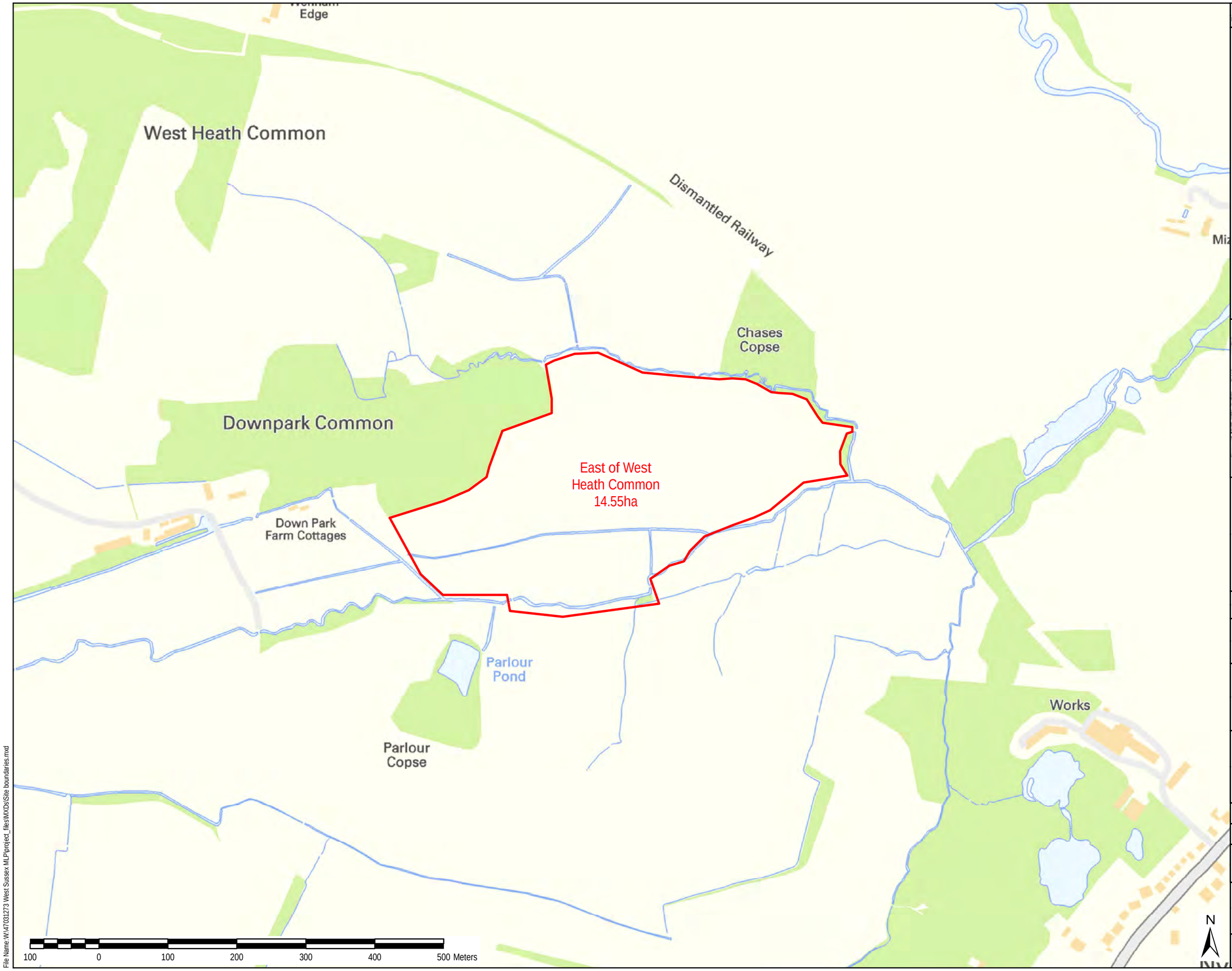

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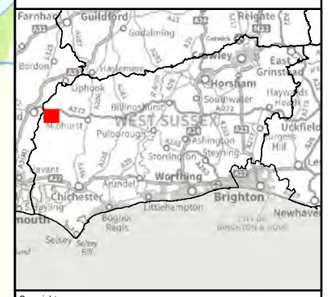
LEGEND

Potential mineral site



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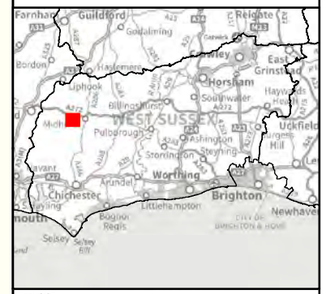
Potential mineral site



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Project Title: WEST SUSSEX HRA

Drawing Title: MINSTED WEST

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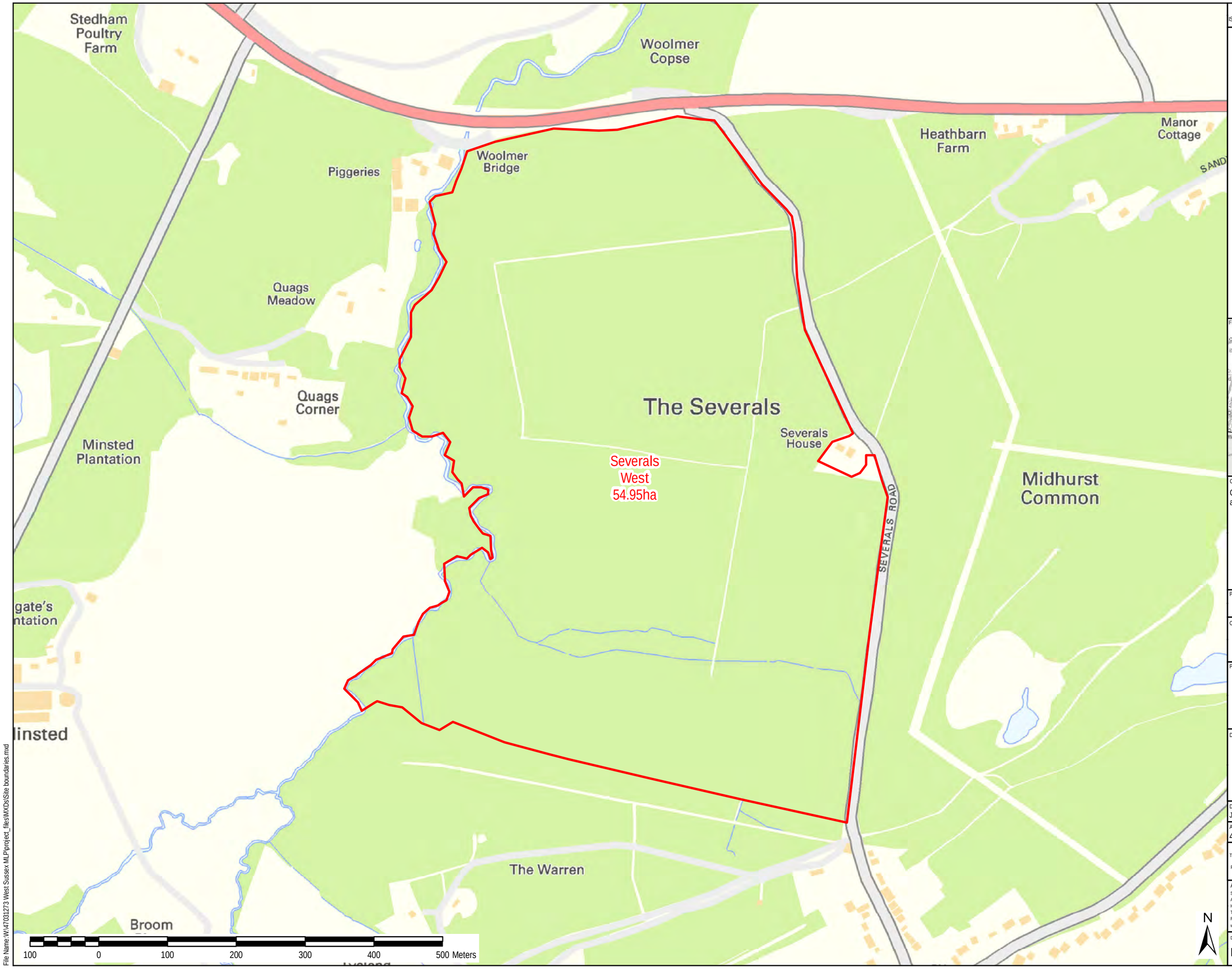

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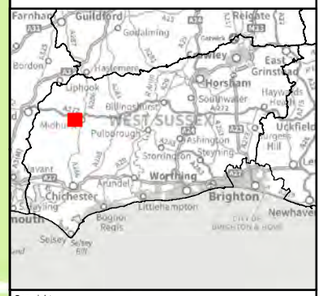
LEGEND

Potential mineral site



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Client: WEST SUSSEX CC

Project Title: WEST SUSSEX HRA

Drawing Title: SEVERALS WEST

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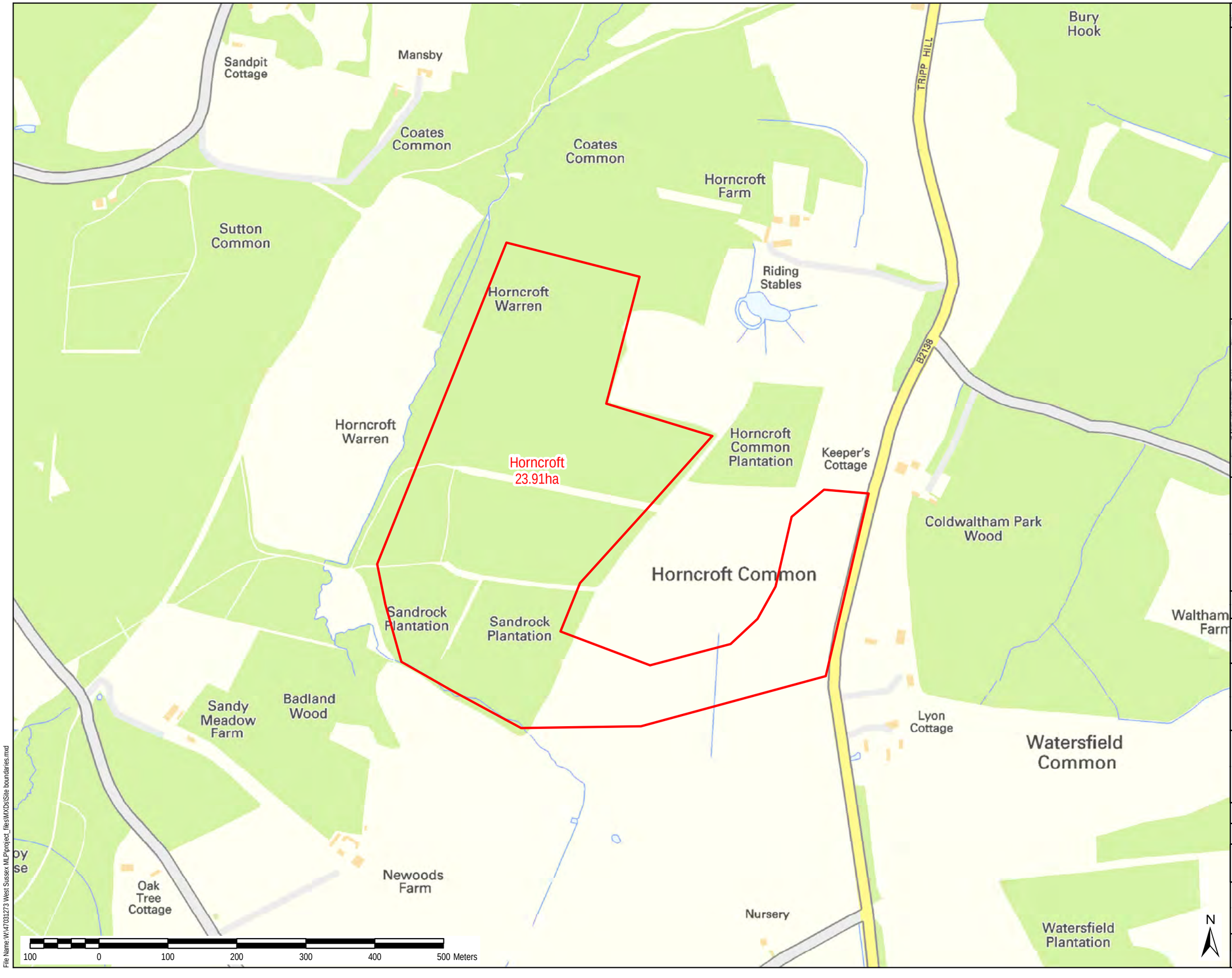

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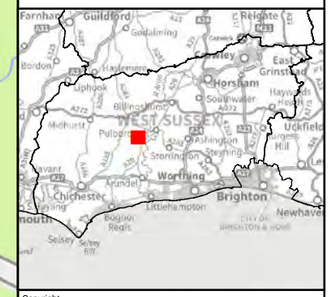
LEGEND

Potential mineral site



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Project Title: WEST SUSSEX HRA

Drawing Title: HORNCROFT

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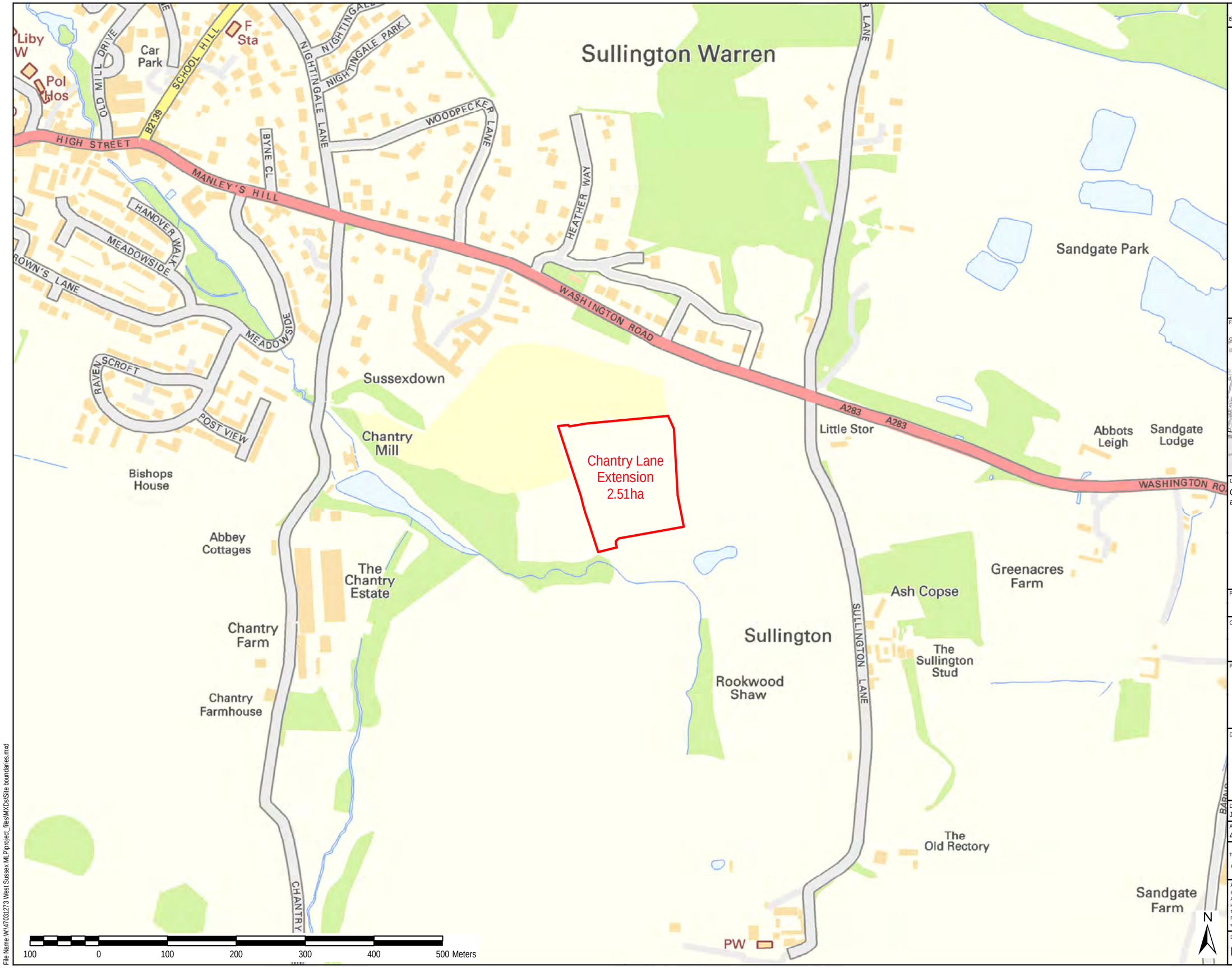

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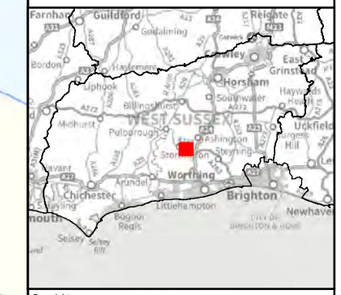
Potential mineral site



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Project Title: WEST SUSSEX HRA

Drawing Title: CHANTRY LANE EXTENSION

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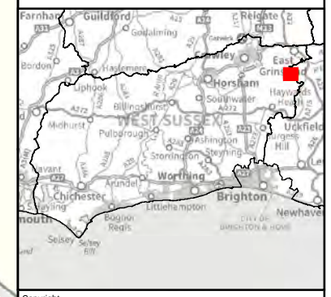
Potential mineral site



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Project Title: WEST SUSSEX HRA

Drawing Title: LAND ADJACENT TO WEST HOATHLY BRICKWORKS

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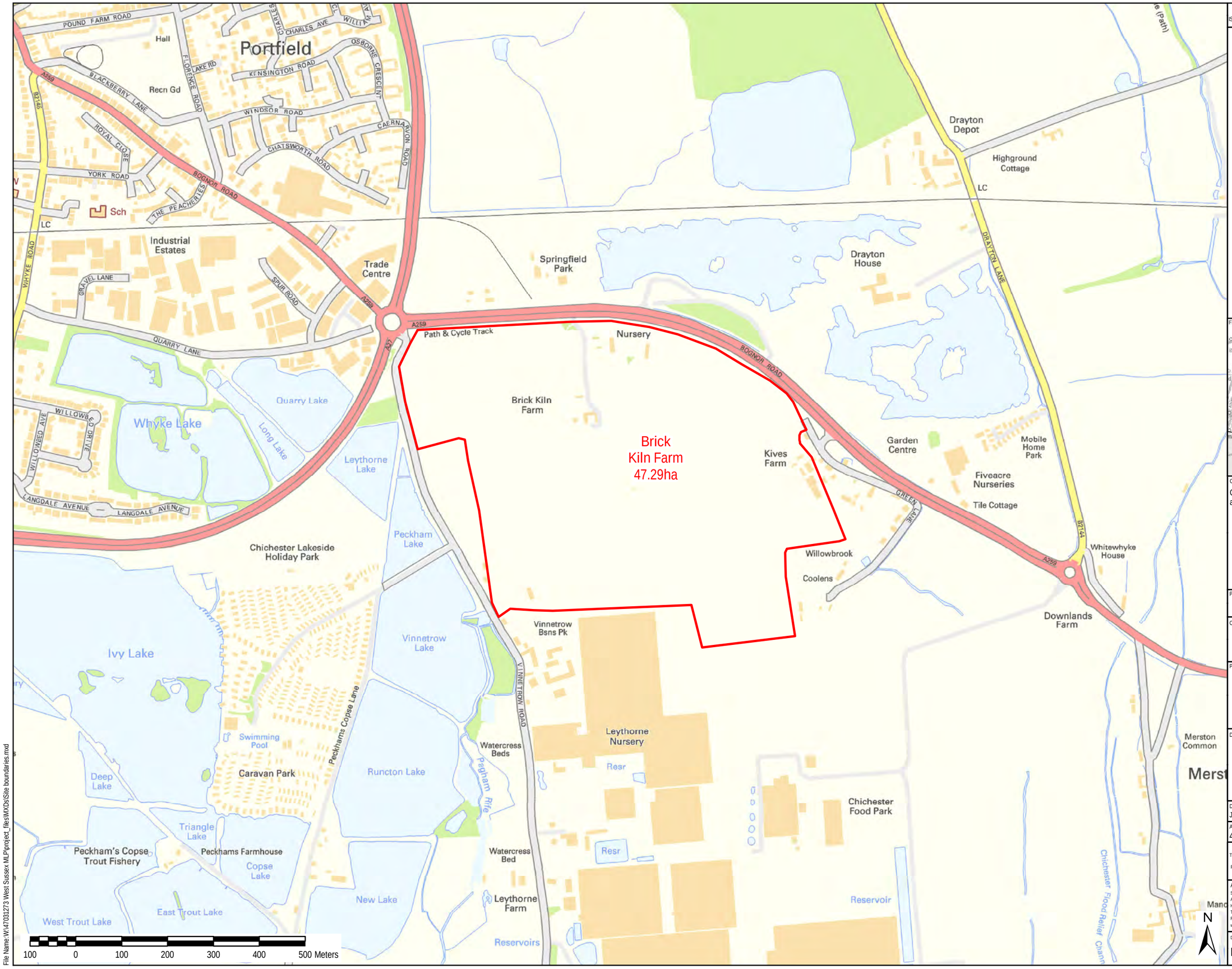

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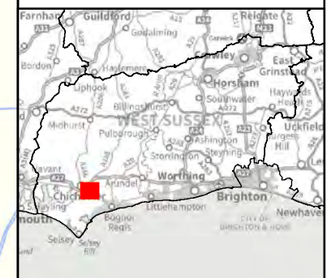
LEGEND

Potential mineral site



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Project Title: WEST SUSSEX HRA

Drawing Title: BRICK KILN FARM

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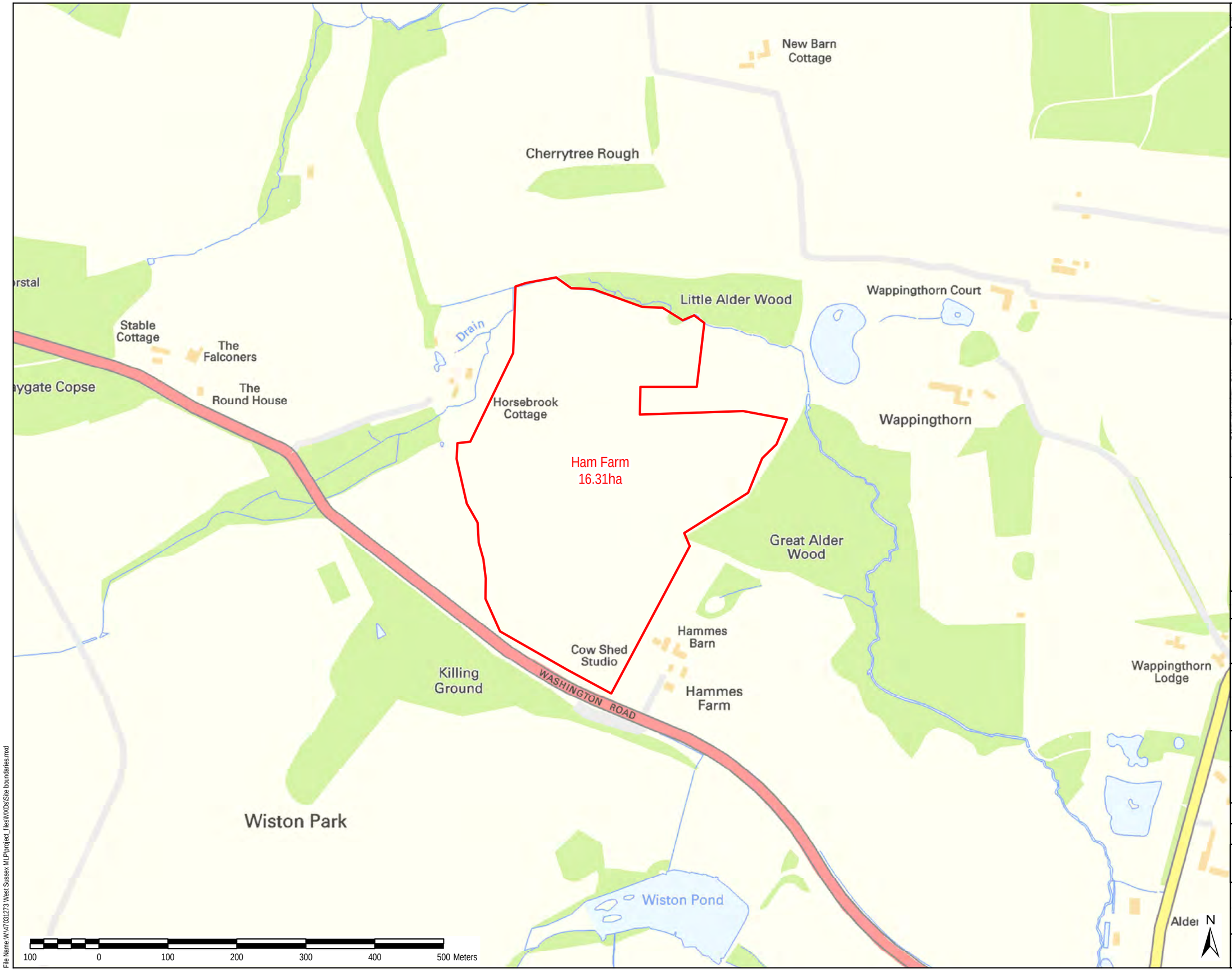

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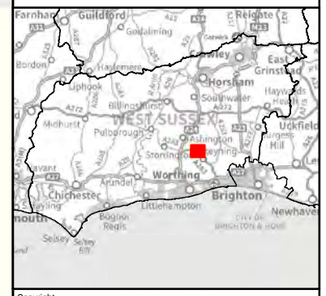

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Client: WEST SUSSEX CC

Project Title: WEST SUSSEX HRA

Drawing Title: HAM FARM

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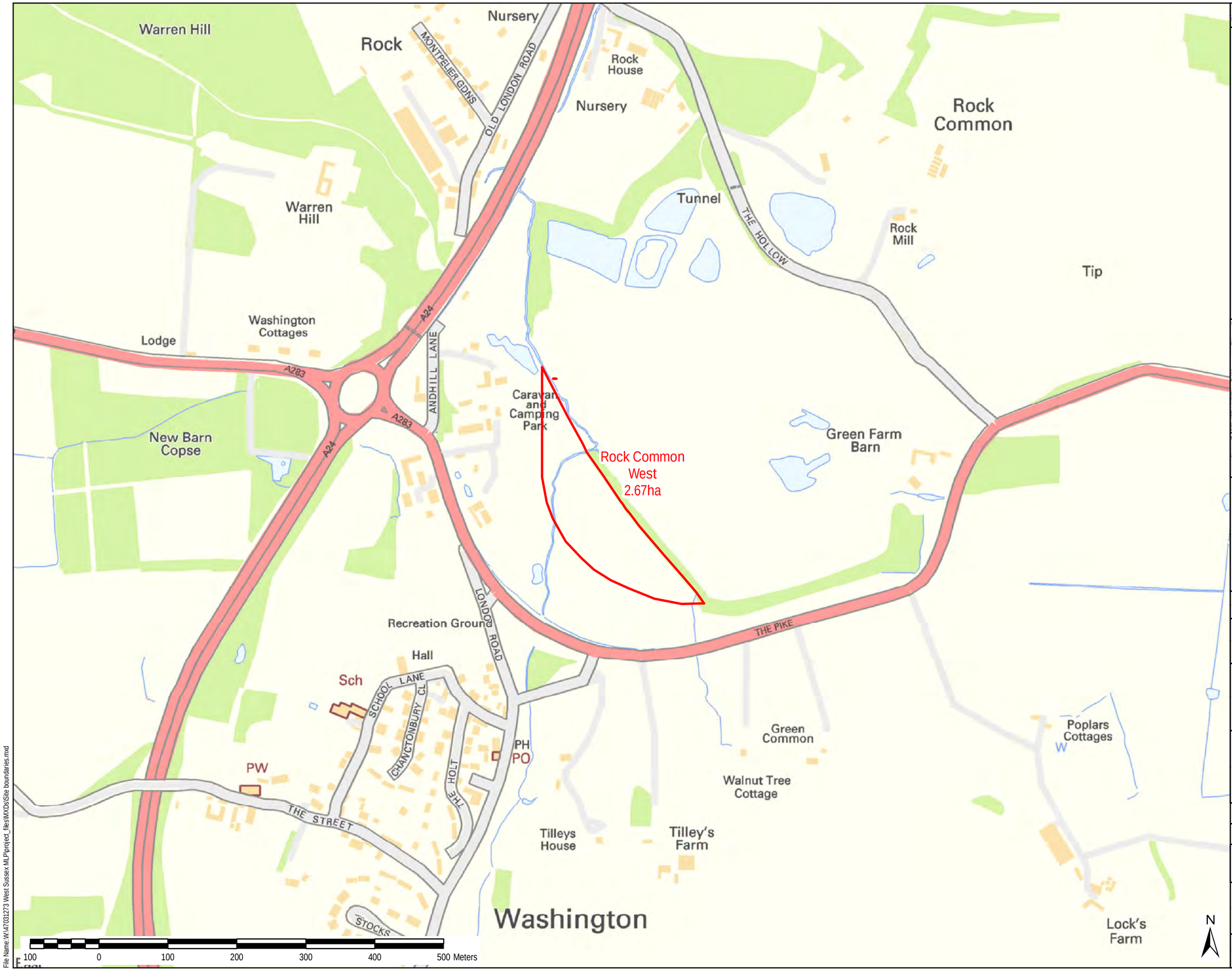

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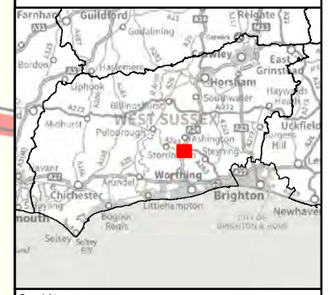

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Project Title: WEST SUSSEX HRA

Drawing Title: ROCK COMMON WEST

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Appendix D. Summary Table

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
14	**Woodmancote**	Potential impact pathways: *Air quality:* (Wealden Heaths Phase II SPA, Woolmer Forest SAC, Butser Hill SAC, Thursley, Ash, Pirbright & Chobham SAC, Thursley, Hankley & Frensham Common SPA) traffic from these sites has potential to pass within 200m of the above mentioned designated sites. *Disturbance of SPA birds:* (Brent geese of the Chichester and Langstone Harbours SPA/Ramsar) Traffic has potential to travel in close proximity to the SPA/Ramsar site that supports a population of Brent geese. However, this land is already subject to considerable vehicle movements and it is	*Air quality*: It is understood that these sites will not be extracted simultaneously, but one at a time. As such it is expected that the AADT will be considerably less than 200hdv per day.	During preparatory work on this plan in 2011, discussions between the Council and Natural England identified that a precautionary approach should be taken and it should not be assumed that there is no likelihood of minerals traffic using the A27 or A3 to transport minerals through Hampshire and Surrey, where these roads pass within 200m of designated sites. However, since that time further clarity has been gained on likely HDV movements. Assuming that movements remain below 200/day Design Manual for Roads and Bridges guidance indicates that air quality effects can be considered neutral and no further assessment would be necessary.	Confirmatory vehicle movement predictions at the time of any planning application
3	**Common Road West**				
4	**Common Road East**				
13	**Slades Field**				
6	**Funtington West**		N/A	NA	NA

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
		unlikely that additional traffic from the working of these minerals sites alone or in combination would significantly alter the disturbance to which the geese are exposed.			
5	**East of West Heath Common**	Potential impact pathways: *Air quality:* (Wealden Heaths Phase II SPA, Woolmer Forest SAC, Butser Hill SAC, Thursley, Ash, Pirbright & Chobham SAC, Thursley, Hankley & Frensham Common SPA) traffic from this site has potential to pass within 200m of the above mentioned designated sites. *Water quality*: (Arun Valley SPA/Ramsar) this site contains and is adjacent to a watercourse that drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar	*Air quality:* It is expected that the AADT will be considerably less than 200hdv per day.	During preparatory work on this plan in 2011, discussions between the Council and Natural England identified that a precautionary approach should be taken and it should not be assumed based on this that there is no likelihood of minerals traffic using the A3 to transport minerals through Hampshire and Surrey, where these roads pass within 200m of designated sites.	Based on current information there is no reason to conclude that this proposed minerals site will have adverse effects on air quality at any European designated site but **transport assessments undertaken for this site should take into account any impacts on Wealden Heaths Phase 2 SPA or Woolmer Forest SAC if there will be a significant increase in vehicle movements (i.e. an increase of over 200 Heavy Duty Vehicles per day) on the A3 within 200m of those European sites**. Such a large increase is considered unlikely.
			Water quality: this site lies almost 25km from the Arun Valley SPA/Ramsar, such that any increase in sediment that might arise from dewatering associated with this minerals site would be	Provided that standard planning conditions are incorporated preventing increased sediment loading in, or pollution, of watercourses from this site there would be no mechanism	NA

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
			subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not. This impact pathway can be screened out.	for an in combination effect.	
10	**Minsted West**	Potential impact pathways: *Water quality:* (Arun Valley SPA/Ramsar) the site lies within 200m of a watercourse that drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar	*Water quality*: this site lies more than 20km from the Arun Valley SPA/Ramsar, such that any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain	Provided that standard planning conditions are incorporated preventing increased sediment loading in, or pollution, of watercourses from this site there would be no mechanism for an in combination effect.	NA

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
			to a European site or not. This impact pathway can be screened out.		
12	**Severals West**	Potential impact pathways: *Water quality:* (Arun Valley SPA/Ramsar) the site includes a watercourse that drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar	*Water quality*: this site lies more than 20km from the Arun Valley SPA/Ramsar, such that any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to	Provided that standard planning conditions are incorporated preventing increased sediment loading in, or pollution, of watercourses from this site there would be no mechanism for an in combination effect.	NA

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
			pollute surface watercourses irrespective of whether they drain to a European site or not. This impact pathway can be screened out.		
8	**Horncroft**	Potential impact pathways: *Bats:* (The Mens SAC) this minerals site lies approximately 3km from Duncton to Bignor Escarpment SAC, 4.9km from The Mens SAC *Water quality:* (Arun Valley SPA/Ramsar) the site includes a watercourse that drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar	*Bats:* due to the distances involved, it is considered that no flightlines from Barbastelle or Bechstein bats from The Mens SAC are present within this site.	NA – no mechanism exists	NA
			Water quality: this site lies more than 6km from the Arun Valley SPA/Ramsar, such that any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not. This impact pathway can be screened out.	Provided that standard planning conditions are incorporated preventing increased sediment loading in, or pollution, of watercourses from this site there would be no mechanism for an in combination effect.	NA

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
2	**Chantry Lane Extension**	Potential impact pathways: *Water quality:* (Arun Valley SPA/Ramsar) a watercourse adjacent to the site drains to the River Rother and ultimately into the Arun Valley SPA/Ramsar	*Water quality*: this site lies approximately 5km from the Arun Valley SPA/Ramsar, such that any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible, particularly since the main channel of the River Arun does not form part of the SPA/Ramsar site. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not. This impact pathway can be screened out.	Provided that standard planning conditions are incorporated preventing increased sediment loading in, or pollution, of watercourses from this site there would be no mechanism for an in combination effect.	NA

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
9	**Land Adjacent to West Hoathly Brickworks**	Potential impact pathways: *Air quality: (*Ashdown Forest SPA/SAC). The site is 1.75km from the SPA/ SAC. It is assumed that site traffic will use the A22 and A275 which bisects this SPA/SAC *Disturbance of SPA birds:* (Ashdown Forest SPA/SAC). Any increases in traffic on the A22 and A275 would have the potential to disturb bird species for which the SPA is designated *Water quality:* (Medway Estuary and Marshes SPA/ Ramsar) This site includes a small waterway. This waterway feeds into a number of tributaries, eventually entering the River Medway which reaches the sea at the SPA/ Ramsar site.	*Air quality and Disturbance of SPA birds:* this site is an extension site. It is considered that the number of vehicle movements associated with the operation of this site will not increase compared to current levels because the allocation of this site is intended to secure its continued operation for a longer time period, rather than to achieve a net per annum increase in mineral extraction. This impact pathway can be screened out.	NA – no mechanism if vehicle movements will not increase	NA
			Water quality: Due to the large distances involved any increase in sediment that might arise from dewatering associated with this minerals site would be subject to such a scale of dilution that its effect on the SPA/Ramsar site would be negligible. Moreover, it is assumed that sediment loading in watercourses near the site will be controlled by conditions since it is an offence to pollute surface watercourses irrespective of whether they drain to a European site or not. This impact pathway can be	Provided that standard planning conditions are incorporated preventing increased sediment loading in, or pollution, of watercourses from this site there would be no mechanism for an in combination effect.	NA

Site number in Appendix C: Figure 1	Site name	Screened in/ out (presence of impact pathways	Appropriate Assessment	In combination impacts	Work required to screen out impact pathway.
			screened out.		
1	**Brick Kiln Farm**	This site lies approximately 4km from Solent Maritime SAC and Chichester and Langstone Harbours SPA/Ramsar, and Kingley Vale SAC. There are no impact pathways present.	NA	NA	NA
7	**Ham Farm**[25]	No European site within 10km of this site. There are no impact pathways present.	NA	NA	NA
11	**Rock Common**	The Arun Valley SPA/ SAC/ Ramsar site is 7.7km from this site. There are no impact pathways present.	NA	NA	NA
15	**Buncton Manor Farm**	The Arun Valley SPA/ SAC/ Ramsar site is 8.1km from this site. There are no impact pathways present.	NA	NA	NA

[25] Following the Regulation 18 consultation, the site boundary for Ham Farm has changed. The site is now 9.2ha is size (when assessed in April 2016 the site was 16ha in size). The northern boundary has moved southwards and a small parcel of land towards the west has been incorporated. The mapping in Appendix C, Figure 10 has not been updated accordingly.

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