

# INTRODUCTION

**Cuadrilla is an independent British energy company based at Lichfield in Staffordshire.**



We are pursuing a gas and oil exploration programme in selected European onshore geological basins, including shale gas basins. Our most advanced exploration activities are located in the Bowland Basin in Lancashire.

Cuadrilla was founded by geologists and engineers in 2007, and geology remains at the heart of what we do: understanding the rocks that lie beneath us, and the national gas and oil resources that they hold. We remain a geology-oriented business, focused on exploring the quality of hydrocarbon-bearing formations.

Our work entails the licensing from the Government of areas where we believe that there are significant untapped resources of oil and gas; then exploration to prove recoverable reserves, the amount of oil and gas that can be produced commercially. Our role is also to demonstrate to regulators and local communities that natural resources can be explored for and, if discovered in commercial quantities, developed safely and sensibly.

Cuadrilla is committed to the highest standards of health and safety management and has just been awarded a Gold Award for Occupational Health and Safety by the Royal Society for the Prevention of Accidents (RoSPA).

The UK has a growing dependency on imported hydrocarbons (natural gas and oil) to meet its heating, electricity and industrial needs. Our exploration programme aims to assess the potential untapped domestic natural resources.

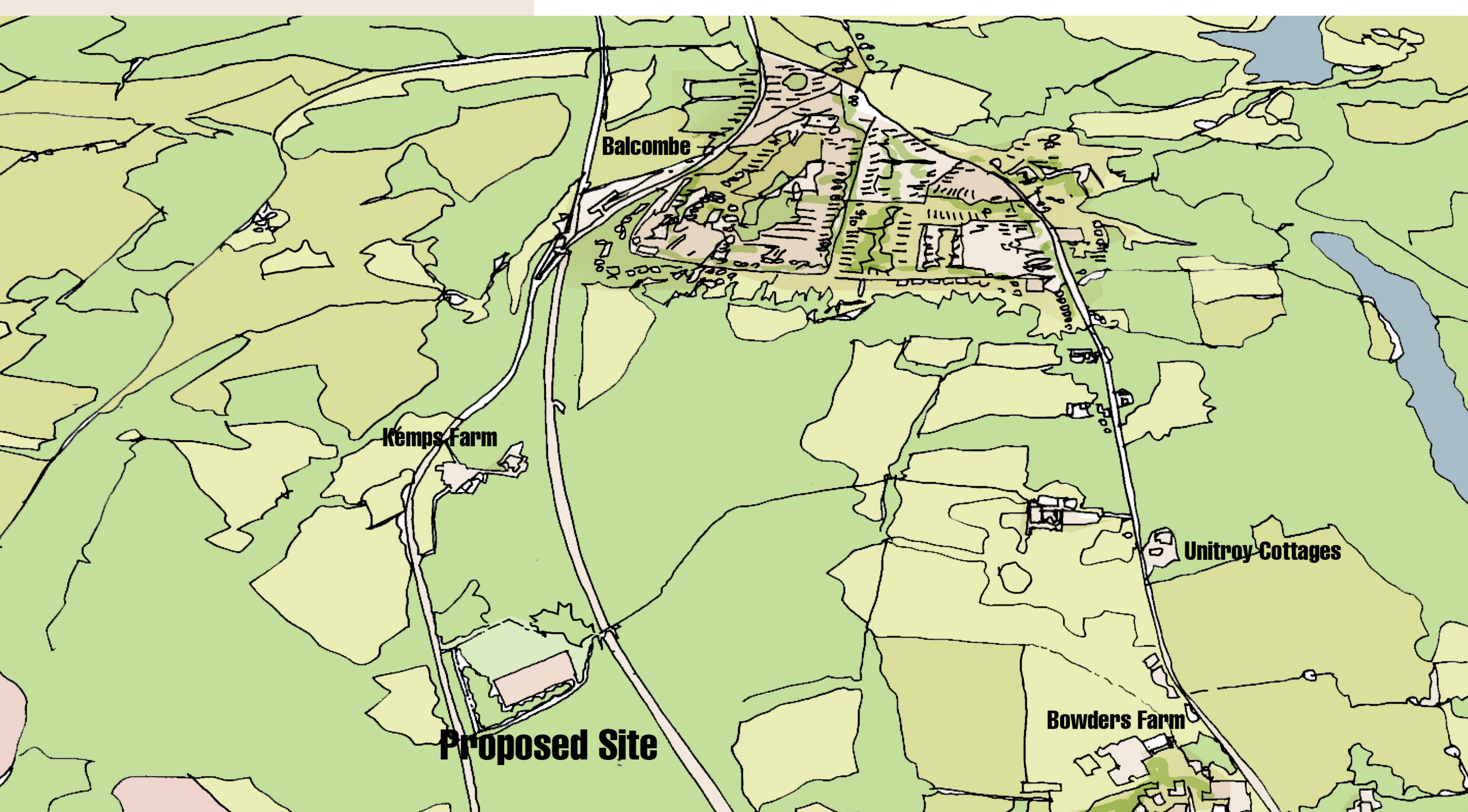
Cuadrilla believes that it is vital to work together with the communities where we are located and is committed to minimising any disruption to the environment and local people whilst conducting our appraisal operations.





# BACKGROUND

In 2008, the Department for Energy & Climate Change (DECC) awarded a Petroleum Exploration & Development Licence to Bolney Resources Ltd (Bolney) to explore for oil and gas within Petroleum Exploration and Development Licence (PEDL) 244, located in West Sussex within what is known by geologists as the central Weald Basin.



Site location

In February 2009, Bolney was purchased by Cuadrilla Resources Ltd and our partner company AJ Lucas.

Cuadrilla was granted planning permission by West Sussex County Council to undertake further exploration work at the Balcombe well location in 2010. Geological studies and geophysical data indicate that there may be significant untapped reserves of hydrocarbons, most likely oil, in this area. The results of test drilling will help us to assess how much oil might be present and whether or not it would be viable to extract on a commercial scale.

The area has a history of oil exploration and production. Oil was first discovered in Kimmeridge in Dorset in 1959, which is the oldest continually producing oilfield in southern England. Oil was also discovered at Wyth Farm in the Bridport Sands in 1973. This site is still producing oil, and is one of the largest onshore oilfields in northwest Europe.

In 1986, energy company Conoco drilled an exploration well on the same site that Cuadrilla will use, situated half a mile from Balcombe village. According to DECC's records, more than 50 oil and gas wells have already been drilled in the county.



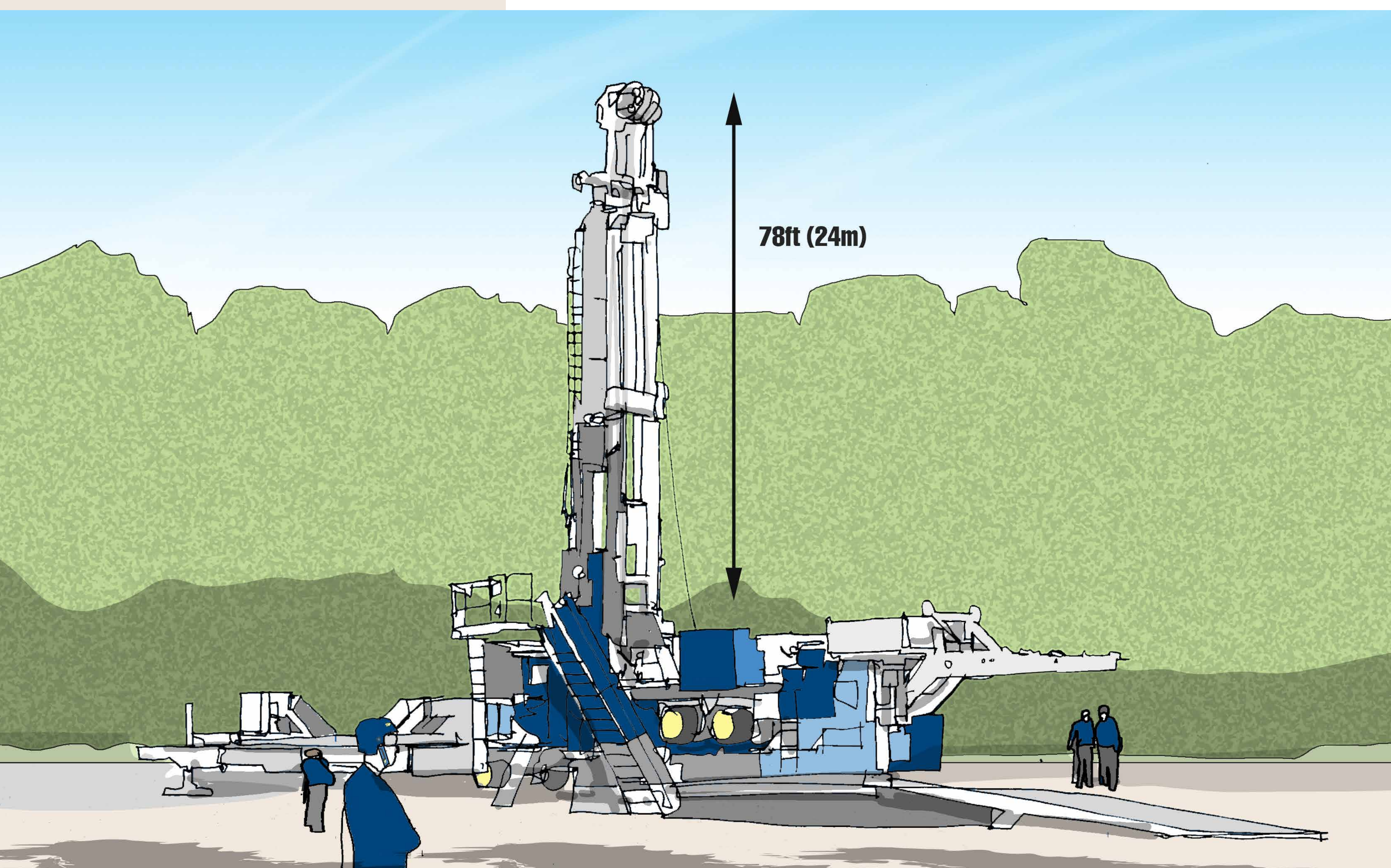


# CUADRILLA'S EXPLORATION PLANS

Exploration wells are the primary way in which we gather data on the sub-surface rock and extend our knowledge of oil and gas resources. Cuadrilla plans to take samples of the underground rock by drilling a vertical well.

Rock cutting samples will be taken to the surface and examined to confirm the rock type being drilled through and to evaluate the presence of hydrocarbons. One of the objectives of the work is to test if oil production is feasible.

A rig of under 80 feet in height will be used and will drill to a total depth of about 3,000 feet. Depending on the results of the vertical section of the well, we may drill a further horizontal leg of approximately 2,500 feet. Hydraulic fracturing, or 'fracing' as it is known, will not be undertaken in either the vertical or horizontal sections of the well.



Proposed drill rig

Cuadrilla operates within the strict UK regulatory framework, which governs all onshore and offshore hydrocarbon exploration. If hydrocarbons are discovered as part of this exploration phase, we will be testing the potential flow for a brief period following which the well will be capped. By the end of September, we plan to have completed our approved operations and to have removed all equipment from the site.



# ENVIRONMENT

As with all other oil and gas operators in the UK, Cuadrilla's operations will be stringently regulated by the Environment Agency (EA), the Health and Safety Executive (HSE), the County Council and the Department for Energy and Climate Change (DECC).

## Water

Throughout Cuadrilla's operations, robust safety measures are put in place to protect the environment.

Our wells are all designed with multiple layers of steel casing and cement to provide barriers between oil or gas flowing into and up the well and the surrounding underground rock. Here, a surface casing, intermediate casing and production casing will be used. Well designs are inspected by an independent well examiner and sent to the HSE for review, as required by legislation. These casings isolate the wellbore from the surrounding rock formations and allow reservoir fluids to flow to the surface and prevent any leakage path from the reservoir to any aquifer or to the surface.



Cuadrilla will be sampling surface water at five locations surrounding the site and will have them independently tested at a UKAS (United Kingdom Accreditation Service) laboratory. The results from the sampling will be shared with the Environmental Agency and benchmarked against environmental water quality levels.





# ENVIRONMENT

## Drilling Mud

When Cuadrilla drills a well, it circulates a water based solution called ‘drilling mud’ as per the planning permission from West Sussex County Council.



This has three main functions. First, to maintain hydrostatic pressure in the wellbore, which will prevent any possible influx of fluid to the surface such as oil, gas or water. Second, to stabilise and seal the walls of the borehole. Third, to cool and lubricate the bit assembly of the drill. This is common practice for all oil and gas drilling activities, as well as geothermal and mineral exploration.

Cuadrilla will disclose all drilling mud formulations to the Environment Agency as part of the environmental method statement for the work, and this method statement will be made available to the public. Drilling muds for drilling through the aquifer are carefully formulated to be non-hazardous to groundwater, even though at this location the aquifer is not used for groundwater extraction. After drilling through the aquifer it is sealed off by the steel casing cemented into the hole, allowing the well to progress deeper. The surface handling systems for drilling mud and drilled cuttings consist of tanks which are only above ground, and no mud or cuttings are discharged at the well site into the local environment.

If a horizontal borehole is drilled it will be necessary to ensure its walls are clean. To do this a pipe will be run inside the well casing of the horizontal section and highly diluted hydrochloric acid will be used to remove any build-up of drill mud in order to expose a clean rock face to the well bore. The hydrochloric acid will be diluted to a maximum concentration of 10%, a level that is non-hazardous to the environment.

Any water on site will be stored in steel tanks before and after it is used. Any water circulated around the well is also stored in steel tanks prior to its removal to licensed disposal sites. Water will not be stored in open pits or ponds.

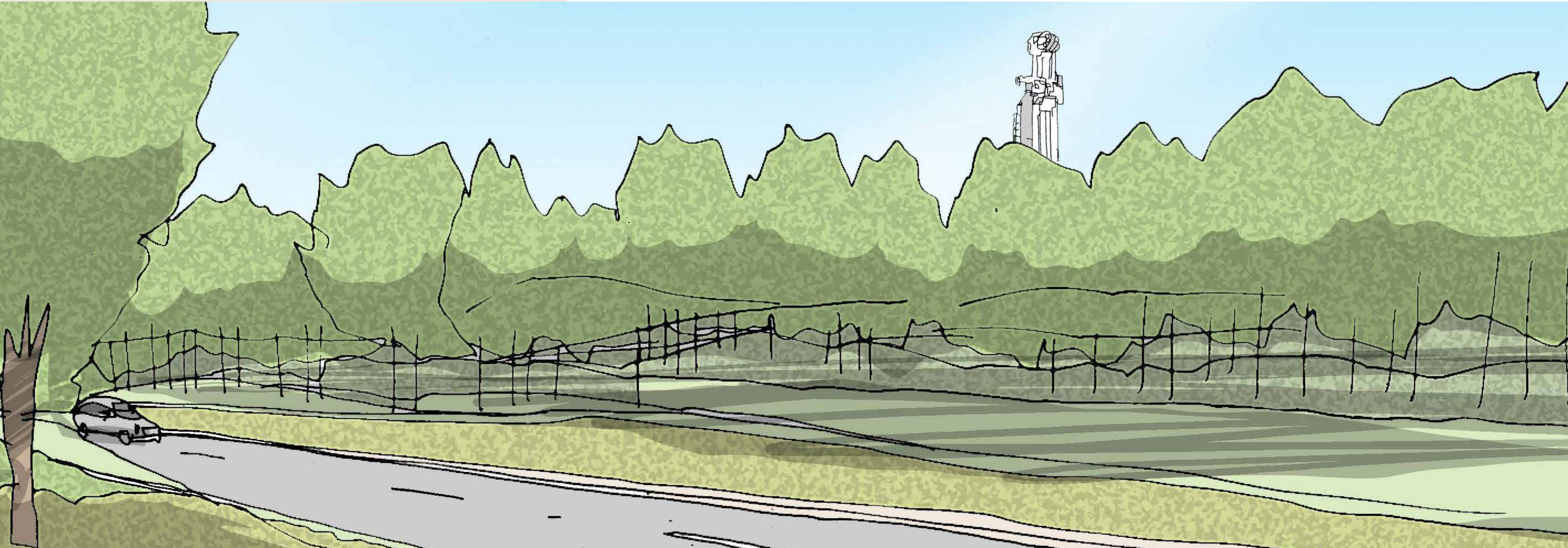




# ENVIRONMENT

## Visual Impact

The setting of Lower Stumble and existing woodland will help to naturally screen the well site from the surrounding area. Depending on your vantage point, you may be able to see it but the impact will be limited and temporary. Our selected drilling rig is under 80 feet (24 metres) tall and will be on site for no more than four months.

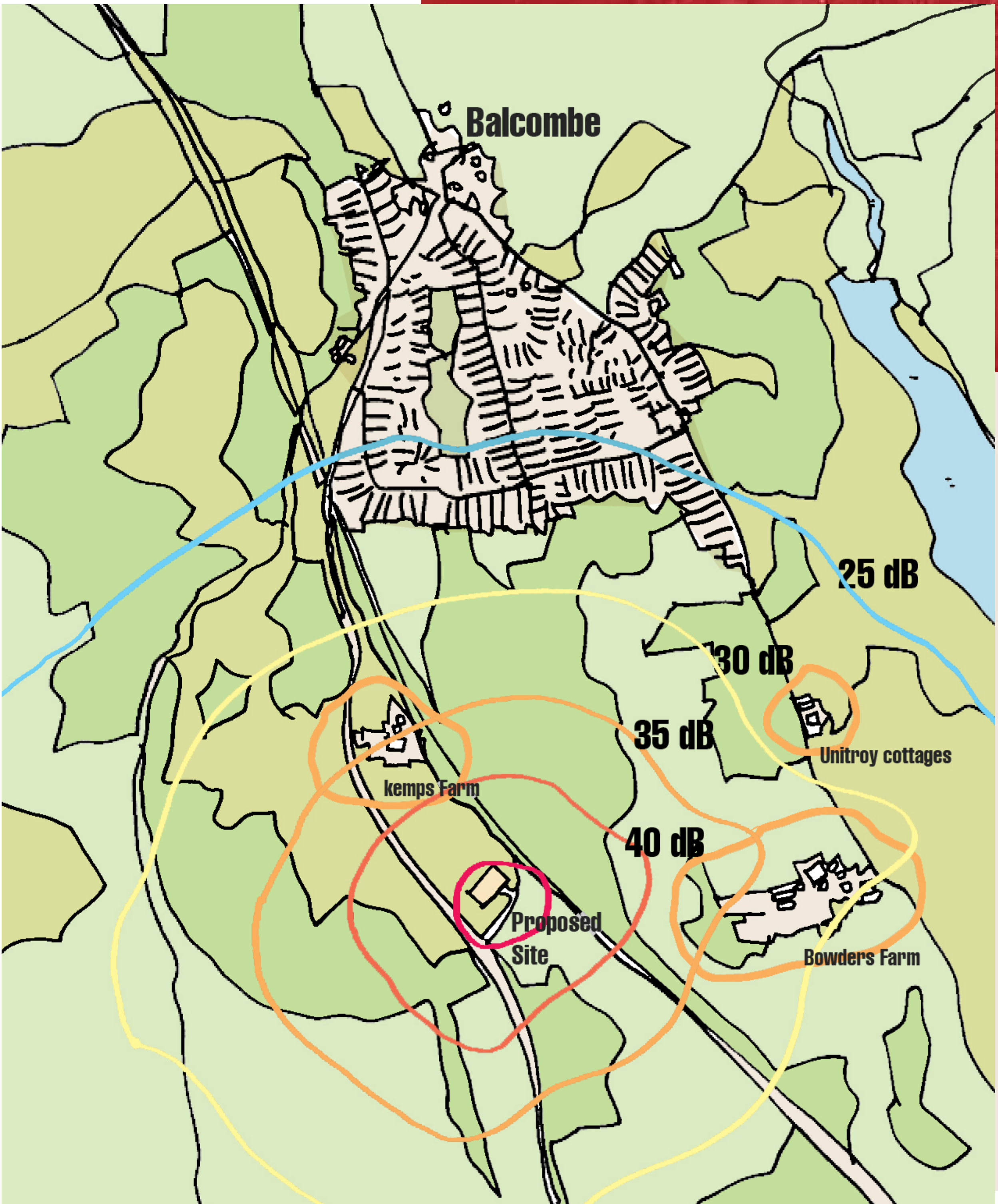


View of drilling rig from London Road

## Noise and Light

Prior to the commencement of exploration, Cuadrilla undertakes careful assessments of the impact of any increase to levels of light and noise that our activities may cause.

We use computer modelling to ensure that we are compliant with UK planning guidance covering noise emissions, which set a level that must not exceed 55 decibels between 7.30am and 6.30pm Monday to Friday, 8am and 1pm on Saturdays, and 42 decibels at all other times. The below table provides a comparison of the potential noise from drilling operations at Lower Stumble as experienced at the nearest residential properties to everyday noise situations. The drilling rig, when operational, will run for 24 hours a day but at all times will conform to mandated noise levels.



Noise contours and range

## Common Noise Comparisons

Noise source situation	Location indoors/outdoors	Typical noise range dB (A)
Live music or disco music	indoors	90-110
Noise at work action levels for advised hearing protection	indoors	80-85
Construction site	outside houses	60-65
Normal conversation	indoors/outdoors	60
General ambient level in an urban area	outdoors	50-60
General ambient level in a rural area	outdoors	30-35
Planning consent noise limit for drilling operations	outdoors (indoors)	42 (32)
Living-rooms (BS5228 reasonable standard)	indoors	40

Noise emission from drilling operations are relatively modest on the site and lower than most single items of construction equipment. At distances beyond 400m the noise is usually below background level (such as from distant road traffic) and as such it cannot be directly measured.

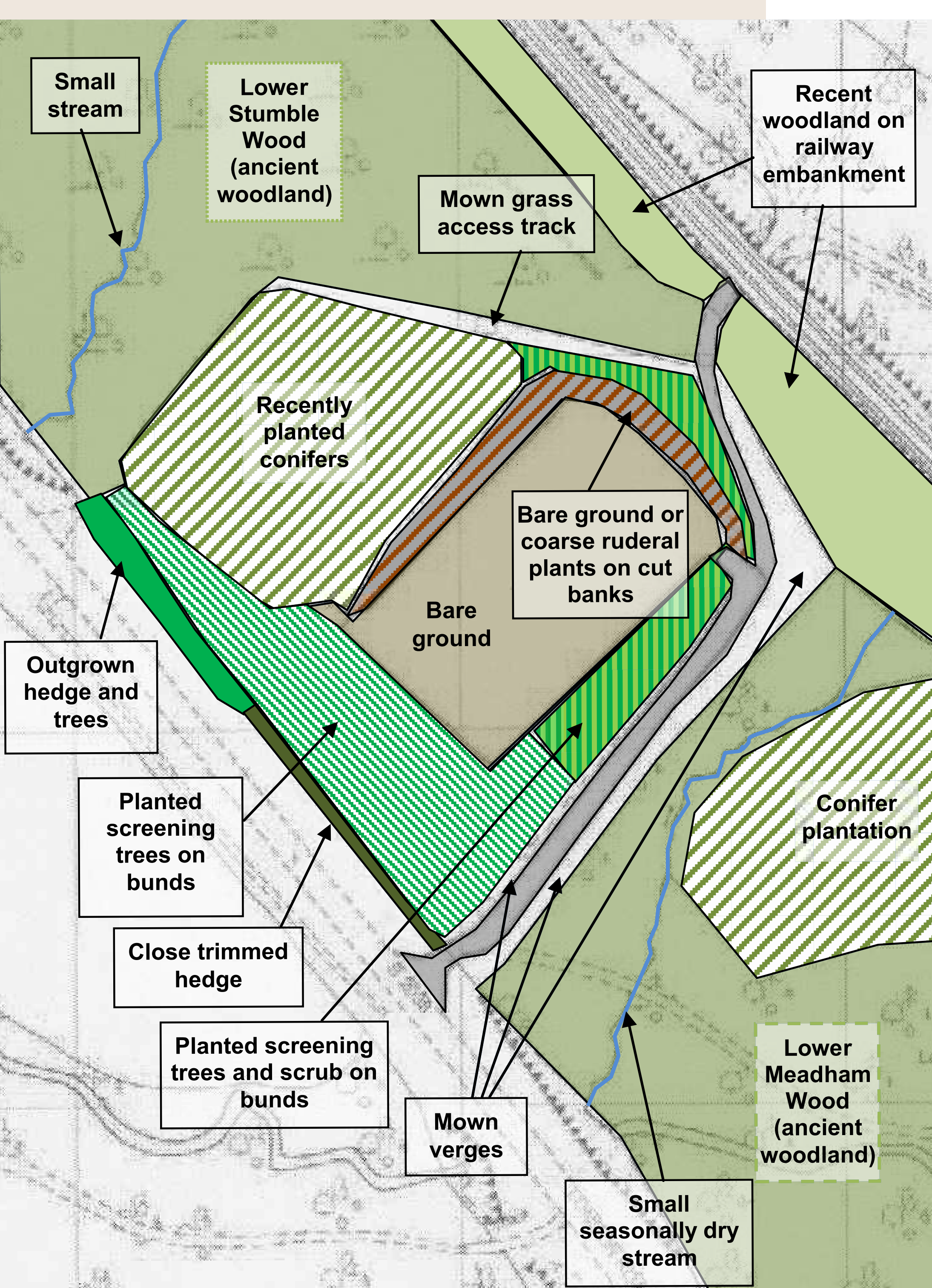
Low level lighting is provided to ensure that staff can move around the site safely during hours of darkness. In addition, lights are designed to have minimal upward light, thereby reducing ‘sky glare’, and minimising any potential impacts on residents and sensitive wildlife.



# ENVIRONMENT

## Transport and Access

Cuadrilla has undertaken a full traffic and transport assessment of the local area. During delivery and removal of the rig, each taking about one week, there will be a temporary increase in traffic. This increase will represent, on average, two lorry (HGV) movements per hour. To limit inconvenience for local people, we will avoid school drop-off and pick-up hours. During drilling, there will be around two HGV movements per day. The traffic and transport assessment demonstrates that the existing road network has sufficient capacity to accommodate this temporary and limited increase in traffic.



Cuadrilla would gain access to its site, just south of Balcombe, via an existing access route, which forks off from the B2036 (London Road) at Lower Stumble Wood. Delivery times have been agreed with West Sussex County Council and we will be liaising regularly with West Sussex County Council Highways Department and the local police throughout the drilling operation.

### Habitat Survey

The habitat survey incorporates a site walkover survey by an independent ecologist. The survey identified a number of common wildlife habitats surrounding the site.

## Ecology

Cuadrilla has secured planning approval from West Sussex County Council and we are committed to comply with all environmental protection regulations.

Our experts have carried out a series of baseline environmental surveys, including ecology, surface water and groundwater. The latest report has identified no adverse ecological impact from our proposed activities.





# NEXT STEPS

Having completed this exploration work, Cuadrilla will analyse the data and carry out a series of technical and environmental assessments. There are three potential outcomes:

1. If there is negligible flow of hydrocarbons, the well will be plugged with cement and left in a safe way. This will be done in accordance with the approved UK procedures and regulations. The rig will then be disassembled and removed from the site before the end of September 2013.
2. If there is sufficient flow, an assessment would be made about the hydrocarbons present. Further exploration wells might be required at other locations to assess the amount of oil that might be present in, and recovered, from the rock. The technique known as hydraulic fracturing (or fracing) would not be required as other oil production enhancement techniques will suffice.
3. If there is insufficient natural flow, consideration would be given to whether or not the reservoir rocks could be hydraulically fractured. This technique involves stimulating the flow of hydrocarbons by pumping water, sand and chemicals approved by the Environment Agency into the well at a high pressure. Fracturing will not take place during our current operation.

Cuadrilla currently has a temporary planning permission granted by West Sussex County Council. If we did wish to conduct further exploration work, we would need to submit plans to DECC and apply for another planning permission from West Sussex County Council. This would include full consultation with the local community. In the event of an application to hydraulically fracture a well, Cuadrilla would carry out a full Environmental Impact Assessment beforehand as part of the planning application.

Cuadrilla places great emphasis on keeping local communities fully informed about our operations and we will ensure that there are plenty of opportunities for site visits and interaction with our experienced team.

We have set up a dedicated community information line – 0800 008 6766 and will keep our website [www.cuadrillaresources.com/balcombe](http://www.cuadrillaresources.com/balcombe) updated with all the latest news. Alternatively you can email [enquiries@cuadrillaresources.com](mailto:enquiries@cuadrillaresources.com)

