Serial	Element	Action	Response
01	**Land Drainage**	Provide supporting evidence that potential land drains beneath the development have been considered and any mitigation measures proposed. **Reason:** Land drains including disconnected drains can represent rapid preferential pathways for contamination to migrate away from the point of origin. Confidence is required that, if present, these have been considered in the design of the site and suitable mitigation measures are in place.	**Site Enabling Works (Land Drainage)** Prior to the commencement of the development, the Europa Construction Manager will liaise with the landowner or his farm manager in order to determine and confirm the presence and locations of the existing buried land drainage system including outfall locations that lie within the proposed development areas. Due to the existing topography of the development areas and existing soils, it is unlikely that land drains are present within the proposed development areas; however, in the event that drains are present the following actions will be undertaken. 1. The Europa Construction Manager in conjunction with the landowner or farm manager will approach an approved land drainage consultant to review and determine a proposed land drainage cut off and diversion scheme that will be implemented and undertaken prior to commencement of the bulk earthworks activities to develop the proposed wellsite area. 2. A schematic land drainage drawing will be produced by the land drainage consultant and a new drainage system will be installed around the perimeter of the proposed development areas in order to divert surface waters around the proposed development with existing lateral drains sealed into the new system. 3. Due to the existing field topography, during the wellsite construction phase and in order to construct a level working platform, bulk earthworks will need to be undertaken with a degree of cut and fill works using the subsoil materials. 4. The current land topography has highlighted that upon completion of the topsoil strip there is a requirement to cut approximately 3m depth from the north of the site with the materials placed to the south of the site with the materials levelled and compacted forming a level working platform. 5. Whilst the new working platform is designed to have an impermeable membrane installed consisting of a fully welded 2mm thickness HDPE liner providing tertiary containment protecting the ground beneath the site; prior to undertaking the bulk earthwork's any existing decommissioned land drains within the proposed development areas will be removed in full thus removing any future pathway with any trenches backfilled and compacted accordingly. 6. In the event land drains are present, installing a new land drainage diversion scheme around the perimeter of the proposed development site will ensure that any surrounding surface waters migrate to the existing field drainage systems without passing through the proposed development site in an appropriate manner and removal of the older redundant drainage system beneath the proposed wellsite areas will ensure any future pathway is prevented.
02	**Cellar Construction**	Provide details on the construction of the well cellar. **Reason:** No details on the construction of the well cellar have been provided as part of the application. This information is required by gov.uk guidance and should include both the construction method and how it is adequately sealed. The Environment Agency notes that the application does state the integrity of the well cellar will be tested.	**Site Enabling Works (Drilling Cellar Construction)** Within the centre of the proposed wellsite a drilling cellar will be constructed. The drilling cellar forms a containment area from which the proposed borehole can be drilled, whilst also housing the wellhead upon completion of the drilling operations. The drilling cellar is to be constructed using precast concrete chamber rings that will be sunk into the ground with sealed floor to maintain control of any fluids arising from the drilling operations. An initial section of large diameter steel casing will be built into the base of the well cellar to provide a starting point for the drilling operations. The chamber rings will be approximately 2,400mm internal diameter and the proposed internal cellar depth will be approximately 2,750mm. Each concrete chamber ring shall be primed and sealed using a bituminous Tockstrip sealant and upon completion of the installation shall receive a minimum 200mm external concrete surround ensuring the cellar is fully sealed. The impermeable membrane underlying the main wellsite area is incorporated into the drilling cellar construction by mechanical fixing and sealing in order to maintain the integrity of the proposed wellsite. A reinforced concrete slab (size to be confirmed) is to be formed and constructed around the surface of the drilling cellar. This element will be incorporated as part of the overall wellsite structural design and ensure a level working platform for the sub-base of the proposed drilling rig as well as providing additional surface ground loading support and site cleanliness. Once the well cellar has been constructed, an integrity test will be carried out to confirm that it provides suitable and effective containment. The integrity test consists of filling the cellar with water and monitoring water loss over a period of 24 hours. The water level is marked on the side wall of the cellar using marker dye to provide a reference point. The cellar is then covered to avoid both water fill (precipitation) and water loss through evaporation. If no water loss within the drilling cellar is observed the test is determined as being successful. Should, however, the test identify that the cellar does not have integrity, the leak point shall be identified, repaired and the integrity test repeated. Immediately following installation of the surface conductor casing, the cellar integrity test will be repeated. A copy of a typical drilling cellar and pad construction (**02 - ZG-GEN-CON-DC-01 Typical Drilling Cellar and Pad Construction Details**) is included within the response.

Serial	Element	Action	Response
03	**Chemical Inventory**	Provide supporting evidence demonstrating that the following additives contain only non-hazardous ingredients: Provide details on the proprietary substance in: • NUT PLUG • Soltex Provide JAGDAG assessment for: • ECF-1882 • FORMABLOK AS • Glydril MC (MIL091) • Safe-Cor • Safe-Scav-NA • ULTRAFREE • SAFE-SURF EU SAPP, and FORM-A-BLOK and SAFE-SCAV HSN previously agreed at Glentworth **Advisory:** We note the MSDS has changed for SOBOS GOLD 08. We are seeking clarification whether the ingredient which has changed is also non-hazardous. **Reason:** The application states that all substances are non-hazardous however the additives listed above are not supported by sufficient evidence to reach this conclusion. We note that several parameters have previously been recorded as acceptable however insufficient information is contained in this application to reach the same conclusion. Please note that the JAGDAG Assessment provided for the Proppant Squeeze is currently being reviewed by the Environment Agency's JAGDAG team and is not included in the assessment above.	1. **NUT PLUG** – Supporting evidence will be supplied directly to the Geoscience Operations Team by the Chemical Manufacturer / Provider. 2. **Soltex** – A copy of the latest Soltex SDS (**03A – SDS Soltex E 230301**) has been provided by the Chemical Manufacturer / Provider and is included within the response. The SDS identifies within Section 1.1 the Chemical Name and CAS No: • **Chemical Name: Asphalt, Sulfonated, Sodium Salt** • **CAS No: 68201-32-1**. Section 3 of the SDS identifies that the **Soltex** product '**Contains no hazardous ingredients according to GHS**.' A copy of the latest **CEFAS Certification** (**03B – CEFAS – Soltex E Version 8 Expires 271603**) has been provided by the Chemical Manufacturer / Provider and is included within the response. 3. **JAGDAG Assessment** – A JAGDAG Assessment has been undertaken by the Chemical Manufacturer / Provider for the following Chemical Products: • **ECF-1882** • **FORMABLOK AS** • **Glydril MC (MIL091)** • **Safe-Cor** • **Safe-Scav-NA** • **ULTRAFREE NS** – This replaces ULTRAFREE which is not Reach registered anymore for use in the UK • **SAFE-SURF EU** The JAGDAG Assessment will be supplied directly to the Geoscience Operations Team by the Chemical Manufacturer / Provider. 4. **SOBO S GOLD 08** – A copy of the latest **CEFAS Certification** (**03C – CEFAS – SOBO S GOLD Version 14 Expires 260703**) has been provided by the Chemical Manufacturer / Provider and is included within the response. 5. **Ultrafree NS –** The Chemical Manufacturer / Provider has identified that the Ultrafree Product is no longer used and has been replaced by Ultrafree NS. A copy of the Ultrafree NS SDS (03D - SDS - ULTRAFREE NS) has been provided by the Chemical Manufacturer / Provider and is included within the response. 6. Chemical Inventory – A revised Chemical Inventory (**09 - Chemical Inventory 250912**) has been provided and is included within the response. **For clarity**, the revised sections of the Chemical Inventory have been highlighted in **BLUE** for ease of reference. All other text / information has not been amended from the Chemical Invention submitted with the permit application.
04	**Proppant Squeeze**	Provide a vertical image/section plan indicating the extent of the proppant squeeze. **Reason:** The application refers to a various primary and secondary targets which are offset in the vertical axis. It is unclear which geological unit(s) the proppant will be undertaken in and how this relates to the estimated height of 40-80m. For example, the Kirkham Abbey Formation is described as a secondary target however there is >40m TVDS difference between this formation and the Primary Targets in the Carboniferous sandstones. The plan should present, but not be limited to, the formations above and below the targeted horizons.	1. See response detailed within **04 – Europa Oil & Gas – Cloughton 2 – Schedule 5 No.1 Q4 Response 250905.**

Serial	Element	Action	Response
05	**Proppant Squeeze**	Provide a description of the methodology proposed to be used to assess, and ensure, the proppant squeeze is maintained within the proposed mining waste facility. **Reason:** The application lacks sufficient detail about the chosen injection pressure and any modelling used to support the estimate of the proposed mining waste facility. More information is needed to provide confidence the proppant squeeze will be restricted to the mining waste facility and that fluids won't spread to adjacent formations.	1. See response detailed within: a. **05 – Europa Oil & Gas – Cloughton 2 – Schedule 5 No.1 Q5 Response 250905; and** **b. 5A – Clean Cloughton 1 Initial Stimulation Modelling and Design.**
06	**Proppant Squeeze**	Provide an assessment of the distances to geological faults relative to the wellbore and the proposed mining waste facility. **Reason:** Faults have the potential to act as conduits for groundwater flow and additional information is required to understand the risks that the proposed proppant squeeze may have to groundwater in the geological faults in the sites geological stratigraphic sequence. Visual presentation of the distances from the wellbore of any faults would provide a greater understanding of these potential risks.	1. See response detailed within **06 – Europa Oil & Gas – Cloughton 2 – Schedule 5 No.1 Q6 Response 250905.**
07	**Proppant Squeeze**	Confirm metrics for the stimulation activity, include supporting models, assumptions and documentation. Provide justification for the stimulation pressure. **Reason:** A large range (40-80m) is presented for the height/zone of the stimulation activity and similarly a large range (100-200m) is presented for the radius/diameter of penetration. The situation described in the previous sentence lends to differing sizes calculated for the mining waste facility. Greater confidence is needed to support the stimulation pressure outlined, than is provided in the application.	1. See response detailed within: a. **07 – Europa Oil & Gas – Cloughton 2 – Schedule 5 No.1 Q7 Response 250905; and** **b. 5A – Clean Cloughton 1 Initial Stimulation Modelling and Design.**
08	**Air Quality Impact Assessment**	Provide the model input files used for the predictions listed in the Air Quality Assessment (AQA). **Reason:** We require the model input files to check the inputs used by the consultant, in accordance with our guidance (Environmental permitting: air dispersion modelling reports - GOV.UK, see "Include input files and input parameters").	1. The model input files are provided within: **a. 08A – BUR WC 2019** **b. 08B – BUR WC 2019** **c. 08C – BUR WC 2022** **d. 08D – BUR WC 2022** **e. 08E – Receptors**
09	**Air Quality Impact Assessment**	**Provide:** a) Actual oxygen (O2) and moisture (H2O) levels for all sources. b) Reference conditions for temperature, O2 and H2O that were used to calculate your emission rates, for example, "273K, 101.3 kPa, dry gas and 5% O2". **Reason:** These parameters are required to demonstrate that the emissions used in the model are a valid representation of the operational scenarios being modelled in accordance with our Air Dispersion Modelling Reports guidance (linked previously, see "Explain emission parameters").	1. See response detailed within **09 – LSW240750-AD1 Europa Oil and Gas Limited, Cloughton Appraisal Well Site, Schedule 5 points 9 to 11, Issue 1.**

Serial	Element	Action	Response
10	**Air Quality Impact Assessment**	Provide volumetric flow rates for all sources: a) Volumetric flow rate at actual conditions (m^3/s) b) Volumetric flow rate at reference conditions (Nm^3/s) **Reason:** The consultant has not provided the volumetric flow rates at actual or reference conditions for any of the sources in their AQA report. Providing these is required as per our Air Dispersion Modelling Reports guidance (linked previously, see "Explain emission parameters").	1. See response detailed within **09 – LSW240750-AD1 Europa Oil and Gas Limited, Cloughton Appraisal Well Site, Schedule 5 points 9 to 11, Issue 1.**
11	**Air Quality Impact Assessment**	Provide emission concentrations (in mg/Nm^3) for all modelled pollutants from all sources, and/or an explanation of how the modelled emission rates were calculated or derived. **Reasons:** • We require the consultant to provide either the emission concentrations used to calculate the modelled emission rates and/or an explanation of how the modelled emission rates were calculated, in accordance with our Air Dispersion Modelling Reports guidance (linked previously, see "Explain emission parameters") – "You must explain how you have worked out the emission rates used in your model. You need to demonstrate that the emissions are appropriate to the assessment purpose". • Providing datasheets for the modelled sources may be useful in supporting the consultant's calculations or explanations.	1. See response detailed within **09 – LSW240750-AD1 Europa Oil and Gas Limited, Cloughton Appraisal Well Site, Schedule 5 points 9 to 11, Issue 1.**
12	**Air Quality Impact Assessment**	Provide an assessment of impacts at all local nature sites within 2 km of the modelled sources, including: a) Scarborough to Whitby Disused Railway Local Wildlife Site (LWS) b) Goose Dale & Quarry Banks LWS c) Cloughton Beck Marsh LWS **Reasons:** • Our checks indicate that the consultant has not assessed impacts at Goose Dale & Quarry Banks LWS or Cloughton Beck Marsh LWS (within 2 km of the source locations) in their AQA report. Assessment of impacts at all local nature sites (including LWS) within 2 km of the source locations is required as per our Air emissions risk assessment for your environmental permit - GOV.UK guidance (see "Screening for protected conservation areas"). • The consultant's modelled receptor location for Scarborough to Whitby Disused Railway LWS does not fall within the boundary of this LWS.	1. See response detailed within **10 – LSW240750-AD2 Europa Oil and Gas Limited, Cloughton Appraisal Well Site, Schedule 5 point 12, Issue 1.**