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Date: 20th June 2024

Our Ref: *WR7640/14/01.R0*
Your Ref: *EPR/CP3994ZR/V006*

Dear Tamara,

ENVIRONMENTAL PERMIT VARIATION APPLICATION - SCHEDULE 5 NOTICE SKELBROOKE QUARRY EXTENSION AREA SKELBROOKE, DONCASTER, SOUTH YORKSHIRE

Thank you for the Schedule 5 request for information of 25th April 2024 to support the variation of an Environmental Permit for Skelbrooke quarry extension area. Responses to each of your information requests are outlined below in blue text. Revisions to the supporting application documents updated in response to this Schedule 5 request are highlighted through out the documents.

1.0 Site Hydraulics and Hydrogeological Setting

1.1 Long term groundwater levels:

- Confirm whether groundwater levels will be managed in the long term;
- Confirm the anticipated groundwater rebound level is following suspension of groundwater management;
- Confirm SK03 is outside of the influence of the dewatering of the quarry void.

Reason: The elevation of the long term groundwater table is fundamental to the assessment of the risks posed by the site to the water environment. Information presented for groundwater management (supporting statement) states, "there is no requirement for groundwater management aside from continued pumping within the parameters of the current discharge

consent to prevent overspill and potential localised flooding." This implies groundwater management will continue ad infinitum. It is unclear what assessments have been undertaken to continue the management of groundwater following infilling of the void, what assessments of the quality of that groundwater will be and how this relates to the regulation of the current discharge consent.

If in the long term groundwater is not proposed to be managed, further information is required with respect to the long term groundwater level. The Application (Supporting Statement and HRA) indicate that this is based on the water levels recorded in SK03. The appropriateness of this approach to the establishment of the long term groundwater rebound level is queried when submitted information also suggests that the water levels within SK03 may be influenced by the managed water levels within the quarry void and therefore not reflective of natural conditions. The information includes:

- *WRPAPP3 Pumping Estimates: Pumping volumes suggest SK03 is within the radius of influence of the drawdown to the void,*
- *Groundwater contours presented on Figure HRA1 imply SK03 lies within the cone of depression around the flooded void,*
- *Significant/ unexpectedly steep hydraulic gradient between SK04 and SK02 presented on Figure HRA1 are unreflective of the site specific permeability quoted as 41m/d.*
- *A spring is shown on OS map in adjacent field (312m NE at approximately 24 mAOD) which if using the reported hydraulic gradient 0.03 (AppHRA3-NE Sidewall Dilution Calculations) would suggest a rebound level of circa 33mAOD, however it is not considered that 0.03 is reflective of a natural groundwater gradient and that this should be reviewed as part of the response.*

Therefore, in order to progress the application, we require a detailed evaluation of the groundwater levels following suspension of management control (pumping from both the flooded void and any abstraction from the back water drains) such that the level would realistically represent the likely natural groundwater conditions.

Furthermore, due consideration should be given to the effects of climate change on long term groundwater levels. This information is required to ensure that the wastes placed above the water table remain above the water table, in the short medium and long term to enable compliance with Schedule 22 to EPR 2016.

Response

There are no long-term proposals to manage groundwater levels within the quarry void. Restoration levels at the edges of the void will extend up to that of surrounding ground levels. Restoration will be largely completed using low permeability cohesive materials that will limit groundwater flows into and through the infilled void and limit infiltration through the wastes.

The restored void will also limit infiltration through the restored surface, allowing development of a surface water attenuation lagoon on the restored surface to support water management requirements of the adjacent landfill facility. All waters collected will be discharged under gravity to a tributary drain to the River Skell located to the immediate north fo the site. Full design details for the attenuation lagoon are attached (*Doc. Ref.: WR7757/SW/01*).

Anticipated peak rebound levels at the application site have been calculated using peak recorded waters levels in monitoring borehole SK12 (~42.46mAOD) and the elevation of the spring (24.09mAOD) located ~320m northeast of the site. Borehole SK12 is located outside the zone of influence of the current dewatering activities carried out at the void. Based on calculated hydraulic gradient of 0.017 a peak rebounded water level in the void equate of ~32.8mAOD. This would place peak groundwater level close to surface level at the void.

As a consequence of the revised rebound levels calculated for the site, a single set of wastes codes will be progressed under this application for filling the quarry void. A separate list is also provided for the materials to be used to construct haul roads to support access to the quarry void. The haul roads will be constructed by the placement of up to 500m of suitable wastes. These wastes are restricted to waste concrete, bricks tiles/ceramic and minerals. A copy of the revised schedules of wastes is included in the revised Supporting Statement (Doc. Ref.: WR7640/04.R4) that has been prepared to support of this response. The wastes codes and descriptions are summarised below.

Wastes for Restoration

- 01 01 02 Wastes from mineral non-metalliferous excavation
- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 01 04 09 Waste sand and clays
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 20 02 02 Soil and stones

Wastes for Haul Road Construction

- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 17 01 01 Concrete
- 17 01 02 Bricks
- 17 01 03 Tiles and ceramics
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 19 12 09 Minerals (for example sand, stones) only

These updated proposals have also been incorporated into revisions to **Drawing Nos. WR7640/10/ESSD4** and **WR7640/10/HRA1.** Copies of the revised drawings are included with this response.

1.2 Provide water balance calculations relating to the surface water discharge comprising:

- Current volume of surface water discharged to existing quarry void,
- Future volumes of water to be discharged to restored wetland areas including climate change factor,
- How the change in permeability associated with the infilling of the void has been taken into account in the estimation of water levels and infiltration capacity within the wetland area, in relation to retained water levels including storm events,
- Confirmation of any discharge from the restored void to adjacent surface water including monitoring and compliance limits in the short, medium and long term scenarios.

Reason: Due to the nature of the proposed restoration soils, further information is required to demonstrate that the soils 'placed above the watertable' will remain above the watertable and the site will comply with Schedule 22 of the EPR 2016. Further information is required that there will be no direct discharge of hazardous substance or pollution by non hazardous substances including high sediment yields.

Response

There is no data is available to confirm the volume of water currently discharged from or to the quarry void.

Full detailed design requirements for the attenuation lagoon are attached *(Doc. Ref.: WR7757/SW/01)*. The lagoon is designed solely to discharge waters under gravity to the surface drain located to the north of the quarry. The wastes used to restore the quarry will offer limited infiltration to the waters being managed in the lagoon.

Updated monitoring schedules for the flooded void during active filling and post-completion are presented in the revised Hydrogeological Risk Assessment (*Doc. Ref.: WR7640/06.R3*) prepared in support of this response.

In lieu of a review of potential rebounded groundwater levels the schedule of wastes for restoration of the quarry has been restricted to low risk wastes of which the chemical characteristics will be suitably restricted to prevent the discernible input of hazardous substances to groundwater and limit the input of non-hazardous pollutants to prevent pollution.

A copy of the revised schedules of wastes is included in the revised Supporting Statement (*Doc. Ref.: WR7640/04.R4*) that has been prepared to support of this response.

2.0 Site Infilling and Restoration Proposals

2.1 Provide estimates of:

- the relative thickness and volumes of the wastes to be deposited into water, above the rebound water table and restorations soils.
- Confirm any 'freeboard' that may be present between the top of the 'below groundwater table tipped waste' and the assumed long term groundwater level.

Reason: It is recognised within the Application that the majority of the infill will be deposited directly into water based on the assumed groundwater level. Given the differences in the proposed waste streams, further confidence is required that the potential variability in groundwater levels has been accounted for in the assessment.

There is a conflict between the WRP which states 1m for restoration soils whereas the Supporting document states 2m. It is also unclear if these will be present in the saturated wetland area.

Response

The schedule of wastes have been simplified following a review of potential rebound levels within the limestone aquifer (refer to revised schedules presented in Appendix SS1 of the Supporting Statement (*Doc. Ref.: WR7640/04.R4*). All restoration deposits will consist of waste streams from naturally occurring materials with a low-risk of contamination. The use of construction/demolition waste streams (i.e. concrete, bricks, tiles/ceramics, minerals) will be limited to the construction of internal haul roads, laid to thicknesses of up to 500mm to support access to the active tipping areas. A summary of the wastes codes are summarised below. All wastes will be subjected to stringent wastes acceptance checks to ensure that they present a low risk to groundwater.

Wastes for Restoration

- 01 01 02 Wastes from mineral non-metalliferous excavation
- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 01 04 09 Waste sand and clays
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 20 02 02 Soil and stones

Waste for Haul Road Construction

- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06

- 17 01 01 Concrete
- 17 01 02 Bricks
- 17 01 03 Tiles and ceramics
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 19 12 09 Minerals (for example sand, stones) only

2.2. Provide a method statement indicating how the filling process will be controlled to prevent the discharge of high sediment loads in the short medium and long term periods.

Reason. It is unclear whether there will be the potential for any surface water discharge during the operations when the waste will be tipped directly into the flooded void. There is no assessment of how the resultant sediment loads will be managed with respect to any discharges from the site.

Response

To prevent the discharge of high sediment loads during active restoration of the quarry it is proposed to implement suspension of pumping from the lagoon during active waste operations. Pumping will be reinstated following the collection of a suitable water sample from a depth of 1m below the surface and performance of colorimetric testing using an appropriately calibrated instrument that confirms that the suspended solids content is less than 100mg/l.

If suspension periods are insufficient to allow for adequate settlement times, consideration will be given to the implementation of silt treatment techniques widely used in the construction industry e.g. Siltbuster treatment systems.

It is not anticipated that high sediment loads will be an issued once final levels have been achieved and the lagoon has been engineered.

3.0 Waste Acceptance

3.1 Waste Acceptance Subwater Table Soils:

- Revise Table SS1 (supporting document) for the natural baseline chemistry associated with the Magnesian Limestone.

Reason: The Application identifies that materials used in the construction of an attenuation layer have to have a pollution potential less than, or equal to, the natural quality of the surrounding geology and water. This statement is considered to exclude baseline data which may have been impacted by anthropogenic activities such as the dilute and disperse facility and as such the values presented in Table SS1 are not considered to be acceptable.

With regards to the natural groundwater chemistry we note that groundwater data presented in AppHRA2.R2 – Skelbrooke LFS GWQ221223 spans over 12 years of development history of the site. Noting that there is an area of dilute and disperse landfill, the older data is not considered to be reflective of current groundwater quality. The last 5-6 years of data is considered more valid of the improving groundwater quality, as there are a number of boreholes with significantly better groundwater which are unlikely to have been impacted by the adjacent site or neighbouring dilute and disperse facility. The waste acceptance criteria for subwater table waste should reflect these natural (unimpacted) conditions. The WAC values presented in Table SS1 are not considered to be acceptable and these should be derived based on the natural geology.

For the avoidance of doubt, any hazardous substance should be less than detection limit and therefore table SS2 would not apply to subwater table waste in the absence of an attenuation layer.

Response

Tabel SS1 of the Supporting Statement (refer to *Doc. Ref.: WR7640/04.R4*) has been updated with the revised Waste Acceptance Criteria derived from an updated review of baseline groundwater quality which focuses on datasets from 2018 onwards (refer to Doc. Ref.: WR7640/06/A2b.R0).

3.2. The waste acceptance procedures contained within the Supporting Statement WR7640/04.R2 acknowledges the sensitivity of the proposal and indicates that all waste to be place below the water table will be subject to testing, however we need you to provide further details on the frequency of the testing by the provider. We note that the proposed sub water table waste can only be accepted without testing if they:

- come from a single source.
- are well characterised (chemically) and described.
- carry no risk of contamination, for example from a site that hasn't previously been developed.

Reason: The Application places heavy reliance on the waste acceptance procedures to ensure that the quality of the proposed restoration materials - meet the necessary minimum standards for use at the site and its environmental setting. Additional information is required to demonstrate that there is sufficient control given the sensitivity of the groundwater environment.

Response

The schedules of waste for the main restoration activity has been revised to a include low-risk waste streams only. A separate schedule of waste is included for use in the construction of haul roads to support access requirements to active tipping areas. The revised schedules of wastes is included in Appendix SS1 of the revised Supporting Statement *(Doc. Ref.: WR7640/04.R4)* that has been prepared in support of this response and are duplicated below. The wastes codes and descriptions are summarised below:-

Wastes for Restoration

- 01 01 02 Wastes from mineral non-metalliferous excavation
- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 01 04 09 Waste sand and clays
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 20 02 02 Soil and stones

Wastes for Haul Road Construction

- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 17 01 01 Concrete
- 17 01 02 Bricks
- 17 01 03 Tiles and ceramics
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 19 12 09 Minerals (for example sand, stones) only

3.3. Waste acceptance for material to be deposited above groundwater:

- Notwithstanding the amendments to Table SS1 required by Question 5 above, confirmation is required that waste to be placed between the rebound water level and the restoration soils will be assessed against the revised targets in SS1.

Reason: The waste list details additional codes for waste to be place above the water table. These include waste streams that require testing such as 19.12.12 and 10.13.14, where there is a reasonable likelihood that contaminants of concern are present.

Response

The schedules of waste has been revised to a include low-risk waste streams only. A separate schedule of waste is included for use in the construction of haul roads to support access requirements to active tipping areas. A copy of the revised schedules of wastes is included in the revised Supporting Statement *(Doc. Ref.: WR7640/04.R4)* that has been prepared to support of this response and are summarised below:

Wastes for Restoration

- 01 01 02 Wastes from mineral non-metalliferous excavation
- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 01 04 09 Waste sand and clays
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 20 02 02 Soil and stones

Wastes for Haul Road Construction

- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 17 01 01 Concrete
- 17 01 02 Bricks
- 17 01 03 Tiles and ceramics
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 19 12 09 Minerals (for example sand, stones) only

- Should the waste above the rebound water table not meet the requirements of the revised SS1, provide an assessment of the risks posed by this material to the surface and groundwater environments.

Reason: The application is not clear on this aspect. Currently there is a disparity between the waste above and below the water table with no degree of certainty that the long-term water table has been identified, nor is it clear that this waste has been included in the extant risk assessments.

Response

The schedules of waste has been revised to a include low-risk waste streams only, as summarised below. A separate schedule of waste is included for use in the construction of haul roads to support access requirements to active tipping areas. Stringent waste acceptance procedures and criteria have been development to minimise the risk of depositing wastes that present a risk to controlled waters. Further details are presents in Section 2.0 of the revised Supporting Statement *(Doc. Ref.: WR7640/04.R4).*

Wastes for Restoration

- 01 01 02 Wastes from mineral non-metalliferous excavation
- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 01 04 09 Waste sand and clays
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 20 02 02 Soil and stones

Wastes for Haul Road Construction

- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 17 01 01 Concrete
- 17 01 02 Bricks
- 17 01 03 Tiles and ceramics

- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 19 12 09 Minerals (for example sand, stones) only

3.4. Restoration soils:

- Provide Restoration soils waste acceptance criteria (WAC) protective of the water environment.
- Provide appropriate assessment of the risks to groundwater and surface water from the Restoration soils.

Reason: Table SS3 and SS4 provide WAC concentrations derived from the risks posed to human health with a modification to reduce potential phytotoxic elements. These assessment values are not applicable to the risks posed to the groundwater or surface water environments. Furthermore, the site is located in a sensitive groundwater environment, that being a principal aquifer with springs ~300m from the site and as such the WAC are not considered to be appropriate.

In addition it is not clear how the risks posed by the higher WAC criteria have been undertaken within the HRA. Of particular note is the risk to surface water contained within the engineered wetland area and any further release to the wider environment from this area.

Response

The schedules of waste has been revised to a include low-risk waste streams only (as summarised below). Due to the relatively small quantity of wastes required to form the final soil profile outside of the lagoon footprint, it is proposed to adopt the same waste acceptance criteria for these materials as the main fill materials, subject to the relaxation of the Total Organic Carbon content to enable the importation of topsoil.

Wastes for Restoration

- 01 01 02 Wastes from mineral non-metalliferous excavation
- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 01 04 09 Waste sand and clays
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 20 02 02 Soil and stones

A separate schedule of waste is included for use in the construction of haul roads to support access requirements to active tipping areas. A copy of the revised schedules of wastes is included in the revised Supporting Statement *(Doc. Ref.: WR7640/04.R4)* that has been prepared to support of this response. A summary is also provided below. These materials will be prevented from having direct contact with groundwater by the presence of a low permeability fill materials beneath. These wastes will not be deposited directly into water.

Wastes for Haul Road Construction

- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 06
- 17 01 01 Concrete
- 17 01 02 Bricks
- 17 01 03 Tiles and ceramics
- 17 05 04 Soil and stones other than those mentioned in 17 05 03
- 19 12 09 Minerals (for example sand, stones) only

4. Risk Assessment and Associated Requisite Surveillance

4.1 Present a risk assessment reflective of the conceptual model in the short medium and long terms.

Reason: ConSim is not designed to model risks from saturated contaminated materials contained beneath the water table and is not considered to be appropriate to assess the risks based on the presented conceptual model. The model files are not accessible at this time, however based on the information presented within the HRA, the source term requires further revision and consideration - as it does not appear to reflect the potential contaminant concentrations proposed for restoration soils, nor the likely shallow lateral pathways to principal aquifer. The model implies a vertical migration pathway down to the Permian Marl as opposed to lateral migration through the waste by groundwater contained within the Brotherton Formation. A review of the contaminants of concern should be undertaken and the use of sulphate as an indicator substance should be considered.

The current lateral side wall leakage model input parameters require review and further justification as it appears the groundwater levels used in the model are not reflective of the conceptual model. Further consideration is also required with respect to the modelled source term and the potential for saturation of the restoration soils in the short medium and long term.

The models should reflect the proposed future use of the site to receive surface water from the adjacent site. We require a risk assessment that reflects the conceptual model and reflects the long term future use of the site, i.e. enhanced infiltration associated with the wetland area receiving surface water from the adjacent landfill facility.

Response

The schedule of wastes have been revised to so that the quarry void will be restored using wastes that present a low risk of contamination, with waste acceptance criteria derived that have result in waste with no discernible leachable concentrations of hazardous substance and leachate concentration of non-hazardous pollutants that accord with inert landfill waste

acceptance criteria. This limit values will therefore prevent the discharge of hazardous substances to groundwater and limit the input of non-hazardous pollutants to avoid pollution.

The Hydrogeological Risk Assessment *(Doc. Ref.: WR7640/06.R3)* has been revised to address the revised Conceptual Site Model as a consequence of these changes. The risk assessment has been revised to a Risk Screening due to the revised and more stringent waste acceptance criteria and procedures being implemented for all waste deposits.

4.2. Environmental monitoring proposals

- Review monitoring parameters in relation to likely substances to be found in inert waste;
- Review/justify frequency of monitoring during the operational filling period with respect to the substance used as indicator species.

Reason: Currently the timescales for the infilling of the void have not been stated, and it is observed that monitoring parameters are more reflective of the adjacent non hazardous facility than the proposed waste streams at the site. A review of the contaminants of concern should focus on indicator substances reflective of the proposed waste streams. Due consideration should be given to the inclusion of sulphate and mobile metals. The frequency of monitoring should also represent the risks posed at each stage of development. The extant proposals currently only monitor metals and, sulphate on an annual basis. This is not considered to be sufficiently protective of the water environment. A fully justified monitoring regime should accompany the proposals. It is acknowledged that Darrington Quarries Limited wish to combine the monitoring with the adjacent landfill, however this is not considered to be a justifiable reason for a reduced monitoring frequency. It is not considered that the monitoring adequately reflects the risks posed by the activities in a high sensitivity groundwater environment, noting that the peak risk from the proposed DfR activity is time limited (which will be reflected in the conditions included in any future permit for the activity)

Please note: Where there are significant updates required to documents associated with the application, we would ask that you provide a summary reference table (an example is attached) to show which elements in the revised documents have been changed or added to answer the questions in the schedule 5 response. This will reduce the time we have to spend reviewing the documents.

Response

Revised groundwater and surface water monitoring schedules are present in Section 4.0 of the revised Hydrogeological Risk Assessment (*Doc. Ref.: WR7640/06.R3*) included in support of this response.

Should you require any further information to support this application, please do not hesitate to contact me.

Yours sincerely

Dylan Thomas

Dylan Thomas
Principal Environmental Consultant
For and on behalf of The Sirius Group

Enc:

Reports

Design Report for the Surface Water Scheme at Skelbrooke Quarry and Landfill Site (Doc. Ref.: WR7757/SW/01; Dated: Nov 2020)

Supporting Statement *(Doc. Ref.: WR7640/04.R3)*

Hydrogeological Risk Assessment *(Doc. Ref.: WR7640/06.R3)*

Skelbrooke Ext GWLs 1996-2023 (*Spreadsheet File Ref: WR7640/06/A1.R2)*

Skelbrooke Ext GWQ 2002-2023 (*Spreadsheet File Ref: WR7640/06/A2a.R2)*

Skelbrooke Ext GWQ 2018-2023 (*Spreadsheet File Ref: WR7640/06/A2b.R0)*

Drawings

WR7640/10/ESSD4 (rev3) – Site Layout and Waste Deposition

WR7640/10/HRA1 (rev3) – Hydrogeological Cross Section