

**Withey Developments Limited**

**Virginia Park, Caerphilly**

**Groundwater Scheme of Monitoring**

12476/RB/20/GSM



**CLIENT:**                    **Withey Developments Limited**

**PROJECT:**                **Virginia Park, Caerphilly**

**TITLE:**                    **Groundwater Scheme of Monitoring**

**JOB NO:**                  **12476**

**DOCUMENT REF:**    **12476/RB/20/GSM**

Revision	Purpose Description	Originated	Reviewed	Authorised	Date
0	Issue	RB	HP	HP	Dec '20

Geotechnical Engineers:

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## 1.0 INTRODUCTION

Withey Developments Limited are proposing the reclamation and remediation of Virginia Park Golf Course, Caerphilly (see Figure 1) to a standard suitable for proposed residential end use.

Intégral Géotechnique completed a Scoping Site Investigation in 2016 report ref: 11637/RB/16/SI followed by a Supplementary Site Investigation undertaken in 2019 and reported in 2020, report ref: 12476/RAH/20/SICOND30/RevA dated February 2020.

The Supplementary Site Investigation Report included a remediation strategy, the principle of which was agreed with the Environmental Health Officer at Caerphilly County Borough Council. Prior to commencement of the site remediation/reclamation works, a remediation implementation plan was prepared to detail how the site reclamation and remediation works would be carried out. Reference should be made to Remediation Implementation Plan Ref. 12476/RAH/20/RIP/RevA dated July 2020.

The above reports were provided to Natural Resources Wales (NRW) for review in relation to the risks to controlled waters and the discharge of Condition 30 (Contamination) of Planning Permission 17/0804/OUT.

NRW's response to the above reports was received in their letter Ref. CAS-131796-N3P7 dated 10/12/2020, see Appendix A. In their letter, NRW did not have any adverse comments on the assessments and conclusions made in the reports. However, with regard to monitoring of groundwater during the proposed earthworks operation NRW have requested a scheme of monitoring, to include the following further information:

- Location of groundwater monitoring boreholes,
- Baseline data – a minimum of three rounds of sampling prior to remediation work commencing,
- Frequency – fortnightly during the works and a minimum of 3 rounds (a month apart) post works,
- Mitigation and contingency measures – define failure criteria which will initiate mitigation measures – if results are elevated what mitigation measure will be employed.

This document details the proposals for groundwater sampling/monitoring to be undertaken during the progression of the required reclamation earthworks, including details regarding the above requested information.



## **2.0 GROUNDWATER MONITORING**

### **2.1 GROUNDWATER SAMPLING & TESTING**

Groundwater has previously been sampled and tested as part of the site investigation works carried out at the site. It is considered that pre-commencement baseline conditions have been established as part of these previous works, and as reported in Supplementary Site Investigation Report ref: 12476/RAH/20/SICOND30/RevA dated February 2020.

Three rounds of groundwater sampling and testing have been completed, and a summary of the results presented in Appendix B. These results are considered to represent baseline conditions.

During the site reclamation and remediation earthworks, groundwater samples will be obtained from eight existing groundwater monitoring wells located around the site (constructed as part of the recent site investigation works).

The groundwater monitoring borehole locations are provided on Figure 2.

The site will be remediated in two phases over two seasons of dry weather conditions. Phase 1 (comprising Phases 1A and 1B) will be remediated during spring and summer 2021, and Phase 2 will be remediated in spring and summer 2022.

The Phasing Plan is presented in Appendix C.

Groundwater monitoring for Phase 1 (Phases 1A and 1B) will be limited to boreholes BH01 to BH05 inclusive. Groundwater monitoring for Phase 2 will be limited to boreholes BH05 to BH08 inclusive.

Groundwater samples will be obtained from the respective groundwater monitoring boreholes across the site on approximately fortnightly occasions for the first two months, and then if consistent results are obtained, monitoring will continue on a monthly basis thereafter.

Upon completion of the site reclamation and remediation earthworks, three rounds of post completion groundwater monitoring will be completed, with each round one month apart.



## **2.1 GROUNDWATER SAMPLING & TESTING (CONTINUED)**

The groundwater samples will initially be tested for a comprehensive suite as detailed below:

- Metals and semi-metals (including aluminium, manganese and iron)
- Inorganics (including chloride, nitrate/nitrite)
- Ammoniacal Nitrogen
- Biological Oxygen Demand (BOD)
- Chemical Oxygen demand (COD)
- Polyaromatic hydrocarbons (PAH)
- Petroleum hydrocarbons (VPH/EPH)

The groundwater risk assessments and conceptual model will be reviewed in light of the results and the testing suite and sampling frequency will be amended accordingly in response to any areas and contaminants of concern.

Groundwater sampling frequency will be on an initial fortnightly basis for the first two months, reducing to monthly monitoring if consistent and low levels of contaminants are detected. The monitoring would be increased back to fortnightly monitoring if an increase in contaminant concentrations is observed.

## **2.2 MITIGATION & CONTINGENCY MEASURES**

The following contingency has been designed in order to deal with any persistent elevated concentrations that are detected.

The established baseline conditions will be used as criteria against which any elevated concentrations will be considered in the first instance.

Any fluctuations in data will be reviewed to see if there are any seasonal fluctuations. Allowing for possible seasonal trends, should any contaminant concentrations rise locally and persistently above the screening values/baseline conditions, site operations will be reviewed, with a view to potentially modifying working methods.

A range of mitigation measures are available, depending on the results of the monitoring including the creation of temporary settlement lagoons, pumping and skimming of contaminants, drilling further boreholes and the use of various in-situ groundwater treatment options such as air sparging, multi-phase extraction, etc.

The conceptual site model will be reviewed and revised on a regular basis, and detailed groundwater risk assessments carried out as required, depending on the results.



## **APPENDIX A**

### **NRW CORRESPONDENCE**



Rivers House,  
St Mellons Business Park,  
St Mellons,  
Cardiff,  
CF3 0EY

Caerphilly County Borough Council  
Regeneration and Planning  
Council Offices,  
Pontllanfraith House,  
Blackwood  
NP122YW

ebost/email:  
southeastplanning@cyfoethnaturiolcymru.gov.uk

10/12/2020

Annwyl Syr/Madam / Dear Sir/Madam,

**BWRIAD / PROPOSAL: DISCHARGE OF PLANNING CONDITIONS  
9 (Hedgerow), 12 (Means of Access), 16 (Off Site Highway Works), 20  
(Mud On Road), 24 (Site Control), 25 (Site Control), 26 (Arboricultural Impact  
Assessment), 29(Trees), 30 (Contamination) and 38 (Remediation Risk Assessment)  
of planning application 17/0804/OUT (Erect up to 350 homes, public open space, a  
local centre and community building, new vehicular, cycle and pedestrian accesses,  
associated engineering works and seek approval of access)**

**LLEOLIAD / LOCATION: Land at Virginia Park Golf Club Virginia Park Caerphilly**

Thank you for consulting Cyfoeth Naturiol Cymru / Natural Resources Wales about the  
above, which we received on 27 November 2020.

You have requested our advice on the risks to controlled waters, relating to the discharge  
of condition 30(Contamination) of planning permission 17/0804/OUT. We have, therefore,  
reviewed the following documents received on 27 November:

1. Virginia Park Golf Course, Caerphilly – Scoping Site Investigation Report. Intégral Géotechnique (Wales) Limited, 11637/RB/16/SI/RevB, September 2017.
2. Virginia Park Golf Course, Caerphilly – Site Investigation and the Proposed Remediation Strategy Report Condition 30 of the Outline Planning Permission. Intégral Géotechnique (Wales) Limited, Document Ref: 12476/RAH/20/SI/Cond30 Rev A, February 2020.

Our advice is that there is insufficient information submitted to satisfactorily assess the  
risks to controlled waters. As such, we do not recommend your Authority discharges  
condition 30, at this time, for the following reasons:



The condition includes the requirement for a “scheme of monitoring”. However, we have been unable to locate any document relating to this.

We note the conclusion of both the above reports that the risk to controlled waters is low and that there is no formal proposal for remediation of the groundwater. However, the remediation proposed for the site (mainly based on human health issues) is a site wide turn and compact operation with the removal of hot spots contamination. Based on this remediation method (as this method has the potential to mobilise contamination into groundwater), we request a “scheme of monitoring” to include the following details is submitted to ensure the risks to groundwater have been addressed:

- – Location of groundwater monitoring boreholes;
- – Baseline data – a minimum of three rounds of sampling prior to remediation work commencing;
- – Frequency – fortnightly during works and a minimum of 3 rounds (a month apart) post works;
- – Mitigation and contingency measures – define failure criteria which will initiate mitigation measures – if results are elevated what mitigation measure will be employed?

**On receipt of the above, we would be happy to advise your Authority further in relation to the risks to controlled waters.**

**We did not request the remaining conditions, subject of this application, therefore we have no comments on their discharge.**

## **Other Matters**

Our comments above only relate specifically to matters included on our checklist, *Development Planning Advisory Service: Consultation Topics* (September 2018), which is published on our [website](#). We have not considered potential effects on other matters and do not rule out the potential for the proposed development to affect other interests.

We advise the applicant that, in addition to planning permission, it is their responsibility to ensure they secure all other permits/consents/licences relevant to their development. Please refer to our [website](#) for further details.

## **Advice for the attention of the applicant**

We note that dewatering may be employed on site. If dewatering is greater than 20 m3/day an abstraction licence may be required from us. More information on abstraction licensing requirements is available at <https://naturalresourceswales.gov.uk/permits-and-permissions/water-abstraction-and-impoundment/?lang=en>



If you have any queries on the above, please do not hesitate to contact us.

Yn gywir / Yours faithfully

**Mrs Claire McCorkindale**

Cynghorydd - Cynllunio Datblygu / Advisor - Development Planning  
Cyfoeth Naturiol Cymru / Natural Resources Wales



## **APPENDIX B**

### **GROUNDWATER BASELINE CONDITIONS**



## 12476/RAH

## Intégral Géotechnique



## **APPENDIX C**

### **REMEDIATION PHASING PLAN**







## FIGURES



Site Location

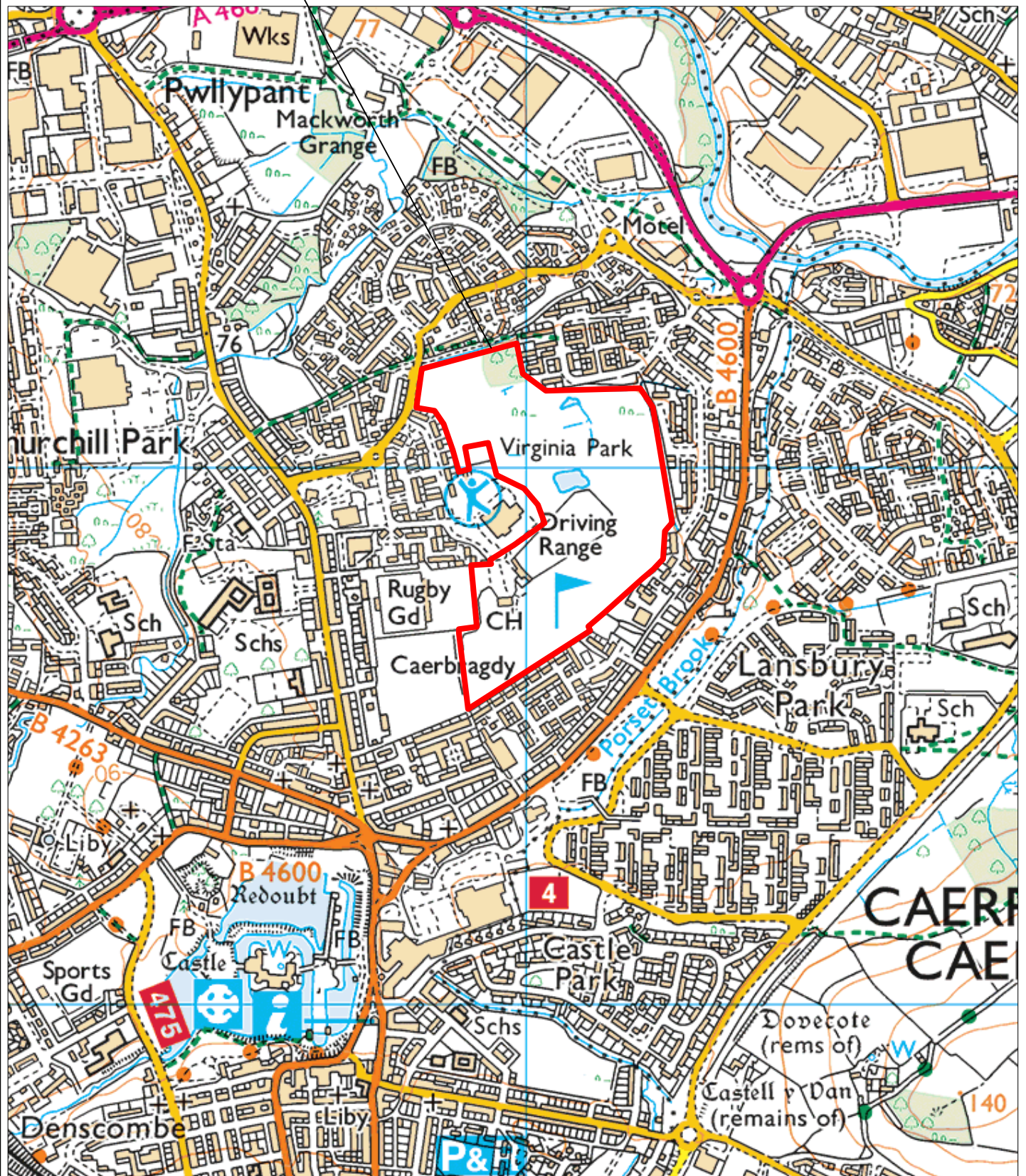


Figure 1: Site Location

Project: Virginia Park Golf Course, Caerphilly

Job no.: 12476

Client: Virginia Park Golf Club

Scale: 1:10,000 at A4

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Figure 2: Groundwater Monitoring Location Plan

Project: Virginia Park Golf Course, Caerphilly

Job No.: 12476

Client: Whtey Developments Ltd & Bellway Homes

Scale: 1:2,000 at A3

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