

Planning Applications Committee

09 September 2026



Reading
Borough Council
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Title	PLANNING APPLICATION REPORT
Ward	Whitley
Planning Application Reference:	PL/25/0705/DOV
Site Address:	Land at Madejski Stadium, Shooters Way, RG2 0FL
Proposed Development	Proposed S106 Deed of Variation in Relation to Planning Application Reference PL/16/0199
Applicant	Reading Borough Council
Report author	Alison Amoah - Principal Planning Officer
Deadline:	Original target determination of 12 th August 2025 with an agreed extension to 19 th September 2026
Recommendation	AGREE Deed of Variation
S106 Obligations	Amend Schedule 6 Clauses 5 and 6 to S106 No. 4308 as follows (additional text underlined and removed text shown as a strikethrough): 5. The First Owner shall carry out the Land Management Measures and Remedial Works until the Council is satisfied that the waste and gases under the Application Land are unlikely to be a hazard to <u>identified critical receptors in the context of the proposed development.</u> human health. (Site Characterisation CS2). <u>In particular, ground gas risks should be characterised in accordance with the approaches outlined within British Standards and where appropriate, other current, relevant, authoritative guidance.</u> 6. The First Owner shall continue to pay on the anniversary of the Implementation of the Development the Land Management Monitoring Contribution until the Land Management Measures and Remedial Works demonstrate to the Council's satisfaction that the waste and gases under the Application Land are unlikely to be a hazard to <u>identified</u>

	<u>critical receptors in the context of the proposed development. human health. (Site Characterisation CS2). In particular, ground gas risks should be characterised in accordance with the approaches outlined within British Standards and where appropriate, other current, relevant, authoritative guidance.</u> All other obligations within the original s106 agreement and the Dov 2023 would continue to apply.
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1. EXECUTIVE SUMMARY

- 1.1 The proposal is for a deed of variation (Dov) which seeks to amend clauses 5 and 6 within the Sixth Schedule ['Land Contamination and Gas Remediation Obligations'] of the existing Section 106 legal agreement for the Royal Elm Park development, which is the approved mixed-use scheme on the land adjacent to the Select Car Leasing Stadium (as approved under PL/16/0199).
- 1.2 This modification proposed would align with the land contamination and gas remediation obligations with the contamination and land gas condition wording previously approved by officers under non-material amendment PL/25/0526 and is, therefore, considered acceptable and it is therefore recommended that the variation sought is agreed.

2. INTRODUCTION

- 2.1 The application site is the land adjacent to the Select Car Leasing Stadium (formerly the Madejski Stadium), which comprises the parking area and the site of the football training Dome and outside training pitches. This forms the land within the approved scheme area known as Royal Elm Park, which was a 'hybrid' planning permission (i.e. part full/detailed permission and part in outline) under ref: PL/16/0199. This was approved subject to a S106 legal agreement (dated 29th November 2018).
- 2.2 The detailed part of the permission has been implemented through some foundation works for the approved Phase 1 multi-storey car park, and the first Reserved Matters application is currently under consideration (ref: PL/25/1655). There has also been the approval of a number of non-material amendments and conditions as documented in Section 4 below.
- 2.3 Of specific relevance is that Conditions 7 and 50 were amended as shown in Appendix 1 and this is further detailed in the assessment in section 7 below.
- 2.4 The site is identified within the Reading Borough Local Plan in addition to the allocated sites. Paragraph 6.3.18 states "*Any future applications on these sites will be acceptable where they are substantially the same as the existing*

permission, subject to the policies in this Local Plan. Applications for developments will need to be considered against policies in the plan, in particular whether it would adversely impact the likelihood of meeting Reading's identified development needs."

- 2.5 It should be noted that this hard commitment is retained within the Local Plan Partial Update Submission version (May 2025) under paragraph 6.3.17.

3. PROPOSAL

- 3.1 The proposal is to vary the existing S106 legal agreement to amend the wording within the Sixth Schedule – 'Land Contamination and Gas Remediation Obligations' with regard to clauses 5 and 6, in order that the wording would align with wording approved under a non-material amendment for conditions 7 and 50 as amended under ref: PL/25/0526.
- 3.2 This DoV would be a supplemental document to the original 2018 S106 agreement and first Deed of Variation dated 20th October 2023, which excluded the installation of a single foundation tie beam for Phase 1 (Multi-storey car park) from the definition of 'implement'¹. The proposed wording would be as follows (additional text underlined and removed text shown as a strikethrough).

5. The First Owner shall carry out the Land Management Measures and Remedial Works until the Council is satisfied that the waste and gases under the Application Land are unlikely to be a hazard to identified critical receptors in the context of the proposed development. ~~human health. (Site Characterisation CS2).~~ In particular, ground gas risks should be characterised in accordance with the approaches outlined within British Standards and where appropriate, other current, relevant, authoritative guidance.

6. The First Owner shall continue to pay on the anniversary of the Implementation of the Development the Land Management Monitoring Contribution until the Land Management Measures and Remedial Works demonstrate to the Council's satisfaction that the waste and gases under the Application Land are unlikely to be a hazard to identified critical receptors in the context of the proposed development. ~~human health. (Site Characterisation CS2).~~ In particular, ground gas risks should be characterised in accordance with the approaches outlined within British Standards and where appropriate, other current, relevant, authoritative guidance.

¹ In Schedule 2 paragraph2, Schedule 4 paragraph 2 (e) and Schedule 6 paragraph 1

3.3 This DoV matter is being reported to the Planning Applications Committee for determination as the original application was a Major application reported to your meeting on 26th April 2017. The relevant contamination section of the main report is attached as Appendix 2 to this report.

3.4 Submitted Plans and Documentation:

The submitted documentation is as follows:

- Cover Letter from the applicant's agent, dated 22/4/25, received 13th May 2025
- Compiled list of Proposed Condition Amendments and S106 Variations

3.5 Community Infrastructure Levy: This is not relevant to this Deed of Variation.

4. PLANNING HISTORY

4.1 The relevant planning history is as follows:

PL/16/0199/FUL - Outline application (all matters reserved apart from access to the site) for residential development (Blocks 1-6) to provide up to 422 residential units, comprising predominantly 1 and 2 bedroom apartments (Use Class C3) along with associated landscaping and car parking; and Detailed application for residential and mixed use development comprising: 196 residential units (within Block 7) (Use Class C3) including 164 dedicated parking spaces (of which 12 are accessible); Convention Centre and ice rink (Use Classes D1/D2); 246 bedroom hotel (Use Class C1) and up to 102 serviced apartments (Use Class C1); Decked car parking within Convention Centre; Flexible ancillary retail space (Use Class A1) (within Block 7 only); Flexible ancillary retail space (Use Class A3/A4) (within Convention Centre only); Multi storey car park including 1,972 sqm of office space (B1a) or 1,732sqm of office space (B1a) and 240 sqm of community space (D1 use); Public open space (including public square and public park) with associated street furniture and public art and directional signage to form part of wider outline public open space strategy; Associated access, landscaping, cycle parking, transport interchange and related infrastructure and engineering works; Ancillary facilities for storage, management facilities and plant; Vehicular and pedestrian access; and Demolition of existing indoor training facility; and Enhancement of existing RFC Garden of Remembrance - Approved 29/11/2018

PL/22/1914/NMA - Minor amendment to planning permission 160199 for changes to condition wording for conditions 12, 16, 23, 24, 26, 32, 33, 74, 75, 83, 87, 91, and 100 to exclude first pile foundation for Phase 1 (MSCP), and 93 to include specific reference to residential - Agreed 6/7/2023

PL/23/0080/NMA - Minor amendment to conditions 7 (parts b and c), 70, 71, 73 and 80 of planning permission 160199 to allow for Phase 1 single pile implementation (amended) – Agreed 24/4/2023

PL/23/1267/NMA - Minor amendment to conditions, 3, 4, 7, 12, 16, 23, 24, 26, 32, 33, 68, 70, 71, 72, 73, 74, 75, 80, 83, 87, 91, and 100 of application 160199 to

exclude the implementation of a single foundation tie beam within Part of Phase 1 – Agreed 9/10/2023

PL/23/0448/DIS – Application for approval of details reserved by condition 79 of application 160199 (amended) – Agreed 10/10/2023

PL/23/0664/DIS – Application for approval of details reserved by condition 65 (Construction Method Statement) of Application 160199 – Agreed 10/10/2023

PL/23/1715/CLE – Certificate of lawfulness of existing use or development for the implementation of the development granted planning permission by Reading Borough Council on 29th November 2018 under reference 160199 (Royal Elm Park) - Approved 12/1/2024

PL/25/0526/NMA- Non-material amendment to conditions 7, 46, 50 & 57 of planning permission PL/16/0199 – Agreed 2/5/2025

5. CONSULTATIONS

5.1 Informal discussions took place with RBC Legal Services and an appointed consultant, along with Environmental Protection officers, at pre- submission stage. The consultant is a specialist in the contaminated land sector within an overall geoenvironmental and geotechnical consultancy. Specialist advice was provided through the original application process, and their services have been retained to provide advice to RBC officers in dealing with reviewing and assessing of submissions regarding contamination related matters.

5.2 The Environment Agency was consulted on the original application and stated:

“In terms of this planning application the assessment of risk to the proposed development from landfill gas is not within our remit and the local planning authority must make a decision about this. However, we do have a regulatory role under the Environmental Permitting (England and Wales) Regulations 2010. We do this via an extant environmental permit which regulates the environmental impact of the site.” They provided advice about the landfill at this site and the potential hazards, about the environmental permit and about maintaining compliance with the requirements of the permit, which was included within the informatives section of the original permission. No consultation with the EA was, therefore, undertaken with regard to this DoV.

5.3 No public consultation was undertaken, because it is not required for a Deed of Variation.

6. RELEVANT PLANNING POLICY AND GUIDANCE

6.1 Section 38(6) of the Planning and Compulsory Purchase Act 2004 requires that proposals be determined in accordance with the development plan unless

material considerations indicate otherwise. Material considerations include relevant policies in the National Planning Policy Framework (NPPF) which states at chapter 14, Policy S3 Paragraph 1. *“Decisions on development proposals should apply a presumption in favour of sustainable development”*.

- 6.2 Section 106A of the Town and Country Planning Act 1990 enables local planning authorities to vary S106 legal agreements.
- 6.3 For this Local Planning Authority the development plan is the Reading Borough Local Plan (November 2019). The relevant national / local policies / guidance in relation to this issue are:

National Planning Policy Framework (August 2026).

The following chapters are the most relevant (others apply to a lesser extent):

3. Decision-Making Policies

17. Pollution, Public Protection and Security

National Planning Practice Guidance (2014 onwards)

- Planning Obligations
- Land Affected by Contamination

Reading Borough Local Plan (November 2019)

The relevant policies are:

CC9: Securing Infrastructure

EN16: Pollution and Water Resources

Relevant Supplementary Planning Documents (SPD) are:

- Planning Obligations under Section 106 (2015)

Other relevant documents:

- BS8485: 2015 Code of Practice for the Design of Protective Measures for Methane & Carbon Dioxide Ground Gases for New Buildings
- CIRIA (Construction Industry Research and Information Association): Publication C665 - Assessing Risks Posed by Hazardous Ground Gases to Buildings (2007)
- RBC Contaminated Land Strategy (2011)

6.4 Local Plan Update

The current version of the Local Plan (adopted in November 2019) turned five years old on Tuesday 5th November 2024. The Local Plan was reviewed in March 2023 and around half of the policies in the plan are considered still up to date. However, the rest need to be considered for updating to reflect changing circumstances and national policy. A consultation version of the draft updated version of the Local Plan was published on 6th November 2024. A submission

draft was submitted to the Secretary of State on 9th May 2025, and it is currently at 'Examination' stage.

Although there is a five-year period for carrying out a review of a plan after it is adopted, nothing in the NPPF or elsewhere says that policies automatically become "out of date" when they are five years old. It is a matter of planning judgement rather than legal fact whether a plan or policies within it are out-of-date. This will depend on whether they have been overtaken by things that have happened since the plan was adopted, either on the ground or through changes in national policy, for example.

Officer advice in respect of the Local Plan policies pertinent to this application listed above is that they remain in accordance with national policy. Of those listed above Policy CC9 is proposed for amendment, but the objectives of this policy remain very similar in the draft updated Local Plan, and at present, due to the status of the emerging Local Plan have limited weight in decision making. The current policies can continue to be afforded weight in the appraisal below and are not considered to be 'out of date'.

7. APPRAISAL

Introduction

- 7.1 The application site is an area of artificially raised land, which was a capped former landfill site which operated between 1972 and 1985, and it is subject to an Environmental Permit held by Reading Football Club. The level of fill material is up to 12m deep in parts.
- 7.2 Development on contaminated land is subject to a number of regulatory regimes, and the Environment Agency (EA) have an important role in relation to this site as it is currently a permitted landfill waste site both in the context of waste permitting and groundwater protection. The application site is subject to a high level of monitoring, to ensure that the terms of the existing Environmental Waste Permit are not breached and that pollution is not occurring to the wider environment, particularly to groundwater and water courses, for which the EA are the lead regulator. As well as acting as lead regulator for waste and controlled waters (groundwater and surface water), both in the context of the existing landfill, they are also the statutory consultee to the LPA for the proposed redevelopment of the site, which includes a change of land use. The LPA act as the lead regulator in the context of human health through the planning regime. During previous consultations the EA did not object to the principle of development sought under the original, now approved, scheme. Any development, or disturbance, of the site would need permission (or a permit) under Environmental Permitting Regulations, which is separate to the planning application process.

- 7.3 The information submitted to support the original planning application (ref: PL/16/0199) noted that there were very high concentrations of ground gas in boreholes immediately to the north of the football stadium and the ground conditions may result in major adverse effects on human health.
- 7.4 The Environmental Protection Manager at the time, with technical advice from the specialist consultant, considered that the information submitted from the monitoring data was insufficient to characterise the application site, a landfill site still in the process of decomposition, liable to shrinkage and emission of toxic gases, in particular methane and carbon dioxide. There was inadequate information to demonstrate the Applicant's contention within the submission documents, that the site was a very low risk gassing site, and that the waste was nearing stabilisation both physically and biologically.
- 7.5 As it was considered that there was insufficient information to properly characterise the site, and thus properly assess the risks involved in its development - particularly for sensitive uses such as residential uses - further data was requested by officers. This led to the applicant installing additional boreholes on site and undertaking further monitoring. This is summarised in the original committee report in paragraphs 7.38-7.43 (included in Appendix 2 below)
- 7.6 Following review of the additional monitoring information RBC's consultant advice to RBC officers was that this further monitoring demonstrated that the Characteristic Situation Level of the site (CS) was CS5 (high risk) (see explanation of CSs in paragraphs 7.8 below), but the coverage of the boreholes and extent of monitoring undertaken was the minimum required to provide a general overview of the risk level of the site. It was, therefore, advised that conditions would be required on any planning permission requiring substantial additional investigation, monitoring and assessment to confirm the initial findings and that, in addition to any gas protection measures, there would also need to be ongoing long-term management to maintain such measures.
- 7.7 The resulting planning permission includes several conditions and obligations related to contamination including ground gas, and conditions 7 and 50 relate specifically to long-term management, monitoring and maintenance (for the detailed and outline parts of the permission respectively) and, as originally approved, specifically referenced CS2 (Low ground gas risk classification. As detailed in section 7.8 below). Obligations within Schedule 6 of the S106 relate to investigating and assessing the risks of ground gases, designing protective measures for such gases for new buildings and carrying out monitoring and management of contamination remedial works required under the contaminated land and gas planning conditions in accordance with relevant authoritative guidance such as British standards and CIRIA Guidance, under the term 'Land Management Measures and Remedial Works'. CIRIA is the Construction Industry Research Information Association, a neutral independent and not-for profit body who work collaboratively across the construction

industry to identify good practice, develop new approaches and to identify and enable innovation. Most CIRIA research projects result in the publication of guidance documents, many of which have been adopted as the standard for excellence in their respective areas, including those specifically related to ground gas risk assessment.

Approaches to Contaminated Land Characterisation (ground gas)

- 7.8 In the context of contaminated land, Characteristic Situation (CS) is a classification system as part of BS 8485, the British Standard for designing ground gas protection measures, and the CIRIA C665 guidance. It classifies a site's ground gas risk profile (specifically in terms of methane and carbon dioxide) based on the Gas Screening Value (GSV - calculated in litres per hour). The GSV is a measure of the potential flow of hazardous ground gases into a building, expressed in litres per hour, used to determine the required level of gas protection. Once the GSV has been determined, a Characteristic Situation or CS is allocated (between CS1 and CS6), which is used to describe the level of risk posed by hazardous ground gases on a development site and helps to determine the level of gas protection required for buildings on the development. Classifications CS1 to CS6 are set out in the table below:

BS 8485 / CIRIA C665 Characteristic Situations (CS) Table

Characteristic Situation (CS)	Risk Classification	Gas Screening Value (GSV) Limit (l/hr)	Typical Carbon Dioxide (CO ₂) or Methane (CH ₄) Thresholds	Typical Protection Requirement
CS1	Very Low Risk	< 0.07	Typically CH ₄ < 1% and CO ₂ < 5%.*	No gas protection measures required.
CS2	Low Risk	< 0.7	If CH ₄ > 1% or CO ₂ > 5%, consider increasing to CS2.	Basic protection (e.g., gas-resistant membrane and sub-floor ventilated void). Requires independent verification.
CS3	Moderate Risk	< 3.5	—	Moderate protection (e.g., reinforced concrete slab, robust membrane, and high-performance ventilation).
CS4	Moderate to High Risk	< 15	—	High protection (e.g., multi-layered defense systems with active or highly advanced passive ventilation).
CS5	High Risk	< 70	—	Very high protection (e.g., active gas extraction systems or in-ground venting barriers).
CS6	Very High Risk	> 70	—	Extremely high risk; development may not be viable or requires specialized engineered containment.

- 7.9 The role of planning when dealing with land which may be contaminated, as set out in NPPF Policy P2: Ground Conditions is that:
1. Sites proposed for development should be suitable for their proposed use taking into account:
 - a. Ground conditions, including any risks arising from land instability or contamination (whether due to natural hazards or current and former activities such as mining or fuel storage); and
 - b. The extent to which any such risks can be mitigated, and the potential impacts on the natural environment arising from remediation.
 2. Where land is remediated it should, as a minimum, not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990.
 3. Adequate site assessment information, prepared by a competent person, should be available to inform these considerations.
 4. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.
- 7.10 RBLP Policy EN16 states: *“Development will only be permitted on land affected by contamination where it is demonstrated that the contamination and land gas can be satisfactorily managed or remediated so that it is suitable for the proposed end use and will not impact on the groundwater environment, human health, buildings and the wider environment, during demolition and construction phases as well as during the future use of the site.”*
- 7.11 In addition to the Environmental Protection Act 1990 (the EPA), there are other regimes considering the implications of contamination for development including the Building Regulations and, as referenced above, the Environmental Permitting Regulations. The original planning conditions for land gas contamination matters had a strong emphasis on the requirements of the Environmental Permitting Regulations. The original stipulation within the conditions was that monitoring should demonstrate that site Characterisation CS2 had been achieved (demonstrated by the results of a minimum of 24 datasets over two consecutive years at this level). This was originally applied, as this is a requirement for any proposed surrender of the existing Environmental Permit associated with the landfill site (in accordance with Chapter 5. of Environment Agency Guidance Landfill and deposit for recovery: aftercare and permit surrender (March 2022)). This is separate legislation to that considered under Planning. The technical advice to RBC officers from the RBC appointed consultant, during the application consideration, did not explicitly recommend that CS2 should be referenced rather RBC officers considered that aligning it with the requirements under Environmental Permitting Regulations would be a reasonable approach.
- 7.12 Specific and more recent advice on this matter, received from the RBC consultant, was that in the context of planning, Part 2A of the Environmental Protection Act and Building Regulations, it could be considered to be overly conservative and

prescriptive, to apply a target specification of CS2 (as proven by the completion of 24 rounds of ground gas monitoring confirming this classification, as set out in the original conditions) for the proposed site end use. This is because the guidance specifies that it is also possible to develop sites classified as CS3 and above, so long as appropriate design precautions are adopted during construction and potentially following completion of construction, through the application of appropriate ongoing maintenance and management regimes. Therefore, it was considered appropriate to adjust the condition wording to make reference to the ground gas risk assessment and the design and construction of gas protection measures being compliant with the relevant authoritative guidance (which can be reviewed and administered through the planning regime), rather than specifically referencing an absolute and highly prescriptive target.

- 7.13 The relevant British Standard (BS8485) stipulates that 'Private' Residential or Commercial/Public buildings would be classified as the highest risk 'Type A' or 'Type B' building types. Footnote A) of Table 4 – Gas protection score by CS and type of building within BS 8485 states the following:

- *Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.*

- 7.14 Since the original conditions were applied (in the hybrid planning permission which was issued on 29th November 2018), there have also been additional relevant and authoritative guidance documents released, which sit alongside the British Standard including now widely adopted guidance from CIRIA, CL:AIRE (a UK charity committed to providing a valuable service for all those involved in sustainable land reuse and who develop training resources, disseminate information and act as a credible resource for all stakeholders), and most recently by NHBC Foundation who deliver research on housing supply and work that leads to improve technical guidance for designers and house builders.

- 7.15 The relevant British Standard and authoritative guidance support the position that a site does not need to be at CS2 level in order for it to be developed for the highest risk site end use (private residential). Such developments can be built on sites classified up to CS3 where the gas risk assessment has been undertaken in accordance with the approach laid out within BS8485 and relevant measures implemented for ground gas protection.

Process

- 7.16 The approved S106 legal agreement is over five years old and under Section 106A (3) of the Town and Country Planning Act (TCPA) an application can be made to a local planning authority to change an obligation where it would continue to serve a useful purpose, but in a modified way.
- 7.17 The proposed changes to Schedule 6, parts 5 and 6 of the 2018 S106, as set out in Section 3 above, propose to remove the specific reference to CS2, but would require gas risks to be characterised in accordance with the approaches outlined within British Standards, as referenced above, and where appropriate, other current, relevant, authoritative guidance. The changes would also mean that there would be reference to critical receptors (which would include, for example, ecological receptors or groundwater) rather than just human health. Requiring an exact CS classification is considered overly conservative for a residential end use and not required by the relevant British Standards and guidance.
- 7.18 The proposed changes would provide for consistency between the S106 wording and that of the already amended conditions 7 and 50 of permission PL/16/0199 as included in Appendix 1 below, which are amongst the conditions to which Schedule 6 relates.
- 7.19 Conditions 7 and 50 also originally included specific timeframes of 24 months' worth of data for gas monitoring to be completed, however, due to considerable advances in science and technology and associated authoritative guidance it means that multiple lines of evidence (including more innovative monitoring technologies such as an automated continuous gas monitoring system can be employed. This enables a reduction in overall timeframes, to still be able to complete a robust and defensible ground gas risk assessment. It was, therefore, agreed that reference to two years of continuous data could be removed.
- 7.20 The amendments to the conditions were agreed by officers, as the changes were considered of themselves to be non-material, in terms of the overall permission, as they still provide a mechanism to ensure that the gas risk assessment is appropriate and suitably conservative for the proposed site end use.
- 7.21 The proposed amendments to the S106 clauses, to align with the amended conditions, which reference the British Standard, focuses on risk management to critical receptors through design of gas protection measures that match whatever risk is actually found on site, ensuring the building is safe even if the risk is higher than CS2, which might not be possible to achieve due to the inherent characteristic based on the source of the risk. It would ensure that the design of gas protection measures would be legally required to match the relevant risk.

- 7.22 It should be noted that, notwithstanding the proposed changes to remove reference to a specific gas classification from the planning conditions, there is a requirement under the waste regulatory regime for a specific gas classification (currently CS2) to be reached, prior to surrender of the Environmental Permit for the landfill site. This stipulation within the Environmental Permit acts as an initial buffer in managing the risks of redeveloping the site, as the Environmental Permitting (England and Wales) Regulations 2016 ('Regulations') outline the conditions under which an environmental permit can be surrendered, including a requirement to demonstrate that the site is in a satisfactory state before surrendering the permit. Under the current regulatory regime, it is necessary to surrender an environmental permit, prior to the redevelopment of a landfill with housing. This process is essential to ensure that the site is in a satisfactory condition and poses no risk of pollution. This is a regulatory requirement which demonstrates that the site is safe for redevelopment and that the environmental impact is minimised.
- 7.23 This means that following re-wording of the relevant planning conditions, and the wording changes now sought to the S06 clauses, the development would not proceed with any significantly increased level of risk to the proposed site end users due to requirements under separate regulatory processes. This is because, as part of the permit surrender process under the 'Regulations', the ground gas assessment will need to have been undertaken in line with current authoritative guidance, as discussed above, and it will be necessary to demonstrate that the ground gas regime is classified as CS2 or lower.
- 7.24 The proposed wording changes sought to the S106, would not cause any impacts on the requirements under other conditions or obligations, and would still ensure that the site would be developed safely for the approved end uses and would continue to enable redevelopment of a contaminated site in accordance with national and local planning policy.

Summary

1. The original planning permission included several conditions and obligations related to contamination including ground gas and these reference the site needing to reach a ground gas risk profile of Characteristic Situation (CS value) CS2 (low risk).
2. The proposed changes to the wording of the S106 clauses would remove specific reference to achieving CS2 before development of the site and would require ground gas risks to be characterised in accordance with British Standards and other relevant authoritative guidance. This would align the wording with previously approved non-material amendments to conditions 7 and 50.

3. Prior to the redevelopment of the site (which is permitted landfill) for housing, it will be necessary to surrender the Environmental Permit, which stipulates the requirement for the site to meet a CS2 regime, however, requiring the site to achieve a CS2 classification before development is overly conservative in the context of the planning regime, as it is possible to develop sites, which have been classified as CS3 or above, so long as appropriate design precautions are adopted during construction and potentially following completion of construction by the application of appropriate ongoing maintenance and management regimes.
4. Current British Standards (BS 8485) and best practice guidance confirm that private residential developments can be safely constructed on CS3, or sometimes higher level sites, subject to appropriate gas protection measures being designed, installed and monitored.
5. Site safety would not be compromised by the changes to the wording of the S106, which would reference the British Standards, and the design of structural gas protection measures would remain legally bound to mitigate the actual risks discovered even if higher than CS2.
6. The updated text would expand environmental protections by shifting the focus from solely safeguarding human health to mitigating risks across all "critical receptors," including groundwater and ecological systems.
7. Under Section 106A(3) of the Town and Country Planning Act, the modification of the legal agreement is legally appropriate as the obligations would continue to serve their useful purpose in an updated, modified format.

8. EQUALITIES IMPLICATIONS

- 8.1 Under the Equality Act 2010, Section 149, a public authority must, in the exercise of its functions, have due regard to the need to—
 - eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under this Act;
 - advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it;
 - foster good relations between persons who share a relevant protected characteristic and persons who do not share it.
- 8.2 The key equalities protected characteristics include age, disability, sex, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sexual orientation. It is considered that there is no indication or evidence that the protected groups have or will have different needs, experiences, issues, and priorities in relation to this particular application.

9. CONCLUSION

- 9.1 The proposed wording change to the obligation within the original S106 legal agreement would have no significantly differing effect compared to the original wording and would still provide a mechanism to ensure that the gas risk assessment is appropriate and suitably conservative for the proposed site end use.
- 9.2 It is considered that the proposed wording change would still ensure that the obligation would continue to serve a useful purpose as required under the 1990 TCPA (as amended).
- 9.3 The proposed wording changes to Schedule 6 clauses 5 and 6 are, therefore, recommended for approval.

Appendix 1 – Amended Conditions 7 and 50 of Planning Permission PL/16/0199

Italic – amended under PL/23/0080 and PL/23/1267; underlined and strikethrough– amended under PL/25/0526

Condition 7

Contamination and Land Gas

7. Long Term Management, Monitoring and Maintenance

a) Ground Gas

Prior to implementation of the development *excluding first foundation tie beam of Phase 1* a management plan shall be submitted to and approved in writing by the Local Planning Authority setting out the:

- Frequency and type of monitoring of ground gases to be undertaken to include on and off site gas migration;
- Frequency and method of reporting the results;
- What remedial actions will be taken in the event of results or readings showing a worsening of earlier readings.

The monitoring, reporting and consequent management of ground gas shall be undertaken by a 'competent person' as defined in Land Contamination Risk Management LCRM: Before you start - GOV.UK in accordance with the approved plan, prior to, during and post construction, but prior to occupation, and until the waste is unlikely to present a hazard to identified critical receptors in the context of the proposed development in human health, i.e. when monitoring demonstrates that the site has been appropriately assessed in accordance with current guidance, such as the Environment Agency's (LCRM) guidance and that the Ground Gas risks have been characterised in accordance with the approaches outlined within British Standards and, where appropriate, other current, relevant, authoritative guidance. ~~Characterisation CS2 has been reached (demonstrated by the results of a minimum of 24 datasets over two consecutive years at this level).~~

b) Gas Mitigation Measures

Prior to construction of any phase or part of phase excluding first foundation tie beam of Phase 1 a management plan shall be submitted to and approved in writing by the Local Planning Authority. This will set out the:

- Proposed gas mitigation measures for the buildings;
- Type and frequency of monitoring and recording of gas levels within buildings;
- Operations and maintenance procedures, including the method of reporting (including incidents), replacement of mitigation measures, detection systems and the corrective actions which would be implemented in the case of the failure of the identified mitigation measures.

The monitoring, reporting and management shall be undertaken in accordance with the approved plan.

Should detailed design of each phase of the development require changes to the approved management plan then an amended plan shall be submitted to and approved in writing by the Local Planning Authority, prior to the occupation of a phase.

c) Management Company

(i) Prior to construction *of any phase or part of phase excluding first foundation tie beam of Phase 1* details of the company, including their level and type of experience, who will

be employed to undertake the monitoring, reporting, management and maintenance requirements in accordance with the plan approved under 7a, shall be submitted to and approved in writing by the Local Planning Authority.

(ii) Prior to the occupation of the first phase, details of the site wide management company, including their level and type of experience, who will have overarching responsibility for the management of the site, including management of the company employed prior to construction as under 7c) (i) above, and who will undertake the ongoing monitoring, reporting, management and maintenance requirements in accordance with the plans approved under 7a and 7b above, shall be submitted to and approved in writing by the Local Planning Authority.

Any subsequent changes of the Management Company shall be submitted to and approved in writing by the Local Planning Authority, one month prior to the change.

Reason: to ensure the development is suitable for its end use and the wider environment and does not create undue risks to occupiers of the site or surrounding areas in accordance with Policy CS34.

Condition 50

Contamination and Land Gas

50. Long Term Management, Monitoring and Maintenance

a) Ground Gas

Prior to implementation of the development a management plan shall be submitted to and approved in writing by the Local Planning Authority setting out the:

- Frequency and type of monitoring of ground gases to be undertaken to include on and off site gas migration;
- Frequency and method of reporting the results;
- What remedial actions will be taken in the event of results or readings showing a worsening of earlier readings.

The monitoring, reporting and consequent management of ground gas shall be undertaken by a 'competent person' as defined in Land Contamination Risk Management LCRM: Before you start - GOV.UK in accordance with the approved plan, prior to, during and post construction, but prior to occupation, and until the waste is unlikely to present a hazard to identified critical receptors in the context of the proposed development in human health, i.e. when monitoring demonstrates that the site has been appropriately assessed in accordance with current guidance, such as the Environment Agency's (LCRM) guidance and that the Ground Gas risks have been characterised in accordance with the approaches outlined within British Standards and, where appropriate, other current, relevant, authoritative guidance. ~~Characterisation CS2 has been reached (demonstrated by the results of a minimum of 24 datasets over two consecutive years at this level).~~

b) Gas Mitigation Measures

Prior to construction of any phase or part of phase a management plan shall be submitted to and approved in writing by the Local Planning Authority. This will set out the:

- Proposed gas mitigation measures for the buildings;
- Type and frequency of monitoring and recording of gas levels within buildings;
- Operations and maintenance procedures, including the method of reporting (including incidents), replacement of mitigation measures, detection systems and the corrective

actions which would be implemented in the case of the failure of the identified mitigation measures.

The monitoring, reporting and management shall be undertaken in accordance with the approved plan.

Should detailed design of each phase of the development require changes to the approved management plan then an amended plan shall be submitted to and approved in writing by the Local Planning Authority, prior to the occupation of a phase.

c) Management Company

(i) **Prior to construction** of *any phase or part of phase* details of the company, including their level and type of experience, who will be employed to undertake the monitoring, reporting, management and maintenance requirements in accordance with the plan approved under 7a, shall be submitted to and approved in writing by the Local Planning Authority.

(ii) Prior to the occupation of the first phase, details of the site wide management company, including their level and type of experience, who will have overarching responsibility for the management of the site, including management of the company employed prior to construction as under 7c) (i) above, and who will undertake the ongoing monitoring, reporting, management and maintenance requirements in accordance with the plans approved under 7a and 7b above, shall be submitted to and approved in writing by the Local Planning Authority.

Any subsequent changes of the Management Company shall be submitted to and approved in writing by the Local Planning Authority, one month prior to the change.

Reason: to ensure the development is suitable for its end use and the wider environment and does not create undue risks to occupiers of the site or surrounding areas in accordance with Policy CS34.

APPENDIX 2: EXTRACT FROM PLANNING APPLICATIONS COMMITTEE REPORT

PL/16/0199 – 26TH APRIL 2017

(iii) Land Contamination

Ground Gas

- 7.16 The application site is a permitted landfill site which is subject to a Waste Management Licence/ Environmental Permit held by Reading Football Club. The licence status is closure, which means that it no longer receives waste. It had been licenced to accept household, commercial and industrial waste.
- 7.17 Between 1972 and 1985 the site was used for landfill, starting in the north-east of the site and then extending westwards. Originally, between 6m and 8m of fill was deposited in the form of land raise. During 1997, the north-eastern part of the tip was relocated to the west end of the site to make way for the new retail park to the east of the site and the development of the Madejski Stadium. Consequently, the land rises to the west and levels are higher on the western end of the site. In parts the level of fill material is around 12m in depth. The development of the Madejski Hotel commenced in 1999 and it was extended in 2006. The hotel is also built on the area of filled ground.
- 7.18 The ES notes that environmental monitoring of the site has occurred over a period of 20 years in accordance with the permitting licence. It noted that there were very high concentrations of ground gas in boreholes immediately to the north of the football stadium (para. 10.160). It notes that ground conditions may result in major adverse effects on human health and the built environment during the construction stage and that they may impact on the operational phase of the development (i.e. occupation). It sets out a summary of mitigation measures. These include management plans, specifically designed engineering works and of the buildings, and a ground gas risk assessment to determine the level of gas protection required. It indicates that in terms of gas emissions, the site can be characterised as level 2/3, based on the industry standard classification in CIRIA C665². Based on this characterisation, it is contended that the proposed mitigation measures will ensure all adverse effects will be reduced to negligible.
- 7.19 The Planning Statement indicates that: *“through the Operational Phase of the development, the contamination management measures will need modifying to replace any compromised landfill infrastructure, in addition to gas monitoring to identify future gas protection measures to be incorporated into the design of the proposals. With regard to the proposals themselves, the aspects which are identified as having potential for causing contamination are the service and car parking areas, with such effects mitigated through appropriate design solutions. It is considered that the mitigation measures proposed will be sufficient to ensure that all adverse effects identified through both the construction and operational stages will be reduced to negligible.”*
- 7.20 The Planning Statement refers to Chapter 10 of the Environmental Statement stating that it, *“considers any likely effects on a number of receptors and sets out the mitigation measures proposed to eliminate, reduce or offset likely significant adverse effects. A CEMP and phasing sequence will be prepared prior to construction to mitigate exposure to landfill material.”*

² Assessing Risks Posed by Hazardous Ground Gases to Buildings, CURUA C665 (2007)

- 7.21 The Design and Access Statement points to the following mitigation and design measures for the development to take account of ground conditions and contamination (para 6.8).
- Due to the high potential for continued ground settlement as a result of the 'made ground' nature of the site, a piled foundation strategy with suspended ground floor slabs will be required.
 - Consideration will need to be given to the differential settlement that may occur between the public realm and proposed buildings should external ground levels be increased through new fill.
 - Any new foundations, sewers and utilities will need to minimise penetration through the existing leachate capping membrane. Local lowering of the membrane will be required where construction does penetrate the capping layer.
- 7.22 Para 6.13 notes:
- The standpipe network can be reconfigured to facilitate development. However, venting columns will need to be repositioned and incorporated into the public realm design.
 - New buildings will require additional protection from gas, through their design.
- 7.23 A2.1 notes that, *"As identified in the site wide features and constraints plan, the convention centre site will require a series of landfill gas protection measures to be incorporated into the construction of the substructure of the new buildings. This will prevent the upwards migration of ground gases into and around the new buildings and reduce the risk of gas build-up in any confined spaces. The design of these will be based on further site investigation, monitoring of ground gases and subsequent quantitative risk assessment."*
- 7.24 Appendix 10.12 notes under the heading Gas Pipe Venting, *"The designers have worked closely with the engineers to advance an integrated design strategy for dealing with the requirements for gas vent piping through the building."* A10.13. goes on to say, *"As such, a network of standing pipes will be integrated with the other service cores and vent to air at roof level."*
- 7.25 An Environmental Strategy dated November 2015 sets out how the development will take account of ground conditions. It details the past history and the monitoring that has been undertaken and which remains in place on the site. It then provides various design measures which can be summarised as follows:
- Piling proposals involving continuous flight auger (CFA) piling which is based on the design and methodology used for the construction of the Stadium and the hotel;
 - Earthworks proposals to construct the foundations and ground floor slabs of each building above the existing capping layer. This capping layer currently prevents surface water from getting through to the waste layer below and it also provides a protection layer to stop any contact between the waste and people using the land above by sealing it off and providing a route through to vent gases above ground. Piling and slabs will replace the capping layer underneath the buildings. The capping layer will then be lapped and sealed with the ground floor slabs;
 - Ground Floor Slab Detail - The usage of each area and the Characteristic Gas Situation (CS) will govern the ground floor slab build-up. Final build-ups will be designed in accordance with a 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.' The suspended reinforced concrete ground floor slab will be cast on a membrane. The membrane beneath the slab will be lapped with the existing membrane around the perimeter of the building.

- Gas vent pipes will channel any collected gas from beneath the sealed layer and vent it to atmosphere.

- 7.26 It should be noted that the usage of the lowest building levels varies between buildings. Typically for the residential blocks, the areas are ventilated car parks. Under the Convention Centre the use varies from a car park, loading bay, hotel lobby, serviced apartments, and bar and food and beverage areas. Particularly where ventilated, these lower building levels will act to disperse any gas that might inadvertently get through the membrane barriers. However, this part of the development is not wholly above a ventilated void and additional secondary membrane barriers will be installed as an additional precaution.
- 7.27 The Environmental Strategy considers a number of scenarios including Scenario 3 (Section 10.3) which examines the upward migration of landfill gas to the surface. Under this scenario, it notes that there is potential for human health (construction workers and end users) to be affected by gas accumulation, the magnitude of which is assessed as major, having the potential to cause asphyxiation in the worse case scenario. It goes on to state that, *“The buildings themselves will require specially designed and detailed gas protection measures in the permanent condition to protect the internal spaces against ingress and build-up of ground gas.”* The study indicates that a series of landfill gas protection measures will be incorporated into the construction of the substructure of the new buildings. This will prevent the upwards migration of ground gases into and around the new buildings and reduce the risk of gas build-up in any confined spaces. The design of these will be based on further site investigation, monitoring of ground gases and subsequent quantitative risk assessment. Lists of other measures are set out in the section for “During Construction” and “Post Construction.” It concludes that, *“based upon the findings of the landfill gas risk assessment the level of risk for the proposed redevelopment is considered acceptable provided that the similar protection measures are employed and that care is taken to fully integrate them with those already in place.”*
- 7.28 Reading Borough Core Strategy Policy CS24: Pollution and Water Resources states that development will be permitted on land affected by contamination where it can be demonstrated, to the satisfaction of the LPA, that the contamination can be satisfactorily remediated so that it is suitable for the proposed end use.
- 7.29 The National Planning Policy Framework (NPPF) seeks to encourage the effective use of land by reusing land that has been previously developed and to remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate. However, it also indicates that the planning system should enhance the environment by preventing both new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.
- 7.30 National Planning Policy Guidance (NPPG) contains pages on land affected by contamination noting that in relation to such land the planning system runs alongside other regimes including the Building Regulations, Environmental Protection and Environmental Permitting Regulations. The Environment Agency is the primary organisation in relation to the latter two regimes and it has been consulted in relation to this application.
- 7.31 The NPPG includes a diagram for decision making that indicates that it is for the applicant to carry out studies to demonstrate that any risk is acceptable or that remediation proposed make the risks acceptable. It indicates that developers should provide proportionate but sufficient site investigation information (a risk assessment) to determine the existence or otherwise of contamination, its nature and extent, the

risks it may pose and to whom/what (the 'receptors') so that these risks can be assessed and satisfactorily reduced to an acceptable level. It refers to Defra and Environment Agency publications that provide technical guidance on carrying out assessments of contamination and risks.

- 7.32 The NPPG also indicates that before granting outline planning permission, a local planning authority will, among other matters, need to be satisfied that:
- it understands the contaminated condition of the site;
 - the proposed development is appropriate as a means of remediating it; and
 - it has sufficient information to be confident that it will be able to grant permission in full at a later stage bearing in mind the need for the necessary remediation to be viable and practicable.
- 7.33 This is a hybrid application for which outline planning permission is being sought for the main part of the proposed residential development.
- 7.34 The NPPG indicates that permission can be granted subject to conditions but it points out that local planning authorities should be satisfied that a proposed development will be appropriate for its location and not pose an unacceptable risk.
- 7.35 As set out in NPPG, development on contaminated land is subject to a number of regulatory regimes and the Environment Agency have an important role in relation to this site as it is a permitted/licensed landfill waste site. Consequently, any development, or disturbance, of the site will need permission (or a permit) under Environmental Permitting Regulations. That will be separate to the granting of planning permission.
- 7.36 As a permit site, the application site is subject to a high level of monitoring to ensure that no pollution is occurring, particularly to groundwater and water courses. The Environment Agency, which has primary responsibility for water pollution matters, has not objected to the principle of development although it did originally object on the grounds of adverse impacts on ecological habitats arising from the form of development. The Agency's initial response did not make any comments related to the suitability of the site to accommodate sensitive developments such as residential development. While matters related to human health are primarily the responsibility of the local planning authority, under the permit, the Environment Agency also has responsibility to consider whether development will be permitted in relation to the control of pollution and potential impacts on human health. The Agency continued to review further data and material submitted by the applicants in response to requests from the local planning authority. Further clarification was sought from the Agency in relation to their role under the Environmental Permitting Regulations and this was documented in their final response in January 2017.
- 7.37 Advice to us from the Environment Agency points to the following. Their full final response is attached at Appendix 3:

Reading FC landfill was a landfill for re-deposited non-hazardous waste and is known to be producing landfill gas and leachate. Landfill gas consists of methane and carbon dioxide which is produced as the waste in the landfill degrades. Methane can present a risk of fire and explosion. Carbon dioxide can present a risk of asphyxiation or suffocation. The trace constituents of landfill gas can be toxic and can give rise to long and short term health risks as well as odour nuisance.

The risks associated with landfill gas will depend on the controls in place to prevent uncontrolled release of landfill gas from the landfill site. Older landfill sites may have

poorer controls in place and the level of risk may be higher or uncertain due to a lack of historical records of waste inputs or control measures.

- 7.38 During the discussions both at pre-app and planning application stages, council officers have expressed concerns that the existing monitoring regime provided insufficient information on the characterisation of the application site, which is wholly on landfill that is still in the process of decomposition and thus liable to shrinkage and emission of toxic gases, in particular methane and carbon dioxide. In the opinion of officers, advised by an expert consultant, the applicants provided insufficient information as part of their application to properly characterise the site and thus properly assess the risks involved in its development, particularly for sensitive uses such as residential uses.
- 7.39 The Council's Environmental Protection and Nuisance Manager, advised by Tweedie Evans Consulting, specialists in contaminated land, initially raised concerns over the proposals. The absence of specific on-site monitoring at that time, particularly of borehole gas flow rates, meant that in their view, ground gas emissions within the development area had not been adequately characterised. They did not consider that the contaminated condition of the site with respect to the gassing regime had been fully demonstrated. Their view was that there was inadequate information to demonstrate the Applicant's contention that the site is a very low risk gassing site, and that the waste is nearing stabilisation both physically and biologically.
- 7.40 In response to these concerns the Applicant's initially sank an additional three gas monitoring boreholes. These were located along a line running East-West through the centre of the site. These wells were installed during June 2016 and a Geo-environmental Interpretive Report was submitted on 29th July 2016 detailing the first round of results of the monitoring of the 3 new wells. This highlighted problems with one of the boreholes. Readings from the other 2 boreholes indicated elevated levels of methane and carbon dioxide, compared to the assumed Level 2/3 characterisation of the site. That raised further concerns and, consequently, the Applicant was requested to provide further boreholes to provide gas readings, specifically in the areas proposed for residential development in the western part of the site.
- 7.41 In response to this request, additional boreholes were installed by the applicant during December 2016 with monitoring commencing in January 2017. The first readings reported in February 2017 resulted in the characterisation of the site being raised from Level CS2/3, as had been indicated in the original environmental statement that accompanied the application, to Level CS4/5.
- 7.42 In order for a proper characterisation of the site, gas readings are required over a period of time (which takes in different weather conditions, including falling atmospheric pressure). Further monitoring was therefore undertaken during March 2017. While these readings show some more elevated readings compared to January/February readings, the applicant remains of the view that the site can be characterised at a level 4/5 and that, technically, it is capable of development for residential uses.
- 7.43 The applicant (represented by Arup in this regard) is of the view that the design proposals submitted with the planning application provide robust protection measures suitable for preventing gas ingress to the proposed accommodation for a Level CS4/5 site on the basis of the empirical method set out in CIRIA C665 and in BS8485:2015. The Council's consultant, Tweedie Evans Consulting, has reviewed the Technical Note, dated 31st March 2017, issued by Arup covering the additional investigation and gas monitoring undertaken by Arup between 12th December 2016 and 29th March 2017.
- 7.44 The response form TEC is as follows:

“The last reporting that was previously formally commented upon was the Arup report referenced 240524-98REP/240524-98 dated 20 October 2016. The comments relating to this report were detailed in correspondence referenced 1603013.001.03 dated 18 November 2016. In this correspondence, several concerns regarding the assessment works that had been undertaken at the site were noted. These concerns related to:

- 1. Encountering of pressurised gas pockets during drilling and implications with respect to the development;*
- 2. Data from newly installed boreholes GW01, GW02 and GW03 principally relating to the manner of installation;*
- 3. Atmospheric pressure conditions during monitoring particularly relating to the absence of flow data during periods of low and falling pressure, periods where significant borehole differential pressures were being recorded;*
- 4. Absence of confirmation regarding materials being monitored in boreholes R, S and T, locations from which the only long term data has been presented; and*
- 5. Future potential for gas generation and settlement.*

With regards to the last point initial comments regarding ground stability and future gas generation were largely related to the future requirement to maintain the Environmental Permit for the site. It is my understanding that the Environment Agency has issued an advisory notice as to what their requirements will be, under waste licencing provisions, with respect to ground stability should planning permission be granted. On this basis, therefore, given that the applicant has indicated that all services will be placed within the clean capping layer and that they have accepted that there will be a significant ongoing maintenance requirement as part of the development in the future, I have not commented further regarding this area.

Additional Investigation

Further to these comments the applicants agreed to undertake additional investigation and monitoring on site with intrusive works commencing on 12 December 2016. Following these works, a report, titled “Site Characterisation Update Report” dated 17 February 2017 and referenced 240524-98, was issued covering the work undertaken. This report detailed the advancement and installation of five boreholes (GW04, GWE05, GW06, GW08 and GW09) within the landfill mass up to a maximum depth of 14.7m. The logs for the boreholes confirmed similar landfill materials, with a significant putrescible content, as previously identified in GW01, GW02 and GW03. It is understood that pressurised pockets of landfill gas were once again encountered during drilling works.

GW04, GW06, GW08 and GW09 were advanced within the southernmost area of the site where the principal residential component of the development is being proposed. GW05 was advanced within the general vicinity of historic boreholes R and S in the northern most area of the site where it confirmed the presence of 10.7m of landfill material above the underlying natural ground. This would suggest that R, S and T are likely to be installed within the main landfill body, along the boundary of the development site, although installation details have still not been provided.

All five boreholes were installed with monitoring standpipes to depth which now allows for monitoring of much of the unsaturated depths of the landfill mass.

Additional Monitoring

The recent Technical Note summarises the monitoring undertaken on the boreholes installed within the development area. The first of the most recent boreholes to be installed was GW08 with monitoring commencing of this location on 04 January 2017. Monitoring of the remaining four new locations commenced as and when the boreholes were installed with monitoring of all five locations being possible from 31 January 2017. The final round of monitoring reported in the Technical Note was dated 29 March 2017 with all five locations being monitored on a minimum of six occasions and GW01, GW02 and GW03 also being monitored intermittently over this period.

The Technical Note does not discuss atmospheric pressures recorded during the monitoring in any detail although it does recognise how important changes in barometric pressure can affect gassing emissions. However, a quick review of the factual data supporting the note indicates that much of monitoring was undertaken at moderate to high atmospheric pressures with only a single monitoring visit occurring at low and falling pressure (27 Feb, 982-987mb). The peak borehole flow rate of 37.9l/hr, and associated borehole differential pressure of ~44mb, occurred on this date confirming that gas emissions are likely to be directly correlated to significant drops in pressure.

The Technical Note further attributes a Characteristic Situation to each location specific monitoring visit based upon the concentrations and flow rates recorded and, based upon the range of "CS's" derived, have assessed the site as being of CS4/5 (moderate to high risk rating) and it is noted that a risk rating of CS5 has been calculated on at least one occasion for five out of eight boreholes installed (five out of seven if the flooded borehole GW01 is excluded). However, current guidance indicates that where limited data exists for a site that the Characteristic Situation attributed to the overall site should be based on a worst case situation of maximum borehole flow rate and gas concentration irrespective of date and location. I recognise that better quality data has been derived from the landfill mass during the most recent works however given the sensitivity and size of the site I would consider the data set recorded still to be restricted. Therefore, using the worst case data from the site (37.9l/hr and 82.8%v/v methane (GW03)) this would give a limiting borehole flow rate of 31.4l/hr well within CS5 (high risk).

Gas Protection Measures

Arup have provided an outline of design measures which would be incorporated into the development to provide adequate protection for the proposed end uses. For the commercial properties and residential developments over basement car parking, it is likely that there are technical solutions, such as those described by Arup, which if designed, installed and maintained in in line with BS8485:2015 (Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings) would be to protective of the development with CS5 (high risk rating) gassing conditions. However, where residential property is located at ground floor without a ventilated car parking basements this may be more difficult to achieve.

Conclusions

I indicated in my previous correspondence that even for an outline planning application the Local Planning Authority.....

"needs to be satisfied that:

- it understands the contaminated condition of the site;
- the proposed development is appropriate as a means of remediating it; and
- it has sufficient information to be confident that it will be able to grant

permission in full at a later stage bearing in mind the need for the necessary remediation to be viable and practicable”.

I would consider that both the coverage of boreholes now provided by the applicant and the extent of monitoring undertaken (including the low and falling period of atmospheric pressure) is the minimum that would be required at this pre-application stage and provides a general overview of the higher risk that would be expected to be associated with a site such as this. Any permission that you may feel minded to grant is going to have to have conditions applied to require substantial additional investigation, monitoring (over a suitable period) and assessment of the gassing regime to confirm these initial findings. Should these additional investigations confirm the current risk assessment it is likely that, based upon current guidance, the provision of the range of solutions to appropriately mitigate against the landfill gas present will not pose a technical barrier to development going ahead. Furthermore, in addition to the gas protection measures outlined, BS8485 requires that any gas protection measures for managed apartments will need to be subject to ongoing long term management by a body of substance who will have the control, resources and access to maintain the measures in the site.

Notwithstanding this, given the limited extent and duration of the monitoring to date, the highly variable nature of the data gathered, the significant putrescible content recorded as well as the presence of pressurised gas pockets it cannot be discounted that such future monitoring may indicate even more onerous gassing conditions may be locally recorded which may require the protection methods currently outlined to be readdressed.”

- 7.45 The proposed development site is a landfill site subject to high concentrations and flows of landfill gas. The applicants monitoring and assessments have characterised the site as CS5. Technical solutions have been put forward to enable residential development of the land with this characterisation and expert advice indicates that if designed, installed and maintained correctly those measures should reduce risks to acceptable levels. Therefore, subject to appropriate planning obligations and conditions, it is concluded that planning permission can be granted for this development on this site.
- 7.46 NPPG says that in relation to contaminated land, local authorities can consider
- 1) *Using planning obligations* - for payments to the local planning authority, for example, for on-going monitoring, maintenance, or as a bond to cover the contingency of future action triggered by the monitoring.
 - 2) *Using Conditions* - including for site characterisation, submission of the remediation scheme - what it should include; implementation of the approved remediation scheme - notification to the local planning authority of when the works will start, validation that the works have been carried out and reporting of unexpected contamination; and monitoring and maintenance - what is required and for how long.
- 7.47 Site Characterisation and Future Monitoring - In the Environmental Strategy submitted by the applicants with their application, it was proposed that a programme of ground gas monitoring be carried out in accordance with the latest industry guidance CIRIA guidance 6651 and BS 8485:2015 prior to the commencement of development and/ or the submission of reserved matters.
- 7.48 It also has to be remembered that a permit will need to be obtained by the developers from the Environment Agency prior to any development. This permit will also control the measures to prevent emissions and pollution as a result of both the construction and operation of the development. The developers will also have to obtain Building Regulations approval which will take account of the risks posed by the ground

conditions. Developers therefore face further and separate regulatory challenges even though planning permission is granted.

- 7.49 Frequent, more comprehensive, long term monitoring of the site will therefore continue into the future. From a planning point of view, monitoring should be maintained to demonstrate the characterisation of the site, changing ground conditions and the level of gas being emitted to ensure that any remediation and management regime remains appropriate. The condition (s) will require that the monitoring information and analysis is provided to the local planning authority on a regular basis.
- 7.50 Remediation - The Environmental Statement submitted with the planning application provides details of the engineering works and building design to take account of the characterisation of the site. They claim that the works proposed is appropriate for a site with a Level C4/5 characterisation. The Council's Environmental Protection and Nuisance Manager, advised by a Tweedie Evans Consulting, accept that the design is appropriate in principle. Further, more detailed design will be required to be submitted prior to the commencement of development for the detailed part of the application that includes the conference centre, hotel, serviced apartments and the residential development in Block 7. Any outline permission will require the submission of details for the residential blocks 1-6. There will also be a need for conditions to secure the implementation of the approved design.
- 7.51 Management of the site and the development - The safety of any development will depend on continuous future management of the site and any gas mitigation measures that may be implemented as part of the development. These will need to be mindful of:
- wider site safety issues (e.g. contamination hazards, combustion hazards, etc.);
 - ambient air quality (e.g. from volatile or trace gases);
 - the anticipated life expectancy of the protection measures;
 - the size and experience of the management company; and
 - the operations and maintenance procedures that they propose.
- 7.52 The management company responsible for the site will need to demonstrate that they have the knowledge, experience and resources over the life of the development, to manage and maintain the site and the development safely at all times. For example, it would not be acceptable for a large developer to pass the development on to a small management company which is the responsibility of the residents, as they would not have the resources or knowledge to ensure appropriate control in the long term. The developer would have to demonstrate that the gas remediation design can operate efficiently and passively at all times, with minimal requirements for maintenance. Appropriate Management conditions are therefore proposed.