

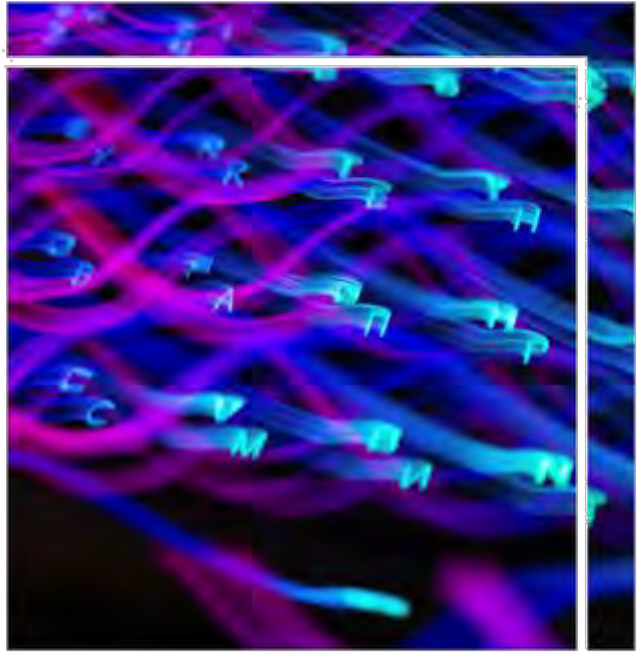
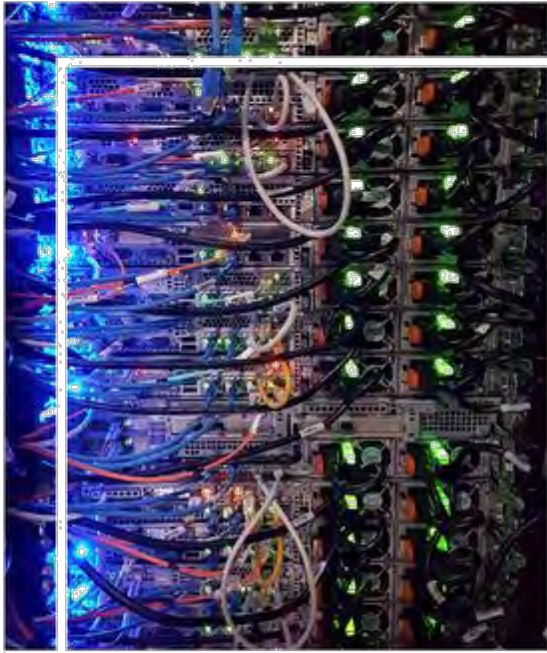


Thames Valley Park Data Centre

EIA Volume 3: Technical Appendices

Tyréns Hilson Moran | On Behalf of FH Trustees
Revision P02 | September 2026





Project Name: Thames Valley Park Data Centre

Report Name: Environmental Statement

Volume 3

Issue Status: Final

Reference: 38792-HML-XX-XX-RP-U-830001

Date of Issue: 25 September 2026

Issue: P02

Suitability Code: S4 Suitable for stage approval

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Document History:

Issue	Date	Details
P01	22/9/2026	FIRST ISSUE
P02	25/9/2026	FINAL ISSUE

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Appendix 1.1 – Schedule 4 Compliance Table

Information for inclusion in Environmental Statements, Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)		Location in the Environmental Statement
1.	A description of the development, including in particular: a) a description of the location of the development; b) a description of the relevant characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases; c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operational phases.	Included in Chapter 4 of Volume 2 and addressed through topic assessments in Chapters 6 – 10 of Volume 2.
2.	A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Included in Chapter 4 of Volume 2
3.	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	A general description is included in Chapter 4 and topic specific descriptions in Chapters 6 to 15 of Volume 2.
4.	A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: biodiversity (for example flora and fauna), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets and waste.	Included in topic specific descriptions in Chapters 6 to 15 of Volume 2. Additional supporting information within Volume 3 where referenced.
5.	A description of the likely significant effects of the development on the environment resulting from, inter alia: a) the construction and existence of the development, including, where relevant, demolition works;	Included in topic specific descriptions in Chapters 6 to 15 of Volume 2.

Information for inclusion in Environmental Statements, Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)	Location in the Environmental Statement
b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste; d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters); e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources; f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; g) the technologies and the substances used. The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development this description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC and Directive 2009/147/EC.	
6. A description of the forecasting methods or evidence use to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	General approach provided in Chapter 2 and topic specific approaches in Chapters 6 to 10 of Volume 2.
7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	Provided in topic assessments in Chapters 6 to 10 of Volume 2.
8. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessment pursuant to EU legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or UK environmental assessments	High level consideration of general accidents/incidents included in Chapters 6 to 10 in Volume 2.

Information for inclusion in Environmental Statements, Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)		Location in the Environmental Statement
	may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Specific assessment, not relevant to the EIA so scoped out.
9.	A non-technical summary of the information provided under paragraphs 1 to 8.	Provided in Volume 1
10.	A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	Within the text of Volume 2 and as a reference list in Volume 3 of the ES: Technical Appendices.

Appendix 1.2 – Statement of Competence

Technical Topic	Role	Specialist	Qualifications and Relevant Experience
Air Quality	Lead Author	Sian Grimsley	Sian Grimsley is a Senior Environmental Consultant at Tyréns Hilson Moran, specialising in air quality, greenhouse gas emissions and climate change. She has over five years of technical experience, including the preparation of air quality chapters for Environmental Statements. Sian holds an MSc in Atmospheric Science and is an Associate Member of the Institute of Environmental Sciences (IES) and the Institute of Air Quality Management (IAQM).
Air Quality	Reviewer	Tom Reade	Tom Reade is a Studio Director at Tyréns Hilson Moran with over 14 years of technical experience, including the preparation and review of air quality chapters for Environmental Statements. Tom holds an MSc in Atmospheric Science, is a full member of the IES and IAQM, and is a Chartered Environmentalist.
Noise and Vibration	Lead Author	Fatima Taha	Fatima Taha is a Principal Acoustic Consultant at Tyréns Hilson Moran, and holds an MSc in Acoustics and Noise Control from Auburn University, Alabama, and an MSc in Mechanical Engineering from the High Institute of Mechanics of Paris. Fatima has over eight years of experience working as an acoustic consultant, including the last five years in senior roles, and has prepared and reviewed acoustic assessments throughout this time. Her professional work covers a wide range of sectors, including residential, commercial, education, and healthcare, and encompasses the full lifecycle of project delivery from planning and design through to completion. Fatima is a Corporate Member of the Institute of Acoustics ('MIOA').
Noise and Vibration	Reviewer	Jerry Rees	Jerry Rees is Head of Acoustics at Tyrens Hilson Moran, and holds an MSc in Environmental and Architectural Acoustics from London South Bank University. Jerry has over twelve years of experience working as an acoustic consultant, including more than five years in senior and lead roles, and has prepared and reviewed ES chapters throughout this time. His professional work covers a wide range of sectors, including residential, commercial, education, and sports, and encompasses the full lifecycle of project delivery from planning and design through to completion. Jerry is a corporate MIOA, and a chartered engineer registered with the Engineering Council ('CEng').
Climate Change and Greenhouse Gas Assessment	Lead Author	Sian Grimsley	Sian Grimsley is a Senior Environmental Consultant at Tyréns Hilson Moran, specialising in air quality, greenhouse gas emissions and climate change. She has over five years of technical experience, including the preparation of climate change and greenhouse gas chapters for Environmental Statements. Sian holds an MSc in Atmospheric Science and is an Associate Member of the IES and IAQM.

Technical Topic	Role	Specialist	Qualifications and Relevant Experience
Climate Change and Greenhouse Gas Assessment	Reviewer	Andy Hart	Andy Hart is an Associate Director at Tyréns Hilson Moran and a Chartered Engineer with over 16 years of technical experience. He is registered with the Engineering Council.
Water Resources	Lead Author	Matt Lai	Matt Lai is a Civil Engineer at Arup with over four years of technical experience within the civil engineering industry, specialising in the design of drainage systems and data centre infrastructure. Matt holds an MEng in Civil Engineering and is a Graduate Member of the Institution of Civil Engineers (GMICE).
Water Resources	Reviewer	Edie Hatter	Edie Hatter is a Senior Civil Engineer at Arup with eight years of experience in flood risk, drainage and water management. Edie is a Chartered Water and Environmental Manager and a member of the Chartered Institution of Water and Environmental Management (CIWEM).
Waste	Lead Author	Lucy Cooper	Lucy Cooper is a Senior Environmental Consultant at Tyréns Hilson Moran with five years of experience in environmental consultancy, including the preparation of Environmental Statements and waste management strategies. Lucy holds an MGeol in Geological Sciences and is an Associate of the Institute of Environmental Sciences (AMIEvSc).
Waste	Reviewer	Rose Gibbon	Rose Gibbon is a Senior Environmental Consultant at Tyréns Hilson Moran with over five years of experience in environmental consultancy, including the preparation and review of Environmental Statements. Rose holds a BSc degree and is a member of the Institute of Sustainability and Environmental Professionals (ISEP).

Appendix 1.3 – Glossary

Term	Definition
A-weighted sound pressure level, LpA	The sound pressure level with the A-weighting applied. The A-weighting is used for most environmental noise measurements and is used to weight a spectrum of sound to match the sensitivity of the human ear.
A1-A3	Product stage modules in a whole-life carbon assessment, covering raw material supply, transport to the manufacturer and manufacturing.
A4-A5	Construction process stage modules in a whole-life carbon assessment, covering transport to the Site and construction or installation activities.
AADT Annual Average Daily Traffic	A daily total traffic flow (24 hrs), expressed as a mean daily flow across all 365 days of the year.
ABC assessment	The assessment method in BS 5228-1 that establishes construction-noise thresholds according to the existing ambient noise level and the relevant time period.
Absorption Coefficient, α	The fraction of reverberant sound energy absorbed by a material. It is expressed as a value between 1.0 which equates to perfect absorption and 0 which equates to zero absorption.
Absorption, A	The acoustic absorption derived from the multiplication of the absorption coefficient by the surface area of a given material.
Acoustic Class, A – E	Classification of sound absorbers into Sound Absorption Classes A-E, according to BS EN ISO 11654, including frequencies 200-5000 Hz
ADMS-Urban	Atmospheric dispersion modelling software used to predict pollutant concentrations from road and point sources in urban areas.
AEP	Annual Exceedance Probability: the probability of a flood event of a specified magnitude being equalled or exceeded in any one year.
Air Quality Objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air Quality Standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective)
Ambient Air	Outdoor air in the troposphere, excluding workplace air.
Ambient Noise Level	The noise level in a given environment whilst it is subject to all of its normal sources of noise.
AMIEEnvSc	Associate Member of the Institute of Environmental Sciences.
Annual Mean	The average (mean) of the concentrations measured for each pollutant for one year.
Application Site	The land within the planning application boundary to which the Proposed Development relates.
AQAL	Air Quality Assessment Level: the pollutant concentration used to assess the significance of air-quality effects, normally derived from an air-quality objective, limit value or guideline.
AQMA	Air Quality Management Area
AQS	Air Quality Strategy, or the associated air-quality standards and objectives used to assess pollutant concentrations.
AURN	Automatic Urban and Rural Network: the United Kingdom's principal network of automatic air-quality monitoring stations.

Term	Definition
B1-B5	Use-stage modules in a whole-life carbon assessment, covering use, maintenance, repair, replacement and refurbishment.
B6	The whole-life carbon module covering operational energy use.
B7	The whole-life carbon module covering operational water use.
Background Sound / Noise Level, LA90	These are amongst the lowest noise levels measured over a given period of time and exclude short term, intermittent noise sources. The background noise level is quantified by the LA90 descriptor and is therefore the level which is exceeded for 90% of a given period of time.
Baseline	The existing environmental conditions against which the effects of the Proposed Development are assessed.
BEIS	Department for Business, Energy and Industrial Strategy, a former United Kingdom government department whose relevant energy functions now sit principally with DESNZ.
BNG	Biodiversity Net Gain: an approach intended to leave biodiversity in a measurably better condition than before development.
BPM	Best Practicable Means: reasonably practicable measures used to prevent or minimise emissions, noise, vibration or other environmental effects.
BREEAM	Building Research Establishment Environmental Assessment Method: a sustainability assessment and certification method for buildings and infrastructure.
BS	British Standard.
C1-C4	End-of-life modules in a whole-life carbon assessment, covering deconstruction or demolition, transport, waste processing and disposal.
Carbon budget, CB	A limit on the quantity of greenhouse gases that may be emitted over a defined period or within a defined jurisdiction.
Carbon dioxide equivalent, CO2e	A common unit that expresses the climate effect of different greenhouse gases relative to carbon dioxide.
CCR	Climate Change Resilience assessment: an assessment of the vulnerability and resilience of the Proposed Development to projected climate hazards.
CEMP	Construction Environmental Management Plan: a document setting out the environmental controls, responsibilities and monitoring arrangements to be implemented during construction.
CH4	Methane, a greenhouse gas.
CIA	Cumulative Impact Assessment: assessment of the combined effects of the Proposed Development with other relevant developments or activities.
CIBSE	Chartered Institution of Building Services Engineers.
Circular economy	An economic approach that seeks to retain the value of products and materials for as long as possible through prevention, reuse, repair, refurbishment, recycling and recovery.
CIRIA	Construction Industry Research and Information Association.
CL:AIRE	Contaminated Land: Applications in Real Environments, an independent organisation that develops guidance and good practice for sustainable land management.
Climate change resilience	The capacity of the Proposed Development to anticipate, withstand, recover from and adapt to climate-related hazards.
Combined sewer	A sewer that carries both foul sewage and surface-water runoff in the same pipe.
Conservative	Tending to over-predict the impact rather than under-predict.

Term	Definition
Construction, demolition and excavation waste	Waste generated by site preparation, demolition, earthworks and construction activities, including soils, concrete, masonry, metals, timber, plasterboard and packaging.
Cross-talk	Noise transmission between one room and another room or space via a duct or other path.
Ctr	A correction term applied to the sound insulation single-number values (R_w , D_w , and $D_{nT,w}$). Applying the Ctr penalises a construction's performance if its low frequency performance is poor in relation its performance at higher frequencies.
Cumulative effect	An environmental effect arising from the interaction of effects from the Proposed Development with effects from other existing or reasonably foreseeable developments.
Data Capture	The percentage of all the possible measurements for a given period that were validly measured.
Decibel, dB	The decibel is a logarithmic unit of measurement used for quantifying sound. It is derived from the logarithm to base 10 of the ratio of two quantities. Use of a logarithmic scale has the advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers.
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero.
DfT	Department for Transport.
DMP	Dust Management Plan: a plan describing measures to prevent, control, monitor and respond to dust emissions.
DoWCoP	Definition of Waste: Development Industry Code of Practice, published by CL:AIRE, which provides a framework for the reuse of excavated materials without treating them as waste where its requirements are met.
Dust	Dust comprises particles typically in the size range 1-75 micrometres (μm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials.
Dynamic Insertion Loss, DIL	The reduction of noise level due to the presence of a noise control device such as an attenuator, including any regeneration noise created by its presence.
EA	Environment Agency.
Effect	The consequence of an environmental impact on a receptor; effects may be beneficial or adverse and significant or not significant.
EFT	Emissions Factors Toolkit: a Defra tool used to calculate road-traffic emissions.
EHO	Environmental Health Officer.
EIA	Environmental Impact Assessment: the process of identifying, assessing and reporting the likely significant environmental effects of a proposed development.
EIA Regulations	The Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended.
Embodied carbon	Greenhouse gas emissions associated with materials and construction processes throughout the relevant life-cycle stages of an asset.
Environmental permit	An authorisation that controls specified activities which could affect the environment, including the treatment, recovery, storage or disposal of waste.
EoL	End of Life: the life-cycle stage covering deconstruction or demolition, transport, waste processing and disposal.

Term	Definition
EPUK	Environmental Protection UK.
Equivalent continuous A-weighted sound pressure level, LAeq,T	The LAeq is an energy average and defined as the level of sound which, over a given period of time, would equate to the same A-weighted sound energy as the actual fluctuating sound.
ES	Environmental Statement: the documents that report the findings of the Environmental Impact Assessment.
Exceedance	A period of time where the concentrations of a pollutant is greater than the appropriate air quality standard.
Fluvial flooding	Flooding caused by watercourses exceeding the capacity of their channels and flowing onto surrounding land.
Foul water	Wastewater from sanitary appliances, kitchens and other domestic or commercial uses, excluding uncontaminated surface-water runoff.
Frequency Weightings	Weightings can be applied to a spectrum of sound and act as a filter to account for different sensitivities and conditions.
Frequency, Hz	In sound, the number of cycles per second of a pressure fluctuation and frequency in sound is proportional to its pitch. Different frequencies are divided into octave and one third octave bands.
GHG	Greenhouse gas: a gas that absorbs and emits infrared radiation and contributes to climate change.
GIA	Gross Internal Area: the area of a building measured to the internal face of the perimeter walls at each floor level.
GWP	Global Warming Potential: a measure of the heat-trapping effect of a greenhouse gas relative to carbon dioxide over a specified period.
Hazardous waste	Waste displaying one or more hazardous properties and requiring specific classification, storage, transport, treatment and disposal controls.
HDV/HGV	Heavy Duty Vehicle/Heavy Goods Vehicle
HFCs	Hydrofluorocarbons, a group of fluorinated greenhouse gases.
HVAC	Heating, ventilation and air conditioning.
HVO	Hydrotreated vegetable oil, a renewable diesel substitute that can be used in compatible plant and generators.
IAQM	Institute of Air Quality Management.
IEMA	Institute of Environmental Management and Assessment, now known as the Institute of Sustainability and Environmental Professionals.
IES	Institute of Environmental Sciences.
Impact	A physical or measurable change to the environment caused by an aspect of the Proposed Development.
Impact Sound	The noise generated by an impact on a structure. This is normally used to describe the noise created by people walking on a floor structure.
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.
ISEP	Institute of Sustainability and Environmental Professionals, formerly the Institute of Environmental Management and Assessment.
LAQM	Local Air Quality Management
LCA	Life Cycle Assessment: a method for evaluating environmental impacts across the life cycle of a product, process or asset.
LETI	Low Energy Transformation Initiative, formerly known as the London Energy Transformation Initiative.

Term	Definition
LPA	Local Planning Authority.
Magnitude of change	The scale, extent, duration and nature of a change to an environmental receptor caused by the Proposed Development.
Material assets	Finite natural resources and manufactured construction products required for development, including aggregates, soils, concrete, steel and timber.
Maximum noise Level, LAFmax	The maximum instantaneous noise level measured during a given period of time. The time weighting to which the meter is set for this measurement parameter is always indicated by either an F or S.
MEP	Mechanical, electrical and public-health engineering services.
Mitigation	Measures incorporated into the design or applied during construction or operation to avoid, prevent, reduce, remedy or offset adverse environmental effects.
MtCO2e	Million tonnes of carbon dioxide equivalent.
MW	Megawatt, a unit of power equal to one million watts.
N2O	Nitrous oxide, a greenhouse gas.
NO2	Nitrogen dioxide
Normalised Element Level Difference, Dne	The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalized to a reference amount of absorption.
NOX	Nitrogen oxides
NPPF	National Planning Policy Framework.
NPPW	National Planning Policy for Waste.
NPSE	Noise Policy Statement for England.
NR	The Noise Rating level. This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting NR level.
NRC	A single-number rating system used to compare the sound-absorbing characteristics of building materials. A measurement of the acoustical absorption performance of a material, calculated by averaging its Sound Absorption Coefficients at 250, 500, 1000 and 2000 Hz
NRMM	Non-road mobile machinery, such as construction plant and equipment that is not primarily intended for carrying passengers or goods on public roads.
NSR	Noise-sensitive receptor: a person, property or other location that may be sensitive to changes in noise or vibration.
Octave Bands	A band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.
Operational carbon	Greenhouse gas emissions associated with operating the Proposed Development, including energy and water use where applicable.
PC	Process Contribution: the modelled pollutant concentration attributable to emissions from the Proposed Development alone.
PEC	Predicted Environmental Concentration: the total predicted pollutant concentration, normally comprising the Process Contribution plus the background concentration.
Percentile level, LAN,T	A-weighted sound pressure level obtained using time-weighting F, which is exceeded for N% of a specified time interval. An example of this is background noise which is quantified with the LA90 descriptor, which is the A-weighted level which is exceeded for 90% of the measurement period.
PFCs	Perfluorocarbons, a group of fluorinated greenhouse gases.

Term	Definition
Physical climate risk	Risk to the Proposed Development arising from acute or chronic climate hazards, such as flooding, high temperatures, drought or extreme weather.
Pluvial flooding	Flooding caused when rainfall exceeds the capacity of the ground or drainage system to absorb or convey surface water.
PM10	Particulate matter with an aerodynamic diameter of less than 10 micrometres (μm)
PM2.5	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres (μm)
PPG	Planning Practice Guidance.
Proposed Development	The development for which planning permission is sought, as defined by the application description and development parameters.
Rating Level, L _{Ar} , Tr	The equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
RBMP	River Basin Management Plan.
RCP 8.5	Representative Concentration Pathway 8.5: a high greenhouse-gas concentration scenario used to assess a precautionary range of future climate conditions.
Reasonable worst case	A precautionary assessment scenario representing the greatest credible environmental effect within the defined development parameters.
Receptor	An environmental resource, feature, person or group that could be affected by the Proposed Development.
Residual effect	The environmental effect remaining after mitigation has been taken into account.
Reverberation Time, T	The time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped. The descriptor T, often includes other nomenclature to describe the type of reverberation time measurement or if the reverberation time is an average taken for specific frequencies. For example a T _{mf} is the mid-frequency reverberation time.
RICS	Royal Institution of Chartered Surveyors.
Sensitivity	The importance, value, susceptibility and ability of a receptor to accommodate environmental change.
SF6	Sulphur hexafluoride, a fluorinated greenhouse gas.
SFRA	Strategic Flood Risk Assessment.
Significant effect	An environmental effect judged significant in EIA terms using the assessment methodology and professional judgement.
Site Waste Management Plan, SWMP	A plan describing how materials and waste will be managed, monitored and reported during demolition and construction.
Sound exposure level, LAE	A level of a sound, of 1 s duration, that has the same sound energy as the actual noise event considered.
Sound Power Level, L _w	This is the total sound energy radiated from a given source. The sound power level is 10 times the logarithm to base 10 of the ratio of the reference sound power level (1×10^{-12}) and the measured power.
Sound Pressure Level, L _p	This is the unweighted or linear level which is measured prior to any weightings being applied. The sound pressure level is 20 times the logarithm to base 10 of the ratio of the reference sound pressure (2×10^{-5}) and the measured sound pressure.
Sound Reduction Index, R	The laboratory measured sound insulation properties of a material or building element in octave or third octave bands.

Term	Definition
Standardized Weighted Level Difference, DnT'w	The standardized, weighted difference in sound level between a pair of rooms, stated as a single figure. The level difference in octave bands is first normalized to a reference reverberation time and then plotted against a set of reference curves to establish a single figure value.
Study area	The geographical area within which baseline conditions and potential environmental effects are considered for a particular topic.
SuDS	Sustainable Drainage Systems: measures designed to manage surface-water runoff in a way that mimics natural drainage and can provide water-quality, biodiversity and amenity benefits.
Surface-water attenuation	Temporary storage and controlled release of surface-water runoff to reduce peak discharge rates and flood risk.
tCO2e	Tonnes of carbon dioxide equivalent.
Time Weightings	A time weighting to denote the response of the sound level meter. For most measurements the Fast time weighting is selected (F) however, a slow time weighting (S) is often used to for the measurement train noise and vibration.
Trackout	The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/ demolition site with dusty materials, which may then spill onto the road, and/or when HDV's transfer dust and dirt onto the road having travelled over muddy ground on site.
TWUL	Thames Water Utilities Limited.
UKCP18	United Kingdom Climate Projections 2018.
UKGBC	UK Green Building Council.
Vibration	The vibratory motion of a surface can be characterised by: (a) displacement (m), (b) velocity (m/s), or © acceleration (m/s ²). The magnitude of the vibration can be quantified in several ways: Peak to Pe-k - The total excursion of the oscillation about the zero datum. Pe-k - This value gives the maximum excursion of the oscillation above or below the zero datum. r.m.-. - This value gives the root mean square of the time history over a specific time interval (time constant). -B - Vibration levels can be expressed in dB. A reference level of 10-6 m/s ² r.m.s. is usually used for acceleration.
Waste carrier	A person or business registered to transport controlled waste.
Waste hierarchy	The order of preference for managing waste: prevention, preparation for reuse, recycling, other recovery and, as a last resort, disposal.
Waste management infrastructure	Facilities used to collect, transfer, treat, recycle, recover or dispose of waste.
WBC	Wokingham Borough Council.
WEEE	Waste electrical and electronic equipment.
Weighted Level Difference, Dw	The weighted level difference between a pair of rooms, stated as a single figure.
Weighted Sound Reduction Index, Rw	A single number which represents the sound reduction of a material. It is derived by plotting the sound reduction index against a set of reference curves. The curves are shifted until a best-fit is established and the curve which best fits the sound reduction spectrum is used to represent the single figure value.
Weighted standardized impact sound pressure level, LnT,w	A single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.

Term	Definition
Weighted, Normalised Element Level Difference, Dnew	The normalised, weighted difference in sound level between a pair of rooms via a small element such as a trickle ventilator, stated as a single figure. The level difference in octave bands is normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
Weighted, Normalised Flanking Level Difference, DnFw	The normalised, weighted difference in sound level between a pair of rooms via a flanking element, such as mullion or ceiling detail. The level difference in octave bands is first normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
Whole-life carbon, WLC	Greenhouse gas emissions associated with an asset across its full life cycle, including embodied and operational emissions and end-of-life stages.
WM3	Environment Agency technical guidance on the classification and assessment of waste.

Appendix 2.1 – Cumulative Developments

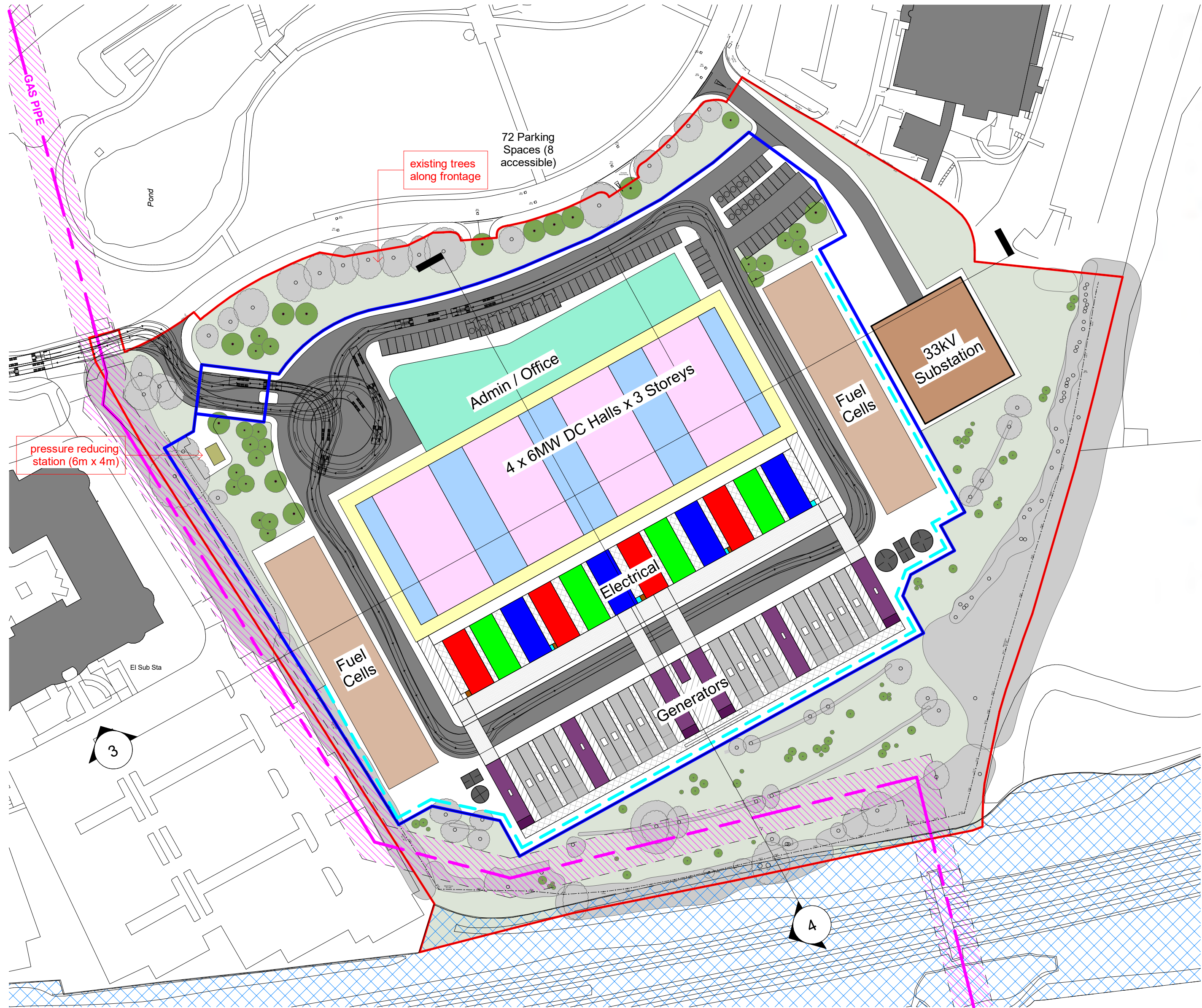
Planning Reference	Location	Status	Description
261324 PP/14897089	Veolia Depot Redevelopment, Old Forest Road, Wokingham	Awaiting Decision	Full application for the proposed demolition of existing structures and buildings, retention and recladding of the existing warehouse, reconfiguration of existing Depot to provide parking, external storage, fuel pump, washdown facilities and hot box, including erection of salt-barn, along with fencing, vehicle barrier, landscaping, access and associated works.
241855	400 Regus House, Thames Valley Park Drive, Wokingham, Earley, RG6 1PT	Prior Approval	Prior approval submission for change of use of the ground, 1st, 2nd and 3rd floors to 62no residential dwellings (use Class C3).
PL/19/2032	Station Hill North Reading RG1 1NB	Permitted; In Construction	Hybrid application comprising: i. Application for Full Planning Permission for Phase 2 (Plot G and public realm) including demolition of existing structures, erection of an eighteen storey building containing office use and flexible retail, non-residential institution and assembly and leisure uses, Provision of podium deck, vehicular access and parking. New public open space and landscaping. Bridge link over Garrard St, and; ii. Application for Outline Planning Permission for Phase 3 (all Matters reserved) for four building Plots (A, B, C and D). Demolition of existing buildings and structures. Mixed-use redevelopment.
PL/25/0616	Sovereign House, 57-59 Vastern Road, Reading	Approved - decision date 26/1/2026	Change of use from E(g)(i) offices to F1(g) Law Courts, including internal alterations, additional external lift, additional sub-station and landscaping works.
241900	Land South of Old Bath Road Sonning, RG4 6GQ	Approved - decision date 3/10/2025	Application to vary condition 2 of planning consent 220663 (as amended by permission 241899) for the proposed erection of 57 dwellings following demolition of the existing dwellings (Access, Layout, Scale and appearance to be considered).
251387	Sonning Golf Club Duffield Road, Woodley Wokingham, RG4 6GJ	Approved - decision date 5/11/2025	Application to vary condition 5,8,11,13 & 14 of planning consent 161529 for the proposed erection of 13 dwellings with associated highway works, public open space and landscaping.(Approval sought for Access).

Appendix 3.1 – Location Plan

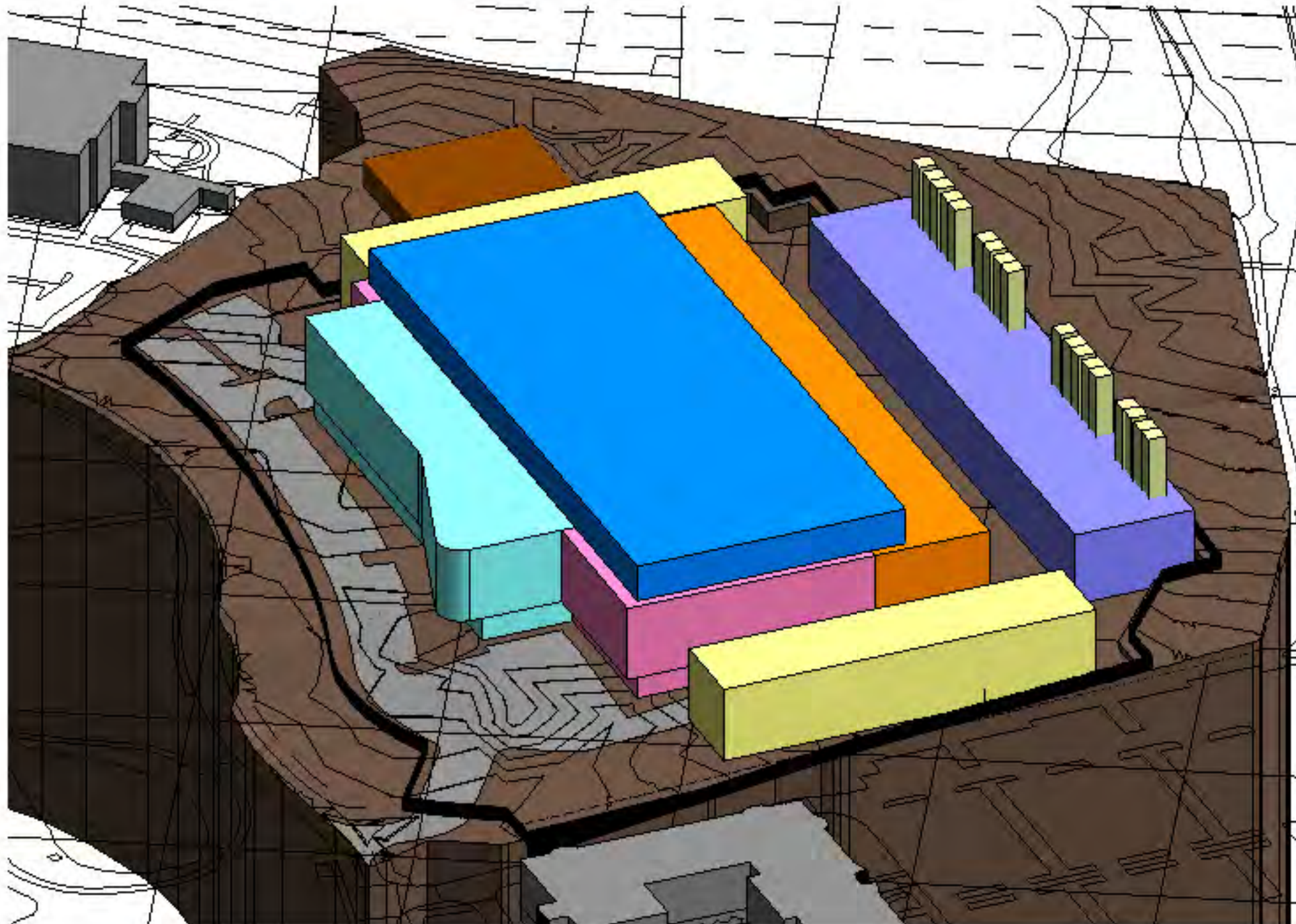


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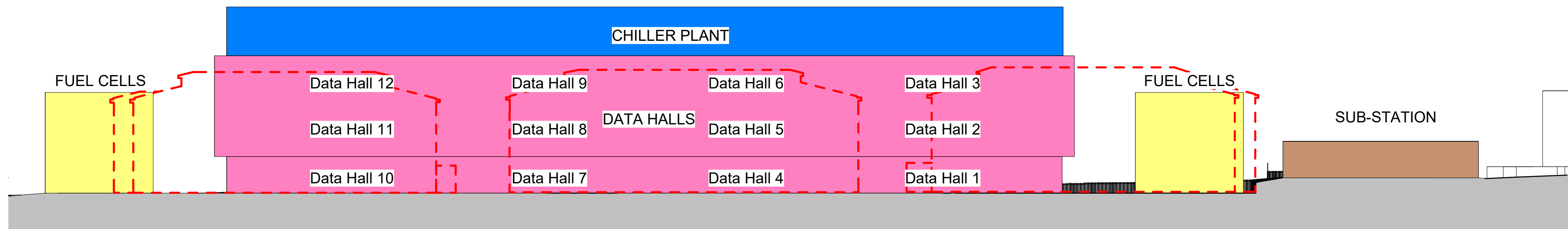
Appendix 4.1 – Proposed Development Drawings



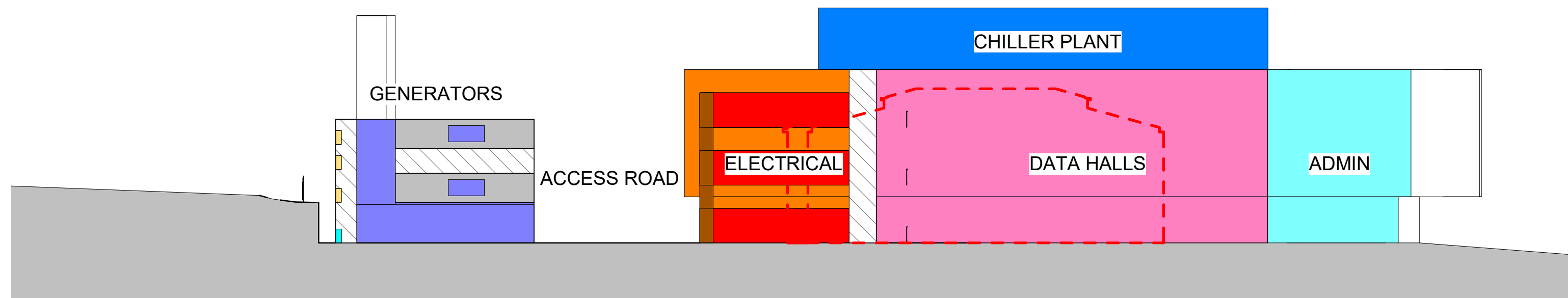
2 Site Plan
1 : 1000



1 3D Site View



3 Site Section 1
1 : 500



4 Site Section 2
1 : 500

NOTE:
SITE BOUNDARY BASED ON IMAGE OF LAND REGISTRY
PLAN (TITLE NUMBER: BK354816).
AS SUCH THE SITE BOUNDARY IS APPROXIMATE AND
SHOULD BE CONFIRMED BY MEASURED SURVEY

Notes:

- Do not scale this drawing.
- Dimensions are in millimetres unless otherwise stated.
- This drawing is to be read in conjunction with all relevant Architectural, Civil, Structural, Service Engineer and Other consultant drawings, schedules and specifications.
- The contractor is to check and verify all dimensions on-site prior to the commencement of work or preparation of shop drawings.

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KEY:

- RETAINED/ENHANCED LANDSCAPE
- HIGH PRESSURE GAS MAIN EXCLUSION ZONE
- EXISTING / PROPOSED TREES
- RETAINING WALL
- APPROX OUTLINE OF EXISTING BUILDINGS
- SITE BOUNDARY
- FENCE BOUNDARY

(NOTE: AREAS SHOWN ARE INDICATIVE AS TAKEN FROM PDF DOCUMENTS WITH UNVERIFIED SCALES)

Key:

- NR FREEHOLD OWNERSHIP

(PLAN @ 1:1000 SCALE)

0 20 50m

Rev.	Date	Description	Drawn	Checked
00	06/08/2026	Initial Issue	GP	MC
01	19/08/2026	Landscape Design Added, Red-Line Boundary Amended to Include Central Reservation	PG	MC
02	15/09/2026	Red-line boundary changed	CP	MC

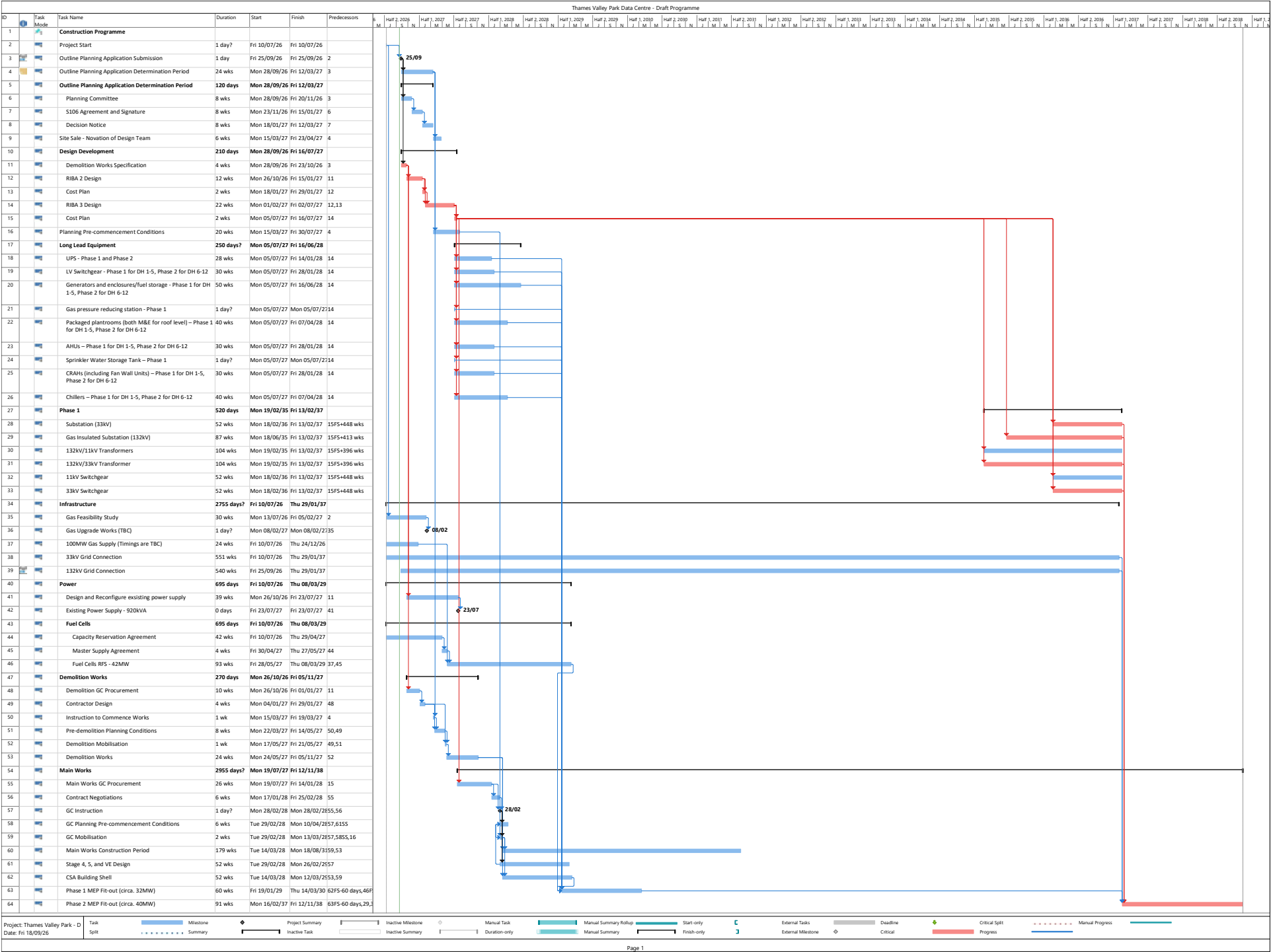
Project Information:		Issue Suitability:	
Project: Thames Valley Park Data Centre		Planning Pre-Application	
Client: AIP Asset Manager		Job No: 12.259904	Scale @ A1: As indicated
Drawing Number: 259904-12A-AR-DR-PL-IP-0000		Status: -R2	Revision: -02
		Drawing Title: ILLUSTRATIVE SITE PROPOSAL DRAWINGS	

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Appendix 4.2 – Indicative Construction Programme



Appendix 6.1 – Legislation, Policy and Guidance

Legislation

A summary of the relevant air quality legislation is provided below.

Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland, most recently updated in 2023. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that the European Union and International agreements are met in the UK.

The AQS covers the following air pollutants: ammonia (NH₃), benzene (C₆H₆), 1,3 butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), oxides of nitrogen (NO_x) (including nitrogen dioxide (NO₂)), particulate matter (PM₁₀ and PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃) and polycyclic aromatic hydrocarbons (PAHs).

The AQS sets standards and objectives for the listed pollutants for the protection of human health, vegetation, and ecosystems. The standards are based on recommendations by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) based on current understanding and scientific knowledge about the effects of air pollution on health and the environment. The air quality objectives are policy-based targets set by the UK Government that are often expressed as maximum concentrations not to be exceeded either without exception or with a limited number of exceedances within a specified timescale.

For the pollutants considered in this assessment, there are both a long-term (e.g., annual mean) and short-term (e.g., one hour mean) standard. In the case of NO₂, the short-term standard is for a 1-hour averaging period (no more than 18 exceedances of 200 µg/m³ per year), whereas for PM₁₀ it is a 24-hour averaging period (no more than 35 exceedances of 50 µg/m³ per year). The variation in time reflects the varying impacts on health of differing exposures to pollutants.

In the 2023 update to the targets an annual mean PM_{2.5} target of 10 µg/m³ to be achieved by 2040 and an average population exposure reduction of 35% in 2040 compared to a 2018 baseline.

Air Quality Standards Regulations

The air quality objectives in the AQS are statutory in England with the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2000 for the purpose of Local Air Quality Management (LAQM).

The Regulations require likely exceedances of the AQS objectives to be assessed in relation to:

‘...the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present...’

The Air Quality Standards (Amendment) Regulations 2016 transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England, with the Air Quality (Amendment of

Domestic Regulations) (EU Exit) Regulations 2019 ensuring continuation of the transposition of the Directive. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as NO₂, PM₁₀ and PM_{2.5}. The limit values for NO₂ and PM₁₀ are the same concentration levels as the relevant AQS objectives and the limit value for PM_{2.5} is a concentration of 20 µg/m³. The relevant air quality objectives are presented in Table 1.

Table 1. Air Quality Objectives for Relevant Pollutants

Pollutant	Concentration	Measured as
NO ₂	200 µg/m ³	1-hour mean, not to be exceeded more than 18 times a year (99.79 %ile)
	40 µg/m ³	Annual mean
PM ₁₀	50 µg/m ³	24-hour mean, not to be exceeded more than 35 times a year (90.41 %ile)
	40 µg/m ³	Annual mean
PM _{2.5}	20 µg/m ³	Annual mean

Environmental Act 1995

Part IV of the Environment Act 1995 requires local authorities to periodically review and assess the quality of air within their administrative area. The reviews must consider both the air quality at the time of review and likely future air quality during the ‘relevant period’ and whether any air quality objectives prescribed in regulations are being achieved or are likely to be achieved in the future. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each designated AQMA the local authority is required to produce an Air Quality Action Plan (AQAP) that works to ensure compliance with the objectives by implementing a number of air quality improvement measures.

Environmental Act 2021

Schedule 11 in Part VI of the Environment Act 2021 sets out the amendments made from the Environment Act 1995. The principles remain consistent in that the Environment Act 2021 requires local authorities to periodically review and assess the quality of air within their administrative area. Where the objectives are not likely to be achieved, an authority is required to designate an AQMA. For each designated AQMA the local authority is required to produce an AQAP that works to ensure compliance with the objectives by implementing several air quality improvements measures.

Environmental Protection Act 1990

Section 79 of the Environmental Protection Act 1990 (as amended) makes provision for the identification and control of statutory nuisances. The Act identifies statutory nuisance, in relation to air quality, as:

‘Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance’; and,

‘Any accumulation or deposit which is prejudicial to health or a nuisance’.

As a result, the level at which a nuisance occurs is highly variable and dependent on perception, with effects influenced by existing conditions and the degree of change that has occurred.

Where a statutory nuisance has been demonstrated the local authority must serve an abatement notice, non-compliance with which would constitute a legal offence. The abatement notice may prevent or restrict occurrence or re-occurrence of the nuisance, or the local authority may, itself, undertake action to abate the nuisance and recover any associated expenses.

WHO Guidelines

Table 2 states the WHO Air Quality Guidelines for NO₂, PM₁₀ and PM_{2.5}. Whilst these guidelines are not targeted in the UK there is a push to meet the guidelines and be more stringent with air quality control.

Table 2 *WHO Air Quality Guidelines*

Pollutant	Concentration	Measured as
NO ₂	25 µg/m ³	24 hour mean, not to be exceeded more than 3-4 times a year (99.79 %ile)
	200 µg/m ³	1 hour mean, not to be exceeded more than 3-4 times a year (99.79 %ile)
	10 µg/m ³	Annual mean
PM ₁₀	45 µg/m ³	24-hour mean, not to be exceeded more than 35 times a year (90.41 %ile) for UK, not to be exceeded more than 3-4 times a year (99 th %ile) under WHO
	15 µg/m ³	Annual mean
PM _{2.5}	15 µg/m ³	24-hour mean, not to be exceeded more than 3 to 4 times a year (99 th %ile)
	5 µg/m ³	Annual mean

Planning Policy

A summary of the national and local planning policy relevant to air quality and the Proposed Development is detailed below.

National

National Planning Policy Framework

The National Planning Policy Framework (NPPF) sets out policies, which apply to the preparation of local plans and to development management decisions. This framework sets out the Government's economic, environmental, and social planning policies for England. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

The NPPF sets out the Government's planning policies on the conservation and enhancement of the natural environment, with the following policies relating to air quality:

- Policy N1 requires development plans to *"safeguard and enhance the natural environment" and "reflect the wider benefits from natural capital and ecosystem services"*. Plans should identify and protect designated environmental assets and other sensitive features, *"identify opportunities for the conservation, enhancement and recovery of landscapes, sensitive waterbodies, habitats and priority or threatened species"*, steer development towards *"land of least environmental value"* where appropriate, and *"set out standards for green infrastructure provision"* informed by Natural England's Green Infrastructure Standards and local circumstances.
- Policy DM3 requires local planning authorities to *"consider whether otherwise unacceptable development proposals could be made acceptable through the use of planning conditions or planning obligations"*.
- Policy CC2, which states development proposals should contribute to *"the transition to net zero"* by promoting *"sustainable patterns of movement"*, reducing the need to travel, and providing infrastructure to support *"the transition to zero-emission vehicles"*.
- Policy P1 which states development plans should ensure that occupiers and users *"will not be put at risk from, or be adversely affected by, unacceptable levels of pollution"*, and that development proposals *"will not cause unacceptable levels of pollution"*, either alone or in combination with other sources. The policy also requires plans to *"consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives"*, including through measures that improve local environmental conditions.
- Policy P3 which states development proposals should *"sustain and contribute to compliance with relevant limit values or national objectives and targets for air pollutants including PM_{2.5}"*. Proposals should take account of *"Air Quality Management Areas"* and be *"consistent with the objectives of relevant Air Quality Action Plans, Clean Air Plans and Local Air Quality Strategies"*. The policy also requires development to avoid contributing to *"unacceptable levels of air... pollution"* and, where possible, to identify opportunities to

"reduce pollution affecting the wider area", including through traffic and travel management measures.

- Policy TR3 which states *"the environmental impacts of traffic and transport infrastructure should be identified, assessed and taken into account – including taking opportunities to avoid or mitigate any adverse environmental impacts, and to secure net environmental gains such as reductions in air pollution"*.

Clean Air Strategy

The Clean Air Strategy sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

The Office for Low Emission Vehicles (OLEV) and DfT published a Policy Paper in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects most new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

The paper sets out a number of measures by which Government will support this transition but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised then road traffic-related nitrogen oxide (NO_x) emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

National Air Quality Plan

Defra has produced an Air Quality Plan to tackle roadside NO₂ concentrations in the UK; a supplement to the 2017 Plan was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the Greater London Authority (GLA) in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ).

There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the Proposed Development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

Local

Wokingham Borough Core Strategy

The Core Strategy is a document within Wokingham Borough Council's (WBC) wider development plan, which sets out the strategy for managing development until 2026. Whilst not specific to air quality, Policy CP1 – Sustainable development is of most relevance to this assessment and states, 'Planning permission will be granted for development proposals that: Maintain or enhance the high quality of the environment... minimise the emission of pollutants into the wider environment... avoid areas where pollution (including noise) may impact upon the amenity of future occupiers'.

Local Plan Update

Work is currently underway on a new local plan; the Wokingham Borough Local Plan Update 2023 – 2040: Proposed Submission Plan was submitted for examination in 2025, with consultations commencing in 2026. Once adopted, this will replace the current Core Strategy above as well as other documents within the development plan. Policy HC6: Air pollution and air quality is of most relevance to this assessment and states:

1. Development proposals should maintain, and where possible improve air quality.
2. Development proposals should consider the prevailing air quality and potential impacts upon air quality arising from airborne particulates, dust and odour associated with the construction and operation of a proposal (including vehicular traffic).
3. Air Quality Assessments can demonstrate how prevailing air quality and potential impacts upon air quality have been considered and how air quality will be maintained at an acceptable standard through avoidance and mitigation measures. Development proposals are likely to require an Air Quality Assessment where:
 - a) The Site is located within an AQMA;
 - b) The development has the potential to impact on air quality within an AQMA either on its own or in combination with other development;
 - c) It has the potential to impact on the implementation of Air Quality Action Plans or Local Air Quality Strategies, either on its own or in combination with other development;
 - d) The Site is located within or close to an urban area that is known to experience higher levels of airborne particulates from vehicle emissions;
 - e) The Site is within proximity to a source of air pollution which could present a significant risk to human health, protected species, or irreplaceable habitats; or

- f) The type of development would mean its occupiers would be particularly sensitive to air pollution, such as schools, health care establishments or specialist accommodation.

Guidance

National Planning Practice Guidance

The NPPF is supported by Planning Practice Guidance, which outlines how the planning process can address potential air quality impacts associated with new development. It provides guidance on the level of detail required, how impacts can be mitigated and provides information on how local authorities may take air quality as a specific consideration in a planning decision.

Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities. This technical guidance, identified as LAQM.TG(22), is for use by local authorities for their review and assessment work and has been applied where appropriate to this assessment.

Land-Use Planning and Development Control: Planning for Air Quality

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance, which offers advice as to when an air quality assessment may or not be required. The guidance document details what should be included within an assessment, how to determine the significance of impacts and the likely mitigation measures required to minimise the impacts.

Guidance on the Assessment of Dust from Demolition and Construction

This document, published by the IAQM, provides guidance on how to assess the impact of construction activities on air quality associated with new developments. The methodology prescribed within the document allows the impacts to be categorised based on risk (with reference to dust and PM₁₀ on sensitive human and ecological receptors) and, where applicable, identify mitigation measures associated to the risk classification determined.

Appendix 6.2 – Generator Specification



Exhaust Emission Data Sheet

C3750 D5e

50 Hz Diesel Generator Set

EPA Tier 2

Engine Information:

Model:	Cummins Inc. QSK95-G10	Bore:	7.48 in. (190 mm)
Type:	4 Cycle, VEE, 16 cylinder diesel	Stroke:	8.27 in. (210 mm)
Aspiration:	Turbocharged and Aftercooled	Displacement:	5816 cu. in. (95.3 liters)
Compression Ratio:	15.5:1		
Emission Control Device:	Turbocharged and Aftercooled		
Emission Level:	Stationary Emergency		

	<u>1/4</u>	<u>1/2</u>	<u>3/4</u>	<u>Full</u>	<u>Full</u>	<u>Full</u>
<u>Performance Data</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Prime</u>	<u>Continuous</u>
Engine BHP @ 1500 RPM (50 Hz)	1094	2189	3283	4377	3892	3503
Fuel Consumption L/Hr (US Gal/Hr)	222 (59)	406 (107)	569 (150)	745 (197)	664 (176)	603 (159)
Exhaust Gas Flow m³/min (CFM)	247 (8724)	405 (14291)	510 (17994)	619 (21853)	568 (20064)	530 (18722)
Exhaust Gas Temperature °C (°F)	366 (690)	382 (719)	386 (727)	432 (810)	406 (762)	391 (736)
<u>Exhaust Emission Data</u>						
HC (Total Unburned Hydrocarbons)	0.33 (132)	0.17 (74)	0.09 (44)	0.06 (28)	0.07 (35)	0.08 (40)
NOx (Oxides of Nitrogen as NO ₂)	3.25 (1304)	3.53 (1550)	4.91 (2360)	6.46 (3152)	5.75 (2789)	5.19 (2499)
CO (Carbon Monoxide)	0.44 (179)	0.20 (90)	0.12 (57)	0.14 (71)	0.12 (59)	0.11 (56)
PM (Particulate Matter)	0.14 (48)	0.05 (20)	0.02 (6)	0.01 (4)	0.01 (5)	0.01 (6)
SO ₂ (Sulfur Dioxide)	0.005 (1.8)	0.005 (1.8)	0.005 (1.8)	0.004 (1.7)	0.004 (1.8)	0.004 (1.8)
Smoke (FSN)	0.75	0.41	0.16	0.13	0.13	0.14

All values (except smoke) are cited: g/BHP-hr (mg/Nm³ @ 5% O₂)

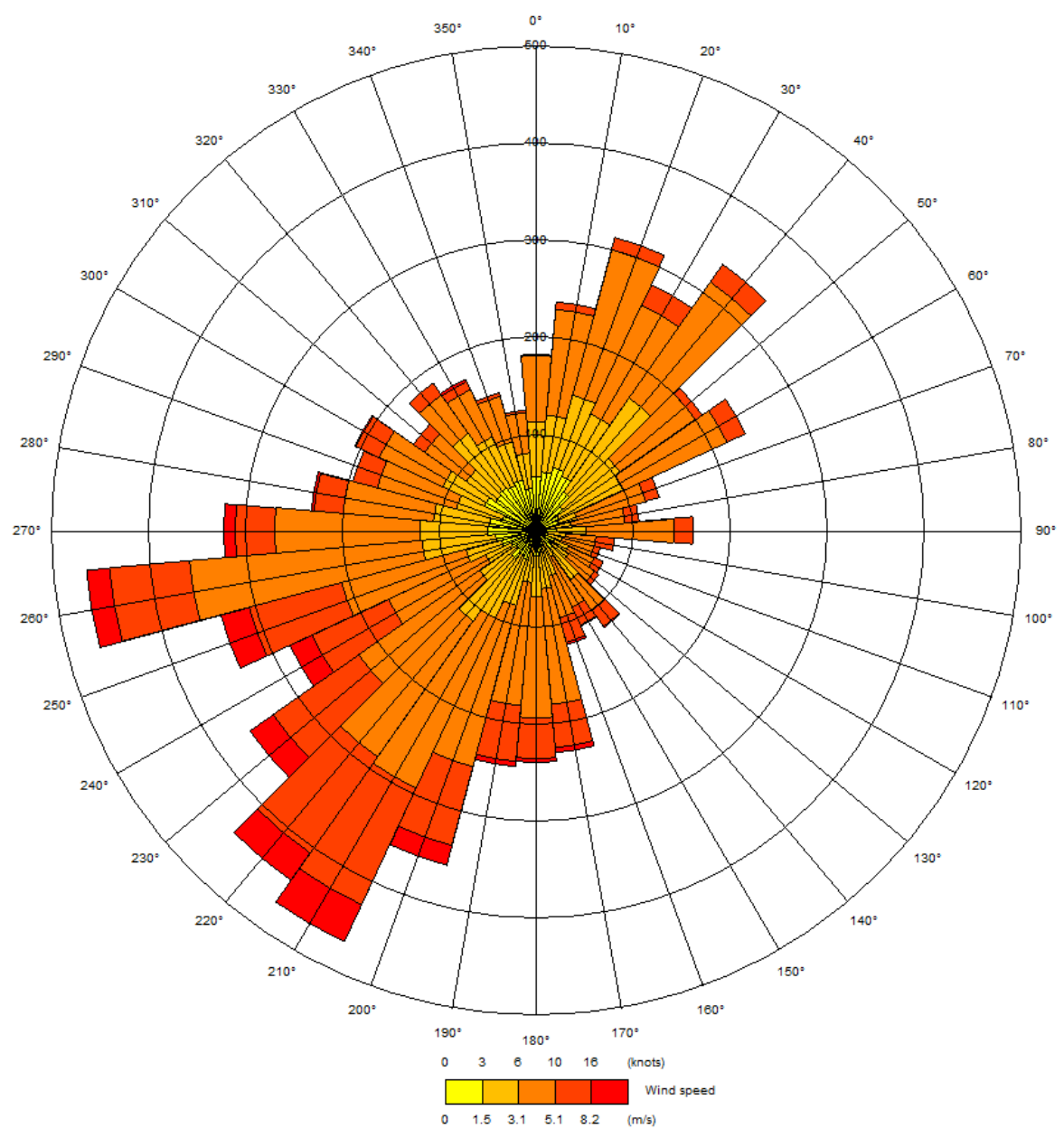
Test Conditions

Steady-state emissions recorded per ISO8178-1 during operation at rated engine speed (+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

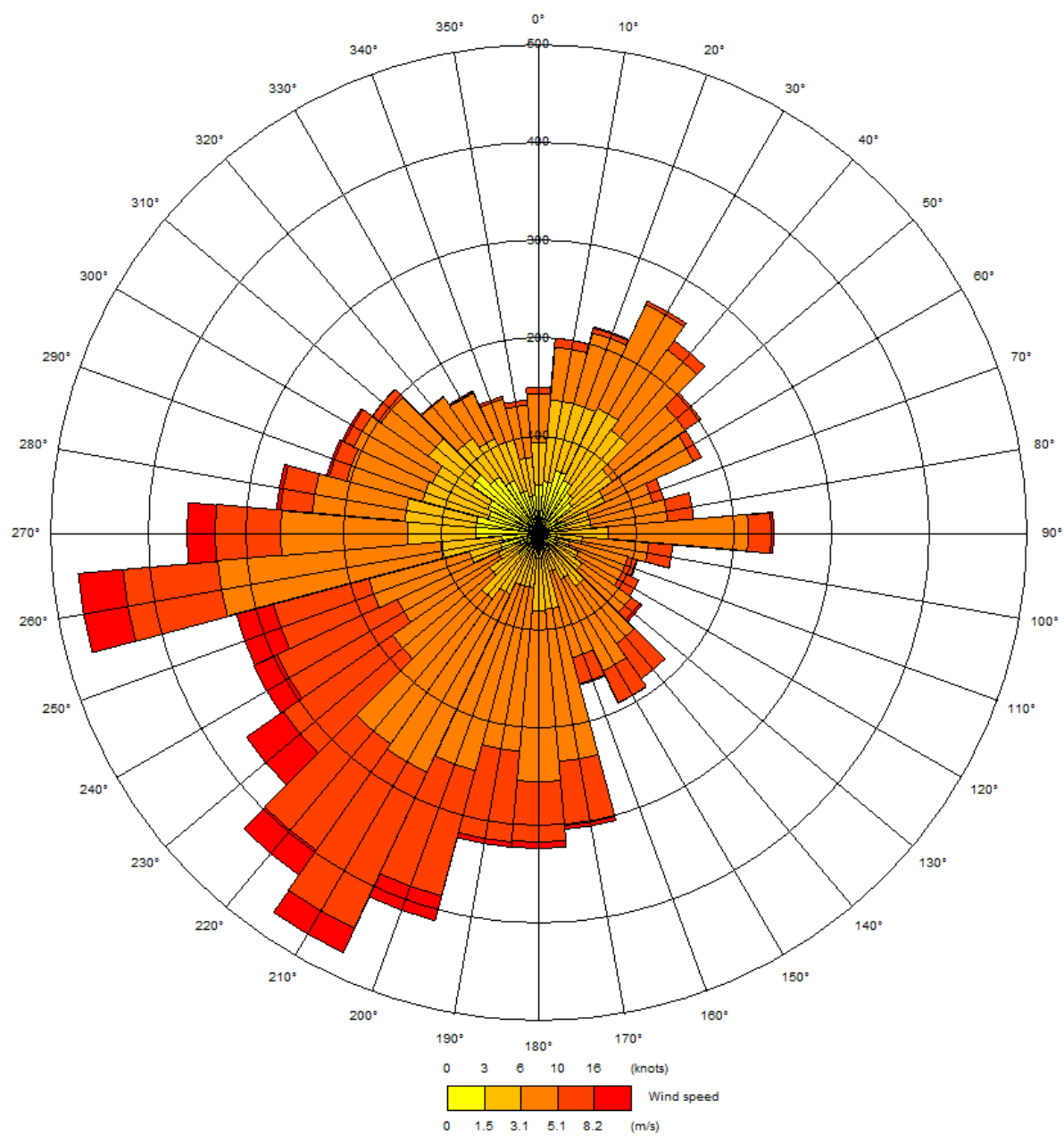
Fuel Specification:	40-48 Cetane Number, 0.0015 Wt.% Sulfur; Reference ISO8178-5, 40 CFR 86, 1313—98 Type 2-D and ASTM D975 No. 2-D. Fuel Density at 0.85 Kg/L (7.1 lbs/US Gal)
Air Inlet Temperature	25 °C (77 °F)
Fuel Inlet Temperature:	40 °C (104 °F)
Barometric Pressure:	100 kPa (29.53 in Hg)
Humidity:	NOx measurement corrected to 10.7 g/kg (75 grains H ₂ O/lb) of dry air
Intake Restriction:	Set to 18 in of H ₂ O as measured from compressor inlet
Exhaust Back Pressure:	Set to 1.5 in Hg
Note:	mg/m³ values are measured dry, corrected to 5% O ₂ and normalized to standard temperature and pressure (0°C, 101.325 kPa)

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

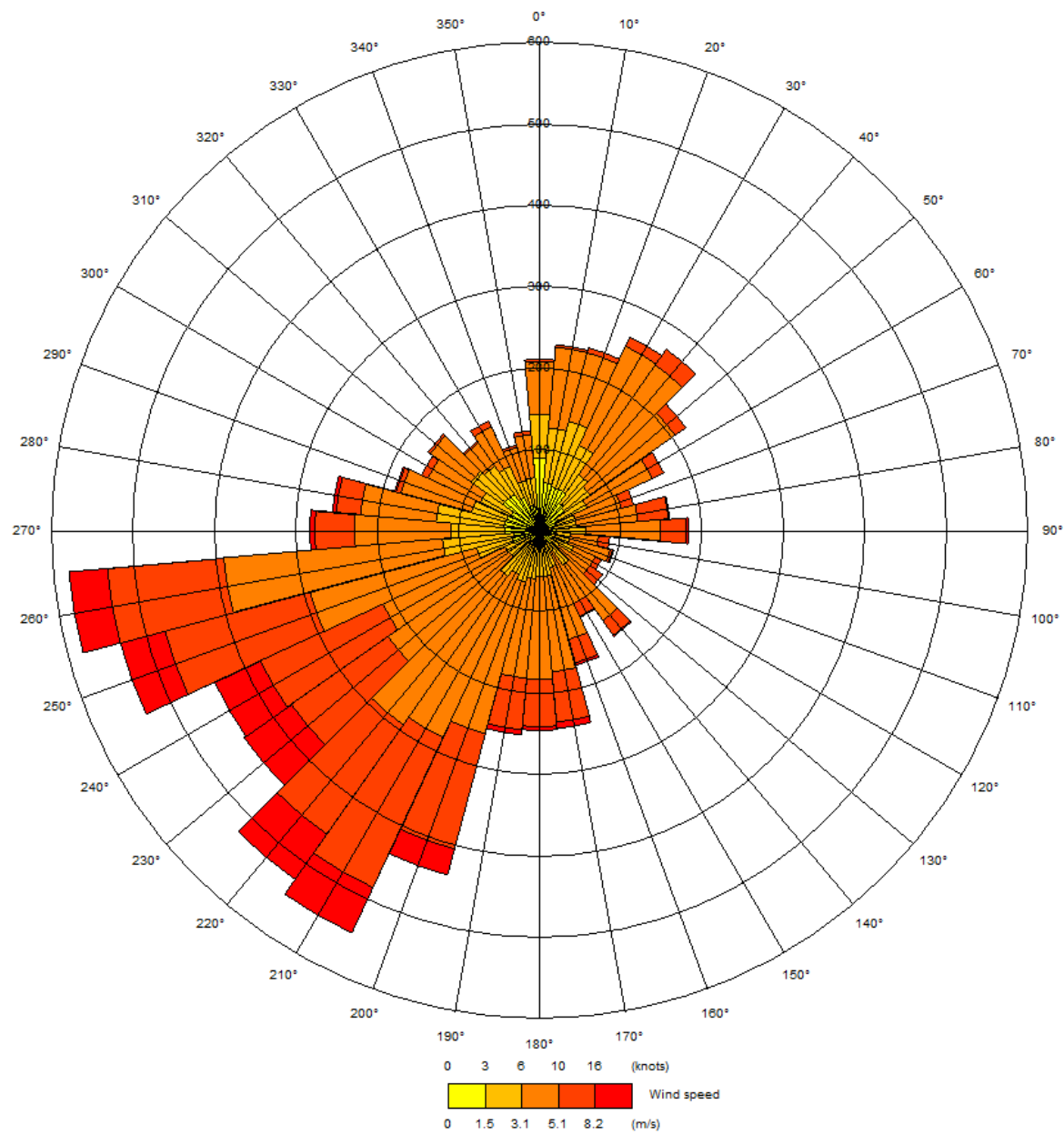
Appendix 6.3 – Heathrow Wind Roses
2021



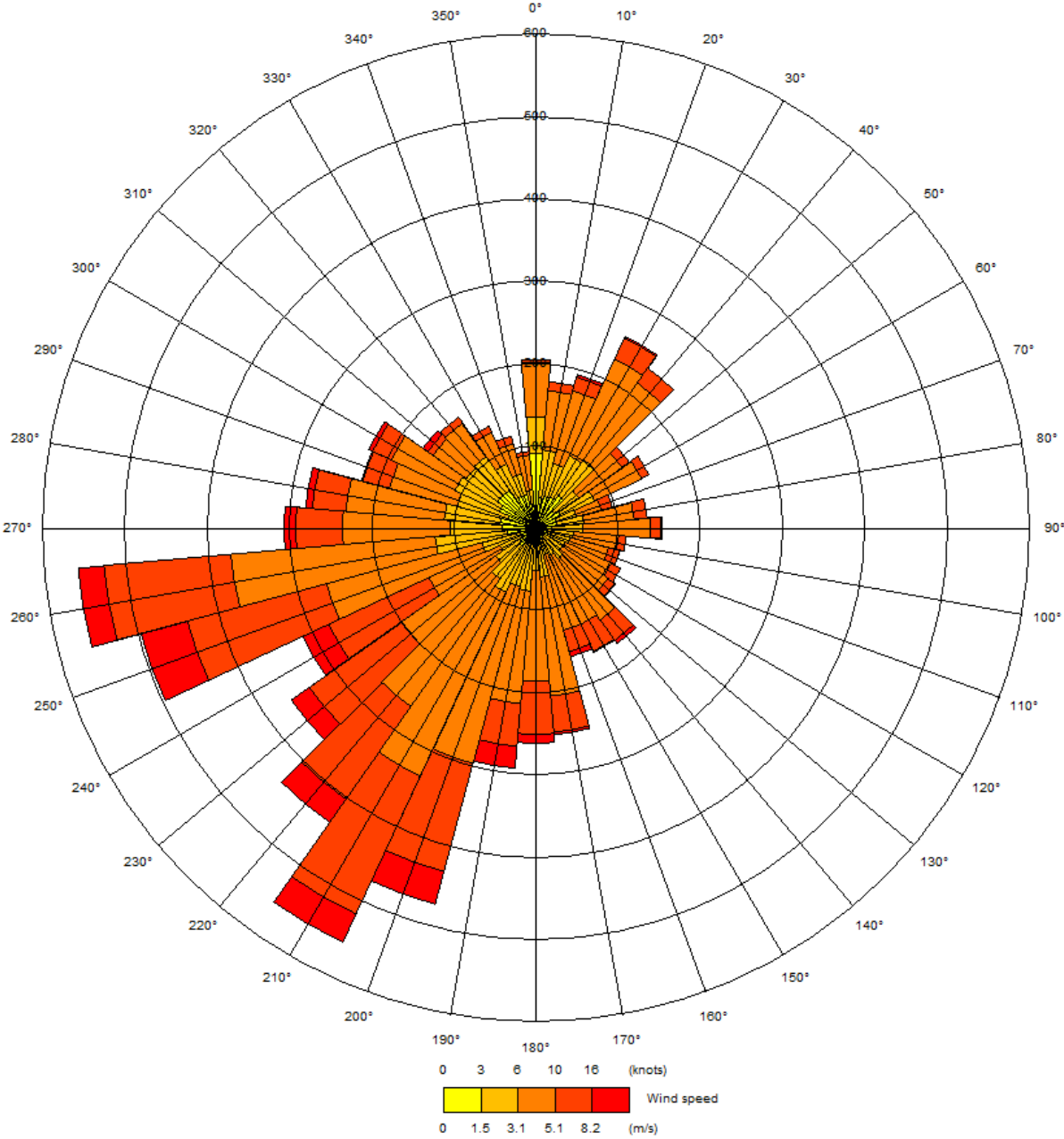
2022



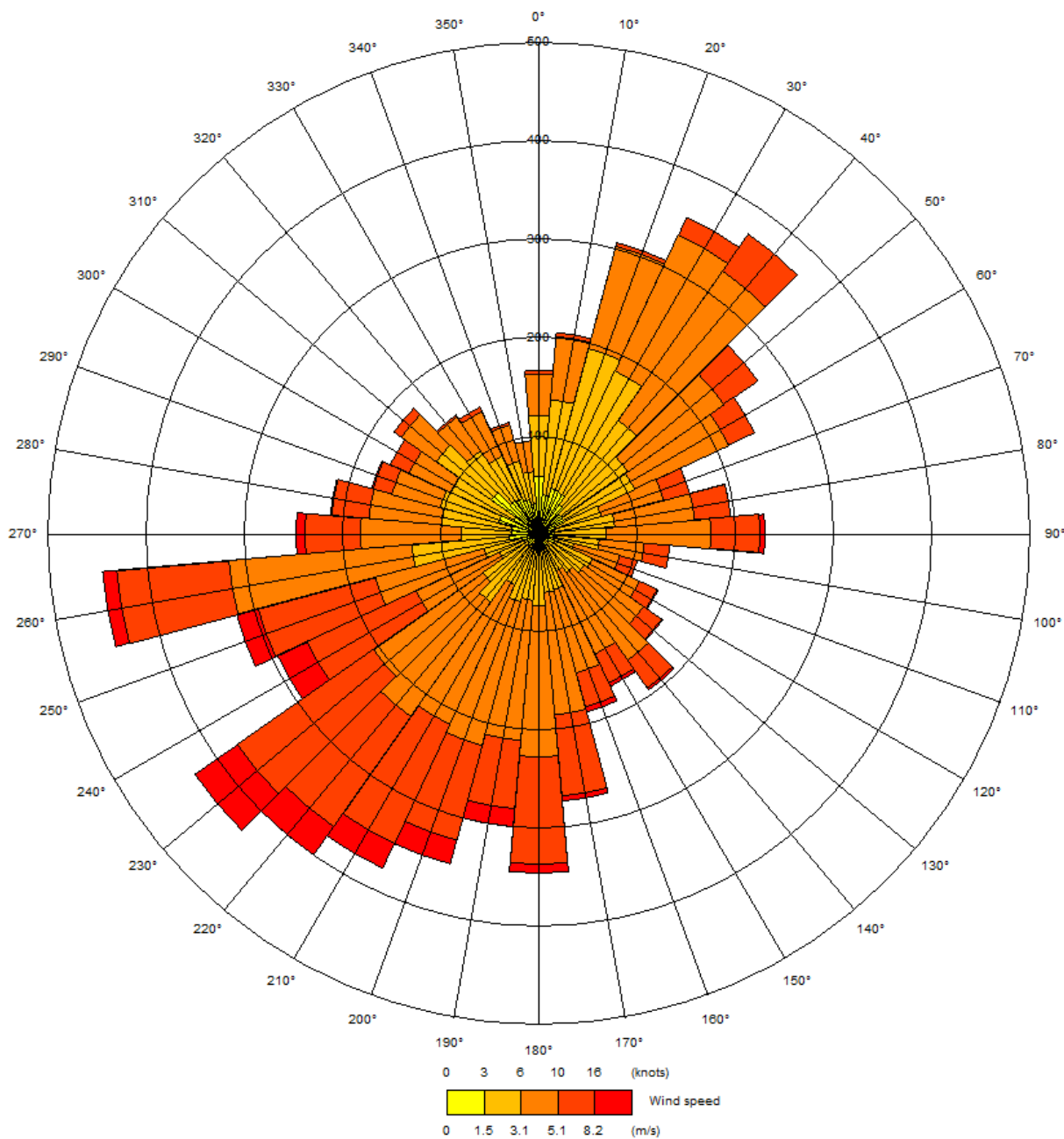
2023



2024



2025



Appendix 6.4 – Traffic Data

ID	Speed (kph)	2024 Baseline					2029 Baseline					2029 Baseline + Construction Traffic				
		AADT	AAHT	HGV %	HGV AADT	HGV AAHT	AADT	AAHT	HGV %	HGV AADT	HGV AAHT	AADT	AAHT	HGV %	HGV AADT	HGV AAHT
1	97	14271	595	3.1	441	18	14919	622	3.1	461	19	15079	628	3.1	469	20
2	97	13854	577	2.7	377	16	14483	603	2.8	398	17	14643	610	2.8	406	17
3	97	14271	595	3.1	441	18	14919	622	3.1	461	19	15079	628	3.1	469	20
4	97	13854	577	2.7	377	16	14483	603	2.8	398	17	14643	610	2.8	406	17
5	97	14271	595	3.1	441	18	14919	622	3.1	461	19	15079	628	3.1	469	20
6	97	13854	577	2.7	377	16	14483	603	2.8	398	17	14643	610	2.8	406	17
7	48	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
8	16	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
9	16	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
10	32	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
11	16	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
12	32	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
13	16	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
14	32	25437	1060	3.0	766	32	26683	1112	3.0	797	33	26972	1124	3.0	797	33
15	97	13854	577	2.7	377	16	14483	603	2.8	398	17	14643	610	2.8	406	17
16	97	13854	577	2.7	377	16	14483	603	2.8	398	17	14643	610	2.8	406	17
17	16	13854	577	2.7	377	16	14483	603	2.8	398	17	14643	610	2.8	406	17
18	16	19131	797	3.7	707	29	20351	848	3.6	733	31	20351	848	3.6	733	31
19	64	19131	797	3.7	707	29	20351	848	3.6	733	31	20351	848	3.6	733	31
20	64	19131	797	3.7	707	29	20351	848	3.6	733	31	20351	848	3.6	733	31

ID	Speed (kph)	2024 Baseline					2029 Baseline					2029 Baseline + Construction Traffic				
		AADT	AAHT	HGV %	HGV AADT	HGV AAHT	AADT	AAHT	HGV %	HGV AADT	HGV AAHT	AADT	AAHT	HGV %	HGV AADT	HGV AAHT
21	64	19131	797	3.7	707	29	20351	848	3.6	733	31	20351	848	3.6	733	31
22	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
23	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
24	48	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
25	48	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
26	48	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
27	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
28	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
29	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
30	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
31	48	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
32	48	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
33	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0
34	16	7877	328	0.0	0	0	8273	345	0.0	0	0	8722	363	0.1	8	0

Appendix 6.5 – Modelled Receptors and Background Concentrations

Receptor ID	X	Y	Z	2024 Background Concentrations			2029 Background Concentrations		
				NO ₂	PM ₁₀	PM _{2.5}	NO ₂	PM ₁₀	PM _{2.5}
RD4	473703	173409	1.5	12.5	12.8	7.9	10.9	12.4	7.5
RD024	473729	173432	2.3	12.5	12.8	7.9	10.9	12.4	7.5
RD034	473233	173244	2.3	12.5	12.8	7.9	10.9	12.4	7.5
E1	473720	173429	1.5	12.5	12.8	7.9	10.9	12.4	7.5
E2	473358	173306	1.5	12.5	12.8	7.9	10.9	12.4	7.5
E3	474333	172790	2	10.5	12.8	8.1	8.8	12.4	7.6
E4	473978	173427	1.5	12.5	12.8	7.9	10.9	12.4	7.5
E5	474257	174166	1.5	11.6	12.0	7.5	10.4	11.6	7.1
E6	474597	173701	1.5	11.1	12.5	7.9	9.5	12.1	7.5
E7	473725	173976	1.5	12.5	12.8	7.9	10.9	12.4	7.5
E8	473658	173744	1.5	12.5	12.8	7.9	10.9	12.4	7.5
E9	474071	173540	1.5	11.1	12.5	7.9	9.5	12.1	7.5
E10	474542	173887	1.5	11.1	12.5	7.9	10.9	12.1	7.5
E11	474559	174082	1.5	11.6	12.0	7.5	10.4	11.6	7.1
E12	474801	174223	1.5	11.6	12.0	7.5	10.4	11.6	7.1
E13	474815	173888	1.5	11.1	12.5	7.9	9.5	12.1	7.5
E14	475006	173941	1.5	9.8	12.2	7.8	8.4	11.7	7.4
E15	474802	174306	1.5	11.6	12.0	7.5	10.4	11.6	7.1
E16	474465	174265	1.5	11.6	12.0	7.5	10.4	11.6	7.1
E17	474534	174356	1.5	11.6	12.0	7.5	10.4	11.6	7.1
E18	474608	174402	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P1_0	474623	174111	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P1_1	474623	174111	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P1_2	474623	174111	15	11.6	12.0	7.5	10.4	11.6	7.1
P1_3	474623	174111	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P2_0	474644	174074	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P2_1	474644	174074	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P2_2	474644	174074	15	11.6	12.0	7.5	10.4	11.6	7.1

Receptor ID	X	Y	Z	2024 Background Concentrations			2029 Background Concentrations		
				NO ₂	PM ₁₀	PM _{2.5}	NO ₂	PM ₁₀	PM _{2.5}
P2_3	474644	174074	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P3_0	474701	174106	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P3_1	474701	174106	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P3_2	474701	174106	15	11.6	12.0	7.5	10.4	11.6	7.1
P3_3	474701	174106	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P4_0	474756	174138	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P4_1	474756	174138	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P4_2	474756	174138	15	11.6	12.0	7.5	10.4	11.6	7.1
P4_3	474756	174138	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P5_0	474735	174174	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P5_1	474735	174174	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P5_2	474735	174174	15	11.6	12.0	7.5	10.4	11.6	7.1
P5_3	474735	174174	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P6_0	474678	174143	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P6_1	474678	174143	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P6_2	474678	174143	15	11.6	12.0	7.5	10.4	11.6	7.1
P6_3	474678	174143	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P7_0	474636	174145	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P7_1	474636	174145	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P7_2	474636	174145	15	11.6	12.0	7.5	10.4	11.6	7.1
P7_3	474636	174145	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P8_0	474678	174169	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P8_1	474678	174169	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P8_2	474678	174169	15	11.6	12.0	7.5	10.4	11.6	7.1
P8_3	474678	174169	22.5	11.6	12.0	7.5	10.4	11.6	7.1
P9_0	474721	174194	1.5	11.6	12.0	7.5	10.4	11.6	7.1
P9_1	474721	174194	7.5	11.6	12.0	7.5	10.4	11.6	7.1
P9_2	474721	174194	15	11.6	12.0	7.5	10.4	11.6	7.1
P9_3	474721	174194	22.5	11.6	12.0	7.5	10.4	11.6	7.1

Appendix 6.6 – Model Verification

The comparison of modelled concentrations with local monitored concentrations is a process termed 'verification'. Model verification investigates the discrepancies between modelled and measured concentrations. Discrepancies occur due to model uncertainties, such as:

- Estimates of background pollutant concentrations;
- Meteorological data uncertainties;
- Traffic data uncertainties;
- Model input parameters; and
- Overall limitations of the dispersion model.

NO₂ is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. Therefore, model verification for nitrogen oxides (NO_x = NO + NO₂) the primary pollutant is appropriate. This has been undertaken in accordance Chapter 7 of LAQM.TG(22). The model has been run to predict the 2024 annual mean road-NO_x contribution at the monitoring locations given below. The model outputs of road-NO_x for each location have been compared with the 2024 'measured' road-NO_x, which was determined utilising the NO_x from NO₂ calculator and the NO₂ concentration data from RBC monitoring in the absence of nearby monitoring data from WBC.

Details of the data used in the verification process is in Table 1 and Figure 1 below.

Table 1 *Monitoring verification inputs*

ID	2024 Monitored Total NO ₂ (µg/m ³)	Background NO ₂ (µg/m ³)	2024 Monitored Road Contribution NO _x (µg/m ³)	2024 Modelled Road Contribution NO _x (µg/m ³)	Ratio of monitored NO _x road contribution/modelled road contribution NO _x
RD04	18.0	12.54	11.88	9.36	1.27
RD034	20.2	12.54	16.97	8.96	1.89

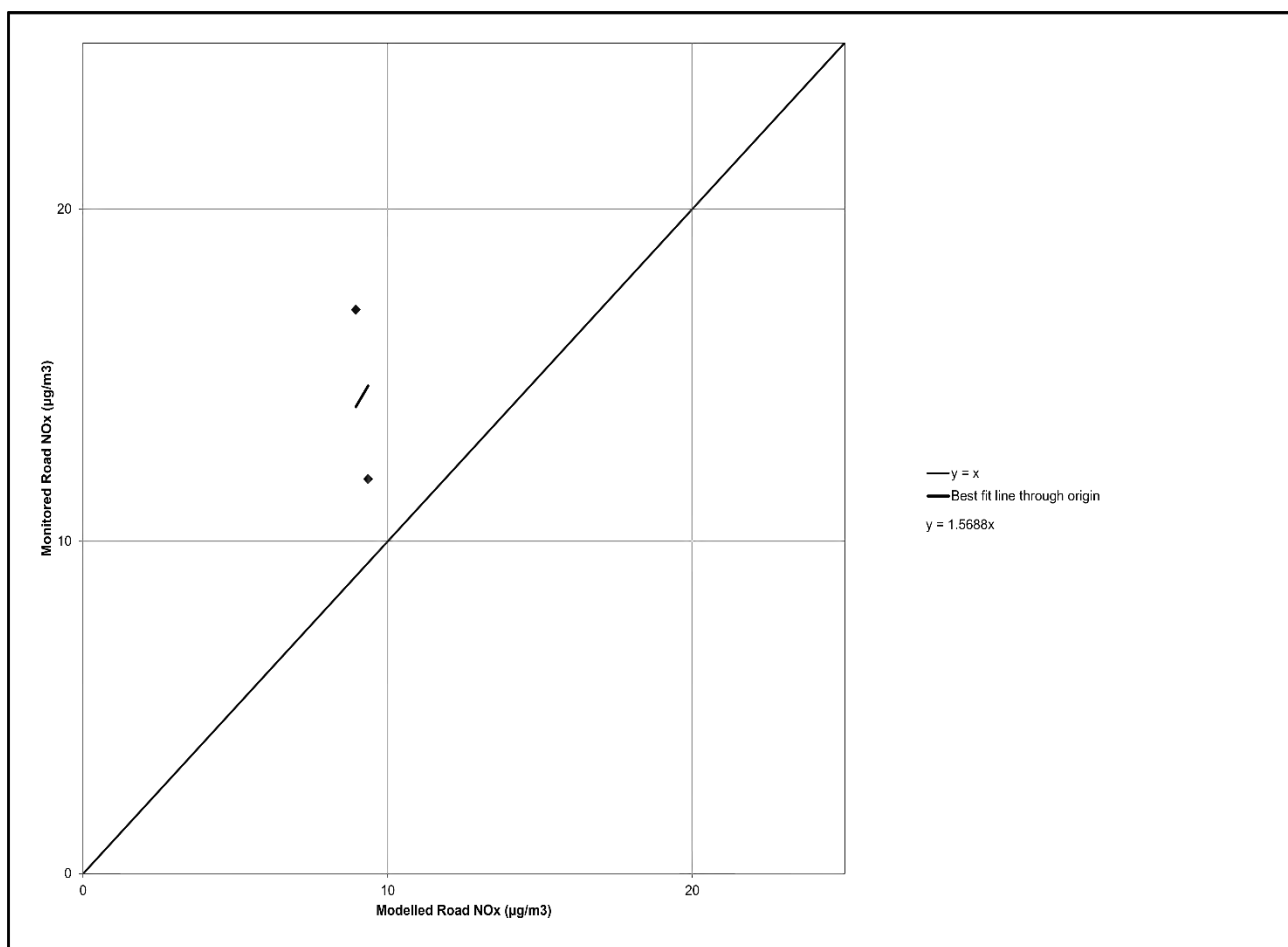


Figure 1 *Comparison of modelled and monitored NO_x.*

No local monitoring data was available for PM_{2.5} and PM₁₀. Although LAQM.TG(22) allows the use of NO_x-derived adjustment factor for PM verification where no PM monitoring exists, the model was found to be overpredicting.

Therefore, in line with the conservative approach taken for modelled road-NO_x outputs, no adjustment factor was applied to the modelled road PM₁₀ or PM_{2.5} outputs before adding background concentrations.

Appendix 6.7 – Modelled Construction Traffic Results

Construction Traffic: Annual Mean NO₂ Results

Receptor ID	2029 Baseline (µg/m ³)	2029 Baseline + Construction (µg/m ³)	Change (µg/m ³)	Impact/Exceed
E1	14.54	14.57	0.03	Negligible
E2	13.57	13.60	0.03	Negligible
E3	11.79	11.82	0.03	Negligible
E4	13.54	13.56	0.02	Negligible
E5	11.61	11.68	0.07	Negligible
E6	10.89	10.90	0.01	Negligible
E7	11.76	11.81	0.05	Negligible
E8	12.30	12.32	0.02	Negligible
E9	10.74	10.74	0.00	Negligible
E10	11.11	11.12	0.01	Negligible
E11	10.65	10.66	0.01	Negligible
E12	10.55	10.56	0.01	Negligible
E13	9.84	9.84	0.00	Negligible
E14	8.54	8.54	0.00	Negligible
E15	10.54	10.54	0.00	Negligible
E16	10.78	10.80	0.02	Negligible
E17	10.65	10.66	0.01	Negligible
E18	10.61	10.62	0.01	Negligible

Construction Traffic: Hourly Mean NO₂ Results

Receptor ID	2029 Baseline (µg/m ³)	2029 Baseline + Construction (µg/m ³)	Change (µg/m ³)	Impact/Exceed
E1	38.45	38.6	0.13	Compliant
E2	34.98	35.1	0.10	Compliant
E3	30.26	30.4	0.12	Compliant
E4	33.31	33.4	0.10	Compliant

Receptor ID	2029 Baseline (µg/m³)	2029 Baseline + Construction (µg/m³)	Change (µg/m³)	Impact/Exceed
E5	26.70	27.0	0.33	Compliant
E6	25.17	25.2	0.01	Compliant
E7	24.83	25.0	0.17	Compliant
E8	30.90	31.0	0.09	Compliant
E9	25.76	25.8	0.03	Compliant
E10	23.48	23.5	0.01	Compliant
E11	22.31	22.4	0.08	Compliant
E12	21.84	21.9	0.01	Compliant
E13	21.38	21.4	0.00	Compliant
E14	18.63	18.6	0.00	Compliant
E15	21.86	21.9	0.03	Compliant
E16	22.98	23.1	0.09	Compliant
E17	22.80	22.9	0.07	Compliant
E18	22.86	22.9	0.08	Compliant

Construction Traffic: Annual Mean PM₁₀ Results

Receptor ID	2029 Baseline (µg/m³)	2029 Baseline + Construction (µg/m³)	Change (µg/m³)	Impact/Exceed
E1	14.31	14.33	0.02	Negligible
E2	13.85	13.86	0.02	Negligible
E3	13.19	13.20	0.01	Negligible
E4	13.39	13.40	0.01	Negligible
E5	12.15	12.18	0.03	Negligible
E6	12.76	12.76	0.00	Negligible
E7	12.85	12.88	0.03	Negligible
E8	12.81	12.81	0.01	Negligible
E9	12.61	12.61	0.00	Negligible
E10	12.2	12.2	0.00	Negligible
E11	11.7	11.7	0.00	Negligible
E12	11.6	11.6	0.00	Negligible

Receptor ID	2029 Baseline (µg/m³)	2029 Baseline + Construction (µg/m³)	Change (µg/m³)	Impact/Exceed
E13	12.2	12.2	0.00	Negligible
E14	11.8	11.8	0.00	Negligible
E15	11.6	11.6	0.00	Negligible
E16	11.8	11.8	0.01	Negligible
E17	11.7	11.7	0.00	Negligible
E18	11.7	11.7	0.00	Negligible
E10	12.2	12.2	0.00	Negligible
E11	11.7	11.7	0.00	Negligible
E12	11.6	11.6	0.00	Negligible
E13	12.2	12.2	0.00	Negligible
E14	11.8	11.8	0.00	Negligible
E15	11.6	11.6	0.00	Negligible
E16	11.8	11.8	0.01	Negligible
E17	11.7	11.7	0.00	Negligible
E18	11.7	11.7	0.00	Negligible

Construction Traffic: Daily Mean PM₁₀ Results

Receptor ID	2029 Baseline (Days Exceedances)	2029 Baseline + Construction (Days Exceedances)	Change (Days)	Impact/Exceed
E1	0	0	0	Compliant
E2	0	0	0	Compliant
E3	0	0	0	Compliant
E4	0	0	0	Compliant
E5	1	1	0	Compliant
E6	1	1	0	Compliant
E7	1	1	0	Compliant
E8	1	1	0	Compliant
E9	1	1	0	Compliant
E10	1	1	0	Compliant
E11	1	1	0	Compliant

Receptor ID	2029 Baseline (Days Exceedances)	2029 Baseline + Construction (Days Exceedances)	Change (Days)	Impact/Exceed
E12	1	1	0	Compliant
E13	1	1	0	Compliant
E14	1	1	0	Compliant
E15	1	1	0	Compliant
E16	1	1	0	Compliant
E17	1	1	0	Compliant
E18	1	1	0	Compliant

Construction Traffic: Annual Mean PM_{2.5} Results

Receptor ID	2029 Baseline (µg/m ³)	2029 Baseline + Construction (µg/m ³)	Change (µg/m ³)	Impact/Exceed
E1	8.55	8.56	0.01	Negligible
E2	8.30	8.31	0.01	Negligible
E3	8.13	8.14	0.01	Negligible
E4	8.08	8.09	0.01	Negligible
E5	7.44	7.45	0.02	Negligible
E6	7.83	7.83	0.00	Negligible
E7	7.78	7.79	0.01	Negligible
E8	7.78	7.78	0.00	Negligible
E9	7.76	7.76	0.00	Negligible
E10	7.5	7.5	0.00	Negligible
E11	7.2	7.2	0.00	Negligible
E12	7.2	7.2	0.00	Negligible
E13	7.5	7.5	0.00	Negligible
E14	7.4	7.4	0.00	Negligible
E15	7.2	7.2	0.00	Negligible
E16	7.2	7.2	0.00	Negligible
E17	7.2	7.2	0.00	Negligible
E18	7.2	7.2	0.00	Negligible

Appendix 6.8 – Modelled Operational Emissions Results

Operational Emissions

Receptor	2029 Baseline				2029 Baseline + Fuel Cell PC + Generator PC				Fuel Cell and Generation PC			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO
E1	14.54	38.58	14.31	0.27	14.56	41.82	14.31	0.28	0.02	3.24	0.000	0.001
E2	13.57	35.08	13.85	0.27	13.58	36.99	13.85	0.28	0.01	1.91	0.000	0.001
E3	11.96	30.81	13.24	0.27	11.99	35.18	13.24	0.28	0.03	4.37	0.000	0.001
E4	13.54	33.41	13.39	0.27	13.57	37.47	13.39	0.28	0.03	4.06	0.000	0.002
E5	11.61	27.03	12.15	0.27	11.65	34.39	12.15	0.28	0.04	7.36	0.000	0.003
E6	10.89	25.18	12.76	0.27	11.03	51.07	12.76	0.28	0.14	25.89	0.000	0.005
E7	11.76	25.00	12.85	0.27	11.78	27.78	12.85	0.28	0.02	2.78	0.000	0.001
E8	12.30	30.99	12.81	0.27	12.32	32.91	12.81	0.28	0.02	1.92	0.000	0.001
E9	10.74	25.79	12.61	0.27	10.77	30.86	12.61	0.28	0.03	5.07	0.000	0.002
E10	11.11	23.49	12.20	0.27	11.30	55.52	12.20	0.28	0.19	32.03	0.000	0.008
E11	10.65	22.39	11.69	0.27	10.74	36.51	11.69	0.28	0.09	14.12	0.000	0.005
E12	10.55	21.85	11.64	0.27	10.87	86.34	11.64	0.29	0.32	64.49	0.001	0.017
E13	9.84	21.38	12.23	0.27	10.00	56.91	12.23	0.28	0.16	35.53	0.000	0.005
E14	8.54	18.63	11.79	0.27	8.65	40.02	11.79	0.28	0.11	21.39	0.000	0.004
E15	10.54	21.89	11.64	0.27	10.79	48.53	11.64	0.29	0.25	26.64	0.000	0.018

Receptor	2029 Baseline				2029 Baseline + Fuel Cell PC + Generator PC				Fuel Cell and Generation PC			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO
E16	10.78	23.07	11.75	0.27	10.86	41.88	11.75	0.28	0.08	18.81	0.000	0.005
E17	10.65	22.87	11.69	0.27	10.75	40.87	11.69	0.28	0.10	18.00	0.000	0.006
E18	10.61	22.94	11.67	0.27	10.73	39.17	11.67	0.28	0.12	16.23	0.000	0.008
P1_0	-	-	-	-	10.62	22.18	11.67	0.27	-	-	-	-
P1_1	-	-	-	-	10.61	22.07	11.67	0.27	-	-	-	-
P1_2	-	-	-	-	10.59	21.89	11.66	0.27	-	-	-	-
P1_3	-	-	-	-	10.56	21.76	11.65	0.27	-	-	-	-
P2_0	-	-	-	-	10.61	22.06	11.67	0.27	-	-	-	-
P2_1	-	-	-	-	10.60	22.03	11.67	0.27	-	-	-	-
P2_2	-	-	-	-	10.59	21.95	11.66	0.27	-	-	-	-
P2_3	-	-	-	-	10.56	21.81	11.65	0.27	-	-	-	-
P3_0	-	-	-	-	10.59	22.01	11.66	0.27	-	-	-	-
P3_1	-	-	-	-	10.59	21.98	11.66	0.27	-	-	-	-
P3_2	-	-	-	-	10.57	21.90	11.65	0.27	-	-	-	-
P3_3	-	-	-	-	10.55	21.79	11.64	0.27	-	-	-	-
P4_0	-	-	-	-	10.57	21.96	11.65	0.27	-	-	-	-
P4_1	-	-	-	-	10.57	21.93	11.65	0.27	-	-	-	-
P4_2	-	-	-	-	10.56	21.85	11.64	0.27	-	-	-	-
P4_3	-	-	-	-	10.54	21.76	11.64	0.27	-	-	-	-

Receptor	2029 Baseline				2029 Baseline + Fuel Cell PC + Generator PC				Fuel Cell and Generation PC			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO
P5_0	-	-	-	-	10.58	21.95	11.65	0.27	-	-	-	-
P5_1	-	-	-	-	10.57	21.88	11.65	0.27	-	-	-	-
P5_2	-	-	-	-	10.56	21.82	11.64	0.27	-	-	-	-
P5_3	-	-	-	-	10.54	21.71	11.64	0.27	-	-	-	-
P6_0	-	-	-	-	10.60	22.06	11.66	0.27	-	-	-	-
P6_1	-	-	-	-	10.59	21.98	11.66	0.27	-	-	-	-
P6_2	-	-	-	-	10.57	21.86	11.65	0.27	-	-	-	-
P6_3	-	-	-	-	10.55	21.73	11.64	0.27	-	-	-	-
P7_0	-	-	-	-	10.62	22.18	11.67	0.27	-	-	-	-
P7_1	-	-	-	-	10.61	22.08	11.67	0.27	-	-	-	-
P7_2	-	-	-	-	10.59	21.87	11.66	0.27	-	-	-	-
P7_3	-	-	-	-	11.35	88.15	11.65	0.36	-	-	-	-
P8_0	-	-	-	-	10.90	83.71	11.66	0.29	-	-	-	-
P8_1	-	-	-	-	10.95	89.06	11.66	0.29	-	-	-	-
P8_2	-	-	-	-	11.10	101.38	11.65	0.31	-	-	-	-
P8_3	-	-	-	-	11.22	89.14	11.64	0.33	-	-	-	-
P9_0	-	-	-	-	10.96	84.19	11.66	0.29	-	-	-	-
P9_1	-	-	-	-	11.00	88.97	11.65	0.29	-	-	-	-
P9_2	-	-	-	-	11.13	105.12	11.65	0.31	-	-	-	-

Receptor	2029 Baseline				2029 Baseline + Fuel Cell PC + Generator PC				Fuel Cell and Generation PC			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily CO
P9_3	-	-	-	-	11.29	96.44	11.64	0.34	-	-	-	-
Background CO: Concentrations were obtained from the Defra Marylebone monitoring station. An average from the most recent year of available monitoring data (2025) was used.												

Sensitivity Analysis

Receptors	FC + Monthly Testing + 72hr Run (Summer)				FC + Monthly Testing + 72hr Run (Winter)			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀
E1	0.11	14.64	0.00	0.00	0.01	3.06	0.00	0.00
E2	0.07	5.91	0.00	0.00	0.00	1.57	0.00	0.00
E3	0.13	34.70	0.00	0.01	0.09	36.15	0.00	0.00
E4	0.18	58.28	0.00	0.01	0.03	7.53	0.00	0.00
E5	0.23	125.36	0.00	0.00	0.05	7.00	0.00	0.00
E6	0.79	326.80	0.00	0.05	0.66	228.92	0.00	0.03
E7	0.09	44.74	0.00	0.00	0.04	2.54	0.00	0.00
E8	0.09	33.54	0.00	0.00	0.01	1.72	0.00	0.00
E9	0.21	64.48	0.00	0.01	0.03	7.73	0.00	0.00
E10	1.61	659.96	0.01	0.06	0.44	40.93	0.00	0.04
E11	1.37	747.86	0.00	0.00	0.10	17.55	0.00	0.00
E12	0.50	85.48	0.00	0.06	3.15	1277.46	0.01	0.25
E13	2.09	731.37	0.01	0.42	1.40	631.39	0.01	0.01

Receptors	FC + Monthly Testing + 72hr Run (Summer)				FC + Monthly Testing + 72hr Run (Winter)			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀
E14	0.69	197.79	0.00	0.03	0.69	197.79	0.00	0.03
E15	0.24	33.46	0.00	0.04	1.54	552.62	0.01	0.22
E16	0.18	17.72	0.00	0.00	0.13	17.72	0.00	0.00
E17	0.12	17.02	0.00	0.01	0.28	18.17	0.00	0.01
E18	0.10	15.24	0.00	0.02	0.31	60.76	0.00	0.02
P1_0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P1_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P1_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P1_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P2_0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P2_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P2_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P2_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P3_0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P3_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P3_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P3_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P4_0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P4_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P4_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Receptors	FC + Monthly Testing + 72hr Run (Summer)				FC + Monthly Testing + 72hr Run (Winter)			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀
P4_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P5_0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P5_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P5_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P5_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6_0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P6_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P7_0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P7_1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P7_2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P7_3	0.52	59.98	0.00	0.04	0.72	89.71	0.00	0.05
P8_0	0.77	247.18	0.00	0.12	0.82	170.99	0.00	0.06
P8_1	0.79	247.18	0.00	0.13	0.91	189.29	0.00	0.06
P8_2	0.82	247.18	0.00	0.15	1.15	229.74	0.00	0.08
P8_3	0.42	63.11	0.00	0.07	1.01	306.99	0.00	0.08
P9_0	0.41	62.32	0.00	0.09	1.35	565.32	0.00	0.10
P9_1	0.42	67.11	0.00	0.10	1.45	649.93	0.01	0.10
P9_2	0.45	81.53	0.00	0.11	1.73	889.19	0.01	0.12

Receptors	FC + Monthly Testing + 72hr Run (Summer)				FC + Monthly Testing + 72hr Run (Winter)			
	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀	Annual NO ₂	Hourly NO ₂	Annual PM ₁₀	Daily PM ₁₀
P9_3	0.32	66.69	0.00	0.08	1.47	573.88	0.01	0.09

Appendix 6-9 – Figures

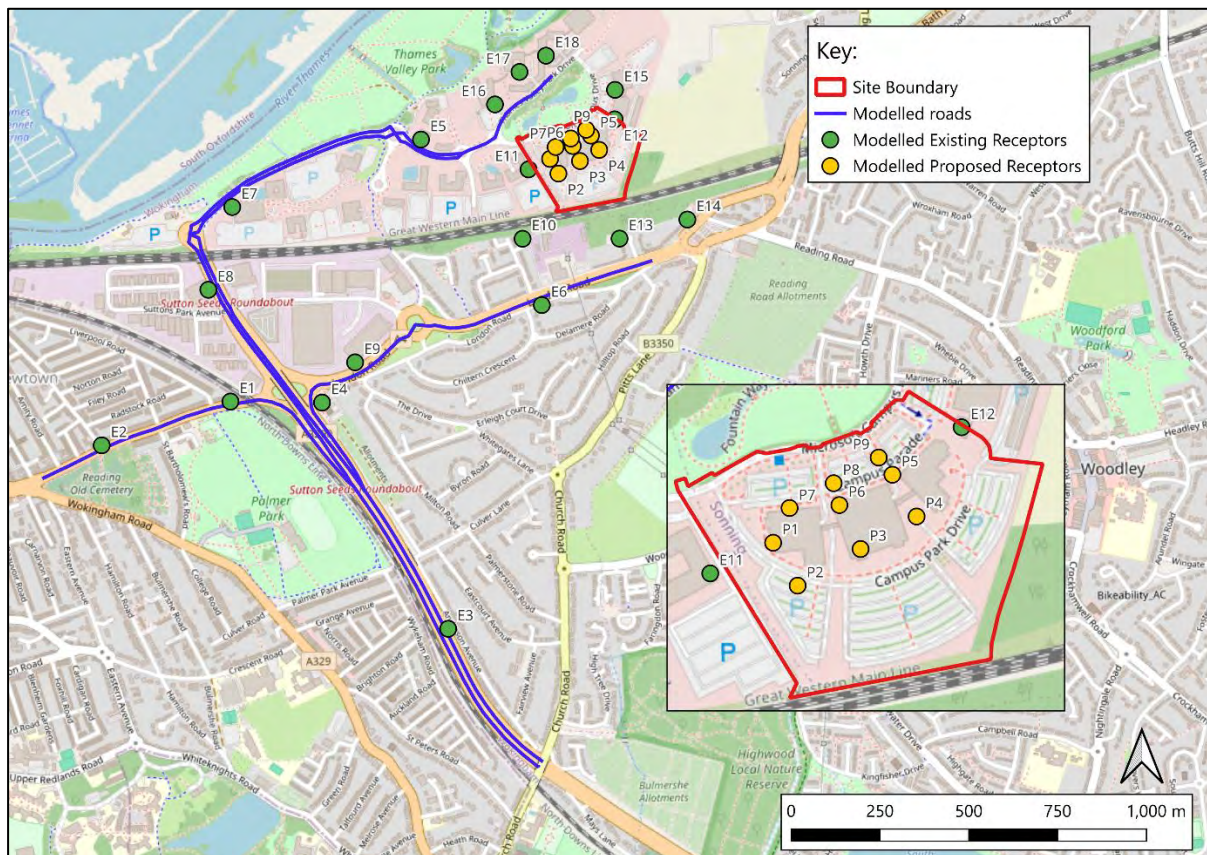
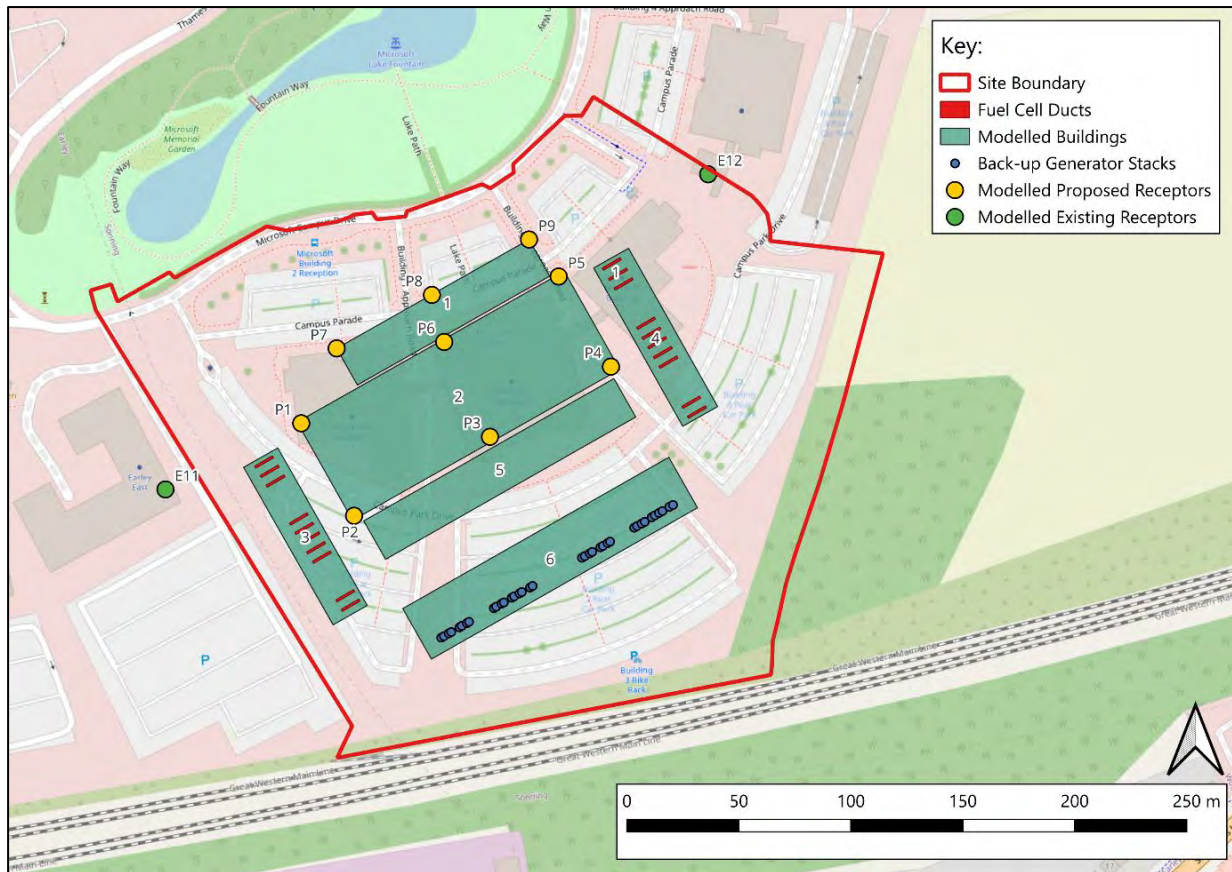


Figure 1. *ADMS-Roads Model Inputs (Contains Ordnance Survey Data © Crown copyright database 2026)*



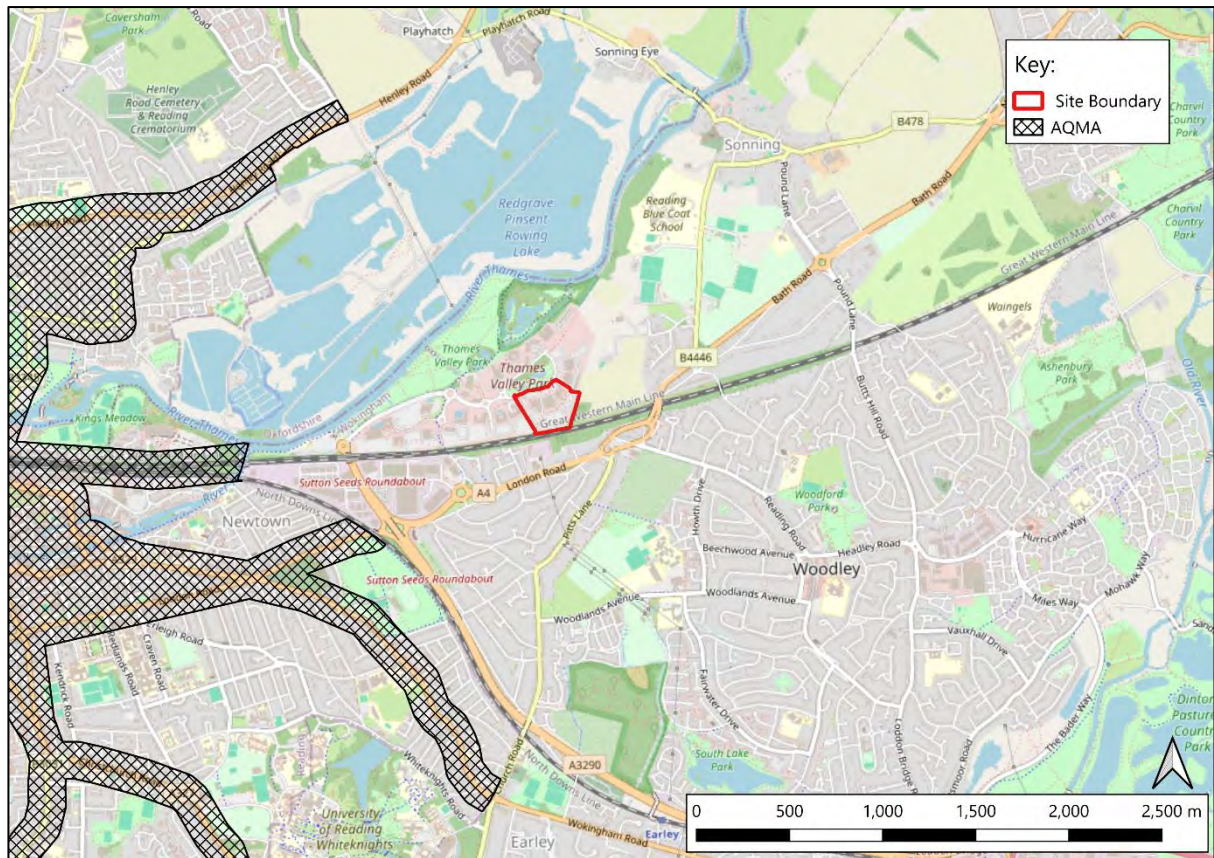


Figure 3. *AQMA and Site Location (Contains Ordnance Survey Data © Crown copyright database 2026)*

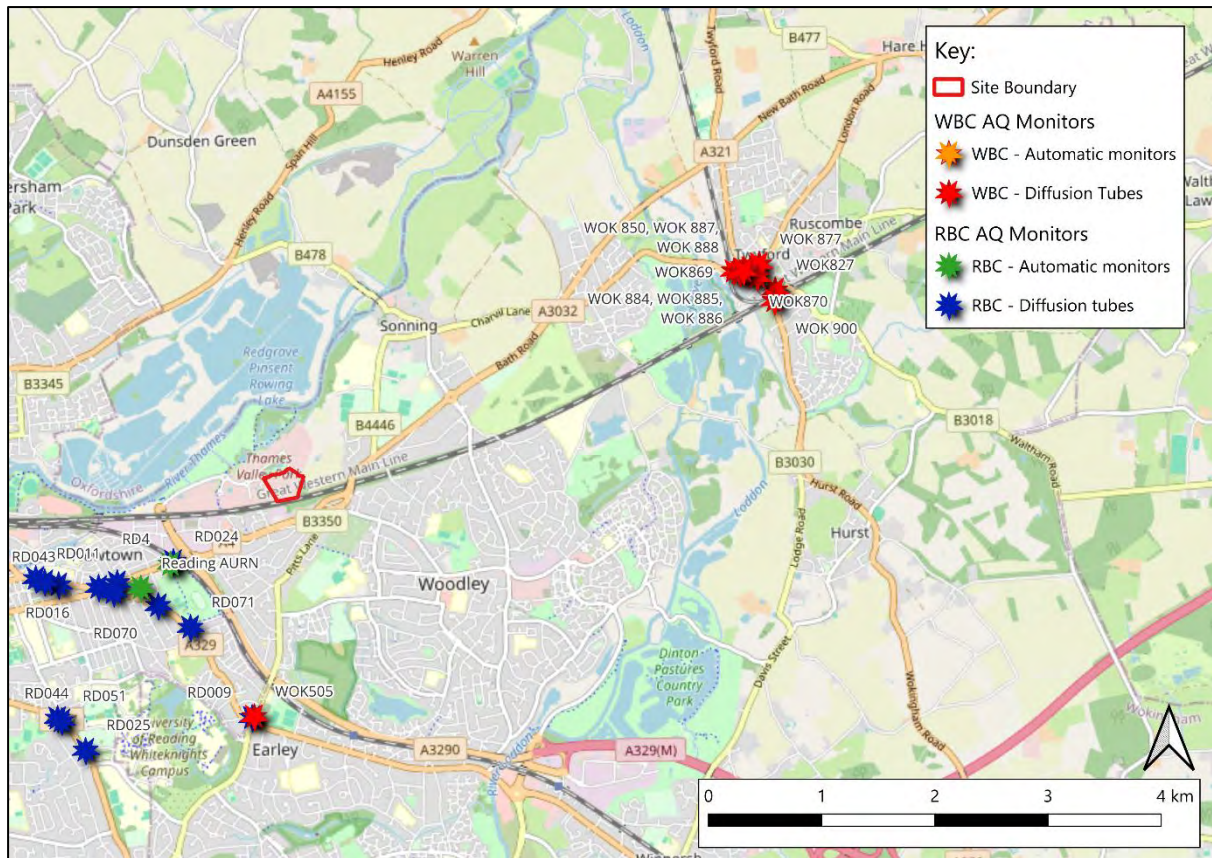
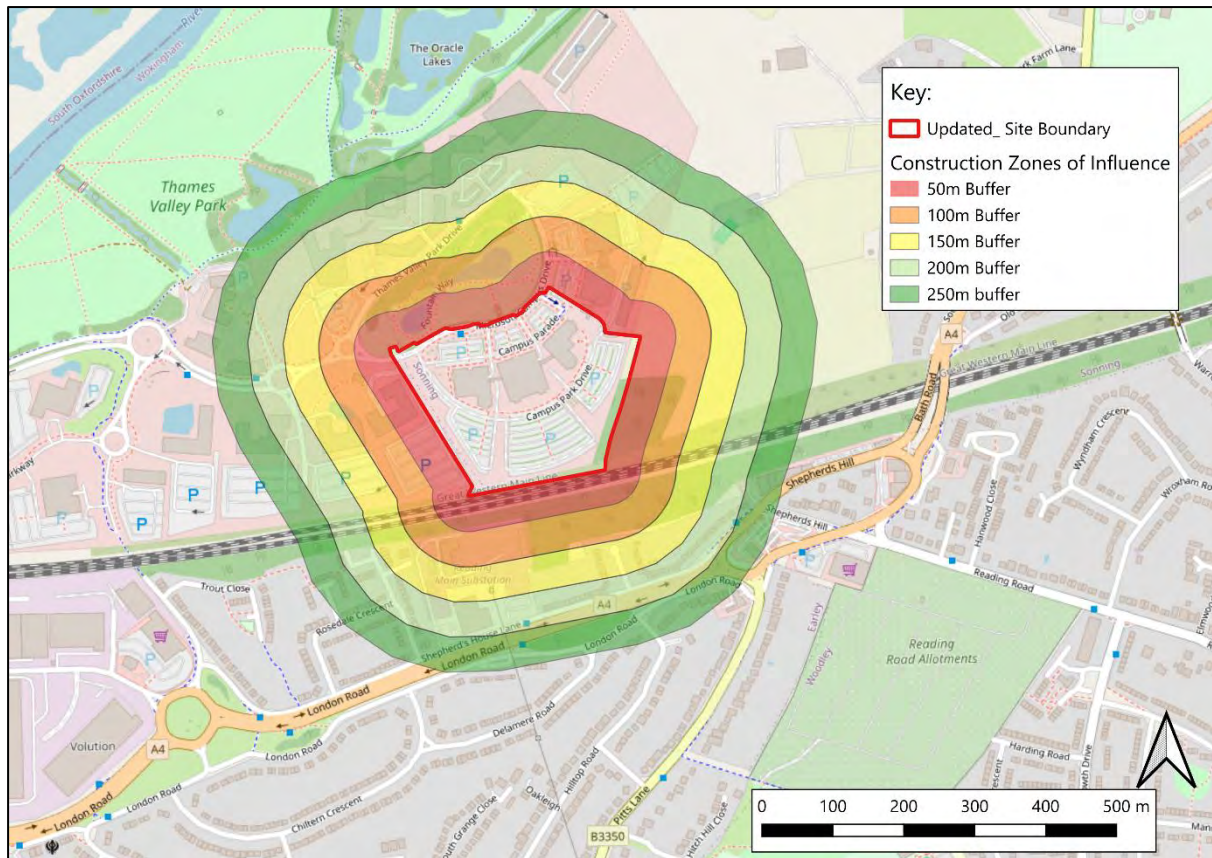


Figure 4. *Monitoring locations (Contains Ordnance Survey Data © Crown copyright database 2026)*



Appendix 7.1 – Legislation, Policy and Guidance

Legislation

The applicable legislative framework is summarised as follows.

Control of Pollution Act 1974

The Control of Pollution Act 1974 gives local authorities special powers for controlling noise and vibration arising from construction and demolition works. These powers may be exercised either before or after works have been started.

Section 60 enables the local authority of an area in which works are scheduled or currently underway, to serve a notice of its requirements for the control of construction site noise/vibration on the person who appears to the local authority to be undertaking the works.

Section 61 provides a mechanism for the contractor or developer to take the initiative in approaching the local authority to ascertain its noise/vibration requirements before construction work starts.

The Act also covers Noise Abatement Zones, Codes of Practice and Best Practicable Means (BPM) regarding noise pollution.

Environmental Protection Act 1990, Part III

Section 79 of the Environmental Protection Act 1990 defines statutory nuisances and the requirement for local authorities to inspect their area for statutory nuisances, taking such steps as are reasonably practicable to investigate any complaint of a statutory nuisance.

Section 80 of the act gives local authorities the right, where a statutory nuisance exists or is likely to be caused, to serve an abatement notice requiring the abatement, prohibition or restriction of the nuisance.

Section 82 of the act allows a person aggrieved by a statutory nuisance to make a complaint to a Magistrates Court in an attempt to seek an abatement notice served on the person responsible for the nuisance.

Planning Policy

Planning policy at the national, regional, county and local level relevant to the proposed development is discussed below.

National Policy

National Planning Policy Framework

The NPPF seeks to contribute to and enhance the natural and local environment, including preventing new and existing developments from contributing to, and/or, being put at an unacceptable risk from noise pollution. In support of this, paragraph 185 of the NPPF states that:

- *“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the Site or the wider area to impacts that could arise from the development. In doing so they should:*
- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason”.*

Noise Policy Statement for England, March 2010

The Noise Policy Statement for England (NPSE) was published in March 2010 by the Department for Environment, Food and Rural Affairs (DEFRA) and forms the overarching statement of noise policy for England. It sets out the long-term vision of Government noise policy, which is to:

“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.”

The policy aims, through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development, to:

- Avoid significant adverse effects on health and quality of life;
- Mitigate and minimise adverse effects on health and quality of life; and
- Where possible, contribute to the improvement of health and quality of life.

The NPSE sets out three terms with regard to noise effects:

- No Observed Effect Level (NOEL) – the level below which no effect can be detected and below which no detectable effect on health and quality of life due to noise can be established;
- Lowest Observed Adverse Effect Level (LOAEL) – the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) – the level above which significant adverse effects on health and quality of life occur.

The above terms are not defined numerically in terms of absolute levels within the NPSE which acknowledges that these will change depending on, but not limited to, the noise source, the receiver type and the time of day/day of week.

Local Planning Policy

Wokingham Borough Core Strategy

The The Wokingham Borough Core Strategy sets out the strategic planning framework for the Borough and includes policies intended to promote sustainable development whilst protecting the amenity of existing and future occupants.

Policy **CP1: Sustainable Development** requires development proposals to minimise environmental impacts and ensure that development does not adversely affect the quality of life of existing communities. The policy seeks to ensure that development avoids adverse environmental effects, including those arising from noise and vibration, and incorporates appropriate mitigation measures where required.

Managing Development Delivery Local Plan

The Managing Development Delivery Local Plan provides detailed development management policies that support the Core Strategy. Relevant policies seek to ensure that new development does not result in unacceptable impacts on residential amenity and that potential environmental effects, including noise and vibration, are appropriately assessed and mitigated.

In particular, development proposals should demonstrate that they would not give rise to unacceptable impacts on the amenity of neighbouring land uses and that suitable mitigation measures have been incorporated where necessary to reduce adverse environmental effects.

Guidance

Where detailed guidance is not contained in the documents described above, the most appropriate Standards and guidance have been adopted in the prediction and assessment of noise and vibration impacts.

Guidance relating to the prediction and assessment of demolition and construction phase noise and vibration impacts has been taken from the following documents:

- British Standards (BS) 5228-1+2:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' provide guidance on the assessment of noise and vibration impacts during the redevelopment of a site, including procedures for estimating noise levels from construction activities and vibration attributable to vibrating rolling and piling activities respectively. The guidance does not define acceptable limits. However, it does provide potential methods for assessing the significance of noise and vibration impacts and the methods for assessing the significance of impacts which the guidance indicates should be defined on a site specific basis. BS 5228 also provides guidance on minimising potential impacts through the use of mitigation and the adoption of BPM.
- BS 7385-2:1993 'Evaluation and Measurement for Vibration in Buildings' provides guidance on the measurement of vibration in buildings and the assessment of the potential of cosmetic or structural damage. Table 1 within BS 7385-2:1993 provides the vibration limits above which cosmetic damage could occur.

The following documents are appropriate to the measurement of baseline noise levels and assessing noise of an industrial nature emanating from existing, new or proposed commercial premises:

- BS 7445-1:2003 'Description and Measurement of Environmental Noise', defines parameters, procedures and instrumentation required for noise measurement and analysis.
- British Standard 4142:2014 'Methods for Rating and Assessing Industrial and Commercial Sound' describes methods for rating and assessing sound of an industrial and/or commercial nature for the purposes of: (a) investigating complaints, (b) assessing sound from proposed, new, modified or additional sources of sound of an industrial/commercial nature, and, (c) assessing sound at proposed new residential premises, with a view to determining the likelihood and degree of adverse impact, having regard to the context in which the sound occurs.

The following documents are appropriate when assessing noise and vibration affecting proposed new and existing development:

- National Planning Practice Guidance (NPPG) was released in March 2014 by the Department for Communities and Local Government (DCLG) and is a web-based resource to support the NPPF. NPPG 'Noise' outlines qualitatively when noise could be a concern, stating: *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment..."*.
- Advice is provided concerning noise exposure and its effects and puts into context the advice stated within the NPSE. The table below presents the qualitative guidance concerning the Noise Exposure Hierarchy, based on the likely average response, as set out in NPPG and with reference to the NPSE.

Table 1. Noise Exposure Hierarchy Based on the Likely Average Response

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level (LOAEL)	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up	Observed Adverse Effect	Mitigate and reduce to a minimum

	volume of television, speaking more loudly; where there is no alternative, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.		
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during noticeable periods of intrusion, where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep; disruptive/premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect (SOAEL)	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Noise Assessment' 2014 addresses the key principles of assessing noise effects and are applicable to all development proposals where noise effects may occur.

The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed. The guidance recognises that the effect associated with a particular noise source will be dependent on a number of factors including, but not limited to, the sensitivity of the receptor, frequency and duration of the noise source and time of day. However, it stops short of providing specific assessment criteria which developments should achieve but instead suggests that the methodology adopted should be selected on a site by site basis with reference to relevant national and local standards.

World Health Organisation (1999) 'Guidelines for Community Noise' provides guidance on desirable levels of noise structured according to specific environments to ensure the critical effects of noise on sleep, annoyance and speech interference are guarded against. One of the tenets of the WHO guidelines is the protection of the most vulnerable and sensitive of the population, with the WHO guideline values for environmental noise set at the level of the lowest adverse health effect below which the occurrence rates of particular 'effects' can be assumed to be negligible.

The WHO recommends specific internal noise levels that will provide an acoustic environment that is conducive to uninterrupted speech and sleep, whilst daytime external noise limits aim to prevent the majority of the population being moderately or seriously annoyed by noise. The table below presents a summary of the WHO guideline values.

Table 2. Summary of WHO Recommended Environmental Noise Levels

Environment	Critical Health Effects	dB L _{Aeq}	Time Base (hours)	dB L _{AFmax}
Outdoor living area	Serious annoyance (daytime and evening)	55	16	n/a
	Moderate annoyance (daytime and evening)	50	16	n/a
Dwelling, indoors	Speech intelligibility and moderate annoyance (daytime and evening)	35	16	n/a
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open	45	8	60

Notes: ¹ For a reasonable standard in bedrooms at night, the WHO,1999 guidelines recommend that individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{AFmax}. The WHO guidelines refer to research that identifies that 10-15 occurrences per night of the limiting maximum noise level may be considered acceptable.

British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' builds on the WHO guidelines, providing guidance for the control of noise in and around both new and refurbished buildings. The guidelines recommend internal ambient noise criteria for a range of indoor spaces including residential land uses. The indoor

ambient noise levels for unoccupied spaces relevant to this assessment are presented below.

Table 3. BS 8233 Guideline Noise Levels for Residential Spaces

Activity	Location	Daytime dB $L_{Aeq,16hr}$ (07:00 to 23:00)	Night-time dB $L_{Aeq,8hr}$ (23:00 to 07:00)
Resting	Living room	35	n/a
Dining	Dining room	40	n/a
Sleeping (daytime resting)	Bedroom	35	30

Unlike the previous version, BS 8233:2014 does not provide recommendations in relation to maximum noise levels in residential bedrooms at night from individual noise events such as vehicle or aircraft movements. Instead, it advises:

“Regular individual noise events...can cause sleep disturbance. A guideline value may be set in terms of SEL (Sound Exposure Level) or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.”

When considering external amenity spaces such as gardens, balconies and terraces, the guidance provided in BS 8233 states:

“For traditional external areas that are used for amenity space, such as gardens or patios it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

It goes on to state:

“Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to

achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

British Standard 6472-1:2008 'Guide to Evaluation of Human Exposure to Vibration in Buildings' provides guidance on the measurement and assessment of vibration within buildings resulting from sources such as road and rail traffic or building services systems that may cause adverse disturbance to human occupants. BS 6472 also introduces the concept of Vibration Dose Values (VDVs) for intermittent vibration assessment and reference curves for continuous vibration assessment. Present knowledge indicates the VDV indices to correspond most closely to the response of people to vibration inside a building. The VDV relates to the level and duration of vibration and effectively accumulates the vibration energy received over the daytime or night-time period in question. The guide VDV's set out in BS 6472-1 for evaluating the various probabilities of adverse comment within residential buildings relevant to the proposed development are presented in Table 8.2.4. The criteria are presented as ranges to reflect the differing susceptibility to vibration evident among members of the population due to social and cultural factors, psychological attitudes and expected degree of intrusion.

Table 4. Criteria for Assessing the Effects of Vibration on Human Response

Vibration dose values (VDV in $m/s^{1.75}$) above which might result in various degrees of adverse comment within residential buildings			
Land Use	Low Probability of Adverse Comment VDV ($m/s^{1.75}$)	Adverse Comment Possible VDV ($m/s^{1.75}$)	Adverse Comment Probable VDV ($m/s^{1.75}$)
Residential Buildings 16hr day ¹	0.2 ² to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8hr night	0.1 ² to 0.2	0.2 to 0.4	0.4 to 0.8

Notes: ¹ For offices and workshops, respective multiplying factors of 2 and 4 should be applied to the vibration dose value ranges for a 16 hour day; ² BS 6472-1:2008 states that adverse comment is not expected for VDV's below the ranges in the table.

Appendix 7.2 – Baseline Survey Information

A baseline noise survey has been carried out at the Site from Thursday 16th April to Tuesday 21st April 2026. The noise measurements were undertaken to establish the variation in noise around the Site and surrounding land uses. Measurement locations are described in Table 1.

Table 1. Description of Noise Monitoring Locations

Monitoring Location	Description	Observation and Dominant Noise Sources
L1	Unattended free-field measurement on the northeast site boundary. Microphone positioned approximately 2.5 m above ground level (AGL).	Railway noise dominates at the location, with natural noise sources and air traffic noise contributing to a lesser extent.
L2	Unattended free-field measurement on the northwest site boundary. Microphone positioned approximately 1.5 m AGL.	Natural noise and operational noise from nearby offices are dominant, with railway noise contributing to a degree.

Results

A summary of the noise results at all locations is presented in Table below, while Appendix B provides time history profile charts at each long-term position.

Table 2. Summary of Noise Measurement Results

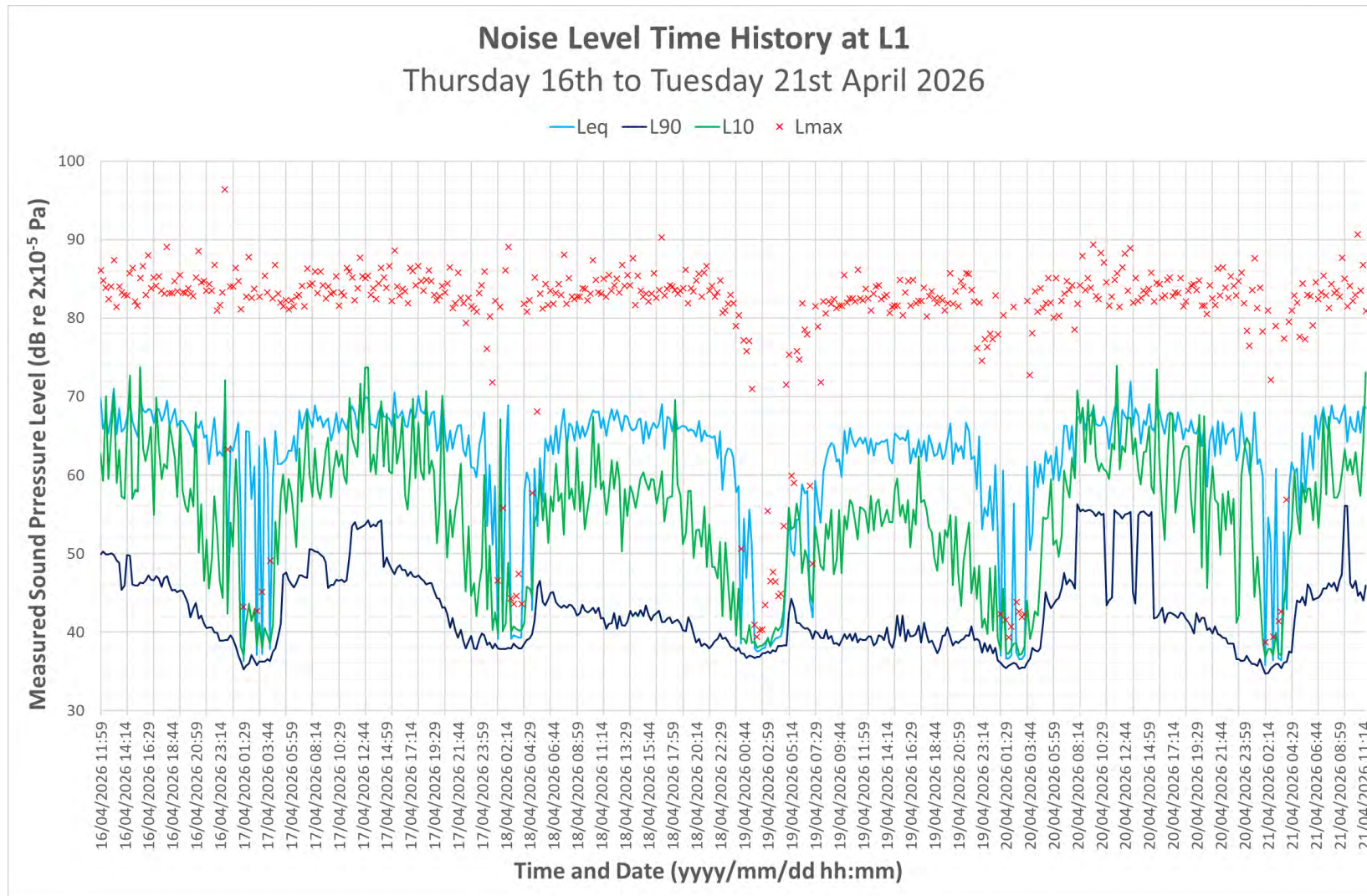
Measurement Position	Reference Time	L_{Aeq} , dB (Log Ave) ¹	L_{A90} , dB		L_{AFmax} , dB (95%ile) ³
			(Lowest)	(10%ile) ²	
L1	Daytime (0700-2300)	66	37	39	87
	Night-time (2300-0700)	61	35	36	86
L2	Daytime (0700-2300)	55	36	38	74
	Night-time (2300-0700)	47	35	37	68

Notes: ¹ Log average of day/night-time $L_{Aeq,T}$, ² The 10th percentile L_{A90} value presented is considered representative of typical lowest L_{A90} , disregarding atypical minima. ³ 95th percentile L_{AFmax} value presented is considered representative of typical highest L_{AFmax} levels experienced. All figures are rounded to the nearest whole decibel.

All noise measurements were undertaken using calibrated Class 1 precision sound level meters with one-third-octave band frequency analysis, providing a detailed representation of the prevailing environmental noise. The meters were configured for continuous logging, integrating over 125 ms (fast time constant) in the A-weighting network for the duration of the survey. Data was subsequently post-processed in 5-minute intervals to derive the standard noise indices: L_{eq} (average level), L_{90} (background) and L_{max} (maximum). A detailed definition of these metrics is provided in Appendix A of this report.

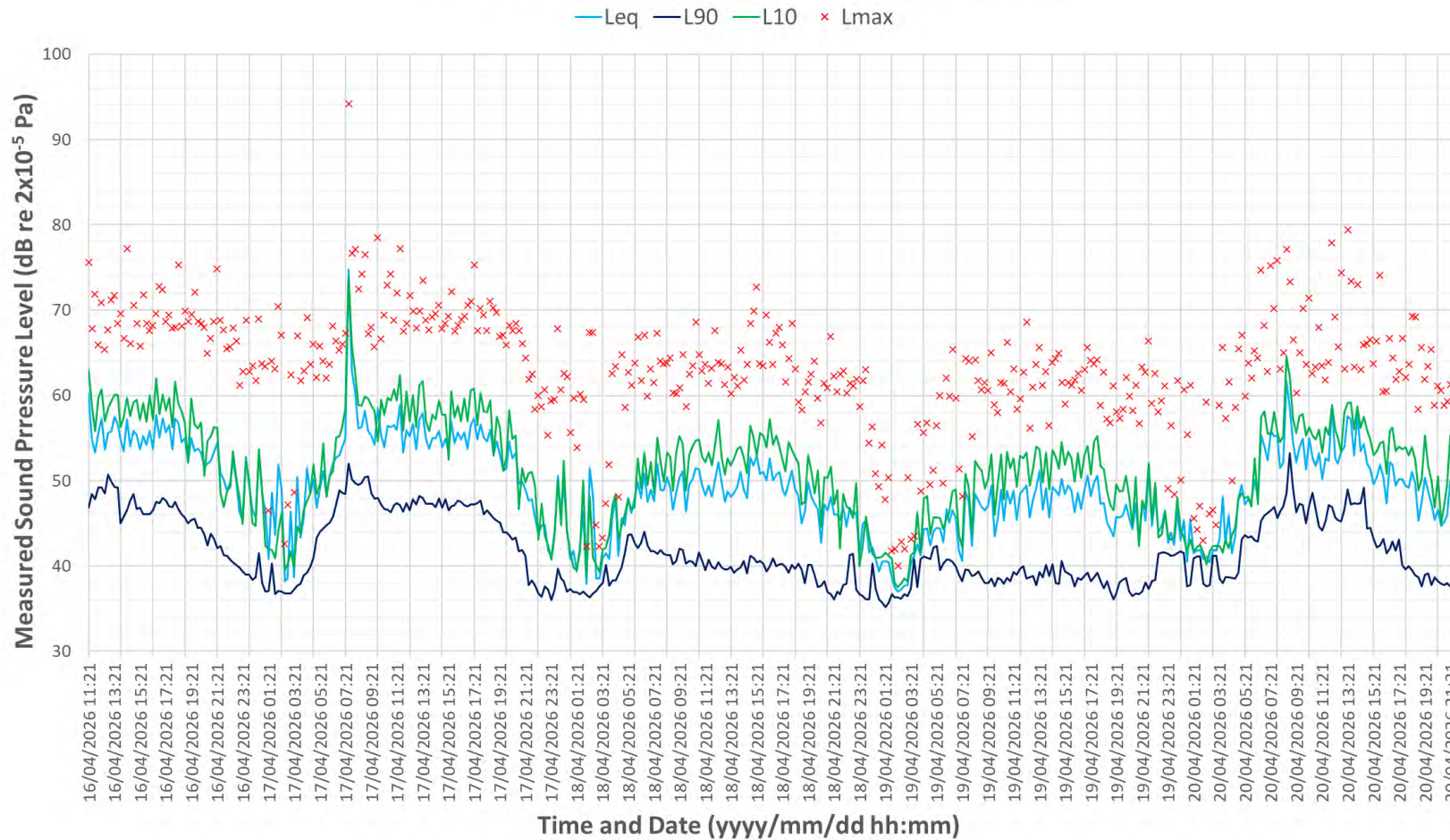
A review of data from nearby weather stations during the survey period indicates that wind speeds were below 5 m/s. No precipitation was recorded throughout the external survey. Based on these conditions, the weather during the environmental noise survey is considered suitable

Time History Graphs



Noise Level Time History at L2

Thursday 16th to Monday 20th April 2026



Appendix 7.3 – ABC Calculations

The potential for a significant effect to occur has been assessed based on threshold values determined by using the ABC Method set out in Annex E3 of BS 5228-1:2009+A1:2014. An extract describing this method is provided below.

Table 1. BS 5228 ABC Categories

Assessment category and threshold value period	Threshold Value (dB)		
	Category A A)	Category B B)	Category C ^{C)}
Night-time (23.00-07.00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07.00-19.00) and Saturdays (07.00-13.00)	65	70	75
NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the Site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increase by more than 3 dB due to site noise. NOTE 3: Applied to residential receptors only. A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.			

The Site noise level determined at the nearest NSR has been compared to the threshold value relevant to the NSR location. The Site noise level has been predicted accounting for the source sound level, plant/activity on-time, distance to the NSR and any intervening screening. Predicted noise levels are in terms of the overall 10-hour L_{Aeq} level for a 'worst case' scenario as determined at the nearest NSR to noise originating from the construction works.

Each of the construction stages will include a range of operational noise generating plant. The table below presents a breakdown of the variety of plant assumed to operate collectively within each construction stage, together with the sound pressure level at a distance of 10 m and the origin of this source information.

Table 2. Assumed Construction Stage Plant and Source Noise Levels

Plant	Sound Pressure Level at 10 m, dB(A)	Data Source (BS 5228-1:2009+A1:2014)	Number of Units
Enabling and demolition works			
Tracked excavator (44t)	82	Table C.1 ref 12	1

Plant	Sound Pressure Level at 10 m, dB(A)	Data Source (BS 5228-1:2009+A1:2014)	Number of Units
Articulated dump truck	80	Table C.1 ref 11	1
Dozer	75	Table C.2 ref 1	1
Wheeled backhoe loader (8t)	68	Table C.2 ref 8	1
Hand-held hydraulic breaker (20 kg / 69 bar)	93	Table C.1 ref 7	1
Lorry 4-axle wagon	80	Table C.2 ref 34	1
Excavation and sub-structure works			
Hydraulic hammer rig (unmitigated)	87	Table C.3 ref 2	1
Drop hammer pile rig power pack (unmitigated)	69	Table C.3 ref 5	1
Hydraulic vibratory compactor (mitigated)	78	Table C.2 ref 42	1
Vibratory tamper (mitigated)	63	Table C.4 ref 35	1
Concrete mixer truck (discharging) and concrete pump (pumping)	75	Table C.4 ref 28	1
Tracked excavator (22t)	78	Table C.2 ref 3	1
Articulated dump truck (25t)	81	Table C.4 ref 1	1
Generator for welding	73	Table C.3 ref 32	1
Construction of the super-structure			
Power for site cabins - diesel generator	61	Table C.4 ref 76	1
Diesel generator - Power for welder	66	Table C.4 ref 85	1
Lorry 4-axle wagon	80	Table C.2 ref 34	1
Cutting concrete slabs - Hand-held circular saw (petrol)	79	Table C.4 ref 72	1
Mobile telescopic crane (80t)	77	Table C.4 ref 39	1
Gas cutter	79	Table C.1 ref 18	1
Tracked excavator	80	Table C.5 ref 18	1
External/ landscaping			
Articulated dump truck	81	Table C.5 ref 16	1
Asphalt paver (+ tipper lorry)	75	Table C.5 ref 30	1
Hydraulic vibratory compactor	78	Table C.2 ref 42	1
Telescopic handler	70	Table C.4 ref 55	1
Road roller	80	Table C.5 ref 19	1

The predicted site noise levels and the determined threshold values at the closest NSR for each construction stage, along with the resultant effect significance as defined in the main Chapter are summarised below for the unmitigated scenario.

Table 3. Predicted Unmitigated Construction Noise Levels at NSRs

Sensitive Receptor	Sensitivity	Construction Phase	Period	Measured Ambient Noise Level, dB L_{Aeq,10hr}	Ambient Noise Level Rounded to 5 dB	Category	Threshold	Predicted Construction Noise Level, dB L_{Aeq,10hr}	Value Over Threshold, dB	Magnitude (Adverse)
NSR1	High	Enabling and demolition works	Daytime	66	65	B	70	68	0	Negligible
		Excavation and sub-structure works						70	0	Negligible
		Construction of building						67	0	Negligible
		External/landscaping						68	0	Negligible

Appendix 8.1 – Legislation, Policy and Guidance

Legislation

Climate Change Act (2008)

The overarching Act in relation to climate is the Climate Change Act 2008. The Act introduces a legally binding target to reduce the UK's GHG emissions to at least 80% below 1990 levels by 2050. It also provides for a Committee on Climate Change (CCC) with power to set out carbon budgets binding on the Government for 5-year periods.

In the 2009 budget, the first three carbon budgets were announced which set out a binding 34% CO₂e reduction by 2020; and the Government has since adopted the fourth and fifth carbon budgets to reduce CO₂e by 50% by 2025 and 57% by 2030.

The CCC also produces annual reports to monitor the progress in meeting these carbon budgets. Consequent upon the enactment of the Climate Change Act, a raft of policy at national and local level has been developed aimed at reducing carbon emissions.

Climate Change Act: 2050 Target Amendment (2019)

In June 2019, the Government passed the Climate Change Act 2008 (2050 Target Amendment) Order 2019 to amend the 2050 carbon emissions target in the Climate Change Act 2008 from 80 % below 1990 levels to zero net carbon (i.e., 100 % below 1990 levels). This new target will essentially end the UK's contribution to climate change by 2050. The amendment to the 2008 Climate Change Act was in part to meet the UK's commitments as a signatory of the 2015 Paris Agreement, as well as the conclusion that net-zero is necessary, feasible, and cost-effective.

The Act clarifies that GHGs include:

- Carbon dioxide
- Methane
- Nitrous oxide
- Hydrofluorocarbons
- Perfluorocarbons
- Sulphur hexafluoride

Energy Act (2023)

The Energy Act makes a provision for the setting of a decarbonisation target range, duties in relation to it and for the reforming of the electricity market for the purposes of encouraging low carbon electricity generation.

Environment Act (1995; 2021)

The Environment Act 1995 was a significant piece of legislation which consolidated different environmental laws and established the Environment Agency, setting the principal aim to protect and enhance the environment, conferring general functions across pollution control, water management and flood defence.

The Environment Act 2021 built on the foundations laid by the 1995 legislation and established legally binding long-term targets for air quality, water, biodiversity and waste. It also introduced the Office for Environmental Protection (OEP) to monitor and enforce governmental compliance with environmental commitments.

EIA Directive (2014/52/EU) and Town and Country Planning (Environmental Impact Assessment) Regulations (2017)

The EIA Directive 2014 sets out the rationale for incorporating climate change into the EIA process. It states:

“Climate change will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to climate change.”

The requirements of the EIA Directive (2014) have been adopted within Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) and require that the assessment provides:

“A description of the likely significant effects of the development on the environment resulting from, inter alia: (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change”.

Town and Country Planning Regulations EIA Regulations (2017)

The Town and Country Planning Regulations EIA Regulations (2017) were introduced to transpose the requirements of the revised EU EIA Directive into the planning system for town and country planning developments in England. The Regulations establish the framework for determining whether development proposals require an EIA and set out requirements for screening, scoping, environmental assessment, decision-making and the preparation of Environmental Statements.

In relation to climate change, Schedule 4 requires Environmental Statements to consider the current environmental baseline and its likely evolution in the absence of the development, the likely significant effects of the project on climate, and the project's vulnerability to major accidents and disasters, including those arising from climate change. The Regulations also require the use of appropriate forecasting methods and evidence, the assessment of likely significant effects, and the identification of mitigation, adaptation and resilience measures to avoid, reduce or offset adverse environmental effects. These requirements ensure that both climate change impacts and climate resilience are integrated into the EIA process.

Infrastructure Planning (EIA) Regulations (2017)

The Infrastructure Planning (EIA) Regulations 2017 was established to transpose the EU EIA Directive into UK law and aims to ensure that environmental factors, including climate-related effects, are assessed as part of the planning process for significant infrastructure developments. The regulations outline the environmental factors to be considered as part of the EIA process, to the screening criteria and how an environmental statement is to be prepared.

In relation to climate change, Schedule 4 of the legislation sets out the framework for climate assessment including: description of the baseline and future baseline; forecasting methods and evidence; likely significant effects on climate as well as consideration of the project's vulnerability to climate-related hazards and the inclusion of appropriate adaptation and resilience measures.

Planning Policy

National

National Planning Policy Framework (2025)

The NPPF sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is an environmental objective:

- “To protect and enhance our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy”.
- Chapter 14 of the framework is entitled “Meeting the challenge of climate change, flooding and coastal change” and sets out the strategy for minimising the climate change effects of new development.
- Paragraph 164 states that “new development should be planned for in ways that [...] can help reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards”.
- Paragraph 165 describes further that “to help increase the use and supply of renewable and low carbon energy and heat, plans should: a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts); b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers”.
- Paragraph 166 states that “in determining planning applications, the NPPF requests that planning authorities should expect new development to: a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and b) take account of landform, layout, building orientation, massing, and landscaping to minimise energy consumption.”

The National Adaptation Programme and Third Strategy for Climate Adaptation

The National Adaptation Programme sets out government’s response to the second Climate Change Risk Assessment, showing the actions government is, and will be, taking to address the risks and opportunities posed by a changing climate. It forms part of the five-yearly cycle

of requirements laid down in the Climate Change Act 2008 to drive a dynamic and adaptive approach to building our resilience to climate change.

The Clean Growth Strategy

The Clean Growth Strategy sets out a comprehensive set of policies and proposals that aim to accelerate the pace of “clean growth”, *i.e.* deliver increased economic growth and decreased emissions. In the context of the UK’s legal requirements under the Climate Change Act, the UK’s approach to reducing emissions has two guiding objectives:

- To meet our domestic commitments at the lowest possible net cost to UK taxpayers, consumers, and businesses; and,
- To maximise the social and economic benefits for the UK from this transition.

The Strategy contains policies relating to the delivery of clean, smart and flexible power, including reducing power costs for homes and businesses and more transparent carbon pricing. It effectively replaces the “The Carbon Plan: delivering our Low Carbon Future” published in 2011.

Emissions from buildings are included in the 2050 target established by the Clean Growth Strategy. Heating in buildings and industry accounted for around 32% of total UK emissions from 1990 to 2015.

The UK’s current emissions policies will also still continue rely on EU mechanisms to achieve its carbon budgets, such as EU products policy which sets minimum standards for a range of products to improve energy efficiency.

The Carbon Plan: Delivering Low Carbon Future

The Carbon Plan sets out the government’s plans for achieving the emissions reductions commitment made in the Climate Change Act 2008 and outlines a strategy consistent with meeting the UK’s 2050 targets.

Regional & Local

Wokingham Borough Adopted Core Strategy Development Plan

The Wokingham Borough Core Strategy Development Plan Document provides the strategic planning framework for development across the borough to 2026. It establishes the spatial vision, development strategy and planning policies that guide the location and form of future growth, including housing, employment, transport, community facilities and environmental protection.

Policy CP3 seeks to ensure that development contributes to climate change mitigation and adaptation by reducing carbon emissions, improving energy efficiency, promoting renewable and low-carbon energy generation, conserving water resources and incorporating sustainable design measures. The policy requires development to address the impacts of climate change through the design, layout and construction of new development and to support the transition to a low-carbon future.

Guidance

Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)

The ISEP (previously IEMA) Guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022) provides a framework for practitioners involved in EIA. The document outlines the methodology for screening and scoping the boundaries of a GHG assessment, the methods for quantifying GHG emissions, and the criteria for evaluating the significance of emissions.

Climate Change Resilience and Adaptation (2020)

The ISEP (previously IEMA) Guidance on Climate Change Resilience and Adaptation (2020) provides a structured approach for integrating climate resilience and adaptation into the Environmental Impact Assessments EIA. The guidance sets out the steps that should be taken to integrate climate adaptation and resilience issues into the EIA process.

RICS: Whole life carbon assessment for the built environment (2017)

This professional statement, aligned with EN 15978, provides guidance for conducting Whole Life Carbon (WLC) assessments for buildings and infrastructure. It quantifies environmental impacts in terms of Global Warming Potential, reported in CO₂ equivalent (CO₂e), and offers practical advice on organizing assessment results.

RICS: Whole life carbon assessment for the built environment (2023)

The second version of the RICs Professional Standard for the Whole life carbon assessment for the built environment launched in 2023 and effective from the 1 of July 2024, introduces mandatory requirements to comply with the WLC RICS methodology. It also expands the scope of the standard to the following built assets:

- New construction/ new-build assets
- Demolition of existing assets,
- Retrofits, masterplans with multiple built assets,
- Fit-out assets

A main contribution from this standard is the clear guidance on how to address the uncertainty in WLCs.

LETI: Embodied Carbon Primer (2020)

This guidance document provides a foundational overview of embodied carbon within the built environment and outlines practical steps for reducing emissions across building life cycles. It explains key concepts such as product stage emissions, upfront carbon, and life-cycle modules, and introduces benchmark ranges to support early-stage decision-making. The primer also highlights typical carbon intensities for major material categories and assemblies, helping practitioners identify hotspots and prioritise reductions. A central contribution is its emphasis on early design intervention, encouraging designers, clients, and project teams to integrate embodied-carbon thinking from concept stage onward.

LETI: Embodied Carbon Benchmarks (2022)

Developed to support industry alignment, LETI's embodied carbon benchmarks provide performance targets for different building typologies, expressed in kgCO₂e/m². These benchmarks complement the LETI Climate Emergency Design Guide and offer clear, outcome-based metrics for assessing both upfront and whole-life embodied carbon. They include best practice, typical, and worst-practice ranges, enabling project teams to evaluate

performance relative to aspirational and minimum expectations. A key contribution of this work is the establishment of transparent, evidence-based targets that support consistent reporting, comparison, and progression across the UK built environment.

UKGBC: Net Zero Whole Life Carbon — Consultation Slides & Embodied Carbon Benchmarks (consultation)

This consultation package from the UK Green Building Council (UKGBC) presents proposed embodied-carbon benchmarks and supporting slides as part of its Net Zero Whole Life Carbon workstream. The materials set out benchmark ranges for different building typologies (expressed as kgCO₂e/m² for upfront and whole-life stages), explain the allocation of emissions across life-cycle modules, and describe how asset-level embodied carbon assessments can be aligned with organisational Scope-3 reporting. The slides sit alongside UKGBC's wider Roadmap and technical reports and are intended to stimulate industry feedback on practicable targets, data-requirements and reporting conventions.

Appendix 8.2 – Assessment Boundaries

Building Assessment Information										Supplementary Information
A1-A3			A4-A5		B1-B7					D
Product Stage			Construction Process		Use Stage					
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	
Raw material supply and production of building products	Transport	Manufacturing	Transport	Construction-Process	Use	Maintenance	Repair	Replacement	Refurbishment	
					B6	Operational Energy Use				
					B7	Operational Water Use				
C1-C4										Reuse-Recovery-Recycling-Potential
End of Life										
C1	C2	C3	C4							
Deconstruction/Demolition	Transport	Waste Processing	Disposal							

Appendix 8.3 – Embodied Carbon Assessment

Thames Valley Park Data Centre

Embodied Carbon Assessment Summary and Assumptions

Embodied Carbon - Lifecycle boundaries

This preliminary assessment provides a representation of the embodied carbon impacts of the proposed development, **over a study period of 60 years**, for the following stages:

A1-A5		Demolition of existing buildings and site preparation This includes on-site impacts for demolition/deconstruction of existing buildings and hard landscape, transport of demolition waste to end-of-life facilities, and waste processing (recycling, recovery, landfill, etc).
		New construction This covers all emissions of green-house gases up to completion of the project, including emissions associated with material extraction and manufacturing, transportation of materials on site and construction activities.
B1-B5		Operation This includes an estimate of the predicted emissions associated with the future operation of the data centre, including maintenance/repair, material replacements, refrigerant leakage, and future re-powering interventions*
C1-C4		Decommissioning This represents the end-of-life stage of the proposed asset. The embodied carbon impacts associated with this stage include future demolition/deconstruction activities and disposal of the arising demolition waste.

* New electrical substation to be installed on site in 2037 - Incoming 132kV utility power supply of 110MVA.

Embodied Carbon – Elemental scope

The elements of the proposed development captured within this preliminary embodied carbon assessment include:

- (A)** Site preparation – Demolition of existing buildings, demolition of existing hard surfaces and site clearance
- (B)** Construction of new data centre (data halls, electrical installations and generators), including server racks and associated IT equipment
- (C)** Construction of new admin/office area, including both base build impacts (structure, façade, MEP plantroom and base build provision) and fit out (finishes & FF&E)
- (D)** On-site power generation – Installation of SOFC power modules with a net output capacity of 42.5 MVA to support the initial phase of data centre operations.
- (E)** External works – Construction of new roads, car park bays, pedestrian paths, soft-landscaping, concrete subbase for future electrical substation and site fencing.
- (F)** New electrical substation to be installed on site in 2037 - Incoming 132kV utility power supply of 110MVA.

Embodied Carbon – Assumptions and limitations

Assumption	Justification
Demolition of existing buildings assessed using the RICS WLCA Professional Standard benchmark of 35 kgCO₂e/m² GIA applied to the existing buildings' area. References: #1	Standard approach for OPA stages – This can be further refined at RMA stage once a Pre-Demolition Audit is undertaken.
Hardstanding demolition assessed from measured site areas, an assumed pavement thickness of 150 mm, and published demolition productivity rates, with emissions calculated using eTool Default V20. References: #2, #3	Standard approach for OPA stages – This can be further refined at RMA stage once a Pre-Demolition Audit is undertaken.
The embodied carbon assessment for the proposed data centre has been undertaken using a benchmark-based approach informed by published whole life carbon studies of comparable data centre developments. The MEP impacts have been adjusted to the fit-out sequence of the data halls: Phase 1 32 MW IT corresponding to 5no. data halls, increased to 72 MW in Phase 2 (12no. data halls). References: #7, #8, #9	At this stage, detailed information relating to the construction materials of the structural design and building envelope has not yet been defined. This can be refined as the design progresses and more detailed project-specific information is available.

Assumption	Justification
Embodied carbon emissions for the data centre fit out (IT servers and server racks) are based on lifecycle impacts reported in product EPDs with total emissions adjusted to the scale and the construction sequence of the proposed development (i.e. Phase 1 32 MW IT, increased to 72 MW in Phase 2). References: #12, #13	In the absence of detailed IT equipment specifications, embodied carbon impacts have been estimated using published product EPD data for typical products deployed in data centre applications scaled to the proposed IT load, providing a reasonable proxy for the anticipated development capacity.
Office/admin space - Base build impacts were estimated using embodied carbon benchmarks from the GLA Whole Life Carbon Guidance (2022), applied to the proposed office GIA. References: #5	At this stage, detailed information relating to the construction materials of the structural design and building envelope has not yet been defined. This can be refined as the design progresses and more detailed project-specific information is available.
Office/admin space - Fit-out impacts were based on benchmark values from Hilson Moran's project portfolio (A1-A5 = 200 kgCO₂e/m²GIA). A fit-out replacement cycle of 15 years was assumed over a 60-year assessment period, comprising one initial installation and three subsequent replacements every 15 years.	At this stage, detailed information relating to the office fit out has not yet been developed. This can be refined as the design progresses and more detailed project-specific information is available.

Assumption	Justification
The embodied carbon assessment for the proposed SOFC fuel cells has been undertaken using a benchmark-based approach informed by limited published lifecycle carbon data. References: #10	Available literature on embodied carbon of Solid Oxide Fuel Cells (SOFCs) is limited and fragmented. No EPDs or similar third-party verified carbon data available from SOFC manufacturers at this stage.

Embodied Carbon – Baseline Scenario

Phase 1 - From 2032 to 2037 (first five years of operation) - Site powered by fuel cells - IT load capacity: 32 MW

Phase 2 - From 2037 onward - Fuel cells removed and installation of 132kV 110 MVA main connection substation - IT load capacity: Increased to 72 MW

Development phase	Existing site	Data Centre*	Office / Admin	Fuel Cells	Substation	External works	TOTAL (tCO2e)
A1-A5 - Construction - Year 0	1,492	49,398	6,082	45,702	-	969	103,643
B1-B5 - Operation - Years 1-60	-	483,992	5,685	45,454	2,147	1,198	538,476
C1-C4 Decommissioning - Year 60+	-	4,430	291	-	60	205	4,985
TOTAL	1,492	537,820	12,058	91,156	2,207	2,371	647,104

*Including server racks and associated IT equipment

Embodied Carbon – Baseline Scenario - Lifecycle impacts normalised per MW IT and sqm GIA

Stage	Including fuel cells
Lifecycle embodied carbon	8,988 tCO2e/MW
A1-A5, B1-B5, C1-C4	18,348 kgCO2e/sqm

Embodied Carbon – Worst Case Scenario

Phase 1 - From 2032 to 2037 (first five years of operation) - Site powered by fuel cells - IT load capacity: 32 MW

Phase 2 - From 2037 onward - Fuel cells maintained and installation of 33kV 60MVA main connection substation - IT load capacity: Increased to 72 MW

Development phase	Existing site	Data Centre*	Office / Admin	Fuel Cells	Substation	External works	TOTAL (tCO ₂ e)
A1-A5 - Construction - Year 0	1,492	49,398	6,082	45,702	-	969	103,643
B1-B5 - Operation - Years 1-60	-	483,992	5,685	495,574	1,073	1,198	987,522
C1-C4 Decommissioning - Year 60+	-	4,430	291	4,270	30	205	9,226
TOTAL	1,492	537,820	12,058	545,546	1,103	2,371	1,100,391

*Including server racks and associated IT equipment

Embodied Carbon – Worst Case Scenario - Lifecycle impacts normalised per MW IT and sqm GIA

Stage	Including fuel cells
Lifecycle embodied carbon	15,283 tCO ₂ e/MW
A1-A5, B1-B5, C1-C4	31,201 kgCO ₂ e/sqm

Embodied Carbon - References

This section brings together a selection of reference documents, research papers, technical standards, and industry publications on embodied carbon in data centres that have informed the preparation of the preliminary embodied carbon assessment for the proposed development.

These sources have been used to support the assessment methodology, establish assumptions and benchmarks where appropriate, and provide context for evaluating the whole-life carbon impacts of the scheme.

- #1 "RICS PS Whole life carbon assessment for the built environment - 2nd Edition"
- #2 "Demolition of existing hard landscape - Breaker excavator productivity rates"
- #3 "eTool LCD - Life Cycle Inventory 'United Kingdom LCI - V20.2 RICS - Life Cycle Strategies'"
- #4 "Greenhouse gas reporting: conversion factors 2026"
- #5 "London Plan Guidance - Whole Life-Cycle Carbon Assessments - March 2022"
- #6 "EPD Ecoflex Substation 6600KVA 33kv/0.8-0.8kv ONAN"
- #7 "Introba's report 'Hidden emissions of the cloud', 2023"
- #8 "Arup's publication 'Circular thinking for data centres', 2025"
- #9 "Ramboll's whitepaper 'Developing sustainable data centres', 2025"
- #10 "Energy and carbon payback times for solid oxide fuel cell based domestic CHP"
- #11 "Optimize Solid Oxide Fuel Cell Stack Maintenance for Extended Lifespan"
- #12 "EPD for server rack - Product reference: PRIMERGY RX2540 M8"
- #13 "EPD for server rack - Product reference: Excel Environ floor-standing rack"

Appendix 9.1 – National Legislation, Regulations and Guidance

National Planning Policy Framework

The National Planning Policy Framework (NPPF) includes policies on flood risk and minimising the impact of flooding under Section 14, Meeting the challenge of climate change, flooding, and coastal change (Paragraphs 161 – 186). The National Planning Policy Guidance (NPPG) provides direction on how the planning policy should be applied.

Flood Risk Assessments are required to be carried out in line with the NPPF to demonstrate that a development will be safe for its lifetime and will not increase flood risk elsewhere.

As of December 2024, the NPPF (Para. 182) requires that “applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff”.

Wokingham Borough Core Strategy (Adopted 29 January 2010, reviewed October 2023)

The Wokingham Borough Core Strategy sets out the long term spatial vision for the Borough with objectives for sustainable development. Policy CP1 – Sustainable Development requires developers to “ensure the provision of adequate drainage”, “limit any adverse effects on water quality” and “avoid increasing (and where possible reduce) risks of or from all forms of flooding”.

WBC Development Plan: Adopted Managing Development Delivery Plan (February 2014)

The Wokingham Borough Development Plan provides more detail on policies from the WBC Core Strategy. Policies CC09 Development and Flood Risk (from all sources) and CC10 Sustainable Drainage lay out the key requirements relevant to flood risk and drainage.

Wokingham Borough Council (WBC) Strategic Flood Risk Assessment (SFRA) (2020)

The WBC SFRA provides an evidence base to inform spatial planning and development management, in line with the NPPF and NPPG. It supports:

- Preparation of the Local Plan (Core Strategy and Development Plan);
- Application of the Sequential Test and, where required, the Exception Test;
- Consideration of flood risk when allocating land and determining planning applications.

The SFRA assesses flood risk from all relevant sources, including, fluvial flooding from the main river network (e.g. River Loddon and tributaries), surface water flooding, groundwater flooding, and artificial sources, such as reservoirs. This aligns with national SFRA requirements and with WBC’s role as Lead Local Flood Authority (LLFA).

Appendix 9.2 – Flood Risk Assessment and Drainage Strategy Report



Thames Valley Park Data Centre

Flood Risk Assessment & Surface Water Drainage Strategy

Arup | On Behalf of FH Trustees
Revision 01 | September 2026

ARUP

Document Verification

Project title Thames Valley Park Data Centre
Document title Flood Risk Assessment and Drainage Strategy
Job number 313902-00
Document ref P01
File reference

Revision	Date	Filename	Flood Risk Assessment and Drainage Strategy		
P01	25/09/2026	Description			
			Prepared by	Checked by	Approved by
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Issue Document Verification with Document ☒

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Executive Summary

This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Ove Arup & Partners (Arup) and has been commissioned by BCS Consultancy Ltd, on behalf of FH Trustees¹ (the Applicant). This report supports an outline planning application submitted to Wokingham Borough Council (the Council) in relation to the following Proposed Development, at **Microsoft Campus, Thames Valley Park, Reading, RG6 1WG** (the Site).

“Outline planning application (all matters reserved except for Access) for the construction of a data centre, fuel cells for energy generation, including ancillary office space and associated plant, drainage, backup generation, car parking, landscaping, and internal maintenance access roads.”

After a comprehensive review of flood risk data and publicly available information, this report concludes that the risk of flooding from all sources is medium, however is reduced to low through the implementation of suitable mitigation in line with the requirements:

- National Planning Policy Framework
- Wokingham Borough Core Strategy (Adopted 29 January 2010, reviewed October 2023)
- WBC Development Plan: Adopted Managing Development Delivery Plan (February 2014)
- Wokingham Borough Council (WBC) Strategic Flood Risk Assessment (SFRA) (2020)

A summary of the flood risk is provided below in Table A.

Table A Flood risk summary

Flood Source	Pathway	Comment	Risk
Fluvial and Tidal	River Thames 600m to the north of the Site	EA flood maps confirm the Site is entirely located within Flood Zone 1.	Negligible / Not at risk
Groundwater	Through underlying strata when groundwater levels rise above surface levels.	Groundwater flood risk is identified as moderate within the site extents. The drainage and external levels strategy should therefore consider potential groundwater emergence and avoid creating low points where groundwater could be contained. However, as the proposed development does not include a basement the risk is low.	Low with suitable mitigation (as needed)
Artificial Sources	No reservoirs or other artificial sources within site environs.	EA flood maps show that the site is not at risk of reservoir flooding.	Negligible/Not at risk
Pluvial	Overland flow or overloading of existing sewers. Generally, at topographic low points.	High pluvial flood risk is identified around the existing south-eastern hardstanding areas, caused by the existing buildings obstructing surface water flow. Demolition of the offices and the proposed drainage strategy will reduce this risk. The development surface water drainage strategy reduces the pluvial flood risk to low.	Low with suitable mitigation (as needed)
Infrastructure Failure	Burst water main inundating local sewer network	Multiple small water mains in adjacent road networks. No large infrastructure features have been identified in the local area. There are no basement structures proposed as part of the development. In the event of a burst water	Low with suitable mitigation (as needed)

¹ FH Trustees and FH Trustees 2 as trustees of the Mapeley Beta HL Unit Trust

Flood Source	Pathway	Comment	Risk
		main, the surface water network will collect and convey runoff away from all critical infrastructure.	

1. Introduction

This FRA has been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) (specifically Chapter 18), with reference to relevant adopted Wokingham Borough Council planning policy and flood risk guidance. This report forms part of the outline planning application, to be submitted to Wokingham Borough Council as the Local Planning Authority (LPA) and Lead Local Flood Authority (LLFA).

The Site is located within the administrative boundary of Wokingham Borough Council. It is bounded by the Great Western Main Line to the south, farmland to the south-east, and the wider Thames Valley Park to the north, east and west.

1.1 Scope of Report

This report is written with reference to the NPPF and draws upon both local policy pertinent to surface water and flood risk management and uses publicly available data. The site is located within a Flood Zone 1 area. However, in accordance with the requirements of the NPPF, a detailed Flood Risk Assessment is still required as the site extents are larger than 1 hectare.

The purpose of this report is to provide an assessment of flood risk to demonstrate that the Site is low risk from all sources of potential flooding. As part of this assessment, this report will:

- Identify and assess potential sources of flooding to the Site;
- Assess historical flood events associated with the Site;
- Assess the potential impacts of the development proposals upon the local hydrological regime;
- Outline ways in which the site will manage surface and assess the ability of the site to utilise sustainable drainage systems, and;
- Propose measures for the management of residual risks.

1.2 Sources of Information

The key sources of information reviewed as part of this study are listed in Table 1.

Table 1 Key Sources of Information

Title	Author	Date
National Planning Policy Framework (NPPF) (and the National Planning Policy Framework)	Ministry of Housing, Communities & Local Government	August 2026
Wokingham Borough Core Strategy	Wokingham Borough Council	Adopted 29 January 2010 (reviewed October 2023)
WBC Development Plan: Adopted Managing Development Delivery Plan	Wokingham Borough Council	February 2014
Wokingham Borough Council (WBC) Strategic Flood Risk Assessment (SFRA)	Wokingham Borough Council	2020
Drainage Search Report	Thames Water	23 April 2018
Technical Due Diligence Report	Arcadis	13 September 2018
Asset Location Search Sewer Map	Thames Water	18 November 2025
Topographical Survey	PRE Chartered Surveyors	12 January 2026
Flood Mapping Data for Fluvial and Pluvial Sources	Environment Agency	August 2022
Flood Estimation Handbook (FEH) Web Version (FEH13) – Greenfield Runoff Rates	UK Centre for Ecology & Hydrology (via uksuds.com)	July 2026
Climate Change Guidance: Rainfall Intensity Allowances in Small and Urban Catchments	Environment Agency	May 2022

1.3 Consultation

This report has been prepared from a desktop assessment only and no direct consultation with the Lead Local Flood Authority (Wokingham Borough Council) has been undertaken at this stage.

A pre-planning application form has been submitted to Thames Water Utilities Ltd (TWUL) to confirm capacity in the network and proposed discharge rates. As of 11 August 2026, there has not been a further response from TWUL.

1.4 Limitations

This report has been prepared for the use the Applicant in relation to the proposed Thames Valley Park Data Centre. It takes into account our Client's instructions and requirements and addresses their priorities at the time. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party in relation to it, except as provided for in Arup's agreement with our client.

Arup has based this report on the sources detailed within it and believes them to be reliable but cannot and does not guarantee the authenticity or reliability of third-party information. Reasonable skill and care have been exercised in preparation of this report in accordance with the technical requirements of the brief.

This report has been prepared based on current legislation, statutory requirements, planning policy and industry good practice at the time of writing. Any subsequent changes or new guidance may require the findings, conclusions and recommendations made in this report to be reassessed in light of the circumstances.

2. Policy and Guidance

The following section details specific local policy and guidance pertinent to flood risk and surface water drainage that are applicable to the proposals. This section does not outline National Legislation, Regulations or Guidance which is provided in Appendix A.

2.1.1 Wokingham Borough Core Strategy (Adopted 29 January 2010, reviewed October 2023)

The Wokingham Borough Core Strategy is the principal planning document that sets out how the borough was expected to grow and develop up to 2026. It establishes the long-term vision, strategic objectives, and policies that guide decisions on housing, employment, transport, infrastructure, environmental protection, community facilities, and the distribution of development across the borough.

The following core strategy policies relate directly to flood risk and drainage:

- Limit any adverse effects on water quality (including groundwater);
- Ensure the provision of adequate drainage, and;
- Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater)

2.1.2 WBC Development Plan: Adopted Managing Development Delivery Plan (February 2014)

The Adopted WBC Development Plan is an important part of implementing the adopted Core Strategy. The following policies are pertinent to flood risk and drainage:

- Policy CC04: Sustainable Design and Construction – water resource management:

Sustainable Drainage Systems (SuDS) can significantly reduce demand for water by incorporating SuDS as part of the design and landscaping of the site, as set out in the Sustainable Design and Construction SPD and Companion Guide.

- Policy CC09: Development and Flood Risk (from all sources):

All sources of flood risk, including historic flooding, must be taken into account at all stages and to the appropriate degree at all levels in the planning application process to avoid inappropriate development in areas at risk of flooding.

- Policy CC10: Sustainable Drainage:

All development proposals must ensure surface water arising from the proposed development including taking into account climate change is managed in a sustainable manner. This must be demonstrated through a Flood Risk Assessment or through a Surface Water Drainage Strategy.

2.1.3 Wokingham Borough Council (WBC) Strategic Flood Risk Assessment (SFRA) (2020)

The Wokingham Borough Council Strategic Flood Risk Assessment provides a comprehensive and robust evidence base on flood risk issues to support the review and update of the Wokingham Borough Council's planning policies. This report provides a summary of the flood risk in Wokingham Borough, including fluvial, surface water, climate change, sewer, ground, and reservoirs.

2.1.4 Thames Water Utilities Limited (TWUL)

Thames Water Utilities Limited (TWUL) provides guidance and regulatory compliance for drainage proposals in accordance with the requirements of the drainage authority.

In accordance with the Building Act 2000 Clause H3.3, positive connections to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. The disposal hierarchy is as follows:

1. Soakaways;
2. Watercourses;
3. Sewers.

Only when it can be proven that soakage into the ground or a connection into an adjacent watercourse is not possible would TWUL consider a restricted discharge into the public surface water sewer network.

3. Environmental Setting

3.1 Site Location

The site, located at Thames Valley Park, Thames Valley Park Drive, Sonning, Reading RG6 1RB, extends to approximately 5.4 hectares within the established Thames Valley Business Park. The site currently comprises of three commercial office buildings, car parking and associated highway infrastructure, and landscaped areas. The postcode is RG6 1WG. The OS grid reference is SU 74714 74131.

As outlined in Figure 1, in the vicinity of the site there are commercial offices to the west, landscaped areas and open fields to the east, and the great western railway line to the south. The River Thames and Caversham Lakes are situated further north, and there is a small woodland and water body directly north of the site.



Figure 1 Site location and surrounding infrastructure (Google Maps)

3.2 Existing Conditions

The existing site conditions including topography, ground conditions, waterbodies, existing infrastructure, and flooding risks are outlined within this section.

3.2.1 Topography

The existing site consists of hardstanding areas, including building roofs, and soft landscaping areas. The existing site topography generally falls from south-east to north-west, with the site high point approximately 51.6m and site low point at 38.2m. The general topographical falls and key point levels are annotated in Figure 2.

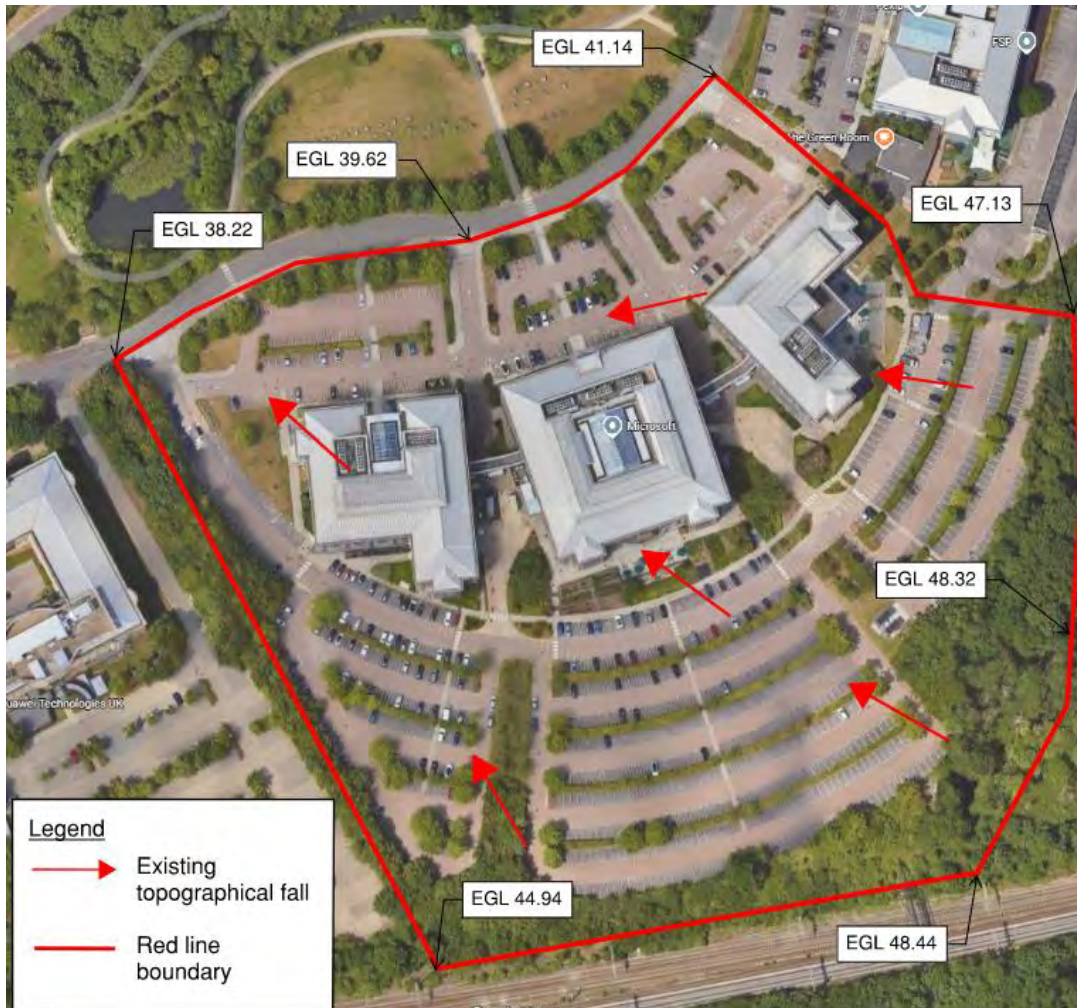


Figure 2 Existing site topography

3.2.2 Ground Conditions

The generalised ground model (strata sequence) across of the site is summarised in Table 2. There are no landslip deposits or bedrock faults recorded within 500m of the site.

Table 2 Ground Investigation Strata sequence

Stratum	Typical Depth (m below ground level)	Description
Hardstanding / Topsoil	0.0 - 0.4	Asphalt, brick paving, sub-base, or local topsoil in landscaped areas.
Made Ground	0.1 - 1.3	Sandy gravelly clay and clayey sandy gravel containing flint, brick, concrete and localised pulverised fuel ash (PFA). Highly variable.
Superficial Deposits (River Terrace Deposits)	~0.2 - 2.9	Firm sandy gravelly clay with interbedded sand and gravel layers. Corresponds to Langley Silt and Kempton Park Gravels.
Lambeth Group	~2.9 - 10.4	Highly variable interbedded clay, silty sand, clayey sand and sandy gravel. Medium dense to dense.
Chalk	~4.1 - 10.4+ to termination	Very weak to weak weathered chalk near the top, becoming more structured with depth (approximately 12-17 m bgl). Flints and marl bands present. Proven to 20 m depth.

Groundwater was encountered within the chalk aquifer at depths between approximately 9 m and 11 m below ground level (bgl), with monitored groundwater levels generally stabilising between 9.6 m and 10.8 m bgl. Localised perched groundwater was recorded at approximately 2.5 m bgl within superficial deposits, although monitoring indicates these horizons are discontinuous and restricted to isolated granular layers.

Aquifer records indicate that the site is underlain by Secondary A aquifer deposits within the superficial geology, with bedrock aquifer mapping also identifying Secondary A strata beneath the site². Unproductive strata were also recorded locally within the site boundary. BRE365 survey testing is ongoing to understand the ability of the existing ground conditions to infiltrate water.

3.2.3 Existing Rivers/Water Bodies

There is a small water body directly north of the site. The River Thames and Caversham Lakes are situated further north, with the River Thames approximately 600m away at its closest point.

² OnyxGeo - Phase 2 Site Investigation Report (5 June 2026)

3.2.4 Existing Infrastructure - Surface Water Drainage

A site-wide Drainage Search report³, prepared by Thames Water on 23 April 2018, Technical Due Diligence report⁴ by Arcadis on 13 September 2018, and asset location plan and topographical survey were reviewed to determine the existing surface water network.

It was identified that the above ground drainage consists of a combination of cast iron soil and vent risers connecting to the below ground drainage. Where visible and could be inspected, the existing above ground drainage was determined to be in a good condition. The existing below ground drainage was not inspected, therefore the existing condition is unknown.

The Drainage Search report and Technical Due Diligence report both identified that the existing drainage network does not discharge to the local sewerage network. The reports do not state a discharge point or methodology.

In conjunction with the reports above, the asset location search sewer map, received on 18 November 2025 and shown in Figure 3, did not identify an existing surface water drainage network within the access road.

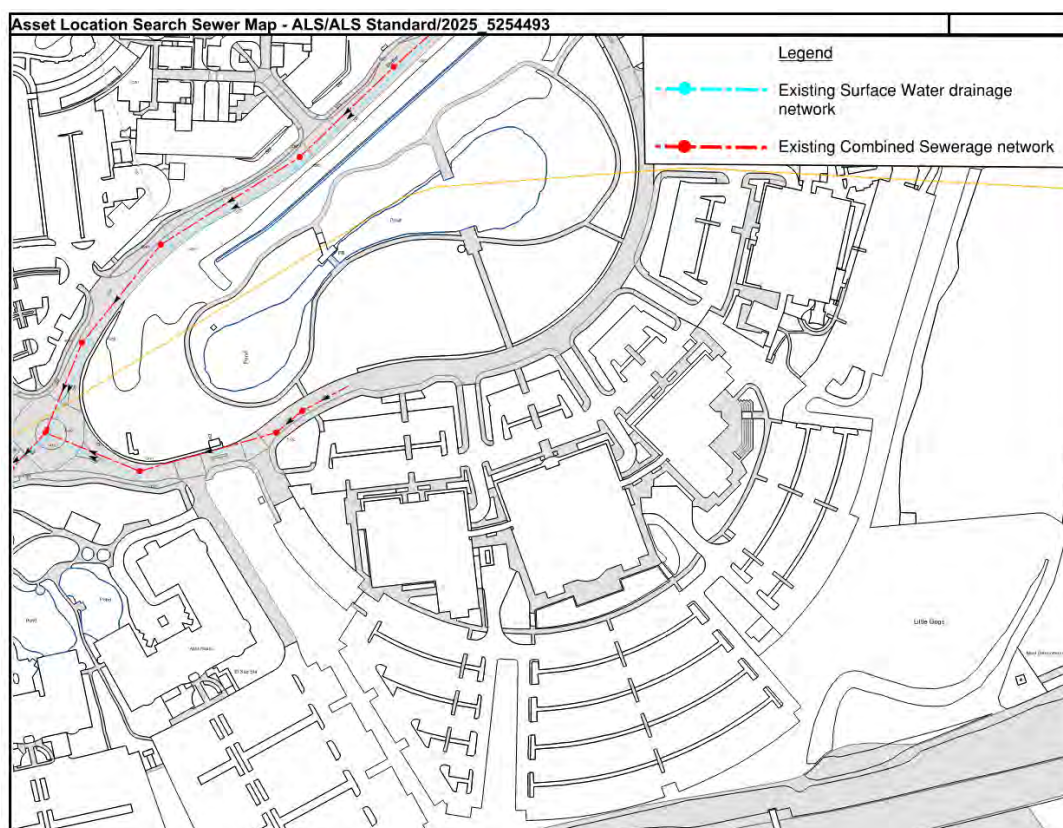


Figure 3 Asset location search map

In contrast to the information provided in the reports and the asset location survey, a topographical survey undertaken on 12 January 2026, identified that the existing below ground drainage network flows north to manholes in the access road (outside of the site extents) see Figure 4. The topographical information implies that the site catchment does in fact discharge to a local drainage network situated in the access road.

³ Thames Water Property Searches – Drainage & Water Enquiry – Buildings 1,2 and 3 Microsoft Campus, Thames Valley Park, Reading

⁴ Arcadis – Technical Due Diligence report – Project Beta - Buildings 1,2 and 3 Microsoft Campus

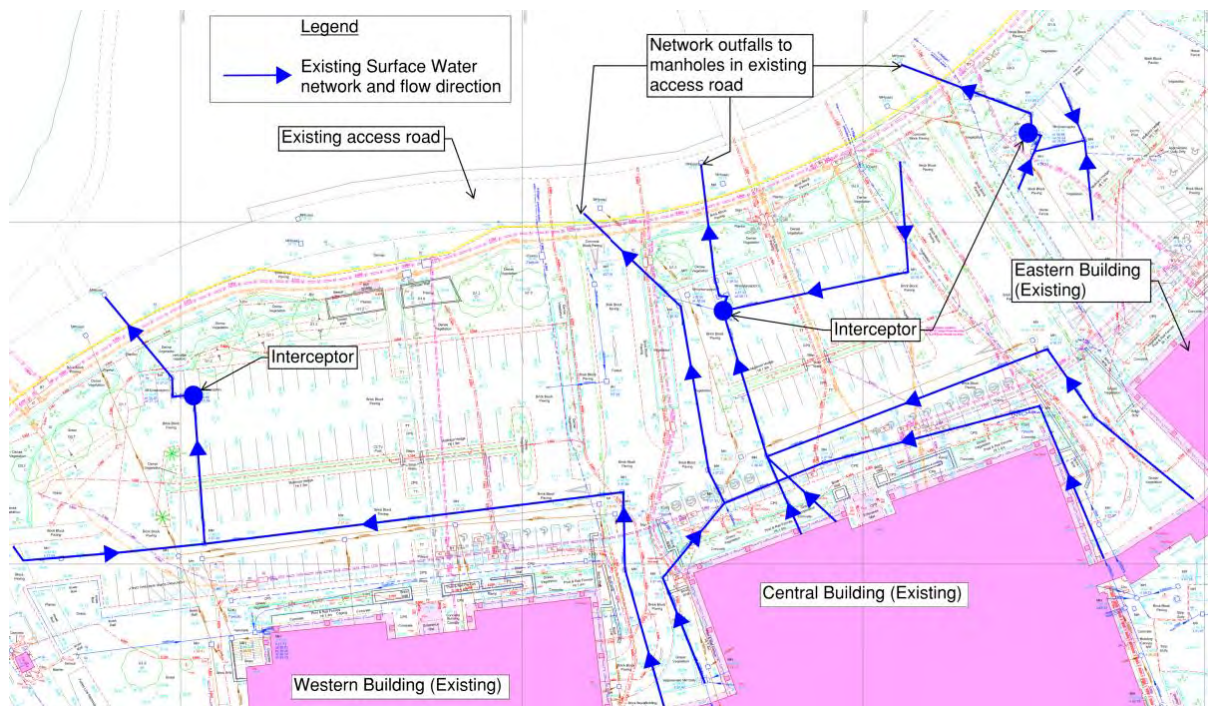


Figure 4 Existing surface water network identified on topographical survey⁵

In consideration of the information reviewed, it is assumed that a private drainage network (not identified within the asset location search map) extends east along the access road to collect all surface water drainage outfalls. It is assumed that this connects into the most eastern manhole of the Thames Water combined sewer network, identified on the asset location search map, to discharge the site's surface water drainage into the local network. This assumption is illustrated in Figure 5 and should be confirmed by a CCTV drainage survey prior to construction.

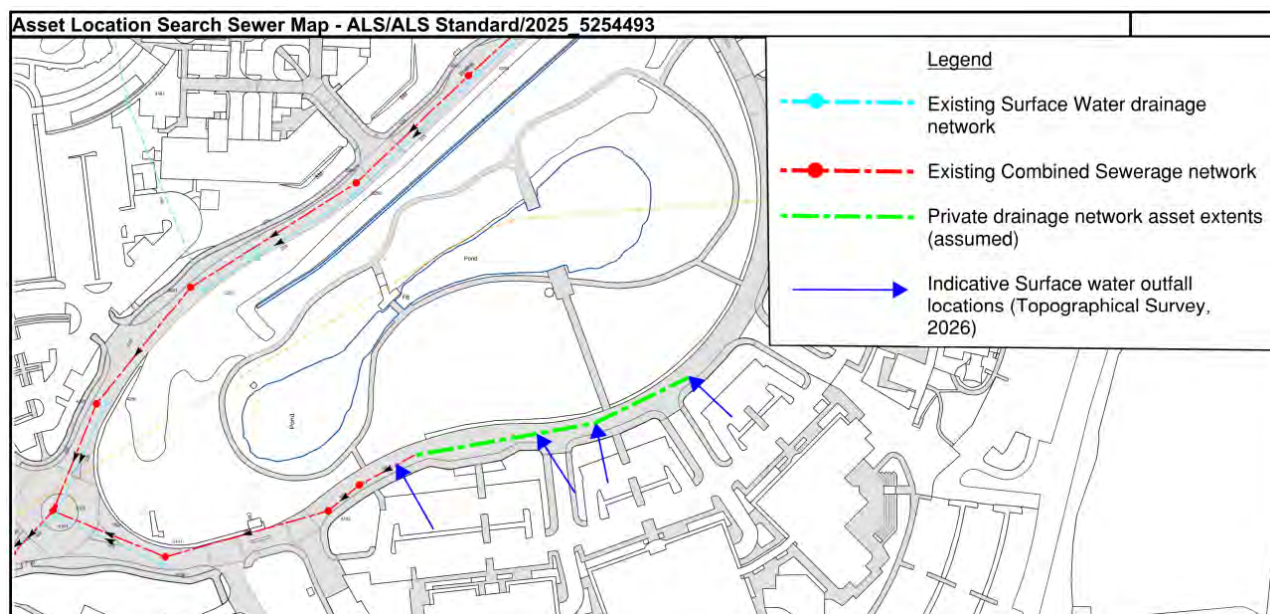


Figure 5 Assumed private drainage network to local sewerage network

There are two interceptors installed in the northern section of the car park, these are situated at the end of the site drainage network as shown in Figure 4, prior discharging outside of the site boundary into the existing highway network. It is assumed the interceptors are suitable to contain oil / petrol spills before discharging off site.

⁵ Topographical Survey – Pre-Chartered Surveyors

3.2.5 Existing Infrastructure - Domestic Foul Sewerage

The drainage search report identified that the foul sewerage water from the property drains to a Thames Water public sewer, this is assumed to be a combined sewer on review of the Thames Water asset drawings.

The topographical survey information and asset location search sewer map coincide to show that the foul sewerage generated in the site extents is discharged to the local sewerage network in the access road. Figure 6 highlights the foul sewerage network within the site extents on the topographical survey.

The existing foul sewerage network has capacity to accommodate three large commercial offices.

In accordance with BSRIA Rules of Thumb to estimate existing worker populations, it can be assumed 12m² per person. The existing commercial office has a gross floor area of 22,867m². Therefore, the design population can be estimated at 1900 staff members.

A commercial office has an approximate potable water daily demand of 45l/person⁶, typically 90% of incoming potable enters the foul network. Therefore, it is assumed that the existing network has an approximate capacity of 76,000l per day.

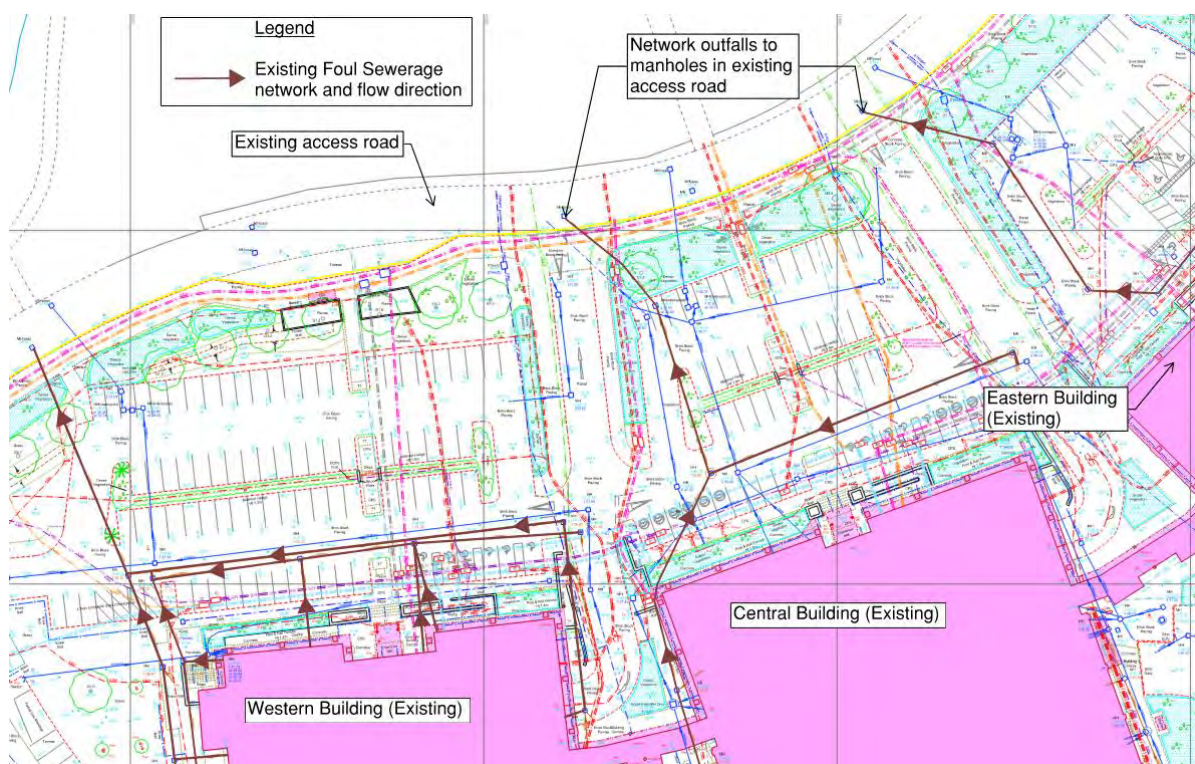


Figure 6 Existing foul sewerage network identified on Topographical Survey

3.2.6 Existing Infrastructure – Industrial Foul Sewerage

The existing site has a grease trap installed in the main outlet from the kitchens (north of Central Building) before connecting into the existing local sewerage network.

In consideration of the operational requirements for a commercial office, it is assumed that there are no other existing industrial foul sewerage volumes

⁶ BSRIA Rules of Thumb – Guidelines for building services (5th Edition)

3.2.7 Historic Flooding

According to the Strategic Flood Risk Assessment (SFRA), Wokingham Borough Council has provided records of historical flooding incidents across the Borough between 1947 and 2015. These records identify flooding from a combination of local drainage/surface water, surface water, sewer-related flooding and channel capacity exceedance.

The recorded incidents are generally noted to have affected wider areas of the Borough, including the west and north of the Borough, areas adjacent to the Foudry Brook and River Loddon, and clusters around Wokingham, Winnersh and Three Mile Cross. Based on the information provided in the SFRA, no historical flooding incidents are identified as having occurred within the site boundary. Therefore, there are no known records of historical flooding at the site, however the Environmental Agency (EA) historic flood map, refer to Figure 7, shows that flooding has occurred previously nearby to the north of the site, it is not understood when these events occurred.

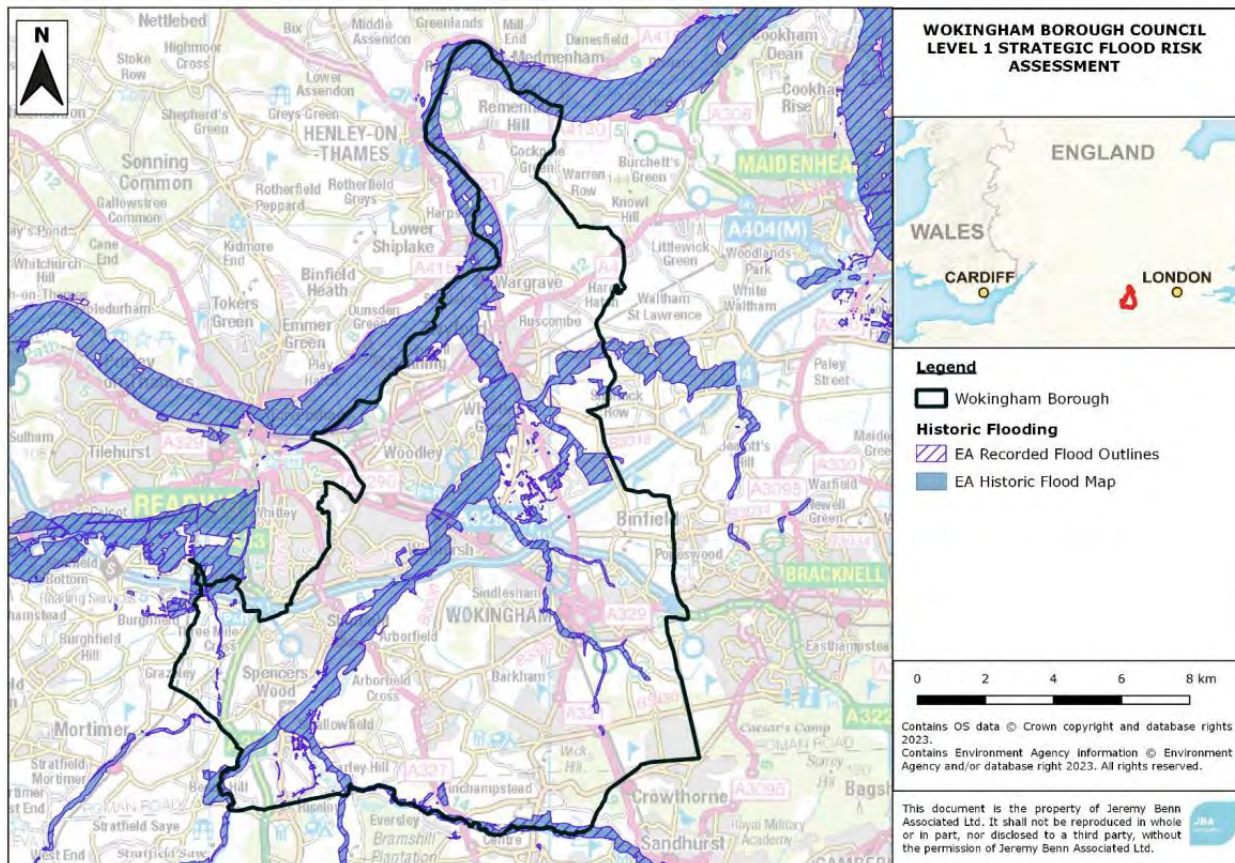


Figure 7 SFRA Historic Flood Map⁷

⁷ Wokingham Borough Council Level 1 Strategic Flood Risk Assessment (May 2023)

4. Development Proposal

4.1 Proposed development Layout

This Planning Application seeks Outline planning permission for data centre development comprising B8 Use Class floor space and fuel cells. The Description of Development for which planning permission is sought is:

“Outline planning application (all matters reserved except for Access) for demolition of existing buildings and the construction of a data centre (Use Class B8), fuel cells for energy generation, ancillary office space and associated plant, drainage, backup power generation, sub-station, car parking, landscaping, engineering works and formation of and alterations to access roads.”

The works that form the Proposed Development comprise:

- data centre halls behind the office frontage comprising approximately 37,000m² of floorspace, excluding fuel cells and generators;
- A substation and compound
- An administrative/office at the front;
- Electrical equipment and generators;
- Double-stacked fuel cells at the east and west of the main building;
- Two access points to the Thames Valley Park estate road – one main access point at the north-west corner, and one emergency access point further east;
- Internal access roads circulating the main buildings, and maintenance access road;
- A security lodge at the main site entrance;
- A car parking area, positioned at the front of the office/admin building; and
- Landscaping and engineering works.

Figure 8 outlines the anticipated layout of the Proposed Development.



Figure 8 Proposed Development Site Layout

Other key characteristics of the proposed scheme are as follows:

- Provision of a primary access from the Thames Valley Park estate road at the north-west corner of the site, forming the main route into the development.
- Provision of a secondary emergency access point to the east of the site, supporting emergency and operational requirements.
- The maximum building height will be approximately 30.5 metres, incorporating rooftop plant areas, with internal data hall floor-to-floor heights of approximately 7.5 metres.
- Construction of four data hall buildings arranged centrally within the site, each comprising three storeys, alongside an administration building positioned at the northern frontage.
- Provision of on-site energy infrastructure including fuel cells (located to the east and west of the main building) and electrical substations to support the operation of the data centre.
- Retention and enhancement of existing tree cover along the site frontage, alongside additional landscaping to reinforce the established green character of Thames Valley Park and soften the appearance of the development.
- Creation of a secure perimeter boundary incorporating appropriate stand-off distances and a combination of fencing and landscape treatment to balance security requirements with visual integration.
- Provision of a central internal access road and circulation network designed to accommodate servicing, maintenance and emergency vehicles, including articulated lorries.

- Provision of 72 car parking spaces (including accessible spaces) located to the front of the administration building to support operational staff requirements.
- Connection to the electricity grid via an on-site substation, with alternative power strategies including a 33kV or 132kV connection currently under consideration as part of a phased approach to energy supply.
- The data centre will operate on a continuous 24-hour basis, reflecting the operational requirements of mission-critical digital infrastructure.

5. Surface Water Drainage Proposals

5.1 Design Criteria

Drainage systems will be designed in accordance with the following standards:

- Design and Construction Guidance (DCG) (2020)
- CIRIA Report C609 - Sustainable Drainage Systems
- National Planning Policy Framework and Technical Guide
- BS EN 752:2008 Drain and Sewer Systems Outside Buildings

The key design criteria are:

- No surcharging of the drainage system during the 1 in 2-year return period storm.
- No flooding on site up to the 1 in 30-year storm event;
- No flooding which may pose a significant risk to people and property from a 1 in 100-year storm (including a 40% allowance for climate change);
- Sewers laid in highways should have a minimum cover of 1.2m. Sewers laid in locations other than the highway should have a minimum cover depth of 0.9m. Where this is not achievable special protective measures may be required;
- Rainfall intensities will be increased by 40% in line with Environment Agency guidance to account for the predicted effects of climate change.

5.2 Existing Surface Water Discharge rate

Rainfall data has been obtained from Flood Estimation Handbook (FEH) Web Version (FEH13) to determine approximate existing discharge rates at the Site. The 30-minute and 60-minute storm durations were used within these calculations as typical duration storm events and the Rational Method applied:

$Q = 2.78 CIA$, where;

Q = flow (l/s);
 C = runoff coefficient (1);
 I = rainfall (mm/hr); and
 A = catchment area (ha).

The existing brownfield run-off rate has been calculated as 13.5l/s using the rational method (1 in 100-year, 30-minute critical storm period). It should be noted that this is theoretical discharge rate, and the site existing discharge is likely restricted by the pipe capacity of the existing drainage connections.

The size, number, and depth of existing connections from the current 3no. buildings and surrounding hard and soft landscaped areas to the public sewer network is unknown at this stage but should be verified to validate existing runoff rates from the site. A below ground utility survey should be completed ahead of the next design stage to confirm the size and depth of the existing drainage network.

5.3 Catchment Areas

An assessment of the existing and proposed permeable and impermeable areas across the Site has been undertaken to inform the surface water drainage strategy and greenfield/brownfield runoff calculations. The existing Site area is approximately 5.4 ha and comprises a combination of hardstanding (building roofs, car parking and access roads) and soft landscaped areas.

The ratio of permeable and impermeable areas is similar for the existing and proposed Site. The area of permeable and impermeable area for the proposed Site will be refined in line with design development. A summary of the existing and proposed permeable and impermeable areas is provided in Table 3 below.

Table 3 Existing and Proposed Impermeable and Permeable areas

Scenario	Total Area (ha)	Impermeable Area (ha)	Permeable Area (ha)
Existing Site	5.4	3.8	1.6
Proposed Site	5.4	3.8	1.6

5.4 Proposed Discharge Rates

Wokingham Borough Council Local Plan require that all development sites limit their peak rate of surface water run-off to the greenfield rate, as far as is practicable. Greenfield runoff rates (GRR) have been obtained for the Site using the UK SuDS greenfield runoff estimation tool⁸ in accordance with the FEH statistical methodology

Greenfield runoff rates are provided for the 1 in 1-year, 1 in 30-year and 1 in 100-year in Table 4 and have been calculated for a total catchment area of 5.4 ha. The calculations to determine the greenfield runoff rate calculations are provided in Appendix B.

Table 4 Greenfield runoff rates

Return Period (years)	Flow rate (l/s)
1 in 1	3.0
1 in 30	8.2
1 in 100	11.4

The proposed discharge rate to the Thames Water combined sewer will be restricted using flow control devices in the penultimate surface water manholes. The total proposed discharge rate from the Site of 13.5 l/s for all rainfall events up to the 1 in 100-year event + climate change. This aligns with the 1 in100-yr greenfield runoff rate.

5.5 Climate Change

NPPF Guidance stipulates that to allow for the predicted impacts of climate change on surface water runoff, an increase to peak rainfall intensity should be applied.

Table 5 is an extract from the updated government guidance in relation to climate change allowances for the Thames and South Chilterns Catchment for the 1% annual exceedance event. For development with a lifetime beyond 2100 the upper end allowances should be assessed at both the 1% and 3.3% annual exceedance probability events for the 2070s epoch.

⁸ www.uksuds.com

Table 5 Peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline)

Annual Exceedance Probability Event	Allowance	Total potential change anticipated for the '2050s' (Development lifetime up to 2060)	Total potential change anticipated for the '2070s' (Development lifetime 2061 to 2125)
3.3%	Upper end	35%	35%
3.3%	Central	20%	25%
1%	Upper end	40%	40%
1%	Central	20%	25%

The development should be designed for the upper end allowance in the 1% annual exceedance probability event. Therefore, in accordance with the NPPF, an allowance of 40% for the effects of climate change to the year 2125 should be applied to achieve the policy requirements for the proposed redevelopment. This will provide resilience to the proposed Site against the anticipated changes in rainfall patterns.

5.6 Proposed Surface Water Strategy

Stormwater within the hardstanding catchments will be collected within the proposed stormwater drainage network through a combination of gullies and drainage channels. Roof catchments are to be collected and discharged to the proposed surface water network through rainwater down pipes. The ambition of the surface water drainage is to convey flows entirely through gravity, this approach will be validated once detailed landscaping levels are available at a later design stage. An initial storage estimate of 2750m³ is required to attenuate the site-wide impermeable catchment for the site greenfield runoff rate. This was determined through a MicroDrainage Source Control model.

Following the comparison exercise between pre-development and post-development catchment types for surface water in Section 5.3, there will be no change in the surface water discharge rate from pre-development to post-development.

As identified in Section 3, the entirety of the existing site catchment is discharged to a private sewer network. The owner of the private sewer network is currently unknown; to assist identifying the owner Thames Water are to be engaged. Whilst it is assumed that the private sewer network has sufficient capacity of accommodate the current discharge rates and volumes, this is to be confirmed following the confirmation of ownership of the private sewer network.

Figure 9 outlines a proposed surface water drainage network. The proposed network utilises the existing discharge points into the private sewer network.

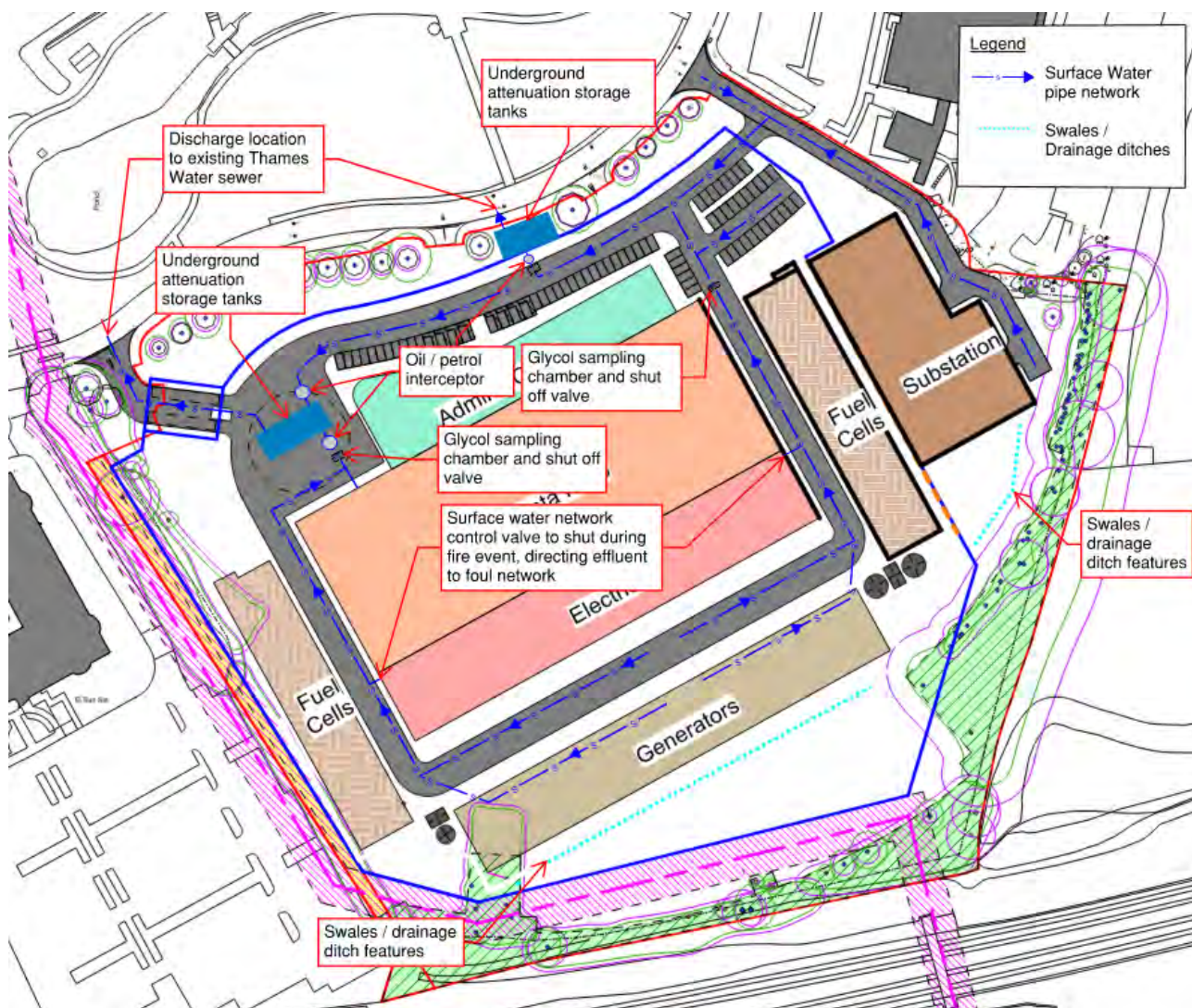


Figure 9 Proposed surface water drainage network

5.7 Opportunities for SuDS

The NPPF (Chapter 18) policy F8 states that Sustainable Drainage Systems (SuDS) should be utilised, where possible, within all new drainage schemes. SuDS generally replicate the natural drainage patterns of the undeveloped Site allowing infiltration into the ground (where feasible) and controlling outflow rates from the development. This reduces the impact and risk of flooding on downstream developments and can provide additional benefits such as pollution control, increased biodiversity, and provision of water-based amenity space.

Table 6 below provides a detailed Site-specific assessment of the suitability of a variety of SuDS considered within the proposed surface water drainage strategy.

Table 6 Sustainable Drainage Systems suitability appraisal

SuDS Type	Site Suitability	
Blue Roof	A roof specifically intended and designed to store water. This can be via open water surfaces, storage within or beneath porous medium or modular surfaces, within shallow geo-cellular crates or below a raised decking/impermeable surface.	
	Advantages	Disadvantages
	No additional land take making them effective within dense urban Sites and can contribute significantly to overall Site attenuation requirements.	Additional weight and cost to structure (compared to normal roof design). Damage to waterproof membrane can be critical. Does not always provide treatment dependent on system.
Site Suitability	Data centre halls not suitable for blue roofs in consideration of risk of water leakage, structural cost on large spans, suitability of locating equipment in glycol leakage events.	
Green Roof	Multi-layered system that covers the roof of a building with vegetation/landscaping over a drainage layer. Designed to intercept and retain rainfall, reducing the volume of runoff and attenuating peak flows. Typically, either defined as intensive or extensive systems depending on the nature of the selected flora.	
	Advantages	Disadvantages
	Mimics greenfield state of building footprint for high density developments, good removal of pollutants, ecological benefits, insulates buildings, sound absorption.	Additional weight, not appropriate for steep roofs, maintenance of roof vegetation. Damage to waterproof membrane can be critical.
Site Suitability	Architect to investigate opportunities to design green roofs on data centre operational / amenity facilities. Location must not interfere with the data centre operation.	
Rainwater Harvesting	The collection of rainwater (usually within underground storage tanks) for later re-use in either buildings (treated), wash down facilities (commercial) or irrigation.	
	Advantages	Disadvantages
	Can provide source control of storm water runoff, reduces demand on mains water.	Use is dependent on demand requirements, contributing surface area, and seasonal rainfall characteristics
Site Suitability	Rainwater harvesting unlikely to meet building greywater demands. However, there is an opportunity to subsidise incoming potable water demand.	
Infiltration Systems/ Soakaways	Any system which stores and discharges water directly to the underlying soils. These are typically soakaways, infiltration trenches, infiltration basins or infiltration blankets.	
	Advantages	Disadvantages
	Provides groundwater recharge, ease of construction and can have minimal land take subject to design. Manages surface water at source.	Increased risk of groundwater ingress and pollution. Not suitable for poor draining soils or where infiltrating water may pit structural foundations at risk. Uncertainty over long term performance. Requires comprehensive geotechnical knowledge of underlying soils.

SuDS Type	Site Suitability	
Site Suitability	Infiltration systems / soakaways to be investigated near highway infrastructure and proposed landscaped areas. Not to be included in the vicinity of the data centre building footprint.	
Swales	Swales are linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate.	
	Advantages	Disadvantages
	Can be incorporated into landscaping proposals, offers good removal of pollutants, and reduces runoff rates and volumes. Relatively low cost.	Not suitable for steep areas and requires significant land take (not suitable for high density urban Sites). Not suitable in areas with roadside parking.
Site Suitability	Considerable proposed topographical falls coincide with available land take areas.	
Filter Drains	Filter drains are shallow trenches filled with stone/gravel that accept runoff through sheet flow and provide temporary subsurface storage (typically provided adjacent to highways or as interception features). They can drain via infiltration or be lined and positively drained via a perforated collection pipe.	
	Advantages	Disadvantages
	Hydraulic benefits achieved with filter trenches; trenches can be incorporated into Site landscaping and fit well beside roads and car parks.	High clogging potential without effective pre-treatment, limited to small catchments, high cost of replacing filter material.
Site Suitability	Filter drains to be investigated by proposed car parks and highway infrastructure.	
Bio-retention Systems/Rain Gardens	Shallow planted features, which receive runoff directly from adjacent hardstanding. Typically, under drained, surface water will infiltrate to the underlying piped drainage system and in doing so promote storage, plant up-take and filtration.	
	Advantages	Disadvantages
	Easily incorporated into soft landscaping, flexible shape and planting mix and provide good degree of storage (reducing the below ground requirement). High degree of pollutant removal and high biodiversity potential. Reduces need for surface drainage (gullies, channels etc) and low cost.	Requires considered use of water tolerant plant species and landscaping & management. Susceptible to clogging if poorly managed and not suitable for steeply sloping Sites.
Site Suitability	Suitable external areas around car park and highway infrastructure to be considered	
Tree Pits	Tree pit systems generally accept sheet runoff from adjacent hardstanding areas in the same manner as bio-retention systems. They can be used in urban settings and provide a range of aesthetic benefits.	
	Advantages	Disadvantages
	Easily incorporated into soft landscaping with high degree of pollutant removal and high biodiversity potential. Reduces need for surface drainage (gullies, channels etc) and low cost.	Limited tree species/size depending on system and requires careful co-ordination with services due to root spread
Site Suitability	Tree pits should be incorporated in the landscape design at the next design stage.	
Permeable Pavements	Pavements that allow rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored before infiltrating the ground (unlined) or discharging to the sewerage system (lined).	
	Advantages	Disadvantages
	Provides low-level treatment of highway-derived pollutants (as recognised by the EA) and reduces need for surface drainage	Often requires increased construction depth and not suitable for use with Type 1 sub-base. May not be applicable for heavy traffic loadings and irregular

SuDS Type	Site Suitability		
	(gullies, channels etc). Available in a range of surface types (not just block paving).	maintenance required in certain situations. Not suitable for utility routes.	
Site Suitability	Suitable external areas such as the car parking areas, that are not in the vicinity of oil / petrol filling areas, should be explored.		
Detention Basins	Detention basins are surface storage basins that provide flow control through attenuation of storm water runoff. They facilitate settling of particulate pollutants. Typically dry, they can also offer multi-functional recreational use.		✗
	Advantages	Disadvantages	
	Can cater for a wide range of rainfall events, easy to maintain, potential for dual land use, can be incorporated in to landscaping proposals and low cost.	Not suitable for steep areas, significant land take and little reduction in runoff volume	
Site Suitability	Suitable external area to include this feature is not available		
Ponds	Ponds can provide both storm water attenuation and treatment. They are designed to support emergent and submerged aquatic vegetation along their shoreline.		✗
	Advantages	Disadvantages	
	Good removal capability of urban pollutants, high potential ecological, aesthetic and amenity benefits, can cater for all storm events and good community acceptability.	No reduction in runoff volume; Anaerobic conditions can occur without regular inflow; Significantly land take; No suitable for steep Sites;	
Site Suitability	Suitable external area to include this feature is not available		
Sub-Surface/Geo-cellular Storage	Oversized pipes, tank systems and modular geo-cellular systems that can be used to create a below ground storage structure.		✓
	Advantages	Disadvantages	
	Modular and flexible, dual usage (infiltration/storage, high void ratios, can be installed beneath trafficked and soft landscaped areas.	No water quality treatment.	
Site Suitability	Geo-cellular storage most favourable attenuation option in consideration of site constraints.		
Rills/Canals	Formal linear drainage features in which surface water can be stored or conveyed. They can be incorporated with water features such as ponds or waterfalls where appropriate.		✗
	Advantages	Disadvantages	
	Negate the need for underground pipework. Can provide some attenuation. Possible reduction in runoff volume via plant uptake and infiltration.	Potential trip/wheel hazard, disabled access issues.	
Site Suitability	Suitable external area to include this feature is not available		

5.7.1 SuDS Selection Summary

Further to the assessment above, Table 7 provides a summary of SuDS that are considered viable within the context of the proposals, SuDS where opportunities to implement should be explored at detailed design stage and SuDS which are not appropriate for the proposals due to spatial constraints and existing ground conditions:

Table 7 SuDS Selection Summary

SuDS Type	Site Suitability		
	Suitable for consideration on Site	Further consideration to be carried out during detailed design	Not suitable for consideration on Site
Blue Roof			×
Green Roof	✓		
Rainwater Harvesting	✓		
Infiltration Systems/Soakaways	✓		
Swales	✓		
Filter Drains	✓		
Bio-retention Systems/Rain Gardens	✓		
Tree Pits	✓		
Permeable Pavements	✓		
Detention Basins			×
Ponds			×
Sub-surface Storage	✓		
Rills/Canals			×

The initial design concept for each SuDS type appraised as suitable for consideration on site is outlined below.

5.7.2 Green Roof and Rainwater Harvesting

The data centre admin / office building is located on the northern side of the data centre building, as shown in Figure 10. Data Centre building roofs are typically flat which promotes the feasibility of a green roof. Loading restrictions will be explored further at the next design stage to assess the available storage volume.

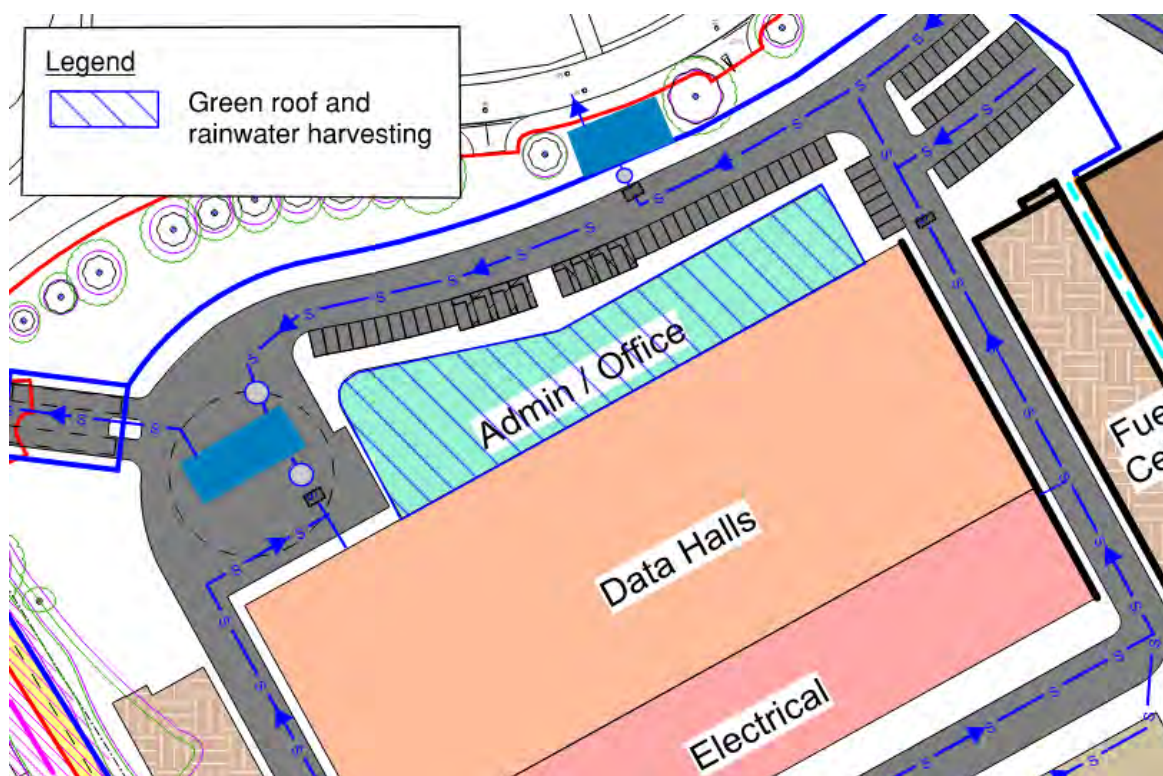


Figure 10 Green roof and rainwater harvesting opportunities

5.7.3 Infiltration Systems/Soakaways and Swales

The landscape design includes areas of soft scaping around the perimeter of the site boundary. For these extents, the proposed drainage strategy seeks to provide an infiltration-led drainage solution. It is proposed that features such as swales, drainage ditches and soakaway systems are arranged to retain the surface water runoff on the soft scaping catchment in larger storm events. The location of these SuDS will be confirmed in the next design stage and consider the proposed topography. The ability to promote infiltration within these areas will reduce the size of the on-site attenuation storage and alleviate capacity requirements on the existing TWUL network.

5.7.4 Rain Gardens and Tree Pits

Rain gardens and tree pits could be utilised within the vehicle car park, north of the data centre building. The location of rain gardens and tree pits would need to be coordinated to avoid proposed utility corridors.

Rain gardens provide a high degree of pollutant removal and high biodiversity potential. The degree of pollutant removal can be calculated at the next stage, once the raingardens are sized.

The volume of attenuation provided in the rain gardens is to be determined at the next design stage with the landscape architect. Attenuation in the rain gardens will likely reduce the size of the attenuation tanks.

5.7.5 Permeable Pavements

Permeable pavements are to be explored in all non-oil refuelling locations such as the worker car park and access roads around the perimeter of the data centre building, as shown in Figure 11. Permeable paving provides upstream attenuation and will reduce the size of below ground attenuation tanks.

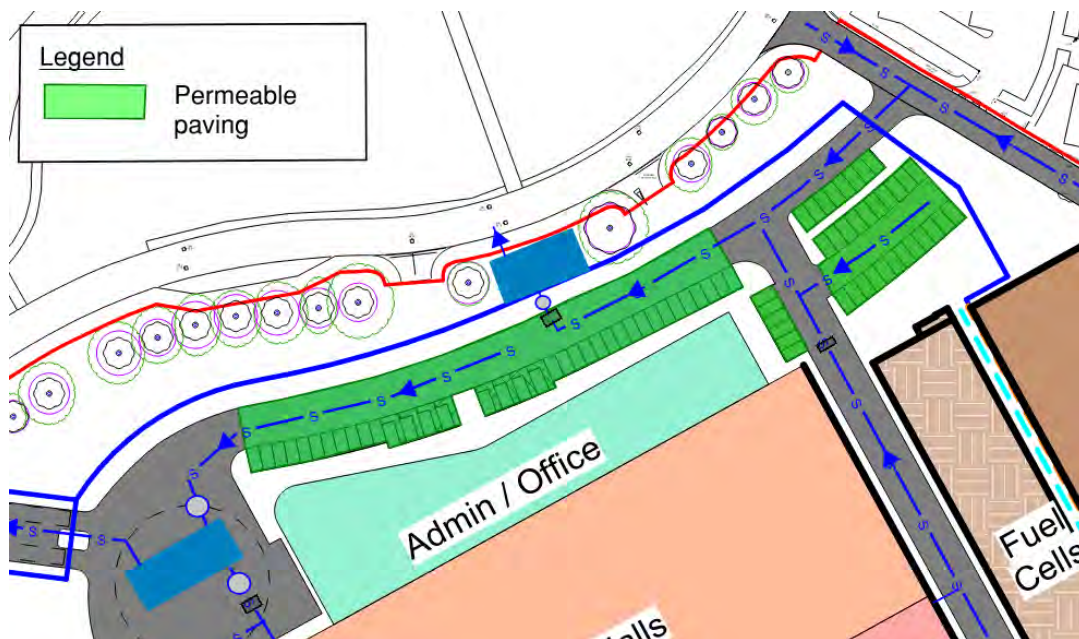


Figure 11 Permeable pavement opportunities

5.7.6 Sub-surface Storage

In consideration of the site extents and proposed infrastructure, there is no available space for a surface-level pond or detention basin. Sub-surface storage is proposed in the form of attenuation tanks. These are to be located beneath the access roads and landscaped areas and are to be coordinated alongside below ground utilities and landscape planting.

An initial total storage volume of 2750m³ has been calculated by applying MicroDrainage modelling software. This has been determined by considering the impermeable catchment area during a 1 in 100-year + 40% uplift for climate change, discharging at the site-specific greenfield runoff rate.

5.8 Compliance with Wokingham SuDS Strategy

In accordance with Wokingham Borough Council's Sustainable Drainage Systems (SuDS) Strategy (2017) and associated local standards, development proposals should ensure that surface water run-off is managed as close to its source as possible, mimicking natural drainage processes. There should also be a preference for surface (green) SuDS features over proprietary engineered (grey) solutions, in line with the following drainage hierarchy⁹:

1. Discharge into the ground (infiltration); or where not reasonably practicable,
2. Discharge to a surface water body; or where not reasonably practicable,
3. Discharge to a surface water sewer, highway drain, or another drainage system; or where not reasonably practicable,
4. Discharge to a combined sewer.

Where a lower-priority discharge route is proposed, justification must be provided demonstrating that all higher-priority options have been assessed and are not reasonably practicable¹⁰. In addition, at least one surface SuDS feature must be incorporated within the management train, with proprietary pollution control devices (e.g. vortex separators, filter screens) only used as a last resort where surface features are demonstrated as not viable¹¹. Design comments relevant to the proposed development are outlined against the Wokingham SuDS hierarchy in Table 8.

Table 8 Wokingham SuDS Hierarchy

Hierarchy	Surface Water Management	Considered Within Design (Yes/No)	Design Comments
1	Discharge into the ground (infiltration)	Yes	Infiltration will be promoted where possible throughout the site. Landscaped areas are to be infiltrated, and drainage opportunities such as permeable paving and tree pits are to be considered during design development.
2	Discharge to a surface water body	No	There are no existing surface water bodies in the vicinity of the Site.
3	Discharge to a surface water sewer, highway drain, or another drainage system	No	It is currently understood that the existing surface water network discharges to a combined sewer. There is a no surface water sewer in the vicinity of the site.
4	Discharge to a combined sewer	Yes	Catchments that are at risk of exposure to hazardous leak substances cannot be infiltrated. This is due to the risk of groundwater contamination risk and instead will be discharged to the surface water sewer network. Refer to Section 5.11 for water quality.

⁹ Wokingham Borough Council - WokBC-LS41

¹⁰ Wokingham Borough Council - WokBC-LS42

¹¹ Wokingham Borough Council - WokBC-LS49

5.9 Modelling Results

The 'cascade function' within Source Control in MicroDrainage has been used to model the below ground attenuation for the total impermeable site catchment. The 1:100-year +40% climate change event has been used to determine the attenuation required when discharge is restricted to 13.5l/s

The flow is modelled through the attenuation tank storage to determine the area and depth of storage required. The MicroDrainage modelling results are shown in Appendix C.

An InfoDrainage Network Model will be developed at RIBA stage 3 to ensure that the pipe network meets the design criteria described in Section 5.1.

5.10 SuDS Management Plan

The drainage networks have been designed to adoptable standards (in accordance with Design and Construction Guidance Appendix C and Part H Building Regulations). At this stage, it is anticipated that the on-site surface water drainage and SuDS features will be managed and maintained by a private management company. It is likely that the maintenance regime for drainage features will be integrated with the landscaping maintenance schedule.

Table 9 to Table 11 outline the advised maintenance requirements for the various elements of the proposed drainage strategy, which have been informed by the guidance outlined within CIRIA C753 and current best practice.

These tables are minimum requirements and are intended to form the basis of a final detailed maintenance strategy document produced by the maintenance team. The following information would also be supplemented by manufacturer's specifications and be dependent on the specific type of system/products used. The tables below are not exhaustive and the introduction of further drainage apparatus through design development would include apparatus-specific operation and maintenance requirements.

Table 9 Operation and Maintenance Requirements for Drainage Pipes

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Remove sediment and debris from inspection chambers and flow control chambers	Annually
	Cleaning of gutters and any filters on downpipes	Annually
	Remove any root ingress	As required
Occasional Maintenance	CCTV survey of drains to check alignment, cracking and joint displacement	10-year intervals

Table 10 Operation and Maintenance Requirements for Attenuation Tanks

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required

Maintenance Schedule	Required Action	Frequency
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually

Table 11 Operation and Maintenance Requirements for Tree Pits

Maintenance Schedule	Required Action	Frequency
Regular Inspections	Remove litter and debris.	Monthly (or as required)
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required)
	Inspect inlets and outlets.	Inspect Monthly
Regular Maintenance	Check tree health and manage tree appropriately	Annually
	Remove silt build-up from inlets and surface and replace mulch as necessary.	Annually, or as required
	Water	Annually, or as required
Monitoring	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

5.11 Water Quality

This section outlines several strategies proposed as part of the development to ensure the water quality discharging from the proposed development is in accordance with the relevant legislation.

5.11.1 Glycol containment strategy

The data centre projects require glycol to operate. If not appropriately contained, glycol, in high concentrations, can be damaging to local watercourses and surrounding environment. There is a risk of a glycol leak within a data centre, and a glycol solution entering the surface water network and discharging into the local sewerage network. This section outlines the proposed strategy to prevent glycol solution from flowing outside of the site boundary.

To capture any glycol solution, a sampling chamber with shut-off valve is proposed upstream of all attenuation features, as shown in Figure 12. These valves will shut following the detection of a glycol leak within a data centre, the glycol solution will be redirected into the foul sewerage network and be collected in the fire effluent storage tank. This will prevent any glycol solution entering the attenuation storage.

Following the resolution of the glycol leak, any glycol solution within the localised surface water network and attenuation storage would be pumped out by vehicular tankers. This would be transported off site for processing, and the affected localised network and storage would then be cleaned appropriately.

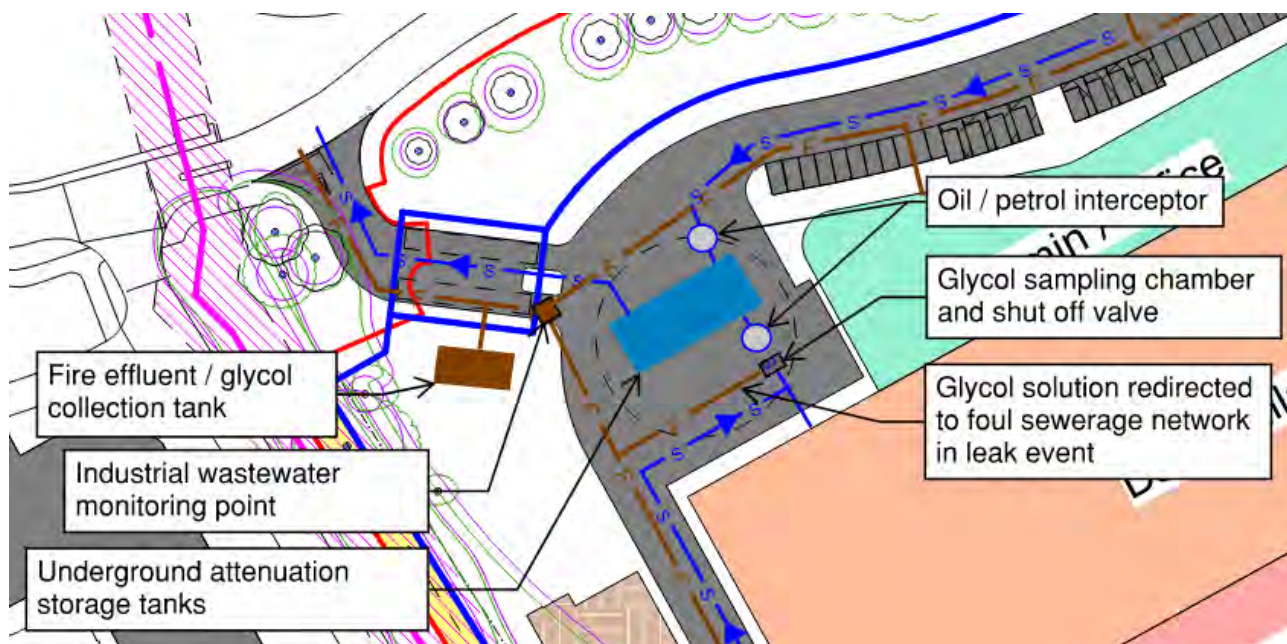


Figure 12 Glycol containment strategy

5.11.2 Fire effluent retention strategy

In the event of a fire within the building, the fire water stored in the data centre is used and discharged via internal drainage to the foul water network. The required volume of fire water is dependent on the affected compartment in the data centre and should be confirmed at the next design stage. It should be noted that the collection gully arrangement in the data centre is outside of this strategy. However, this arrangement will discharge the fire effluent into the site foul sewerage network, as shown in Figure 13.

Fire effluent in the generator yard will be collected by the surface water network. In a fire event, a surface water shut off valve will redirect flow into the foul sewerage network and the effluent will be collected in the collection tank. The probability of a concurrent fire event and storm event is deemed very low. If necessary, the site network can be oversized to provide additional storage to accommodate a fire event and a 1 in 5-year storm period.

A fire effluent collection tank is proposed downstream in site foul sewerage network. This tank should be sized to accommodate the total volume of fire water stored upstream. The collection tank is transported by vehicle for processing off site.

5.11.3 Diesel and Ad-blue isolation strategy

Diesel and ad-blue chemicals are required at fuelling points within the data centre plot. To prevent diesel and ad-blue chemicals entering the local sewerage network, the following examples of provisions should be considered as part of the drainage strategy:

- Self-containment bunds around fuel storage points to be sized to contain a minimum 110% of the diesel / ad-blue stored volume.
- All fuelling points are located on hardstanding, impermeable areas.
- Isolating valves installed immediately downstream of refuelling points to contain AdBlue leakage.
- Petrol / oil interceptors are proposed downstream of all areas that may be susceptible to oil leaks, such as refilling stations and generator equipment. Oil separators will ensure that the water quality of the stormwater discharged to the local sewerage network aligns with drainage authority requirements. All interceptors are located upstream of attenuation storage.

6. Foul Drainage

6.1 Existing Foul Water Drainage

A review of topographical survey information and asset location search sewer maps show 3no. existing foul sewerage connections (2no. 225mm diameter and 1no 150mm diameter foul pipe) to the combined sewer within the access road. There is currently no available information on the invert level of the existing connections. A below ground utility survey will be completed ahead of the RIBA 3 design stage to confirm the depth of the existing drainage network.

6.2 Domestic foul water

The proposed data centre will significantly reduce the number of employees on site from the existing commercial offices; in conjunction, the volumes and discharge rates of domestic foul water from site will reduce. Therefore, it is assumed that the local sewerage network will have capacity to accommodate the domestic foul water volumes for the Thames Valley Park Data Centre.

The proposed domestic foul water network will utilise the existing foul sewerage network connections to the local sewerage network. The proposed building domestic foul water outfall locations are to be confirmed at the next design stage. For the purposes of this strategy, indicative foul water outfall locations are shown on the network. Figure 13 displays the foul water network.

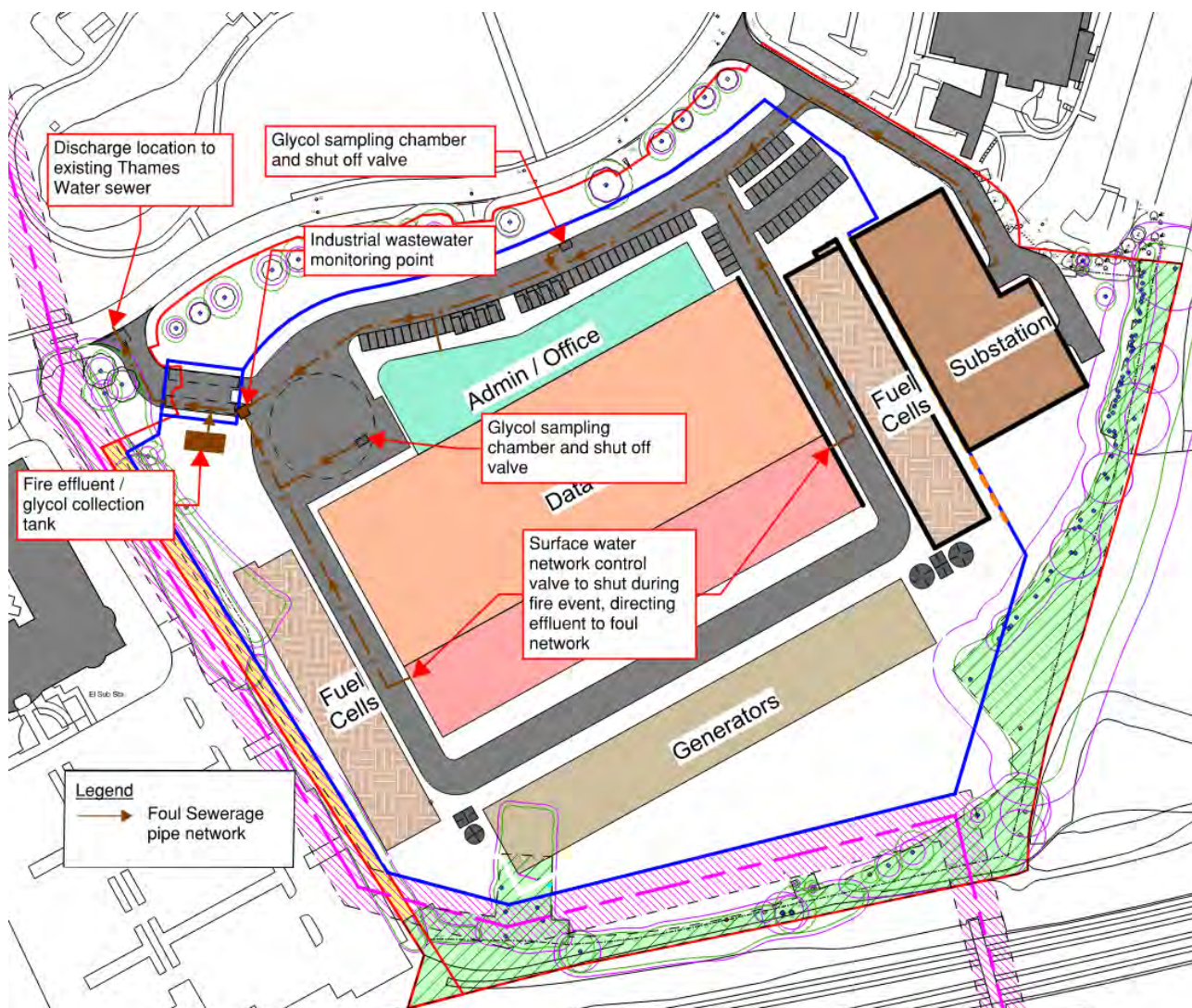


Figure 13 Domestic and Industrial foul water network

6.3 Industrial wastewater

During the operation of the Thames Valley Park Data Centre, the data centre chillers will produce condensate effluent. Condensate effluent is classified as industrial wastewater and can be discharged into the local sewerage network without prior treatment. It should be noted since the existing site does not produce condensate industrial wastewater, Thames Water will need to be consulted, and the project will be required to obtain a trade effluent consent in accordance with the Water Industry Act 1991.

To determine if the existing foul sewerage network can accommodate the industrial wastewater demands associated with a data centre, the volumes from a similar data centre case study have been assessed. This case study obtained planning approval in 2025 and now is under construction. The case study shares multiple similarities to the Thames Valley Park Data Centre, including power demand, geographical location and climate, and will produce approximately 12-15l/s of industrial wastewater during operation. Therefore, it is assumed that Thames Valley Park Data Centre will also produce approximately 12-15l/s of industrial wastewater during operation.

As outlined in Section 3.2.6, the existing site has an existing industrial wastewater strategy, and in consideration of the anticipated industrial and domestic wastewater volumes, it is assumed that the existing network will have capacity to accommodate the Thames Valley Park Data Centre.

Industrial wastewater network includes a monitoring and sampling chamber to ensure wastewater is an appropriate water quality before discharging to the local sewerage network.

7. Flood Risk Assessment

The technical guidance of the NPPF requires flood risk from the following sources to be assessed:

1. Fluvial and tidal sources (flooding from rivers and the sea);
2. Groundwater sources;
3. Artificial sources, canals, reservoirs etc;
4. Pluvial sources (flooding resulting from surface water/overland flows)

In addition, the risk from increases in surface water discharge to be assessed (surface water management). The following section provides a site-specific flood risk assessment of each potential flood source.

7.1 Fluvial and Tidal Risk flood risk

Environment Agency (EA) Flood Maps confirm that the site is wholly located within Flood Zone 1 (FZ1), defined as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%) – very low.

There are areas to the north of the site, coinciding with the location of the River Thames and Caversham Lakes, that have a low-medium fluvial flood risk. It should be noted that the EA considers the climate change scenario, with this inclusion the flood extents still do not reach the site boundary. These are outlined as flood zone 2 and 3 respectively on Figure 14 There are no existing flood defences that benefit the site.

Due to the site location in Flood Zone 1, flooding from breach and overtopping of flood defences is not considered to pose a risk to the site. The Site is therefore at **negligible** risk of fluvial or tidal flooding.



Figure 14 Fluvial flood zone areas

7.2 Pluvial flood risk

There is a risk of pluvial flooding within the extents of the proposed development. Within the existing development, a pluvial flooding risk has been identified in the south-eastern hardstanding corner of the three commercial offices, as shown in Figure 15. The pluvial flood risk at these locations is considered as high risk (greater than 1 in 30 (33%)).

It should be noted that this flooding has been created by the existing commercial offices acting as an obstruction to surface water flows. As part of the Thames Valley Park Data Centre proposal, the existing commercial offices are to be demolished. An effective drainage strategy for the proposed Thames Valley Park Data Centre will address this pluvial flood risk, as outlined in Section 5.6. This will reduce the pluvial flood risk on the site.



Figure 15 Pluvial flood risk for existing development

7.3 Groundwater flooding

Groundwater flooding occurs when the water table rises above the ground surface and is caused because of unusually high groundwater levels. Groundwater flooding typically lasts for a longer duration in comparison to surface water (pluvial) flooding.

The groundwater within the site extents is considered Moderate and is based on a 1 in 100-year return period. Figure 16 outlines the risk of groundwater flooding within the site extents. This approximately coincides with parts of the site where the superficial deposits are recorded, i.e. land north of the boundary between the southwest corner to the eastern site boundary. Land of south of this is mapped as being at low or negligible risk from groundwater flooding.

Consideration should be given in the design to the surface levels and layout to mitigate risk of groundwater being contained and causing flooding on the site.

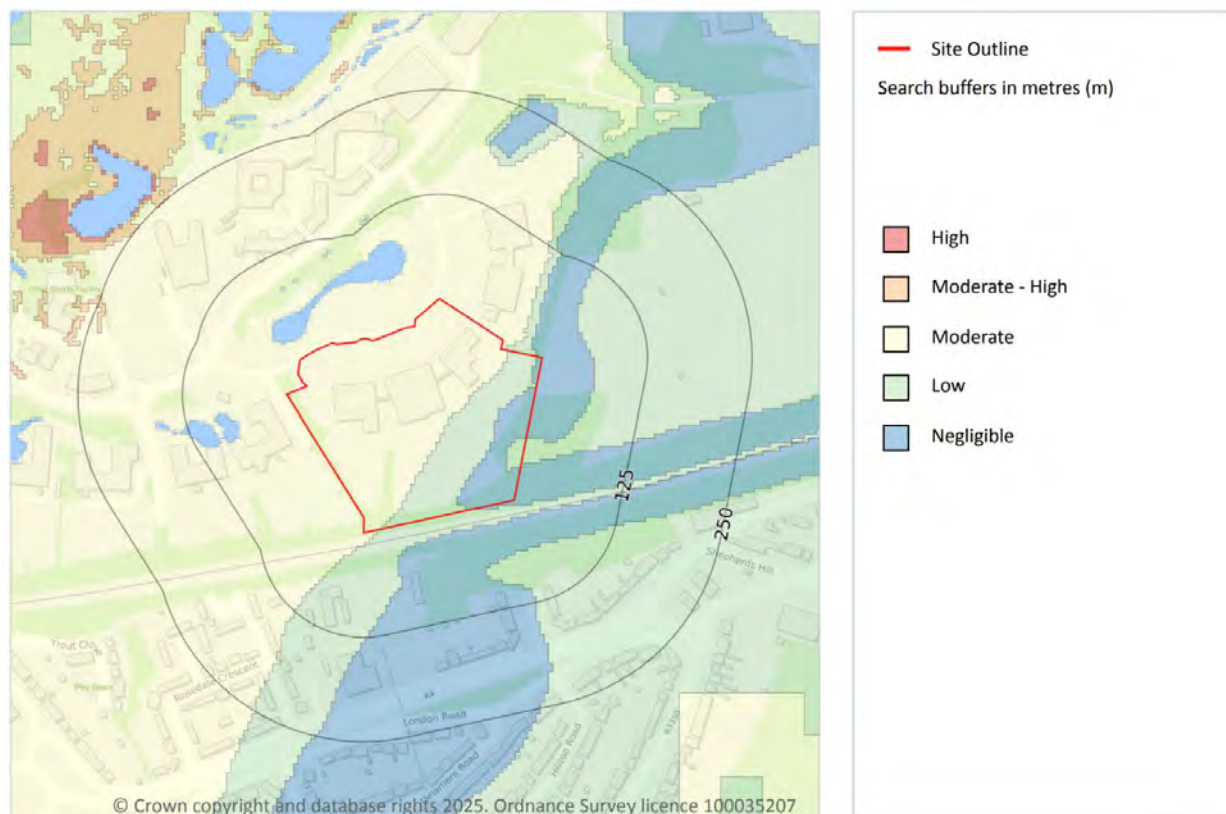


Figure 16 Groundwater flooding¹²

7.4 Flooding from Artificial Sources

In general, reservoir flooding is extremely unlikely to occur and there has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the EA ensures that reservoirs are inspected regularly, and essential safety work is carried out.

EA flood maps confirm that the Site is not at risk of reservoir flooding and there are no canals or other artificial sources which will influence flooding at the Site.

There is one potable water main within the access road, north of the proposed development. Following a review of the existing topographical survey, in the scenario of a water leak any overland surface water will flow north, away from the proposed development and not introduce any flooding.

There is an existing 300mm diameter potable water trunk main within the southern extents of the proposed development. In the event of a pipe leak, runoff water to convey north towards the proposed development. However, in consideration of the proposed site levels the proposed surface water drainage network would capture and convey the leak water before reaching critical data centre infrastructure. As a result of the above, the risk of flooding from artificial sources is low.

Both existing potable water mains are shown schematically in Figure 17.

¹² Groundsure report, dated 25 August 2025



Figure 17 Existing potable water mains

7.5 Sewer Flooding

Thames Water are responsible for the management of drainage networks across the Wokingham Borough. A record of flooding incidents relating to public foul, combined or surface water sewers from January 2000 to May 2022 has identified a total of 48 flooding related incidents within the postcode area (RG6 1) coinciding with the location of the Site. The distribution of incidents across the years recorded is shown in Table 12

Table 12 Sewer flooding incidents recorded by Thames Water (Postcode RG6 1)

Number of recorded incidents (year)					
2022	2021	2020	2019	2000-2019	Total flooding incidents
0	5	5	4	34	48

7.6 Flood Risk Summary

A summary of flood risk is provided in Table 13, following the above assessment from all sources.

The level of risk* is defined as low, medium, or high and as described by the following:

Low: Probability of flooding is low-negligible and risk to people or property should not form a material consideration for development. There is little or no residual risk.

Medium: Whilst probability of flooding is low, residual risk to people or property may be severe and require the development proposals to consider mitigation or further investigation. Mitigation may include flood resilience measures or protection of key infrastructure.

High: Flooding is likely to occur and should be specifically addressed as part of the development proposals. There is a significant risk to people or property, and a flood management plan, evacuation plan/safe refuge plan or permanent flood prevention measures should be provided. May require further modelling, investigation, survey or consultation with LLFA/EA/Drainage Authority.

Table 13 Flood risk summary

Flood Source	Pathway	Comment	Risk
Fluvial and Tidal	River Thames 600m to the north of the Site	EA flood maps confirm the Site is entirely located within Flood Zone 1.	Negligible / Not at risk
Groundwater	Through underlying strata when groundwater levels rise above surface levels.	Groundwater flood risk is identified as moderate within the site extents. The drainage and external levels strategy should therefore consider potential groundwater emergence and avoid creating low points where groundwater could be contained. However, as the proposed development does not include a basement the risk is low.	Low with suitable mitigation (as needed)
Artificial Sources	No reservoirs or other artificial sources within site environs.	EA flood maps show that the site is not at risk of reservoir flooding.	Negligible/Not at risk
Pluvial	Overland flow or overloading of existing sewers. Generally, at topographic low points.	High pluvial flood risk is identified around the existing south-eastern hardstanding areas, caused by the existing buildings obstructing surface water flow. Demolition of the offices and the proposed drainage strategy will reduce this risk. The development surface water drainage strategy reduces the pluvial flood risk to low.	Low with suitable mitigation (as needed)
Infrastructure Failure	Burst water main inundating local sewer network	Multiple small water mains in adjacent road networks. No large infrastructure features have been identified in the local area. There are no basement structures proposed as part of the development. In the event of a burst water main, the surface water network will collect and convey runoff away from all critical infrastructure.	Low with suitable mitigation (as needed)

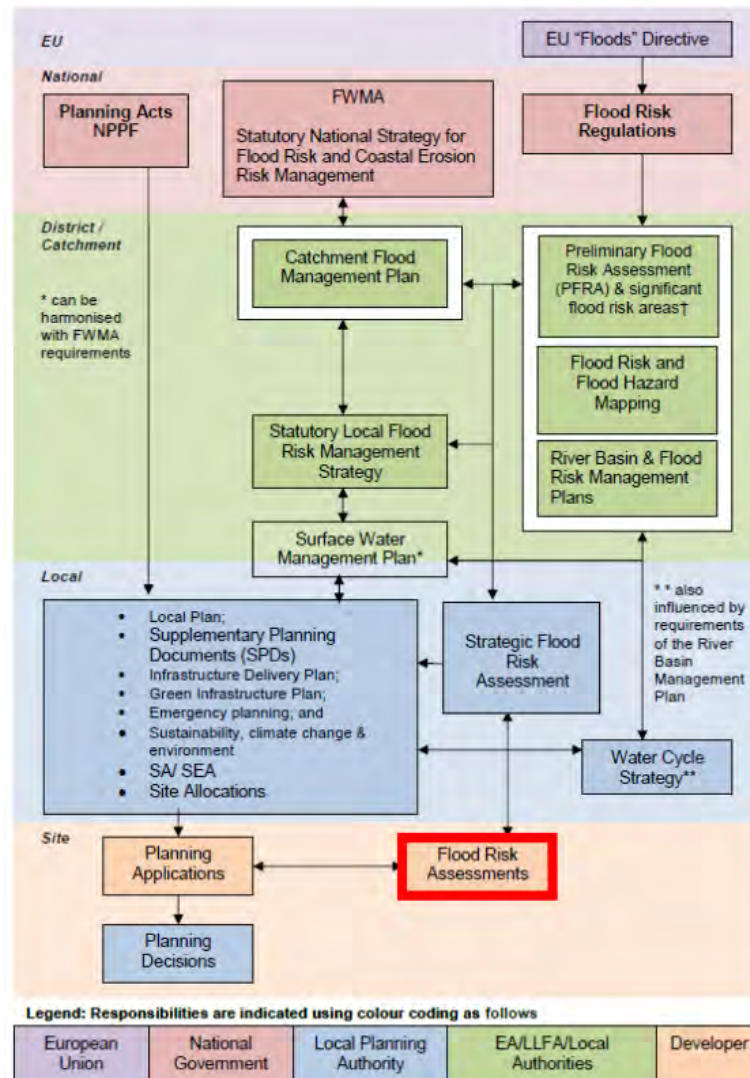
8. Conclusion

This Flood Risk Assessment is based on a review of published data and hydraulic calculations. The following points are considered pertinent to the proposed development's suitability for this Site:

- The Site is located within Flood Zone 1.
- Flood risk from fluvial/tidal, pluvial, groundwater, artificial sources and infrastructure failure are all considered to be low or negligible.
- In accordance with the requirements of Chapter 18 of the NPPF, consideration has been given both to flood risk to the Site and to potential offsite flood risk as a result of the proposed development.
- Surface water runoff from the Site will be restricted to a total of 13.5 l/s, the Site greenfield runoff rate.
- Based on our understanding of the Site setting and the proposals, it is considered that the development can be constructed and operated safely and will not increase flood risk elsewhere.

Appendix A – National Legislation, Regulations and Guidance

The overarching aim of development and flood risk planning policy in the UK is to ensure that the potential risk of flooding is considered at every stage of the planning process. The following diagram outlines the key planning policy for flood risk management and associated documents.



A.1 International Planning Policy

A.1.1 Water Framework Directive (2000/60/EC)

The Water Framework Directive (WFD) sets out objectives prioritising future water protection across the European Union, with the aim of achieving improvements in the quality of polluted water bodies and maintaining the quality of clean water bodies.

Member states were required to transpose the Water Framework Directive (WFD) into domestic law by December 2003. This took place in England and Wales through the WFD England and Wales Regulations 2003 (WFD Regulations). In the UK, the Environmental Agency (EA) is the ‘competent authority’ under the WFD Regulations.

Member water bodies are categorised as: ‘rivers’; ‘lakes’; ‘transitional waters’; ‘coastal waters’; or ‘groundwaters’. Each is identified within each category as being ‘at risk’; ‘probably at risk’; ‘probably not at

risk'; or 'not at risk' of failing WFD objectives with regard to 'water abstraction and flow regulation'; 'physical or morphological alteration'; or 'alien species'.

Under the WFD Regulations, each river basin district must have a river basin management plan in place which sets out environmental objectives for the district and a programme of measures to be applied in order to achieve those objectives. Water in rivers, estuaries, coasts and aquifers will improve as a result of the measures set out in the river basin management plans.

A.1.2 EU Floods Directive (2007/60/EC)

The aim of the Directive is to provide a consistent approach across the European Union to reducing and managing the risks posed by flooding to human health, the environment, cultural heritage and economic activity. The Floods Directive is to be delivered in conjunction with the objectives of the Water Framework Directive (2000/60/EC) to deliver a better water environment through river basin management.

In the UK, the Floods Directive is transposed into law via the Flood Risk Regulations by setting out the duties of local government in assessing flood risk to their area.

A.2 National Policy and Guidance

A.2.1 Environmental Permitting Regulations (2016)

The Environmental Permitting Regulations 2016 consolidate and replace the 2010 Regulations and subsequent amendments. The permitting regime covers a range of activities that release emissions to land, air and water, or that involve waste.

Schedule 21 relates to water discharge activities and Schedule 25 relates to flood risk activities. Schedule 22 relates to groundwater activities, and the regulations place a duty on regulating authorities to implement the Water Framework Directive.

A.2.2 The Water Resources Act (1991) and Water Acts (2003, 2014)

The Water Resources Act 1991 provides legislation for the control of the pollution of water resources. Under this Act, offences of polluting controlled waters occur if a person knowingly permits any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters. The Water Resources Act 1991 also provides an all-embracing system for the licensing of the abstraction of water for use, which is administered by the EA. The Water Acts (2003, 2014) modernise water legislation and amend the Water Resources Act 1991 to improve long-term water resource management.

A.2.3 Flood Risk Regulations (2009)

The Flood Risk Regulations 2009 transpose the Floods Directive (2007/60/EC) into law in England and Wales.

The regulations required the Lead Local Flood Authority (LLFA), to produce:

- A Preliminary Flood Risk Assessment (PFRA) by December 2011;
- Flood hazard and flood risk maps by December 2013; and
- A Local Flood Risk Management Strategy by December 2015.

A.2.4 The Flood and Water Management Act (2010)

The Flood and Water Management Act 2010 (FWMA), which received Royal Assent on 8 April 2010, takes forward some of the proposals in three previous documents published by the UK Government:

- Future Water;
- Making Space for Water; and

- The Government's Response to the Sir Michael Pitt's Review of the summer 2007 Floods.

The FWMA gives the EA a strategic overview of the management of flood and coastal erosion risk in England. In accordance with the Government's Response to the Pitt Review, it also gives upper tier local authorities in England responsibility for preparing and putting in place strategies for managing flood risk from groundwater, surface water and ordinary watercourses in their areas.

A.2.5 Land Drainage Acts (1991, 1994)

The water quality and flood risk management of controlled waters including rivers and aquifers is protected by legislation under the Land Drainage Acts (1991, 1994).

A.2.6 National Planning Policy Framework (2019)

The NPPF includes policies on flood risk and minimising the impact of flooding under Section 14, Meeting the challenge of climate change, flooding and coastal change (Paragraphs 155 – 165). The NPPF supersedes the Planning Policy Statement 25 (PPS25).

The NPPF states that:

Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and develop policies to manage flood risk from all sources, taking account of advice from the EA and other relevant flood risk management bodies, such as LLFAs and internal drainage boards.

Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change.

When determining planning applications, Local Planning Authorities (LPAs) should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:

- *within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and*
- *development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of Sustainable Urban Drainage Systems (SuDS).*

A.2.7 National Planning Policy Framework (2023)

The NPPF includes policies on flood risk and minimising the impact of flooding under Section 10, Meeting the challenge of climate change, flooding and coastal change (Paragraphs 152 – 173). The NPPF states that:

Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.

All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property.

When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*

- b) *the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) *it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) *any residual risk can be safely managed; and*
- e) *safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

A.2.8 National Planning Policy Framework (2026)

The NPPF (2026) has been updated to include Chapter 18 ‘Managing flood risk and coastal change’, a chapter dedicated to flood risk and drainage considerations. This includes the following nine policies:

Plan-making policies

- *F1: Assessing flood risk for plan-making*
- *F2: Planning for effective flood risk management*
- *F3: Managing coastal change*

National decision-making policies

- *F4: Assessing flood risk for decision-making*
- *F5: The sequential test*
- *F6: Development in areas at risk of flooding from rivers or the sea*
- *F7: Ensuring development is safe for flooding*
- *F8: Sustainable drainage systems and watercourses*
- *F9: Development in Coastal Change Management Areas*

A.2.9 Sewerage Section Guidance Appendix C – Design and Construction Guidance (2022)

[Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England ("the Code")]

Adopted drainage networks need to meet the criteria outlined in the Design and Construction Guidance (2020). A piped drainage system is required to not surcharge for a 1 in 1-, 1 in 2-, or 1 in 5-year event depending on site conditions or flood the ground in a 1 in 30-year event using a design storm with the critical duration relevant to the site (i.e. the worst-case for a given return period). Private drainage systems also tend to use these criteria as a basis for design. Adoption of new sewers or abandonment of old sewers should take place in accordance with the Water Industry Act 1991, Sections 104 and 116 respectively.

A.2.10 DEFRA Non-Statutory Technical Standards for Sustainable Drainage Systems (2015)

The DEFRA Non-Statutory Technical Standards for Sustainable Drainage Systems provides guidance on:

- Flood risk outside the development;
- Peak Flow Control;
- Volume Control;
- Flood Risk within the development;
- Structural Integrity;

- Designing for Maintenance Considerations
- Construction

Key extracts from this document are provided below:

Peak flow control

S2 For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100-year rainfall event should never exceed the peak greenfield runoff rate for the same event.

Volume control

S4 Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 10- year, 6-hour rainfall event should never exceed the greenfield runoff volume for the same event.

S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

Flood risk within the development

S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30-year rainfall event.

S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100-year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

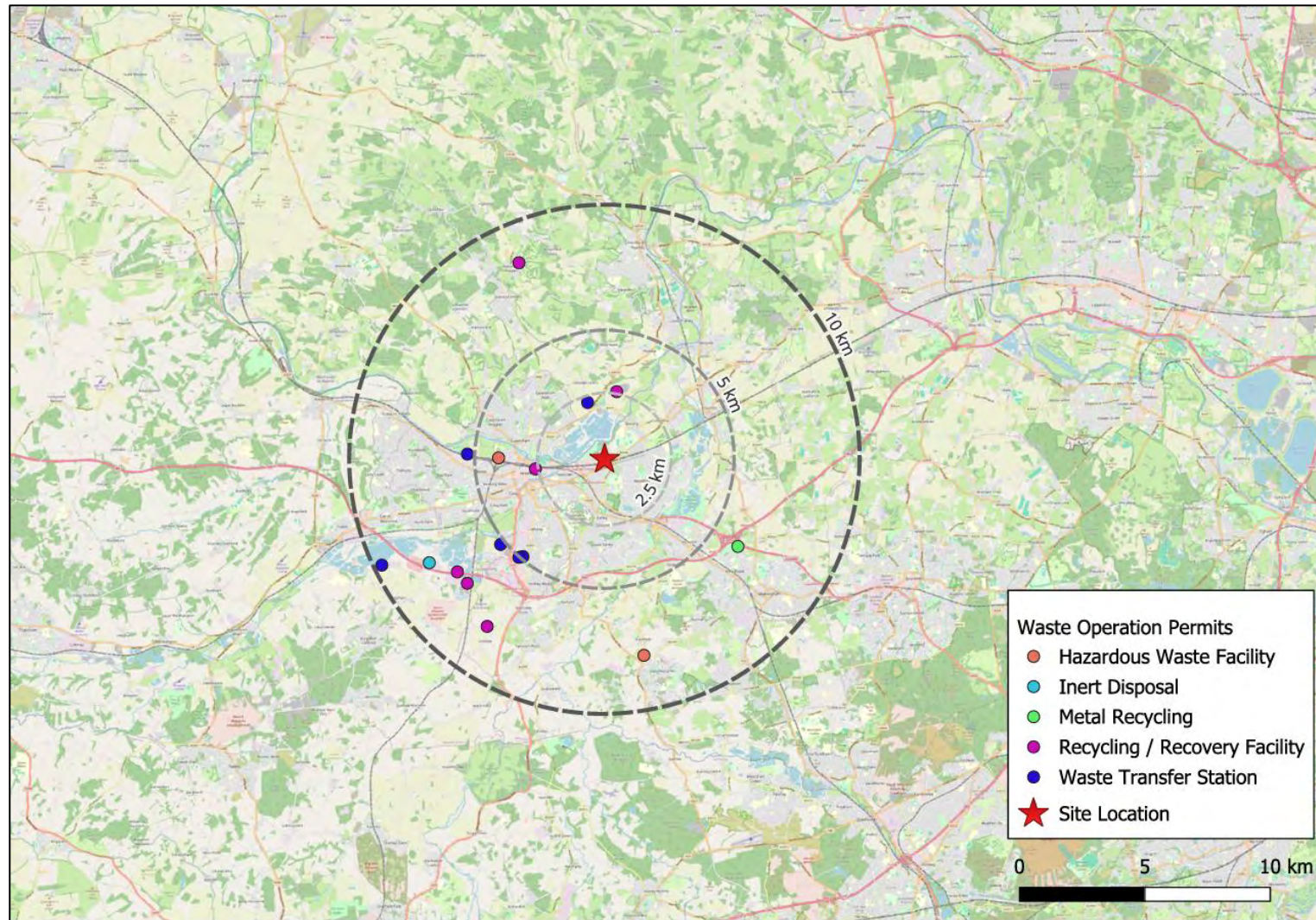
S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risks to people and property.

The standards are supported by Practice Guidance prepared by the Local Authority SuDS Officer Organisation (LASOO).

Appendix B – Greenfield runoff rate calculations

Appendix C - MicroDrainage modelling

Appendix 10.2 – Waste Sites





Places shaped for
people and planet