



AHR Architects Ltd.

North Huddersfield Trust School AQA – Air Quality Assessment

June 2023

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Executive Summary

Bureau Veritas UK Ltd has been commissioned by AHR Architects Ltd. (“the Client”) to undertake an air quality assessment to evaluate air quality impacts for the planning application for a new two storey, five classroom teaching block at North Huddersfield Trust School, Woodhouse Hall Road, Huddersfield, HD2 1DJ.

The assessment has considered the existing air quality conditions and potential air quality effects during the construction phase of the development. The assessment of dust and PM₁₀ effects from the construction phase of the development was subject to a qualitative assessment. The assessment carried out has shown that, providing effective mitigations are implemented, such as those outlined in Section 6 of this report, any off-site impacts from dust emissions during the construction phase would be **Not significant**.

The assessment of air quality effects in relation to the development’s operational phase has been undertaken in accordance with EPUK/IAQM Guidance². The results of the operational phase air quality assessment concluded that the effect of additional vehicle movements from the proposed development on air quality are considered to be **Not significant**.

1. Introduction

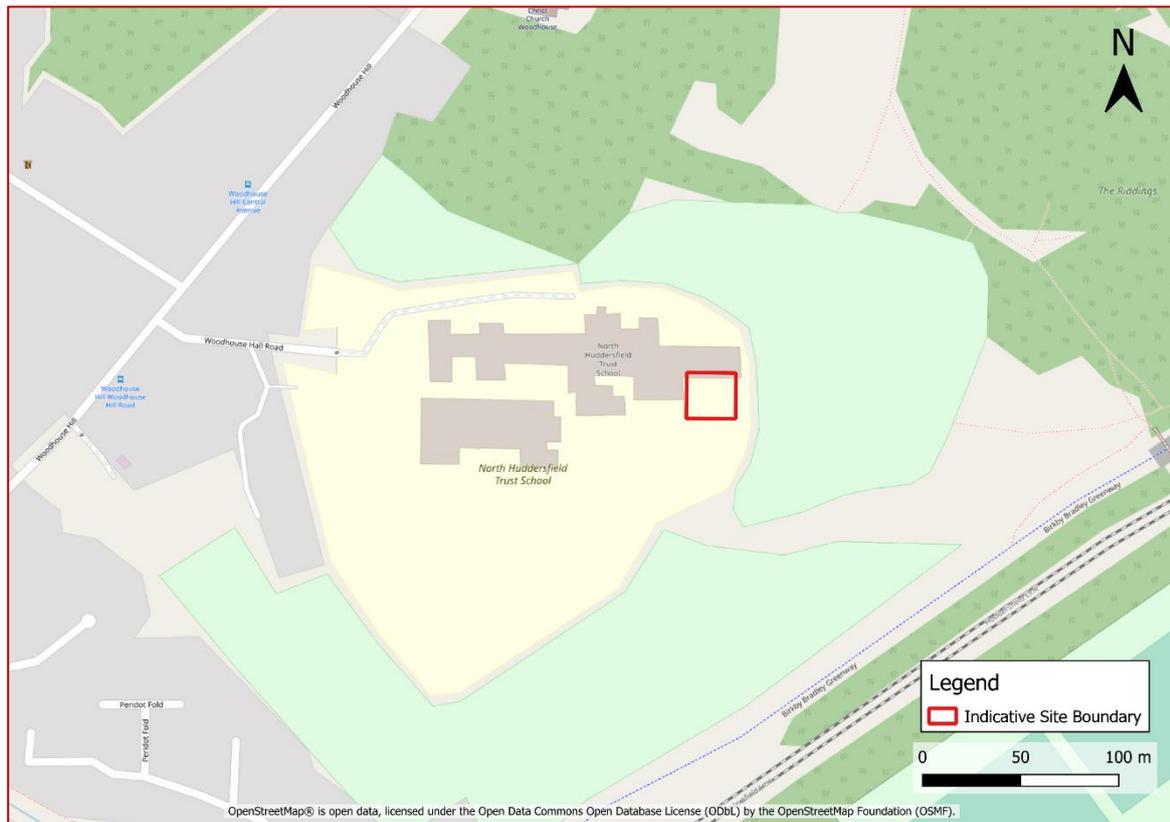
Bureau Veritas UK Ltd has been commissioned by AHR Architects Ltd. (“the Client”) to undertake an air quality assessment to evaluate air quality impacts for the planning application for a new two storey, five classroom teaching block at North Huddersfield Trust School, Woodhouse Hall Road, Huddersfield, HD2 1DJ. Following the submission of the planning application, comments have been received from Environmental Health at Kirklees Council stating the following:

“Before the application is determined, we require an air quality screening assessment to be undertaken to determine if a more detailed air quality impact assessment using dispersion modelling is required. We would expect the air quality screening assessment to be undertaken in accordance with Table 6.2 of the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) – Planning for Air Quality Guidance 2017. It may be that a more detailed Air Quality Impact Assessment is required at a later stage based on the outcome of the screening assessment.”

The Site is located within the existing North Huddersfield Trust School site. The proposed development is bounded by the existing school building and car parks to the north and west. There are green areas directly to the east and south of the area. Land use within the immediate vicinity primarily consists of educational activities, with leisure green areas to the east and south. There are no residential facilities within 200m of the area. There is no Air Quality Management Area (AQMA) declared at or near the Site. The closest AQMA is the Kirklees AQMA 9, located 1.4 miles (2.3 km) from the site, the designated area incorporates roads bordering and within the Huddersfield Ring Road, an area of 0.80km² where NO₂ objectives are declared annually. The purpose of this report is to determine the likely air quality impacts of the proposed development on nearby sensitive receptors.

The Site location is illustrated in Figure 1.1 and a site layout plan is provided in Appendix 2.

Figure 1.1 – Site Location



1.1 Scope of Assessment

The following are the main objectives of the assessment:

- To obtain and review the Council’s latest statutory air quality Review and Assessment reports and place them (and any relevant monitoring results) within the context of the proposed development;
- To assess, qualitatively, any short-term impacts of the construction phase on sensitive receptors adjacent to the proposed construction activities;
- To assess, semi-quantitatively, any impacts of vehicular traffic once the development is operational; and
- Determine appropriate controls during any construction or operational works of the proposed development.

The purpose of the air quality assessment (AQA) is to characterise existing air quality conditions in the area and to quantify the effect (if any) the development may have on these conditions and its impact upon existing receptor locations near to the site.

The assessment covers the existing air quality conditions at the Site and the impact on air quality during the construction phase of the development through the emissions of dust and Particulate Matter (PM₁₀). It is understood that there is no intention to provide on-site energy generation, therefore this has not been considered as part of the assessment. Further general information in relation to these pollutants and urban pollution is provided in Appendix 1.



The approach adopted in this assessment to assess the impact of dust and particulates during the construction phase was based on the Institute of Air Quality Management (IAQM) Guidance for Construction Sites¹, and the approach adopted in this assessment to assess the impact of road traffic on air quality was based on the EPUK/IAQM Guidance for Land-Use Planning and Development² as required by the Environmental Health at Kirklees Council.

¹ IAQM (2014). Guidance on the Assessment of Dust from Demolition and Construction (v1.1)

² EPUK & IAQM (2017). Land-Use Planning and Development Control: Planning for Air Quality (v1.2)

2. Air Quality – Legislative Context

2.1 Air Quality Strategy

The importance of existing and future pollutant concentrations can be assessed in relation to the national air quality standards and objectives established by Government. The Air Quality Strategy (AQS) provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the UK Government and Devolved Administrations to protect human health. The air quality objectives incorporated in the AQS and the UK Legislation are derived from Limit Values prescribed in the EU Directives transposed into national legislation by Member States.

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period. Typically these include residential properties and schools/care homes for long-term (i.e., annual mean) pollutant objectives and high streets for short-term (i.e., 1-hour) pollutant objectives. Table 2-1, taken from LAQM TG(22)³, provides an indication of those locations that may or may not be relevant for each averaging period.

This assessment focuses on NO₂, PM₁₀ and PM_{2.5} as these are the pollutants of most concern within the Council's administrative area. The AQS objectives for these pollutants are presented in Table 2-2.

Table 2-1– Examples of where the AQS Objectives should apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens or residential properties ¹ .	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-minute mean	All locations where members of the public might reasonably be expected	

³ LAQM Technical Guidance LAQM TG(22) – August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.

	to spend a period of 15 minutes or longer.	
Notes:		
¹ For gardens and playgrounds, such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.		

Table 2-2 – Relevant AQS Objectives for the Assessed Pollutants in the UK

Pollutant	AQS Objective	Concentration Measured as:	Date for Achievement
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 µg/m ³	Annual mean	31 December 2005
Particulate Matter (PM ₁₀)	50 µg/m ³ not to be exceeded more than 35 times per year	24-hour mean	1 January 2005
	40 µg/m ³	Annual mean	1 January 2005
Particulate Matter (PM _{2.5})	10 µg/m ³	Annual Mean	31 st December 2040

2.2 National Planning Policy

The revised National Planning Policy Framework⁴ (NPPF), published on the 20th July 2021, states that the planning system should contribute to and enhance the natural, built and historic environment, by preventing new development from contributing or being adversely affected by unacceptable concentrations of air pollution and development should, wherever possible, help to improve local environmental conditions such as air and water quality. In specific relation to the air quality policy, the document states:

“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan”.

2.3 Local Air Quality Management (LAQM)

Part IV of the Environment Act 2021⁵ places a statutory duty on local authorities to periodically Review and Assess the current and future air quality within their area and determine whether they are likely to meet the AQS objectives set down by Government for a number of pollutants – a process known as LAQM. The AQS objectives that apply to LAQM are defined for seven pollutants: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide and particulate matter.

Where the results of the Review and Assessment process highlight those problems in the attainment of health-based objectives for air quality will arise, the authority is required to declare an AQMA – an area defined by high pollution concentrations and exceedances of health-based standards.

⁴ National Planning Policy Framework (2021), available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

⁵ Environment Act (2021), Part IV. Published by the UK Government. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/part/4/enacted>

Where an authority has declared an AQMA, and development is proposed to take place either within or near the declared area, further deterioration to air quality resulting from a proposed development can be a potential barrier to gaining consent for the development proposal. Similarly, where a development would lead to an increase of the population within an AQMA, the protection of residents against the adverse long-term impacts of exposure to existing poor air quality can provide the barrier to consent. As such, following an increased number of declarations across the UK, it has become standard practice for planning authorities to require an air quality assessment to be carried out for a proposed development.

2.4 Local Planning Policy

Local Plan

Kirklees Local Plan Strategy and Policies⁶, adopted in February 2019, references new developments and air quality. In particular, the Policy LP51 ('Protection and improvement of local air quality'), states that:

1. *“Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would have an unacceptable impact on the natural and built environment or to people.”*
2. *Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase must incorporate sustainable mitigation measures that reduce the level of this impact. If sustainable measures cannot be introduced the development will not be permitted.*
3. *Where the development introduces new receptors into Air Quality Management Areas or Areas of Concern or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable mitigation measures that protect the new receptors from unacceptable levels of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted.”*

The references made to air quality in Policy LP15 ('Protection and improvement of local air quality') have informed this assessment.

2.5 Air Quality Guidance for Construction Sites

There are a number of regulatory and legislative constraints in place to control pollution from construction and demolition activities. The Building Act 1984 and subsequent Building Regulations 2000 are in place to ensure the safety of people in and around the building during work. Part III of the Environmental Protection Act (EPA) 1990 identifies the emission of dust from construction sites as having the potential to be a statutory nuisance and requires its control under Section 80.

In December 2011, the IAQM published a guidance document to assess the impact of construction on air quality. The guidance was reviewed in January 2012 and updated in February 2014 to incorporate new evidence. The approach adopted in this assessment is based on adopting the methodology published in the 2014 version of the IAQM guidance. The significance of the impact

⁶ Air Quality & Emissions. Technical Planning Guidance. (2019), available at: <https://www.kirklees.gov.uk/beta/crime-and-safety/pdf/WYLES-air-quality-and-emissions-planning-technical-guide.pdf>

of the construction phase on air quality was determined through application of the criteria outlined in IAQM construction guidance⁷.

2.6 Land-Use Planning & Development Control: Planning for Air Quality

Although no formal procedure exists for classifying the magnitude and significance of air quality effects from a new development, the EPUK and IAQM guidance document 'Land-Use Planning and Development Control: Planning for Air Quality'² provides a decision-making process which assists with the understanding of air quality impacts and implications as a result of development proposals. The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of an air quality impact associated with a development proposal and whether this impact is significant.

2.7 West Yorkshire Low Emissions Strategy

The West Yorkshire Low Emissions Strategy (WYLES), adopted in December 2016, sets out the strategy for local authorities across West Yorkshire to deliver cleaner air. As part of this strategy, the Air Quality & Emissions Technical Planning Guidance has been developed. This guidance sets out a framework for how to undertake an air quality assessment within the West Yorkshire area. This guidance has not been utilised within this assessment, as the IAQM guidance has been utilised as per the request of Environmental Health at Kirklees Council.

⁷ Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction (v1.1).

3. Review and Assessment of Air Quality Undertaken by the Council

3.1 Local Air Quality Management

The Council has maintained a thorough annual review and assessment of air quality through their statutory reporting, as part of its obligations in Part IV of the Environment Act 1995 (as amended 2021)⁸.

The most recent LAQM report published by Kirklees Council is the 2022 Air Quality Annual Status Report (ASR)⁹ containing 2021 monitoring data. In 2021, the Council undertook passive diffusion tube monitoring of NO₂ at 99 sites. Kirklees Council undertake automatic monitoring at two sites. The Council currently have ten AQMAs declared within their jurisdiction. The Site is not located within any AQMA, with the closest (Kirklees AQMA 9) located 1.4 miles from the Site.

3.2 Review of Air Quality Monitoring

Pollutant concentrations from 2017-2021 at monitoring locations closest to the Site have been utilised to inform this assessment. However, owing to the impact of the COVID-19 pandemic, the 2020 and 2021 data is likely to not be representative of future years as a result of changes in vehicle use. The closest passive monitoring locations are presented in Table 3-1, and their locations are presented in Figure 3.1.

The nearby monitoring locations show that NO₂ concentrations have remained relatively stable from 2017 to 2019. There is a general decrease of concentrations at most locations in 2020 and a general increase in 2021. This is likely due to the effects of travel restrictions associated with COVID-19 in 2020 and part of 2021. The monitoring locations are within 1.4km to 2.5km of the Site. Since 2019, all reported NO₂ concentrations as being below the annual mean AQS objective of 40 µg/m³. The monitoring locations where this was exceeded (K22 and K32) are roadside locations, situated near the junction of major roads and are over 2 km from the Site. Therefore, the concentrations are not deemed representative of the area of the Site.

The closest automatic monitoring station is over 2.7km from the Site and are located in more urban areas; therefore, the concentrations are not deemed representative of the area of the Site.

Table 3-1 – Annual Average NO₂ Monitoring Locations within 1km of the Site

Site ID	Site Name	Site Type	Coordinates		Distance from site (km)	NO ₂ Annual Mean Concentration (µg/m ³)				
			X	Y		2017	2018	2019	2020	2021
K8	Bradford Road Fartown 1	Roadside	414496	417795	1.4	35.5	36.1	36.0	30.5	33.4
K9	Bradley Road	Kerbside	417280	420482	2.5	35.3	27.5	34.4	28.3	21.7
K10	Leeds Road Bradley 1	Roadside	417227	420337	2.3	37.3	39.3	34.5	28.8	-
K12	Leeds Road Bradley 2	Roadside	417335	420412	2.5	37.4	38.8	27.3	29.4	-
K22	Leeds Road Bradley 3	Roadside	417418	420479	2.6	41.4	40.6	33.4	22.7	34.7
K31	Blacker Road 1	Roadside	413400	417495	2.4	32.1	33.8	30.5	17.1	25.0
K32	Blacker Road 2	Roadside	413513	417481	2.3	44.2	45.9	35.5	-	36.1
K45	Bradford Road Fartown 2	Roadside	414480	417720	1.4	35.7	36.3	36.4	25.1	33.2

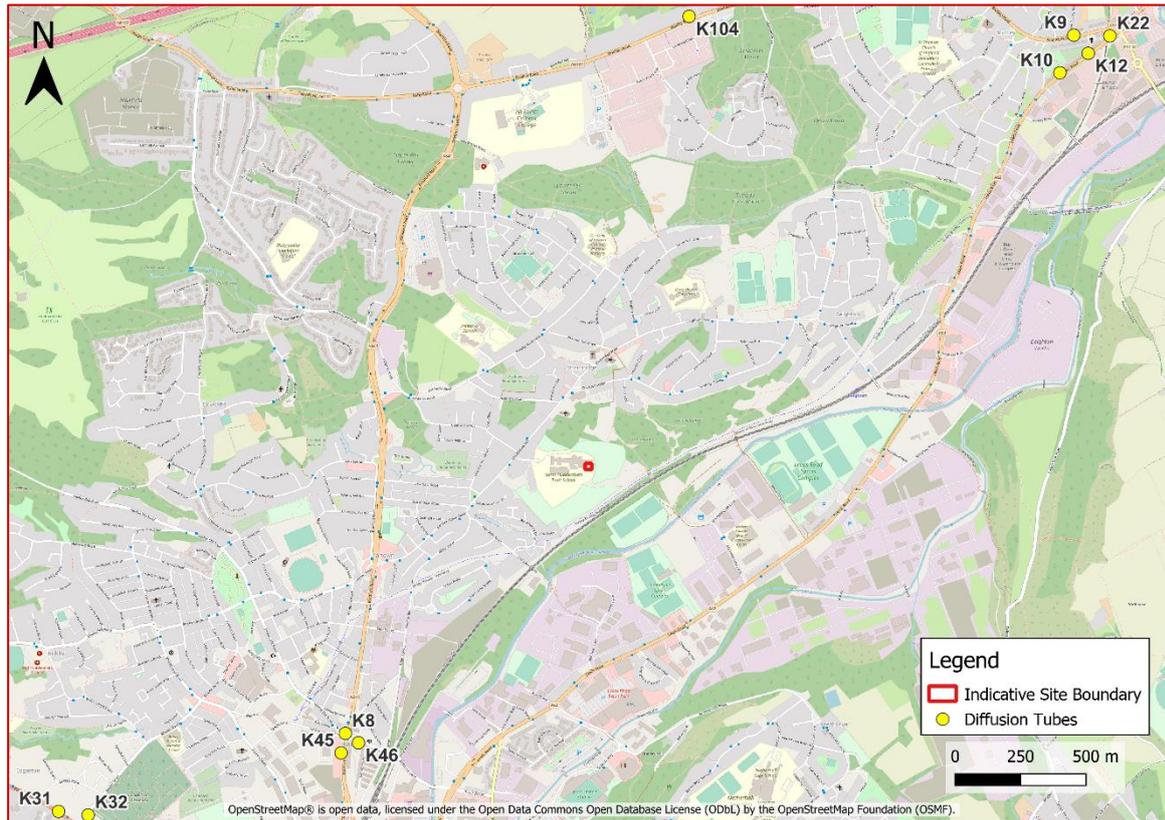
⁸ Environment Act 2021. <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

⁹ Kirklees Council 2022 ASR available at: <https://www.kirklees.gov.uk/beta/crime-and-safety/air-pollution.aspx>

Site ID	Site Name	Site Type	Coordinates		Distance from site (km)	NO ₂ Annual Mean Concentration (µg/m ³)				
			X	Y		2017	2018	2019	2020	2021
K46	Willow Lane East Fartown	Roadside	414546	417759	1.4	37.1	37.0	34.8	29.2	22.5
K104	Bradley Road, Bradley	Roadside	415810	420554	1.8	-	-	-	17.4	19.9

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

Figure 3.1 – Monitoring Locations Near to the Site



3.3 Background Concentrations

Defra maintain a nationwide model of existing and future background air quality concentrations at a 1 km x 1 km grid square resolution¹⁰. The data sets include annual average concentration estimates for NO_x, NO₂, PM₁₀ and PM_{2.5}, using a reference year of 2018. The model used is semi-empirical in nature; it uses the national atmospheric emissions inventory (NAEI) emissions to model-predict the concentrations of pollutants at the centroid of each 1 km x 1 km grid square, but then calibrates these concentrations in relation to actual monitoring data.

The estimated background concentrations for the baseline year (2019) and the proposed opening year (2024) are outlined in Table 3-2. Background values remain considerably lower than the annual mean AQS objectives for all pollutants for the years 2019 and 2024. There is a marginal decrease year on year in PM₁₀ and PM_{2.5} concentrations, with a slight decrease seen in NO₂ concentrations.

¹⁰ UK AIR Background Mapping Tool. Available at: <https://uk-air.defra.gov.uk/data/laqm-background-home>



Table 3-2– 2019 and 2024 Background Pollutant Concentrations

Year	Background Concentration ($\mu\text{g}/\text{m}^3$) <i>(Background concentrations taken from grid square; 415500, 418500)</i>		
	NO₂	PM₁₀	PM_{2.5}
2019	15.9	11.7	8.0
2024	13.5	11.0	7.5
<i>AQS Objective (annual mean)</i>	40	40	20

4. Assessment Methodology

Following the submission of the planning application, comments have been received from Environmental Health at Kirklees Council stating the following:

“Before the application is determined, we require an air quality screening assessment to be undertaken to determine if a more detailed air quality impact assessment using dispersion modelling is required. We would expect the air quality screening assessment to be undertaken in accordance with Table 6.2 of the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) – Planning for Air Quality Guidance 2017. It may be that a more detailed Air Quality Impact Assessment is required at a later stage based on the outcome of the screening assessment.”

The approach applied to this assessment has been based on the following:

- Qualitative assessment of the impacts from the proposed development’s construction phase on air quality through emission of dust and particulates.
- Semi-quantitative assessment of the effect of emissions from road traffic during the operation phase of the proposed development.

4.1 Construction Effects

The assessment of potential dust/PM₁₀/PM_{2.5} effects in relation to the development’s construction phase has been undertaken qualitatively in accordance with IAQM Guidance¹. The guidance proposes a method to assess the significance of construction dust impacts by considering the annoyance due to dust soiling, as well as harm to ecological receptors and the risk of health effects due to significant increases to dust/PM₁₀/PM_{2.5} concentrations.

Construction site activities are divided into four types to reflect their different potential impacts. These activities are:

- Demolition – an activity involved with the removal of any existing structure or structures;
- Earthworks – the processes of soil-stripping, ground-levelling, excavation, and landscaping;
- Construction – an activity involved in the provision of a new structure; and
- Trackout – the transport of dust and dirt from the site onto the public road network. This arises when lorries leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site.

An assessment is required where a sensitive human receptor is located within 350 m from the site boundary and/or within 50 m of the routes used by vehicles on the public highway, up to 500 m from the site entrances. There are approximately 70 residential properties located within 350 m of the site boundary of the proposed development, thus an air quality assessment is required.

An assessment is also required where ecologically sensitive receptors are located within 50m of the site boundary and/or 50 m of the routes used by vehicles on the public highway, up to 500 m from the site entrances. In accordance with IAQM methodology¹, these are defined as legislatively protected areas such as Sites of Special Scientific Interest (SSSI) and Special Conservation Areas (SCA). There is no ecological receptor within 50 m of the site boundary or 50m of the routes used by vehicles on the public highway, therefore detailed assessment regarding ecological receptors is not required.

The first step of the detailed assessment is to assess the risk of dust impacts. This is undertaken separately for each of the four activities (demolition, earthworks, construction and trackout) and takes account of:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium, or large; and
- The sensitivity of the area to dust impacts, which is defined as low, medium, or high sensitivity.

These two factors are combined to give an estimate of the risk of dust impacts occurring with no mitigation applies. Risks are described in terms of there being a low, medium, or high risk of dust impact; the risk category assigned to the site can be different for each of the four potential activities (demolition, earthworks, construction, and trackout). Where there are low, medium, or high risks of an impact, then site specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgment, one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the scale is very small and there are no receptors near to the activity.

Site-specific mitigation for each of the four potential activities is then determined based on the risk of dust impacts identified. Where a local authority has issued guidance on measures to be adopted at demolition/construction sites, these should also be taken into account. Professional judgment is then employed to examine the residual dust effects assuming mitigation to determine whether or not they are significant.

Given the short-term nature of the construction phase and the comparatively low volume of vehicle movements that will likely arise, there is not considered to be any potential for significant air quality effects from development related road traffic NO₂ emissions during the construction phase. Such potential impacts have therefore been scoped out from requiring detailed assessment based on their negligible impact.

Operational Effects – Road Traffic Emissions

The assessment of air quality effects in relation to the development's operational phase has been initially undertaken qualitatively in accordance with the EPUK/IAQM Guidance². The guidance makes reference to the Town and Country Planning (Development Management Procedure) (England) Order¹¹ definition of a 'major' development when scoping assessments required for the planning process. Table 4-1 provides the criterion which determines whether a development is classified as 'major'.

Consideration of air quality impacts and approaches to reduce impacts from any 'major' development is then recommended. The air quality impacts considered include both the impact of existing sources in the local area on the proposed development and the impacts of the proposed development on the local area.

With regards to changes in air quality or exposure to air pollution, the guidance indicates that each local authority will likely have their own view on the significance of this; these are to be described in relation to whether an air quality objective is predicted to be met, or at risk of not being met. Exceedances of these objectives are considered as significant if not mitigated.

¹¹ UK Government, The Town and Country Planning (Development Management Procedure) (England) Order 2010. Available at: <https://www.legislation.gov.uk/uksi/2010/2184/contents/made>



As part of the impact of the proposed development on the local area, a two staged assessment is recommended as per EPUK/IAQM guidance:

- Stage 1: Determines the need for an air quality assessment and requires any of the criteria under (A) coupled with any of the criteria under (B) in Table 4-1 to proceed to Stage 2.
- Stage 2: Where an assessment is deemed to be required, this may take the form of a simple qualitative assessment or a more detailed dispersion modelling assessment. The level of air quality assessment required is determined by the criteria in Table 4-2.

The approach adopted in this report is a screening assessment, as the traffic data provided by the client (AHR Architects Ltd) does not exceed the EPUK/IAQM indicative criteria for the requirement for a detailed assessment within or outside an AQMA.

Table 4-1 – Stage 1 Criteria to Proceed to Stage 2

Criteria to Proceed to Stage 2	
1.	If any of the following apply: <ul style="list-style-type: none"> • 10 or more residential units or a site area of more than 0.5 ha • More than 1,000 m² floor space for all other uses or a site greater than 1 ha
2.	Coupled with any of the following: <ul style="list-style-type: none"> • The development has more than 10 parking spaces; or • The development will have a centralised energy facility or other centralised combustion process.

Table 4-2 – Indicative Criteria for Requiring an Air Quality Assessment

The Development Will	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors	A change of LDV flows of: - more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A Change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100AADT elsewhere
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).



<p>7. Have one or more substantial combustion processes.</p>	<p>Where the combustion unit is:</p> <ul style="list-style-type: none"> - any centralised plant using bio fuel - any combustion plant with single or combined thermal input >300kWh - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
<p>8. Have a combustion process of any size.</p>	<p>Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way or their size and/or height.</p>

5. Assessment Results

5.1 Construction Phase – Dust / PM₁₀ Emissions

This assessment of dust/PM₁₀/PM_{2.5} presents the effects which are likely to be relevant both prior to and following the use of the appropriate mitigation measures on-site. As per the IAQM guidance, the risk associated with the site to potentially generate dust/PM₁₀/PM_{2.5} is identified. Potential unmitigated effects at receptor locations are determined, and site-specific recommendations are then made to ensure residual dust/PM₁₀/PM_{2.5} effects associated with the construction phase are not significant.

The assessment of construction dust will focus on dust arising from the three relevant dust producing construction activities outlined in the IAQM guidance (earthworks, construction and trackout).

Demolition

The site is currently a vacant green site which consists of no standing buildings/structures. **No demolition** works are proposed to take place as part of this development, therefore impacts associated with demolition have not been considered.

Earthworks

Potential sources of impacts associated with earthworks/ground preparation activities include fugitive dust/PM₁₀/PM_{2.5} emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. The total site area is approximately 600 m² with sandy¹² soil. The dust emission magnitude for earthworks is therefore considered to be **Small**.

Construction

Potential sources of impacts associated with construction activities include fugitive dust/PM₁₀/PM_{2.5} emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. Activities at the development site will comprise the construction of 4 classrooms of 53.78m², one classroom of 52.79m², one office of 11.11m² and communal areas of approximately 104m², including restrooms and 2 stores. The total area of the site is 300m², of which 205m² include an elevated construction, the volume of the site is therefore below 25,000m³. The dust emission magnitude for construction is therefore considered to be **Small**.

Trackout

Dust emissions during trackout from the site may occur from the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. The number of predicted outward HDV (i.e., >3.5 tonne) movements in any one day is likely to be less than 10, the approximate unpaved on-site road length is expected to be <50m. The dust emission magnitude for trackout is therefore considered to be **Small**.

Summary

A summary of the dust emission magnitude for the relevant activities is detailed in Table 5-1.

¹² UK Soil Observatory, available at: <http://mapapps2.bgs.ac.uk/ukso/home.html>

Table 5-1 – Construction Dust Emission Magnitude

Source	Dust Emission Magnitude
Earthworks	Small
Construction	Small
Trackout	Small

Sensitivity of the Area

The site is by an existing educational facility, there are sensitive receptors located within 20 m of the development, located to the west and north of the Site. The sensitivity of the area with respect to dust soiling effects on people and property resulting from earthworks, construction and trackout is therefore **High**.

The existing max background PM₁₀ concentration is 11.7 µg/m³ which is below the AQS annual mean objective of 40 µg/m³. Given the above information regarding the number of receptors within 20 m of the site boundary, the sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is therefore **Low**.

A summary of the sensitivity of the surrounding area is detailed Table 5-2 below. According to the Defra Magic Maps natural environment mapping tool¹³, the nearest ecologically sensitive receptor (England Bypass Cutting (SSSI)) is more than 50 m from the development site and more than 50 m from the nearest road used for trackout. Therefore, the assessment of ecological receptors is not required.

Table 5-2 – Sensitivity of Surrounding Area

Potential Impact	Sensitivity Of The Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Low

Risk of Dust Impacts

The risk of dust impacts is defined using Tables 6, 7, 8 and 9 in the IAQM guidance for earthworks, construction and trackout respectively. The dust emission magnitude classes in Table 5-1 combined with the sensitivity of surrounding area classes in Table 5-2, result in the site risk categories as shown in Table 5-3.

Table 5-3 – Summary of Dust Risk

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	Low Risk
Human Health	Negligible	Negligible	Negligible

Following the construction dust assessment, the development Site is found to be **Low Risk** in relation to dust soiling effects on people and property and **Negligible** for human health impacts, as summarised in Table 5-3.

¹³ DEFRA Magic Maps Tool. Available at: <https://magic.defra.gov.uk/>

Providing mitigation measures are implemented, such as those outlined in Section 6.1, construction dust impacts are considered to be **Not Significant**.

5.2 Operational Phase – Road Traffic Emissions

The proposed development consists of a new two storey, five classroom teaching block within the current North Huddersfield Trust School area. An evaluation of the proposed development against the EPUK/IAQM criteria is outlined within Table 5-1 below.

Table 5-1 – Evaluation of the Proposed Operational Impacts in Relation to EPUK/IAQM Criteria

Indicative Criteria to Proceed to an Air Quality Assessment	Evaluation of the Potential Operational Impacts of the Proposed Development
A change of LDV* flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere	The proposed development site is located outside any declared AQMA. A total of approximately 113 AADT will be generated by the proposed development. This number is beyond the criteria of 500 AADT outside of an AQMA.
A change of HDV** flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere	The proposed development site is located outside any declared AQMA. No additional Heavy Goods Vehicle (HGV) trips (AADT) are expected to be generated as a result of the new development.
Road realignment, where the change is 5 m or more and the road is within an AQMA	No change of road realignment expected.
Introduction of a new junction or the removal of an existing junction near to relevant receptors. This applies to junctions that cause traffic to significantly change vehicle accelerate/ decelerate, e.g. traffic lights or roundabouts	No junction is expected to be introduced.
Introduction or change of a bus station, where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere	The introduction or changes to a bus station are not proposed.
Have an underground carpark with extraction system, where the ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	No underground carpark proposed.
Having one or more substantial combustion process, where the combustion unit it: - any centralised plant using biofuel - any combustion plant with single or combined thermal input > 300kWh - a standby emergency generator associated with a centralised energy centre (is likely to be tested/used > 18 hours a year).	No plant proposed.
Have a combustion process of any size, where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way of their size and/or height.	No such plant proposed.

*LDV – Light Duty Vehicle **HDV – Heavy Duty Vehicle

As outlined within Table 5-1, none of the indicative criteria for air quality impacts are met. Additionally, it is a development with a proposed floor space of less than 1,000 m² for all other uses, so as stated in the Stage 1 criteria the development should not proceed to the Stage 2 analysis. Therefore the impact of the proposed development on the local area, and the impacts can be considered to be **Not Significant**.

6. Recommended Mitigation Measures

6.1 Short-term Impacts during Construction – Dust / PM₁₀ Emissions

As discussed in Section 5.1, construction impacts associated with the proposed development would result in the generation of dust and PM₁₀. However, it is considered that employment of construction best practice should ensure that no problematic dust or PM₁₀ concentrations occur during the construction process.

The IAQM guidance outlines a number of site-specific mitigation measures based on the assessed site risk. The measures are grouped into those which are highly recommended and those which are desirable.

As the site is classed as **low risk** the following mitigation measures are highly recommended:

With respect to communications:

- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

With respect to site management:

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.

With respect to preparing and maintaining the site:

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.

With respect to operating vehicle/machinery and sustainable travel:

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.

With respect to operations:

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

With respect to waste management:

- Avoid bonfires and burning of waste materials.

Additionally, as the site is classed as **low risk** the following mitigation measures are desirable:

With respect to preparing and maintaining the site:

- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

With respect to operating vehicle/machinery and sustainable travel:

- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

With respect to operations:

- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

As the site is classed as **low risk** for earthworks no mitigation measures are required with respect to earthworks.

As the site is classed as **low risk** for construction the following mitigation measures are desirable:

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

As the site is classed as **low risk** for trackout the following mitigation measures are desirable:

- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

7. Conclusions

Bureau Veritas UK Ltd have been commissioned by AHR Architects Ltd. (“the Client”) to undertake an air quality assessment to evaluate air quality impacts for the planning application for a new two storey, five classroom teaching block at North Huddersfield Trust School, Woodhouse Hall Road, Huddersfield, HD2 1DJ.

The following section provides the conclusions of this assessment.

The Defra background maps, estimate that background values remain considerably lower than the annual mean AQS objectives for all pollutants for the baseline year of 2019 and the predicted development opening year of 2024.

The assessment of dust and PM₁₀ effects from the construction phase of the development was subject to a qualitative assessment following IAQM guidance¹. With such mitigation in place, the assessment carried out has shown that any off-site impacts from dust emissions during the construction phase would be **Not Significant**.

The assessment of air quality effects in relation to the development’s operational phase has been undertaken in accordance with EPUK/IAQM Guidance². The results of the operational phase air quality assessment concluded that the effect of additional vehicle movements from the proposed development on air quality are considered to be **Not Significant**.



Appendices

Appendix 1 – Background to Air Quality

Emissions from road traffic contribute significantly to ambient pollutant concentrations in urban areas. The main constituents of vehicle exhaust emissions produced by fuel combustion are carbon dioxide (CO₂) and water vapour (H₂O). However, combustion engines are not 100% efficient and partial combustion of fuel results in emissions of a number of other pollutants, including carbon monoxide (CO), particulate matter (PM), Volatile Organic Compounds (VOCs) and hydrocarbons (HC). For HC, the pollutants of most concern are 1,3 - butadiene (C₄H₆) and benzene (C₆H₆). In addition, some of the nitrogen (N) in the air is oxidised under the high temperature and pressure during combustion; resulting in emissions of oxides of nitrogen (NO_x). NO_x emissions from vehicles predominately consist of nitrogen oxide (NO), but also contain nitrogen dioxide (NO₂). Once emitted, NO can be oxidised in the atmosphere to produce further NO₂.

The quantities of each pollutant emitted depend upon a number of parameters; including the type and quantity of fuel used, the engine size, the vehicle speed, and the type of emissions abatement equipment fitted. Once emitted, these pollutants disperse in the air. Where there is no additional source of emission, pollutant concentrations generally decrease with distance from roads, until concentrations reach those of the background.

This air quality assessment focuses on NO₂ and PM₁₀ (PM of aerodynamic diameter less than 10µm) as these pollutants are least likely to meet their respective Air Quality Strategy (AQS) objectives near roads. This has been confirmed over recent years by the outcome of the Local Air Quality Management (LAQM) regime. The most recent statistics¹⁴ regarding Air Quality Management Areas (AQMA) show that approximately 650 AQMA are declared in the UK. The majority of existing AQMA have been declared in relation to road traffic emissions.

In line with these results, the reports produced by the Council under the LAQM regime have confirmed that road traffic within their administrative area is the main issue in relation to air quality.

An overview of these two pollutants, briefly describing the sources and processes influencing the ambient concentrations, is presented below.

Particulate Matter (PM₁₀)

Particulate matter is a mixture of solid and liquid particles suspended in the air. There are a number of ways in which airborne PM may be categorised. The most widely used categorisation is based on the size of particles such as PM_{2.5}, particles of aerodynamic diameter less than 2.5µm (micrometre = 10⁻⁶ metre), and PM₁₀, particles of aerodynamic diameter less than 10µm. Generically, particulate residing in low altitude air is referred to as Total Suspended Particulate (TSP) and comprises coarse and fine material including dust.

Particulate matter comprises a wide range of materials arising from a variety of sources. Examples of anthropogenic sources are carbon (C) particles from incomplete combustion, bonfire ash, recondensed metallic vapours, and secondary particles (or aerosols) formed by chemical reactions in the atmosphere. As well as being emitted directly from combustion sources, man-made particles can arise from mining, quarrying, demolition, and construction operations, from brake and tyre wear in motor vehicles and from road dust resuspension from moving traffic or strong winds. Natural sources of PM include wind-blown sand and dust, forest fires, sea salt and biological particles such as pollen and fungal spores.

The health impacts from PM depend upon size and chemical composition of the particles. For the purposes of the AQS objectives, PM₁₀ or PM_{2.5} is solely defined on size rather than chemical composition. This enables a uniform method of measurement and comparison. The short and long-term exposure to PM has been associated with increased risk of lung and heart diseases. PM may also carry surface-absorbed carcinogenic compounds. Smaller PM have a greater likelihood of

¹⁴ Statistics from the UK AIR website available at <https://uk-air.defra.gov.uk/aqma/summary> – Figures as of November 2019

penetrating the respiratory tract and reaching the lung to blood interface and causing the above adverse health effects.

In the UK, emissions of PM₁₀ have declined significantly since 1980, and were estimated to be 114kt (kilotonne) in 2010¹⁵. Residential / public electricity and heat production and road transport are the largest sources of PM₁₀ emissions. The road transport sector contributed 22% (25kt) of PM₁₀ emissions in 2010. The main source within road transport is brake and tyre wear.

It is important to note that these estimates only refer to primary emissions, that is, the emissions directly resulting from sources and processes and do not include secondary particles. These secondary particles, which result from the interaction of various gaseous components in the air such as ammonia (NH₃), sulphur dioxide (SO₂) and NO_x, can come from further afield and impact on the air quality in the UK and vice versa.

Similarly to PM₁₀, emissions of PM_{2.5} have declined since 1970, and were estimated to be 67kt in 2010, which makes over 58% of PM₁₀ emissions. In 2010, the road transport sector emitted 28% (18kt) of the total PM_{2.5} emissions in the UK.

Nitrogen Oxides (NO_x)

NO and NO₂, collectively known as NO_x, are produced during the high temperature combustion processes involving the oxidation of N. Initially, NO_x is mainly emitted as NO, which then undergoes further oxidation in the atmosphere, particularly with ozone (O₃), to produce secondary NO₂. Production of secondary NO₂ could also be favoured due to a class of compounds, VOCs, typically present in urban environments, and under certain meteorological conditions, such as hot sunny days and stagnant anti-cyclonic winter conditions.

Of NO_x, it is NO₂ that is associated with health impacts. Exposure to NO₂ can bring about reversible effects on lung function and airway responsiveness. It may also increase reactivity to natural allergens, and exposure to NO₂ puts children at increased risk of respiratory infection and may lead to poorer lung function in later life.

In the UK, emissions of NO_x have decreased by 62% between 1990 and 2010. For 2010, NO_x (as NO₂) emissions were estimated to be 1,106kt. The transport sector remained the largest source of NO_x emissions with road transport contribution 34% to NO_x emissions in 2010.

¹⁵ National Atmospheric Emissions Inventory (NAEI) Summary Emission Estimate Datasets 2010. March 2012

Appendix 2 – Site Layout Plan

