April 2020

BOWMER KIRKLAND

Turing House

Noise and Vibration Management Plan

Project Details	
Name	Turing House School
Address	Hospital Bridge Road, Twickenham, TW2 6LH

Approval	Prepared By	Reviewed By	Approved By
Name	Paul Smith, PIEMA	Perry Goodhew	Richmond Council through Discharge of planning condition NS43 of planning application 18/3561/FUL
Position	Environmental Advisor	Contracts Manager	
Date	21st August 2019	21st August 2019	

Issue	Date	Reason
P1	21st August 2019	Initial Draft for Internal Review.
C1	13th January 2020	For Construction
C2	28th April 2020	Amended as per LBRuT planning comments.

Contents

1. Introduction

B+K

1. Introduction

This Noise and Vibration Management Plan (NVMP) has been developed to identify the environmental mitigation measures and management controls to minimise the impact of the development of the Turning House School project.

Quality

Bowmer and Kirkland recognise the importance of developing our business through continued improvements in quality. By consistent and effective implementation of a robust Quality Management System (QMS) we believe that we can add value to the project development process for the benefit of Clients and users of our buildings. Our Quality Management System complies with ISO 9001:2015, (see certificate **appendix B**) and delivers the objectives of our Quality Policy (see **appendix A**).

Environment

Bowmer and Kirkland are committed to sound management practices that minimise the potential effects of building activities on the environment. By encouraging the sustainable use of natural resources, minimising environmental pollution, reducing waste and encouraging recycling, we aim to contribute to improving the world in which we work and live.

We believe that a proactive approach for promoting awareness of environmental issues with our employees, together with our development of various environmental initiatives, helps us to grow an even more sustainable business of the future.

Bowmer & Kirkland's Environmental Policy (see appendix A) sets out the company's strategy for minimising the environmental impact of our site and office operations. Through promoting the prevention of pollution, energy efficiency and the sustainable use of natural resources in all our construction activities and those of our subcontractors, we endeavour to achieve a high standard of environmental performance.

Our Environmental Management System complies with ISO 14001:2015, (see certificate **appendix B**) and delivers the objectives of our Environmental Policy (see **appendix A**).

Health & safety and Well-being

Bowmer and Kirkland has the highest regard for the well-being of all persons involved in its activities and other who may be affected by them. We are committed to working with our Clients and external stakeholders to manage and control Health & Safety Risks. It is our belief that all accidents and occupational ill health can be prevented by adherence to our policies and procedures. We take a sensible, positive approach to Health & Safety.

Through the company's Health & Safety Policy (see **appendix A**) the importance of discharging our statutory obligations and duties, and our leadership and commitment to effective Health & Safety management is defined. Best practice is accepted as a core aim throughout business operations and integral to maintaining a strong, positive safety culture. To facilitate this aim, the company the company's management system and procedures has gained accreditation to OHSAS 18001:2007 (see certificate **appendix B**)

Corporate and Social Responsibility

Bowmer and Kirkland is underlining its commitment to sustainability through compliance with BS ISO 26000:2010 (see certificate in **Appendix B**). This Standard presents a framework for Bowmer and Kirkland to ensure that socially responsible behaviour is incorporated into its existing policies, procedures, and performance.

Bowmer and Kirkland has a strong commitment to ethical practices in its business operations, and hopes to strengthen these through a more rigorous assessment of its social responsibility policies. Adherence to the Standard will create multiple benefits, not only improving the company's environmental credentials and enhancing its brand reputation, but also supporting more cost-effective business practice to build a long-term competitive advantage. Engaging staff to improve the company's environmental performance can also improve employee motivation, and bring sustainability into mainstream corporate communications. Meanwhile, monitoring environmental performance can present an insight into potential risks and opportunities to the business.

1. Introduction

This Noise and Vibration Management Plan has been produced to discharge the planning condition NS45:

Noise and Vibration Construction Method Statement :

A. Unless otherwise agreed in writing by the LPA, prior to commencement of the development, a noise and vibration Construction Method Statement (CMS) for the ground works, demolition and construction phases of the development site shall be submitted to and approved in writing by the Council. Details shall include control measures for noise, vibration including working hours. Approved details shall be implemented throughout the project period.

B. The CMS shall follow the Best Practice detailed within BS 5228:2009+A1:2014 Code of Practice for noise and Vibration Control on construction and open sites and BS 6187:2011 Code of practice for full and partial demolition. Further guidance can be obtained from the commercial environmental health department. The CMS should include an acoustic report undertaken by a suitably qualified and experienced consultant and include all the information below:

I. Baseline noise assessment – undertaken for a least 24-hours under representative conditions to determine the pre-existing ambient noise environment.

II. Noise predictions and the significance of noise effects - Predictions should be included for each phase of the demolition, and construction, vehicle movements and an assessment of the significance of noise effects must be included based on the guidance in BS 5228:2009+A1:2014 Annex E

III. Piling - Where piling forms part of the construction process, a low noise and vibration method must be utilised wherever possible, and good practice guidelines should be followed e.g. BS 5228:2009+A1:2014.

IV. Vibration Predictions and the significance of vibration effects - Predictions should be included for each phase of demolition, and construction, and an assessment of the significance of vibration effects must be included e.g. as per BS 5228:2009+A1:2014.

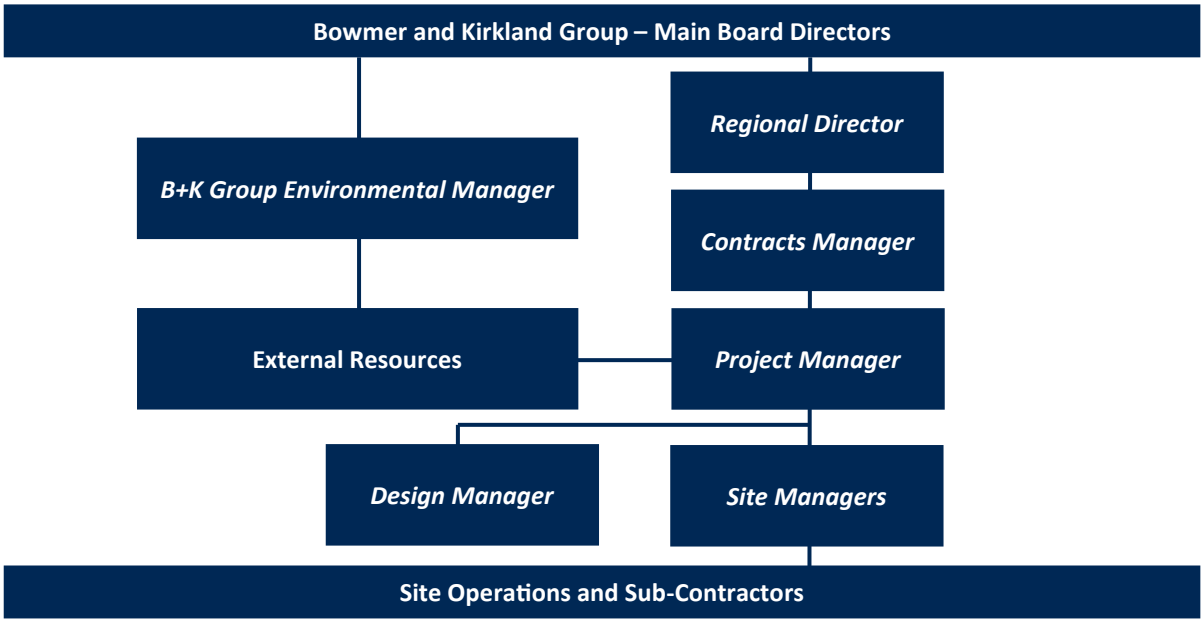
V. Noise and vibration monitoring – Permanent real time web enabled and/or periodic noise and vibration monitoring must be undertaken for the duration of the demolition and construction phases which may result in a significant impact. The location, number of monitoring stations and the measurement data must be agreed with the LPA prior to the start of construction.

VI. Community engagement – The steps that will be taken to notify and update residents and businesses that may be affected by the construction of the proposed development.

REASON: In order to safeguard the amenities of neighbouring residents.

2. Organisation and Responsibilities

2. Organisation and Responsibilities



Regional Director

The Regional Director takes overall responsibility for all projects conducted by the construction region responsible for delivering the project and will visit the site on a regular basis.

Contracts Manager

The Contracts Manager (CM) takes Senior Management Responsibility for the overall project. The Contracts Manager will not be permanently on site but will visit the project 2-3 days per week to ensure the requirements of this NDVMP and Bowmer and Kirkland's IMS are fully implemented and effective. The Contracts Manager will conduct a formal inspection of the Site Operations on a monthly basis to assess the adequacy of Health, Safety and Environmental controls.

The Contracts Manager along with the Project Manager is responsible for liaison with the public and community groups during construction. The Contracts Manager will manage communication with the public and wider community which will include meetings, notices, news-letters and site visits as appropriate. This includes overseeing the resolution of any complaints raised relating to nuisance during the work.

Project Manager

The Project Manager is responsible for the day to day management of the project and will be permanently on site during the works. This includes the selection of competent sub-contractors and the inclusion of control measures in their sub-contracts. The Project Manager, in conjunction with the Site Managers, will monitor the works on a daily basis to ensure the specified controls are implemented and effective. In addition, the Project Manager will ensure that the project is inspected on a weekly basis for compliance with Health, Safety and Environmental compliance. The Project Manager will assist the Contracts Manager in liaison with the public and community groups during construction. The Project Manager will assist in communication with the public and wider community which will include meetings, notices, news-letters and site visits as appropriate. This includes assisting with the resolution of any complaints raised relating to nuisance during the works.

Design Manager

The Design Manager is responsible for the management of the design consultants to ensure that the project specification is established in accordance with project requirements, building regulations and relevant standards. The Design Manager will be permanently on site during the early stages of the project and will visit site regularly during the later stages of the project. The Design Manager will liaise with relevant parties on the final scheme design and ensure advice is provided to the Project Manager on the potential impact of proposed construction methods.

2. Organisation and Responsibilities Continued)

Site Managers

Site Managers are based permanently on site during the works, the number of site managers will vary depending on the construction output. The Site Managers are responsible to monitor the implementation and effectiveness of the specified controls on a day to day basis. This includes the induction of all sub-contractor's operatives and liaison with their management should improvements be required. The Site Managers, under instruction from the Project Manager, will formally inspect the works on a weekly basis for compliance with Health, Safety and Environmental compliance.

Environmental Manager

The Environmental Manager takes overall responsibility for the organisational legal compliance of the Bowmer and Kirkland Group of Companies. This includes ensuring our EMS recognises current regulatory and other requirements and the specified controls are effective in achieving compliance, preventing pollution and reducing the environmental impact of the organisation. The Environmental Manager will monitor the compliance of the project from information provided by external resources see below) and site visits ensuring the project is audited internally at least once.

External Resources

The following resources are employed by the Bowmer and Kirkland Group:

RG Wilbrey Consultants – conduct Health, Safety & Environmental inspections of the project bi-weekly

Adler & Allen – provide pollution response 24/7 mobilising resources where required

Cardinal Environmental – provide legislation updates and specialist legal advice where required.

3. Scope of Work

3. Scope of Work

The development comprises part demolition of existing buildings currently on site with the retention of Place House and carriage turning circle. Construction of new steel framed 2 and 3 storey Teaching Block and separate Sports Block. Refurbishment and alterations to the existing Place House, incorporating and joining it up with the new school buildings. New external works include hardstanding, games court areas, eternal dining, and soft landscaping.

Fig 1 – Arial View taken from www.google.co.uk/maps)

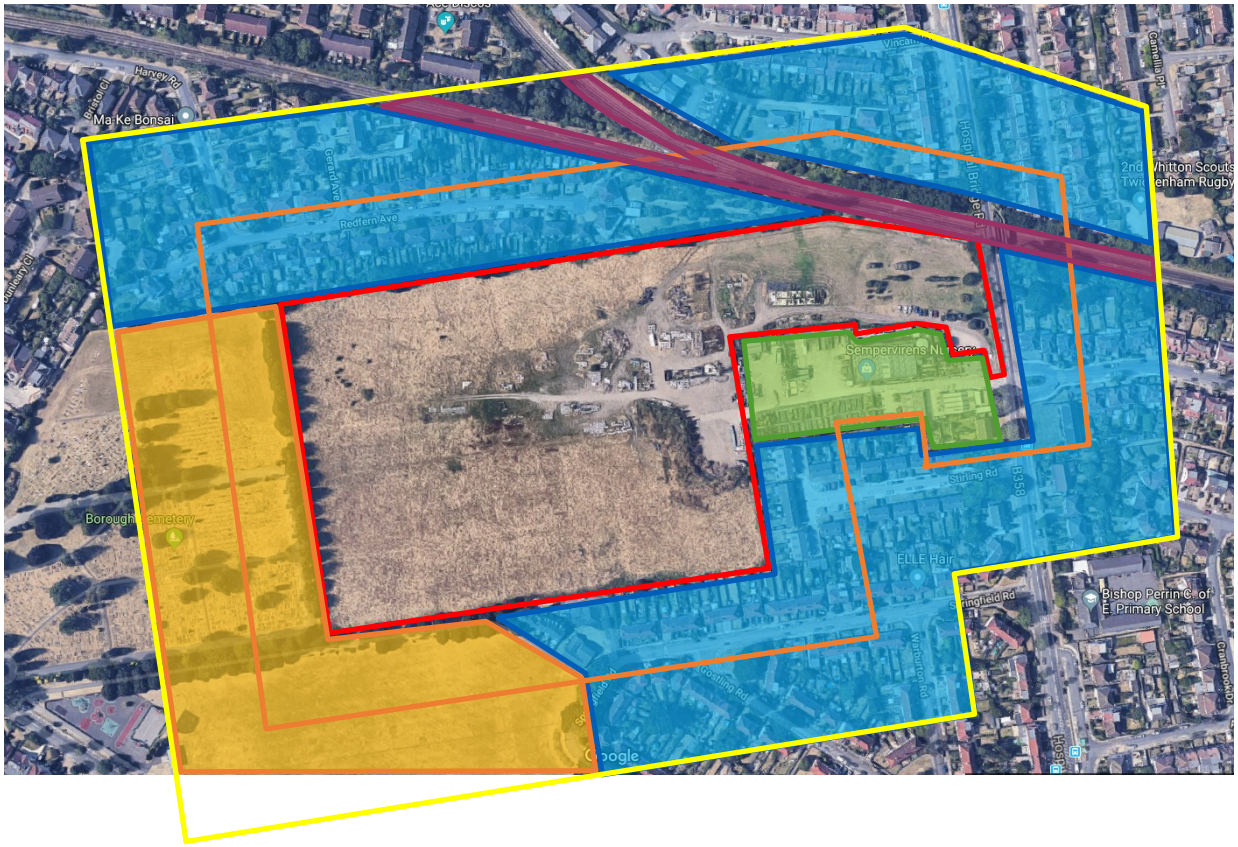
Fig 2 – Proposed site Plan

4. Receptors

B+K

4. Receptors

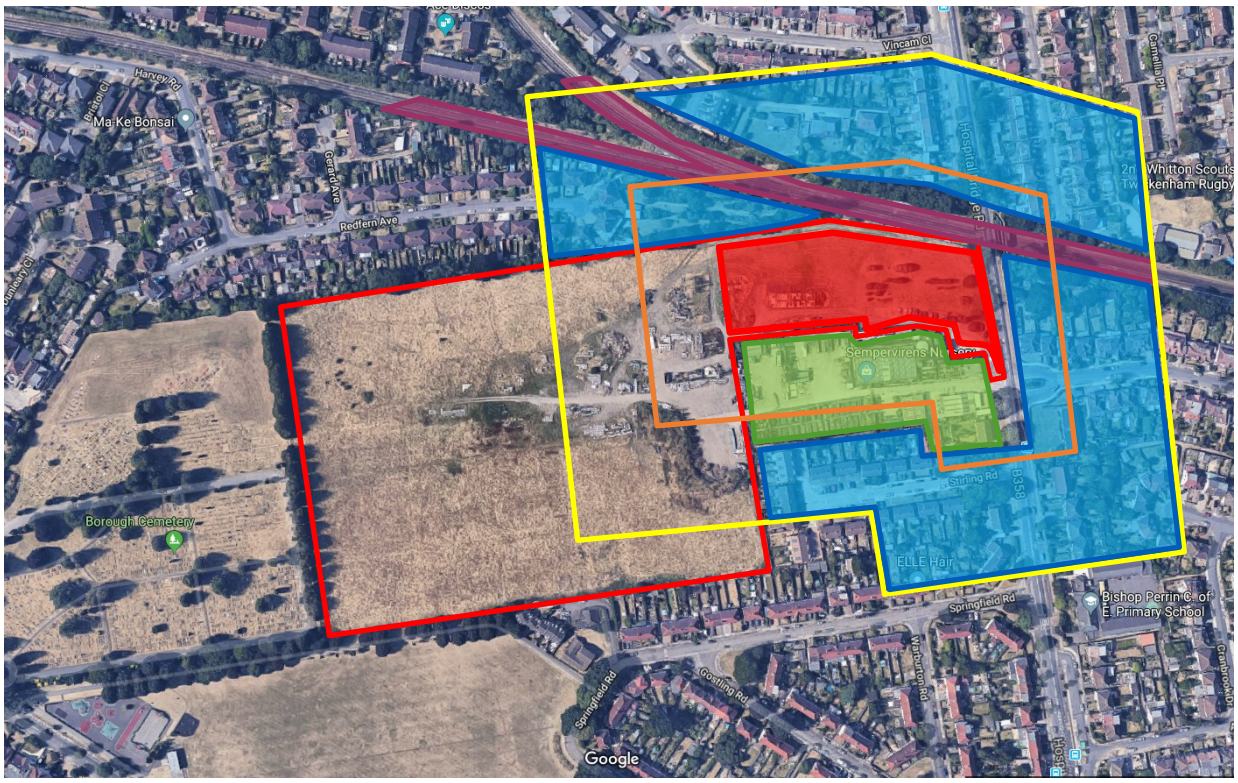
The plan below identifes the receptors within 50m and 100m from the site boundary that may be impacted by construction activites with regards noise and vibration.



- Site Boundary
- 50m
- 100m
- Residential Receptor
- Commercial Receptor
- Network Rail
- Recreational / Other

4. Receptors

The plan below identifes the receptors within 50m and 100m from the main construction area that may be impacted by construction activites with regards noise and vibration.



Site Boundary

50m

100m

Main Construction Area

Residential Receptor

Commercial Receptor

Network Rail

4. Receptors

The following tables summarises impacts and predictions of vibration based on risk to the recptors on and around the development sites which may be impacted by Bowmer and Kirkland's operations and the overall risk to receptors from noise, dust and vibration from the development activiies.

Area Sensitivity

Receptor	Area of Sensitivity 50m from Site Boundary		Area of Sensitivity 100m from Site Boundary	
	Noise	Vibration	Noise	Vibration
Residential	Medium	Medium	Low	Low
Commercial	Medium	Medium	Low	Low
Network Rail	Low	Medium	Low	Low
Other	Low	Low	Low	Low

General Construction Activities Risk Assessment

Construction Activity	Noise Emission Risk	Vibration Emission Risk
Cut & Fill	Medium	Medium
Foundations (Beam and pad)	Medium	Low
Working Platform	Medium	Medium
Structural Steel	Medium	Low
Floor Slabs (pre-cast planks)	Low	Low
Floor Slabs (Power Floating)	Medium	Low
Floor Slab (Skip Floating)	Low	Low
SFS Frame	Medium	Insignificant
Cladding & Roofing	Low	Insignificant
Fitout	Low	Insignificant
Soft Landscaping	Medium	Low
Hard Landscaping	Medium	Medium

5. Noise Management

5. Noise Management

To minimise impacts caused by noise during construction, Best Practise Means will be employed in accordance with BS5228:2009 Part 1 during each phase of the project.

Working Hours

Working hours for construction activities on project will be restricted as follows:
Construction: 08:00 – 18:00 Monday to Friday
Construction: 08:00 – 13:00 Saturday
There will be no construction works on Sundays or Bank Holiday.

Where construction activities may exceed these working hours then the Local Environmental Health Officer will be notified in writing at least 5 days prior to the works commencing. Newsletter will also be sent to local residents.

Delivery Hours

The following section details the restriction of delivery times imposed on “Large Construction Vehicles” and “General Construction Vehicles”. The logic behind these times is to avoid Large Construction Vehicles being in close proximity to school children during the times when they are arriving and leaving the schools.

Large Construction Vehicle Delivery Times:

Monday to Friday 09:30 - 15:00 and 16:30 to 18:00

Saturday 08:00 to 12:00

Bank Holidays and Sunday No works or deliveries

General Construction Vehicle Delivery Times:

Monday to Friday 09:30 -18:00

Saturday 08:00 to 12:00

Bank Holidays and Sunday No works or deliveries

Community Liaison

The relationship with people working and living in the vicinity of a construction site is of paramount importance. It is essential that early communication with local residents is established and that this communication is maintained throughout the project, this can in the form of direct meetings / house visits or posting of newsletters.

The initial communication with local residents should include information about the project, and details of who the point of contact for the project.

Throughout the project regular updates in the form of project newsletters are to be sent to all local residents (recommend to include all properties within 100m of the site). Where specific higher risk residents are identified (i.e. those located directly next to the site boundary) then more regular communications maybe required.

General Community information will be displayed using a community notice board located on the site hoarding.

5. Noise Management

Noise Monitoring

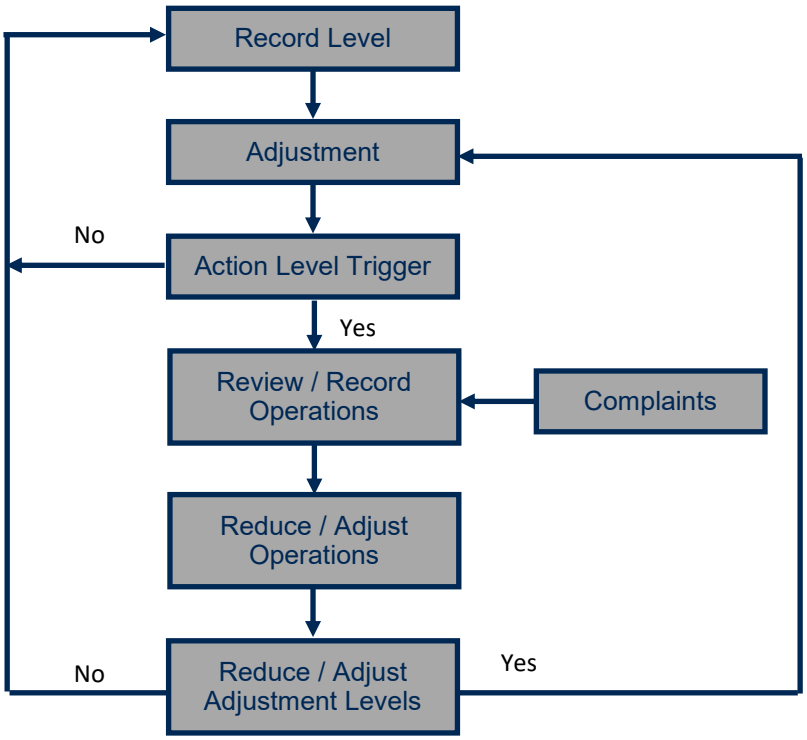
Active and Daily noise monitoring will be carried out for the sensitive receptors nearby and records maintained. Where necessary for particularly high risk sites continuous monitoring stations maybe installed to give regular data on noise emissions and allow action and warning limits to be set.

BS 5228:2009 Part 1 Significance Criteria			
Assessment category and threshold value period (LAeq)	**Threshold value, in decibels (dB)**		
	Category A	**Category B**	**Category C**
Night-time (23:00-07:00)	45	50	55
Evenings (19:00-23:00 weekdays) and Saturdays (13:00-23:00)	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75

Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.
Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.
Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

A baseline noise survey has been carried out and report issued to the LPA as part of the planning application, dated 5th July 2017 by SRL Technical Services Ltd, this identified a baseline level of between 60-65dB.

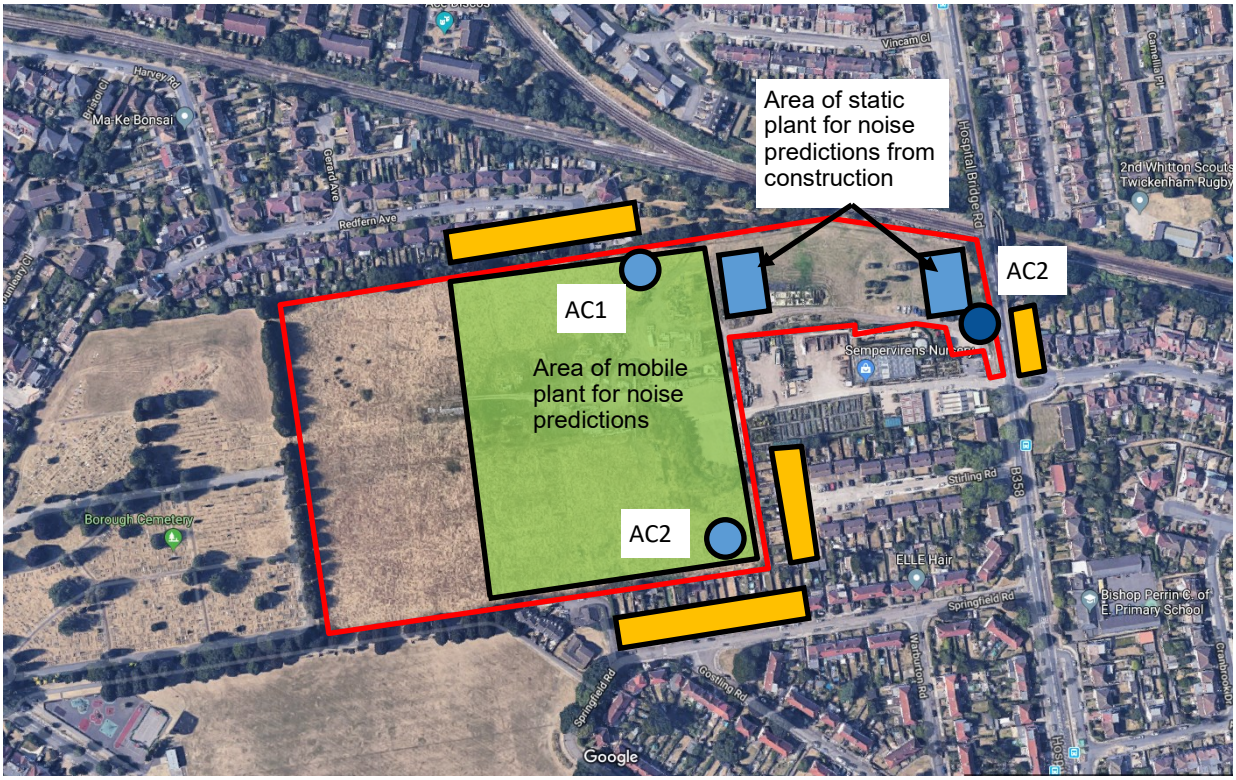
Noise Monitoring and Action Process



5. Noise Management

Noise Monitoring Plan

Active Noise Monitoring Locations:



Receptors for Noise Prediction Assessment

Proposed Active Noise Monitoring Locations:

- AC1 - North Boundary (during site clearance and Construction)
- AC2 - South Boundary, (during site clearance)
- AC2 - Moved to East Boundary (start of construction phase)

The noise meters will be removed following a review of the recorded data were it demonstrates the noise emissions are not at a level to cause complaints from the local community.

When active meters are removed B+K site Management will continue with daily site noise meter readings at the locations defined for the remained of the project.

Adjustment and Trigger Levels

Based on the higher background levels of 65dB (SRL Baseline noise survey) a trigger level of 70dB(a) is to be set, should this level be exceeded then review of current operations at that time will be carried out to determine the source of the noise and the expected duration. Where necessary additional noise controls will be implemented and noise levels monitored.
In addition to the above a first Action Trigger level of 73 decibels (LAeq, 1hr) will be set to ensure daily levels are within the 70 decibels (LAeq, 10hr) level.

Predicted Noise Levels

Predictions for noise from both mobile and static plant has been carried out as per BS5228:1 see following tables (pages 13 & 14).

For mobile plant the noise from site clearance and earthworks to the sports pitch and the distance to the nearest receptor have been used.

Noise Predictions for Mobile Construction Activities (BS5228:1)

Construction Activity	Plant Type	LAeq at 10m (BS 5228:1)	Nearest Receptor	Distance from site boundary	Adjustments			Resultant Laeq	Correc-tion to LAeq	Calculated Activity LAeq
					Distance (-dB)	Screen-ing (-dB)	Reflection (+dB)			
Site Clearance	Tracked excavator (16t)	79	Rear of properties Sterling Road / Springfield Road	21	35	5	3	42	12	30
Site Clearance	Tracked excavator (16t)	79	Rear of properties Redfern Avenue	16	28	5	3	49	12	37
Site Clearance	Tracked excavator (16t)	79	Front of properties Hospital Bridge Road	19	33	5	3	44	12	32
Earthworks (sports pitch)	Roller	79	Rear of properties Sterling Road / Springfield Road	21	35	5	3	42	12	30
Earthworks (sports pitch)	Roller	79	Rear of properties Redfern Avenue	16	28	5	3	49	12	37
Earthworks (sports pitch)	Tracked excavator (15t)	73	Rear of properties Sterling Road/ Springfield Road	21	35	5	3	36	12	24
Earthworks (sports pitch)	Tracked excavator (15t)	73	Rear of properties Redfern Avenue	16	28	5	3	43	12	31
Earthworks (sports pitch)	Dozer 20t	81	Rear of properties Sterling Road / Springfield Road	21	35	5	3	44	12	32
Earthworks (sports pitch)	Dozer 20t	81	Rear of properties Redfern Avenue	16	28	5	3	51	12	39

Noise Predictions for Static Construction Activities (BS5228:1)

Construction Activity	Plant Type	LAeq at 10m (BS 5228:1)	Nearest Receptor	Distance from Nearest Construction activity	Adjustments			Resultant LAeq	Correction to LAeq	Activity LAeq
					Distance (-dB)	Screening (-dB)	Reflection (+dB)			
Lifting operations	50t Crane	67	Properties Hospital Bridge Road adjacent to site	35	10	5	3	55	1	54
Materials move-ment	Telehandler	79	Properties Hospital Bridge Road adjacent to site	35	10	5	3	67	4	63
Site generator	Site Generator	66	Properties Hospital Bridge Road adjacent to site	33	10	5	3	54	1	53
Access (working at height)	Scissor Lift	78	Properties Hospital Bridge Road adjacent to site	56	13	5	3	63	4	59
Concrete Pours	Truck mounted Concrete Pump	81	Properties Hospital Bridge Road adjacent to site	68	15	5	3	64	1	63
Floating Concrete	Power Float	72	Properties Hospital Bridge Road adjacent to site	68	15	5	3	55	2	54
Lifting operations	50t Crane	67	Rear of properties Redfern Avenue	62	14	5	3	51	1	50
Access (working at height)	Scissor Lift	78	Rear of properties Redfern Avenue	62	14	5	3	62	4	58
Concrete Pours	Truck mounted Concrete Pump	81	Rear of properties Redfern Avenue	62	14	5	3	65	1	64
Floating Concrete	Power Float	72	Rear of properties Redfern Avenue	62	14	5	3	56	1	55

5. Noise Management

Noise Mitigation Measures - General

The quietest and lowest impact processes that are reasonably practicable will be employed on -site in the undertaking of all construction works. Measures that can be implemented as a means of minimising noise include:

Construction Methods

- Consideration of alternative construction methods for high risk activities.
- Use of enclosures.
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise;
- Keep internal haul routes well maintained and avoid steep gradients;
- Minimize drop height of materials;
- Radios and other noise-generating devises are not permitted on site.
- Keep voices and conversation outside of the perimeter of the Site to a minimum and low in volume.
- Use of work equipment designed to reduce noise such as oil pulse impact drivers for steel erection.
- SFS Frame, noise controls on the cutting of the SFS will be required due to works being undertaken on floors with no noise attenuation. Cutting booths or enclosure will be enforced.
- Local residents will be advised of the start and finishing dates and times (particularly noisy works such as site clearance) and these will be timed to minimise the disruption to local residents as far as possible.
- Power floating although the prediction noise impact is low compared to normal daily background levels, as works carry the risk of exceeding working hours, the impact would be greater.

Site Plant

- The quietest vehicles, tools and machinery shall be used as far as is reasonably practicable
- Avoid unnecessary revving of engines and switch off equipment when not required;
- Start up plant and vehicles sequentially rather than all together
- No machinery will be permitted to start up on-site before 08:00.
- No engines left running whilst vehicles are stopped on-site;
- Local residents will be advised of the start and finishing dates and times of particularly noisy works such as site clearance) and these will be timed to minimise the disruption to local residents as far as possible.

Enclosures

The use of enclosures can significant reduce noise, these range form localised enclosures to the erection of noise reducing fence around larger activities. Enclosures will be designed in accordance with BS5228:2009 Part 1, appendix B.

Examples of Enclosures:

Plant	Enclosure Type	Noise Reduction
Site Generators	Ventilated acoustic enclosure	Up to 20dB
Pneumatic breakers, drills	Portable or Fixed enclosure	Up to 20dB
Rotary Drills, Diamond Drilling	Ventilated Acoustic Shed	Up to 15dB
Pumps	Acoustic enclosure with allowance for engine cooling and exhaust	Up to 20dB
Large Plant	Acoustic Screen / Fence	Dependant on design

5. Noise Management

Noise Insulation and Temporary re-housing

Bowmer and Kirkland will implement BPM to ensure the noise limits as defined in the table below are met. This NVMP acknowledges that BS 5228 Part 2 provides for noise insulation and/or temporary housing where, despite implementing BPM, the trigger levels exceeded.

Annex E of BS 5228-1 provides criteria for the assessment of significance of construction noise. Exceedances of threshold levels trigger a responsibility on the developer to provide noise insulation or a scheme to facilitate temporary rehousing. This represents additional protection for a residential property in the event that it is not practical to mitigate construction noise on site, or reduce its exposure durations to tolerable levels.

The standard suggests that noise insulation should be provided if the trigger levels shown in table below are predicted to be exceeded for a period of ten or more days of working in any 15 consecutive days, or for a total number of days exceeding 40 in any six month period.

Where noise levels at affected residential properties are expected to exceed the trigger levels for the periods defined in the table below and where the temporal criteria is met, approved noise insulation, (or reimbursement of the reasonable costs thereof), or temporary re-housing of occupants as appropriate, will be offered. Affected parties will be notified in advance of the commencement of works which may cause the relevant trigger levels to be exceeded.

Noise insulation or temporary re-housing will be offered to qualifying parties when noise levels are predicted, or measured, to exceed:

a. the relevant trigger levels. or

b. where the current ambient noise level is greater than the noise insulation trigger level:

   - the ambient noise level shall be used as the noise insulation trigger level; and
   - the ambient noise level +10dB shall be used as the temporary re-housing trigger level.

Noise insulation (or the reasonable costs thereof against agreed bills) will be offered to owners, where applied for by owners or legal occupiers, if all of the following apply to a property lawfully occupied as a permanent dwelling:

a. The predicted noise level exceeds the noise trigger level for noise insulation at the property during at least ten days out of any period of fifteen consecutive days or alternatively during 40 days in any six month period;

b. Noise insulation does not already exist that is of an equivalent standard to that which would be allowed for under the Noise Insulation Regulations 1975; and

c. The property complies with all other requirements of the Noise Insulation Regulations 1975.

Temporary re-housing (or the reasonable costs thereof) will be provided, where applied for by legal occupiers, if both of the following apply to a permanent dwelling:

a. The predicted noise level exceeds the noise trigger level for temporary rehousing at that property for at least ten days out of any period of 15 consecutive days or alternatively 40 days in any six month period; and

b. The property complies with all other requirements of the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996.

The noise insulation and temporary re-housing policy is primarily applicable to residential buildings; however non-residential buildings will be considered on a case by case basis where these are occupied by noise sensitive uses such as hospitals and educational establishments.

Day	Relevant time period	Averaging time T	Noise insulation trigger level, dB LAeq,T	Temporary rehousing trigger level, dB $L_{Aeq,T}$[1]
Monday to Friday	0700-0800	1 hour	70	80
	0800-1800	10 hour	75	85
	1800-1900	1 hour	70	80
	1900-2200	3 hour	65	75
	2200-0700	1 hour	55	65

Note 1) Equivalent continuous A-weighted noise level predicted or measured at a point 1m in front of the most exposed windows or doors leading directly to a habitable room (living room or bedroom) in an eligible dwelling.

6. Vibration Management

B+K

6. Vibration Management

Introduction

Bowmer and Kirkland will seek to maximise any opportunities to influence the decisions made during the design stage of construction projects to reduce the levels of vibration leaving site or impacting on existing structures. Where possible, vibration will be minimised through design, specification and the use of alternative methods particularly where there are sensitive receptors adjacent to the works, e.g. schools, public areas, sites of special scientific interest (SSSI's) and listed buildings.

Vibration Risks

- High vibration levels over sustained periods can cause damage to buildings, roads and utilities.
- Lower vibration levels can cause nuisance to residents.
- Vibration may also cause disruption to wildlife and damage to geological and archaeological sites.
- Vibration is a safety critical issue adjacent to railway lines.

Evaluate the Potential for Vibration

- Identify what is on or around the site which may be affected by vibration.
- Obtain dilapidation surveys for sensitive structures.
- Some construction activities will cause significant vibration through the ground, e.g. piling, plant and vehicle movements.
- The transmission of vibration is highly dependent upon ground conditions, where there is underlying sloping hard strata this can transmit vibration underground undetected for several hundred metres until the strata is nearer the surface.
- Activities causing low levels of vibration could become significant in occupied buildings / work on party walls, e.g. power floating, minor demolition and strip out. This can become an issue for sensitive building occupiers, e.g. libraries, laboratories.
- Liaise with Regulatory bodies and other interested parties including Network Rail, English Heritage, TFL, Environment Agency, Natural England etc. (there may be time / seasonal restrictions).
- Monitor conditions before work starts for sensitive structures / neighbours – take photographs.

Construction Vibration Assessment Criteria - Overview

BS 5228-2:2009 'Code of practice for noise and vibration control on construction and open sites – Part 2', gives guidance on vibration levels that could be used to assess the likely impacts of construction activities, including piling, on the environment and people. The main vibration impacts could arise from piling activities or heavy construction vehicle movements near sensitive receivers (typically within 20m).

Annex B of BS 5228 Part 2 gives guidance on the significance of vibration effects in terms of human response to vibration and structural response to vibration.

BS5228 Part 2 Guidance on Human Response to Vibration Levels

Vibration Level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration
0.3 mm/s	Vibration might be just perceptible in residential environments
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation is given to residents
10 mm/s	Vibration is likely to be intolerable for any more than a brief exposure at this level

BS5228 Part 2 Transient vibration guide values for cosmetic damage

Type of Building	Vibration Level 4 Hz to 15 Hz	Vibration Level > 15 Hz
Reinforced or framed structures Industrial	50 mm/s at >4 Hz	50 mm/s at >4 Hz
Heavy commercial buildings		
Unreinforced or light framed structures	15 mm/s at 4 Hz increasing to 20 mm/s at 15Hz	20 mm/s at 4 Hz increasing to 50 mm/s at 15Hz
Residential or light commercial buildings		

7. Vibration Management

Vibration Predictions

As per Annex E of BS 5228-2 with regards predictions of vibrations, due to the foundation design being beam and pad with no piling operations being carried out, and therefore the requirement for vibration predictions is not applicable.

Vibration Monitoring

Vibration monitoring will be carried out for the initial site clearance and earthworks, where it is confirmed that vibration levels are well below the proposed trigger level of 1.0mm/s that further monitoring of the remainder of the project would not be required, this will be agreed with the EHO prior to commencing works.

A trigger level of 1.0mm/s is proposed by B+K. Where active monitoring during earthworks and foundations works, where recorded data shows that the trigger of 1.0mm/s is not be exceed then active monitoring will no long be required, for the construction phase due to reduce risk from construction methods.

Vibration Mitigation

- Choose appropriate working methods when working adjacent to sensitive areas or structures.
- Inform Neighbours - consult residents or workers in the vicinity of the works to explain the type and duration of the works.
- Schedule the work to avoid particularly sensitive times.
- Monitor vibration levels during the works for sensitive structures / neighbours.
- Monitor conditions after works are completed. Results should be compared to the pre-condition surveys – take photographs.
- Consider vibration caused by plant and vehicles when establishing traffic management – early black topping / provision of engineered haul roads can significantly reduce vibration from traffic movements.

Proposed vibration monitoring locations

South Boundary (monitor will then be moved to east boundary for construction)

North Boundary

East Boundary (Monitor moved from the south boundary)

7. Implementation and Review

7. Implementation & Review

The control measures identified in the NVMP, and sub-ordinate documentation, will be implemented by the following means:

- Relevant information will be communicated to sub-contractors before an order is placed during a pre-contract meeting. An order will only be placed with a sub-contractor following a commitment that they will work to the control measures specified. Where they are required to appoint specific plant, equipment or specialist resources this will be stated in their contract.
- Sub-contractors will be required to submit a detailed method statement for all works they undertake stating detailed control measures. This will be reviewed and authorised by the Site Manager prior to the commencement of operations.
- All sub-contractors will be required to monitor their own works and provide a permanent on-site Supervisor. Where many operatives are provided Supervisors will be required at a ratio of 1:8 with site operatives.
- All site operatives will be required to attend a site induction before undertaking any work. The induction will be conducted by the Site Manager and will include all control measures site operatives are required to work to.
- Access and egress from the site for operatives and deliveries / collections will be controlled by a gateman who will be supervised by the Site Managers.
- The Site Managers will walk the site daily to monitor the works and implementation of the specified controls. Where actions are required to further implement controls these will be raised with the sub-contractor's supervisor. If required they may use a red / yellow card disciplinary and or toolbox talks to improve the implementation of the specified controls.
- Any incidents or visits from regulators will be reported to the Environmental Manager by the Site Manager.

In addition to the monitoring described above, the implementation and effectiveness of controls will be reviewed as follows:

- The Site Manager will conduct an inspection on general good order and security on a daily basis.
- The Site Manager will conduct an inspection of all environmental controls on a fortnightly basis, this will be alternated with the external inspection described below.
- RG Wilbrey Consultants will conduct an inspection of all environmental controls on a fortnightly basis.
- The Contracts Manager or Regional Director will conduct an inspection of environmental controls on a monthly basis.
- The Environmental Manager will ensure the project will be audited for compliance with our Environmental Management System, controls which have been specified and legal requirements at least once during the project.
- A project meeting will be held on a monthly basis, to be attended by the Site Manager and Contracts Manager, to review the results of the above monitoring and inspections. The effectiveness of the specified controls will be considered and any actions required to improve the overall environmental performance of the project agreed and documentation updated accordingly.

Appendix A - Quality, H&S and Environmental Policies

B+K

Quality Policy

Bowmer + Kirkland are dedicated to achieving the highest possible level of Client satisfaction in everything we undertake. Over time, the company has grown substantially and adapted to suit many differing circumstances, but the underlying principle of Client satisfaction has never changed.

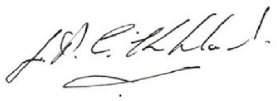
Throughout the Bowmer + Kirkland Group we recognise the importance of developing our business through continued improvements in quality. By consistent and effective implementation of a robust Quality Management System, we believe that we can add value to the project development process for the benefit of our Clients. During this process our objectives are to meet specific project requirements, and to exceed Client expectations.

To achieve quality performance on our construction projects, we are committed to operating and maintaining a certified Quality Management System that complies with ISO 9001: 2015. To promote efficiency this is part of an Integrated Management System which also complies with ISO 14001: 2015 (Environmental) and OHSAS 18001: 2007 (Health & Safety).

- In support of high quality performance through our Quality Management System, we have set the following strategic aims:
- Ensure that all employees remain dedicated to looking after our Clients' best interests.
- Develop the skills, knowledge and capability of all existing and new employees so that we can successfully meet the changing needs and expectations of our Clients and other interested parties.
- Monitor the effectiveness of our Quality Management System and set high standards on all projects undertaken by the company.
- Set clear Quality objectives and targets that are regularly reviewed to enable continual system improvements.
- Communicate essential objectives and targets to all employees to ensure that our quality ethos permeates the entire company.
- Continually review and develop our Quality Management System working procedures to support company objectives.

This Quality Policy, together with our Management System, will be periodically reviewed to ensure their continued suitability within an ever-changing industry.

Signed:



J A C Kirkland - Chairman
Date: 1st January 2019

Health & Safety Policy

Policy Statement

Bowmer + Kirkland is a family owned business and promotes family values. We wish to maintain workplaces where everyone is valued, all views are listened to and a safe and healthy working environment is the norm and not the exception by taking a sensible, positive approach to health & safety.

We endeavour to help everyone in our business to work safely, prevent unsafe or poor work practices and deliver a successful project. Our clients are at the heart of everything we do and their total satisfaction is our goal.

We are committed to creating a future free of incidents, injuries and ill health as a result of our activities and we take pride in everyone returning home safely every day;

Documented arrangements are maintained in our Health & Safety Management System based upon OHSAS 18001:2007 and the Company's operational procedures. Compliance and continual improvement are achieved by effective implementation of this Policy and monitoring and audit to evaluate performance and progress. The Group Health & Safety Policy is reviewed on an annual basis and monitoring the implementation of this Policy is supported by the Group Director of Health & Safety and his Team.

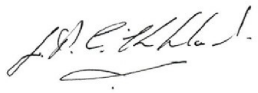
We embrace the principles of leadership, responsibility and accountability. All the Group Companies' Directors acknowledge their responsibility for successful implementation of the Health & Safety Policy and for promoting the continual improvement of Health & Safety within the Company.

The Group expects and requires all levels of Management and Supervision to actively initiate and pursue ways and means of making the working environment as safe and healthy as possible.

All workers including our employees and subcontractors are expected to comply with legal, moral and company safety requirements. Good safety behaviour is admired, respected and recognised across the organisation.

Proper management of Health & Safety is critical in the future development of the Company and in safeguarding its reputation. Attitude and behaviour, not just statistics, are a measure of success. Our business welcomes those who support our values and vision and are willing to work with us – without compromise on safety.

Signed:



J A C Kirkland - Chairman Date - January 2019

Environmental Policy

Bowmer + Kirkland are committed to promoting the conservation and sustainable use of natural resources, to preventing environmental pollution and to promote energy efficiency in all of its own construction activities and those of its sub-contractors and suppliers.

To achieve a high standard of environmental performance on our construction projects and related operations, we are committed to operating and maintaining a certified Environmental Management System that complies with ISO 14001: 2015. To promote efficiency this is part of an Integrated Management System which also complies with ISO 9001: 2015 (Quality) and OHSAS 18001: 2007 (Health + Safety).

It is the general policy, therefore, to:

Minimise any potential effects on the environment arising from site operations

Liaise with our Clients on any potential environmental and sustainability issues and work with them to address issues and concerns

Set clear environmental objectives and targets that are regularly reviewed to enable continual improvement in our overall environmental management performance

Provide appropriate training for our employees

Foster a constructive working environment through liaison with government and other interested parties, together with the communities in which we work.

- Conserve energy through minimising consumption, maximising efficiency and monitoring our carbon emissions
- Develop management processes and operational procedures to prevent pollution and enable compliance with environmental laws, regulations, codes of practice and other relevant obligations
- Minimise the use of materials which may be harmful to the environment
- Promote efficient purchasing which will avoid waste, incorporate sustainable materials and allow for materials to be recycled at the end of building life.
- Employ sound waste management
- practices and encourage the efficient use of materials
- Promote prudent environmental practice in design
- Recognise and encourage the contribution every employee can make towards improving the Company's environmental performance

This Environmental Policy, together with our Management System, will be periodically reviewed to ensure their continued suitability within an everchanging industry.

Signed:

J A C Kirkland - Chairman
Date 1st January 2019

Appendix B - Management System Certificates

B+K

012

CERTIFICATE OF REGISTRATION

This is to certify that

Bowmer & Kirkland Group
High Edge Court
Heage
Belper
Derbyshire
DE56 2BW

has been audited and found to meet the requirements of standard
ISO 9001:2015 Quality Management System

Scope of certification

Building Contracting, including Design & Build.
Property Refurbishment, Fit Out and New Build Contractor, including Design & Build.

Certificate number: C1000

Issue number: 2017-01

Certificate start date: 19 February 2017

Certificate expiry date: 18 February 2020

Date of initial certification: 1 September 2000

Karen Prendergast
Sector Director - Certification
Exova BM TRADA

CERTIFICATE OF REGISTRATION

This is to certify that

Bowmer & Kirkland Group
High Edge Court
Heage
Belper
Derbyshire
DE56 2BW

has been audited and found to meet the requirements of standard
ISO 14001:2015 Environmental Management System

Scope of certification

Building Contracting, including Design & Build.
Property Refurbishment, Fit Out and New Build Contractor, including Design & Build.

Certificate number: 1133

Issue number: 2017-01

Certificate start date: 19 February 2017

Certificate expiry date: 18 February 2020

Date of initial certification: 19 February 2008

Karen Prendergast
Sector Director - Certification
Exova BM TRADA

012

CERTIFICATE OF REGISTRATION

This is to certify that

Bowmer & Kirkland Group
High Edge Court
Heage
Belper
Derbyshire
DE56 2BW

has been audited and found to meet the requirements of standard
(BS) OHSAS 18001:2007 Health & Safety Management System

Scope of certification

Building Contracting, including Design & Build.
Property Refurbishment, Fit Out and New Build Contractor, including Design & Build.

Bowmer & Kirkland Group is deemed to satisfy and is registered to the SSIP Accredited Registered Scheme, which covers all OHSAS 18001 certified sites detailed in this certificate, for the duration of this certificate and for the following CDM categories (Designer, Principal Contractor and Principal Designer). This certificate on its own should not be considered evidence of registration. To verify this organisations registration please go to the SSIP Portal: http://www.ssipportal.org.uk/Home

SSIP SAFETY SCHEMES IN PROCUREMENT

Karen Prendergast
Sector Director - Certification
Exova BM TRADA

Certificate number: 304

Issue number: 2017-01

Certificate start date: 19 February 2017

Certificate expiry date: 18 February 2020

Date of initial certification: 16 June 2009

Planet Positive verifies that Bowmer & Kirkland have aligned their Social Responsibility Policy, Procedures & Practices with ISO 26000:2010

Steve Malkin, CEO Planet Positive
1st May 2012

Planet Positive

ISO 26000:2010 - Social Responsibility

Bowmer & Kirkland's Social Responsibility Policy, Procedures & Practices encapsulate the seven fundamental core principles of social responsibility:

Organisational Governance	*Ensuring that an organisation has an effective system and structure in place to implement its social responsibility policies.*
Human Rights	*The guarantee that Bowmer & Kirkland respects the fundamental rights of the people that it interacts with. It means, for example, promoting equal opportunities and diversity.*
Labour Practices	*Practices to ensure that the health and wellbeing of Bowmer & Kirkland's employees and those working on behalf of B&K are safeguarded, that they are well trained and receive opportunities for development.*
The Environment	*Stems from the recognition that businesses have an impact on their environment, both directly and indirectly. Puts procedures in place to minimise this and wherever possible have a positive impact.*
Fair Operating Practices	*Commits Bowmer & Kirkland to ethical, honest and fair transactions with other parties. Also promotes harmonious working practices bewteen management and Bowmer & Kirkland's employees.*
Consumer Issues	*Gives consumers the confidence that Bowmer & Kirkland have their best interests at heart. Focused primarily on B&K delivering complete customer satisfaction.*
Community Involvement & Development	*Acknowledges the important role that Bowmer & Kirkland plays in the wider community and that Bowmer & Kirkland can promote positive community development through engagement.*

BSI British Standards

BOWMER KIRKLAND