

Technical note



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| Project: | Westnewton Bridge Scour Protection Works | To: | Peter Vickers, Will Davies |
| Subject: | Construction Phase Noise Impact Assessment | From: | Mark Underhill (Atkins) |
| Date: | 5 Jul 2016 | cc: | Dominic Bradley |

Introduction

This technical note provides a summary of the noise impact assessment undertaken for the proposed scour protection works at Westnewton Bridge, between Westnewton and Kirknewton, Wooler.

It is understood that the proposed works are subject to a planning condition which stipulates that a construction phase noise impact assessment shall be undertaken. The planning condition is reproduced below:

'Prior to the commencement of development a noise assessment using BS5228-1:2009+A1:2014 shall be submitted to, and approved in writing by, the Local Planning Authority.'

Site Description

Westnewton Bridge is located on the B6351 over College Burn, at National Grid Reference 390783E, 630384N. The site is located in a rural setting with the surrounding land use mainly comprising open fields and isolated residential properties. The nearest noise sensitive receptors to the proposed work site are:

- **Jamarus Lodge** – Situated approximately 55m to the north-east of Westnewton Bridge;
- **Old Station House** – Situated approximately 130m to the east of Westnewton Bridge;
- **North Eastern House** – Situated approximately 210m to the east of Westnewton Bridge; and
- **No. 1-8 Westnewton** – Situated approximately 245m to the west of Westnewton Bridge.

Figure 1 Site Location Plan



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Proposed Development

The Scheme comprises the repair to the channel invert below the bridge to protect it from scour. It also includes upstream river training works and minimal bank reprofiling downstream.

The invert protection requires the installation of 4.5m long steel sheet piles, located 5m upstream and downstream of the bridge. The channel between the piles is to be excavated to allow the installation of precast concrete slabs that will be tied into the existing bridge abutments and new piles with insitu concrete. The upstream training works consist of a combination of 3m timber and steel universal column piles that will be installed to form river training barriers.

The contractor intends to deploy the following plant and equipment to carry out the works:

Table 1 Primary Construction Plant Items

| Plant Item | Proposed Use |
|--|--|
| 34 tonne excavator using Movax vibratory piling attachment | Piling works to bridge and upstream training logs |
| 20 tonne excavator | Excavation of channel and augering of pile locations |
| 8 tonne excavator | Excavation of channel and concreting works |
| 10 tonne Dumper | Removal of arisings from excavations |
| All terrain forklift | Placing of precast units and transporting materials |
| Water pump | Removal of water entering construction areas |

The piling works will be undertaken using a combination of augering and vibratory techniques. Auger piling will be used to identify and go through any obstructions, with the vibratory piling following on.

The construction works are expected to have a total duration of 14 weeks. During this period, it is intended that the noisy construction work will only be undertaken during daytime hours, between 07.30 to 18.00 Monday to Friday, and 08.00 to 13.00 on Saturdays (where necessary). No work will be undertaken on Sundays or Bank Holidays.

Relevant Guidance

BS5228:2009(+A1:2014) - Code of practice for noise and vibration control on construction and open sites

BS5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' (BS5228) gives recommendations for basic methods of noise and vibration control relating to construction work. It also provides guidance concerning methods of predicting and measuring noise and vibration and assessing its impact on those exposed to it.

Department of the Environment Advisory Leaflet 72 'Noise control on building sites' is referenced within BS5228 and provides the following guidance on fixed limits for construction noise:

'Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut. Noise levels, between 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- 70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise;
- 75 decibels (dBA) in urban areas near main roads in heavy industrial areas.

These limits are for daytime working outside living rooms and offices. In noise-sensitive situations, for example, near hospitals and educational establishments - and when working outside the normal hours say between 19.00 and 22.00 – the allowable noise levels from building Sites will be less: such as the reduced

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values given in the contract specification or as advised by the Environmental Health Officer (a reduction of 10dB(A) may often be appropriate). Noisy work likely to cause annoyance locally should not be permitted between 22.00 hours and 07.00 hours.'

Assessment Methodology and Criteria

Construction noise predictions have been undertaken based on the methodology contained within BS5228. This has enabled predictions to be made of the noise emissions from the construction activities for given distances from the works. The assessment assumes:

- Source noise levels derived from BS5228 data;
- Geometric divergence over soft ground conditions to reflect local conditions;
- A +3 dB building façade correction; and
- No allowance for the acoustic screening provided by intervening structures

Based on a review of the contractor's programme, the following primary work stages have been considered to account for concurrent activities being undertaken on site.

Table 2 Primary Work Stages Considered in the Assessment

| Work Stages | Activities Undertaken |
|-------------|---|
| Stage 1 | Access road construction |
| Stage 2 | Sheet piling works adjacent to the bridge |
| | Excavation of the channel local to the bridge |
| | Placing of precast concrete units |
| | In-situ concreting works to fix precast units to piles and bridge abutments |
| | Over-pumping to remove water from the work areas |
| Stage 3 | Piling works for the upstream training logs |
| | Cutting down bridge sheet piles to required level |
| | Placing of precast concrete units |
| | Over-pumping to remove water from the work areas |

A daytime construction noise level above 70 dB $L_{Aeq,10hr}$ has been adopted as the threshold noise limit, above which there is potential for significant construction impacts to occur. Construction phase noise levels above 75 dB $L_{Aeq,10hrs}$ would constitute a significant adverse impact and therefore this is considered to represent an upper noise limit.

Predicted Noise Levels

Table 3 presents the predicted unmitigated noise levels (dB $L_{Aeq,10hr}$) for the primary construction activities to be undertaken in support of the Scheme. The noise levels are given for a notional setback distance of 10m, as defined in the BS5228.

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Table 3 Predicted Construction Phase Noise Levels at 10m Setback Distance

| Activity noise levels | Plant to be used | BS5228 Ref. | Estimated % on-time | No. in use | Noise level at 10m (dBA) | Combined Noise level at 10m (L _{Aeq,T} dB) |
|------------------------------------|----------------------------------|-------------|---------------------|------------|--------------------------|---|
| Access road construction | Tracked excavator | C.2.21 | 75 | 1 | 73 | 79 |
| | Dumper | C.4.4 | 50 | 1 | 76 | |
| | 4-axle wagon | C.2.34 | 10 | 1 | 73 | |
| Piling installation works | Vibratory piling rig | C.3.8 | 50 | 1 | 88 | 89 |
| | Auger piling - CFA rig | C3.22 | 50 | 1 | 80 | |
| | Telescopic handler | C.2.35 | 50 | 1 | 71 | |
| Excavation Works | Tracked excavator (22t) | C.2.21 | 75 | 1 | 73 | 78 |
| | Wheeled backhoe loader (8t) | C.2.8 | 75 | 1 | 70 | |
| | Dumper | C.4.4 | 50 | 1 | 76 | |
| Placing precast conc. Units | Telescopic handler | C.2.35 | 50 | 1 | 71 | 76 |
| | Lorry Delivery | C.6.21/23 | 10 | 1 | 74 | |
| Concreting Works | Wheeled backhoe loader (8t) | C.2.8 | 50 | 1 | 68 | 77 |
| | Conc. pump + cement truck | C.4.24 | 75 | 1 | 69 | |
| | Poker vibrator | C4.33 | 25 | 1 | 75 | |
| Cutting piles | Gas cutter (cutting top of pile) | C.3.34 | 75 | 1 | 70 | 70 |
| Over-pumping | Water pump | C.2.45 | 100 | 1 | 68 | 68 |

From the activity noise levels set out in Table 3, the cumulative noise levels have been predicted for the three construction work stages, which are presented in Table 4 below. These noise levels account for the separation distances between each activity and the nearest noise sensitive receptor (Jamarus Lodge).

Table 4 Predicted Receptor Noise Levels

| Work Stages | Activity | Approx. distance to nearest receptor (m) | Activity noise level (L _{Aeq,10hr} dB) | Combined Receptor Noise Level (L _{Aeq,10hr} dB) |
|----------------|--------------------------------|--|---|--|
| Stage 1 | Access road construction | 30 | 69 | 69 |
| Stage 2 | Bridge piling works | 55 | 72 | 73 |
| | Bridge excavation works | 60 | 61 | |
| | Placing precast concrete units | 60 | 58 | |
| | Concreting Works | 60 | 59 | |
| | Over-pumping | 70 | 49 | |
| Stage 3 | Training logs piling works | 85 | 67 | 68 |
| | Cutting down bridge piles | 55 | 53 | |
| | Placing precast concrete units | 60 | 58 | |
| | Over-pumping | 70 | 49 | |

It is evident from Table 4 that the highest noise levels are predicted to occur during Work Stage 2 at 73 dB L_{Aeq,10hrs}. The predicted noise levels during work stages 1 and 3 are both below the 70 dB L_{Aeq,10hrs} threshold criterion at the nearest noise sensitive receptor.

The dominant noise source during Work Stage 2 results from the sheet piling works associated with the bridge invert protection. The bridge sheet piling works are predicted to result in an exceedance of the 70 dB L_{Aeq,10hr}

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threshold criterion at Jamarus Lodge, albeit the predicted noise levels will not exceed the upper limit of 75 dB $L_{Aeq,10hrs}$. The bridge piling works are programmed to be undertaken over a 10 day period and therefore exposure to elevated noise levels will be limited in duration.

All other noise sensitive receptors in the vicinity of the site are predicted to experience construction induced noise levels below 70 dB $L_{Aeq,10hr}$, during all work stages. This is a function of the increased separation distances between source and receiver positions.

Mitigation

Due to the nature of the piling works, it will be difficult to introduce effective noise abatement measures for this activity i.e. an elevated source height and challenging location within the channel of the burn. Where practicable, the following mitigation measures will be adopted elsewhere to control the noise levels generated by the construction works.

Best Practicable Means

Best practicable means (BPM) as defined by the Control of Pollution Act 1974, should be implemented as part of the working methodology. This will serve to minimise the noise impacts at receptors in the vicinity of the construction works; the reduction in noise levels provided through the implementation of BPM varies depending on the nature of the works being undertaken.

Example BPM measures, a number of which would need to be implemented to minimise the construction phase noise are listed below:

- Plan working hours to take account of the effects of noise;
- Where reasonably practicable, adopt quiet working methods, using plant which generate lower noise and vibration levels;
- Locate plant away from noise sensitive receptors, where feasible;
- Use silenced and well-maintained plant;
- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained;
- Minimise drop height of materials;
- Start-up plant and vehicles sequentially rather than all together;
- Carry out regular inspections of noise mitigation measures to ensure integrity is maintained at all times;
- Provide briefings for all site-based personnel so that noise and vibration issues are understood and mitigation measures are adhered to;
- Manage plant movement to take account of surrounding noise sensitive receptors, as far as is reasonably practicable; and
- Use of acoustic enclosures for static items of plant that could cause a disturbance.

Community Liaison

Community liaison and communication throughout the construction phase should be undertaken to provide information to occupants of properties located in the vicinity of the construction works, to reduce the likelihood of noise complaints.

It is envisaged that the community liaison campaign would provide local residents with the following information:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractor's working hours;

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- Mitigation measures that have been adopted to minimise noise; and
- Contact details in the event of a disturbance.

Conclusion

A noise impact assessment has been undertaken for the proposed scour protection works proposed at Westnewton Bridge to address a planning condition.

Fixed noise limits have been defined for the construction work and an assessment of construction induced noise has been undertaken to determine whether there is potential for the noise criteria to be exceeded, which could give rise to complaints from occupants of the surrounding noise sensitive receptors.

The predicted noise levels generated by the works have been determined using the contractor's intended working methodologies and programme.

The assessment has identified that the installation of sheet piles 5m upstream and downstream of Westnewton Bridge have the potential to result in an exceedance of the recommended noise limit of 70 dB $L_{Aeq,10hr}$ at Jamarus Lodge, albeit the levels are predicted to be below the upper limit of 75 dB $L_{Aeq,10hr}$. All other construction activities are predicted to generate noise levels below the 70 dB $L_{Aeq,10hr}$ limit at the nearest noise sensitive receptor.

The bridge piling works are programmed to be undertaken over a 10 day period and therefore exposure to elevated noise levels will be limited in duration. All works are to be undertaken during daytime hours only i.e. no evening or night-time works are intended.

Mitigation measures have been introduced to minimise noise levels where practicable. This includes the adoption of BPM and an effective community liaison campaign.