BRIDGEWATER PRIMARY SCHOOL

ENVIRONMENTAL NOISE SURVEY

Acoustics Report A532/R07
23rd October 2012

Report for: Northampton Schools Ltd

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3rd Floor West
3-5 Barrett Street
W1U 1AY

Attention: Rowan Parnell

Prepared by: Chris Borak BSc MIOA

Checked by: David O'Neill BEng MSc CEng MIOA

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1 Introduction

Ion Acoustics is appointed by Architecture Initiative on behalf of Northampton Schools Ltd to provide acoustic advice on external noise in respect of potential expansion of a number of primary schools in Northampton. This report relates to an external noise assessment for a proposed new teaching block for Bridgewater Primary School in Northampton.

Requirement E4 of the Building Regulations applies to the acoustics of new school buildings and applies to this project. Detailed advice on meeting the Building Regulations Requirement E4 is provided in Building Bulletin 93 (BB93). This report relates only to environmental noise affecting the proposed new teaching block.

Ion Acoustics has carried out a noise survey at the site to determine baseline environmental noise levels. The results have been used to assess the implications for the ventilation strategy, building envelope sound insulation and compliance with the noise level performance standards in BB93. The results have also been used to determine suitable external plant noise limits for the proposed development. This report documents the survey findings.

2 Site Proposal

The proposal is to construct a new two storey teaching block to the north west of the existing main Bridgewater Primary School building. The new teaching block will likely comprise six classrooms, a multi-use hall and associated ancillary circulation and accommodation space. The current preferred location for the new block is shown in pink in Figure 1; a possible alternative location is shown in blue. This report comments on both locations in respect of external noise.

![Figure 1 – Proposed School layout and Survey Locations](image-url)
3 Site and Surroundings

Bridgewater Primary School, Figure 2, is in a predominantly residential area. Billing Road, 250m to the south east of the school, is relatively heavily trafficked with fast moving vehicles. An area of allotments immediately east of the school provides clear line of sight from the school to the road and therefore, road noise levels on the site are higher than they might be if the area between were built up. Also to the south east, 500m or more, is the A45 dual carriage way which is a heavily trafficked road. Of the possible sites for the new block, the location identified by the architects as preferred is also likely to be the quietest. Other roads around the site are relatively quiet residential streets.

Figure 2 – Aerial Photograph: Showing main noise source to south

4 The Building Regulations and Building Bulletin 93 (BB93)

Requirement E4 from Part E of Schedule 1 to The Building Regulations 2000 states:

"Each room or other space in a school building shall be designed and constructed in such a way that it has the acoustic conditions and the insulation against disturbance by noise appropriate to its intended use."
Approved Document E provides further information on complying with the Building Regulations and includes the following statement:

"In the Secretary of State’s view the normal way of satisfying Requirement E4 will be to meet the values for sound insulation, reverberation time and internal ambient noise which are given in Section 1 of Building Bulletin 93 ‘The Acoustic Design of Schools’, produced by DfES."

The performance standards indicated within Section 1 of BB93 should, therefore, form the basis for the acoustic design of new schools. Section 1.1 of BB93 states that:

"The overall objective of the performance standards in Section 1.1 is to provide acoustic conditions in schools that (a) facilitate clear communication of speech between teacher and student, and between students, and (b) do not interfere with study activities."

The BB93 standards and regulations are directly applicable to the following rooms and spaces:

- All teaching and learning spaces.
- Administration and ancillary spaces in as much as they affect adjacent learning spaces.
- Adult/Community education spaces (if any).
- Nurseries which are part of a school.

It is useful to note that meeting the numerical standards in BB93 is the normal method of complying with Requirement E4. However, if alternative standards can be demonstrated to be appropriate, then it can be acceptable not to comply with the numerical performance standards. This is subject to agreement with the school and the building control body. Section 1.2.1 of BB93 describes this process.

5 Noise Limits

5.1 External Noise Limits

BB93 gives fairly conservative advice on noise levels in respect of sites for new schools. Section 2.3 states: "If the noise measurement survey shows that the ambient external noise levels on the site are below 45 dB $L_{Aeq,30min}$, no special measures are likely to be necessary to protect the building or playing fields from external noise". However, sites below 45 dB $L_{Aeq}$ are rare in urban areas.

In terms of playgrounds and playing fields, BB93 states "Noise levels in unoccupied playgrounds, playing fields and other outdoor area should not exceed 55 dB $L_{Aeq,30min}$ and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50 dB $L_{Aeq,30min}$.”

Note that, the recommendations on noise levels in outdoor areas in BB93 do not form part of the Building Regulations and are, therefore, stated as non-mandatory guidance only. The $L_{Aeq,30min}$ index is defined as the equivalent steady-state noise level with the same energy as the actual fluctuating noise over the time period (in this case 30 minutes).
5.2 Internal Noise Limits

In schools which are naturally ventilated, the internal noise climate is determined by noise transmission from the exterior. For mixed mode or fully mechanically ventilated schools, the noise climate is a combination of the noise from mechanical services and from the exterior. A sound level difference of 10 dB is often assumed for a façade with open windows and, assuming an *internal* noise limit of 35 dB $L_{A_{eq}}$ as recommended for classrooms in Table 1.1 of BB93, this translates as a maximum external noise level of 45 dB $L_{A_{eq}}$ as stated in Section 2.3 BB93 (quoted above).

External noise levels at most urban school sites exceed 45 dB $L_{A_{eq}}$, and hence the application of the internal noise limits was revised in the Building Bulletin 101 “Ventilation in School Buildings” (BB101). BB101 states that where natural ventilation is provided, the BB93 noise limits must be maintained for ventilation rates of 3 l/s/person, but noise levels 5dB(A) higher are permitted at a ventilation rate of 8 l/s/person (i.e. with windows more fully opened). Therefore, naturally ventilated teaching rooms now effectively have two noise limits according to the ventilation rate. These are set out in Table 1 below for various rooms.

The ambient noise limits given in BB93 represent the combined noise levels from the following sources:

- External noise, e.g. traffic, railways, aircraft, industrial noise
- Mechanical services, e.g. Ventilation systems and Plant.

Noise sources excluded from the targets are:

- Teaching activities within the school premises including in playgrounds
- Equipment noise, e.g. from machine tools, computers, fume cupboards
- Rain noise – however, BB93 states that rain noise should be controlled so that it does not impinge upon the performance of the school. Numerical targets are not specified.
Table 1 – Internal Noise Targets derived from BB93 and BB101

<table>
<thead>
<tr>
<th>Room</th>
<th>Internal Noise Limit, $L_{Aeq,30mins}$ dB at ventilation rate of 3 l/s/person and for mechanical ventilation*</th>
<th>Internal Noise Limit, $L_{Aeq,30mins}$ dB at ventilation rate of 8 l/s/person (natural vent only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary classrooms, Class bases, General teaching areas, small group rooms</td>
<td>35 dB</td>
<td>40 dB</td>
</tr>
<tr>
<td>Nursery school playrooms and quiet rooms</td>
<td>35 dB</td>
<td>40 dB</td>
</tr>
<tr>
<td>Music Classroom</td>
<td>35 dB</td>
<td>40 dB</td>
</tr>
<tr>
<td>Assembly Hall</td>
<td>35 dB</td>
<td>40 dB</td>
</tr>
<tr>
<td>Library (Resource Area)</td>
<td>40 dB</td>
<td>45 dB</td>
</tr>
<tr>
<td>Classrooms* designed specifically for use by hearing-impaired students (including speech therapy rooms)</td>
<td>30 dB*</td>
<td>30 dB*</td>
</tr>
</tbody>
</table>

* - Note that no relaxation is permitted for these rooms
# - Note that with mechanical ventilation the room must meet the lower BB93 target at the design ventilation rate.

Hence, the general internal noise limit under natural ventilation conditions is $L_{Aeq}$ 35 or 40 dB depending on the ventilation rate for most teaching spaces. Note that, BB93 requires a lower limit of 30 dB $L_{Aeq}$ for rooms “specifically designed” for hearing-impaired pupils or for speech therapy and that no relaxation is permitted under BB101. We are not aware of any requirement for such rooms in the proposed new teaching block, but if there were, this must be brought to the attention of the designers and the specific room would be subject to the more onerous acoustic design criteria.

A window only slightly open and providing only background ventilation provides better sound insulation than one which is fully open. Therefore, taking 10 dB(A) at standard attenuation for an open window, sites which have external noise levels no greater than $L_{Aeq}$ 50 dB are demonstrably suitable for naturally ventilated teaching accommodation.

BB101 encourages the use of natural ventilation in schools. Where there are difficulties in meeting these limits BB101 suggests that “alternative performances standards” as permitted under Section 1.2.1 of BB93 may be appropriate, if agreed with the school and acoustic specialist. BB101 states in section 1.6.1:

*It is recognised that the acoustic needs of classrooms are stringent and may prevent the use of natural ventilation in some circumstances, even given the suggested addition of 5 dB to the requirements when providing external air at a rate of 8 l/s per person. Consequently, the designer is advised to refer to section 1.2.1 of Building Bulletin 93*
The aim of quoting this statement of ‘alternative performance standards’ for the acoustic requirements in this Building Bulletin on ventilation, is to allow some flexibility so that the ventilation requirements of schools can be met by natural means, wherever it is possible to maintain a level of acoustic performance that is deemed appropriate by the users of the school. It is intended that this will lessen the likelihood of an unwanted mechanical ventilation system being installed, incurring unnecessary capital and running costs.”

It is, therefore, recognised that the benefits of providing natural ventilation may, for some sites where noise levels are slightly above $L_{Aeq}$ 50 dB, outweigh the slightly increased internal noise levels. However, this would need to be accepted and approved as an “Alternative Performance Standard” following the procedures of BB93. Effectively the school must agree to accept the slight reduction in acoustic conditions.

6 Noise Survey

6.1 Procedure

The noise survey was carried out at the existing school site on 9th October 2012. All measurements were external. The measurement locations are shown in Figure 1. Measurement microphones were mounted on tripods at around 1.5m above local ground level and at least 3m from vertically reflective surfaces such as building façades or walls.

To properly assess the site background noise level in accordance with BB93 and BS4142 it is necessary to exclude activity noise from the existing school and any other non typical noise. The survey took place on a normal school day; therefore, the sound level meter was paused during periods of outdoor school activity.

6.2 Measurements

Measurements at both the attended locations were made in octave frequency bands using a SVANTEK 947 sound level meter. Measurements were generally in 10 minute intervals; however, some were cut short when, during attended monitoring, extraneous noises from school activity, including vehicle movements in the car park, were omitted as far as possible.

Measurements at the unattended location were made using a Norsonic Nor140 sound level meter which logged noise levels in ten minute intervals. As the meter was unattended, these measurements included all activity noise from the school.

The meters were calibrated using a Brüel & Kjær 4231 calibrator before and after the measurement period. No drift in the calibration level was noted.

6.3 Weather Conditions

The weather conditions for the survey were recorded using a hand held anemometer and thermometer and were as follows:

Average temperatures: 10°C
Wind Speed at microphone: 3 m/s
Wind direction: Easterly

There was no precipitation and weather conditions were conducive to successful noise monitoring.

6.4 Results – External Noise Levels

The measured noise levels for the two positions around the preferred site are given in Table 2 and 3, below.

**Table 2 – Attended Noise Survey Results**

<table>
<thead>
<tr>
<th>Start Time</th>
<th>Duration</th>
<th>$L_{Aeq}$, dB</th>
<th>$L_{A01}$, dB</th>
<th>$L_{A90}$, dB</th>
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<td><strong>53.3</strong></td>
<td><strong>58.2</strong></td>
<td><strong>47.8</strong></td>
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</tbody>
</table>

Note 1: The summary values are given as the energy average for $L_{Aeq}$, the arithmetic average for $L_{A01}$ and the lowest measured value for $L_{A90}$.
Table 3 – Unattended Noise Survey Results

<table>
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<tr>
<th>Start Time</th>
<th>Duration</th>
<th>$L_{\text{Aeq}}$ dB</th>
<th>$L_{A01}$ dB</th>
<th>$L_{A90}$ dB</th>
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<td>56.5</td>
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</tbody>
</table>

Summary: (Average/Minimum)$^1$

53.3 dB $L_{\text{Aeq}}$ 57.0 dB 47.5 dB

Note 1: The summary values are given as the energy average for $L_{\text{Aeq}}$, the arithmetic average for $L_{A01}$ and the lowest measured value for $L_{A90}$.

A further measurement was made at the alternative location to the southeast of the main school building. 55.8 dB $L_{\text{Aeq}}$ was measured at 18:33, this is 3dB more than the simultaneous measurement at the unattended location on the preferred site. Therefore, as expected, due to the proximity of the alternative location to Billing Road East, noise levels are higher than at the preferred location. It is noted that noise levels during the peak evening traffic flow period would be expected to be higher given the dominance of the road noise on this site.

From both the attended and unattended measurements at the preferred site, the typical measured noise level was $L_{\text{Aeq}}$ 53 dB. This shows that noise levels are uniform across the preferred site. The easterly wind on the day of the survey would have led to slightly higher noise levels then on days with the more typical south-westerly winds as the site is more exposed to road noise from the east. However, winds were light so the difference would have been small.

The noise source was characterised as distant free flowing road traffic noise, so was not of a particularly disturbing character.

7 Implications for Ventilation

The typical ambient noise level incident on the proposed teaching block at the preferred site is 53dB $L_{\text{Aeq}}$. Noise levels from road traffic at the alternative location under consideration at this stage will be 3dB higher than this.
The intention is to naturally ventilate the proposed buildings. Background ventilation of 3 l/s/p can be provided through small window openings where sound insulation of 15 dB(A) can be achieved. Hence under conditions with small openings, internal levels will be around $L_{Aeq}$ 38 dB.

With windows open to provide higher levels of ventilation (8 l/s/p) attenuation of 10dB(A) can be assumed through the façade. This will result in internal levels around 3dB above the $L_{Aeq}$ 40 dB limit obtained by applying the 5dB relaxation allowable under BB101 for naturally ventilated school buildings. Three decibels is often considered the minimum perceptible change in noise level, this is based on lab studies that asked people to compare steady noise levels and is not strictly applicable to the average level assessed here. However, this may be useful in communicating the significance of the exceedance should an alternative performance standard, as described in BB93, be sought by agreement with the school. During the prevailing south westerly or neutral wind conditions, slightly lower noise levels can be expected which may well achieve the BB93/BB101 limits.

The noise levels will be slightly above the BB93 limits and strictly to be acceptable with openable windows would require an Alternative Performance Standard. Alternatively if it is considered more appropriate to meet the limits reliably, then attenuated ventilation could be provided, perhaps in the form of attenuated roof vents.

Noise levels incident on the existing school building are similar to, or higher, than those on the site preferred for the proposed new teaching block. The ventilation of the existing school building is not known, however, if it is via openable windows then the school will already have a good idea if the resulting internal noise levels are suitable for them and whether they affect their teaching.

8 External Plant Noise Limits

It is unlikely that there will be any mechanical services plant associated with the new scheme, and therefore, there would be no need for control of external plant. However, if plant were added then the background noise levels measured can be used to determine the daytime plant noise limit at nearby sensitive receptors.

This could be a requirement under a planning condition, typically at the nearest housing, or under BREEAM if that were a project requirement. Under BREEAM 2011 Pol 05 the limit would apply at either nearby housing or other teaching blocks in the school.

The lowest background noise level measured during the day was $L_{A90}$ 47 dB and this can be used to set a relative plant noise limit.

We have consulted with Natasha Stanley, senior environmental health officer for Northampton Borough Council. She has advised that their current criteria for plant noise are as follows:

"Assuming the plant is emitting steady noise levels, whether it cycles on and off or not, we expect that the operational noise levels ($L_{eq,T}$) from that plant should be at least 6 dB below the minimum Background ($L_{90, i\text{new}}$), for the times of operation, at the nearest sensitive
location. This could be an amenity space for daytime or the proximity of a bedroom window for night time.

Ideally this should be specified in octave bands but if assessed on A-weighted levels then there should be a BS 4142 assessment that accounts for the character.”

Therefore in principle the plant limit to be would be 6 dB below the $L_{90}$ in each octave band, which is a relatively onerous criterion. It is not common to measure the background noise level in $L_{90}$ octave bands (particularly as many meters do not record this parameter). We have recorded spectral $L_{90}$ levels in some locations, but not all.

An alternative more standard criterion has been discussed and agreed with NBC; specifically that, should there be any plant, then its rating level according to BS 4142 should be 10dB(A) below the background noise level outside nearby housing or in gardens of housing or other relevant amenity areas. The noise limit would therefore be $L_{Ar}$ 37 dB.

The limit applies to the aggregate of all new plant operating

The BREEAM 2011 Pol 05 limit requires the rating level as defined by BS 7445 to not exceed the background noise levels, $L_{A90}$, by more than 5dB(A) outside nearby noise sensitive developments. Hence a limit of 52 dB(A) would also apply outside the existing school teaching room windows and at the nearby housing.

9 Summary

An external noise survey has been carried out at the existing Bridgewater Primary School in Northampton. The site is more exposed to road noise from the east and south east. Environmental noise levels on site comprise road traffic noise from local roads and distant trunk roads. Typical noise levels affecting the proposed building will be around $L_{Aeq}$ 53 dB during normal school hours. Based on this, the natural ventilation with openable windows will not reliably achieve BB93 and BB101 internal noise limits without additional attenuation and an alternative performance standard would need to be sought. The background noise levels measured have also been used to determine plant noise limits at the nearby sensitive receptors.
Bridgewater Primary School – Appendix A
Photos

Primary Attended Monitoring Location

Alternative Attended Monitoring Location

Unattended Monitoring Location
### Primary Attended Measurement Location - Octave Band Data

<table>
<thead>
<tr>
<th>Start Time</th>
<th>L(\text{Aeq}, \text{dB})</th>
<th>L(\text{eq})</th>
<th>63 Hz</th>
<th>125 Hz</th>
<th>250 Hz</th>
<th>500 Hz</th>
<th>1000 Hz</th>
<th>2000 Hz</th>
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<td>54.4</td>
<td>62.4</td>
<td>54.0</td>
<td>50.0</td>
<td>47.9</td>
<td>52.8</td>
<td>44.6</td>
<td>34.6</td>
<td>26.5</td>
</tr>
<tr>
<td>09/10/2012 17:30</td>
<td>54.0</td>
<td>54.0</td>
<td>57.8</td>
<td>53.3</td>
<td>48.4</td>
<td>47.5</td>
<td>52.8</td>
<td>43.1</td>
<td>27.7</td>
<td>21.5</td>
</tr>
<tr>
<td>09/10/2012 17:47</td>
<td>53.3</td>
<td>53.3</td>
<td>58.2</td>
<td>52.5</td>
<td>47.8</td>
<td>46.7</td>
<td>52.1</td>
<td>42.4</td>
<td>30.0</td>
<td>23.4</td>
</tr>
<tr>
<td>09/10/2012 17:58</td>
<td>54.3</td>
<td>54.3</td>
<td>56.6</td>
<td>54.6</td>
<td>48.3</td>
<td>48.2</td>
<td>53.0</td>
<td>43.8</td>
<td>29.3</td>
<td>20.7</td>
</tr>
<tr>
<td>09/10/2012 18:09</td>
<td>54.1</td>
<td>54.1</td>
<td>58.6</td>
<td>56.2</td>
<td>50.0</td>
<td>47.6</td>
<td>52.7</td>
<td>42.9</td>
<td>26.3</td>
<td>20.6</td>
</tr>
<tr>
<td>09/10/2012 18:19</td>
<td>53.8</td>
<td>53.8</td>
<td>56.5</td>
<td>52.2</td>
<td>48.6</td>
<td>47.8</td>
<td>52.6</td>
<td>42.6</td>
<td>27.5</td>
<td>20.6</td>
</tr>
</tbody>
</table>
The noise survey for Bridgewater Primary School was carried out before the final location was determined. The proposed location for the new block is shown in Figure A1; below. The survey locations shown were chosen to represent a previous location for the new building. However, the most exposed side of the new location is very well represented by the unattended monitoring location shown below.

The primary noise source affecting the site is Billing Road East, approximately 150m directly south of the school campus. The new proposed location is no closer nor more exposed to Billing Road East than the previous location. Therefore, the conclusions of the noise survey report remain valid for the new location.
The Denver™ Pole Mount luminaire with its attractive contemporary styling and exceptional performance characteristics is unsurpassed in meeting modern lighting design criteria for striking landscape illumination at night, coupled with aesthetic appeal by day. The latest control gear and lamp technology, coupled with a precisely engineered anodised reflector, achieve maximum performance and high efficiency. Compliance with Night Time Friendly requirements is easily achieved due to precise light control.
features and benefits

Contemporary styling
  > Unique aesthetic appeal to complement today’s architecture

High quality construction
  > Durability
  > Fully Weather Sealed

Controlled upward light
  > ‘Night Time Friendly’

Two light distributions
  > Maximum efficiency and uniformity for any application

Extensive choice of bracket permutations
  > Unique appearance for every application
  > Flexibility of design

Tool-free access to lamp & gear tray
  > Easy maintenance

lamp types included

35W - 150W metal halide (various)
70W - 150W high pressure sodium
32W - 42W compact fluorescent (twin lamp)

IP rating

IP657

approvals

Complies with EN60598

CE

< grange park school - northampton
specification

The luminaire shall consist of a polycarbonate lens housed in an ABS alloy door arrangement with a high pressure die-cast aluminium body, housing integral control gear to suit a wide range of high intensity discharge or compact fluorescent lamps. An acrylic lens shall be available as an option. The optical arrangement shall consist of an anodised aluminium reflector and injection moulded polycarbonate or acrylic lens. The door shall be secured to the body by two concealed latches providing tool free access for maintenance. The two sections shall be sealed by a closed cell silicone gasket ensuring IP65 is maintained. The luminaire complies with EN60598 and has a range of complementary brackets and column permutations available.

windage

Code
Denver™ Pole 0.1m²

weights & thermal data

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Weight (kg)</th>
<th>Min. Operating Temperature (°C)</th>
<th>Max. Ambient Temperature (°C)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>70W High Pressure Sodium</td>
<td>7.1</td>
<td>-30</td>
<td>60</td>
</tr>
<tr>
<td>100W High Pressure Sodium</td>
<td>7.8</td>
<td>-30</td>
<td>50</td>
</tr>
<tr>
<td>150W High Pressure Sodium</td>
<td>8.5</td>
<td>-30</td>
<td>50</td>
</tr>
<tr>
<td>35W CDMT3 Metal Halide</td>
<td>7.1</td>
<td>-20</td>
<td>55</td>
</tr>
<tr>
<td>70W CDMT3 Metal Halide</td>
<td>7.1</td>
<td>-20</td>
<td>75</td>
</tr>
<tr>
<td>100W CDMT3 Metal Halide</td>
<td>7.8</td>
<td>-20</td>
<td>60</td>
</tr>
<tr>
<td>150W CDMT3 Metal Halide</td>
<td>8.5</td>
<td>-20</td>
<td>50</td>
</tr>
<tr>
<td>32W (Twin) Compact Fluorescent</td>
<td>5.6</td>
<td>-10</td>
<td>50</td>
</tr>
<tr>
<td>42W (Twin) Compact Fluorescent</td>
<td>5.6</td>
<td>-10</td>
<td>50</td>
</tr>
</tbody>
</table>

* The maximum ambient temperatures stated are for exterior use only. For interior use deduct 10°C from the temperature stated. Note: For photocell options please deduct 15°C for 100 & 150W types.

Photometric data is available at www.holophane.co.uk
optical versatility

Two choices of optical arrangements are available for the Denver™ Pole Mount luminaire, asymmetric & street.

- **Street**
- **Asymmetric**

Controlled directional light, minimising:
> Light pollution
> Light spill
> Discomfort glare

Precision engineered anodised semi-specular aluminium reflectors ensure either maximum lateral and forward distribution (street distribution), ideal for entrance roads, or an asymmetric distribution for car parks, pedestrian areas and retail parks. Both light distributions provide excellent uniformity.

easy maintenance

Internal component layout allows easy access to all critical components. The control gear is secured to a removable geartray which can be easily lifted out for maintenance purposes.

- **Mains termination block**
- **Reflector & lampholder arrangement**
- **Control gear**
- **Removable geartray**
- **Door retaining strap**

Tool-free latches allow quick and easy access for maintenance.
Denver™ Pole
### Ordering Details: Luminaire

<table>
<thead>
<tr>
<th>Code</th>
<th>Denver Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS.BLS</td>
<td>Back-light Shield (for asymmetric only)</td>
</tr>
<tr>
<td>DPS.42</td>
<td>42mm Adaptor (reduces 60mm entry to 42mm)</td>
</tr>
</tbody>
</table>

### Lamp Type

<table>
<thead>
<tr>
<th>Code</th>
<th>Lamp Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>.70XT</td>
<td>70W Clear High Output HPS Lamp (E27) Base</td>
</tr>
<tr>
<td>.100XT</td>
<td>100W Clear High Output HPS Lamp (E40) Base</td>
</tr>
<tr>
<td>.150XT</td>
<td>150W Clear High Output HPS Lamp (E40) Base</td>
</tr>
<tr>
<td>.35CDMT3</td>
<td>35W Clear CDMT 3000K Metal Halide Lamp (G12) Base*</td>
</tr>
<tr>
<td>.70CDMT3</td>
<td>70W Clear CDMT 3000K Metal Halide Lamp (E27) Base*</td>
</tr>
<tr>
<td>.100CDMT3</td>
<td>100W Clear CDMT 3000K Metal Halide Lamp (E27) Base*</td>
</tr>
<tr>
<td>.150CDMT3</td>
<td>150W Clear CDMT 3000K Metal Halide Lamp (E40) Base*</td>
</tr>
<tr>
<td>.232PL4</td>
<td>32W Twin 4000K Electronic Compact Fluorescent 4-Pin Lamp**</td>
</tr>
<tr>
<td>.242PL4</td>
<td>42W Twin 4000K Electronic Compact Fluorescent 4-Pin Lamp**</td>
</tr>
</tbody>
</table>

### Light Distribution

<table>
<thead>
<tr>
<th>Code</th>
<th>Light Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>.AY</td>
<td>Asymmetric</td>
</tr>
<tr>
<td>.NR</td>
<td>Street</td>
</tr>
</tbody>
</table>

### Colour

<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>.C1</td>
<td>White (RAL 9016)</td>
</tr>
<tr>
<td>.C4</td>
<td>Graphite (RAL 7011)</td>
</tr>
<tr>
<td>.C6</td>
<td>Grey (RAL 7035)</td>
</tr>
<tr>
<td>.C7</td>
<td>Black (RAL 9005)</td>
</tr>
<tr>
<td>.C9</td>
<td>Metallic Silver (RAL 9006)</td>
</tr>
<tr>
<td>RAL****</td>
<td>RAL colour (customer choice)***</td>
</tr>
</tbody>
</table>

### Options

<table>
<thead>
<tr>
<th>Code</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>.A</td>
<td>Acrylic Lens****</td>
</tr>
<tr>
<td>.C</td>
<td>Enhanced Paint Finish</td>
</tr>
<tr>
<td>.T</td>
<td>Photocell</td>
</tr>
</tbody>
</table>

### Notes

- All ceramic lamp circuits contain timed ignitors. **.NR distribution only. ***Please specify RAL colour reference. ****For 100W maximum.

Note: Luminaires are supplied as standard for use on 240V 50Hz supply and complete with lamp. For 230V 50Hz add prefix ‘N’. Other voltages available on request.

** Luminaires are supplied as standard for use on 240V 50Hz supply and complete with lamp. For 230V 50Hz add prefix ‘N’. Other voltages available on request.

### Luminaire Accessories

Order separately for on-site installation by others

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS.BLS</td>
<td>Back-light Shield (for asymmetric only)</td>
</tr>
<tr>
<td>DPS.42</td>
<td>42mm Adaptor (reduces 60mm entry to 42mm)</td>
</tr>
</tbody>
</table>

### 0 Degree Wall Bracket

<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS.B.W.C1</td>
<td>White</td>
</tr>
<tr>
<td>DPS.B.W.C4</td>
<td>Graphite</td>
</tr>
<tr>
<td>DPS.B.W.C6</td>
<td>Grey</td>
</tr>
<tr>
<td>DPS.B.W.C7</td>
<td>Black</td>
</tr>
<tr>
<td>DPS.B.W.C9</td>
<td>Metallic Silver</td>
</tr>
</tbody>
</table>

### 5º all brackets are available. Configuration e.g. DPS.B.W.B.C7

< milton keynes hospital subway - netherfield
### Ordering Details: Columns & Brackets

#### Denver Tubular Base Compartment Column (DPSB)
- **HELB.FS1**: J-Anchor bolts for flange base, 3m to 5m
- **HELB.FS2**: J-Anchor bolts for flange base, 6m to 8m
- **HEL.CBEPAC**: Cut Out Box and Earth Plate for Armoured Cable*

#### Denver Steel Conical Column (DPSC)
- **HELC.FS1**: J-Anchor bolts for Flange Base, 3m to 5m
- **HELC.FS2**: J-Anchor bolts for Flange Base, 6m to 8m
- **HEL.CBEPAC**: Cut Out Box and Earth Plate for Armoured Cable*

#### Denver Steel Mid Hinged Column (DSPMH)
- **HELMH.FS1**: J-Anchor bolts for Flange Base, 4m to 5m
- **HELMH.FS2**: J-Anchor bolts for Flange Base, 6m to 8m
- **.RLR4**: Raise lower rope 4m-5m
- **.RLR6**: Raise lower rope 6m
- **.RLR8**: Raise lower rope 8m

#### Denver Aluminium Conical Column (DSPAC)
- **HELAC.FS1**: J-Anchor bolts for Flange Base, 3m to 5m
- **HELAC.FS2**: J-Anchor bolts for Flange Base, 6m to 8m
- **HEL.CBEPAC**: Cut Out Box and Earth Plate for Armoured Cable*

---

**Column Accessories**

<table>
<thead>
<tr>
<th>Code</th>
<th>Luminaires Mounting Height</th>
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<tbody>
<tr>
<td>.3</td>
<td>3 metres*</td>
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<tr>
<td>.4</td>
<td>4 metres</td>
</tr>
<tr>
<td>.5</td>
<td>5 metres</td>
</tr>
<tr>
<td>.6</td>
<td>6 metres</td>
</tr>
<tr>
<td>.8</td>
<td>8 metres</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Column Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>.LMZ</td>
<td>For light &amp; medium area wind zones (EN40 rationalised wind zones)</td>
</tr>
<tr>
<td>.HVZ</td>
<td>For heavy area wind zones (EN40 rationalised wind zones)</td>
</tr>
<tr>
<td>.HEZ</td>
<td>For extra heavy wind zones (EN40 rationalised wind zones)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Column Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>.A0</td>
<td>Angle at 0°</td>
</tr>
<tr>
<td>.A5</td>
<td>Angle at 5°</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>.C1</td>
<td>White (RAL 9016)</td>
</tr>
<tr>
<td>.C4</td>
<td>Graphite (RAL 7011)</td>
</tr>
<tr>
<td>.C6</td>
<td>Grey (RAL 7035)</td>
</tr>
<tr>
<td>.C7</td>
<td>Black (RAL 9005)</td>
</tr>
<tr>
<td>.C9</td>
<td>Silver (RAL 9006)</td>
</tr>
<tr>
<td>.RAL****</td>
<td>RAL Colour (customer choice)**</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Optional Base Type</th>
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</thead>
<tbody>
<tr>
<td>.FB1</td>
<td>Flange Base</td>
</tr>
<tr>
<td>.FB2</td>
<td>Flange Base</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Optional Column Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>.P1</td>
<td>Black undercoat primed</td>
</tr>
<tr>
<td>.P2</td>
<td>Undercoat primed to match RAL colour specified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Optional Paint Finish (Bracket Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.C</td>
<td>Enhanced paint finish</td>
</tr>
</tbody>
</table>

#### Luminaire Mounting Heights

- **.3**: 3 metres*
- **.4**: 4 metres
- **.5**: 5 metres
- **.6**: 6 metres
- **.8**: 8 metres

#### Column Category
- **.LMZ**: For light & medium area wind zones (EN40 rationalised wind zones)
- **.HVZ**: For heavy area wind zones (EN40 rationalised wind zones)
- **.HEZ**: For extra heavy wind zones (EN40 rationalised wind zones)

#### Brackets
- **.1L**: Single head long bracket
- **.1S**: Single head short bracket
- **.2L**: Twin head long bracket
- **.2S**: Twin head short bracket

#### Bracket Style
- **.A0**: Angle at 0°
- **.A5**: Angle at 5°

#### Colour
- **.C1**: White (RAL 9016)
- **.C4**: Graphite (RAL 7011)
- **.C6**: Grey (RAL 7035)
- **.C7**: Black (RAL 9005)
- **.C9**: Silver (RAL 9006)
- **.RAL******: RAL Colour (customer choice)**

#### Optional Base Type
- **.FB1**: Flange Base
- **.FB2**: Flange Base

#### Optional Column Finish
- **.P1**: Black undercoat primed
- **.P2**: Undercoat primed to match RAL colour specified

#### Optional Paint Finish (Bracket Only)
- **.C**: Enhanced paint finish

---

*Please contact Holophane for details.

---

**Example**

DPSB .3 .LMZ .1S .A0 .C1 .FB1 .P1 .C

---

*not available with DSPMH. **Please specify RAL colour reference.
The Gateway® architectural bulkhead series offers a variety of styles designed to accent architectural settings and meet the needs of extreme environments with its die-cast aluminium and injection-moulded polycarbonate enclosures. Available in round and oval shapes for wall or ceiling mounting, Gateway® provides four distinct designs for a wide array of attractive looks to enhance the space. The versatile Gateway® series accepts a wide selection of compact fluorescent and high intensity discharge lamps to provide superior performance and uniform illumination, improving visibility for commercial and institutional public use facilities.
features and benefits

Contemporary styling in different shapes
  > Aesthetic appeal to complement today’s architecture
High quality construction
  > Durable and vandal-resistant
Total lamp obscurity
  > Even, glare-free illumination
Polycarbonate lens
  > Flexibility of use
Choice of lamp types
  > Versatility
Totally enclosed luminaire
  > Suitable for wide range of applications

lamp types included

35W - 70W metal halide
18W - 42W compact fluorescent (various)

IP rating
IP65

approvals
Complies with EN60598
CE
specification

The (round / oval) bulkhead luminaire shall consist of a powder coated pressed steel back plate (GRS / GOS) or a die cast aluminium housing (GRC / GOC) and a cast aluminium bezel. The housing encloses a reflector and integral control gear to suit a choice of 18W, 26W, 32W, 42W TRT compact fluorescent lamps or 35W, 70W ceramic metal halide high intensity discharge lamps, depending on whether this be GRS/GOS or GRC/GOC. The lens shall be a UV stabilised opal diffuser secured in place by a die cast aluminium bezel ensuring environmental protection to IP659 (20 joules impact resistance). The luminaire shall be suitable for surface mounting and complies with EN60598 with a choice of options and accessories.

weights & thermal data

<table>
<thead>
<tr>
<th>Unit</th>
<th>Lamp Type</th>
<th>Weight (kg)</th>
<th>Min Operating Temperature (˚C)</th>
<th>Max Ambient Temperature (˚C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRC</td>
<td>35W CDMT</td>
<td>5.6</td>
<td>-20</td>
<td>25</td>
</tr>
<tr>
<td>GRC</td>
<td>70W CDMT</td>
<td>5.9</td>
<td>-20</td>
<td>25</td>
</tr>
<tr>
<td>GRC</td>
<td>26W TRT</td>
<td>5.3 / 4.5*</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>GRC</td>
<td>32W TRT</td>
<td>4.5</td>
<td>-10</td>
<td>25</td>
</tr>
<tr>
<td>GRC</td>
<td>42W TRT</td>
<td>4.5</td>
<td>-10</td>
<td>25</td>
</tr>
<tr>
<td>GRC</td>
<td>2 x 42W TRT</td>
<td>4.8</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>GRS</td>
<td>2 x 26W PL</td>
<td>3.1</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>GRS</td>
<td>32W TRT</td>
<td>2.9</td>
<td>-10</td>
<td>25</td>
</tr>
<tr>
<td>GRS</td>
<td>26W TRT</td>
<td>2.9</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>GOC</td>
<td>42W TRT</td>
<td>3.7</td>
<td>-10</td>
<td>25</td>
</tr>
<tr>
<td>GOC</td>
<td>18W TRT</td>
<td>4.5 / 3.7*</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>GOC</td>
<td>35W CDMT</td>
<td>5.6</td>
<td>-20</td>
<td>25</td>
</tr>
<tr>
<td>GOC</td>
<td>32W TRT</td>
<td>2.4</td>
<td>-10</td>
<td>25</td>
</tr>
<tr>
<td>GOS</td>
<td>26W TRT</td>
<td>2.4</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>GOS</td>
<td>18W TRT</td>
<td>2.4</td>
<td>-10</td>
<td>25</td>
</tr>
</tbody>
</table>

* Non emergency only
Emergency below:
26W TRT Round Emergency +25˚C
26W TRT Emergency +25˚C
18W TRT Oval Emergency +25˚C

light distributions

Photometric data is available at www.holophane.co.uk
round style

oval style

.RF1

.OF1

.RF2

.OF2

.RF3

.OF3
## Ordering Details: Luminaire

### Luminaire Codes
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRS</td>
<td>Round Gateway slim-line bulkhead</td>
</tr>
<tr>
<td>GRC</td>
<td>Round Gateway cast bulkhead</td>
</tr>
</tbody>
</table>

### Lamp Type
<table>
<thead>
<tr>
<th>Code</th>
<th>Lamp Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>.35CDMTF3</td>
<td>3SW Clear CDM-T 3000K ceramic metal halide lamp (G12) base*</td>
</tr>
<tr>
<td>.70CDMT3</td>
<td>70W Clear CDM-T 3000K ceramic metal halide lamp (E27) base*</td>
</tr>
<tr>
<td>.26TRT</td>
<td>26W Triple tube 4000K compact fluorescent 4 pin lamp (Gx24q-3) base*</td>
</tr>
<tr>
<td>.32TRT</td>
<td>32W Triple tube 4000K compact fluorescent 4 pin lamp (Gx24q-3) base</td>
</tr>
<tr>
<td>.42TRT</td>
<td>42W Triple tube 4000K compact fluorescent 4 pin lamp (Gx24q-4) base*</td>
</tr>
<tr>
<td>.242TRT</td>
<td>2 x 42W Triple tube 4000K compact fluorescent 4 Pin lamp (Gx24q-4) base*</td>
</tr>
<tr>
<td>.226PL4</td>
<td>2 x 26W 4000K Compact fluorescent 4 pin lamp (G24d-2) base**</td>
</tr>
</tbody>
</table>

### Style
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.RF1</td>
<td>Round front design with opal polycarbonate lens</td>
</tr>
<tr>
<td>.RF2</td>
<td>Round front with horizontal eye lid design with opal polycarbonate lens</td>
</tr>
<tr>
<td>.RF3</td>
<td>Round front with cross design with opal polycarbonate lens</td>
</tr>
</tbody>
</table>

### Colour
<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>.C1</td>
<td>White (RAL 9016)</td>
</tr>
<tr>
<td>.C4</td>
<td>Graphite (RAL 7011)</td>
</tr>
<tr>
<td>.C6</td>
<td>Grey (RAL 7035)</td>
</tr>
<tr>
<td>.C7</td>
<td>Black (RAL 9005)</td>
</tr>
<tr>
<td>.C9</td>
<td>Metallic Silver (RAL 9006)</td>
</tr>
<tr>
<td>RAL****</td>
<td>RAL Colour (Customer Choice)***</td>
</tr>
</tbody>
</table>

### Options
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.ME</td>
<td>Self contained 3 hour maintained emergency battery &amp; inverter</td>
</tr>
<tr>
<td>.T</td>
<td>Factory fitted miniature photocell</td>
</tr>
<tr>
<td>.TW</td>
<td>Through wiring</td>
</tr>
<tr>
<td>.V</td>
<td>Tamper resistant screws†</td>
</tr>
<tr>
<td>.SHR</td>
<td>Decorative shroud†</td>
</tr>
</tbody>
</table>

### Optional Paint Finish
<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>.C</td>
<td>Enhanced paint finish*</td>
</tr>
</tbody>
</table>

---

*Not available with GRS option. **Available with GRC, GRS option. ***Please specify RAL colour reference. †V option available for GRC & GRS only. ††Option only available to GRC. Note: Luminaires are supplied as standard for use on 240V 50Hz supply and complete with lamp. For 230V 50Hz add prefix ‘N’. Other supply variations available on request.
# Luminaire Accessories

**Gateway**

<table>
<thead>
<tr>
<th>Code</th>
<th>Lamp Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOS</td>
<td>Oval Gateway slim-line bulkhead</td>
</tr>
<tr>
<td>GOC</td>
<td>Oval Gateway cast bulkhead</td>
</tr>
<tr>
<td>.35CDMTF3</td>
<td>35W Clear CDM-T 3000K ceramic metal halide lamp (G12) Base*</td>
</tr>
<tr>
<td>.18TRT</td>
<td>18W Triple tube 4000K compact fluorescent 4 pin lamp (Gx24q-2) base</td>
</tr>
<tr>
<td>.26TRT</td>
<td>26W Triple tube 4000K compact fluorescent 4 pin lamp (Gx24q-3) base</td>
</tr>
<tr>
<td>.32TRT</td>
<td>32W Triple tube 4000K compact fluorescent 4 pin lamp (Gx24q-3) base*</td>
</tr>
<tr>
<td>.42TRT</td>
<td>42W Triple tube 4000K compact fluorescent 4 pin lamp (Gx24q-4) base*</td>
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**Example**

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*Only available with GOC range. **Please specify RAL colour reference.