Sustainable Acoustics

IAC Group Ltd

UNITS A AND B, PROGRESS WAY, PROLOGIS PARK, BIRMINGHAM INTERCHANGE

Noise Impact Assessment

Report No. 20-0116-0 R01

♦ PROTECT ♦ ENHANCE ♦ CONNECT

Noise Impact Assessment

IAC GROUP LTD

PROLOGIS PARK, BIRMINGHAM INTERCHANGE

Report No.:	20-0116-0 R01
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1 INTRODUCTION

Prologis Park Birmingham Interchange is a development of 28,800m^2, across two industrial units (Units A and B) at Progress Way, which accommodate the manufacturing facilities of IAC Group Ltd.

A noise impact assessment was undertaken by Sustainable Acoustics Ltd in 2016 - 17 to consider the potential noise impact on local properties in support of approved outline planning permission reference PL/2016/02001/PPOL. Following the final iteration of the design of the site, the report 16-0050-0 R04 was issued in September 2017 to accompany reserved matters application reference PL/2017/01509/PPRM, which was subsequently approved.

Following pre-application engagement with Solihull MBC in November 2019, this planning application proposes an amendment to site layout to incorporate an additional 388 car parking spaces and the introduction of a retaining structure to the north of the landscaping bund that screens residential properties to the south of Blackfirs Lane from the application site.

Solihull Metropolitan Borough Council have identified the following issues to be addressed through this Noise Impact Assessment:

- Need to demonstrate how the proposed car parking, including the introduction of a retaining structure along the landscaping bund, would not compromise previously approved noise mitigation; and,

- Need to assess noise arising from vehicle movements and car parking noise in the southern area of proposed additional car parking

This report looks to assess the anticipated levels of noise incident at receiver locations based on potential on-site vehicle movement on the updated site layout. Assessment of cumulative traffic growth on Bickenhill Link, or plant noise arising from site, is omitted from this report and has been assessed previously in 16-0050-0 R04.

2 SITE

2.1 Location and Context

The site is located approximately 1km from the M42 and 1km from Birmingham Airport, close to the NEC.

Figure 1 shows an overview of the approved site layout currently being built (assessed on noise grounds in 16-0050-0 R04 in September 2017) in the context of its immediate surroundings.

Figure 2 shows the assumed site for pre-application with the additional parking spaces.

The nearest noise sensitive receivers are residential properties in Blackfirs Lane to the immediate south. The approximate distance from the south façade of Unit A to the façade of the nearest property is around 110 metres; whereas Unit B is approximately 90 metres from the nearest property.

Figure 1 – Currently approved plan

Figure 2 – Proposed plan with additional parking provision

2.2 Proposed Mitigation

Mitigation to on-site vehicle noise is addressed through an earth-bund serving as a barrier. An update to the bund has been proposed, and is illustrated in Figure 3 below. The illustrated bund profile is between points A – A as shown in Figure 2, and has a height of 4m.

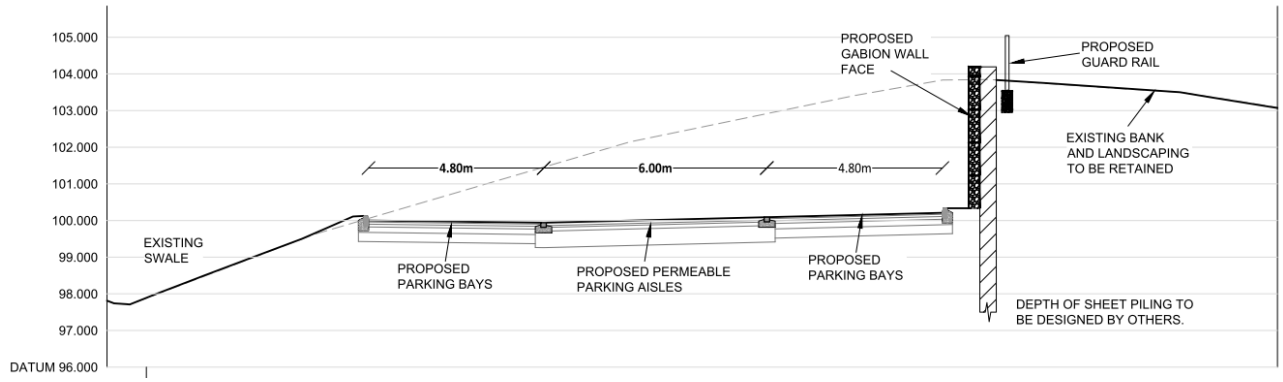

Figure 3 – Proposed revised earth bund at cross section A-A

The west side cross section between points B – B is shown below in Figure 4, though this is not a bund for mitigation purposes.

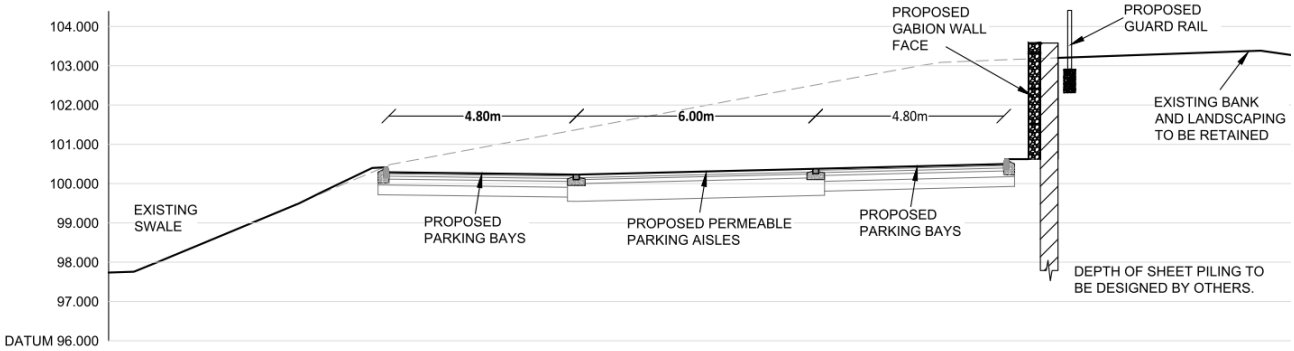

Figure 4 – Proposed revised earth bund at cross section B-B

3 POLICY AND GUIDANCE ON NOISE

3.1 National Planning Policy Framework

Current planning policy is based on the National Planning Policy Framework (NPPF), revised in February 2019, which supports a presumption in favour of sustainable development, unless the adverse impacts of that development would outweigh the benefits when assessed against the policies in the Framework, taken as a whole.

The noise implications of development are recognised at paragraph 180, where it is stated that planning policies and decisions should:

- *"mitigate and reduce to a minimum potential adverse impact from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[60]"*

- *"Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"*

The Government's objective is to significantly boost the supply of homes, but puts in place protections for existing business in paragraph 182:

> *"Planning policies and decisions should ensure that new development can be "integrated effectively with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs)". Existing businesses should not have "unreasonable restrictions placed on them as a result of development permitted after they were established". Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

3.2 Noise Policy Statement for England

Paragraph 180 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England[i] (NPSE). This document sets out a policy vision to

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

To achieve this vision the Statement sets the following three aims:

> *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life*

[i] Department for Environment, Food and Rural Affairs, *Noise Policy Statement for England,* London, 2010

- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Health and Quality of Life

The explanatory note to the NPSE states that "quality of life" is a subjective measure that refers to people's emotional, social and physical wellbeing and "health" refers to physical and mental wellbeing.

It is recognised that noise exposure can cause annoyance and sleep disturbance both of which impact on quality of life. It is also agreed by many experts that annoyance and sleep disturbance can give rise to adverse health effects.

The distinction recognises that there is emerging evidence that long term exposure to some types of transport noise can additionally cause an increased risk of direct health effects.

3.3 Local planning policy – Solihull Metropolitan Borough Council

Solihull Borough Council Local Plan has several sections which refer to impact from noise. The most relevant is outlined below:

"Policy P14 of the SLP states that the Council will seek to protect and enhance the amenity of existing and potential occupiers of houses, businesses and other uses in considering proposals for new development, and will (amongst other matters):

- *Permit development only if it respect the amenity of existing and proposed occupiers and would be a good neighbour*
- *Seek to minimise the adverse impact of noise; and*
- *Protect those parts of the Borough that retain a dark sky from the impact of light pollution"*

They have also provided the following specific comments:

Pre-application advice received from Solihull MBC confirmed that Policy P14 is the key Development Plan policy for consideration of noise arising from development.

Solihull MBC identified the following issues to be addressed through this Noise Impact Assessment:

- Need to demonstrate how the proposed car parking, including the introduction of a retaining structure along the landscaping bund, would not compromise previously approved noise mitigation; and,

- Need to assess noise arising from vehicle movements and car parking noise in the southern area of proposed additional car parking.

3.4 British Standard BS 4142: 2014

The British Standard BS 4142: 2014, *Methods for rating and assessing industrial and commercial sound* is an update of the previous edition of the standard, and describes methods for rating and assessing sound of an industrial and/or commercial nature, to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The sound from the industrial/commercial source is rated by taking into account the sound level of the source, known as the specific sound level, and its characteristics, such as tonal, impulsive or intermittency of the source, and applying an appropriate correction to give the rating level of the sound source. To gain an initial estimate of the potential impacts of the sound source, it is compared to the background noise level, and the level by which the rating level exceeds the background noise level indicates the following potential impacts:

Difference	Assessment
Around 10 dB or more	Likely to be an indication of a significant adverse impact, depending on the context
Around 5 dB	Likely to be an indication of an adverse impact, depending on the context
0 dB or less	An indication of the specific sound source having a low impact, depending on the context

The standard states that "*where an initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following:*

1) *The absolute level of the sound*

2) *The character and level of the residual sound compared to the character and level of the specific sound*

3) *The sensitivity of the receptor"*

The standard also requires an indication of the uncertainty of the assessment made.

NOTE – THIS STANDARD IS NOT STRICTLY APPLICABLE FOR ASSESSMENT OF NOISE FROM VEHICLE MOVEMENTS

Notwithstanding, as there is no defined way of assessing noise from discrete vehicle movements, and it is considered that an assessment based on the methodology in BS 4142 may give an indication of adverse effects where the ***context is appropriately considered***. It is considered that in order to fully evaluate noise from the proposed additional car parking, reference to the existing background noise climate at the nearest affected noise sensitive properties, identified as those in Blackfirs Lane, should be made.

3.5 British Standard 8233: 2014

The British Standard BS 8233: 2014, *Guidance on Sound insulation and noise reduction for buildings* provides additional guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organisation. The criteria desirable levels of steady state, "anonymous" noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$

Table 1 – BS 8233 internal noise level criteria

The standard provides a level difference between internal and external levels of 15 dB(A) at Annex G and therefore the above levels would normally be achieved where external levels are 50 dB $L_{Aeq,\ 16\ hour}$ during the day and 45 dB $L_{Aeq,\ 8\ hour}$ at night.

It is noted, however that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

The standard also recommends that for traditional external amenity areas, such as gardens, it is desirable that external noise levels do not exceed 50 dB $L_{Aeq,T}$, and that 55 dB $L_{Aeq,T}$ would be acceptable in noisier environments. However, it is recognised that these values may not be achievable in all areas where development is desirable, and in such locations, development should be designed to achieve the lowest practicable levels.

It is also noted that noise limits should not be necessary for external areas, such as balconies, roof gardens and terraces, where normal external amenity space is limited.

With reference to BS 8233, an indication of cumulative noise from proposed vehicle movements and existing sources on site within the residential properties can be compared against acceptable internal ambient noise levels.

3.6 Guidelines for Environmental Assessment of Road Traffic

In line with guidance provided in the *Guidelines for the Environmental Assessment of Road Traffic*, Institute of Environmental Assessment and Design Manual for Roads and Bridges (DMRB) manuals, additional or reductions in traffic noise due to traffic generated by the development and change in roads shall be carried out by an assessment of the potential change in noise traffic noise levels. The significance of the predicted change in noise levels at noise sensitive receivers near to the site is assessed according to the criteria shown below in Table 2; the assessment criteria are based on the following:

- A change of 3 dB (A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear.
- Changes in steady noise of 1 dB are generally only perceptible in laboratory conditions.
- A 10 dB (A) change in noise represents a doubling or halving of the noise level.

Noise Level Change	Subjective response	Assessment
-1 dB to +1 dB		NOEL
+1 dB to <3dB	Barely perceptible change	Negligible LOAEL
+3dB to <5 dB	Noticeable	Minor adverse
+5dB to >10dB	UP to a doubling of loudness	Moderate adverse
>10.0 dB	More than a doubling of loudness	Major adverse, SOAEL

Table 2 – Significance of change in road traffic noise

Because of the size of the development, growth in traffic is only likely to effect the roads immediately adjacent to the development area; traffic effects on the wider traffic network is not considered likely to have a significant effect and therefore has not been included in the scope of this study.

3.7 ProPG: Planning & Noise

Whilst ProPG Professional Practice Guidance on Planning & Noise (Revision May 2017) is specifically written with regards to new ***Residential*** Developments, to assist the delivery of sustainable

development by promoting good health and well-being through the effective management of noise, it is still considered relevant to consider for its commentary on maximum noise levels.

With regard to maximum noise levels, the standard suggests that an aspirational target would be to ensure that 45 dB $L_{Amax,F}$ is not exceeded by individual events more than 10 times a night in bedrooms.

Appendix A para A.19: "A site should be regarded as high risk where the $L_{Amax,\,f}$ exceeds or is likely to exceed 80 dB more than 20 times per night."

4 AMBIENT NOISE SURVEY

In order to establish the existing noise climate around the development a noise survey was previously carried out in support of the original outline planning application PL/2016/02001/PPOL. Existing noise levels were measured in 15 minute periods between the 5th and 6th May 2016 at ground floor level, just off of Blackfirs Lane (labelled MP1 in Figure 5 below), to capture representative noise levels at the nearest residential properties to the development scheme. Figure 5 also shows the positions of short-term measurement locations MP2 and MP3 which were used for simultaneous measurements whilst MP1 monitored continuously, unattended. The weather during the measurement period was calm, dry and warm, with very light southerly/ still winds. Temperatures varied between 6 °C at night and 23°C in the day.

As the site is not yet operational, and the context of the site is the same as it was during the previous survey, it is considered likely that the only possible relevant change to the area would be incremental traffic growth (which would be favourable for the assessment, if at all significant). As such, the 2016 noise conditions as previously measured are considered appropriate for use in this study. An outline of the assessment method was sent to and discussed with Solihull MBC, and it was not advised for an additional noise survey to be undertaken.

Figure 5 – Measurement locations

4.1 Instrumentation

Noise levels were measured using a Rion sound level meter, type NL-32 (serial number 0024066790), with a Rion type NX-22J Sound Monitor Card installed (serial number 00630553, version 2.1) and a Rion type UC-53A ½ - inch free field microphone (serial number 305924) and a Rion type NH-21 pre-amplifier (serial number 10711) fitted. The microphone was fitted with a windshield during measurements. Prior to the survey, the sound level meter, microphone and preamplifier were last calibrated in a calibration laboratory on 3 February 2015 and calibration and conformance certificates are available.

Additional measurements were undertaken using a Rion type NA-28 Rion sound level meter, type NL-28 (serial number 00170246), fitted with a Rion type UC-59 ½-inch free field microphone (serial number 00299) and a Rion type NH-23 pre-amplifier (serial number 60254). The microphone was fitted with a windshield during the measurements. Prior to the survey, the sound level meter, microphone and preamplifier were last calibrated in a calibration laboratory on 31 March 2015 and calibration and conformance certificates are available.

Prior to and on completion of the survey, the calibration of the sound level meters and microphones was checked using a Rion type NC-74 Sound Level Meter Calibrator (serial number 00830811). Prior to the survey, the Calibrator was last calibrated on 27 January 2015, in accordance with the requirements of ISO 10012 and a calibration and conformance certificate is available. No change in the calibration level occurred during the survey.

Calibration of all instrumentation is checked in a calibration laboratory at least every two years and since the survey no significant changes were found in any of the equipment used.

4.2 Measured Noise Levels

Table 3 below gives the daytime, evening and night-time measured acoustic parameters measured at MP1 during the survey.

Period	L_{Aeq} Period	$L_{Aeq,\ 15\ min}$ Range	$L_{A90,\ 15\ min}$ Range	$L_{Amax,\ f,\ 15\ min}$ Range
Daytime (0700-1900)	52	50 – 60	46 – 54	59 – 79
Evening (1900-2300)	52	49 – 54	46 – 50	58 – 74
Night-time (2300-0700)	54	47 – 61	44 – 55	54 – 75

Table 3 – Daytime, Evening and Night time measured noise levels at MP1

During the survey, both background and ambient levels were observed to be dominated by noise from Bickenhill Parkway. Due to being more steady, the relative difference in background noise between MP1 and MP2/MP3 was deemed a sensible metric to use to estimate $L_{Aeq,16hour}$ levels at MP2 and MP3. Table 4 gives the background levels measured at the three different locations and the estimated $L_{Aeq,16hour}$ levels at position MP2 and MP3.

	MP1	MP2	MP3
$L_{A90,15min}$ measured on 05/05/16	48, 49, 47, 50	45, _, 45, _	_, 47, _, 49
Difference with MP1 background	-	-3, _, -2, _	_, -2, _, -1
Average Level Difference with MP1	-	-2.5	-1.5
$L_{Aeq,16hour}$	52	-	-
Estimated $L_{Aeq,16hour}$	-	49.5	50.5

Table 4 – Results from manned survey

The graph in Figure 6 shows the variation in acoustic parameters over time at position MP1.

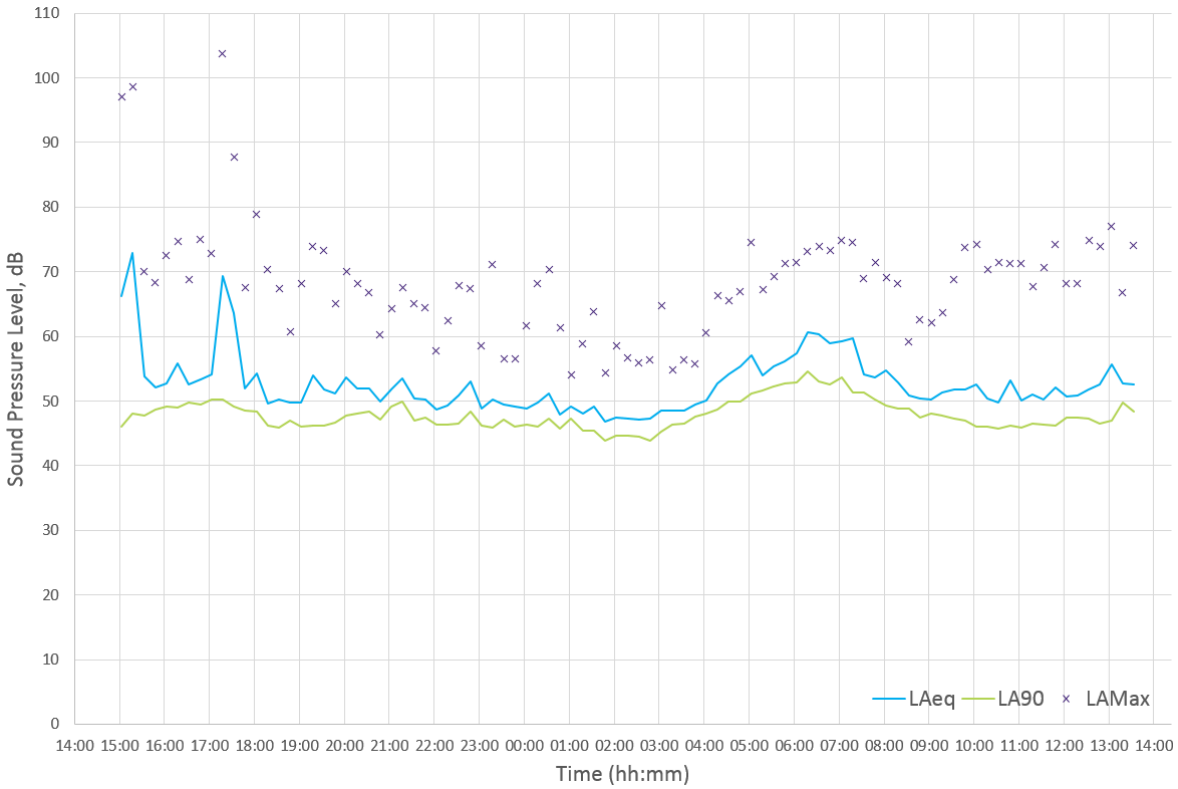

Figure 6 – Variation in noise levels through unattended survey at MP1, 5th – 6th May 2016

4.3 Observations

The site was a semi-rural site at the time of the survey, and noise levels were strongly influenced by the near and distant trunk road networks. Background noise levels stay fairly consistent during the day, evening and night periods, with quietest background noise levels recorded as 44 dB L_{A90} during the night time period. Blackfirs Lane is a very lightly trafficked road.

5 SITE VEHICLE AND CAR PARK NOISE CALCULATIONS

5.1 Traffic flow Calculations

Noise from vehicles entering the site and service yards and from the car parks has been estimated at the nearest noise sensitive properties.

Cars:

Vectos Transport Statement issued 14th December 2020 has been put together with correspondence from IAC, and includes traffic data that has been calculated specifically for the Birmingham site, Prologis Park. This report serves as the most recent calculation of anticipated traffic flow on site and the vehicles have been reported in a table format showing the shift changes, where traffic flow will

peak. The peak hour during the day remains as 14:00 – 15:00, as it was in the previous iteration of this report. Appendix 1 shows the table of anticipated vehicle flows throughout the 24 hour period. From Vectos Transport Statement.

HGVs:

The TRICS Data used in the Transport Assessments produced by Vectos in support of the original outline planning application PL/2016/02001/PPOL and reserved matters application PL/2017/01509/PPRM has been used to estimate the flow of HGVs on site. Vectos estimated the potential hourly breakdown based on movements from the number of vehicles movements associated with larger development with a similar use type (shown in Appendix 1) and adjusted pro-rata based on the proposed floor area. This results in a slightly higher number of overall movements, but is considered appropriate for a worst case assessment of the potential impact of on-site movements in the day, evening and night-time periods with 24 hour use. These traffic flow levels were used for the assessment in 2017, and will be used again.

The site is divided into the following sections for consideration:

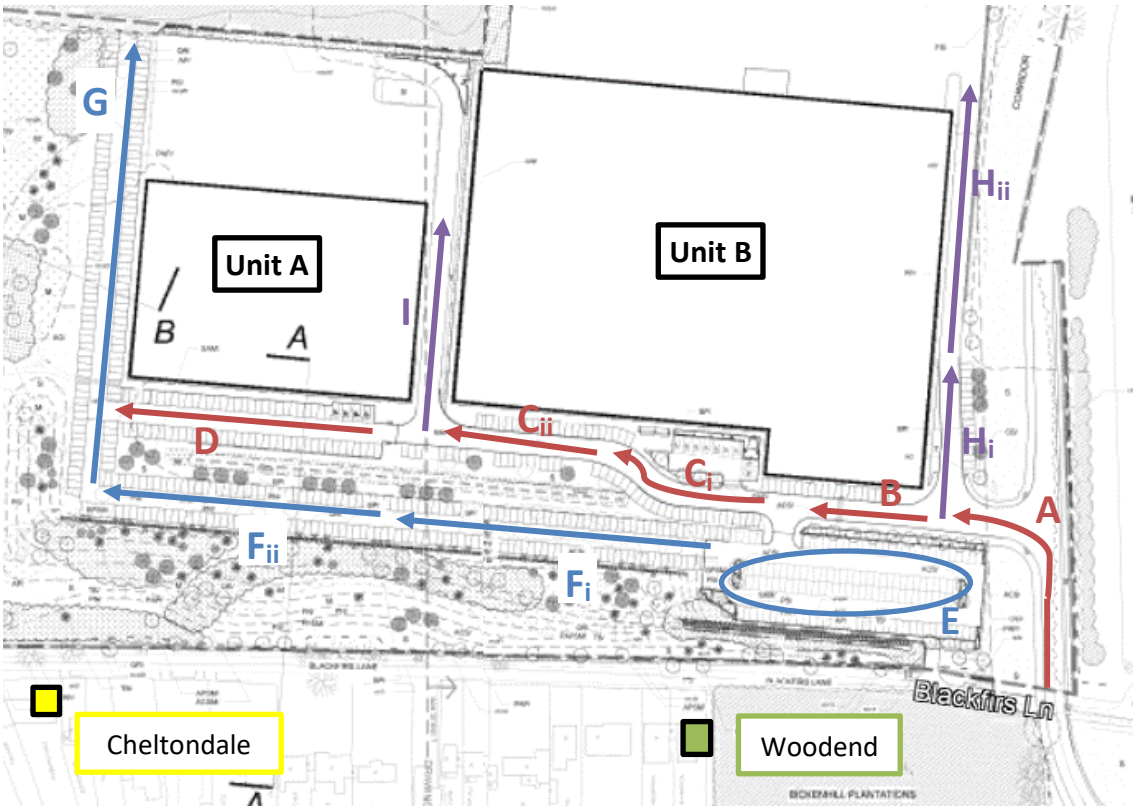

Figure 7 – Considered segments and worst-affected receivers

Using the number of parking spaces to estimate the relative distribution of cars on site, along with the assumptions that two thirds of HGVs will head towards Yard A and cars parking in F_i and F_{ii} will travel there via area E, the anticipated flow of site traffic is calculated for each segment in terms of

a percentage of vehicles entering. This information along with distances from these segment to the two worst-affected properties is given below in Table 5.

Area of Traffic	% of cars relative to those entering site	% of HGVs relative to those entering site	Distance to the property "*Cheltondale*", in meters	Distance to the property "*Woodend*", in meters
A	100	100	350	130
B	98	33	300	115
Ci	39	33	230	75
Cii	33	33	190	100
D	28	0	120	170
E	56	0	285	55
F_i	33	0	200	70
F_{ii}	17	0	100	180
G	16	0	100	230
Hi	2	67	330	140
Hii	0	67	370	150
I	0	33	180	160

Table 5 – Assumed vehcile distrubtion on site, and approximate distances from roads to sensitive receivers

5.2 Propagation Calculations

Noise propagating from vehicles in the service yards is significantly screened from the houses on Blackfirs Lane by virtue of the units themselves, and the genesis of the noise itself is also considerably further back at this location, than on the access roads. Contribution of HGV noise from the service yards is calculated to be a *minimum* of 10dB lower than the contribution of noise from all vehicle movements at the front of the site; and is therefore scoped out of the assessment of noise impact on the residential properties at Blackfirs Lane.

Calculations in this section are undertaken exclusively considering roads and car parking within the Prologis Park development; the cumulative effect from the unscreened main access and roundabout is considered in Section 5.4.

The calculation assumes point source, hemi-spherical propagation from the segments in Figure 7, taking account any screening by the mass of the units or of the proposed earth bund which breaks line of sight from vehicles to Blackfirs Lane; as can be seen in Figure 3. The noise from vehicle movements associated with the proposed car parks has been calculated from data previously measured for cars moving slowly (obtained in a supermarket car park). These levels were found to be approximately:

- 62 dB L_{Amax} at 6 m for a vehicle driving by - (Sound power levels of 86 dB (A))
- 75 dB L_{Amax} at 5 m for a car door slam – (Sound power level of 97 dB (A))

Noise from Heavy Goods Vehicles on site has been estimated based on the EU limiting values for heavy trucks, as outlined in ISO 362 – Measurement of noise emitted by accelerating road vehicles. The value for the limit is given as:

- 80dB, measured at 7.5m normal to the source – (Sound power level of 108 dB(A))

The noise level from the proposed car parks and access roads has been calculated at first floor window height at the nearest residential properties along Blackfirs Lane (4.5m from ground level). It is assumed that vehicles will travel at approximately 15-20mph on the access road, and 5mph when manoeuvring into or out of a space; it is also assumed there would be two door slams per car when parking.

The summary results are shown in Table 6 below. The noise levels from vehicle movements on the proposed site have been assessed for a worst hour in the day, evening and night-time periods, based on *Vectos* estimated hourly traffic. For the existing levels at "Cheltondale", a 1.5B correction has been applied, as demonstrated in the difference between noise levels at MP1 and MP3.

	Time	Vehicles movements in peak hour (cars + HGV)	Noise from on-site vehicle movements		Existing noise levels			Assessment relative to existing background
			L_{Amax}	$L_{Aeq,\ 1hr}$	L_{Amax}	$L_{Aeq,\ 1hr}$	L_{A90}	
Woodend	Daytime hour -14:00	362 (340 + 22)	57	47	75	52	49	- 2
	Evening hour - 22:00	317 (305 + 19)		46	68	49	47	- 1
	Night (morning) hour – 06:00	317 (305 + 12)		45	63	49	46	- 1
Cheltondale	Daytime hour – 14:00	362 (340 + 22)	48	41	75	50	47	- 6
	Evening hour – 22:00	317 (305 + 19)		41	68	47	45	- 4
	Night (morning) hour – 01:00	317 (305 + 12)		40	63	47	44	- 4

Table 6 – Assessment of vehicle noise from site at their nearest residential property as identified above.

5.3 Low frequency noise from HGVs

Whilst A-weighted noise levels from potential vehicle movements may be below ambient levels already measured on site, it is considered useful to examine the frequency spectra of any potential noise, as this gives insight to the character (and potential audibility) of the noise. HGVs produce significant sound energy at low frequencies, and so could potentially still be audible in an environment where the overall noise from the vehicle ($L_{Aeq,T}$) is low compared to existing levels.

Table 7 shows predicted spectra from HGV noise at the worst affected receiver, Woodend, based on vehicle movements at the nearest segment of the access road, using a MAKAEWA barrier calculation. The table compares this predicted noise with the existing average ambient noise levels on site.

Spectrum shape from HGV noise has been taken from previously measured library data. The relationship between the maximum and ambient levels at the receiver due to the HGVs (established in Table 6) has been applied in Figure 8 for each octave band.

Description	dB(A)	Octave centre band frequency, Hz							
		63	125	250	500	1k	2k	4k	8k
Estimated Sound Power Level of HGV	108	110	102	97	100	104	103	97	86

Table 7 – Source sound power level for HGVs

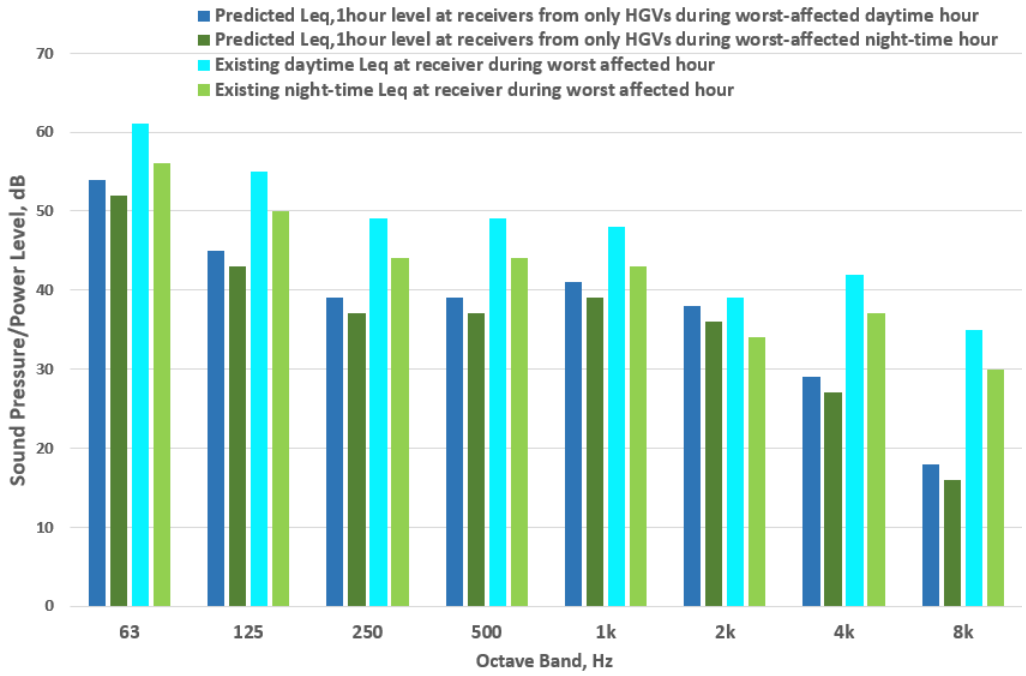

Figure 8 – Octave band sound propagation of HGV from closest point on access road to Woodend

5.4 Noise Modelling Predictions - Daytime

The Wölfel Meßsysteme-Software IMMI environmental noise modelling package has been used to calculate daytime and night-time noise levels for both existing and predicted noise levels. The software adheres to the methodology in CRTN[ii] and calculates noise in terms of the L_{A10}; as such, the 18 hour L_{A10} has been used to derive the 16 hour L_{Aeq} by subtracting 2.2 dB[iii].

Traffic data for Bickenhill Parkway (B4438) as received from Vectos was implemented into the noise model. Using the observation that ambient noise is dominated by traffic from Bickenhill Parkway, the speed of the traffic flow and the percentage of soft ground were marginally amended within the software so as to calibrate the model so noise levels at MP1 were 52dB $L_{Aeq,16hour}$. Traffic data was then entered into Coleshill Heath Road to the west, in order to calibrate noise levels at MP3.

On-site traffic movements have been based on the Vectos Transport Statement issued 14th December as shown in Appendix 1 (and as used in Table 6); and supplemented with HGV counts used previously to estimate the percentage of HGVs. The model has assumed approximately 50% soft ground cover, and screening and reflection from buildings has been taken into account. The same assumptions were made regarding speed of vehicles; ≈15mph on roads within site, ≈5mph in car parks, with movements of ≈30mph on the access road.

[ii] Department of Transport and Welsh Office. (1988) Calculation of Road Traffic Noise, HMSO, London.
[iii] Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping, P G Abbott and P M Nelson PR/SE/451/02

Figure 9 show noise contours for the $L_{Aeq,16hour}$ levels across the site as calculated previously in 2017, and Figure 10 shows the same metric for the newly proposed site layout with updated traffic counts.

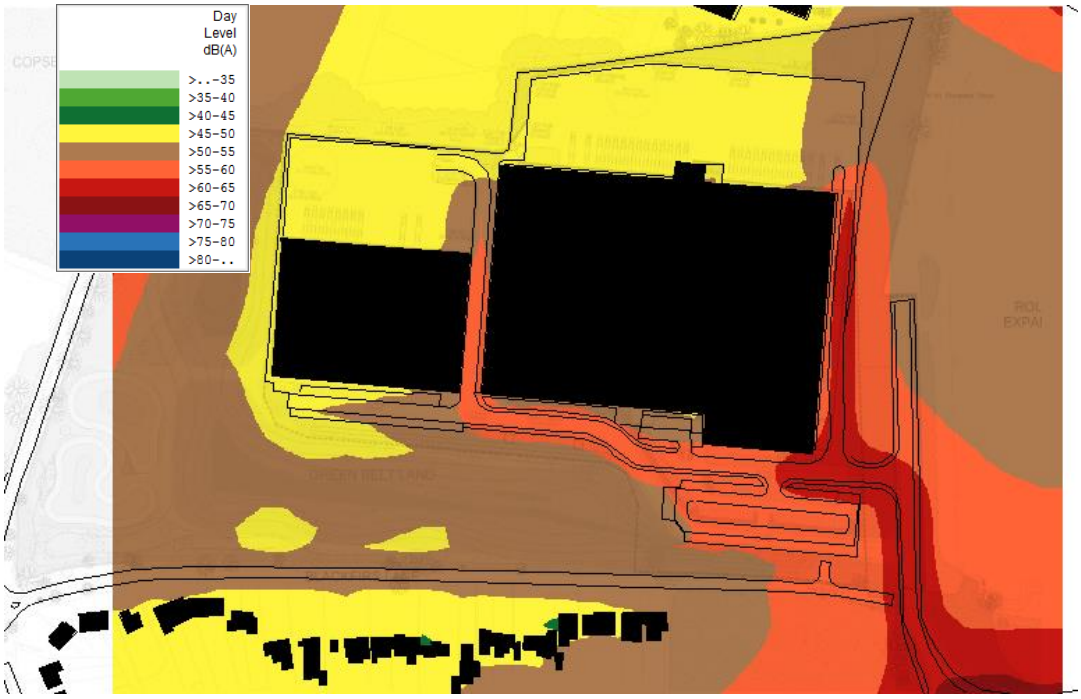

Figure 9 – Daytime noise level across site at first floor level as predicted with current approved layout, $L_{Aeq,16hour}$

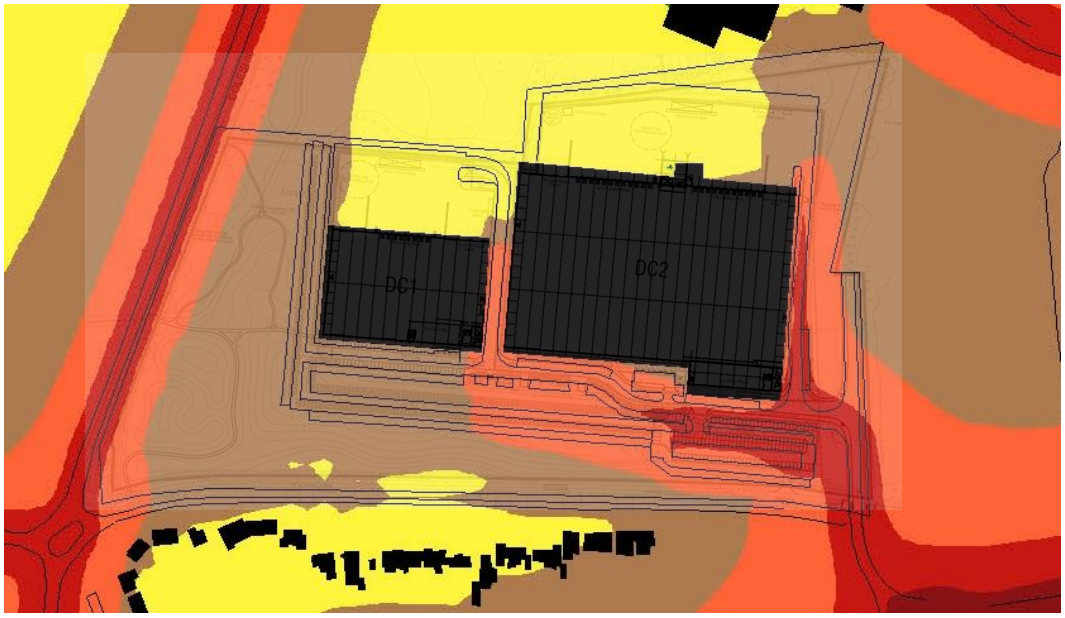

Figure 10 – Daytime noise level across site at first floor level as predicted with proposed layout, $L_{Aeq,16hour}$

5.5 Noise Modelling Predictions – Night-time

It is understood that the only vehicle movements during the night time period would be between 05:00 – 07:00; and so only noise from this 2 hour period could have any effect on the $L_{Aeq,8hour}$ level. The level from on-site vehicles at residential receivers during both of these hours is 10dB lower than the corresponding existing ambient noise levels during these hours, and will therefore have no effect on the $L_{Aeq,8hour}$.

6 SITE VEHICLE AND CAR PARK NOISE ASSESSMENT

6.1 On Site Vehicle Noise

At "Woodend", noise levels from the site are calculated to be governed by HGVs entering and leaving the site, and at "Cheltondale" noise levels are calculated to be governed by HGVs moving on the access road through the middle of the site.

The predicted noise levels are below, or equal to the existing background noise levels during both daytime and night time worst-affected hours. This suggests that while they may be discernible, they would not be prominent in the context of existing road traffic noise. Taking account of intermittent character, an assessment to BS 4142 would indicate a low probability of adverse effect.

With reference to BS 8233, the predicted $L_{Aeq,\ hourly}$ levels due to traffic noise on site would result in internal ambient noise level of no approximately around 32 dB $L_{Aeq,\ 1hour,}$ during daytime hours at the worst-affected property (assuming a 15 dB reduction through an open window). This is 3 dB below the daytime criterion for desirable ambient noise levels for sleeping and resting during the daytime, and also below existing background noise levels.

Through the majority of the night, there will be no noise from vehicles, though between 05:00 and 07:00, the noise level within the worst-affected properties on Blackfirs Lane would be 30 dB $L_{Aeq,\ 1hour}$, meeting the night-time criterion for desirable internal levels in bedrooms. In addition, it should be considered that this is 10dB lower than the existing background level at these hours (assuming 15 dB reduction through an open window).

The criteria in BS 8233 are for 'anonymous' noise sources and so to assess the intermittent nature of individual movements, it is important to look at maximum noise levels in the worst-affected hours.

Maximum noise levels from HGV movements on site are calculated to be up to 53 dB L_{Amax} externally at the eastern property *Woodend*; with potentially up to 95 events per night. Assuming a 15 dB reduction through an open window, *maximum* internal levels would not be expected to exceed 38dB L_{Amax} in bedrooms over the night-time period, and would therefore be lower than the maximum aspirational target of 45dB L_{Amax} as suggested in ProPG. Furthermore, it should also be noted that the predicted maximum noise levels are significantly lower than existing maximum noise levels already occurring in the baseline condition, and therefore no change is expected to the existing adverse effect, and that maximum levels form vehicle movements typically occur in a burst of less than a few seconds.

It is considered that the overall impact is below the threshold for "No Observable Effect Level" NOEL with a low number of events, and given the number of events that may occur, this could potentially be a low adverse effect (LOAEL). As such, the installation of the bund intends to demonstrate that noise impact arising from the proposed additional car parking, as well as the approved development, has been mitigated and minimised as far as practicable.

6.2 Observations from noise maps and off-site movements

Noise levels at the residential properties in Figure 10, with mitigation, generally fall below 50 dB $L_{Aeq16hour}$, and between 50 – 55 dB at the worst affected property; they are observed to be of the order of no more than ≈1dB different to those that are seen from the previously approved plan shown in Figure 9.

Noise levels at residential locations as shown in the 2017 post-development noise map (Figure 9) has previously been established as yielding a resultant change at the worst-affected receiver of no more than 2dB when compared with the pre-development noise maps (as shown in reporting 16-0050-0 R04). This is below that which is normally considered a perceptible change. For road traffic noise occurring during a short period, this would be considered a negligible LOAEL.

It is worth noting that the noise contours are based on a height equivalent to a first floor storey window, and the ground floor levels would benefit more from the mitigation bund.

External amenity areas for the residential properties fall within the 50 – 55 dB contour line in the worst of cases, and this is the case with or without the development in place. These levels would be considered acceptable levels for external amenity areas as specified in BS 8233 guidelines.

Maximum noise levels arising from unscreened vehicles on the roundabout and/or access road off-site may reach levels of 57dB L_{Amax} at the worst-affected property; however, with 15 dB attenuation through an open window, these are not expected to exceed 42 dB L_{Amax} internally, both 3dB lower than the minimum L_{Amax} level that merits consideration as per ProPG guidance, and >15 dB lower than unrelated maximums already observed to be occurring in the area during the 2016 noise survey.

6.3 HGV low frequency noise

At the receiver, the contributions to ambient noise levels from HGVs are predicted to be below the existing daytime ambient levels for both daytime and night-time scenarios (as seen in Figure 8)

It is possible that maximum levels at the receiver from discrete movements of individual HGVs may be noticeable during periods of low noise, though it is calculated that there will be no effect on the overall ambient noise levels at day or night. It is also worth noting that the existing character of noise is already one governed by traffic, and that maximum levels already measured on site are greater than those from potential HGV movements on site, as stated in the previous section.

7 SUMMARY AND CONCLUSIONS

The proposal to install an additional 388 parking spaces at the Prologis Park development to serve Units A and B at Progress Way has been considered, and an assessment of the potential noise impacts from this development has been undertaken.

Noise from vehicles using the car parks and on-site access roads has previously been assessed in *16-0050-0 R04*, and the development, in conjunction with proposed mitigation, was deemed to have sufficiently low adverse impact on the closest residential receivers.

The latest proposed layout with additional parking and amended mitigation yields noise levels at residential receptors that are very similar to those calculated previously.

This has been verified through:

- Calculations of noise from vehicle movements over the site to close residential receivers during daytime, evening, and night time, and comparison of these levels with levels measured and monitored whilst on site.
- Analysis of the frequency spectra of HGVs against the ambient spectra already measured on site.
- Noise modelling to demonstrate that daytime and night-time noise from the site results in either a LOAEL or NOEL at the residential receivers, and no change in overall ambient noise level is expected from the development if mitigation is put in place.

The anticipated levels from the site and from the road have been assessed using methodology within BS 8233:2014 and other relevant standards. It is concluded that, with the proposed mitigation measures the noise levels incident on the closest residential properties would be sufficiently low, so are not considered likely to cause an adverse effect at the nearest residential receptors.

APPENDIX 1 Estimated Hourly Vehicle Movements

Table 4.3: Parking Accumulation Shifts

Shift	Time Period	Arriving	Departing	Accumulation	Car Mode Split (76%)
Morning shift	05:25	84		344	261
	05:35		84	260	198
	05:55	80		340	258
	06:05		80	260	198
	06:25	141		401	305
	06:35		96	305	232
Office	07:30	270		575	437
Afternoon shift	13:25	84		659	501
	13:35		84	575	437
	13:55	80		655	498
	14:05		80	575	437
	14:25	141		716	544
	14:35		141	575	437
Office	16:00		270	305	232
Evening shift	21:25	84		389	296
	21:35		84	305	232
	21:55	80		385	293
	22:05		80	305	232
	22:25	96		401	305
	22:35		141	260	198

Anticipated traffic flow predictions for Prologis Park as issued by Vectos, December 2020

DIRFT Traffic Generation

Hour	All Vehicles			HGV		
Start	In	Out	2-way	In	Out	2-way
00:00	113	177	290	58	66	124
01:00	107	246	353	64	100	164
02:00	78	124	202	47	60	107
03:00	136	130	266	57	63	120
04:00	130	122	252	54	63	117
05:00	728	261	989	70	65	135
06:00	327	363	690	68	75	143
07:00	341	205	546	74	78	152
08:00	385	139	524	71	78	149
09:00	300	155	455	77	76	153
10:00	209	184	393	99	93	192
11:00	238	207	445	101	99	200
12:00	269	250	519	113	116	229
13:00	494	292	786	121	114	235
14:00	271	629	900	123	144	267
15:00	264	325	589	143	126	269
16:00	235	399	634	133	101	234
17:00	287	429	716	89	106	195
18:00	218	326	544	51	46	97
19:00	188	238	426	85	104	189
20:00	155	159	314	76	65	141
21:00	362	167	529	106	58	164
22:00	188	369	557	133	100	233
23:00	171	176	347	133	107	240
Total	6194	6072	12266	2146	2103	4249

DIRFT Traffic Generation

GFA 354351

Hour	All Vehicles			HGV		
Start	In	Out	2-way	In	Out	2-way
00:00	0.032	0.050	0.082	0.016	0.019	0.035
01:00	0.030	0.069	0.100	0.018	0.028	0.046
02:00	0.022	0.035	0.057	0.013	0.017	0.030
03:00	0.038	0.037	0.075	0.016	0.018	0.034
04:00	0.037	0.034	0.071	0.015	0.018	0.033
05:00	0.205	0.074	0.279	0.020	0.018	0.038
06:00	0.092	0.102	0.195	0.019	0.021	0.040
07:00	0.096	0.058	0.154	0.021	0.022	0.043
08:00	0.109	0.039	0.148	0.020	0.022	0.042
09:00	0.085	0.044	0.128	0.022	0.021	0.043
10:00	0.059	0.052	0.111	0.028	0.026	0.054
11:00	0.067	0.058	0.126	0.029	0.028	0.056
12:00	0.076	0.071	0.146	0.032	0.033	0.065
13:00	0.139	0.082	0.222	0.034	0.032	0.066
14:00	0.076	0.178	0.254	0.035	0.041	0.075
15:00	0.075	0.092	0.166	0.040	0.036	0.076
16:00	0.066	0.113	0.179	0.038	0.029	0.066
17:00	0.081	0.121	0.202	0.025	0.030	0.055
18:00	0.062	0.092	0.154	0.014	0.013	0.027
19:00	0.053	0.067	0.120	0.024	0.029	0.053
20:00	0.044	0.045	0.089	0.021	0.018	0.040
21:00	0.102	0.047	0.149	0.030	0.016	0.046
22:00	0.053	0.104	0.157	0.038	0.028	0.066
23:00	0.048	0.050	0.098	0.038	0.030	0.068
Total	1.748	1.714	3.462	0.606	0.593	1.199

Prologis Park Traffic Generation

GFA 28799

Hour	All Vehicles			HGV		
Start	In	Out	2-way	In	Out	2-way
00:00	9	14	24	5	5	10
01:00	9	20	29	5	8	13
02:00	6	10	16	4	5	9
03:00	11	11	22	5	5	10
04:00	11	10	20	4	5	10
05:00	59	21	80	6	5	11
06:00	27	30	56	6	6	12
07:00	28	17	44	6	6	12
08:00	31	11	43	6	6	12
09:00	24	13	37	6	6	12
10:00	17	15	32	8	8	16
11:00	19	17	36	8	8	16
12:00	22	20	42	9	9	19
13:00	40	24	64	10	9	19
14:00	22	51	73	10	12	22
15:00	21	26	48	12	10	22
16:00	19	32	52	11	8	19
17:00	23	35	58	7	9	16
18:00	18	26	44	4	4	8
19:00	15	19	35	7	8	15
20:00	13	13	26	6	5	11
21:00	29	14	43	9	5	13
22:00	15	30	45	11	8	19
23:00	14	14	28	11	9	20
Total	503	493	997	174	171	345

Traffic flow at TRICS site, as used previously to establish anticipated HGV movements