



Bericote Properties Limited

Proposed Employment Development

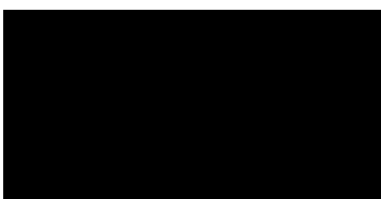
Land at Oldlands Farm, Shripney Road

Bognor Regis

Noise Assessment

June 2014

Executive Park, Avalon Way, Anstey, Leicester, LE7 7GR





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1.0 Introduction

1.0 Purpose of this Report

This report presents the findings of a noise assessment undertaken in support of a planning application for the erection of 2 no. detached industrial/distribution units (B1(c)/B2/B8) including access and servicing arrangements, car parking, landscaping and associated flood compensation area at Oldlands Farm, Shripney Road, Bognor Regis.

This report considers the potential noise impact of the 24 hour operation of the following potential external noise sources at both proposed units:

- ✧ Building Services Plant
- ✧ Car Parking
- ✧ Pallet Storage
- ✧ Waste Recycling Facility
- ✧ Goods Deliveries/Loading (HGV Movements and Docking - Refrigerated and Non-refrigerated Vehicles)

A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken previously and the results used to verify predictions of the short-term and long-term effects of noise. The noise levels from the proposed development have been predicted at local representative receptors using CADNA noise modelling software which incorporates CRTN and ISO 9613 methodologies and calculations.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No Specific Measures Required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Observed Adverse Effect	Prevent

The NPPG also states that *neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.*



2.0 Assessment Criteria

2.0 National Planning Practice Guidance - Assessment Criteria

In order enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

BS 4142:1997, '*Rating Industrial Noise Affecting Mixed Residential and Industrial Areas*'

BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings – Code of practice*'

BS 5228-1: 2009 '*Code of Practice for Noise and vibration control on construction and open sites*'

The National Planning Practice Guidance web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible.

For the purpose of this assessment, the target noise level criteria are noted in italics in the table below.

Table 2.1 Noise Level Criteria and Actions

Effect Level	Assessment	Noise Level Criteria	Action / Justification
No Observed Adverse Effect	Building Services Plant	BS4142 Score of minus 10 or lower	No Action Required Complaints Relating To Plant Noise Unlikely
	Goods Deliveries/Car Parking/Site Access /Recycling Facility	Noise levels less than: Bedrooms (night-time) – 30 dBL _{Aeq,8hours} / 45 dBL _{Amax} Living Rooms (daytime) – 30 dBL _{Aeq,16hours} External Amenity Space (daytime) – 50 dBL _{Aeq,16hours} Open Plan Office (daytime) – 45 dBL _{Aeq,T}	No Action Required Within BS8233 / WHO
	Construction Noise Assessment	External Noise Level less than: 70 dB(A)	No Action Required
Lowest Observed Adverse Effect Level (LOAEL)	Building Services Plant	BS4142 Score of minus 5 or higher	Mitigate to achieve: BS4142 Score of -5 or lower

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Effect Level	Assessment	Noise Level Criteria	Action / Justification
Lowest Observed Adverse Effect Level (LOAEL)	Goods Deliveries/Car Parking/Site Access /Recycling Facility	Noise levels exceed: Bedrooms (night-time) – 30 dBL _{Aeq,8hours} / 45 dBL _{Amax} Living Rooms (daytime) – 35 dBL _{Aeq,16hours} External Amenity Space (daytime) – 50 dBL _{Aeq,16hours} Open Plan Office (daytime) – 45 dBL _{Aeq,T}	Mitigate to achieve: <i>Bedrooms – 30 dBL_{Aeq,8hours} / 45 dBL_{Amax}</i> <i>Living Rooms – 35 dBL_{Aeq,16hours}</i> <i>External Amenity Space – 50 dBL_{Aeq,16hours}</i> Open Plan Office (daytime) – 45 dBL _{Aeq,T} Within BS8233 / WHO
	Construction Noise Assessment	External Noise Level less than: 70 dB(A)	No Action Required
Significant Observed Adverse Effect Level (SOAEL)	Building Services Plant	BS4142 Score of plus 5 or higher	Mitigate to achieve: BS4142 Score of zero or lower
	Goods Deliveries/Car Parking/Site Access /Recycling Facility	Noise levels exceed: Bedrooms (night-time)– 35 dBL _{Aeq,8hours} / 45 dBL _{Amax} Living Rooms (daytime)– 45* dBL _{Aeq,16hours} External Amenity Space (daytime) – 55 dBL _{Aeq,16hours} Open Plan Office (daytime) – 50 dBL _{Aeq,T}	Mitigate to achieve: <i>Bedrooms – 30 dBL_{Aeq,8hours} / 45 dBL_{Amax}</i> <i>Living Rooms – 35 dBL_{Aeq,16hours}</i> <i>External Amenity Space – 55 dBL_{Aeq,16hours}</i> Open Plan Office (daytime) – 45 dBL _{Aeq,T} Within BS8233 / WHO
	Construction Noise Assessment	External Noise Level greater than: 70 dB(A)	Mitigate to achieve external noise level equal to or less than 70 dB(A)
Unacceptable Observed Adverse Effect Level (UOAEL)	Building Services Plant	BS4142 Score of plus 10 or higher	Mitigate to achieve: BS4142 Score of zero or lower
	Goods Deliveries/Car Parking/Site Access /Recycling Facility	Noise levels exceed: Bedrooms (night-time) – 51 dBL _{Aeq,8hours} / 67 dBL _{Amax} Living Rooms (daytime) – 57 dBL _{Aeq,16hours} *Open Plan Office (daytime) – 80 dBL _{Lepd,8hours}	Avoid Values correspond with PPG24 Category D (mixed sources), planning permission should normally be refused. L _{Amax} noise levels based on PPG24 regular exceedance of 82 dB L _{Amax} less 15 dB for an open window. *Noise at Work Regulations Lower Action Value
	Construction Noise Assessment	External Noise Level greater than: 75 dB(A)	Mitigate to achieve external noise level equal to or less than 75 dB(A)



3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three dimensional noise modelling will be undertaken based on the monitoring data to predict source noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on the Department of Transport Calculation of Road Traffic Noise (CRTN) and ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken for large numbers of receptor points and different noise emission scenarios both horizontally and vertically. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table below have been used.

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Ground levels – other areas	Site Observations and Ordnance Survey	OS 1:25,000 contours and OS 1:10,000 spot heights.
Traffic data – main surrounding roads	WYGE	Traffic flows for local roads based on WYGE observations and experience.
Traffic data – local roads	WYGE	Traffic flows for local roads based on WYGE observations and experience.
Building heights – around site	WYGE Observations	8 m height for two storey residential properties, and 4 m for Bungalows
Barrier heights	WYGE Observations	All existing barriers at 1.0 m with the exception of hedges and trees which are assumed to offer no noise protection.
Receptor positions	WYGE	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties with ground floor or bungalow dormer windows. 7 m for dormer windows on two storey properties. 1.5 m height for model grid and monitoring locations for validation.
Reflections	WYGE	First order reflections have been applied based on mirror image sources
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.
Façade Correction	CADNA	Façade corrections have been incorporated into the modelling
Proposed Plans	Bericote Properties	Site Layout Plan, Drawing No. 99603-ss-25

It is acknowledged that a number of these assumptions will affect the overall noise levels presented in this report. However, it should be noted that certain assumptions made, as identified above, are worst case.



3.2 Model Input Data - Operational Phase

HGV Docking Event Noise Data (Warehouses 1 and 2)

Noise of a docking event has been known to vary from site to site by as much as 22 dB L_{Aeq} at 5 m distance even with the same vehicle type. Similarly, individual events using the same vehicle and at the same location have been recorded to vary by as much as 14 dB.

As such, the following worst-case calculations have been based on measurements of refrigerated and non-refrigerated HGVs at an existing distribution depot. All measurements were undertaken in free-field conditions. In addition to noise from the loading/unloading process, the levels used in the assessment include noise from the vehicle pulling up to the unloading bay, manoeuvring into position and then pulling away once unloading/loading is complete, together with other sources such as reversing beepers. The calculations are based on a maximum of one event per bay per hour. Events are modelled as a point source.

It is understood that articulated vehicles will serve the proposed development and the noise levels from each vehicle type are presented below based on an average worst case of 1 delivery/loading event per bay at each warehouse.

Articulated Vehicles

✧ *Daytime Noise Level (Refrigerated Vehicles)*

1 x 2 minute at L_p 84 dB at 3 m distance	(vehicle arriving and manoeuvring)
1 x 30 minutes at L_p 80.7 dB at 3 m distance	(vehicle loading/unloading)
1 x 1 minute at L_p 75 dB at 3 m distance	(vehicle leaving)

$$L_{Aeq(60 \text{ mins})} = 10\log(1/60)(2 \text{ mins} \times 10^{0.1 \times 84 \text{ dB}} + 30 \text{ mins} \times 10^{0.1 \times 80.7 \text{ dB}} + 1 \text{ min} \times 10^{0.1 \times 75 \text{ dB}})$$

$$= 78.3 \text{ dB at 3 m distance}$$

✧ *Daytime Noise Level (Non-Refrigerated Vehicles)*

1 x 2 minute at L_p 77 dB at 3 m distance	(vehicle arriving and manoeuvring)
1 x 30 minutes at L_p 73 dB at 3 m distance	(vehicle loading/unloading)
1 x 1 minute at L_p 74 dB at 3 m distance	(vehicle leaving)

$$L_{Aeq(60 \text{ mins})} = 10\log(1/60)(2 \text{ mins} \times 10^{0.1 \times 77 \text{ dB}} + 30 \text{ mins} \times 10^{0.1 \times 73 \text{ dB}} + 1 \text{ min} \times 10^{0.1 \times 74 \text{ dB}})$$

$$= 70.8 \text{ dB at 3 m distance}$$



❖ *Night-time Noise Level (Refrigerated Vehicles)*

1 x 2 minute at L_p 84 dB at 3 m distance (vehicle arriving and manoeuvring)
 1 x 3 minutes at L_p 80.7 dB at 3 m distance (vehicle loading/unloading)

$$L_{Aeq(5 \text{ mins})} = 10\log(1/5)(2 \text{ mins} \times 10^{0.1 \times 84 \text{ dB}} + 3 \text{ mins} \times 10^{0.1 \times 80.7 \text{ dB}})$$

$$= 82.3 \text{ dB at 3 m distance}$$

❖ *Night-time Noise Level (Non-Refrigerated Vehicles)*

1 x 2 minute at L_p 77 dB at 3 m distance (vehicle arriving and manoeuvring)
 1 x 3 minutes at L_p 73 dB at 3 m distance (vehicle loading/unloading)

$$L_{Aeq(5 \text{ mins})} = 10\log(1/5)(2 \text{ mins} \times 10^{0.1 \times 77 \text{ dB}} + 3 \text{ mins} \times 10^{0.1 \times 73 \text{ dB}})$$

$$= 75.1 \text{ dB at 3 m distance}$$

❖ *Maximum Noise Level*

L_{Amax} = 89.4 dB at 3 m distance

HGV Movements

The following calculations will be used to represent this as a line source in the model.

❖ *Daytime Noise Level (Refrigerated Vehicles)*

11 x 10 seconds L_p = 69.3 dB at 3 m distance (vehicle arrivals and departures)
 $L_{Aeq(60 \text{ mins})} = 10\log(11/3600)(10 \text{ sec} \times 10^{0.1 \times 69.3 \text{ dB}})$
 = 54.2 dB at 3 m distance

❖ *Night-time Noise Level (Refrigerated Vehicles)*

1 x 10 seconds L_p = 69.3 dB at 3 m distance (vehicle pass-by)
 $L_{Aeq(5 \text{ mins})} = 10\log(1/5)(10 \text{ sec} \times 10^{0.1 \times 69.3 \text{ dB}})$
 = 54.5 dB at 3 m distance

❖ *Daytime Noise Level (Non-Refrigerated Vehicles)*

11 x 10 seconds L_p = 65.4 dB at 3 m distance (vehicle arrivals and departures)
 $L_{Aeq(60 \text{ mins})} = 10\log(11/3600)(10 \text{ sec} \times 10^{0.1 \times 65.4 \text{ dB}})$
 = 50.2 dB at 3 m distance

❖ *Night-time Noise Level (Non-Refrigerated Vehicles)*

1 x 10 seconds L_p = 65.4 dB at 3 m distance (vehicle pass-by)
 $L_{Aeq(5 \text{ mins})} = 10\log(1/5)(10 \text{ sec} \times 10^{0.1 \times 65.4 \text{ dB}})$
 = 50.6 dB at 3 m distance





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✧ *Maximum Noise Level*

L_{Amax} used is as 73.1 dB at 3 m distance

Building Services Plant Noise Data (Warehouses 1 and 2)

Point sources have been defined in the model to represent potential building services plant associated with the proposed employment development. The maximum sound pressure levels of the point sources at 3 metres were estimated in the model as a conditional maximum level that the noise levels at nearby receptors were predicted to meet the BS 4142 assessment criteria.

Car Park Noise Data (Warehouses 1 and 2)

Noise levels from the proposed car park have been determined based upon estimated worst case number of car parking trips per space (assumed to be 1 parking event every hour). For the purposes of this assessment it is assumed that the car parks are operating at full capacity with all spaces in use to ensure that the assessment is worst case.

Waste Recycling Facility Compactor (Warehouse 1)

The compactor data used in the model was collected during measurement of a typical compactor at a similar sized depot. The noise levels used to represent the compactor noise are 52.1 dB $L_{Aeq\ 1hr}$ or 59.9 dB $L_{Aeq\ 5\ mins}$ at a distance of 10 metres.

Pallet Storage Area (Warehouse 1)

The pallet storage data used in the model was collected during measurement forklift trucks manoeuvring and stacking metal pallets. The noise levels used to represent the stacking of pallets are 72.5 dB $L_{Aeq\ 1hr}$ or 77.3 dB $L_{Aeq\ 5\ mins}$ at a distance of 10 metres, events are modelled as a point source.

3.3 Model Input Data – Demolition / Construction Phase

Information regarding noise emissions from equipment used during the demolition/construction phase has been obtained from Annex C of BS 5228-1:2009 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. This annex presents a range of current sound level data on typical site equipment and common site activities.

This data is obtained by field measurements for items of plant in actual use on construction and open sites in the UK. Levels quoted in the database are based on an average (logarithmic) of measured sound levels,





and where appropriate have been derived from more than one model of similarly sized plant. The results are presented as un-weighted octave band activity L_{eq} levels, and overall A-weighted activity L_{eq} levels in dB. All sound pressure levels are standardized to 10 metres from the plant.

3.4 Sensitive Receptors

Table 3.2 below summarises receptor locations that have been selected to represent worst-case residential receptors with respect to direct noise from the site and road traffic noise. Ground, first and second floors of the nearest commercial and residential properties have been represented. The locations of the receptors are shown on SK02 in Appendix B.

Table 3.2 Existing Receptor Locations

Ref.	Description	Closest Source	Approximate Distance To Source (m)	Height (m)
R1	1 Oldlands Farm Cottages	Warehouse 1 Car Park	60	4.0
R2	Units 1 – 5, Beeding Close	Warehouse 1 Car Park	100	1.5
R3	Caravan Park, Rowan Way	Warehouse 1 Car Park	220	1.5
R4	Gares Wood, Shripney Road, First Floor	Delivery Vehicle Movements	305	4.0
R5	Gares Wood, Shripney Road, Dormer Window	Delivery Vehicle Movements	305	7.0

3.5 Tranquillity Rating

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zone 4.



4.0 Noise Survey

4.1 Noise Survey Methodology

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels.

Equipment used during the survey included:

B&K 2260	Environmental Noise Analyser (WYG1)	s/n	2361273
B&K 2238	Environmental Noise Analyser (WYG9)	s/n	2684499
B&K 4231	Calibrator	s/n	2176211
Rion NL-52	Environmental Noise Analyser (WYG13)	s/n	620858
Rion NL-52	Environmental Noise Analyser (WYG20)	s/n	1021331

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice and no drift was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at seven locations (as specified in the following table and shown in SK01 of Appendix B) from Thursday 22nd May 2014 to Thursday 29th May 2014. Attended short term measurements were undertaken at four locations during the day, evening and night-time periods with three additional locations being measured unattended over a 163 hour period. The raw data collected from the long term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*. Weather conditions during the survey period were observed as being dry with scattered showers. Anemometer readings confirmed that wind speeds were less than 5 ms⁻¹ at all times during the survey with a predominant westerly wind direction.

Table 4.1 Noise Monitoring Locations

Ref	Description	Grid Reference	
		X	Y
LT1	To rear of abandoned agricultural building, adjacent to Oldlands Farm Cottage	494334	101423
LT2	Adjacent to A29 opposite caravan park	494075	101408
LT3	Adjacent to rear of Gares Wood	493920	101845
ST1	To rear of abandoned agricultural building, adjacent to Oldlands Farm Cottage	494371	101398
ST2	Adjacent to industrial units, Beeding Close	494396	101337



Ref	Description	Grid Reference	
		X	Y
ST3	A29 adjacent to caravan park	494047	101415
ST4	Adjacent to A29, between relief road and Gares Wood	493897	101826

4.2 Noise Survey Results

Existing ambient noise levels around the site are dominated by vehicles using the A29 to the west of the site, with noise from the railway line to the east of the site audible at all survey locations. Noise from industrial units to the south of the site included plant noise, noise breakout from various units and HGV and LGV movements.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period).

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2×10^{-5} Pa).

Table 4.2 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A50,T}$ (dB)	$L_{A50,T}$ (dB)
Weekday Day 07:00 – 23:00	57 Hours	22/05/2014 – 29/05/2014 07:00 – 23:00	LT1	47.8	78.9	25.2	48.0	41.3
Weekday Night 23:00 – 07:00	32 Hours	22/05/2014 – 29/05/2014 23:00 – 07:00		43.8	87.1	20.9	40.3	32.1
Weekend Day 07:00 – 23:00	32 Hours	22/05/2014 – 29/05/2014 07:00 – 23:00		49.1	88.1	25.4	47.2	38.4
Weekend Night 23:00 – 07:00	23 Hours	22/05/2014 – 29/05/2014 23:00 – 07:00		46.9	81.8	22.1	41.3	31.7
Bank Holiday Monday Day 07:00 – 23:00	16 Hours	22/05/2014 – 29/05/2014 07:00 – 23:00		47.8	71.7	29.8	49.0	43.9
Bank Holiday Monday Night 23:00 – 07:00	8 Hours	22/05/2014 – 29/05/2014 23:00 – 07:00		44.4	75.9	23.8	42.4	33.4
Weekday Day 07:00 – 23:00	57 Hours	22/05/2014 – 29/05/2014 07:00 – 23:00	LT2	70.2	95.7	30.2	72.2	66.1
Weekday Night 23:00 – 07:00	32 Hours	22/05/2014 – 29/05/2014 23:00 – 07:00		62.0	86.5	27.5	66.4	48.2

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Period	Duration (T)	Monitoring Date and Times	Location	$L_{max,T}$ (dB)	$L_{max,T}$ (dB)	$L_{min,T}$ (dB)	$L_{min,T}$ (dB)	$L_{avr,T}$ (dB)
Weekend Day 07:00 – 23:00	32 Hours	22/05/2014 – 29/05/2014 07:00 - 23:00	LT2	69.3	98.3	32.3	71.4	65.2
Weekend Night 23:00 – 07:00	23 Hours	22/05/2014 – 29/05/2014 23:00 - 07:00		60.7	85.2	27.8	64.4	51.4
Bank Holiday Monday Day 07:00 - 23:00	16 Hours	22/05/2014 – 29/05/2014 07:00 - 23:00		69.8	87.1	34.3	72.2	64.8
Bank Holiday Monday Night 23:00 – 07:00	8 Hours	22/05/2014 – 29/05/2014 23:00 - 07:00		62.5	85.5	27.6	66.7	49.3
Weekday Day 07:00 - 23:00	57 Hours	22/05/2014 – 29/05/2014 07:00 - 23:00	LT3	64.0	89.1	24.3	67.5	49.5
Weekday Night 23:00 – 07:00	32 Hours	22/05/2014 – 29/05/2014 23:00 - 07:00		57.4	89.8	20.5	53.9	37.6
Weekend Day 07:00 – 23:00	32 Hours	22/05/2014 – 29/05/2014 07:00 - 23:00		64.5	102.4	31.8	66.9	50.2
Weekend Night 23:00 – 07:00	23 Hours	22/05/2014 – 29/05/2014 23:00 - 07:00		55.2	78.4	21.4	54.5	39.4
Bank Holiday Monday Day 07:00 - 23:00	16 Hours	22/05/2014 – 29/05/2014 07:00 - 23:00		63.3	96.7	37.4	66.4	50.9
Bank Holiday Monday Night 23:00 – 07:00	8 Hours	22/05/2014 – 29/05/2014 23:00 - 07:00		56.6	77.5	24.2	52.3	36.4
Day 07:00 - 19:00	15 Mins	29/05/2014 10:32	ST1	44.9	61.4	36.2	48.5	38.2
	15 Mins	29/05/2014 10:05	ST2	57.7	79.5	37.9	59.9	41.1
	15 Mins	29/05/2014 10:55	ST3	74.4	92.8	46.8	78.7	53.9
	15 Mins	29/05/2014 11:16	ST4	74.4	89.3	43.7	79.7	50.9
Evening 19:00 - 23:00	15 Mins	28/05/2014 21:52	ST1	42.0	55.9	34.3	45.1	37.1
	10 Mins	28/05/2014 22:14	ST2	49.1	67.4	32.5	51.8	36.1
	15 Mins	28/05/2014 22:31	ST3	65.9	82.8	35.2	69.2	40.8
	15 Mins	28/05/2014 22:49	ST4	62.1	82.7	25.2	61.2	28.4
Night 23:00 - 07:00	15 Mins	28/05/2014 23:16	ST1	39.8	53.0	32.0	42.0	35.0
	15 Mins	28/05/2014 23:48	ST3	60.4	81.8	31.1	49.7	32.8
	15 Mins	29/05/2014 00:07	ST4	61.1	85.8	22.2	51.5	24.6

All values are sound pressure levels in dB re: 2×10^{-5} Pa



5.0 Assessment of Effects

5.1 Building Services Plant Noise Assessment

This assessment has been undertaken in order to establish the maximum external plant noise levels for the proposed scheme. The assessment compares the predicted average noise levels from proposed building service plant (BSP) noise with the lowest existing background noise L_{A90} at the surrounding existing residential receptors (worst case façade direction and floors were selected). As the proposed plant noise is likely to contain a 'distinguishable hum', a 5dB correction (specified in 8.2 of BS 4142) has been added to create the Plant 'Rating Level at Receptor'.

A series of predictions were made by defining different sound power levels at the point sources. When the sound pressure levels are set as shown in Table 5.1, the noise levels at all the representative receptors modelled are 5 dB below the background levels during daytime and night-time with a 5 dB tonal correction as shown in Tables 5.2. These levels are considered to be readily achievable.

Table 5.1 Proposed Emission Limits for BSP as Modelled

BSP Location	Noise Emission Limit - Sound Pressure Level	
	Daytime	Night-time
Warehouse 1 – Western Corner (Roof of Offices)	62.5 dB(A) at 3 m OR 52.0 dB(A) at 10 m	54.4 dB(A) at 3 m OR 43.9 dB(A) at 10 m
Warehouse 2 – Western Corner (Roof of Workshop Area)	62.9 dB(A) at 3 m OR 52.44 dB(A) at 10 m	58.1 dB(A) at 3 m OR 47.6 dB(A) at 10 m

Table 5.2 BS 4142 Assessment for Proposed Plant

Ref	Existing Background L_{A90}		Noise rating level from plant (with +5 dB Correction)		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R1	38.4	31.7	33.4	26.7	-5.0	-5.0
R2	38.4	31.7	25.7	18.3	-12.7	-13.4
R3	64.8	48.2	26.4	20.7	-38.4	-27.5
R4	49.5	37.6	25.9	19.7	-23.6	-17.9
R5	49.5	37.6	25.4	19.2	-24.1	-18.4

All values are sound pressure levels in dBA re: 2×10^{-5} Pa.

Utilising the defined sound power levels suggested in Table 5.1, the noise levels from the assumed building services plant at all modelled receptors will be below the background by 5 dB or more.



5.2 Operational Phase – Noise Intrusion Assessment

All External Sources (Except Building Services Plant) Noise Intrusion Assessment

Internal noise levels, at nearby sensitive receptors from the following sources (including the 24 hour operation of both proposed units) have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of single glazing with a sound reduction of 30 dB has been used.

- ✧ Car Parking
- ✧ Waste Recycling Facility
- ✧ HGV Goods Deliveries/Loading (HGV Movements and Docking - Refrigerated Vehicles and Non-refrigerated Vehicles)

Table 5.3 Daytime Noise Intrusion Levels L_{Aeq} 1 hour (Refrigerated Good Deliveries)

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	NPPG SOAE L_{Aeq}
R1	43.8	28.8	13.8	30-40
R2	41.1	26.1	11.1	45
R3	37.6	22.6	7.6	30-40
R4	43.3	28.3	13.3	30-40
R5	42.9	27.9	12.9	30-40

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.4 Night-time Noise Intrusion Levels L_{Aeq} 5 mins (Refrigerated Good Deliveries)

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	NPPG SOAE L_{Aeq}
R1	44.7	29.7	14.7	30
R2	41.9	26.9	11.9	N/A
R3	38.9	23.9	8.9	30
R4	47.2	32.2	17.2	30
R5	46.8	31.8	16.8	30

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

**Table 5.5 Daytime Noise Intrusion Levels L_{Aeq} 1 hour (Non-Refrigerated Good Deliveries)**

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	NPPG SOAE L_{Aeq}
R1	43.2	28.2	13.2	30-40
R2	40.5	25.5	10.5	45
R3	35.8	20.8	5.8	30-40
R4	36.9	21.9	6.9	30-40
R5	36.5	21.5	6.5	30-40

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.6 Night-time Intrusion Levels L_{Aeq} 5 mins (Non-Refrigerated Good Deliveries)

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	NPPG SOAE L_{Aeq}
R1	43.4	28.4	13.4	30
R2	40.8	25.8	10.8	N/A
R3	36.4	21.4	6.4	30
R4	40.8	25.8	10.8	30
R5	40.3	25.3	10.3	30

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.7 Night-time Noise Intrusion Levels L_{Amax} (Both Refrigerated and Non-Refrigerated)

Location	External L_{Amax}	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	NPPG SOAE L_{Amax}
R1	49.8	34.8	19.8	45
R2	46.4	31.4	16.4	N/A
R3	51.4	36.4	21.4	45
R4	54.7	39.7	24.7	45
R5	54.2	39.2	24.2	45

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

The assessment presented in the tables above show that internal daytime and night-time noise levels from all external noise sources (including 24 hour operations) with open windows would be within the relevant noise intrusion criteria at all receptors and below the Lowest Observable Effect Level. All residential receptors are also predicted to meet the BS 8233 external target level of 50 – 55 dB for gardens and external spaces.



5.3 Construction Phase – Noise Assessment

Noise levels from potential construction activity associated with the redevelopment of the site have been assessed in accordance with BS 5228-1: 2009 criteria which indicate if a significant effect is likely to occur at noise sensitive properties.

Both 'point' and 'line' sources representing all likely items of plant have been represented in the model and in the case of mobile plant these have been placed in worst case location with respect to nearby noise sensitive premises. Worst case assumptions regarding the 'on-time' of individual plant items have also been made and represented in the calculations. In order to ensure that the assessment is worst case, it is assumed that all proposed demolition/construction activity is occurring simultaneously.

Significance based on fixed limits

The table below shows predicted levels of construction noise at existing noise sensitive properties for comparison with the recommended noise limit criteria.

Table 5.8 Construction Noise Assessment Results (Fixed Limits Method)

Ref	Construction Noise Level (dB(A))	NPPG SOAEL Criteria (dB(A))	Within NPPG SOAEL Fixed Noise Limit?
R1	68.0	70.0	Yes
R2	65.4	70.0	Yes
R3	54.6	70.0	Yes
R4	42.3	70.0	Yes
R5	42.0	70.0	Yes

All values are sound pressure levels in dB re: 2x 10⁻⁵ Pa.

The results indicate that the noise levels at the façades of the existing noise sensitive properties would be below the NPPG SOAEL recommended criteria. Noise levels within the fixed limit criteria are likely to result in internal conditions where conversation would not be difficult.

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zone 4. There are no public footpaths within the site, with the nearest public footpaths being approximately 300m to the east leading to Shripney and Flansham.

Whilst the area therefore has some tranquillity value, it is adjacent to existing industrial premises and the future Bognor Relief Road, there is currently no public access and would therefore be considered to be of less tranquillity value than footpaths and other open spaces. As such the proposed development is considered to have a negligible effect on local access to areas of tranquillity.

This report presents the findings of a noise assessment undertaken for planning application for a proposed employment development on land at Oldlands Farm, Bognor Regis. Consideration within the report has been given to the 24 hour operation, including vehicle movements, docking and loading activities associated with the two units, fixed plant noise, recycling facility, and staff car parking.

Section 123 of the NPPF gives four test points relating to noise. Considering these the following conclusions can be drawn:

- » avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development

Combined noise intrusion assessments of external noise levels during all 24 hours (both daytime and night-time) from goods deliveries, docking and loading activities, vehicle movements, waste recycling facility compactor, pallet storage area, noise breakout and car parking, have shown that noise levels from the proposed employment development are predicted to be within the lowest observable adverse effect level criteria at nearby sensitive receptor locations on the basis of worst case assumptions. Therefore, the proposed development will not have a 'significant adverse impact' on health, amenity or quality of life.

- » mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions

Rating noise levels from the new building services plant and noise insulation properties of the buildings have been specified in order to set suitable noise limits (at least 5dB(A) below existing background noise levels with an acoustic feature correction applied) and break out noise that will ensure that target noise levels are met at nearby noise sensitive receptors.

- » *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*

As the site is bordered by similar industrial units to the south, it is not considered that the use of the site would restrict the operation of neighbouring businesses.

- » *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and recreational and amenity value for this reason.*

The development is situated in a CPRE Zone 4 area for tranquillity (1 being least tranquil and 10 being most). The proposed development is considered to have a negligible effect on local access to areas of tranquillity.



Appendices



An explanation of the specific acoustic terminology referred to within this report is provided below.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.



Proposed Employment Development – Noise Assessment

An explanation of abbreviations used within this report is provided below.

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

WYGE – WYG Environment





Appendix B – Sketches

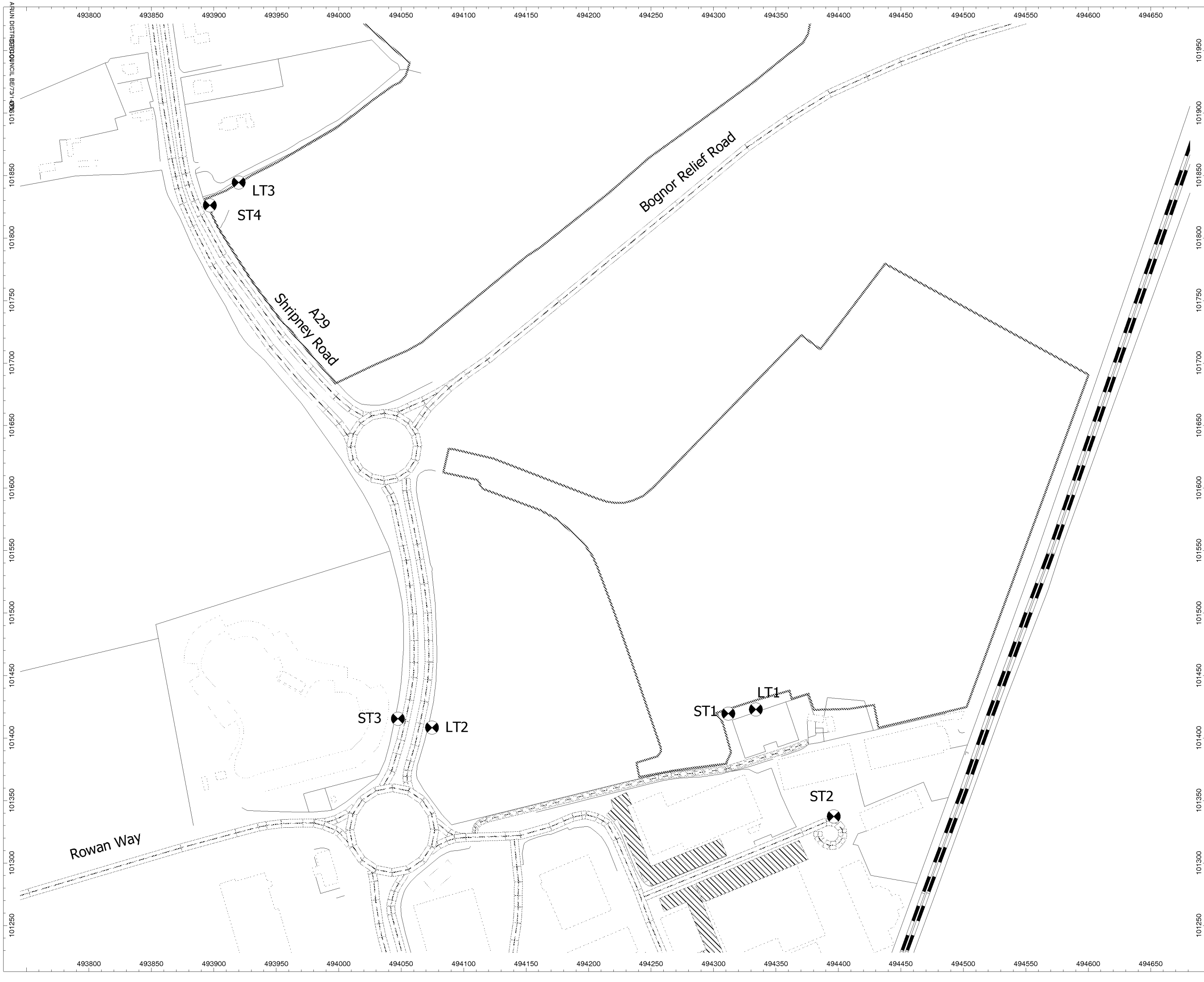
SK01 Noise Monitoring Locations

SK02 Sensitive Receptor Locations

SK03 Combined Worst Case Noise Levels $L_{Aeq, 1hour}$ (Refrigerated HGVs)

SK04 Combined Worst Case Noise Levels $L_{Aeq, 1hour}$ (Non-Refrigerated HGVs)





Client:
Bericote Properties Ltd.

Project:
Oldlands Farm
Bognor Regis

Project Number:
A087856

Drawing Title / Scenario:
Noise Monitoring Locations

Drawing Number:
SK01

Key:

Site Boundary:

Scale : Not to scale

WYGE Leicester 18.06.14

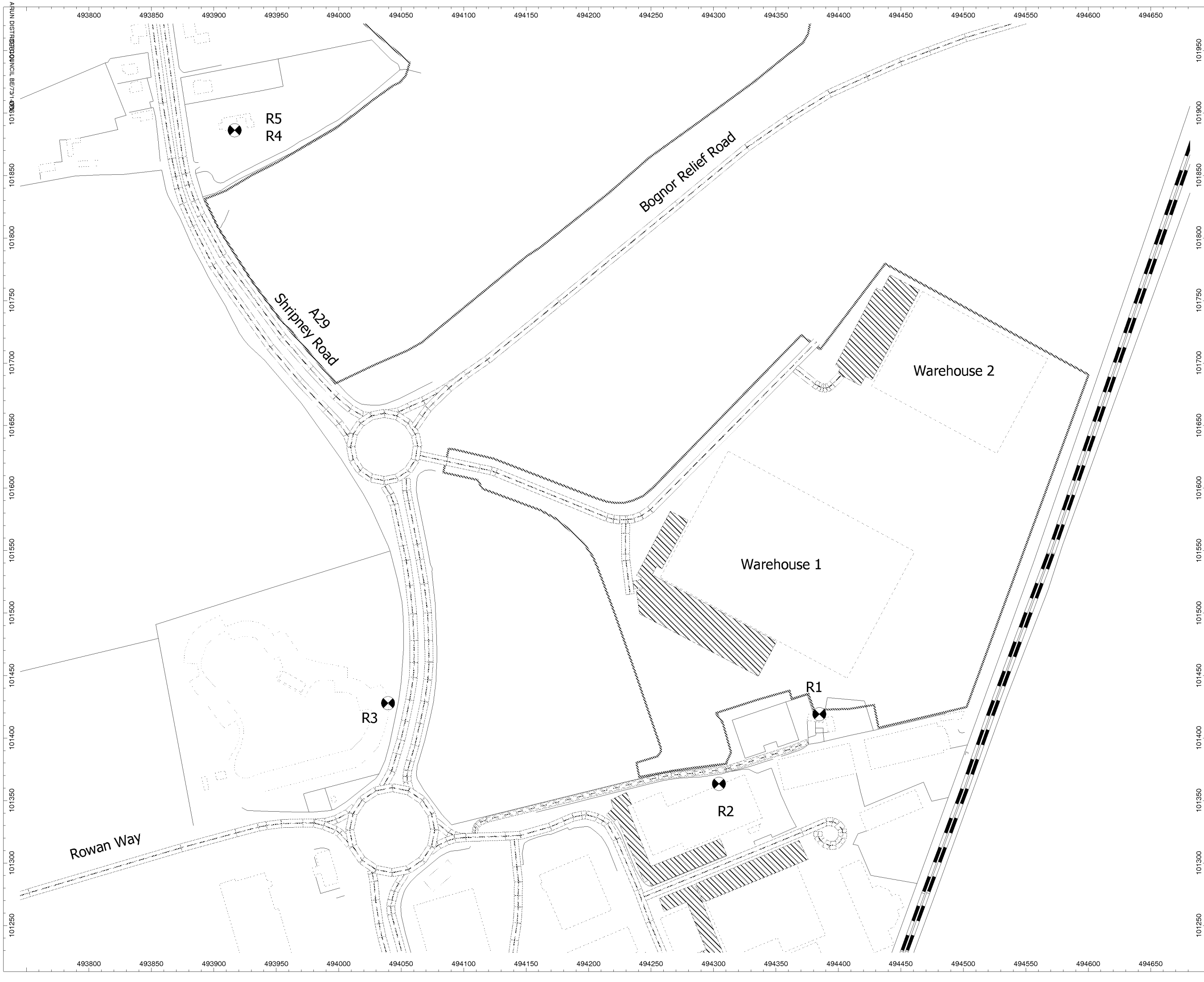
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Client:
Bericote Properties Ltd.

Project:
Oldlands Farm
Bognor Regis

Project Number:
A087856

Drawing Title / Scenario:
Sensitive Receptor
Locations

Drawing Number:
SK02

Key:

Site Boundary: -----

Scale : Not to scale

WYGE Leicester 18.06.14

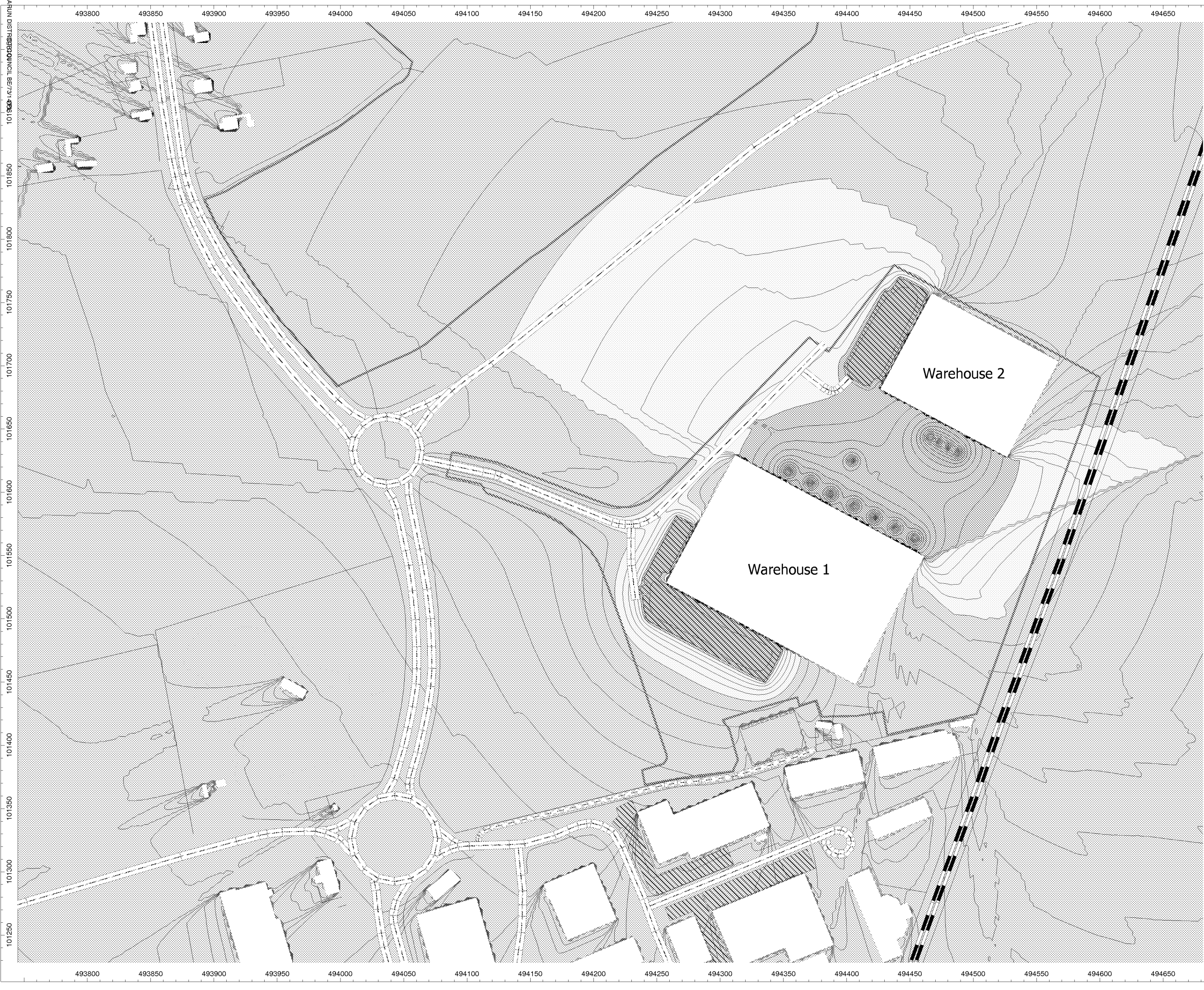
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Client:
Bericote Properties Ltd.

Project:
Oldlands Farm
Bognor Regis

Project Number:
A087856

Drawing Title / Scenario:
Worst Case Combined
Noise Levels LAeq 1hr
(Refrigerated HGVs)

Drawing Number:
SK03

Key:

Site Boundary: -----

0.0 - 50.0 dB
50.0 - 60.0 dB
60.0 - 70.0 dB
>70.0 dB

Scale : Not to scale

WYGE Leicester 18.06.14

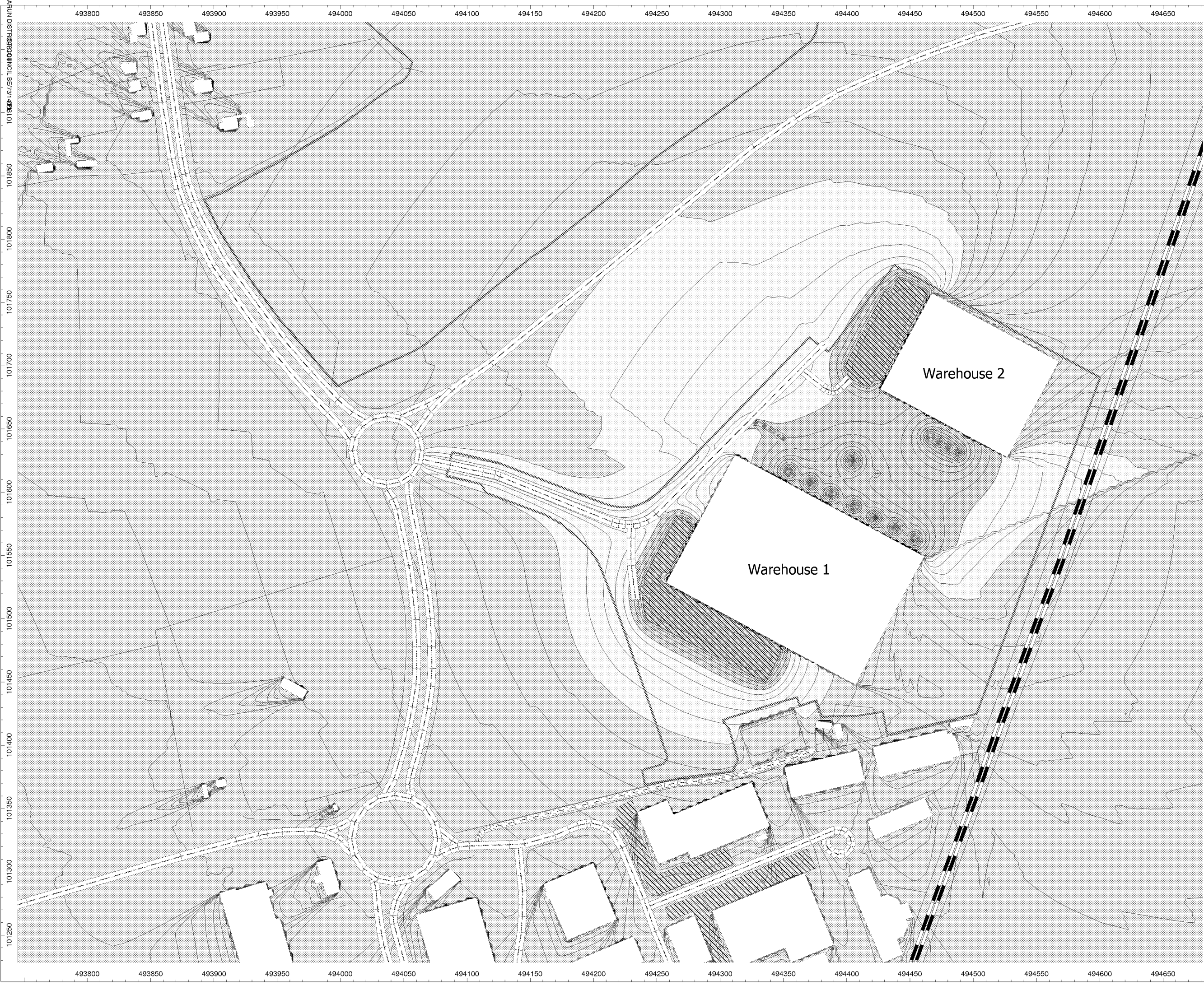
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Client:
Bericote Properties Ltd.

Project:
Oldlands Farm
Bognor Regis

Project Number:
A087856

Drawing Title / Scenario:
Worst Case Combined
Noise Levels LAeq 1hr
(Non-Refigerated HGVs)

Drawing Number:
SK04

Key:

Site Boundary: -----

0.0 - 45.0 dB
45.0 - 55.0 dB
55.0 - 65.0 dB
>65.0 dB

Scale : Not to scale

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