Appendix G1

Noise Measurement Site Survey

A77 Maybole Bypass

Noise Measurement Site Survey

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(Enter Details of Amendment)	Name: (print) Signature: Date:	Name: (print) Signature: Date:	Name: (print) Signature: Date:
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(Enter Details of Amendment)	Name: (print) Signature: Date:	Name: (print) Signature: Date:	Name: (print) Signature: Date:

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1. Noise Baseline Survey Report

1.1. Introduction

1.1.1. The purpose of this report is to present the results of noise survey measurements undertaken within the proposed area for the Maybole Bypass to inform the environmental impact assessment of existing ambient noise levels. The information was used to help validate the acoustic road noise model (CADNA) used for predictive noise calculations.

1.1.2. This involved completing short term noise surveys in accordance with shortened procedure as described in Calculation of Road Traffic Noise (CRTN) to quantify road traffic noise at various representative locations along the proposed scheme corridor.

1.1.3. Attended noise surveys in an hemispherical 'free field' condition or 'façade conditions were undertaken in and around Maybole (north and south of the existing A77 route) between 21st and 22nd May 2013; 29th and 30th May and 6th June 2013 to establish existing ambient noise levels at sensitive locations. Noise levels were recorded at a total of six positions within the proposed area. Two to the north of the proposed bypass, two north and two south of the existing A77. These were undertaken during weekday and night time hours.

2. Site Description

2.1. Site Location

2.1.1. The A77 passes through the centre of Maybole along the High Street, the main retail area of the town. The High Street has been developed since the Medieval Ages and has restricted carriageway and footway widths, which results in poor conditions for pedestrians and road users.

2.1.2. The proposed route for the scheme is located to the north of the small town of Maybole, South Ayrshire. Starting at the approximate co-ordinates: 228873, 609500 on the A77, south of Maybole, the centreline of the proposed route extend north east through arable fields and hedgerows. The proposed centreline of the route re-joins the A77, north of Maybole, at the approximate co-ordinates: 232147, 612962. The location of Maybole is illustrated within Drawing 25000182/LND/024, Appendix A.

2.2. Measurement Locations

2.2.1. Measurement locations are illustrated within Drawing 25000182/ENV/002, Appendix A and detailed below.

Measuring Location 1: 40 Burns Drive (NGR: 229099, 609912)

2.2.2. Measurements were undertaken at Burns Drive on 22nd May 2013. The measurement location is approximately 6m from the edge of the carriageway. The area to the north of the measurement location is under construction for further residential properties. During the survey steady traffic from the B7023 Culzean Road and intermittent traffic from the local residential area was recorded.

Measuring Location 2: Gardenrose Path (NGR: 229520, 610444)

2.2.3. Measurements were undertaken at Gardenrose Path on 21st/22nd May 2013 for night time survey and 22nd May for daytime survey. The area is situated within a semi-rural setting with rows of residential properties. During the day time survey light traffic from the Kirklandhill Path and background traffic noise of the A77 was recorded.

Measuring Location 3: 16 Crosshill Road (NGR: 230297, 609870)

2.2.4. Measurements where undertaken at 16 Crosshill Road on 30th May 2013 for daytime surveys. The measurement location was 1m from the front façade. The area is within Maybole town centre, located near to Glebe Park. Constant traffic noise is noted along the B2 from the A77 carriageway.

Measuring Location 4: Cargliston House (NGR: 229865, 611009)

2.2.5. Measurements were undertaken at Cargliston House on 29th May 2013 located north of Maybole town Centre within a rural setting with narrow farm roads. The farm is served by the B7023 and B7024 roads which have a steady traffic flow.

Measuring Location 5: Kirklandhill Farm (NGR: 229867 610839)

2.2.6. Measurements were undertaken at Kirklandhill Path on 6th June 2013 1m from the front façade for day time surveys over 3 consecutive hours. The area is within a rural setting with surrounding fields used for grazing.

Measuring Location 6: Netherculzean Farm (NGR: 231826, 611515)

2.2.7. Measurements were undertaken at Netherculzean Farm on 30th May 2013 for daytime surveys. The farm is surrounded by open fields with cattle grazing. Constant traffic noise is audible from the A77 carriageway. The measurement location is 1m from the front façade.

Measuring Location 7: Netherculzean Farm (NGR: 231826, 611515)

2.2.8. Further measurements were undertaken 6th June 2013, 1m from the façade of the farm house over 3 consecutive hours.

Measuring Location 8: Low Grange Bungalow (NGR: 231758, 612831)

2.2.9. Measurements were undertaken at a location near to the Low Grange Bungalows' on 29th May 2013 2013. The bungalows are approximately 400m from the A77 carriageway.

3. Methodology

3.1. Relevant Standards

3.1.1. Baseline conditions were determined in accordance with Calculation of Road Traffic Noise (CRTN - ISBN 0 11 550847 3) issued by the Department of Transport, Welsh Office in 1988 and BS 5228:2009. The shortened measurement procedure was used during the survey locations. Measurements of LA10 are made over three consecutive hours between the hours 1000 and 1700 hours. Using LA10 (3-hour) as the arithmetic mean of the three consecutive values of hourly LA10 (18-hour) can be calculated.

3.1.2. Within the survey the Scottish Development Department (SDD) Measurement Procedure within CRTN is used for noise measurements. This differs from the shortened measurement procedure above in that it identifies the position to be 1m in front of a façade. It also suggests that for a busy road between 1000 and 1600 when the traffic flow is comparatively uniform, a 15 minute survey yields an L10 result which is 2dB above the LA10 (18hour) from 0600 to 2400 hours. This can only be undertaken during the months May or August. The survey was undertaken during the month of May as this would be representative of the year round traffic and worst case scenario

3.1.3. The noise measurement parameters recorded during the survey period were LAeq, LAmax, LA10 and LA90 levels.

3.2. Instrumentation

3.2.1. The following equipment was used during the noise survey:

- Brüel & Kjaer Type 2250 Sound Level Meter (Serial No. 2717775)
- Brüel & Kjaer Type 4189 Microphone (Serial No. 2710690)
- Brüel & Kjaer Type 4231 Acoustic Calibrator (Serial No. 2714830)
- Richard Paul Russell Ltd., Kestrel Wind Speed Meter (Serial No. 1621547)
- Anemo handheld anemometer with compass
- GPS Receiver GlobalSat BT-338 (Serial No. AAW072069)

3.2.2. The battery power level was regularly monitored throughout the measurement period.

3.2.3. In all instances the SLM was mounted on a tripod, with microphone set approximately 1.2m above ground level and set at grazing incidence in ‘free field’ or ‘façade’ conditions. All surveys were attended surveys in hemispherical conditions.

3.2.4. As the scheme lies within a semi- rural area with farmland to the north and south, the A77 is considered to be the main source of noise within the study area. A windshield was fitted to the microphone to minimise the effects of wind-induced noise across the microphone diaphragm.

3.3. Calibration

3.3.1. The sound level meter was calibrated in accordance with the manufacturer's instructions before and after each series of measurements. Copies of valid accredited calibration certificates are enclosed within Appendix B.

3.4. Meteorological Conditions

3.4.1. A number of site visits were made during the month of May and June to carry out noise measurements during both daytime and night time periods. The weather conditions were recorded during each survey period and illustrated within Appendix C, for site details. The meteorological conditions such as wind speed, gusting winds, rain, and/or e road surface conditions found on site did comply fully with the requirements of CRTN meteorological conditions for the entire measurement period.

3.5. Measurement Period

3.5.1. Daytime noise measurements surveys were undertaken over either, three consecutive hours between 10:00 and 17:00 or three consecutive 15mins between 10:00 and 16:00 hours in accordance with the shortened measurement procedure described within CRTN and the Scottish Development Department (SDD) Measurement Procedure.

3.5.2. One, three consecutive hours survey was undertaken during night time hours between 23:00 and 03:00 at Gardenrose Path in accordance with CRTN

3.5.3. No unusual acoustic events occurred during measurements, and the data is considered to provide a fair representation of the acoustic environment at each measurement location.

4. Results

4.1. Daytime results

4.1.1. Day noise surveys were carried out over several days – 22nd May; 29th and 30th May and 6th June 2013 by Amey personnel. Meteorological conditions at the start and during the noise survey are recorded within the Site Specific Survey Forms (Appendix C).

4.1.2. All measurements varied between 15mins to 3 hours. In each case, the time period was considered appropriate to provide a good representation of the typical noise climate at each measurement location.

4.1.3. This information was used to validate the acoustic road model used for the predictive noise calculation.

4.1.4. The results of the measurement are tabulated below with detailed information within Appendix C.

Table 1: Results of Noise Survey at representative locations (Daytime)

Date	Start Time	Stop Time	Elapsed Time	L_{Aeq} (dB)	L_{AF90} (dB)	L_{AF10} (dB)	L_{AMAX} (DB)	Comments/ Constraints
22/05/13	**Measuring Location ID No. 01 – Gardenrose Path (Free field conditions)**							
	12:05	12:20	15mins	56.0	40.9	55.9	79.0	Intermittent traffic from Gardenrose Path. Busier near to 15:00 for school coming out. Road traffic from the A77.
	13:20	13:35	15mins	55.5	44.0	57.6	78.8	
	14:40	14:55	15mins	56.0	43.2	55.8	85.1	
	Average			**55.8**	**42.7**	**56.4**	-	
	$L_{A10,18hr}$			-	-	**56.9**	-	
	Measuring Location ID No. 02 – Burns Drive (Free field conditions)							
	12:50	13:05	15mins	54.0	47.0	58.2	67.0	Constant Traffic from the B7023 – Culzean Road. Noise from construction site for new residential properties.
	14:05	14:20	15mins	52.6	46.9	54.9	76.0	
	15:15	15:30	15mins	42.0	36.6	44.8	61.2	
	Average			**51.8**	**43.5**	**52.6**	-	
	$L_{A10,18hr}$			-	-	**52. 9**	-	
29/05/13	**Measuring Location ID No. 03 – Cargilston (Free field conditions)**							
	10:15	10:30	15mins	45.1	36.2	48.7	61.3	Intermittent traffic noise from the rural road between B7023 and B7024. Area was a farmland with farm animals present on site.
	10:30	10:45	15mins	44.8	36.5	47.8	60.8	
	10:45	11:00	15mins	47.1	38.4	49.6	66.9	
	11:00	11:15	15mins	49.9	35.8	48.2	66.0	

Table 1: Results of Noise Survey at representative locations (Daytime)								
Date	**Start Time**	**Stop Time**	**Elapsed Time**	**L_{Aeq} (dB)**	**L_{AF90} (dB)**	**L_{AF10} (dB)**	**L_{AMAX} (DB)**	**Comments/ Constraints**
	Average			**47.2**	**36.7**	**48.6**	**-**	
	$L_{A10,18hr}$			**-**	**-**	**49.1**	**-**	
	Measuring Location ID No. 04 – Low Grange (Free field conditions)							
	13:45	14:00	15mins	60.4	38.3	64.9	77.0	Constant traffic flow including HGVs and tractors passing.
	14:15	14:30	15mins	59.0	38.9	63.6	78.3	
	Average			**59.8**	**38.6**	**64.3**	-	
	$L_{A10,18hr}$			**-**	**-**	**64.8**	-	
30/5/13	**Measuring Location ID No. 05 – 16 Crosshill Road* (Façade conditions)**							
	10:20	10:35	15mins	61.5	45.1	63.7	81.9	Constant traffic flow from Crosshill street. Bus route. Links to the existing A77 Area next to Recreational Park.
	11:40	11:55	15mins	60.5	45.6	64.3	80.3	
	Average			**60.1**	**45.4**	**64.0**	**-**	
	Measuring Location ID No. 06 –Nether Culzean Farm* (Free field conditions)							
	11:05	11:20	15mins	58.5	47.8	61.4	71.6	Constant traffic from the A77, cattle in fields.
	12:05	12:20	15mins	57.6	46.2	60.9	71.1	
	Average			**55.8**	**47.0**	**61.2**	**-**	
06/06/13	**Measuring Location ID No. 06 – Nether Culzean Farm (Façade conditions)**							
	14:00	15:00	1hour	57.6	46.3	61.1	67.7	Constant traffic from A77, sheep in fields and rookery crows with the trees.
	15:00	16:00	1hour	57.8	47.4	61.1	69.4	
	16:00	17:00	1hour	57.8	47.8	61.2	71.1	
	Average			**57.7**	**47.2**	**61.1**	**-**	
	$L_{A10,18hr}$			**-**	**-**	**60.1**	**-**	
	Measuring Location ID No.07 – Kirklandhill Farm (Façade conditions)							
	10:15	11:15	1hour	45.5	28.4	47.1	66.4	Background noise from road traffic from road linking B7023 and B7024. Across from survey location was sheep which used water bath.
	11:15	12:15	1hour	45.5	27.8	44.9	70.9	
	12:15	13:15	1 hour	46.0	28.8	44.2	70.8	
	Average			**45.7**	**28.3**	**45.4**	**-**	
	$L_{A10,18hr}$			**-**	**-**	**44.4**	**-**	

**Survey was cancelled due to rainfall and battery issues.*

Only two 15minute measurements over three consecutive hours were undertaken.

4.2. Night time survey results

4.2.1. A consecutive 3 hour noise survey was undertaken 21st to 22nd May 2013 by Amey personnel. Meteorological conditions at the start of the noise survey were dry, calm, no wind, a cloud cover of 80% with a temperature of 7°C. The noise at the beginning of the survey was light traffic noise in the background from the A77. A north wind increased during the survey slightly to 0.2m/s.

Table 2: Results of Noise Survey at representative locations (Night-time)

Date	Start Time	Stop Time	Elapsed Time	L_{Aeq} (dB)	L_{AF90} (dB)	L_{AF10} (dB)	L_{AMAX} (DB)	Comments/ Constraints
21/05/13 – 22/05/13	Measuring Location 1 - Gardenrose Path							
	[1]23:30	00:00	30mins	36.6	19.2	31.9	65.1	Survey was stopped due to noise from cars idling at residential properties and shouting. Continued on new project for further 30mins
	[2]00:00	00:30	30mins	26.2	19.7	28.4	50.6	Light traffic noise from the A77 and Gardenrose Path.
	***1+2 (1 Hour average)**			**34.0**	**19.5**	**30.2**	**65.1**	
	00:45	01:45	1 hour	29.2	22.2	32.2	51.5	
	02:00	03:00	1 hour	29.2	24.4	31.8	55.8	
	Average			**30.4**	**22.0**	**31.4**	**-**	
	$L_{A10,18hr}$			**-**	**-**	**29.4**	**-**	

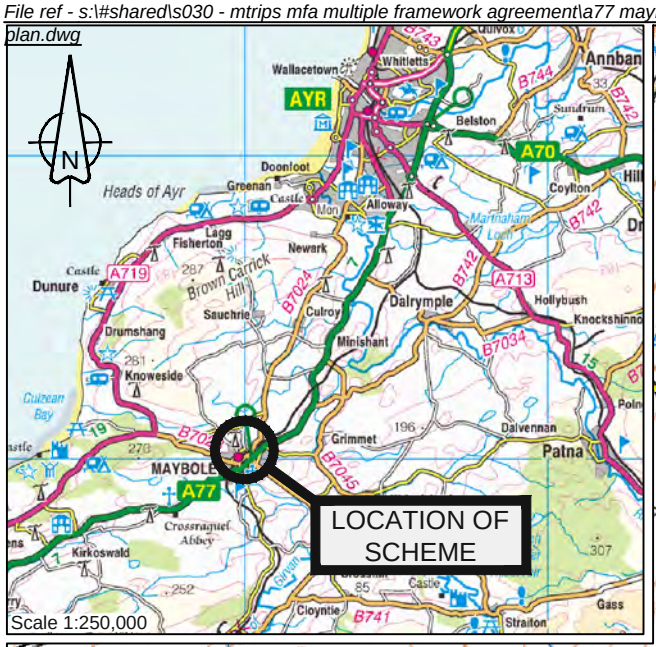
** Logarithmic average*

Appendix A

Drawings

0 100

File ref - s:\#shared\s030 - mtrips mfa multiple framework agreement\a77 maybole bypass\02 design\10 drawings\approved\25000182_lnd_024_location plan.dwg



KEY

Scheme Extents

Rev	Revision details	Chkd	Appd	Date

Drawn: GK	
Design: GK	
Chkd: MT	
Appd: GMD	
Date: 24/08/2012	

Preliminary	
For comment	✓
For tender	
For construction	
As constructed	
Other	

Project Name

A77 Maybole Bypass

Drawing Title

Location Plan

Original Drg Size : A4	Dimensions : -
Scale : 1:25000m	Copyright © Amey

Client

Drawing No

25000182/LND/024

Rev

-

File ref - s:\#shared\s030 - mtrips mfa multiple framework agreement\a77 maybole bypass\02 design\10 drawings\work area\1 live drgs\environmental\25000182_env_002.dwg

0 100

Key

Noise Measurement Locations

- ML1 Gardenrose Path
- ML2 Burns Drive
- ML3 Cargliston House
- ML4 Low Grange Cottages
- ML5 16 Crosshill Road
- ML6 Netherculzean Farm
- ML7 Kirklandhill Farm

Existing A77

Proposed A77 Alignment

40 metre buffer

Rev	Revision details	Chkd	Appd	Date

Drawn:		Preliminary	
Design:		For comment	✓
Chkd:		For tender	
Appd:		For construction	
Date:		As constructed	
		Other	

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Client

TRANSPORT SCOTLAND

Project Name

A77 Maybole Bypass

Drawing Title

Environmental Noise Survey Locations

Original Drawing Size : A1	Dimensions : m
Scale : 1:10,000	Copyright © Amey

Drawing No 25000182/ENV/002

Rev P0

Appendix B

Site survey records

Noise Monitoring Report Form

Date and Time: 6th June 2013 10:15 – 13:15		**Project: Maybole Bypass**	
Location	Kirklandhill Farm		
Personnel	Nicola Sim, Heather Ather		
SLM Type/Serial No.	B & K Type 2250/ 2717775	**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830
Weather conditions at start of Survey			
Wind speed (m/s)	0 – 1m/s^{-1}	Cloud cover:	10%
Wind direction		Temp (°C):	13°C
Calibration at the beginning survey	0.01 deviation from last	Calibration at the end of survey	-0.04 deviation from last
Power Check at beginning	98% - 8hrs	Power check at the end of survey	69% 5hrs 7mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the predicted outcome of the noise levels.

Description and Image of Site

Kirklandhill Farm is with rural setting along Kirklandhill Path just off the B7023. The surrounding fields are used for cattle grazing.

Description of Noise Environment at Start of Survey

Light traffic noise from the road that links B7023 and B7024 connecting Kirklandhill Path. Birds chirping. Sheep in the adjacent fields.

Description of Noise Environment at End of Survey

Same as above.

Facade location?	Yes

Constraints

None

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
44	10:15	11:15	1hr	45.5	28.4	47.1	66.4	Distant traffic. Birds chirping. Two planes overhead 28-29mins. Sheep in fields' drinking water and calling. Car passed 48m 30s Lamb escaped through fence then back to field 53m, 58m and 59m.
45	11:15	12:15	1hr	45.5	27.8	44.9	70.9	Birds calling. Sheep drinking from bath.

								Car passed 3m 45s, 32m 05s, 49m 27s and 57m 28s Chickens clucking in next doors property. Motorbikes along the road linking Kirklandhill Path. Plane heard in the distance between 16 and 17m, 28m 25s, and 33m. Plane overhead 44m, 46m 37s. Man walking with dog 38m 12s
46	12:15	13:15	1hr	46.0	28.8	44.2	70.8	Plane overhead 5m 58s, and 11m. Resident leaving driveway 10m 30s Jet 16.40 70.8dB Walkers talking 25m. Sheep calling. Car at next property 27 and 38m Sheep drinking from water bath. Winds gusting to $2ms^{-1}$
								Total $L_{A10,3hr}$ – 45.4dB **$L_{A90,3hr}$ – 22.0dB**

Comments

	Name	Signature	Date
Recorded by	Nicola Sim	Nicola Sim	10.06.13
Checked by	Heather Ather	Heather Ather	10.06.13

Noise Monitoring Report Form			
Date and Time: 21st/22nd May 2013 – 23:30 – 03:00		**Project: Maybole Bypass**	
Location	No. 16 Gardenrose Path		
Personnel	Nicola Sim, Heather Ather		
SLM Type/Serial No.	B & K Type 2250/ 2717775	**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830
Weather conditions at start of Survey			
Wind speed (m/s)	No wind	Cloud cover:	80%
Wind direction	N/A	Temp (°C):	7°C
Calibration at the beginning survey	-0.04	Calibration at the end of survey	0.07
Power Check at beginning	100% - 8hrs 30mins	Power check at the end of survey	77% 5hrs 30mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the predicted outcome of the noise levels.

Description and Image of Site

Gardensrose Path is within a residential area (two storey buildings) with rural gazing fields located to the northwest of the properties. The area is within a bus route which is in place for the school (Gardenrose Primary School).

Description of Noise Environment at Start of Survey

Light traffic noise from the A77. No wind at the start of the survey. Birds chirping

Description of Noise Environment at End of Survey

Same as above except wind increases to 0.2m/s in a north direction.

Facade location?	No

Constraints

None

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
21	23:30	00:00	30mins	36.6	19.2	31.9	65.1	Car passing 3mins 30secs. Noise from residents at bins at the houses. Cows mooing. 2 Aeroplane overhead between 12 – 13 mins.
23	00:00	00:30	30mins	26.2	19.7	28.4	50.6	3 cars passing. Dog barking. Aeroplane overhead

								Cows mooing 13mins Intermittent traffic from the A77and Gardenrose Path.
-	23:30	00:30	1hr	34.0	19.5	30.2	65.1	As above
24	00:45	01:45	1hour	29.2	22.2	32.2	51.5	Aeroplane overhead 3mins 30sec. Wind increased to 0.2m/s with gusts up to 1.5m/s Trees and hedges rustling.
25	02:00	03:00	1hour	29.2	24.4	31.8	55.8	Birds singing 12mins & 38mins Traffic noise from the A77
								Total $L_{A10,3hr}$ - 31.4 dB **$L_{A90,3hr}$ – 22.0dB**

Comments

	Name	Signature	Date
Recorded by	Nicola Sim	Nicola Sim	22.05.13
Checked by	Heather Ather	Heather Ather	22.05.13

Noise Monitoring Report Form			
Date and Time: 29th May 2013, 10:15 to 11:15		**Project: Maybole Bypass**	
Location	Cargliston Farm (Day)		
Personnel	Nicola Sim, Heather Ather		
SLM Type/Serial No.	B & K Type 2250/ 2717775	**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830
Weather conditions at start of Survey			
Wind speed (m/s)	1m/s	Cloud cover:	5%
Wind direction	NE	Temp (°C):	17°C
Calibration at the beginning survey	0.01 deviation from the last	Calibration at the end of survey	0.00 deviation from the last
Power Check at beginning	42% 2hrs 53mins	Power check at the end of survey	29% 1hrs 53mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the outcome of the noise levels.

Description of Site

Cargliston Farm is located adjacent to the road that links the B7023 and B7024. Area is set with a rural setting surrounded by open fields. Farm has geese, hens and pigs in the property. The Sound Level Meter (SLM) was located to the entrance of the farm near an access to fields just off the farm track.

Description of Noise Environment at Start of Survey

Birds calling.
Sheep banging hooves on wooden pallet.
Rustling of leaves.

Description of Noise Environment at End of Survey

As above

Facade location?	No

Constraints

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
34	10:15	10:30	15mins	45.1	36.2	48.7	61.3	Plane overhead 2-4mins. Sheep banging on steel pallet. Birds calling. Distant traffic on A77. Van and car passing on the B7024.

								Sheep calling 10m 40s. Gulls flying overhead 12m. Pigs grunting 14m.
35	10:30	10:45	15mins	44.8	36.5	47.8	60.8	Distant traffic from B7024 Sheep and birds calling. Plane overhead (in the distance) 9m. Car passing 10mins. Wind changed to between 1 -2 ms^{-1} with gusts up to 3ms^{-1}
36	10:45	11:00	15mins	47.1	38.4	49.6	66.9	Birds calling. Plane in distance. Distant traffic B7024. Dog walker passed by. Sheep calling. Trees rustling. Wind 1-2ms^{-1} with gusts up to 4.5ms^{-1}.
37	11:00	11:15	15mins	49.9	35.8	48.2	66.0	Wind 0 -1ms^{-1} with gusts up to 3ms^{-1} Sheep calling. Pigs grunting. Birds calling. Plane overhead.
								Total $L_{A10, 1hr}$ 48.6 **$L_{A90, 1hr}$ – 36.7**

Comments

	Name	Signature	Date
Recorded by	Nicola Sim	Nicola Sim	31/05/13
Checked by	Heather Ather	Heather Ather	31/05/13

Noise Monitoring Report Form

Date and Time: 22nd May 2013 12;00 and 16:00			**Project: Maybole Bypass**				
Location	40 Burns Drive (Day)						
Personnel	Nicola Sim, Heather Ather						
SLM Type/Serial No.	B & K Type 2250/ 2717775			**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830		
Weather conditions at start of Survey							
Wind speed (m/s)	0.5m/s with Gusts of 3m/s			Cloud cover:	33%		
Wind direction	North			Temp (°C):	11 - 12°C		
Calibration at the beginning survey (dB deviation from last)	Project 28	Project 30	Project 32	Calibration at the end of survey	Project 28	Project 30	Project 32
	0.02	-0.06	0.01		-0.01	0.02	-0.01
Power Check at beginning	76% 5hrs 41mins	62% 4hrs 35mins	56% 3hrs 52mins	Power check at the end of survey	66% 4hrs 37mins	59% 4hrs 10mins	51% 3hrs 38mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the outcome of the noise levels.

Description and Image of Site

The measurement location is located within a new residential area at 1m from the front façade along the B7023 Culzean Road. Further housing is currently being built behind the properties. Agricultural fields surround the housing estate.

Description of Noise Environment at Start of Survey

Construction works, Sand martins and starlings calling.

Description of Noise Environment at End of Survey

As above

Facade location?	No

Constraints

None

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
28	12:25	12:40	15mins	54.0	47.0	58.2	67.0	Noise from Construction site. Reversing vehicles beeping. Construction vehicle movement on site – 7mins 2 cars passed.

30	14:15	14:30	15mins	52.6	46.9	54.9	76.0	Boy playing in garden. Banging from site. Helicopter overhead - 4m 15s. Wind changed to gusts up to 3ms^{-1}
32	15:15	15:30	15mins	42.0	36.6	44.8	61.2	Car passing 30s, 1m Road traffic noise in the distance.
				49.5	43.5	52.6	68.1	**Total $L_{A10,15mins}$ -52.6** **$L_{A90,15mins}$ – 43.5**

Comments
During the third 15minute survey no construction noise was heard.

	Name	Signature	Date
Recorded by	Nicola Sim	Nicola Sim	31/05/13
Checked by	Heather Ather	Heather Ather	31/05/13

Noise Monitoring Report Form			
Date and Time: 29th May 2013 13:45 and 14:15		**Project: Maybole Bypass**	
Location	Low Grange Bungalow (Day)		
Personnel	Nicola Sim, Heather Ather		
SLM Type/Serial No.	B & K Type 2250/ 2717775	**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830
Weather conditions at start of Survey			
Wind speed (m/s)	0- 1m/s with Gusts of 4m/s	Cloud cover:	30%
Wind direction	SE	Temp (°C):	19°C
Calibration at the beginning survey	0.00 deviation from last	Calibration at the end of survey	0.00 deviation from last
Power Check at beginning	29% 2hrs 3mins	Power check at the end of survey	22% 36mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the outcome of the noise levels.

Description of Site

The Low Grange Bungalow is located to the north east of Maybole Town Centre. Measurement location was 15m from the carriageway edge. The area is located within a rural setting with grazing fields.

Description of Noise Environment at Start of Survey

Constant heavy traffic flow from the A77. Birds calling in the distance.

Description of Noise Environment at End of Survey

As above.

Facade location?	No

Constraints

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
38	13:45	14:00	15mins	60.4	38.3	64.9	77.0	Traffic Noise, approximately 30cars in 15minutes and 5 HGVs. Cows calling

39	14:00	14:15	15mins	59.0	38.9	63.6	78.3	Constant traffic noise approximately: Cars – 70 Van – 10 LGV – 1 Bus - 1 HGV – 3 Wind increased to gusts of 4 – 5ms^{-1}, with 80% cloud cover.
								Total $L_{A10, 30mins}$ 64.3 **$L_{A90, 30mins}$** 38.6

Comments

	Name	Signature	Date
Recorded by	Nicola Sim	NicolaSim	31/05/13
Checked by	Heather Ather	Heather Ather	31/05/13

Noise Monitoring Report Form

Date and Time: 30th May 2013, 11:00 and 13:00		**Project: Maybole Bypass**	
Location	Netherculzean Farm (Day)		
Personnel	Nicola Sim, Heather Ather		
SLM Type/Serial No.	B & K Type 2250/ 2717775	**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830

Weather conditions at start of Survey

Wind speed (m/s)	No wind		Cloud cover:	66%	
Wind direction	-		Temp (°C):	15°C	
Calibration at the beginning survey	Project 41	Project 43	Calibration at the end of survey	Project 41	Project 43
	0.03	0.00		-0.01	0.00
Power Check at beginning	Project 41	Project 43	Power check at the end of survey	Project 41	Project 43
	22% 1hr 23mins	12% 50mins		18% 1hr 45mins	8% 32mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the outcome of the noise levels.

Description of Site

Netherculzean Farm is located west of the existing A77 carriageway. The area is within a rural setting with fields surrounding the property used for arable and grazing farming. During the survey there were sheep in the fields adjacent the measurement location.

Description of Noise Environment at Start of Survey

Constant road traffic noise from the A77. Sheep in fields and birds calling.

Description of Noise Environment at End of Survey

As above.

Facade location?	No

Constraints

The Sound Level Meter (SLM) was out of battery to undertake a third 15 minutes with a consecutive 3hrs. Therefore survey was suspended.
No façade measurement undertaken as owner was not in for permission on private land.

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
41	11:05	11:20	15mins	58.5	47.8	61.4	71.6	Constant traffic from the A77. Trickling of water from the burn.

								Bird and sheep calling 11m 30s.
42	12:05	12:20	15mins	57.6	46.2	60.9	71.1	Birds and cows calling. Traffic from the A77.
								Total $L_{A10, 30mins}$ .61.2 **$L_{A90, 30mins}$– 47.0**
Comments								

	Name	Signature	Date
Recorded by	Nicola Sim	Nicola Sim	31/05/13
Checked by	Heather Ather	Heather Ather	31/05/13

Noise Monitoring Report Form					
Date and Time: 30th May 2013, 10:00 to 13:00			**Project: Maybole Bypass**		
Location	16 Crosshill Road (Day)				
Personnel	Nicola Sim, Heather Ather				
SLM Type/Serial No.	B & K Type 2250/ 2717775		**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830	
Weather conditions at start of Survey					
Wind speed (m/s)	0-1ms^{-1} Gusts 2ms^{-1}		Cloud cover:	90%	
Wind direction			Temp (°C):	14°C	
Calibration at the beginning survey	Project 40	Project 42	Calibration at the end of survey	Project 40	Project 42
	-0.01	-0.01		0.03	0.00
Power Check at beginning	Project 40	Project 42	Power check at the end of survey	Project 40	Project 42
	25% 1hr 47mins	18% 1hr 45mins		22% 1hr 23mins	12% 50mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the outcome of the noise levels.

Description of Site

The Sound Level Meter (SLM) was located 1m from the façade of 16 Crosshill Road. The surrounding area is a residential area just off High Street, through Maybole Town Centre. Adjacent to the survey area is Glebe Recreational Park. There are two bus stops across from the park.

Description of Noise Environment at Start of Survey

Traffic noise from Crosshill Road and distant noise from the A77.
Birds calling.

Description of Noise Environment at End of Survey

Dog Trainers present in the Park.

Facade location?	Yes

Constraints

The Sound Level Meter (SLM) was out of battery to undertake a third 15 minutes with a consecutive 3hrs. Therefore survey was suspended.

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
40	10:20	10:35	15mins	61.5	45.1	63.7	81.9	Constant traffic from Crosshill Road. Car parking. Hiab passing 5m 40s

								Dog barking 9m 30s
42	11:40	11:55	15mins	60.5	45.6	64.3	80.3	Constant traffic flow. Wind changed – gusts of 3ms^{-1} Birds calling 6m
								Total $L_{A10, 30mins}$-64.0 **$L_{A90,30mins}$– 45.4**

Comments

	Name	Signature	Date
Recorded by	Nicola Sim	Nicola Sim	31/05/13
Checked by	Heather Ather	Heather Ather	31/05/13

Noise Monitoring Report Form			
Date and Time: 6th June 2013 14:00 – 17:00		**Project: Maybole Bypass**	
Location	Netherculzean Farm		
Personnel	Nicola Sim, Heather Ather		
SLM Type/Serial No.	B & K Type 2250/ 2717775	**Calibrator Type/Serial No.**	B & K Type 4231/ 2714830
Weather conditions at start of Survey			
Wind speed (m/s)	No wind	Cloud cover:	0%
Wind direction	N/A	Temp (°C):	19°C
Calibration at the beginning survey	-0.04 deviation from last	Calibration at the end of survey	0.01 deviation from last
Power Check at beginning	69% - 5hrs 7mins	Power check at the end of survey	43% 3hrs 10mins

Purpose of the survey and relevant standards and guidelines

The survey was undertaken in accordance with the SDD Measurement Procedure within CRTN to determine the baseline noise surveys for noise sensitive receptors. This is to compare the existing to the predicted outcome of the noise levels.

Description and Image of Site

Netherculzean Farm is located approximately 82m from the existing A77 carriageway surrounded by arable and grazing fields. The property is surrounded by the trees with a private path to the house.

Description of Noise Environment at Start of Survey

Constant traffic noise from the A77. No wind at the start of the survey. Rook calls from trees within private land.

Description of Noise Environment at End of Survey

Same as above.

Facade location?	Yes

Constraints

None

Measurements

Project No.	Start	Stop	Elapsed Time	L_{Aeq} (dB)	L_{A90} (dB)	L_{A10} (dB)	L_{AMAX} (dB)	Comments
48	14:00	15:00	1hr	57.6	46.3	61.1	67.7	Traffic from the A77. Crows calling between 40 and 56dB. Quad bike. Tractor behind property in fields
49	15:00	16:00	1hr	57.8	47.4	61.1	69.4	Traffic from A77. Plane overhead 20mins 40secs Dog barking Rooks calling.

50	16:00	17:00	1hr	57.8	47.8	61.2	71.1	Traffic from A77 Rooks calling. Police car passing 11m 50s, 19m 30s and 31m 45s. Plane overhead 21m 45s Dog barking 32m.
								Total $L_{A10,3hr}$ – dB = 61.1 **$L_{A90,3hr}$ – dB = 47.2**

Comments

	Name	Signature	Date
Recorded by	Nicola Sim	Nicola Sim	10.06.13
Checked by	Heather Ather	Heather Ather	10.06.13

Appendix C

Calibration Certificates

CERTIFICATE OF CALIBRATION

Date of issue: 28 November 2012 Certificate Number: C1209079

ilac-MRA

DANAK
CAL Reg.nr. 307

Brüel & Kjær

The Calibration Laboratory
Skodsborgvej 307. DK-2850 Nærum, Denmark
Tel: +45 45 800 500 Fax: +45 45 801 405
Email: ukservice@bksv.com

Morten Høngård Hansen
Approved Signatory

CALIBRATION OF:

Sound Level Meter:	Brüel & Kjær Type 2250	No: 2717775	Id: -
Microphone:	Brüel & Kjær Type 4189	No: 2710690	
Associated Calibrator:	Brüel & Kjær Type 4231	No: 2714830	
Calibrator Certificate:	C1209029	Calibrator Level:	93.98 dB SPL
SLM Software Version:	BZ7223 Version 3.5.3		

Date of calibration: 27 November 2012

CUSTOMER:

Amey OW Limited
Precision House, McNeil Drive
Eurocentral. Motherwell
ML1 4UR Glasgow
United Kingdom

Customer Ref: 2000193001

CALIBRATION CONDITIONS:

Preconditioning: 12 hours at 23°C ± 3°C

Environment conditions: Air Temperature: 23.0 °C, Air Pressure: 100.1 kPa, Relative Humidity: 49.0 %RH

SPECIFICATIONS:

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in BS7580: Part 1: 1997.

PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.7 - DB: 4.60) by using procedure 2250-4189.

RESULTS:

Unless otherwise stated herein, the reported uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with DANAK requirements. The uncertainties refer to the measured values only with no account being taken of the ability of the device under test to maintain its calibration.

Note: Calibration after repair/adjustment.

Brüel & Kjær

The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

ilac-MRA DANAK CAL Reg.nr. 307

CERTIFICATE OF CALIBRATION

No: C1209029

CALIBRATION OF

Calibrator:	Brüel & Kjær Type 4231	No: 2714830 Id: -
½ Inch adaptor:	Brüel & Kjær Type UC-0210	
Pattern Approval:	None	

CUSTOMER

Amey OW Limited
Precision House, McNeil Drive
Eurocentral. Motherwell
ML1 4UR Glasgow
United Kingdom

CALIBRATION CONDITIONS

Preconditioning:	4 hours at 23°C ± 3°C
Environment conditions:	Pressure: 99.93 kPa. Humidity: 49 % RH. Temperature: 23.2 °C.

SPECIFICATIONS

The Calibrator Brüel & Kjær Type 4231 has been calibrated in accordance with the requirements as specified in IEC60942:2003 Annex B Class 1. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær acoustic calibrator calibration application software Type 7794 (version 2.4) by using procedure P_4231_D04.

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2012-11-27

Date of issue: 2012-11-27

Susanne Nygaard
Calibration Technician

Erik Bruus
Approved Signatory