APPENDIX A7

Port Augusta landing facility noise assessment

BHP Billiton

Olympic Dam Expansion

Port Augusta Landing Facility Noise Assessment

R0001

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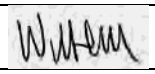
		Signature			
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Contents

1 Introduction

An offsite landing facility is proposed at Port Augusta as part of the of the Olympic Dam Expansion project.

A noise assessment has previously been undertaken for the proposed landing facility and is detailed in Arup report *Olympic Dam Expansion Environmental Impact Assessment – Noise and Vibration*[1] (2008 Arup report). Two scenarios of operation were considered in this report with the following outcomes:

- It was predicted that noise levels for the day time operation (scenario 1) will exceed the day time noise limits at nearby noise sensitive receivers for neutral meteorological conditions and significantly exceed the day time noise limits for adverse meteorological conditions; and
- It was predicted that noise levels for the night-time operation (scenario 2) will meet the night-time noise limits at all noise sensitive receivers for the meteorological conditions which were considered.

BHP Billiton (BHPB) has requested Arup to investigate the noise reduction that is required to meet criteria determined using the South Australia Environmental Protection (Noise) Policy[2] (EPP) for the following conditions:

- Criteria based on proposed industrial zoning for the landing facility; and
- Criteria based on the current zoning for the landing facility as requested by the South Australia Environmental Protection Authority (SA EPA).

In-principle mitigation options to achieve the noise reductions identified are also provided in this report.

[1] Arup Acoustics, *Olympic Dam Expansion Environmental Impact Assessment – Noise and Vibration Revision D*, 17 November 2008.
[2] South Australia Environment Protection (Noise) Policy 2007

2 Methodology

2.1 Criteria

Criteria determined using the EPP and based on the proposed industrial zoning for the landing facility are provided in Table 1 below.

Receiver Location	External Noise Limit at Noise Sensitive Receiver	
	Day (7am to 10pm)	Night (10pm to 7am)
Shacks Road, Port Augusta	51 dBL_{Aeq}	45 dBL_{Aeq} 60 dBL_{Amax}

Table 1: Criteria determined based on industrial zoning for the proposed landing facility

Criteria proposed by the SA EPA, using the EPP and based on the current zoning for the proposed landing facility are provided in Table 2 below.

Receiver Location	External Noise Limit at Noise Sensitive Receiver	
	Day (7am to 10pm)	Night (10pm to 7am)
Shacks Road, Port Augusta	47 dBL_{Aeq}	40 dBL_{Aeq} 60 dBL_{Amax}

Table 2: Criteria determined based on current zoning for the proposed landing facility

2.2 Source Data

Data used in the acoustic model is the same as detailed and used in 2008 Arup report and includes the following noise sources:

- Barge Engine Noise (Idle)
- Truck Engine Noise (Idle)
- Crane Operational Noise
- 100 kW Generator

Noise levels associated with items of the landing facility are detailed in Table 3 below. Noise levels are based on data from Arup's source noise database.

Description	Octave Band Sound Power Level dB re 10-12 W								
	dB(A)	63	125	250	500	1k	2k	4k	8k
Barge	112	124	120	112	108	108	104	96	87
Truck Idle	81	90	87	77	79	75	73	67	63
Operational Crane	99	101	99	96	98	94	91	82	77
100kW Generator	95	93	92	97	92	91	86	81	77

Table 3: Source noise levels used for acoustic modelling

2.3 Modelling

The existing acoustic model detailed in the 2008 Arup report has been updated to remove the nearest noise sensitive receiver as the building has been demolished since the previous assessment.

The modelling considers the following scenarios for neutral and adverse meteorological conditions:

- Scenario 1: Daytime operation, including all noise sources listed in Section 2.2 operating at the landing facility and barge.
- Scenario 2: Night-time operation with only generators operating on the barge.

Based on acoustic modelling, the predicted excesses over criteria have been determined and the most significant noise source contribution identified.

The reduction in noise level that is required to meet criteria is determined for the most significant noise source identified. Noise contours are calculated after applying this reduction.

Mitigation options for the identified noise sources are provided to meet criteria.

3 Results

3.1 Scenario 1 - Daytime

Predicted daytime noise levels for the typical landing facility detailed in the 2008 Arup report and using the updated acoustic model exceed all criteria in Section 2.1. The excess over the criteria is provided in Table 4.

Meteorological Condition	Criteria dBL_{Aeq}	Predicted Sound Pressure Level dB(A) re 20 X 10^{-6} Pa	Excess (dB)
Neutral	51 (Proposed Zoning)	52	1
Neutral	47 (Current Zoning)	52	5
Adverse	51 (Proposed Zoning)	57	6
Adverse	47 (Current Zoning)	57	10

Table 4: Predicted daytime noise levels and the excess over criteria

In all cases, the barge is the most significant noise source.

3.2 Scenario 2 – Night-time

Predicted night-time noise levels for the updated acoustic model (including the removed building nearest to the facility) meet the criteria in Section 2.1.

3.3 Noise Reduction

For Scenario 1, during the daytime period, the barge is the most significant contribution to the overall noise level at the most exposed noise sensitive receiver.

It is predicted that the noise level at the most exposed noise sensitive receiver will meet criteria during the daytime period by reducing the noise level of the barge by the levels shown in Table 5.

Meteorological Condition	Criteria dBL_{Aeq}	Reduction to overall noise level Required (dB)
Neutral	51 (Proposed Zoning)	1
Neutral	47 (Current Zoning)	6
Adverse	51 (Proposed Zoning)	7
Adverse	47 (Current Zoning)	13

Table 5: Required reduction in barge noise levels

4 Predicted Noise Levels

4.1 Scenario 1

Noise levels have been predicted for Scenario 1 for neutral and adverse meteorological conditions with the noise level reductions required to meet each of the criteria as identified in Table 5.

Noise contours for neutral meteorological conditions and 1 dB noise reduction applied to the barge engines to meet criteria based on the proposed zoning are provided in Figure 1.

Noise contours for adverse meteorological conditions and 6 dB noise reduction applied to the barge engines to meet criteria based on the proposed zoning are provided in Figure 2.

Noise contours for neutral meteorological conditions and 7 dB noise reduction applied to the barge engines to meet criteria based on the current zoning are provided in Figure 3.

Noise contours for adverse meteorological conditions and 13 dB noise reduction applied to the barge engines to meet criteria based on the current zoning are provided in Figure 4.

4.2 Scenario 2

Noise contours for neutral meteorological conditions are provided in Figure 5.

Noise contours for adverse meteorological conditions are provided in Figure 6.

5 Discussion

For Scenario 1 to meet the noise criteria for all meteorological conditions considered, the overall noise level of the barge will need to be reduced by the levels provided in Table 6 below for each of the zonings considered.

Criteria dBL_{Aeq}	Reduction to overall noise level Required (dB)
51 (Proposed Zoning)	7
47 (Current Zoning)	13

Table 6: Scenario 1, daytime operation noise reduction Requirement

In principle mitigation options for the barge to meet criteria are:

- Turn off the barge engines when using the landing facility;
- Ensure that any barge using the facility is below the relevant criterion (this can be determined by measurement); or
- Provide specific attenuation for a barge or barges that will use the landing facility. Attenuation of the engines could include sound insulation for the engine room and attenuation of the exhaust outlets (this will require a detailed study of noise sources at the barge).

For scenario 2, it is predicted that the night-time use of the generators will meet all proposed criteria.

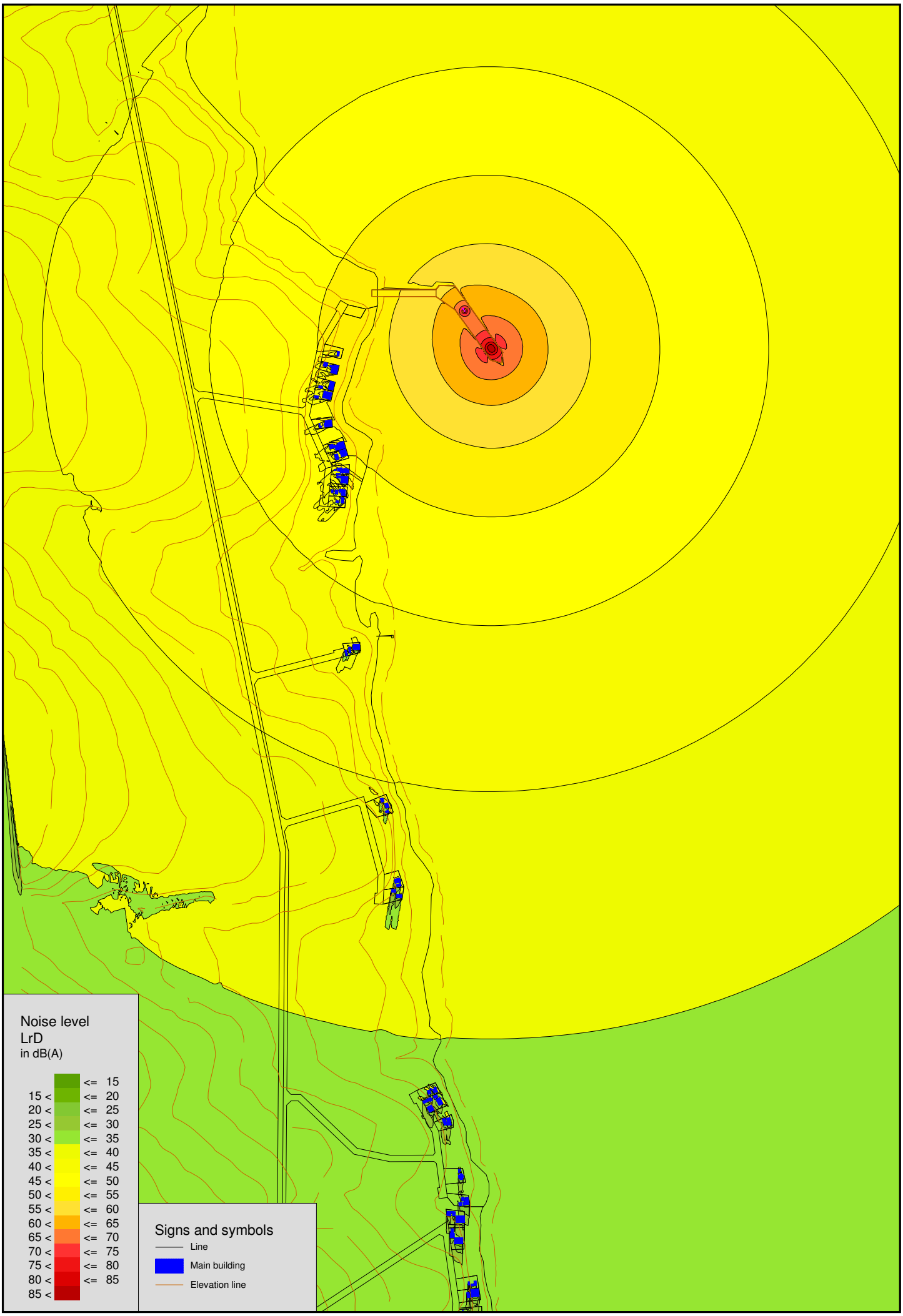

Figure 1: Predicted Daytime Noise Level for Neutral Meteorological Conditions.

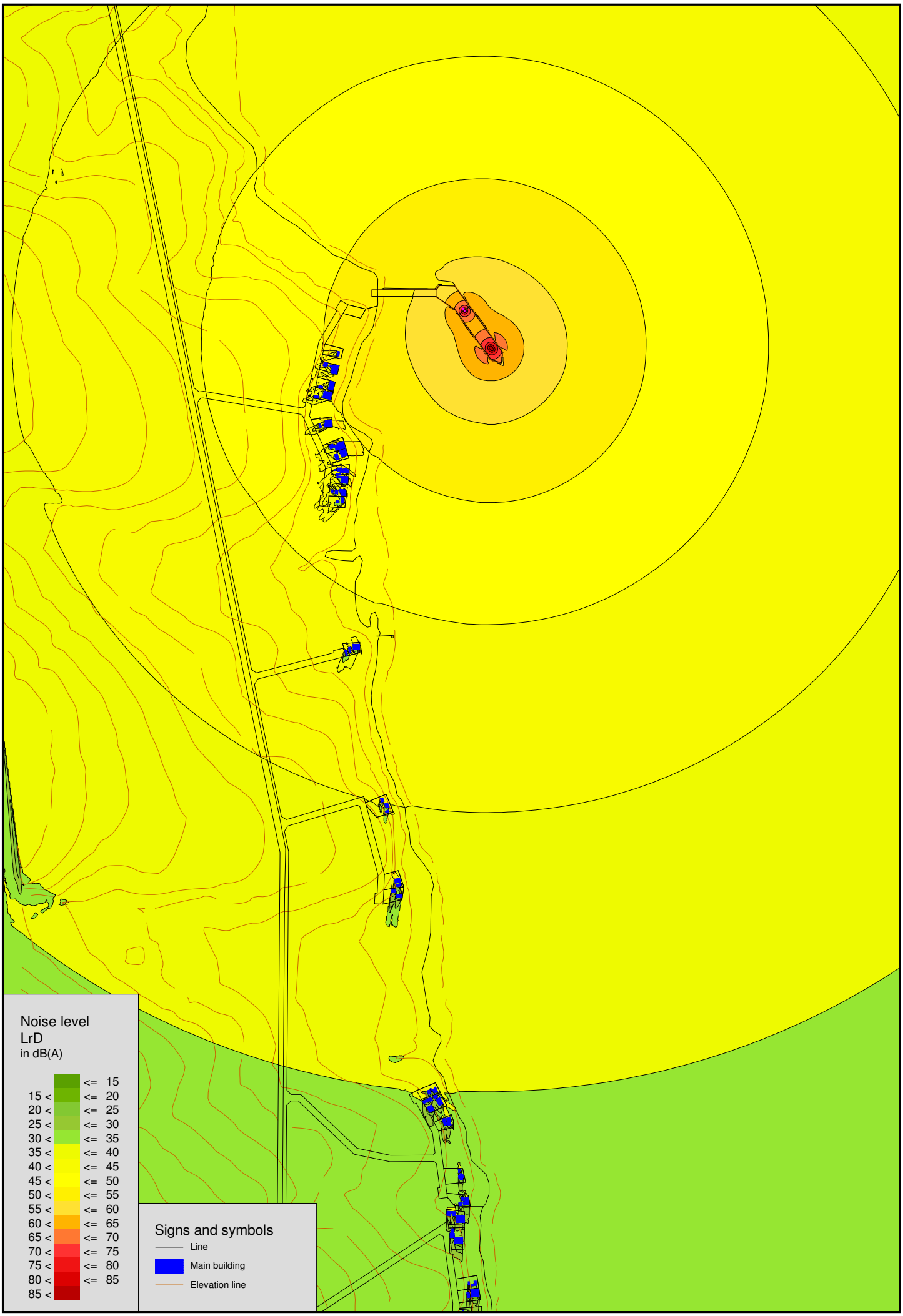

Figure 2: Predicted Daytime Noise Level for Adverse Meteorological Conditions.

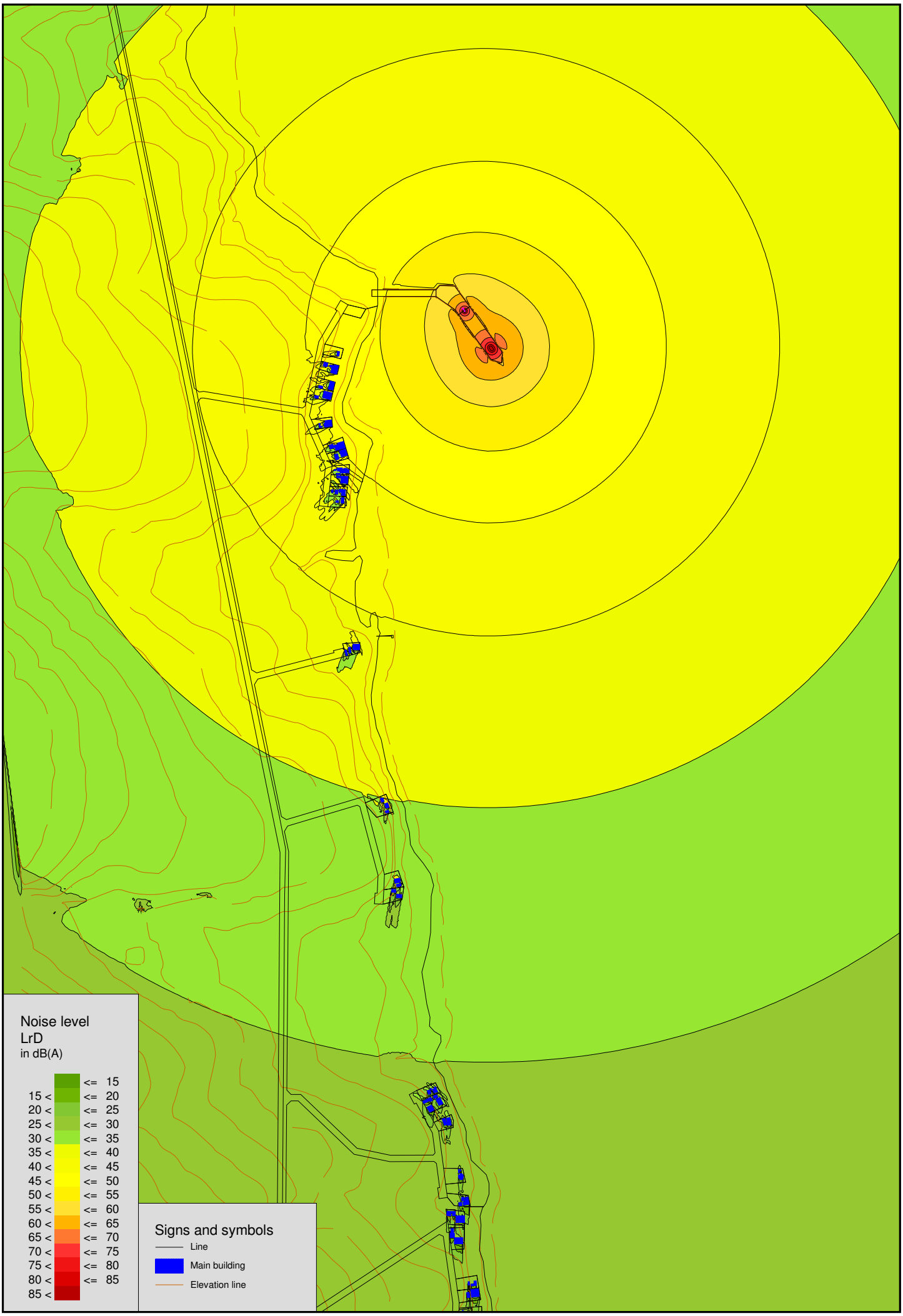

Figure 3: Predicted Daytime Noise Level for Neutral Meteorological Conditions.

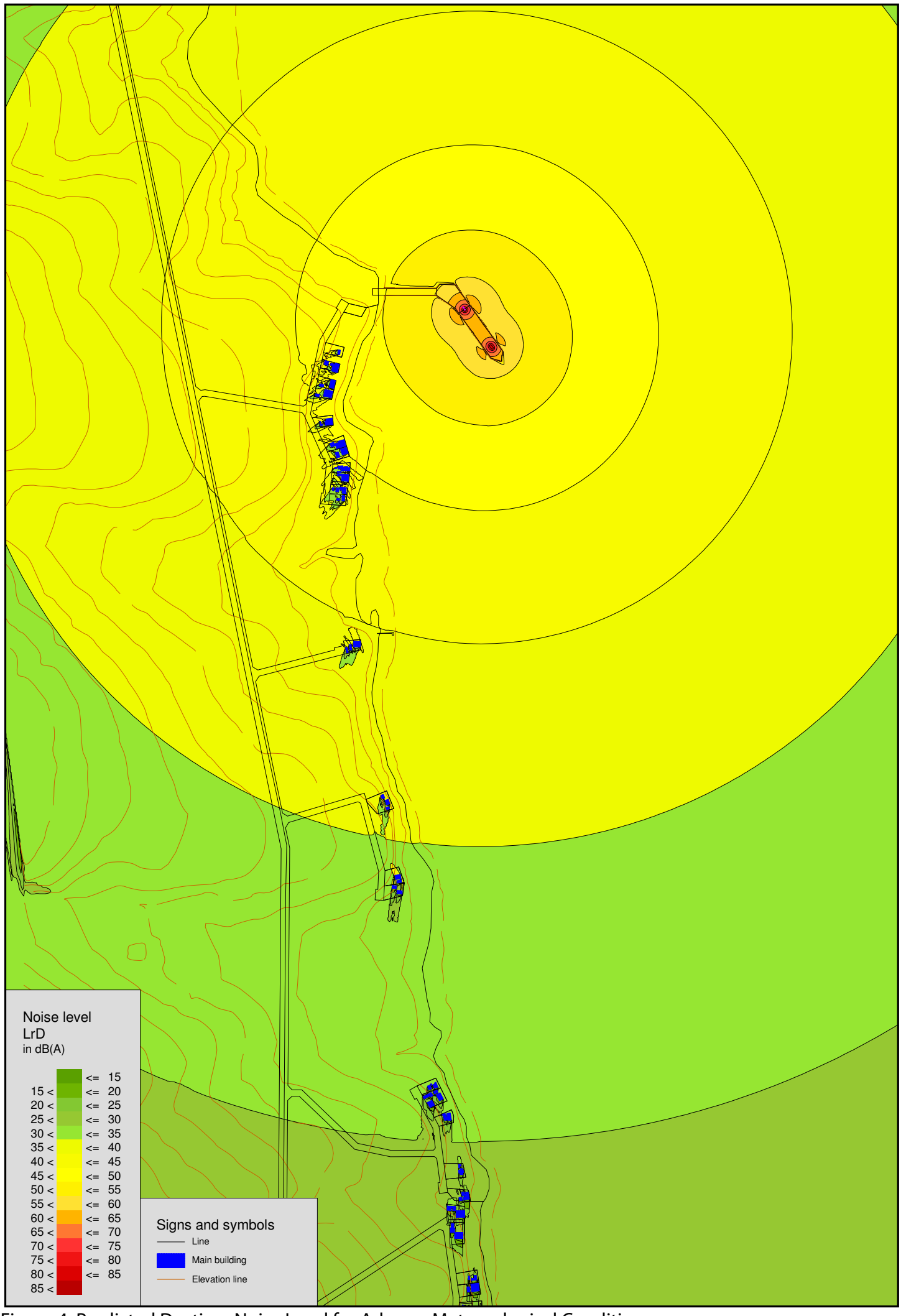

Figure 4: Predicted Daytime Noise Level for Adverse Meteorological Conditions.

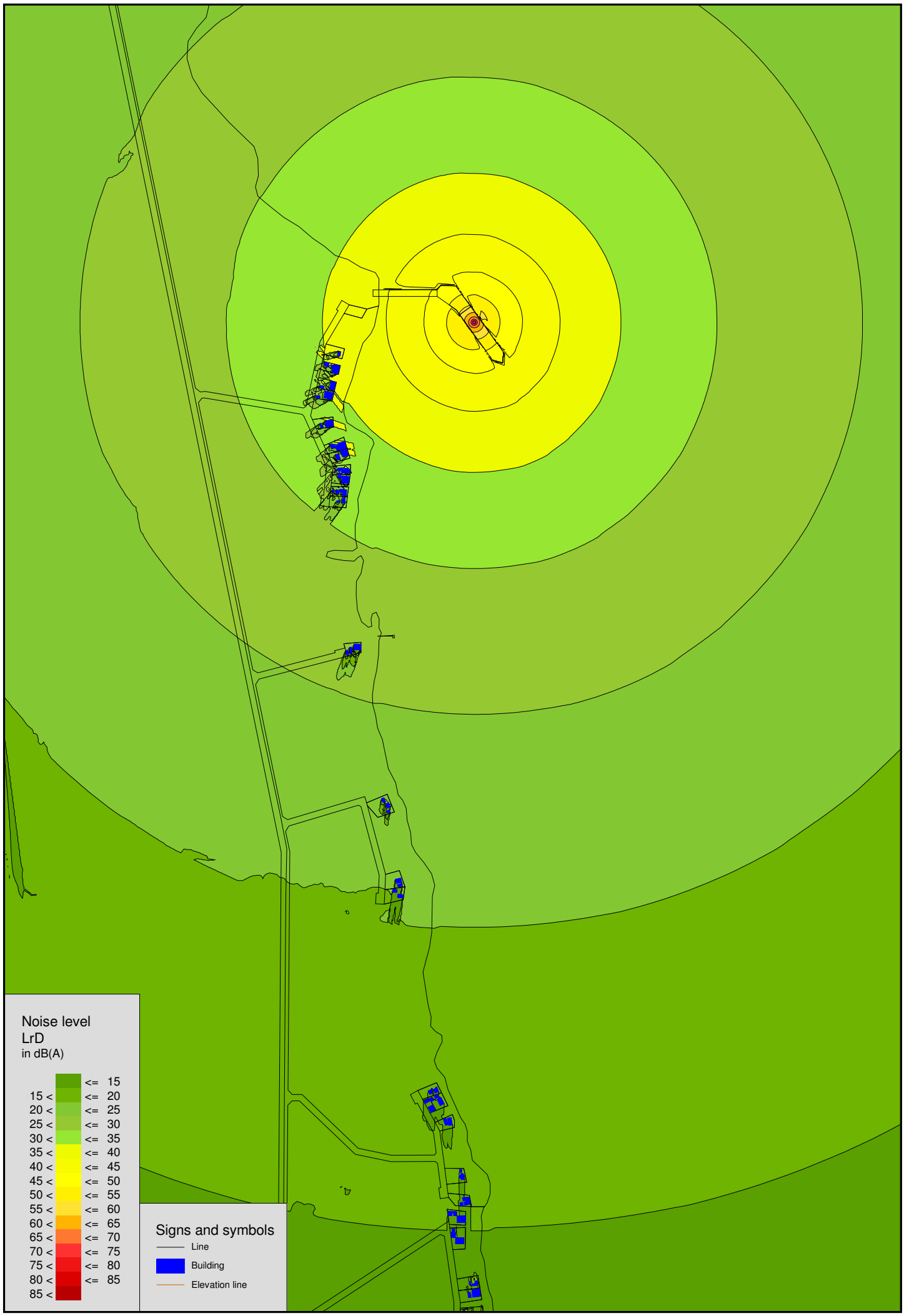

Figure 5: Predicted Night-time Noise Level for Neutral Meteorological Conditions.

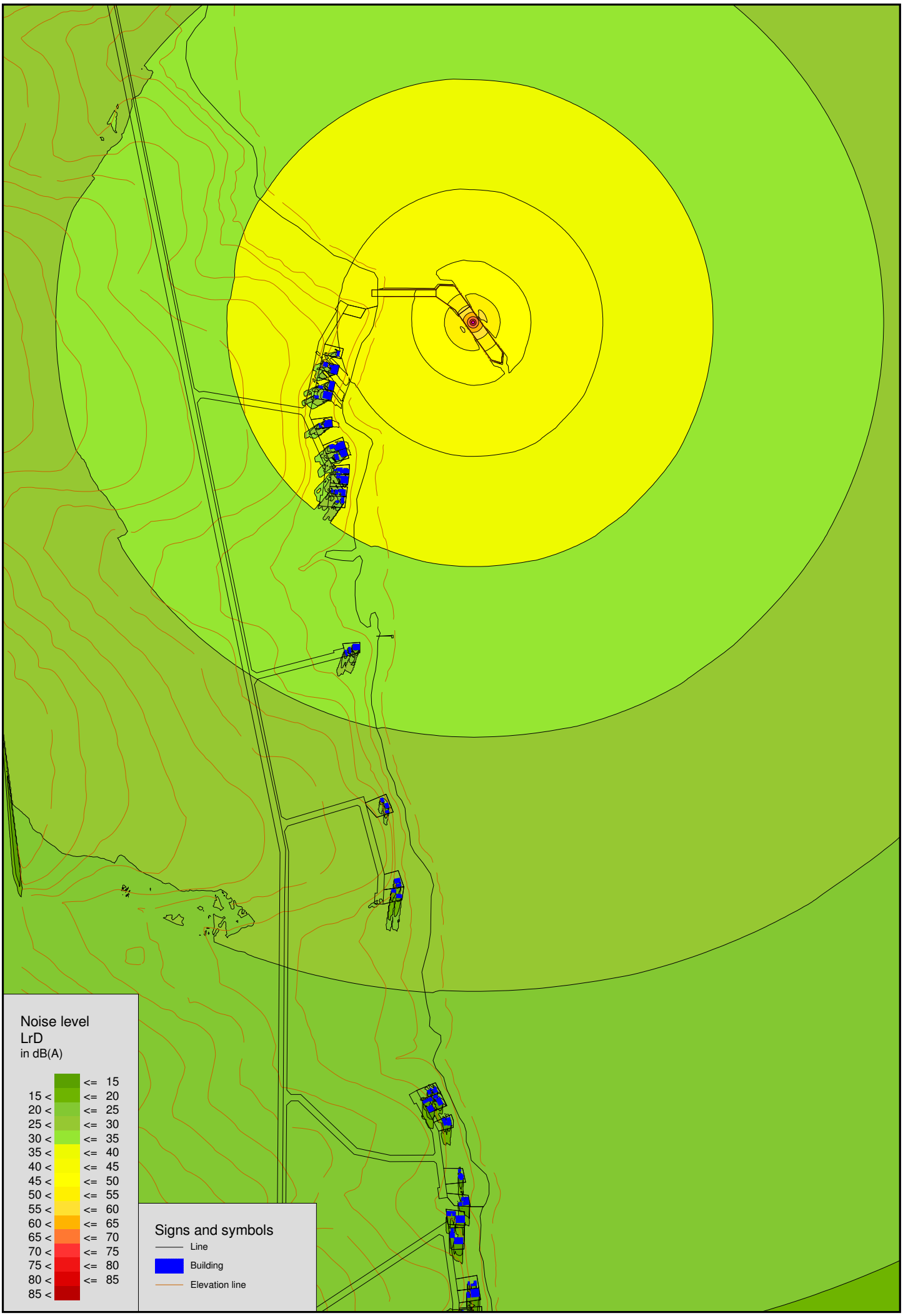

Figure 6: Predicted Night-time Noise Level for Adverse Meteorological Conditions.