

## Technical Note

|                |                                               |
|----------------|-----------------------------------------------|
| Project title  | Hampshire County Council - Upland Farm Estate |
| Job number     | 251898-02                                     |
| File reference |                                               |
| cc             |                                               |
| Prepared by    | Sarah Dennison                                |
| Date           | 20 July 2023                                  |
| Subject        | Botley Fields WPP53 - Revised Technical Note  |

Parkin House 8 St. Thomas Street Hampshire SO23 9HE United Kingdom  
t +44 1962 829900 d 01962829912  
[arup.com](https://www.arup.com)

---

### 1. Introduction

Arup have provided ongoing specialist technical support to Hampshire County Council (HCC) to assist with the development of the HCC noise mitigation strategy in connection with the ‘site suitability assessment’ for the proposed Botley Fields housing development in Eastleigh, Hampshire. This was referred to as Uplands Farm in previous assessments.

The reported results from the first noise HCC mitigation design iteration for this site was issued by Arup in July 2018 (referred in this report Original HCC ‘2018’ mitigation design). The residential scheme application subsequently received successful planning approval.

HCC re-commissioned Arup in December 2022 to undertake an additional study in order to establish whether a proposed mitigation design variation (provided by the HCC bypass team) on the original ‘approved’ 2018 version would still provide the same level of noise mitigation. The outcome revealed that this latest design (referred in this report as Proposed HCC ‘2023’ mitigation design) would not result in any degradation in performance but would in fact offer slight beneficial improvements at some locations, to the original mitigation design strategy.

This latest assessment reported here is to evaluate the effectiveness of HCC’s revised noise mitigation proposal<sup>1</sup>, and compare its performance relative to the original noise mitigation design submitted with the (now consented) housing scheme.

The revised noise mitigation design from HCC, was provided to Arup, in digital format, which was then incorporated into the original road noise prediction model, as provided by Atkins (Engineering and design company). Atkins had produced the original noise model and prediction results. All other parameters, such as the new bypass alignment and traffic flow conditions were kept the same

---

<sup>1</sup> As shown in HCC drawing ‘CJ008882-ECH-HGN-M3-HWAYS DESIGN WITH ACOUSTIC FENCE’

Job number 251898-02  
Date 20 July 2023

---

as in the original assessment, to permit a direct comparison with the results from the original mitigation design.

This technical note also clarifies some other queries raised by the HCC bypass team, in order for this document to be used in support of the submission for the 'Botley Fields noise phase reserved matters' application, as detailed in the following paragraphs.

The exact same road noise modelling software was used (NoiseMap Server Edition) in both assessments, along with the exact same calculation output parameters to produce the required  $L_{Aeq,16hr}$  daytime and  $L_{Aeq,8hr}$  night-time 'absolute' noise values.

Confirmation has also been received from Atkins that the latest traffic data has been used for this study. They have advised that the very latest traffic flow data (as used in their 2021 updated Botley Bypass Phase 3 noise report – section 4.1 – dated May 2021<sup>2</sup>) was included within the 'zip' files containing the modelled scenarios provided to Arup to undertake this latest work.

Regarding the Public Right of Way (PRoW) - A brief discussion on whether enhancements are required to the PRoW (which traverses directly through, and thus creates a 'gap' within, part of the proposed noise bunding), is covered in Section 4.

## 2. Results

The original noise mitigation design incorporated three separate 3m high earth bunds (along with a short section of 3m vertical noise barrier in the NE quadrant, where underground HT power lines would be laid). The revised design again comprises three separate earth bunds, but this time 2m high, with a 1m vertical noise barrier along each apex - again with a short section of 3m vertical noise barrier in a similar location to the original design.

The only change to the noise model was the inclusion of the new bund profiles with the 1m vertical barrier. The same (eleven) assessment locations were used to undertake the noise calculations. These locations are shown beneath each Table. A brief explanation of the component parts of each of the mitigation scenarios assessed is presented here:-

- **Original HCC '2018'**:- mitigation design incorporates three separate 3m high earth bunds (along with a short section of 3m vertical noise barrier in the NE quadrant, where underground HT power lines would be laid).
- **Proposed HCC '2023'**:- this revised HCC mitigation design, again comprises three separate earth bunds (with slightly differing termination points at the northern site boundary) but now of 2m height above local ground level. On each apex is an additional 1m vertical noise

---

<sup>2</sup> Email from Henrik Malter, Atkins, dated Wed 21-6-23

**Job number** 251898-02  
**Date** 20 July 2023

---

barrier - again with a short section of 3m vertical noise barrier in a similar NE quadrant to 2018 design where HT power lines would be located.

The calculated noise exposure results for the case without mitigation, original HCC '2018' mitigation design (3m bunds) and new mitigation strategy (Proposed HCC '2023', 2m bunds and 1m barrier), are shown below in Table 1, Table 2 and Table 3 respectively.

Job number

251898-02

Date

20 July 2023

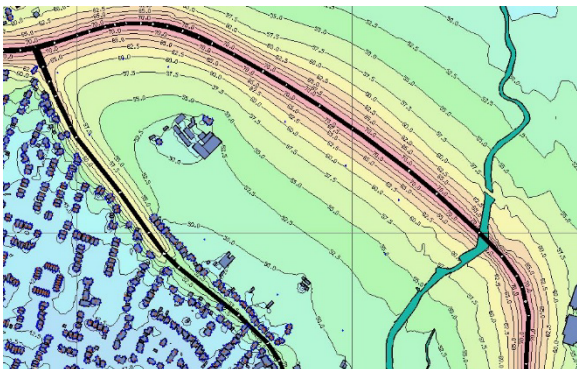
| Location<br>(see plan below and Fig.3)                                                                                   | Floor | Predicted dBL <sub>Aeq,16h</sub> Free Field Daytime |         |                                 |                         | Predicted dBL <sub>Aeq,8h</sub> Free Field Night time                    |         |                                 |                         |
|--------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------------|---------|---------------------------------|-------------------------|--------------------------------------------------------------------------|---------|---------------------------------|-------------------------|
|                                                                                                                          |       | External Areas                                      |         | Indoors, Partially open windows | Indoors, Closed Windows | External Areas                                                           |         | Indoors, Partially open windows | Indoors, Closed Windows |
|                                                                                                                          |       | Sound level                                         | Effect* | Sound level                     |                         | Sound level                                                              | Effect* | Sound level                     |                         |
| Wi-1                                                                                                                     | Gnd   | 59                                                  | LOAEL   | 44                              | 33                      | 51                                                                       | LOAEL   | 37                              | 26                      |
|                                                                                                                          | 1st   | 61                                                  | LOAEL   | 46                              | 35                      | 53                                                                       | LOAEL   | 39                              | 27                      |
| Wi-2                                                                                                                     | Gnd   | 59                                                  | LOAEL   | 44                              | 33                      | 51                                                                       | LOAEL   | 37                              | 26                      |
|                                                                                                                          | 1st   | 60                                                  | LOAEL   | 45                              | 34                      | 53                                                                       | LOAEL   | 39                              | 28                      |
| Wi-3                                                                                                                     | Gnd   | 59                                                  | LOAEL   | 44                              | 33                      | 51                                                                       | LOAEL   | 37                              | 26                      |
|                                                                                                                          | 1st   | 61                                                  | LOAEL   | 46                              | 35                      | 53                                                                       | LOAEL   | 39                              | 28                      |
| Wi-4                                                                                                                     | Gnd   | 54                                                  | LOAEL   | 39                              | 28                      | 46                                                                       | LOAEL   | 31                              | 20                      |
|                                                                                                                          | 1st   | 55                                                  | LOAEL   | 40                              | 29                      | 47                                                                       | LOAEL   | 32                              | 21                      |
| Wi-5                                                                                                                     | Gnd   | 49                                                  | <LOAEL  | 34                              | 23                      | 42                                                                       | LOAEL   | 27                              | 16                      |
|                                                                                                                          | 1st   | 50                                                  | <LOAEL  | 35                              | 24                      | 43                                                                       | LOAEL   | 28                              | 17                      |
| Wi-6                                                                                                                     | Gnd   | 48                                                  | <LOAEL  | 33                              | 22                      | 41                                                                       | LOAEL   | 26                              | 15                      |
|                                                                                                                          | 1st   | 49                                                  | <LOAEL  | 34                              | 23                      | 42                                                                       | LOAEL   | 27                              | 16                      |
| Wi-7                                                                                                                     | Gnd   | 48                                                  | <LOAEL  | 33                              | 22                      | 41                                                                       | LOAEL   | 26                              | 15                      |
|                                                                                                                          | 1st   | 49                                                  | <LOAEL  | 34                              | 23                      | 42                                                                       | LOAEL   | 27                              | 16                      |
| Wi-8                                                                                                                     | Gnd   | 56                                                  | LOAEL   | 41                              | 30                      | 48                                                                       | LOAEL   | 33                              | 22                      |
|                                                                                                                          | 1st   | 58                                                  | LOAEL   | 43                              | 32                      | 50                                                                       | LOAEL   | 35                              | 24                      |
| Wi-9                                                                                                                     | Gnd   | 60                                                  | LOAEL   | 45                              | 34                      | 52                                                                       | LOAEL   | 37                              | 26                      |
|                                                                                                                          | 1st   | 62                                                  | LOAEL   | 47                              | 36                      | 54                                                                       | LOAEL   | 39                              | 28                      |
| Wi-10                                                                                                                    | Gnd   | 58                                                  | LOAEL   | 43                              | 32                      | 50                                                                       | LOAEL   | 35                              | 24                      |
|                                                                                                                          | 1st   | 60                                                  | LOAEL   | 45                              | 34                      | 52                                                                       | LOAEL   | 37                              | 26                      |
| Wi-11                                                                                                                    | Gnd   | 57                                                  | LOAEL   | 42                              | 31                      | 49                                                                       | LOAEL   | 34                              | 23                      |
|                                                                                                                          | 1st   | 58                                                  | LOAEL   | 43                              | 32                      | 51                                                                       | LOAEL   | 36                              | 25                      |
|                                       |       |                                                     |         |                                 |                         | Meeting NPSE / WHO / BS8233 noise criteria                               |         |                                 |                         |
|                                                                                                                          |       |                                                     |         |                                 |                         | Within +5dB of WHO / BS8233 internal criteria **                         |         |                                 |                         |
|                                                                                                                          |       |                                                     |         |                                 |                         | * In accordance with Government noise policy (NPPF, NPSE, and PPG-Noise) |         |                                 |                         |
| ** +5dB relaxation allowed in BS 8233 guidance where the development is considered 'necessary or desirable'.             |       |                                                     |         |                                 |                         |                                                                          |         |                                 |                         |
| L <sub>Aeq,16hr</sub> Daytime noise contours, 1st Floor Level<br>(see Contour Maps in Appendix A for Receptor Locations) |       |                                                     |         |                                 |                         |                                                                          |         |                                 |                         |

Table 1: Uplands Farm development (Botley Fields), with **no mitigation** strategy incorporated. Assessment of daytime external noise exposure relative to Government Noise Policy criteria and internal noise exposure relative to relevant guidance criteria

| Location | Floor | Predicted dBL <sub>Aeq,16h</sub> Free Field Daytime |  |  |  | Predicted dBL <sub>Aeq,8h</sub> Free Field Night time |  |  |  |
|----------|-------|-----------------------------------------------------|--|--|--|-------------------------------------------------------|--|--|--|
|----------|-------|-----------------------------------------------------|--|--|--|-------------------------------------------------------|--|--|--|

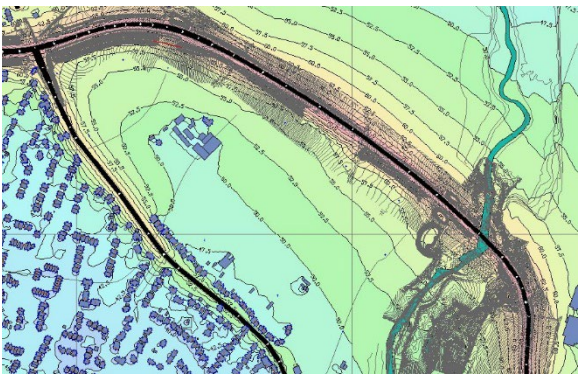
Job number

251898-02

Date

20 July 2023

| (see plan below and Fig.3) |     |                |         |                                 |                         |                |         |                                 |                         |
|----------------------------|-----|----------------|---------|---------------------------------|-------------------------|----------------|---------|---------------------------------|-------------------------|
|                            |     | External Areas |         | Indoors, Partially open windows | Indoors, Closed Windows | External Areas |         | Indoors, Partially open windows | Indoors, Closed Windows |
|                            |     | Sound level    | Effect* | Sound level                     |                         | Sound level    | Effect* | Sound level                     |                         |
| Wi-1                       | Gnd | 54             | LOAEL   | 39                              | 28                      | 46             | LOAEL   | 31                              | 20                      |
|                            | 1st | 55             | LOAEL   | 40                              | 29                      | 48             | LOAEL   | 33                              | 22                      |
| Wi-2                       | Gnd | 56             | LOAEL   | 41                              | 30                      | 49             | LOAEL   | 34                              | 23                      |
|                            | 1st | 58             | LOAEL   | 43                              | 32                      | 50             | LOAEL   | 35                              | 24                      |
| Wi-3                       | Gnd | 56             | LOAEL   | 41                              | 30                      | 49             | LOAEL   | 34                              | 23                      |
|                            | 1st | 58             | LOAEL   | 43                              | 32                      | 51             | LOAEL   | 36                              | 25                      |
| Wi-4                       | Gnd | 52             | LOAEL   | 37                              | 26                      | 45             | LOAEL   | 30                              | 19                      |
|                            | 1st | 54             | LOAEL   | 39                              | 28                      | 46             | LOAEL   | 31                              | 20                      |
| Wi-5                       | Gnd | 49             | <LOAEL  | 34                              | 23                      | 42             | LOAEL   | 27                              | 16                      |
|                            | 1st | 50             | <LOAEL  | 35                              | 24                      | 43             | LOAEL   | 28                              | 17                      |
| Wi-6                       | Gnd | 47             | <LOAEL  | 32                              | 21                      | 40             | LOAEL   | 25                              | 14                      |
|                            | 1st | 48             | <LOAEL  | 33                              | 22                      | 41             | LOAEL   | 26                              | 15                      |
| Wi-7                       | Gnd | 47             | <LOAEL  | 32                              | 21                      | 40             | LOAEL   | 25                              | 14                      |
|                            | 1st | 48             | <LOAEL  | 33                              | 22                      | 41             | LOAEL   | 26                              | 15                      |
| Wi-8                       | Gnd | 56             | LOAEL   | 41                              | 26                      | 48             | LOAEL   | 33                              | 19                      |
|                            | 1st | 57             | LOAEL   | 42                              | 27                      | 50             | LOAEL   | 35                              | 20                      |
| Wi-9                       | Gnd | 59             | LOAEL   | 44                              | 33                      | 51             | LOAEL   | 36                              | 25                      |
|                            | 1st | 61             | LOAEL   | 46                              | 35                      | 53             | LOAEL   | 38                              | 27                      |
| Wi-10                      | Gnd | 54             | LOAEL   | 39                              | 28                      | 47             | LOAEL   | 32                              | 21                      |
|                            | 1st | 56             | LOAEL   | 41                              | 30                      | 49             | LOAEL   | 34                              | 23                      |
| Wi-11                      | Gnd | 54             | LOAEL   | 39                              | 28                      | 47             | LOAEL   | 32                              | 21                      |
|                            | 1st | 56             | LOAEL   | 41                              | 30                      | 49             | LOAEL   | 34                              | 23                      |



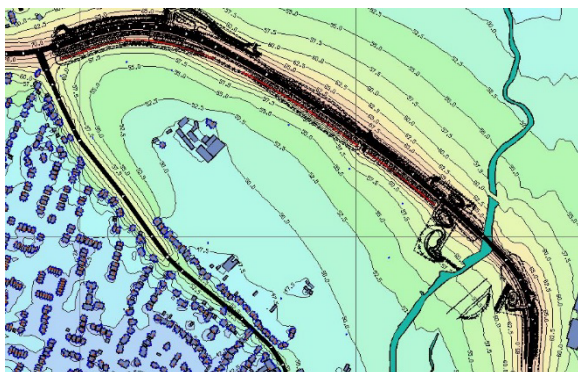
L<sub>Aeq,16hr</sub> Daytime noise contours, 1st Floor Level

|                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Meeting NPSE / WHO / BS8233 noise criteria                                                                                                                                                          |
| Within +5dB of WHO / BS8233 internal criteria **                                                                                                                                                    |
| <p>* In accordance with Government noise policy (NPPF, NPSE, and PPG-Noise)</p> <p>** +5dB relaxation allowed in BS 8233 guidance where the development is considered 'necessary or desirable'.</p> |

Table 2: **Original HCC '2018'** mitigation design (3m bunds). Assessment of daytime external noise exposure relative to Government Noise Policy criteria and internal noise exposure relative to relevant guidance criteria. *Note: the difference in noise levels discussed in Arup's first technical note<sup>2</sup> which were reported for receptor Wi8 in the original July 2018 report<sup>1</sup>, was a direct result of the amended '2019yr' traffic flow data included within the latest noise model provided by Atkins. This explains why the categorisation colours have changed.*

| Floor | Predicted dBL <sub>Aeq,16h</sub> Free Field Daytime | Predicted dBL <sub>Aeq,8h</sub> Free Field Night time |
|-------|-----------------------------------------------------|-------------------------------------------------------|
|-------|-----------------------------------------------------|-------------------------------------------------------|

| (see plan below and Fig.3) |     | External Areas |         | Indoors, Partially open windows | Indoors, Closed Windows | External Areas |         | Indoors, Partially open windows | Indoors, Closed Windows |
|----------------------------|-----|----------------|---------|---------------------------------|-------------------------|----------------|---------|---------------------------------|-------------------------|
|                            |     | Sound level    | Effect* | Sound level                     |                         | Sound level    | Effect* | Sound level                     |                         |
| Wi-1                       | Gnd | 53             | LOAEL   | 38                              | 27                      | 46             | LOAEL   | 31                              | 20                      |
|                            | 1st | 55             | LOAEL   | 40                              | 29                      | 47             | LOAEL   | 32                              | 21                      |
| Wi-2                       | Gnd | 55             | LOAEL   | 40                              | 29                      | 48             | LOAEL   | 33                              | 22                      |
|                            | 1st | 57             | LOAEL   | 42                              | 31                      | 49             | LOAEL   | 34                              | 23                      |
| Wi-3                       | Gnd | 56             | LOAEL   | 41                              | 30                      | 49             | LOAEL   | 34                              | 23                      |
|                            | 1st | 58             | LOAEL   | 43                              | 32                      | 51             | LOAEL   | 36                              | 25                      |
| Wi-4                       | Gnd | 53             | LOAEL   | 38                              | 27                      | 46             | LOAEL   | 31                              | 20                      |
|                            | 1st | 54             | LOAEL   | 39                              | 28                      | 46             | LOAEL   | 31                              | 20                      |
| Wi-5                       | Gnd | 49             | <LOAEL  | 34                              | 23                      | 42             | LOAEL   | 27                              | 16                      |
|                            | 1st | 50             | <LOAEL  | 35                              | 24                      | 42             | LOAEL   | 27                              | 16                      |
| Wi-6                       | Gnd | 47             | <LOAEL  | 32                              | 21                      | 40             | LOAEL   | 25                              | 14                      |
|                            | 1st | 47             | <LOAEL  | 32                              | 21                      | 40             | LOAEL   | 25                              | 14                      |
| Wi-7                       | Gnd | 47             | <LOAEL  | 32                              | 21                      | 40             | LOAEL   | 25                              | 14                      |
|                            | 1st | 48             | <LOAEL  | 33                              | 22                      | 41             | LOAEL   | 26                              | 15                      |
| Wi-8                       | Gnd | 56             | LOAEL   | 41                              | 30                      | 48             | LOAEL   | 33                              | 22                      |
|                            | 1st | 57             | LOAEL   | 42                              | 31                      | 50             | LOAEL   | 35                              | 24                      |
| Wi-9                       | Gnd | 59             | LOAEL   | 44                              | 33                      | 51             | LOAEL   | 36                              | 25                      |
|                            | 1st | 61             | LOAEL   | 46                              | 35                      | 53             | LOAEL   | 38                              | 27                      |
| Wi-10                      | Gnd | 54             | LOAEL   | 39                              | 28                      | 46             | LOAEL   | 31                              | 20                      |
|                            | 1st | 56             | LOAEL   | 41                              | 30                      | 48             | LOAEL   | 33                              | 22                      |
| Wi-11                      | Gnd | 53             | LOAEL   | 38                              | 27                      | 46             | LOAEL   | 31                              | 20                      |
|                            | 1st | 55             | LOAEL   | 40                              | 29                      | 47             | LOAEL   | 32                              | 21                      |



L<sub>Aeq,16hr</sub> Daytime noise contours, 1st Floor Level

Meeting NPSE / WHO / BS8233 noise criteria

Within +5dB of WHO / BS8233 internal criteria \*\*

\* In accordance with Government noise policy (NPPF, NPSE, and PPG-Noise)

**\*\* +5dB relaxation allowed in BS 8233 guidance where the development is considered 'necessary or desirable'.**

Table 3: **Proposed HCC ‘2023’** mitigation design (*2m bunds/1m barriers*). Assessment of daytime external noise exposure relative to Government Noise Policy criteria and internal noise exposure relative to relevant guidance criteria

Noise maps of the latest 2023 mitigation strategy, for both daytime and night-time ( $L_{Aeq,16hr}$  daytime and  $L_{Aeq,8hr}$  night-time), have been included below to provide a visual illustration of the spread of noise across the site, shown as coloured ‘absolute noise level’ contours in 2.5dB steps.

Job number

251898-02

Date

20 July 2023

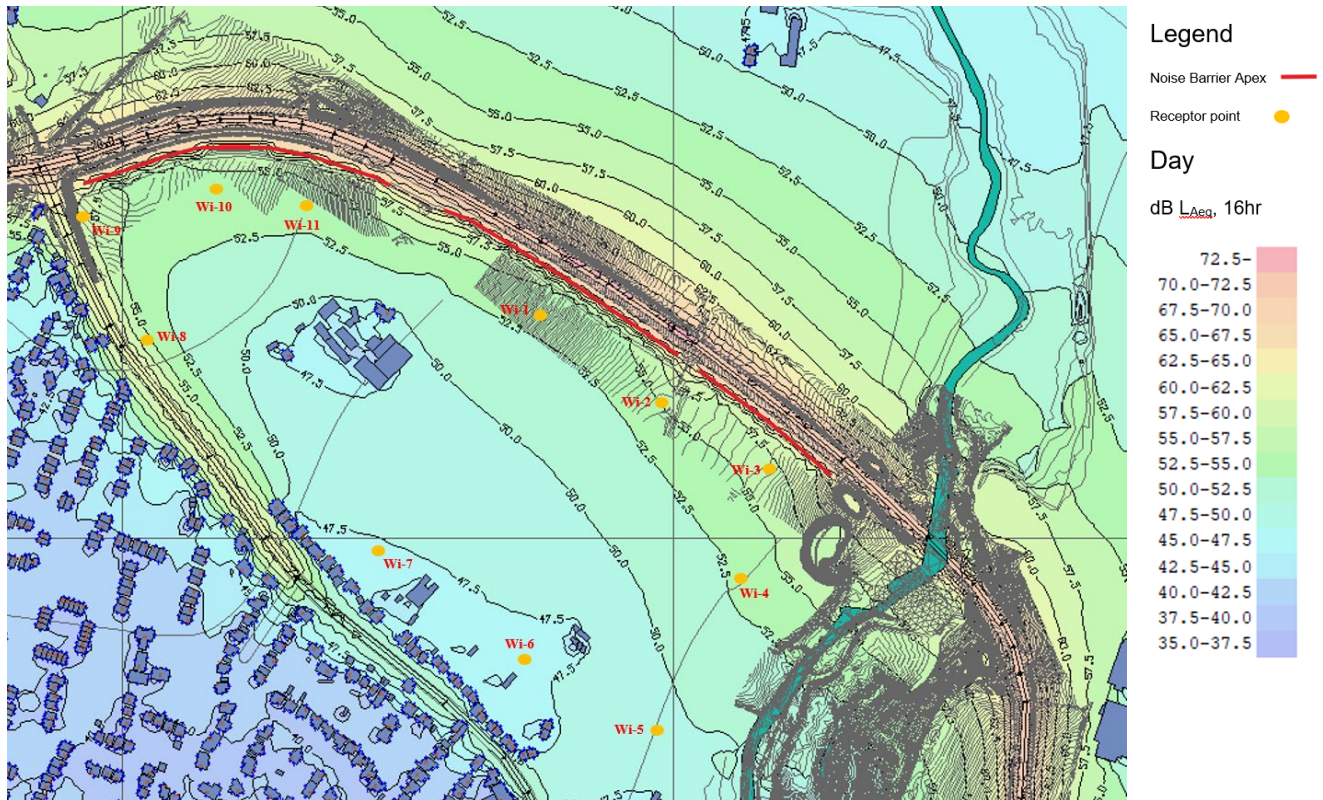


Figure 1:  $L_{Aeq,16hr}$  daytime noise contours (ground floor) – HCC 2023 Noise Mitigation Strategy

Job number

251898-02

Date

20 July 2023

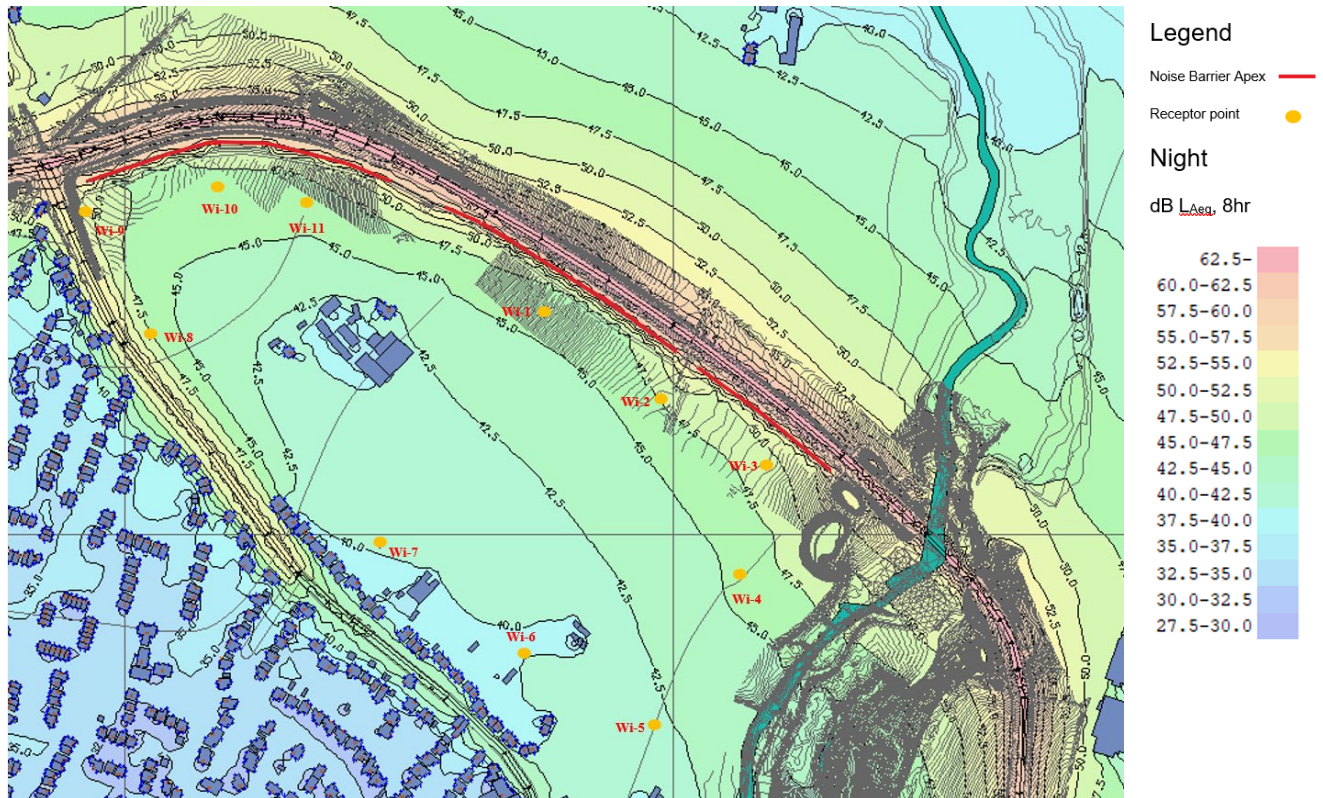


**Figure 2:  $L_{Aeq,8hr}$  night-time noise contours (ground floor) – HCC 2023 Noise Mitigation Strategy**

Job number 251898-02  
Date 20 July 2023

---

### 3. Analysis

The purpose of this section is to compare results for the three scenarios (namely ‘no mitigation’, ‘Original HCC 2018’ and ‘Proposed HCC 2023’) in relation to where changes have occurred in compliance with assessment criteria. The changes are shown for daytime in Table 4 and for night time in Table 5. These tables use the same colour coding as Tables 1 to 3, but without presenting the ‘absolute’ noise levels.

The actual ‘absolute’ noise levels have also been presented for completeness, and are incorporated into Table 6 and Table 7 (daytime and night-time respectively). These tables also present the noise attenuation afforded by each of the scenarios considered.

Job number

251898-02

Date

20 July 2023

| Loc  | Floor | External Areas              |                   |                   | Indoors,<br>Partially open windows |                   |                   | Indoors,<br>Closed Windows  |                   |                   |
|------|-------|-----------------------------|-------------------|-------------------|------------------------------------|-------------------|-------------------|-----------------------------|-------------------|-------------------|
|      |       | Uplands Farm -no Mitigation | Original HCC 2018 | Proposed HCC 2023 | Uplands Farm -no Mitigation        | Original HCC 2018 | Proposed HCC 2023 | Uplands Farm -no Mitigation | Original HCC 2018 | Proposed HCC 2023 |
| Wi1  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi2  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi3  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi4  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi5  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi6  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi7  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi8  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi9  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi10 | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi11 | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |

Table 4: Summary of changes in **Daytime** categorisations of noise criteria compliance based upon colour, as used in Tables 1 to 5

Job number

251898-02

Date

20 July 2023

| Loc  | Floor | External Areas              |                   |                   | Indoors,<br>Partially open windows |                   |                   | Indoors,<br>Closed Windows  |                   |                   |
|------|-------|-----------------------------|-------------------|-------------------|------------------------------------|-------------------|-------------------|-----------------------------|-------------------|-------------------|
|      |       | Uplands Farm -no Mitigation | Original HCC 2018 | Proposed HCC 2023 | Uplands Farm -no Mitigation        | Original HCC 2018 | Proposed HCC 2023 | Uplands Farm -no Mitigation | Original HCC 2018 | Proposed HCC 2023 |
| Wi1  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi2  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi3  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi4  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi5  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi6  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi7  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi8  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi9  | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi10 | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
| Wi11 | Gnd   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |
|      | 1st   |                             |                   |                   |                                    |                   |                   |                             |                   |                   |

Table 5: Summary of changes in *Night-time* categorisations of noise criteria compliance based upon colour, as used in Tables 1 to 5

Job number

251898-02

Date

20 July 2023

| Receptor | Floor | Predicted dBL <sub>Aeq,16h</sub> Free Field Daytime |                                    |                |                                    |                |
|----------|-------|-----------------------------------------------------|------------------------------------|----------------|------------------------------------|----------------|
|          |       | Uplands Farm Dev.<br>Without Mitigation             | HCC<br>2018<br>Original Mitigation | Lvl Diff<br>dB | HCC<br>2023<br>Proposed Mitigation | Lvl Diff<br>dB |
| Wi1      | Gnd   | 59                                                  | 54                                 | -5             | 53                                 | -6             |
|          | 1st   | 61                                                  | 55                                 | -6             | 55                                 | -6             |
| Wi2      | Gnd   | 59                                                  | 56                                 | -3             | 55                                 | -4             |
|          | 1st   | 60                                                  | 58                                 | -2             | 57                                 | -3             |
| Wi3      | Gnd   | 59                                                  | 56                                 | -3             | 56                                 | -3             |
|          | 1st   | 61                                                  | 58                                 | -3             | 58                                 | -3             |
| Wi4      | Gnd   | 54                                                  | 52                                 | -2             | 53                                 | -1             |
|          | 1st   | 55                                                  | 54                                 | -1             | 54                                 | -1             |
| Wi5      | Gnd   | 49                                                  | 49                                 | 0              | 49                                 | 0              |
|          | 1st   | 50                                                  | 50                                 | 0              | 50                                 | 0              |
| Wi6      | Gnd   | 48                                                  | 47                                 | -1             | 47                                 | -1             |
|          | 1st   | 49                                                  | 48                                 | -1             | 47                                 | -2             |
| Wi7      | Gnd   | 48                                                  | 47                                 | -1             | 47                                 | -1             |
|          | 1st   | 49                                                  | 48                                 | -1             | 48                                 | -1             |
| Wi8      | Gnd   | 56                                                  | 56                                 | 0              | 56                                 | 0              |
|          | 1st   | 58                                                  | 57                                 | -1             | 57                                 | -1             |
| Wi9      | Gnd   | 60                                                  | 59                                 | -1             | 59                                 | -1             |
|          | 1st   | 62                                                  | 61                                 | -1             | 61                                 | -1             |
| Wi10     | Gnd   | 58                                                  | 54                                 | -4             | 54                                 | -4             |
|          | 1st   | 60                                                  | 56                                 | -4             | 56                                 | -4             |
| Wi11     | Gnd   | 57                                                  | 54                                 | -3             | 53                                 | -4             |
|          | 1st   | 58                                                  | 56                                 | -2             | 55                                 | -3             |

Table 6: Receptor locations – **Daytime** ‘Absolute’ noise levels for each scenario, along with the noise attenuation achieved for each option. The ‘Level Difference’ values are all relative to the ‘Uplands Farm – without mitigation’ option.

|  |  | Predicted dBL <sub>Aeq,8h</sub> Free Field Night time |
|--|--|-------------------------------------------------------|
|--|--|-------------------------------------------------------|

Job number

251898-02

Date

20 July 2023

| Receptor | Floor | Uplands Farm Dev.<br>Without Mitigation | HCC<br>2018<br>Original Mitigation | Lvl Diff dB | HCC<br>2023<br>Proposed Mitigation | Lvl Diff dB |
|----------|-------|-----------------------------------------|------------------------------------|-------------|------------------------------------|-------------|
| Wi1      | Gnd   | 51                                      | 46                                 | -5          | 46                                 | -5          |
|          | 1st   | 53                                      | 48                                 | -5          | 47                                 | -6          |
| Wi2      | Gnd   | 51                                      | 49                                 | -2          | 48                                 | -3          |
|          | 1st   | 53                                      | 50                                 | -3          | 49                                 | -4          |
| Wi3      | Gnd   | 51                                      | 49                                 | -2          | 49                                 | -2          |
|          | 1st   | 53                                      | 51                                 | -2          | 51                                 | -2          |
| Wi4      | Gnd   | 46                                      | 45                                 | -1          | 46                                 | 0           |
|          | 1st   | 47                                      | 46                                 | -1          | 46                                 | -1          |
| Wi5      | Gnd   | 42                                      | 42                                 | 0           | 42                                 | 0           |
|          | 1st   | 43                                      | 43                                 | 0           | 42                                 | -1          |
| Wi6      | Gnd   | 41                                      | 40                                 | -1          | 40                                 | -1          |
|          | 1st   | 42                                      | 41                                 | -1          | 40                                 | -2          |
| Wi7      | Gnd   | 41                                      | 40                                 | -1          | 40                                 | -1          |
|          | 1st   | 42                                      | 41                                 | -1          | 41                                 | -1          |
| Wi8      | Gnd   | 48                                      | 48                                 | 0           | 48                                 | 0           |
|          | 1st   | 50                                      | 50                                 | 0           | 50                                 | 0           |
| Wi9      | Gnd   | 52                                      | 51                                 | -1          | 51                                 | -1          |
|          | 1st   | 54                                      | 53                                 | -1          | 53                                 | -1          |
| Wi10     | Gnd   | 50                                      | 47                                 | -3          | 46                                 | -4          |
|          | 1st   | 52                                      | 49                                 | -3          | 48                                 | -4          |
| Wi11     | Gnd   | 49                                      | 47                                 | -2          | 46                                 | -3          |
|          | 1st   | 51                                      | 49                                 | -2          | 48                                 | -3          |

Table 7: Receptor locations – *Night-time* ‘Absolute’ noise levels for each scenario, along with the noise attenuation achieved for each option. The ‘Level Difference’ values are all relative to the ‘Uplands Farm – without mitigation’ option.

Job number

251898-02

Date

20 July 2023

### 3.1 Reductions

Of the numerous reductions shown in Table 2, the following categorisation changes (with respect to the highlighted box colours defined in each table) have been identified as follows:

- Wi2 ground floor Daytime ‘External Areas’ change from un-highlighted into the ‘Green’ category (LOAEL) for the ground floor, and into ‘Yellow’ for ‘Partial windows closed’ category. All other categories at this receptor remain unchanged from those in Table 1.
- Wi11 1<sup>st</sup> floor Daytime ‘External Areas’ category, changes from un-highlighted into ‘Green’, whilst the ‘partial windows open’ changes from un-highlighted into ‘Yellow’.

### 3.2 Increases

Of the two increases in predicted noise levels shown in Table 2, only one has actually resulted in a categorisation change (Wi4), with respect to the highlighted box colours shown in each table (see below regarding receptor Wi8).

- Wi4 has realised a slight noise increase which has resulted in the ground floor level changing from ‘Green’ to ‘Yellow’ for the Night-time ‘partially open window’ scenario.
- \*Wi8 has *appeared* to have increased substantially at ground and first floor levels, for both Daytime and Night-time. Based upon this apparent increase, this has resulted in the ‘External Areas’ Daytime falling just outside of the ‘+5dB relaxation’ classification by 2dB.

*\* The original noise levels predicted in the provided results at this particular location were found to be in error, by being artificially lower than they should have been. Therefore, the actual resulting noise changes realised from the updated mitigation design should in fact be in line with those recorded at Wi9, where noise changes of less than 1dB have in fact occurred.*

| Loc  | Floor | Daytime           |                   |                                 |                   | Night-time        |                   |                                 |                   |
|------|-------|-------------------|-------------------|---------------------------------|-------------------|-------------------|-------------------|---------------------------------|-------------------|
|      |       | External Areas    |                   | Indoors, Partially open windows |                   | External Areas    |                   | Indoors, Partially open windows |                   |
|      |       | 2018yr Mitigation | 2023yr Mitigation | 2018yr Mitigation               | 2023yr Mitigation | 2018yr Mitigation | 2023yr Mitigation | 2018yr Mitigation               | 2023yr Mitigation |
| Wi2  | Gnd   |                   |                   |                                 |                   |                   |                   |                                 |                   |
| Wi11 | 1st   |                   |                   |                                 |                   |                   |                   |                                 |                   |
| Wi4  | Gnd   |                   |                   |                                 |                   |                   |                   |                                 |                   |

Table 8: Summary of changes in categorisations of Government noise policy and relevant guidance criteria based upon colour, as used in Tables 1 and 2 (*Wi8 excluded as no actual change due to mitigation revision*)

## 4. Conclusion

Job number

251898-02

Date

20 July 2023

---

The revised mitigation design now being proposed by HCC, has been shown to provide a comparable level of mitigation to that obtained from the original 2018 design. In some cases, it offers a slight improvement in attenuation of road noise at several of the assessment locations.

The only exception to this has been receptor Wi8, which has shown an apparent increase in noise level relative to the previous assessment results, although that was not due to the change in mitigation design as explained above. In that case, the receptor result, whilst slightly exceeding some of the criteria, still has a lower predicted noise level than its adjacent receptor Wi9, and both are in the same category shown in Table 2.

In respect to the Public Right of Way (**PRoW**), it is evident (as can be seen in contour maps in Figures 1 to 8 in the appendix) that the gap caused by the PRoW currently allows some noise ‘leakage’ to occur into the site.

However, noise levels at the nearest receptor to this area (Wi2) are still reduced with the current proposed mitigation. Should it be possible to ‘stagger’ and ‘overlap’ the bund profiles at this PRoW, this further ‘enhancement’ to the mitigation strategy would achieve additional beneficial noise attenuation around this localised area of the site (near to the Wi2 receptor).

The current ‘**Proposed HCC ‘2023’**’ mitigation strategy would provide a slightly better overall noise reduction when compared against the ‘**Original HCC 2018**’ design (which has already received planning approval). This is largely due to the implementation of a slightly lower earth bund which (given the same aspect ratio of the battered slopes) allows the apex to be slightly closer to Botley Bypass. Both this along with the addition of a 1m vertical noise barrier on top (providing the same overall 3m noise barrier as in the ‘**Original HCC 2018**’ design) shifts the ‘effective’ shadow zone of the barrier slightly closer to the road, increasing the overall noise attenuation performance.

Job number 251898-02  
Date 20 July 2023

---

## Appendix A

All 'absolute level' noise contours presented in Figure 1 to Figure 8 are referenced to dB re:  $2 \times 10^{-5}$  Pascals.

Job number

251898-02

Date

20 July 2023

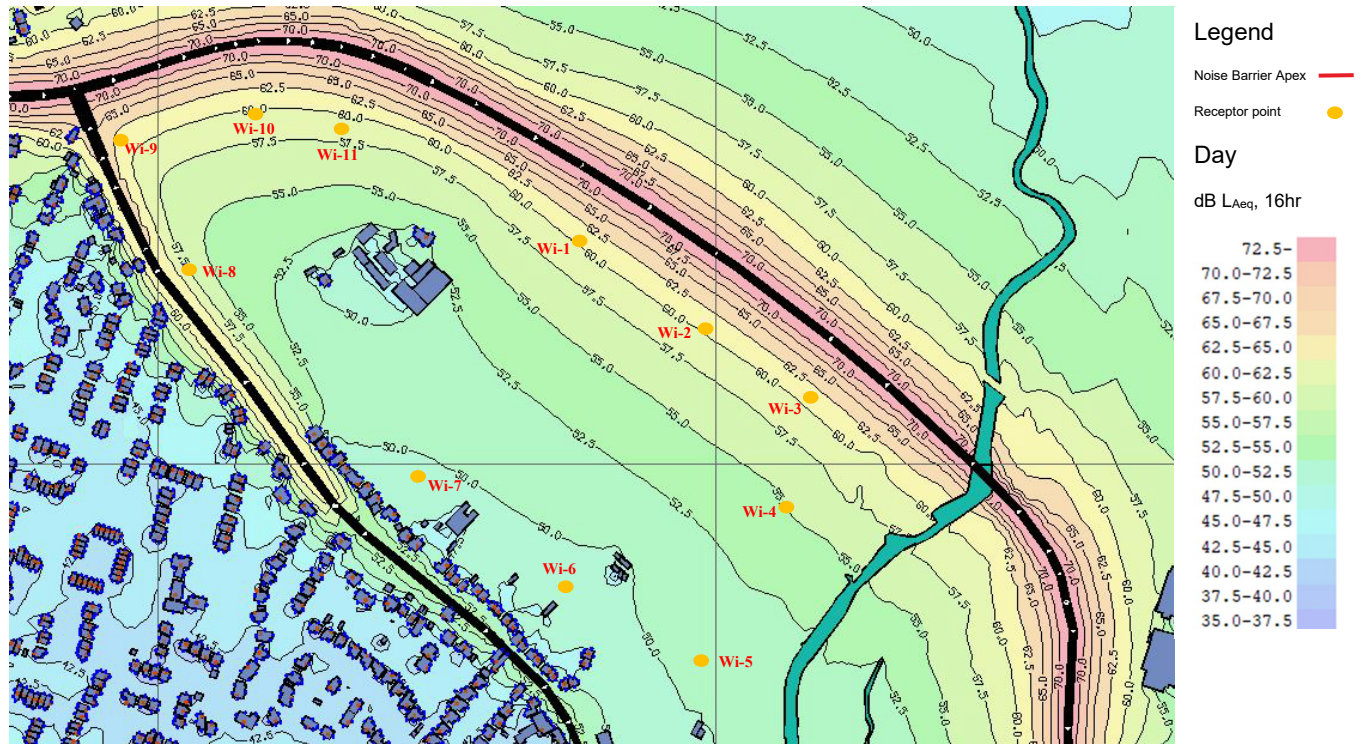


Figure 1: Uplands Farm 'Do Nothing' Option (No Mitigation) – dB LAeq,16hr Noise Contours, Daytime (1<sup>st</sup> Floor)

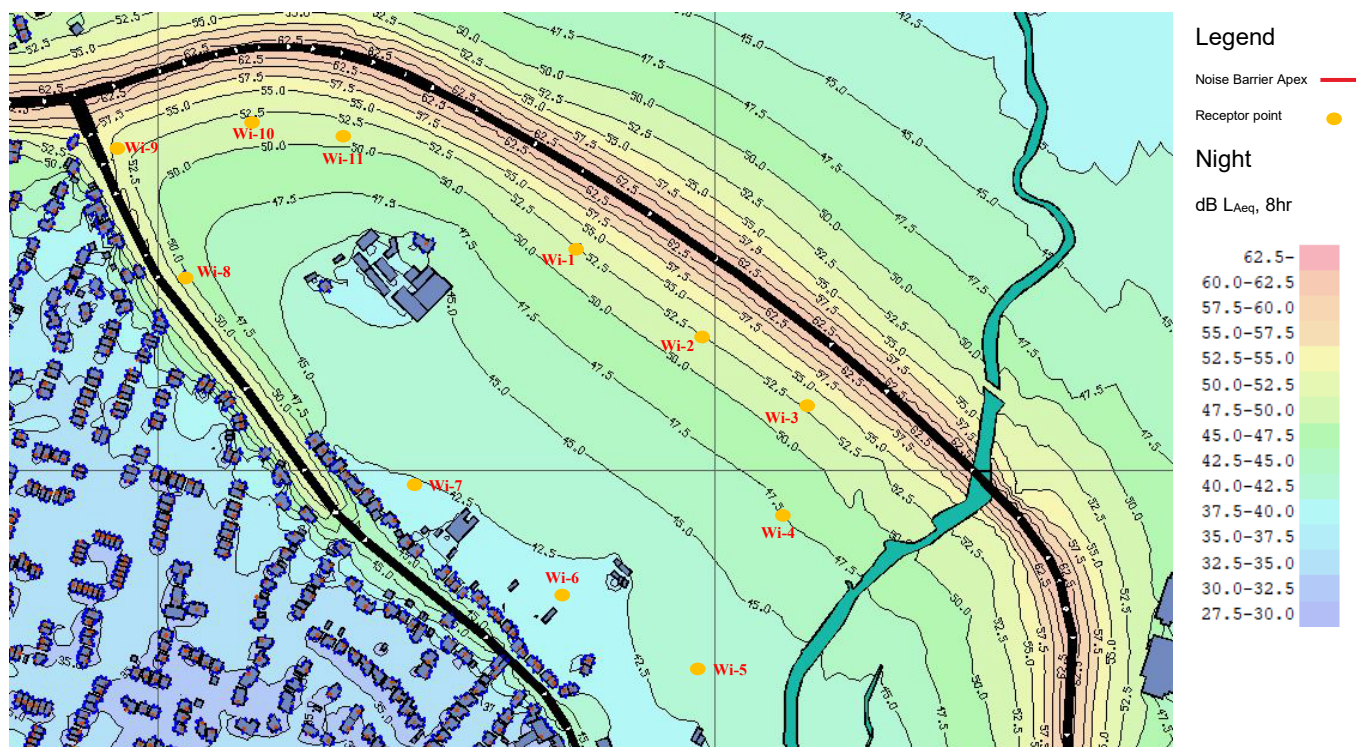


Figure 2: Uplands Farm 'Do Nothing' Option (No Mitigation) – dB LAeq,8hr Noise Contours, Night-time (1<sup>st</sup> Floor)

Job number

251898-02

Date

20 July 2023

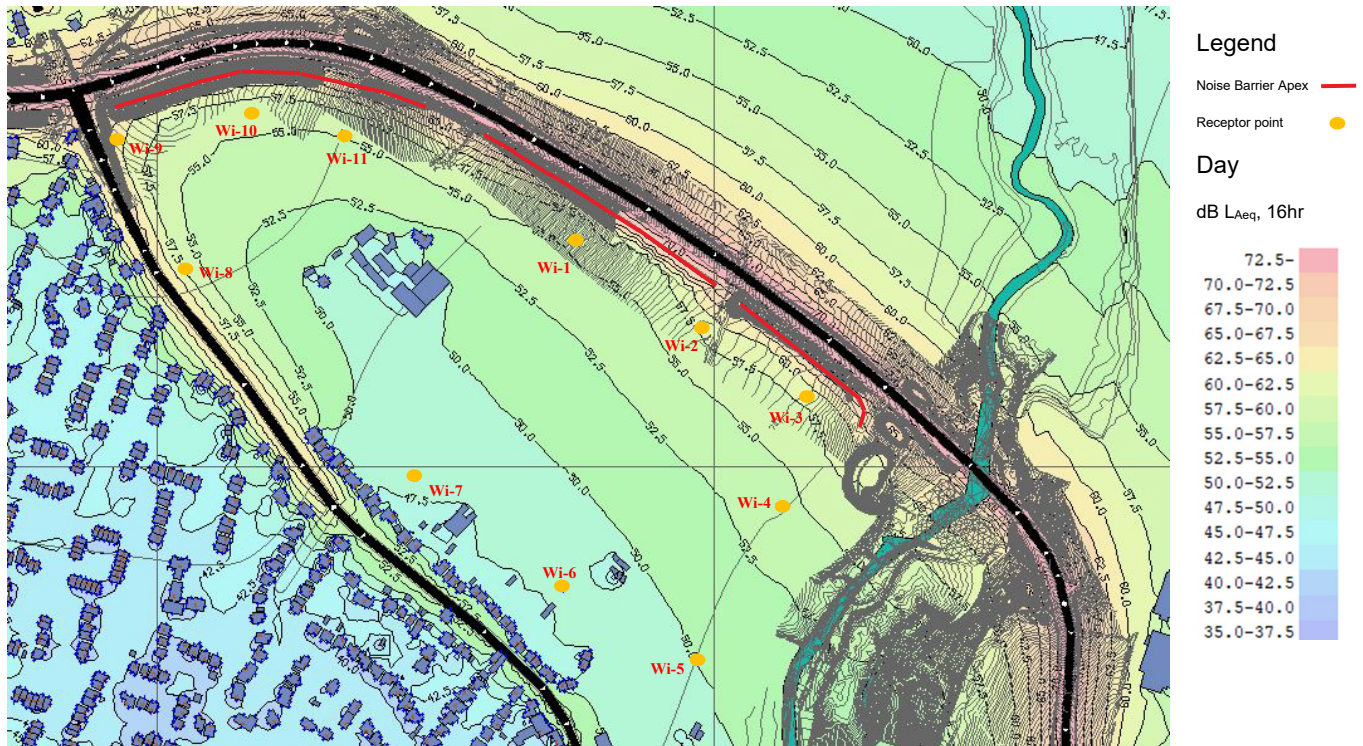


Figure 3: HCC original 2018 Mitigation – dB LAeq,16hr Noise Contours, Daytime (1st Floor)

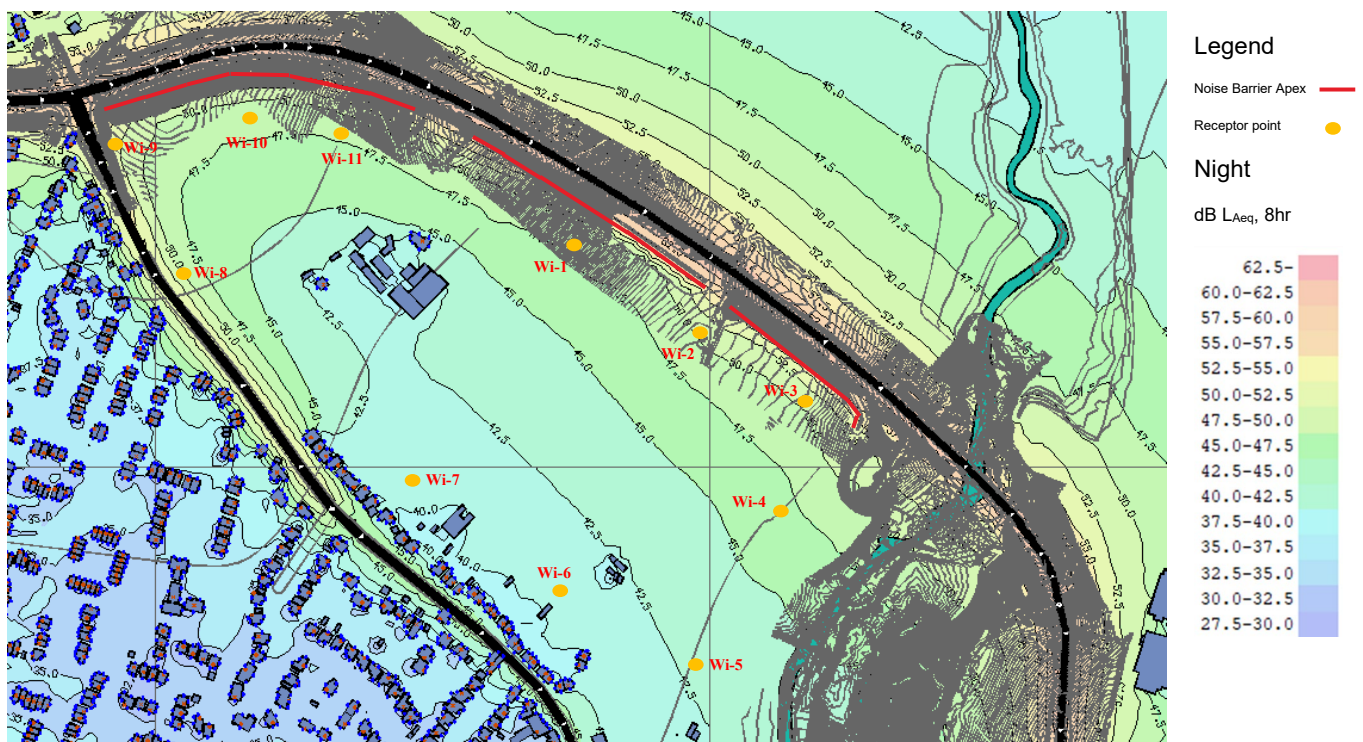


Figure 4: HCC original 2018 Mitigation - dB LAeq,8hr Noise Contours, Night-time (1st Floor)

Job number

251898-02

Date

20 July 2023

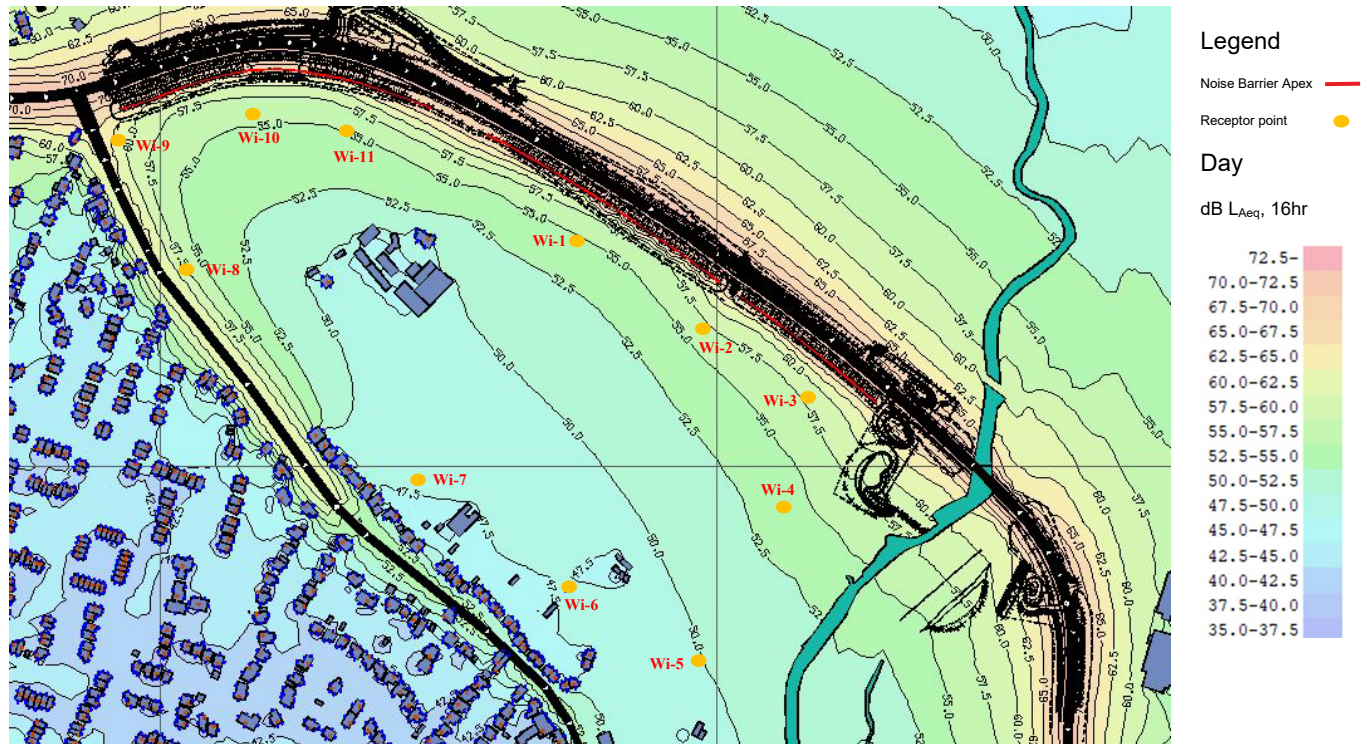


Figure 5: HCC proposed 2023 Mitigation – dB LAeq,16hr Noise Contours, Daytime (1<sup>st</sup> Floor)

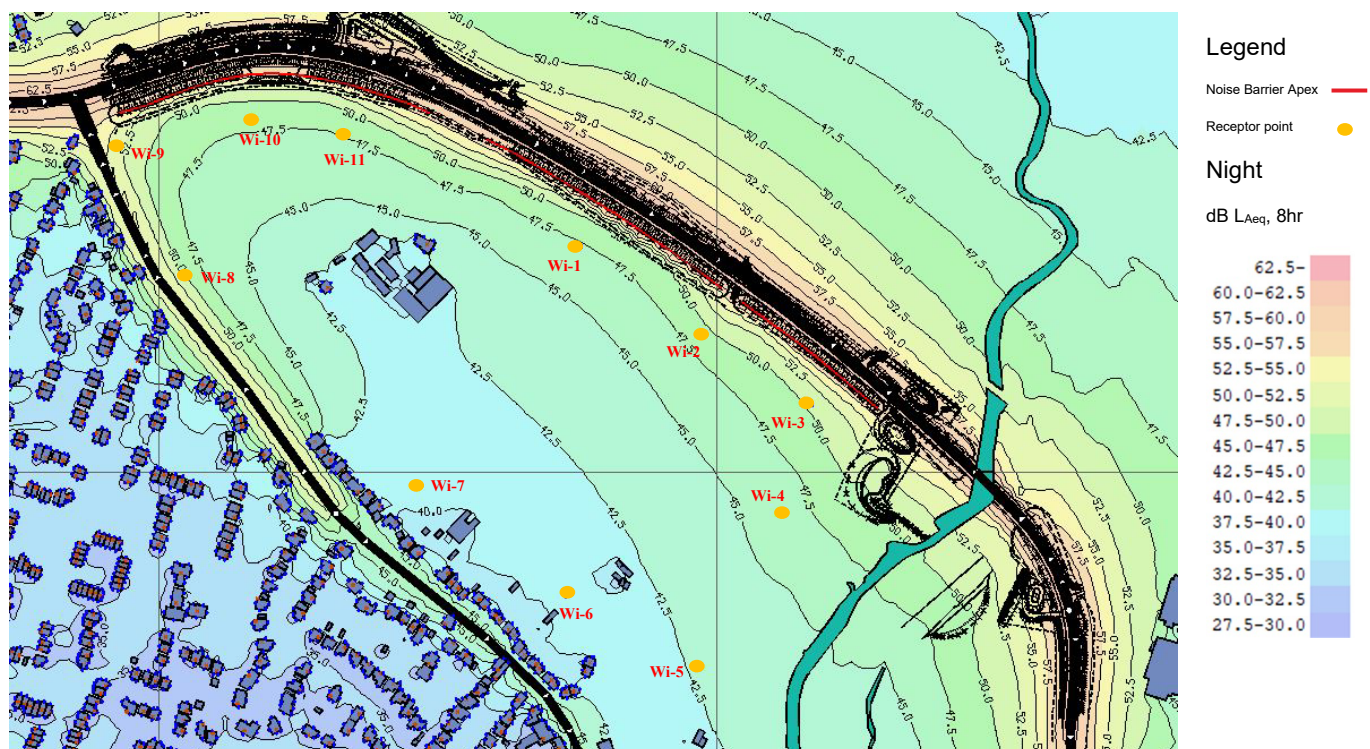


Figure 6: HCC proposed 2023 Mitigation – dB LAeq,8hr Noise Contours, Night-time (1<sup>st</sup> Floor)

Job number

251898-02

Date

20 July 2023

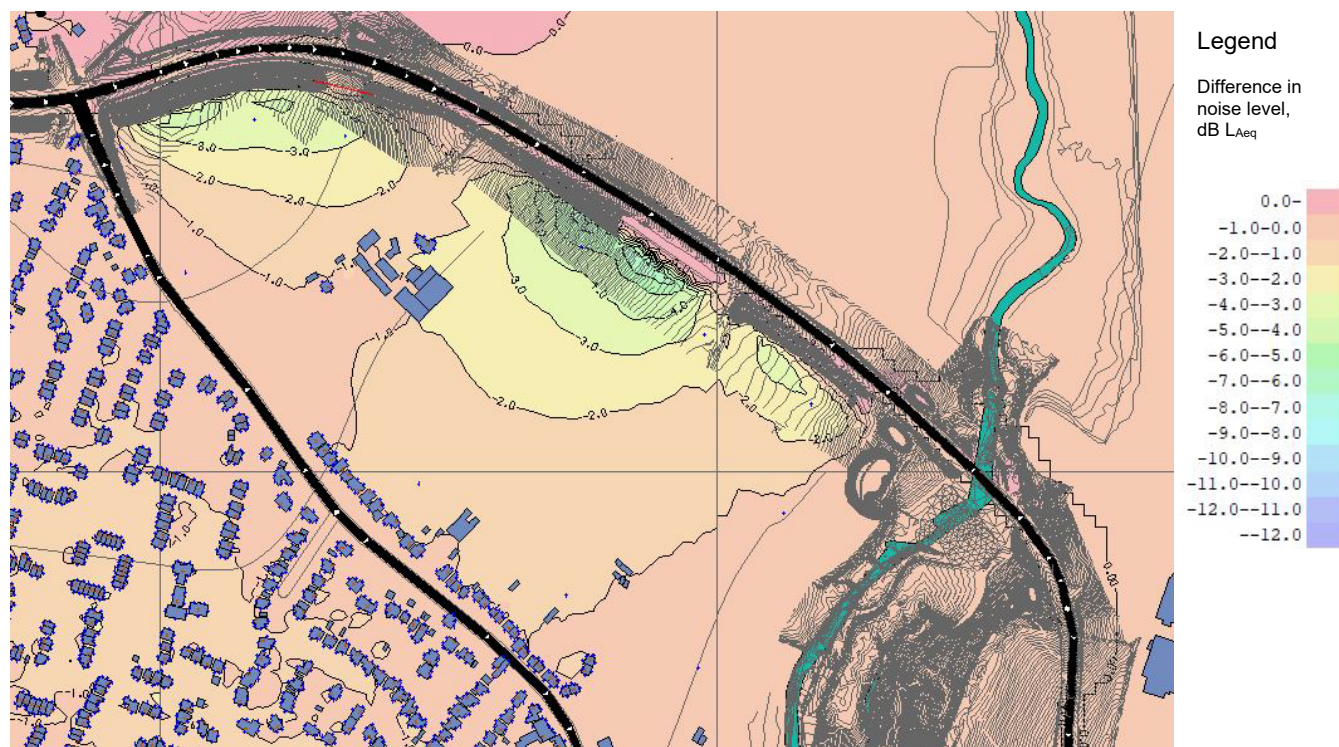


Figure 7: HCC original 2018 Mitigation minus 'Do Nothing', dB Level Difference Noise Contours (1<sup>st</sup> Floor)

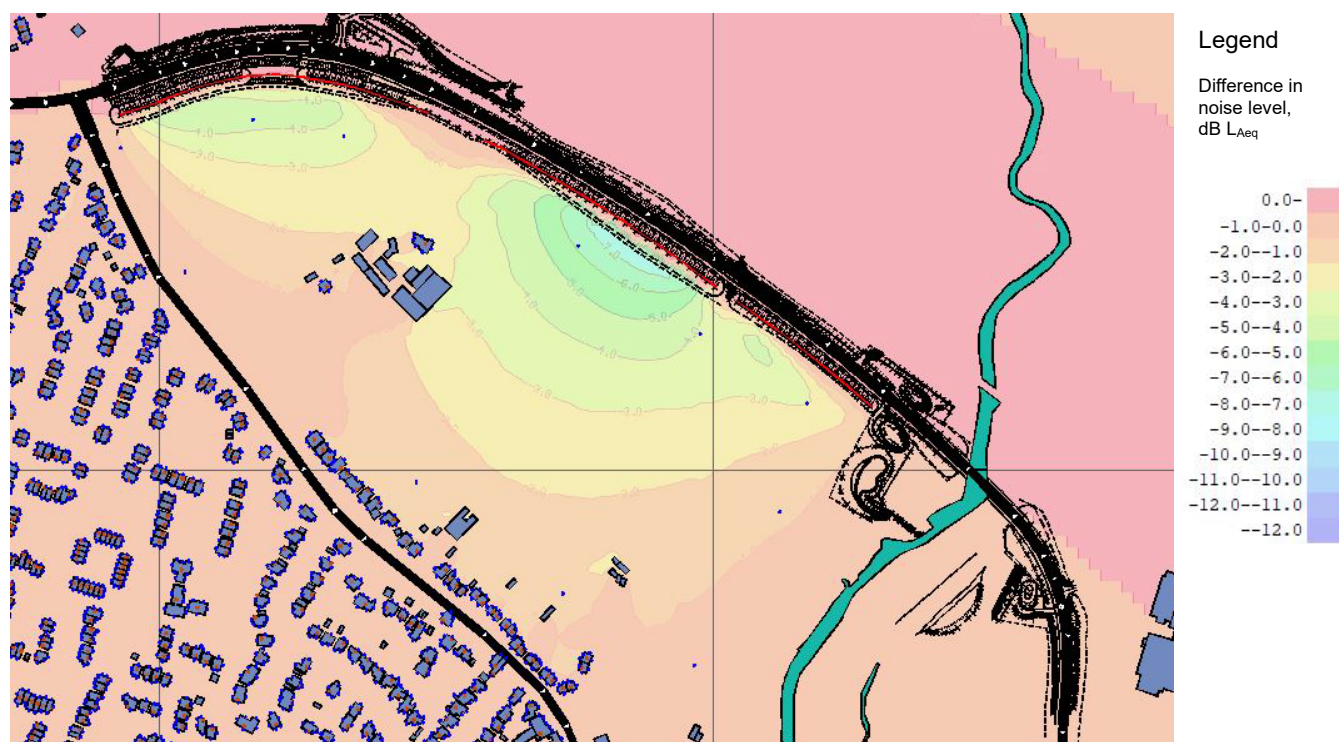
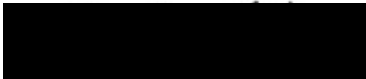
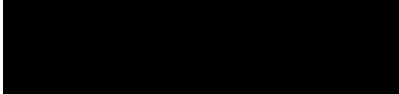
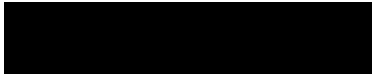


Figure 8: HCC proposed 2023 Mitigation minus 'Do Nothing', dB Level Difference Noise Contours (1<sup>st</sup> Floor)

Job number 251898-02  
Date 20 July 2023

## DOCUMENT CHECKING

|           | Prepared by                                                                       | Checked by                                                                            | Approved by                                                                         |
|-----------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Name      | Sarah Dennison                                                                    | Dr. Ana Luisa P. Maldonado,<br>MsC PhD MIOA FRAes                                     | Emmeline Brooks                                                                     |
| Signature |  |  pp |  |