

Appendix 11.4

Introduction

Events staged at the stadium considered in this assessment may be described as concerts and other major spectator events (which for the avoidance of doubt shall exclude team sporting events but include non-team sporting events).

Events may take place during weekend daytime/evening periods or during weekday evenings. With the exception of boxing, events will not operate beyond 23:00, other than for safe dispersal of event patrons. Boxing events may operate until 23:30. It is anticipated that up to 12 events could be staged in the football closed season.

Legislative Framework and Guidance

The main guidance which has been used in this assessment is the Noise Council Code of Practice on Environmental Noise Control at Concertsⁱ.

This document, hence-forth referred to as the Code” or “Code of Practice” provides a methodology for assessing and controlling noise break-out from concerts and guideline criteria for noise levels at noise sensitive premises (usually residences) close to the venue. The criteria changes depending upon the number of concerts proposed. For up to three concert days per calendar year in an urban area, the Code recommends the use of a fixed criterion that the Music Noise Level (MNL) at the residence defined as $L_{Aeq,15minutes}$ should not exceed 75 dB over a 15 minute period.

For 4 to 12 concert days per calendar year the Code recommends an alternative approach whereby the measurement criterion becomes site specific and is based upon a limit that the MNL should not exceed the Background Noise Level defined as L_{A90} by more than 15 dB over a 15 minute period e.g. if the background noise level is L_{A90} 50 dB, the MNL limit at the residences should be ≤ 65 dB.

Background noise level is defined as that noise level which is exceeded 90% of the time. The Code of Practice uses the average L_{A90} over the last four hours of the proposed music event; that is generally lower than the ambient noise level (defined as L_{Aeq}) and may be well below maximum noise level (L_{max}) at a given location. The recommended criterion for 4 – 12 concerts is therefore usually more onerous to achieve than that for up to 3 events.

For clarity the criteria are reproduced in **Table A11.4.1** below, which is an abridged version of Table 1 from the Code of Practice.

Table A11.4.1: Concert Venue Noise Criteria

Concert days per calendar year per venue	Venue Category	Guideline
1 - 3	Urban Stadia or Arenas	The MNL should not exceed 75 dB over a 15 minute period
4-12	All Venues	The MNL should not exceed the background noise level (L_{A90}) by more than 15 dB over a 15 minute period.

Source: Table 1 of The Noise Council Code of Practice on Environmental Noise Control at Concerts.

The above criteria do not extend to events which continue beyond 23:00. For such events the Code of Practice states that “the music noise should not be audible within noise-sensitive premises with

windows open in a typical manner for ventilation”. This is a very onerous criterion and is not applicable to this assessment.

Determination of Noise Impacts and Effects

Assessment against LOAEL and SOAEL

LOAEL for concert noise is considered to be a Music Noise Level (MNL) of $L_{Aeq,15min}$ 50 dB. This is based on the World Health Organisation (WHO) guideline threshold for moderate annoyance in outdoor living areas during the daytime and eveningⁱⁱ, although it should be noted that the WHO criteria uses an annual average 16 hour time-base. Using the 15 minute time-base may therefore be regarded as a conservative approach.

SOAEL for concert noise is considered to be MNL of $L_{Aeq,15min}$ 76 dB at the facade. In other words, the lowest noise level rounded to the nearest dB which exceeds the upper limit for MNL for urban stadia from the Code of Practice.

Where more than three concert events are staged during a calendar year, and MNL exceeds 15 dB above background noise level, but does not exceed $L_{Aeq,15min}$ 75 dB, this would be regarded as an impact between LOAEL and SOAEL which would require management. This impact will be temporary and will be limited to the duration of the event on the small number of occasions in a calendar year when such events will be held.

This situation where impacts lie between LOAEL and SOAEL falls within the context of the second aim of the noise Policy Statement for England (NPSE)ⁱⁱⁱ. Clause 2.24 of NPSE states that where this occurs: “all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur”.

The hierarchy of impacts set out in **Table A11.4.2** is proposed for the evaluation of MNL.

Table A11.4.2: Hierarchy of Music Noise level Impacts

Description of Music Noise Level	Degree of Impact
MNL < $L_{Aeq,15mins}$ 50 dB (LOAEL)	Negligible Adverse
MNL ≥ $L_{Aeq,15mins}$ 50 dB (LOAEL) but no greater than 15dB above background noise level defined as LA90T	Minor Adverse
MNL greater than 15 dB above background noise level but ≤ 75 dB (i.e. not reaching or exceeding SOAEL)	Moderate Adverse
MNL > $L_{Aeq,15mins}$ 75 dB (i.e. ≥ SOAEL)	Major Adverse

Baseline Noise Levels

Baseline noise levels determined by survey are reported in detail in **Appendix 11.2**.

Assessment of Impacts and Effects

The assessment below makes the assumption that reasonable and appropriate noise mitigation measures are implemented as a matter of best practice. Mitigation is described in each section below. The noise impacts and effects described are therefore those that remain after implementation of mitigation.

In accordance with condition 7 of the temporary planning permission granted in October 2018, an Event Management Strategy (EMS) was submitted to and approved by the Local Planning Authority prior to the first events at the stadium in summer 2019. The Event Management Strategy provides an over-arching approach to mitigating the potential impacts, including noise, of holding concerts and other major events at Anfield.

A copy of the approved Event Management Strategy may be found below.

Stage Set Delivery, Installation and Removal

Stage set delivery and installation occurs over a relatively short period of time prior to a given event. The detail of the works will vary depending upon the event. With the exception of delivery, works will be contained within the stadium with no line of sight to noise sensitive receptors in the surrounding streets.

Noise and vibration from installation activities will usually be tolerated by the occupiers of sensitive receptors provided that prior notice is given, the effects are restricted to reasonable times and they are kept to a minimum. The Event Management Strategy (EMS) confirms that “Structures will be prefabricated and do not require heavy plant and machinery for assembly, work will generally be restricted from 08:00 – 21:00 daily except on the days following a Major Event where soft strip works will take place throughout the night.” For each specific event, limits for normal working hours will be agreed in advance with LCC and incorporated into an Event Management Plan which is required under separate licencing arrangements for each given event, although some evening and night-time working is likely to be required. Night-time post event work will be managed to minimise potential noise output.

Best Practicable Means for noise control (BPM) will be applied at all times. BPM draw upon guidance provided within BS5228 and should include the selection of the most appropriate method and plant for the job, adequate maintenance of plant, optimum siting of stationary plant, local screening and the education of the workforce. Potentially affected residents will be kept informed in advance of the works and contact details will be provided to request further information or to report disturbance.

A feature of set installation and removal will be transportation of set and equipment by HGV, with each event requiring in the region of 40 HGV. A strategy for delivery to minimise noise impacts on nearby noise sensitive receptors will also be agreed in advance with LCC as part of the Event Management Plan and in accordance with the approved EMS which sets out the general strategy for management of production vehicle access into the stadium and subsequent lay-up during the event.

Note that an increase in general regular traffic flow on a given road of 25% over the 18-hour period 06:00 – 00:00 would be needed to increase noise levels at adjacent noise sensitive receptors by 1 dB; the smallest noise change perceivable in the short term. Changes to traffic levels resultant from event installation traffic on roads approaching the stadium will not be of this order of magnitude. Installation traffic noise will therefore not result in adverse impacts and effects.

With the approach to mitigation described above and with the limited duration and transient nature of the works, no significant adverse noise and vibration effects due to set delivery, installation and removal associated with events are anticipated.

Event Operation

Music Concerts and Analogous Events

Operational noise from music concerts and events, including for example boxing contests, differ from the current football offering in the following ways:

- Type of noise – amplified music is likely to continue over a prolonged period rather than short bursts for match entertainment; and
- Event finish times – typical finish time is likely to be 23:00 (or up to 23:30 for boxing matches) rather than 21:45 for an evening football match.

Modelling of Concert Music Noise for Anfield Stadium

Concert music noise break-out from Anfield Stadium to the surrounding residential areas has been modelled using proprietary computer software by acoustic consultants Vanguardia Limited who are industry experts in this field. Three concert stage locations were evaluated:

- North East Facing Stage;
- South West Facing Stage; and
- Central Stage Location.

The modelling was based upon typical concert speaker configurations providing acceptable concert sound levels within the stadium for all proposed seating locations.

Noise contour plots showing predicted noise levels in the residential areas close to the stadium are reproduced in **Appendix 11.7**. The Vanguardia Report is reproduced in below for reference.

The evaluation demonstrates that the Code of Practice guideline criteria of MNL $L_{Aeq,15min} \leq 75dB$ for 1-3 concert days per year are likely to be achieved for all noise sensitive receptors with all stage configurations. In other words exceedance of SOAEL and therefore a significant adverse effect is not anticipated.

The non-match day background (L_{A90}) noise levels for the last four hours of a potential event (19:00 – 23:00) reported in Appendix 11.2 at representative noise sensitive receptor locations has been compared with the MNL modelling predictions for those locations for each stage configuration (presented in Appendix C of the Vanguardia Report). The results of this comparison are shown in Table **A11.4.3**. All data has been corrected to a façade level where relevant by addition of +3 dB to the free field measurement or modelled MNL. This is to align the noise data with the Code of Practice.

Table A11.4.3: Comparison of Background Noise Levels with Predicted Concert Music Noise Level.

Locn.	Average Background Noise Level 19:00 – 23:00 $L_{A90,15mins}$ (dB)	Predicted MNL for each Stage Orientation $L_{Aeq,15min}$ (dB)			Difference of Predicted MNL from Background Noise Level for Each Stage Location (dB)		
		Northeast	Southwest	Central	Northeast	Southwest	Central
ST1	46	66	49	69	20	3	23
ST2	44	54	60	65	10	16	21

ST3	56	53	60	63	0	4	7
ST4	44	56	65	67	12	21	23
ST5	45	53	67	69	8	22	24
ST6	46	60	55	64	14	9	18

It can be seen from **Table A11.4.3** that, with the exception of properties on Walton Breck Road, represented by measurement location ST3, which is exposed to significant through traffic noise, existing background noise levels at residential facades were generally of the order L_{A90} 44 – 46 dB during the period of an evening event.

Note that in all the locations assessed, with the exception of ST1 with the south west stage orientation, the predicted MNL was greater than $L_{Aeq15mins}$ 50 dB and therefore exceeded LOAEL.

Where the predicted MNL was greater than LOAEL, but did not exceed 15 dB above the background noise level, this has been considered to represent a minor adverse impact falling between LOAEL and SOAEL.

Where the predicted MNL exceeded 15 dB above background noise level, but did not exceed $L_{Aeq,15mins}$ 75 dB i.e. fell below SOAEL, this represented a moderate adverse impact falling between LOAEL and SOAEL.

These noise impacts will occur for that part of the event where amplified music or speech is sustained such that it is the dominant source of noise in a given 15 minute period.

As well as the specific locations given in Table A11.4.3, the residential areas where a moderate adverse impact is likely to occur can have been determined by review of the MNL contours for each stage configuration presented in **Appendix 11.7**. Background noise level has been assumed to be L_{A90} 45 dB for this evaluation. These have been captured by the contour bands from 60-65 dB upwards.

North East Facing Orientation

Areas where the MNL modelling indicated that a moderate adverse impact may occur were:

- 45 Anfield Road, north west of the Stadium;
- Residences on Anfield Road, to the south east of the Stadium as far as the junction with Arkles Lane;
- Residences on the north west side of Skerries Road (approximately northern third of Skerries Road from the junction with Anfield Road); and

Residences facing onto Arkles Lane.

South West Facing Orientation

- Residences at junction of Anfield Road and Arkles Lane;
- Residences on the southwestern portion of Skerries Road;
- Residences to the south of Walton Breck Road (but set back from junctions with Walton Breck Road) including Venmore Street, Burleigh Road South, Hartnup Street, Donaldson Street, Glaisher Street and Davy Street;
- Residences on the southern part of Pulford Street

Central Orientation

- Residential Streets to the east and Northeast of Anfield Stadium including Anfield Road, Skerries Road, Wylva Road, Arkles Road and Arkles Lane;
- Residential Streets to the west and northwest of Anfield Stadium including Anfield Road, Alroy Road, Rockfield Road, Sybil Road, Conningsby Road, Pulford Street and streets accessed from Burnand Street.
- Residences to the south of Walton Breck Road (but set back from junctions with Walton Breck Road) including Burleigh Road South, Burleigh Road North, Venmore Street, Hartnup Street, Donaldson Street, Glaisher Street, Maslin Drive and Davy Street.

For all stage configurations, minor adverse impacts may be experienced for those residential areas where the noise contour plots in **Appendix 11.7** predicted MNL in the range $L_{Aeq,15mins}$ 50-55 dB. Where MNL was predicted to be less than $L_{Aeq,15mins}$ 50 dB impacts would be below LOAEL and therefore are regarded as negligible.

Mitigation for Concert Noise

The EMS confirms that noise mitigation will be applied for all concert type events as a matter of best practice.

Noise associated with concert type events will be mitigated principally by implementation of an effective event noise management plan with noise control measures based upon the guidance in Section 4 of the Noise Council Code of Practice. The noise management plan would be included in the Event Management Plan for each individual event.

The EMS sets out the general noise mitigation measures which will apply to all events – these are reproduced below for ease of reference:

- “The Production Manager and Sound Control Engineer will be instructed to control sound emission levels to keep them within the limits set out in the relevant Noise Impact Assessment”;
- “Means and timings for the testing of sound systems and the artist’s sound check will be agreed with the Environmental Health Officer with due regard for the local residents”;
- “In addition, sound levels will be checked during the Major Event by sound meters. These sound meters will comply with the provisions of BS 5969: 1981 and will be available for inspection”;
- “A suitably qualified noise consultant has been appointed to monitor noise levels and liaise between LFC and the promoter”;
- “During sound checks, rehearsals and Major Events, the music noise level (MNL) measured at a point one metre from the façade of any noise sensitive receptor shall not exceed 75 dB $L_{Aeq,15min}$ ”;
- “There shall be no amplified music within the external concourse area, including any music directed thereto from within the premises, beyond levels agreed with the local planning authority (in conjunction with the Environmental Health Service).”

In accordance with standard practice, the event noise management plan will be submitted as part of the Event Management Plan when an entertainments licence is sought for each event.

Assessment of Concert Music Noise Level (MNL)

MNL was not predicted to exceed $L_{Aeq,15mins}$ 75 dB for any noise sensitive receptor complying with the guidance from the Noise Council Code of Practice for up to three concert days per calendar year.

Concert MNL was predicted to be more than 15 dB above the prevailing background noise levels at residential locations around the Anfield Stadium and therefore the Code of Practice guideline recommended criteria for 4 – 12 concert days per year are likely to be exceeded.

As MNL was not predicted to exceed $L_{Aeq,15mins}$ 75 dB for any noise sensitive receptor, so MNL will not exceed SOAEL. A significant adverse effect is not therefore anticipated resulting from concert noise.

Where there are more than three concert days per calendar year and music noise levels were predicted to be greater than LOAEL of $L_{Aeq,15mins}$ 50 dB, this has been considered an impact falling between LOAEL and SOAEL. Where MNL was predicted to exceed 15 dB above the prevailing background noise level, this has been considered a moderate adverse impact. Management of this impact would be by means of effective implementation of the noise control elements of the event noise management plan described above.

Boxing events, which are considered in this assessment to be analogous to music events, may extend beyond 23:00, to a latest finish time of 23:30. This represents a potential intrusion into the night-time period of 30 minutes. For this exceptional case, there is the potential for a major impact. Given the very limited duration of the impact (maximum 30 minutes) and very limited frequency (no more than twice per calendar year) this has not been regarded as resulting a significant adverse effect.

Commentary on Events Staged in 2019.

Three concerts were staged in the 2019 close season:

- Take That – June 6, 2019;
- Bon Jovi – June 19, 2019;
- P!nk - June 26, 2019.

The south west facing stage orientation was used for each of these events.

Specialist acoustic consultants Vanguardia Ltd. were appointed as part of the noise management procedures for the events. In advance of the concerts, Vanguardia Ltd. prepared a Noise Management Plan (NMP) for the events. The NMP is presented for reference below. The NMP sets out the approach and procedures for sound management followed in the lead up to the event (e.g. "load in" (stage set delivery and installation), rehearsal or sound check), during the event, including response to complaints received during the event and after the event (e.g. "load out" (set dismantling and removal)).

As part of the approach to noise management LFC employ a dedicated Community Liaison Officer whose role includes liaising with local stakeholders in the lead up to, during and after events, including responding to and following up on any complaints received.

Condition 10 of the Decision Notice for the current temporary planning permission for events states "During sound checks, rehearsals and Major Events, the music noise level (MNL) measured at a point one metre from the façade of any noise sensitive receptor shall not exceed 75 dB $L_{Aeq, 15min}$ "

For each event, Vanguardia Ltd. were employed either by the event promoter or, for the P!nk concert, by LFC directly, to undertake noise management as set out in the NMP. Noise monitoring was undertaken during the events at four residential locations in the vicinity of the stadium:

- Skerries Road;
- Hartnup Street*
- Anfield Road; and
- Alroy Road.

*During the P!nk concert, a location in Glaisher Street was monitored, rather than Hartnup Street.

During the Take That concert, MNL was measured in the range $L_{Aeq,15min}$ 63 dB to 69 dB (highest levels at Hartnup Street). During the Bon Jovi concert, MNL was measured in the range $L_{Aeq,15min}$ 63 to 71 dB (highest levels at Hartnup Street) and during P!nk MNL was measured in the range $L_{Aeq,15min}$ 63 to 70 dB (highest levels measured at Glaisher Street).

No breaches of the conditioned MNL limit of $L_{Aeq,15min}$ 75 dB were recorded during any of the concerts.

The report prepared by Vanguardia following the P!nk Concert is appended for information below.

In total less than 50 complaints were received and logged by LFC for all issues associated with the three events in 2019. Of these only seven were directly attributed to noise, and all of these seven related to the Bon Jovi and Pink concerts. The majority of the noise complaints related to audibility of concert noise within residents' homes, with two residents citing noise keeping children awake. In all cases a representative of LFC apologised for inconvenience caused and advised the resident about the agreed noise limits and confirmed that the complaint would be formally logged and passed to the consultant's undertaking noise management.

LFC maintains a liaison tracker which allows comments and complaints to be followed up and lessons learned for future events where appropriate;

It can therefore be concluded that Active noise management using an appropriate noise management plan has been successfully applied to events at Anfield Stadium; this has been effective in ensuring that the impact of noise on local residents is, at worst, moderate adverse and occurs over a short duration on a small number of occasions to a small number of residents annually.

Event Management Strategy



The Liverpool Football Club and Athletic Grounds Limited

Event Management Strategy

Planning Application Ref: 18F/1632

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Appendix 1 – FMPZ

Appendix 2 – Walking Route

1. INTRODUCTION

- 1.1 LFC secured Planning Approval to host up to six Major Events at Anfield Stadium in any calendar year (excluding the month of July) in October 2018 (Ref: 18F/1632).
- 1.2 The Approval provided an obligation on LFC to prepare, prior to the use of the Stadium for hosting any Major Event, a full and detailed Event Management Strategy and to submit it for approval by the Local Planning Authority.
- 1.3 This document is the Event Management Strategy ("**Strategy**") and provides details of how Major Events at Anfield Stadium ("**Venue**") will be managed, including but not limited to:
 - Traffic management and car parking in the local area in accordance with the Event Transport Management Strategy and bespoke Event Transport Management Plan for each Major Event.
 - Measures to control noise levels associated with individual Major Events, including deliveries, setting up and taking down of sets.
 - Marketing strategy for Major Events including ticketing options and where to find information relating to public transport services.
 - Procedures for liaising with the local community prior to, during and immediately after Major Events.
 - Procedures for monitoring and managing crowds outside the Stadium that are attending the Major Event.
- 1.4 This Strategy outlines the approach that LFC will take when organising Major Events at the Venue in accordance with the conditions set out by Liverpool City Council and should be read in conjunction with:
 - the Event Traffic Management Strategy (version G – May 2019) which includes, but is not limited to, information on the following:
 - Operation of the Temporary Traffic Regulation Order for Major Events;
 - Information relating to car parking to serve Major Events;
 - Procedures for liaising with public transport operators, taxi and coach companies and where to find information relating to those services;
 - A scheme for monitoring indiscriminate on-street car parking resulting from the use of the Venue for Major Events and the mechanism for review and identification of any remedial measures that may be required;
 - Measures to encourage more sustainable non-car modes of transport;
 - A mechanism for monitoring and review of the Event Traffic Management Strategy for the first five years annually from holding the first Major Event at the Venue;
 - and
 - the Communications Strategy Plan (January 2019) which includes details of:
 - Arrangements for regular liaison with Ward Councillors;
 - Messaging to those attending Major Events at the Venue leading up to, during and immediately after each Major Event;
 - Communication channels for local residents leading up to, during and after each Major Event; and
 - A mechanism for reviewing feedback received from the local community as a result of holding Major Events.

2. LFC'S MAJOR EVENT STRATEGY

- 2.1 The Venue is located between Walton Breck Road and Anfield Road; it lies approximately 2 miles to the north of Liverpool City Centre.
- 2.2 As well as being home to LFC's first team, Anfield has hosted numerous international football matches and many other sporting events.
- 2.3 While the primary business of the Venue is as a Premiership football club, it also contains ancillary functions, including the LFC Museum and various meeting rooms offering facilities for conferencing and events throughout the year.
- 2.4 In 2016, following a redevelopment of its Main Stand, the capacity of the Venue was increased to c. 54,000. This increased capacity and improved facilities enabled the Venue to become a viable option for the hosting of Major Events. Not only assisting LFC's strategy to bring concerts and other non-team sporting events to its Stadium but also supporting Culture Liverpool in accomplishing its wider Liverpool City corporate and strategic objectives.
- 2.5 LFC held discussions with the UK's leading concert promoters to obtain key industry feedback and gauge potential interest to utilise Anfield Stadium as a major Venue within the UK concert market, subject to planning approval, these discussions were positive.
- 2.6 On 9 October 2018 LFC secured Planning Approval to host up to six Major Events at the Venue in any calendar year (excluding the month of July) Ref 18F/1632.
- 2.7 LFC's Stadium Management Team have extensive experience of staging high-profile major sporting events, safely accommodating over 50,000 spectators. Aside from sporting uses, Anfield has also hosted a number of musicians of different genres and the Venue featured in Liverpool's 2008 European Capital of Culture celebrations when c. 36,000 people attended a concert on 1 June headlined by Paul McCartney.
- 2.8 Although the operational plans which underpin the management of sporting events are well rehearsed, tried and tested, it is recognised that concerts and other Major Events hold a different dynamic. The pitch can be occupied partly by the stage and by many thousands of spectators and there have also been numerous changes to the layout and capacity of the Stadium since the historical concerts, including the redevelopment of the Main Stand.
- 2.9 Therefore, all of the Club's existing event management plans have been reviewed and assessed in relation to the use of the Stadium as a Venue for Major Events and a number of new documents and procedures relating to safe and effective delivery have been developed. Bespoke Major Event Operations Manuals will be produced for each Major Event to capture the unique nature and elements of each such Major Event along with bespoke Event Transport Management Plan. These will be used by LFC as live operational documents and submitted to Liverpool City Council's Building Control Department. They will cover matters unique to each Major Event such as:
 - the capacity and ticket sales strategy;
 - the stage overlay, set up and production requirements;
 - use of stage pyrotechnics;
 - the build and take down schedules;

- the use of additional screens;
- the use of additional and varied entrance, ingress, convergence and egress points and modelling;
- revised welfare and sanitation requirements;
- medical plans;
- traffic plans;
- communications plans;
- the ratio of male and female audience members; and
- the age range of spectators etc.

2.10 The average capacity for each concert at Anfield will be circa 50,000 (range 47,000 – 54,000); while, exceptionally some Major Events such as combat sports may have a capacity of 60,000.

To date LFC have three Major Events planned for June 2019:

- Take That Concert, 6 June 2019 - capacity 38,000
- Bon Jovi, 19 June 2019 - capacity 47,000
- P!nk, 25 June 2019 - capacity 43,000

3. EVENT MANAGEMENT RESPONSIBILITY

- 3.1 Anfield Stadium is designated under the Safety of Sports Grounds Act 1975, the Major Events will be held under LFC's General Safety Certificate for a Designated Sports Ground.
- 3.2 Pursuant to its statutory obligations LFC will, at all times, ultimately retain control over the whole and each part of the Venue. Responsibility for safety during a Major Event will lie with LFC as Safety Certificate Holder.
- 3.3 The safety management of Major Events will be coordinated and controlled from the Stadium Event Control Room by the Event Safety Officer supported by a dedicated Event Management Team comprising:

- **The Event Safety Officer** who is in overall control of operational safety management issues on the day of a Major Event and is the principal adviser on all crowd safety matters. Among the responsibilities of the Event Safety Officer are the following:
 - act as safety manager in relation to all safety matters and have overall responsibility for all aspects of safety;
 - be present at all consultation or information meetings with any or all of the prescribed bodies;
 - ensure that pre-event checks are carried out;
 - be present during the event to monitor and manage all the safety arrangements including crowd control measures, fire safety and rescue tactics for persons in distress;
 - ensuring that all stewards and security staff are briefed and trained;
 - ensuring that effective command communication and co-ordination systems are in place;
 - liaise with the Head of Stewarding, Emergency Services and others where necessary;
 - advise the Venue Manager on the initiation of emergency procedures where required;
 - ensuring adequate emergency response measures are taken when necessary; and
 - initiation of the evacuation procedure where appropriate.
- **The Head of Stewarding** whose duties include:
 - assisting with the circulation of spectators;
 - prevention of overcrowding;
 - reducing the likelihood of incidences of disorder;
 - ensuring the proper deployment of security personnel as determined by the risk assessment;
 - deploying staff for specific responsibilities and ensure adequate resources are provided for the Event; and
 - observing, monitoring and reporting in respect of crowd safety management throughout all stages of the preparation and hosting of Major Events.
- **The Venue Manager** who is responsible for the management of all aspects of the Stadium's operational delivery and all relevant stadium designated departments including catering, technical operations, cleaning, waste and hospitality. The Venue Manager is also the primary interface with the promoter, save in relation to

emergency procedures where the promoter will have direct interface with the Event Safety Officer. Among the responsibilities of the Venue Manager are the following:

- overall responsibility for the management (and implementation by any promoter or other relevant third party) of the Stadium overlay;
- participation in consultation or information meetings with any or all of the prescribed bodies;
- ensuring that the Major Event is staffed by a sufficient number of competent staff in the prescribed operational areas (excluding security);
- ensuring that effective command communication and co-ordination systems are in place;
- ensuring that all relevant documentation is made available to staff/other workers – including operations manuals, construction RAMS, risk assessments and safety plans;
- attending all meetings pre, during and post each Major Event; and
- being the primary contact for any promoter event manager.

- 3.4 Each promoter or other third party who hires the Venue for the purposes of hosting a Major Event will also have their own Event Management Team.
- 3.5 LFC will enter into arrangements for support from Merseyside Police by way of a Special Police Services Agreement for each Major Event which will include a Statement of Intent defining and agreeing each party's respective responsibilities.
- 3.6 LFC will contract with St John's Ambulance and the North West Ambulance Service to ensure appropriate medical and welfare support arrangements are in place for each Major Event.
- 3.7 The Event Operations Manual for each Major Event will include substantive details on each parties' respective management role and responsibilities.
- 3.8 LFC will enter into a bespoke memorandum of understanding with each promoter and their security operatives setting out each of the parties' respective responsibilities, the numbers, roles & location of each of their security and stewarding operatives.

4. STRUCTURAL DYNAMICS

4.1 Structural Assessments Undertaken

LFC commissioned an assessment of the Stadium structures and its ability to meet the IStructE 'Dynamic performance requirements for permanent grandstands subject to crowd action: Recommendations for management, design and assessment guidance 2008'. The Venue was tested against Scenario 4 as set out in this Guide, which is the most extreme event situation of high energy concerts with high intensity music.

4.2 Outcome of Assessments

The table below summarises the conclusions reached:

Anfield Road Stand	By high level review and site testing: all relevant vertical natural frequencies of the stand meet the IStructE guidance Route 1 recommendation of >6Hz for Scenario 4 events	No action required	By site testing: the first side-to-side mode of the stand is above the IStructE guidance Route 1 recommendation of >1.5Hz	No action required
Kenny Dalglish Stand	By high level review and site testing: all relevant vertical natural frequencies of the stand meet the IStructE guidance Route 1 recommendation of >6Hz for Scenario 4 events	No action required	By site testing: the first side-to-side mode of the stand is above the IStructE guidance Route 1 recommendation of >1.5Hz	No action required

4.3 Improvement Works

Following receipt of the above recommendations, LFC commissioned the design and installation of a series of props to the Kop structure to improve the dynamic performance of that Stand. These props are permanent but are hinged so that they can be raised into the roof when not needed (i.e. for non-concert events). The props have been installed, signed off by a structural engineer and approved by Building Control.

4.4 Management Measures

LFC have organised briefings to stewards on the Main Stand tiers to take action should the crowd start a co-ordinated sway to avoid crowd perception that the Stand is moving horizontally. In addition, the monitoring of the lateral sway of the Main Stand during the first Major Event will be observed.

5. CROWD CAPACITY MANAGEMENT AND CONTROLS

5.1 Capacity Calculations/Crowd Modelling

LFC have carried out extensive work with specialist crowd modelling and capacity consultants in relation to the use of the Venue for concerts and boxing matches.

LFC reviewed the three key stages of the crowd journey:

- Ingress;
- Circulation at peak times in relation to concerts; and
- Egress including the emergency egress and removal of one emergency exit.

The objective of this work was to offer insights in to the peak times, flow rates of spectators and safe evacuation times having regard to current legislation and guidance to establish what areas of the Venue were and were not suitable for occupation and what adaptations would have to be made to accommodate the three key stages of the crowd journey.

This modelling has been done in both static and dynamic form and will be used to inform LFC, promoters and Building Control of the areas to be used, how the crowd will access the Venue, offer direction for the counter terrorism plan and to support event specific traffic management plans. The modelling has provided the Stadium with an updated Safe Holding Capacity relevant to Major Events taking place at the Venue. Full details of the capacity and modelling calculations, along with ingress/egress arrangement and emergency procedures for each Major Event will be provided and agreed with Building Control as part of the Club's General Safety Licensing arrangements and contained in the Event Operations Manual for each Major Event.

For all Major Events the Venue will be accessed via a combination of existing turnstiles, reconfigured exit gates, hospitality receptions and existing disabled access points.

5.2 Ground Regulations

Entry to the Venue is subject to the LFC's Ground Regulations which will be prominently displayed in areas inside and outside the Venue on the day of each Major Event. The Regulations include details of prohibited items which include:

- firearms, knives or weapons of any kind;
- any article that might be used as a weapon and/or compromise public safety;
- illegal drugs or substances;
- alcoholic beverages;
- signs, banners or flags on poles;
- staffs or selfie sticks;
- fireworks;
- animals (except service animals to aid persons with disabilities);
- glass, cans & aluminium bottles;
- flammable liquids;
- laser pens/pointers; and
- laptop computers, iPads, cameras or tablets with filming capabilities, flash photography or other lighting devices.

All prohibited items will be disposed of before access to the Venue is permitted. Where a dangerous or illegal prohibited item is imported into the Venue and then discovered at a later stage, the matter will be dealt with by LFC in consultation with the Police.

5.3 Procedures for Monitoring Crowds

Access to the Venue perimeter will involve a 3-step process of checks at each of the designated access points:

1. Ticket scanning using either PDAs or existing turnstiles;
2. Search Process; and
3. Wristband Allocation for designated areas.

- **Turnstile and Search Operation**

Spectators will be greeted upon arrival at the turnstiles by external staff and/or search staff and asked to have a valid ticket ready for inspection. Spectators will be prevented from approaching the turnstiles without valid tickets and be directed to the ticket office to make a purchase if there are tickets still available.

The search protocol will be determined by the Event Safety Officer in conjunction with the Police and promoter prior to each Major Event and will be dynamically reviewed as each Major Event progresses having regard to the flow rates.

Searches will be in operation outside of the turnstiles. All persons entering the Venue, staff and visitors alike, must give their permission to be searched. Search staff must ask for permission to be given explicitly before commencing a search and cannot force persons to be searched, but they can refuse entry to anybody refusing to be searched.

- **Ticket Checks**

Following the entry search, spectators will be directed to enter the turnstiles and access gates.

Queue management stewards will be positioned adjacent to the turnstiles. The turnstiles include bar code scanners which will allow access to the Venue on the presentation of a valid ticket.

The ticket scanning system has the facility to allow access to only those people who have a ticket for the area served by the specific access point to which their ticket has been allocated.

Stewards will monitor the ingress phase of the operation and provide assistance as necessary to spectators. Random checks of tickets will be carried out, and if at any point the ticket appears to be invalid or the person presenting the ticket does not fall into the correct category the search staff will alert a supervisor via a radio system.

Seated tickets are only valid for the seat indicated on the ticket. Under no circumstances can spectators take a seat which doesn't match the allocation of their ticket.

The turnstiles are electronically connected to the turnstile counting system in the Event Control Room allowing the Event Safety Officer to know at any one time the number of spectators within the Venue.

- **Admission**

The ticketing strategy will depend upon each Major Event but will generally consist primarily of hard stock paper tickets using a mixture of hard stock, print at home tickets, thermal tickets and perforated tickets.

All ticket styles used at Anfield will be tested in advance of any Major Event taking place and proven to be compatible with the LFC Access Control System that is in use at the Venue. There will be two barcodes on each ticket.

The promoter's ticket terms will provide that all under 16's must be accompanied by a responsible adult (aged 18 year or over) who holds a valid ticket in the same area of the Stadium as the child. In addition to this for the majority of Major Events there will also be restrictions on the ages of children who will be granted access to the pitch.

- **Crowd Disorder and Anti-Social Behaviour**

LFC will operate a Crowd Disorder and Anti-Social Behaviour Plan at each Major Event.

Information and intelligence for each Major Event will be reviewed in the planning and preparation stage in conjunction with the Police, the promoter and other partner agencies to analyse the threat of disorder and anti-social behaviour.

Such analysis of threat will include the known and anticipated behaviours / activities of those attending, or that associated with expected attendees such as: heavy drinking, crowd disorder and anti-social behaviour, adverse responses to authority, etc.

LFC will work in partnership with the Police, Local Authorities, promoters and partner agencies to create a bespoke plan based on known, believed or anticipated threats close to the date of each Major Event when a clearer picture can be determined.

The person with Safety responsibility for each Major Event is the Event Safety Officer. The Event Day Safety Officer has operational responsibility for the safety of spectators on event days on behalf of LFC. He/she is the nominated person to instigate, supervise and undertake detailed safety requirements on behalf of LFC in liaison with Liverpool City Council, The Sports Grounds Safety Authority, Merseyside Police, Merseyside Fire and Rescue Service and North West Ambulance Service.

In relation to crowd management, disorder and anti-social behaviour, LFC will ensure the provision of adequate systems and procedures to ensure the safety and security of all staff, visitors, contractors and the public attending. LFC operates a Spectator Safety Management System as required by the General Safety Certificate to ensure the reasonable safety of spectators when entering and circulating the Venue, when viewing any Major Event and when leaving.

- **Counter Terrorism Measures**

LFC regularly review the National Threat Levels set by JTAC in conjunction with Merseyside Police, Counter Terrorism Policing NW and partners to assess the risk posed to each specific Major Event and the community of Anfield. This will be completed as part of the threat assessment for each Major Event at the Venue.

- **Emergency Egress Plan**

The emergency escape calculations have been ratified by dynamic and static testing configured independently.

- **Stewarding**

Detailed stewarding plans will be produced for each Major Event upon receipt of the production schedules from each promoter. For each Major Event, LFC, the promoter and their security operatives will also enter into a bespoke memorandum of understanding setting out each parties' respective roles and responsibilities.

- **LFC Fan Support**

LFC's Fan Support Team are deployed at key public transport hub points to provide advice and guidance to visitors, including Lime Street and Sandhills Stations and the 917 bus hub in the City Centre. They will also have a dedicated presence in an information tent adjacent to the Venue and be on hand in various locations to provide guidance to visitors after before and after each Major Event with wayfinding, transport information and to encourage speedy dispersal of visitors from the residential areas around the Venue.

5.4 Zone Ex

Zone Ex is defined by the Green Guide as the last mile of approaches to Anfield Stadium. The term 'last mile' is a theoretical mile that incorporates the last part of the journey to a venue or destination. The 'last mile' usually involves the transition from normal transport links during the arrival phase, into the final walk-up to a stadium or venue. This area often incorporates a range of transport hubs and communication links for visitors.

While the last mile or Zone Ex for the Venue is technically outside the footprint of responsibility for LFC, it is recognised that the safe and efficient arrival and departure of visitors to Major Events is key and where this is managed effectively it supports in minimising any impact on residential amenity. Therefore, LFC will work in collaboration with a wide range of partner agencies to manage this area.

Partner agencies involved in the management plans for Zone Ex include:

- Liverpool City Council
- Mersey Travel
- Merseyside Police
- Liverpool FC Club Staff (Stewards, Fan Support, Volunteers etc.)
- Traffic Management Operatives
- NWS and St John Ambulance
- Local Residents & Representatives

Due to the location and geography of the Venue spectators will take a wide range of transport methods to arrive or depart. These include:

- Public bus services
- Train
- Private car/taxi
- Organised coach and minibus
- Walking

- Cycling

There is very limited parking within the Venue confines and adjacent car parks therefore visitors will be encouraged to use public transport and take advantage of the designated drop off/pick up area. There may be pre-bookable parking however at one of the following locations:

- Stanley Car Park
- Utting Avenue Car Park
- St Domingo Car Park

LFC will maintain communication links with Merseyside Police throughout any Major Event to evaluate anti-social behaviour, crowd migration and movement, or any other threats that could impact on public safety or affect the local community.

Insofar as is reasonably practicable LFC will work together with the partner agencies listed above and any other relevant organisation or body to:

- Raise awareness and take account of Zone Ex
- Co-ordinate a plan for the safe arrival and dispersal of spectators within the zone
- Co-ordinate a plan for the management and movement of vehicles within the zone
- Identify areas of vulnerability
- Work with partner agencies to mitigate those vulnerabilities and create appropriate contingency plans
- Produce relevant documents and plans that outline how to manage incidents and events within the zone as listed above

In the event of a full or partial evacuation of the Venue (Operation Anfield) being required, LFC will be responsible for communicating with partner agencies and co-ordinating the safe movement of people within Zone Ex to places of relative safety within that zone, or to a particular location or zone as required having considered the likely impact of movement to that zone or location.

6. PRODUCTION ARRANGEMENTS FOR MAJOR EVENTS

6.1 Preparing the Venue

In preparation to host Major Events at Anfield a number of key permanent infrastructure adaptations have been made to accommodate the overlay required, these included:

- the introduction of propping to the Kop Stand following dynamic loading testing;
- the widening and higher access range to gate compound XK12 and XK13 on Flag Pole Corner (corner of Sir Kenny Dalglish Stand and the Kop) to assist with access for HGV vehicles into the bowl; and
- the modular configuration of 35 seats in the front 7 rows of the Kop Stand to assist with the access of HGV vehicles and allow the removal of seats.

There are a number of further temporary alterations that are to be provided by LFC to improve the customer experience, support operationally and for safety purposes.

These adaptations include (but will be subject to change depending on the requirements of each production):

- alterations of the wall and installation of a handrail in order to allow a ramp installation in the KOP corner to support safe egress;
- a Safety Wire for Upper Tier Front Row Barriers;
- the perimeter on the pitch at the Sir Kenny Dalglish Stand and Main Stand will have a stage truss and ply infill to compensate for the graduating slope along the pitch towards Anfield Road;
- temporary gangways to accommodate egress from pitch to vomitories;
- removal of the Wheelchair Platform on Anfield Road to accommodate the egress for vomitory 122;
- steel shield compound in Paisley Square for pitch spectator access, food & beverage and welfare;
- conversions of male toilets to female toilets;
- existing wayfinding, toilets and directional signage will be temporarily substituted with signage to reflect the access and egress models of each Major Event;
- removal of the LED Pitch side advertising boards;
- installation of the KOP cover boards at pitch edge; and
- steel shield compound installed around the Anfield Road production compound.

6.2 LFC Welfare, Catering and Hospitality Operations

In the lead up to an event day LFC will be preparing to manage its hospitality and welfare arrangements, this will involve the delivery of stock via Anfield Road into the underground car park.

In addition to the Venue hospitality, LFC will also be involved in the set-up of several welfare and catering facilities during a Major Event. The precise set up for each event may differ, please see plan below for indicative locations:



- Sir Kenny Dalglish Fan Village**
The Sir Kenny Dalglish Fan Village will consist of 3 x food units and 3 x bar units, these will be utilised to serve spectators located on the pitch. They will be open from 4.00pm and service will cease 30 minutes prior to the main act finishing.
- Paisley Square Pitch Village**
This will consist of 2 x food units and 2 x bar unit, these will be utilised to serve audience members located on the pitch. They will be open from 4.00pm and service will cease 30 minutes prior to the main act finishing.
- Anfield Road Family Park**
This will consist of 4 x food units and 2 x bar units, these will be utilised to serve spectators located on the pitch. They will be open from 4.00pm and service will cease 30 minutes prior to the main act finishing.
- Stanley Car Park**
This will consist of 2 x food units, these will be utilised to serve spectators arriving at Anfield. They will be open from 1.00pm and will close at 7.00pm. This will be operated under a temporary event notice and will be subject to Liverpool City Council Building Control and Liverpool City Council Licensing approval. There will be no alcohol served within this area.
- Stanley Park**
This will consist of 3 x food units, these will be utilised to serve spectators arriving at the stadium. They will be open from 1.00pm and will close at 7.00pm.
- Venmore Food Hub**
This will consist of 3 x food units, these will be utilised to serve spectators arriving at the stadium. They will be open from 1.00pm and will close at 7.00pm.
- Paisley Square**
This will consist of 2 x food units, these will be utilised to serve spectators arriving at the stadium. They will be open from 1.00pm and will close at 7.00pm.
- Hawking**
There will also be hawkers operating on the pitch and concourses with mobile drink dispensers consisting of alcohol, soft drinks and water. These hawkers will work in pairs and at no time be more than 10 metres away from Liverpool Football Club stewards. Tap water will be available free of charge from any concession. All the hawking operation will be cashless.

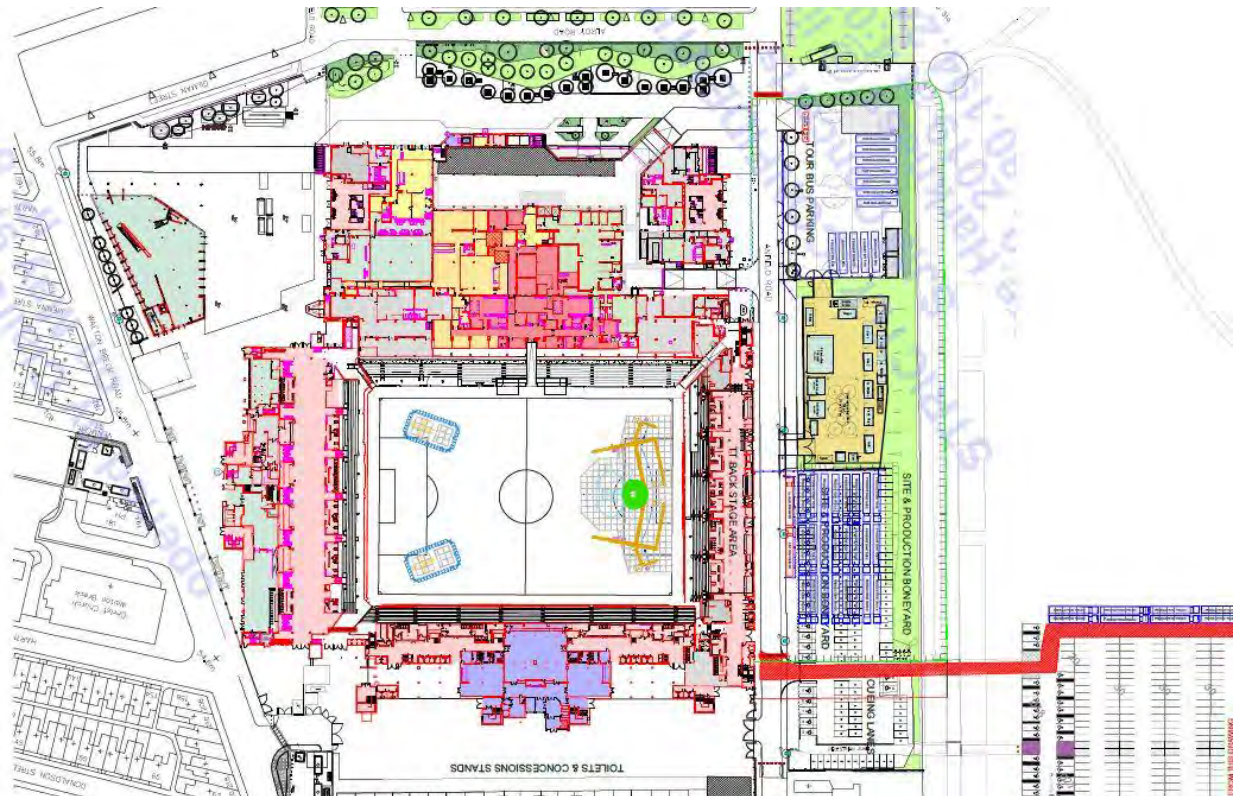
6.3 Event Production

6.3.1 Production Vehicles

There will be a number of HGV and other vehicles to support with the technical production of each Major Event, the number of vehicles and the location where they parked will depend on the particulars of each production, however the following areas will generally be used to house vehicles:

- a dedicated fenced area in Anfield Road Car Park;
- Stanley Car Park; and
- St Domingo Car Park.

During the period of the stage build, vehicles will travel into the Venue via Stanley Car Park to the access point at Flag Pole Corner moving across Dahlia Walk and Anfield Road. Please see the plan below showing the route of HGV vehicles into the Venue:



All vehicles will arrive at Stanley Park and wait there in designated bays before entering the campus via Dahlia Walk across Anfield Road Car Park and will then enter the Sir Kenny Dalglish Car Park. There will be no waiting on Dahlia Walk or on Anfield Road, these areas will be manned by LFC stewards.

HGV access to the Venue is via an opening between the Sir Kenny Dalglish Stand and the Kop at Flag Pole Corner. This entry has been adapted specifically for HGV access.

On entry to the Venue HGV lorries will drive on to the pitch which is covered by terratrack plus protection. Vehicle movements will be managed by a banksman and all drivers must comply with the site conditions of LFC and any promoter which will be given in advance of arrival to the Venue. These include the following:

- Vehicles are limited to speeds of 5mph
- Drivers must not wear earphones
- Drivers must wear high visibility PPE
- Drivers should not have any music on within their cab
- Drivers are not permitted to use mobile phones or radios whilst driving
- Drivers must be vigilant to the other moving persons and vehicles in their areas
- Drivers must switch off engines when their vehicle is parked.

A suitable turning area will be maintained at all times within the bowl for HGV lorries to egress and no vehicles will reverse out of the bowl.

Once the vehicle is emptied and no longer required in the bowl it will be guided out by trained and competent staff members and parked in one of the secured car parks, where it will remain until required post event.

6.3.2 Promoter Areas of Use

It is anticipated that each promoter will take occupation of the Venue a minimum of 4 days prior to their event day, within this time it is likely that, in addition to the production vehicle areas they will utilise a number of areas internally and work from a dedicated site compound on Anfield Road.

Within these areas each promoter will install the overlay relevant to the production of their event, which will include the relevant demountable structures, electrical installations and barriers in relation to access and crowd safety.

Each Major Event will have varying degrees of infrastructure due to the size of the production required and the physical elements of the stage which include set design, lighting, screens and any special effects. However, all Major Events will have a steel erected stage structure, sound delay towers (steel structure fitted with PA and lighting) and a front of house lighting and sound desk which hosts the controls for both of these assets. All of these areas will have barriers around them.

These structures will be built within the bowl and are made of pre-fabricated steel. The build will be undertaken by trained and qualified crew members who will be provided by the stage company who design, manufacture and build live event stages.

Each major Event will have up to 3 days prioritised to build the steel structures as detailed below and the production infrastructure will generally take up to one day to install.

The main structures are all situated within the bowl on the pitch, however the promoter will also be allocated a number of rooms throughout the Venue for use as offices and dressing room areas.

An example of a typical event build programme is set out below:

Promoter Infrastructure Per Area

AREA	INFRASTRUCTURE
St Domingo Car Park	Parking for steel trucks
Bowl	Stage No. 2 delay tower and front of house Certified front of stage barriers – (Pit) Crowd barriers around Golden Circle perimeter Crowd barriers in front of Main Stand Ground coverage for pitch Running man and emergency signage
Anfield Road Car Park/OB Car Park	No. 4 generators Steel shield compound anti climb fencing Heras fencing Crowd barrier fencing to form queue lanes Poly Jons Urinals Accessible toilets Tables for bag search Amnesty bins
Sir Kenny Dalglish Car Park	Poly Jons Urinals Catering units and bars – provided by LFC
Paisley Square Car Park	Poly Jons Urinals Catering and bar unit – provided by LFC Steel shield anti climb fencing for compound surround Crowd barrier fencing to form queue lanes Tables for bag search Amnesty bins
LFC Broadcast Unit	Pop up marquee 6x6m Marquee 12 x 12 Existing shipping container

Event Vehicles (approx.)

Production Trucks	40
Steel Trucks	25
Buses	15
Generator Flat Bed Trucks	2

Event Plant (approx.)

Forklifts with side shift and lifting capacity 3,5 ton	4
Forklifts with side shift and lifting capacity 5 ton	1
Forklifts with side shift and lifting capacity 5 ton	2
Telescopic cranes 80 ton	3
Telescopic cranes 40 ton	2
Pallet Jacks 2,5 tons	2

Cherry picker reach 30 m	2
Cherry Picker reach 125m	1
pallet jacks 2,5 tons	2
pallet jacks 5 tons	2
Golf Buggies	4

Build and Derig Days and Activity

Build Day	Plant	Area of Use	Description of Use
Day 1	Golf Buggies Trailers Telehandlers Rough Terrain Forks Cherry Picker	Stanley Car Park Anfield Road Sir Kenny Dalglish Car Park Bowl	Delivery of materials, site and build plant. Delivery of crew internal kitchen equipment. Delivery of security cabins including site storage and pyro storage. Delivery of flat foot. Barrier. Delivery of tilda nett, Visquin and stage brushes. Delivery of Dressing Room equipment. Delivery of heavy duty matting. Delivery of radios. Delivery of photocopiers and office equipment.
	Cranes Telehandlers Cherry Pickers	Stanley Car Park Anfield Road Sir Kenny D Car Park Bowl Paisley Square	Unload steel trucks arrive. Base out. Build floor system. Build towers. Build trusses on stage deck. Stage to be earthed by electrician.
Day 3	Cranes Telehandlers Cherry Pickers	Anfield Road Sir Kenny D Car Park Bowl Paisley Square OB Car Park	Hang motors to raise roof. Build grid for roof. Build roof. Lift roof. Build PA grid. Fill water ballast. Catering deliveries.
Day 3	Golf Buggies Trailers Telehandlers Rough Terrain Forks Cherry Picker	Anfield Road Sir Kenny D Car Park Bowl Paisley Square OB Car Park	Stage ballast tanks filled. Steel build continues. Stage skins in place. Front of house and delay towers built. External toilet installation.

			Paisley Square catering unit in place. Dressing rooms installed. Independent Stage Engineer sign off.
Day 4	Golf Buggies Telehandlers Rough Terrain Forks Cherry Picker	Stanley Car Park Anfield Road Sir Kenny D Car Park Bowl OB Car Park Anfield Road Car Park	Production load and lighting and sound Propagation, front of stage barriers installed, delay tower barriers installed, installation of Dressing Room furnishings, installation of barrier water and show water
EVENING/ OVERNIGHT DAY 4	Cherry Picker	Bowl	Lighting installed and tested.
Day 5		Stanley Car Park Anfield Road Sir Kenny D Car Park Bowl Paisley Square OB Car Park	Site Poly Jons set up. Queue lanes set up. Production enclosure fencing set up. Catering vehicles moved into Sir Kenny Dalglish Car Park. Artist buses arrive. Show day.
OVERNIGHT DAY 5		Bowl Sir Kenny Dalglish Car Park Stanley Car Park Anfield Road Car Park	Production load out - sound, lights, video screens, power cables removed from stage\work areas. Stage generators removed. Front of stage and delay tower barriers removed. Dressing Room furniture stacked and cleared. Water ballasts removed and pumped into drainage. Fire extinguishers removed from non required areas. Stage, FOH and delay skins removed.
Day 6		Bowl Sir Kenny Dalglish Car Park Stanley Car Park Anfield Road Car Park	Delays and FOH removed. Dismantle roof and grid. Load out stage floor. External toilets uplifted. Load trucks.

			Merchandise set ups Removed 20:00 stage trucks Leave Site
Day 7		Sir Kenny Dalglish Car Park Stanley Car Park Anfield Road Car Park	Load remaining trucks Plant removed Golf buggies removed Waste removed from site
Day 8			Site out

More information on the detail of each of the promoter's works, scheduling and safety arrangements will be included in the Event Operation Manual.

7. TRAFFIC MANAGEMENT AND CAR PARKING

7.1 Traffic Management

The traffic management plans for each Major Event will differ however, the typical schedule for a concert can be split into a number of distinct phases over a six-day period - being three days before a Major Event, the event day and the two days following the event day ("**Event Period**"), a summary of the anticipated plan is set out below:

(i) Event Day Minus 7

Advanced warning signage will be erected in areas on the main routes around the Venue to notify residents and businesses of forthcoming road closures. This signage will be removed, replaced and supplemented with the appropriate road closure and traffic management signage at the appropriate times.

(ii) Event Period

Operatives will be in place to manage vehicular crossings across Dahlia Walk to maintain pedestrian safety.

(iii) Event Period – Closure of Anfield Road

During the Event Period the area of Anfield Road adjacent to the Venue will be closed during the build phase for health and safety reasons.

(iv) Event Day – Walton Breck Road

In order to reduce the impact on local residents, where feasible, LFC will endeavor to keep Walton Breck Road open during the Event Period and on the day of an event, until the event has finished whereupon it will be closed to facilitate the safe egress of the public from the Venue. Walton Breck Road may also be closed as part of any emergency incident management procedure.

Event Day – Post Event Road Closures

- **Priory Road** – Priory Road will be controlled at its junctions at Utting Avenue and Walton Lane on the day of any Major Event to manage access and egress from Stanley Car Park and coach parking at Walton Lane.
- **Arkles Lane** – Arkles Lane will be closed to facilitate loading and movement of the 917 buses and Wylva Road will be closed to facilitate access for the buses to join the queue lane on Arkles Lane.
- **Anfield Road towards Blessington Road/Sleepers Hill** – The Anfield Road closure and regulation of traffic control will be extended to support safe egress.

As soon as it is safe to do so all traffic management measures will be lifted except the Anfield Road closure which will usually remain on for a further two days to accommodate the production removal.

7.2 TTRO

Requests will be made for Temporary Traffic Regulation Orders to support the Traffic Management Plan and change the existing times and hours of operation for Major Events which differ from the match day operation. As part of the process the relevant advertisement and stakeholder communications will be completed.

7.3 FMPZ

To manage the increase of cars associated with matches and major Events at the Venue, parking in the surrounding area is controlled by the Football Match Parking Zone (“FMPZ”), as shown on the diagram at **Appendix 1**. Residents are given permits for their vehicles by Liverpool City Council allowing them to park in residential bays during the hours the scheme is operative. Residents may also apply for one visitor permit for use on any visiting car and may park in the residents’ bays. Parking in the ‘free’ bays is allowed without the use of a permit. Businesses may use their business permit to park in residents’ bays

The FMPZ currently operates from Monday to Friday between 17:00 and 22:00 and between 22:00 and 18:00 on Saturdays and Sundays, from 1 August to 31 May each year.

These times/dates of operation were set to cover the times when matches took place when the FMPZ system was first introduced in 1999. Since then match times have changed and the current hours of the restrictions no longer cover all match times.

In addition, Major Events may take place outside the operational months and times of the existing FMPZ, so it is not currently possible for Liverpool City Council to control parking and enforce the FMPZ on these event days.

This leads to difficulty in enforcing the restrictions and therefore can lead to an excess of non-residential vehicles parking in what is primarily a residential area.

Therefore, the operational hours/dates of the FMPZ have been extended to 10:00 – 00:00 from 1 August to 30 June. This time period will allow enforcement, if necessary, to take place to cover all potential match times as well as Major Events.

7.4 Car Parking

- **Promoter Vehicles**

- St Domingo Car Park – it is anticipated that a number of production trucks will occupy spaces in St Domingo Car Park on the day of any Major Event.
- Stanley Car Park – for the duration of the period that any promoter is in occupation of the Venue, an allocated fenced off area (approx. 400 spaces) will be established in Stanley Car Park.
- Anfield Road – each promoter will also have a site established in a fenced off area of LFC’s land on Anfield Road adjacent to Stanley Park where further vehicles will be parked.

- **Stanley Car Park**

LFC will use Stanley Car Park as an operational car park on the day of any Major Event and save for pre-paid disabled parking no public parking will be available in this area:

- Disabled Parking – pre-paid disabled parking, 100 spaces
- Disabled Drop Off and Pick Up
- Promoter Vehicles – as described above
- Staff – all LFC staff working on any Major Event will be provided with free parking in Stanley Car Park
- The remaining area of Stanley Car Park will be used for car drop off and pick up.

- **Utting Avenue/Priory Road**

LFC will sell the spaces in this car park by way of pre-paid bookings to the general public.

7.5 Coaches

The area at the end of Priory Road near Walton Lane will be used for coach parking, the number of coaches attending will depend on the particulars of each Major Event and the likely demographics of the attendees. If additional coach parking is needed there is an overspill area adjacent to LFC's car park on Utting Avenue (approx. 5 coaches). Transport Management operatives will be briefed to monitor coaches and ensure that engines are switched off while they are idling.

7.6 Taxis

A dedicated taxi rank will be established on Sleepers Hill.

7.7 Buses

- 917 – a high frequency service will run from the City Centre to Arkles Lane and will pick up from Arkles Lane following each Major Event.
- Soccerbus – a dedicated shuttle bus will run from and to Sandhills Station to Walton Lane.

7.8 Rail Services

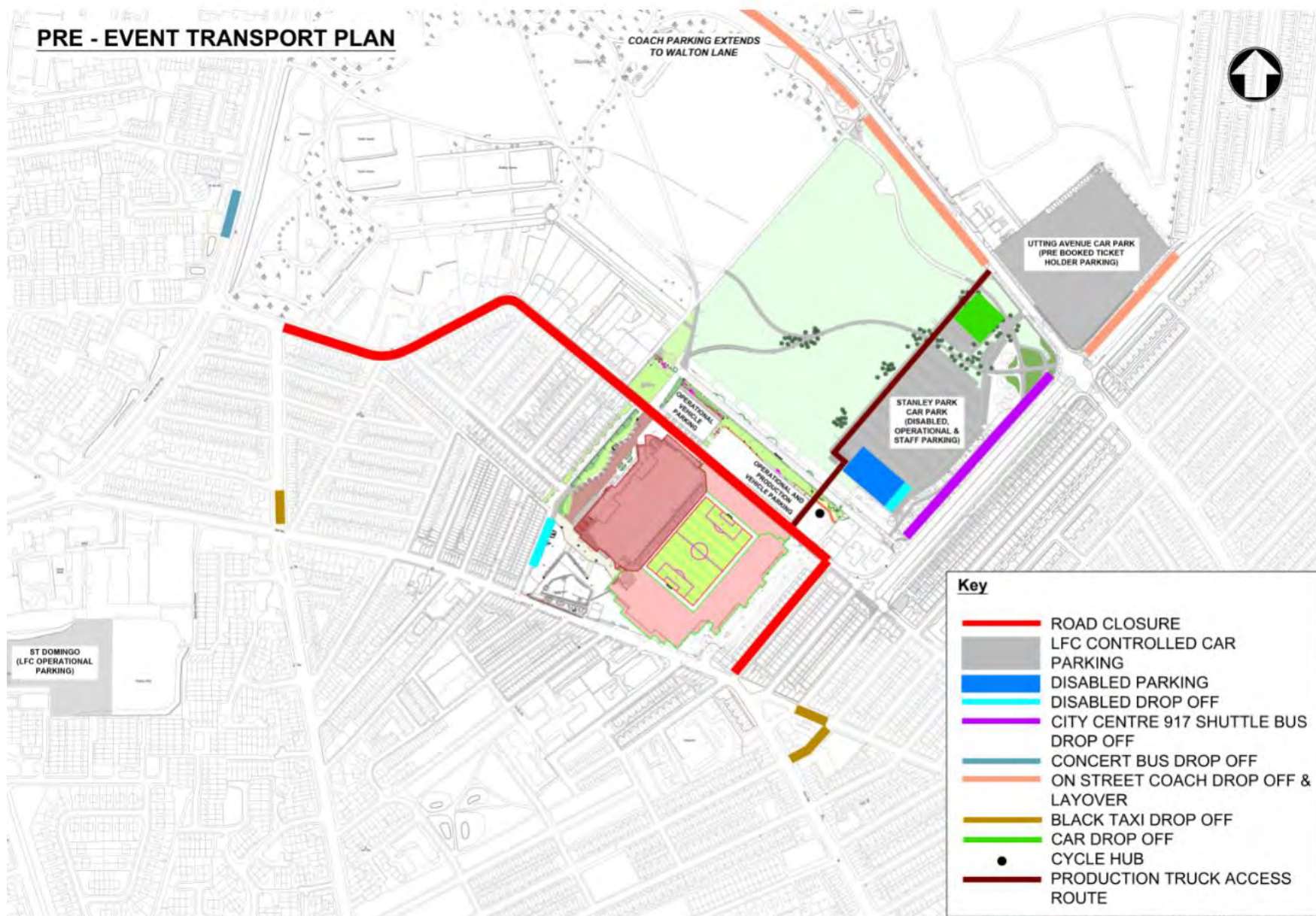
Lime Street Station is Liverpool's mainline station for regional and national journeys. On the day of a Major Event LFC will have Fan Support staff at the Station to provide advice to travellers on how to get to and from the Venue.

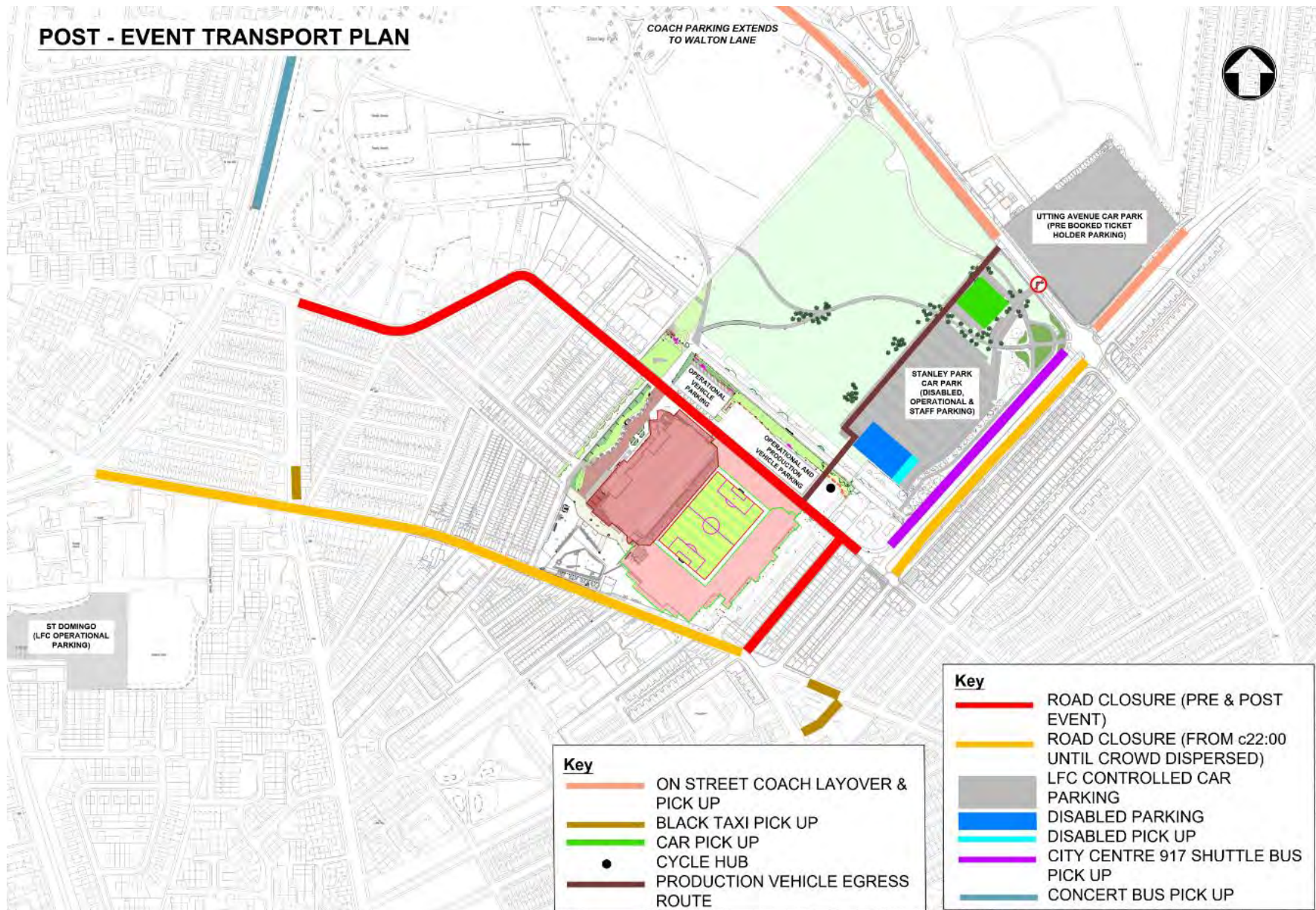
7.9 Walking Routes

The Venue is approximately 40 minutes' walk from the City Centre/Lime Street Station and a 30- minute walk from Sandhills and Kirkdale Stations there is directional signage on the public highway defining the route. Please see diagram at **Appendix 2** showing the walking distance.

7.10 Transport Plan

Please see the diagrams below summarising the pre and post-event transport arrangements.





8. MARKETING AND TICKETING STRATEGY

The ticketing strategy for Major Events will consist primarily of hard stock paper tickets using a mixture of hard stock, print at home tickets, thermal tickets and perforated tickets.

All ticket styles that are used at the Venue will be in advance of any Major Event taking place and proven to be compatible with the LFC Access Control System that is in use at the Venue. There will be two barcodes on each ticket.

The promoter's ticket terms provide that all under 16's must be accompanied by a responsible adult (aged 18 year or over) who holds a valid ticket in the same area of the Venue as the child. In addition to this no child under the age of 14 years will be granted access to the pitch.

The event promoter is ultimately responsible for the full marketing and ticketing strategy for their event. They will pull together their own marketing strategy with regional and national advertising and will likely look for support from partners to help raise awareness e.g. the artist, Venue and sponsors. The promoter has the responsibility for selling tickets and they utilise ticket agents to do so e.g. TicketMaster. Advertising examples include billboards, poster sites, social media, radio, print and TV.

The Venue will support with any relevant PR and marketing communication to assist the promoter with raising awareness through suitable LFC channels. The Venue agrees hospitality packages with the promoter and will sell these packages direct, supporting the sales for hospitality through its own advertising to its audience, along with some external advertising in relevant areas.

9. COMMUNICATIONS STRATEGY

9.1 Communications to Visitors

LFC will liaise with the promoter and ticket agent to employ similar marketing strategies for those attending Major Events. In particular, ensuring that visitors are directed to the LFC official website where travel, parking and public transport details are clearly available.

LFC and the promoter will work with Merseytravel to ratify proposed travel messaging ensuring all communications will include service information, timings, diversions, costs to attendees and link to service providers website for further information.

LFC's website will be updated to clearly signpost travel information in relation to Major Events. Communications will include:

- Dedicated Concert & Major Event web pages with 'getting to Anfield' and 'getting home pages' and a downloadable 'Getting to Anfield' guide.
- An 'Anfield Stadium Checklist' for event goers - a handy event checklist which details all of the key information attendees will need before setting off including travel options, road closures, parking, security, getting to your seat etc.
- A detailed 3D map signposting transport options available to event attendees which is available to view on LFC's website.
- Detailed FAQs page on LFC website where travel and car parking information will be clearly outlined.

FAQs/information sheet including key travel information and messaging will be given to the promoter and their ticket agents to send out with attendees' tickets. This information will also be published in their various event pages.

Event-day communication will be led by the promoter, with LFC supporting via social media. Messages will largely be related to transport, experiential points, relevant information and any changes to the event on the day.

An event change plan will be established with all travel providers which outlines the process for the dissemination of information to key stakeholders and service providers.

LFC and promoters will also work with Merseytravel to ensure Merseytravel Customer Services are briefed about highlighting pertinent issues that affect people getting to and from Anfield.

9.2 Communications with Local Residents

In order to inform the local residents of transport plans around Major Events LFC will:

- Hold regular meetings with local Ward Councillors and exchange information and feedback about plans
- Hold drop-in sessions for residents during the course of the planning and preparation period to advise residents of proposed plans
- Share regular updates on LFC's Resident's Hub www.liverpoolfc.com/local-residents advising residents of plans
- Once plans have been ratified by Liverpool City Council, LFC will issue advisory leaflets to homeowners within the agreed consultation area, setting out the dates and times of any Major Event, proposed road closures, local access arrangements including mechanism for obtaining and utilising LFC's resident access pass, public transport services (including any diversion or changes to services) and contact details for any queries and feedback during a Major Event
- The information provided in the aforementioned leaflet will also be published on the local Resident's Hub
- Any relevant changes to the Major Event or will be communicated via the Resident's Hub
- LFC's Resident Liaison Officer will also support effective liaison with residents.

10. NOISE MANAGEMENT

10.1 Background

The Health and Safety at Work Act 1974 and The Control of Noise at Work Regulations 2005 as amended require LFC and promoters to protect workers and the audience from noise.

The Management of Health and Safety at Work Regulations 1999 (Management Regulations) also apply to cover noise and vibration considerations.

For the community impact of noise from events, Liverpool City Council has environmental music noise control protocols which apply to Anfield Stadium as set out in the planning consent ref 18F/1632.

It is accepted that during the course of a Major Event there will be sound emissions that may affect residents. LFC is committed to keeping emissions to Liverpool City Council guidelines. Measures that will be in place are as follows:

- The Production Manager and Sound Control Engineer will be instructed to control sound emission levels to keep them within the limits set out in the relevant Noise Impact Assessment.
- Means and timings for the testing of sound systems and the artist's sound check will be agreed with the Environmental Health Officer with due regard for the local residents.
- In addition, sound levels will be checked during the Major Event by sound meters. These sound meters will comply with the provisions of BS 5969: 1981 and will be available for inspection.
- A suitably qualified noise consultant has been appointed to monitor noise levels and liaise between LFC and the promoter.
- During sound checks, rehearsals and Major Events, the music noise level (MNL) measured at a point one metre from the façade of any noise sensitive receptor shall not exceed 75 dB LAeq 15min.
- There shall be no amplified music within the external concourse area, including any music directed thereto from within the premises, beyond levels agreed with the local planning authority (in conjunction with the Environmental Health Service).
- Noise control measures will be employed within the development such that sound generated within the commercial entertainment areas contained within the expanded Venue does not give rise to noise levels exceeding NR25 at the boundary of any nearby residential accommodation (expressed in terms of the maximum sound pressure level in each octave band) outside the hours of 0700 - 2300.
- The rating level of the noise emitted from any plant shall not exceed the existing background noise level. The noise level shall be determined at the nearest noise sensitive premises. The measurements and assessments shall be made according to BS4142: 1997. 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas'.

10.2 Noise Monitoring Locations

Noise monitoring locations have been agreed these are thought to be the areas with the biggest impact and monitoring will be done in conjunction with a Liverpool City Council Environmental Health Officer.

- Alroy Road

- Anfield Road
- Skerries Road



10.3 Audience

There is no specific legislation setting noise limits for the audience's exposure to noise, however, the general requirements of the Health and Safety at Work Act and civil law duties relating to negligence indicate that audiences need to be protected against and informed of the risk.

10.4 Promoter Staff

The responsibility for all health and safety issues including noise for the staff employed by and through the promoter will be that of the promoter. The staff will include but not be exclusive to, the stage builders, riggers, artists staff, sound engineers and their staff and the security staff employed in the pit and backstage by the promoters.

10.5 Staff

Staff that are exposed to high sound levels will be provided with ear protection and be rotated as appropriate through the high sound positions. Ear Protection will be provided for all staff who request it and will be supplied for use, if required, to:

- All safety personnel on duty at the Major Event.
- All facilities personnel.

Those safety personnel working on the pitch and near to the stage will be required to wear ear protection, rotate duties and take breaks as instructed.

10.6 Construction Noise and Curfew

Construction noise will be minimal. Structures will be prefabricated and do not require heavy plant and machinery for assembly, work will generally be restricted from 08:00 – 21:00 daily except on the days following a Major Event where soft strip works will take place throughout the night.

10.7 Lighting

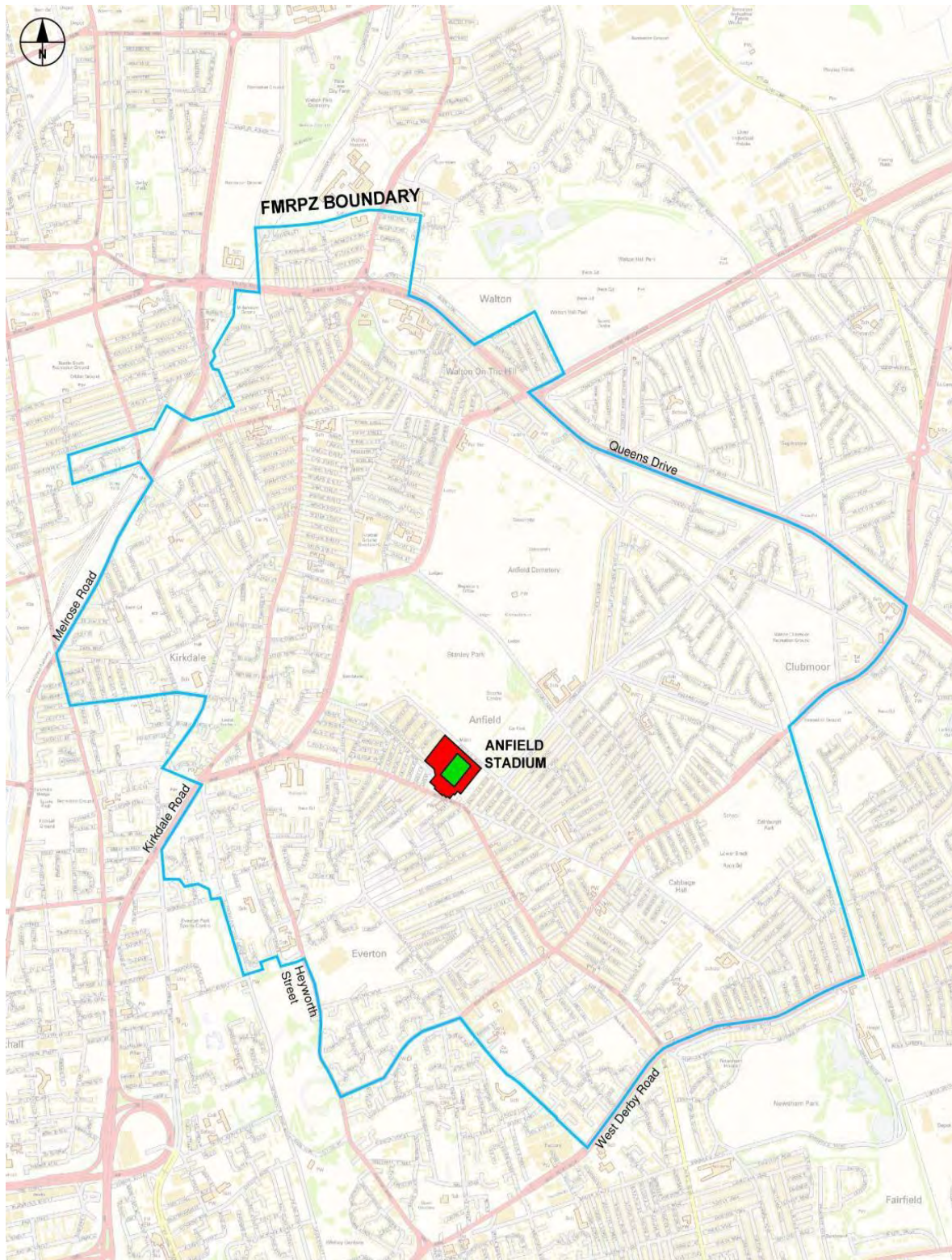
It will be necessary to test stage lighting during the hours of darkness in the days before a Major Event. This testing will take place up to midnight but will not require Venue floodlights. All external lighting fittings shall be orientated so that any measurements taken at any nearby habitable roomed windows do not exceed 6 lux.

Lighting levels will remain at the lowest level consistent with crowd and worker safety.

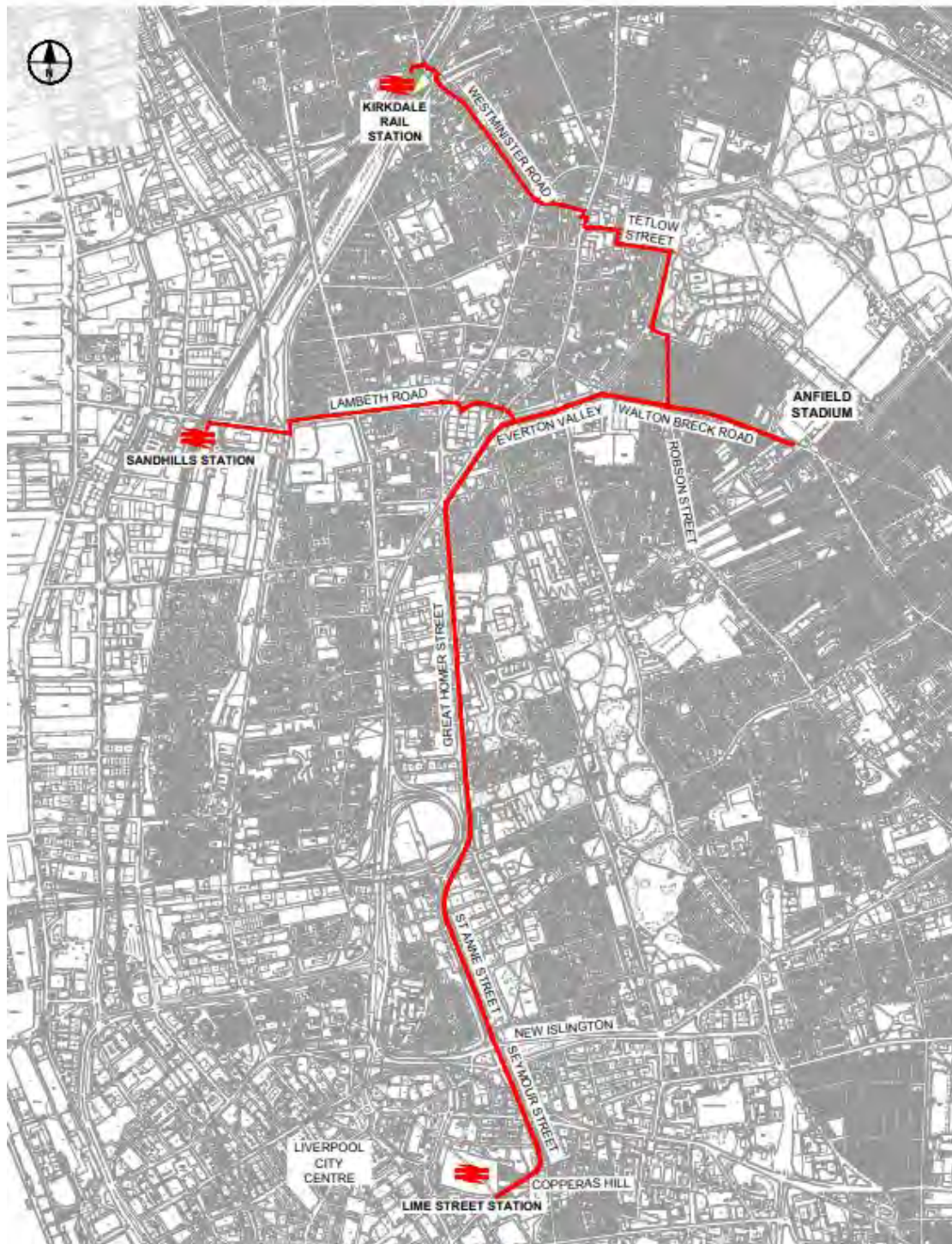
10.8 Noise Management Plan

A bespoke Noise Management Plan will be produced for each Major Event which will set out the detail of the production and measures in place to ensure that the concert music noise level and any works associated with a Major Event fall within the scope of the relevant codes and best practice measures.

APPENDIX 1 – FMPZ



APPENDIX 2 – WALKING ROUTES



ANFIELD STADIUM SIGNPOSTED WALKING ROUTES



Vanguardia Concert Noise Assessment Report

ANFIELD STAND EXPANSION CONCERT PLANNING

NOISE ASSESSMENT

VC-103265-EN-RP-01

R00

JAN 2020



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DOCUMENT CONTROL

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1. INTRODUCTION

- 1.1. Vanguardia Consulting has been commissioned by Liverpool Football Club Ltd to provide a noise assessment as part of a premises licence application for music concerts to be held at the venue.
- 1.2. This report provides an update to the previous report carried out in 2018 to include the proposed Anfield Stand. This report provides the output predictions for concert noise breakout for inclusion in the Mott Macdonald environmental assessment.
- 1.3. This report provides guidance on the recommended criteria and predicted noise levels expected from concert events at the venue.
- 1.4. A glossary of acoustic terms is shown in Appendix A.
- 1.5. Noise contour plots are provided in Appendix B.
- 1.6. Appendix C includes a number of receiver prediction locations as requested by Mott Macdonald.

2. ENTERTAINMENT NOISE CRITERIA

NOISE COUNCIL'S CODE OF PRACTICE ON ENVIRONMENTAL NOISE CONTROL AT CONCERTS (1995)

- 2.1. The established guidance for noise from outdoor music events is contained in the Noise Council's Code of Practice on Environmental Noise Control at Concerts (1995). The recommended noise limits contained within the Code of Practice for events held between the hours of 09:00 and 23:00 hours are summarised in Table 1 below.

Table 1 Recommended Noise Limits

Concert days per calendar year, per venue	Venue Category	Guideline
1 to 3	Urban Stadia or Arenas	The MNL should not exceed 75 dB(A) over a 15 minute period
1 to 3	Other Urban and Rural Venues	The MNL should not exceed 65 dB(A) over a 15 minute period
4 to 12	All Venues	The MNL should not exceed the background noise level by more than 15 dB(A) over a 15 minute period

- 2.2. The Code of Practice states that 'for venues where just one event has been held on one day in any one year, it has been found possible to adopt a higher limit value without causing an unacceptable level of disturbance'.
- 2.3. Therefore, taking the guidance from table 1 above, the suggested criteria is that the Music Noise Level (MNL)¹ would be 75dB $L_{Aeq,15min}$ measured at the facade of the nearest residential property.
- 2.4. Noise predictions are shown in the following section of this report.

¹ The Music Noise Level is the L_{Aeq} of the sound from the music and vocals during a concert or sound check and not affected by other sources

3. PREDICTED NOISE LEVELS

3.1. Noise predictions have been carried out using IMMI noise modelling software to predict the noise impact at the following noise sensitive locations. These have been chosen to be indicative of the expected noises levels at each off the surrounding noise sensitive locations.

- Alroy Road
- Pulford Street
- Walton Breck Road
- Arkles Lane
- Anfield Road
- Skerries Road

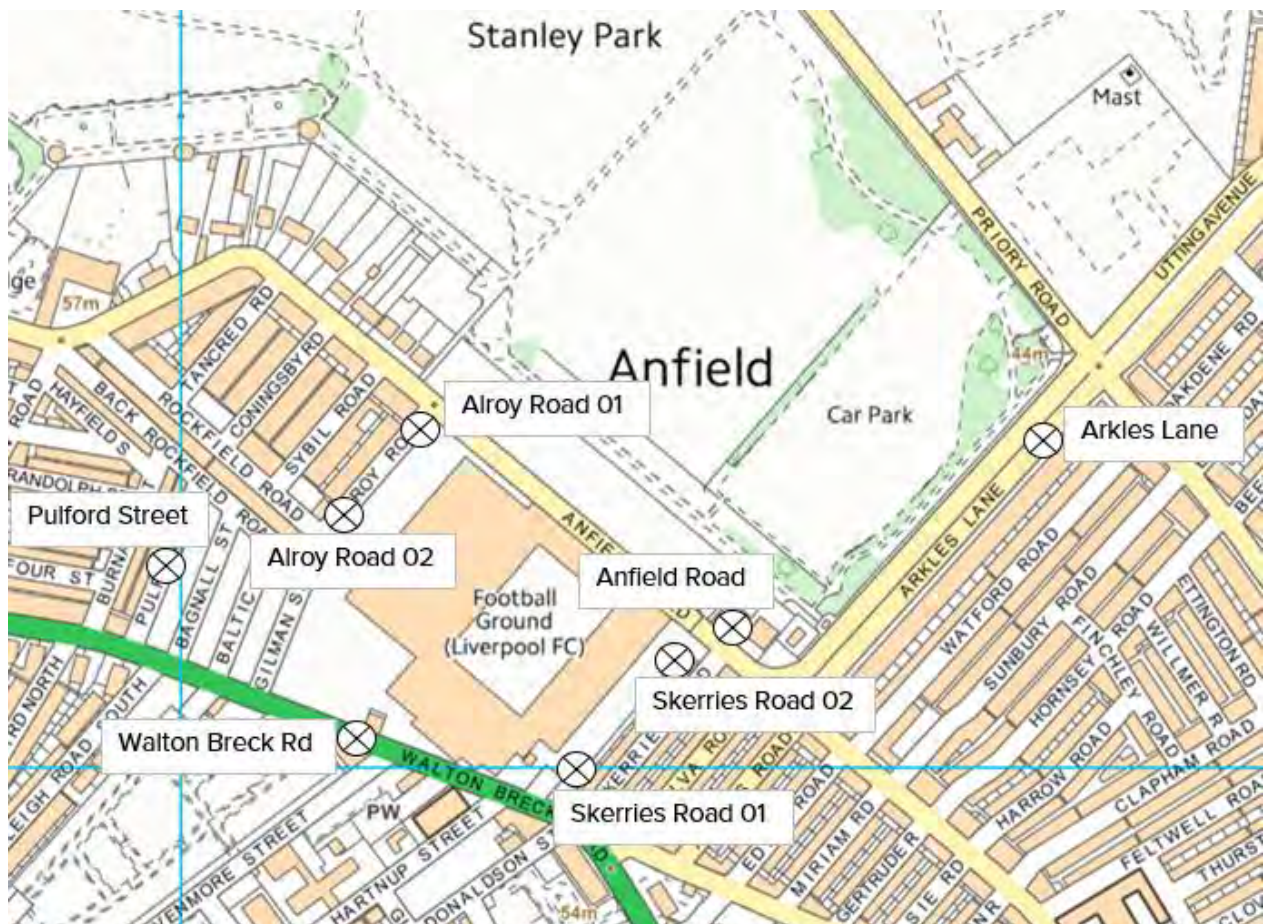


FIGURE 1: RECEIVER LOCATIONS FOR MODEL PREDICTIONS

- 3.2. Noise predictions have been carried out at a height of 1.5m for three stage locations, with the stage at the north-east end of the stadium, orientated towards the south-west, at the south-west end of the stadium, orientated towards the north-east and with a centre stage option.
- 3.3. The following assumptions have been made in predicting noise levels at the nearest noise sensitive locations:
- Noise predictions have been made based on the intended coverage of the sound system and data from similar previous events to achieve a music noise level for music performances of 98dB(A) at the mixing desk position, 50m from the stage.
 - The sound system had been modelled as a 'line array' system which is the most common type of system used for most concert events. The horizontal dispersion data is taken from an L-Acoustics K1 line array sound system at a trim height of 12m.
 - Ground attenuation effects as per ISO 9613.
 - Moderate downwind propagation as per ISO 9613.
- 3.4. The following table 2 shows the predicted noise levels at the model receptor points at the facade of the nearest noise sensitive properties. In addition to this data noise contours have been plotted to assess the noise impact at all nearby community receptors. The noise contour plots are provided in Appendix B:

Table 2 Predicted Noise Levels at Nearest Noise Sensitive Properties

Location	North East Orientation	South West Orientation	Centre Stage Orientation
	Predicted $L_{Aeq,T}$ (dB)	Predicted $L_{Aeq,T}$ (dB)	Predicted $L_{Aeq,T}$ (dB)
Mixer	98	98	98
Alroy Road 01	60	55	64
Alroy Road 02	55	58	64
Pulford Street	54	61	64
Walton Breck Road	52	65	65
Arkles Lane	67	46	64
Anfield Road	65	61	65
Skerries Road 01	54	63	65
Skerries Road 02	62	55	65

- 3.5. The results indicate minimal change at the majority of the prediction locations in comparison to results before the proposed anfield stand. As expected, the largest reductions are behind the new Anfield stand on Arkles lane. The model also indicates a reduction at the end of skerries road where the increased height of the stand provides an additional barrier particularly in the South West orientation.

LIMITATIONS OF NOISE MODEL

- 3.6. Whilst the noise prediction model provides a relatively accurate indication of the noise impact at noise sensitive properties, it can in no way guarantee the actual operational noise levels of an event as meteorological conditions such as temperature inversions and wind direction may have a significant effect on noise levels at noise sensitive properties during an event, the effects of which cannot be readily predicted. Verification of previous models has shown that under normal conditions the model provides results within a good tolerance. All predictions are based on a downwind model, which means that the model provides a worst-case scenario for the wind blowing in all directions. In the real world this does not happen, and the noise levels are only accurate in the downwind direction.
- 3.7. Since the previous model a number of events have been carried out at the venue and provide a good correlation between measured and predicted values.

4. NOISE ASSESSMENT

- 4.1. The guidance from the Code of Practice advises that for urban stadia or arenas used for 1-3 events per calendar year, the music noise level (MNL) should not exceed 75dB(A) over a fifteen-minute period at the nearest noise sensitive premises for events finishing no later than 2300hrs.
- 4.2. It should be noted that the Code of Practice is currently being revised and a number of venues now successfully operate with greater number of events than defined in the code of practice. Currently Tottenham Hotspur and the London Stadium has permission for 6 events per year at 75 dB(A).
- 4.3. The noise predictions indicate that the recommended noise limit would likely be achieved at all locations for any of the stage locations.
- 4.4. It is understood that from a production viewpoint the South-West facing stage would be preferred.
- 4.5. Through effective noise management, sound system design and mitigation measures, the music noise level (MNL) will not exceed 75dB(A) over a fifteen-minute period at the nearest noise sensitive premises as recommended in the guidance contained in the Noise Council's Code of Practice on Environmental Noise Control at Concerts (1995).

5. CONCLUSION

- 5.1. An assessment has been carried out to determine the feasibility of concert events in the stadium. Three alternate stage locations have been reviewed using a computer model simulation.
- 5.2. Audience levels in excess of 104dB(A) for all stage locations can be achieved. This is likely to give satisfactory audience sound levels within the venue for a rock/pop concert for any of the stage locations.
- 5.3. In comparison to the previous model the noise levels to the North East of the stadium are reduced with little change to the other locations around the stadium.

APPENDIX A

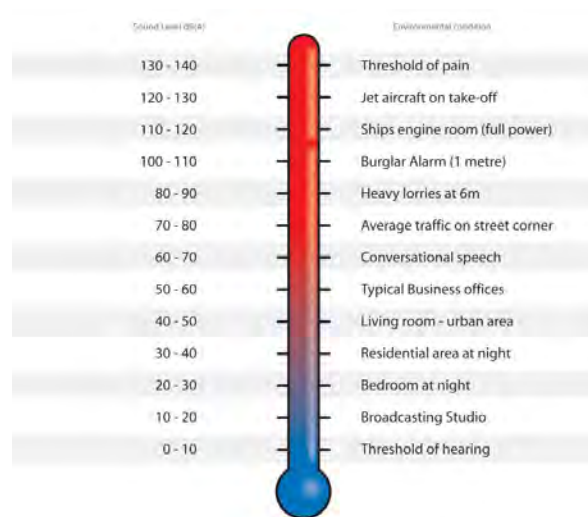
GLOSSARY OF TERMS

Noise is defined as unwanted sound. The range of audible sound is from 0dB to 140dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high frequency component of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most used and which correlates best with the subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

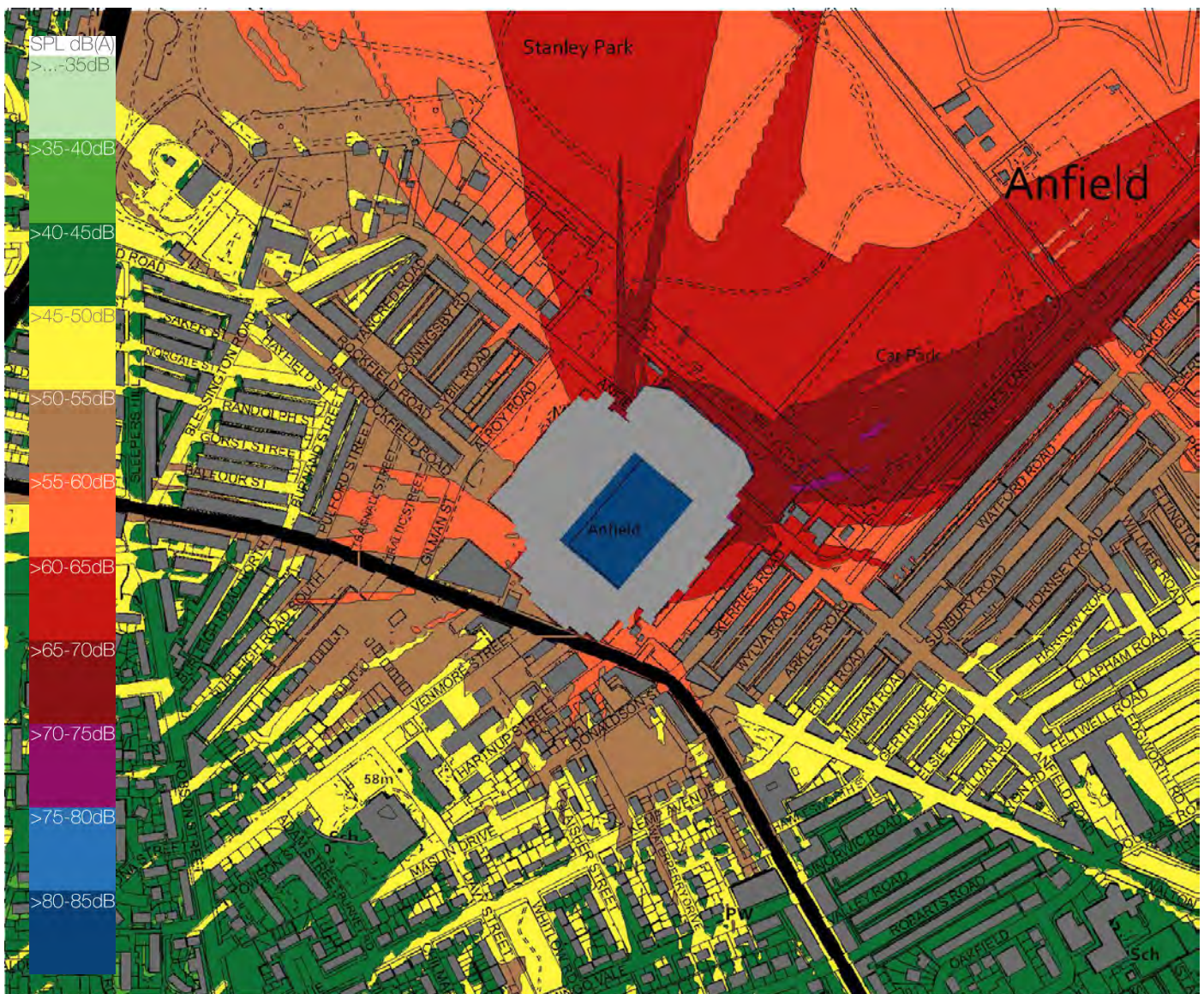
The ear can just distinguish a difference in loudness between two noise sources when there is a 3dB(A) difference between them. Also when two sound sources of the same noise level are combined the resultant level is 3dB(A) higher than the single source. When two sounds differ by 10dB(A) one is said to be twice as loud as the other.

The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various indices have been developed to try and correlate annoyances with the noise level and its fluctuations. The parameter used for this measure is Equivalent Continuous Sound Pressure Level (L_{Aeq}). The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. It is in effect the energy average level over the specified measurement period (T) and is the most widely used indicator for environmental noise. A few examples of noise of various levels are given right:

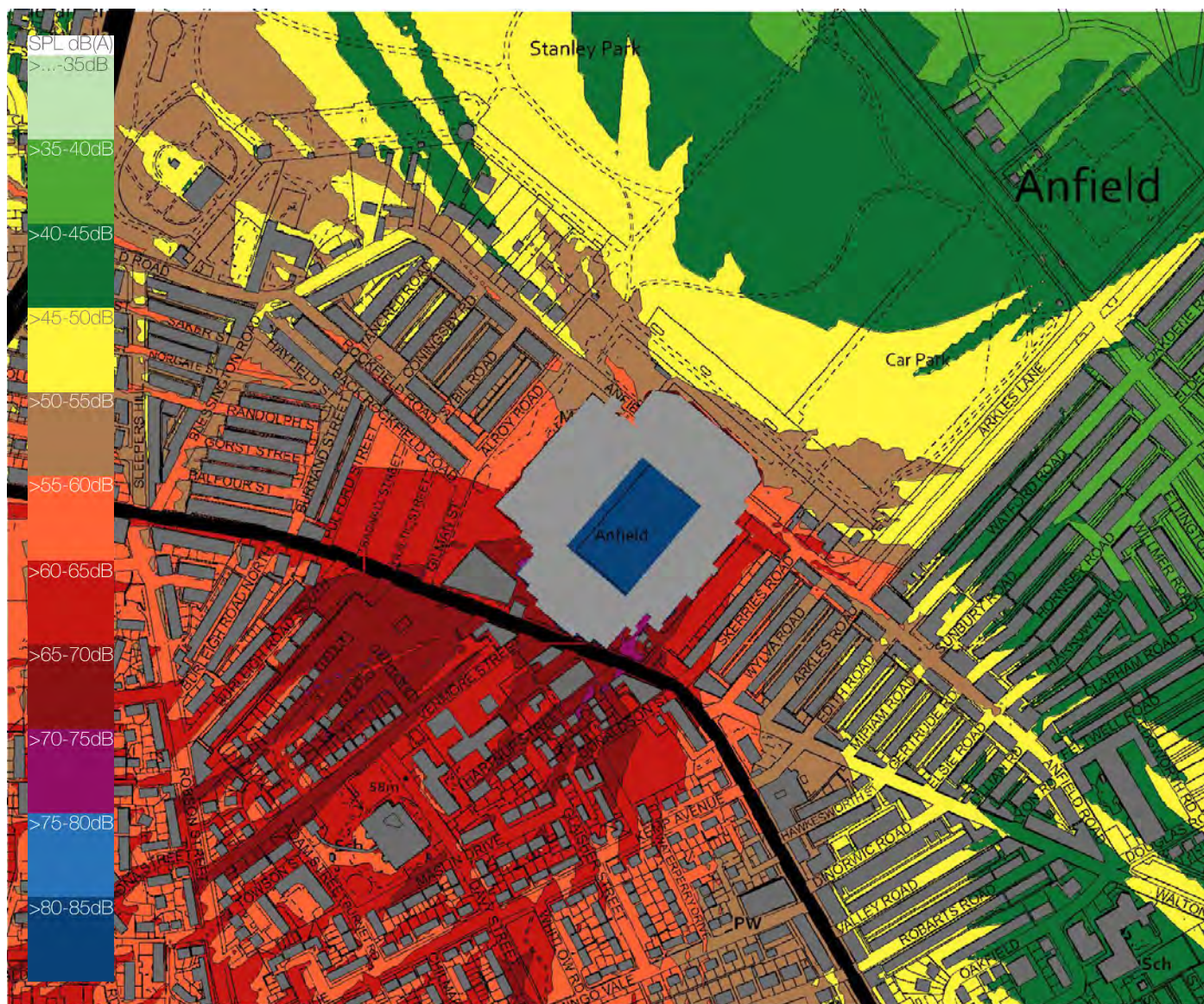


6. APPENDIX B- NOISE CONTOUR PLOTS

NORTH EAST ORIENTATION



SOUTH WEST ORIENTATION



APPENDIX C - ADDITIONAL LOCATIONS FOR MOTT MACDONALD

Location	North East Orientation	South West Orientation	Centre Stage Orientation
	Predicted L _{Aeq,T} (dB)	Predicted L _{Aeq,T} (dB)	Predicted L _{Aeq,T} (dB)
Mixer	98	98	98
ST1	66	49	69
ST2	54	60	65
ST3	53	60	63
ST4	56	65	67
ST5	53	67	69
ST6	60	55	64



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Noise Management Plan

LIVERPOOL FC CONCERTS

ANFIELD STADIUM – LIVERPOOL

NOISE MANAGEMENT PLAN
VC-102941-EN-NMP-0001

R02

17TH MAY 2019



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1. INTRODUCTION

1.1. This sound management plan has been prepared by Vanguardia Ltd as the appointed acoustic consultants (AAC), as part of the noise management procedures for the following events at Anfield Stadium, Liverpool:

- Take That – June 6th 2019
- Bon Jovi – June 19th 2019
- P!nk – June 25th 2019

1.2. The purpose of this document is to describe the sound management scheme that will be put in place to manage the Music Noise Level (MNL) at residential properties in line with the objectives of the Premises Licence.

1.3. The MNL is the A-weighted Leq of the music noise measured at a given location and excludes contributions from other sources such as traffic or crowds.

1.4. Conditions set by the local authority are reproduced in Section 2 and the concert noise management procedures are described in section 3. In addition to this the details of the report cover:

- Monitoring, assessment and management protocol;
- Communications procedures;
- Contact details

1.5. The technical acoustic terms used in this document are set out in Appendix A.

1.6. The noise management scheme described in this report fundamentally follows the procedures that have been successfully adopted for many previous concerts and festivals in the UK

CONSULTANT'S EXPERIENCE

1.7. Vanguardia Ltd is an independent acoustic consultancy specialising in the field of sound, noise and acoustics related to entertainment venues. The team of consultants have many years' experience dealing with some of the largest and most innovative sound and acoustic projects in the UK, including Wembley Stadium, the O2, The London Stadium, Wembley Arena and Hyde Park.

- 1.8. The consultants have successfully provided sound management advice, including noise control, at over 1000 concerts during the past 25 years. These concerts have ranged from relatively small scale events at green field sites to major events staged at national stadia providing entertainment for tens of thousands of people.
- 1.9. The company director also sat on the UK Noise Council Working Party which prepared the Code of Practice on Environmental Noise Control at Concerts (1995). They have also managed Government research projects related to sound and noise aspects of the entertainment business.
- 1.10. As well as the provision of sound and acoustic design/management for entertainment venues, the company deals with the whole range of acoustic, noise and vibration issues and our staff have presented expert testimony at planning and licensing hearings, magistrates and high courts, Judicial Reviews and House of Commons and House of Lords Select Committees.

2. CONCERT INFORMATION

2.1. Key timings and event information are provided in Table 1 below

Table 1 Key Event Information

	Take That	Bon Jovi	P!nk
Date(s)	6th June 2019	19 th June 2019	25 th June 2019
Promoter	SJM Concerts	Live Nation	Marshall Arts
Promoters Rep	Andy Cerrone	Andrew Craig	Andrew Lennie
LFC EVENT MANAGER NAME AND CONTACT DETAILS			
Provisional doors, sound checks, rehearsals date/time	Sound checks permitted from 0800hrs. Doors 1730hrs	TBC	TBC
Licence Requirements	The music noise level (MNL) shall not exceed 75dB(A) Leq, 15mins at the nearest noise sensitive premises		
Sound propagation test time	5 th June (TBC)	18 th June (TBC)	24 th June (TBC)
Curfew	22:30	23:00	23:00

3. ENTERTAINMENT NOISE CRITERIA

3.1. The established guidance for noise from outdoor music events is contained within the Noise Council Code of Practice on Environmental Noise Control at Concerts (1995). The recommended noise limits contained within the Code of Practice for events held between the hours of 09:00 and 23:00 hours are summarised in Table 2 below.

Table 2 Entertainment Noise Criteria

Concert Days per Calendar Year	Venue Category	Guideline
1 to 3	Urban Stadia or Arenas	The MNL should not exceed 75 dB(A) over a 15 minute period
1 to 3	Other Urban and Rural Venues	The MNL should not exceed 65 dB(A) over a 15 minute period
4 to 12	All Venues	The MNL should not exceed the background noise level by more than 15 dB(A) over a 15 minute period

3.2. In 2019 there are only 3 large scale music events proposed for the venue and therefore the noise level for this event, is as per the information in Table 2, 'The MNL should not exceed 75 dB(A) over a 15-minute period'. This accords with the granted Premises Licence and Planning Permission.

3.3. The orientation of the stage for the proposed 2019 events is shown in Figure 1 below:



Figure 1 Stage Orientation

3.4. The 75 dB(A) music noise limit should be measured 1m from the nearest residential, or other noise sensitive premises. The suggested locations are shown in Appendix C and based on the information contained above, the proposed monitoring locations are presented in Table 2 below:

Site No.	Location	Monitoring Description
1	Alroy Road	Short term
2	Skerries Road	Short term
3	Anfield Road	Short term

3.5. Noise levels measured at each of the above receptor locations are likely to be the highest based on the proximity and orientation to the main source of noise. The key locations for monitoring will be based on the prevailing weather conditions on the day and subject to discussions with the local authority. A control position will be determined based on the worst affected receptor on the day of the event.

3.6. Additional receptors can be included through consultation with the Environmental Health Officers if it is deemed appropriate.

4. CONCERT NOISE MANAGEMENT

- 4.1. During rehearsals the appointed acoustic consultant will monitor noise levels at noise sensitive locations as agreed with the local authority on the day, based on the proximity of noise sensitive properties to the event and weather conditions on the day.
- 4.2. If noise levels do need to be reduced during these rehearsals, the appointed acoustic consultant will ask the engineer to reduce the overall noise levels to check compliance with the premises licence conditions.
- 4.3. The timings of sound checks and rehearsals will be agreed with the local authority in advance of the event although these timings may not be known until a few days before the event day.

SOUND MANAGEMENT PROCEDURES

- 4.4. A sound propagation test will be undertaken prior to the start of the event in order to set appropriate noise management limits at the sound mixer position. The sound system will be configured and operated in a similar manner as intended for the event. The noise source used for the test will be similar in character to the music likely to be produced during the event. Officers from Environmental Health will be given prior notification of the test and provided access to the results. The music noise levels at the mixing desk will be correlated with those observed at the pre-agreed monitoring locations to determine the likely maximum operational noise levels of the show.
- 4.5. All non-emergency PA announcements will be limited after 2300hrs.
- 4.6. Noise control measures will be employed within the venue such that sound generated within the commercial entertainment areas contained within the expanded stadium does not give rise to noise levels exceeding NR25 at the boundary of any nearby residential accommodation (expressed in terms of the maximum sound pressure level in each octave band) outside the hours of 07:00 – 23:00]. These measures will be directly managed by the Venue.
- 4.7. The music sound levels at the mixing desk position will be continually monitored in terms of 15-minute and 1-minute LAeq values. The noise limit is set in 15-minute intervals, but the 1-minute values provide the AAC with immediate information. The sound engineers are continually informed of the position of the music noise levels and immediate instructions will be issued to them if it appears that the limit may be exceeded at any point. The AAC at this position will be in radio contact with colleagues and EHOs monitoring music noise levels at nearby residential properties. For clarity, communications with the Sound Engineer will be from the AAC only.

- 4.8. Short term noise measurements at residential properties will be carried out by a consultant at regular intervals throughout the event. It is anticipated that the monitoring will be carried out in conjunction with the EHOs. This team will be in radio contact with the AAC inside the venue at the mixing desk position. Action necessary to check compliance with the licence conditions will be transmitted by radio through to the consultancy team at the mixer and immediate instructions issued to the sound engineer to resolve any potential problems.
- 4.9. An attended complaint number will operate throughout the event. Information from the attended complaint telephone number will be immediately given to the noise consultant to allow assessment of whether any adjustment is required to the music noise level.
- 4.10. A standard template will be used to log all complaints and will include the name and address and contact details of the complainant, date and time of the complaint, location of the complaint (general indicative street location), event to which the complaint relates, nature of the complaint, name of the person who receives the complaint and response given. (A specimen complaint form is shown in Appendix D).

5. NOISE FROM LOAD IN / LOAD OUT

- 5.1. Stage set delivery, Construction and Removal - will occur over a relatively short period of time. Typically, “soft strip” (quiet removal) of the stage set would begin immediately the event finishes and the stage and heavy set removals will take place the day following the event – as described in the load in/out schedule within the Event Management Plan.
- 5.2. With the exception of delivery, works will be contained within the Stadium with no line of sight to noise sensitive receptors in the surrounding streets. Noise and vibration from construction activities will usually be tolerated by the occupiers of sensitive receptors provided that prior notice is given, the effects are restricted to reasonable times and they are kept to a minimum. Construction noise will be minimal and any external loading will also be kept to a minimum. Structures will be prefabricated and do not require heavy plant and machinery for assembly.
- 5.3. Night time post event work will be managed to minimise potential noise output. Best Practicable Means for noise control (BPM) will be applied at all times. BPM draws upon guidance provided within BS5228 and should include the selection of the most appropriate method and plant for the job, adequate maintenance of plant, optimum siting of stationary plant, local screening and the education of the workforce.
- 5.4. If the load in / load out of production equipment onto stage trucks and lorries is to occur outside normal working hours, consideration will be made to minimise noise impact and includes the movements made by lorries and other associated vehicles such as fork lift trucks. Agreed routes from the M62 to the Stadium, agreed times for delivery and waiting/lay-up locations for HGVs in Stanley Car Park and Anfield Road will be specified by the Venue Management. During the load in / load out period HGV's will access the stadium bowl at an access point in the corner of the Sir Kenny Dalglish and New Main Stand as shown on the Plan attached at Appendix E.
- 5.5. Vehicle access routes to site will be located as far away from noise sensitive properties as practical. Potentially affected residents will be kept informed in advance of the works and contacts details be provided to request further information or to report disturbance. The approach to construction, dismantling of event sets is set out in Chapter 26 of each Event Management Plan.
- 5.6. Practical steps to reduce the noise disturbance include a full briefing session to all rigging and supervisory staff prior to the event. Where practically possible these steps will include the following:

PRODUCTION LOAD OUT

- All noise break out points should be closed off, to include all doors, windows and fire escapes.
- Residents should be provided with out of hours contact information for a site manager in case of overnight disturbance and if a complaint is received, work should stop until the source has been identified, and additional work methods adopted to achieve a reduction in level where practical and appropriate.
- Refrain from shouting when communicating
- Refrain from dropping scaffold bars etc
- Use damping materials to line truck floors
- Locate trucks as near to possible to operation, reducing transit time and noise from fork lift trucks
- Where possible lifting is preferable to wheeled loading
- The use of white noise reversing alarms on all site vehicles as an alternative to bleeper alarms
- When trucks are parked their engines will be switched off at all times.

STEEL LOAD OUT

- In addition to the points for the production load out, further steps should be taken to minimise impacts from any steel work or the breakdown of any on site infrastructure.
- Never drop steel, always ensure it is placed in a designated steel area, if scaffolding is regularly being dropped all work should cease and working methods should be re-assessed.
- Clamps should be stacked or placed in crates close to the working area of the steep operative, if this is not possible working methods should be assessed to avoid dropping clamps into boxes.

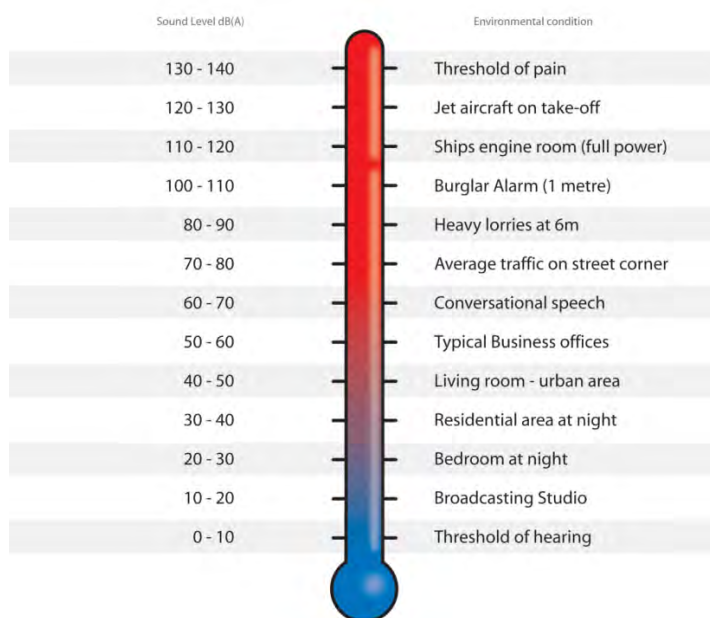
APPENDIX A - ACOUSTIC GLOSSARY

Noise is defined as unwanted sound. The range of audible sound is from 0dB to 140dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high frequency component of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most used and which correlates best with the subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

The ear can just distinguish a difference in loudness between two noise sources when there is a 3dB(A) difference between them. Also when two sound sources of the same noise level are combined the resultant level is 3dB(A) higher than the single source. When two sounds differ by 10dB(A) one is said to be twice as loud as the other.

The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various indices have been developed to try and correlate annoyances with the noise level and its fluctuations. The parameter used for this measure is Equivalent Continuous Sound Pressure Level (L_{Aeq}). The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. It is in effect the energy average level over the specified measurement period (T) and is the most widely used indicator for environmental noise. A few examples of noise of various levels are given right.



APPENDIX B - CONSULTANT INFORMATION**ACOUSTIC CONSULTANT DETAILS**

Vanguardia Ltd

Name	Designation	Contact number
Tom Deering (6 th June)	Acoustic Consultant	07857 500839
Peter Wheeler (19 th June)	Acoustic Consultant	07757 554319
Tom Deering (25 th June)	Acoustic Consultant	07857 500839

LOCAL AUTHORITY DETAILS

Name	Designation	Contact number
Dr. Ian Rushforth	Senior Enforcement Officer	0151 233 3055

APPENDIX C – MONITORING LOCATIONS

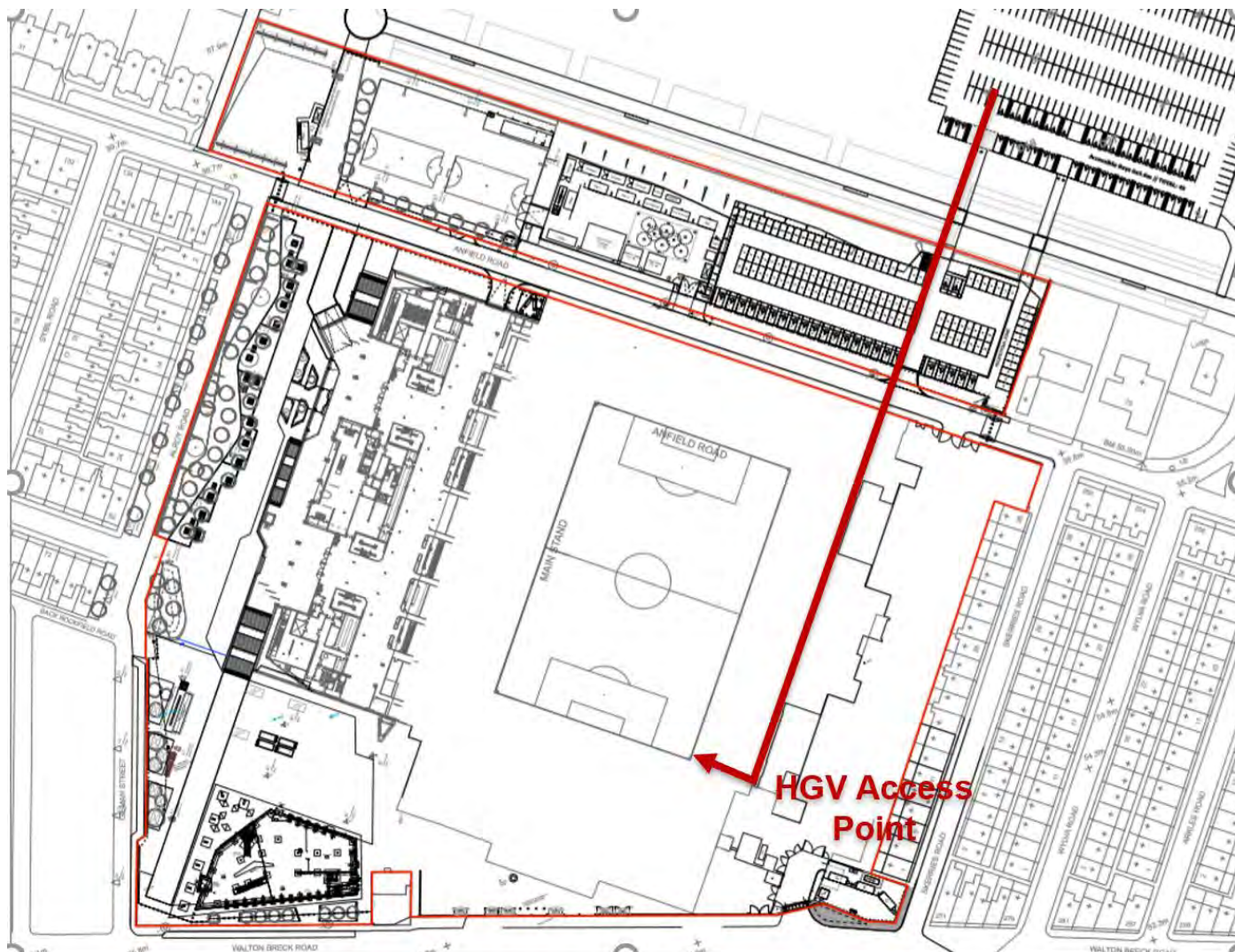


APPENDIX D - SPECIMEN COMPLAINT FORM

If event control receives a telephone call of complaint regarding noise during a concert / event, the following form could be completed:

Date	
Concert	
Time complaint received	
Name of complainant	
Address of complainant	
Telephone number of complainant	
Location of noise disturbance (address)	
Time disturbance noted	
Nature of complaint	Vocals / bass / general
	Inside / outside
Any additional comment	

The complainant should be advised that the complaint is logged and will be passed on to the AAC for investigation.

APPENDIX E- HGV ACCESS POINT



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P!nk Concert Report

P ! N K

ANFIELD FOOTBALL STADIUM, LIVERPOOL

POST CONCERT REPORT

VC-102941-PCR-0001

R00

9TH JULY 2019

7



VANGUARDIA
| | | | |

DOCUMENT CONTROL

DOCUMENT TITLE	P!NK ANFIELD POST CONCERT REPORT	REVISION	00
DOCUMENT NUMBER	VC-102941-PCR-0001	ISSUE DATE	9 TH JULY 2019
PROJECT NUMBER	102941	AUTHOR	TD
STATUS	ISSUE	CHECKED	DB
ISSUED TO	LIVERPOOL FOOTBALL CLUB	PASSED	TD

REVISION HISTORY

REVISION	NOTES	DATE ISSUED
R00	ISSUE	9 TH JULY 2019

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1. INTRODUCTION

- 1.1. Vanguardia Ltd. was appointed by Liverpool Football Club (LFC) to manage noise levels, from the P!nk concert held at Anfield football stadium in Liverpool, on the 25th of June 2019.
- 1.2. The purpose of this document is to describe the results of the noise management scheme that was put in place to manage music noise levels at residential properties. Information relating to noise from the event, including offsite noise limits set by the local licencing authority, is presented in Section 2. A summary of the results of the noise management and monitoring scheme are set out in Section 3.
- 1.3. The noise management scheme was carried out with reference to the noise management plan (NMP), produced by Vanguardia Ltd. and presented to the licencing authority and event promoter prior to the concert (document ref. *102941 - Noise Management Plan Anfield Stadium.R02 17th May 2019*)
- 1.4. A glossary of technical acoustic terms used is included in Appendix A of this report.

2. EVENT INFORMATION

2.1. Key information relating to the event is summarised in Table 1 below.

Table 1 P!nk Anfield - Event information

Event promoter	SJM Concerts
Sound propagation test	Event day, 15:10
Event start & finish times	18:00 – 22:30
Noise Licence Conditions	Music Noise Level (MNL) shall not exceed 75 dB L _{Aeq} 15 min measured at 1 metre from the façade of any noise sensitive premises.
Licencing Authority	Liverpool City Council

2.2. The objective of the noise management scheme was to ensure that the offsite music noise level limit of 75 dB L_{Aeq}, 15 min was not breached.

2.3. Weather conditions throughout the event were suitable for taking environmental noise measurements. A summary of weather history during the event is presented in Appendix B of this report.

2.4. Acoustic measurements were taken by Vanguardia Ltd. before and during the event with the instrumentation presented in Table 2. All equipment used has a traceable laboratory calibration history and was field calibrated at 1 kHz before and after the event with no significant drift noted.

Table 2 Acoustic measurement instrumentation used during P!nk, Anfield

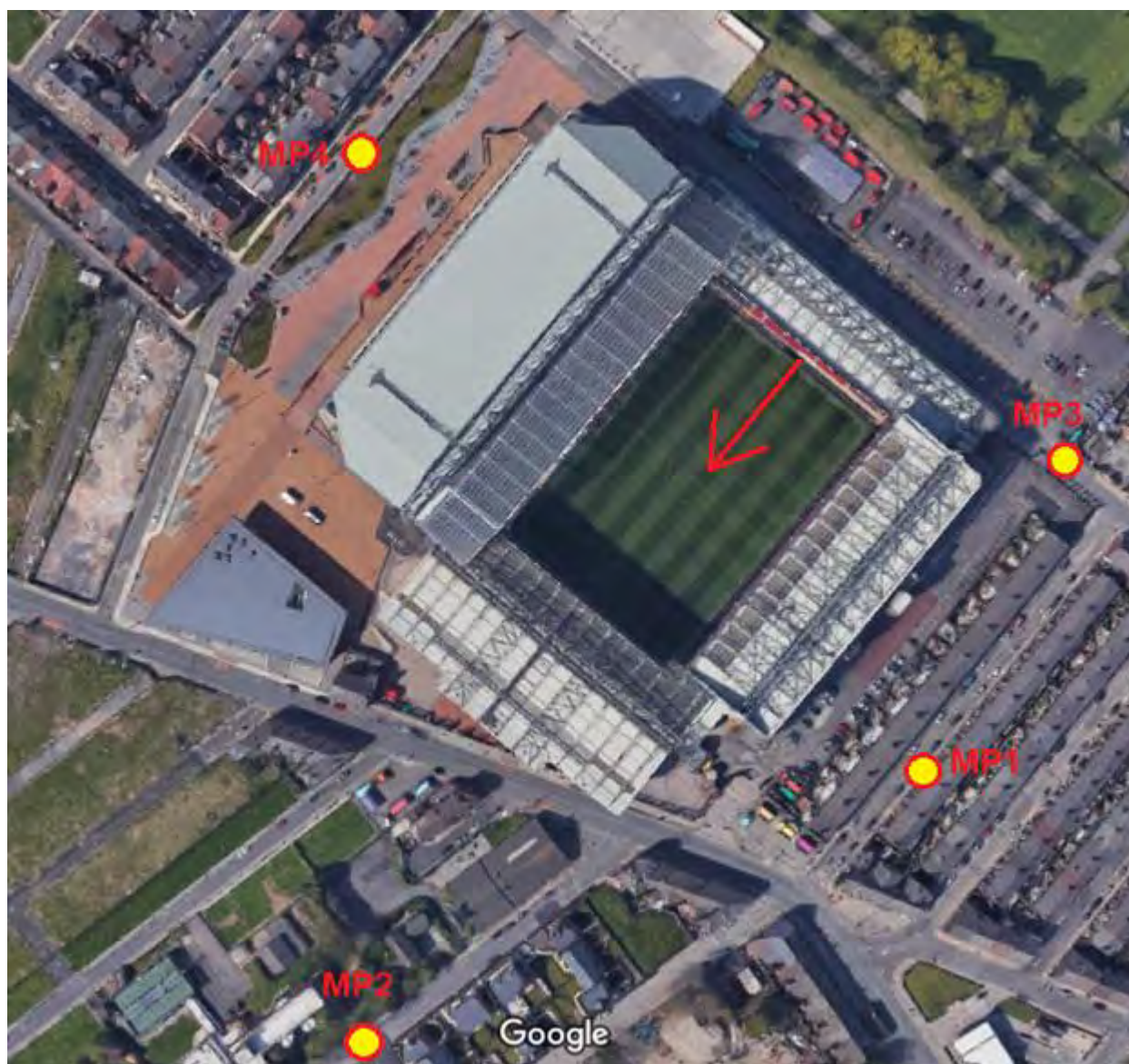
Sound level meter (SLM) model	Measurement position	SLM serial number	Microphone serial number
Larson Davis LxT	Offsite (MP1 and MP2)	3316	LW139016
NTi XL2 Sound Analyzer	Front of House mix position	A2A-04199-D2	5907

2.5. During the event, music noise levels were monitored with regular sound pressure level measurements taken from three offsite locations indicated in the NMP and an additional position (Glaisher Street) identified by Liverpool City Council as being representative of noise sensitive facades to the south of the venue. Glaisher Street was chosen as it was judged representative of music noise levels hitting the residential facades to the south of the stadium, excluding traffic noise from Walton Breck Road).

2.6. Noise monitoring locations are presented in Figure 1 below:

- **MP1:** Skerries Road
- **MP2:** Glaisher Street
- **MP3:** Anfield Road
- **MP4:** Alroy Road

Figure 1 Offsite noise monitoring positions at P!nk, Anfield (stage orientation indicated in red)



3. NOISE MANAGEMENT RESULTS

SOUND PROPAGATION TESTING

- 3.1. Sound propagation testing was undertaken prior to the event to establish an indicative FOH sound level with regards to offsite noise level limits. Heavy precipitation reduced the ability to take extended sound pressure level measurements however four measurements were successfully taken with music being played through the system. The music used during sound propagation testing was of a similar genre and frequency content to that being played during the event. The results of sound propagation testing are presented in Table 3 below.

Table 3 Sound propagation test data from P!nk, Anfield

Time	FOH Level (dB LAeq, 1 min)	Offsite measurement (dB LAeq, 1 min)
15:14	96	75
15:18	101	75
15:19	100	74

MUSIC NOISE LEVEL MEASUREMENTS

- 3.2. Sound pressure level data, measured by Vanguardia Ltd. on and offsite during the event, are presented in Table 4 below.

Table 4 Noise data from P!nk, Anfield

Time	FOH Level (dB LAeq, 15 min)	MP1 – Skerries Road (dB)	MP2 – Glaisher Street (dB)	MP3 – Anfield Road (dB)	MP4 – Alroy Road (dB)
18:00	90				
18:15	90				
18:30	91				
18:45	98		72 (LAeq, 5 min)		
19:00	99		70 (LAeq, 5 min)		
19:15	93				
19:30	98				
19:45	100	64 (LAeq, 5 min)			
20:00	101		66 (LAeq, 5 min)		
20:15	98				
20:30	92				
20:45	101		70 (LAeq, 15 min)		

21:00	101			71 (L _{Aeq} , 15 min)	
21:15	100				
21:30	101				
21:45	100				
22:00	101		66 (L _{Aeq} , 5 min)		64 (L _{Aeq} , 5 min)
22:15	103		73 (L _{Aeq} , 15 min)		

- 3.3. All of the offsite measurements taken were dominated by music noise from the event but influenced by traffic and pedestrian noise from the urban roads surrounding the venue.
- 3.4. Measurements were impacted by constant low-frequency generator noise at MP3 (Anfield Road). The measurement position was moved approximately 20 metres away from the venue entrance to account for this noise source.
- 3.5. A representative from the Environmental Health department of Liverpool City Council was in attendance at offsite monitoring positions during the concert and was in regular liaison with Vanguardia Ltd. to review the measurement methodology and resultant noise data.

NOISE COMPLAINTS

- 3.6. At the time of writing Vanguardia Ltd. have been made aware of six complaints received by Liverpool City Council relating to music noise from the concert. Complaints were received from residential streets in postcode areas L4 (Skerries Road, Sybil Road and Watford Road) and L5 (Albion Street, Glaisher Street and Vienna Street).

4 . S U M M A R Y

- 4.1. Vanguardia Ltd. have undertaken noise management of the P!nk concert Anfield, Liverpool, on the 25th of June 2019, following the noise management scheme outlined in Section 2 of this report.
- 4.2. It can be seen from Table 4 that no breaches were recorded of the offsite noise level limit imposed by the licence condition for the event. Six complaints have been logged by Liverpool City Council relating to music noise from the event.

APPENDIX A - ACOUSTIC GLOSSARY

A-WEIGHTING

The human ear is not equally sensitive to all frequencies of sound. It is relatively much less sensitive to very low frequencies such as 'mains hum', and to very high frequencies such as the call of a bat, than to the 'mid-frequencies' important for human voice communication. In order to make sound level meters, which would otherwise be indiscriminate in registering sound pressures, respond in a way which reflects human perception of sound, they usually are fitted with a set of filters to progressively filter out the high and low frequency energy. The filters are made to an internationally standardised specification and the filtered noise level is said to be 'A-weighted'. Sometimes A-weighted decibel levels are denoted 'dBA', but the correct, internationally standardised format for reporting requires the 'A' to be appended to the noise descriptor e.g. $L_{Aeq,T}$, L_{Amax} , etc.

AMBIENT NOISE

This is the totally encompassing sound at the measurement position over a specified time interval and usually comprises sound from many different sources both near and far.

ATTENUATION

A general term used to indicate the reduction of noise, or the amount (in decibels) by which it is reduced.

AVERAGING

In the absence of a dominant steady source, the sound level at a point, indoors or outdoors, varies continuously. For example, the variation may be over a few dB about an average value in a quiet room, or over 10 dB or more in a noisy outdoor environment. In order to define a level to represent the relative level of noise in the space it is necessary to define that average value. The most common averaging methods are energy averaging (L_{Aeq}) and statistical averaging (L_{AN} where N is a percentage between 1 and 100). The $L_{A10,T}$, the noise level exceeded for 10% of the measurement time interval T, is commonly used in the UK for the assessment of road traffic noise.

BACKGROUND NOISE LEVEL, $L_{A90,T}$

Background noise level is a term used to describe that level to which the noise falls during quiet spells, when there is lull in passing traffic for example. It is quantified by the $L_{A90,T}$ which is the noise level that is exceeded for 90% of the measurement time interval, T.

DECIBELS

Noise conventionally is measured in decibels (dB). The decibel is a logarithmic unit and decibel levels do not add and subtract arithmetically. An increase or decrease of 3 dB in the level of a steady noise is about the smallest that is noticeable. It represents a doubling or halving of noise energy. An increase or decrease of 10 dB represents a ten-fold change in noise energy, and is perceived as a doubling or halving of loudness. The threshold of hearing for a typical young, healthy adult is 0 dB A-weighted sound pressure level. A noise level of 140 dBA can cause physical pain. Most people listen to their televisions at about 60 to 65 dBA. Alongside a busy main road the ambient noise level may be in the 70 to 80 dBA range; on a quiet day in the country it might be as low as 30 dB, in town 40 to 50 dBA.

DECIBEL ADDITION

If two similar noise sources operate together their combined noise level at an observer's position some distance away is 3 dB higher than the noise level generated by just one of them. If two further machines are switched on the noise level generated by all four at the observer's position is 3 dB higher than the level generated by the two. If the number of machines is again doubled, to eight, the noise level increases by another 3 dB, and so on.

EQUIVALENT CONTINUOUS A-WEIGHTED SOUND PRESSURE LEVEL, $L_{Aeq,T}$

The 'equivalent continuous A-weighted sound pressure level' is an average of the fluctuating sound energy in a space. It is the value of the A-weighted sound pressure level of a continuous, steady sound that, over the specified time period, T seconds, has the same root mean square sound pressure as the varying sound. It can be likened to the mean petrol consumption of a car over a specific journey during which the instantaneous consumption peaked during periods of acceleration and fell during periods of coasting or braking.

FAÇADE SOUND LEVELS

Road and railway traffic noise levels often are specified in terms of the sound level at a position 1 m in front of the most exposed façade of potentially noise sensitive premises. Such levels are assumed to be 3 dBA higher than sound levels measured at an equivalent position away from the noise reflected off the building façade and any other surfaces (excluding the ground).

MUSIC NOISE LEVELS (MNL)

The L_{Aeq} of the music noise measured at a particular location without interference from extraneous ambient noise.

APPENDIX B – WEATHER HISTORY DATA

Weather data on the day of the event is taken from www.wunderground.com [Accessed 5th July 2019].

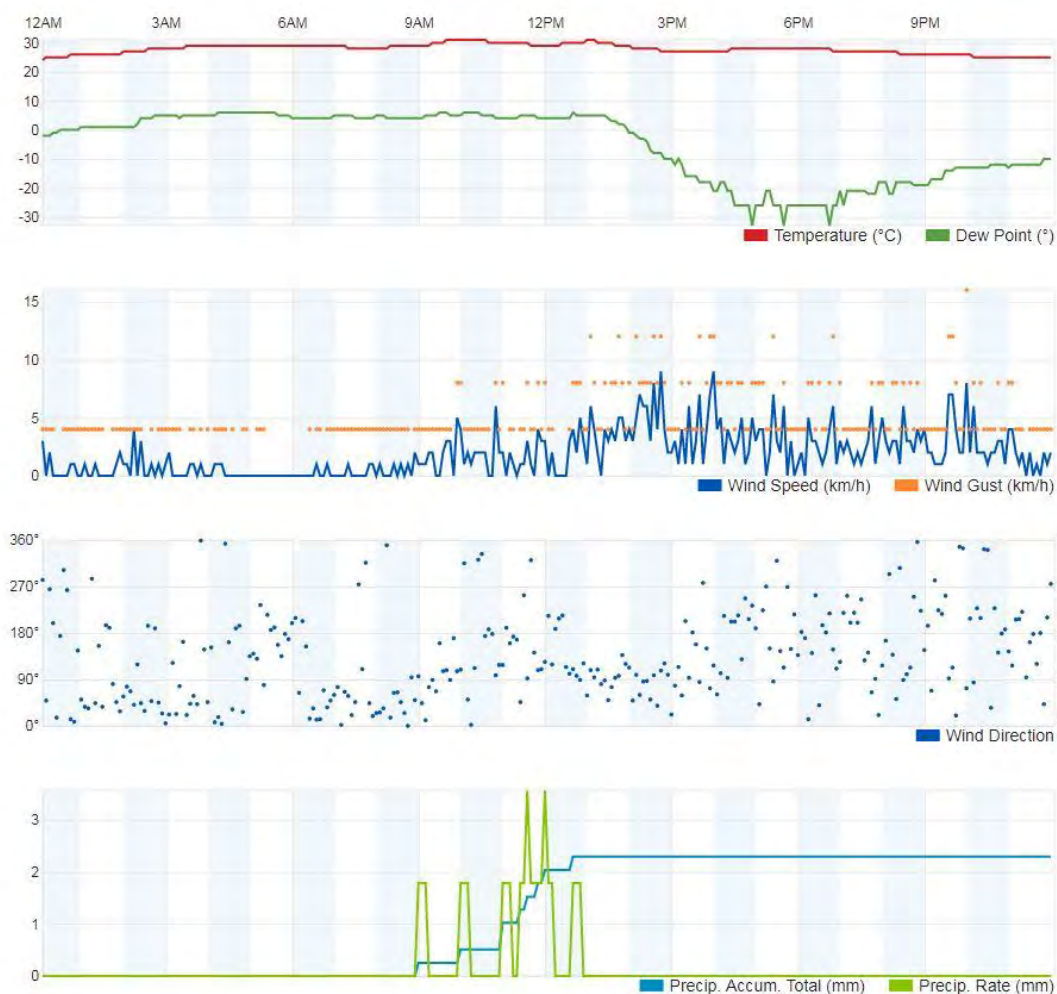
Weather station PWS ID: *ILIVERPO33*

June 25, 2019

	High	Low	Average
Temperature	31 °C	24 °C	28 °C
Dew Point	6 °C	-33 °C	-5 °C
Humidity	23 %	1 %	14 %
Precipitation	2.29 mm	--	--

	High	Low	Average
Wind Speed	9.0 km/h	0.0 km/h	0.0 km/h
Wind Gust	16.0 km/h	--	1.0 km/h
Wind Direction	--	--	ENE
Pressure	1026.41 hPa	1018.96 hPa	--

June 25, 2019



Registered in England 05666276



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Reference List

-
- ⁱ THE NOISE COUNCIL, 1995. Code of Practice on Environmental Noise Control at Concerts
 - ⁱⁱ WORLD HEALTH ORGANISATION (1999). Guidelines for Community Noise
 - ⁱⁱⁱ DEFRA, 2010. The Noise Policy Statement for England.