LDP Ltd
Independent Electrical & Illumination Engineers

14 February 2020

Eden Park Trust
42 Reimers Avenue
Kingsland
AUCKLAND 1024

Attention: Nick Sautner

Dear Nick,

RE: EDEN PARK – 42 REIMERS AVENUE, SANDRINGHAM
PROPOSED CONCERTS
LIGHTING – ASSESSMENT OF ENVIRONMENTAL EFFECTS

LDP Ltd has been engaged by the Eden Park Trust (**EPT**) to prepare a Lighting Assessment of Environmental Effects (**AEE**) for the above activities.

1.0 INTRODUCTION

This report sets out the lighting concept and the likely effects with respect to the requirements of the Auckland Unitary Plan (**AUP**).

2.0 RC PURPOSE

EPT seeks all necessary resource consents from Auckland Council to authorise night time concert events at Eden Park, including activities associated with the set up and pack down of each event.

2.1 Indicative Program

- Pack-in: Up to 7 days prior to the event, with most activity expected in the 2 days prior to the event. Set-up and testing is proposed to be carried out on the day prior to the concert, with concert lighting switched off by 10:00pm.
- Concert: The application includes daytime and night-time concerts. The Tattico AEE contains a table setting out the concert parameters. This includes a finish time of 11pm Friday, Saturday and any day preceding a public holiday (including Sunday) and 10:30pm every other day. Following a concert, the floodlighting will be switched to egress mode and turned off once the stadium is cleared, which will occur within 30-45 minutes of the finish time.
- Pack-out: Up to 3 days post the event

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3.0 SITE DESCRIPTION

Eden Park is located at 42 Reimers Avenue, Kingsland.

Eden Park is one of Auckland's oldest established sport sites and was the established home of Auckland Cricket in 1910 then Auckland Rugby in 1925. The site is acknowledged as one of Auckland's premier sporting and recreational facility and is recognised as a regionally, nationally and internationally important venue for events of this nature.

Eden Park is sited adjacent to Sandringham Road, which is a major arterial road and public transport link, connecting Auckland's central suburbs to the city fringe. The site is also located within close proximity to the Kingsland train station which connects the area to Auckland's light rail network in Newmarket and Britomart in the central city.

Sandringham and the surrounding residential suburbs of Mt Eden, Kingsland, Morningside, Western Springs and Eden Terrace are characterised by typically residential dwellings with various local amenities / facilities, light commercial centres and recreational areas located interspersed through the suburbs. The hospitality areas of Kingsland and Dominion Road are located within close proximity to the site.

3.1 Legal Description

The legal description of the site is set out in the AEE.

3.2 Zoning

The site is zoned Special Purpose – Major Recreation Facility, and bordered to the north, east and south by Residential – Single House zoned land, and to the west by Business – Neighbourhood Centre and Local Centre, Residential – Terrace Housing and Apartment Buildings and Mixed Housing Urban zoned land.

4.0 LIGHTING STANDARDS

The lighting standards in the Eden Park Precinct make a distinction between general lighting at Eden Park and Special Lighting Events. Concert lighting is assessed for the purposes of this application as a Special Lighting Event. The relevant part of the standards relating to Special Lighting Events is discussed below.

Clause I310.6.3 Special Lighting Events, part (2) states;
"(2) For the purpose of this standard, a Special Lighting Event exceeds the standard lighting limits but does not exceed the Special Lighting Event limits listed in Table I310.6.2.3 Pre-curfew luminous intensity."

Table I310.6.2.3: Pre-curfew luminous intensity *Pre-curfew luminous intensity limit*

Standard	*7,500 cd*
Special Lighting Events	*70,000 cd*

The lighting rules in section I310.6.2 are not applicable for a Special Lighting Event. The only relevant standard is I310.6.2 (9), which provides;

"(9) Any artificial lighting must be selected, located, aimed, adjusted and/or screened to ensure that glare resulting from the lighting does not exceed the applicable limits for pre-curfew times in Table I310.6.2.3 Pre-curfew luminous intensity and 1,000 candelas for curfew times. This must

be measured or calculated at the windows of habitable rooms of a lawfully established dwelling within a residential zone or at the boundary of any residentially zoned site where a dwelling does not yet exist.

Rule I310.6.2.1 (4) states that the pre-curfew times are 7:00am to 11:00pm.

The lighting standard for Special Lighting Events is 70,000 cd luminous intensity measured or calculated at the windows of habitable rooms of a lawfully established dwelling within a residential zone or at the boundary of any residentially zoned site where a dwelling does not yet exist.

5.0 LIGHTING DESCRIPTION

The lighting associated with a concert performance is theatrical, generally occurs for the duration of the show and will include a degree of manual control to create theatrical effects as required to facilitate the performance.

Theatrical lighting is predominantly directed towards the performance (stage) and to a lesser degree at the audience. There may be occasional brief exceptions as a beam of light transitions from one place to another within the site, but such effects would not be persistent and thus will result in a much lower degree of effects than would be the case for steady persistent/continuous lighting.

Lighting will be mounted on temporary scaffold structures (i.e. Theatre lighting towers), which would be expected to be lower than the main stadium roof. While unlikely, the towers could possibly be higher than the Stadium. However, as the lights on the towers are typically aimed down to the performance area, the higher they are, the less will be any effects beyond the venue. Generally, lighting rigs are standardised to be used at multiple venues with little if any modification.

The AEE details that concert lighting may be switched on for set-up and testing. Set-up and testing is proposed to be carried out on the day prior to the concert with all lighting switched off by 11.00pm.

In addition to the temporary concert lighting, the AEE details that the permanent stadium floodlighting will be used for the safe movement of the concert goers, staff and others. This will include exposed under canopy, concourse, external building, carpark and general area lighting. Following a concert, the main stadium floodlights will be switched to egress mode and turned off once the stadium is cleared, estimated to be 30-45 minutes following the finish of the concert.

6.0 LIGHTING EFFECTS

For the purpose of this section of the report, lighting effects are taken to mean direct lighting effects of spill light and glare unless otherwise stated.

While concert lighting can vary in intensity, in our opinion any effect experienced at a residential location can meet the 70,000 cd luminous intensity limit.

Luminous intensity effects from fixed lighting, such as the permanent stadium floodlights, which could persist in the same direction for a number of hours, are considerably more obtrusive than the effect from the same intensity produced for a brief period from theatrical lighting.

6.1 Concert Lighting

Concert lighting is theatrical and by its nature has the potential to produce some effects beyond the site.

While the stage could be placed anywhere in the Stadium, the most likely locations are towards the eastern or western ends or towards the centre. Any lighting effects would likely be greatest at the opposite end where the stage is located as the lighting is mainly aimed in that direction.

Since the western end of the Stadium has a lower height than most of the Stadium, it presents the greatest risk of effects for locations beyond, especially if the stage is located at the western end. There are elevated residential properties located opposite the site on the rail embankment and some residential properties on Sandringham Road and roads which would be subject to such effects in that direction. However, any such effects would be of very short duration (typically a few seconds or less) on each occasion. The quantity of such occurrences cannot be accurately predicted as they will vary with each event. However, the cumulative amount of any such occurrences would represent a very small percentage of the total concert duration, estimated in the order of 5% or less.

Motorists travelling along a road may encounter a small number of such occurrences, so the cumulative effects would be negligible for any motorist.

Residents may choose to minimise or block any such effects using curtains or blinds. Without such screening, there would be some effects. The cumulative effects during the concert may be moderately intrusive if a resident chooses not to use screening, but the infrequent nature of concerts throughout the year would be a mitigating factor. Should a resident choose to be outdoors, then any effects would be more noticeable, but consistent with the atmosphere accompanying such events (i.e. sound, light, traffic, etc).

The Auckland Unitary Plan does not place controls upon lighting effects to public space areas other than roads (i.e. motorists), nor to non-residential properties.

The eastern end of the Stadium is also lower height than the north and south stands in the Stadium, albeit higher than the western end. EPT has obtained a Certificate of Compliance to install an acoustic barrier and digital screen above the Upper East stand. Whilst the acoustic barrier comprises transparent glass, the digital screen would block a portion of light effects to the east, equivalent to its width. The proposed digital screen will be 43.05m long (approximately half the overall length of the raised eastern stand) and approximately as high as the main Stadium roof leading edge. The glass acoustic barrier will be nearly as high as the main roof and would also attenuate lighting effects that pass through the glass by approximately 10-15% on either side of the video screen.

While less locations will be affected to the east than the west, the same logic applies as stated for motorists and residents.

Lighting effects will be screened by the main Stadium roof to the north and south. While the length of these two roof portions differ, in total they account for approximately half the Stadium perimeter.

In the vicinity of the lower height parts of the Stadium to the west and east, the nearest roads (Sandringham Road, Cricket Avenue and to a lesser degree Walters Road) would be most affected. Residential locations fronting those roads, would likewise be the most affected.

Roads and residential locations further afield in those directions could also be affected, but any such effects will reduce with distance and intervening screening effects of topography, buildings and vegetation.

There could also potentially be upward directed lighting on occasions for effect. Any such lighting would not directly affect motorists or residential locations.

The temporary lighting will generally be set up on scaffolding at various heights to suit the needs of the performance. The majority of the lighting will be located higher than the stage and typically be directed toward the stage most of the time during the performance.

Some lighting is expected to be located at or near ground level, lighting up towards the stage. Any such lighting is typically used for localised effects and would have no direct effects outside the Stadium.

At times, some of the lights may be directed into the audience.

Whereas the permanent main field floodlighting is fixed in terms of aiming, focus, colour and intensity, the temporary performance lighting will be variable in these factors. The creative, temporary and manually adjusted nature of theatrical lighting means that exact figures and effects are impractical to quantify. However, as stated, the lighting equipment locations and predominant aiming directions are such that direct lighting effects experienced at any residential locations beyond the site are expected to be minimal.

The concert lighting will generally only be switched on at night but may be switched on during daylight hours for set-up, testing and prior to the start of the concert. Day time effects will be less than night time effects due to the presence of ambient light (i.e. sunlight) as this will reduce contrast. The apparent brightness of an artificial light seen against a bright sky will be much less than the same light viewed against a dark sky.

6.2 Stadium Floodlighting

In addition to the temporary concert lighting, the permanent stadium lighting will be used for the safe movement of the concert goers, staff and others. This will include exposed under-canopy, concourse, external building, carpark and general area lighting.

The application includes that the permanent main field floodlights used for egress will be switched down to an average of nominally 300 lux on the field at the concert finish time

The use of the stadium's floodlights for egress will extend beyond the 11.00pm curfew. The length of time that the egress floodlights will need to remain on past the curfew will vary depending on the applicable concert finish time. With an anticipated crowd dispersal time of some 30-45 minutes, the floodlights would remain on 15 minutes longer than the curfew for a 10:30pm finish and 45 minutes for an 11.00pm finish.

Any lighting effects that persist beyond the present 11:00pm curfew will be limited to those generated by the permanent lighting, for up to 45 minutes. Unlike theatrical lighting, the permanent lighting is not dynamic. In our opinion the added effects of this exceedance would be minimal.

6.3 Night Sky

Skyglow is the effect that can be seen above an artificial lighting installation at night as a glowing aura or dome, most obvious when seen from a distance and more evident when there is moisture, dust or pollution present. The effect tends to reduce visibility of the night sky and night time terrestrial views.

Skyglow will be generated by a concert, both from the theatrical lighting and permanent lighting (main floodlights, Stadium audience seating lights, circulation lights, carpark lights and the like).

Permanent lighting effects are managed by existing consents. A concert will generate additional skyglow effects, but those effects would likely be less than those encountered when the Stadium TV broadcast floodlights are in use.

In our opinion, the additional skyglow effects generated by a concert would be minimal.

7.0 UNITARY PLAN ASSESSMENT

7.1 I310.8 – Assessment – Restricted Discretionary Activities

As above, the proposal is for a discretionary activity so the restricted discretionary activity assessment criteria do not strictly apply. Again, for completeness, the following analysis is included relative to the items listed in section I310.8;

(1) (c) Duration – Addressed above and more fully in the Tattico AEE.

(1) (d) Traffic Safety – There will be no persistent additional effects beyond the site. Any external effects generated by the temporary concert lighting will be transitory and consistent with the nature of the activity. Direct dynamic lighting effects are unlikely to be received on the road as they are typically directed inwards towards the performance.

(1) (e) Light fittings & support structures – As the light fittings and support structures are expected to be lower than the existing main stadium roof and located within the stadium (generally on the main field), they will not diminish views.

(1) (f) Indoor amenity and sleep disturbance – There may be some loss of amenity for the limited duration of the event. However, any added effects of the lighting associated with concerts will be consistent with the nature of such events. As stated earlier in the report, the effects will be mostly internalised and time limited. Further, the use of curtains or blinds by residents would, in our opinion, adequately control lighting effects to ensure very little disruption to indoor amenity or sleep disturbance.

(1) (g) Necessity – Theatrical lighting is an essential and integral part of a concert. However, by the nature of its purpose, it will generally be internalised and thus protect the amenity of the surrounding environment.

8.0 CONCLUSION

Based on the foregoing, in our opinion and on balance considering the nature and duration of the event, the expected lighting effects will be negligible.

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John Mckensey MIES

Executive Engineer