



Swan and Canning Rivers Management Act 2006

PART 5

DETERMINATION OF DEVELOPMENT APPLICATION

FILE NUMBER	:	2023/4596
APPLICANT	:	East Fremantle Lawn Tennis Club
LANDOWNER	:	Town of East Fremantle
LAND DESCRIPTION	:	Lot 15722 (Reserve 7800) 1 Jerrat Drive, East Fremantle
DEVELOPMENT	:	Material change of use to allow night time tennis – installation of electric cabling and six (6) LED floodlights
VALID FORM 1 RECEIVED	:	14 August 2023
DETERMINATION	:	APPROVAL WITH CONDITIONS

The application to commence development in accordance with the information received on date and as subsequently amended is APPROVED subject to the following conditions:

CONDITIONS

1. Approval to implement this decision is valid for two (2) years from the date of this approval. If substantial on-site works have not commenced within this period, a new approval will be required before commencing or completing the development.
2. All works are to be undertaken in accordance with a Construction Environment Management Plan which is to be submitted to and approved by the Department of Biodiversity, Conservation and Attractions prior to commencement of works (**Advice Notes 1 and 2**).
3. Prior to commencement of use, a lighting audit is to be conducted to demonstrate that the lighting has been installed in accordance with the proposed lighting plans and approved by the Department of Biodiversity, Conservation and Attractions (**Advice Note 3**).
4. The approved use is to be undertaken in accordance with an Operations Plan which is to be submitted to and approved by the Department of Biodiversity, Conservation and Attractions prior to commencement of use (**Advice Note 4**).
5. The authorised works shall not prevent public access along the foreshore reserve unless temporary closure is necessary for safety purposes. In the event the path is closed, a clearly signed, safe alternative route shall be provided.
6. Upon completion of the works, all waste materials shall be removed and the site cleaned-up and reinstated to the satisfaction of the Department of Biodiversity, Conservation and Attractions.

ADVICE NOTES

1. Notifications and documents required as a condition of this approval can be emailed to rivers.planning@dbca.wa.gov.au.
2. Regarding **Condition 2**, the Construction Environmental Management Plan (CEMP) should describe how the authorised works will be managed to minimise potential environmental impacts. Guidance for preparation of a CEMP is provided in [DBCA](#)

Guidance Note 6 – Construction Environmental Management Plans (the PDF will download automatically) and <https://bit.ly/SCRMAPolicies>.

3. Regarding **Condition 3** all lighting is to be installed in accordance with the lighting plan prepared by Sylvania Schreder dated 13 November 2023. In particular, it should be noted that:
 - a. lighting is to be designed to minimise light spill so that fauna, community enjoyment and visual amenity are not unacceptably affected
 - b. all lighting is to be consistent with the National Light Pollution Guidelines for Wildlife (DBCA, DCCEEW 2023) and
 - c. the LED lighting installed will be equivalent to 4000K correlated colour temperature.
4. Regarding **Condition 4**, the Operations Plan shall address (but not be limited to):
 - a. hours of operation, noting that lighting is to be switched off and play suspended between the hours of 10:00pm and 6:00am Monday to Sunday, unless it can be demonstrated through an acoustic assessment that the noise will comply with the requirements of the Environmental Protection (Noise) Regulations 1997 after 10:00pm, in which case DBCA may allow an extension of the curfew to 10:30pm.
 - b. minimisation of lighting when not in use, and
 - c. minimisation of noise from patrons, traffic and parking.
5. The applicant is advised that noise generated by the playing of tennis at the East Fremantle Lawn Tennis Club is required to comply with the Environmental Protection (Noise) Regulations 1997.
6. This development application has been granted in accordance with the *Swan and Canning Rivers Management Act 2006* and does not negate the need for the applicant to address the requirements of other legislation.
7. The tennis courts are located within an area registered with the Department of Water and Environmental Regulation as a 'contaminated site – awaiting classification'. It is recommended that a management plan including an unexpected finds protocol be implemented in the event that any evidence of contamination is encountered.



Hon Reece Whitby MLA

MINISTER FOR ENVIRONMENT

Date: 23/10/24

DEPARTMENT OF BIODIVERSITY, CONSERVATION AND ATTRACTIONS REPORT

PROPOSAL	Material change of use to allow night time tennis - installation of electric cabling and six (6) LED floodlights
LOCATION	East Fremantle Lawn Tennis Club Lot 15722 (Reserve 7800) 1 Jerrat Drive, East Fremantle
COST	\$270,000
APPLICANT	East Fremantle Lawn Tennis Club Inc.
LANDOWNER	Town of East Fremantle
LOCAL GOVERNMENT	Town of East Fremantle
MRS CLASSIFICATION	Parks and Recreation Reserve
DECISION TYPE	Part 5, <i>Swan and Canning Rivers Management Act 2006</i> , Ministerial Determination
ATTACHMENTS	1A Location map (one page) 1B Section 73 – Referral responses: - Town of East Fremantle (one page) - Department of Water and Environmental Regulation – Contaminated Sites (two pages) - Department of Water and Environmental Regulation – Environmental Noise (three pages) 1C Section 74 – Summary of Public Submissions 1D Section 75 – Summary of Public Submissions on Draft Report 1E Section 75 – Referral responses on Draft Report - Department of Water and Environmental Regulation – Contaminated Sites (two pages) - Department of Water and Environmental Regulation – Environmental Noise (three pages) 1F Overall Site Plan (one page) 1G Electrical Services Layout (one page) 1H Lighting Plan (seven pages)
RECOMMENDATION	APPROVAL WITH CONDITIONS

1. INTRODUCTION

- 1.1 The Department of Biodiversity, Conservation and Attractions (DBCA) has received an application from the East Fremantle Lawn Tennis Club (the Club), proposing to install upgraded cabling and floodlights at the East Fremantle Lawn Tennis Club, 1 Jerrat Drive, East Fremantle (**Attachment 1A**).
- 1.2 The proposal includes the installation of underground electrical cabling plus a new switchboard and six (6) LED floodlights to allow for the playing of night tennis on the five (5) existing western hard courts.

- 1.3 The subject land is contained within the Parks and Recreation Reserve under the Metropolitan Region Scheme.
- 1.4 The proposed development is to occur on land entirely within the Swan Canning development control area (DCA) and constitutes a material change of use, as it will allow the additional use of playing of tennis at night on the western hard courts. Therefore, the proposal requires an approval from the Minister for Environment in accordance with Part 5 of the *Swan and Canning Rivers Management Act 2006* (SCRM Act).
- 1.5 DBCA has prepared this report in accordance with section 76 of the SCRM Act.

2. CONSULTATION

In accordance with Section 74 of the SCRM Act, the application was advertised on DBCA's website commencing on 17 August 2023.

Town of East Fremantle

- 2.1 The Town of East Fremantle (the Town) provides the following comments relating to the management of light spill and the potential impact at nearby residences:
 - It is strongly recommended that light spill investigations be undertaken before and after installation of the light towers to ensure that both surrounding residents and those on the north side of the river are not adversely impacted.
 - Should there be any issues with light spill after installation then the East Fremantle Lawn Tennis Club is to remedy the situation within 14 days of the complaint being communicated to the Club, to the satisfaction of the Town of East Fremantle.
 - The lights are not to operate between 10:30pm and 6am daily.

- 2.2 The Town's comments are provided in Attachment 1B.

Department of Water and Environmental Regulation – Contaminated Sites Branch

- 2.3 The Department of Water and Environmental Regulation (DWER) – Contaminated Sites Branch advises that Lot 15722 on Plan 40472 (the site) was classified under the Contaminated Sites Act 2003 as *possibly contaminated – investigation required* on 18 September 2012 and a memorial was placed on the certificate of title.
- 2.4 The classification was based on several soil, sediment and groundwater investigations undertaken between 2006 and 2007 for the East Fremantle Yacht Club, which is located around 30m away, which found antifouling agents (tributyltin) in river sediments. No detailed, or recent, soil, groundwater, or sediment quality investigations have been conducted at the site.
- 2.5 Based on available information, the site is not proposed for a more sensitive land use and therefore, DWER has no objection to the proposed works. Given the risk associated with potential disturbance of historical contaminants, DWER recommends an advice note be included with any approval.
- 2.6 DWER - Contaminated Sites advice is included in **Attachment 1B**.

Department of Water and Environmental Regulations – Environmental Noise

- 2.7 The proposal was referred to DWER, Environmental Noise for advice relating to potential noise disturbance from the playing of tennis at night and specifically, the likelihood, if any, of there being exceedances of the Environmental Protection (Noise) Regulations 1997.
- 2.8 DWER advises that while measuring noise from the existing lit courts (on the eastern side) would be the best way of assessing the impact of noise from the western courts proposed to be lit during the evening, it is recognised that measurement might be difficult given the distance and background noise, particularly due to the presence of traffic on Preston Point Road.
- 2.9 Based on extrapolated results from the monitoring of other similar tennis clubs, DWER advised that noise from the courts proposed to be lit in the evening at the East Fremantle Lawn Tennis Club is likely to comply with the assigned levels under the Environmental Protection (Noise) Regulations 1997. As such, the proposal is unlikely to generate unacceptable noise levels.
- 2.10 Accordingly, an advice note is recommended for inclusion, to ensure the club is aware of its responsibilities to comply with the Environmental Protection (Noise) Regulations 1997.
- 2.11 The advice from DWER is provided in **Attachment 1B**.

Submissions from the notification of new proposal

- 2.12 In accordance with the requirements of Section 74(1) of the SCRM Act the proposal was listed on the DBCA website as a new proposal open for comment between 17 August 2023 and 28 September 2023. Two (2) submissions were received from members of the public objecting to the proposal.
- 2.13 The objections raised concerns about lighting and potential impacts to visual amenity. A summary of the comments raised in the submissions and DBCA's response are provided at **Attachment 1C**.

3. PUBLIC CONSULTATION – SUBMISSIONS ON DRAFT REPORT

- 3.1 In accordance with the requirements of Section 75(3)b of the SCRM Act, a copy of the draft report and proposed recommendations was provided to the applicant and the relevant stakeholders being the Town and DWER. A copy was also published on the DBCA website between 1 July 2024 and 14 August 2024, with an invitation for public submissions.
- 3.2 Five submissions were received in total. One public submission objected to the proposal and one expressed support for the proposal. A third submission was received from the Club which included letters of support from members of the club and provided additional information in response to the objections received under Section 74 and summarised in **Attachment 1D** along with DBCA's response.
- 3.3 Two submissions were from DWER. One from the Contaminated Sites Branch reiterating its previous advice, and the other from Environmental Noise providing further detailed advice regarding the management of potential noise. The submissions from DWER are at **Attachment 1E**.
- 3.4 The matters raised in the public submissions are discussed in Section 7 of this report.

4. RELEVANT POLICIES AND PLANS

- State Planning Policy 2.10 – Swan-Canning River System (SPP 2.10)
- Corporate Policy Statement No. 42 – Planning for Land Use, Development and Permitting Affecting the Swan Canning Development Control Area (Policy 42)
- Corporate Policy Statement No. 45 – Planning for Miscellaneous Structures and Facilities in the Swan Canning Development Control Area (Policy 45)
- Environmental Protection (Noise) Regulations 1997
- *Guide on the Limitation and Effects of Obtrusive Light from Outdoor Lighting Installations* (2003)

5. ENVIRONMENTAL AND PLANNING CONSIDERATIONS

- Environmental protection
- Contaminated sites
- Visual amenity and lighting
- Noise management

6. BACKGROUND

- 6.1 The Club is located between Preston Point Road and Jerrat Drive in East Fremantle. The Club comprises 16 grass courts along the southern boundary closest to Preston Point Road, four (4) blue hard courts in the northeastern corner along Jerrat Drive and Petra Street (already lit), and five (5) plexipave (green) hard courts on the northwestern corner along Jerrat Drive.



Figure 1: East Fremantle Lawn Tennis Club

- 6.2 The Club was identified as having low numbers of floodlit courts for its member base, and therefore has secured a State Government Club Night Lights Program (CNLP) grant of \$108,000 towards the upgrading of power and installation of sustainable LED floodlights on the five (5) western hard courts. Tennis Australia has also contributed \$40,000 in grant funding.
- 6.3 The proposal seeks approval to install six (6) LED floodlights around the five (5) plexipave (acrylic) western hard courts (Courts 5, 6, 7, 8 and 9) to allow for the playing

of night tennis to 10:30pm at night, seven days a week. The four (4) eastern blue hard courts have been similarly lit for over 30 years with play extending up to 10:30pm.

- 6.4 The lights would allow for the playing of tennis at night on five (5) additional courts, which is considered a material change of use as it constitutes an increase in the intensity and scale of the use of the premises.
- 6.5 The courts are booked through a system which programs the lights to come on only if the court has been booked. The court lights will switch off automatically when the booking time has finished. Courts 5 and 6 will be on the same circuit and therefore switch on and off together, and courts 7, 8, and 9 will be on another circuit (**Attachment 1F**).
- 6.6 The proposed floodlights were initially approved in 2010, however the lighting was not installed at that time. Since that approval has expired, the installation of the lights requires a new approval. The proposal also involves the installation of a new switchboard and small distribution board.
- 6.7 The proposed light poles are located approximately 40m from the river, and at the top of an embankment approximately 15m high. The light poles are 15m tall and at least 75m from the nearest residence on the other side of Preston Point Road.

7. DISCUSSION

Environmental protection

- 7.1 Policy 42 aims to ensure that land use and development on and adjacent to the river system maintains and enhances the quality and amenity of the river environment. Development adjacent to the river should be carefully undertaken to prevent detrimental impacts to the foreshore area.
- 7.2 To allow for the installation of the floodlights, trenching is proposed to lay the new cabling. The cabling requires 140m of 600mm deep trenching. In addition, there will be 50m of 300mm deep trenching for the Book-a-court control cabling, and 30m of cabling run through an existing conduit under the carpark (**Attachment 1G**).
- 7.3 The location of the trenching is around 40m from the edge of the river and is at the top of an embankment 15m high. Direct impacts to the river from the trenching are unlikely. The applicant has advised that no vegetation (other than turf) will be removed or damaged as a result of the works. The trench will be backfilled and turf reinstated.
- 7.4 The new switchboard and distribution board installation will not require any additional excavation as they will be installed on 100mm platforms at ground level.
- 7.5 The footings for the light poles have previously been installed, so no further ground disturbing works are required. A construction environment management plan can be required as a condition of approval to demonstrate that the trenching works can be undertaken with no impact to the foreshore.
- 7.6 The *National Light Pollution Guidelines for Wildlife* (DBCA, DCCEEW 2023) acknowledge that artificial light sources, including LEDs can have potentially negative effects on animal biorhythms, daily activity, and reproduction, particularly certain colours of lighting which are known to have a detrimental impact on wildlife. In particular, wildlife can be sensitive to blue light. The applicant has indicated that the selected LED lights will be 4000K, which is closer to yellowish light and preferable for use near wildlife. In addition, the lighting plan indicates that the level of lighting will achieve 0 lux along the edge of the trees at the top of the escarpment.

- 7.7 DBCA is aware of known bird species in the area such as black cockatoos and shorebirds, however the nearest known roost is around 1km away and breeding sites around 6.5km away. Due to the limited number of tall trees adjacent to the Club, the impact to black cockatoos or other birds is not likely to be significant.
- 7.8 The Point Walter sandbar is within the line of sight of the Club, however light spill from the proposed new poles will be contained and will not reach the beach or water's edge, consistent with the *National Light Pollution Guidelines for Wildlife*.
- 7.9 DBCA considers that the trenching activities should be carried out using mitigation measures to prevent fauna such as quendas from becoming trapped in the trench. This has been included in advice and conditions.

Visual amenity and lighting

- 7.10 Policy 45 states that lighting in the Riverpark should be fit-for purpose so that it meets relevant Australian Standards and safety requirements while minimising light spill to areas within and immediately adjoining the DCA so that fauna, community enjoyment and visual amenity are not unacceptably affected. The lighting towers have the potential to create light spill in the foreshore and river. Light spill could also potentially affect residences along Preston Point Road.
- 7.11 The Club is located in an area known as the Preston Point Road North Recreational Precinct. The Preston Point Precinct Master Plan, endorsed by the Town in June 2020 recommended future lighting plans at the Club be supported. Adjacent sporting clubs in the same precinct (East Fremantle Lacrosse Club and East Fremantle Junior Football Club) have floodlit training on various evenings during the week. The proposed lighting will allow for the playing of tennis throughout summer into the evening when the temperature drops.
- 7.12 The Club proposes to install four (4) 15m high light towers to courts 7, 8, and 9 and two (2) towers to courts 5 and 6. The poles are proposed to be tapered, multisided silver-grey galvanised steel. The poles themselves are unlikely to have a detrimental impact on the visual amenity of the location due to their narrow and tapered shape. Numerous sporting clubs along this stretch of the river have similar lighting poles installed. While the additional six (6) will add to the potential impact it is expected to be minimal overall.
- 7.13 The applicant has advised that the proposed lighting has been designed to be consistent with Australian Standard AS 2560.2:2021 Sports Lighting Part 2.1: *Specific Applications – Lighting for outdoor tennis*. A Sports Lighting Assessment has been provided to demonstrate compliance with AS2560.
- 7.14 In addition, the applicant has provided an Obtrusive Light Assessment, which is based on the light limiting parameters and guidelines from Australian Standard AS/NZS4282:2019 *Control of the obtrusive effects of outdoor lighting*. The objective of AS/NZS4282 is to provide a common basis for assessment of the likely effects of developments that involve the provision of outdoor lighting. The Obtrusive Light Assessment demonstrates that the lighting proposed for the Club is fully compliant with parameters for spill light, luminous intensity at vertical planes, threshold increment and upward light ratio for both non-curfew (6am to 11pm) and the more stringent curfew requirements (applicable between 11pm to 6am). The Obtrusive Light Assessment is included in the Lighting Plan which can be found at **Attachment 1H**.
- 7.15 The luminaires selected for the project have inbuilt glare and spill controls which direct the lighting towards the courts and away from the nearby vegetation, the river and the residences.

- 7.16 The Town recommended that light spill investigations be undertaken before and after installation of the light towers to ensure that surrounding residents are not adversely impacted. The lighting plan provided is considered sufficient to meet this requirement pre-installation. A condition of approval can require the Club undertake a lighting audit post-installation to demonstrate compliance with the plans provided.
- 7.17 The Town also requested that the lights are not to operate between 10:30pm and 6am daily. This has been included as a condition of approval, however the time has been brought forward to 10:00pm to address potential noise issues, and is discussed in more detail in section 7.19-7.24 of this report.
- 7.18 The proposal includes the installation of a new switchboard 2000mm high, 950mm wide and 350mm deep, and a distribution board 1200mm high, 400mm wide and 400mm deep, along an existing wall on the southern end of Court 5 (**Attachment F**). Both boards will be painted Hawthorn Green which is the standard council-approved colour for switchboards and is considered appropriate for the location.

Noise management

- 7.19 Policy 42 states that proposals should enhance and protect the character and landscape setting of the Swan Canning river system. Excessive noise from activities in the Riverpark can detract from the riverine environment and cause a nuisance to nearby residences.
- 7.20 Given the intensification of the use of the tennis courts to include the playing of night tennis, and the proximity of the residences along Preston Point Road, potential noise impacts are a relevant consideration. Sporting clubs are required to comply with the Environmental Protection (Noise) Regulations 1997. The proposal was referred to DWER, Environmental Noise for advice regarding the potential for noise disturbance and the likelihood of the Club being able to comply with the regulations.
- 7.21 DWER advised that noise monitoring of the existing lit courts would give some indication of the noise impacts of the additional courts, however, it was acknowledged that it would be difficult to measure the impact of the noise on nearby residences, due to the distance and potential background noise, particularly from traffic on Preston Point Road. In order to provide a response, DWER used recent monitoring data from a similar, nearby tennis club to conservatively extrapolate the likely levels of noise experienced by the residences on the other side of Preston Point Road during the playing of night tennis. DWER concluded that the noise from tennis playing activities from the courts proposed to be lit in the evening at the Club is likely to comply with the assigned levels under the Environmental Protection (Noise) Regulations 1997.
- 7.22 DWER provided more detailed advice in response to the draft report which can be found at **Attachment 1E**. The response discusses the applicant's requested limit of 10:30pm for the playing of night tennis. DWER advises that the period from 10:00pm to 7:00am (Monday to Saturday), or to 9am Sunday and public holidays, has lower assigned levels for some parameters than prior to 10:00pm. This means that while DWER considers that noise from the courts would likely comply with the assigned levels prior to 10:00pm, there is marginally less certainty regarding compliance after 10:00pm.
- 7.23 DWER advises that in the absence of site-specific monitoring data from the Club, DBCA may wish to consider restricting the operations of the courts to 10:00pm unless shown by measurement to comply with the assigned levels after 10:00pm. Accordingly, Condition 4 will require the preparation and approval of an Operations Plan, which will be required to commit to hours of operation from 10:00pm to 6:00am. DBCA considers it reasonable that if the Club can demonstrate compliance with the assigned levels after

10:00pm through monitoring of its activities, the time may be extended to 10:30pm in the future. This has been recommended for inclusion in an advice note to the applicant.

8. SWAN RIVER TRUST

8.1 In accordance with section 75(3A) of the SCRM Act, the Swan River Trust (the Trust) considered DBCA's draft report at its meeting on 21 May 2024. The Trust resolved to advise the Director General of DBCA that it supports the draft report and recommendation of approval, with the inclusion of a condition to require the preparation and approval of an Operations Plan to clarify hours of operation and outline how the Club will minimise any issues from lighting or noise.

8.2 The additional condition is included as **Condition 4**.

9. CONCLUSION

9.1 The proposed installation of six (6) LED floodlights and associated cabling and switchboard will allow for the playing of night tennis until 10:00pm at night. Information provided with the application demonstrates that the lights will be designed to minimise the light spill in the direction of the river and towards the residents on the other side of Preston Point Road.

9.2 Potential noise impacts from the additional tennis courts in use at night are expected to be minimal and are likely to be compliant with the Environmental Protection (Noise) Regulations 1997. Environmental impacts during works are minimal and can be managed with appropriate conditions.

9.3 For these reasons, the proposal is recommended for approval, subject to conditions and advice.

10. RECOMMENDATION – APPROVAL WITH CONDITIONS

That the Director General of DBCA advises the Minister for Environment that the proposal at East Fremantle Lawn Tennis Club, Lot 15722 (Reserve 7800) Preston Point Road, East Fremantle, as described in the application received on 9 August 2023, and additional information received on 13 November 2023 be approved, subject to the following:

CONDITIONS

1. Approval to implement this decision is valid for two (2) years from the date of this approval. If substantial on-site works have not commenced within this period, a new approval will be required before commencing or completing the development.
2. All works are to be undertaken in accordance with a Construction Environment Management Plan which is to be submitted to and approved by the Department of Biodiversity, Conservation and Attractions prior to commencement of works (**Advice Notes 1 and 2**).
3. Prior to commencement of use, a lighting audit is to be conducted to demonstrate that the lighting has been installed in accordance with the proposed lighting plans and approved by the Department of Biodiversity, Conservation and Attractions (**Advice Note 3**).
4. The approved use is to be undertaken in accordance with an Operations Plan which is to be submitted to and approved by the Department of Biodiversity, Conservation and Attractions prior to commencement of use (**Advice Note 4**).

5. The authorised works shall not prevent public access along the foreshore reserve unless temporary closure is necessary for safety purposes. In the event the path is closed, a clearly signed, safe alternative route shall be provided.
6. Upon completion of the works, all waste materials shall be removed and the site cleaned-up and reinstated to the satisfaction of the Department of Biodiversity, Conservation and Attractions .

ADVICE NOTES

1. Notifications and documents required as a condition of this approval can be emailed to rivers.planning@dbca.wa.gov.au.
2. Regarding **Condition 2**, the Construction Environmental Management Plan (CEMP) should describe how the authorised works will be managed to minimise potential environmental impacts. Guidance for preparation of a CEMP is provided in [DBCA Guidance Note 6 – Construction Environmental Management Plans](#) (the PDF will download automatically) and <https://bit.ly/SCRMAPolicies>.
3. Regarding **Condition 3** all lighting is to be installed in accordance with the lighting plan prepared by Sylvania Schreder dated 13 November 2023. In particular, it should be noted that:
 - a. lighting is to be designed to minimise light spill so that fauna, community enjoyment and visual amenity are not unacceptably affected
 - b. all lighting is to be consistent with the National Light Pollution Guidelines for Wildlife (DBCA, DCCEEW 2023) and
 - c. the LED lighting installed will be equivalent to 4000K correlated colour temperature.
4. Regarding **Condition 4**, the Operations Plan shall address (but not be limited to):
 - a. hours of operation, noting that lighting is to be switched off and play suspended between the hours of 10:00pm and 6:00am Monday to Sunday, unless it can be demonstrated through an acoustic assessment that the noise will comply with the requirements of the Environmental Protection (Noise) Regulations 1997 after 10:00pm, in which case DBCA may allow an extension of the curfew to 10:30pm.
 - b. minimisation of lighting when not in use, and
 - c. minimisation of noise from patrons, traffic and parking.
5. The applicant is advised that noise generated by the playing of tennis at the East Fremantle Lawn Tennis Club is required to comply with the Environmental Protection (Noise) Regulations 1997.
6. This development application has been granted in accordance with the *Swan and Canning Rivers Management Act 2006* and does not negate the need for the applicant to address the requirements of other legislation.
7. The tennis courts are located within an area registered with the Department of Water and Environmental Regulation as a 'contaminated site – awaiting classification'. It is recommended that a management plan including an unexpected finds protocol be implemented in the event that any evidence of contamination is encountered.

FINAL REPORT ENDORSED

Signed:



Date:

1.10.24

Peter Dans

Acting Director General



5 courts proposed to be floodlit

4 courts already floodlit

Preston Point Road

YOUR REF 2023/4596
OUR REF IEM120385
ENQUIRIES 9339 9339



20 September 2023

Department of Biodiversity, Conservation and Attractions
Parks and Wildlife Service
Locked Bag 104
Bentley Delivery Centre
Western Australia 6983
rivers.planning@dbca.wa.gov.au

Dear Sir/Madam,

Re: Installation of Cables and 6 LED Floodlights – East Fremantle Lawn Tennis Club – Application 2023/4596

Following a review of the proposed development at the East Fremantle Lawn Tennis Club the Town can make the following referral comments in relation to the development.

1. Electrical work must comply with Part 4 of the Health (Public Building) Regulations 1992 and a licenced electrician must certify all work and lodge a Form 5 with the Town of East Fremantle upon completion of the works.
2. The installation of LED lights has the potential to create a light spill nuisance at nearby properties. It is strongly recommended that light spill investigations be undertaken before and after installation of the light towers to ensure that both surrounding residents and those on the north side of the river are not adversely impacted.
3. Should there be any issues with light spill after installation then the East Fremantle Lawn Tennis Club is to remedy the issue within 14 days of the complaint being communicated to the Club, to the satisfaction of the Town of East Fremantle.
4. The lights are not to operate between 10.30pm and 6am daily.

If you have any queries regarding this matter do not hesitate to contact the Town of East Fremantle on 9339 9339 or by email at admin@eastfremantle.wa.gov.au.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'A. Malone', with a horizontal line extending to the right.

ANDREW MALONE
Executive Manager Regulatory Services for



Your ref:
Our ref: DMO 397
Enquiries: Ivan Hodgson, Ph 6364 7707
Email: Ivan.Hodgson@dwer.wa.gov.au

Statutory Assessments
Rivers and Estuaries Branch
Department of Biodiversity, Conservation and Attractions
17 Dick Perry Avenue, Kensington WA 6151
Locked Bag 104, Bentley Delivery Centre WA 6983

By email rivers.planning@dbca.wa.gov.au

Dear Rivers and Estuaries Branch

***DEVELOPMENT APPLICATION LOT 15722 JERRAT DRIVE EAST
FREMANTLE.***

I refer to your email dated 17 August 2023 to the Department of Water and Environmental Regulation (the department) regarding an application to the Department of Biodiversity, Conservation and Attractions for the proposed development of the above-mentioned lot.

As per the requirements under section 58(6)(a) of the *Contaminated Sites Act 2003* (CS Act), advice is required as to the suitability of the land for the proposed works. The department understands the proposed works are to install cables and floodlights at East Fremantle Lawn Club.

Land at Lot 15722 on Plan 40473 (the site) was classified under the CS Act as *possibly contaminated – investigation required* on 18 September 2012 and a memorial (reference number M66012) was placed on the certificate of title.

The classification was based on several soil, sediment and groundwater investigations undertaken between 2006 and 2007 carried out for the East Fremantle Yacht Club. The investigations found antifouling agents in the form of tributyltin in river sediments adjacent to a boat slipway. No detailed, or recent, soil, groundwater or sediment quality investigations have been conducted at the site as a whole.

Based on available information, the site is not proposed for a more sensitive land use. Therefore, the department has no objection to the proposed works at the site and recommends that the approval should not include a contamination condition.

However, given the risks associated with the potential disturbance of historical contaminants, the department recommends that the following advice note be applied to any approval granted:

Advice

The department recommends that a management plan including an unexpected finds protocol is implemented in the event that any evidence of contamination is encountered.

The site is not located within an area that is mapped as having a risk of encountering acid sulfate soils. The department therefore advises that no specific comment is required in relation to acid sulfate soil management during development.

If you have any queries in relation to the above, please contact Environmental Officer, Ivan Hodgson, on 6364 7707.

Yours sincerely



Andrew Miller
SENIOR MANAGER
CONTAMINATED SITES
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

27 September 2023

Josie Watson

From: Peter Popoff-Asotoff <peter.popoff-asotoff@dwer.wa.gov.au >
Sent: Tuesday, 23 April 2024 1:36 PM
To: Josie Watson
Subject: RE: East Fremantle Tennis Club

[External Email] This email was sent from outside the department - be cautious, particularly with links and attachments.

OFFICIAL

OFFICIAL

Hi Josie

While measuring noise from the existing lit courts at East Fremantle Tennis Club would be the best way of assessing the impact of noise from the courts on the western side that are proposed to be lit during the evening period, it is recognised that measurement might be difficult given the distance and potential background noise, particularly due to the presence of traffic on Preston Point Rd. However, as the noise sensitive receivers across from the Applecross Tennis Club and the East Fremantle Tennis Club are both similarly exposed to the courts the noise data that that is available for Applecross can be adapted to the East Fremantle location.

The table below sets out the extrapolation of the measured or predicted levels of tennis noise from the Applecross Tennis Club to residents on Preston Point Rd directly south, opposite the courts proposed for evening lighting at the East Fremantle Tennis Club. The extrapolation is conservative. Applecross distances are chosen to be the worst case for extrapolation purposes and adjustment for impulsiveness (where relevant) have been included, even though its presence at Applecross is unknown. The shoe squeaks and ball-hits are maximum levels, but the ball-hits have the potential to be present for long enough to require compliance with the L_{A1} assigned level. The general noise level is based on a predicted L_{A10} level but compared with all assigned level parameters, should the noise be present for less time. The lowest evening assigned levels have been quoted, however it can be noted that the premises numbering 176 to 186 Preston Point Rd would have assigned levels 2 dB higher due to their proximity to the sporting facility building (see Schedule 3 2(8) of the Environmental Protection (Noise) Regulations 1997).

Extrapolation using Applecross Tennis Club noise levels to estimate levels received at residents opposite from the courts proposed for evening lighting at East Fremantle Tennis Club			
Parameter	Shoe squeak	Ball hit	General noise
Distance to Applecross source [m]	53 ⁽¹⁾	53 ⁽²⁾	53 ⁽²⁾
Distance to East Fremantle source [m]	71 ⁽³⁾	71 ⁽³⁾	71 ⁽³⁾
Level at Applecross residents [dB(A)]	46	≤39 ⁽⁴⁾	38 ⁽⁵⁾
Extrapolated level at East Fremantle residents [dB(A)] ⁽⁶⁾	44	≤37	36
Adjustment for impulsiveness [dB] ⁽⁷⁾	+10	+10	+0

Adjusted level [dB(A)]	54	≤47	36
Evening Assigned levels $L_{Amax}/L_{A1}/L_{A10}$ [dB] ⁽⁸⁾	55/50/40	55/50/40	55/50/40
Exceedance [dB] ⁽⁹⁾	-1/na/na	≤ -8/≤ -3/na	-19/-14/-4

Notes

- (1) From Applecross hard courts 13 & 14, the only source of shoe squeak.
- (2) Worst case is if prediction is from Applecross hard courts 13 & 14. If the source was from the closer synthetic courts extrapolated levels would be lower.
- (3) From edge of court area to residents directly opposite on Preston Point Rd.
- (4) Measured 42 dB(A) adjusted for background of 39 dB(A).
- (5) Highest level predicted in Eco Acoustics Applecross Tennis Club report dated 7 December 2023.
- (6) Using noise level reduction due to distance only.
- (7) A conservative approach is to assume impulsiveness, although unlikely to be present, given the distance.
- (8) Worst case evening assigned levels.
- (9) A negative or zero exceedance value indicates compliance. "na" is not applicable.

The extrapolated results indicate that the noise from tennis playing activities from the courts proposed to be lit in the evening at the East Fremantle Tennis Club is likely to comply with the assigned levels under the Environmental Protection (Noise) Regulations 1997.

Regards

[Peter Popoff-Asotoff](#)

Principal Environmental Officer (Noise)

Environmental Noise

[Department of Water and Environmental Regulation](#)

Prime House, 8 Davidson Terrace, JOONDALUP WA 6027

Locked Bag 10, Joondalup DC, WA 6919

T: (08) 6364 6899

E: peter.popoff-asotoff@dwer.wa.gov.au | www.dwer.wa.gov.au

Twitter: [@DWER WA](#)

From: Josie Watson <josie.watson@dbca.wa.gov.au>

Sent: Monday, April 22, 2024 12:41 PM

To: Peter Popoff-Asotoff <peter.popoff-asotoff@dwer.wa.gov.au>

Subject: East Fremantle Tennis Club

Hi Peter,

Thank you very much for your time today to discuss the East Fremantle Tennis Club proposal for additional lighting for the facilitation of evening tennis. As you are aware, the club have been advised that the additional use of the courts would need to comply with the Environmental Protection (Noise) Regulations 1997. In your experience, would you expect that the playing of tennis on an additional four (4) courts would present a problem for the club in terms of compliance with the noise regulations?

Kind regards

Josie

Josie Watson | Environmental Officer
Rivers and Estuaries Branch | Department of Biodiversity, Conservation and Attractions
17 Dick Perry Avenue, Technology Park, Western Precinct, Kensington 6151
Locked Bag 104, Bentley Delivery Centre WA 6983
P: 08 9278 0910 | rivers.planning@dbca.wa.gov.au
Web: <https://www.dbca.wa.gov.au/swan-canning-riverpark>

CARING FOR THE SWAN CANNING RIVERPARK

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Disclaimer: This e-mail is confidential to the addressee and is the view of the writer, not necessarily that of the Department of Water and Environmental Regulation, which accepts no responsibility for the contents. If you are not the addressee, please notify the Department by return e-mail and delete the message from your system; you must not disclose or use the information contained in this email in any way. No warranty is made that this material is free from computer viruses.

Summary of public submissions under Section 74 – Part 5 application for East Fremantle Lawn Tennis Club (EFLTC) (2023/4596)

Issue	DBCA response
OBJECTION	
Lighting	
The lights will contribute to visual and light pollution.	The proposed lighting design is compliant with Australian Standard AS/NZS4282:2023 <i>Control of the obtrusive effects of outdoor lighting</i> . The applicant has provided plans indicating that there will be no light spill to the property line along Preston Point Road. Condition 3 has been included to ensure the lights are installed in accordance with the plans.
Additional lights will make a continuous flood lit area along the foreshore.	Noted, although not all of the lights along Preston Point Road are on every night.
The lights are left on when the courts are not being used.	Condition 4 requires the preparation of an Operations Plan to outline how the lighting will be managed and switched off when not in use wherever possible.
The light poles are excessively high and will be an eye sore.	It is acknowledged that the poles will be visible to residents, however the poles are narrow and are not considered obtrusive structures. The poles are the same height as the existing eastern court poles, which are lower than the light poles on the neighbouring sporting fields. Shorter poles would make light spill harder to manage. The poles are not expected to disrupt the view unacceptably.
The lighting is excessive and will adversely impact the amenity of the area.	The proposed lighting design is compliant with Australian Standard AS/NZS4282:2023 <i>Control of the obtrusive effects of outdoor lighting</i> . The applicant has provided plans indicating that there will be no light spill to the property line along Preston Point Road. Light pollution and light spill is discussed in the final report sections 7.10-7.18. A lighting audit is required under Condition 3 to ensure the lighting installed is in accordance with the plans. An Operations Plan required under Condition 5 will demonstrate how the lighting system will be managed to minimise lighting impacts.
Other	
The already lit eastern courts are underutilised. Query the need for further lit courts.	EFLTC advises that there is demand for more available evening tennis courts.
The power usage associated with the lighting is environmentally conflicting.	The proposed lights are energy efficient LEDs and the site is powered using solar panels.

The information supplied by the Town of East Fremantle regarding the proposed number of new light poles is incorrect.

The plans submitted to DBCA with the application show 6 new light poles to be installed in the locations where the poles were previously approved. This is what has been considered in the draft report.

Summary of public submissions under Section 75 Draft Report – Part 5 application for East Fremantle Lawn Tennis Club (EFLTC) (2023/4596)

Issue	DBC response
OBJECTION	
Lighting	
<p>Drawings have been provided but no written report for the Obtrusive Light Assessment. The assessment claims that the design of the lighting is compliant with all the various factors associated with Australian Standard AS/NZ4282.2019, however no actual survey data has been obtained.</p>	<p>The drawings provided include text confirming that the proposed lighting plan is compliant with AS/NZ4282.2019. Condition 3 will require survey data be obtained to demonstrate the lights have been installed in accordance with the plans.</p>
<p>The assessment has been based on a scaled aerial image to “estimate” property boundaries and roadways. As such the assessment can only be considered as an estimate and as such this does not fully demonstrate potential compliance with AS/NZ4282.2019.</p>	<p>The lighting plan demonstrates compliance with AS/NZ4282.2019 as far as reasonably possible prior to installation of the lights. A scaled aerial image would not change the assessment of the compliance with AS/NZ4282.2019. Condition 5 will ensure the lights have been installed in accordance with the plans.</p>
<p>Reflective light from wet courts after a rain event may be extremely bright and difficult to look at.</p>	<p>EFLTC lighting consultant was asked to respond to this question and provided the following advice:</p> <p>There is no reference in AS/NZ4282.2019 to wet courts creating reflective light. However, rain would potentially stop play and the lights could be switched off if possible. The residential elevation is such that any light reflectance would not be noticeable to the surrounding boundaries. In addition, any reflectance would be minimal as the courts are a rough, dark surface. The courts are graded so no water would be puddling to create a mirror effect.</p>
Noise	
<p>No noise survey specific to the East Fremantle Lawn Tennis Club has been undertaken on the basis that this would be difficult because of background noise issues associated with traffic noise from Preston Pt Road, however a noise assessment could be conducted after 8:30pm or 9pm when background noise is low.</p>	<p>The Department of Water and Environmental Regulation (DWER), Environmental Noise was asked to respond to this question and provided the following advice:</p> <p>A noise survey <i>can</i> be done (by a competent person) as there are existing courts with night lighting at the appropriate distance to enable direct measurement of representative noise. However, conditions have to be conducive to obtaining useable data. In most cases this is essentially an issue of cost. A consultant may be lucky enough to obtain useable data on the first night of measurement or it may take many nights of measurements to obtain a reasonable amount of</p>

	<p>useable data. Even then, inferences may still have to be made to enable determination of compliance with the Regulations.</p> <p>When direct measurement is difficult acoustic consultants use a modelling approach. This has its own issues, particularly in defining the sound power level for a noise source (the fundamental data on which the modelling relies to extrapolate noise levels to other locations) that is variable in level and occurrence, as well as predicting if a source will retain its characteristics at a distance.</p>
<p>It is a relief to have low noise levels after 9pm. Having these quiet periods filled with more noise is concerning.</p>	<p>Noted. This is the reason that under the Regulations there are different sets of assigned noise levels at different times of day for noise sensitive receivers. In the Regulations some of the assigned level parameters are reduced in level after 10:00pm. The applicant has agreed to reduce the hours of play until 10:00pm until the tennis club can demonstrate that the lower levels after 10:00pm can be complied with.</p>
<p>The noise assessment indicates that based on the estimates the expected noise levels are “likely” to comply with the assigned levels under the Regulations.</p> <p>With the addition of a noise “impulsiveness” factor added to the data it would appear that the adjusted noise level for “Noise Squeak” is estimated as 54dB which is just below the Evening Assigned L_{max} limit of 55dB. So, the Exceedance Level is noted as -1dB. The report notes, however, that for residences opposite the courts/building should be assigned a noise level of 2dB higher due to their proximity. This would actually mean that the estimated “Noise Squeak” level would in fact be 56dB and would exceed the Evening Assigned Max of 55dB by 1dB.</p>	<p>DWER, Environmental Noise was asked to respond to this question and provided the following advice:</p> <p>This is not a correct interpretation of the table provided. The adjustment of 2 dBs is to the influencing factor (which raises the assigned level) not to the measured/estimated level.</p> <p>In other words, the influencing factor adjusts the base assigned levels (Table 1 of the Regulations) depending on the environment surrounding the noise sensitive receiver and hence relates to a resident’s acoustic expectations for the area in which they live. It is an adjustment that essentially relates to the potential background noise without resorting to measuring a background noise level (there are many issues with using the background noise level measurement approach for criteria in noise regulations). A sporting facility building may have noise sources attached that may increase the ambient levels (exhaust fans, air-conditioning, pumps etc) and can have similarities to commercial premises.</p> <p>Regarding the estimation, <i>the lowest evening assigned levels have been quoted, however it can be noted that the premises numbering 176 to 186 Preston Point Rd would have assigned levels 2 dB higher due to their proximity to the sporting facility building...</i>. As per Schedule 3 2(8), if there is a building associated with a sporting facility within 100 m of the noise sensitive premises the influencing factor, and hence the assigned level, of the noise sensitive premises is increased by 2 dB. This means that the evening assigned levels for those premises would be L_{Amax}/L_{A1}/L_{A10} = 57/52/42 dB not 55/50/40 dB. Hence given a “shoe squeak” of 54 dB(A) it would likely comply with the L_{Amax} assigned level at those receivers with a margin of 3 dB.</p>

Does this mean that noise levels could “possibly” not comply with the Regulations and that this uncertainty warrants an actual survey to be conducted, and particularly after 9.00pm?	DWER, Environmental Noise was asked to respond to this question and provided the following advice: It indicates that it is <i>less</i> likely that the noise from the tennis club would exceed the assigned levels at the premises numbering 176 to 186 Preston Point Rd. The hours of operation will be limited to 10:00pm unless the Club can demonstrate that the noise levels will comply with the Regulations after 10:00pm.
Notwithstanding this point there will be times when noise levels exceed the limits as when tennis players celebrate winning points with loud exclamations, which have been noted from the existing lighted courts.	Noted. Condition 4 requires an Operation Plan which will outline how the newly lit courts will be managed to comply with the Regulations, including management of noise from patrons.
Other	
No response was provided in the draft report to the comments raised in the submissions.	This table has been included to respond to and address the comments received in relation to the application and the draft report.
What is the basis for the 10:30pm curfew outlined in the draft report?	10:30pm was the requested curfew. The curfew has now been reduced to 10pm to ensure that noise from the tennis courts will meet the requirements of the Regulations. EFLTC may choose to demonstrate at a later date that compliance with the noise regulations is possible after 10pm.
SUPPORT	
Proposal will provide opportunities for health and fitness.	Noted. Consistent with the Swan Canning River Protection Strategy.
There is a strong demand for evening tennis.	Noted.
Proposal is a benefit to the community.	Noted.
Support for extended usage of the courts.	Noted.
Support for additional courts for the Tennis Factory to continue providing tennis lessons.	Noted.
Flood lights will allow busy people to play tennis during the week after hours.	Noted.



Your ref: 2023/4596
Our ref: DEC13200/1, DMO 397
Enquiries: Tim Hallam, Ph 6364 6596
Email: tim.hallam@dwer.wa.gov.au

Statutory Assessments
Rivers and Estuaries Branch
Department of Biodiversity, Conservation and Attractions
17 Dick Perry Avenue, Kensington WA 6151
Locked Bag 104, Bentley Delivery Centre WA 6983

By email rivers.planning@dbca.wa.gov.au

Dear Rivers and Estuaries Branch

DEVELOPMENT APPLICATION NUMBER 2023/4596 – LOT 15722 (RESERVE 7800) JERRAT DRIVE EAST FREMANTLE.

I refer to your email dated 28 June 2024 to the Department of Water and Environmental Regulation (the department) regarding an application to the Department of Biodiversity, Conservation and Attractions (DBCA) for the proposed development of the above-mentioned lot.

As per the requirements under section 58(6)(b) of the Contaminated Sites Act 2003 (CS Act), advice is required as to the suitability of the land for the proposed development. The department understands that the proposed development comprises the installation of electric cabling and six LED floodlights at the East Fremantle Lawn Tennis Club.

Land at Lot 15722 on Plan 40473 (the site) was classified under the CS Act as possibly contaminated - investigation required on 18 September 2012 and a memorial (reference number M66012) was placed on the certificate of title.

The classification was based on several historical soil, sediment and groundwater investigations undertaken in 2001 and 2007. The investigations were mainly carried out at the yacht club portion of the site and found antifouling agents in the form of tributyltin in river sediments adjacent to a boat slipway. No detailed or recent site investigations have been undertaken at the site as a whole.

The site is not proposed for a more suitable land use. Based on available information, and consistent with historical advice from the department, the department has no objection to the proposed development of the site and recommends that the approval should not include a contamination condition.

However, given the risks associated with the potential disturbance of historical contaminants, the department recommends that the following advice note be applied to any approval granted by DBCA:

Advice

The department recommends that a management plan including an unexpected finds protocol is implemented in the event that any evidence of contamination is encountered.

The site is not located within an area that is mapped as having a risk of encountering acid sulfate soils. The department therefore advises that no specific comment is required in relation to acid sulfate soil management during development.

If you have any queries in relation to the above, please contact Environmental Officer, Tim Hallam, on 6364 6596.

Yours sincerely



Chek Cher
A/SENIOR MANAGER
CONTAMINATED SITES
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*

3 July 2024



Technical Expert Advice—Addendum

Details About Addendum	
Full title of original DWER document	Email to Department of Biodiversity, Conservation and Attractions (BDCA) dated 23 April 2024
Advice requested by	Department of Biodiversity, Conservation and Attractions
Description	Comment on draft Department of Biodiversity, Conservation and Attractions report: Material Change of use to allow night time tennis – installation of electric cabling and six (6) LED floodlights
DWER reference	2011/7180
Previous DER reference	2011/7180

Additional Advice			
Please write below if there is any additional advice.			
DWER's previous comment			
<p>Environmental Noise Branch (ENB) of the Department of Water and Environmental Regulation (DWER) previously provided (in an email to BDCA dated 23 April 2024) an estimation of the noise levels received at residents directly to the south of Preston Point Road from tennis activities on the courts associated with the proposed evening lighting at the East Fremantle Tennis Club.</p> <p>As none of the reports regarding noise from the East Fremantle Tennis Club provided to DWER contained data from which a determination could be made regarding compliance with the assigned levels under the Environmental Protection (Noise) Regulations 1997 (Noise Regulations), noise data that that was available for Applecross Tennis Club was adapted to the East Fremantle location to enable an estimation of the received noise levels. This was possible as the noise sensitive receivers across from the Applecross Tennis Club and the East Fremantle Tennis Club are both similarly exposed to the courts.</p> <p>For the three considered noise sources associated with tennis club activities the following table was provided to BDCA that details that the activities would likely comply with the <i>evening period</i> assigned levels under the Noise Regulations:</p>			
<p>Extrapolation using Applecross Tennis Club noise levels to estimate levels received at residents opposite from the courts proposed for evening lighting at East Fremantle Tennis Club</p>			
Parameter	Shoe squeak	Ball hit	General noise
Distance to Applecross source [m]	53 ⁽¹⁾	53 ⁽²⁾	53 ⁽²⁾
Distance to East Fremantle source [m]	71 ⁽³⁾	71 ⁽³⁾	71 ⁽³⁾
Level at Applecross residents [dB(A)]	46	≤39 ⁽⁴⁾	38 ⁽⁵⁾

Extrapolated level at East Fremantle residents [dB(A)] ⁽⁶⁾	44	≤37	36
Adjustment for impulsiveness [dB] ⁽⁷⁾	+10	+10	+0
Adjusted level [dB(A)]	54	≤47	36
Evening Assigned levels $L_{Amax}/L_{A1}/L_{A10}$ [dB] ⁽⁸⁾	55/50/40	55/50/40	55/50/40
Exceedance [dB] ⁽⁹⁾	-1/na/na	≤ -8/≤ -3/na	-19/-14/-4

Notes

- (1) From Applecross hard courts 13 & 14, the only source of shoe squeak.
- (2) Worst case is if prediction is from Applecross hard courts 13 & 14. If the source was from the closer synthetic courts extrapolated levels would be lower.
- (3) From edge of court area to residents directly opposite on Preston Point Rd.
- (4) Measured 42 dB(A) adjusted for background of 39 dB(A).
- (5) Highest level predicted in Eco Acoustics Applecross Tennis Club report dated 7 December 2023.
- (6) Using noise level reduction due to distance only.
- (7) A conservative approach is to assume impulsiveness, although unlikely to be present, given the distance.
- (8) Worst case evening assigned levels.
- (9) A negative or zero exceedance value indicates compliance. "na" is not applicable.

DWER's comment on BDCA's draft report

It is noted in the draft report that the East Fremantle Tennis Club proposal is stated "*to allow for the playing of night tennis to 10:30pm at night, seven days a week*".

For noise sensitive receivers the assigned levels under the Noise Regulations are different for different times of day, with the evening period defined as being from 7:00pm to 10:00pm every day. From 10:00pm to 7:00am (Monday to Saturday) or to 9:00am Sunday and public holidays is the nighttime period and the assigned levels for this period are lower than for the evening period by 5 dB for some assigned level parameters (the L_{A1} and L_{A10} parameters). While DWER considers that noise from the courts would likely comply with the assigned levels for the *evening* period there is marginally less certainty regarding compliance in the *nighttime* period.

While the Noise Regulations define decibel levels, they also consider the character of the noise and provides adjustments to the decibel levels for certain annoying characteristics. When measured near the source, the "shoe squeak" and "ball hit" noise sources which occur during tennis activities contain the "impulsive" characteristic, as defined under the Noise Regulations. The impulsive character of sources diminishes with distance from the source. As no data was available to indicate if the "shoe squeak" or "ball hit" noise sources contained the "impulsive" characteristic at the receiver location a conservative approach was taken in the assessment. The following table assesses the extrapolated values against the *nighttime* assigned levels, for the cases where impulsiveness is, and is not, assumed to be present.

Extrapolation using Applecross Tennis Club noise levels to estimate levels received at residents opposite from the courts proposed for evening lighting at East Fremantle Tennis Club – compared with the worst-case nighttime assigned levels			
Parameter	Shoe squeak	Ball hit	General noise
Extrapolated level including a +10 dB adjustment for impulsiveness [dB(A)]	54	≤47	36

Nighttime Assigned levels $L_{Amax}/L_{A1}/L_{A10}$ [dB] ⁽¹⁾	55/45/35	55/45/35	55/45/35
Exceedance [dB] ⁽²⁾	-1/na/na	$\leq -8/\leq +2$ /na	-14/-9/+1
Extrapolated level NOT including a +10 dB adjustment for impulsiveness [dB(A)]	44	≤ 37	36
Nighttime Assigned levels $L_{Amax}/L_{A1}/L_{A10}$ [dB] ⁽¹⁾	55/45/35	55/45/35	55/45/35
Exceedance [dB] ⁽²⁾	-11/na/na	$\leq -18/\leq -8$ /na	-14/-9/+1

Notes:

- (1) Worst case nighttime assigned levels.
(2) A negative or zero exceedance value indicates compliance. "na" is not applicable.

Discussion

The "shoe squeak" noise source is likely to comply at all times, the "ball hit" noise source is likely to comply at all times if not impulsive, but potentially exceeding by +2 dB at nighttime if impulsive, and "general noise" is likely to exceed by +1 dB at nighttime.

Note that premises numbering 176 to 186 Preston Point Rd would have assigned levels 2 dB higher than those in the table due to their proximity to the sporting facility building (see Schedule 3 2(8) of the Noise Regulations). All noise sources would therefore likely comply at all times of the day at these receivers.

Although not supported by available data, given the distance it is unlikely that impulsiveness would be present for the "shoe squeak" and "ball hit" noise sources at the receiver locations.

It is also worth noting that a level difference of 1 dB is not generally detectable.

If approval is obtained to operate until 10:30pm and should complaints occur due to tennis being played after 10:00pm, an option is to restrict the operations of the courts to before 10:00pm unless shown by measurement to be complying with the assigned levels after 10:00pm.

Signatures

Author

Name

Peter Popoff-Asotoff

Position title

Principal Environmental Noise Officer

Signature



Date

2/08/2024

Reviewer

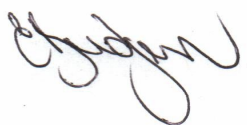
Name

Emma Bridgeman

Position title

Manager Environmental Noise

Signature



Date

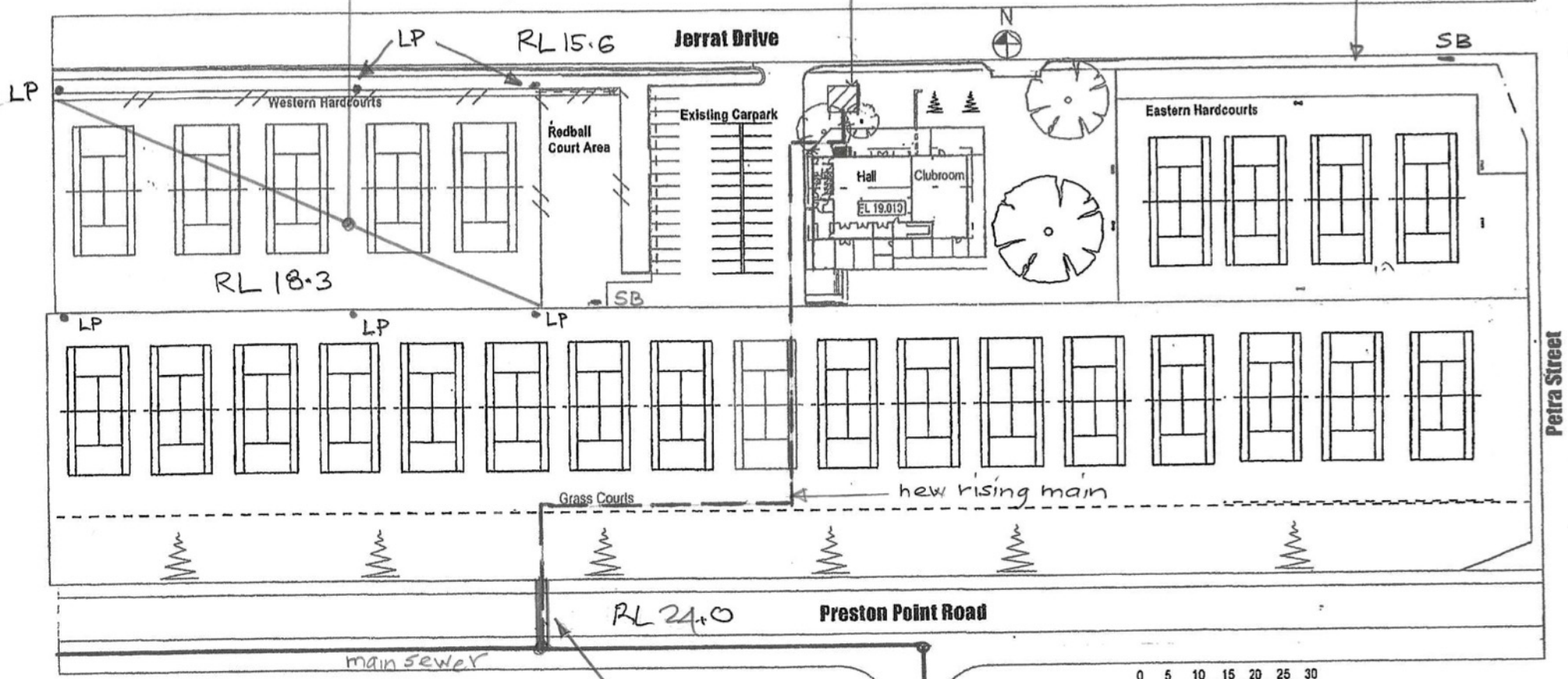
2/08/2024

SWAN RIVER (below)

western courts to be flood lit (refer EOI)

new pump station RL 16.4
(Commissioned July 2023)

refer to EOI for location & details of power cable upgrade



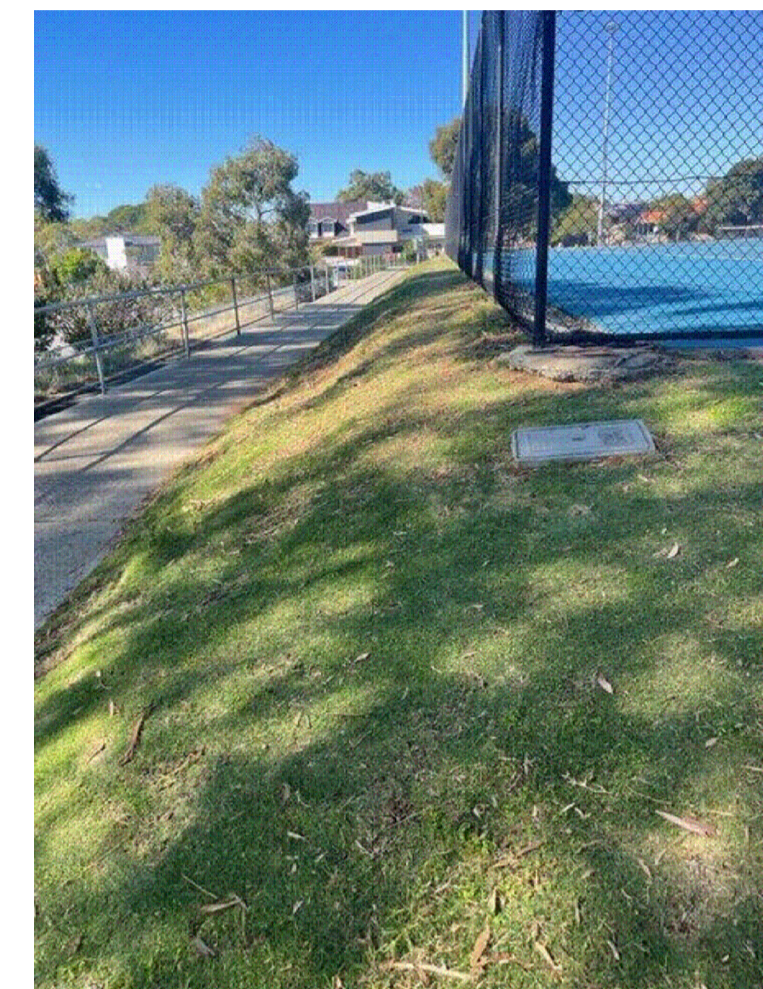
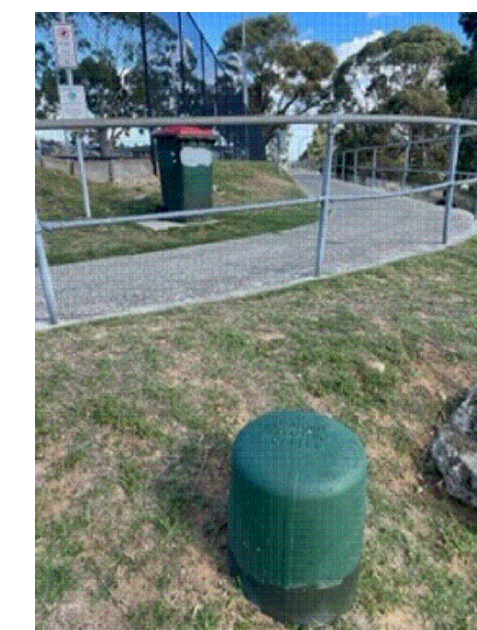
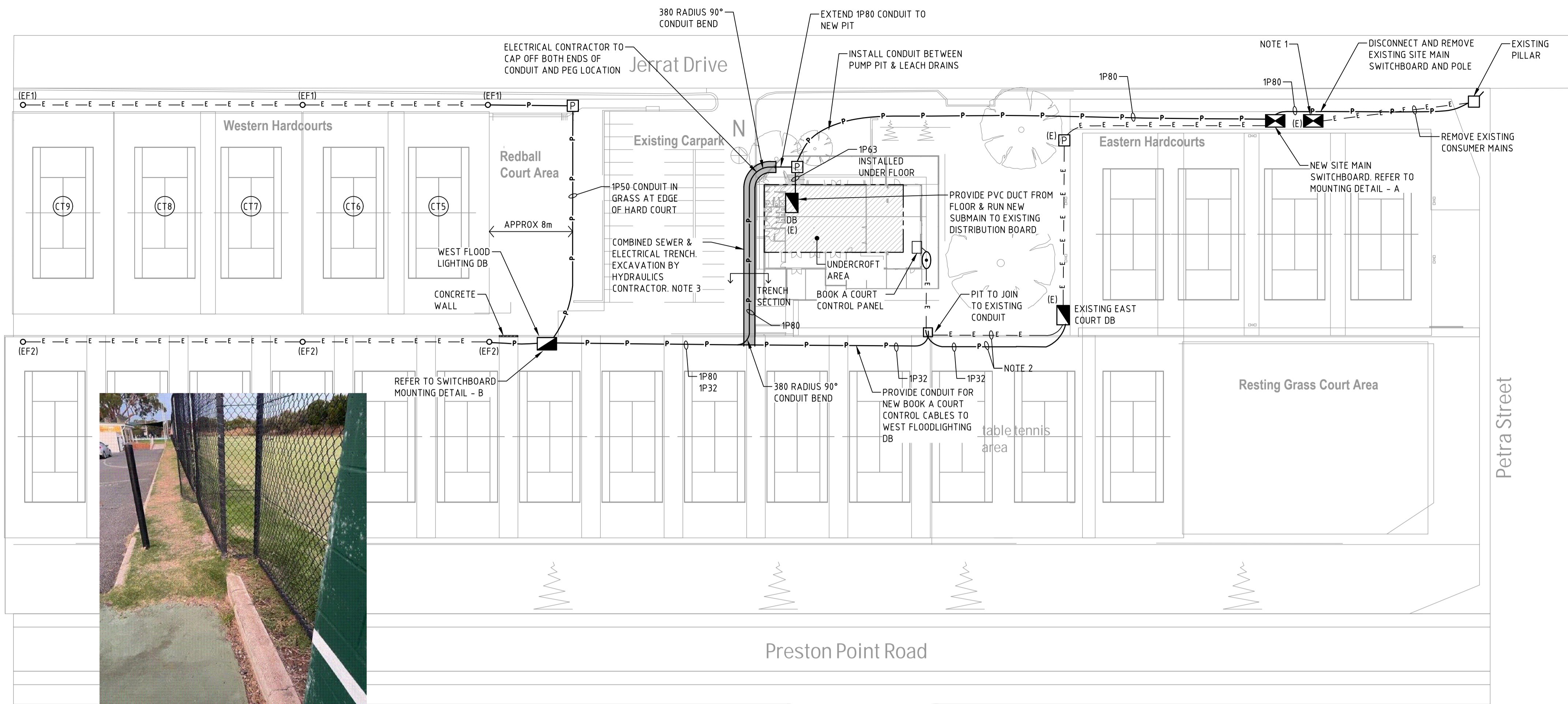
Overall Site Plan
1:1000 @ A3
(all Levels AHD)

LP indicates new lightpole
on existing footing

SB indicates new switchboard.

EAST FREMANTLE LAWN TENNIS CLUB

SPI July 2023

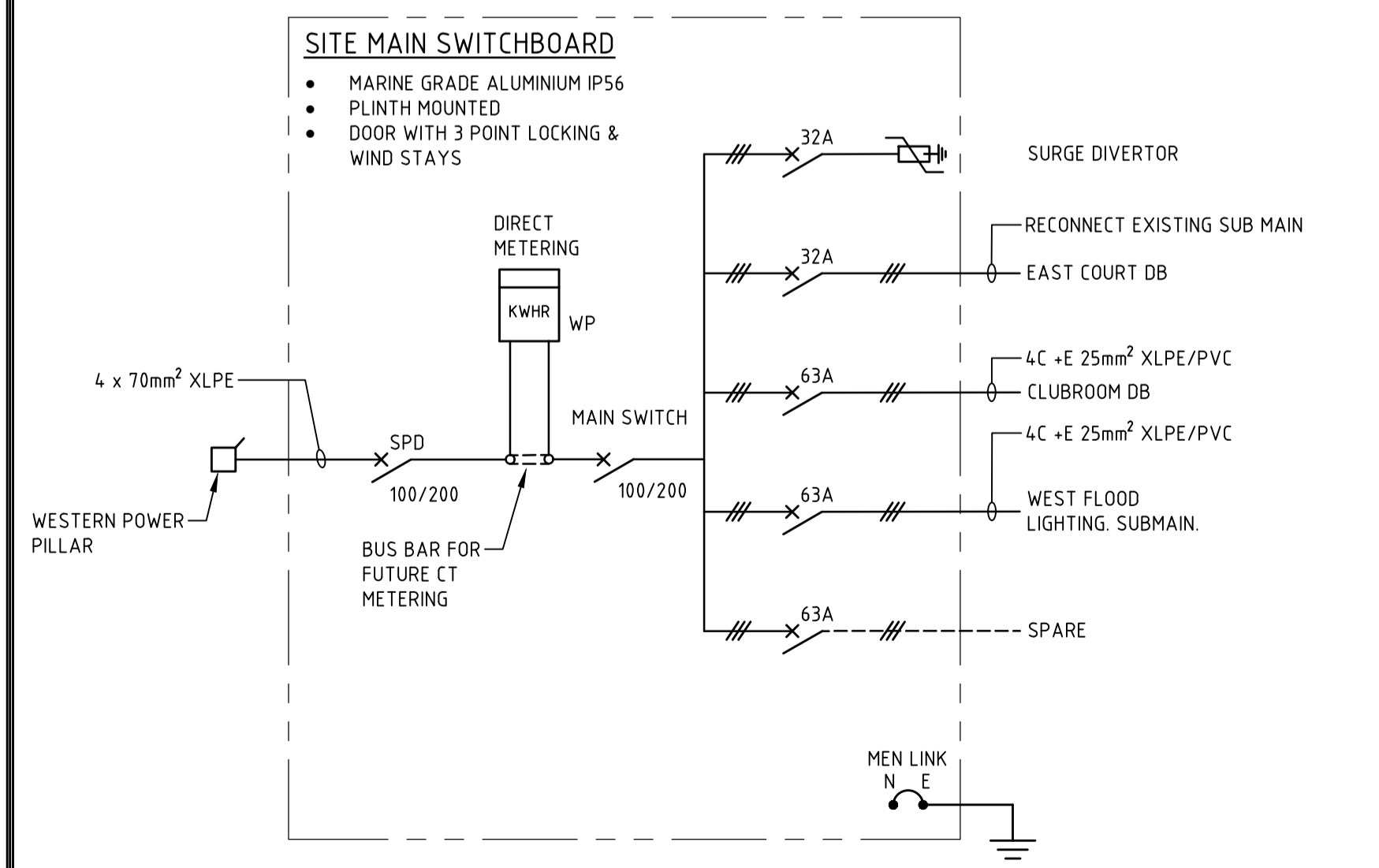
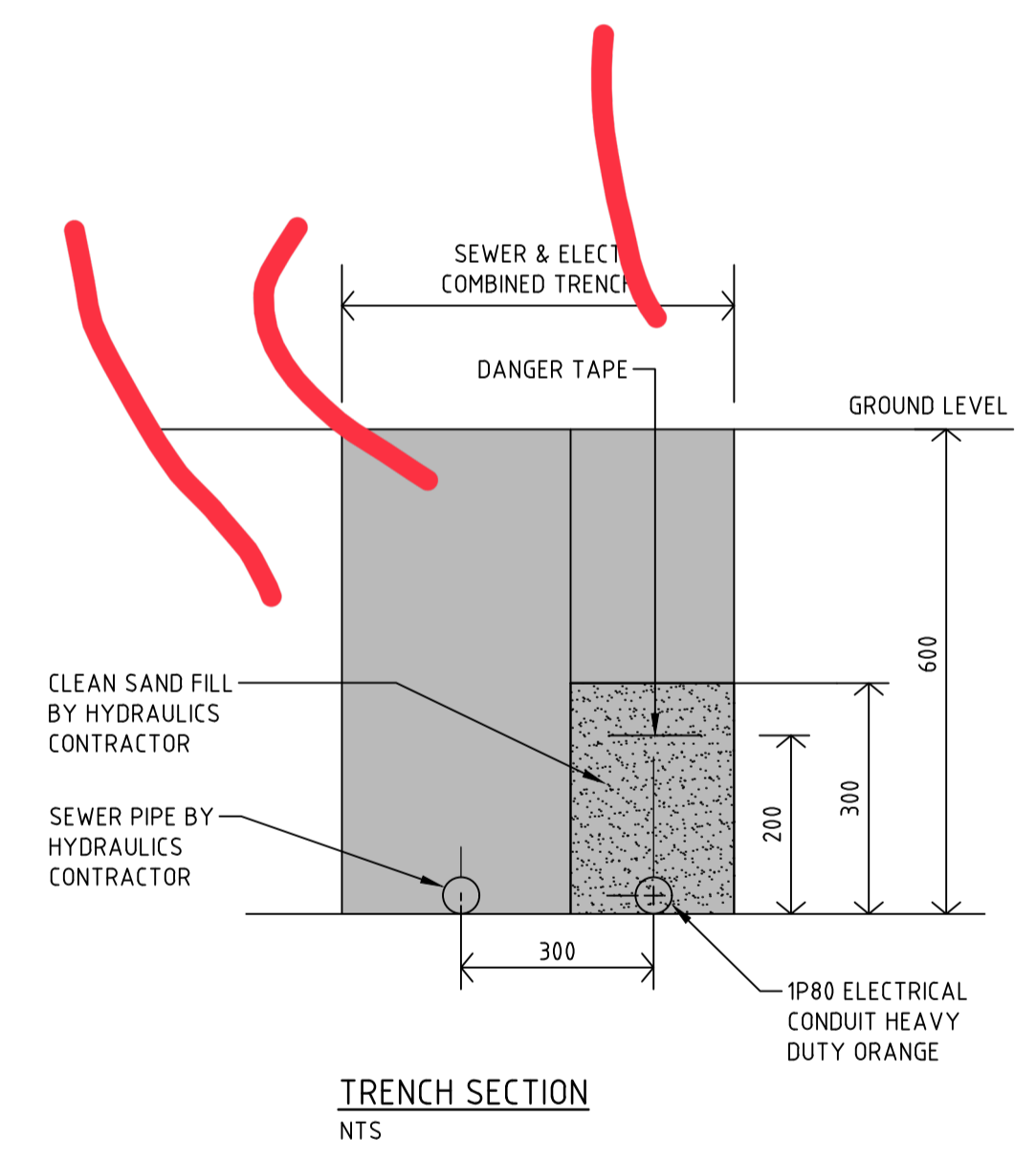
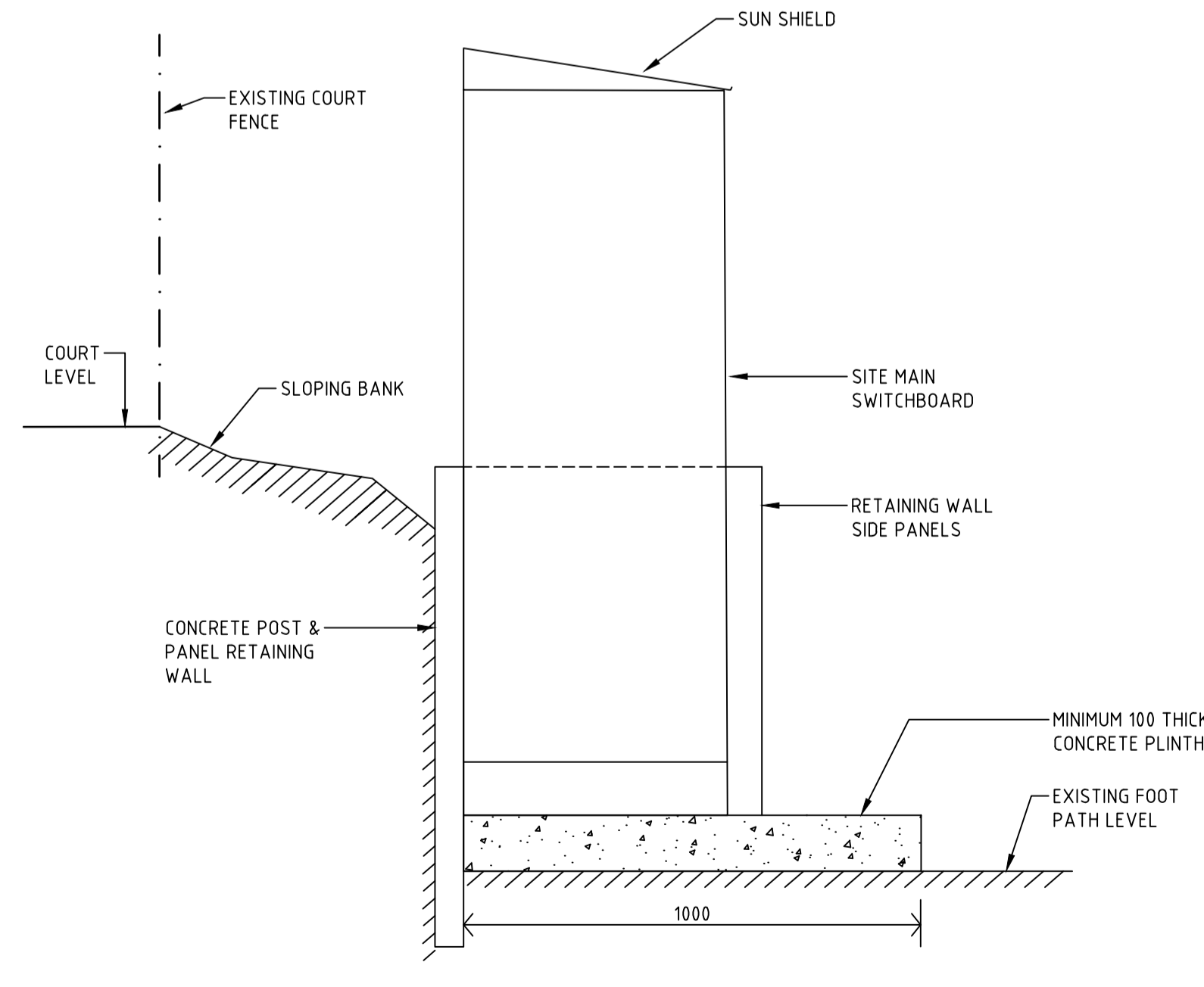
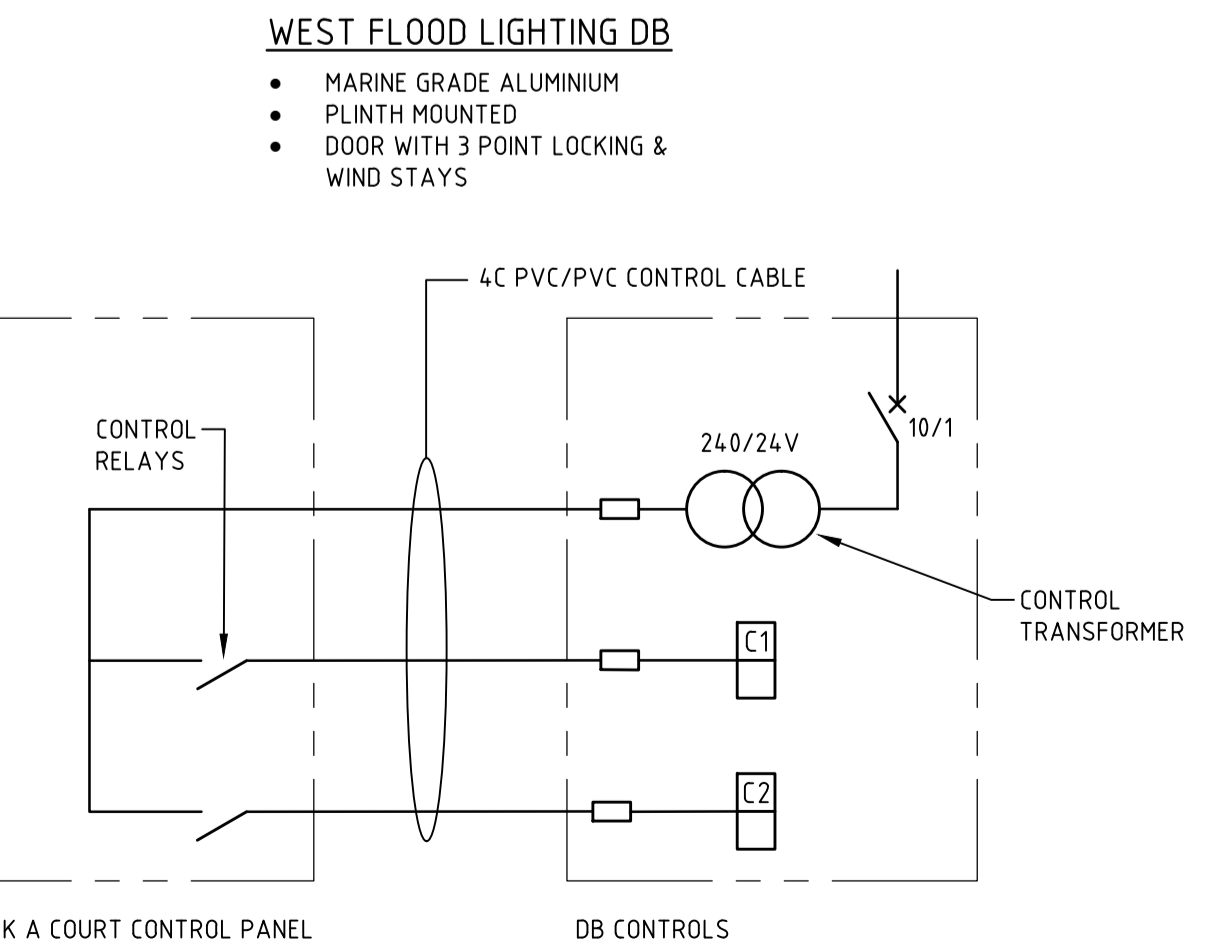
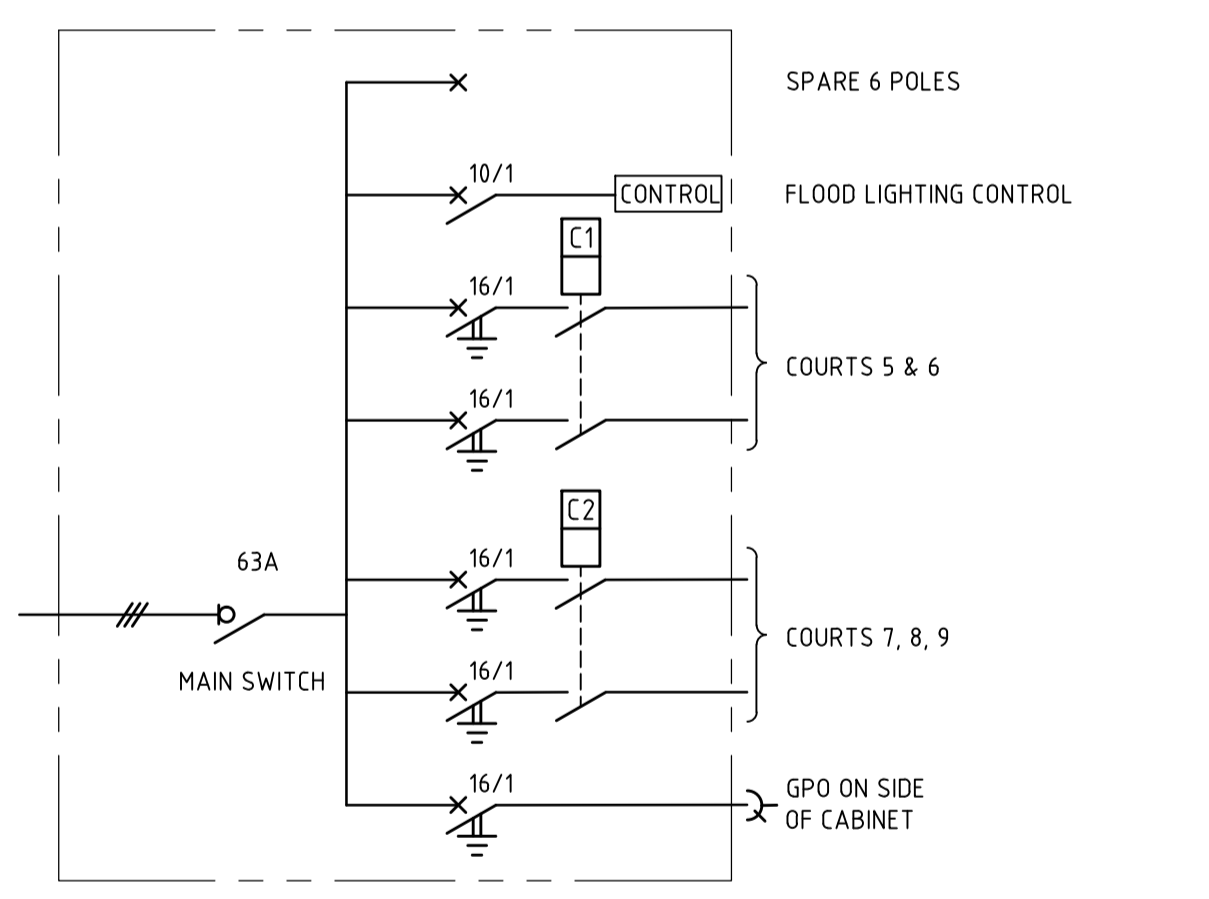
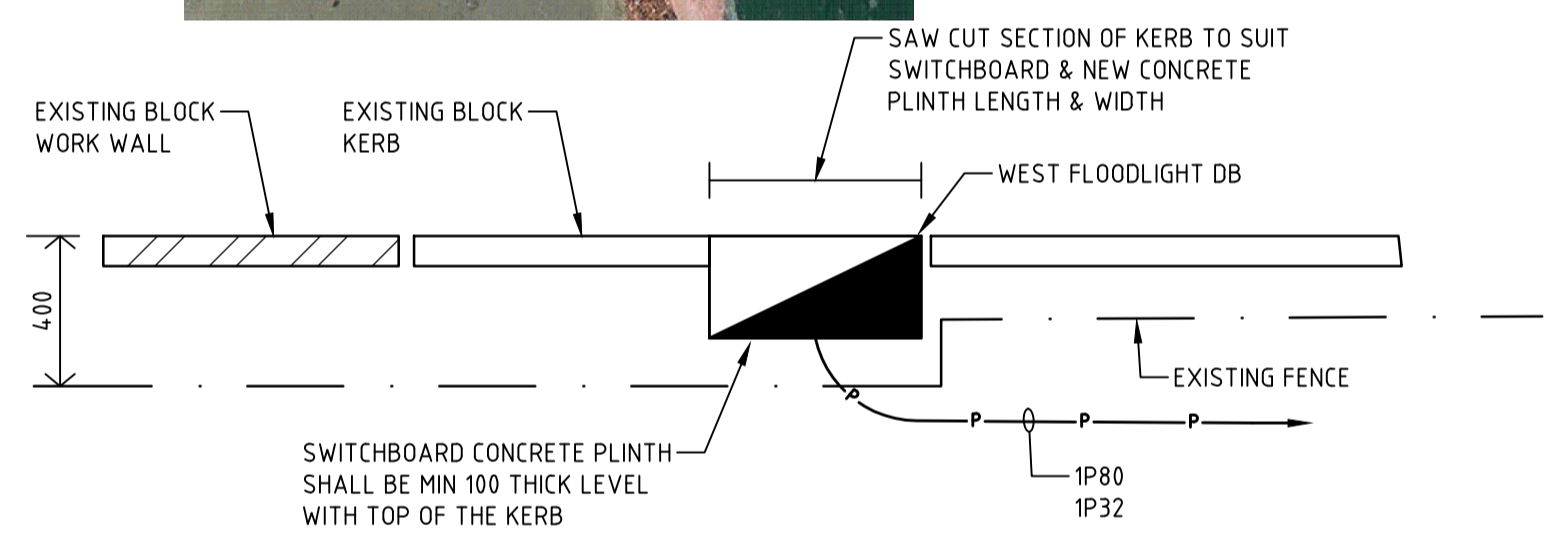


NOTES

1. REPLACE THE EXISTING CONSUMER MAINS & MAIN SWITCHBOARD. LIAISE WITH WESTERN POWER FOR INSTALLATION.
2. REMOVE THE EXISTING BOOK A COURT CONDUIT & CABLING FROM THE TOP OF FENCE. EXCAVATE NEW TRENCH ADJACENT TO FENCE & PROVIDE A NEW CONDUIT FROM THE WEST DB TO A NEW PIT FOR JOINING TO EXISTING CONDUIT TO THE CONTROL PANEL AND EAST COURT DB. PROVIDE NEW CONTROL CABLES & REINSTATE THE EXISTING CABLES.
3. ATTEND SITE WHEN ADVISED BY THE HYDRAULIC CONTRACTOR & INSTALL THE 1P80 CONDUIT IN THE COMBINED SERVICES TRENCH.

LEGEND

- WESTERN POWER UNI PILLAR
- SITE MAIN SWITCHBOARD
- DISTRIBUTION BOARD
- EXISTING U/G CONDUIT
- POWER CONDUIT
- POWER PIT
- CIRCUIT BREAKER
- RCBO
- kWh METER
- THREE PHASE LINE
- EXISTING FLOODLIGHT FOOTING 600 DIA x 2000 DEEP
- EXISTING FLOODLIGHT FOOTING 600 DIA x 1600 DEEP WITH 15m HIGH POLE
- 80 HD CONDUIT
- CONTACTOR



REV	DATE	DESCRIPTION	CHECK
2	19.06.23	LAYOUT REVISIONS	AH
1	05.04.23	LAYOUT REVISIONS	AH

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**EAST FREMANTLE TENNIS CLUB
ELECTRICAL SERVICES LAYOUT**

PRELIMINARY ISSUE
REFER TO REVISION COLUMN

DRAWN	DESIGNED	DRAWING No.
S. SHRESTHA	A. HOEHN	E.01 2
CHECKED	DATE	SCALE
A. HOEHN	9-Jun-23	1:500 @ (A1)
APPROVED	SCALE	BEST PROJECT N° 2122.109
A. HOEHN		



The luminaire specified for this project is the Sylvania RAPTOR GEN 3 floodlight.

For technical information on this product, please select the weblink below or via the QR code above.

<https://au.schreder.com/en/products/raptor3-sports-floodlighting>

REPORT CONTENTS:

This report provides for the following:

- * Client brief
- * A sports lighting solution for East Fremantle Lawn Tennis
- * Acknowledging the relevant sections from Australian Standard AS2560.2:2021, Sports Lighting
- * An assessment for Obtrusive Light in accordance with Australian Standard AS/NZS4282:2019 Control of the obtrusive effects of outdoor lighting.

CLIENT BRIEF:

- * LED Upgrade
- * 15m poles
- * Designed to comply with the requirements of AS2560.2:2021: Lighting for Tennis Club Competition play - 350/250lx
- * AS/NZS4282-2019 Obtrusive Light Evaluation assess for: Pre-Curfew
- * AS/NZS4282 Compliance required



DISCLAIMER:

1. No CAD drawing, or site dimensions, were supplied with the design brief. All calculations are based on a scaled aerial image. Whilst every intent is maintained to provide dimensional accuracy, a scaled aerial image will always introduce inaccuracies. We provide this calculation as a close estimate of expected lighting levels. Prior to installation all calculations should be confirmed with accurate site measurements, preferably a surveyed CAD drawing with relevant field markings and surrounding residential boundaries.
2. This scheme is subject to the accuracies and tolerances of lighting systems described within Australian Standard AS/NZS3827, Lighting System Performance Accuracies and Tolerances.
3. The contractor must confirm pole location details 2 weeks prior to the date of installation of the footings. This will allow for any required fine tuning of the design and finalisation of luminaire aiming details.

Overall Site View

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REV	DATE	COMMENTS	DESIGNER	PROJECT	TITLE	REVISION
R0	20/08/2023	Original design	C FARE	East Fremantle Lawn Tennis Courts 5-9	Site location	R1
R1	13/11/2023	Curfew Assessment Included				A3
R2				CONTACT Steve Cox scox@sylvania-schreder.com	DOCUMENT NO. 0251116CTR0.AGI	PAGE NO. Page 1 of 7
R3						
R4						
R5						

DESIGN NOTES: SPORTS LIGHTING ASSESSMENT

This Sports Lighting Assessment is based on the Light Technical Parameters and Guidelines from Australian Standard AS2560.2:2021, "Sports Lighting Part 2 Specific Applications".

The lighting design is to comply with the requirements of Section 2.11, Tennis: Club Competition & commercial.

The Light Technical Parameters (LTP) are as follows:

- * Average horizontal maintained illuminance: PPA: 350lux | TPA: 250lux
- * Minimum horizontal uniformity U1 (Min/Ave): PPA: 0.60 | TPA: 0.30
- * Minimum horizontal uniformity U2 (Min/Max): PPA: 0.40 | TPA: 0.20
- * Maximum glare rating (GR): 50

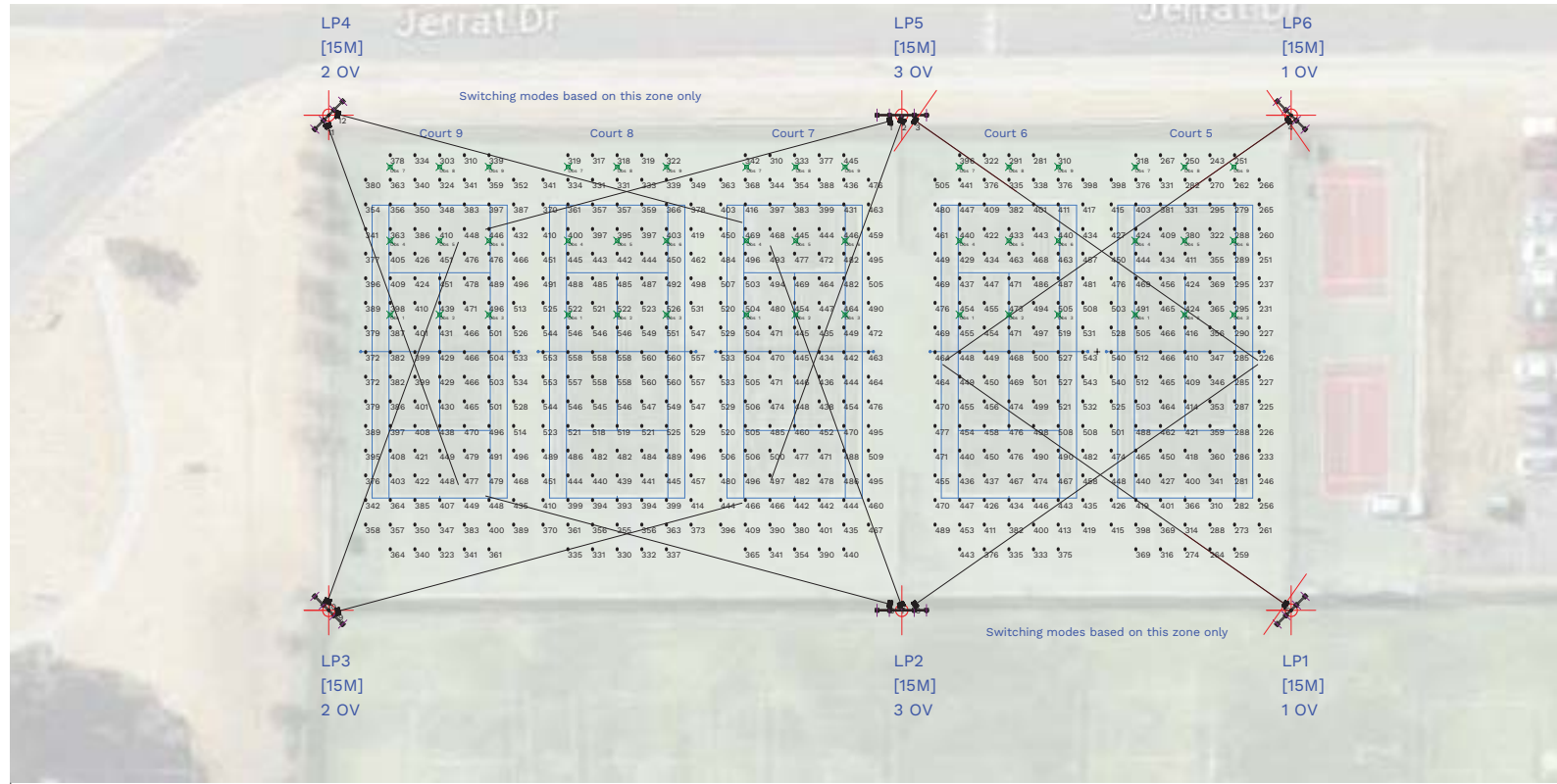
Calculation grid points are established in a horizontal plane, covering the field of play, in accordance with Table 2.11.2 and Figure 2.11.1 from AS2560.2:2021. This being a grid of size 2m x 2m at 1m above the level of the playing surface.

The luminaire height above the field of play has been taken as indicated, acknowledging the height recommendations within Table 2.11.3 from AS2560.2:2021. This assessment does not take into consideration the topography of the site. An analysis of the site topography should be considered when determining the actual heights of each pole.

Poles have been located in accordance with the recommendations of <Figure 2.11.3/Figure 2.11.4> from AS2560.2:2021, based on a six pole arrangement.

Glare rating has been calculated at observer positions in accordance with Figure 2.11.6 from AS2560.2:2021. We have used a surface reflectance of 20% for coloured courts, as specified in Table 2.11.5.

This assessment does not take into consideration the effect of topography or the obstructive effect from buildings, trees, fences etc.



Glare Calculation			
Project: GR			
Scene: All On			
Label	CalcType	Reflect.	Max
GR Max CRT 5	Glare Rating	25	39
GR Max CRT 6	Glare Rating	25	36
GR Max CRT 7	Glare Rating	25	38
GR Max CRT 8	Glare Rating	25	38
GR Max CRT 9	Glare Rating	25	39

Calculation Summary: All Luminaires On											
Project: Playing Area											
Scene: All On											
Label	CalcType	Units	Avg	Max	Min	U1	U2	UG	PTSpclr	PTSpctb	Grid Z
01 Court 9 PPA	Illuminance	Lux	431.58	504	348	0.81	0.69	1.18	2	2	1
01 Court 9 TPA	Illuminance	Lux	414.59	534	303	0.73	0.67	1.18	2	2	1
02 Court 8 PPA	Illuminance	Lux	482.15	560	357	0.74	0.64	1.12	2	2	1
02 Court 8 TPA	Illuminance	Lux	453.90	560	317	0.70	0.57	1.12	2	2	1
03 Court 7 PPA	Illuminance	Lux	464.82	506	383	0.82	0.76	1.18	2	2	1
03 Court 7 TPA	Illuminance	Lux	453.92	533	310	0.68	0.58	1.19	2	2	1
04 Court 6 PPA	Illuminance	Lux	461.54	527	382	0.83	0.72	1.13	2	2	1
04 Court 6 TPA	Illuminance	Lux	448.71	543	281	0.83	0.52	1.23	2	2	1
05 Court 5 PPA	Illuminance	Lux	388.51	512	279	0.72	0.54	1.26	2	2	1
05 Court 5 TPA	Illuminance	Lux	364.61	540	225	0.62	0.42	1.28	2	2	1

Luminaire Schedule						
Project: Luminaires						
Scene: All On						
Symbol	Qty	Label	Description	Lum. Watts	Total Watts	LLF
	12	SR4H757A0LG3 Im	SR4H757A0LG3 RAPTOR GEN 3 1200W A0 Asymmetric CR70 5700K	1193.55	14322.601	0.900

Light Loss Factor (LLF):

A Light Loss Factor (LLF), accounting for LED lumen and dirt depreciation, of 0.9 has been used for all RAPTOR GEN 3 luminaires. This is derived from a combination of the following:

- * Luminaire Dirt Depreciation (LDD) - 0.92, based on a 60-month cleaning cycle (per AS2560.1:2018 Table 4.1)
- * Lamp Lumen Depreciation (LLD) - 0.971 (L97.1) @ 20,000 burning hours.

Luminaire Arrangement:

Light poles labelled LP1 to LP6.

- * Light pole LP1-6 - as indicated within the design

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REV	DATE	COMMENTS	DESIGNER	PROJECT
R0	20/08/2023	Original design	C TARE	East Fremantle Lawn Tennis Courts 5-9
R1	13/11/2023	Curfew Assessment Included		
R2				
R3				
R4				
CONTACT				Steve Cox scoc@sylvania-schroeder.com

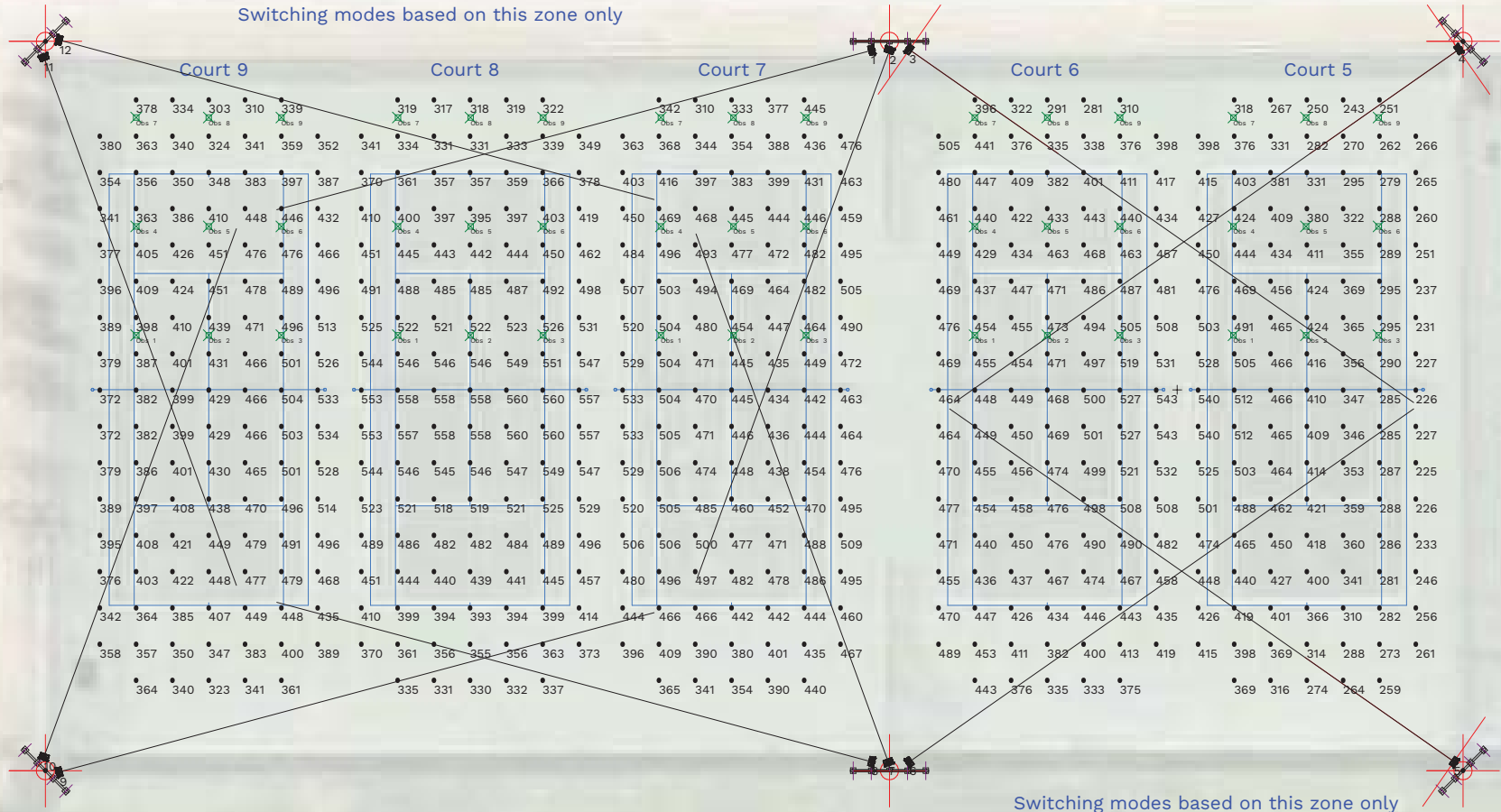
TITLE	REVISION
Technical details and results All On	R1
	A3
DOCUMENT NO. 0251116CTR0.AGI	PAGE NO. Page 2 of 7

LP4
[15M]
2 OV

LP5
[15M]
3 OV

LP6
[15M]
1 OV

Switching modes based on this zone only



LP3
[15M]
2 OV

LP2
[15M]
3 OV

LP1
[15M]
1 OV

Switching modes based on this zone only

REV	DATE	COMMENTS	DESIGNER
R0	20/08/2022	Original design	C TAMB
R1	13/11/2023	Curfew Assessment Included	
R2			
R3			
R4			
R5			

PROJECT	DESIGNER
East Fremantle Lawn Tennis Courts 5-9	C TAMB
CONTACT	
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TITLE	DOCUMENT NO.
Tennis: Club Competition & commercial. All On	0251116CTR0.AGI

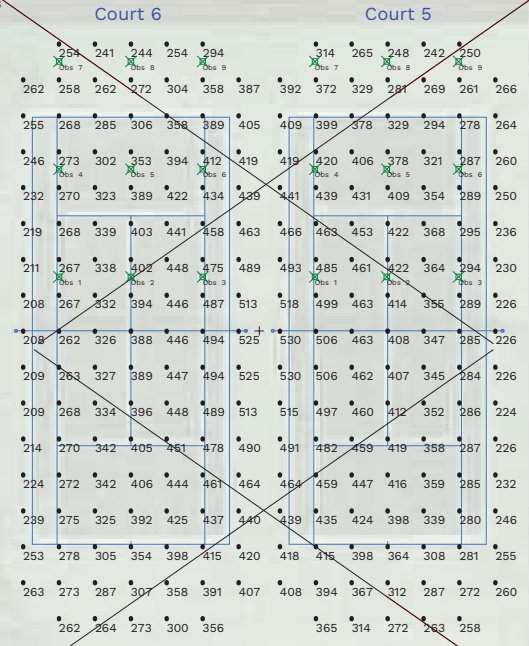
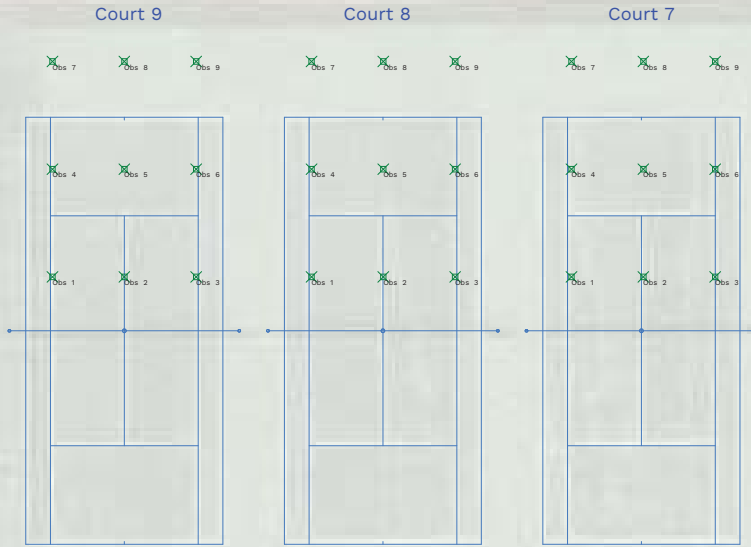
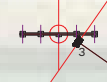
REVISION	PAGE NO.
R1	Page 3 of 7

LP4
[15M]
2 OV

LP5
[15M]
3 OV

LP6
[15M]
1 OV

Switching modes based on this zone only



LP3
[15M]
2 OV

LP2
[15M]
3 OV

LP1
[15M]
1 OV

Switching modes based on this zone only

Glare Calculation			
Project: GR			
Scene: Courts 5-6			
Label	CalcType	Reflect.	Max
GR Max CRT 5	Glare Rating	25	39
GR Max CRT 6	Glare Rating	25	39

Luminaire Schedule						
Project: Luminaires						
Scene: Courts 5-6						
Symbol	Qty	Label	Description	Lum. Watts	Total Watts	LLF
	4	SR4H75A0LG3 Im	SR4H75A0LG3 RAPTOR GEN 3 1200W A0 Asymmetric CR170 5700K	1193.55	4774.2	0.900

Calculation Summary: All Luminaires On											
Project: Playing Area											
Scene: Courts 5-6											
Label	CalcType	Units	Avg	Max	Min	U1	U2	UG	Pt5pLr	Pt5pTb	Grid Z
04 Court 6 PPA	illumina	Lux	372.14	494	262	0.70	0.53	1.27	2	2	1
04 Court 6 TPA	illumina	Lux	350.89	525	208	0.59	0.40	1.28	2	2	1
05 Court 5 PPA	illumina	Lux	386.03	506	278	0.72	0.55	1.26	2	2	1
05 Court 5 TPA	illumina	Lux	361.63	530	224	0.62	0.42	1.28	2	2	1

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REV	DATE	COMMENTS	DESIGNER
R1	20/08/2022	Original design	C TAMB
R1	13/11/2023	Curfew Assessment Included	
R2			
R3			
R4			
R5			

PROJECT	East Fremantle Lawn Tennis Courts 5-9
CONTACT	Steve Cox scoc@sylvania-schroeder.com

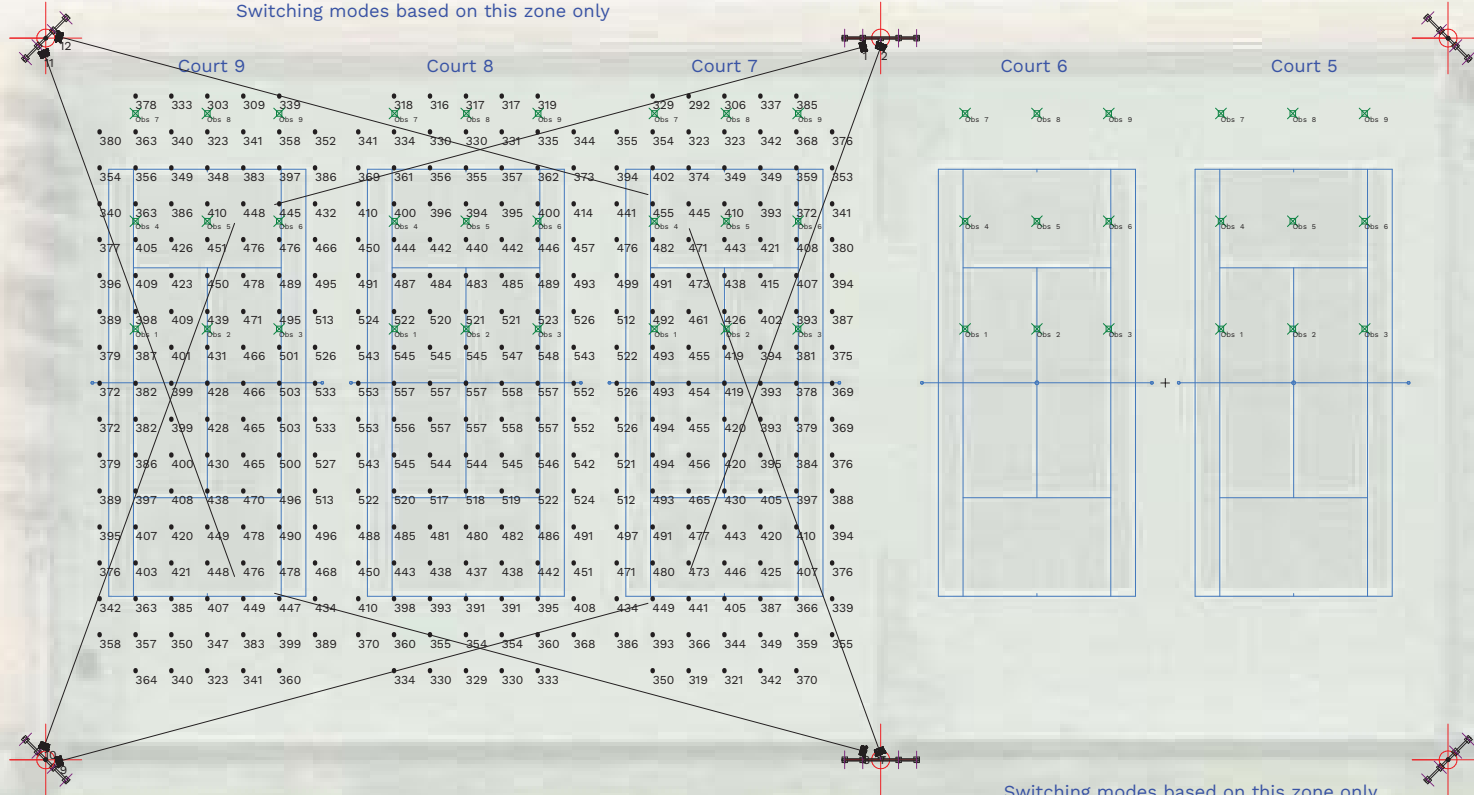
TITLE	Technical details and results Courts 5-6
DOCUMENT NO.	0251116CTR0.AGI

REVISION	R1
SHEET	A3
PAGE NO.	Page 4 of 7

LP4
[15M]
2 OV

LP5
[15M]
3 OV

LP6
[15M]
1 OV



LP3
[15M]
2 OV

LP2
[15M]
3 OV

LP1
[15M]
1 OV

Switching modes based on this zone only

Switching modes based on this zone only

Glare Calculation

Project: GR
Scene: Courts 7-9

Label	CalcType	Reflect.	Max
GR Max CRT 7	Glare Rating	25	39
GR Max CRT 8	Glare Rating	25	38
GR Max CRT 9	Glare Rating	25	39

Luminaire Schedule

Project: Luminaires
Scene: Courts 7-9

Symbol	Qty	Label	Description	Lum. Watts	Total Watts	LLF
	8	SR4H75A0LG3 Im	SR4H75A0LG3 RAPTOR GEN 3 1200W A0 Asymmetric CR170 5700K	1193.55	9548.4	0.900

Calculation Summary: All Luminaires On

Project: Playing Area
Scene: Courts 7-9

Label	CalcType	Units	Avg	Max	Min	U1	U2	UG	PtsPcLr	PtsPcTb	Grid Z
01 Court 9 PPA	illumination	Lux	431.26	503	348	0.81	0.69	1.18	2	2	1
01 Court 9 TPA	illumination	Lux	414.30	533	303	0.73	0.57	1.18	2	2	1
02 Court 8 PPA	illumination	Lux	480.40	558	355	0.74	0.64	1.12	2	2	1
02 Court 8 TPA	illumination	Lux	451.89	558	316	0.70	0.57	1.12	2	2	1
03 Court 7 PPA	illumination	Lux	427.85	494	349	0.82	0.71	1.19	2	2	1
03 Court 7 TPA	illumination	Lux	411.53	526	292	0.71	0.56	1.20	2	2	1

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REV	DATE	COMMENTS	DESIGNER
R1	20/08/2023	Original design	C TARB
R1	13/11/2023	Curfew Assessment Included	
R2			
R3			
R4			
R5			

PROJECT	DESIGNER
East Fremantle Lawn Tennis Courts 5-9	C TARB
CONTACT	
Steve Cox scox@sylvania-schroeder.com	

TITLE	DOCUMENT NO.
Technical details and results Courts 7-9	0251116CTR0.AGI

REVISION	PAGE NO.
R1	Page 5 of 7
A3	

DESIGN NOTES: OBTRUSIVE LIGHT ASSESSMENT

The Obtrusive Light assessment is based on the light limiting parameters and guidelines from the Australian Standard AS/NZS4282:2019 "Control of the obtrusive effects of outdoor lighting".

To claim compliance with the Standard, calculations must comply with the following light limiting parameters:

- * Spill light (Illuminance (lux))
- * Luminous Intensity At Vertical Planes (Candelas (cd))
- * Threshold Increment (TI)
- * Upward Light Ratio (ULR)

Refer to image opposite for all assumed spill light, luminous intensity and threshold increment boundaries.

Calculations are initial (LLF = 1), representing the worst-case scenario and assume Pre-curfew conditions in accordance with AS/NZS4282:2019.

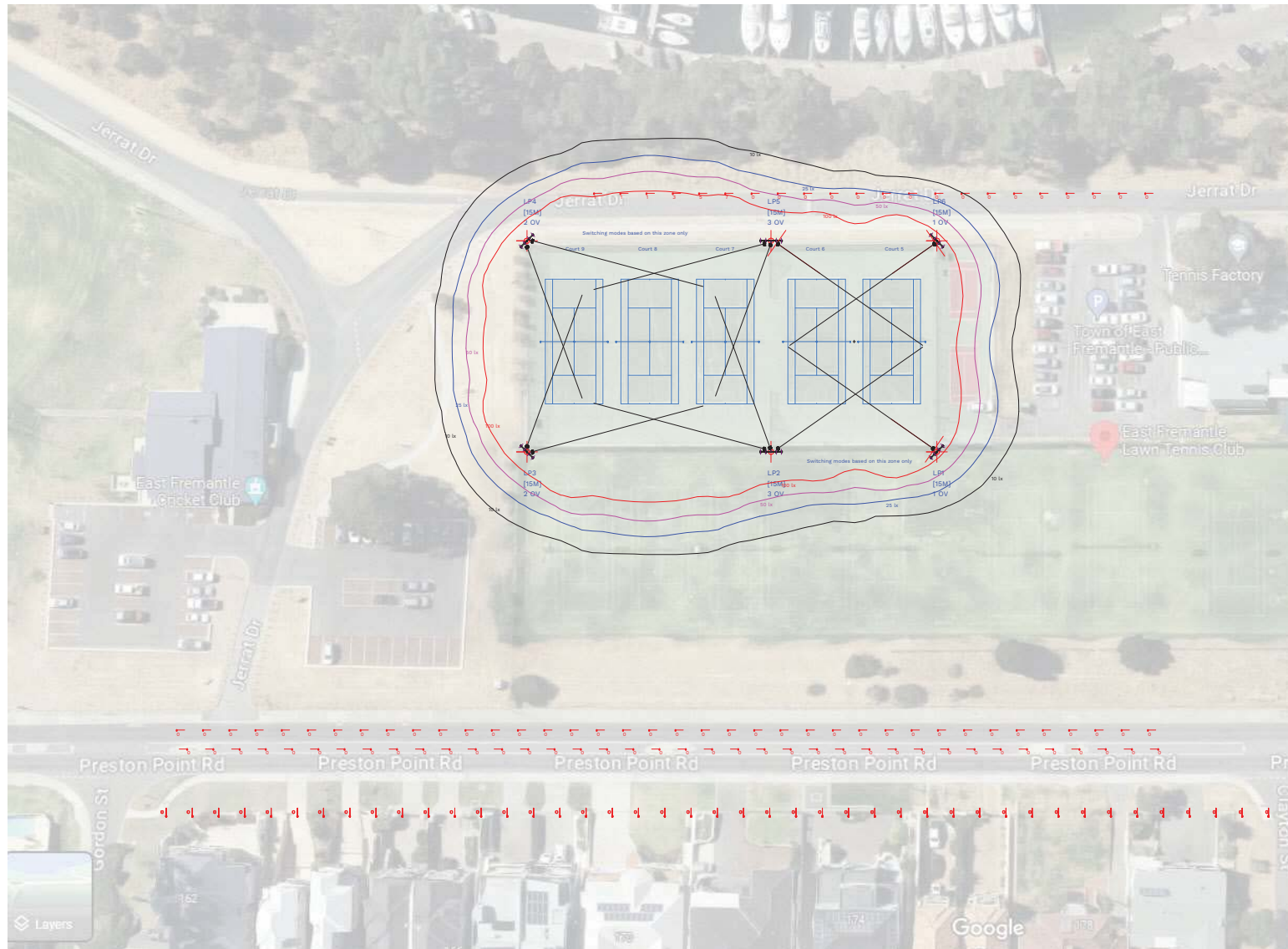
This calculation has assumed the site to fall within environmental category, Zone A3 Medium District Brightness, as per Table 3.1 within AS/NZS4282:2019.

The relevant light technical parameters for spill light, threshold increment and upward light ratio are taken from Table 3.2 within AS/NZS4282:2019. Refer to next page for light technical parameters.

The relevant light technical parameters for luminous intensity are taken from Table 3.3 within AS/NZS4282:2019. All luminaires are aimed to comply with Level 1 control limits. Refer to next page for light technical parameters.

Calculations use a scaled aerial image to estimate assumed property boundaries and roadways. A surveyed drawing, highlighting property boundaries and surrounding roadways, should always be used to verify calculation locations.

See following page for relevant definitions and calculation parameters taken from AS/NZS4282:2019.



Obtrusive Light - Compliance Report
 AS/NZS 4282:2019, A3 - Medium District Brightness, Curfew
 Filename: 0251116CTR0 AS4282
 13/11/2023 10:12:20 AM

Illuminance
 Maximum Allowable Value: 2 Lux

Calculations Tested (1):

Calculation Label	Test Results	Max. Illum.
South Spill Boundary_IL_Seg1	PASS	0

Luminous Intensity (Cd) At Vertical Planes
 Maximum Allowable Value: 2500 Cd

Calculations Tested (1):

Calculation Label	Test Results
South Spill Boundary_Cd_Seg1	PASS

Threshold Increment (TI)
 Maximum Allowable Value: 20 %

Calculations Tested (3):

Calculation Label	Adaptation Luminance	Test Results
Jerratt Dr_TI	1	PASS
Preston Point Rd_TI_1	1	PASS
Preston Point Rd_TI_2	1	PASS

Upward Waste Light Ratio (UWLR)
 Maximum Allowable Value: 2.0 %

Calculated UWLR: 0.0 %
 Test Results: PASS

UWLR Area Summary	
Project: UWLR	
Scene: All On	
Label	UWLR
Upward Waste Light Ratio	0.000

AS/NZS4282:2019 Software Compliance Report

Luminaire Schedule		
Scene: All On		
Qty	Description	LLF
12	SR4H75XALG3 RAPTOR GEN 3 1200W A0 Asymmetric CR170 5700K	1.000

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REV	DATE	COMMENTS	DESIGNER	PROJECT
R0	20/08/2022	Original design	C FARE	East Fremantle Lawn Tennis Courts 5-9
R1	13/11/2023	Curfew Assessment included		
R2				
R3				
R4				
CONTACT				Steve Cox scox@sylvania-schroeder.com
R5				

TITLE		REVISION
AS/NZS4282:2019 Obtrusive Light Report		R1
DOCUMENT NO. 0251116CTR0 AS4282.AG1		A3
PAGE NO. Page 6 of 7		

DESIGN NOTES: AS/NZS4282 DEFINITIONS AND CALCULATION PARAMETERS

The Ostrusive Light assessment is based on the light limiting parameters and guidelines from Australian Standards AS/NZS4282:2019, "Control of the ostrusive effects of outdoor lighting". To claim compliance, calculations must comply with the light limiting parameters specified by AS/NZS4282:2019 for Spill Light, luminous intensity, Threshold Increment and Upward Light Ratio.

The lighting design must determine whether light limiting parameters are to be calculated assuming Pre-Curfew or Curfew conditions. For example, Pre-Curfew conditions may be applicable up to a time slot of 10pm therefore, Curfew conditions will be applicable at a time slot from 10pm to 6am. We note, the actual time frame for Pre-Curfew conditions will be set by the Controlling Regulatory Authority.

Spill Light:

* The calculation plane, being a vertical grid facing the site, is generally determined at the building line of the potentially affected dwelling/s.

* Property building lines are assessed at their assumed locations, as shown on previous page.

* In the case where the building line is greater than 10m from the relevant property boundary, the calculation plane shall be located 10m from the property boundary.

* Spill light has been calculated in a vertical plane, facing the site from a starting height of 1.5m. The calculation grid size is 5m(L) x 1m(H), where boundaries are greater than 20m from nearest pole. The calculation grid size is 2m(L) x 1m(H), where boundaries are less than 20m from nearest pole.

* Light limiting parameters must not exceed values highlighted in Table 3.2 within AS/NZS4282:2019.

Luminous Intensity:

* The direct view of bright luminaires from normal viewing directions can cause annoyance, distraction, and discomfort. The luminous intensity of a luminaire, in a nominated direction, is an indicator of this effect.

* All new installations require luminaires to be aimed to meet Level 1 Control Limits. Level 1 being the highest form of control afforded to luminaire aiming. Where the reuse of existing infrastructure, or a modified installation, does not permit Level 1 control, Level 2 control is applicable.

* Luminous intensity has been calculated on the same vertical plane at coincidental points, as per the Spill Light grids noted above. Light limiting parameters must not exceed values highlighted in Table 3.3 within AS/NZS4282:2019.

Threshold Increment:

* The effects on transport system users (e.g., motorists, railway lines) normally involve a reduction in the ability to see caused by disability glare from bright light sources. The relevant indicator for transport system users is Threshold Increment.

* Threshold Increment has been calculated on all surrounding roadways, as shown on previous page, in accordance with Table 3.2 within AS/NZS4282:2019.

Upward Light Ratio (Sky Glow):

* The amount of flux from a luminaire that is emitted above the horizontal, directly into the night sky, calculated as a ratio and expressed as a percentage, is known as the Upward Light Ratio (ULR). Maximum limits as per Table 3.2 within AS/NZS4282:2019.

**TABLE 3.1
ENVIRONMENTAL ZONES**

Zones	Descriptions	Examples
A0	Intrinsically dark	UNESCO Starlight Reserve, IDA Dark Sky Parks. Major optical observatories No road lighting - unless specifically required by the road controlling authority
A1	Dark	Relatively uninhabited rural areas No road lighting - unless specifically required by the road controlling authority
A2	Low district brightness	Sparsely inhabited rural and semi-rural areas
A3	Medium district brightness	Suburban areas in towns and cities
A4	High district brightness	Town and city centres and the commercial areas Residential areas abutting commercial areas
TV	High district brightness	Vicinity of major sports stadiums during TV broadcasts
V	Residences near traffic routes	Refer AS/NZS 1158.1.1
R1	Residences near local roads with significant setback	Refer AS/NZS 1158.3.1
R2	Residences near local roads	Refer AS/NZS 1158.3.1
R3	Residences near a roundabout or local area traffic management device	Refer AS/NZS 1158.3.1
RX	Residences near a pedestrian crossing	Refer AS/NZS 1158.4

NOTE: Recreational areas are not considered commercial

**TABLE 3.2
MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS**

Zones	Vertical Illuminance Levels (E _v) lx		Threshold Increments (I _T)		Sky Glow
	Non-curfew	Curfew	%	Default adaptation level (L _{ad})	Upward light ratio
A0	See Note 1	0	N/A	N/A	0
A1	2	0.1	N/A	N/A	0
A2	5	1	20%	0.2	0.01
A3	10	2	20%	1	0.02
A4	25	5	20%	5	0.03
TV	See Table 3.4	N/A	20%	10	0.08
V	N/A	4	Note 2	Note 2	Note 2
R1	N/A	1	20%	0.1	Note 3
R2	N/A	2	20%	0.1	Note 3
R3	N/A	4	20%	0.1	Note 3
RX	N/A	4	20%	5	Note 4

NOTES:

- For A0, E_v shall be as close to zero as practicable without impacting safety considerations
- Refer to AS/NZS 1158.1.1
- Refer to AS/NZS 1158.3.1
- Refer to AS/NZS 1158.4
- N/A means 'Not Applicable'.

**TABLE 3.3
MAXIMUM LUMINOUS INTENSITIES PER LUMINAIRE**

Zone	Luminous intensity (I _v), cd		
	Non-curfew L1	Non-curfew L2	Curfew
A0	See Note	See Note	0
A1	2 500	5 000	500
A2	7 500	12 500	1 000
A3	12 500	25 000	2 500
A4	25 000	50 000	2 500
TV	100 00	150 000	0

NOTE: For A0, I_v shall be as close to zero as practicable without impacting safety considerations

This design calculation is based upon specified parameters supplied by the client, and other design inputs assumed by us, as detailed in this document. To practice the accuracy of the design will differ due to environmental variations such as actual luminaire positioning, light fixture reflectance, nearby obstructions, local luminaires ambient temperature, dust/dirt/furniture, etc. These results are also subject to normally accepted photometric tolerances, and calculation program uncertainties.
Schröder Australia provides this calculation without any representation or warranty of any kind. The Client shall be under no liability to the Customer for failure to attain such performance figures unless the performance of the goods supplied is specifically guaranteed in writing, and any such written guarantee shall be subject to recognised manufacturing variations and tolerances applicable to the goods.

REV	DATE	COMMENTS	DESIGNER	PROJECT
R0	20/08/2023	Original design	C FARE	East Fremantle Lawn Tennis Courts 5-9
R1	13/11/2023	Curfew Assessment Included		
R2				
R3				
R4				CONTACT
R5				Steve Cox scox@sylvania-schreder.com

TITLE	DOCUMENT NO.	REVISION
AS/NZS4282:2019 Definitions and Parameters	0251116CTR0 AS4282.AG1	R1
		A3
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