

October 2021

The Northern Tennis Club Proposed Lighting Summary

Overview

The Northern Tennis Club is a nationally recognised tennis club catering for a membership base beyond the local area encouraging participation in sport for all as well as offering facilities capable of meeting requirements of elite level players.

There are well known mental and physical benefits from the participation of sport and tennis is an inclusive sport contributing to the national agenda of the UK Government to drive for a happier, healthier population through playing sport.

Existing lighting review

The existing light fittings on the all weather courts at The Northern do not comply with LTA lighting regulations, they are symmetrical beam light fittings aimed in the sky in many instances, providing an inefficient and possible obtrusive light to the surrounding environment. At the time of the original installation, regulations would have been different regarding lighting and environment.

Current regulations focus more on the quality of light, where it is put and how the light effects the surrounding environment including people and wildlife.

Proposed Lighting Review

Scope

The scope for the proposed replacement lighting solution is to illuminate the courts in a careful, considered way, ensuring that both LTA tennis requirement is achieved, and obtrusive light is minimised to the surrounding area.

To correctly light for the task, asymmetric beam pattern lights will be utilised, focused on providing more light on the task area and less in the sky and surrounding environment. There are many mitigations that have been specifically applied to this proposal to achieve functional, fit for purpose lighting and consider the surrounding environment.

Below is a summarised breakdown of the application proposals for the lighting solution to aid the consideration of the proposals by the LPA. These are as follows:

- 2 x 8m lighting columns on Court G adjacent to Blackburn Gardens are removed and replaced by 4 x 4m columns along that one side enabling the use of Stellar 300w reduced light fittings (orange on plan) in consideration of potential light spill into any properties.
- The net line fittings (red on the night plan) are Galaxy 450w
- The remaining perimeter lights (purple on the night plan) are the Atlas 600w Exled Luminaire designed specifically for use in tennis environments
- Constructed using individual modules – enables individual aiming, allowing greater control of light and adjustment if required in future years
- Individual reflector internally on every led in each module - reduces spill light and tightly controls where light is put in the environment
- Asymmetric – downward facing fitting used to reduce sky glow and obtrusive light.
- All fittings are horizontal to the ground to minimise any spillage.

Presently, the floodlighting of outdoor courts is permitted until 22:00hrs daily. This operational curfew is to be maintained without amendment.

We have provided a detailed identification of the specification of the proposed lighting fittings as well as 3D analysis of the lighting upgrade effects on the illumination of the courts and containment of light spillage beyond court areas (see page 35.)

Overall the proposed lighting scheme will ensure The Northern are adequately catering for their growing membership by providing illuminated outdoor courts to the requisite, modern standard. The proposals have been developed to a specification which will ensure that there are also no adverse impacts to the amenity of local residents.



The Stellar 300W is a completely new and unique floodlight specifically designed to evenly illuminate tennis courts from a low mounting height to LTA lighting requirements. A column height of only 4m is required, meaning only basic planning permission is normally required, and that the installation costs are much reduced. Top spec Philips LEDs with very high lumen efficiency, advanced asymmetric optics, excellent thermal management and a corrosion proof coating combine to make the Stellar 300W a class leading product.

Features:

- Across court uniformity from low mounting height
- IP65
- Corrosion Proof Coating

5 year warranty

The Stellar 300W is a latest generation LED floodlight with a circuit efficiency of + 145 lumens per watt. Philips LEDs, Robust construction and a corrosion proof coating make this fixture ideal for harsh weather climates.



The Galaxy XM Range comprises high power LED floodlights with aimable heads specifically designed to achieve uniformity on the pitch. Top spec Philips LEDs for very high lumen efficiency, combined with excellent thermal management and a corrosion resistant coating, make the Galaxy XM range a class leading product.



Features:

- Philips LEDs
- Up to 155 lumens per watt
- Wide Choice of beam angles
- 5 Year Warranty
- Corrosion proof coating

5 Year Warranty

The Galaxy XM 450-1350W range is the latest generation high power LED floodlight, with a circuit watt efficiency up to +155 lumens per watt. The externally rated driver can be remotely mounted if required. Robust construction and corrosion proof coating make this fixture ideal for harsh weather climates.



The Atlas XT Range comprises high power LED floodlights with a wide range of beam angles specifically designed to achieve uniformity on the pitch. Top spec Osram LEDs for very high lumen efficiency, combined with excellent thermal management, low wind resistance and a corrosion resistant coating, make the Atlas XT range class leading products.



Features:

- Osram LEDs
- Inventronics Drivers
- Up to 160 lumens per watt
- Wide Choice of beam angles
- 10KV surge protector
- Corrosion proof coating
- 5 Year Warranty

5 Year Warranty

The Atlas XT range is the latest generation high power LED floodlight, with a circuit watt efficiency up to +160 lumens per watt. The externally rated driver can be remotely mounted if required. Robust construction and corrosion proof coating make this fixture ideal for harsh weather climates.





The Northern Tennis

Installation : Existing court lighting upgrade

Project number :

Customer :

Processed by : Mark Ruthers

Date : 07.10.2021

Project description:

The following values are based on precise calculations performed on calibrated lamps and luminaires, and their configurations, whereby gradual, unavoidable deviations can occur in practice. All guarantee claims are excluded for the specified data.

This exclusion of liability applies irrespective of the legal grounds for both damages and consequential damages suffered by users and third parties.

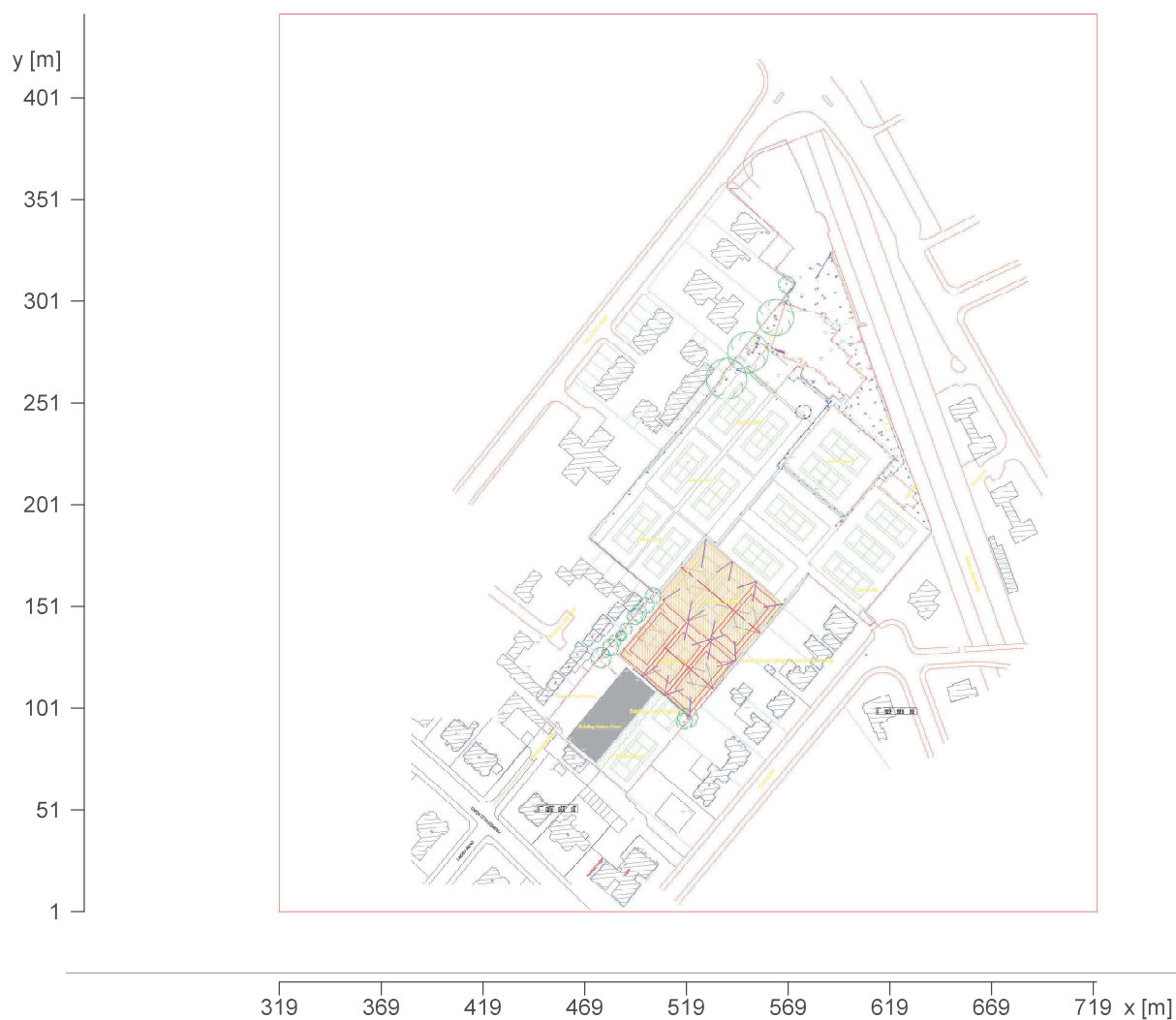
Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1 Exterior 1

1.1 Description, Exterior 1

1.1.1 Floor plan

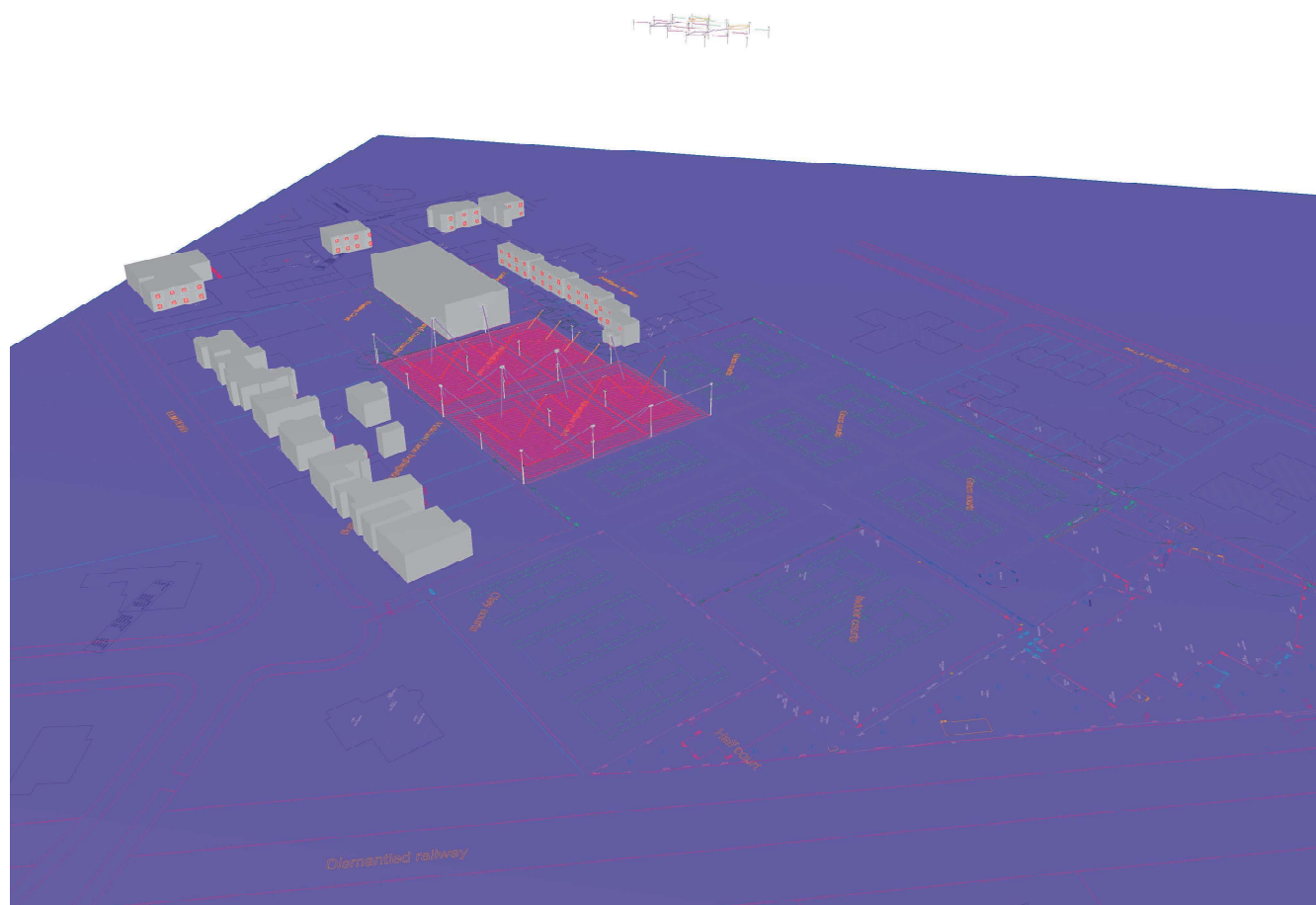


Object : The Northern Tennis
Installation : Existing court lighting upgrade
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1.1 Description, Exterior 1

1.1.2 3D view, View 1



Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



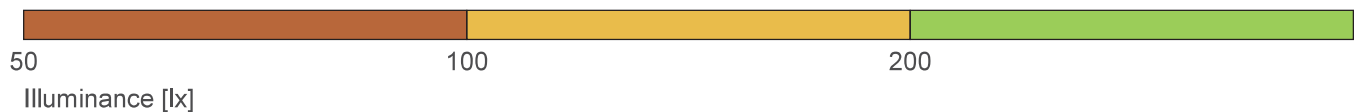
1 Exterior 1

1.2 Summary, Exterior 1

1.2.1 Result overview, G



319 419 519 619 719 x [m]



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ² (0.08 W/m ² /100lx)

Illuminance

Average illuminance	Em	128 lx
Minimum illuminance	Emin	62.6 lx
Maximum illuminance	Emax	241 lx
Uniformity Uo	Emin/Em	1:2.04 (0.49)
Diversity Ud	Emin/Emax	1:3.85 (0.26)

Type No. \ Make

3	3	Order No. :	
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm
4	6	Order No. :	
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
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Date : 07.10.2021



1 Exterior 1

1.2 Summary, Exterior 1

1.2.1 Result overview, G

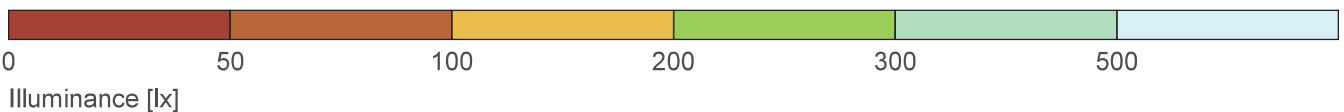
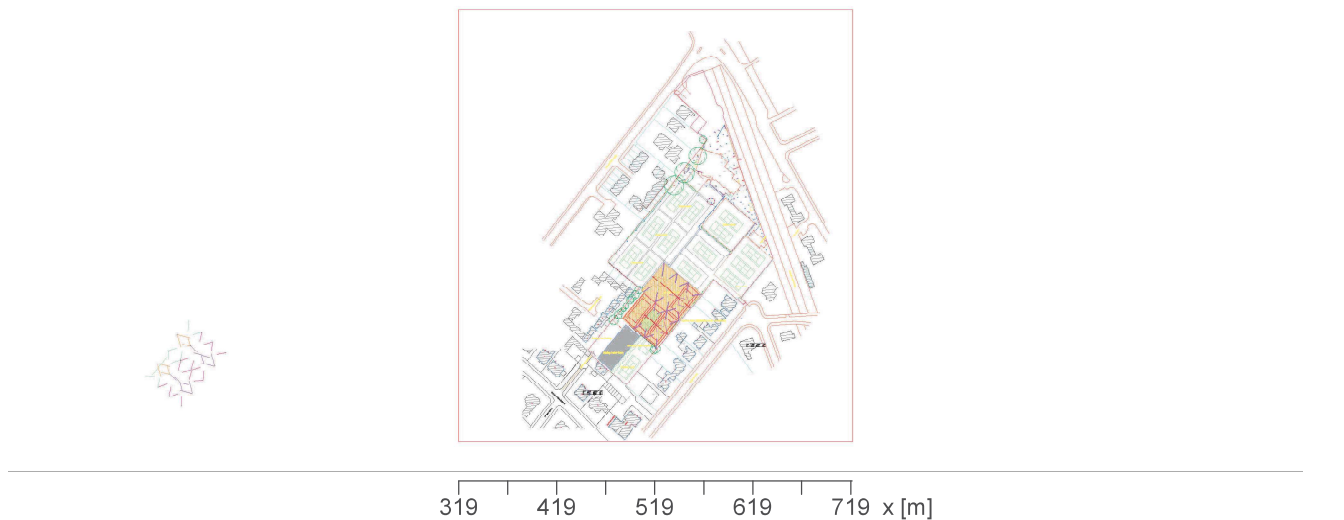
5	2	Order No.	:	
		Luminaire name	:	8m 4 x 600W
		with	:	4 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
		EXLED		
16	4	Order No.	:	!Stellar Tennis fixture rear and front visors-Y.IES
		Luminaire name	:	STELLA-300W-1302413040 50%
		Equipment	:	1 x 148 W / 12000 lm
		Exled Ltd		
10	10	Order No.	:	GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
		Luminaire name	:	GALAXY-XM-V2-450W-130X40
		Equipment	:	1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.2 Result overview, H



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ² (0.01 W/m ² /100lx)

Illuminance

Average illuminance	Em	704 lx
Minimum illuminance	Emin	513 lx
Maximum illuminance	Emax	1100 lx
Uniformity Uo	Emin/Em	1:1.37 (0.73)
Diversity Ud	Emin/Emax	1:2.15 (0.46)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm
4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.2 Result overview, H

5	2	Order No.	:	
		Luminaire name	:	8m 4 x 600W
		with	:	4 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
		EXLED		
16	4	Order No.	:	!Stellar Tennis fixture rear and front visors-Y.IES
		Luminaire name	:	STELLA-300W-1302413040 50%
		Equipment	:	1 x 148 W / 12000 lm
		Exled Ltd		
10	10	Order No.	:	GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
		Luminaire name	:	GALAXY-XM-V2-450W-130X40
		Equipment	:	1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.3 Result overview, J



319 419 519 619 719 x [m]

300

500

Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ² (0.01 W/m ² /100lx)

Illuminance

Average illuminance	Em	691 lx
Minimum illuminance	Emin	480 lx
Maximum illuminance	Emax	978 lx
Uniformity Uo	Emin/Em	1:1.44 (0.69)
Diversity Ud	Emin/Emax	1:2.04 (0.49)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm
4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.3 Result overview, J

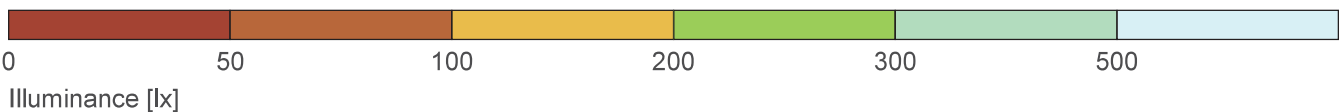
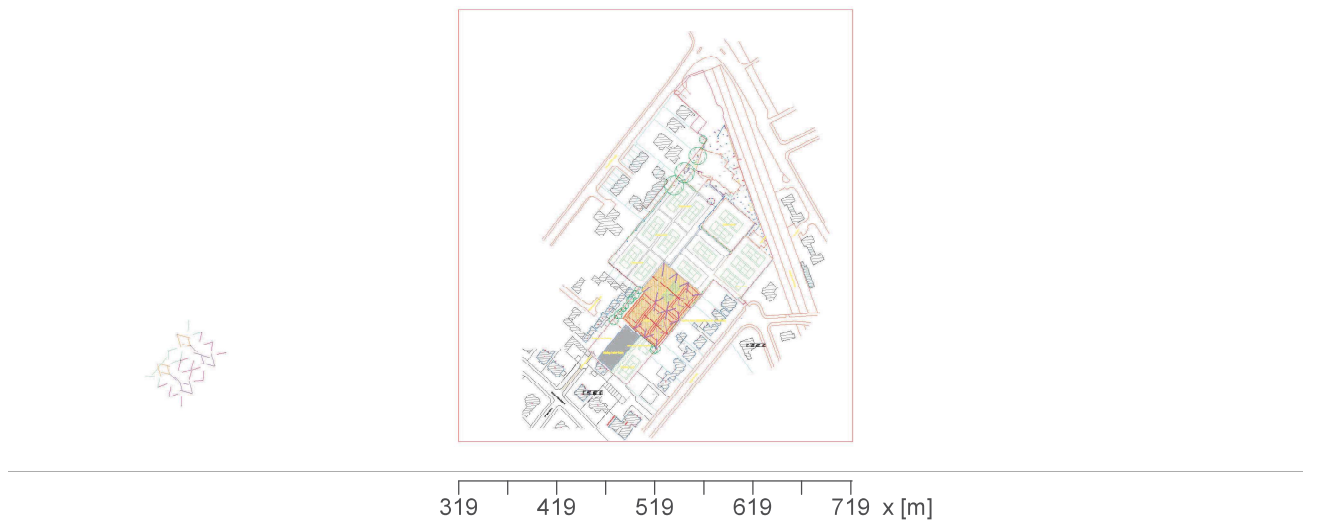
5	2	Order No.	:	
		Luminaire name	:	8m 4 x 600W
		with	:	4 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
		EXLED		
16	4	Order No.	:	!Stellar Tennis fixture rear and front visors-Y.IES
		Luminaire name	:	STELLA-300W-1302413040 50%
		Equipment	:	1 x 148 W / 12000 lm
		Exled Ltd		
10	10	Order No.	:	GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
		Luminaire name	:	GALAXY-XM-V2-450W-130X40
		Equipment	:	1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.4 Result overview, E



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ² (0.01 W/m ² /100lx)

Illuminance

Average illuminance	Em	727 lx
Minimum illuminance	Emin	546 lx
Maximum illuminance	Emax	999 lx
Uniformity Uo	Emin/Em	1:1.33 (0.75)
Diversity Ud	Emin/Emax	1:1.83 (0.55)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm
4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.4 Result overview, E

5 2 Order No. :
Luminaire name : 8m 4 x 600W
 with : 4 x ATLAS-XT-600W-P50D.ies
Equipment : 1 x 600 W / 89977 lm

EXLED
16 4 Order No. : !Stellar Tennis fixture rear and front visors-Y.IES
 Luminaire name : STELLA-300W-1302413040 50%
Equipment : 1 x 148 W / 12000 lm

Exled Ltd
10 10 Order No. : GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
 Luminaire name : GALAXY-XM-V2-450W-130X40
Equipment : 1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.5 Result overview, D



319 419 519 619 719 x [m]

300

500

Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ² (0.02 W/m ² /100lx)

Illuminance

Average illuminance	Em	609 lx
Minimum illuminance	Emin	423 lx
Maximum illuminance	Emax	848 lx
Uniformity Uo	Emin/Em	1:1.44 (0.69)
Diversity Ud	Emin/Emax	1:2.01 (0.5)

Type No. \ Make

3	3	Order No.	:	
		Luminaire name	:	8m 1 x 600 Atlas
		with	:	1 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
4	6	Order No.	:	
		Luminaire name	:	8m 2 x 600w
		with	:	2 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.5 Result overview, D

5	2	Order No.	:	
		Luminaire name	:	8m 4 x 600W
		with	:	4 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
		EXLED		
16	4	Order No.	:	!Stellar Tennis fixture rear and front visors-Y.IES
		Luminaire name	:	STELLA-300W-1302413040 50%
		Equipment	:	1 x 148 W / 12000 lm
		Exled Ltd		
10	10	Order No.	:	GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
		Luminaire name	:	GALAXY-XM-V2-450W-130X40
		Equipment	:	1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
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 Date : 07.10.2021

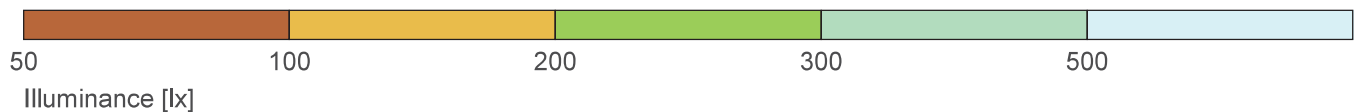


1.2 Summary, Exterior 1

1.2.6 Result overview, G TPA



319 419 519 619 719 x [m]



General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90

Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ²

Illuminance

Average illuminance	Em	200 lx
Minimum illuminance	Emin	63.2 lx
Maximum illuminance	Emax	760 lx
Uniformity Uo	Emin/Em	1:3.16 (0.32)
Diversity Ud	Emin/Emax	1:12 (0.08)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.6 Result overview, G TPA

5 2 Order No. :
Luminaire name : 8m 4 x 600W
 with : 4 x ATLAS-XT-600W-P50D.ies
Equipment : 1 x 600 W / 89977 lm

EXLED
16 4 Order No. : !Stellar Tennis fixture rear and front visors-Y.IES
 Luminaire name : STELLA-300W-1302413040 50%
Equipment : 1 x 148 W / 12000 lm

Exled Ltd
10 10 Order No. : GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
 Luminaire name : GALAXY-XM-V2-450W-130X40
Equipment : 1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021

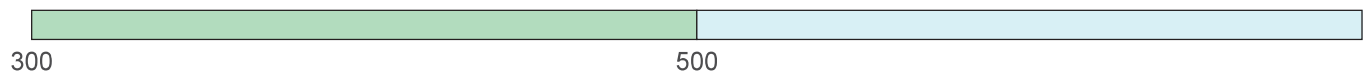


1.2 Summary, Exterior 1

1.2.7 Result overview, H TPA



319 419 519 619 719 x [m]



Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90

Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ²

Illuminance

Average illuminance	Em	658 lx
Minimum illuminance	Emin	302 lx
Maximum illuminance	Emax	1240 lx
Uniformity Uo	Emin/Em	1:2.18 (0.46)
Diversity Ud	Emin/Emax	1:4.09 (0.24)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.7 Result overview, H TPA

5 2 Order No. :
Luminaire name : 8m 4 x 600W
 with : 4 x ATLAS-XT-600W-P50D.ies
Equipment : 1 x 600 W / 89977 lm

EXLED
16 4 Order No. : !Stellar Tennis fixture rear and front visors-Y.IES
 Luminaire name : STELLA-300W-1302413040 50%
Equipment : 1 x 148 W / 12000 lm

Exled Ltd
10 10 Order No. : GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
 Luminaire name : GALAXY-XM-V2-450W-130X40
Equipment : 1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.8 Result overview, J TPA



319 419 519 619 719 x [m]

300

500

Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ²

Illuminance

Average illuminance	Em	641 lx
Minimum illuminance	Emin	306 lx
Maximum illuminance	Emax	1230 lx
Uniformity Uo	Emin/Em	1:2.1 (0.48)
Diversity Ud	Emin/Emax	1:4.01 (0.25)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm
4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.8 Result overview, J TPA

5	2	Order No.	:	
		Luminaire name	:	8m 4 x 600W
		with	:	4 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
		EXLED		
16	4	Order No.	:	!Stellar Tennis fixture rear and front visors-Y.IES
		Luminaire name	:	STELLA-300W-1302413040 50%
		Equipment	:	1 x 148 W / 12000 lm
		Exled Ltd		
10	10	Order No.	:	GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
		Luminaire name	:	GALAXY-XM-V2-450W-130X40
		Equipment	:	1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
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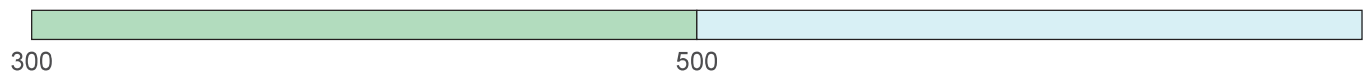


1.2 Summary, Exterior 1

1.2.9 Result overview, D TPA



319 419 519 619 719 x [m]



300

500

Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90

Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ²

Illuminance

Average illuminance	Em	562 lx
Minimum illuminance	Emin	316 lx
Maximum illuminance	Emax	909 lx
Uniformity Uo	Emin/Em	1:1.78 (0.56)
Diversity Ud	Emin/Emax	1:2.88 (0.35)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

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1.2 Summary, Exterior 1

1.2.9 Result overview, D TPA

5 2 Order No. :
Luminaire name : 8m 4 x 600W
 with : 4 x ATLAS-XT-600W-P50D.ies
Equipment : 1 x 600 W / 89977 lm

EXLED
16 4 Order No. : !Stellar Tennis fixture rear and front visors-Y.IES
 Luminaire name : STELLA-300W-1302413040 50%
Equipment : 1 x 148 W / 12000 lm

Exled Ltd
10 10 Order No. : GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
 Luminaire name : GALAXY-XM-V2-450W-130X40
Equipment : 1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.10 Result overview, E TPA



319 419 519 619 719 x [m]

300

500

Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90

Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ²

Illuminance

Average illuminance	Em	718 lx
Minimum illuminance	Emin	367 lx
Maximum illuminance	Emax	1210 lx
Uniformity Uo	Emin/Em	1:1.96 (0.51)
Diversity Ud	Emin/Emax	1:3.31 (0.3)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.10 Result overview, E TPA

5 2 Order No. :
Luminaire name : 8m 4 x 600W
 with : 4 x ATLAS-XT-600W-P50D.ies
Equipment : 1 x 600 W / 89977 lm

EXLED
16 4 Order No. : !Stellar Tennis fixture rear and front visors-Y.IES
 Luminaire name : STELLA-300W-1302413040 50%
Equipment : 1 x 148 W / 12000 lm

Exled Ltd
10 10 Order No. : GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
 Luminaire name : GALAXY-XM-V2-450W-130X40
Equipment : 1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.11 Result overview, F TPA



319 419 519 619 719 x [m]

300

500

Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90

Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ²

Illuminance

Average illuminance	Em	635 lx
Minimum illuminance	Emin	310 lx
Maximum illuminance	Emax	1400 lx
Uniformity Uo	Emin/Em	1:2.05 (0.49)
Diversity Ud	Emin/Emax	1:4.51 (0.22)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.11 Result overview, F TPA

5 2 Order No. :
Luminaire name : 8m 4 x 600W
 with : 4 x ATLAS-XT-600W-P50D.ies
Equipment : 1 x 600 W / 89977 lm

EXLED
16 4 Order No. : !Stellar Tennis fixture rear and front visors-Y.IES
 Luminaire name : STELLA-300W-1302413040 50%
Equipment : 1 x 148 W / 12000 lm

Exled Ltd
10 10 Order No. : GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
 Luminaire name : GALAXY-XM-V2-450W-130X40
Equipment : 1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.12 Result overview, F



319 419 519 619 719 x [m]

300

500

Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Height of evaluation surface	0.01 m
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ² (0.02 W/m ² /100lx)

Illuminance

Average illuminance	Em	640 lx
Minimum illuminance	Emin	431 lx
Maximum illuminance	Emax	1070 lx
Uniformity Uo	Emin/Em	1:1.49 (0.67)
Diversity Ud	Emin/Emax	1:2.48 (0.4)

Type No. \ Make

3	3	Order No.	:
		Luminaire name	: 8m 1 x 600 Atlas
		with	: 1 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm
4	6	Order No.	:
		Luminaire name	: 8m 2 x 600w
		with	: 2 x ATLAS-XT-600W-P50D.ies
		Equipment	: 1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.12 Result overview, F

5	2	Order No.	:	
		Luminaire name	:	8m 4 x 600W
		with	:	4 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
		EXLED		
16	4	Order No.	:	!Stellar Tennis fixture rear and front visors-Y.IES
		Luminaire name	:	STELLA-300W-1302413040 50%
		Equipment	:	1 x 148 W / 12000 lm
		Exled Ltd		
10	10	Order No.	:	GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
		Luminaire name	:	GALAXY-XM-V2-450W-130X40
		Equipment	:	1 x 456 W / 64315 lm

Object : The Northern Tennis
 Installation : Existing court lighting upgrade
 Project number :
 Date : 07.10.2021

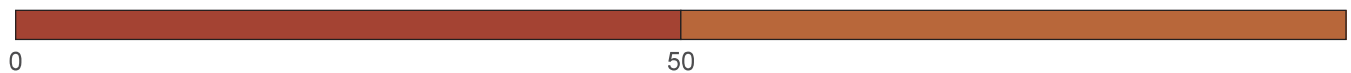


1.2 Summary, Exterior 1

1.2.13 Result overview, Window



319 419 519 619 719 x [m]



Illuminance [lx]

General

Calculation algorithm used	Average indirect fraction
Maintenance factor	0.90
Total luminous flux of all lamps	2490690 lm
Total power	17152 W
Total power per area (177061.50 m ²)	0.10 W/m ²

Illuminance

Average illuminance	Em	22.8 lx
Minimum illuminance	Emin	21.4 lx
Maximum illuminance	Emax	24.9 lx
Uniformity Uo	Emin/Em	1:1.06 (0.94)
Diversity Ud	Emin/Emax	1:1.16 (0.86)

Type No. Make

3	3	Order No.	:	
		Luminaire name	:	8m 1 x 600 Atlas
		with	:	1 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm
4	6	Order No.	:	
		Luminaire name	:	8m 2 x 600w
		with	:	2 x ATLAS-XT-600W-P50D.ies
		Equipment	:	1 x 600 W / 89977 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1.2 Summary, Exterior 1

1.2.13 Result overview, Window

5 2 Order No. :
Luminaire name : 8m 4 x 600W
 with : 4 x ATLAS-XT-600W-P50D.ies
Equipment : 1 x 600 W / 89977 lm

EXLED
16 4 Order No. : !Stellar Tennis fixture rear and front visors-Y.IES
 Luminaire name : STELLA-300W-1302413040 50%
Equipment : 1 x 148 W / 12000 lm

Exled Ltd
10 10 Order No. : GALAXY-XM-V2-450W-130X40-4000K_IESNA2002.IES
 Luminaire name : GALAXY-XM-V2-450W-130X40
Equipment : 1 x 456 W / 64315 lm

Object : The Northern Tennis
Installation : Existing court lighting upgrade
Project number :
Date : 07.10.2021



1 Exterior 1

1.3 Calculation results, Exterior 1

1.3.1 3D luminance, View 1

