

kalinga hub

architectural lighting plate

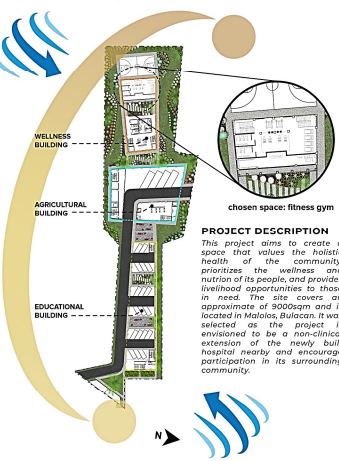
Specialized Holistic Health and Nutritional Facility

CRUZ, Daniella Ivan A. | 2018-10263
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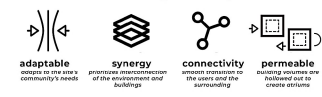


DAY PERSPECTIVE OF THE SITE FEATURING THE EXTERIOR OF THE GYM. The building is oriented in an east-west axis to ensure access to sunlight all day long. Hence, passive daylighting strategies were also integrated to achieve thermal comfort, minimise daytime heat gain and minimize the effect of harsh afternoon sun.

1.0 site development plan

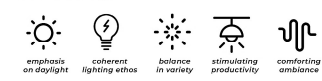


1.1 architectural design concept



1.2 lighting design concept

Design for this space is anchored on creating an engaging environment that utilizes daylight with maximum efficacy. Integrates luminaires that ensures the safety of the users and provides ambient lighting that stimulates a productive yet charismatic energy.



1.3 daylighting strategies

Passive daylighting strategies are integrated to allow natural light into the gym all day long while managing harsh lighting and minimizing heat gain.

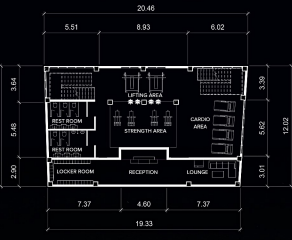
- usage of glass curtain walls**
Allows natural lighting to enter the space therefore minimize the need for artificial lighting during the day and better reflectance at
- external sunshading systems**
Vertical sun shading is integrated in the western part of the room to control glare and reduce high contrast ratios in that area
- light wall colors**
Light, reflective paint is used to help light to bounce around the room and makes the space feel brighter and cooler



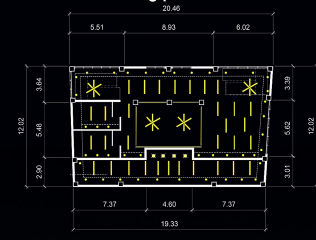
kalinga fit

The fitness gym was selected as it requires adequate, focused and efficient lighting. It is essential that lighting standards are carefully integrated to help users properly exercise and boost their performance. The luminaires are also laid out properly according to the needs of specific areas.

2.0 floor plan of the gym



2.1 reflected ceiling plan



LEGENDS: linear downlight, round recessed downlight, drop down light, pendant light, cove light

2.2 lighting design approach & strategies

- HIGH UNIFORMITY LIGHTING**
Can be achieved by using recessed strip lighting around the room providing even and adequate illumination
- RECESSED LIGHTING & LOWBAY FIXTURES**
Should be used in the space since it causes mostly physical activities
- PROPER EQUIPMENT PLACEMENT**
Lighting on areas which have equipments that require long light to the ceiling are reduced significantly
- LIGHT LAYERING**
To achieve variety in lighting layout, the lower spectrum of the required illuminance is used for the general lighting computation
- USAGE OF MATTE FINISHES**
Non-reflective materials contrast to the room luminaires can help reduce disruptions due to glare
- AMBIENT LIGHTING**
Direct downlight luminaires can be integrated in the outer frame of the room's ceiling to bring a charismatic effect especially during nighttime
- USAGE OF LED LUMINARIES**
Considered to be highly energy efficient. Can give bright, high lumens output with minimal glare, less heat and lower cost
- COOL BLUE LIGHTING**
Introduces an element of the blue light spectrum which is mentally stimulating and ideal for physical activities
- WARM LIGHTS ILLUSION**
Integration of wood finishes in the wall can give illusion of warm lights at night stimulating a calming ambience



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NIGHT PERSPECTIVE OF THE SITE FEATURING THE EXTERIOR OF THE GYM. Dark sky lighting is integrated in the exterior space of the building to protect wildlife and reduce light pollution. Fixtures that shield the light source and casts downward were used to facilitate vision at night.

3.0 lighting standards

- Illuminance:** 350-550 lux (350 lux will be used for the calculations of general lighting)
- CR: 80 (or higher)**
- Color temperature:** Cooler blue white (4000-5000K)
- Details:** Light should not emit a lot of heat
- IESNA Handbook Lighting Recommendation:** Category D: Performance of visual tasks of high contrast and large sizes, at least 300lux Classified under common visual tasks
- Weighting Factor:** Workers' age (<40): Speed and accuracy (>70) important; Reflectance or task background (>70)

3.1 calculating using lumen method

GIVEN:

- ALCON 1210-66-R (led Linear)
- Recessed Light (surface mounted),
- 85000K, 4800 lumens
- 4ft (1.2m) x 4ft (1.2m) (1.4)
- E= 350 lux
- L= 4800 lumens

Area

- H= total room vertical area = 225 sqm
- A2 (total floor area) = 240 sqm
- P1 (floor perimeter) = 64m
- h = 3.8m
- hC = 0.6m
- hR = 3.2m

Initial Reflectances:

- pc1: 80%
- pc2: 70%
- pc3: 50%

SOLUTION:

a. Coefficient of Utilization

Recessed Light (surface mounted),

h=0
H=3.2
H/R=0.6

b. Cavity Ratio

$$CR = \frac{2.5 A_1 + (2.5) A_2}{A_2} = 2.65$$

c. Effective Reflectance

pc= 80%, pc= 70%, CCR=0
RSC= 0.78 (0.78)

pc= 50%, pc= 70%, CCR=0.5
RSC= 0.52 (0.52) @ 0.25

Light Loss Factor

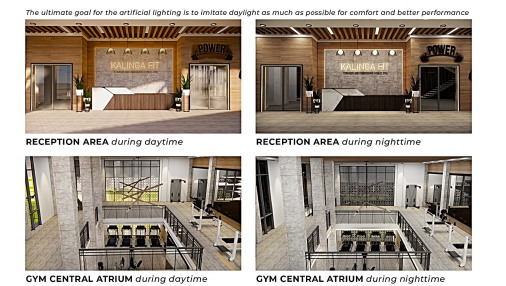
LLF = LLF1 * LLF2 * LLF3 * LLF4 * LLF5

LLF1 = 0.95 (0.95) (0.95) (0.95) (0.95) = 0.86

Total No. of Fixtures

$$N = \frac{E \times A_2}{\text{Lumens} \times \text{CU} \times \text{LLF}}$$

$$N = \frac{350 \times 240}{4800 \times 0.78 \times 0.86} = 31.19 \approx 32 \text{ fixtures}$$



3.2 lighting specifications

ALCON LIGHTING

Linear downlight

round recessed downlight

drop down light

pendant light

cove light