

Lusail City

GSAS 2 Star Rating

Guidelines



November 2014

V1.0



GORD

المنظمة الخليجية للبحث والتطوير
Gulf Organisation for Research & Development

A Member of QATARI DIAR



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1.0 Introduction

GSAS assesses the project from design stage to post-construction. Project shall receive the certificate of Letter of Conformance (LOC) upon the approval of the design submissions indicating the achieved GSAS (2) Star rating, minimum requirement for Lusail city projects.

Upon receiving the Letter of Conformance (LOC) from GORD Trust, the Owner (or Client) should nominate a Representative with a valid Service Provider license to be responsible for facilitating the necessary site audits.

During construction process and after construction is completed, GORD Trust shall conduct a number of routine and random site audits which should be facilitated by the Client Representative. The goal of these audits are to verify the validity of the data provided during the design stage as well as to ensure that the sustainability performance objectives of the project are adequately met as per the initial design assessment.

More information about part (I)-CDA can be found in form C01 on www.gord.qa.

Lusail City minimum requirements

Lusail City mandates that all projects constructed in the city should attain a minimum of GSAS 2 star rating.

The minimum requirements for achieving the (2) star rating are categorized under two groups.

Group (1) - Inherited criteria from Masterplan

Based on the assessment of Lusail city master plan, conducted by GORD Trust, several criteria scores can be inherited for all buildings without any further due diligence review. The inherited criteria are:

- UC1 - Proximity to infrastructure.
- UC2 - Load on local traffic conditions.
- UC3 - Public transportation.
- UC5 - Sewer and water contamination.
- UC7 - Proximity to amenities.
- S1 - Land preservation.
- S2 - Water body preservation.
- S3 - Habitat preservation.

Group (2) - Other criteria requirements

- E1 - E5 -Energy
- W1 -Water
- S7 -Heat Island effect (adhering to local regulations)

2.0

Energy category related requirements

Energy category related pre requisites shall be submitted with all supporting drawings / calculations / documents and data sheets for the review and comments by GORD Trust. The following describes the Energy components in details.

Note: The green color cells represent user input values and the blue color cells represent the fixed values.

2.1. Building General

2.1.1 Description:

This section comprises of building general details like the total gross air conditioned area, height and building volume. The other values such as occupancy schedule, equivalent full load occupancy hours, occupancy area per person and occupied internal set point for cooling are fixed default values and selected automatically by the calculator based on the building typology.

2.1.2 Typical parameters values for commercial building

Building General		
Building type	COMMERCIAL	
Total gross air conditioned area of building [m ²]	?	Provide estimation and drawings
Building volume [m ³]	?	Provide estimation and drawings
Height [m]	?	Provide estimation and drawings
Occupancy schedule [days / week]	5	Default Value

Internal Temperature Set Point		
Occupied internal set point for cooling [°C]	23.0	Default Value

2.0 Energy category related requirements

2.1.3 Typical parameters values for residential building

Building General		
Building type	RESIDENTIAL	
Total gross air conditioned area of building [m ²]	?	
Building volume [m ³]	?	Provide drawings
Height [m]	?	Provide drawings

Internal Temperature Set Point		
Occupied internal set point for cooling [°C]	23.0	Default Value

Residential General			Documentation Link
Area for Living Room + Kitchen for dwelling [m2]	10330		Provide drawings
Area for other conditioned for dwelling [m2]	11622	21952	Provide drawings
Area for public services [m2]	3874	25826	Provide drawings
Number of units for 1 bedroom type 1 Bedroom unit area [m2]	196 89.45		Provide drawings
Number of units for 2 bedroom type 2 Bedroom unit area [m2]	16 152.77		Provide drawings
Number of units for 3 bedroom type 3 Bedroom unit area [m2]	0 0		Provide drawings
Number of units for 4 bedroom type 4 Bedroom unit area [m2]	0 0		Provide drawings
Number of units for 5 bedroom type 5 Bedroom unit area [m2]	0 0		Provide drawings
Number of units for 6 bedroom or greater than 6 bedroom type 6 Bedroom or greater than 6 unit area [m2]	0 0	23850.42	

2.1.4 Required submittals:

- Provide floor plans with orientation, sections & elevations
- Area and volume summary details (Tabulated excel sheet)

2.2. Building Envelope

2.2.1 Description:

This section includes the user inputs for the building envelope with the orientation details. The section requires the details of opaque and glazing areas from all sides of the building.

The details of shading reduction factors inputs are available in reference sheet of the calculator.

2.0 Energy category related requirements

2.2.2. Typical parameters values for commercial building

Note: The overall glazing to opaque ratio of the building should not exceed 50% of the air-conditioned envelope

Envelope Area							
Orientation	Exposed Opaque [m ²]	Exposed Door [m ²]	Window1 [m ²]	Window1 SRF1	Window2 [m ²]	Window2 SRF1	Remarks
SW	?	?	?	≤ 1.00	?	≤ 1.00	SRF 2: 0.45 (white venetian blinds inside building)
S	?	?	?	≤ 1.00	?	≤ 1.00	
SE	?	?	?	≤ 1.00	?	≤ 1.00	Provide sectional drawings, elevations with opaque and glazing areas and supporting calculations
E	?	?	?	≤ 1.00	?	≤ 1.00	
NE	?	?	?	≤ 1.00	?	≤ 1.00	
E	?	?	?	≤ 1.00	?	≤ 1.00	
NW	?	?	?	≤ 1.00	?	≤ 1.00	
W	?	?	?	≤ 1.00	?	≤ 1.00	
HOR	?		?		?		

SRF 1: Shading Reduction Factor from External Obstacle (Overhang or Fin), Refer to REFERENCE sheet.

SRF 2: Shading Reduction Factor from Internal or External Shading Device (Blind or Curtain), Refer to REFERENCE sheet.

2.2.3. Typical parameters values for residential building

Note: The overall glazing to opaque ratio of the building should not exceed 50% of the air-conditioned envelope

Envelope Area							
Orientation	Exposed Opaque [m ²]	Exposed Door [m ²]	Window1 [m ²]	Window1 SRF1	Window2 [m ²]	Window2 SRF1	Remarks
SW	?	?	?	≤ 1.00	?	≤ 1.00	SRF 2: 0.57 (Colored textiles inside building)
S	?	?	?	≤ 1.00	?	≤ 1.00	
SE	?	?	?	≤ 1.00	?	≤ 1.00	Provide sectional drawings, elevations with opaque and glazing areas and supporting calculations
E	?	?	?	≤ 1.00	?	≤ 1.00	
NE	?	?	?	≤ 1.00	?	≤ 1.00	
E	?	?	?	≤ 1.00	?	≤ 1.00	
NW	?	?	?	≤ 1.00	?	≤ 1.00	
W	?	?	?	≤ 1.00	?	≤ 1.00	
HOR	?	?	?	≤ 1.00	?	≤ 1.00	

SRF 1: Shading Reduction Factor from External Obstacle (Overhang or Fin), Refer to REFERENCE sheet.

SRF 2: Shading Reduction Factor from Internal or External Shading Device (Blind or Curtain), Refer to REFERENCE sheet.

2.0 Energy category related requirements

2.2.4 Required submittals:

- Provide sectional and elevation drawings with opaque and glazing area details
- Provide tabulated excel sheets supporting calculations for opaque and glazing area details
- Provide supporting documents / drawings and for calculated shading reduction factors. (SRF1)

2.3. Material

2.3.1 Description:

This section comprises the building envelope materials details like the solar transmittance, U- values (overall heat transfer co-efficient) for the roof, exposed opaque wall, window and doors determined in accordance to the standards EN-ISO 6946 or equivalent.

2.3.2 Typical parameters values for commercial & residential buildings

Material		
Roof		
Roof U-value [W/(m ² K)]	≤ 0.250	Provide U - value datasheet
Opaque Exposed Wall		
Opaque Wall U-value [W/(m ² K)]	≤ 0.3	Provide U - value datasheet
Door material U-value [W/(m ² K)]	≤ 1.3	Provide U - value datasheet
Window Type 1		
Window Type 1 U-value [W/(m ² K)]	≤ 1.8	Provide U - value datasheet
Window Type 1 Solar Transmittance	≤ 0.250	Provide Supporting datasheet
Window Type 1 Frame Fraction	?	Provide estimation
Window Type 2		
Window Type 2 U-value [W/(m ² K)]	?	Provide U - value datasheet
Window Type 2 Solar Transmittance	?	Provide Supporting datasheet
Window Type 2 Frame Fraction	?	Provide estimation

2.3.3 Required submittals:

- Provide materials data sheets for roof and wall U - values and calculations
- Provide glazing data sheets for U - values and solar transmittance value (Shading Coefficient)

2.0 Energy category related requirements

2.4. Building System

2.4.1. HVAC

2.4.1.1 Description:

Seasonal Energy Efficiency Ratio (SEER) is the ratio of the total amount of cooling energy provided, divided by the total energy input to the cooling plant summed over the year. The equation below illustrates how to determine the seasonal efficiency of the cooling plant at four steps of load control for a single chiller well matched to the applied load¹.

$$\text{SEER} = a (\text{EER}_{25}) + b (\text{EER}_{50}) + c (\text{EER}_{75}) + d (\text{EER}_{100})$$

Where EER_x is the measured at the defined partial load conditions of 25%, 50%, 75% and 100% and a, b, c and d are the load profile weighing factors relevant to the proposed application.

Ref: Non- Domestic Heating, Cooling and ventilation Compliance Guide. OPDM, UK. ISN 13978185946

2.4.1.2 Case - 1:

2.4.1.3 Typical parameters values for commercial & residential buildings - LUSIAL city district cooling

Building System		
HVAC		
Seasonal Energy Efficiency Ratio (SEER) (KW/KW)	5.1	Lusail City District Cooling Default Value

2.4.1.4 Required submittal:

No submittals required

2.4.1.5 Case -2:

For other cooling systems used in the project (non district cooling)

Building System		
HVAC		
Seasonal Energy Efficiency Ratio (SEER) (KW/KW)	?	Refer to 2.4.1.6

2.0 Energy category related requirements

2.4.1.6 Required submittal:

- a. Provide SEER calculations
- b. Data sheets for the equipments

2.4.2 Building System Ventilation

2.4.2.1 Description:

This section includes the mechanical fresh air input details such as:

- Fresh air flow rate in accordance with the ASHRAE standards 62.1- 2010 or EN-ISO standards
- Fan operation time fraction based on the total duration of fan hours over the day, fan shaft capacity in accordance with ASHRAE standards 90.1 - 2010 or equivalent
- Efficiency of the fan motor
- Heat recovery (if heat recovery is provided)

2.4.2.2 Case - 1: Typical parameters values for high rise commercial & residential buildings in compliance with ASHRAE 62.1-2010.

Ventilation		
Ventilation type	Mechanical vent	Recommended Default Value
Mechanical ventilation fresh air flow rate [liter/s]	?	Provide Calculation according to ASHRAE 62.1-2010
Fan shaft capacity [kW]	?	Provide Calculation according to ASHRAE 90.1
Fan flow control type	Speed control (0.65)	Recommended value or better
Fan motor efficiency	≥ 0.85	Recommended value or better
Heat recovery efficiency	≥ 0	Recommended value or better

2.4.2.3 Case - 2: Typical parameters values for high rise commercial & residential buildings for higher fresh air flow rates

The fresh air flow rate is exceeding ASHRAE 62.1- 2010 by more than 15%; heat recovery with at least 65% efficiency is required for such cases.

Heat recovery efficiency	≥ 0.65	Recommended value or better
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2.0 Energy category related requirements

2.4.2.4 Required Submittals:

- Provide floor plans showing zoning and fresh air flow rate calculations in accordance with ASHRAE standards 62.1-2010 or equivalent
- Provide data sheets showing the fan shaft capacity in accordance with ASHRAE 90.1 standards or equivalent

2.4.3 Building Lighting System

2.4.3.1 Description:

This section comprises user inputs for lighting system and the area benefiting from the natural lighting. The lighting capacity installed shall be in accordance with the IESNA 2010 or equivalent standards. The horizontal work plane area benefiting from natural lighting shall be calculated in accordance with the EN 15193 or equivalent standards.

2.4.3.2 Case - 1: Typical parameters values for commercial buildings

Lighting System		
Installed peak power intensity [W/m ²]	≤ 9	Provided that lux level is maintained according to IESNA
Lighting occupancy dependency factor	≤ 1	Without occupancy sensor value is 1 and With occupancy sensor value is 0.9
Horizontal work plane area benefiting from natural lighting (m ²)	?	Provide calculation/drawings, use reference sheet for convenience
Control of artificial lighting system	Manual	Default value for no control case

2.4.3.3 Case - 2: Typical parameters values for residential buildings

Lighting System		
Installed peak power intensity [W/m ²]	≤ 6.5	Provided that lux level is maintained according to IESNA
Lighting occupancy dependency factor	≤ 1	Without occupancy sensor value is 1 and With occupancy sensor value is 0.9
Horizontal work plane area benefiting from natural lighting (m ²)	?	Provide calculation/drawings, use reference sheet for convenience
Control of artificial lighting system	Manual	Default value for no control case

2.0 Energy category related requirements

2.4.3.4 Required Submittals:

- a. Provide floor plans for lighting system
- b. LPD (watt/m²) calculation showing lx level compliance with IESNA 2010 or equivalent
- c. Provide drawings and data sheets / calculations showing the horizontal work plane area calculations
- d. Lighting occupancy dependency factor, if the building is provided with 80% occupancy sensors (Motion Detector), the value shall be 0.9 supported by appropriate layouts, if no occupancy sensors are provided, the value shall be 1.

3.0

Water category related requirements

3.1 Water Fixtures Requirements:

Dual flush WC	Urinal	Bediet	Lavatory sink	Showerhead	Kitchen sink	Janitor Sink
Low flush ≤ 3.0 Liters/ flush	≤ 1.9 Liters/flush	≤ 1.2 Liters/flush	≤ 6.8 Liters/min	≤ 6.8 Liters/min	≤ 6.8 Liters/min	≤ 6.8 Liters/ min
Full flush ≤ 6.0 Liters/ flush						

3.2 Home Appliances

- Efficient Dish washer only for residential
- Efficient Clothes washer only for residential

3.3 Irrigation & Landscape

- Landscape area should not exceed 10% of the total plot area
- Dripping system to be used for irrigation
- Lawn area should not exceed 30% of the landscape area
- Use for the landscape area native/semi-natives plants

4.0

Certification review process

- The Design Consultant (GSAS Authorized Service Provider) should register the Project online through GSASgate portal using the online registration form (F01).
- Upon successful registration, GORD Trust representative and Design Consultant shall have a Kick-off meeting to introduce the certification process, GSAS descriptive specifications, submittals documentation requirements for DC - I & DC - II stages and the Energy Calculator.
- For Design Control Stage DC (I), the Design consultant shall submit the energy calculator to GSAS project manager for review and comments.
- For the Design Control Stage DC (II), the Design consultant shall submit all the required supporting final documents, calculations and data sheets along with the Energy calculator as well as water category related requirements for GORD Trust representative review and comments.
- Upon successful approval of the submitted information and evidences, GORD shall issue the Letter of Conformance (LOC) to the project confirming the GSAS two star rating.

5.0

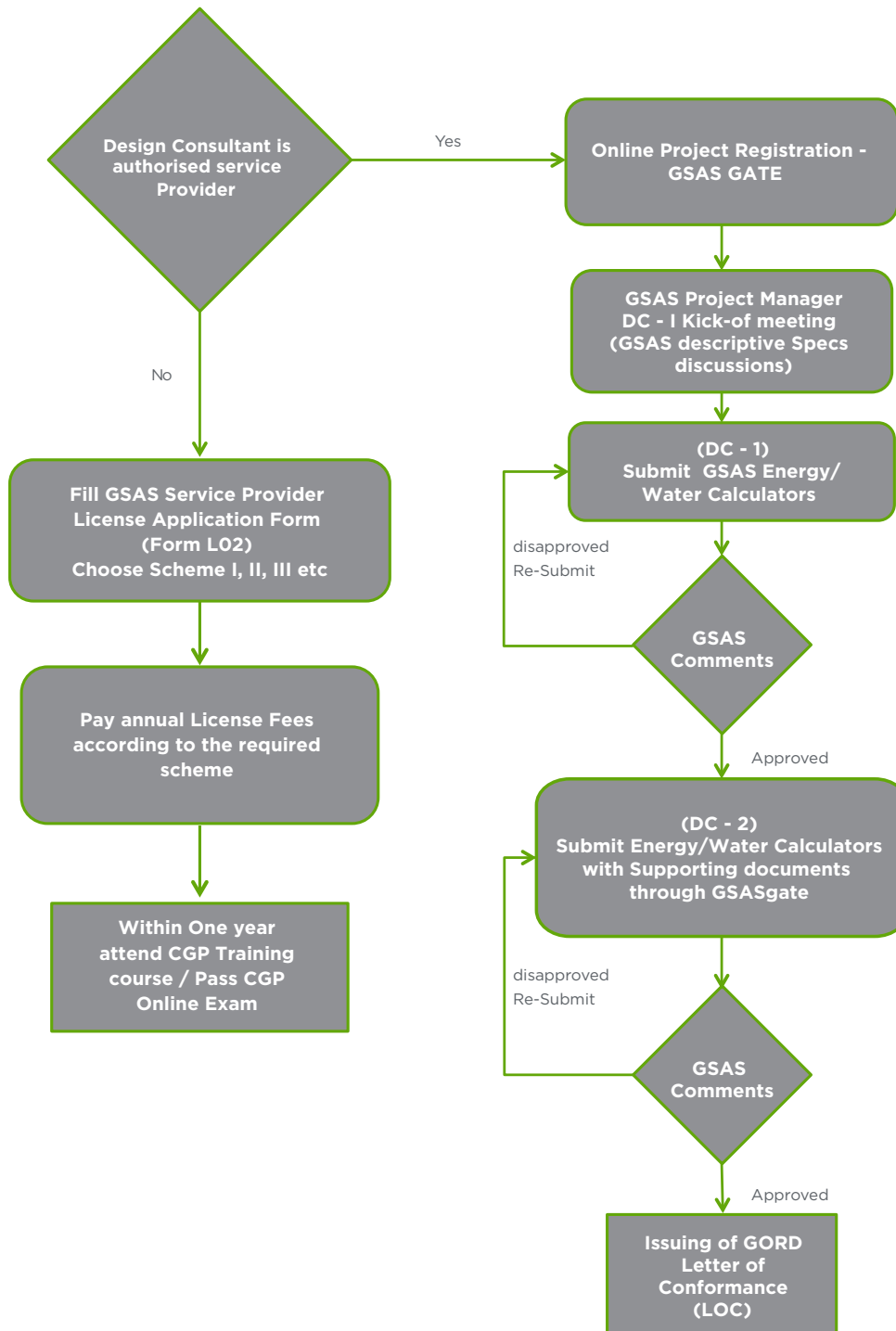
New GSAS Service Provider License registration

The design consultant shall hold a valid GSAS Service Provider License to register and handle the project assessed for GSAS certification in Lusail City. In case of no valid license, the design consultant shall follow the expedited procedure for license registration as noted below.

- The Consultant shall complete the GSAS Service Provider License application form (Form L02 -Design) identifying the appropriate building typology scheme(s) for subscription. (i.e. Scheme I, II, III, IV or V mentioned in the form).
- Pay annual License Fees for the scheme(s) selected.
- Attend GSAS CGP Training course and Pass the CGP Online exam within One year from registration.

6.0 Process flow chart

GORD - PROJECT CERTIFICATION FOR LUSAIL CITY



7.0 Appendix

a. Commercial Related Parameters Sheets

Building General		
Building type	COMMERCIAL	
Total gross air conditioned area of building [m ²]	?	Provide estimation and drawings
Building volume [m ³]	?	Provide estimation and drawings
Height [m]	?	Provide estimation and drawings
Occupancy schedule [days / week]	5	Default Value

Internal Temperature Set Point		
Occupied internal set point for cooling [°C]	23.0	Default Value

Envelope Area							
Orientation	Exposed Opaque [m ²]	Exposed Door [m ²]	Window1 [m ²]	Window1 SRF1	Window2 [m ²]	Window2 SRF1	Remarks
SW	?	?	?	≤ 1.00	?	≤ 1.00	SRF 2: 0.45 (white venetian blinds inside building)
S	?	?	?	≤ 1.00	?	≤ 1.00	
SE	?	?	?	≤ 1.00	?	≤ 1.00	Provide sectional drawings, elevations with opaque and glazing areas and supporting calculations
E	?	?	?	≤ 1.00	?	≤ 1.00	
NE	?	?	?	≤ 1.00	?	≤ 1.00	
E	?	?	?	≤ 1.00	?	≤ 1.00	
NW	?	?	?	≤ 1.00	?	≤ 1.00	
W	?	?	?	≤ 1.00	?	≤ 1.00	
HOR	?		?		?		

SRF 1: Shading Reduction Factor from External Obstacle (Overhang or Fin), Refer to REFERENCE sheet.

SRF 2: Shading Reduction Factor from Internal or External Shading Device (Blind or Curtain), Refer to REFERENCE sheet.

7.0 Appendix

Material		
Roof		
Roof U-value [W/(m ² K)]	≤ 0.250	Provide U - value datasheet
Opaque Exposed Wall		
Opaque Wall U-value [W/(m ² K)]	≤ 0.3	Provide U - value datasheet
Door material U-value [W/(m ² K)]	≤ 1.3	Provide U - value datasheet
Window Type 1		
Window Type 1 U-value [W/(m ² K)]	≤ 1.8	Provide U - value datasheet
Window Type 1 Solar Transmittance	≤ 0.250	Provide Supporting datasheet
Window Type 1 Frame Fraction	?	Provide estimation
Window Type 2		
Window Type 2 U-value [W/(m ² K)]	?	Provide U - value datasheet
Window Type 2 Solar Transmittance	?	Provide Supporting datasheet
Window Type 2 Frame Fraction	?	Provide estimation
Building System		
HVAC		
Seasonal Energy Efficiency Ratio (SEER) (KW/KW)	5.1	Lusail City District Cooling Default Value
Ventilation		
Ventilation type	Mechanical vent	Recommended Default Value
Mechanical ventilation fresh air flow rate [Litre/s]	?	Provide Calculation according to ASHRAE 62.1-2010
Fan shaft capacity [kW]	?	Provide Calculation according to ASHRAE 90.1
Fan flow control type	Speed control (0.65)	Recommended value or better
Fan motor efficiency	≥ 0.85	Recommended value or better
Heat recovery efficiency	≥ 0	Recommended value or better
Lighting System		
Installed peak power intensity [W/m ²]	≤ 1	Provided that lux level is maintained according to IESNA
Lighting occupancy dependency factor	≤ 9	Without occupancy sensor value is 1 and With occupancy sensor value is 0.9
Horizontal work plane area benefiting from natural lighting (m ²)	?	Provide calculation/drawings, use reference sheet for convenience
Control of artificial lighting system	Manual	Default value for no control case

b. Residential Related Parameters Sheets

Building General			
Building type	RESIDENTIAL		
Total gross air conditioned area of building [m ²]	?		
Building volume [m ³]	?		Provide drawings
Height [m]	?		Provide drawings

Internal Temperature Set Point		
Occupied internal set point for cooling [°C]	23.0	Default Value

Residential General			Documentation Link
Area for Living Room + Kitchen for dwelling [m ²]	10330		Provide drawings
Area for other conditioned for dwelling [m ²]	11622	21952	Provide drawings
Area for public services [m ²]	3874	25826	Provide drawings
Number of units for 1 bedroom type	196		Provide drawings
1 Bedroom unit area [m ²]	89.45		
Number of units for 2 bedroom type	16		Provide drawings
2 Bedroom unit area [m ²]	152.77		
Number of units for 3 bedroom type	0		Provide drawings
3 Bedroom unit area [m ²]	0		
Number of units for 4 bedroom type	0		Provide drawings
4 Bedroom unit area [m ²]	0		
Number of units for 5 bedroom type	0		Provide drawings
5 Bedroom unit area [m ²]	0		
Number of units for 6 bedroom or greater than 6 bedroom type	0	23850.42	
6 Bedroom or greater than 6 unit area [m ²]	0		

Envelope Area							
Orientation	Exposed Opaque [m ²]	Exposed Door [m ²]	Window1 [m ²]	Window1 SRF1	Window2 [m ²]	Window2 SRF1	Remarks
SW	?	?	?	≤ 1.00	?	≤ 1.00	SRF 2: 0.57 (Colored textiles inside building)
S	?	?	?	≤ 1.00	?	≤ 1.00	
SE	?	?	?	≤ 1.00	?	≤ 1.00	Provide sectional drawings, elevations with opaque and glazing areas and supporting calculations
E	?	?	?	≤ 1.00	?	≤ 1.00	
NE	?	?	?	≤ 1.00	?	≤ 1.00	
E	?	?	?	≤ 1.00	?	≤ 1.00	
NW	?	?	?	≤ 1.00	?	≤ 1.00	
W	?	?	?	≤ 1.00	?	≤ 1.00	
HOR	?	?	?	≤ 1.00	?	≤ 1.00	

SRF 1: Shading Reduction Factor from External Obstacle (Overhang or Fin), Refer to REFERENCE sheet.

SRF 2: Shading Reduction Factor from Internal or External Shading Device (Blind or Curtain), Refer to REFERENCE sheet.

7.0 Appendix

Material		
Roof		
Roof U-value [W/(m ² K)]	≤ 0.250	Provide U - value datasheet
Opaque Exposed Wall		
Opaque Wall U-value [W/(m ² K)]	≤ 0.3	Provide U - value datasheet
Door material U-value [W/(m ² K)]	≤ 1.3	Provide U - value datasheet
Window Type 1		
Window Type 1 U-value [W/(m ² K)]	≤ 1.8	Provide U - value datasheet
Window Type 1 Solar Transmittance	≤ 0.250	Provide Supporting datasheet
Window Type 1 Frame Fraction	?	Provide estimation
Window Type 2		
Window Type 2 U-value [W/(m ² K)]	?	Provide U - value datasheet
Window Type 2 Solar Transmittance	?	Provide Supporting datasheet
Window Type 2 Frame Fraction	?	Provide estimation

Building System		
HVAC		
Seasonal Energy Efficiency Ratio (SEER) (KW/KW)	5.1	Lusail City District Cooling Default Value

Ventilation		
Ventilation type	Mechanical vent	Recommended Default Value
Mechanical ventilation fresh air flow rate [Litre/s]	?	Provide Calculation according to ASHRAE 2010-1 .62
Fan shaft capacity [kW]	?	Provide Calculation according to ASHRAE 90.1
Fan flow control type	Speed control (0.65)	Recommended value or better
Fan motor efficiency	≥ 0.85	Recommended value or better
Heat recovery efficiency	≥ 0	Recommended value or better

Lighting System		
Installed peak power intensity [W/m ²]	≤ 6.5	Provided that lux level is maintained according to IESNA
Lighting occupancy dependency factor	≤ 1	Without occupancy sensor value is 1 and With occupancy sensor value is 0.9
Horizontal work plane area benefiting from natural lighting (m ²)	?	Provide calculation/drawings, use reference sheet for convenience
Control of artificial lighting system	Manual	Default value for no control case

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