



# GRASS

~**G**reen **R**ecovery **A**nd **S**ustainable **S**olutions~

**A New Building Rating System for Lebanon**

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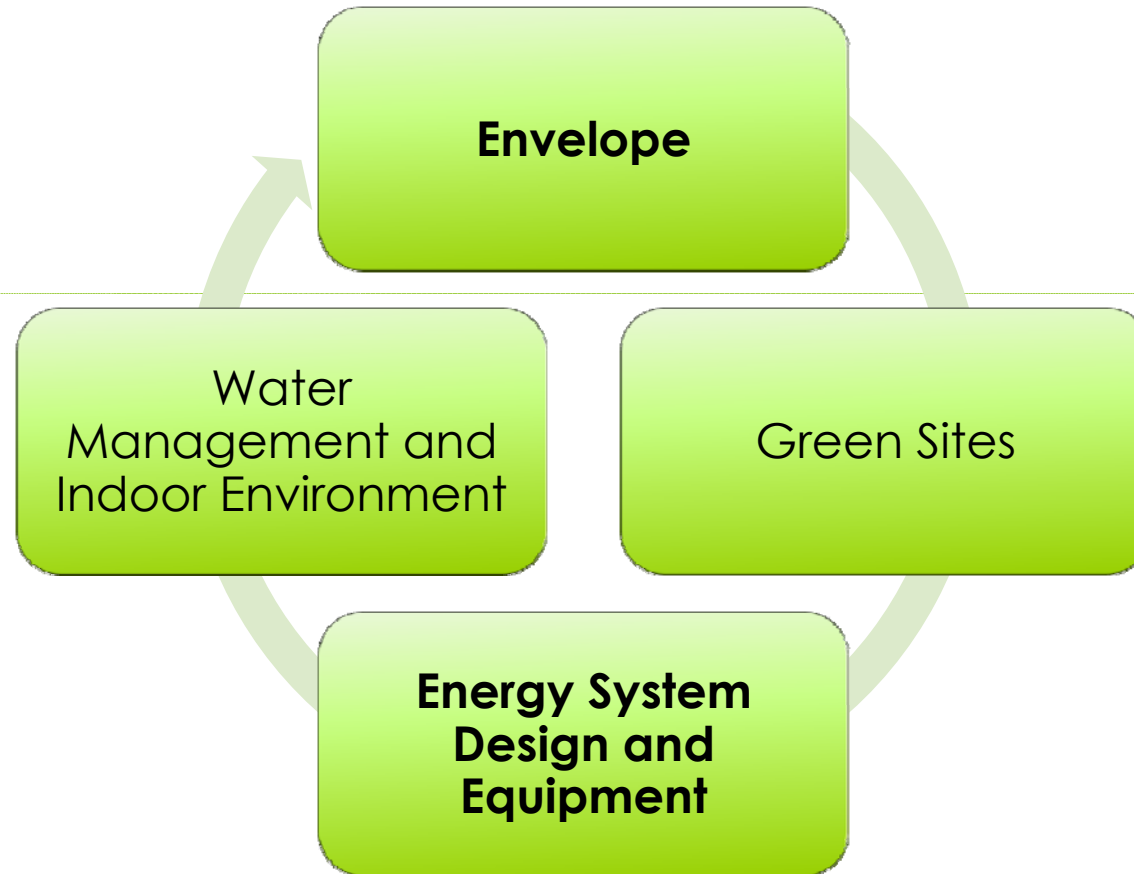




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## How to Earn “GRASS” Certification?

1- Assess the building using the Checklist

2- Make sure that the building Complies with the prerequisites and minimum requirements

3- Find the total Scored Points to identify the level achieved





# How to Earn “GRASS” Certification?

1- Assess the building using the Checklist

## EDE 4A - Natural Ventilation

### Commercial Building

Design Recommendation	Scoring Points	Points Awarded ( /20)
Maximize wind-induced ventilation by siting the ridge of a building perpendicular to the summer winds	5	
Each room should have two separated supply and exhaust openings:		
<b>Locate exhaust high above inlet to maximize stack effect</b>	3	
<b>Locate openings away from outdoor sources of pollutants and noise</b>	3	
Provide ridge vents	1	
Allow for adequate internal airflow	1	
Consider the use of clerestories or vented skylights	1	
Provide attic ventilation	1	
Apply Ventilation Configuration properly	5	
<b>Awarded Points (out of 20)</b>		<b>0</b>





### Envelope

- Heating & Cooling Energy Needs
- Eco-construction
- Green Roofs

### Green Sites

- Pre-Developed Lands
- Existing Infra-Structure
- Proximity to Basic Services
- Site Plantation
- Parking Structure and Design
- Parking Capacity

### Energy System Design and Equipment

- Solar Water Heating
- Renewable Energy Technologies
- Daylight Design
- Natural & Mechanical Ventilation
- Lighting Efficiency (Building & Parking Design)
- Effectiveness of Cooling & Heating
- Back-up Electricity
- BMS

### Water Management and Indoor Environment

- Health Protection
- Indoor Vegetation
- Water Conservation





## Envelope

- Heating & Cooling Energy Needs – E1
- Eco-construction – E2
- Green Roofs – E3



**Envelope features include *form, shading, day lighting, and choice of materials, sizing, orientation, and glass specification.***





# Envelope

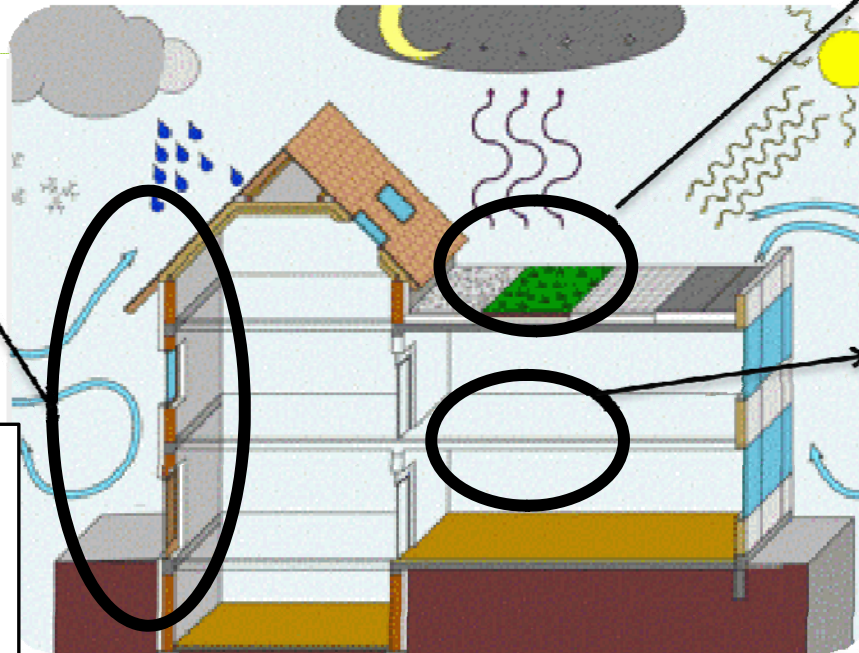
**No Certificate** will be attained if the building **doesn't comply** with **thermal standards**.



**E1**

U-envelope  
U-facade  
WWR

Calculated  
be:  
**TSBL**  
software



**E3**

Green/Cool  
Roofs

**E2**

Eco-Friendly  
Materials



## Green Sites

- Pre-Developed Lands – GS1
- Existing Infra-Structure – GS 2
- Proximity to Basic Services –GS3
- Site Plantation – GS4
- Parking Structure and Design – GS5
- Parking Capacity – GS6



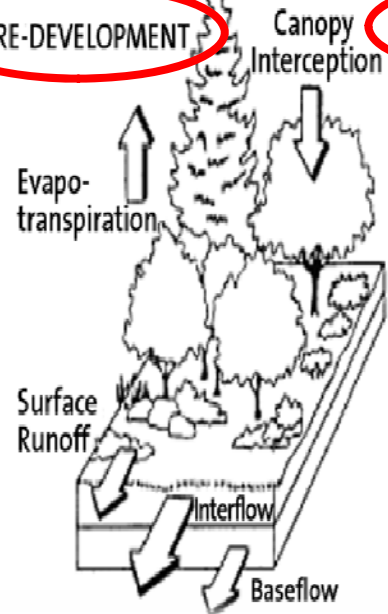


# Green Sites

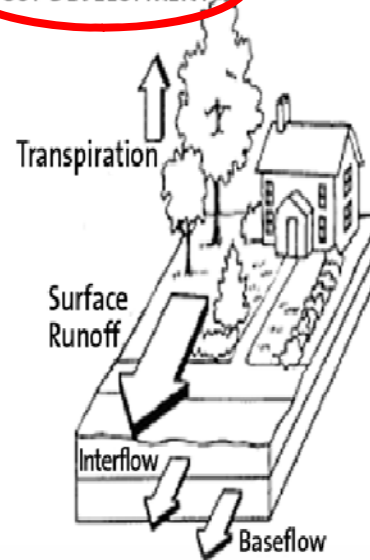


## WATER BALANCE

### PRE-DEVELOPMENT



### POST-DEVELOPMENT



## GS1

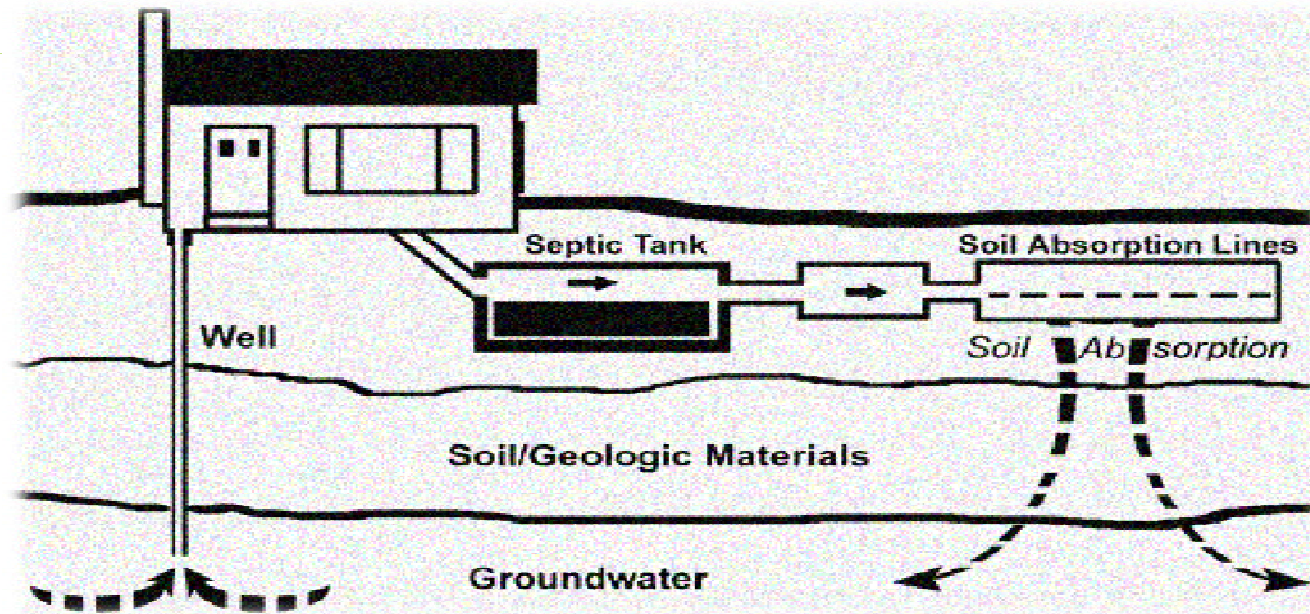
Pre-developed  
Lands



# Green Sites

## GS2

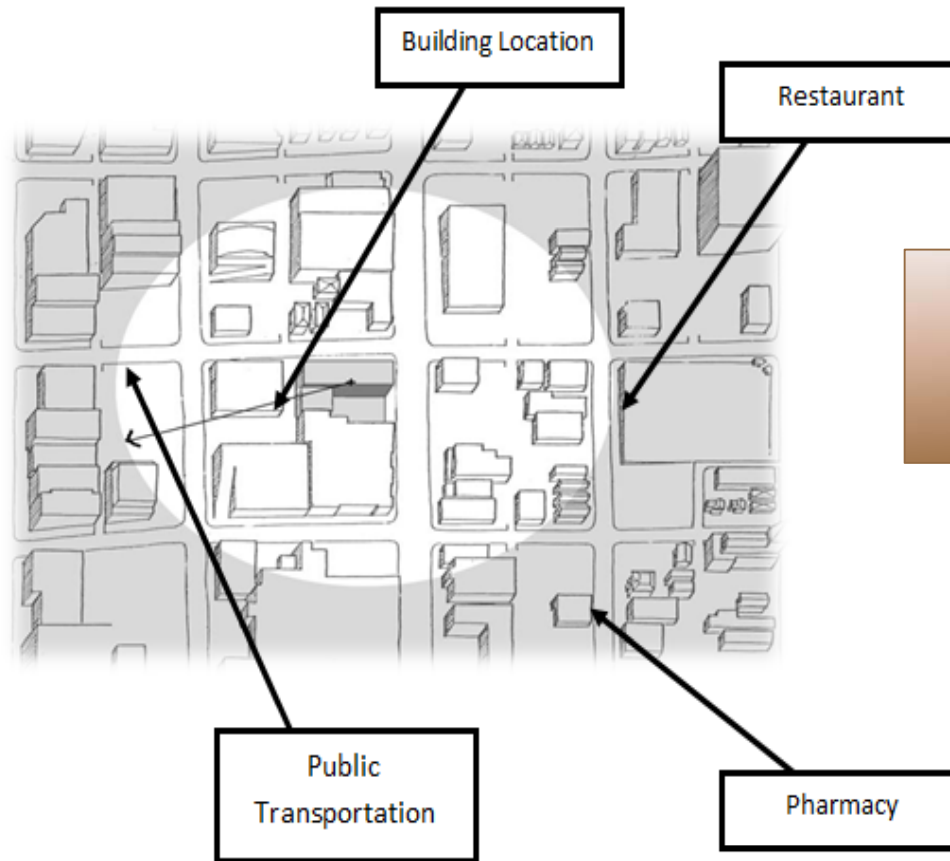
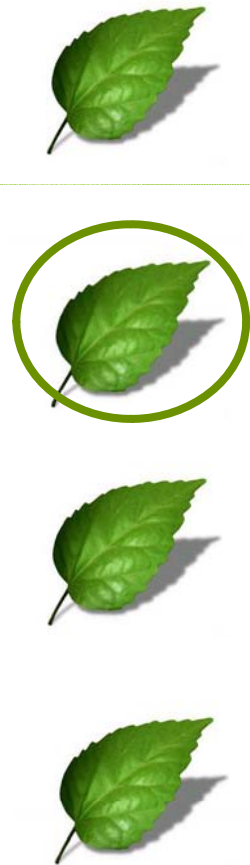
Existing Infra-  
Structure







# Green Sites



**GS3**  
Proximity to Basic  
Services



# Green Sites



**GS4**

Site Plantation





# Green Sites



50% under covered  
or

environmental friendly  
external parking

1-Permeable Paving  
2-On-site Water  
Management

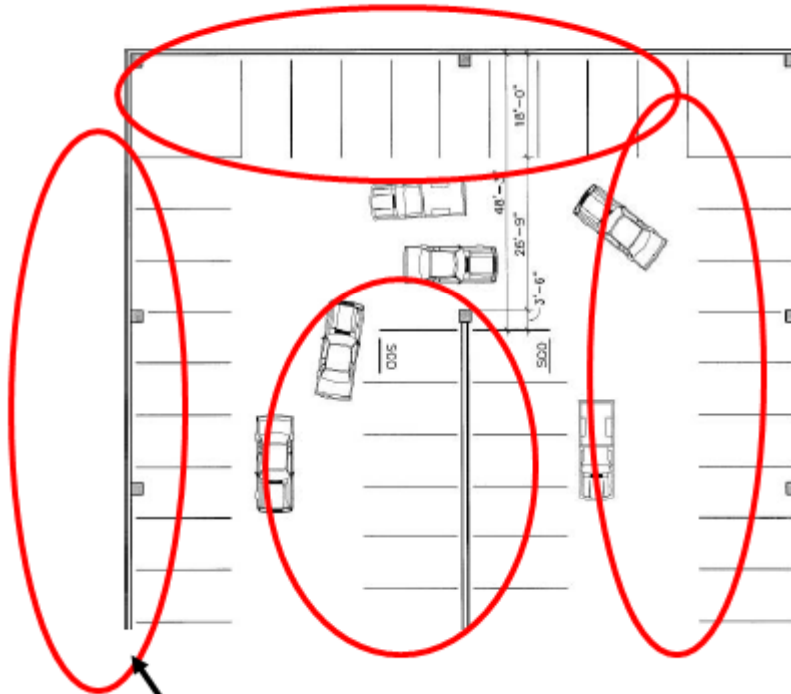


**GS4**

Site Plantation



# Green Sites



Reduce these parking lots for individual vehicles by providing percent area for buses and vanpools

**GS6**  
Parking Capacity





## Energy System Design and Equipment



- Solar Water Heating – EDE 1
- Renewable Energy Technologies – EDE 2
- Daylight Design – EDE 3
- Natural & Mechanical Ventilation – EDE 4
- Lighting Efficiency (Building & Parking Design) – EDE 5
- Effectiveness of Cooling & Heating – EDE 6
- Back-up Electricity – EDE 7
- BMS – EDE 8



## EDE1

Solar Water Heating



% HWD  
Commercial 40%  
Residential 50%  
+  
Innovation







## EDE2

Renewable Energy

**Minimum  
1% from  
Total  
Electricity  
Demand**





## EDE3

Day Light Design

**ADF  $\geq$  2%**  
**In More than 70%**  
**of building Rooms**



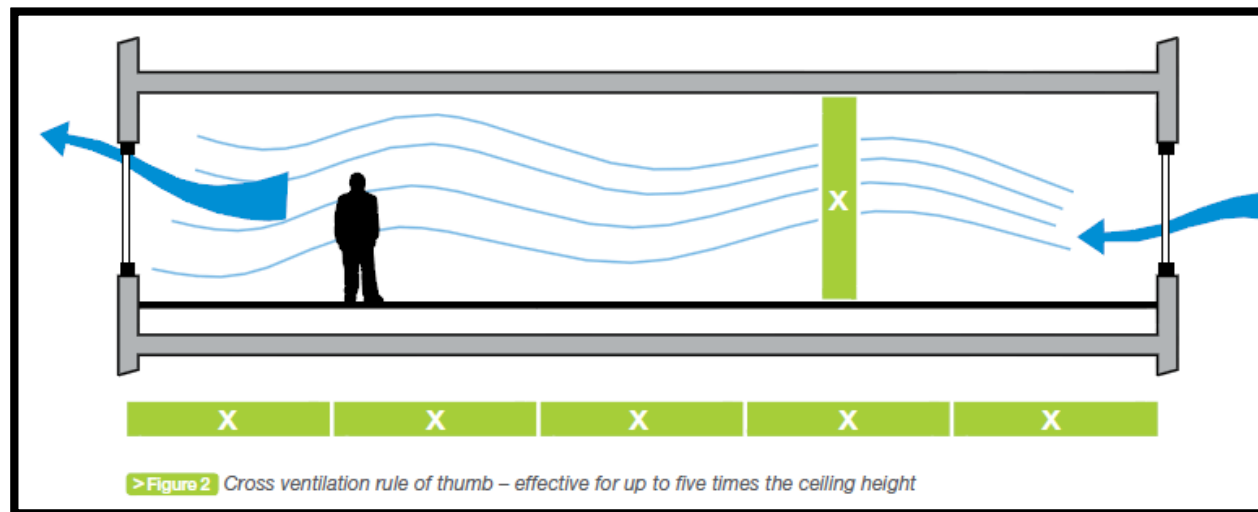




## EDE4

Natural & Mechanical  
Design

### CFM of fresh air + Energy Recovery Unit Installation





## EDE5

High Efficient Lighting  
(Building & Parking)



**Building:**  
**Lm/Watt**  
**&**  
 **$\leq 2.5$**   
**Watt/m<sup>2</sup>/100lux**







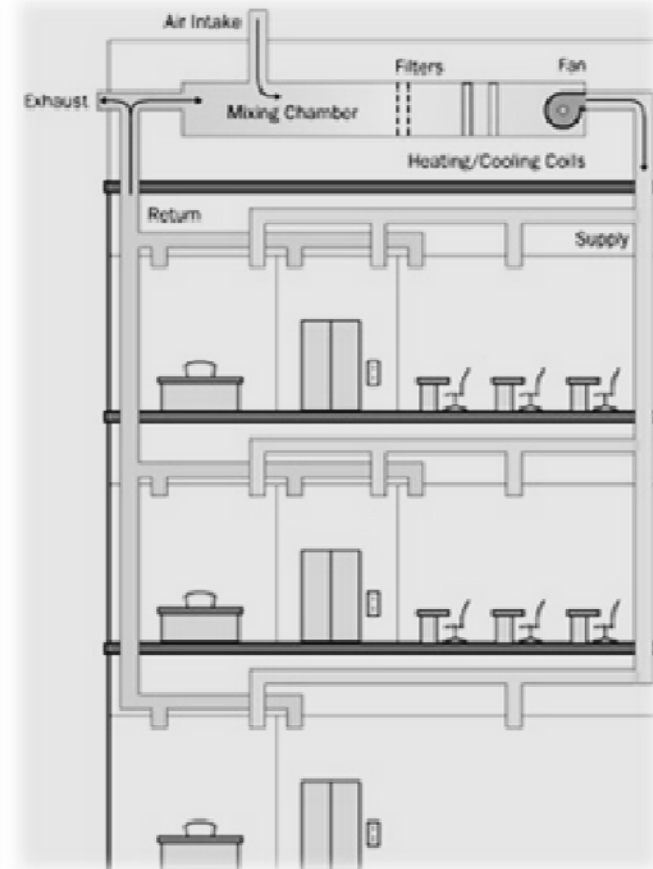
## EDE6

Effectiveness of  
Cooling & Heating  
Systems



**HVAC:** COP (heating)  
EER (Cooling)  
CF  $\geq 5$

**Boiler :** AFUE  $\geq 80\%$





## EDE7

Back up Electricity



- 1- Installation of sound attenuators
- 2- Installation of heat recovery units
- 3- Installation of air filters
- 4- Use of Biomass Diesel Fuels





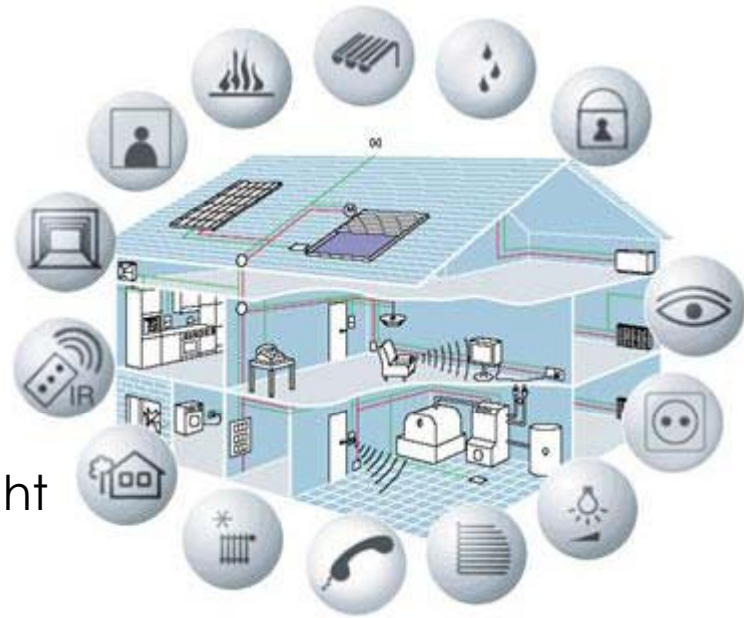


## EDE8

BMS



- 1- HVAC controls:  
thermostats, VFD, flow  
sensors...
- 2- Lighting Control:  
movement sensors, daylight  
sensors...
- 3- Electric power systems  
controls





## Water Management and Indoor Environment

- Health Protection – WMIE 1
- Indoor Vegetation – WMIE 2
- Water Conservation – WMIE 3







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## How to Earn “GRASS” Certification?

3- Find the **Total Scored Points** to identify the level achieved

Points Awarded = X

Total Scoring Points = 500

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$$\textbf{Total Percentage} = \frac{X}{500} * 100$$



CommercialResidential

	Indicator	Commercial Sector	Residential Sector
Envelope	Heating & Cooling Energy Needs (Optimizing Energy Performance)	150.00	150.00
	Eco-construction	26.00	26.00
	Green Roofs	15.00	15.00
		191.00	191.00

CommercialResidential

Green Sites	Site Selection	7.00	10.00
	Existing infrastructure	4.00	10.00
	Proximity to basic services	4.00	10.00
	Site Plantation	15.00	10.00
	Parking Structure Design	22.00	17.00
	Parking Capacity	20.00	0.00
		72.00	57.00



CommercialResidential

<b>Energy System Design and Equipment</b>	Solar water heating	8.00	30.00
	Renewable energy Technologies	15.00	15.00
	Daylighting Design	20.00	20.00
	Ventilation	20.00	20.00
		10.00	10.00
	Lighting efficiency	25.00	15.00
		8.00	8.00
	Effectiveness of Cooling and Heating	35.00	35.00
		6.00	0.00
	Back-up Electricity	15.00	15.00
	BMS	15.00	15.00
		<b>177.00</b>	<b>183.00</b>

CommercialResidential

<b>Water Management and Indoor Environment</b>	Health Protection	10.00	10.00
	Indoor Vegetation/Plantation	6.00	5.00
	Water conservation	18.00	23.00
		18.00	23.00
		8.00	8.00
		<b>60.00</b>	<b>69.00</b>





1  $\geq 80.1\%$



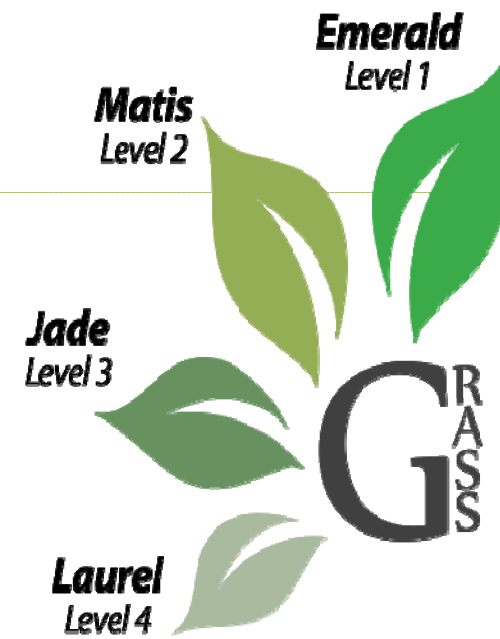
2 70.1% - 80%



3 60.1% - 70%



4 50% - 60%



# Sample Form of "GRASS"



"GRASS" Certificate is rewarded to the Building

"FM Residence" located in Beirut - Verdun Street

The level achieved is "3" by scoring  
70/100

THIS PROJECT HAS  
BEEN ASSESSED  
BY:  
.....  
OF 20 MAY 2012



**ALAMEE**  
ORGANIZATION  
HAS APPROVED  
THIS ASSESSED  
PROJECT.

123 Certificates



*“We Are Seeing The Birth Of A New Perspective Of The World, Where **Ecology** And **Economics** Are Two Sides Of The Same Coin” – Leif Johansson*



Bright & 

