



*" a greener today for a better tomorrow "*



# GREEN WALL SYSTEM





## GREEN WALL SYSTEM



PlanterCell® H2O-R Panel



PlanterCell® 75



PlanterCell® 170



PlanterCell® 125



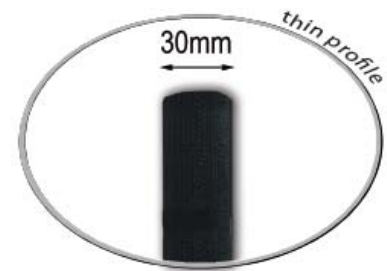
PlanterCell® 170 mini





GREEN WALL SYSTEM

# PlanterCell<sup>®</sup> H<sub>2</sub>O-R Panel



everyday nnovation



### PlanterCell® H<sub>2</sub>O-R GREEN WALL SYSTEM

- |  |   |
|--|---|
| (1) Concrete Structure                           | (6) Insu™ Felt                          |
| (2) Waterproofing Membrane<br>(where necessary)  | (7) Insu™ Net                           |
| (3) Insu™ Board                                  | (8) Drip Irrigation System              |
| (4) PlanterCell® H <sub>2</sub> O-R Moisture Mat | (9) Selected Green wall Plants          |
| (5) Water Retention Foam                         | (10) Drainage tray<br>(where necessary) |

## SPECIFICATIONS

SGBC*** Green Product		Yes
Panel Size		
Thickness	mm	30
Width	mm	1,220
Length	mm	2,220
Weight:		
Panel	kg/m <sup>2</sup>	8
Design	kg/m <sup>2</sup>	25 to 30
Insu™ Board Thickness		mm 12
Water Retention Foam		
Thickness	mm	15
Density	kg/m <sup>3</sup>	29 to 39
Hardness <sup>1</sup>	kPa	7 to 12
Swell Test <sup>2</sup>	%	10 to 20
Water Uptake <sup>2</sup>	by weight	> 25x
Insu™ Felt Weight		g/m <sup>2</sup> 100 to 120
PlanterCell® H <sub>2</sub> O-R Moisture Mat		
Weight	g/m <sup>2</sup>	400
Insu™ Net Material		HDPE
Sun Protection		UV-Stabilised
Shade Efficiency	%	80

<sup>1</sup> 40% compression measured at 1st cycle

<sup>2</sup> after 24 hours

\*\*\* Singapore Green Building Council





## EASY INSTALLATION:

### A) ON-SITE INSTALLATION

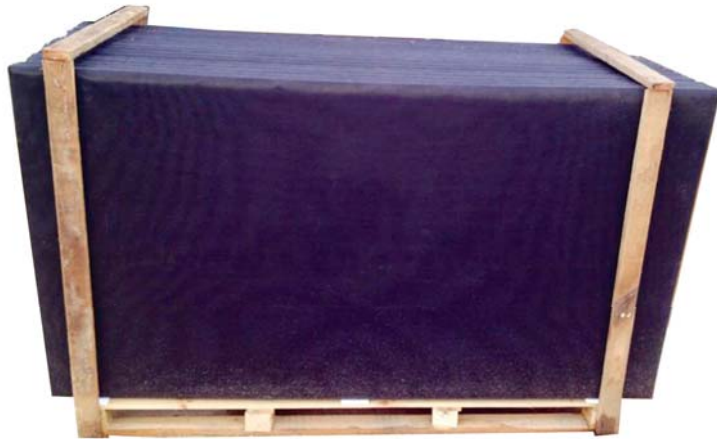




## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- H2O-R Foam Panels are pre-packed and delivered at site.





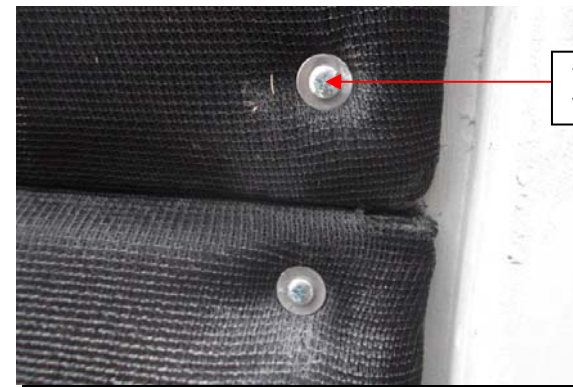
## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Setting-out of panels onto the prepared wall surface.



•Basement Carpark Area



75mm - 100mm  
wall plug



## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Setting-out & fixing of panels onto the prepared wall surface.



•Pool Side Pavilion Area



•Tennis Court Area



Fix and secure the corners of the panels onto the wall using 75mm - 100mm wall plug .

For Metal Structure:

- 1) Use 50mm to 75mm SS screw
- 2) At least 12 SS Self-tapping screw per 1220mm x 2220mm panel.





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Completed installed panels.



•Basement Car Park



•Tennis Court



•Pool Side Pavilion Area



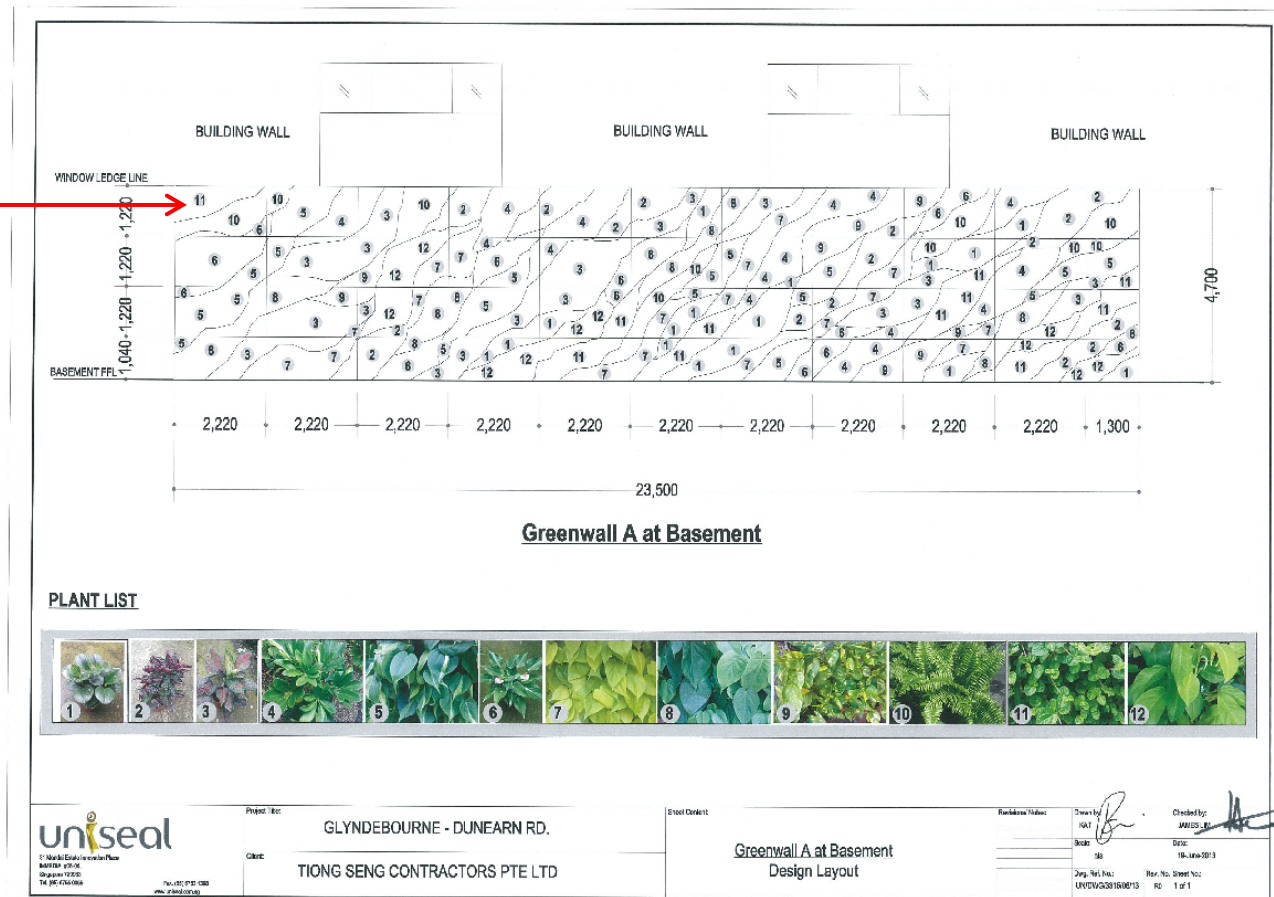


## PlanterCell® H2O-R Foam Green Wall Panel

- Sample of Plant Pattern Layout.

PLANT  
PATTERN  
LAYOUT  
(ELEVATION)

PLANT LIST





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Draw the plant pattern design indicating plant species.



•Basement Carpark Area



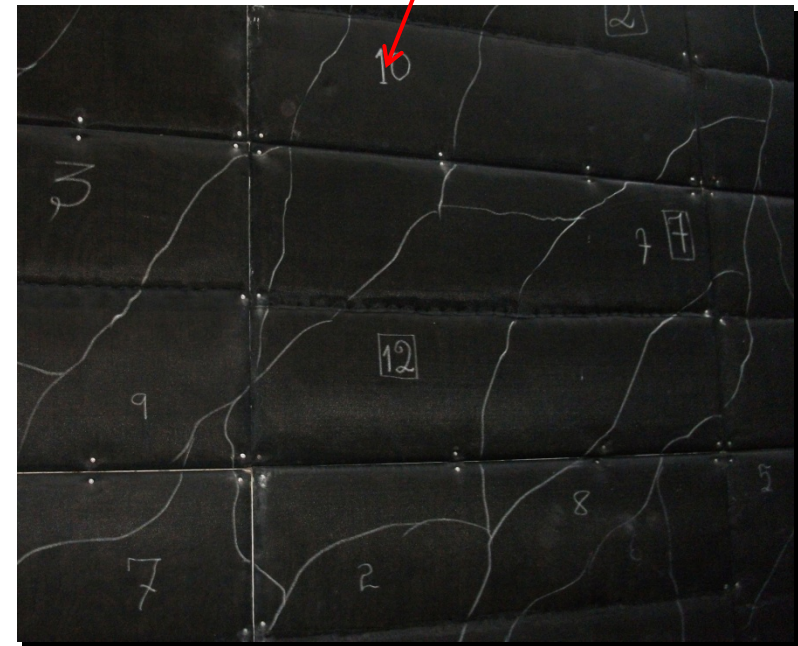
## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Completed plant pattern design.



•Basement Carpark Area



Numbers indicate  
Plant Species





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Delivery of plants to the site.



- Cut the Insufelt/InsuNet layer to form pockets for planting. Soil-less media is placed at the root zone for better sustainable plant growth.

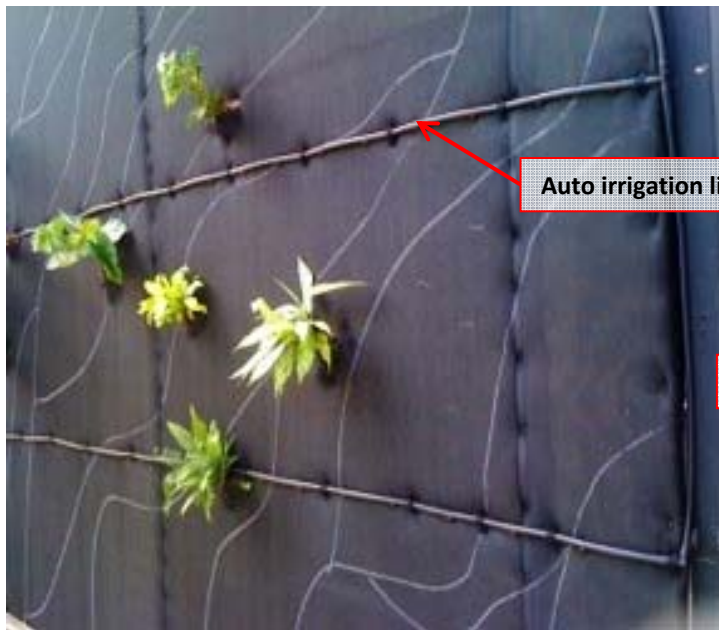




## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Automatic irrigation system is installed to ensure sufficient water and nutrients are delivered precisely to each plants.



Auto irrigation line



Emitters





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Planting according to the plant pattern design.



•Tennis Court Area





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) On-Site Installation

- Planting according to the plant pattern design.



•Pool Side Pavilion Area







PlanterCell® H2O-R Foam Green Wall Panel  
Completed Green Wall at Tennis Court







PlanterCell® H2O-R Foam Green Wall Panel  
Completed Green Wall at Pool Side Pavilion Area







PlanterCell® H2O-R Foam Green Wall Panel  
Completed Green Wall at Basement Carpark





## EASY INSTALLATION:

### B) OFF-SITE INSTALLATION...Outdoor



## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Production of H2O-R Foam Panels at Uniseal R&D Center.







## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Plants are carefully selected from the R&D center according to the approved plants list .



### Approved Plants List and Layout



PLANTS LIST				
1) Schefflera Arboricola green	2) Philodendron Erubescens 'gold'	3) Peperomia scandens variegata	4) Rabbit's Foot Fern Davallia leporalis	5) Graptophyllum pictum
6) Oenocarpus Song of India	7) Schefflera Arboricola variegata	8) Serissa foetida 'variegata'	9) Dieckmannia rotundifolia	

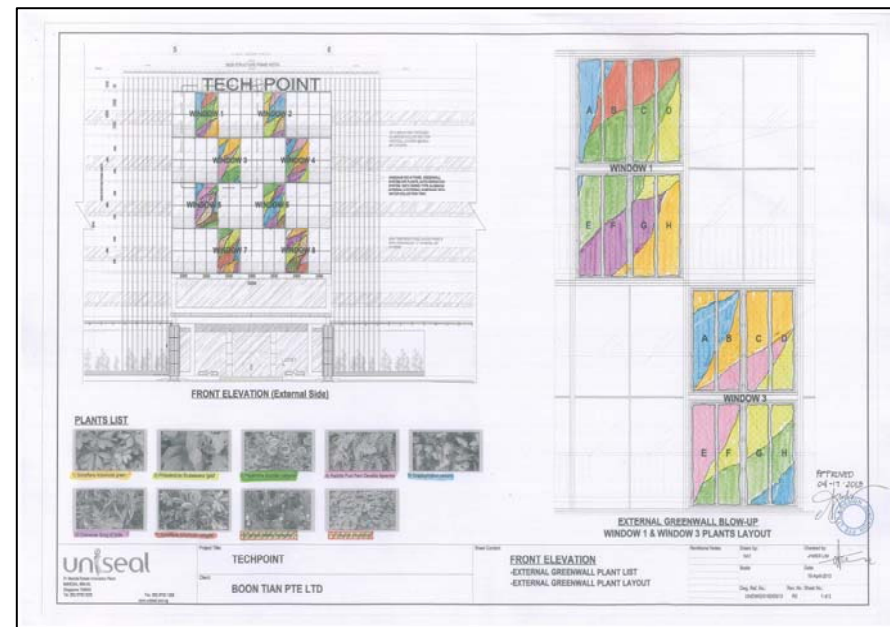
Project: Ascendas Techpoint Building @ Ang Mo Kio Industrial Estate



## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Planting according to the approved design layout.



**Approved Plants List and Layout**





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Planting according to the approved design layout.





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Completed H2O-R panels with plants. Ready for site delivery.







## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Installation of planted H2O-R panels onto the mainframe at site.





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Installation of planted H2O-R panels onto the mainframe at site.



•Internal Side







## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Installation of planted H2O-R panels onto the mainframe at site.



- External Side



## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Installation of planted H2O-R panels onto the mainframe at site.



•External Side







## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Outdoor

- Setting of Irrigation lines, control panel and accesories.





## PlanterCell® H2O-R Foam Green Wall Panel

### Completed Green Wall – Internal side







PlanterCell® H2O-R Foam Green Wall Panel  
Completed Green Wall – Facade





## EASY INSTALLATION:

### B) OFF-SITE INSTALLATION...Indoor





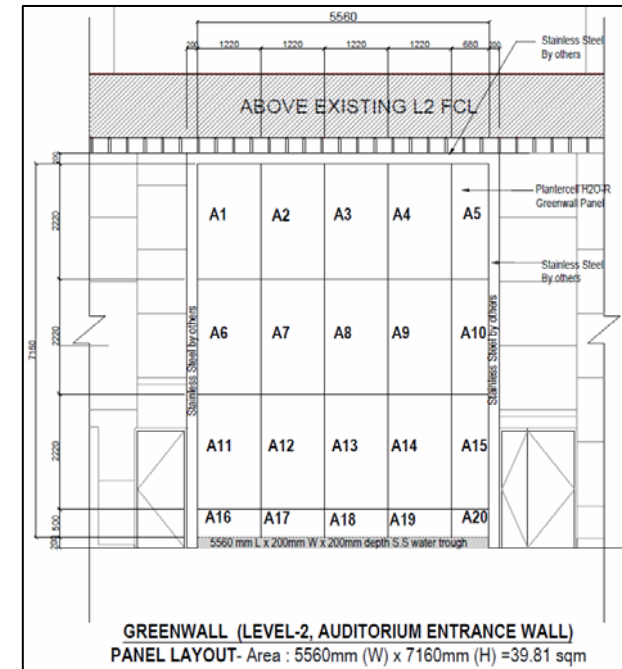
## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Indoor

- Production of H2O-R Foam Panels at Uniseal R&D Center.



- Marking of panels according to the design layout.



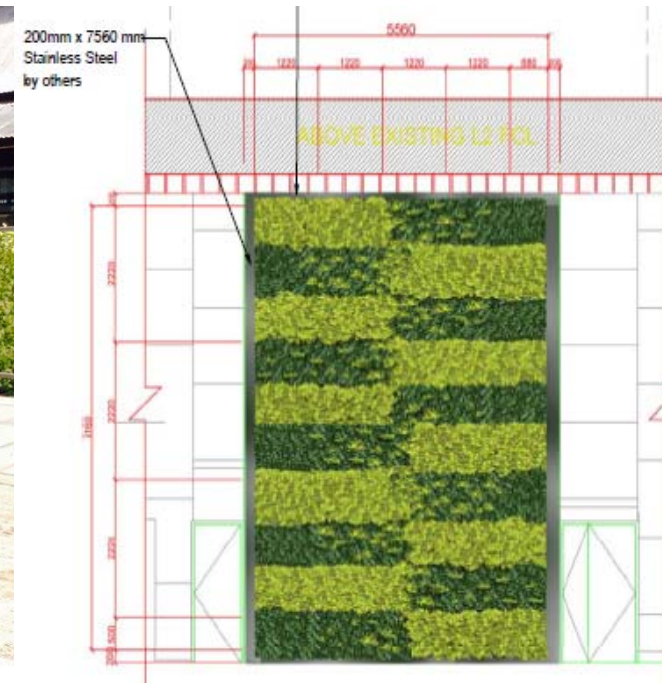
### Panel Layout



## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Indoor

- Planting according to the approved plants design.



#### PLANTS LIST:



(1) Philodendron Scandens  
Green



(2) Philodendron Scandens  
Yellow

#### Plants List and Design Layout





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Indoor

- Planting according to the approved plants design.





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Indoor

- Setting-out and Installation of greenwall frames at the site..







## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Indoor

- Installation of planted H2O-R panels onto the mainframe at the site..







## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Indoor

- Installation of Auto-irrigation lines, controller and accessories.





## PlanterCell® H2O-R Foam Green Wall Panel

### A.) Off-Site Installation... Indoor

- LED growlight light reading and testing..







## PlanterCell® H2O-R Foam Green Wall Panel

### Completed Green Wall – Indoor



Project: 2 Shenton Way, SGX Centre





## PROJECT REFERENCES



## PlanterCell® H2O-R Foam Green Wall Panel



•R&D Centre - 119 Neo Tiew Lane





## PlanterCell® H2O-R Foam Green Wall Panel

•Hamilton Scotts

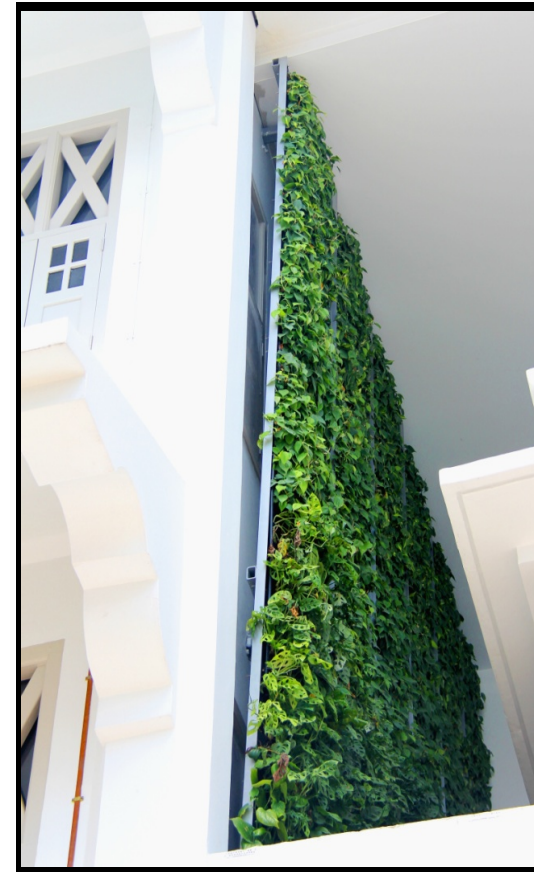
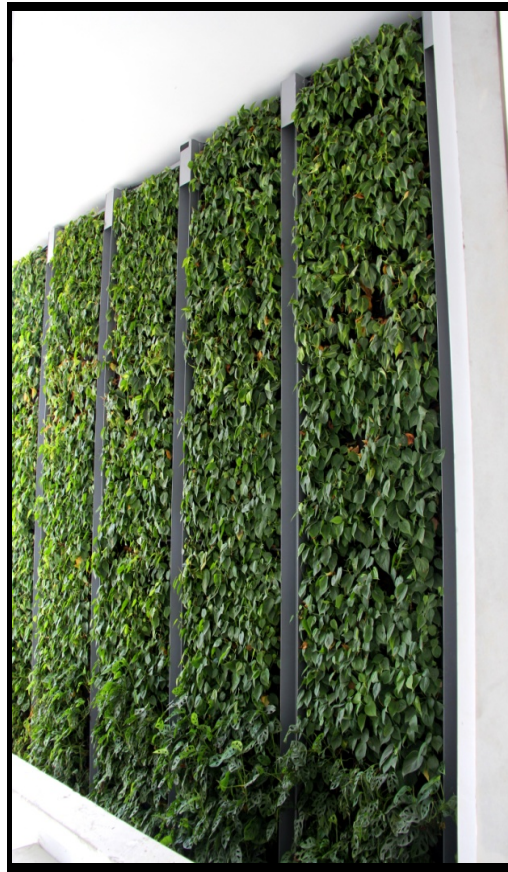






## PlanterCell® H2O-R Foam Green Wall Panel

•National Design Centre





## PlanterCell® H2O-R Foam Green Wall Panel

•Jalan Raya 36 (Residential Perimeter Wall)







## PlanterCell® H2O-R Foam Green Wall Panel

•Jalan Sindor 25 (Residential Perimeter Wall)







## PlanterCell® H2O-R Foam Green Wall Panel

•Sentosa , Imbiah Station







## PlanterCell® H2O-R Foam Green Wall Panel

•118 Killiney Road Condominium







## PlanterCell® H2O-R Foam Green Wall Panel

•Nepal Hub at Nepal Hill







## PlanterCell® H2O-R Foam Green Wall Panel

•7 Green Lane







## PlanterCell® H2O-R Foam Green Wall Panel

•CDL Green Gallery







## PlanterCell® H2O-R Foam Green Wall Panel

•Marina Barrage





## PlanterCell® H2O-R Foam Green Wall Panel

•Meyerise Condominium







## PlanterCell® H2O-R Foam Green Wall Panel

•Parkway Parade

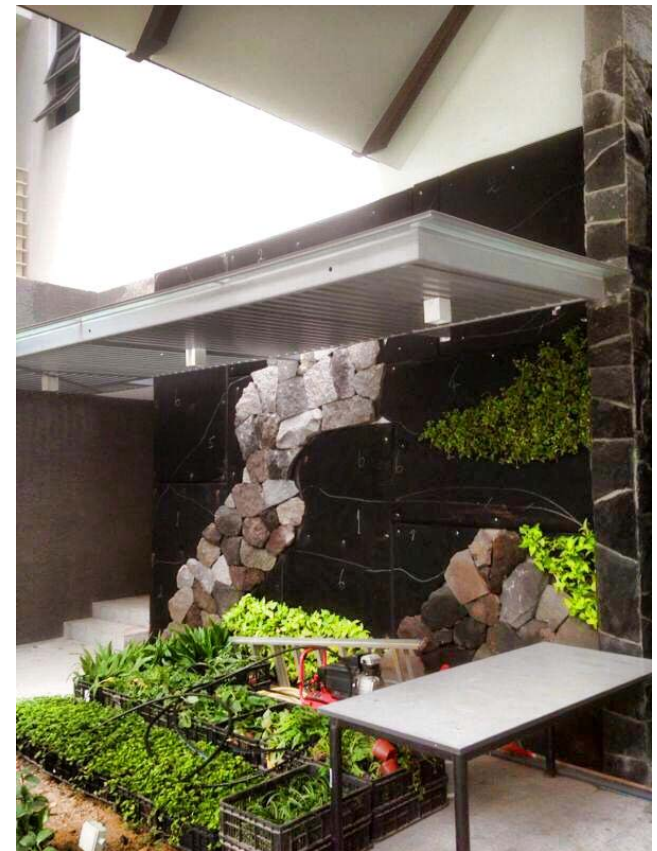






## PlanterCell® H2O-R Foam Green Wall Panel

•The Lanai







## PlanterCell® H2O-R Foam Green Wall Panel

•Scala Condominium





## PlanterCell® H2O-R Foam Green Wall Panel

•Scala Condominium







## PlanterCell® H2O-R Foam Green Wall Panel

•19th Storey Feature Wall - 277 Orchard Road

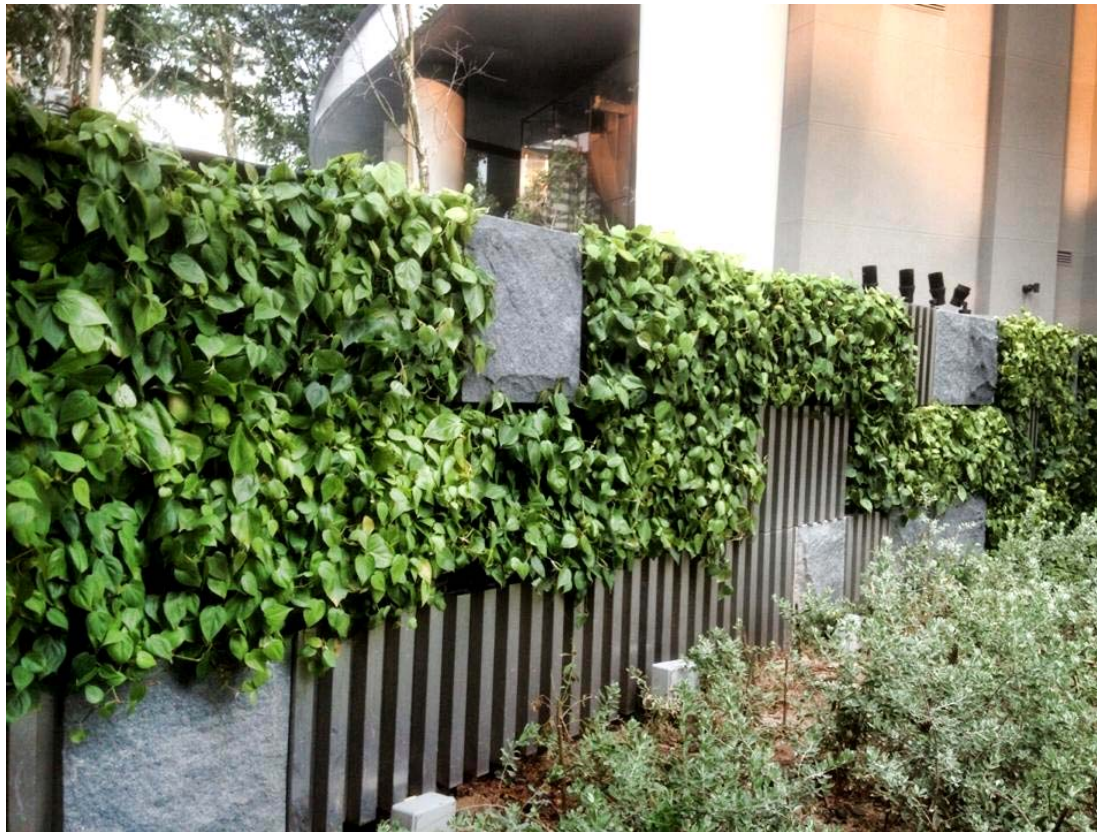






## PlanterCell® H2O-R Foam Green Wall Panel

•8 Ardmore Park

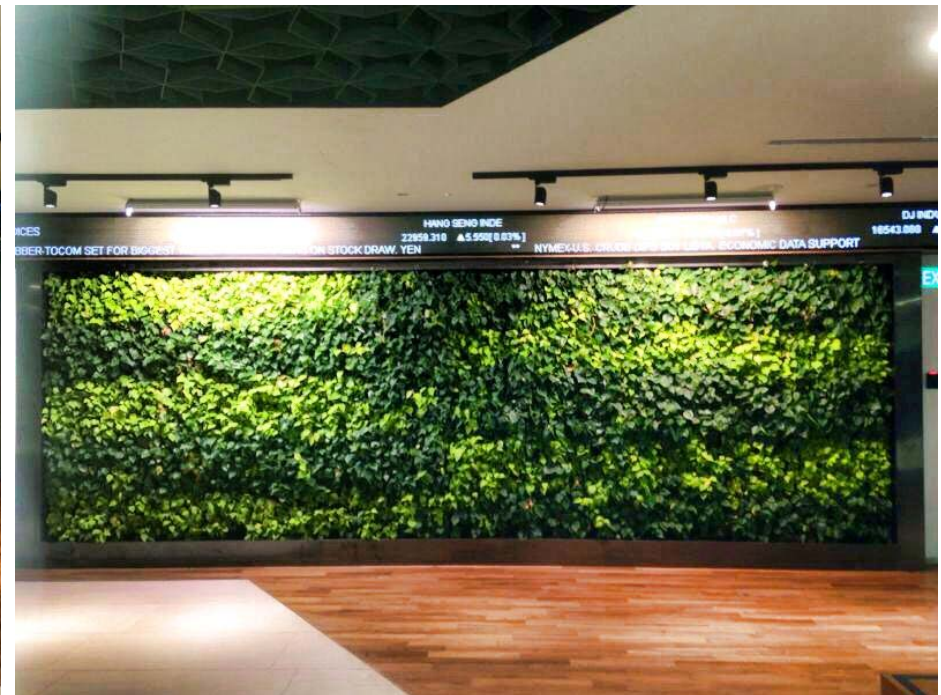






## PlanterCell® H2O-R Foam Green Wall Panel

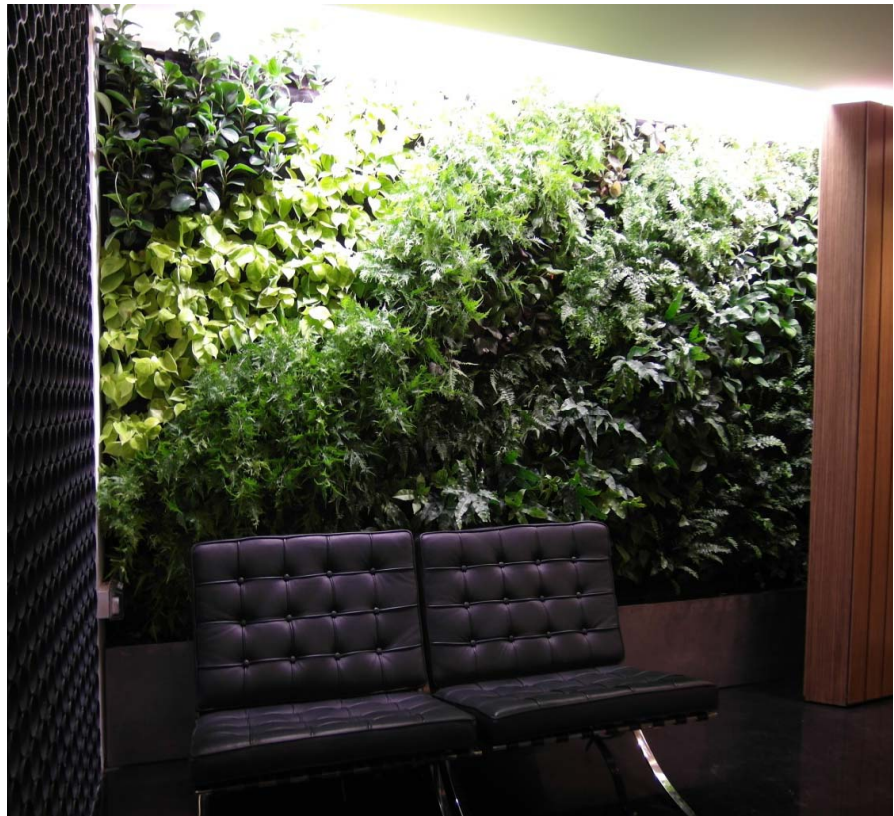
•SGX Vista Office





## PlanterCell® H2O-R Foam Green Wall Panel

•336 Smith Street Office Kyoob Office –Reception Area







## PlanterCell® H2O-R Foam Green Wall Panel

•294A Onan Road (Airwell)







## PlanterCell® H2O-R Foam Green Wall Panel

•140 Arab Street - Airwell







## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - SILA Awards 2013





## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - LIAS Awards of Excellence 2013







## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - Pasarbella: i-Light Event 2014 at MBS



•Pasarbella: i-Light Event 2014 at MBS





## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - SILA World Class Design Forum 2014







## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - Thailand Exhibition 2014





## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - Sky Rise Greenery Conference 2014







## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - Singapore Garden Festival 2014 (CIB Indoor Gallery )







## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS - BexAsia 2014 Technology Talk

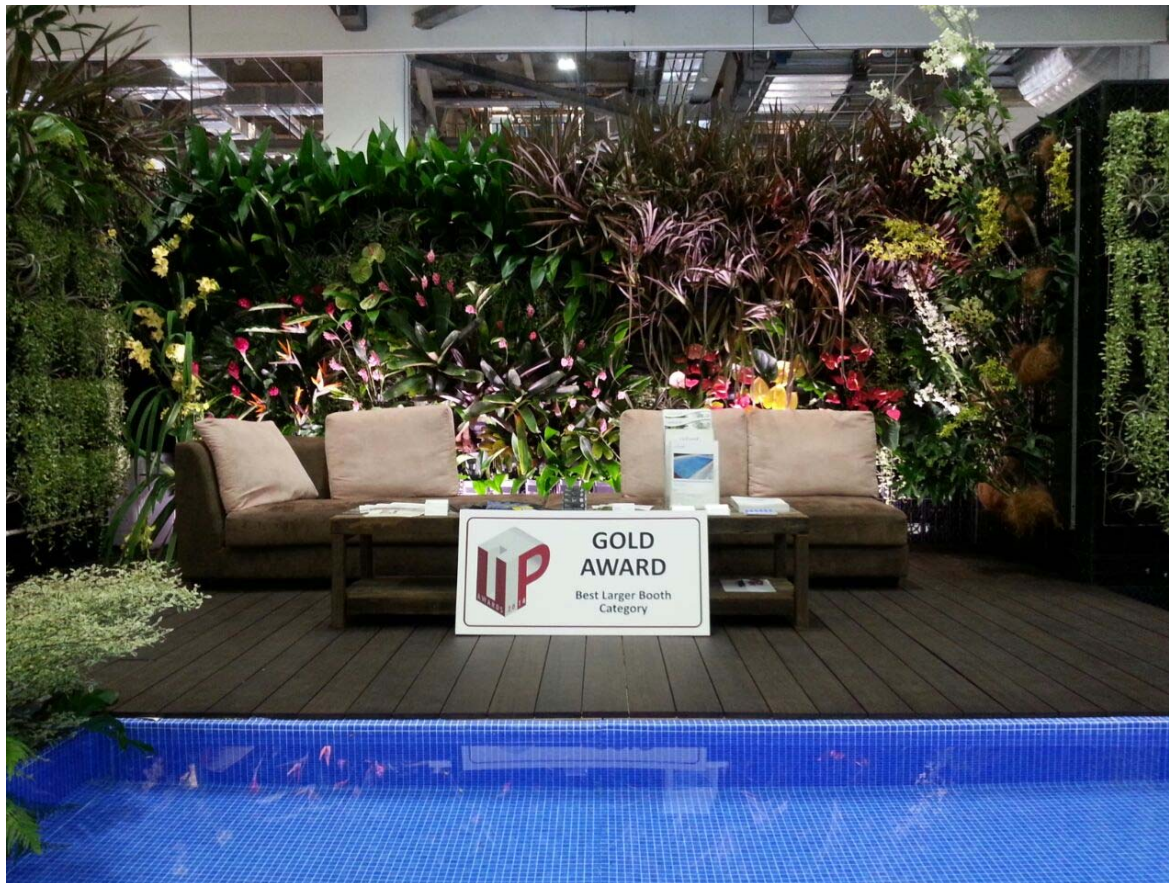






## PlanterCell® H2O-R Foam Green Wall Panel

•EVENTS – ArchExpo 2014





## PlanterCell® 170



**PlanterCell® 170** is a specially designed lightweight but sturdy planter box to build a green wall.

## GREEN WALL SYSTEM







## PlanterCell® 170 – Technical Specifications

### SPECIFICATIONS

Material		Recycled PP
SEC** Green Label		Yes
SGBC*** Green Product		Yes
Size:		
Height	mm	170
Width	mm	120
Length	mm	500
Pieces per m <sup>2</sup>	nos.	10
Weight:		
Empty	kg/unit	0.7
Planted*	kg/unit	6 to 8
Cells (Reservoirs)	nos.	2 x 10
Water Storage:		
Planting within tray	l/box	~ 2.4
Colour		Black

\* with planting mix, water, Insu® Felt and plants

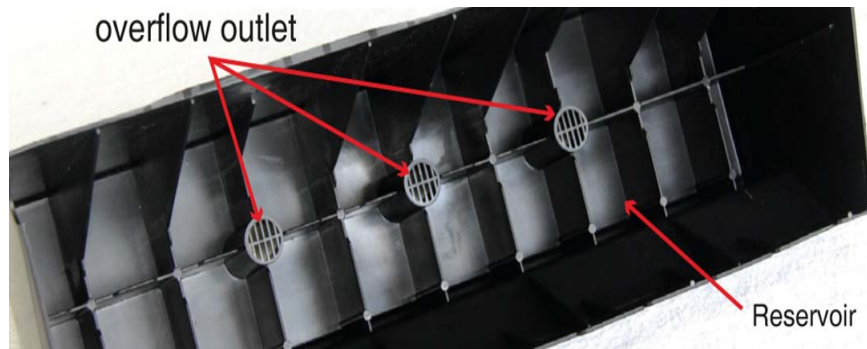
\*\* Singapore Environment Council

\*\*\* Singapore Green Building Council





## Features of PlanterCell® 170



**PlanterCell® 170** has three overflow outlet holes which allow excess water to discharge effectively.

**PlanterCell® 170** has reservoirs which contains 2.4 litres of water to provide the essential moisture to sustain plant growth.



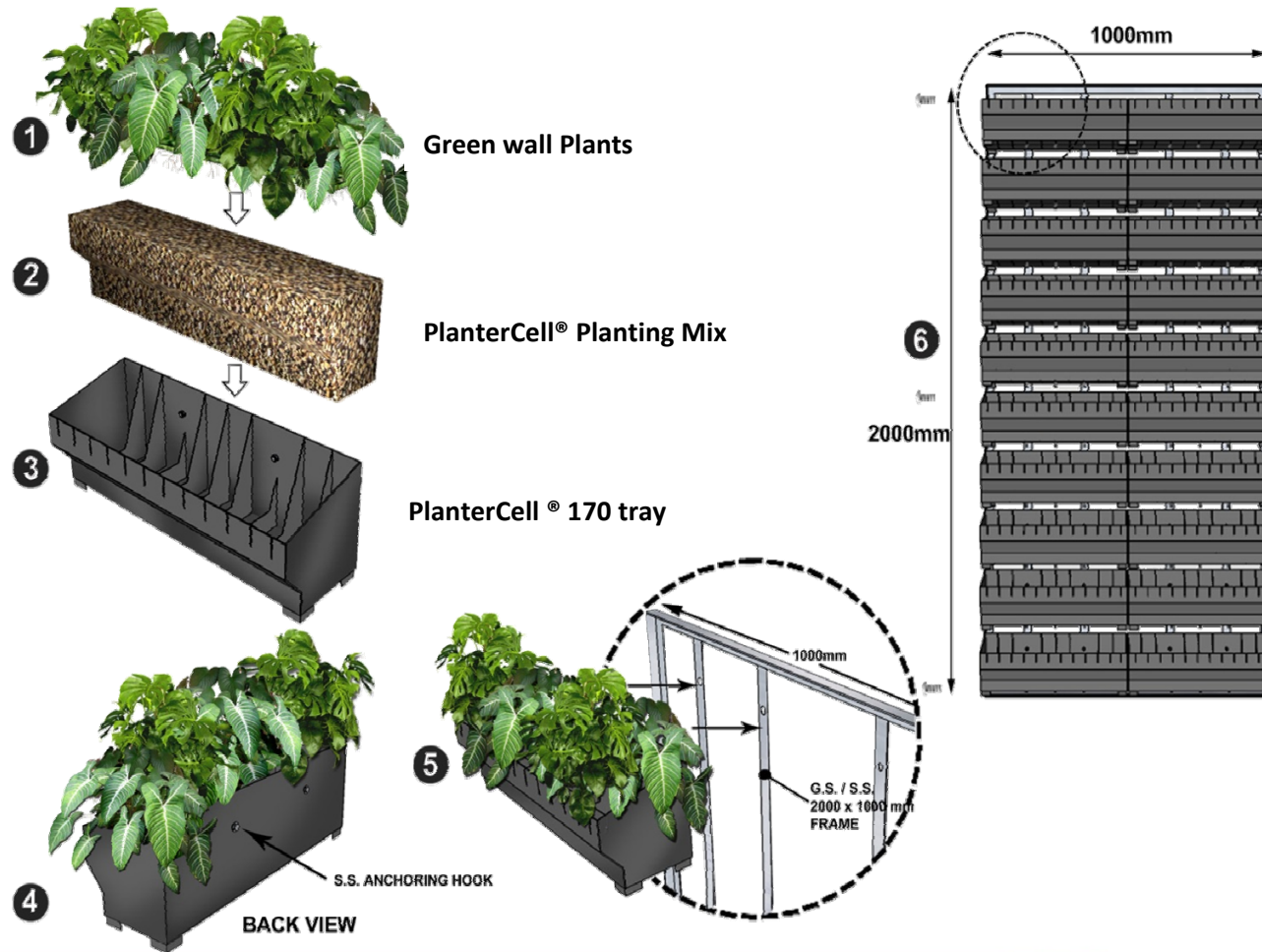
**PlanterCell® 170** can be easily anchored to wall with specially designed **anchor bolts** or **SS304 Hooks**







## PlanterCell® 170 Installation





## GREEN WALL SYSTEM

### PlanterCell® 170 Mini



**PlanterCell® 170 Mini**, by its' name, is a small version of our PlanterCell® 170 green wall system. This mini model allows for more creative design options of green walls and provides solutions for facades with space constraints.





## PlanterCell® 170 Mini



### PlanterCell® 170 Mini GREEN WALL SYSTEM

- (1) PlanterCell® 170 Mini
- (2) PlanterCell® Planting Mix
- (3) Selected Green Wall plants

## SPECIFICATIONS

Material		Recycled PP
SEC** Green Label		Yes
SGBC*** Green Product		Yes
Size:		
Height	mm	170
Width	mm	175
Length	mm	200
Pieces per m <sup>2</sup>	nos.	25
Weight:		
Empty	kg/unit	0.26
Planted*	kg/unit	1.4 to 2
Cells (Reservoirs)	nos.	6
Water Storage:		
Planting within tray	l/unit	0.4
Colour		Black

\* with planting mix, water, Insu® Felt and plants  
 \*\* Singapore Environment Council  
 \*\*\* Singapore Green Building Council



everyday **i**nnovation



## Features of PlanterCell® 170 mini



**PlanterCell® 170 mini** has 6 overflow outlet holes which allow excess water to discharge effectively.

**PlanterCell® 170 mini** has reservoirs which contains 10 l /m<sup>2</sup> of water to provide the essential moisture to sustain plant growth.

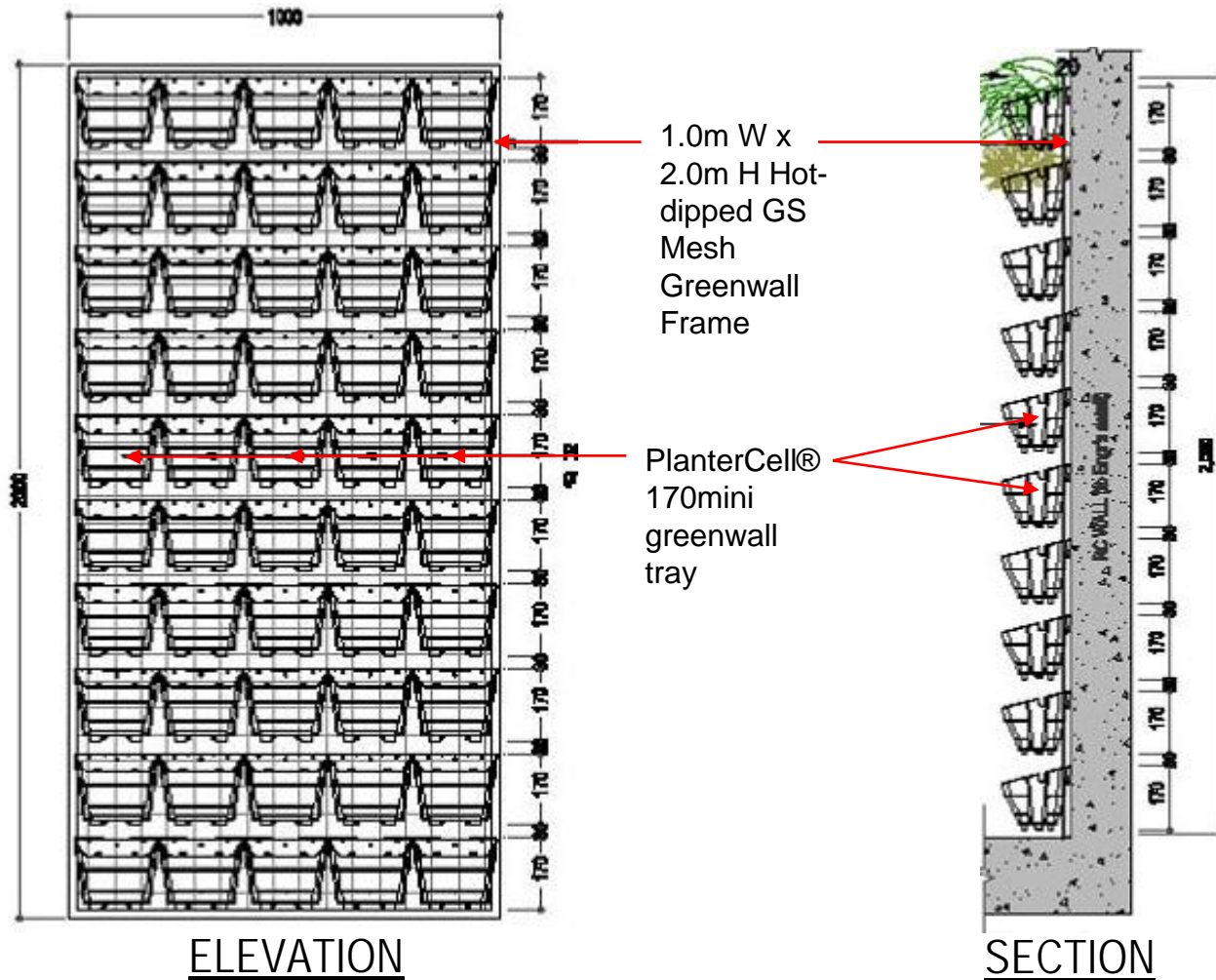


**PlanterCell® 170** can be easily anchored to wall with specially designed incorporated anchoring hooks and anchoring bolt holes.





## PlanterCell® 170 mini – Standard Details





## PlanterCell® 170 mini – Tray Installation

Setting-out of Plantercell170 mini tray : Residential Project (2014)

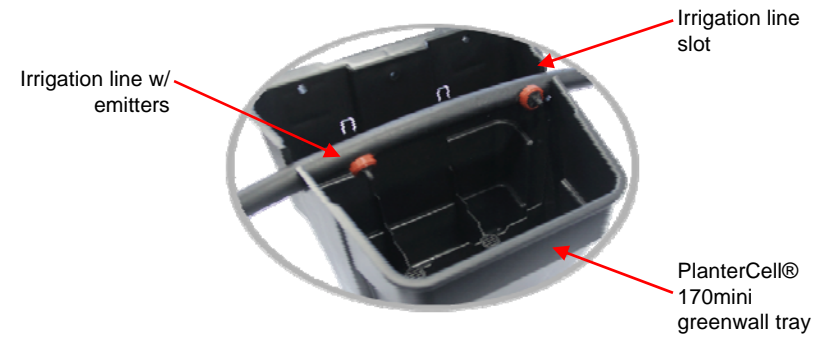






## PlanterCell® 170 mini

### Installation of Auto-Irrigation:





- Changi T1 Skytrain Lobby (Stand-alone Vertical Landscape)







- Changi T1 Skytrain Lobby (Stand-alone Vertical Landscape)





•MOE Headquarters - Partition Wall



•Kranji Loop Office - Feature Wall







•240 Balestier Road - Feature Wall



•Robinson Road 71 - Partition Wall







•70 Old Upper Thomson Road  
- Vertical Vegetable & Herbs Farming



•Coriander



•Rosemary



•Thyme



•Peppermint





•Gaia Condominium Showflat





•Gaia Condominium Façade @ 33 Jalan Dusun







•Bishan Junction 8 – Level 3 Roof Garden Area



Installation in Progress



Completion



•Bishan Junction 8 – Level 1



Installation in Progress



Completion





•JTC Summit Office - Reception Area



Installation in Progress



Completion





Applicable areas (Outdoor):



•Starhill Hotel in KL, Malaysia







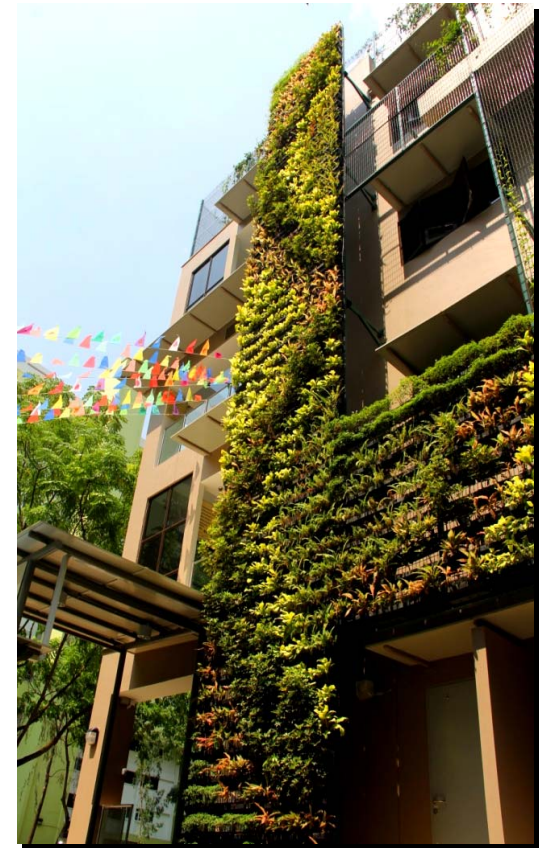
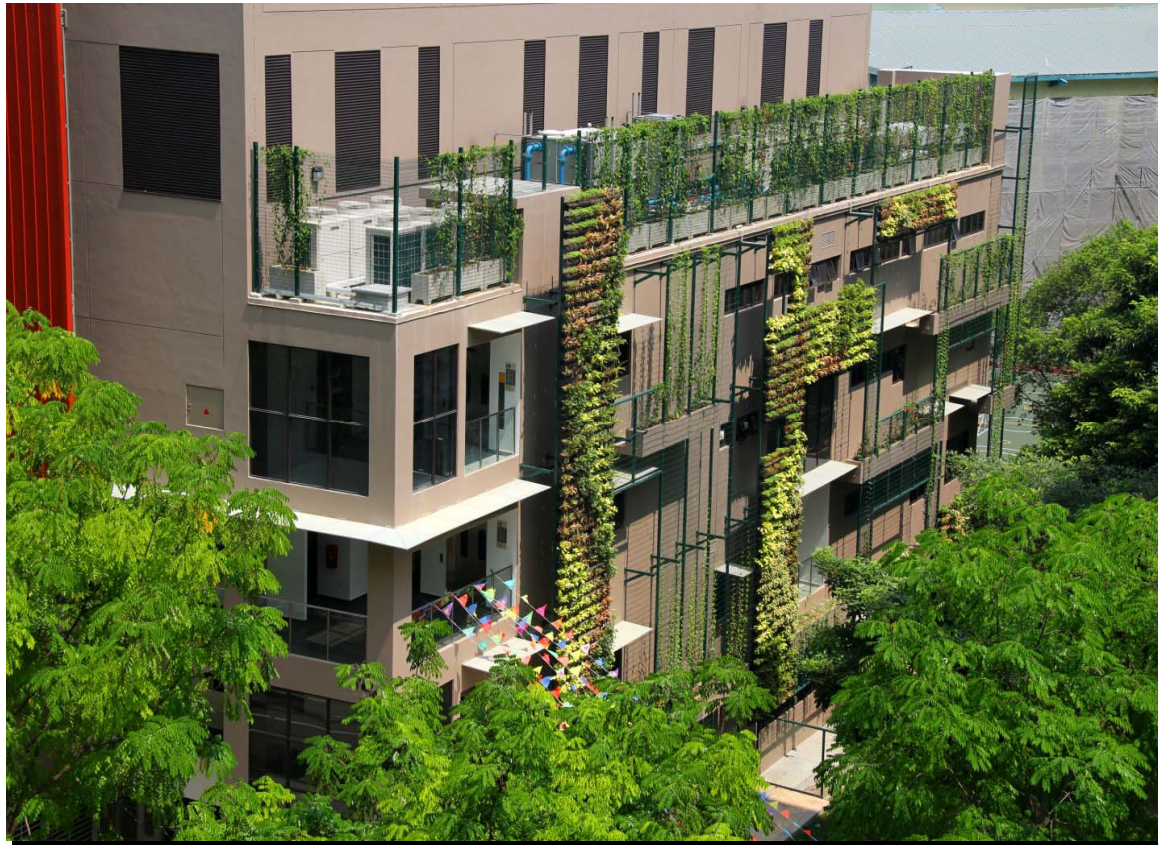
•Starhill Hotel in KL, Malaysia







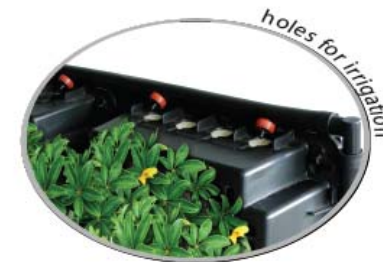
•Pek Kio Community Centre





# uniseal

## PlanterCell® 75



PlanterCell® 75 is a lightweight and sturdy **cassette type** system for green wall.



## SPECIFICATIONS

Material	Recycled PP	
SEC* Green Label	Yes	
SGBC** Green Product	Yes	
Size:		
Height	mm	75
Width	mm	250
Length	mm	500
Pieces per m <sup>2</sup>	nos.	8
Weight:		
Empty	kg/cassette	0.58
Planted#	kg/cassette	4.5 to 6
Water Storage:		
Planting within tray##	l/cassette	~ 1.4
Colour	Black	

\* Singapore Environment Council

\*\* Singapore Green Building Council

# with planting mix, water, Insu™ Felt and plants







## PlanterCell® 75 – Build Up

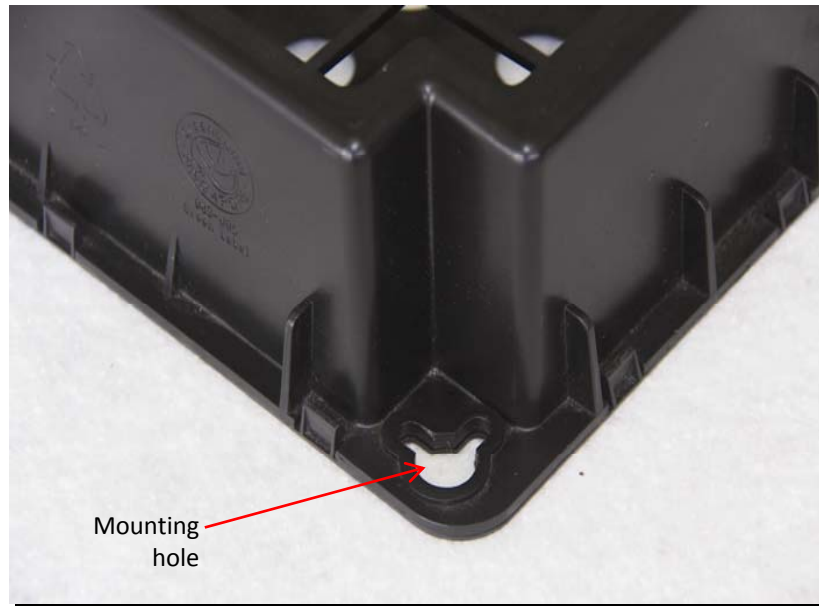


### PlanterCell® 75 GREEN WALL SYSTEM

- |                               |                                |
|-------------------------------|--------------------------------|
| (1) Back Cover                | (4) Insu™ Felt                 |
| (2) Water Retention Foam      | (5) Front Cover                |
| (3) PlanterCell® Planting Mix | (6) Selected Green Wall plants |

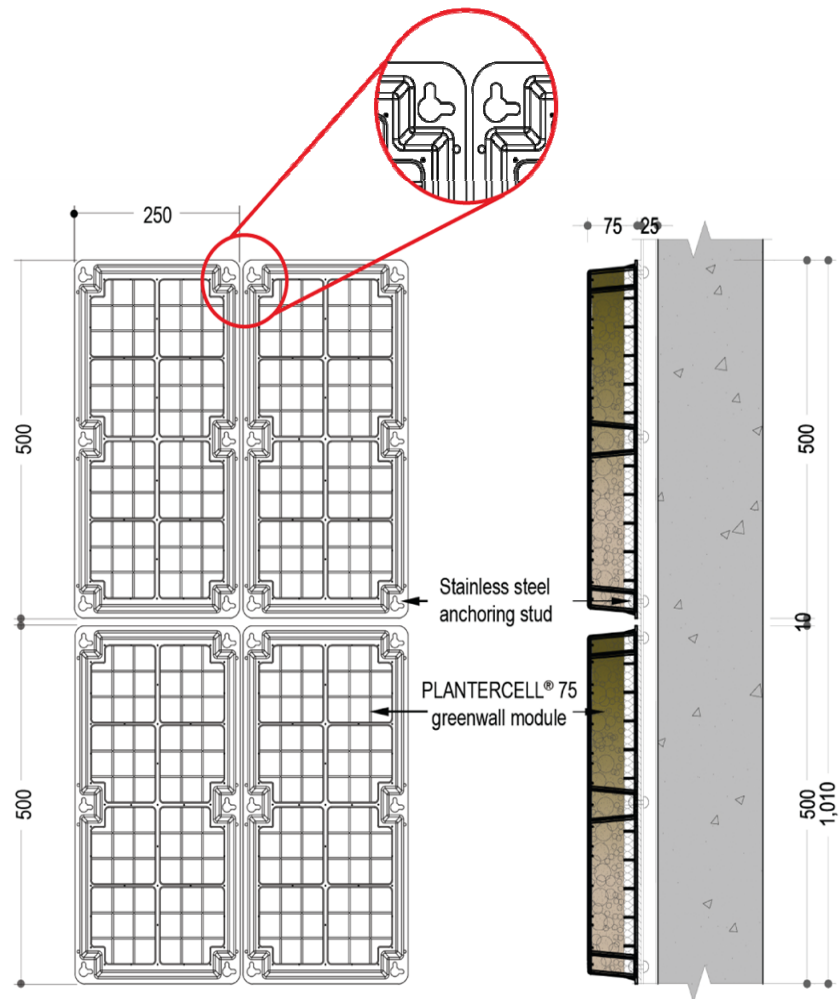


## Features of PlanterCell® 75



•PlanterCell® 75 can be easily anchored to wall through specially designed mounting holes.

Stainless or hot-dipped galvanised mild steel pilasters and anchor bolts are specially designed to facilitate easy mounting and re-mounting of the modules during installation and future maintenance.

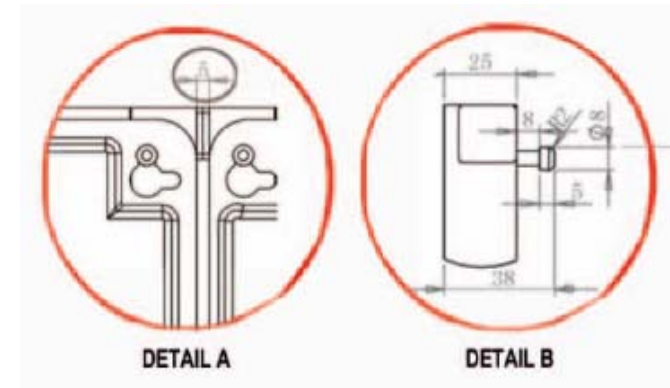
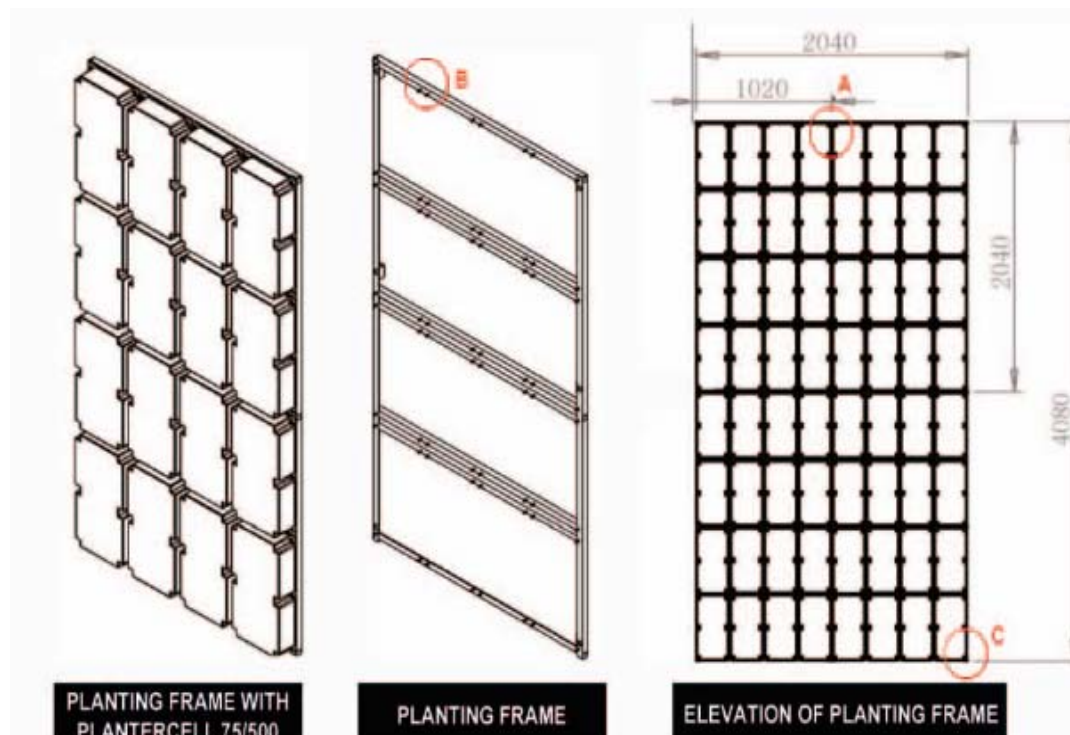






## GREEN WALL SYSTEM

Stainless or hot-dipped galvanised mild steel pilasters and anchor bolts are specially designed to facilitate easy mounting and re-mounting of the modules during installation and future maintenance





Off-site pre-planting...







## Applications:

- Railing / barricade / Partition walls







## PlanterCell® 75 – Featured @ World Orchid Conference 2011







PlanterCell® 75 – Singapore Garden Festival 2012







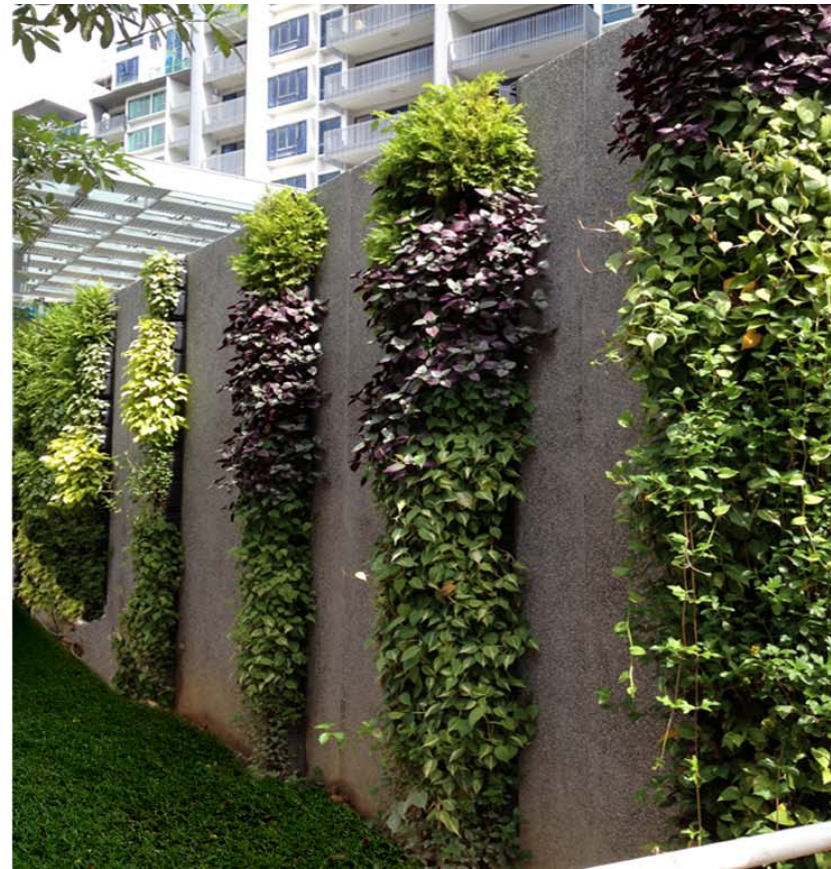
- Hundred Trees Condominium – Drop off Area Feature Wall







•Hundred Trees Condominium – Entrance Feature Wall





## PlanterCell<sup>®</sup> 125



### GREEN WALL SYSTEM



PlanterCell<sup>®</sup> 125 is an innovative lightweight but sturdy planter box that is stackable and allows for planting on both faces creating a **double sided** green wall.





## SPECIFICATIONS

Material	Recycled PP	
SEC** Green Label	Yes	
SGBC*** Green Product	Yes	
Size:		
Height	mm	125
Width	mm	125
Length	mm	500
Pieces per m <sup>2</sup>	nos.	16
Weight:		
Empty	kg/unit	~ 0.7
Planted*	kg/unit	5 to 7
Cells (Reservoirs)	nos.	4 x 4
Water Storage:		
Planting within tray	//unit	2.3
Colour	Black	

\* with planting mix, water, Insu® Felt and plants

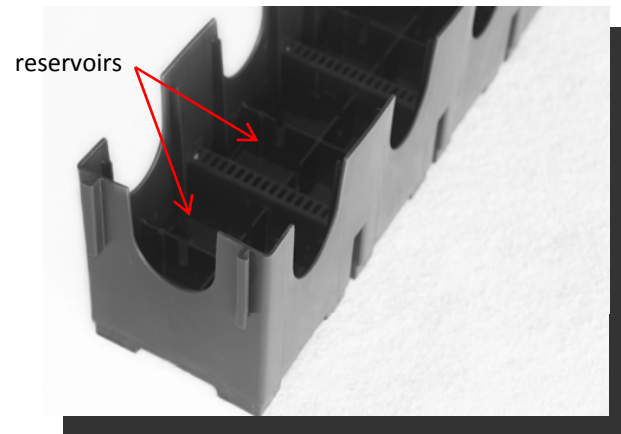
\*\* Singapore Environment Council

\*\*\* Singapore Green Building Council





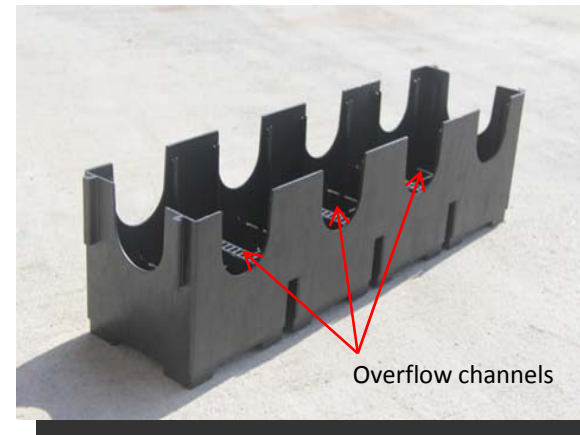
## Features of PlanterCell® 125



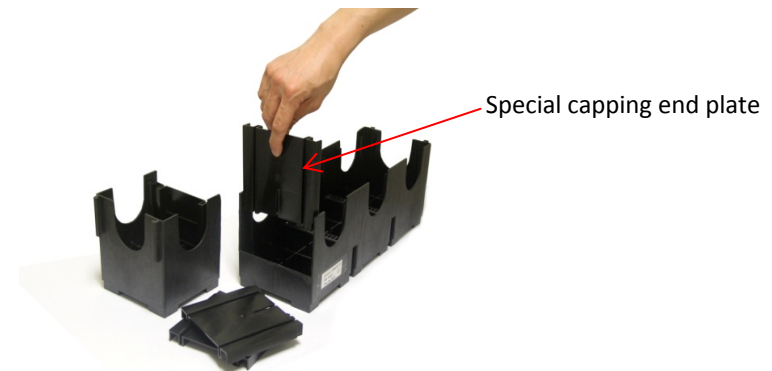
•**PlanterCell® 125** has reservoirs which contains 2.4 litres of water to provide the essential moisture to sustain plant growth.



•**PlanterCell® 125** is able to interlock with adjacent trays.



•**PlanterCell® 125** has overflow outlet holes to allow excess water to discharge effectively.



•**PlanterCell® 125** tray can be cut to suit design and site requirement.





## PlanterCell® 125 Build-up

### PlanterCell® 125 GREEN WALL SYSTEM

- (1) PlanterCell® 125
- (2) PlanterCell® Planting Mix
- (3) Selected Green Wall plants





## Applications:

- Revolving Greenery







## Applications:

- Railing / barricade







## GREEN WALL SYSTEM

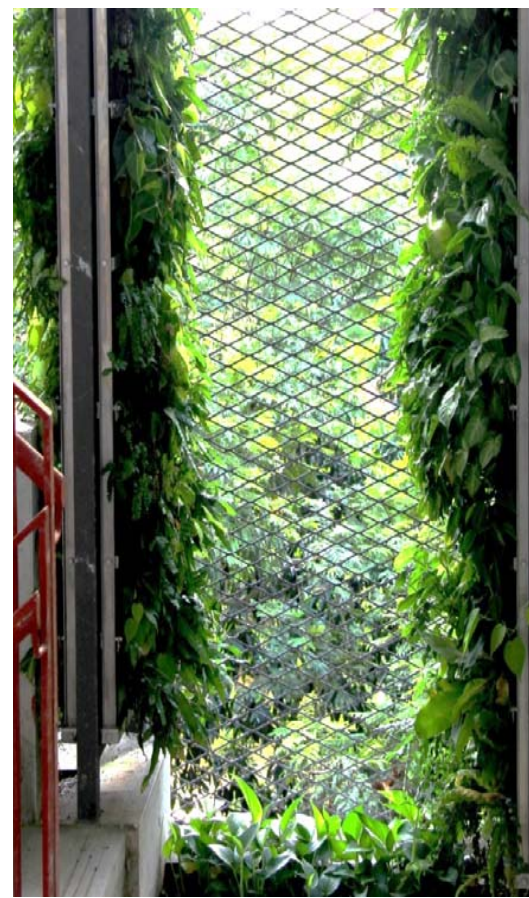
•On-site Planting







- Goodwood Residences (9 Blocks)





# Auto-Irrigation System

- Green wall
- Green roof







## Auto-Irrigation System Accessories:

### •Irrigation Controller

-device to operate automatic irrigation systems such as lawn sprinklers and drip irrigation systems.

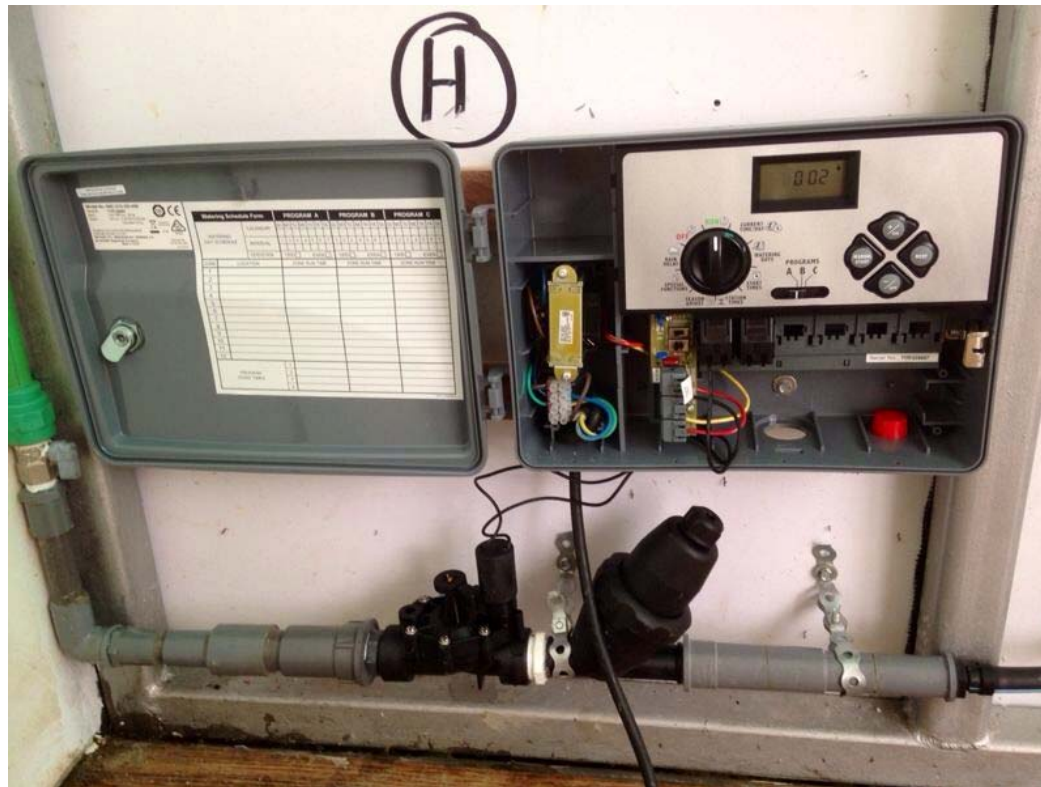
Most controllers have a means of setting the frequency of irrigation, the start time, and the duration of watering.





## Auto-Irrigation System

- Irrigation Controller





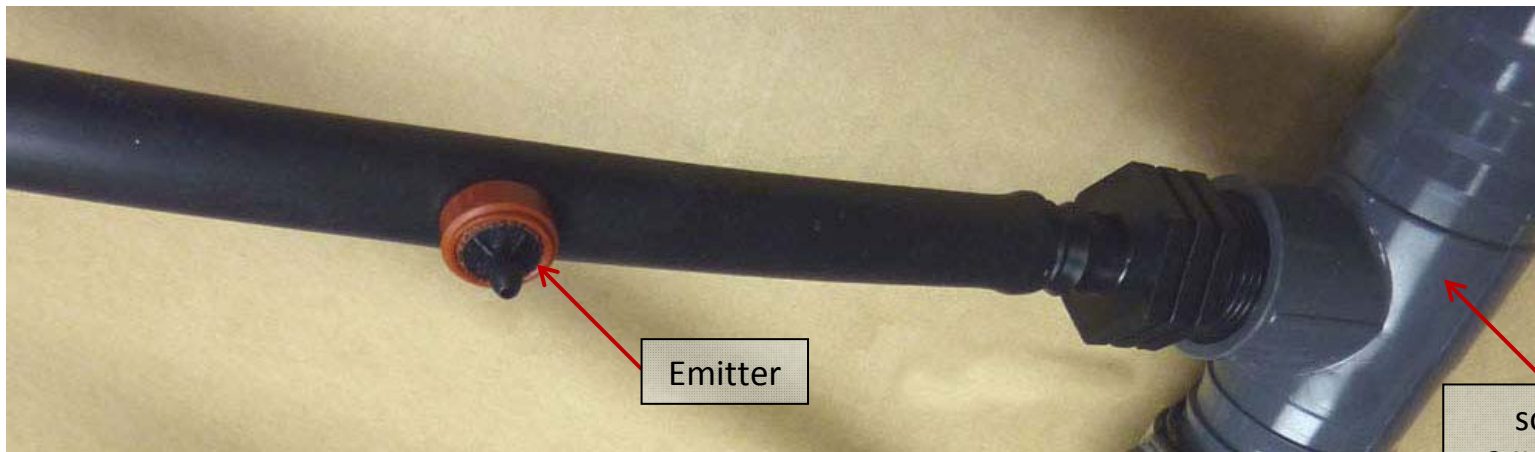


## Auto-Irrigation System

### Accessories:

- Irrigation Pipe for Green wall

-16mm dia., a flexible pipe, use in agricultural irrigation systems, water delivery systems, sprinkler stands, and hydraulic automation applications.



Emitter

solenoid  
24VAC valve



## Irrigation Pipe Installation:







## Auto-Irrigation System

- Irrigation Pipe lines for diff. types of Green wall Systems



•Plantercell® 170 Greenwall System with Auto-Irrigation



•Plantercell® 75 Greenwall System with Auto-Irrigation



•Plantercell® H2O-R Foam Greenwall System with Auto-Irrigation



## Auto-Irrigation System Accessories:

- Irrigation Pipe for Green roof

- used for above ground and underground irrigation systems
- drip irrigation system



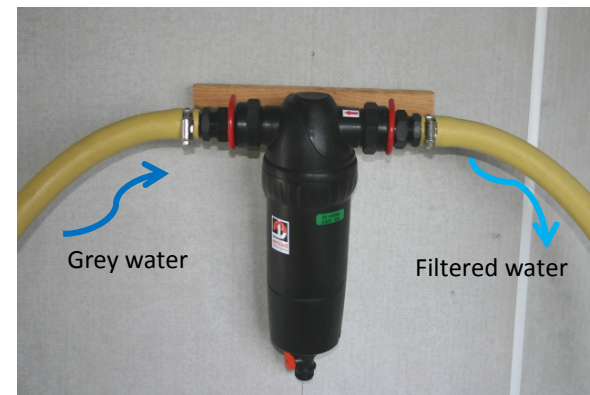




## Auto-Irrigation System Accessories:

### •Micron Filter

- to prevent emitters from becoming plugged.
- filter sands, organic materials, algae, etc.
- can remove particles down to 5 microns first pass.
- for capturing and retaining water-transported debris or sediment.

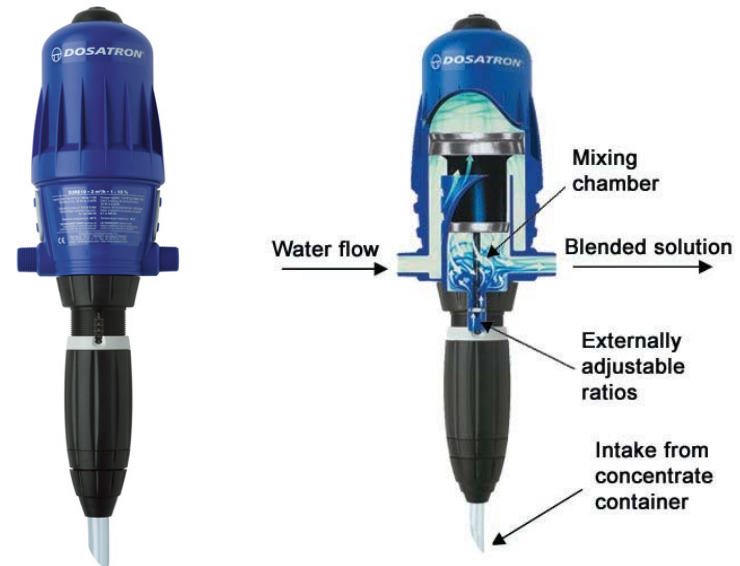




## Auto-Irrigation System Accessories:

### •Fertigator

- feeding soil by sending small amounts of fertilizer through an irrigation system on a regular basis.
- takes the required percentage of liquid fertiliser and injects it into the water for irrigation.
- Dosing range from 0.2% to 2%.







# GREEN ROOF SYSTEM



## GREEN ROOF SYSTEM







## GREEN ROOF SYSTEM



PlanterCell® 30P



PlanterCell® 50



PlanterCell® 70



PlanterCell® 130



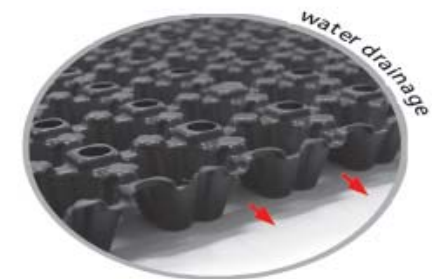
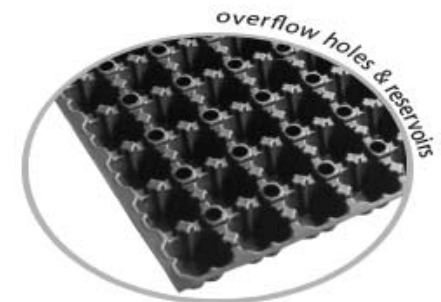


**PlanterCell<sup>®</sup> 30P**



**PlanterCell<sup>®</sup> 30P** is a lightweight, sturdy and flexible water retention and drainage sheet that can be applied both as a green roof system or a sub-soil drainage system.

## GREEN ROOF SYSTEM







## SPECIFICATIONS

Material Recycled PS

SEC\*\* Green Label Yes  
SGBC\*\*\* Green Product Yes

### Size:

Height	mm	30
Width	mm	1000
Length	mm	2000

Pieces per m<sup>2</sup> nos. 0.5

### Weight:

Empty	kg/m <sup>2</sup>	~ 1.4
Planted*	kg/m <sup>2</sup>	80 to 120

Cells (Reservoirs) nos. 18 x 36

### Water Storage:

Planting on top l/m<sup>2</sup> ~ 12.5

Compressive Strength	kPa	min. 180
	tonnes/m <sup>2</sup>	min. 18

Planting Intensive  
Extensive

Colour Black

\* with planting mix, water, Insu® Felt and plants

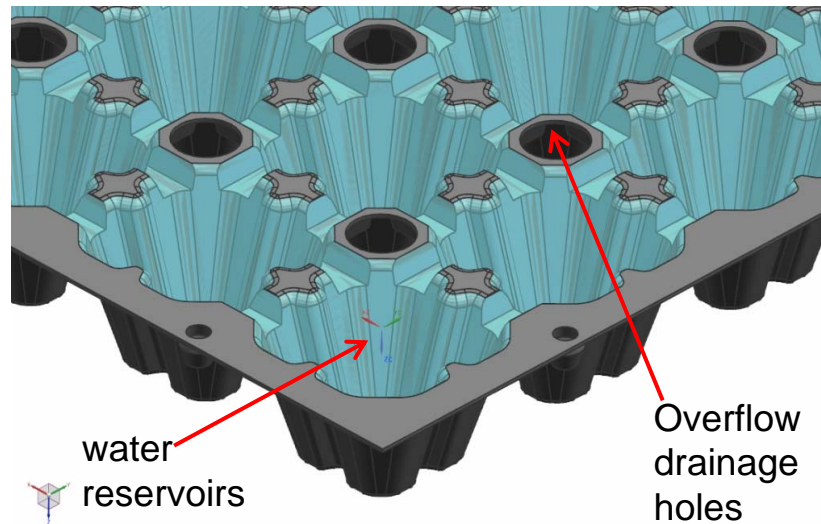
\*\* Singapore Environment Council

\*\*\* Singapore Green Building Council

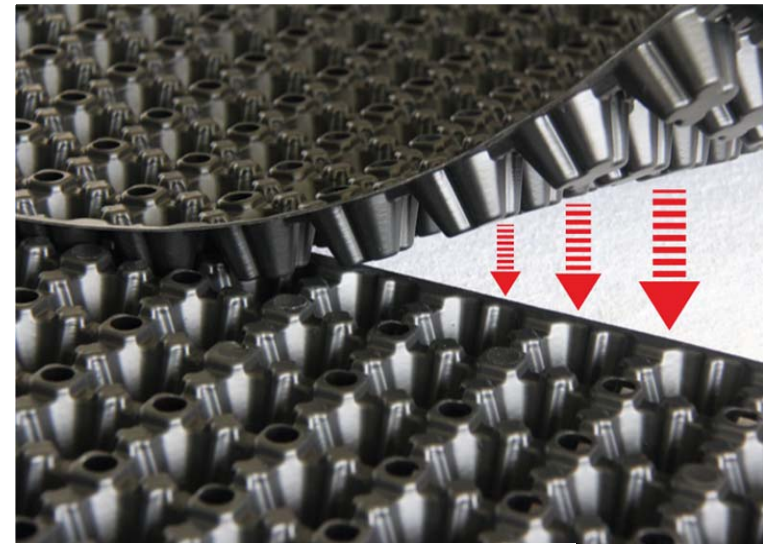




## Features of PlanterCell® 30P



**PlanterCell® 30P** has a array of reservoirs which contains 12.5 l/m<sup>2</sup> of water to provide the essential moisture to sustain plant growth.



\*Overlapping Design

**PlanterCell® 30P** are joined by overlapping at least one row of reservoirs. Sheets are flexible, allowing them to conform to any undulations on site.





## PlanterCell® 30P Build-up

### • On RC Roof



- 1) RC Roof Slab
- 2) 1.5mm thk PVC Waterproofing membrane
- 3) PlanterCell® 30P
- 4) Insu® Felt (120g/m2) geo-textile
- 5) PlanterCell® Planting Mix
- 6) Greenroof Plants

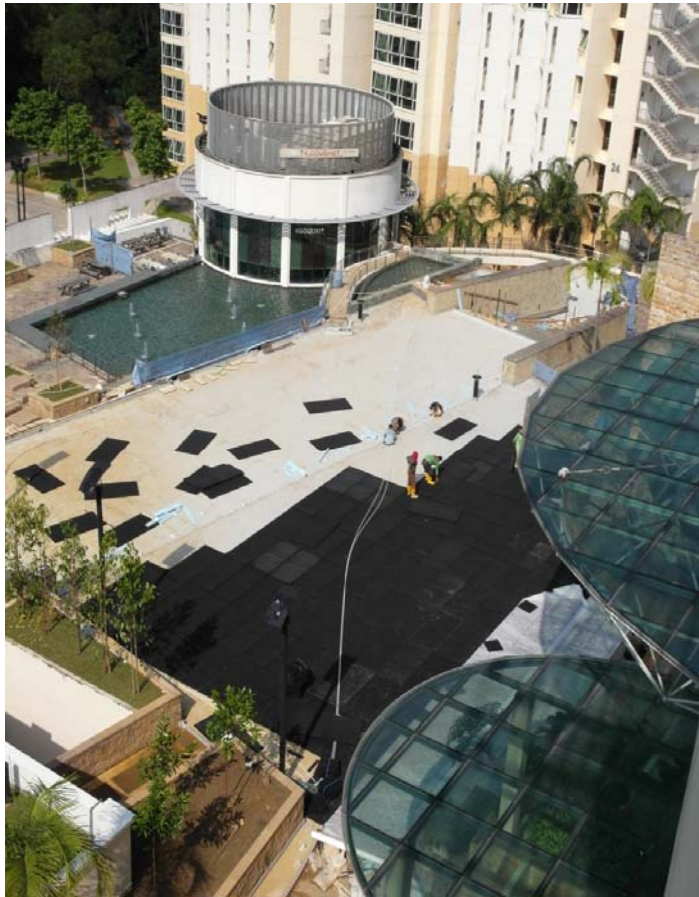
### • On Metal Roof



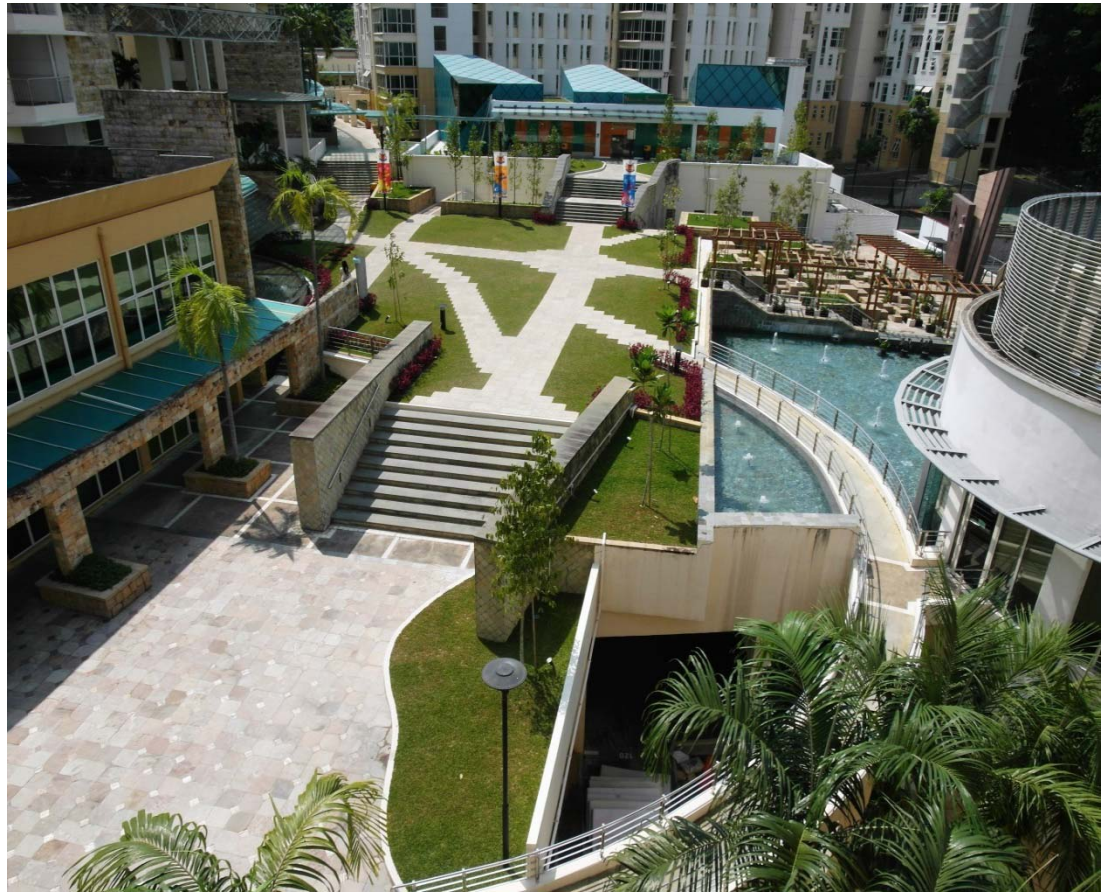
- 1) Metal Roof System
- 2) PlanterCell® 30P
- 3) Insu® Felt (120g/m2) geo-textile
- 4) PlanterCell® Planting Mix
- 5) Greenroof Plants



•Prince George's Park Residence - NUS



•Installation



•Completion





• Prince George's Park Residence - NUS







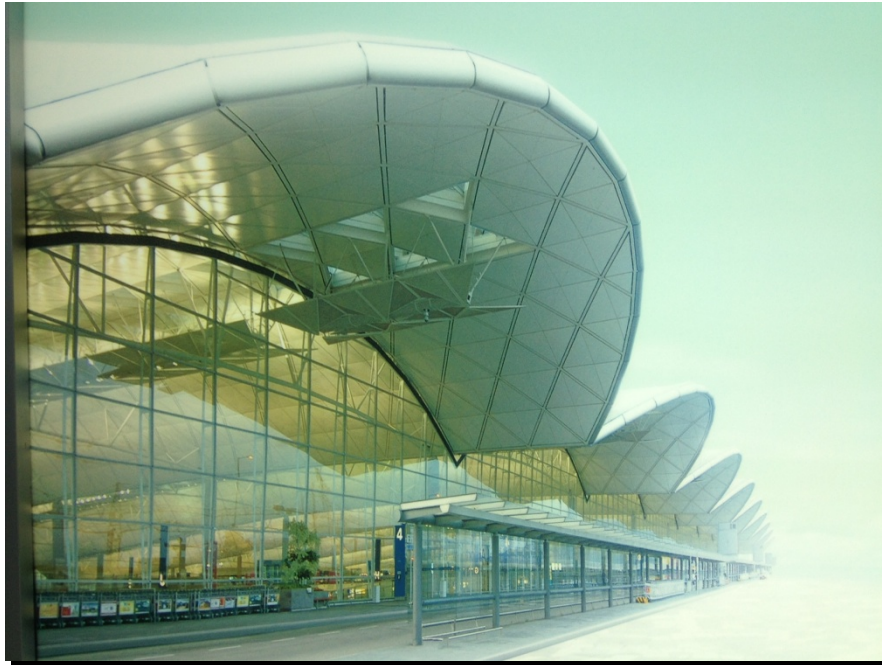
• Hong Kong, Shing Wan Road







• Hong Kong International Airport





• Hong Kong International Airport





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## PlanterCell® 50



### GREEN ROOF SYSTEM



PlanterCell® 50 is an innovative patented product with dual applications. It is a green roof system and a sub-soil drainage mat on the other.

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## SPECIFICATIONS

Material	Recycled PP
----------	-------------

SEC** Green Label	Yes
SGBC*** Green Product	Yes

Size:

Height	mm	50
Width	mm	500
Length	mm	500

Pieces per m <sup>2</sup>	nos.	4
---------------------------	------	---

Weight:

Empty	kg/m <sup>2</sup>	5.6
Planted*	kg/m <sup>2</sup>	80 to 120

Cells (Reservoirs)	nos.	11 x 11
--------------------	------	---------

Water Storage:

Planting on top	l/m <sup>2</sup>	~18
-----------------	------------------	-----

Compressive Strength	kPa	min. 860
	tonnes/m <sup>2</sup>	min. 87.3

Planting	Intensive
	Extensive

Colour	Black
--------	-------

\* with planting mix, water, Insu\* Felt and plants  
 \*\* Singapore Environment Council  
 \*\*\*Singapore Green Building Council



everyday *i*nnovation



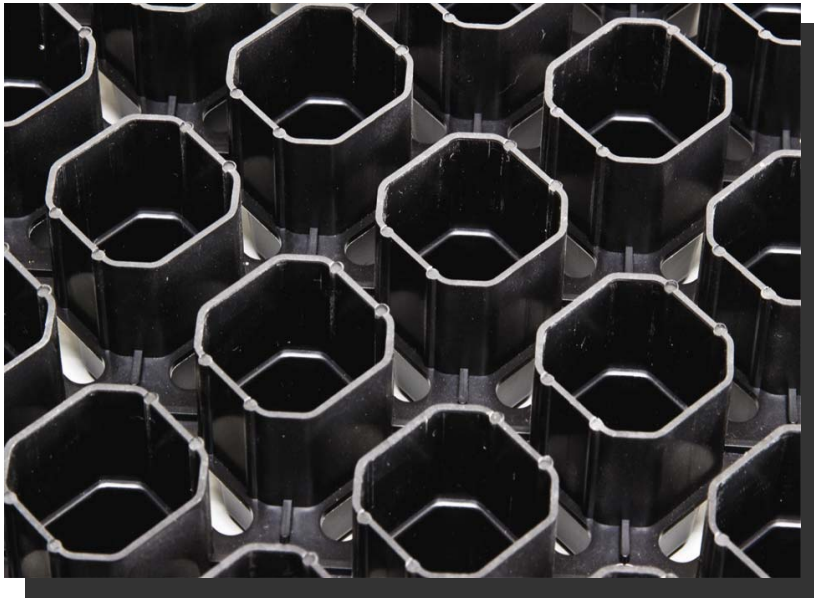


#### PlanterCell® 50 GREEN ROOF SYSTEM

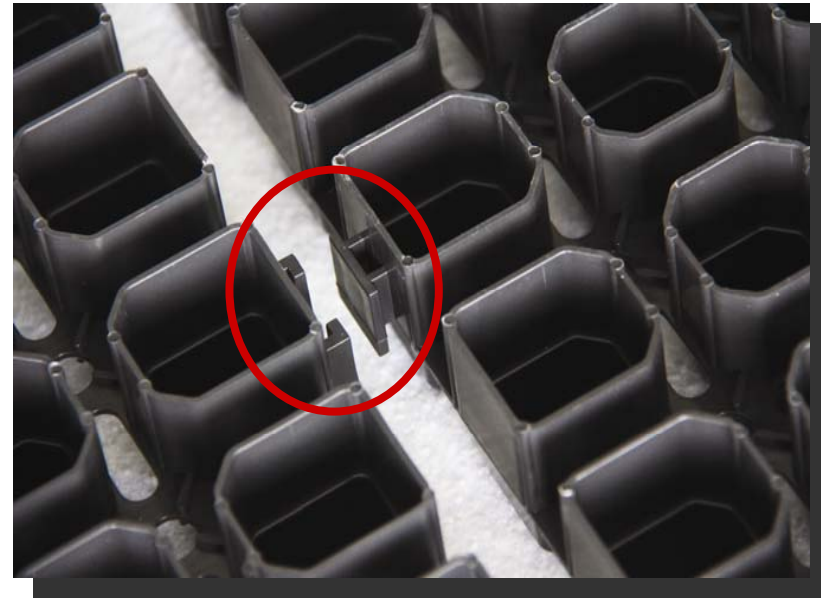
- |   |                                |
|---|--------------------------------|
| (1) Roof Slab                             | (5) PlanterCell® 50            |
| (2) Root Resistant Waterproofing Membrane | (6) Insu® Felt                 |
| (3) Termination Groove Line<br>12mmx12mm  | (7) PlanterCell® Planting Mix  |
| (4) GrasCell® DC30                        | (8) Selected Green Roof plants |
|   | (9) Drain Pipe                 |



## Features of PlanterCell® 50



**PlanterCell® 50** has a reservoir which contains 18 l/m<sup>2</sup> (with planting on top) of water to provide the essential moisture to sustain plant growth.

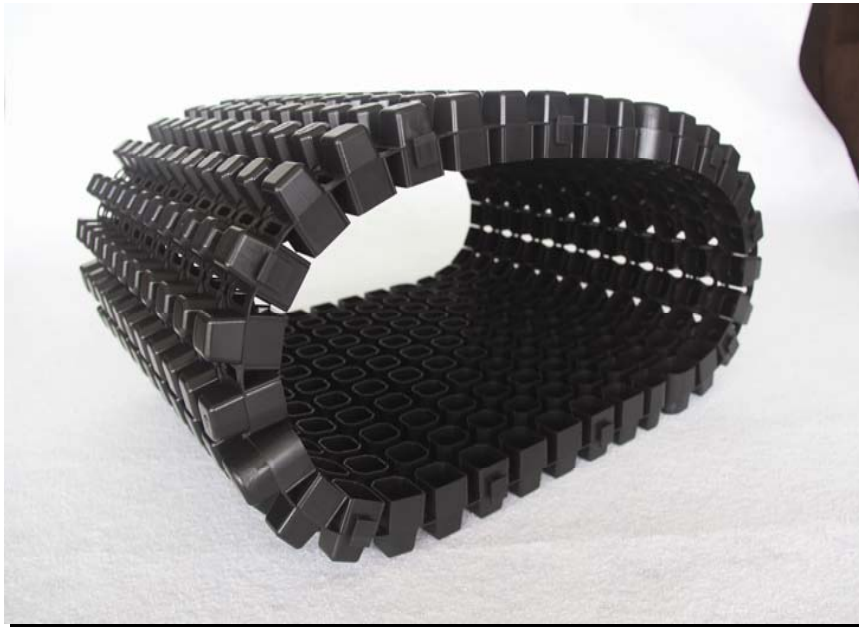


**PlanterCell® 50** is able to interlock (male & female) with adjacent modules.





## Features of PlanterCell® 50



**PlanterCell® 50** is flexible and able to conform to any undulations on site.



**PlanterCell® 50** is stackable which save storage space and shipment costs.



**PlanterCell® 50** is easy to cut and fit to odd corners and different planter shapes.



• Surface Engineering Hub @ Tanjong Kling



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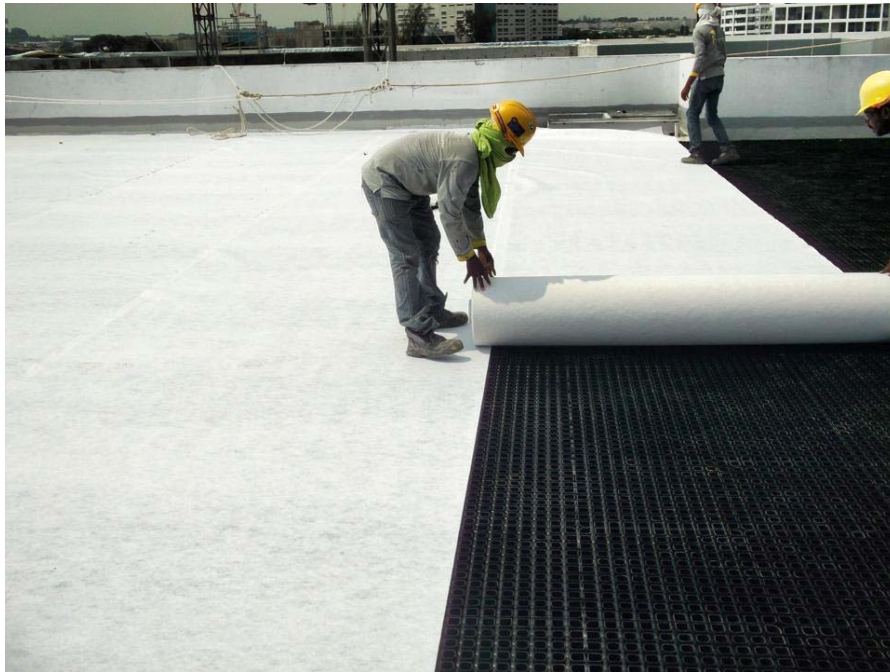


• Surface Engineering Hub @ Tanjong Kling





• Surface Engineering Hub @ Tanjong Kling







• Surface Engineering Hub @ Tanjong Kling







• Surface Engineering Hub @ Tanjong Kling







- Surface Engineering Hub @ Tanjong Kling





• Kuo Chuan Secondary School







• Kuo Chuan Secondary School





• Kuo Chuan Primary School







• Kuo Chuan Primary School







• Kuo Chuan Primary School



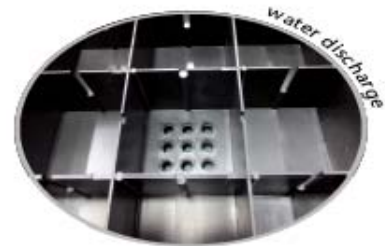
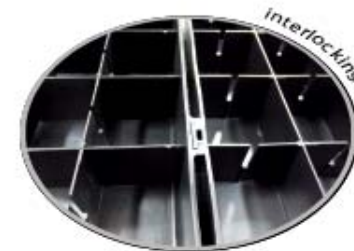
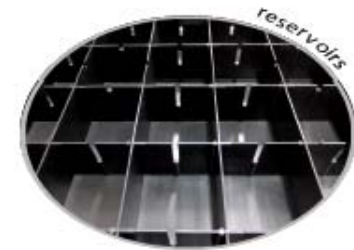




PlanterCell<sup>®</sup> 70



## GREEN ROOF SYSTEM



PlanterCell<sup>®</sup> 70 is a green roof modular tray system with the highest water storage capacity to reduce irrigation needs and can also be used as a part of rain water management to reduce peak flow. It has a high compressive strength to accommodate human traffic.



## SPECIFICATIONS

Material		Recycled PP
SEC** Green Label		Yes
SGBC*** Green Product		Yes
Size:		
Height	mm	70
Width	mm	500
Length	mm	500
Pieces per m <sup>2</sup>	nos.	4
Weight:		
Empty	kg/m <sup>2</sup>	5.8
Planted*	kg/m <sup>2</sup>	80 to 120
Cells (Reservoirs)	nos.	8 x 8
Water Storage:	l/m <sup>2</sup>	~ 46.8
Compressive Strength	kPa	min. 540
	tonnes/m <sup>2</sup>	min. 55
Planting		Intensive Extensive
Colour		Black

\* with planting mix, water, Insu® Felt and plants

\*\*Singapore Environment Council

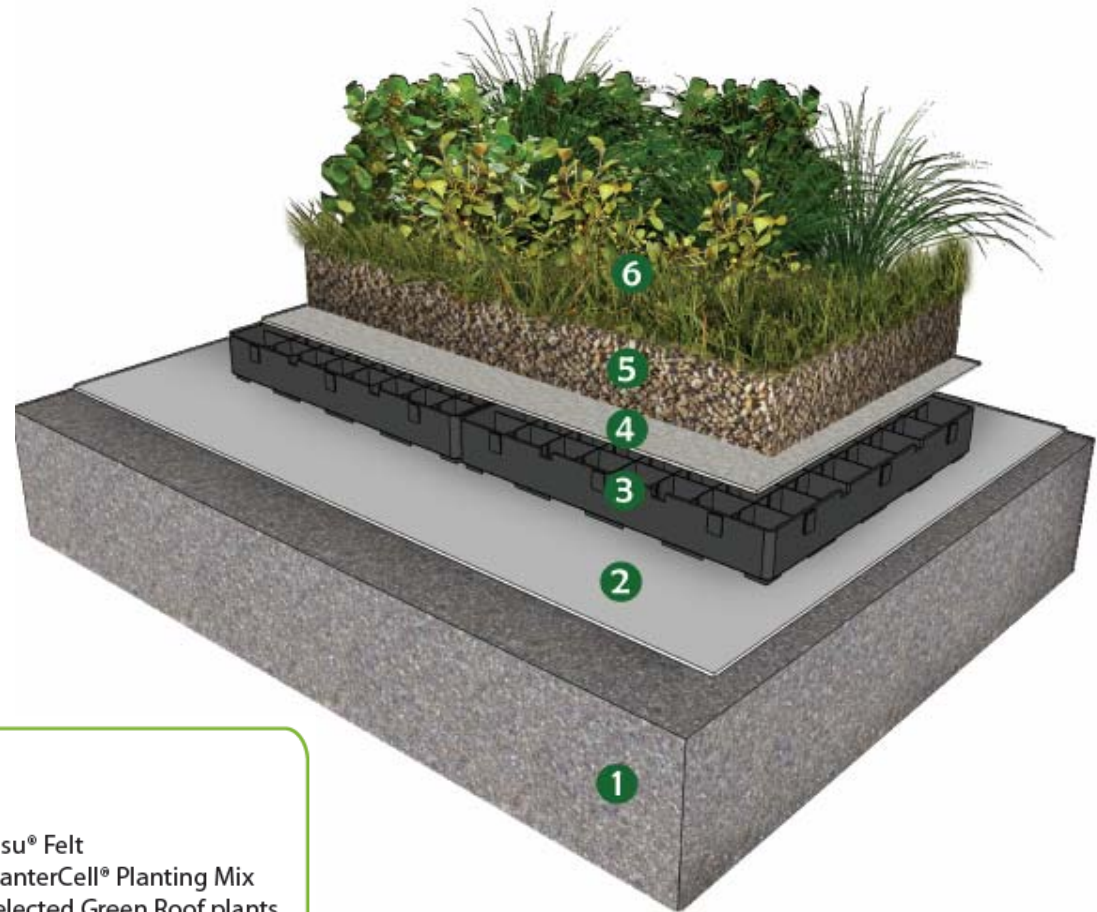
\*\*\* Singapore Green Building Council







## PlanterCell® 70 Build-up

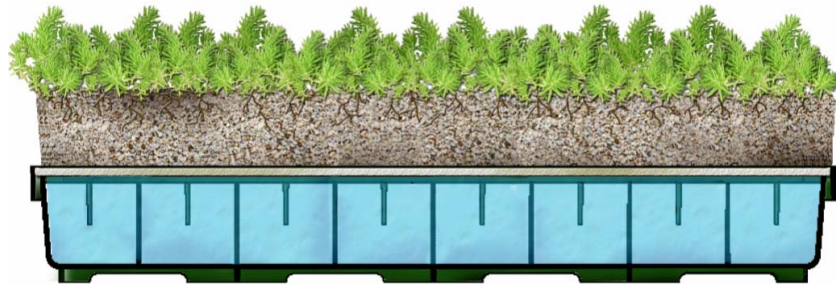


### PlanterCell® 70 GREEN ROOF SYSTEM

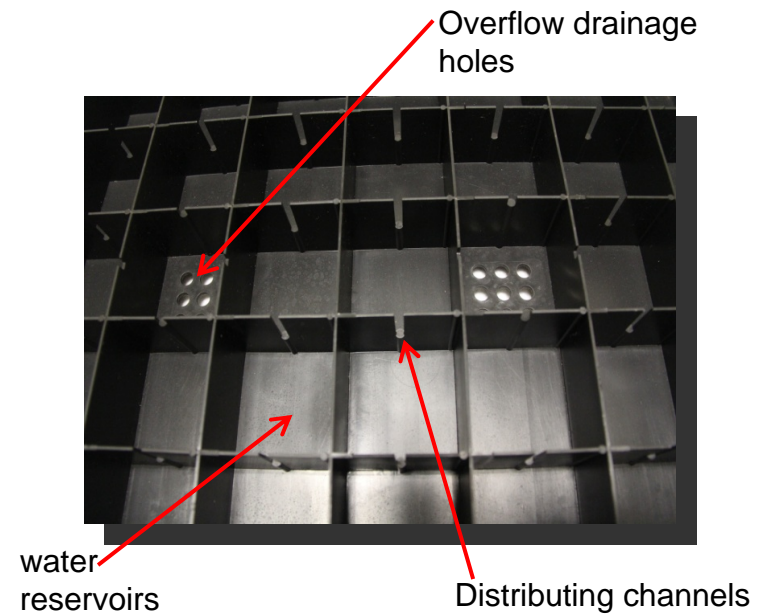
- |   |                                |
|---|--------------------------------|
| (1) Roof Slab                             | (4) Insu® Felt                 |
| (2) Root-Resistant Waterproofing Membrane | (5) PlanterCell® Planting Mix  |
| (3) PlanterCell® 70                       | (6) Selected Green Roof plants |



## Features of PlanterCell® 70



It is a water retention and drainage tray which stores 46.80 litres of water per square meter.



**PlanterCell® 70** has water reservoirs to provide the essential moisture to sustain plant growth. It also has water distributing channels to ensure even water storage.



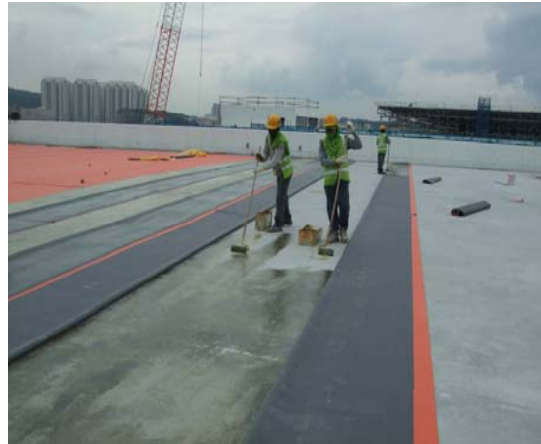


•ITE College West (7000 m2)





•ITE College West (7000 m2)



•INSTALLATION





•ITE College West (7000 m2)



•COMPLETION





•ITE College West (7000 m2)



•COMPLETION







- 11 Empress Place



- Installation



- Completion

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## PlanterCell® 130



### GREEN ROOF SYSTEM



PlanterCell® 130 is our premium green roof modular tray system with a good balance of water storage capacity to reduce irrigation needs and can also be used as part of rain water management to reduce peak flow.

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## SPECIFICATIONS

Material	Recycled PP	
SEC** Green Label	Yes	
SGBC*** Green Product	Yes	
Size:		
Height	mm	130
Width	mm	500
Length	mm	500
Pieces per m <sup>2</sup>	nos.	4
Weight:		
Empty	kg/m <sup>2</sup>	6.9
Planted*	kg/m <sup>2</sup>	80 to 120
Cells (Reservoirs)	nos.	4 x 16
Water Storage:	l/m <sup>2</sup>	~ 32.8
Planting	Intensive Extensive	
Colour	Black	

\* with planting mix, water, Insu®Felt and plants

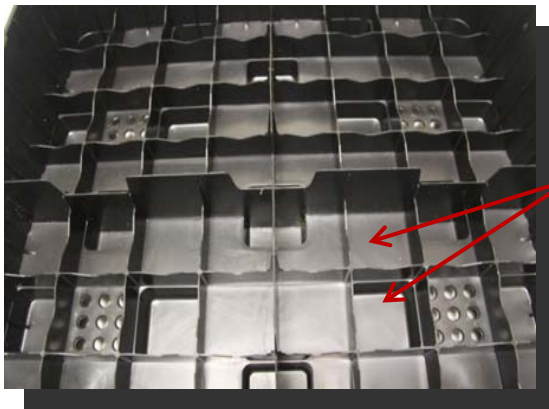
\*\*Singapore Environment Council

\*\*\* Singapore Green Building Council



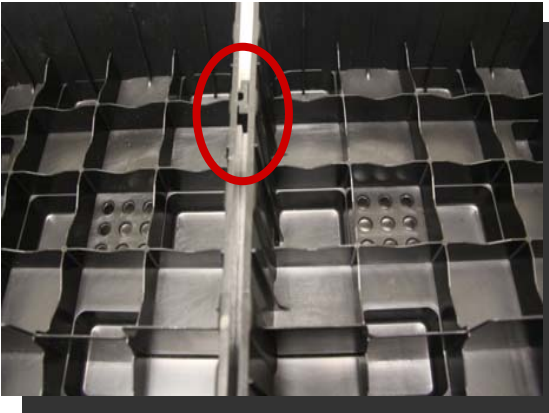


## Features of PlanterCell® 130

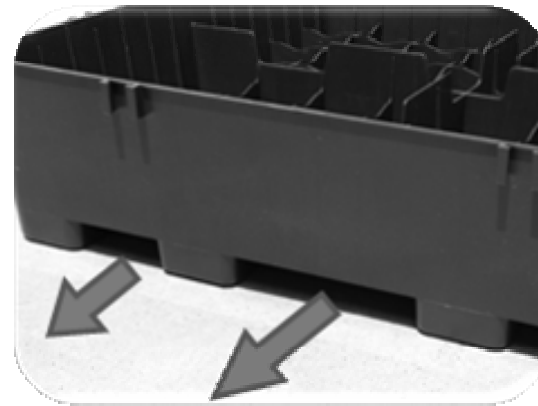


reservoirs

**PlanterCell® 130** has reservoirs which contains 32.8 l/m<sup>2</sup> of water to provide the essential moisture to sustain plant growth.



**PlanterCell® 130** is able to interlock with adjacent trays.



**PlanterCell® 130** has legs which elevate the tray for speedy and efficient discharge of excess water.



Stackable to save storage and easy transportation.





## PlanterCell® 130 Build-up



With Insu® Felt (120g/m<sup>2</sup>) geo-textile



With soil-less media



With selected greenroof plants





•Private Residential Units







• Gammon Chinatown Circle Line



• LTA Head Quarters





• Guangzhou Landscaping Research Centre, China







• 80 Woodlands Drive 17 - Innova Primary School



• Hort Park Visitor Center





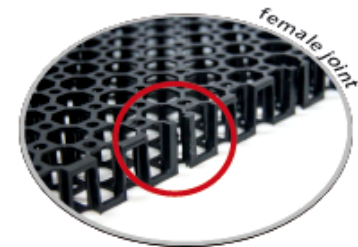
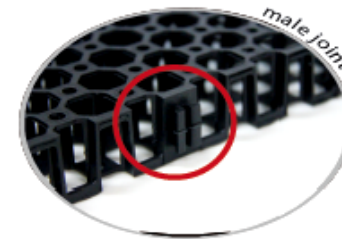
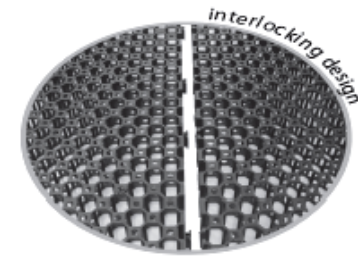
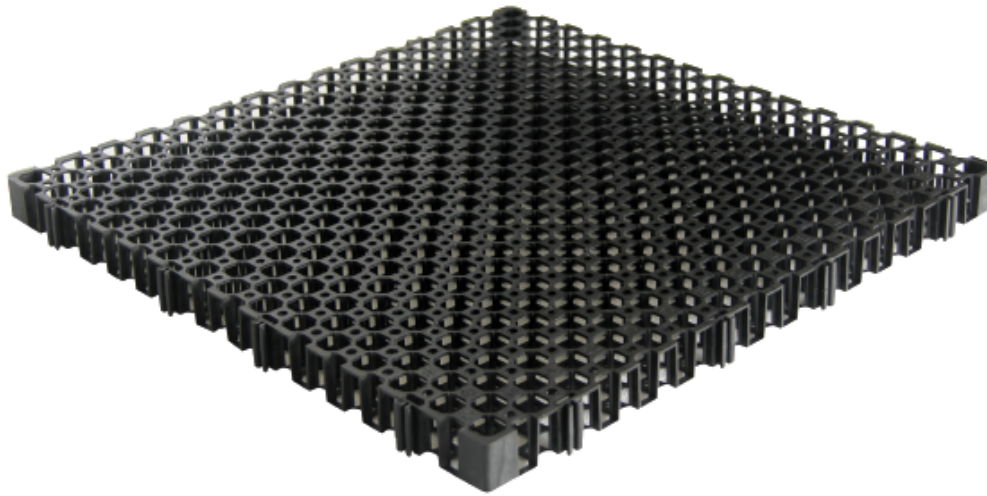
# LANDSCAPE ENGINEERING





## GrasCell® DC30

### LANDSCAPE ENGINEERING



**GrasCell® DC30** is lightweight yet sturdy sub-soil drainage mat developed to replace the traditional use of granite aggregates for sub-soil drainage. It also acts as a protection medium for waterproofing membrane in applications such as roof decks and planter boxes.



## SPECIFICATIONS

Material		Recycled PP
SEC** Green Label		Yes
SGBC*** Green Product		Yes
Size		
Height	mm	30
Width	mm	500
Length	mm	500
Pieces per m <sup>2</sup>	nos.	4
Weight	kg/m <sup>2</sup>	2.6
Water Discharge	l/m <sup>2</sup> s	16.5
Compressive Strength	kPa	~1070
	tonnes/m <sup>2</sup>	~108
Planting	Intensive	
Colour	Black	

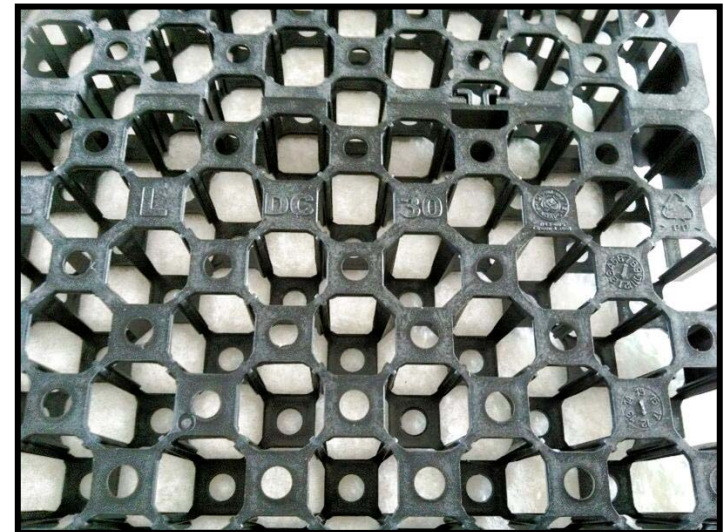
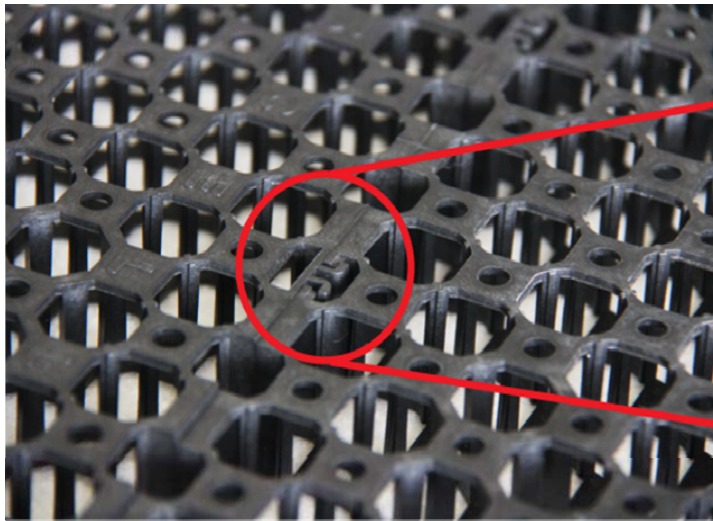
\*\* Singapore Environment Council  
 \*\*\* Singapore Green Building Council







## Features of GrasCell® DC30

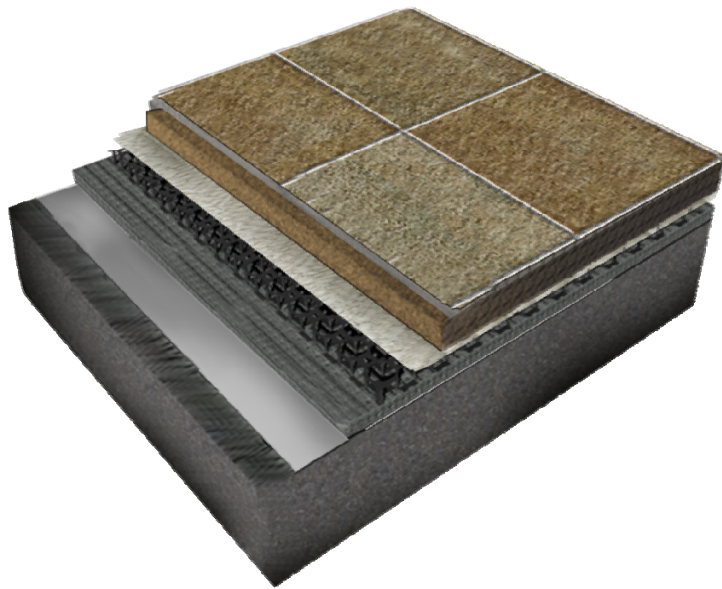


\*Interlocking Design

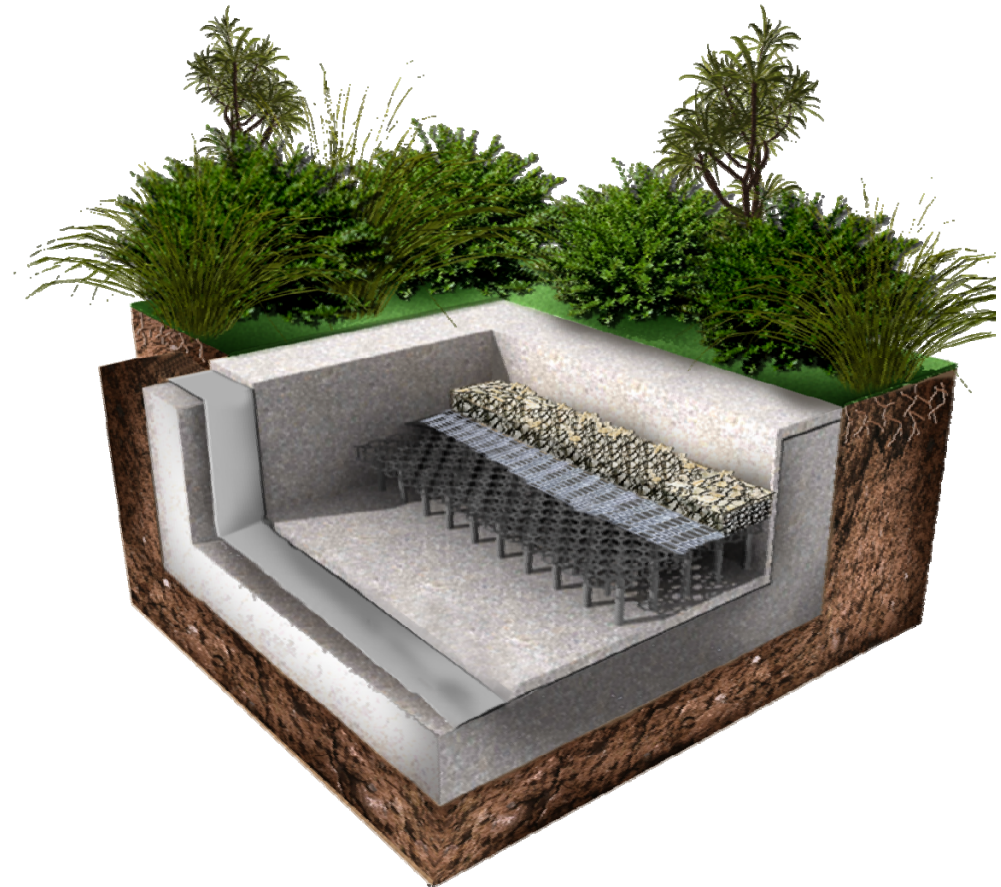
**PlanterCell® DC30** can be interlocked (male and female joints) with one another to prevent accidental movements.



## Other applications



• Plaza Deck drainage

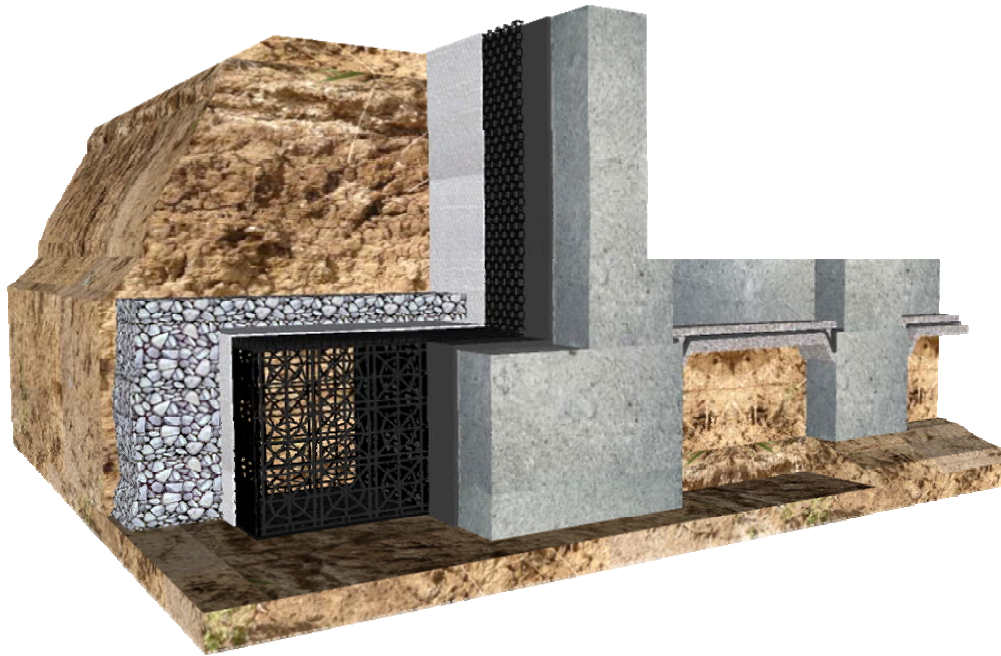


• Pond infiltration system

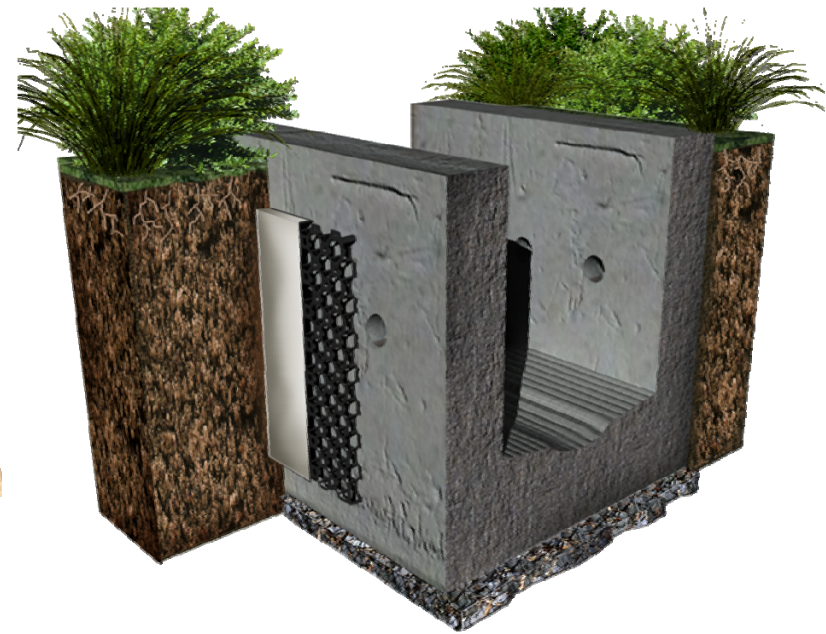




## Other applications



• Basement / retaining wall drainage



• Weep hole cover



## Other applications



- Planterboxes



- Sub-soil Water Filter





## Other applications : Intensive Greenroof



• HDB C931





Other applications : Greenroof

- Punggol West C20 HDB

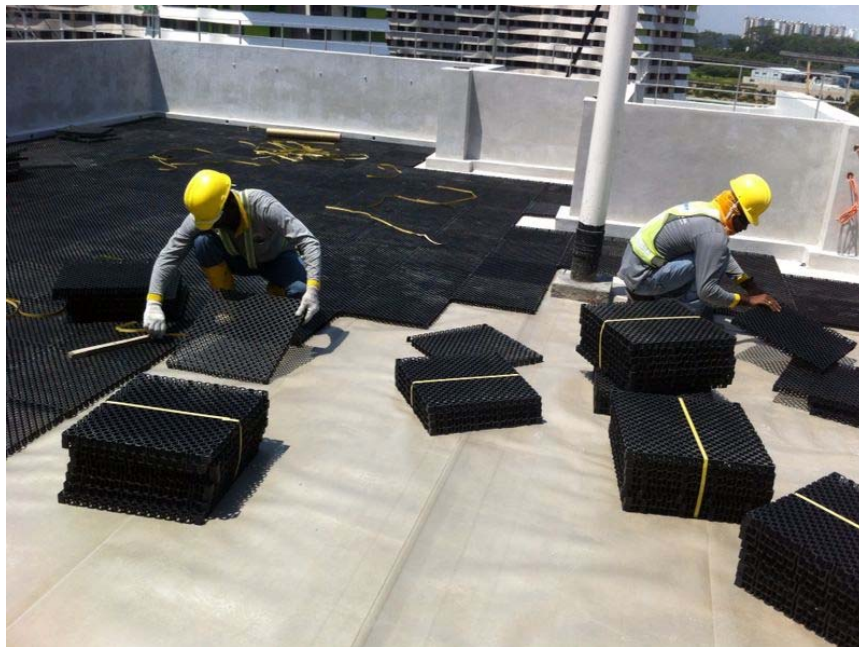






Other applications : Greenroof

- Punggol West C20 HDB





Other applications : Greenroof

- Punggol West C20 HDB







Other applications : Greenroof

- Punggol West C20 HDB





Other applications : Greenroof

- Punggol West C20 HDB







## Other applications : E-Deck Planters

- Punggol West C20 HDB





Other applications : Planterboxes

- Punggol West C20 HDB







Other applications : Greenroof

- Punggol West C22 HDB





Other applications : Greenroof

- Punggol West C22 HDB







Other applications : Greenroof

- Punggol West C22 HDB





## Other applications : Storm Water Run-off Management

- D'Nest Condominium, Pasir Ris

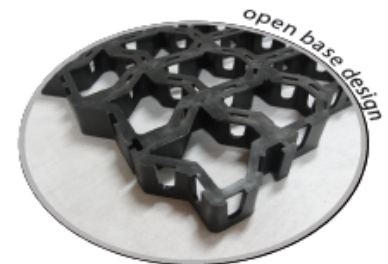
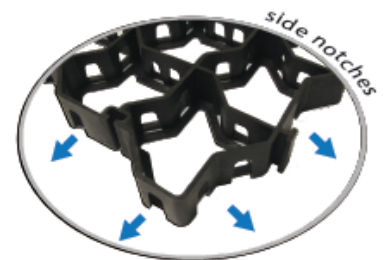




# uniseal

## GrasCell® GP40

### LANDSCAPE ENGINEERING



**GrasCell® GP40** is lightweight high strength turf stabilisation paver, designed to protect the root zones of grass and stabilise the surrounding soil when subjected to vehicular traffic.



## SPECIFICATIONS

Material	Recycled PP	
SEC** Green Label	Yes	
SGBC*** Green Product	Yes	
Size		
Height	mm	40
Width	mm	453
Length	mm	453
Area	m <sup>2</sup> /pc.	0.205
Weight	kg/m <sup>2</sup>	~ 3.0
Compressive Strength	tonnes/m <sup>2</sup>	~ 258
Base Area	90% Open	
Colour	Black	

\*\* Singapore Environment Council  
 \*\*\* Singapore Green Building Council



### Grascell® GP40 build-up

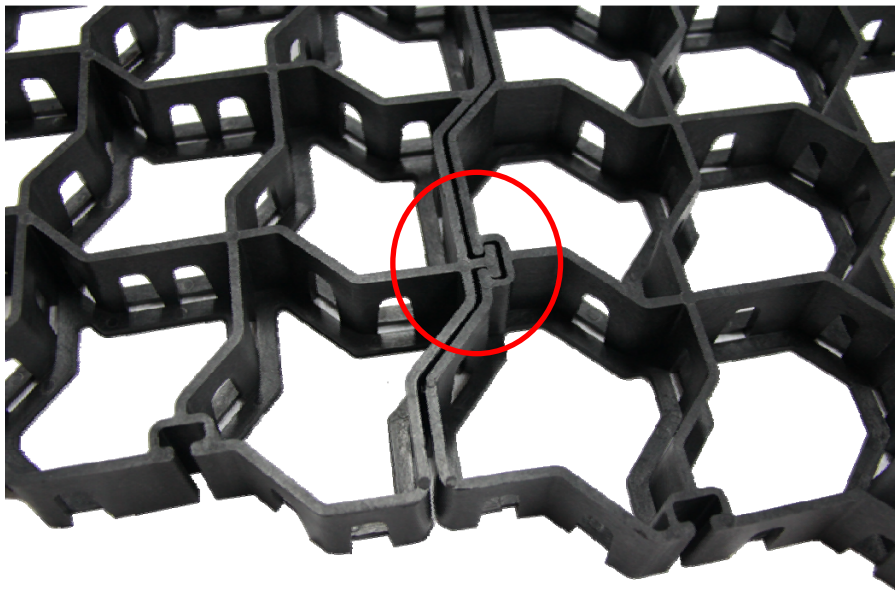
- (1) Grass
- (2) Soil
- (3) GrasCell® 40
- (4) Levelling Sand

- (5) 200-500mm thk  
Compacted Crushed Stones
- (6) Subgrade Soil

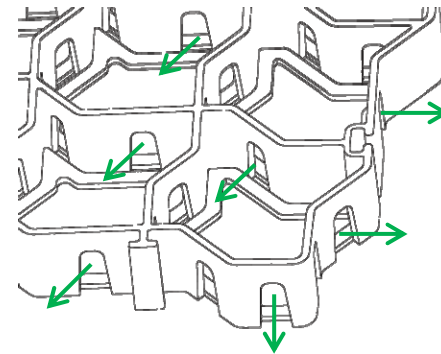




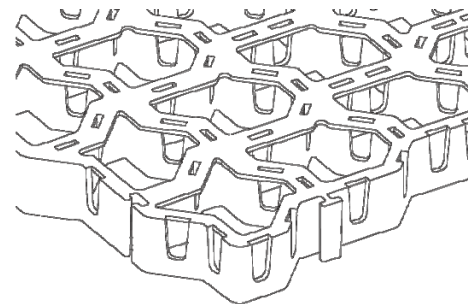
## Features of GrasCell<sup>®</sup> GP40



- Interlocking clips



- Individual cells are designed with side notches to allow roots and runners to grow freely.



- Open base design provides more space for roots migration.



## GrasCell® GP40



GrasCell® GP40 can be interlocked with each other that allows the mat to be laid out securely and fitted together with common concrete car park pavers.

GrasCell® GP40 can replace the usage of common concrete pavers due to its special dimensional design to provide more greening opportunities.



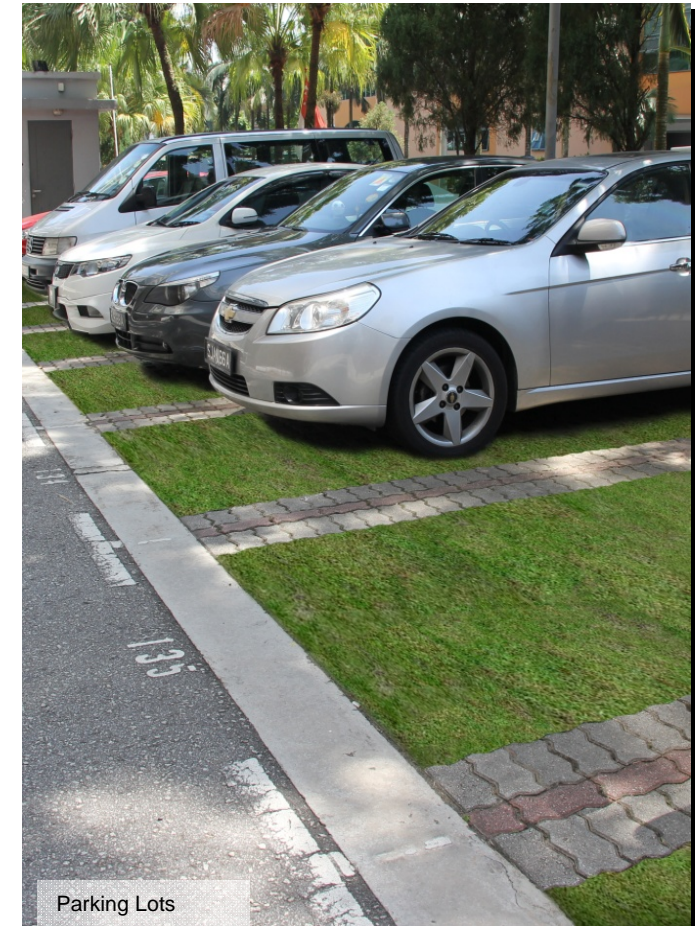
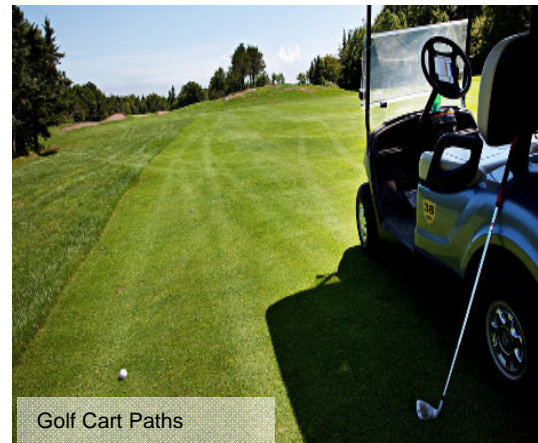
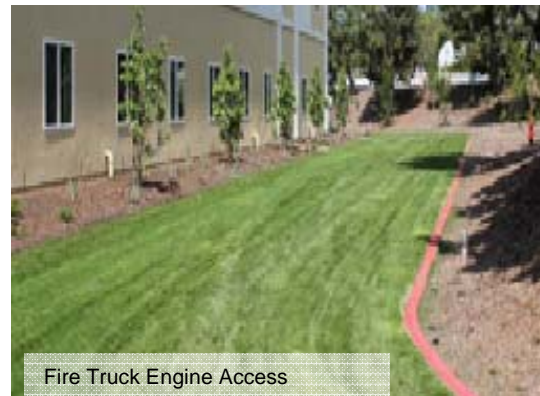




## GrasCell® GP40

### Applicable Areas:

- Fire truck access lane
- Maintenance & utility access
- Vehicle parking lots
- Street shoulder parking & reinforcement
- Golf cart paths
- Porous pavements
- Boat ramps
- RV and boat access road and parking
- Infiltration basin / swale reinforcement
- Multiple-use trails





GrasCell<sup>®</sup> GP40

Installation: Laying of GP40 onto the leveling sand.







GrasCell<sup>®</sup> GP40

Installation: Laying of GP40 onto the leveling sand.







GrasCell<sup>®</sup> GP40

Installation: Levelling of GP40







GrasCell® GP40

Installation: Laying of soil





GrasCell<sup>®</sup> GP40

Installation: Planting of grass







GrasCell<sup>®</sup> GP40

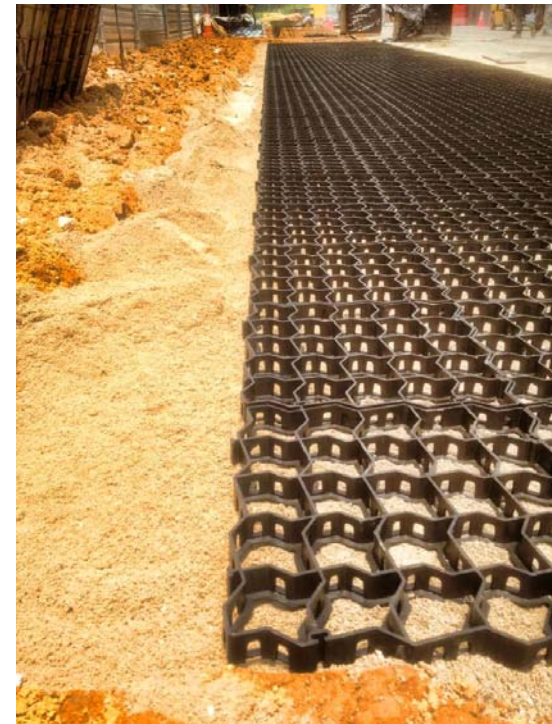
Changi Business Park Project





GrasCell<sup>®</sup> GP40

Changi Business Park Project







GrasCell<sup>®</sup> GP40

Changi Business Park Project





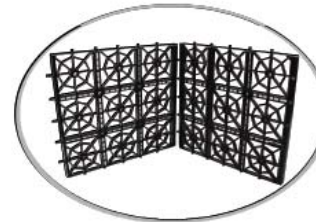
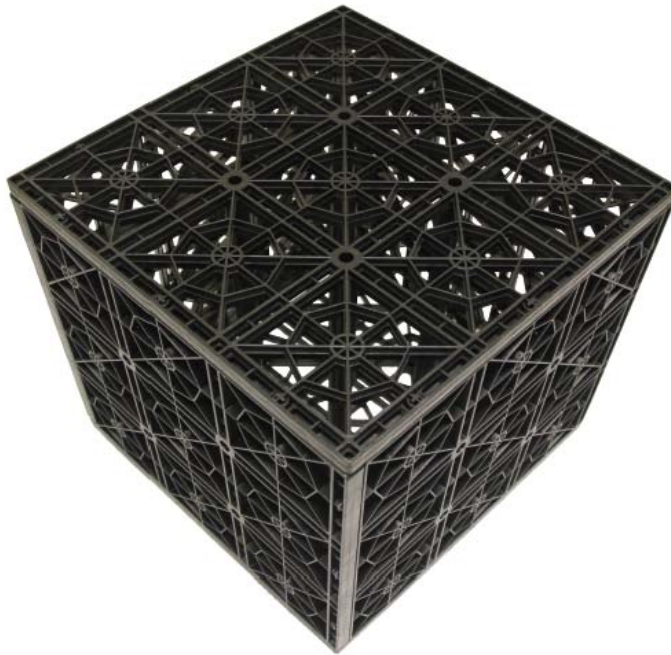
# STORM WATER MANAGEMENT





## STORM WATER MANAGEMENT

### PlanterCell® SW-Tank



**PlanterCell® SW Tank** is a modular storm water management system designed for storm water filtration, detention or retention underground. It is constructed using our proprietary plastic injection moulded panels.



## SPECIFICATIONS

Material Recycled PP

SEC\*\* Green Label Yes  
SGBC\*\*\* Green Product Yes

### Panel

Thickness	mm	20
Width	mm	500
Length	mm	500

### Tank

Height	mm	500
Width	mm	500
Length	mm	500
Weight	kg	~ 6

Panels per tank nos. 6

### Void Area

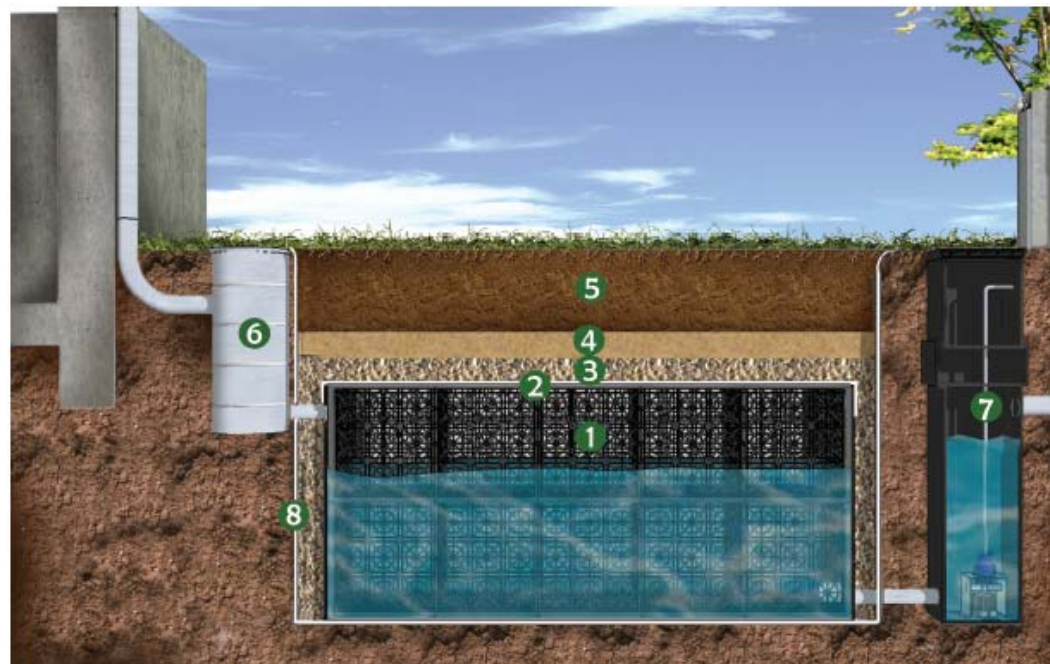
Surface	%	65
Internal	%	95

### Compressive Strength

No reinforcement	tonnes/m <sup>2</sup>	17.33
Reinforced w/1 pipe	tonnes/m <sup>2</sup>	18.35
Reinforced w/5 pipes	tonnes/m <sup>2</sup>	23.45
Reinforced w/9 pipes	tonnes/m <sup>2</sup>	29.56

Colour Black

\*\* Singapore Environment Council  
\*\*\* Singapore Green Building Council



### PlanterCell® SW-Tank (Rain Water Retention)

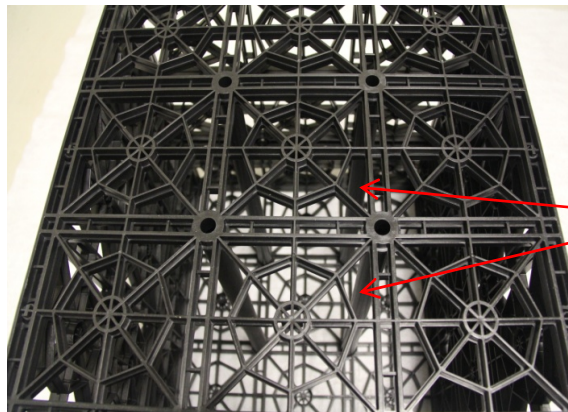
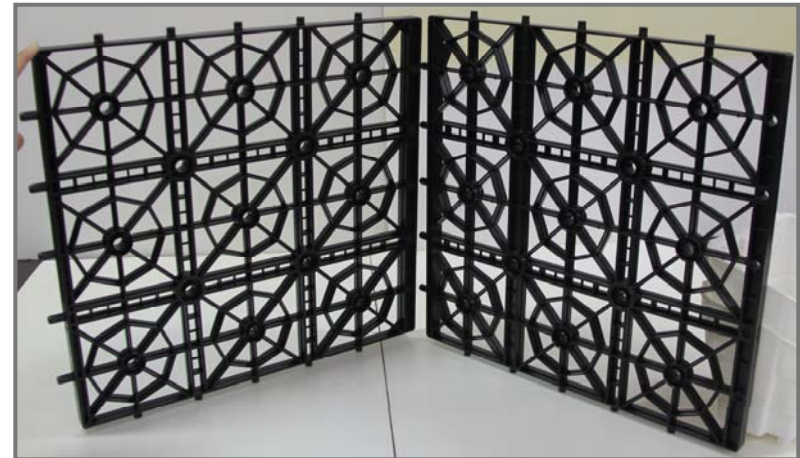
- |                                    |                                |
|------------------------------------|--------------------------------|
| (1) PlanterCell® SW-Tank           | (5) Filter Media (sandy loam)  |
| (2) Insu®Felt                      | (6) Rain Water Collection Tank |
| (3) Drainage Layer (gravel)        | (7) Filtered Water Pump        |
| (4) Transition Layer (coarse sand) | (8) Waterproofing Membrane     |





## What is Plantercell® SW Tank?

- The panels, a single piece injection moulding, are designed with 65% void area for water catchment. Six pieces of panels are assembled together through an interlocking system to construct a modular tank of approx. 0.125 m in volume.
- The strength of the tank can be reinforced with the insertion of PVC pipes across the internal space of the tank propping up the walls.



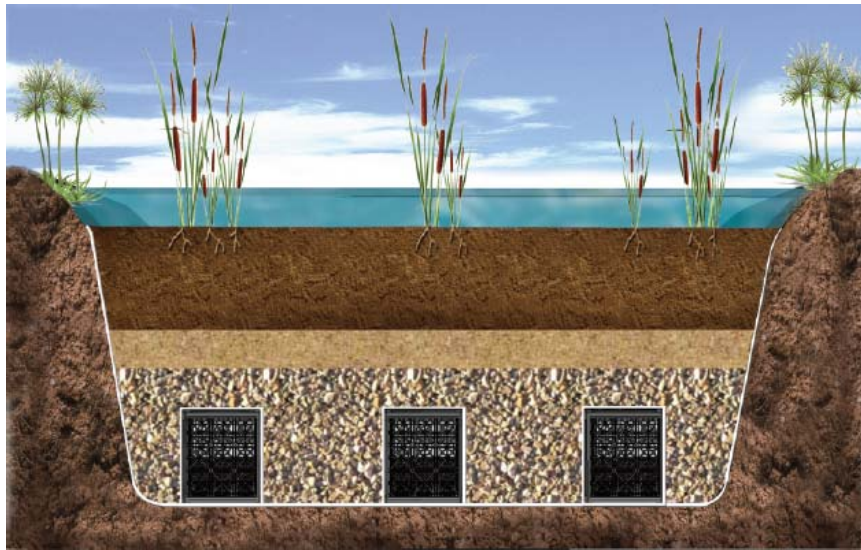
PVC Pipe reinforcement



## Areas of Use - Plantercell® SW Tank

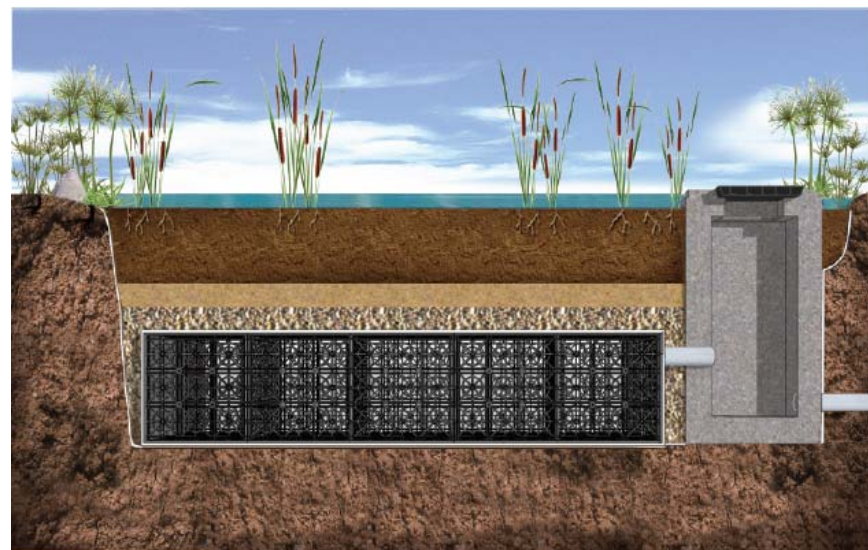
### BIO-RETENTION SWALE

Swales are linear depression of channels that provide for stormwater collection and conveyance.



### BIO-RETENTION BASIN ( Rain Garden)

A rain garden is a planted depression that allows rainwater runoff from impervious urban areas to be absorbed by the surrounding soil.



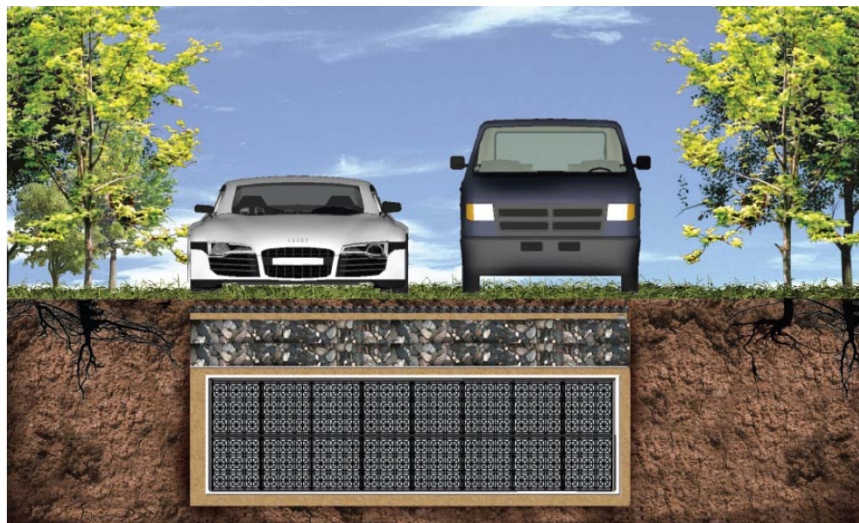




## Areas of Use - Plantercell® SW Tank

### INFILTRATION SYSTEM

An infiltration system is used to manage stormwater run-off, prevent flooding and downstream erosion, and improve water quality in an adjacent waterways and reservoir.



### INFILTRATION TRENCH

An infiltration trench is a shallow, excavated trench filled with porous materials, into which run-off collects. This is an ecological drainage alternative to surface drains.





## Areas of Use - Plantercell® SW Tank

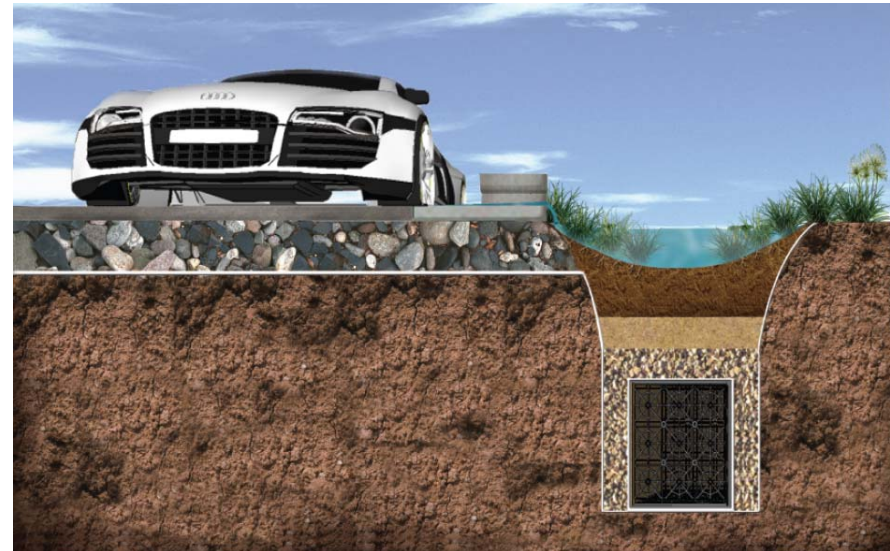
### DEEP PLANTERS

Used as void fillers for deep planter boxes and roof gardens to reduce the imposed loading on the supporting structures while allowing efficient subsoil drainage.



### ROADWAY RETENTION SWALE

Stormwater filtrates from the ecological roadway drainage into the surrounding soil, while particulate and some dissolved pollutants are retained in the shallow depression after been screened by the filter substrate.







## D'Nest Condominium at Pasir Ris

- Laying of PlanterCell® SW Tank

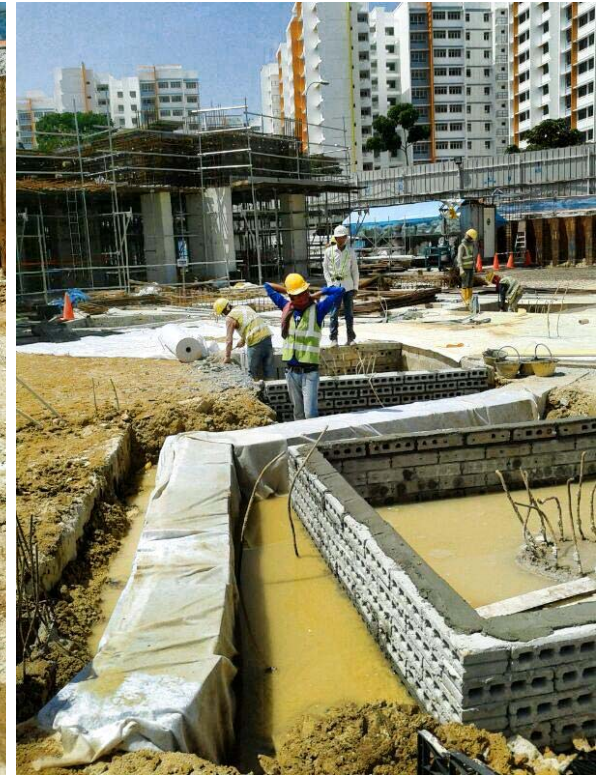
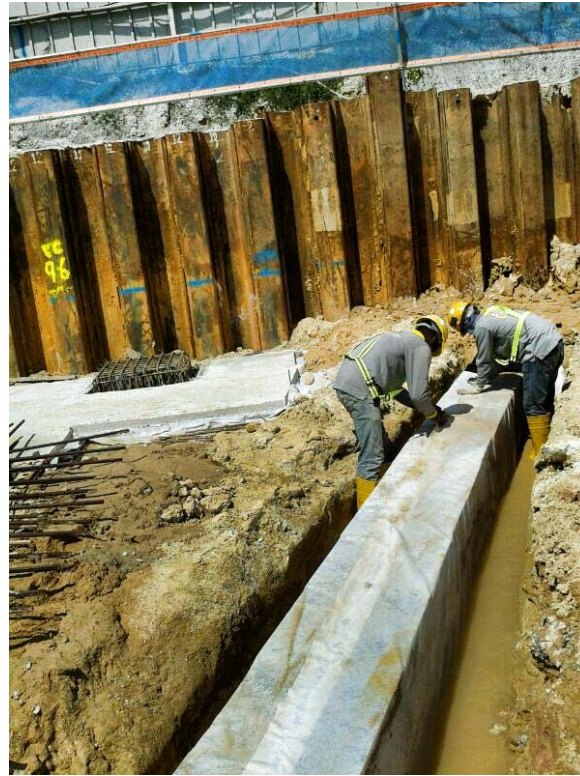






## D'Nest Condominium at Pasir Ris

- Laying of PlanterCell® SW Tank







## • Rain Garden Harvesting





# COMPOSITE SLABS





## STORM WATER MANAGEMENT



### Benefits:

- Pre-fabricated and modular
- Incorporate thermal insulation
- Incorporate water drainage
- Improves on-site productivity considerably
- Reduce on-site construction time
- Lightweight
- Simple to install and non-destructive maintenance
- Immediate foot trafficable
- Cost savings – logistics, storage, installation
- Allow for formation of graphic patterns on roof
- Result in a consistent and better quality roof
- Improve housekeeping

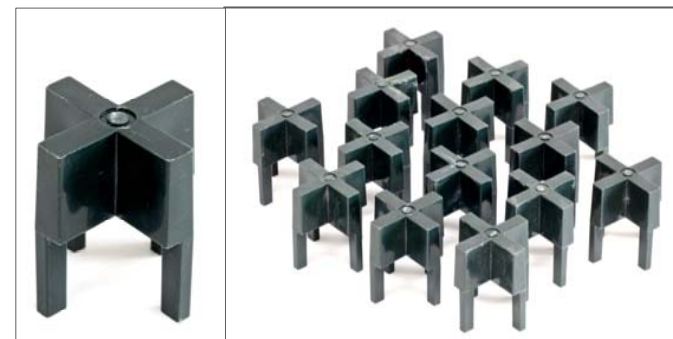
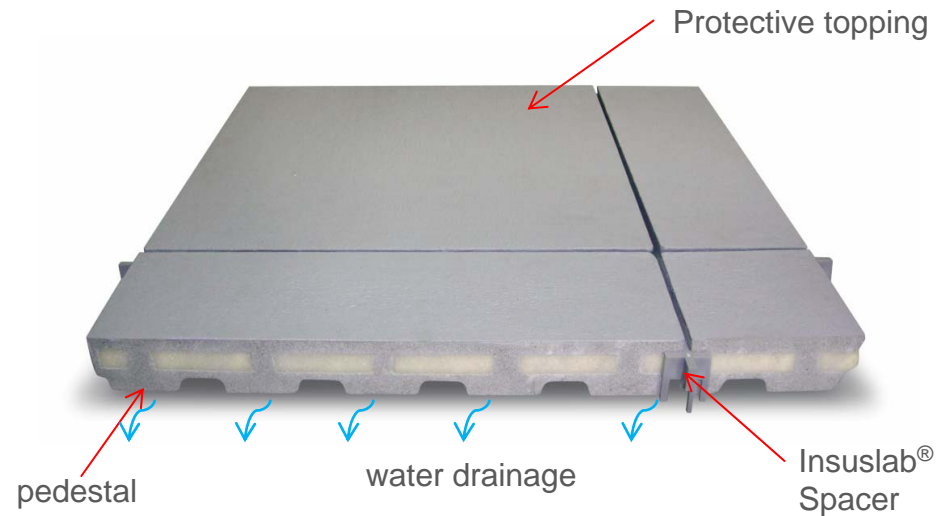
**Insuslab®** is a patented pre-fabricated, lightweight, composite slab made of cement and polyurethane foam board. It is used on concrete roof decks as a thermal insulating medium, protection slab for underlying waterproofing membrane, and incorporates a water drainage system. It is also foot trafficable.



Insuslab®

### SPECIFICATIONS

Material		high strength mortar + Polyurethane Foam	
SGBC*** Green Product		Yes	
Size:	Height	mm	50
	Width	mm	500
	Length	mm	500
Weight	kg	~15	
Compressive Strength	kN/m <sup>2</sup>	609	
Thermal Conductivity (PU Foam)	W/m.°K	0.2587	
Finishes	Standard Enquiry	Cement Other sizes and finishes	



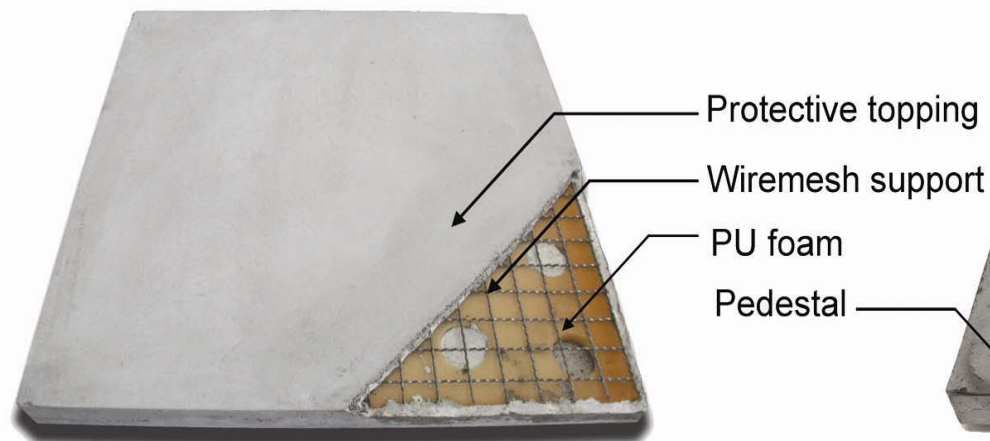
Insuslab® Spacer





## INSUSLAB®

### •Build-up layers



### CROSS SETION VIEW

- The slab consists of a high strength cement outer casing with a polyurethane foam core that provides excellent thermal insulation properties.



### BOTTOM VIEW

- A series of 25 pedestal designed into the slab, increases its load bearing properties, as well as creating a medium to drain water and vent any residual moisture, minimizing water stagnation and relieving pressure on the slab from underneath.



**Insuslab®**

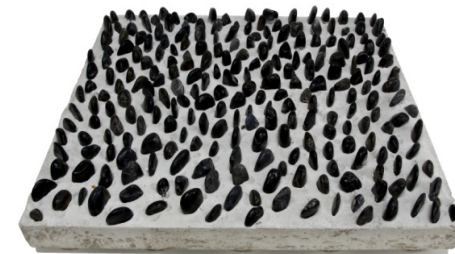
Different Finishes:



Cement Finish



Timber Finish



Reflexology Stones  
Finish



Pebble Wash Stone AB5



Pebble Wash Stone (Black)



Pebble Wash Stone (Grey)



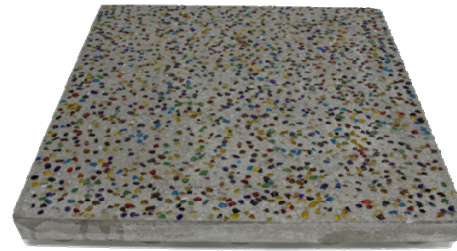


**Uniseal® Insuslab®**

**Different Finishes (Cont..) :**



Pebble Wash Stone  
Brown



Recycle colour Glass stone



Recycle Glass Finish  
(brown)

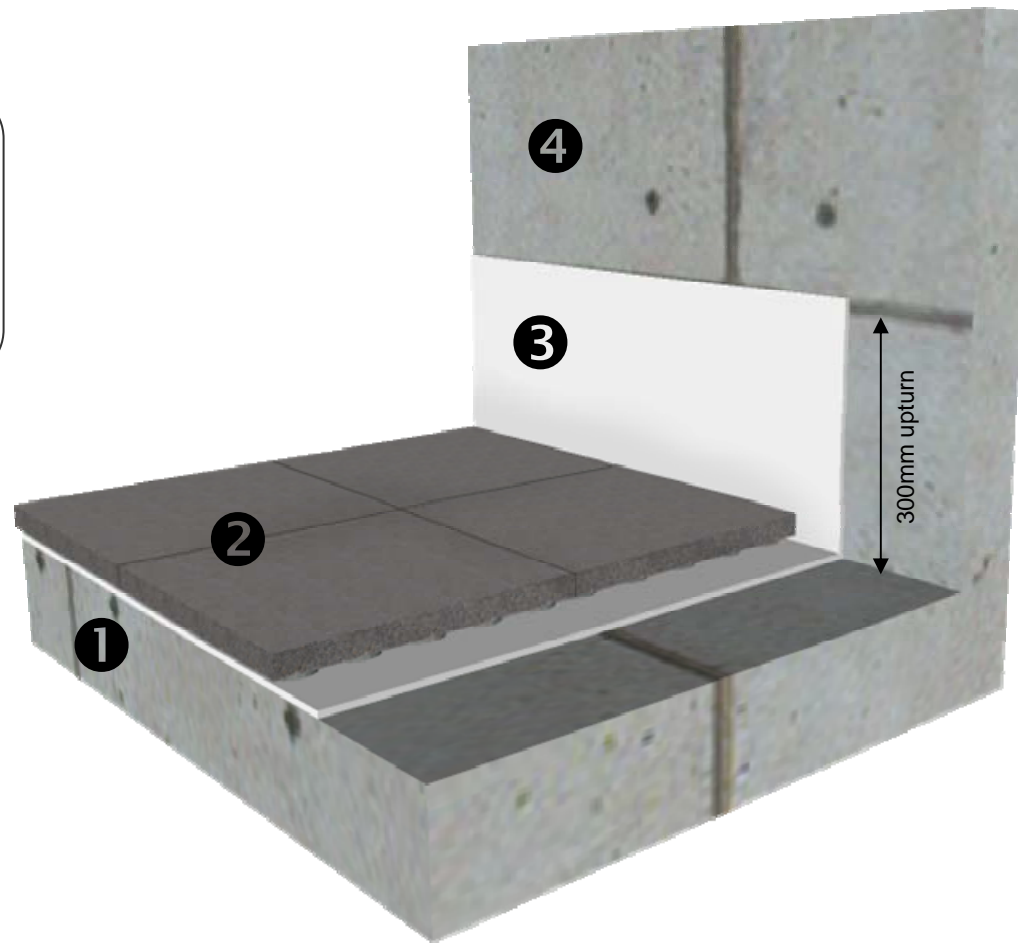


Recycle Glass Finish



## •Insuslab on RC Roof

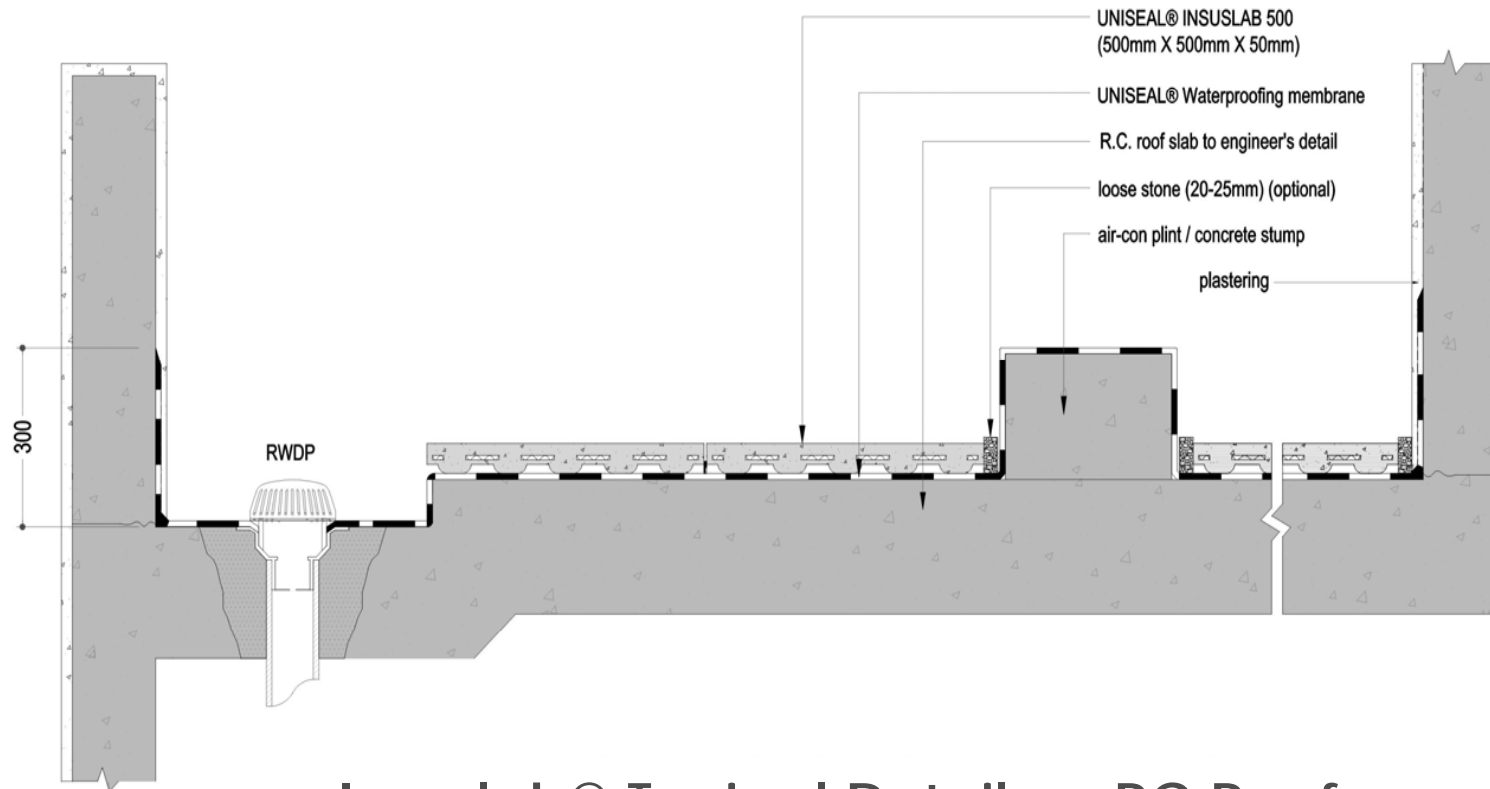
- 1) Roof RC Slab
- 2) Insuslab®
- 3) Waterproofing Membrane
- 4) Parapet Wall







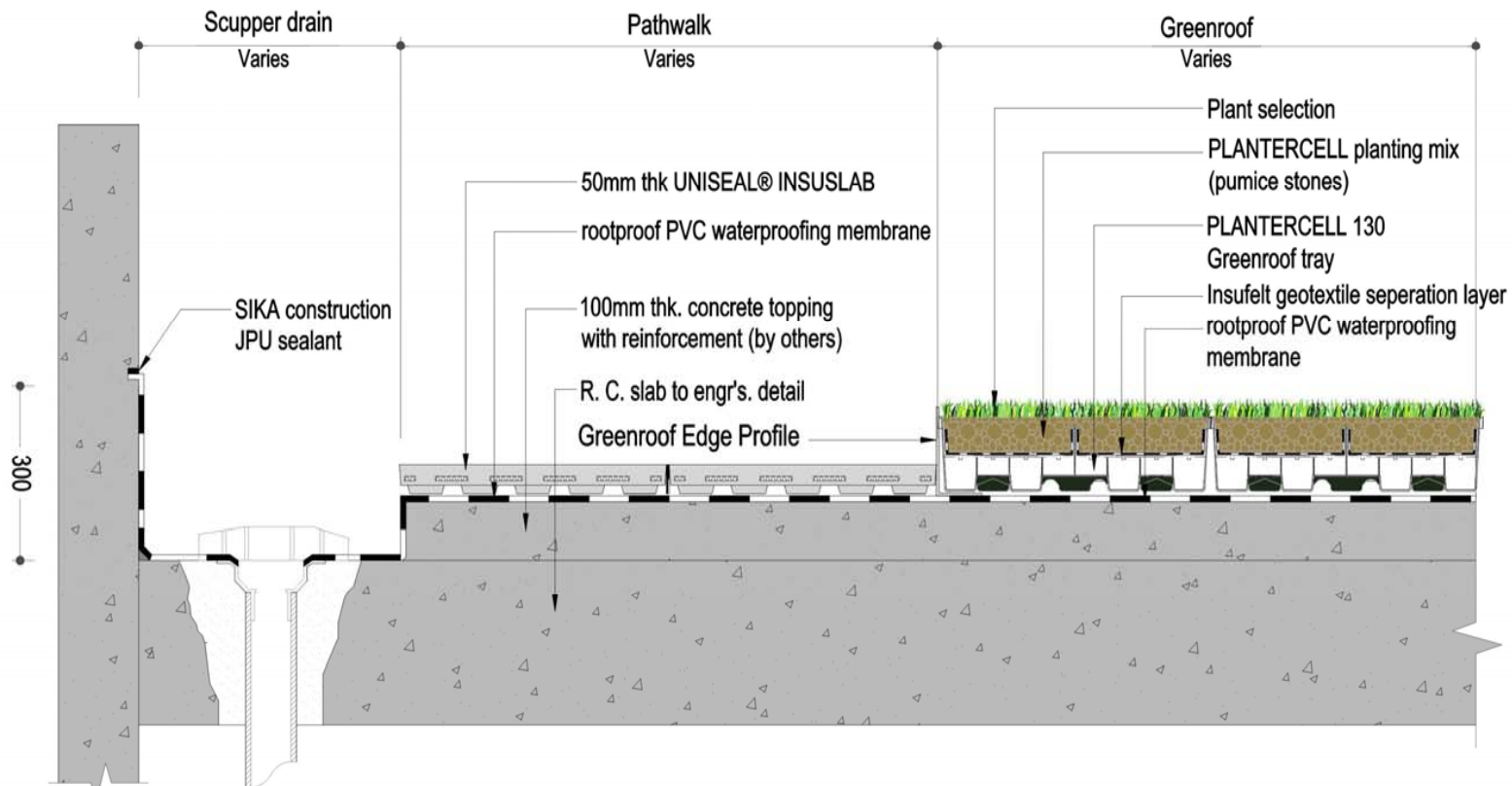
•Detail Drawings



Insuslab® Typical Detail on RC Roof



•Detail Drawings



Insuslab® Typical Detail on Green Roof





- 33 Hindhede Walk – RC Roof



- Site condition before installation of Insuslab®



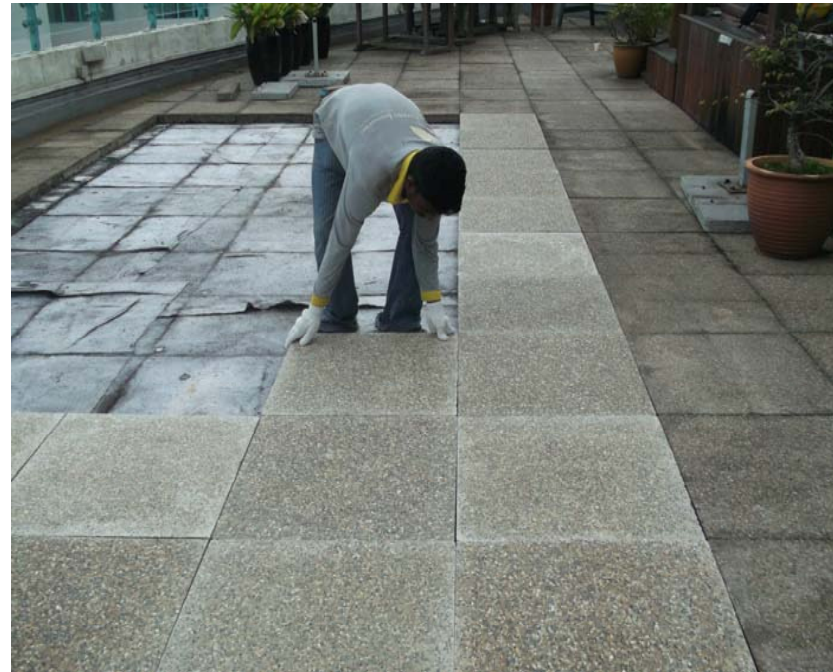
- Surface Preparation



- 33 Hindhede Walk – RC Roof



- Prepared Surface



- Laying of Insuslab®





- 33 Hindhede Walk – RC Roof



- Completed Works



## •511 Yio Chu Kang Roof Garden



•Site Condition Before installation



•Completed Works





- Roof Garden - RC Roof



- Installation process



- Completed Works



- Goodwood Park Hotel



- Site Condition before Insuslab® Installation



- Completed Works





- MOM Podium Block



- Surface Preparation



- Installation Process



- MOM Podium Block



- Completed Works

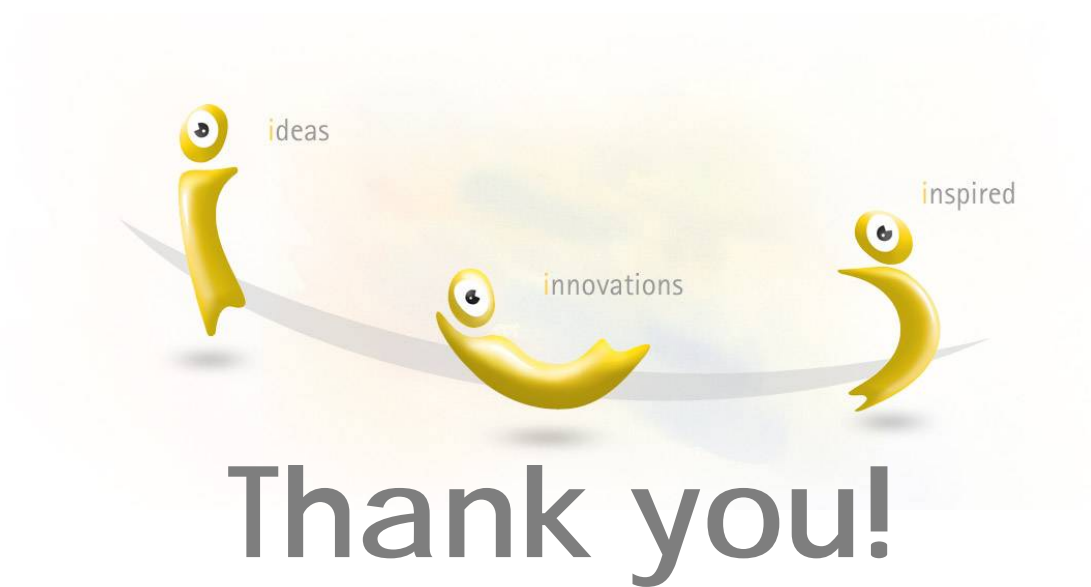




*"An enhanced and sustainable living environment  
fosters a closer and harmonious relationship  
amongst the family and the community"*

*-James Lim, CEO*





Thank you!