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INTRODUCTION

Taiwan is a country spanning only 36,193 km² but with a population of 23.34 million (compare with France’s 674,834 km² and 65.7 million people). The population density is especially high because two-thirds of the island is composed of mountains, and as a result most people live along the coastal areas. It is especially crowded in urban areas, such as the capitol city, Taipei, which is one of the top ten densest cities in the world. In addition to the high population density, Taipei also developed rapidly over the years, both of which contribute to a random assortment of architecture in the city that expands horizontally instead of vertically to conserve space.

However, also as a result of the rapid development, many of the residential buildings were not built to last and have infrastructure that is now rundown or outdated. In recent years, new residential buildings are sky scraper apartments, which are usually only affordable by the wealthy upper class because of the luxury design and locations in the city center.

This population growth results in the lack of living space and sufficient public amenity, and cause middle classes moving toward the periphery, even outside of city. The majority of these people are young professionals who just graduated from college whom have worked a few years, and they are not able to afford a house yet. However, most of them works in the city center and commute, and caused major traffic congestions with millions of cars and motorcycle. Consequently, the city is left with a high carbon dioxide pollution, and the decrease living quality.
Urban Acupuncture

Taipei city population reached its 20-year peak and residential building has been constructed in various types. The majorities are a duplex apartment, which is relatively wide and 4 to 5 story building, and a row house that is extremely narrow and deep single family owned. These two types were constructed during the modern democracy period. Most of flat-roof duplex apartment and row house are facing problems: leakage, heat absorption and no public facilities. Therefore, the illegal make-shift metal roofed shelters have been introduced widely in most of the residential buildings and create unregulated cityscape of Taipei.

For Orchid House urban design strategy, NCTU UNICODE focus districts where the most of duplex apartment and row house are located as the most needed area for urban regeneration to vitalize not only the residential building, but also these districts.

Zero Energy District: Ximending

As main focal point of Ximending Zero Energy District plan, NCTU UNICODE proposes not only PV panel implementation to buildings, but also larger scale of renewable energy sources such as CSP (Concentrated Solar Power), Biomass, Wind power and Geothermal. In order for all renewable energy sources to be distributed efficiently, advanced applications of Wide-area-Measurement System (WAMS) is installed one of larger footprint building rooftops, and Data Centre (MDMS) serve all the energy with automation system. Furthermore, AMI (Advanced Metering Infrastructure) is installed to Orchid House Clusters to manage power supply within houses. Please refer Architecture Design Narrative for farther details of AMI integration to housing appliances.

The Orchid House Cluster acts as a pilot project for further development of smart building energy management technology. Eventually, AMI system will be installed to most of buildings in the district to increase 20% energy usage efficiency from conventional grid system.
Orchid Cluster

Orchid House extension on existing building in Taipei city plays not only critical role for Ximending zero energy district urban planning, but also to apply new concept of urban regeneration. Almost 50% of residential building in Taipei city are over 30 years old and typically demolished during the renewal planning. However, NCTU UNICODE points out the problem of city re-development organized by government and executed by private developers. The developer tends to acquire larger number of properties to combine the land FAR (Floor Area Ratio) to build up high-rise residential condominium, which is not affordable for average income level and treated as investment target by investors.

Orchid House will proved unique opportunity for not only the building owner, but also the targeted tenants, who needs housing support to pursue their young profession to promote new creative industry in Taipei.
Taipei Residential Type Analysis

DESCRIPTION

Row House and Duplex Apartment are the most number of Taipei residential building Type. These two types are usually 4 to 5 floor high and the oldest building in Taipei, which are about 20 to 30 years old and facing some following problems:

1. Top floor Leaking
2. Top floor is too hot
3. No Public Facility

Presently, most households live in flat-roofed row houses and duplex apartments, but due to a lack of space, people try to expand their living area by building on their roofs. The illegal make-shift metal-roofed shelters that result are unregulated and displeasing to the eye. Lastly, social housing projects have fallen to the wayside and do not adequately consider the needs of disadvantaged groups, social justice, and the problems of housing for those with low-income.
COMPETITION DWELLING

- Rooftop Pavilion
- Tiny Alley
- Rooftop Extension
- Cheap & Light Weight Construction

- Rooftop Pavilion
- Tiny Alley
- Rooftop Extension
- Cheap & Light Weight Construction

- Small-Scale Street
- Extended Signboard
- Steel Bar Window
- Rooftop Garden
- Extension Canopy
MAXIMUM MEASURABLE AREA: 56.92 m²

BESS Photovoltaic Inverter & Battery

Couch

Piping Shaft

Indoor unit

Humidifier

UP Indoor unit
Project: ROOF LEVEL PLAN

Consultants: NCTU/UNICODE

Address: 1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan

www.sde.tw

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- Bayer Makrolon® Solid Sheet
- Bayer Makrolon® Polypropylene Hollow Sheet
- Aluminum Louvers
- Fan Exhaust
- Delta PV Panel
- Clear Glass
- Solar Water Heater
Footprint Calculation

House : 120.4 M2
Canopy : 8.7 M2
Louvers : 17.8 M2
Total : 146.9 M2

House : 9.332x12.735+x0.6375x0.7854x3.14=120.4 (M2)
Canopy : 5.975x0.41+(8.975-0.41)x0.408+6.375x0.335+8.0 (M2)
Louvers : 9.332x1.912+17.8 (M2)
Total : 120.4x1.05+17.34+146.3 (M2)

House : 9.332x12.735+x0.6375x0.7854x3.14=120.4 (M2)
Canopy : 5.975x0.41+(8.975-0.41)x0.408+6.375x0.335+8.0 (M2)
Louvers : 9.332x1.912+17.8 (M2)
Total : 120.4x1.05+17.34+146.3 (M2)

RECONFIGURABLE FEATURES 1

Dimensions:
- House: 9.332x12.735 (M2)
- Canopy: 5.975x0.41
- Louvers: 9.332x1.912

Canopy:
- 5.975x0.41 + (8.975-0.41)x0.408 + 6.375x0.335 + 8.0

Total:
- 120.4x1.05 + 17.34 + 146.3
Louvers
Sliding Door
Swing Door
Awning Window

DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
ST 2014/03/03 CD Submission
ST 2014/04/30 CD Submission

RECONFIGURABLE FEATURES 3
FLOOR CONSTRUCTION

Ground Level

Thermal conductivity R = 7.7 \text{(m}^2\text{K/W)}

- **Finished Flooring**: 16mm
- **Plywood**: 16mm
- **Timber**: 30mm x 54mm
- **Vacuum Insulation**: 30mm
- **Plywood**: 12mm
- **Air gap**: 40mm
- **E-Form**: 91mm
- **Floor supporting**: 
- **Glider**: C-150/75 19.5mm
- **Foiling

Scale 1:10

Unit mm

Drawn by CH
Checked by DN

AR-321 PAGE 3
Thermal conductivity R = 13.7  (m²K/W)
Thermal conductivity $R = 13.5$ (m²K/W)
**JOINT DETAIL 1**

1. Bayer Makrolons Polycarbonate: Interlocking Hollow Sheet 40mm
2. Interlocking Sheet supporting 75mm
3. Plywood 18mm
4. Plywood 13mm
5. E-foam 75mm
6. Vacuum Insulation 30mm
7. Ceramic board 23mm
8. Steel enclosure 1mm
9. L shape steel 35x35 In 2.3mm
10. L shape steel 25x35 In 9mm
11. Fusing
12. Sand
13. Wood frame (sand box)
14. Wood frame (wall)
15. H = 150x150 L = 10mm
16. Wood Plastic Composites 25mm

**Legend:**
- 0.1 METER
- 0.5 METER

**Scale:** 1:10

**Unit:** mm

**Drawn by:** CH

**Checked by:** DN

**NCTU Architecture**

Project:

Institution:

Team Name:

Checked by:

Scale:

DWG. Title:

DWG. No.:

Address:

Contact:

Consultants:

AR-361 PAGE 2
JOINT DETAIL 3

1. Finished Flooring 18mm
2. Plywood 18mm
3. Vacuum Insulation 30mm
4. Wood frame 54mm
5. Plywood 12mm
6. Ebeam 50mm
7. Air gap 40mm
8. Beam 250x75 mm 9.5mm
9. Floor supporting
10. Furring
11. Sand box
12. Wood frame

Scale: 1:10

Note:
DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
ST 2014/03/03 CD Submission
ST 2014/04/30 CD Submission

AR-363
Wood plastic composites thickness = 25mm

50x50 Angle Bar = 4mm

50x50 Square Tube = 1.2mm

30x30 icon bar = 3mm

Galvanized waves grids 1.5-inch

Welding

Note:

ST 2013/04/01 SD Submission

ST 2013/11/01 DD Submission

ST 2014/03/03 CD Submission

ST 2014/04/30 CD Submission
SMART SKIN DETAIL
Steel plate t = 6 mm

Drill hole for T18

Welding

Drill hole for T18

Steel plate t = 6 mm

Steel plate t = 6 mm

Drill hole for T18

Steel plate t = 6 mm

Steel plate t = 6 mm

Steel reinforcement
t = 6 mm

Steel plate t = 6 mm

Steel plate t = 6 mm

Steel plate t = 6 mm
TEMPERATURE (°C)
LOCATION: TAIPEI, TWN

- RANGE OF OUTDOOR TEMPERATURE FOR COMFORTABLE INDOOR TEMPERATURE
- MAXIMUM TEMPERATURE
- AVERAGE TEMPERATURE
- MINIMUM TEMPERATURE

HUMIDITY (%)
LOCATION: TAIPEI, TWN

- RELATIVE HUMIDITY (09:00AM)
- RELATIVE HUMIDITY (03:00PM)

DEGREE HOURS
(HEATING, COOLING AND SOLAR)
LOCATION: TAIPEI, TWN

- HEATING DEGREE-HOURS: 5795
- SOLAR EXCESS DEGREE-HOURS: 24511
- COOLING DEGREE-HOURS: 34668

PSYCHROMETRIC CHART
LOCATION: TAIPEI, TWN
DISPLAY: Monthly Mean Minimum/Maximum
BAROMETRIC PRESSURE: 101.36 kPa

SELECTED DESIGN TECHNIQUES:
1. passive solar heating
2. thermal mass effects
3. natural ventilation
4. direct evaporative cooling
PREVAILING WINDS

Wind Frequency (Hrs)
Location: TAIPEI, TWN
Date: January 1st - December 31st
Time: 00:00 - 24:00

January
February
March
April
May
June
July
August
September
October
November
December
**TEMPERATURE (°C)**

LOCATION: PARIS, ORLY, FRA

- RANGE OF OUTDOOR TEMPERATURE FOR COMFORTABLE INDOOR TEMPERATURE
- MAXIMUM TEMPERATURE
- AVERAGE TEMPERATURE
- MINIMUM TEMPERATURE

**HUMIDITY (%)**

LOCATION: PARIS, ORLY, FRA

- RELATIVE HUMIDITY (09:00AM)
- RELATIVE HUMIDITY (03:00PM)

**DEGREE HOURS**

(HEATING, COOLING AND SOLAR)

LOCATION: PARIS, ORLY, FRA

- DEGREE-HOURS ANNUAL
  - HEATING DEGREE-HOURS 64193
  - SOLAR EXCESS DEGREE-HOURS 19993
  - COOLING DEGREE-HOURS 2929

**PSYCHROMETRIC CHART**

LOCATION: PARIS, ORLY, FRA

DISPLAY: Monthly Mean Minimum/Maximum

BAROMETRIC PRESSURE: 101.36 kPa

SELECTED DESIGN TECHNIQUES:
1. passive solar heating
2. thermal mass effects
3. natural ventilation
4. direct evaporative cooling
RADIATION (W/m²)

LOCATION: PARIS, ORLY, FRA

DAILY SOLAR RADIATION

BASIC CLIMATIC CONDITION

LOCATION: PARIS, ORLY, FRA

- OVERHEATED PERIOD
- UNDERHEATED PERIOD
- COMFORTABLE PERIOD

SOLAR PATH DIAGRAM

JUN. 22nd
AUG. 22nd
MAY. 02nd
DEC. 22nd

VERSAILLES SHADING ANALYSIS

DRAWN No. BA-005 PAGE 95
PREVAILING WINDS
Wind Frequency (Hrs)
Location: PARIS, ORLY, FRA
Date: 1st January - 31st December
Time: 00:00 - 24:00
### Heating Strategies

- **Active**: High Energy Consumption
  - Heat Pump Heating

- **Semi-Passive**: Low Energy Consumption
  - Heat Exchanger Preheated by Solar Hot Water

- **Passive**: Low Energy Consumption
  - Thermal Wall
  - Green House Effect
  - Direct Solar Gain

### Cooling Strategies

- **Active**: High Energy Consumption
  - Heat Pump Cooling

- **Semi-Passive**: Low Energy Consumption
  - Shading
  - Natural Ventilation
  - Solar Chimney
  - Heat Sink and Vegetation Cooling
  - Evaporative Cooling
OUTDOOR TEMPERATURE UNDER 19°C WITH WIND
PV PANELS WASTE HEAT
OPEN LOUVERS
HOT AIR GO UP
OPEN DOORS, WINDOWS AND LOUVERS

EXTerior TEMPERATURE UNDER 19°C
NO WIND

OPEN LOUVERS
CLOSE WINDOWS

FANS ON
EXTERIOR TEMPERATURE ABOVE 26°C

CLOSE WINDOWS AND LOUVERS

RAIN WATER TANK

CONCRETE SLAB COOLING

FANS ON
EXTERIOR
TEMPERATURE ABOVE 26°C

OPEN LOUVERS
CLOSE WINDOWS
WATER WALL ON
FANS ON
CLOSE WINDOWS
OVERHEATED PERIOD
THE DESIGN OF BUILDING GEOMETRY PROVIDES SHADING

UNDERHEATED PERIOD
BUILDING GEOMETRY ALLOWS SUNLIGHT ENTERING LIVING SPACE

THE HIGHEST ANGLE OF THE SUN
SEP.21; MAR.21
OVERHEAT/UNDERHEAT TRANSITION DATE
ANGLE OF THE SUN

THE LOWEST ANGLE OF THE SUN

88°
66°
41.4°
OUTDOOR TEMPERATURE BELOW 26°C

- SOLAR RADIATION
- PV PANELS
- PV PANELS WASTE HEAT
- LONG-WAVE INFRARED
- WINTER COLD AIR
- CLOSE DOORS, WINDOW AND LOUVERS
A 30cm water thermal wall is built on the west side of the house. Each bottle contains 6 liters of water. The bottles are piled to 2 meter height-wise and 3 meter length-wise. The bottles are held together and fixed to a transparent acrylic sheet on their exterior side. The water in the thermal wall absorbs solar radiation during the day and releases heat to the interior space at night.
FILLED WITH WATER

INDOOR TEMPERATURE ABOVE 29°C

THERMAL WALL IN TAIPEI
OUTDOOR TEMPERATURE UNDER 19°C
HEAT PUMP HEATING

- Increased Pressure
- Compressor
- Absorb Heat
- Decompression
- Release Heat

HEAT PUMP COOLING

- Increased Pressure
- Compressor
- Absorb Heat
- Decompression
- Release Heat

Diagram showing the process of heat pump heating and cooling.
APPLIANCE LIST

<table>
<thead>
<tr>
<th>APP. No</th>
<th>TYPE</th>
<th>BRAND</th>
<th>TYPE</th>
<th>LOCATION</th>
<th>SIZE (W<em>D</em>H)</th>
<th>NOTE</th>
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<tbody>
<tr>
<td>APP. 01</td>
<td>REFRIGERATOR</td>
<td>MIELE</td>
<td>KFN 37452 1 D</td>
<td>KITCHEN</td>
<td>560x550x1772</td>
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<tr>
<td>APP. 02</td>
<td>DISH WASHER</td>
<td>MIELE</td>
<td>G8895 SCV 2 D</td>
<td>KITCHEN</td>
<td>598370845-910</td>
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<tr>
<td>APP. 03</td>
<td>SINK</td>
<td>HCG</td>
<td>BK650</td>
<td>KITCHEN</td>
<td>600x400x190</td>
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<tr>
<td>APP. 04</td>
<td>CABINET</td>
<td>HCG</td>
<td></td>
<td>KITCHEN</td>
<td>3210x600</td>
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<tr>
<td>APP. 05</td>
<td>HOOD</td>
<td>BEST</td>
<td>GLOSS</td>
<td>KITCHEN</td>
<td>405435x30x1180</td>
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<tr>
<td>APP. 06</td>
<td>INDUCTION TOP</td>
<td>MIELE</td>
<td>Domino CS 1112 E</td>
<td>KITCHEN</td>
<td>272x500</td>
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<td>APP. 07</td>
<td>OVEN</td>
<td>MIELE</td>
<td>H2611 B CLST</td>
<td>KITCHEN</td>
<td>600x600x500</td>
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<td>APP. 08</td>
<td>FAUCET</td>
<td>HCG</td>
<td>KTS80T</td>
<td>KITCHEN</td>
<td>25x215x295</td>
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<td>APP. 09</td>
<td>DRAIN</td>
<td>HCG</td>
<td></td>
<td>KITCHEN</td>
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WOOD COUNTER TOP
FIXED FURNITURE LIST

<table>
<thead>
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<th>FIXT. No</th>
<th>TYPE</th>
<th>BRAND</th>
<th>LOCATION</th>
<th>SIZE (W<em>D</em>H)</th>
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<tbody>
<tr>
<td>FIXT. 01</td>
<td>TOILET PAPER HOLDER</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>170x10x135</td>
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<td>FIXT. 02</td>
<td>REPLACEMENT TAP</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>830x460x225</td>
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<td>FIXT. 03</td>
<td>CABINET</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>1900x500x700</td>
<td>LCP40-4119MP</td>
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<td>FIXT. 04</td>
<td>MIRROR</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>1200x800x80</td>
<td>BA2826</td>
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<td>FIXT. 05</td>
<td>TISSUE HOLDER</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>245x130x105</td>
<td>BA202</td>
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<td>FIXT. 06</td>
<td>SOAP DISH</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>300x140x105</td>
<td>BA207</td>
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<td>FIXT. 07</td>
<td>TEMPERATURE CONTROL</td>
<td>HCG</td>
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<td>235x60x180</td>
<td>LF316P7TI</td>
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<td>ACCESSIBLE SHOWER DOOR</td>
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<td>SHOWER SHOWER GLASS</td>
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<td>HCG</td>
<td>BATHROOM</td>
<td>897x1797x4</td>
<td>STANDARD 4142</td>
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<td>FIXT. 13</td>
<td>DOUBLE TOWEL RACK</td>
<td>HCG</td>
<td>BATHROOM</td>
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<td>FIXT. 14</td>
<td>CLOTH HOOK</td>
<td>HCG</td>
<td>BATHROOM</td>
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</table>

Fixed Furniture List:

1. 897x676 五片
2. 897x897 五片
3. 1533x676 二片
4. 897x835 五片
5. 1460x676 一片
6. 1460x897 一片
7. 1320x835 一片

BATHROOM PLAN

Institution: NCTU Architecture
NCTU/UNICODE: 1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan

NCTU/UNICODE: IN-501 PAGE 126

Drawn by
Checked by
Mark Date Description
DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
ST 2014/03/03 CD Submission
ST 2014/04/30 CD Submission

Scale 1:20
Unit mm

Solar De o t eur ope

1 Meter

陶板分割尺寸：
1. 897x676 五片
2. 897x835 五片
3. 1533x676 二片
4. 897x835 五片
5. 1460x676 一片
6. 1460x897 一片
7. 1320x835 一片
SMOKE ALARM/DETECTOR (NQ9S-3)

POWER RECEIVE

9V BATTERY

MEZZANINE

BEDROOM

LIVING RM.

PVC E20, W/600V 380°C
1.25mm /2C

PVC E20, W/600V 380°C
1.25mm /4C

BAS

FIRE PROTECTION DETAIL

FP-001 160
General circuit breaking

Inverters circuit breaking

PVC E20, W/800V 380°C
1.25mm/4C, 1.25mm/2C

Smoke Alarm/Detector
NQ9S-3:
- DC 9V Battery
- Alarm Contacts
- Interlock with all detectors when alarm of any detector
- AC 220V

Fire Extinguisher
ABC-EN3-4K:
21A/113B/C efficiency

Power cut ON/OFF
General circuit breaking

Power cut ON/OFF
Inverters circuit breaking
FIRE PROTECTION
EVACUATION PATH
MEZZANINE LEVEL

- Fire Extinguisher
  ABC-EN3-4K:
  21A/113B/C efficiency

- Evacuation Route
- Evacuation Origin

1 75mm 1/2", 1 150mm DN200:

NQ6S-3:
- DC 9V Battery
- Alarm Contacts
- Interlock with all detectors when alarm of any detector
- AC 220V

Rain Water Collection Surface

Mezzanine

LAUNDRY HANGING AREA

OPEN TO BELOW

DN

OPEN TO BELOW

FP-005
1. **Cold Water Tank**
   - Size: 1.00x0.70x0.30 m
   - Volume: 2100l.

2. **Greywater tank**
   - Size: 1.00x0.60x0.30 m
   - Volume: 1800l.

3. **Black Water Tank**
   - Size: 1.20x1.80x0.30 m
   - Volume: 600l.

4. **Rainwater Tank**
   - Size: 0.70x1.50x0.30 m
   - Volume: 300l.

5. **Rainwater Pump**
   - Flow: 15 lpm
   - Head: 15 m

6. **Cold Water Pump**
   - Flow: 25 lpm
   - Head: 20 m
3. **Black Water Tank**
   - Size: 2.00×1.00×0.30 m
   - Volume: 600 l

4. **Rainwater Tank**
   - Size: 1.50×0.70×0.30 m
   - Volume: 300 l

5. **Rainwater Pump**
   - Flow: 15 lpm
   - Head: 15 m

6. **Cold Water Pump**
   - Flow: 20 lpm
   - Head: 18 m
1. Cold Water Tank
   Size: 1.00x7.00x0.30 m, Volume: 2100l.

2. Greywater Tank
   Size: 1.00x6.00x0.30 m, Volume: 1800l.

3. Black Water Tank
   Size: 1.20x1.80x0.30 m, Volume: 600l.

4. Rainwater Tank
   Size: 0.70x1.50x0.30 m, Volume: 300l.

5. Rainwater Pump
   Flow: 15 lpm
   Head: 15 m

6. Cold Water Pump
   Flow: 25 lpm
   Head: 20 m
1. **Cold Water Tank**
   Size: 1.00x7.00x0.30 m, Volume: 2100l.

2. **Greywater tank**
   Size: 1.00x6.00x0.30 m, Volume: 1800l.

3. **Black Water Tank**
   Size: 1.20x1.80x0.30 m, Volume: 600l.

4. **Rainwater Tank**
   Size: 0.70x1.50x0.30 m, Volume: 300l.

5. **Rainwater Pump**
   Flow: 15 lpm
   Head: 15 m

6. **Cold Water Pump**
   Flow: 25 lpm
   Head: 20 m

**Containers and Fill Locations**
The diagram illustrates a comprehensive water management system, integrating various components to optimize water efficiency and sustainability.

1. **Pre-Filtration**
   - Filtration process to remove impurities before further treatment.

2. **Buffering Chamber**
   - Designed to combine active sludge and foam separation, ensuring the organic sediments are further sedimented in the tank.

3. **Heat Exchanger**
   -分为冷侧 (Cold Side): 水温(C,Ewt/Lwt): 15/23, 流量(Lpm): 18.75
   - and hot side: 水温(C,Ewt/Lwt): 33/23, 流量(Lpm): 15

4. **Sedimentation Process**
   - The biofiltration process is resilient to shock loads with additional fixed biofilter skimmers.

5. **Greywater Tank**
   - Designed to buffer and treat greywater.

6. **Biological Treatment**
   - Cap.: 1.8M

7. **Disinfection**
   - A UV-C system for disinfection.

8. **Clean Cold Water**
   - Clean water distribution system.

9. **Clean Hot Water**
   - Hot water distribution system.

10. **Graywater**
    - Graywater management and treatment.

11. **Solar thermal and heat pump system**
    - Integrating solar and heat pump technologies for efficient water heating.

12. **City Water**
    - Primary water supply.

13. **Potted Vegetation**
    - Integration of greenery for water purification.

14. **Cold Water Tank**
    - Storage tank for cold water.

15. **Dish Washer**
    - Efficient use of water in kitchen appliances.

16. **Lavatory**
    - Water management in bathroom areas.

17. **Shower**
    - Efficient water usage in showers.

18. **Kichen**
    - Water management in kitchen areas.

19. **To Building's Rainwater Tank**
    - Integration of rainwater harvesting.

20. **Overflow Buffer Chamber**
    - Buffering to manage excess water.

21. **Progressive depth filtration**
    - Advanced filtration technology for improved water quality.

22. **Fist Flush**
    - Water conservation technique in initial flushes.

23. **Heat Exchanger**
    - Efficient heating of water.

24. **City Drain**
    - Outlet for excess or treated water.

This comprehensive system integrates multiple components to ensure efficient water usage, treatment, and distribution, promoting sustainability and environmental responsibility.
The water closet is not connected to the sewage disposal system (black water tank) during the event.

Heat Exchanger
- Cold Side: Water (°C, Ewt / Lwt) : 15 / 23 Flow (Lpm) : 18.75
- Hot Side: Water (°C, Ewt / Lwt) : 33 / 23 Flow (Lpm) : 15

Note:
1. The diagram includes various water systems such as solar thermal and heat pump systems, rainwater collection, and collection of greywater.
2. The water closet is not connected to the sewage disposal system during the event.

The diagram shows the flow of water through different systems, including:
- Solar thermal and heat pump system
- Rainwater collection
- Greywater tank
- Black water tank
- Cold water tank
- Potted vegetation
- Dish washer
- Kitchen
- Shower
- Lavatory
- Washing machine
- Air condition

Key:
- Clean Cold Water
- Clean Hot Water
- Greywater

Dimensions and capacities are indicated for each tank, with flows and temperatures for the heat exchanger.
1. Black Water Tank
2. Water Closet
3. Kitchen Sink
4. Dish Washer
GREEN CORE
IRRIGATION SYSTEM
PLAN

NOTE:
1. Use screws to secure the pipes on this structure
2. Pipe link with irrigation system at 620 cm high
3. Pipe cross-sectional area (4.7cm²) x length (13553 cm)
   61220 mL (irrigation)
4. 200mmx200mm Hand Hole
5. Overflow
6. Rainwater Filling

DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
ST 2014/03/03 CD Submission
ST 2014/04/30 CD Submission

Project:
Institution:
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National Chiao Tung University
Address:
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
Contact:
www.sde.tw

Consultants:

1:60

Scale:

mm

Unit:

NCTU/UNICODE

Page: 178

NCTU Architecture

Green Core

IRRIGATION SYSTEM

PLAN

NOTE:
1. Use screws to secure the pipes on this structure
2. Pipe link with irrigation system at 620 cm high
3. Pipe cross-sectional area (4.7cm²) x length (13553 cm)
   61220 mL (irrigation)
4. 200mmx200mm Hand Hole
5. Overflow
6. Rainwater Filling

DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
ST 2014/03/03 CD Submission
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Project:
Institution:
NCTU Architecture
National Chiao Tung University
Address:
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
Contact:
www.sde.tw

Consultants:

1:60

Scale:

mm

Unit:

NCTU/UNICODE

Page: 178

NCTU Architecture
1. Use screws to secure the pipes on this structure.
2. Pipe link with irrigation system at 620 cm high.
3. Pipe cross-sectional area (4.7 cm²) x length (13027 cm) = 61226 ML (irrigation).

Connected to gray water tank.
1. Connected to gray water tank
Outdoor Unit of Cooling/Heating Heat Pump

**Name**

**Outdoor Unit of Cooling/Heating Heat Pump**

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<th>Service</th>
<th>HVAC Cooling and Heating</th>
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<td>Type</td>
<td>Heat Pump</td>
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<td>Cooling Capacity</td>
<td>11.2 kW</td>
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<tr>
<td>Heating Capacity</td>
<td>12.5 kW</td>
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<tr>
<td>COP</td>
<td>Cooling = 3.8, Heating = 3.82</td>
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<td></td>
<td>Cooling = 4.4, Heating = 4.4</td>
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<tr>
<td>LER</td>
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<tr>
<td>Electrical Power Supply</td>
<td>230 V</td>
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<tr>
<td>Frequency</td>
<td>50 Hz</td>
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<td>Power Consumption</td>
<td>kW Cooling = 2.95, Heating = 3.27</td>
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<td>Refrigerant</td>
<td>R-410A</td>
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Test condition for outdoor unit:

1. Cooling Condition: Indoor Temperature 27°C DB / 19°C WB
   Outdoor Temperature 35°C DB

2. Heating Condition: Indoor Temperature 20°C DB
   Outdoor Temperature 7°C DB / 6°C WB

**Name**

**Indoor Unit of Heat Pump**

<table>
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<th>Service</th>
<th>Room Heating and Cooling</th>
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</thead>
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<td>Quantity</td>
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<tr>
<td>Cooling Capacity</td>
<td>4.5 kW</td>
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<tr>
<td>Heating Capacity</td>
<td>5 kW</td>
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<tr>
<td>Fan Flow (High/Low)</td>
<td>12 / 9 m³/min</td>
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<tr>
<td>Air Filter</td>
<td>Washable Resin Net</td>
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Note:

- HVAC EQUIPMENTS 1
- CHUNG
- ST 2014/03/03 CD Submission
- ST 2014/04/30 CD Submission
- ST 2014/06/20 CD Submission
Heat Reclalm Ventilator

<table>
<thead>
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<th>Outdoor °C/°F</th>
<th>rH %</th>
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</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>27/80</td>
<td>50</td>
<td>35/95</td>
<td>60</td>
</tr>
<tr>
<td>Heating</td>
<td>20/68</td>
<td>40</td>
<td>7/40</td>
<td>70</td>
</tr>
</tbody>
</table>

Test condition for exchange efficiency.
Winter - Night

- In cold-stream winter night.
- Space heating is required.
- Both heating coil and heat pump are operating.
- HRV is in HX mode.

Legend:

- Exhaust Air
- Indoor Air
- Exhaust Air
- Outdoor Air
- Supply Air
- Hot Air
- Warm Air
- Cool Air
- Cold Air
- Refrigerant Pipe
- Exhaust Air

Winter

- Winter of freezing temperature.
- Space heating is required.
- Only heating coil is operating.
- HRV is in HX mode.

Project:
Institution:
Team Name: NCTU/UNICODE
Address: 1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
Contact: www.sde.tw
Consultants:
Consulted by:
Checked by:
Scale:
Unit:

Check:
Date:
Description:

ME-021
187
Summer - Day
- Typical of summer day.
- Space cooling is required.
- Heat pump is operating.
- HRV is in HX mode.

Spring - Night
- Outdoor temperature is much less than room temperature.
- Space cooling is still required.
- HRV is in bypass mode.

Summer - Early Morning
- Outdoor temperature is less than room temperature.
- Space cooling is required.
- Heat pump is operating.
- HRV is in HX mode.

Spring - Day
- Outdoor temperature is higher than room temperature.
- Space cooling is required.
- HRV is in HX mode.
**Summer - Day**
- Outdoor temperature is much higher than room temperature.
- HRV is in HX mode.

**Spring - Day**
- Outdoor temperature is higher than room temperature.
- Space cooling is required.
- HRV is in HX mode.

**Winter - Night**
- Outdoor temperature is much less than room temperature.
- HRV is in HX mode.
- Humidifier is operating.

**Spring - Night**
- Outdoor temperature is less than room temperature.
- Space cooling is required.
- HRV is in bypass mode.

---

**Legend:**
- **Exhaust Air**
- **Indoor Air**
- **Outdoor Air**
- **Supply Air**
- **Hot Air**
- **Warm Air**
- **Cold Air**
- **Exhaust Air**

**HRV - Heat Exchange Mode**

**HRV - Bypass Mode**
1. Hot Water Storage Tank
2. Heat Pump
3. CO2 Heat Pump Package
4. Expansion Tank 1
5. CO2 Heat Pump Package 2
6. Pump Station

Mechanical Room Elevation (East)

Mechanical Room Elevation (North)
When the heat pump is operating in heating mode and the outdoor temperature is lower than the room temperature, the energy recovery ventilator is automatically switched to the heat recovery mode.
When the heat pump is operating in heating mode and the outdoor temperature is higher than the room temperature, the energy recovery ventilator is automatically switched to the bypass mode.
When the heat pump is operating in cooling mode and the outdoor temperature is higher than the room temperature, the energy recovery ventilator is automatically switched to the heat recovery mode.
When the heat pump is operating in cooling mode and the outdoor temperature is lower than the room temperature, the energy recovery ventilator is automatically switched to the bypass mode.
Operation Mode Of HRV Unit

1. In case of cooling operation

   - Cooling
   - Heat Exchange
   - Bypass

   - Set temp. of A/C
   - Room temp. (R.T)
   - O.T=R.T
   - O.T>R.T
   - O.T<R.T

   - Zone 1: Free cooling (cooling by outdoor air) in bypass mode.
   - Zone 2: Room temperature to be achieved set temperature by heat exchange mode.
   - Zone 3: Room temperature to be achieved set temperature in bypass mode.
   - Zone 4: Fresh air supply is cooled down by indoor air in heat exchange mode (energy saving).

   - The air cannot be supplied at the same temperature as the outdoor air because it is partly heat-exchanged.

2. In case of heating operation

   - Heating
   - Heat Exchange
   - Bypass

   - Set temp. of A/C
   - Room temp. (R.T)
   - O.T=R.T
   - O.T>R.T
   - O.T<R.T

   - Zone 1: Fresh air supply is heated up by indoor air in heat exchange mode (energy saving).
   - Zone 2: Free heating (heating by outdoor air) in bypass mode.
   - Zone 3: Room temperature to be achieved set temperature by heat exchange.
   - Zone 4: Room temperature to be achieved set temperature in bypass mode.

   Ventilation mode is individually determined by the original formula of HRV with the temperature sensors.

   - The air cannot be supplied at the same temperature as the outdoor air because it is partly heat-exchanged.

3. In case of fan operation only

   - Fan
   - Heat Exchange
   - Bypass

   - Ventilation mode is individually determined by the original formula of HRV with the temperature sensors.

   - The air cannot be supplied at the same temperature as the outdoor air because it is partly heat-exchanged.
Remote Controller Function:
1. Cooling
2. Heating
3. Automatic Heating / Cooling Changeover
4. Program Dry Mode
5. Fan Mode
6. Program Timer
7. Program The Start/Stop Time

Solar Thermal Collector

Domestic Hot Water

CO2 Heat Pump Package

City Water

Make up Water

Heating Coil

Local Control Unit

BAS Control System
Photovoltaic Module:
NSP D6P250B3A
Max. DC power = 250Wp
Voc = 37.33 V
Vmp = 30.34 V
Isc = 8.69 A
Temp. Coeff. of Voc = -0.117 V/°C
Temp. Coeff. of Isc = 0.004 A/°C
Temp. Coeff. of Vmp = -0.127 V/°C
Module Efficiency = 15.3%

Inverter:
Delta Solivia 5.0
Max. input power = 6,000Wp
Input Voltage range = 125 ~ 600V
Full power MPP range = 150 ~ 480V
Max. current = 36.6A
DC connector = 2 pairs
Nominal apparent power = 5,000VA
Full power MPP range = 150 ~ 480V
Max. current = 36.6A
DC connector = 2 pairs
Nominal apparent power = 5,000VA
Voltage range = 184~264Vac
AC output frequency = 50 Hz
Max. current = 27.2 Aac
Max. efficiency = 96.1%
EU efficiency = 94.6%

Voltage Calculations:
Voc @ coldest expected operating Temp.:
Low ambient Temp. = -20°C
Voc(-20°C) = Voc(STC) + (-20°C-25°C)*(ΔVoc/°C) = 37.33 - 45*(-0.117) = 42.595V
Max. modules of string:
nmax = Vdc(input max)/Voc(-20°C) = 600/42.595 = 14.086 ≤ 14pcs

Vmp @ highest expected operating Temp.:
High ambient Temp. = 75°C
Vmp(75°C) = Vmp(STC) + (75°C-25°C)*(ΔVmp/°C) = 30.34 + 50*(-0.127) = 23.99V
Min. modules of string:
nmin = Vmp(min)/Vmp(75°C) = 150/23.99 = 6.25 ≥ 7pcs
Selection modules of string = 10 pcs

Label for pv installations:
ON DC SIDE
All the junction boxes and DC electrical cabling must indicate live conductors or the internal parts of the boxes can remain live even after the opening of the DC switch.
The front of all junction boxes, insert a label: "Attention, cables courant continu sous tension"
In all the junction boxes and in all the DC disconnect boxes, insert a label: "Ne pas manœuvrer en charge"

ON THE INVERTERS
All the inverters shall have clear markings specifying that before all work, all the voltage sources must be electrically isolated.
Insert this label on the inverter front.

Components
PV Module
Surge Protection Device
Inverter

Manufacturer
NSP
Shihlin
Delta

Model
D6P250B3A
BHP30-2P
Solvia 5.0

Notes
Q'ty
20
1
42
1

Selection modules of string = 10 pcs
Voc(-20°C)_string = Modules*Voc(-20°C) = 10*42.595V = 425.95V < 600V
Vmp(75°C)_string = Modules*(75°C) = 10*23.99V = 239.9V > 150V

DC Protections
Fuse
SPD

Solar Cable 4mm², 15m + Solar Cable 4mm², 15m + Solar Cable 4mm², 20m + Solar Cable 4mm², 20m

Solar Cable 4mm², 5m + Solar Cable 4mm², 5m + Solar Cable 4mm², 5m + Solar Cable 4mm², 5m

Grounding Terminal
Low Voltage Moulded Case Circuit Breaker
Low Voltage Moulded Case Circuit Breaker with Ground Fault Circuit Interrupter (GFCI)
Grounding
Current Transformer
Transformer
Low Voltage Fuse
0.6/1KV Low Smoke Free Cable
Surge Protection Device

Electronic Symbols
- Low Voltage Molded Case Circuit Breaker
- Grounding
- Current Transformer
- Transformer
- Low Voltage Fuse
- 0.6/1KV Low Smoke Free Cable
- Surge Protection Device

Diagram:
- CU Bus Bar 162W 230V 32A
- EL-501
- EL-502

Table:
<table>
<thead>
<tr>
<th>CIRCUIT NO.</th>
<th>DESCRIPTION</th>
<th>LOAD(W)</th>
<th>CURRENT (A)</th>
<th>VOLTAGE (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Clean Water Pump</td>
<td>540W</td>
<td>-</td>
<td>230V</td>
</tr>
<tr>
<td>17</td>
<td>Rain Water Pump &amp; Level relay</td>
<td>270W</td>
<td>-</td>
<td>230V</td>
</tr>
<tr>
<td>18</td>
<td>BathRoom &amp; Tea Terrace Receptacle</td>
<td>-</td>
<td>-</td>
<td>230V</td>
</tr>
<tr>
<td>19</td>
<td>Floor Receptacle (General Use)</td>
<td>-</td>
<td>-</td>
<td>230V</td>
</tr>
<tr>
<td>20</td>
<td>Tea Terrace &amp; Mech. RM Lighting</td>
<td>-</td>
<td>-</td>
<td>230V</td>
</tr>
<tr>
<td>21</td>
<td>Control Valve (For irrigation)</td>
<td>-</td>
<td>-</td>
<td>230V</td>
</tr>
<tr>
<td>22</td>
<td>SPARE</td>
<td>-</td>
<td>-</td>
<td>230V</td>
</tr>
</tbody>
</table>

Notes:
- Cables: 2.5mm²/2C+G-2.5mm² XLPE-LSFH in PVC PIPE 20mm
- Electrical symbols:
  - Grounding
  - Current Transformer
  - Transformer
  - Low Voltage Fuse
  - 0.6/1KV Low Smoke Free Cable
  - Surge Protection Device

Diagram:
- One-Line Diagram
- EL-501
- EL-502

Consultants:
- United Integrated Services
**ONE-LINE DIAGRAM**

**CIRCUIT NO.**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOAD (W)</td>
<td>2760W</td>
<td>100W</td>
<td>1340W</td>
<td>-</td>
<td>560W</td>
<td>550W</td>
<td>480W</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CURRENT (A)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Note:**
- 6mm/2C+G/6mm2 XLPE-LSFH IN PVC PIPE 28mm
- 32A/2P
- 30mA 0.15Sec
- ELB
- 300mA 0.15Sec
- Mezzanine Area Receptacle
- Water wall Pump
- From AC Switch Panel 14Φ2W 230V 50Hz

**Electrical Symbols:**
- Low Voltage Molded Case Circuit Breaker
- Grounding
- Current Transformer
- Transformer
- Low Voltage Fuse

**Electrical Details:**
- **2F 230V Panelboard**
- **IC: 10 kA Symm**
- **Cable:** 0.6/1KV Low Smoke Free Cable of Halogen Cable
- **Surge Protection Device**
- **Power Meter**
- **CU BUS BAR 14Φ2W 230V 32A**
### Components

<table>
<thead>
<tr>
<th>Tag</th>
<th>Components</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Qty</th>
<th>Notes</th>
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<tbody>
<tr>
<td>1</td>
<td>PV Module</td>
<td>NSP</td>
<td>DSP250B3A</td>
<td>20</td>
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<tr>
<td>2</td>
<td>DC Protections</td>
<td>HI BOX</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Inverter</td>
<td>Delta</td>
<td>Solva 5.0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Box</td>
<td>HI BOX</td>
<td></td>
<td>1</td>
<td></td>
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<tr>
<td>5</td>
<td>Power Meter</td>
<td>Schneider</td>
<td>PR3200</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>ELCB</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Surge Protection Device</td>
<td>Shihlin</td>
<td>BNP30 1PN</td>
<td>2</td>
<td>Uc:275V, Up:1.2kV, In:15kA(B200a)</td>
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<tr>
<td>8</td>
<td>BESS</td>
<td>Delta</td>
<td>RenE-ES 6120</td>
<td>1</td>
<td>Battery Energy Storage System</td>
</tr>
</tbody>
</table>

### Labels for PV Installations:

**ON AC SIDE**

- On AC side, insert this label near the main AC photovoltaic circuit breaker or near the main AC photovoltaic switch.
- On AC side, insert this label near the main circuit breaker if a main circuit breaker cut off simultaneously photovoltaic and electrical loads.

### Inverter AC side overcurrent Calculations:

**Output max. current**: 27.2A

**Overcurrent protection**: 27.2A * 1.25 = 34A

**Selection 40AT ELCB**

### Inverter AC output conductor:

**Output max. current**: 27.2 Aac

**1.56 * 27.2A = 42.432A**

**Selected conductor**: XLPE-LSHF 4mm²
**System Design Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Module Type</td>
<td>Standard</td>
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<tr>
<td>Module Power</td>
<td>260 Wp</td>
</tr>
<tr>
<td>Number of Module</td>
<td>24 pieces</td>
</tr>
<tr>
<td>Inverter Type</td>
<td>Solvia 5.0</td>
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<tr>
<td>Number of Inverter</td>
<td>1</td>
</tr>
<tr>
<td>System Capacity</td>
<td>6 kWp</td>
</tr>
<tr>
<td>Tilt Angle of Modules</td>
<td>18°</td>
</tr>
<tr>
<td>Azimuth of Modules</td>
<td>South</td>
</tr>
<tr>
<td>System Type</td>
<td>On Grid</td>
</tr>
</tbody>
</table>

**DELTA ELECTRONICS, INC.**

**DELTA PV Panel**

**Clear Glass**

**Solar Water Heating**

**Photovoltaic System:**

**General 2**

**Delta PV Panel**

**Clear Glass**

**Solar Water Heating**

**Scale:** 1:60

**Unit:** mm

**PHOTOVOLTAIC SYSTEM:**

**GENERAL 2**

**Drawn by:** CF

**Checked by:** DN

**Done:** 2013/04/01

**Submission:** SD

**Done:** 2013/11/01

**Submission:** DD

**Done:** 2014/03/03

**Submission:** CD

**Done:** 2014/04/30

**Submission:** CD
### Components

<table>
<thead>
<tr>
<th>Tag</th>
<th>Components</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Q'ty</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SDE Grid</td>
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<td></td>
<td>1</td>
<td>Organization Supplied Grid Power</td>
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<tr>
<td>2</td>
<td>Power Meter</td>
<td>Schneider</td>
<td>PM3200</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PV array</td>
<td>NSP</td>
<td>D6P250B3A</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>DC Protections</td>
<td>HI BOX</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Inverter</td>
<td>Delta</td>
<td>Solivia 5.0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Power Meter</td>
<td>Schneider</td>
<td>PM3200</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>BESS</td>
<td>Delta</td>
<td>RenE-ES 6120</td>
<td>1</td>
<td>Battery Energy Storage System</td>
</tr>
</tbody>
</table>

### Diagram

1. SDE Grid 230V 50Hz
2. Power Meter
3. PV array
4. DC Protections
5. Inverter
6. Power Meter
7. BESS

- **Power Flow**:
  - SDE Grid to Power Meter
  - Power Meter to PV array
  - PV array to Inverter
  - Inverter to Power Meter
  - Power Meter to BESS
  - BESS to AC Load

- **Connections**:
  - RS485 connection between Power Meter and Inverter
  - Earth cable connection between PV array and Inverter

- **Suppliers**:
  - Delta Electronics
  - Schneider Electric
  - Delta Battery Energy Storage System

- **Notes**:
  - Battery Energy Storage System
  - Organization Supplied Grid Power
Photovoltaic Module:
NSP D6P250B3A
Max. DC power = 250Wp
Voc = 37.33 V
Vmp = 30.34 V
Isc = 8.69 A
Temp. Coeff. of Voc = -0.117 V/°C
Temp. Coeff. of Isc = 0.004 A/°C
Temp. Coeff. of Vmp = -0.127 V/°C
Module Efficiency = 15.3 %

Inverter:
Delta Solivia 5.0
Max. input power = 6,000Wp
Max. current = 36.6A
Input Voltage range = 125 ~ 600V
Full power MPP range = 150 ~ 480V
Max. current = 27.2 Aac
Max. efficiency = 96.1%
EU efficiency = 94.6%

Voltage Calculations:
- Voc @ coldest expected operating Temp.:
  - Low ambient Temp. = 20°C
  - Voc(20°C) = Voc(STC)+20°C * ΔVoc/°C = 37.33+20*0.117 = 37.33+2.34 = 39.67 V
- Vmp @ highest expected operating Temp.:
  - High ambient Temp. = 75°C
  - Vmp(75°C) = Vmp(STC)+75°C * ΔVmp/°C = 30.34+75*0.127 = 30.34+9.525 = 39.865 V

String in parallel:
- Max. DC power of Charge Controller / Selection modules of string / Module Max. DC power
  = 6,000W / 10pcs / 250W
  = 2.4 ≤ 2 parallel

DC array conductor:
- 1.56 * Isc * 2 = 1.56 * 8.69A * 2 = 27.11A
- Selected conductor: solar cable 4mm²

Labels for pv installations:
- ON DC SIDE:
  * Attention, cables courant continu sous tension*
  - On the front of all junction boxes, insert a label:
  "Attention, cables courant continu sous tension"

- ON THE INVERTERS:
  - All the inverters shall have clear markings specifying that before all work, all the voltage sources must be electrically isolated.
  - Insert this label on the inverter front.
### Tag Components

<table>
<thead>
<tr>
<th>Tag</th>
<th>Components</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Q'ty</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PV Module</td>
<td>NISI</td>
<td>D6P25B3A</td>
<td>20</td>
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</tr>
<tr>
<td>2</td>
<td>DC Protections</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Inverter</td>
<td>Delta</td>
<td>Solaris 5.0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Box</td>
<td>HI BOX</td>
<td></td>
<td>1</td>
<td></td>
</tr>
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<td>5</td>
<td>Power Meter</td>
<td>Schneider</td>
<td>PM3200</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Surge Protection Device</td>
<td>Shihlin</td>
<td>BHP30 1PN</td>
<td>2</td>
<td>Uc:275V,Up:1.2kV,In:19A(8/20us)</td>
</tr>
<tr>
<td>7</td>
<td>BESS</td>
<td>Delta</td>
<td>RenE-ES 6120</td>
<td>1</td>
<td>Battery Energy Storage System</td>
</tr>
</tbody>
</table>

### Inverter AC side overcurrent Calculations:
- Output max. current: 27.2 A
- Selection: 60A ELCB

### Inverter AC output conductor:
- Output Max. current = 27.2 Aac
- Selection: XLPE-LSHF 4mm²

### Labels for pv installations:
**ON AC SIDE**
- On AC side, insert this label near the main AC photovoltaic circuit breaker or near the main AC photovoltaic switch.
- On AC side, insert this label near the main circuit breaker if a main circuit breaker cut off simultaneously photovoltaic and electrical loads.

---

**Diagram Details:**
- **PV Array:**
  - XLPE-LSHF 4mm², 10m
- **DC Protections:**
  - XLPE-LSHF 4mm², 10m
- **Inverter:**
  - XLPE-LSHF 4mm², 10m
- **BESS:**
  - XLPE-LSHF 4mm², 20m
- **AC Switch Panel:**
  - XLPE-LSHF 4mm², 10m
  - XLPE-LSHF 16mm², 10m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 6.0mm², 15m
  - XLPE-LSHF 16mm², 15m
  - XLPE-LSHF 16mm², 15m
  - XLPE-LSHF 16mm², 15m
  - XLPE-LSHF 16mm², 15m
  - XLPE-LSHF 4mm², 10m

---

**Note:**
- UV side: 2F 230V Panelboard
- LV side: 1F 230V Panelboard
- Water Pipe
- Aerial
- Earth Bus Bar
PHOTOVOLTAIC SYSTEM:
MODULE LAYOUT

UNIT:mm
SCALE: 1:30

Detail A

Detail B
PHOTOVOLTAIC SYSTEM:
MODULE STRING LAYOUT

DELTA ELECTRONICS, INC.

1:60

ST 2013/07/01 DDc Submission
ST 2013/11/01 DD Submission
ST 2014/03/03 CD Submission
ST 2014/04/30 CD Submission

PV Array (XLPE-LSHF 4mm², ADUCT)
Home Automation System

- PLC System
  - HMI (Control Panel)
  - Ethernet
  - ASUS AIO Server

- Wireless AP
- Weather Station
- RS-232

- PAD/Smartphone
- Ethernet

- GATEWAY
  - RS-485
  - Power Meter

- BESS
- RS-485

- PLC
  - DI / DO / AI / AO

- HRV/VRV
- GATEWAY

Consultants:
- Aaron Chen
- Steven Yu
<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
<th>Brand/Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature &amp; Humidity</td>
<td>T: -50<del>50°C or 0</del>100°C H: 0~100%RH</td>
<td>Airtek / AR1000</td>
</tr>
<tr>
<td>Air Quality (CO2)</td>
<td>±30 ppm ±2% of Reading</td>
<td>Airtek / VC1008T</td>
</tr>
<tr>
<td>Smoke Detector</td>
<td>Action concentration: 15% Alarms: 90dB/ft</td>
<td>Horing Lh / NQ95</td>
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<tr>
<td>Soil Moisture Sensor</td>
<td>0-100% ; ±3%(m3/m3)</td>
<td>Jetec / JSH-100</td>
</tr>
<tr>
<td>Smart Weather Station</td>
<td>T/H ; Rainfall ; Wind ; BP</td>
<td>Vaisala WXT520</td>
</tr>
<tr>
<td>Light Level Sensor</td>
<td>0-400 lux</td>
<td>Schneider / SLR320</td>
</tr>
<tr>
<td>Motion Detector</td>
<td>Infrared /</td>
<td>Panasonic / WTKF2311</td>
</tr>
<tr>
<td>Access Point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch Panel</td>
<td>Android 4.2 ; DDR3 1G ; WiFi</td>
<td>Asus / Nexus 7</td>
</tr>
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</table>
Monitor Panel
Dimensions: 50x40x15 cm
Free Space Left For The Monitoring Panel: 100x60x20 cm

5.1 Living Room
5.2 Living Room
5.3 Living Room
5.1 Kitchen Room
6.1
6.2
6.3
6.5
6.6

Monitoring Power Line
Monitoring Ethernet 1
Monitoring Ethernet 2

FRONT VIEW
<table>
<thead>
<tr>
<th>Tag</th>
<th>Components</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Qty</th>
<th>Notes</th>
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<tr>
<td>①</td>
<td>SDE Grid</td>
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<tr>
<td>②</td>
<td>Smart Meter</td>
<td>Schneider</td>
<td>PM3200</td>
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<tr>
<td>③</td>
<td>PV array</td>
<td>DelSolar</td>
<td>D6P250B3A</td>
<td>24</td>
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<tr>
<td>④</td>
<td>DC Protections</td>
<td>HI BOX</td>
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<td>1</td>
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</tr>
<tr>
<td>⑤</td>
<td>Inverter</td>
<td>Delta</td>
<td>Solivia 5.0</td>
<td>1</td>
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<tr>
<td>⑥</td>
<td>Power Meter</td>
<td>Schneider</td>
<td>PM3200</td>
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<tr>
<td>⑦</td>
<td>BESS</td>
<td>Delta</td>
<td></td>
<td>1</td>
<td>Battery Energy Storage System</td>
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</table>

① SDE Grid: 230V 50Hz

② Smart Meter

③ PV array

④ DC Protections

⑤ Inverter

⑥ Power Meter

⑦ BESS

AC Load

RS485
<table>
<thead>
<tr>
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<th>Components</th>
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<th>Qty</th>
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<td>DC Protections</td>
<td>HI BOX</td>
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<td>1</td>
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<tr>
<td>③</td>
<td>Inverter</td>
<td>Delta</td>
<td>Solivia 5.0</td>
<td>1</td>
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<tr>
<td>④</td>
<td>Box</td>
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<td>⑤</td>
<td>Power Meter</td>
<td>Schneider</td>
<td>PM2000</td>
<td>3</td>
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<td>⑥</td>
<td>ELCB</td>
<td>Shihlin</td>
<td></td>
<td>4</td>
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<td>Surge Protection</td>
<td>Shihlin</td>
<td></td>
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<td>⑧</td>
<td>BESS</td>
<td>Delta</td>
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Notes:
- Battery Energy Storage System

Diagram:
- PV Array
- DC Protections
- Inverter
- AC Switch Panel
- BESS
- Surge Protection Device
- Power Meter
- ELCB
- SPD
- AC Load
- Grounding Terminal

Components:
- XLPE-LSHF 16mm²
- Schneider PM2000
- Delta Solivia 5.0
- DelSolar D6P250B3A
- Schneider ELCB 2P 63AT
- Delta ELCB 2P 63AT
- Delta ELCB 2P 40AT
- Delta ELCB 2P 63AT
- Shihlin Surge Protection Device
- Schneider Power Meter
- Delta Power Meter
Legend / Brand / Model

- Refrigeration: MIELE KFN 37452 | DE
- Dish Washer: MIELE G6995 SCVI K20
- Oven: MIELE H2161 B CLST
- TV: Samsung F4000 Series 4
- PC: Asus Transformer AO P1801
### Phase Port Arrival Departure
1. KAOSHIUNG 2014/4/29 10:00 2014/4/30 08:00
2. YANTIAN 2014/5/1 08:00 2014/5/2 08:00
3. SINGAPORE 2014/5/5 16:00 2014/5/6 22:00
4. ROTTERDAM 2014/5/26 01:00 2014/5/27 10:00
5. LE HAVRE 2014/6/1 06:00 2014/6/2 06:00

### Shipping, Freight, Demand, Process Timetable

<table>
<thead>
<tr>
<th>Date</th>
<th>Local</th>
<th>Project target</th>
<th>Demand Help</th>
<th>Self assist</th>
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<tbody>
<tr>
<td>4/16~4/29</td>
<td>Taiwan</td>
<td>Apply to customers</td>
<td>Declaration process guidance</td>
<td>Customs detail, customs declaration</td>
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<tr>
<td>4/7~4/13</td>
<td>Taiwan</td>
<td>Component packaging and protection</td>
<td>Packaging and protective materials to provide</td>
<td>Packaging and Protection</td>
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<tr>
<td>4/13~4/16</td>
<td>Taiwan</td>
<td>Component transport (Container *14)</td>
<td>Hsinchu→Container port</td>
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<tr>
<td>4/13~4/16</td>
<td>Taiwan</td>
<td>Component loading(Container*14)</td>
<td>Loading location and Equipment evaluation</td>
<td>Component classification</td>
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<td>Ship</td>
<td>Taiwan→France</td>
<td>Transport</td>
<td>The number of containers and the declaration content</td>
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<td>6/1~6/5</td>
<td>France</td>
<td>Immigration Customs</td>
<td>Declaration process guidance</td>
<td>Customs detail, the number of containers and the declaration content</td>
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<td>France</td>
<td>Component Discharge (Container*14) (Trailers Trucks *15)</td>
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<td>Component transport (Trailers Trucks *15)</td>
<td>France transport (Trailers Trucks *15)</td>
<td>Trucks size</td>
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<tr>
<td>6/5~6/25</td>
<td>France</td>
<td>Pre Construction Warehouse (H-SM,400m² Warehouse)</td>
<td>Warehouse</td>
<td>Warehouse size</td>
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<tr>
<td>7/15~7/25</td>
<td>France</td>
<td>Heavy equipment rental</td>
<td>Lodging Near Warehouse Forklift, Bridge Crane or small crane, Scaffolding, air Compressors</td>
<td>Warehouse size</td>
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<tr>
<td>6/16~6/25</td>
<td>France</td>
<td>Transport sequence</td>
<td>Transport</td>
<td>Transport sequence in 10 Days</td>
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<tr>
<td>7/15~7/24</td>
<td>France</td>
<td>Disassembly Warehouse (H-SM,400m² Warehouse)</td>
<td>Forklift, Bridge crane or small crane, Scaffolding, air Compressors</td>
<td></td>
</tr>
<tr>
<td>7/19~7/24</td>
<td>France</td>
<td>Component packaging and protection</td>
<td>Packaging and protective materials to provide</td>
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<td>France</td>
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<td>France</td>
<td>Outbound Customs</td>
<td>Declaration process guidance</td>
<td>Customs detail, customs declaration</td>
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<td>8/1</td>
<td>Taiwan</td>
<td>Transportation back to Taiwan</td>
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</table>

### Trailer Frequency Transport Date Location & Directions Travel time(min)

| 15 | 6/16-6/25 | Voie des Colverts(start) 0 A131 Highway 7 A13 Highway 16 A12 Highway 60 D10 Road 26 Versailles(end) 5 | 114 |
| 16 | 7/15-7/19 | Versailles(start) 0 D10 Road 5 A12 Highway 26 A13 Highway 60 A131 Highway 16 Voie des Colverts(end) 7 | 114 |
### Truck Assembly Schedules

#### Truck-4: Low Loader 6/16 15:00

<table>
<thead>
<tr>
<th>Truck No.(A)</th>
<th>Type</th>
<th>Designation</th>
<th>Package No</th>
<th>Assembly No</th>
<th>QTY</th>
<th>Weight(kg)</th>
<th>Dimensions(mm)</th>
<th>Arrival</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Low</td>
<td>Steel Structure UNIT 05</td>
<td>P05</td>
<td>20</td>
<td>1</td>
<td>1150</td>
<td>4000 2200 3450</td>
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<td>4</td>
<td>Low</td>
<td>Eform</td>
<td>N31</td>
<td>24</td>
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<td>Low</td>
<td>Steel Structure UNIT 04</td>
<td>P04</td>
<td>27</td>
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<td>105</td>
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<tr>
<td>4</td>
<td>Low</td>
<td>Electrical Pipe</td>
<td>W22</td>
<td>32</td>
<td>1</td>
<td>80</td>
<td>3100 1000 800</td>
<td>6/16 15:00</td>
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<tr>
<td>4</td>
<td>Low</td>
<td>Water Pipe</td>
<td>W23</td>
<td>32</td>
<td>1</td>
<td>110</td>
<td>3100 1000 800</td>
<td>6/16 15:00</td>
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<tr>
<td>4</td>
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<td>Steel Structure UNIT 06</td>
<td>P06</td>
<td>54</td>
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<td>150</td>
<td>3850 2200 1130</td>
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<tr>
<td>4</td>
<td>Low</td>
<td>Vacuum Insulation Panel</td>
<td>P76</td>
<td>122</td>
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<td>120</td>
<td>2480 1303 1200</td>
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<tr>
<td>4</td>
<td>Low</td>
<td>UFS Tool</td>
<td>N24</td>
<td>147</td>
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<td>70</td>
<td>1000 1000 600</td>
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</tr>
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<td>UFS Tool</td>
<td>N21</td>
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<td>70</td>
<td>1000 1000 600</td>
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<td>UFS Tool</td>
<td>N22</td>
<td>147</td>
<td>1</td>
<td>70</td>
<td>1000 1000 600</td>
<td>6/16 15:00</td>
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<td>4</td>
<td>Low</td>
<td>Air Pipe</td>
<td>W24</td>
<td>153</td>
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<td>50</td>
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<td>6/16 15:00</td>
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<tr>
<td>4</td>
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<td>Exhaust Fan Air Pipe</td>
<td>W25</td>
<td>198</td>
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<td>6/16 15:00</td>
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<td>PV Table Tray</td>
<td>W25</td>
<td>244</td>
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<td>250</td>
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#### Truck-5: Low Loader 6/16 16:00

<table>
<thead>
<tr>
<th>Truck No.(A)</th>
<th>Type</th>
<th>Designation</th>
<th>Package No</th>
<th>Assembly No</th>
<th>QTY</th>
<th>Weight(kg)</th>
<th>Dimensions(mm)</th>
<th>Arrival</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Low</td>
<td>Tool</td>
<td>N12</td>
<td>3</td>
<td>1</td>
<td>835</td>
<td>2900 1890 1000</td>
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<td>Low</td>
<td>Tool</td>
<td>N11</td>
<td>3</td>
<td>1</td>
<td>806</td>
<td>3400 1690 1200</td>
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<td>Low</td>
<td>Steel Structure UNIT 03</td>
<td>P03</td>
<td>34</td>
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<td>4000 1810 3450</td>
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<td>Steel Structure UNIT 02</td>
<td>P02</td>
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<td>P01</td>
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#### Truck-6: Flatbed 6/16 23:00

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<th>Package No</th>
<th>Assembly No</th>
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<th>Weight(kg)</th>
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<th>Arrival</th>
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<tbody>
<tr>
<td>6</td>
<td>Flat</td>
<td>Steel Structure Beam</td>
<td>P37</td>
<td>83</td>
<td>1</td>
<td>1660</td>
<td>4030 1900 630</td>
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<td>Flat</td>
<td>Steel Structure Stair</td>
<td>P39</td>
<td>92</td>
<td>1</td>
<td>350</td>
<td>4730 1150 565</td>
<td>6/16 23:00</td>
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<td>6</td>
<td>Flat</td>
<td>Steel Structure Stair</td>
<td>P40</td>
<td>92</td>
<td>1</td>
<td>200</td>
<td>1880 1305 540</td>
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<td>P38</td>
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<td>Steel Structure Beam</td>
<td>P36</td>
<td>102</td>
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<td>GL Upper Wooden Box</td>
<td>W26</td>
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<td>Dimensions(mm)</td>
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<td>L</td>
<td>W</td>
<td>H</td>
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<td>7</td>
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<td>Bedroom Cabinet</td>
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<td>2515</td>
<td>1065</td>
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<td>7</td>
<td>Flat</td>
<td>Steel Structure Beam(South)</td>
<td>P33</td>
<td>02</td>
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<td>800</td>
<td>3530</td>
<td>1900</td>
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<td>7</td>
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<td>Wooden Box (Wall)</td>
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<td>Wuxioxi Bus (Wall)</td>
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<td>3000</td>
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<td>Bedroom Cabinet</td>
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<th>QTY</th>
<th>Weight (kg)</th>
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<th>Arrival</th>
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<tbody>
<tr>
<td>Glass Louver</td>
<td>W5</td>
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<td>950</td>
<td>L: 712, W: 1200, H: 740</td>
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<tr>
<td>Aluminum Windows</td>
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Total: 11 items 1840 mm

### Truck-5 Low Loader

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<td>P64</td>
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<td>P61</td>
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<td>L: 2650, W: 1140, H: 1236</td>
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<td>Toilet equipment</td>
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Total: 7 items 5140 mm

### Truck-6 Flatbed

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<td>300</td>
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<td>Ceramic Panel</td>
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<td>Washing Machine</td>
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<td>28</td>
<td>150</td>
<td>L: 800, W: 1260, H: 1180</td>
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<tr>
<td>Hot Water Tank</td>
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<td>170</td>
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<tr>
<td>Polli-Brick</td>
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<td>160</td>
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Total: 7 items 2390 mm
### TRUCK-7 FLATBED
7/16 23:00

### TRUCK-8 FLATBED
7/17 09:00

### TRUCK-9 FLATBED
7/17 15:00

### DISASSEMBLY TRUCKS
SHIPMENT 3

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<th>Weight (kg)</th>
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### Trucker 10 FLATBED
- **Type:** Electrical Pipe
- **Package No:** W23
- **Dismantling No:** 1
- **QTY:** 1
- **Weight:** 80 kg
- **Dimensions:**
  - L: 3100 mm
  - W: 1000 mm
  - H: 800 mm
- **Arrival:** 7/17 16:00

### Trucker 11 FLATBED
- **Type:** FRP Clean Water Tank
- **Package No:** W35
- **Dismantling No:** 1
- **QTY:** 1
- **Weight:** 110 kg
- **Dimensions:**
  - L: 7600 mm
  - W: 1310 mm
  - H: 880 mm
- **Arrival:** 7/17 16:00

### Trucker 12 FLATBED
- **Type:** Electrical Pipe
- **Package No:** W22
- **Dismantling No:** 1
- **QTY:** 1
- **Weight:** 110 kg
- **Dimensions:**
  - L: 3100 mm
  - W: 1000 mm
  - H: 800 mm
- **Arrival:** 7/17 16:00
### Truck-13 Flatbed 7/19 03:00

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### Truck-16 Flatbed 7/19 12:00

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<td>Steel Structure UNIT 12</td>
<td>P09</td>
<td>148</td>
<td>1</td>
<td>2640</td>
<td>9500 2275 3450</td>
<td>7/19 12:00</td>
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<td>Low</td>
<td>Plastic Bucket</td>
<td>W3</td>
<td>150</td>
<td>1</td>
<td>890</td>
<td>1100 900 630</td>
<td>7/19 12:00</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Plastic Bucket</td>
<td>W2</td>
<td>150</td>
<td>1</td>
<td>120</td>
<td>1100 900 630</td>
<td>7/19 12:00</td>
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<tr>
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<td>Low</td>
<td>Tool</td>
<td>P48</td>
<td>150</td>
<td>1</td>
<td>680</td>
<td>1500 1500 2000</td>
<td>7/19 12:00</td>
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<td></td>
<td>Low</td>
<td>Sand Bag</td>
<td>N34</td>
<td>150</td>
<td>1</td>
<td>6000</td>
<td>2000 2000 2000</td>
<td>7/19 12:00</td>
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<tr>
<td></td>
<td>Low</td>
<td>Sand Bag</td>
<td>N36</td>
<td>150</td>
<td>1</td>
<td>6000</td>
<td>2000 2000 2000</td>
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<td></td>
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<td>14</td>
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Site Preparation

<table>
<thead>
<tr>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Detail</td>
<td>Datum Point</td>
<td>Spacing</td>
<td>Sand Box</td>
<td>Footing Set</td>
<td>Coordinate positioning</td>
<td>Horizontal correction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>4</td>
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Note
Insulation

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Detail</th>
<th>Note</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Stair Unit and Terrace Unit Assembly and Lifting</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Interior Insulation Assembly</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>M.E.P System Tube and trunking</td>
<td>4</td>
</tr>
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<td>4</td>
<td>Interior Upper Floor Insulation</td>
<td>8</td>
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Assembly Phase 3
Assembly Phase 4

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>Work Detail</td>
<td>Additional components</td>
<td>M.E.P System Shaft</td>
<td></td>
<td></td>
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<tr>
<td>Week</td>
<td>8</td>
<td>4</td>
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Assembly Phase 5

Roof Structure

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Detail</th>
<th>Note</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>2F Main Structure</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Roof Unit</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worker

| Work | 8 | 4 |

Note
Assembly Phase 7

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---

Water | 8 | 4

Note
Facade

Step | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
-----|----|----|----|----|----|----|----|----|----|
Work Detail | Bayer Wall System | Roof Cover & Gutter System |
Worker | 8  | 6  |    |    |    |    |    |    |    |
Note    |    |    |    |    |    |    |    |    |    |
### Disassembly Phase 1

#### Furnishing and Planting

<table>
<thead>
<tr>
<th>Step</th>
<th>Work detail</th>
<th>Worker</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plants removing</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>accessory removing</td>
<td>4</td>
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</tr>
<tr>
<td>3</td>
<td>Furniture removing</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Kitchen/Appliance/Lamp equipment</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Machinery room</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Outside pipeline/Lamps</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Outside handrail</td>
<td>4</td>
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</tr>
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</table>

**Note:**
- Worker numbers indicate the number of workers required for each task.
### Outdoor Deck Units

<table>
<thead>
<tr>
<th>Step</th>
<th>Work detail</th>
<th>Worker</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Outside WPC/Deck</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Outside footing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>East/West Bayer board</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>South Electric Blinds</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Disassembly Phase 2**

**SC**

- **Checked by:**
- **Unit:**
- **Drawn by:**
- **Draw No.:**
- **Title:**
Ground Floor

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
Work detail | 1F Interior floor | Aluminium window | Sensor removing | 1F Ceiling | 1F Wooden wall | Bathroom | Kitchen Island | Work Station removing | Thermal wall removing |
Worker | 4 | 2 | 2 | 4 | 6 | 4 | 3 | 4 | 4 |
Note | | | | | | | | | |
Roof Panels

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8
Work detail | Roof cover board | North Bayer board | Roof ridge Fans | Smart skin | Solar panel | North Electric Blinds | Solar water heater | Water tank
Worker | 4 | 3 | 4 | 3 | 3 | 4 | 2 | 6

Disassembly Phase 5

Note
East Roof Structure

Step | 1 | 2 | 3 | 4
--- | --- | --- | --- | ---
Work detail | E1,E2,E3,E4 unit disassembly | Roof Unit 5-7 disassembly | Roof Unit 9-11 disassembly | East column
Worker | 5 | 3 | 4 | 3
Note

Disassembly Phase 6
Disassembly Phase 7

West Roof Structure

<table>
<thead>
<tr>
<th>Step</th>
<th>Work detail</th>
<th>Worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Roof Unit 1~3 removing</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>2F unit disassembly</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Roof Unit 9~11 disassembly</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>West column</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>East/North canopy</td>
<td>6</td>
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</table>

Note: Worker Work detail Step Roof Unit 1~3 removing 2F unit disassembly Roof Unit 9~11 disassembly West column East/North canopy
Tea Terrance Units

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>Work detail</td>
<td>Unit 6~10 disassembly</td>
<td>Tea terrance footing</td>
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Worker

Note

Disassembly Phase 8
### Step

<table>
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<tr>
<th>Step</th>
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### Work detail

<table>
<thead>
<tr>
<th>Work detail</th>
<th>Unit 1~5 disassembly</th>
<th>Unit 1~5 removing</th>
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### Worker

<table>
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### Note:

- Disassembly Phase 9
- Box Units
- Unit 1~5 disassembly
- Unit 1~5 removing

---

**Disassembly Phase 9**

**Box Units**

**Step**

<table>
<thead>
<tr>
<th>Step</th>
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<th>2</th>
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**Work detail**

<table>
<thead>
<tr>
<th>Work detail</th>
<th>Unit 1~5 disassembly</th>
<th>Unit 1~5 removing</th>
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</table>

**Worker**

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**Disassembly Phase 9**

**Box Units**

**Step**

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</table>

**Work detail**

<table>
<thead>
<tr>
<th>Work detail</th>
<th>Unit 1~5 disassembly</th>
<th>Unit 1~5 removing</th>
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</table>

**Worker**

<table>
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<th>Worker</th>
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</table>
Footing

<table>
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<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>Work detail</td>
<td>Unit 11-12 disassembly</td>
<td>Unit 11-12 removing</td>
<td>Footing removing</td>
<td>Site cleaning</td>
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<tr>
<td>Worker</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

Note

Footing removing
Site cleaning

Disassembly Phase 10
VEHICLE ACCESS TO LOT

SITE DESCRIPTION
Lot number: R
Lot size: 20 x 20 m (400m²)

Elements around the lot:
- Our lot situated near the main path export
- The track route overlaps with our loading/unloading area

ROUTE TO THE NEAREST HOSPITAL
A: La Cite du Soleil

Head south on "Allée des Matelots"
- Turn right to stay on "Allée des Matelots"
- Turn left onto "Rue de l’Indépendance Américaine"
- Continue onto "Rue Saint-Julien"
- Turn right onto "Av. Neipveu Sud"
- Slant left onto "Av. Rockefeller"
- Continue onto "Rue Hoche/D186"
- Continue onto "Rue Carnot"
- Keep right to stay on "Rue Carnot"
- Slight right onto "Rue des Réservoirs"
- At the roundabout, take the 2nd exit onto "Bd du Roi/D186"
- At the roundabout, take the 4th exit onto "Rue de Versailles"
- Keep left to stay on "Rue de Versailles"
- At the roundabout, take the 4th exit

Distance: 6 km, 15 mins

B: 177 Rue de Versailles
Address: 177 Rue de Versailles, 78150 Le Chesnay, France
Tel.: 01.39.63.91.33
ROUTE TO THE NEAREST POLICE OFFICE

A: La Cite du Soleil
- Head northeast on Allée des Matelots toward D10
- Turn left onto D10
- Slight right onto Av. de la Division Leclerc/D10
- At the roundabout, take the 1st exit onto the Av. des Frères Lumière/D127 ramp
- Keep left at the fork, follow signs for D127/Guyancourt/Quartier saint-quentin
- Turn left onto Av. des Frères Lumière/D127
- Turn right onto Rue de la Division Leclerc

B: Commissariat de Police
Address: 1 Rue de la Division Leclerc
8280 Guyancourt, France

ROUTE TO THE FIRE STATION

A: La Cite du Soleil
- Head northeast on Allée des Matelots toward D10
- Turn left onto D10
- Slight right onto Av. de la Division Leclerc/D10
- Turn right onto Av. Jean Jaurès/D11
- Continue to follow D11
- At the roundabout, take the 2nd exit onto Rue Jules Massenet/D98
- Turn left onto D98

B: Sapeurs Pompiers des Yvelines
Address: Avenue de Pépinière
78450 Villepreux, France
Distance: 11.3km, 18 mins

B: Commissariat de Police
Address: 1 Rue de la Division Leclerc
8280 Guyancourt, France
Distance: 5.8km, 9 mins
TRUCKS ROUTE FROM "Le Havre" TO "La Cite du Soleil"

A: LE HAVRE
- Head west on Av. du Général Leclerc toward Pl. de l'Hôtel de ville
- Take the 1st left onto Pl. de l'Hôtel de ville
- Turn right onto Bd de Strasbourg
- Continue onto Cours Lafayette
- Continue onto Quai Colbert
- Slight left onto D6015
- Keep left to stay on D6015
- Continue onto N282
- Continue onto A131
- At the roundabout, take the 3rd exit onto N182
- Slight left onto E5
- Continue onto A131/E5
- Merge onto A13/E5
- Take the exit onto A12 toward Saint-Quentin-en-Yvelines
- Take the exit toward Évry/Lyon/Dreux/Saint-Quentin-en-Yvelines/Bois-D'Arcy/Versailles-Satory

B: La Cite du Soleil
- Keep right at the fork, follow signs for Saint-Cyr-l'École
- Turn left onto D129
- Slight right onto Av. Volta/D129
- Continue to follow D129
- At the roundabout, take the 3rd exit onto Rue Emile Zola
- Slight right to stay on Av. Pierre Curie/D10
- Turn right onto Allée des Matelots

Distance: 191 km, 1 hour 56 mins

PROBLEM | RISKS | ADOPTED MEASURES
---|---|---
Dangers caused by weather | Heavy rain due to slippery floors | Drive slowly
Traffic problem during shipping | Traffic jam due to spent more time | To do another preparation during waiting for trucks
Road construction | Road blocked | Plan B (other route)
Complex traffic system | Get lost | Arrange the route clearly before departure
## HEALTH AND SAFETY DURING THE INSIDE LOGISTIC

### PROBLEM

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>RISKS</th>
<th>ADOPTED MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dangers caused by weather</td>
<td>Ground subsidence</td>
<td>Provision of lifting devices</td>
</tr>
<tr>
<td></td>
<td>Getting stuck of heavy equipment</td>
<td>Support plates for heavy vehicles' legs</td>
</tr>
<tr>
<td></td>
<td>Getting stuck of heavy components</td>
<td></td>
</tr>
<tr>
<td>Dangers due to the great number of people on shipping to the site</td>
<td>Unclear arrangement danger of injury increases</td>
<td>No access for unauthorized persons</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access only in coordination with construction/shift supervisor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High visibility vest in compliance with the color scheme required by site operations for every person entering construction site</td>
</tr>
<tr>
<td>Too many access possibilities to the lot</td>
<td>Unclear arrangement danger of unauthorized access</td>
<td>Security officers for control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site fence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clearly marked pedestrian access to construction site</td>
</tr>
<tr>
<td>Too small distances from lot and trees/plants</td>
<td>Obstruction of vehicle' movements</td>
<td>No changes possible</td>
</tr>
<tr>
<td></td>
<td>Obstructions due to small distances between construction grounds</td>
<td>- steady crane</td>
</tr>
<tr>
<td></td>
<td>Obstruction of vehicle' movements</td>
<td>- site fence</td>
</tr>
<tr>
<td></td>
<td>Obstruction / limitations through on-site security installations</td>
<td>- unloading/loading materials in the storage area inside the lot</td>
</tr>
<tr>
<td>Ground limitations</td>
<td>Obstruction / limitations through on-site security installations</td>
<td>- unauthorized and external persons who invade the lot</td>
</tr>
</tbody>
</table>

**Note:**

- steady crane
- site fence
- unloading/loading materials in the storage area inside the lot
- unauthorized and external persons who invade the lot

**Security:**

- Security officers for control
- Site fence
- Clearly marked pedestrian access to construction site
THE SAFETY PLAN AND COORDINATION PHASE

Plan of site

THE SAFETY PLAN AND COORDINATION PHASE

Plan of site

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>RISKS</th>
<th>ADOPTED MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too small property lines</td>
<td>Collision with other people, Collision with parts stored, Discomfort to the maneuvers</td>
<td>Marking dangerous parts stored, High visibility vests, Guiding gear during maneuvers with two pedestrians, Designing a delivery zone</td>
</tr>
<tr>
<td>Dangers due to the great number of people in the site</td>
<td>Increased dangers of injury muddle</td>
<td>High visibility vest, Denial of access to other people</td>
</tr>
<tr>
<td>Trucks passway</td>
<td>Pass by operation area</td>
<td>Arrange signpostings</td>
</tr>
<tr>
<td>Heavy rain or rain of long-term</td>
<td>Degradation of the land, Electric shock due to humidity</td>
<td>Use anti-slide mats on slipping surfaces, Regularly remove water from the floor with scrapers, Replacement of defective cables, Waterproof plugs, Protective clothes</td>
</tr>
<tr>
<td>Ground limitations</td>
<td>Obstruction / limitations through on-site security installations</td>
<td>Securing existing escape routes, No dangerous works close to this area</td>
</tr>
<tr>
<td>Traffic and parking of the crane or a truck</td>
<td>Shock, collisions with pedestrians, existing equipment or vehicle, Falling objects transported</td>
<td>Respect the rules of the road, Parking places reserved for this purpose, Lash with appropriate means and in sufficient number</td>
</tr>
</tbody>
</table>

HEALTH AND SAFETY DURING LOAD / UNLOAD

ANETY PLAN AND COORDINATION PHASE

Plan of site

<table>
<thead>
<tr>
<th>PROBLEM</th>
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<th>ADOPTED MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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</table>
PPE MUST BE WORN ON THIS SITE
Where the worker are:
On the ground
ALL SAFETY RULES MUST BE FOLLOWED

Footing Lifting Phase

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
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<tbody>
<tr>
<td>Work Detail</td>
<td>Datum Point</td>
<td>Spacing</td>
<td>Sand Box</td>
<td>Coordinate positioning</td>
<td>Horizontal correction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Worker | 8 | 4 | 4 | 8 | 4 |

Note

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:
On the ground
Where the worker are:
On the ground
On the Floor
ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:
On the mezzanine floor

Modular Unit Phase

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Detail</th>
<th>Modular Unit 1~5</th>
<th>Modular Unit 11~12</th>
<th>M.E.P System</th>
<th>Unit combination</th>
<th>Building positioning correction</th>
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<td>6</td>
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<td>8</td>
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<td></td>
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<td></td>
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</tbody>
</table>

Worker:
8 4 4 8

Note:
Main Structure & Interior Insulation & M.E.P System Phase

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Detail</th>
<th>Stair Unit and Terrace Unit Assembly and Lifting</th>
<th>Interior Insulation Assembly</th>
<th>M.E.P System Tube and trunking</th>
<th>Interior Upper Floor Insulation</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Worker</td>
<td>5</td>
<td>4</td>
<td>4</td>
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</table>

Note: Worker: 5, 4, 4, 8

Where the worker are:
- On the ground
- On the mezzanine floor
- On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

<table>
<thead>
<tr>
<th>Note</th>
<th>Worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Detail</td>
<td>Work Deatail</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Phase 3
Where the worker are:
On the ground    On the mezzanine floor
On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

Additional components & M.E.P System Shaft Phase

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Detail</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Additional components</td>
<td>M.E.P System Shaft</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note

Woker

2 4

Note

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:
On the ground    On the mezzanine floor
On the Floor

ALL SAFETY RULES MUST BE FOLLOWED
<table>
<thead>
<tr>
<th>Step</th>
<th>Work Detail</th>
<th>Note</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>2F Main Structure</td>
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</tr>
<tr>
<td>2</td>
<td>Roof Unit</td>
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</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
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<td>5</td>
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<td></td>
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<tr>
<td>6</td>
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<td>7</td>
<td></td>
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<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Where the worker are:
- On the ground
- On the Floor
- On the mezzanine floor
- On the roof

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:
- On the ground
- On the Floor
- On the mezzanine floor
- On the roof

ALL SAFETY RULES MUST BE FOLLOWED
Where the worker are:
On the ground  On the mezzanine floor
On the Floor  On the roof

ALL SAFETY RULES MUST BE FOLLOWED

Solar Panel & Bayer Roof Panel & Louver Panel Phase

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Detail</td>
<td>Solar Panel &amp; Solar Panel Electricity System</td>
<td>Bayer Roof Panel</td>
<td>Louver Panel</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Worker</td>
<td>8</td>
<td>4</td>
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<td></td>
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</tbody>
</table>

Note

Where the worker are:
On the ground  On the mezzanine floor
On the Floor  On the roof

ALL SAFETY RULES MUST BE FOLLOWED
<table>
<thead>
<tr>
<th>Step</th>
<th>Work Channel</th>
<th>Green Core &amp; MEP Wire &amp; Water System Piping &amp; Piping System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

- Where the worker are:
  - On the ground
  - On the mezzanine floor
  - On the Floor

**ALL SAFETY RULES MUST BE FOLLOWED**

**Worker Work Detail**

- Green Core & Structure & Panel & Water System
- MEP Wiring & Piping System

**Phase 7**

- 123456789

- MS DN -
### Note

- Where the worker are:
  - On the ground
  - On the Floor
  - On the mezzanine floor
  - On the roof

ALL SAFETY RULES MUST BE FOLLOWED

### Work Details

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Detail</td>
<td>Bayer Wall System Structure &amp; Panel</td>
<td>Roof Cover &amp; Gutter System</td>
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<td></td>
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<tr>
<td>Worker</td>
<td>8</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

### Phase 8
Where the worker are:
On the ground                      On the mezzanine floor
On the Floor                        On the roof

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:
On the ground                      On the mezzanine floor
On the Floor                        On the roof

ALL SAFETY RULES MUST BE FOLLOWED

Roof Waterproof & Equipment & Lighting Test - Phase

Step          1          2          3          4          5          6          7          8          9

Work Chart   Roof Waterproof  Equipment & Lighting Test

Worker       8          6

Note
Outdoor Terrace & Planting & Furniture Phase

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Detail</td>
<td>Outdoor Terrace Structure &amp; Handrail &amp; Lighting</td>
<td>Outdoor Planting &amp; Green Core Planting</td>
<td>Furniture</td>
<td>Appliances</td>
<td>System Test</td>
<td>Lot Clean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>6</td>
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<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

Where the worker are:
- On the ground
- On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:
- On the ground
- On the mezzanine floor

ALL SAFETY RULES MUST BE FOLLOWED
Where the worker are:
On the ground                   On the mezzanine floor
On the Floor                    On the roof
ALL SAFETY RULES MUST BE FOLLOWED

PROJECT:
NCTU/UNICODE
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
www.sde.tw

CONSULTANTS:
Disassembly Phase 1

Where the worker are:
On the ground
On the Floor
On the mezzanine floor

ALL SAFETY RULES MUST BE FOLLOWED

INTERIOR EQUIPMENT removing

<table>
<thead>
<tr>
<th>Step</th>
<th>Work detail</th>
<th>Worker</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plants removing</td>
<td>6</td>
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<tr>
<td></td>
<td>accessory removing</td>
<td>4</td>
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<tr>
<td></td>
<td>Furniture removing</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kitchen/Appliance/Lamp equipment</td>
<td>4</td>
<td></td>
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<tr>
<td></td>
<td>Machinery room</td>
<td>2</td>
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</tr>
<tr>
<td></td>
<td>Outside pipeline/Lamps</td>
<td>4</td>
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<tr>
<td></td>
<td>Outside handrail</td>
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</tbody>
</table>

Worker

Note

SC

Disassembly Phase 1

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### Disassembly Phase 2

**Outside disassembly**

<table>
<thead>
<tr>
<th>Step</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>Work detail</td>
<td>Outside WPC/deck</td>
<td>Outside footing</td>
<td>East/West Bayer board</td>
<td>South Electric Blinds</td>
</tr>
<tr>
<td>Worker</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Note</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Where the worker are:**
- On the ground
- On the Floor

**ALL SAFETY RULES MUST BE FOLLOWED**

- Wear protective clothing
- Use safety equipment
- Keep the area clean and organized

**Note:**
- Worker are:
  - On the ground
  - On the Floor
- All safety rules must be followed.
Where the worker are:
On the ground    On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

First Floor disassembly

<table>
<thead>
<tr>
<th>Step</th>
<th>Work detail</th>
<th>Worker</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1F Interior floor</td>
<td>4</td>
<td>4</td>
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<tr>
<td>2</td>
<td>Aluminium window</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Sensor removing</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>1F Ceiling</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>1F Wooden wall</td>
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<tr>
<td>6</td>
<td>Bathroom</td>
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<td>4</td>
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<td>Kitchen Island</td>
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<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Work Station removing</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Thermal wall removing</td>
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Disassembly Phase 3

Note: Worker
Work detail
Step 5
Worker 4

Where the worker are:
On the ground    On the Floor

ALL SAFETY RULES MUST BE FOLLOWED
Second Floor disassembly

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Work detail | 2F WPC | 2F Equipment/Appliance | Water wall removing | 2F pipeline | Green core | 1F Upper wooden box | 2F Upper wooden box | Window/Door disassembly | Tea temrance/Entrance WPC
Worker | 3 | 5 | 8 | 4 | 4 | 8 | 8 | 4 | 8

Note

Where the worker are:
On the ground
On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:
On the ground
On the mezzanine floor

ALL SAFETY RULES MUST BE FOLLOWED

Disassembly Phase 4
Roof disassembly

Where the worker are:
On the ground              On the mezzanine floor
On the Floor               On the roof
ALL SAFETY RULES MUST BE FOLLOWED

Note:
Worker

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8
-----|---|---|---|---|---|---|---|---
Work detail | Roof cover board | North Bayer board | Roof ridge Fans | Smart skin | Solar panel | North Electric Blinds | Solar water heater | Water tank |
Worker | 4 | 3 | 4 | 3 | 4 | 2 | 6 | 2 |

Where the worker are:
On the ground              On the mezzanine floor
On the Floor               On the roof
ALL SAFETY RULES MUST BE FOLLOWED

Note:
Worker

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8
-----|---|---|---|---|---|---|---|---
Work detail | Roof cover board | North Bayer board | Roof ridge Fans | Smart skin | Solar panel | North Electric Blinds | Solar water heater | Water tank |
Worker | 4 | 3 | 4 | 3 | 4 | 2 | 6 | 2 |

Where the worker are:
On the ground              On the mezzanine floor
On the Floor               On the roof
ALL SAFETY RULES MUST BE FOLLOWED

Note:
Worker

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8
-----|---|---|---|---|---|---|---|---
Work detail | Roof cover board | North Bayer board | Roof ridge Fans | Smart skin | Solar panel | North Electric Blinds | Solar water heater | Water tank |
Worker | 4 | 3 | 4 | 3 | 4 | 2 | 6 | 2 |

Where the worker are:
On the ground              On the mezzanine floor
On the Floor               On the roof
ALL SAFETY RULES MUST BE FOLLOWED

Note:
Worker

Step | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8
-----|---|---|---|---|---|---|---|---
Work detail | Roof cover board | North Bayer board | Roof ridge Fans | Smart skin | Solar panel | North Electric Blinds | Solar water heater | Water tank |
Worker | 4 | 3 | 4 | 3 | 4 | 2 | 6 | 2 |
Where the worker are:
On the ground       On the mezzanine floor
On the Floor        On the roof

ALL SAFETY RULES MUST BE FOLLOWED

---

East Roof construction disassembly:

<table>
<thead>
<tr>
<th>Step</th>
<th>Work detail</th>
<th>Worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E1,E2,E3,E4 unit disassembly</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Roof Unit 5~7 disassembly</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Roof Unit 9~11 disassembly</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>East column</td>
<td>3</td>
</tr>
</tbody>
</table>

---

Note:

Where the worker are:

- On the ground
- On the mezzanine floor
- On the Floor
- On the roof

All safety rules must be followed.

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Disassembly Phase 6

---

Worker:

- E1,E2,E3,E4 unit disassembly: Worker 5
- Roof Unit 5~7 disassembly: Worker 3
- Roof Unit 9~11 disassembly: Worker 4
- East column: Worker 3

---

East Roof construction disassembly:

<table>
<thead>
<tr>
<th>Step</th>
<th>Work detail</th>
<th>Worker</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E1,E2,E3,E4 unit disassembly</td>
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</tr>
<tr>
<td>2</td>
<td>Roof Unit 5~7 disassembly</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Roof Unit 9~11 disassembly</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>East column</td>
<td>3</td>
</tr>
</tbody>
</table>
Disassembly Phase 7

Tea terrance structure disassembly

Where the worker are:
On the ground
On the Floor
On the mezzanine floor

ALL SAFETY RULES MUST BE FOLLOWED

Worker
4
6
4
3
6

Note

Step
1
2
3
4
5

Work detail
Roof Unit 1~3 removing
2F unit disassembly
Roof Unit 9~11 disassembly
West column
East/North canopy

SC

Table:

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Work detail</td>
<td>Roof Unit 1~3 removing</td>
<td>2F unit disassembly</td>
<td>Roof Unit 9~11 disassembly</td>
<td>West column</td>
<td>East/North canopy</td>
</tr>
<tr>
<td>Worker</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>
West Roof construction disassembly

Where the worker are:
On the ground  On the mezzanine floor
On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

1. Step 1: Unit 6~10 disassembly  Tea termence footing
2. Step 2:

Worker 4 4

Note:

Worker are:
On the ground  On the mezzanine floor
On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor

WHERE THE WORKER ARE:

ON THE GROUND
ON THE MEZZANINE FLOOR
ON THE FLOOR

ALL SAFETY RULES MUST BE FOLLOWED

- On the ground
- On the mezzanine floor
- On the Floor
Unit 1~5 structure disassembly

Where the worker are:
On the ground
On the Floor
On the mezzanine floor

ALL SAFETY RULES MUST BE FOLLOWED

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work detail</td>
<td>Unit 1~5 disassembly</td>
<td>Unit 1~5 removing</td>
</tr>
<tr>
<td>Worker</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: Worker Work detail

Unit 1~5 disassembly Unit 1~5 removing

Disassembly Phase 9

Where the worker are:
On the ground
On the Floor
On the mezzanine floor

ALL SAFETY RULES MUST BE FOLLOWED
Disassembly Phase 10

Unit 11~12 disassembly, clean site

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work detail</td>
<td>Unit 11~12 disassembly</td>
<td>Unit 11~12 removing</td>
<td>Footing removing</td>
<td>Site cleaning</td>
</tr>
<tr>
<td>Worker</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

Note:
- Worker are: On the ground, On the Floor
- All safety rules must be followed

Where the worker are:
On the ground
On the Floor

ALL SAFETY RULES MUST BE FOLLOWED

Unit: 11~12

Disassembly Phase 10
The space offers visitors shading comfort while they enjoy traditional Chinese Tea and appreciating the Winter Camp made by the senior high schoolers. Besides, the deck will offer a space for occasional rest.

Guide will introduce the concept of Green Core and Taiwanese orchid. 

The kitchen serves a multifunctional task-free center piece it can be converted into a dining table for formal occasions.

Guide will provide a translucent glimpse into the House through the window.

The Living Room features abundant natural light and can be filtered and adjusted by louvers as well as the liquid thermal wall on the west side. Further details will be provided to explain how the thermal wall conserves energy and maintains comfortable temperatures both day and night.

Guide will explain how we conceived the L-shape house and how it serves as a prototypical solution to Taipei rooftops. Some general description of city issues will be provided.

Guide will explain the mechanical system including.

Guide will explain the concept of Green Core and Taiwanese orchid.

Get more Q&A before finishing the tour and get a vote card.

0 1 2 5 METER