Construction Documentation Drawing

Deliverable #4
March 3rd 2014

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GENERAL ABBREVIATIONS

# Pound: OR Number
&: And
@: At
ACT: Acoustic Ceiling Tile
AD: Area Drain
AFF: Above Finished Floor
ALUM: Aluminum
ANOD: Anodized
BSMT: Basement
BYND: Beyond
BOT: Bottom
CIP: Cast In Place
CHNL: Channel
CJ: Control Joint
CLG: Ceiling
CLB: Clear
CMU: Concrete Masonry Unit
COL: Column
COMP: Compressible
CONC: Concrete
CONT: Continuous
CPT: Carpet
CT: Ceramic Tile
CTYD: Courtyard
DBL: Double
DEMO: Demolish or Demolition
DIA: Diameter
DIM: Dimension
DIMS: Dimensions
DN: Down
DR: Door
DWO: Drawing
EA: Each
EI: Expansion Joint
EL: Elevation
ELEC: Electrical
ELEV: Elevator or Elevation
EPDM: Ethylene Propylene Diene M-Class (Roofing)
EQ: Equal
EXIST: Existing
EXP JT: Expansion Joint
EXT: Exterior
FD: Floor Drain or Fire Department
FEC: Fire Extinguisher Cabinet
FIXT: Fixture
FLR: Floor
FM: Filled Metal
FND: Foundation
GA: Gauge
GALV: Galvanized
GWBR: Gypsum Wall Board
HC: Hollow Core
HI: High
HM: Hollow Metal
HP: High Point
HR: Hour
HVAC: Heating, Ventilating, And Air Conditioning
IRGWB: Impact Resistant Gypsum Wall Board
ILO: In Lieu Of
INSUL: Insulated or Insulation
INT: Interior
LO: Low
MAX: Maximum
MD: Masonry Opening
MECH: Mechanical
MEMBR: Membrane
MIN: Minimum
MRGWB: Moisture-Resistant Gypsum Wall Board
NIC: Not In Contract
NO: Number
NOM: Nominal
OC: On Center
OH: Opposite Hand
OZ: Ounce
PCC: Pre-Cast Concrete
PLUMB: Plumbing
PLY: Plywood
PT: Pressure Treated
PNT: Paint or Painted
PVC: Polyvinyl Chloride
RBR: Rubber
RCP: Reflected Ceiling Plan
RD: Roof Drain
REQD: Required
RM: Room
SIM: Similar
SPEC: Specified OR Specification
SPK: Sprinkler or Speaker
SST: Stainless Steel
STC: Sound Transmission Coefficient
STL: Steel
STRUC: Structure or Structural
T&G: Tongue And Groove
TELE: Telephone
TO: Top Of
TOC: Top Of Concrete
TOC: Top Of Steel
TO:I: Toilet Paper Dispenser
TP: Typical
VIF: Verify In Field
W/: With
WD: Wood
**Taipei, Taiwan**

Population: 2,650,900 P  
Area: 271.8 Km²  
Density: 9,753 P/Km²\n
---

**INTRODUCTION**

Taiwan is a small, developed island country located on the Tropic of Cancer and mainly mountainous.

Most of the 22 million people of Taiwan live along the coast and as a result, urban areas such as the capital city, Taipei, have extremely high population densities.

Although Taipei is so small a city comparing to other cities, it has well-developed infrastructure and people can enjoy convenient life.

Comparing to other cities which are plain, Taipei has only 45% plat region available for developing. Therefore, Taipei is much more crowded than other cities.

This way of development has caused several problems.

First, Taipei city uses a lot of electricity that is supplied from a factory far outside the city limits. Second, the numerous high-rises and lack of vegetation create a heat island effect. Third, the sewage system cannot adequately handle heavy typhoon rains, which also contributes to storm water runoff problems.

---
Orchid House = House Keeper + City Keeper System

The house keeper system is a basic node including some functions, such as environment control, public security, health management, house and life-style, personal secretary and shopping system.

All the functions will act as an in-house intelligent application and create a database system.

The possibility of solar house prototype is to integrate the nodes and form a city keeper system which is highly well-interweaved in the city network.
GREEN CORE

Green Core serves as the heart/ engine of the Orchid House - it keeps the temperature in balance, provides the exchange of fresh air, and kicks off recycling system for the irrigation of plants. The difference in temperature will be immediately sensible to visible to the one who enters the Orchid House.

MECHANICAL ROOM

Mechanical Room serves as the engine/hub of the Orchid House - it is a storage of being dedicated to the mechanical and electrical equipment.

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Mechanical Room serves as the engine/hub of the Orchid House - it is a storage of being dedicated to the mechanical and electrical equipment.

THERMAL WALL

The liquid thermal mass wall on the west side of Orchid House, and it conserves energy and maintains comfortable temperature both day and night.

CIRCULATION INTEGRATE

Orchid House is targeted to be developed and implemented in the future on rooftops over a great number of existing housing in Taiwan. To integrate the new system with old one is the key point.
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.
SOLAR VILLAGE PLAN

Project:
Institution:
Team Name:
Checked by
Scale
DWG. Title
DWG. No.
Address:
Contact:
NCTU/UNICODE
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
www.sde.tw

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

Note:
1:1000
Unit
mm

PAGE
AR-001

DN

S1
S2
S3
UNI
ROM
LUC
BUC
OTP
DEL
ATC
BAR
PLT
FNX
SHU
REC
KMU
DTU
ROF
CUJ

2
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E

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E

2
3
4
5
6
7
A
B
C
D
E
Footprint Calculation

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

House:
9.332x12.735x0.6375x0.7854x3.14=120.4 (M²)

Canopy:
5.975x0.41+(8.975-0.41)x0.408+6.375x0.335=8.0 (M²)

Louvers:
9.332x0.312=17.8 (M²)
Total:
120.4+8.05+17.84=146.3 (M²)
Thermal conductivity $R = 7.7$ (m²K/W)
FLOOR CONSTRUCTION
MEZZANINE LEVEL

Thermal conductivity $R = 13.7 \ \text{(m}^2\text{K/W)}$
FLOOR CONSTRUCTION DETAILS
MEZZANINE LEVEL 1

Project: NCTU/UNICODE
Institution: National Chiao Tung University
Team Name: NCTUUNICODE
Address: 1001 Ta-Hsueh Road, Hsinchu City 30010, Taiwan
Contact: www.sde.tw

Consultants:

Drawn by: CF
Checked by: ST
Scale: 1:50
Unit: mm

Note:

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

Special Module

2F Lower Box Module

Piping Space
Thermal conductivity $R = 13.5$ (m²K/W)

1. Bayer Makrofol Polycarbonate Inter-locking Hollow Sheet 1.420mm
2. Inter-locking Sheet supporting 75mm
3. Plywood 18mm
4. Glass foam 59mm "2"
5. Vacuum Insulation 30mm
6. Framing 42mm
7. Framing 24mm
8. Finished wall 18mm
9. L-shape steel
10. Sub-beam +25x75 14.5mm

Notes:
- DN2013/04/01 SD Submission
- ST 2013/11/01 DD Submission
- ST 2014/03/03 CD Submission
PARTITION DETAILS

1. Interior finish 3mm
2. Plywood 18mm
3. E4em 100mm
4. Wood framing 18mm*100mm
5. Plywood 12mm
6. Ceramic board 4mm

Scale: 1:10
Unit: mm

2013/04/01 SD Submission
2013/11/01 DD Submission
2014/03/03 CD Submission
1. Wood Plastic Composite 40mm
2. Air gap 40mm
3. Building paper 1mm
4. Vacuum Insulation 30mm
5. Dust
6. Plywood 18mm
7. Sub-board <15x75 1mm
8. Glass foam 60mm
9. Plywood 12mm
10. E-foam 60mm
11. C = 20x20x20 23.3mm (cladding system)
12. Ceiling 12mm (plywood 9mm + ceiling finish 3mm)
13. T8 LED Link Light
14. Soft seat
15. Bayer Makrolon Polycarbonate Inter-locking Hollow Sheet t=4mm
16. Bayer Makrolon Polycarbonate Hollow Sheet t=16mm

Note:
- DN2013/04/01 SD Submission
- ST 2013/11/01 DD Submission
- Unit: mm
- Scale: 1:10

Consultants:
- Drawn by: CH
- Checked by: DN

Page: AR-362
Lot: 67

Project:
- NCTU/UNICODE
- Institution:
  - Address: 1001 Ta-Hsueh Road
  - Hsinchu City 30010
  - Taiwan
  - www.sde.tw
- Team Name: NCTU/UNICODE
- Contact:
THERMAL WALL DETAILS 6

2.45 995

245 995

245 995

245 995

245 995

245 995

245 995

245 995
Steel plate t = 5 mm

Drill hole for T18

Drill hole for T18

Steel plate t = 10mm

Welding

Drill hole for T18
TEMPERATURE (°C)
LOCATION: TAPEI TWN

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

HUMIDITY (%)
LOCATION: TAPEI TWN

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

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

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

PSYCHROMETRIC CHART
LOCATION: TAPEI 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
RADIATION (W/m²) LOCATION: TAIPEI, TWN

DAILY SOLAR RADIATION

BASIC CLIMATIC CONDITION

LOCATION: TAIPEI, TWN

OVERHEATED PERIOD
(JUN.01-SEP.21)

UNDERHEATED PERIOD
(DEC.01-MAR.21)

COMFORTABLE PERIOD
(MAR.21-JUN.01 & SEP.21-DEC.01)

SOLAR PATH DIAGRAM

UNDERHEATED PERIOD
DIRECT SOLAR GAIN

OVERHEATED PERIOD
SHADING

JUN. 22nd

MAR. 21st
SEP. 21st

DEC. 22nd

Date: December 22nd
ANGLE: 65.7°
Date: September 21st
Date: June 22nd
ANGLE: 66.2°
PREVALEING WINDS

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

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

- 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
PREVAILING WINDS

Wind Frequency (hrs)
Location: PARIS, ORLY, FRA
Date: 1st January - 31st December
Time: 00:00 - 24:00

January
February
March
April
May
June
July
August
September
October
November
December

VERSAILLES WIND ROSE ANALYSIS
BIOCLIMATIC STRATEGIES

Project:
Institution:
Team Name:
Checked by:
Scale:
DWG. Title:
DWG. No.:
Address:
Contact:
NCTU/UNICODE
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
www.sde.tw

Consultants:
Drawn by:
Mark Date Description:
Note:
DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
Unit
ST 2014/03/03 CD Submission

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COOLING
HIGH ENERGY CONSUMPTION
ACTIVE
HEAT PUMP COOLING
EVAPORATIVE COOLING
HEAT SINK AND VEGETATION COOLING
SOLAR CHIMNEY

HEATING
HIGH ENERGY CONSUMPTION
ACTIVE
HEAT EXCHANGER PREHEATED BY SOLAR HOT WATER

COOLING
LOW ENERGY CONSUMPTION
PASSIVE
HEAT SINK AND VEGETATION COOLING
SOLAR CHIMNEY

HEATING
LOW ENERGY CONSUMPTION
PASSIVE
GREEN HOUSE EFFECT
DIRECT SOLAR GAIN

COOLING
LOW ENERGY CONSUMPTION
SEMI-PASSIVE
NATURAL VENTILATION
SOLAR CHIMNEY

HEATING
LOW ENERGY CONSUMPTION
SEMI-PASSIVE
THERMAL WALL

COOLING
LOW ENERGY CONSUMPTION
PASSIVE
HEAT PUMP COOLING

HEATING
LOW ENERGY CONSUMPTION
PASSIVE
THERMAL WALL

HEATING
HIGH ENERGY CONSUMPTION
ACTIVE
HEAT PUMP HEATING

HEATING
HIGH ENERGY CONSUMPTION
ACTIVE
HEAT PUMP HEATING
OUT DOOR TEMPERATURE UNDER 19°C WITH WIND
EXTERIOR TEMPERATURE UNDER 19°C
NO WIND

- PV PANELS WASTE HEAT
- OPEN LOUVERS
- OPEN LOUVERS
- CLOSE WINDOWS
- HOT AIR GO UP
- FANS ON
- OPEN LOUVERS, WINDOWS AND LOUVERS

- OPEN LOUVERS
- OPEN DOORS, WINDOWS AND LOUVERS

- EXTERIOR TEMPERATURE UNDER 19°C
- NO WIND
EXTERIOR TEMPERATURE ABOVE 26°C
EXTERIOR TEMPERATURE ABOVE 26°C

- WATER WALL ON
- CLOSE WINDOWS
- OPEN LOUVERS
- FANS ON

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

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

Checked by: LY
Mark Date: DN2013/04/01
Description: SD Submission

DWG. Title: EVAPORATIVE COOLING
DWG. No.: BA-015

NCTUNICODE
National Chiao Tung University
OVERHEATED PERIOD
THE DESIGN OF BUILDING GEOMETRY PROVIDES SHADING

UNDERHEATED PERIOD
BUILDING GEOMETRY ALLOW 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

N
SOLAR RADIATION

PV PANELS

PV PANELS WASTE HEAT

LONG-WAVE INFRARED

CLOSE DOORS, WINDOW AND LOUVERS

WINTER COLD AIR

OUTDOOR TEMPERATURE BELOW 26°C
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 up to 2 meters height-wise and 3 meters 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 interior space at night.

INDOOR TEMPERATURE UNDER 21°C
OUTDOOR TEMPERATURE UNDER 19°C

HEAT EXCHANGER

PREHEATED BY SOLAR HOT WATER

SOLAR HOT WATER HEATER

EXHAUST WARM AIR

INLET COLD AIR

PREHEAT

CLEAN OUTDOOR COLD AIR

SOLAR HOT WATER COIL

EXHAUST COOL AIR
Extractor hood
Best Glass
H=830~1180

VIVITAK
QUIM O7 B
H=33
### APPLIANCE LIST

<table>
<thead>
<tr>
<th>APP. No</th>
<th>TYPE</th>
<th>BRAND</th>
<th>LOCATION</th>
<th>SIZE (W<em>D</em>H)</th>
<th>NOTE</th>
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<tr>
<td>APP. 01</td>
<td>REFRIGERATOR</td>
<td>MIELE</td>
<td>KITCHEN</td>
<td>560x590x1772</td>
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<tr>
<td>APP. 02</td>
<td>DISHWASHER</td>
<td>MIELE</td>
<td>G6995 SC-VI</td>
<td>598<em>708</em>455-910</td>
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<tr>
<td>APP. 03</td>
<td>SINK</td>
<td>HCG</td>
<td>KITCHEN</td>
<td>830x450x190</td>
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<td>APP. 04</td>
<td>CABINET</td>
<td>HCG</td>
<td>KITCHEN</td>
<td>3210x680</td>
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<tr>
<td>APP. 05</td>
<td>HOOD</td>
<td>BEST GLOSS</td>
<td>KITCHEN</td>
<td>400x39x30-1180</td>
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<tr>
<td>APP. 06</td>
<td>INDUCTION TOP</td>
<td>MIELE</td>
<td>Domino CS 1112</td>
<td>272x500</td>
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<td>APP. 07</td>
<td>OVEN</td>
<td>MIELE</td>
<td>KITCHEN</td>
<td>560x555x593</td>
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<td>APP. 08</td>
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<td>HCG</td>
<td>KITCHEN</td>
<td>25x215x295</td>
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<td>APP. 09</td>
<td>DRAIN</td>
<td>HCG</td>
<td>KITCHEN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**KITCHEN PLAN 1**

- **App. 01**: Refrigerator, Brand: MIELE, Type: KFN 37452 i DE, Location: Kitchen, Size: 560x590x1772.
- **App. 02**: Dishwasher, Brand: MIELE, Type: G6995 SC-VI, Location: Kitchen, Size: 598*708*455-910.
- **App. 03**: Sink, Brand: HCG, Type: BKR85i, Location: Kitchen, Size: 830x450x190.
- **App. 04**: Cabinet, Brand: HCG, Type: Kitchener, Size: 3210x680.
- **App. 05**: Hood, Brand: BEST GLOSS, Location: Kitchen, Size: 400x39x30-1180.
- **App. 06**: Induction Top, Brand: MIELE, Type: Domino CS 1112, Location: Kitchen, Size: 272x500.
- **App. 07**: Oven, Brand: MIELE, Type: Kitchener, Size: 560x555x593.
- **App. 08**: Faucet, Brand: HCG, Type: KT580T, Location: Kitchen, Size: 25x215x295.
- **App. 09**: Drain, Brand: HCG, Location: Kitchen, Size: 25x215x295.

---

**Note:**

- 1:20 Scale
- 120 Unit
- **Checked by:** ST
- **Drawn by:** ST

---

**Project:**

- **Institution:** NCTU/UNICODE
- **Address:** 1001 Ta-Hsueh Road, Hsinchu City 30010, Taiwan
- **Website:** www.sde.tw

**Consultants:**

- NCTU Architecture

---

**Dimensions:**

- Wood Counter Top: Width 600 mm, Height 700 mm
拍拍手固定法
／下方氣密壓條
### FIXED FURNITURE LIST

<table>
<thead>
<tr>
<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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<td>FIXT. 01</td>
<td>TOILET TOILET</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>170x10x135</td>
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<td>FIXT. 02</td>
<td>WASHLET TOILET</td>
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<td>800x400x620</td>
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<td>FIXT. 03</td>
<td>CUBET</td>
<td>HCG</td>
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<td>1500x500x700</td>
<td>LQF300-115NP</td>
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<td>MIRROR</td>
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<td>FIXT. 06</td>
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<td>300x140x105</td>
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<td>FIXT. 07</td>
<td>ACCESSORY CHROME FAUCET</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>235x60x180</td>
<td>LF3167PT(AW)</td>
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<tr>
<td>FIXT. 08</td>
<td>DRAIN TUBESOPH</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>LF725L-B1</td>
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<tr>
<td>FIXT. 09</td>
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<td>HCG</td>
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<td>FIXT. 10</td>
<td>ACCESSIBLE SHOWER DOOR</td>
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<td>FIXT. 11</td>
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<td>STANDARD 4142</td>
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<td>FIXT. 13</td>
<td>DOUBLE TOWEL RACK</td>
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<td>BATHROOM</td>
<td>300x110x180</td>
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<td>FIXT. 14</td>
<td>CLOTH HOOK</td>
<td>HCG</td>
<td>BATHROOM</td>
<td>145x110x105</td>
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</tr>
</tbody>
</table>

---

**BATHROOM PLAN**

**Project:** ORCHID HOUSE

**Institution:**

**Team Name:** NCTU/UNICODE

**Address:** 1001 Ta-Hsueh Rd, Hsinchu City 30010, Taiwan

**Contact:**

**Consultants:**

**Checked by:**

**Drawn by:**

**Scale:** 1

**Unit:** a

**Drawing No.:** IN-501

---

**Note:**

- DN 2013/04/01 SD Submission
- ST 2013/11/01 DD Submission
- ST 2014/03/03 CD Submission
Smoke alarm/detector (NQ9S-3)

Smoke alarm/detector (NQ9S-3)

9V BATTERY

POWER RECEIVE

MEZZANINE

PVC E20,W/600V 380°C
1.25mm²/4C

Smoke alarm/detector (NQ9S-3)

Smoke alarm/detector (NQ9S-3)

BEDROOM

LIVING RM.

PVC E20,W/600V 380°C
1.25mm²/4C

9V BATTERY

POWER RECEIVE

MEZZANINE

PVC E20,W/600V 380°C
1.25mm²/4C
Smoke Alarm/Detector
- N90S-3:
  - DC 9V Battery
  - Alarm Contacts
  - Interlock with all detectors when alarm of any detector
  - AC 220V
- Smoke Alarm/Detector
- Fire Extinguisher
- ABC-EN3-4K:
  - 21A/113B/C efficiency
Power cut ON/OFF
- General circuit breaking
- Inverters circuit breaking

- PVC E20, W/600V 380°C
  - 1.25mm /4C, 1.25mm /2C

- Smoke Alarm/Detector
- Fire Extinguisher
- Power cut ON/OFF
- Inverters circuit breaking

Note:
- PVC E20, W/600V 380°C
  - 1.25mm /4C, 1.25mm /2C

- Smoke Alarm/Detector
- Fire Extinguisher
- Power cut ON/OFF
- Inverters circuit breaking
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
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
The water closet is not connected to the sewage disposal system (black water tank) during the event.

The diagram shows a water system with various components:
- **Rain Water**
- **Air Condition**
- **Lavatory**
- **Washing Machine**
- **Shower**
- **Water Closet**
- **Heat Exchanger**
- **Rainwater collection** (Cap: 0.3M³)
- **Greywater Tank** (Cap: 1.8M³)
- **Black Water Tank** (Cap: 0.6M³)
- **Cold Water Tank** (Cap: 2.1M³)
- **Dish Washer**
- **Potted Vegetation**

Flow details:
- **Flow: 15 Lpm**
- **Head: 15 m**
1. Solar Thermal Collector
2. Hot Water Storage Tank
3. Pump Station
4. Expansion Tank 1
5. CO2 Heat Pump Package 2
6. CO2 Heat Pump Package 1
Outdoor Unit of Cooling/Heating Heat Pump

<table>
<thead>
<tr>
<th>Name</th>
<th>Outdoor Unit of Cooling/Heating Heat Pump</th>
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</thead>
<tbody>
<tr>
<td>Service</td>
<td>HVAC Cooling and Heating</td>
</tr>
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<td>Heat Pump</td>
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<td>Heating Capacity</td>
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<tr>
<td>COP</td>
<td>Cooling = 3.8  Heating = 3.82</td>
</tr>
<tr>
<td>COP</td>
<td>Cooling = 4.4  Heating = 4.4</td>
</tr>
<tr>
<td>Electrical Power Supply</td>
<td>230 V</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>kW  Cooling = 2.95  Heating = 3.27</td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R-410A</td>
</tr>
</tbody>
</table>

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>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Service</td>
<td>Room Heating and Cooling</td>
</tr>
<tr>
<td>Type</td>
<td>Wall Mounted</td>
</tr>
<tr>
<td>Quantity</td>
<td>2</td>
</tr>
<tr>
<td>Cooling Capacity</td>
<td>4.3 kW</td>
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<tr>
<td>Heating Capacity</td>
<td>5 kW</td>
</tr>
<tr>
<td>Fan Flow (High/Low)</td>
<td>12 / 9 m³/min</td>
</tr>
<tr>
<td>Air Filter</td>
<td>Washable Resin Net</td>
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</table>
Heat Reclaim Ventilator

**Name**
Heat Reclaim Ventilator

**Service**
Room Active Ventilation

**Temperature Exchange Efficiency**
79%

**Enthalpy Exchange Efficiency**
71%

**Cooling**
66%

**Heating**
77%

**Fan Air Flow Rate**
150 m³/h

**Electrical Power Supply**
230 V

**Frequency**
50 Hz

**Power Consumption**
30 W x 2

**Test condition for exchange efficiency**:

<table>
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<tr>
<th>Condition</th>
<th>°Cdb</th>
<th>%</th>
<th>°Cdb</th>
<th>%</th>
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<td>Cooling</td>
<td>27</td>
<td>50</td>
<td>35</td>
<td>60</td>
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<tr>
<td>Heating</td>
<td>20</td>
<td>40</td>
<td>7</td>
<td>70</td>
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</table>

**Consultants**:
NCTU/UNICODE

**Address**:
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan

**Website**:
www.sde.tw
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
- Indoor Air
- HRV - Heat Exchange Mode
- HRV - Bypass Mode

Winter
- Winter of freezing temperature.
- Space heating is required.
- Only heating coil is operating.
- 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

HRV - Heat Exchange Mode
HRV - Bypass Mode
Mechanical Room Elevation (East)

Mechanical Room Elevation (North)

1. Hot Water Storage Tank
2. Heat Pump
3. CO2 Heat Pump Package 1
4. Expansion Tank 1
5. CO2 Heat Pump Package 2
6. Pump Station
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.
Control Wiring Diagram

To IN/D Unit

F1

F2

F1

F2

J2

J1

ss1

To BAS Control System

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

Operation Mode Of HRV Unit

1. In case of cooling operation
   - 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
   - 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.
   * 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
   - Room temperature is individually determined by the ventilation
     mode.
   - Ventilation mode is individually determined by the original
     formula of HRV with the temperature sensors.
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
ISOMETRIC DISTRIBUTION

1. Hot Water Storage Tank
2. Heat Pump
3. CO2 Heat Pump Package
4. Expansion Tank 1
5. Expansion Tank 2
6. CO2 Heat Pump Package 2
7. Pump Station

Mechanical Room Elevation (East North)

Mechanical Room Elevation (West South)
Power Cable XLPE-LSFH
2-16mm²+G-16mm²
in PVC PIPE 40mm

SDE General Box
Maximum power 15kw/230V 50HZ
Photovoltaic Module:
DelSolar D6P250B3A
- Max. DC power = 250Wp
- Voc = 37.37 V
- Vmp = 30.95 V
- Isc = 8.63 A
- Temp. Coeff. of Voc = -0.131 V/°C
- Temp. Coeff. of Isc = 0.0043 A/°C
- Temp. Coeff. of Vmp = -0.142 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
- 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. = 0°C
- Voc(0°C) = Voc(STC)-25°C*(ΔVoc/°C) = 37.37-25*(-0.131) = 40.65V

Max. modules of string:
- nmmax = Vdc(input max)/Voc(0°C) = 600/40.65 = 14.76 ≤ 14pcs

Vmp @ highest expected operating Temp.:
- High ambient Temp. = 75°C
- Vmp(75°C) = Vmp(STC)+(75°C-25°C)*(ΔVmp/°C) = 30.95+50*(-0.142) = 23.85V

Min. modules of string:
- nmmin = Vmp(min)/Vmp(75°C) = 150/23.85 = 6.29 ≥ 7pcs

Selection modules of string = 12 pcs

String in parallel:
- Max. DC power of Charge Controller / Selection modules of string / Module Max. DC power
  = 6,000W / 12pcs / 250W
  = 2parallel
<table>
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<tr>
<th>Tag</th>
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<th>Model</th>
<th>Q'ty</th>
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<td>Inverter</td>
<td>Delta</td>
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<td>⑦</td>
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<td>Delta</td>
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Diagram:

1. SDE Grid
   230V 50Hz

2. Smart Meter

3. PV array

4. DC Protections

5. Inverter

6. Power Meter

7. BESS

AC Load

RS485

---

**Notes:**
- Organizer Supplied Meter
- Battery Energy Storage System
PHOTOVOLTAIC SYSTEM: GENERAL 2

System Design Data

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<th>Module Type</th>
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<td>Inverter Type</td>
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<td>Number of Inverter</td>
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<td>Tilt Angle of Modules</td>
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<td>Azimuth of Modules</td>
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<tr>
<td>System Type</td>
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Note:

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

Check by: DN

Scale: 1:60

Unit: mm

Drawing No. PV-002

Page: 208
Photovoltaic Module:
DelSolar D6P250B3A
Max. DC power = 250Wp
Voc = 37.37 V
VmP = 30.95 V
Isc = 8.63 A
Temp. Coeff. of Voc = -0.131 V/°C
Temp. Coeff. of Isc = 0.0043 A/°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 = 86.6A
DC connector = 2 pairs
Nominal apparent power = 5,000VA
AC output frequency = 50 Hz
Max. current = 27.2Aac
Max. efficiency = 96.1%
EU efficiency = 94.6%

Voltage Calculations:
Voc @ coldest expected operating Temp.:
Low ambient Temp. = 0°C
Voc(0°C) = Voc(STC) - 25°C*(ΔVoc/°C) = 37.37 - 25*(-0.131) = 40.65V
Max. modules of string:
nmax = Vdc(input max)/Voc(0°C) = 600/40.65 = 14.76 ≤ 14pcs

Vmp @ highest expected operating Temp.:
High ambient Temp. = 75°C
Vmp(75°C) = Vmp(STC) + (75°C-25°C)*(ΔVmp/°C) = 30.95 + 50*(-0.142) = 23.85V
Min. modules of string:
nmin = Vmp(min)/Vmp(75°C) = 150/23.85 = 6.29 ≥ 7pcs
Selection modules of string = 12 pcs

Voc(0°C)_string = Modules*Voc(0°C) = 12*40.65 = 487.8V < 600V

String in parallel:
Max. DC power of Charge Controller / Selection modules of string / Module Max. DC power
= 6,000W / 12pcs / 250W
= 2parallel
GROUNDING CALCULATIONS:
DC ARRAY GROUNDING CONDUCTOR:
1.56 * Isc * 2 = 1.56 * 8.21A * 2 = 25.62A
SELECTED CONDUCTOR: PVC 16mm²

<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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<td>Solvia 5.0</td>
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<td>Delta</td>
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</tr>
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<td>4</td>
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<td>HI BOX</td>
<td></td>
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</table>

PV Module: DelSolar
Model: DSP250B3A
Manufacturer: Delta
Model: Solvia 5.0
Inverter: Delta
AC Switch Panel: HI BOX
Battery Energy Storage System

Diagram shows the connections between PV Array, DC Protections, Inverter, AC Switch Panel, BESS, and AC Grid with grounding terminals.
### Legend / Brand / Model

<table>
<thead>
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<th>Item</th>
<th>Specification</th>
<th>Brand/Model</th>
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<tr>
<td>Access Point</td>
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<tr>
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### Equipment

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<td>Soil Moisture Sensor</td>
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<td>Motion Detector</td>
<td></td>
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<tr>
<td>Light Level Sensor</td>
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</tbody>
</table>
Task/Monitoring

5.1 Temperature Sensor. Living Room (L=21m)
5.1 Temperature Sensor. Bedroom (L=28m)
5.1 Temperature Sensor. Kitchen (L=16m)
5.2 Humidity Sensor. Living (L=21m)
5.3 Air Quality Sensor. Living (L=21m)
5.1 Temperature Sensor. Refrigeration (L=11m)
5.2 Temperature Sensor. Freezing (L=11m)
5.3 Temperature Sensor. Dish Washer (L=12m)
5.6 Temperature Sensor. Oven (L=13m)

Monitoring panel

Temporal Tripod Location

5.1 Bedroom Tripod Line. = 11 Meters.
5.1 Kitchen Tripod Line. = 7 Meters.
5.1, 5.2, 5.3 Living Room Tripod Line. = 8 Meters.
Task/Monitoring

6.3 Temperature Sensor.
Clothes Washer / Dryer (L=11m)
1F 230V PANELBOARD (600Wx1200Hx300D)mm

Support

MONITORING PANEL (450Wx650Hx150D)mm

FRONT VIEW

1F 230V Panelboard

Support

Monitoring Panel Dimensions: 65x45x15 cm
Free Space Left For The Monitoring Panel: 100x80x25 cm

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

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

Support

Monitoring Power Line
Monitoring Ethernet 1
Monitoring Ethernet 2

Sensor Entrance

AC SY
<table>
<thead>
<tr>
<th>Tag</th>
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</table>

**Diagram:***

1. **SDE Grid**
   - 230V 50Hz

2. **Smart Meter**
   - RS485

3. **PV array**

4. **DC Protections**

5. **Inverter**

6. **Power Meter**

7. **BESS**

**AC Load**
### Components Table

<table>
<thead>
<tr>
<th>Tag</th>
<th>Components</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Qty</th>
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- Battery Energy Storage System

### Diagram

- PV Array
- DC Protections
- Inverter
- AC Switch Panel
- BESS

---

**Notes:**
- XLPE-LSHF 16mm²
- SPD
- AC Load
- Grounding Terminal
- Power Meter
- ELCB
- Fuse
### List of elements to ship to France

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### Diagrams

- **TRUCK-10 FLATBED**
  - **TRUCK-11 FLATBED**
  - **TRUCK-12 FLATBED**
  - **TRUCK-13 FLATBED**
SOLAR VILLAGE PLAN

DTU
ROF
CUJ
SHU
REC
KMU
ROF
CUJ
PAR
S1
UNI
ROM
LUC
BUC
S2
S3
OTP
DEI
ATC
BAR
PLT
FNX

Project:
Institution:
Team Name:
Checked by:
Scale:
DWG. Title:
DWG. No.:
Address:
Contact:
NCTU/UNICODE
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
www.sde.tw

Consultants:

Drawn by:
Mark Date Description
DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
DN2013/07/01 DDc Submission
ST 2014/03/03 CD Submission

Unit:

Note:

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

Lofting Workflow

**Step** | **1** | **2** | **3** | **4** | **5** | **6**
--- | --- | --- | --- | --- | --- | ---
**Work Phase** | Datum Point | Four Point Range | Mid Point | Ground Level | Spacing | Point Positioning
**Description** | Follow official Point | Laser Positioning Distance, Vertical and Horizontal | Four Point Laser Cross Mid Point | Find Point of Lowest and Highest | Use Laser and Rope Positioning Construction Area | Use Sand Box to Positioning Construction Area
**Worker** | 1 | 4 | 4 | 4 | 4 | 4
**Note**
### Footing Set Workflow

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Note:
## Assembly Unit Module Workflow

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Second Row Footing Set Workflow

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Note
### Other Unit and Insulation box Set Workflow

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**Note:**
- Set Insulation box Put it in and Seal it
- Set Insulation Wall box Set, Seal and Fix it

**Phase 6**
Other Unit and Insulation box Set Workflow

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Note

Phase 7
### Terrace Unit Set Workflow

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**Note**

Phase 8
Terrace Unit Lower Beam Workflow

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Stair Beam and Floor Set Workflow

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Note

Worker: 6

Step 2:
- M-16 Bolt
- Temporary floor Fixed

Worker: 4

Step 3:
- M-16 Bolt
- Temporary floor Fixed

Worker: 6
# Terrace Structure Workflow

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### Note
- DN2013/04/01 SD Submission
- ST 2013/11/01 DD Submission
- ST 2014/03/03 CD Submission

### Terrace Structure Workflow Details
- **Worker**: 6
- **Description**: Lifting Column, M-16 Bolt
- **Description**: Lifting Beam, Lifting guide, M-16 Bolt

---

**Phase 11**
## Louver Frame Workflow

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**Note:**
- Worker: 6 in each step.
Roof Structure Workflow

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DN2013/04/01 SD Submission
ST 2013/11/01 DD Submission
ST 2014/03/03 CD Submission
Solar Structure Workflow

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Note:
### Solar Workflow

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**Note**

- Solar Panel Panel Fix
- Lifting Panel M-16 Bolt
- Phase 15
### Roof Panel Workflow

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<td>Window Structure</td>
<td>Structure Fix</td>
<td>Bayer Structure</td>
<td>Structure Fix</td>
<td>Water Cover</td>
<td>Water Cover</td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Structure</td>
<td>M-16 Bolt</td>
<td>Lifting Structure</td>
<td>M-16 Bolt</td>
<td>Lifting Structure</td>
<td>M-16 Bolt</td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
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</tbody>
</table>

**Note:**

Phase 17
### Bayer and Thermal Wall Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>Work Phase</td>
<td>Bayer Wall</td>
<td>Panel Fix</td>
<td>Thermal Wall</td>
<td>Frame Fix</td>
<td>Polli Brick</td>
<td>Structure Fix</td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Panel</td>
<td>Joining board</td>
<td>Lifting Frame</td>
<td>M-16 Bolt</td>
<td>Array Polli Brick</td>
<td>M-16 Bolt</td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
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</tr>
<tr>
<td>Note</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Finish Floor, Ceiling, Wall Finish Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Finish Floor</td>
<td>Ceiling</td>
<td>Wall Finish</td>
<td>Water Tray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Detail-1</td>
<td>Detail-2</td>
<td>Detail-3</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
### Green Core, MEP System Workflow

<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 Phase</td>
<td>Green Core</td>
<td>Green Core Wood</td>
<td>MEP System</td>
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<tr>
<td>Description</td>
<td>Structure Frame</td>
<td>Wood Plan</td>
<td>MEP System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
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</tr>
</tbody>
</table>

**Note**

Phase 20
# Out Door Floor, Window & Door Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Phase</th>
<th>Description</th>
<th>Worker</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Out Door Floor</td>
<td>Floor Assembly</td>
<td>6</td>
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<tr>
<td>2</td>
<td>Floor Unit</td>
<td>Floor Unit Lifting</td>
<td>4</td>
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<tr>
<td>3</td>
<td>Floor Fix</td>
<td>Bolt</td>
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<tr>
<td>4</td>
<td>Window Install</td>
<td>Bolt</td>
<td>4</td>
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<tr>
<td>5</td>
<td>Door Install</td>
<td>Install</td>
<td>4</td>
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</tr>
<tr>
<td>6</td>
<td></td>
<td>Fixed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Handrail, Planting Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Phase</th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Handrail Lifting</td>
<td>Handrail Lifting</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Handrail Fix</td>
<td>Bolt</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Planting Pots</td>
<td>Assembly Pots</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Planting Install</td>
<td>Install Planting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Note
### Work 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>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Work Phase</strong></td>
<td>Furniture Position</td>
<td>Clean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Furniture Position</td>
<td>House Clean</td>
<td>Site Clean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Worker</strong></td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**

**Clean, Furniture Position Workflow**
VEHICLE ACCESS TO LOT

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 right into "D10"
- Turn left onto "Rue Royale/D10"
- Continue to follow D10
- Turn right onto "Av. de Paris/D10"
- Turn right onto "Rue des États Généraux"
- Continue onto "Rue des Chantiers"
- Turn right onto "Pl. du 8 Mai 1945/D939" Continue to follow D939
- Turn left

B: Département Anesthésie-Réanimation
- Hôpitaux Privés de Versailles
- 78600 Versailles, France
- TLF: +33 606 30 33 33
- anesthesie-versailles.com

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 overwraps with our loading/unloading area

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 overwraps with our loading/unloading area

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Lot size: 20 x 20 m (400m²)
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- Our lot situated near the main path export
- The track route overwraps with our loading/unloading area

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 overwraps with our loading/unloading area

ADDRESS: 7bis A Rue de la Porte de Buc
78000 Versailles, France
TLF: +33 826 30 33 33
anesthesie-versailles.com

Distance: 3.4km, 8 mins
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 Jaures/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
Distance: 5.8km, 9 mins
## 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>Heavy rain due to slippery floors</td>
<td>Drive slowly</td>
</tr>
<tr>
<td>Traffic problem during shipping</td>
<td>Traffic jam due to spent more time</td>
<td>To do another preparation during waiting for trucks</td>
</tr>
<tr>
<td>Road construction</td>
<td>Road blocked</td>
<td>Plan B (other route)</td>
</tr>
<tr>
<td>Complex traffic system</td>
<td>Get lost</td>
<td>Arrange the route clearly before departure</td>
</tr>
</tbody>
</table>

### 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 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 A131/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 Cité 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
### HEALTH AND SAFETY DURING THE INSIDE LOGISTIC

<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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>operations for every person entering construction site</td>
</tr>
<tr>
<td></td>
<td></td>
<td></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></td>
<td></td>
<td></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></td>
<td>- unloading/loading materials in the storage area inside the lot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- unauthorized and external persons who invade the lot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground limitations</td>
<td>Obstruction / limitations through on-site security installations</td>
<td>Securing existing escape routes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No dangerous works close to this area</td>
</tr>
</tbody>
</table>
THE SAFETY PLAN AND COORDINATION PHASE

Plan of site

PROBLEM

Too small property lines

Dangers due to the great number of people in the site

Trucks passway

Heavy rain or rain of long-term

Ground limitations

Traffic and parking of the crane or a truck

RISKS

Collision with other people

Collision with parts stored

Discomfort to the maneuvers

Increased dangers of injury muddle

Pass by operation area

Degradation of the land

Electric shock due to humidity

Obstruction / limitations through on-site security installations

Shock, collisions with pedestrians, existing equipment or vehicle

ADOPTED MEASURES

Marking dangerous parts stored

High visibility vests

Guiding gear during maneuvers with two pedestrians

Designing a delivery zone

High visibility vest

Denial of access to other people

Arrange signpostings

Use anti-slide mats on slipping surfaces

Regularly remove water from the floor with scrapers

Replacement of defective cables

Waterproof plugs

Protective clothes

Securing existing escape routes

No dangerous works close to this area

Respect the rules of the road

Parking places reserved for this purpose

Lash with appropriate means and in sufficient number

Lot "S" Lot "Q" Lot "P"
THE SAFETY PLAN AND CO-ORDINATION PHASE

Plan of site

PROBLEM

RISKS

ADOPTED MEASURES

Implementation of the crane

Slam person

Markup
Preparation of the operation by releasing space
Use a rope to guide package

Reversal of the crane

Information on resistance of the ground and underground structures

Lifting work

Fall of objects because of manipulation
Fall of objects because they come loose
Fall of person at a different level
Fall of person at the same level

Construction safety for on-site workers
Information on resistance of the ground and underground structures

Clash of the crane or load by person or vehicle

Mark the area of evolution of the crane and load

Reversal of the crane

Reversal of the crane

Reprogram the electronic control for load after removal of the crane counterweight and verification of the program before any operation

Electronic control for load active during removal operation

Clean the lot

Remove the markings of the construction
Remove the any waste in appropriate containers
PPE MUST BE WORN ON THIS SITE
## Lofting Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Phase</th>
<th>Description</th>
<th>Datum Point</th>
<th>Four Point Range</th>
<th>Mid Point</th>
<th>Ground Level</th>
<th>Spacing</th>
<th>Point Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Step</td>
<td>Follow official Point</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lofting Phase</td>
<td>Laser Positioning Distance, Vertical and Horizontal</td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td></td>
<td>Four Point Laser Cross Mid Point</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Find Point of Lowest and Highest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Use Laser and Rope Positioning Construction Area</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Use Sand Box to Positioning Construction Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Day 1 8:00

- Site preparation
- Truck 1 Flat: Tool, Foundation, Construction Safety Box, Unit 7

---

**Note:**

Where the worker are:

On the ground

ALL SAFETY RULES MUST BE FOLLOWED

- Construction Area
- Use Sand Box to Positioning
- Foundation Construction Safety Box
- Unit 7
### Footing Set Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Work Phase</strong></td>
<td>Sand Box Position</td>
<td>Footing Base Set</td>
<td>&quot;Pre-Joint Set&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Set Sand Box</td>
<td>Set Footing</td>
<td>Half Joint</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading sand</td>
<td>Use Laser Position</td>
<td>Pre Set on Unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Worker</strong></td>
<td>6</td>
<td>8</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

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

**ALL SAFETY RULES MUST BE FOLLOWED**

**Health and Safety During Phase 2**

- HEALTH AND SAFETY DURING PHASE 2

- [Diagram showing worker positions and safety symbols]
## Assembly Unit Module Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Lifting Unit</td>
<td>Unit Position</td>
<td>Unit Fixed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Rope guide</td>
<td>Laser Position</td>
<td>M-16 Bolt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>10</td>
<td>4</td>
<td>10</td>
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</tbody>
</table>

Note

*Where the worker are:
On the ground

ALL SAFETY RULES MUST BE FOLLOWED*

---

**HEALTH AND SAFETY DURING PHASE 3**
Second Row Footing Set Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Sand Box Position</td>
<td>Footing Base Set</td>
<td>&quot;Pre-Joint Set&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Set Sand Box Loading sand</td>
<td>Set Footing Use Laser Position</td>
<td>Half Joint Pre Set on Unit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>8</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note

Where the worker are:
On the ground

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:

HEALTH AND SAFETY DURING PHASE 4

Note:

The 7 basic structural modules are installed on site, the roof supporting
Assembly Unit Module Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Lifting Unit</td>
<td>Unit Position</td>
<td>Unit Fixed</td>
<td>Unit Regulate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Rope guide</td>
<td>Laser Position</td>
<td>M-16 Bolt</td>
<td>Laser Position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>10</td>
<td>4</td>
<td>10</td>
<td>2</td>
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</tr>
<tr>
<td>Note</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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

HEALTH AND SAFETY DURING PHASE 5
### Other Unit and Insulation box Set Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Phase</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sand Box Position</td>
<td>Set Sand Box Loading sand</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Footing Base Set</td>
<td>Set Footing Use Laser Position</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>&quot;Pre-Joint Set&quot;</td>
<td>Half Joint Pre Set on Unit</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Insulation box</td>
<td>Put it in and Seal it</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Insulation Wall box</td>
<td>Set, Seal and Fix it</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Worker**

1. Step 1: Worker 6
2. Step 2: Worker 8
3. Step 3: Worker -
4. Step 4: Worker 6
5. Step 5: Worker 6
6. Step 6: Worker -

**Note**

HEALTH AND SAFETY DURING PHASE 6

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

ALL SAFETY RULES MUST BE FOLLOWED
### Other Unit and Insulation box Set Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Sand Box Position</td>
<td>Footing Base Set</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Set Sand Box</td>
<td>Set Footing</td>
<td>Loading sand</td>
<td>Use Laser Position</td>
<td></td>
<td></td>
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<tr>
<td>Worker</td>
<td>6</td>
<td>8</td>
<td></td>
<td></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**

**Health and Safety During Phase 7**

- **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**
## Terrace Unit Set Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Unit Frame Set</td>
<td>Unit Fixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Unit</td>
<td>M-16 Bolt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifting guide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Note

ALL SAFETY RULES MUST BE FOLLOWED

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

HEALTH AND SAFETY DURING PHASE 8

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

ALL SAFETY RULES MUST BE FOLLOWED
## Terrace Unit Lower Beam Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Unit Beam Set</td>
<td>Unit Fixed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Unit Lifting guide</td>
<td>M-16 Bolt</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

ALL SAFETY RULES MUST BE FOLLOWED

Where the worker are:

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

Health and Safety During Phase 9

HEALTH AND SAFETY DURING PHASE 9
Stair Beam and Floor Set Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Beam Set</td>
<td>Unit Fixed</td>
<td>Floor Laying</td>
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</tr>
<tr>
<td>Description</td>
<td>Lifting Unit</td>
<td>M-16 Bolt</td>
<td>Temporary floor</td>
<td>Fixed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

Note
### Terrace Structure Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Column Set</td>
<td>Column Fixed</td>
<td>Beam Set</td>
<td>Beam Fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Column Lifting guide</td>
<td>M-16 Bolt</td>
<td>Lifting Beam Lifting guide</td>
<td>M-16 Bolt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Louver Frame Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Column Set</td>
<td>Column Fixed</td>
<td>Beam Set</td>
<td>Beam Fixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Column</td>
<td>M-16 Bolt</td>
<td>Lifting Beam</td>
<td>M-16 Bolt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

ALL SAFETY RULES MUST BE FOLLOWED

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

HEALTH AND SAFETY DURING PHASE 12
Roof Structure Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>2F Column Lifting</td>
<td>Column Fixed</td>
<td>Long Beam</td>
<td>Beam Fixed</td>
<td>Short Beam</td>
<td>Beam Fixed</td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Column</td>
<td>M-16 Bolt</td>
<td>Lifting Beam</td>
<td>M-16 Bolt</td>
<td>Lifting Beam</td>
<td>M-16 Bolt</td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Note:

ALL SAFETY RULES MUST BE FOLLOWED

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

HEALTH AND SAFETY DURING PHASE 13
### Solar Structure Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Solar Frame</td>
<td>Solar Frame Fix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Frame</td>
<td>M-16 Bolt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

ALL SAFETY RULES MUST BE FOLLOWED

Health and Safety During Phase 14

ALL SAFETY RULES MUST BE FOLLOWED
### Solar Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Solar Panel</td>
<td>Panel Fix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Panel</td>
<td>M-16 Bolt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**ALL SAFETY RULES MUST BE FOLLOWED**

- Wear hard hat
- Wear high visibility vest
- Wear safety glasses
- Use lanyard
- Use safety harness
- Use safety line
- Use safety equipment

**Health and Safety During Phase 15**

- Ensure all safety rules are followed.
- Wear personal protective equipment as required.
- Follow site safety rules.
- Report any incidents or hazards immediately.
- Use safety equipment properly.

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

- DN2013/07/01 DD Submission
- ST 2013/11/01 DD Submission
- Unit 2014/03/03 CD Submission

- Health and Safety during Phase 15
- All workers must follow safety rules.

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

- All safety rules must be followed.
### Roof Panel Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Phase</th>
<th>Description</th>
<th>Step</th>
<th>Description</th>
<th>Step</th>
<th>Description</th>
<th>Step</th>
<th>Description</th>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Roof Panel</td>
<td>Lifting Panel</td>
<td>2</td>
<td>Panel Fix</td>
<td>3</td>
<td>Lifting Panel</td>
<td>4</td>
<td>Panel Fix</td>
<td>5</td>
<td>Heat Water Panel</td>
</tr>
<tr>
<td>6</td>
<td>Panel Fix</td>
<td>M-16 Bolt</td>
<td>4</td>
<td>Lifting Panel</td>
<td>5</td>
<td>Lifting Panel</td>
<td>6</td>
<td>Panel Fix</td>
<td>M-16 Bolt</td>
<td></td>
</tr>
<tr>
<td>Note</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

ALL SAFETY RULES MUST BE FOLLOWED

---

**HEALTH AND SAFETY DURING PHASE 16**

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

- All safety rules must be followed
### Additional structure  Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Window Structure</td>
<td>Structure Fix</td>
<td>Bayer Structure</td>
<td>Structure Fix</td>
<td>Water Cover</td>
<td>Water Cover</td>
</tr>
<tr>
<td>Description</td>
<td>Lifting Structure</td>
<td>M-16 Bolt</td>
<td>Lifting Structure</td>
<td>M-16 Bolt</td>
<td>Lifting Structure</td>
<td>M-16 Bolt</td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

**Note:**
- Window Structure: Structure Fix
- Lifting Structure: M-16 Bolt

**Worker:**
- 6
- 4
- 6
- 4
- 6
- 4

**Health and Safety during Phase 17**

- All safety rules must be followed
- Where the worker are:
  - On the ground
  - On the mezzanine floor
  - On the Floor
  - In the house

**Additional Information:**
- Project: NCTU/UNICODE
- Institution: NCTU/UNICODE
- Team Name: NCTU/UNICODE
- Checked by: DN
- Scale: DWG.
- Title: HS-420
- DWG. No.: 278
### Bayer and Thermal Wall Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>Work Phase</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bayer Wall</td>
<td>Lifting Panel</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Panel Fix</td>
<td>Joining board</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Thermal Wall</td>
<td>Lifting Frame</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Frame Fix</td>
<td>M-16 Bolt</td>
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<td>5</td>
<td>Polli Brick</td>
<td>Array Polli Brick</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Structure Fix</td>
<td>M-16 Bolt</td>
<td>4</td>
</tr>
</tbody>
</table>

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

**ALL SAFETY RULES MUST BE FOLLOWED**

**HEALTH AND SAFETY DURING PHASE 18**

- ALL SAFETY RULES MUST BE FOLLOWED
- Where the worker are:
  - On the ground
  - On the mezzanine floor
  - On the Floor
  - In the house
Finish Floor, Ceiling, Wall Finish Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Finish Floor</td>
<td>Ceiling</td>
<td>Wall Finish</td>
<td>Water Tray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Detail-1</td>
<td>Detail-2</td>
<td>Detail-3</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note

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

ALL SAFETY RULES MUST BE FOLLOWED

WORKER64

NOTE

Finish Floor Ceiling

Wall Finish Water Tray

Heath and Safety During Phase 19

ALL SAFETY RULES MUST BE FOLLOWED

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

ALL SAFETY RULES MUST BE FOLLOWED
**Green Core, MEP System Workflow**

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Green Core</td>
<td>Green Core Wood</td>
<td>MEP System</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Description</td>
<td>Structure Frame</td>
<td>Wood Plan</td>
<td>MEP System</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

ALL SAFETY RULES MUST BE FOLLOWED

HEALTH AND SAFETY DURING PHASE 20
Out Door Floor, Window & Door Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Phase</td>
<td>Out Door Floor</td>
<td>Floor Unit</td>
<td>Floor Fix</td>
<td>Window Install</td>
<td>Door Install</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Floor Assembly</td>
<td>Floor Unit Lifting</td>
<td>Bolt</td>
<td>Bolt</td>
<td>Install</td>
<td>Fixed</td>
</tr>
<tr>
<td>Worker</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Note:

ALL SAFETY RULES MUST BE FOLLOWED

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

ALL SAFETY RULES MUST BE FOLLOWED
### Handrail, Planting Workflow

<table>
<thead>
<tr>
<th>Step</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Work Phase</strong></td>
<td>Handrail Lifting</td>
<td>Handrail Fix</td>
<td>Planting Pots</td>
<td>Planting Install</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Handrail Lifting</td>
<td>Bolt</td>
<td>Assembly Pots</td>
<td>Install Planting</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Worker</strong></td>
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<td>4</td>
<td>6</td>
<td>4</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

- **HEALTH AND SAFETY DURING PHASE 22**
### Clean, Furniture Position Workflow

<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><strong>Work Phase</strong></td>
<td>Furniture Position</td>
<td>Clean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>Furniture Position</td>
<td>House Clean</td>
<td>Site Clean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Worker</strong></td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:

- All safety rules must be followed.

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

**HEALTH AND SAFETY DURING PHASE 23**
**HOUSE TOUR PLAN**

**FIRST IMPRESSION (Depends on the visitors in queue)**
Visitors will get a general view of Orchid House. Then experience the passage designed to access the house.

**PHOTOGRAPH (1 MIN)**
Experience the northwest side of Orchid House. Guide will explain the concept, design and background knowledge of Orchid House and the city issue in Taipei. Friendly guide will start the tour from this spot, introducing the concept of Orchid House.

**FIRST GLIMPSE (10 SECS)**
At the middle of the west ramp, we provide a translucent glimpse into the House through the window.

**BATHROOM & KITCHEN (2 MINS)**
The kitchen serves a multifunctional task-like center piece is an island that can be converted into a dining table for formal occasions.

**LIVING ROOM & THERMAL MASS (2 MINS)**
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.

**BEDROOM & WORKSTATION (2 MINS)**
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.

**MECHANICAL ROOM (3 MINS)**
Guide will explain the mechanical system including.

**ENTRANCE & GREEN CORE (3 MINS)**
Guide will introduce the concept of Green Core and Taiwanese orchid.

**TEA TERRACE & PHOTOGRAPH (5 MINS)**
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.

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FIRST IMPRESSION (depends on the visitors in queue)
FIRST GLIMPSE (10 secs)
PHOTOSHOT 1 (1 min)
MECHANICAL ROOM (3 mins)
ENTRANCE & GREEN CORE (3 mins)
BATHROOM & KITCHEN (2 mins)
LIVING ROOM & THERMAL MASS (2 mins)
BEDROOM & WORKSTATION (2 mins)
TEA TERRACE (5 mins)
PHOTOSHOT 2 (2 mins)
PHOTOSHOT 3 (2 mins)
FEEDBACK & GET THE VOTE CARD (3 mins)