Alpha
Consulting Engineers Pte Ltd

# PROJECT QUALITY PLAN

## EUHABITAT

For

## TRANSURBAN PROPERTIES PTE LTD &
## OPH MARYMOUNT LIMITED

| Copy No. | 1 |
|---|---|

Prepared By: Kevin Kee

Authorised By: Loh Fook Yuen

Date: 23 September 2014

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**SECTION 1**

**QUALITY PLAN CONTROL AND DISTRIBUTION**

## 1.1 List of Copy Holders

| Copy No. | Copy Holder | Date of Issue |
|---|---|---|
| 1 | 6142-PQP File | 23 September 2014 |
| | | |
| | | |
| | | |
| | | |

## 1.2 Revision Record

| Revision | Date of Issue | Section Reference | Page(s) | Remarks |
|---|---|---|---|---|
| 0 | 28 July 2011 | 1 to 11 | 28 | |
| 1 | 17 February 2012 | 1 to 11 | 28 | |
| 2 | 11 November 2013 | 1 to 11 | 29 | +2 pages (Section 8.4 – List of Pre-Consultation and Waiver) |
| 3 | 23 September 2014 | 1 to 11 | 29 | +2 pages (Section 8.4 – List of Pre-Consultation and Waiver) |
| | | | | |
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**SECTION 2**

**PROJECT INFORMATION**

## 2.1 Project Description

| | |
|---|---|
| Type of Development | |

| Statistics of Development | |
|---|---|
| Site Area, m² | 41,261.20 |
| Nett Floor Area, m² | - |
| Gross Floor Area, m² | 57,766 |
| Covered Carpark, m² | - |
| No. of Covered Carpark Lots | - |
| No. of Apartments/Houses | 748 |
| No. of Beds (for Hospitals) | - |
| No. of Guestroom (for Hotels) | - |
| No. of Blocks / No. of Storeys | 6 Blocks of 3-storey Townhouse, 23 blocks of 5-storey Residential Flats |
| Green Mark Category | - |
| No. of Phases | 1 |

## 2.2 Project Cost

| M&E Services Cost Plan (S$ x 1M) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Services | EI | ACVI | LEI | FFAI | PSI | SPFI | | | | |
| Estimate | - | - | - | - | - | - | | | | |
| Awarded | 9.5 | 8.8 | 2.3 | 1.8 | 12.6 | 1.7 | | | | |

| Total Project Construction Cost (S$ x1M) | | | |
|---|---|---|---|
| | Site Clearance | Piling Works | Main Contract |
| Estimate | - | - | - |
| Awarded | - | - | 169.138 |

*Site Clearance shall include earth work, soil improvement, service diversion and termination.*

## 2.3 Scope of Works

### 2.3.1 Scope of Consultancy Services

| | |
|---|---|
| Conceptual/Schematic Design | ✓ |
| Detailed Design | ✓ |
| Tender Documentation | ✓ |
| Tender Evaluation | ✓ |
| Contract Supervision | ✓ |
| M&E Costing | ✓ |
| Submissions to Authority | ✓ |

(✓*where applicable*)

### 2.3.2 Scope of M&E Services

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ELECTRICAL | ✓ | AIR CONDITIONING | ✓ | SPRINKLER | ✓ | SANITARY | ✓ | SWIMMING POOL | ✓ |
| LIFT | ✓ | MECHANICAL VENTILATION | ✓ | FIRE ALARM | ✓ | COLD WATER | ✓ | STEAM BOILER | |
| ESCALATOR | | MECHANICAL SMOKE EXTRACT | ✓ | HOSEREEL | ✓ | HOT WATER | ✓ | FUEL STORAGE | |
| PABX | | COMPUTER A/C | | WET RISER | | TOWN GAS | ✓ | | |
| SECURITY | ✓ | BST CARPARK EXH | ✓ | DRY RISER | ✓ | LPG GAS | | | |
| TELELIFT | | HEATING | | | | MEDICAL GAS | | | |
| DATA COMM. | | | | | | | | | |
| FLUSHFLOOR TRUNKING | | | | | | | | | |

(✓*where applicable*)

### 2.3.3 Submission to Relevant Authorities by Others

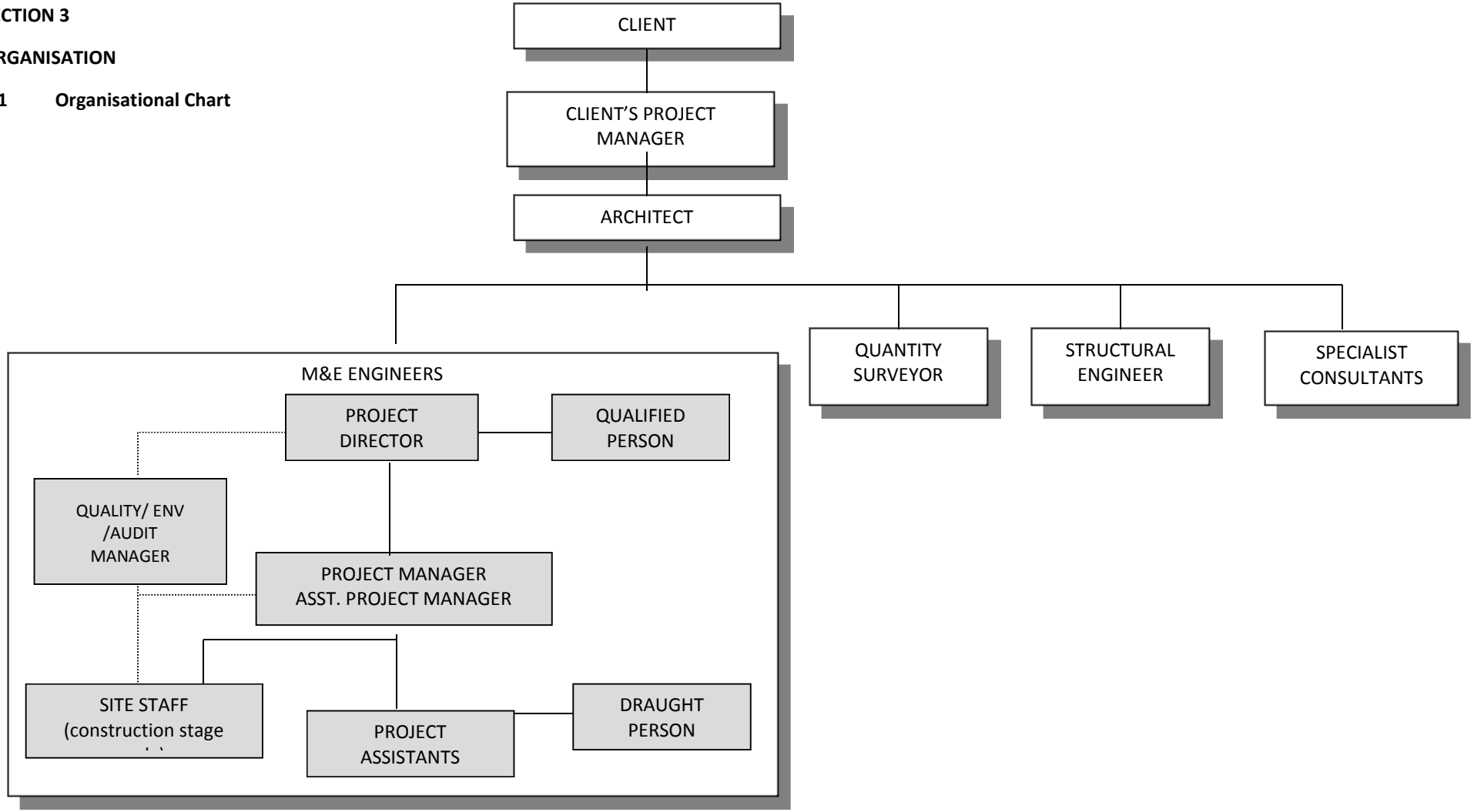
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EJECTOR & DIVERTER | ✓ | SUMP PUMP | ✓ | FUEL OIL TANK | ✓ | LIFT & ~~ESCALATOR~~ | ✓ | PRESSURE VESSEL | | HOISTS | | FOAM | |

(✓*where applicable*)

**SECTION 3**

**ORGANISATION**

**3.1 Organisational Chart**



**SECTION 3**

**ORGANISATION**

### 3.2 ACEPL's Project Team Member

| TITLE | | NAME |
|---|---|---|
| Project Director | | Loh Fook Yuen (LFY) |
| Deputy Project Director | | Ong Ngee Yong (ONY) |
| Qualified Person | Mechanical | Choong Choon Guan (CCG) |
| | Electrical | Loh Fook Yuen (LFY) |
| Project Manager | | Kevin Kee (KK) |
| Assistant Project Manager | | - |
| Project Assistant (Mech) | | - |
| Project Assistant (Elect) | | Suren Shanmugalingam (SS) |
| Draughtsperson | | Common Pool |
| Resident Engineer (M&E) | | - |
| Assistant Resident Engineer (M&E) | | - |
| Clerk-of-Work (M&E) | | - |
| | | |
| | | |

### 3.3 Client/Client's Representatives

Client:- Transurban Properties Pte Ltd & OPH Marymount Limited

Address: 14 Scotts Road, #06-00 Far East Plaza Singapore 228213

Tel: 62352411

Fax: 62352216

Client's Representatives:-

| Name of Company | Contact Person | Contact |
|---|---|---|
| Transurban Properties Pte Ltd & OPH Marymount Limited | Name: Mr Kamil bin Mohamad Ali<br>Position: Project Manager | Tel: 6830 6159<br>Fax: -<br>Handphone: 9834 8908<br>Email: kamil@fareast.com.sg |
| Davis Langdon KPK (S) Pte Ltd | Name: Mr Davis Tan<br>Position: Project Manager | Tel: 6394 0319<br>Fax: 6536 2633<br>Handphone: 9327 8721<br>Email: Davis.Tan@davislangdon.com.sg |
| | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |

### 3.4 **Other Consultants** (Local)

| Function / Name of Company | Contact Person | Contact |
|---|---|---|
| Architect<br>DP Architects Pte Ltd | Name: Mr Philip Tan<br>Position: Architect | Tel: 6828 7842<br>Fax: 6337 9989<br>Handphone: -<br>Email: philiptan@dpa.com.sg |
| Quantity Surveyor<br>Davis Langdon KPK (Singapore) Pte Ltd | Name: Mr Stephen Wong<br>Position: Director | Tel: 6222 3888<br>Fax: 6536 2633<br>Handphone: -<br>Email: w.stephen@kpkqs.com.sg |
| Structural Engineer<br>P&T Consultants Pte Ltd | Name: Mr Yiong Hoi Liong<br>Position: Associate Director | Tel: 6309 0295<br>Fax: 6534 5496<br>Handphone: -<br>Email: hlyiong@ptcon.com.sg |
| Interior Designer<br>JC Will & Associates Pte Ltd | Name: Ms June Chua<br>Position: Director | Tel: 6227 7198<br>Fax: 6227 7192<br>Handphone: -<br>Email: junejcwill@gmail.com |
| Lighting Consultant | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| Acoustic Consultant | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| Landscape Architect<br>ICN Design International Pte Ltd | Name: Mr Chia Jui Siang<br>Position: Senior Landscape Architect | Tel: 6225 3006<br>Fax: 6225 0924<br>Handphone: -<br>Email: juisiang@icn.design.com.sg |
| _____ | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |

**3.4 Other Consultants** (Overseas) – NOT USED

| Function / Name of Company | Contact Person | Contact |
|---|---|---|
| Architect | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| M&E Consultant | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| Quantity Surveyor | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| Structural Engineer | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| Interior Designer | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| Lighting Consultant | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| Acoustic Consultant | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| _____ | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |

### 3.5 Contractors/Sub-Contractors

| Function / Name of Company | Contract * | Contact Person | Contact |
|---|---|---|---|
| Main Contractor<br>Woh Hup (Private) Ltd | DC | Name: Mr Tan Beng Chwee<br>Position: Senior M&E Manager | Tel: 6385 8585<br>Fax: 6272 3322<br>Handphone: 9229 2584<br>Email: tan_bengchwee@wohhup.com |
| Air Conditioning & Ventilation Installation Sub-Contractor<br>Powen Electrical Pte Ltd | DSC | Name: Mr Victor Tam<br>Position: Project Manager | Tel: 6468 6868<br>Fax: 6763 1908<br>Handphone: 9145 8006<br>Email: victortam@powen.com.sg |
| Plumbing & Sanitary Installation Sub-Contractor<br>APP Engineering Pte Ltd | DSC | Name: Mr Dennis Lee<br>Position: Senior Project Engineer | Tel: 6425 6633<br>Fax: 6425 6636<br>Handphone: 9221 8787<br>Email: dennis@appengrg.com.sg |
| Electrical Installation Sub-Contractor<br>Powen Electrical Pte Ltd | DSC | Name: Mr Victor Tam<br>Position: Project Manager | Tel: 6468 6868<br>Fax: 6763 1908<br>Handphone: 9145 8006<br>Email: victortam@powen.com.sg |
| Lift & Escalator Installation Sub-Contractor<br>Mitsubishi Elevator (S) Pte Ltd | DSC | Name: Mr Edmund Koh<br>Position: Project Engineer | Tel: 6842 5678<br>Fax: 6748 2292<br>Handphone: 8322 3712<br>Email: mitsubishielevator@mesp.meap.com |
| Fire Fighting & Alarm Installation Sub-Contractor<br>Sprinkler Engineering Pte Ltd | DSC | Name: Mr Jeff Tan<br>Position: Project Manager | Tel: 6453 1488<br>Fax: 6453 7656<br>Handphone: 9380 7580<br>Email: jeff@sprinkler-eng.com.sg |
| Swimming Pool Filtration Plant Installation Sub-Contractor<br>Hydrotech Mechanical & Electrical Services Pte Ltd | DSC | Name: Mr Kelvin Ang<br>Position: Senior Project Coordinator | Tel: 6748 4779<br>Fax: 6748 8016<br>Handphone: 8138 4474<br>Email: project@hydrotech.coms.g |
| Carpark System Installation Sub-Contractor | | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |
| _____ | | Name:<br>Position: | Tel:<br>Fax:<br>Handphone:<br>Email: |

** Type of Contract*
- *NSC (Nominated Sub-Contract)*
- *DSC (Domesticated Sub-Contract)*
- *DC (Direct Contract)*
- *NS (Nominated Supplier)*

### 3.6 Authorities

| Authorities/Department | Contact Person | Tel/Fax Nos./E-mail |
|---|---|---|
| SP PowerGrid: | | |
| (a) Sub-Station | Mr Francis Chang | 6823 8555 |
| (b) Diversion | | |
| SP Services: | | |
| (a) Customer Supply | Mr Liang Chee Wei | 6823 8794/6823 8289 |
| (b) Installation | | |
| (c) Meter Section | Mr Chen Ye Xiang | 6876 4857 |
| (d) Road Lighting | | |
| TFCC: | | |
| (a) SCV | | |
| (b) SingTel | Mr Wong Chee Hoong / Gino | 8428 3959 |
| (c) IDA | Ms Alisa Ting | 6211 1301 |
| BCA: | | |
| (a) Building Plan | | |
| (b) Green Mark | | |
| FSSD: | | |
| (a) Building Plan | | |
| (b) M&E Plan | | |
| PUB (Water Supply) Network Dept: | | |
| (a) Water Conservation | | |
| (b) Plumbing Plan | Mr Benson Ang | 6731 3934 |
| (c) Diversion | | |
| (d) NEWater | | |
| PUB Water Reclamation (Network) Dept: | | |
| (a) Building Plan/CBPU | Mrs Alison Liew | 6731 9155 |
| (b) M&E Plan | Mr Abdul Razak Bin Abdul Majid | 6731 9385 |
| (c) Diversion | | |
| City Gas Pte Ltd: | | |
| (a) Planning/Submission | Mr Liew Khee Boon | 6586 8846 |
| (b) Installation/Inspection | | |
| PowerGas Pte Ltd | | |
| (a) Diversion | | |
| NEA (Pollution Control) | | |
| (a) Planning/Submission | | |
| (b) Inspection | | |

**SECTION 4**

**PROGRAMME**

## 4.1 Overall Programme

| | | | 2011 | | | | | | | | | | | | 2012 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | TASK NAME | MONTHS | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| 1. | Preliminary Planning | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | Planning Submission | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | Detail Design | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | BP Submission | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | BP Submission (Amendments) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. | Tender Period for Piling | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | Tender Period for Sub-Structure | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | Tender Period for Super-Structure | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. | Piling Period | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. | Sub-Structure Construction Period | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. | Super-Structure Construction Period | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. | TOP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. | CSC | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | 2013 | | | | | | | | | | | | 2014 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | TASK NAME | MONTHS | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| 10. | Sub-Structure Construction Period | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. | Super-Structure Construction Period | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | 2015 | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | TASK NAME | MONTHS | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| 10. | Sub-Structure Construction Period | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. | Super-Structure Construction Period | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. | TOP | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. | CSC | | | | | | | | | | | | | | | | | | | | | | | | | |

**SECTION 4**

**PROGRAMME**

## 4.2 Authority Submission Status for M&E Services - 1st Submission

| Service | Authority | Original Submission | | Comments/Resubmission | | | | | | Approval/ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Scheduled | Actual | Comment | Resubmit | Comment | Resubmit | Comment | Resubmit | Clearance |
| Application for Electricity Supply | SP Services Ltd | 22/11/10 | 22/11/10 | | | | | | | 01/12/10 |
| Power Supply Substation | SP PowerGrid Ltd | 22/7/11 | 20/7/11 | 24/7/11 | 18/10/11 | 23/10/11 | 8/12/11 | | | 29/12/11 |
| Metering Layout | SP Services Ltd | N.A | | | | | | | | |
| Sanitary Installation | PUB Water Reclamation (Network) Dept | 16/8/13 | 2/9/13 | | | | | | | 11/9/13 |
| Domestic Water Supply | PUB (Water Supply) Network Dept | 10/9/12 | 25/7/12 | 14/8/12 | 17/9/12 | | | | | 17/10/12 |
| Gas Supply Installation | City Gas Pte Ltd | 17/9/12 | 19/7/12 | 28/8/12 | 5/4/13 | 19/4/13 | 9/5/13 | | | 11/7/13 |
| Air Conditioning & Ventilation Inst. | FSSD | 1/10/2014 | | | | | | | | |
| Fire Fighting & Alarm Installation | FSSD | 10/10/2014 | | | | | | | | |
| Telephone Installation | TFCC | 2/7/12 | 21/6/12 | | | | | | | 17/7/12 |
| Broadband Co-axial Cable System (BCS) | Starhub Cable Vision | N.A | | | | | | | | |
| Fuel Storage | FSSD | N.A | | | | | | | | |
| | NEA (Pollution Control ) | N.A | | | | | | | | |
| | | | | | | | | | | |

**SECTION 4**

**PROGRAMME**

### 4.3 Authority Submission Status for M&E Services (Amendments) - 2nd Submission

| Service | Authority | Original Submission | | Comments/Resubmission | | | | | | Approval/ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Scheduled | Actual | Comment | Resubmit | Comment | Resubmit | Comment | Resubmit | Clearance |
| Application for Electricity Supply | SP Services Ltd | 30/09/13 | 30/09/13 | 22/10/13 | 29/10/13 | | | | | |
| Power Supply Substation | SP PowerGrid Ltd | | | | | | | | | |
| Metering Layout | SP Services Ltd | | | | | | | | | |
| Sanitary Installation | PUB Water Reclamation (Network) Dept | | | | | | | | | |
| Domestic Water Supply | PUB (Water Supply) Network Dept | | | | | | | | | |
| Gas Supply Installation | City Gas Pte Ltd | 27/02/14 | 27/02/14 | 22/04/2014 | 19/06/2014 | | | | | 30/07/2014 |
| Air Conditioning & Ventilation Inst. | FSSD | | | | | | | | | |
| Fire Fighting & Alarm Installation | FSSD | | | | | | | | | |
| Telephone Installation | TFCC | | | | | | | | | |
| Broadband Co-axial Cable System (BCS) | Starhub Cable Vision | | | | | | | | | |
| Fuel Storage | FSSD | | | | | | | | | |
| | NEA (Pollution Control ) | | | | | | | | | |
| | | | | | | | | | | |

**SECTION 5**

**PROJECT RECORDS**

## 5.1 List of Internal Files

**Standard Files**

| File Ref: | | File Ref: | |
|---|---|---|---|
| - Owner | ✓ | - Architect | ✓ |
| - Authorities | ✓ | - Other Consultants | ✓ |
| - Contractors | ✓ | - CC | |
| - CF | ✓ | - PQP/QSP | ✓ |

**Project Files to be initiated by PM as and when required**

| File Ref: | | File Ref: | | File Ref: | |
|---|---|---|---|---|---|
| - PP/VO | ✓ | | | | |
| | | | | | |
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(✓*where applicable*)

**SECTION 5**

**PROJECT RECORDS**

**5.2 Filing of Drawings**

The following team members shall take charge of filing of drawings, stamping "SUPERSEDED" drawings, etc.

| Description | Team Member |
|---|---|
| Incoming Architectural Floor Plans | Soft Copy – Server<br>[(Kevin Kee (KK) to forward to CAD mail] |
| Incoming Architectural Sketches/Details | |
| Incoming Structural Drawings | |
| M&E Drawings | |
| - Electrical Installation | Suren Shanmugalingam (SS) |
| - Lift & Escalator Installation | Suren Shanmugalingam (SS) |
| - Air Conditioning & Ventilation Installation | Kevin Kee (KK) |
| - Fire Fighting & Alarm Installation | Kevin Kee (KK) |
| - Plumbing & Sanitary Installation | Kevin Kee (KK) |
| - Swimming Pool & Filtration Installation | Kevin Kee (KK) |
| Other Drawings | |
| - Landscape Drawings | Soft Copy – Server |
| | |
| | |
| | |
| | |

**SECTION 6**

**INTERFACING**

## 6.1 Method of Interface

| Description | Method of Interface | |
|---|---|---|
| Client's Review & Approval | M&E Design Report | |
| | Pre-planned meeting at fixed intervals | ✓ |
| | Telefax, letter and telephone | ✓ |
| | Email | ✓ |
| | | |
| Interface With External Design Teams | M&E Design Report | |
| | Pre-planned meeting at fixed intervals | ✓ |
| | Telefax, letter and telephone | ✓ |
| | Email | ✓ |
| | | |
| Interface Between Internal Design Teams | Telephone | ✓ |
| | Email | ✓ |
| | Internal Project Team Meeting | ✓ |
| | Circulation of Information | ✓ |
| | | |

(✓*where applicable*)

**SECTION 6**

**INTERFACING**

**6.2 Internal Design Interface – NOT USED**

| Item No. | Description* | Required From | Required By | Date Required | Remarks |
|---|---|---|---|---|---|
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** Information required by INTERNAL DESIGN TEAM MEMBERS*

**SECTION 6**

**INTERFACING**

### 6.3 Circulation of Documents to External Parties

| | Code:<br>A - Approval Required<br>C - For Comments<br>I - For Information Only | Client/ Client Rep. | Client's Project Manager | Architect | Structural Engineer | Quantity Surveyor | |
|---|---|---|---|---|---|---|---|
| **1.** | **Letters/Fax:** | | | | | | |
| a. | Project Design | A | - | C | C | - | |
| b. | Project Administration | - | - | - | - | - | |
| c. | Project Cost Estimate/Contract Cost | - | - | - | - | - | |
| **2.** | **Drawings** | | | | | | |
| a. | Outline Design Drgs. | C | - | C | C | - | |
| b. | Sketch Design Drgs. | C | - | C | C | - | |
| c. | Final Design Drgs. | A | - | C | C | - | |
| d. | Shop Drawings | - | - | A/C | - | - | |
| e. | As Built Drgs. | I | - | - | - | - | |
| **3.** | **Other Document** | | | | | | |
| a. | Specification | - | - | - | - | - | |
| b. | Tender Document | - | - | - | - | - | |
| c. | Tender Evaluation Report | - | - | - | - | - | |
| d. | Design Report | C | - | I | - | - | |
| e. | Progress Report | - | - | - | - | - | |
| f. | Financial Report | - | - | - | - | - | |
| g. | Minutes of Meeting | - | - | - | - | - | |
| h. | Inspection Report | - | - | - | - | - | |
| i. | Testing & Comm. Report | - | - | - | - | - | |
| j. | O & M Manual | I | - | - | - | - | |

**SECTION 7**

**WORK AUTHORISATION**

| Activity \ Authorised Signatories | PD | QP | PM | AE | SS |
|---|---|---|---|---|---|
| General Correspondences with Client | ✓ | ✓ | ✓ | | |
| General Correspondences with Other Consultants | | | ✓ | ✓ | |
| M&E Cost Estimate Report | ✓ | | ✓ | | |
| M&E Design Report | ✓ | | | | |
| Check Prints | | ✓ | | | |
| Tender Drawing Approval | ✓ | | ✓ | | |
| Tender Specification Approval | ✓ | | ✓ | | |
| List of Tenderers | ✓ | | | | |
| Tender Questionnaires | ✓ | | ✓ | | |
| Tender Reports | ✓ | | | | |
| Draft Letter of Award | ✓ | | | | |
| Review of Contractor's Shop Drawing | | | ✓ | ✓ | |
| Review of Contractor's Technical Submittal | | | ✓ | ✓ | |
| Review of Contractor's Sample Submittal | | | ✓ | ✓ | |
| Contractor's Request for Deviation | | | ✓ | | |
| Progress Payment Valuation Form | ✓ | | ✓ | | |
| Final Account Valuation | ✓ | | ✓ | | |
| Draft Variation Order | | | ✓ | ✓ | |
| Engineer/Architect's Instruction/Direction | ✓ | | ✓ | | |
| Site Instruction/Direction | | | | | |
| Correspondence/Submission to Authorities | | ✓ | ✓ | | |

(✓*where authorised*)

Key to abbreviations:-

PD : Project Director
QP : Qualified Person
PM : Project Manager/Assistant Project Manager
AE : Assistant Engineer
SS : ACEPL Site Staff

**SECTION 8**

**DESIGN INPUT & METHODOLOGY**

## 8.1 List of Client's Standards, Reference Documents or Brief – NOT USED

| ITEM | KEPT BY |
|---|---|
| | |
| | |
| | |
| | |
| | |

## 8.2 List of Applicable Code of Practice and Regulations

| Services | Title of Code of Practice/Standard |
|---|---|
| Electrical Wiring | CP5 |
| Lightning Protection System | SS555 |
| Emergency Voice Communication System | - |
| Air Conditioning & Ventilation Installation | SS553 |
| Lift & Escalator Installation | SS550 |
| Sprinkler System | CP52 |
| Wet Riser System | - |
| Automatic Fire Alarm System | CP10 |
| Sanitary System | Code of Practice on Sewerage & Sanitary Works |
| Plumbing System | CP48 |
| Town Gas/LPG Supply System | CP51 |
| Boiler and Steam Supply System | - |
| Mechanical Smoke Control System | - |

**SECTION 8**

**DESIGN INPUT & METHODOLOGY**

### 8.3 List of Design Guide or Handbook Used

Carrier's Handbook of Air Conditioning System Design

ASHRAE Handbooks

Institute of Plumbing's Plumbing Services Design Guide

### 8.4 List of Pre-Consultation and Waiver (Please refer to attached list)

| S/N | Description | Date of Application | Date of Approval | Remarks |
|---|---|---|---|---|
| 1 | *Clause number in Code of Practice for (Services) which require clarification or waiver.<br>Consultation Ref No.<br>Waiver Ref. No. | | | |
| 2 | *Clause number in Code of Practice for (Services) which require clarification or waiver.<br>Consultation Ref No.<br>Waiver Ref. No. | | | |
| 3 | *Clause number in Code of Practice for (Services) which require clarification or waiver.<br>Consultation Ref No.<br>Waiver Ref. No. | | | |

*To fill in actual information

PUB (Sanitary)

| S/N | Description | Date of Application | Date of Approval | Remarks |
|---|---|---|---|---|
| 1 | Clause 2.4.1.3<br>Is the soil & waste from aboveground level allowed to be discharged to Inspection Chambers via ejector pit at basement? | 9 March 2011 | NA | Disapproved.<br>Soil & waste pipes from aboveground level shall connect directly to IC. |
| 2 | Clause 3.1.3.10- Standard circular grease interceptor for F&B shops<br><br>We proposed to have portable grease interceptor for two F&B shops where the total area is less than 150m$^2$. | 14 Sept 2011 | 14 Sept 2011 | |
| 3 | Clause 3.1.3.4<br>Connection between floor waste & waste sump and drain-line between waste sumps at driveway are of heavy-duty uPVC to SS242 with full haunching. | 19 Nov 2012 | NA | To comply with 3.1.3.4. |
| 4 | Due to site condition, depth of floor trap is more than 600mm from FFL for bathroom & kitchen area of apartment units. The cleaning eye will be provided to the floor trap with access panel on the false ceiling for maintenance. | 27 Sept 2013 | 27 Sept 2013 | |
| 5 | Clause 3.2.3.6 (a)<br>Due to 1200mm depth of transfer beam at 1$^{st}$ storey, soil & waste pipes from WC & floor trap are cast in the beam. | 18 Oct 2013 | NA | FT and soil & waste pipes shall not be cast in the transfer beam. |

PUB (Water)

| S/N | Description | Date of Application | Date of Approval | Remarks |
|---|---|---|---|---|
| 1 | Clause 2.6<br>Since the Reduced Level of the highest fitting at 5$^{th}$ storey is below 125m, we proposed to have indirect water supply with half-day water storage roof tank to serve top 3 floors of 23 blocks. | 21 Dec 2011 | 06 Feb 2012 | |
| 2 | We proposed to have domestic water tanks and pumps at basement. | 17 Feb 2012 (walk-in)<br>06 March 2012 (via email) | 8 March 2012 (via email) | No objection to the proposal with 1-day storage and standby generating system. |

PUB (Water)

| S/N | Description | Date of Application | Date of Approval | Remarks |
|---|---|---|---|---|
| 3 | We proposed to reduce the water storage capacity from 1 day to half day as the highest fittings is below 125m | 23 March 2012 | 03 April 2012 (via email) | |

SP Services

| S/N | Description | Date of Application | Date of Approval | Remarks |
|---|---|---|---|---|
| 1 | Unit electrical distribution box (DB) is proposed to be located in one of the cabinets above the countertop in the kitchen.<br>Consultation Ref No.:<br>SPS/IB/0008/2011 | 17 Aug 2011 | 29 Aug 2011 | |
| 2 | Site visit to review the location of switches and SSOs at SOHO units with raised bed furniture<br>6142/26993 | 12 July 2014 | 14 July 2014 (via email) | |
| 3 | Pre-consultation on the requirement of duplicate isolators to the condenser units which cannot be accessed from inside the units<br>6142/26992 | 12 July 2014 | 14 July 2014 (via email) | |

SCDF

| S/N | Description | Date of Application | Date of Approval | Remarks |
|---|---|---|---|---|
| 1 | Clause 13.1.2 (SS 550:2009)<br>1. Since the basement car park is protected by sprinklers with standby generating system. Can we conclude that lift lobbies on typical floor of the residential blocks need not to have fire detection as the development has standby generating system for lift homing?<br>2. Is smoke detector required at the top of lift shaft of a Group II development having machine room less lift system?<br>Consultation Ref No.: CON/C06961/11 | 02 Nov 2011 | 04 Nov 2011 | 1. Generator shall cater for lift homing under power failure.<br>2. Not required. |

### 8.5 List of Applicable Quality System Procedures

Alpha Consulting Engineers Pte Ltd's Quality Management System Procedures

| Section | Title | ✓ where applicable |
|---|---|---|
| M1 | Preparation of Consultancy Offer | ✓ |
| M2 | Project Commissioning and Service Agreement | ✓ |
| M3 | Design Control | ✓ |
| M4 | Design Change Control | ✓ |
| M5 | Tender Process and Evaluation | ✓ |
| M6 | Authority Submission | ✓ |
| M7 | Construction Process Control | ✓ |
| M8 | Testing and Commissioning | ✓ |
| S1 | Document Control | ✓ |
| S2 | Documentation of Quality & Environmental Management System Procedure | ✓ |
| S3 | Documentation of Project Quality Plan | ✓ |
| S4 | Specification Control | ✓ |
| S5 | Library Control | ✓ |
| S6 | Archive Control | ✓ |
| S7 | Filing Control | ✓ |
| S8 | Drawing Control | ✓ |
| S9 | Administration Control | ✓ |
| S10 | Purchasing Control | |
| S11 | Training Control | |
| S12 | Computer Control | |
| QE1 | Quality & Environmental System Audit | ✓ |
| QE2 | Feedback Reporting | ✓ |
| QE3 | Clients Feedback | ✓ |
| QE4 | Management Review | ✓ |

### 8.6 List of Software Used For Design/Analysis

| DESCRIPTION/ PACKAGE NAME | VERSION | SUPPLIER/ SOURCE | PURPOSE | |
|---|---|---|---|---|
| Calculux | 2.30 | Philips | Lighting design | |
| Cophos | 3.31 | Zumtobel | Lighting design | |
| Carrier E20-II | 3.21 | Carrier | Programme for determination of heat load, duct size and its losses, etc. | ✓ |
| Gensize 2 | 2.1 | Onan | Generator sizing | |
| Lift Traffic | - | Alpha Consulting Engineers Pte Ltd | Lift traffic calculation | |
| Econdial | 2.5 | Merlin Gerlin | Design for low voltage network | |
| Hyena | 4.00.1 | ACADS-BSG | Fire Sprinkler & Hydrant Analysis | |
| Fault Level Calculation | - | Alpha Consulting Engineers Pte Ltd | Calculation of voltage drop and fault level | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

(✓*where applicable*)

**SECTION 9**

**ENVIRONMENTAL CONSIDERATIONS**

### 9.1 Sustainable Design Features / Criteria

| Item | Remarks |
|---|---|
| Green Mark criteria | Certified |
| Green Design Features | Energy efficient air-conditioners, Mechanical Ventilation with CO sensors, Energy Efficiency Index, energy efficient features, water efficient fittings |

### 9.2 Site PPE Requirement

The necessary Personal Protective Equipment (detailed below) shall be provided by the main contractor / Company in accordance to the site EHS requirements prior to the site monitoring.

| PPE | ✓ where applicable |
|---|---|
| Safety Helmet | ✓ |
| Safety Shoes | ✓ |
| Eye Protection | - |
| Ear Protection | - |
| Safety Harness / Belt | - |
| Others: | |

### 9.3 Site Emergency Preparedness

Site staff shall comply with the site emergency preparedness and response procedure, established by the main contractor / owner, which shall include the following details.

| Items | ✓ where applicable |
|---|---|
| Evacuation Route | ✓ |
| Emergency Exit | ✓ |
| Assembly Point | ✓ |
| Emergency Contact List / Person | ✓ |
| Alarm system / methods | ✓ |

**SECTION 9**

**ENVIRONMENTAL CONSIDERATIONS**

### 9.4 Reporting of Environmental Non-conformances

When encountering environmental non-conformances, Site Staff shall be responsible to feedback to the main contractor.

### 9.5 List of Applicable Environmental management system Procedures

Alpha Consulting Engineers Pte Ltd's Environmental Management System Procedures

| Section | Title | ✓ where applicable |
|---|---|---|
| E1 | Aspect / Impact Identification, Risk Assessment & Risk Control | ✓ |
| E2 | Identifying Legal & Other Requirements | ✓ |
| E3 | Objectives, Targets & Programmes | ✓ |
| E4 | Communication | ✓ |
| E5 | Emergency Preparedness & Response | ✓ |
| E6 | Monitoring & Measurement | ✓ |
| E7 | Control of Air & Noise Pollution | ✓ |
| E8 | Management of Wastes | ✓ |

**SECTION 10**

**CLIENT'S REQUIREMENTS**

**10.1 List of Output Required by Client:-**

| Item | * Remarks |
|---|---|
| M&E Design Report | N.A |
| M&E Cost Estimate Report | N.A |
| Pre-Qualification of Tenderers | N.A |
| Tender Documents | N.A |
| Tender Report | N.A |
| Payment Valuation for QS | I |
| Certificates of Supervision for TOP/CSC | Re |

* *Remarks*

*A: for approval* *C: for comment* *I: for Information* *Re: for record*

*Other purposes and for action: please specify.*

**10.2 Specific Procedures Required By Client** *(If applicable)* – NOT USED

**SECTION 11**

**LIST OF SUB-JOB**

**11.1 List of Sub-Job Numbers – NOT USED**

| Sub Job No | Description | Allocation Details |
|---|---|---|
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