Alpha
Consulting Engineers Pte Ltd

PROJECT QUALITY PLAN

ST THOMAS SUITES

For

FCL TOWER PTE LTD

Copy No.	1

Prepared By: Yip Yoke Fun

Authorised By: Loh Fook Yuen

Date: 3 May 2010

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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	6044-PQP File	22 June 2007

1.2 Revision Record

Revision	Date of Issue	Section Reference	Page(s)	Remarks
0	22 June 2007	1 to 10	26	+ 1 pg (Sect 4.1 – Overall Programme)
1	14 January 2008	1 to 11	28	+ 2 pgs (Sect 4.1 – Overall Programme and Sect 9.1 - Sustainable Design Features / Criteria)
2	7 July 2008	1 to 11	28	+ 1 pg (Sect 4.1 – Overall Programme and Sect 9.1 - Sustainable Design Features / Criteria)
3	9 June 2009	1 to 11	28	+ 3 pgs (Sect 4.1 – Overall Programme and Sect 9.1 - Sustainable Design Features / Criteria)
4	3 May 2010	1 to 11	28	+ 3 pgs (Sect 4.1 – Overall Programme and Sect 9.1 – Sustainable Design Features / Criteria)

SECTION 2

PROJECT INFORMATION

2.1 Project Description

Type of Development	Residential

Statistics of Development	
Site Area, m²	13,031.70
Nett Floor Area, m²	-
Gross Floor Area, m²	36,489
Covered Carpark, m²	17,000
No. of Covered Carpark Lots	225
No. of Apartments/Houses	176
No. of Beds (for Hospitals)	NA
No. of Guestroom (for Hotels)	NA
No. of Blocks / No. of Storeys	2 blocks of 33-storey
No. of Phases	1 phase

2.2 Project Cost

M&E Services Cost Plan (S$ x 1M)							
Services	EI	ACVI	LEI	FFAI	PSI	SPFI	
Estimate	-	-	-	-	-	-	
Awarded	7.7	7.3	2.13	0.8	2.5	0.24	

Total Project Construction Cost (S$ x1M)			
	Site Clearance	Piling Works	Main Contract
Estimate			
Awarded	-	Included	104

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

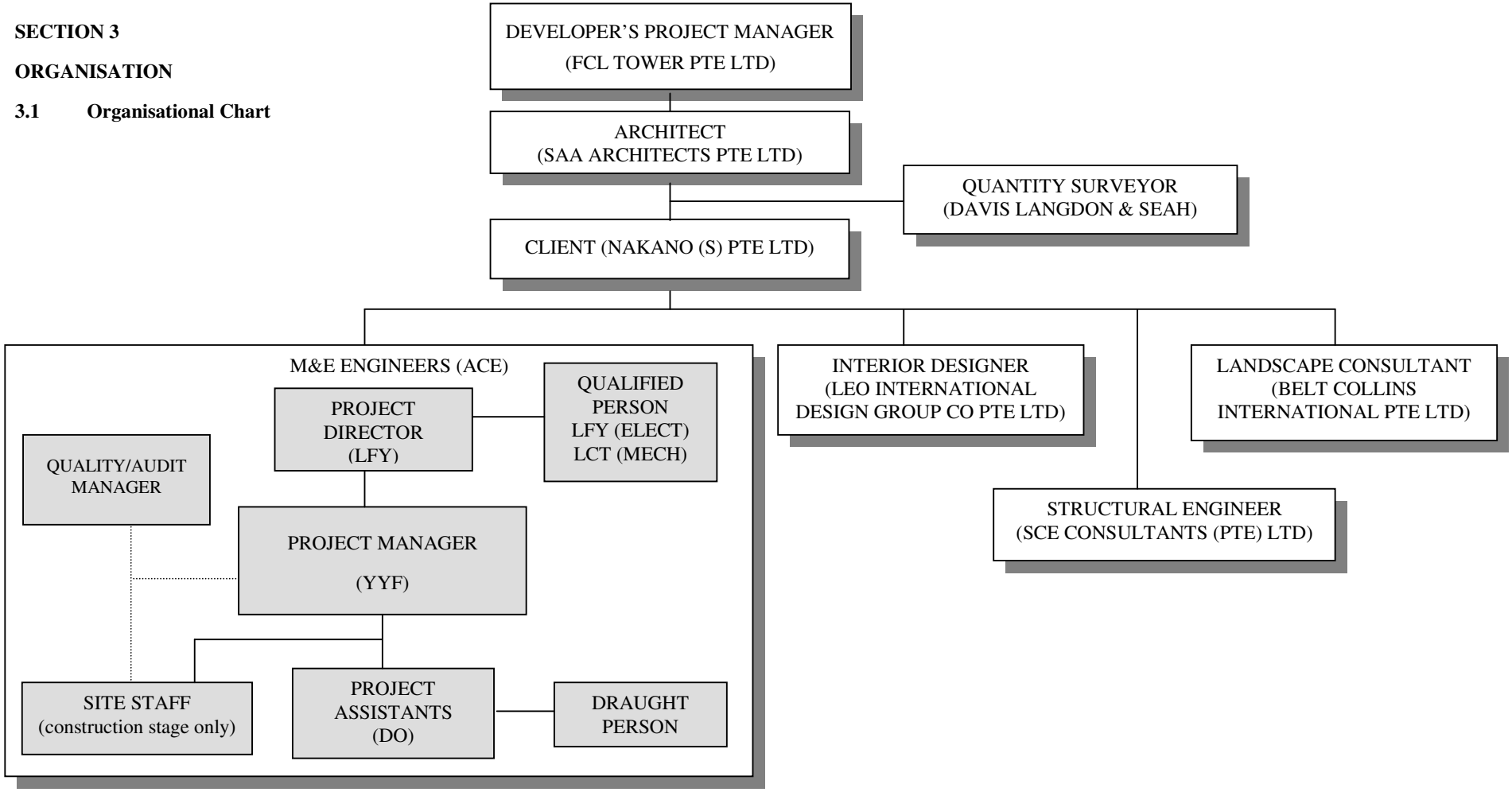
EJECTOR & DIVERTER	✓	SUMP PUMP	✓	FUEL OIL TANK		LIFT	✓	PRESSURE VESSEL	✓	HOISTS		FOAM	

(✓*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)
Qualified Person	Mechanical	Andrew Loh (LCT)
	Electrical	Loh Fook Yuen (LFY)
Project Manager		Yip Yoke Fun (YYF)
Assistant Project Manager		-
Project Assistant (Mech)		-
Project Assistant (Elect)		Derek Ong (DO)
Draughtsperson		Common Pool
Resident Engineer (M&E)		-
Assistant Resident Engineer (M&E)		-
Clerk-of-Work (M&E)		-

3.3 Client/Client's Representatives

Client: (Developer)	FCL Tower Pte Ltd	Client: (Main Contractor)	Nakano Singapore (Pte) Ltd
Address:	438 Alexandra Road #21-00 Alexandra Point Singapore 119958	Address:	1 Coleman Street, #06-02, The Adelphi, Singapore 179803
Tel:	6276 4882	Tel:	6333 4933
Fax:	6276 6328	Fax:	6338 8568

Client's Representatives:

Name of Company	Contact Person	Contact
FCL Tower Pte Ltd	Name: Mr John Koh Position: Senior Project Manager	Tel: 6277 2102 Fax: 6276 6330 Handphone: - Email: johnkoh@fraserscentrepoint.com
Nakano Singapore (Pte) Ltd	Name: Mr M Hidaka Position: Director	Tel: 6333 4933 Fax: 6338 8568 Handphone: - Email: hidaka@nakano.com.sg
	Name: Position:	Tel: Fax: Handphone: Email:
	Name: Position:	Tel: Fax: Handphone: Email:
	Name: Position:	Tel: Fax: Handphone: Email:

3.4 **Other Consultants** (Local)

Function / Name of Company	Contact Person	Contact
Architect SAA Architects Pte Ltd	Name: Mr Don Tan Zhi Shao Position: Architectural Executive	Tel: 6514 0830 Fax: 6224 9929 Handphone: 9062 9278 Email: don.tzs@saaarchitects.com.sg
Quantity Surveyor Davis Langdon & Seah Singapore Pte Ltd	Name: Mr Tay Ter Long Position: Assistant Director	Tel: 6239 8233 Fax: 6224 7089 Handphone: - Email: tayterlong@dls.com.sg
Structural Engineer SCE Consultants (Pte) Ltd	Name: Mr Slamet Gunawan Position: Associate Director	Tel: 6337 2828 Fax: 6339 9313 Handphone: - Email: sg@sce.com.sg
Interior Designer Belt Collins International (S) Pte Ltd	Name: Ms Anna Tabo-Nair Position: Landscape Architect	Tel: 6223 8133 Fax: 6222 9602 Handphone: - Email: anna@beltcollins.com.sg
Lighting Consultant	Name: Position:	Tel: - Fax: - Handphone: - Email: -
Acoustic Consultant	Name: Position:	Tel: - Fax: - Handphone: - Email: -
Interior Designer Leo International Design Group Co Pte Ltd	Name: Ms Sandra Lee Position: Project Manager	Tel: 6272 7371 Fax: 6276 9616 Handphone: - Email: leo@lidgintl.com
_____	Name: Position:	Tel: Fax: Handphone: Email:

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

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

3.5 Contractors/Sub-Contractors

Function / Name of Company	Contract *	Contact Person	Contact
Main Contractor Nakano Singapore (Pte) Ltd	DC	Name: Mr Lim Meng Teck Position: Project Manager	Tel: 6333 4933 Fax: 6338 8568 Handphone: - Email: mengteck@nakano.com.sg
Air Conditioning & Ventilation Installation Sub-Contractor Design Aire Engineering (S) Pte Ltd	DSC	Name: Mr William Liew Position: Director	Tel: 6746 9611 Fax: 6747 4922 Handphone: 9672 6277 Email: deaire@mbox3.singnet.com.sg
Plumbing & Sanitary Installation Sub-Contractor WTC Engineering Pte Ltd	DSC	Name: Mr Wang T C Position: Managing Director	Tel: 6745 9733 Fax: 6745 6806 Handphone: 9067 1144 Email: wtc97@mbox2.singnet.com.sg
Electrical Installation Sub-Contractor Bond M&E Pte Ltd	DSC	Name: Mr Vincent Chin Position: Project Director	Tel: 6741 1968 Fax: 6741 6763 Handphone: 91458782 Email: vchin@bondgrp.net
Lift & Escalator Installation Sub-Contractor Hitachi Elevator Engineering (S) Pte Ltd	NSC	Name: Mr Stephen Koh Position: Section Manager	Tel: 6416 1711 Fax: 6561 0766 Handphone: 9635 2208 Email: stephen.koh@hees.hitachi.com.sg
Fire Fighting & Alarm Installation Sub-Contractor Sprinkler Engineering Pte Ltd	DSC	Name: Mr Tan Tiong Hin Position: General Manager	Tel: 6453 1488 Fax: 6453 7656 Handphone: 9780 0452 Email: sprinkler@singnet.com.sg
Swimming Pool Filtration Plant Installation Sub-Contractor Hydrotech M&E Services Pte Ltd	DSC	Name: Mr Lai Heng Tong Position: Managing Director	Tel: 6748 4779 Fax: 6748 8016 Handphone: 9026 1457 Email: project@hydrotect.com.sg
Carpark System Installation Sub-Contractor		Name: Position:	Tel: Fax: Handphone: Email:
_____		Name: Position:	Tel: Fax: Handphone: 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 Chin Yoke Fah	6823 8556
(b) Diversion		
SP Services:		
(a) Customer Supply		
(b) Installation		
(c) Meter Section		
(d) Road Lighting		
TFCC:		
(a) SCV		
(b) SingTel		
(c) IDA	Mr Gary Chng	9006 8688
BCA:		
(a) Building Plan	Mr Yap Guan Hwa	6325 2211
FSSD:		
(a) Building Plan	Mr Ding Tuen Cheng	6848 1415
(b) M&E Plan	Mr Vijayaratnam	6848 1448
PUB (Water Supply) Network Dept:		
(a) Water Conservation		
(b) Plumbing Plan	Mr Toh Tse Teck	6885 2466
(c) Diversion		
PUB Water Reclamation (Network) Dept:		
(a) Building Plan/CBPU	Mr Johari B Abd Rahman	6731 9577
(b) M&E Plan		
(c) Diversion		
City Gas Pte Ltd:		
(a) Planning/Submission	Mr Tan Kah Hock	6586 8888
(b) Installation/Inspection	Mr Lim Teck Seng	6586 8872
PowerGas Pte Ltd		
(a) Diversion		
NEA (Pollution Control)		
(a) Planning/Submission		
(b) Inspection		

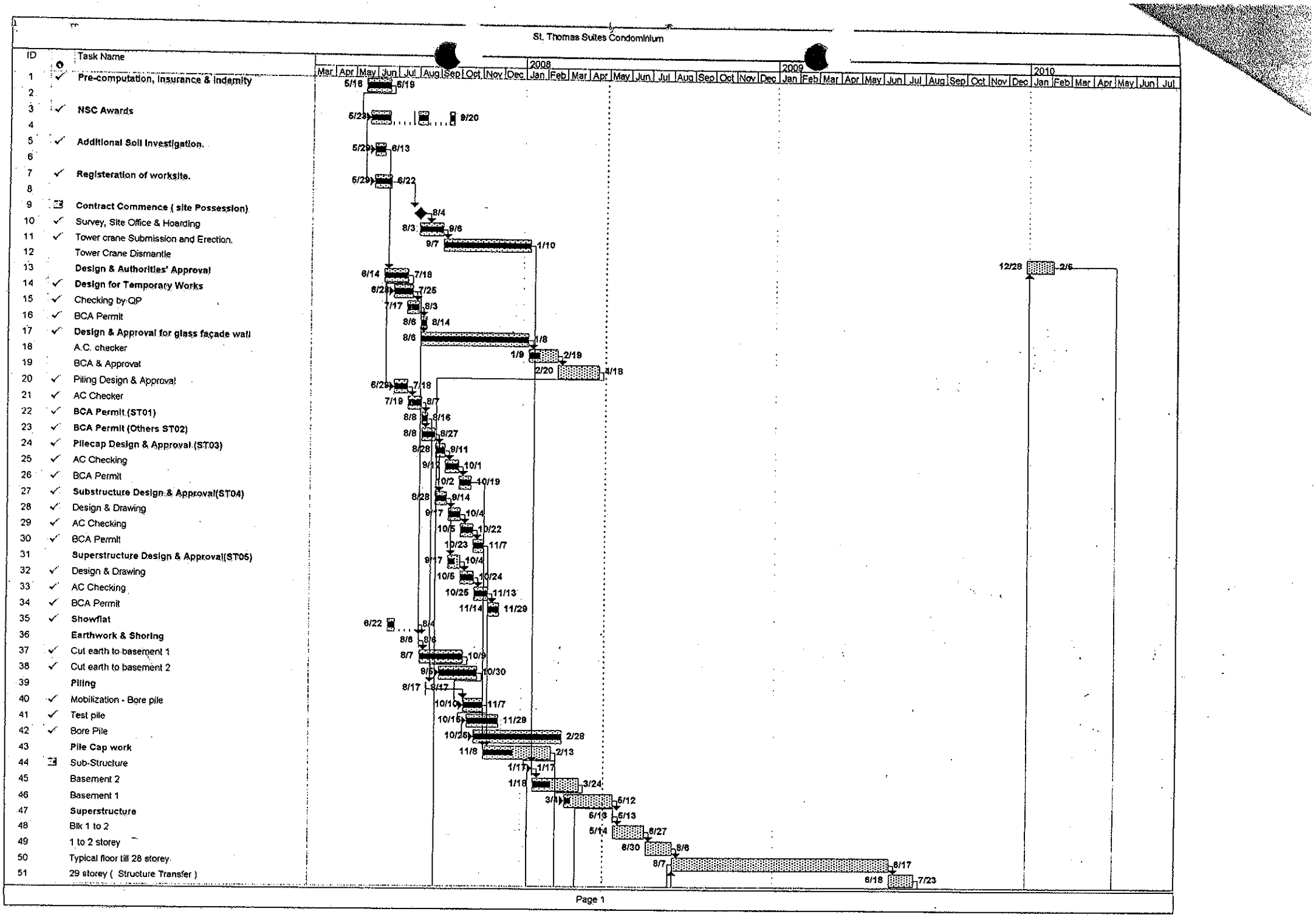
SECTION 4

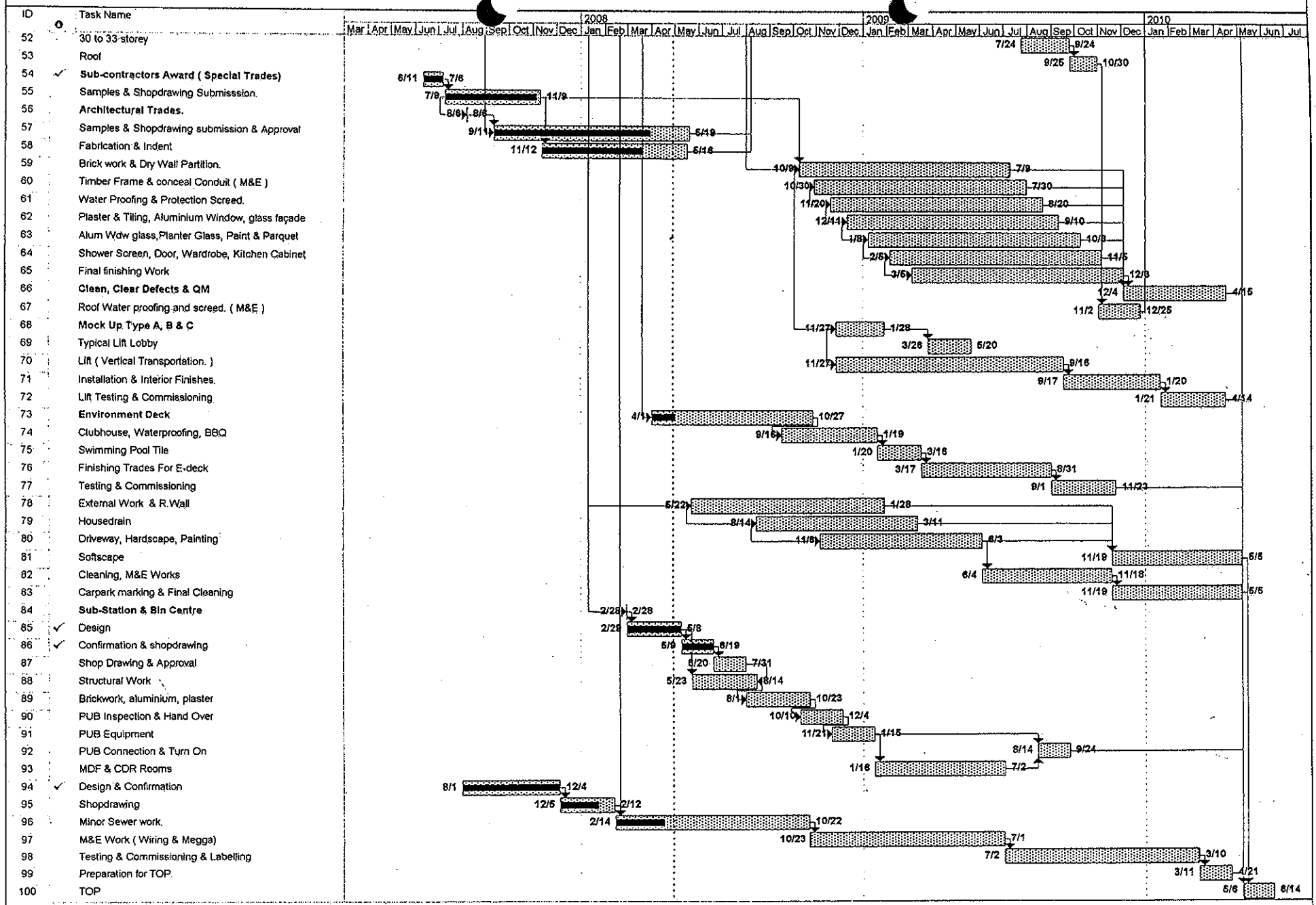
PROGRAMME

4.1 Overall Programme (refer to attached master programme)

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																									

St. Thomas Suites Condominium



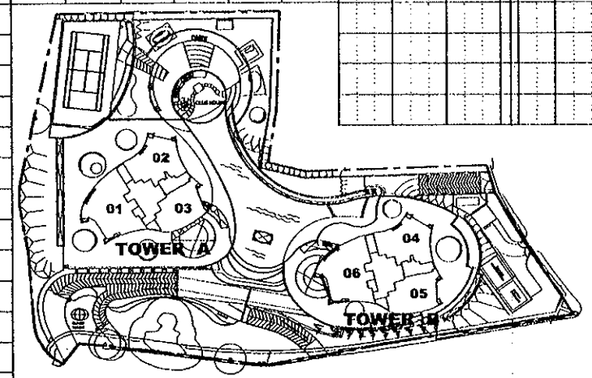

ID
Task Name
2008
2009
2010
52 30 to 33 storey
53 Roof
54 Sub-contractors Award (Special Trades)
55 Samples & Shopdrawing Submisssion.
56 Architectural Trades.
57 Samples & Shopdrawing submission & Approval
58 Fabrication & Indent
59 Brick work & Dry Wall Partition.
60 Timber Frame & conceal Conduit (M&E)
61 Water Proofing & Protection Screed.
62 Plaster & Tiling, Aluminium Window, glass façade
63 Alum Wdw glass,Planter Glass, Paint & Parquet
64 Shower Screen, Door, Wardrobe, Kitchen Cabinet
65 Final finishing Work
66 Clean, Clear Defects & QM
67 Roof Water proofing and screed. (M&E)
68 Mock Up Type A, B & C
69 Typical Lift Lobby
70 Lift (Vertical Transportation.)
71 Installation & Interior Finishes.
72 Lift Testing & Commissioning
73 Environment Deck
74 Clubhouse, Waterproofing, BBQ
75 Swimming Pool Tile
76 Finishing Trades For E-deck
77 Testing & Commissioning
78 External Work & R.Wall
79 Housedrain
80 Driveway, Hardscape, Painting
81 Softscape
82 Cleaning, M&E Works
83 Carpark marking & Final Cleaning
84 Sub-Station & Bin Centre
85 Design
86 Confirmation & shopdrawing
87 Shop Drawing & Approval
88 Structural Work
89 Brickwork, aluminium, plaster
90 PUB Inspection & Hand Over
91 PUB Equipment
92 PUB Connection & Turn On
93 MDF & CDR Rooms
94 Design & Confirmation
95 Shopdrawing
96 Minor Sewer work.
97 M&E Work (Wiring & Megga)
98 Testing & Commissioning & Labelling
99 Preparation for TOP.
100 TOP

MASTER NETWORK

NO.	PROJECT NAME	CLIENT	CONSTRUCTION ENGINEER	TOTAL FLOOR AREA	NO.OF STOREY	CHECKED BY
	PROPOSED CONDOMINIUM DEVELOPMENT AT ST. THOMAS WALK	FCL TOWER PTE LTD	SCE CONSULTANTS PTE LTD	36480.76m²	33 Storeys	Hidaka
		ARCHITECT: SAA ARCHITECTS PTE LTD	M & E ENGINEER: ALPHA ENGINEERING CONSULTANT		CONSTRUCTION PERIOD: 35 months	DATE: 2 May 07

NAKANO SINGAPORE (PTE) LT
No. 1 COLEMAN STREET #06-02
THE ADELPHI SINGAPORE 179803
Tel : 333 4933 Fax : 338 8568
Telex : RS 33197 NASIN

SCHEDULE DATE	Years	2007							2008													2009												2010				
	Mths		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
	Construction Schedule	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY



External Work		
PUB substation , Water		
Lower Roof	FFL 246.45	
33rd storey	FFL 241.45	3000
32nd storey	FFL 236.55	4900
31st storey	FFL 233.05	3500
30th storey	FFL 229.55	3500
29th storey	FFL 226.05	3500
28th storey	FFL 221.15	4900
27th storey	FFL 217.65	3500
26th storey	FFL 214.15	3500
25th storey	FFL 210.65	3500
24th storey	FFL 207.15	3500
23rd storey	FFL 203.65	3500
22nd storey	FFL 200.15	3500
21st storey	FFL 196.65	3500
20th storey	FFL 193.15	3500
19th storey	FFL 189.65	3500
18th storey	FFL 186.15	3500
17th storey	FFL 182.65	3500
16th storey	FFL 179.15	3500
15th storey	FFL 175.65	3500
14th storey	FFL 172.15	3500
13th storey	FFL 168.65	3500
12th storey	FFL 165.15	3500
11th storey	FFL 161.65	3500
10th storey	FFL 158.15	3500
9th storey	FFL 154.65	3500
8th storey	FFL 151.15	3500
7th storey	FFL 147.65	3500
6th storey	FFL 144.15	3500
5th storey	FFL 140.65	3500
4th storey	FFL 137.15	3500
3rd storey	FFL 133.65	3500
2nd storey	FFL 130.150	3500
1st storey	FFL 125.15	5000
Basement 1	FFL 121.00	4150
Basement 2	FFL 117.5	3500
Pilecap , Excavation		
Pile		
Excavation , Shoring , Temporary Facilities		
Curtain Wall		
Lift		

DRAIN , BOUNDARY WALL
SUBSTATION CONSTRUCTION
SUBSTATION HANDOVER
PUB WORK
TURN ON ELECTRIC SUPPLY
TURN ON WATER SUPPLY
TENNIS COURT , SWIMMING POOL , DECK FINISHING , PLANTING
WATER PROOFING,TOPPING UP
BRICK , TIMBER FRAME , M&E WORK , WATERPROOFING , TILE , MARBLE , FINISHING
CHINESE NEW YEAR
GROUND BEAM, M&E
PILECAP
PILE
SITE OFFICE HOARDING
EARTH CUTTING
APPROVAL
ORDER MATERIAL
FACTORY FABRICATION
CURTAIL WALL INSTALLATION
FACTORY FABRICATION 12M
LIFT INSTALLATION
QA , QC
TESTING & COMMISSIONING
TOP

0 2 MAY 2007.

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	6/8/07	27/8/07							12/9/07
Power Supply Substation	SP PowerGrid Ltd	30/10/07	16/10/07	7/11/07	12/3/08					1/4/08
Metering Layout	SP Services Ltd	-								
Sanitary Installation	PUB Water Reclamation (Network) Dept	28/3/08	15/5/09							18/5/09
Domestic Water Supply	PUB (Water Supply) Network Dept	30/4/08	28/5/08	17/6/08	22/7/08	7/8/08	21/8/08	4/9/08	5/9/08	15/9/08
Gas Supply Installation	City Gas Pte Ltd	1/8/07	7/9/07	19/9/07	30/10/07					13/11/07
Air Conditioning & Ventilation Inst.	FSSD	31/5/10								
Fire Fighting & Alarm Installation	FSSD	31/5/10								
Telephone Installation	TFCC	31/7/07	30/10/07	15/11/07	14/3/08	20/3/08				8/4/08
Broadband Co-axial Cable System (BCS)	Starhub Cable Vision	-								
Fuel Storage	FSSD	-								
	NEA (Pollution Control)	-								

SECTION 4

PROGRAMME

4.3 Authority Submission Status for M&E Services (Amendments) - 2nd Submission - NOT USED

Service	Authority	Original Submission		Comments/Resubmission						Approval/
		Scheduled	Actual	Comment	Resubmit	Comment	Resubmit	Comment	Resubmit	Clearance
Application for Electricity Supply	SP Services Ltd									
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									
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:	
- MC/EC	✓				

(✓*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	YYF
Incoming Architectural Sketches/Details	YYF
Incoming Structural Drawings	DO
M&E Drawings - Electrical Installation	DO
- Lift & Escalator Installation	DO
- Air Conditioning & Ventilation Installation	YYF
- Fire Fighting & Alarm Installation	YYF
- Plumbing & Sanitary Installation	YYF
- Swimming Pool & Filtration Installation	YYF
Other Drawings - Landscape Drawing	DO
- FSSD Approval Building Plan	YYF

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

** Information required by INTERNAL DESIGN TEAM MEMBERS*

SECTION 6

INTERFACING

6.3 Circulation of Documents to External Parties

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

Electrical Wiring	~~BS~~	SS	~~IEE~~	~~NFPA~~	
Lightning Protection System	~~BS~~	SS			
Emergency Voice Communication System	~~BS~~	~~SS~~	~~NFPA~~		
Air Conditioning & Ventilation Installation	~~BS~~	~~AS~~	~~NFPA~~	SS	~~MS~~
Lift & Escalator Installation	~~BS~~	SS			
Sprinkler System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~LPC~~
Wet Riser System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Automatic Fire Alarm System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Sanitary System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Plumbing System	~~BS~~	SS	~~NFPA~~	~~AS~~	~~MS~~
Town Gas/LPG Supply System	~~BS~~	SS	~~NFPA~~	~~AS~~	
~~Boiler and Steam Supply System~~	~~ASME~~	~~BS~~	~~AS~~		
~~Mechanical Smoke Control System~~	~~BS~~	~~NFPA~~	~~AS~~		

(Delete where necessary)

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 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	

8.5 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	Gold
Green Design Features	Refer to attached

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:	NA

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.

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

GREEN MARK INCENTIVE SCHEME
APPLICATION FORM

PROJECT INFORMATION (Sheet 2)

CHECKLIST OF DOCUMENTS TO BE ENCLOSED WITH APPLICATION

A summary of the green features, its installation costs and estimated saving for the project should be included.

a) Summary of Green Features

Category	List of green features	Installation costs	Potential savings
1. Design for Energy Efficiency	Inverter and environmentally friendly air conditioner split units with 4 NEA 'ticks' green label are used in all apartment units.	-	1,908.84/ unit/year
	Install PLC lights for lobby, staircase and corridor	-	113,649.12/year
	Use alternate looping and timer controller for lights in car-park and landscape	-	8,976.96/ year
	Variable frequency variable voltage (VVVF) drive lifts. The lights and fans in the lifts will be switched off after a predetermined time delay when there are no hall calls.	-	53,017.08/ year
	1st & 2nd basement level car-park are provided with 20% & 2.5% openings respectively. CO sensor are used at basement car-park to control ductless exhaust system.	-	237,720.12/year
2. Design for Water Efficiency	Dual flush cistern for WC is used in all apartment unit toilets. All basin, sink & shower mixer taps in apartment unit toilets are fitted with constant flow regulator.	-	43.68unit/ year
	Automatic sensor taps and flushing cistern for the WCs in the clubhouse changing rooms. All basin, sink & shower mixer taps in the clubhouse changing rooms/toilets are fitted with constant flow regulator.	-	1,038.36/ year
3. Site & Project Management	1) ISO 14000 2) Recycle water from filtration tank for of curing concrete, vehicles washing 3) Noise monitoring	-	
4. Indoor Environmental Quality & Environmental Protection	CO sensors are used at 2 basement levels car-park to control ductless exhaust system.	-	123,366.24/year
5. Innovation	1) Solar powered bollard lighting		
	2) Sunpipe at E-deck for natural lighting to basement carpark		
	3) Pneumatic Refuse Collection System		

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	NA
M&E Cost Estimate Report	NA
Pre-Qualification of Tenderers	NA
Tender Documents	NA
Tender Report	NA
Payment Valuation for QS	NA
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

Sub Job No	Description	Allocation Details
6044-601	Purchaser's Request Blk 33 Unit #24-06	
6044-602	Purchaser's Request Blk 31, Unit #12-01	
6044-603	Purchaser's Request Blk 31, unit #17-01	
6044-604	Purchaser's Request Blk 33, unit #09-05	
6044-605	Purchaser's Request Blk 33, unit #28-06	