



CS DIRECTIVE ON CADASTRAL SURVEY PRACTICES

The Directive is available on the Singapore Land Authority website.

URL: <http://www.sla.gov.sg/>.

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1. GENERAL

1.1 Directive to be read with related documents

This Directive serves to provide the details for the procedures and practices relating to the conduct of cadastral surveys in Singapore. It is not intended to be an interpretation of the Boundaries and Survey Maps Act and the Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules.

It should not be used as a replacement of the Act and Rules which are the authoritative documents. It is also not intended to be an instruction manual for listing every operational process. It does not list details of established practices which registered surveyors are fully aware of and have been practicing them.

CS Circulars and CS Notices are issued by the Chief Surveyor as and when necessary for subject matters on new practices or changes to existing practices. Periodically, these subject matters are reviewed for incorporation in this Directive. At any time, new circulars and notices may still be in use.

Hence, prior to the incorporation, the subject matters in these new circulars and notices are in practice. Registered surveyors should therefore refer to this Directive in conjunction with the Act, Rules, CS Circulars, CS Notices, SG LandXML Mapping and Structure and any other established practices where applicable.

1.2 Registration of registered surveyors and authorised assistant

1.2.1 Registration of registered surveyors

A Surveyor shall only practise if:

- (a) his name is in the Register of Surveyors; and
- (b) his name is in the Annual Register of Practitioners.
 - i. Application for registration

A person who meets the requirements for registration as a surveyor can apply to the Land Surveyors Board on a prescribed form accompanied by the requisite documents and a cheque for the prescribed fee made payable to Land Surveyors Board Singapore. For more information, visit the Board website at <http://www.minlaw.gov.sg/content/lwb/en.html>.

- ii. Application for practising certificates

A Registered Surveyor who wishes to practise cadastral survey in Singapore is required to apply to the Board for a Practising Certificate on a prescribed form accompanied by the requisite documents and a cheque for the prescribed fee made payable to Land Surveyors Board Singapore. For more information, visit the Board website at <http://www.mlaw.gov.sg/content/lwb/en.html>.

1.2.2 Licensing of corporations

A corporation or partnership which intends to provide cadastral survey services is required to have a licence granted by the Land Surveyors Board. Application for a licence should be made on a prescribed form accompanied by the requisite documents and a cheque for the prescribed fee made payable to Land Surveyors Board Singapore. For more information, visit the Board website at <http://www.mlaw.gov.sg/content/lwb/en.html>.

1.2.3 Registration of authorised assistant

A registered surveyor shall employ suitably qualified assistants to conduct cadastral surveys.

(a) Qualifications of authorised assistant

The academic qualifications of authorised assistant surveyors are as follows:

- i. The Technician Diploma in Land Surveying of the Singapore Polytechnic; or
- ii. The Certificate in Cadastral Surveying of the Singapore Institute of Surveyors and Valuers; or
- iii. Any other qualification which is regarded by the Chief Surveyor as an equivalent to the specified qualification above.

(b) Application for registration

In application for registration, registered surveyor must confirm the following conditions:

- i) the assistant is suitably qualified as he holds one of the academic qualification in (a) above;
- ii) he and his assistant accept the rules and procedures on the use of the entry card and the entry to land/flat as set out in CS Circular No. 5/2005;
- iii) shall submit a Certificate of Employment (sample is posted in SLA website :<http://www.sla.gov.sg>.) certifying that the name(s) listed are his assistants under his direct employment.

A digital passport size photograph in jpeg format and a certified true copy of the qualification document must be enclosed with the application.

(c) Cessation of employment of authorised assistant

The Surveyor shall notify and surrender the authorised assistant's entry pass to the Singapore Land Authority (SLA) within 30 days from the date the authorised assistant ceases to be employed by him.

1.2.4 Entry Card

- (a) The Chief Surveyor shall issue to every registered surveyor and authorised assistants an entry card for entry to land, seabed, foreshore or building. The entry card will expire on 31st December of each year. For renewal, a new card will be issued to the registered surveyor and each of his authorised assistants when the registered surveyor renews his practising certificate annually. The card is issued free of charge. However, a fee is payable for replacement of card. Refer to SLA website <http://www.sla.gov.sg>.

The entry card shall be displayed to show that the card-holder is the registered surveyor himself or the authorised assistant of the registered surveyor as the case may be.

The registered surveyor must return the entry card to the Chief Surveyor when:

- (b)
- i) the card validity has expired;
 - ii) his authorised assistant is no more under his employ; or
 - iii) the registered surveyor ceases to practise surveying.

1.2.5 Engagement of registered surveyors

For every cadastral survey, the registered surveyor shall declare in the RS Portal that the registered surveyor has been engaged by the owner or applicant before he/she submits the cadastral survey job.

1.2.6 Notice of commencement of Cadastral Survey

The requirement for the registered surveyor to give the Chief Surveyor advance notice of his intention to commence the cadastral survey is discontinued. Please refer to the CS Circular 6/2005 for details.

1.3 Authorised boundary and control marks

1.3.1 Types of marks

The following marks are authorised for the type of use specified in relation thereto:

- (a) for general use — iron pipes not less than one metre long and not less than 3 and not more than 5 centimetres in diameter, preferably tarred or galvanised;
- (b) for general use — reinforced cylindrical concrete marks, approximately 50 centimetres long with a diameter of not less than 5 centimetres and carrying a punched impression for the actual station point;
- (c) for general use — existing granite stones with punched centre marks used in previous surveys;
- (d) for marking salient traverse points on road surfaces and general use — iron spikes of not less than 15 centimetres long and one centimetre in diameter and set in concrete;
- (e) for marking on soft ground — reinforced concrete posts approximately one to two metres long, not less than 5 square centimetres in cross-section and carrying a punched impression for the actual centre point;
- (f) for marking on masonry, brickwork and formed pavements — nails or spikes set in concrete;
- (g) for marking on large rocks and smooth masonry — cut marks carrying a punched hole with a chiselled broad arrow pointing to it on large rocks and on smooth masonry;
- (h) for any other specific use — any other marks approved by the Chief Surveyor; and
- (i) any ISN or Precise Level Bench mark which has been established by the Chief Surveyor.

1.3.2 Abbreviations and symbols for marks

The abbreviations and symbols for marks in sketches/ LandXML and on plans at Appendix A shall be adopted.

1.4 Stability of marks

- (a) A registered surveyor shall take every precaution to ensure that marks are permanent and stable.
- (b) Concrete marks shall be planted with not more than 5 centimetres of the mark projecting above ground, and the earth around the mark shall be firmly rammed while planting the mark.

- (c) Iron pipes shall be driven into the ground leaving not more than one-tenth of their length projecting.
- (d) Spikes, pipes or nails planted in roadways or pavements shall be sunk flush with the surface, their heads set in concrete, and the road or pavement disturbed by the operation shall be made up with concrete to withstand all wear from traffic.
- (e) Existing marks found in a survey which are proved to be in position but do not comply with this rule shall be raised or lowered accordingly.

1.5 Numbering of stations

- (a) Stations shall be numbered consecutively in the order in which they are observed and no letters or accentuated numbers for stations shall be used for this purpose.
- (b) No station number shall be used more than once in each survey.
- (c) A station number shall refer to a position and not to any particular mark which may be used to define that position.
- (d) A mark which is moved to a different position from where it was first observed shall be allotted a new number.

1.6 Authorised plan forms

1.6.1 Plan requirements

- (a) Clarity
 - i. The scale on which the plan is drawn and the plan size shall be selected such that the coordinates of each station and the area of each lot can be clearly seen.
 - ii. On plans, if stations or boundaries are illegible or difficult to interpret, a diagram drawn on a scale larger than that of the plan, or drawn not to scale, may be added as an inset.
- (b) Plan form
 - Certified Plan (CP)
 - i. A1 (594 mm X 841 mm)
 - ii. A2 (420 mm X 594 mm)
 - iii. A3 (297 mm X 420 mm)
 - Certified Plan, Strata (CPST)
 - iv. B3 (353 mm x 500 mm)

1.6.2 Drafting requirements

- (a) Line types

Boundary lines shall be represented by firm black lines, and connection lines and traverse lines in sketches shall be represented by broken black lines.

Mukim and Town Subdivision boundary lines shall be represented as shown in the symbol sheet.

(b) Abbreviations

The abbreviations, symbols and conventional signs adopted by the Chief Surveyor shall be used on plans/sketches/field details/Landxml.

Symbol sheet is shown in Appendix G.

1.7 Notations descriptors used in format

Unless otherwise specified, digital files shall be in readable ASCII format e.g. LandXML, DXF. The LandXML file shall comply with SG LandXML mapping and structure which is available in SLA website.

1.8 Survey equipment calibrations

1.8.1 Calibration baseline

All Total Station/Calibration instrument used for cadastral surveys shall be calibrated using the calibration baseline at the Lower Pierce Reservoir.

1.8.2 Calibration booking form

The prescribed calibration booking form could be retrieved from the SLA website: <http://www.sla.gov.sg>. Each registered surveyor shall process the measurements and ensure that the survey equipment used is tested to be in good adjustment. The Registered Surveyor is required to submit the result to Chief Surveyor as and when required.

1.8.3 Calibration requirements

(a) Calibration frequency

Total stations and electronic distance measuring equipment shall be calibrated based on Chief Surveyor's standards:

- i. before being brought into use when new or after repair;
- ii. at intervals of not more than one year.

(b) Distance measurement calibration

The distance measurements shall be calibrated for instrument constant and scale and shall be better than (5 mm ± 5 ppm).

(c) Direction Measurement

The repeatability of direction measurements shall be checked by a series of at least 20 measurements to a distant target. The standard deviation of each direction measurement shall be better than ±5 seconds.

1.8.4 Calibration certificates

(a) Digital calibration certificate

The digital calibration certificate shall accompany every survey submitted. Refer to Cadastral Information File described in Chapter 4.

(b) Additive constant

The additive constant shall be less than 5 mm and shall be applied to all measurements.

1.8.5 GPS testing and calibration

GPS testing and calibration is described in “ Guidelines and Specifications for GPS Surveys of ISN Markers”

2 ADMINISTRATIVE

2.1 Conduct of Cadastral Survey

2.1.1 Commencement of survey

(a) Duty to acquire relevant Information

When carrying out a survey, every registered surveyor or his representatives shall obtain all relevant information to locate and re-locate the boundaries of any land to be surveyed.

2.1.2 Survey in sequence

Registered surveyors shall carry out cadastral survey in sequence. Registered surveyor will need to consult with SLA if the registered surveyor wants the child lots to approve first prior to the submission of the parent lot by another registered surveyor. Reshuffling of lots is needed if relevant parties agreeable to it. Additional fees are payable where applicable. The demarcation of the common boundary shall be made known and accepted by both registered surveyors.

2.2 Supervision of cadastral surveys during registered surveyor's absence

2.2.1 Notification of absence

Any registered surveyor who is away overseas for a continuous period of more than 3 weeks shall inform the Chief Surveyor in writing of:

- i. the period of absence from Singapore; and
- ii. the name of the registered surveyor supervising the cadastral survey in his absence.

2.3 Encroachments

2.3.1 Encroachments discovered in cadastral surveys

- (a) Registered surveyors must detect and record all encroachments in their surveys in the Sketch(SK) or Field detail(FD) pages and in LandXML file under any situation of the encroachments. The encroachment may be on the ground, above-ground or below-ground level. The extent of the encroachment details are to be highlighted in yellow in the detail SK.
- (b) After checking the survey is in order, any structure located more than 30mm into neighbouring boundary and vice versa must be indicated clearly in the field sketches and reported.
- (c) Offsets and radiations are to be taken and recorded to determine the extent of encroachments of the structures in relation to lot boundaries.

2.3.2 Reporting encroachments

- (a) Registered surveyors must indicate whether there are any encroachments in the LandXML and encroachment web form in RS Portal when submitting the job to the

Chief Surveyor. For any encroachment reported, the registered surveyors are to give a brief description of the encroachment.

- (b) Where encroachment is reported in strata survey, it is to be shown and clearly described in the Site Plan and / or Storey Plans of the FD and strata certified plan(CPST). Registered surveyors are to ascertain whether the common properties or strata units or both are affected. If strata units are affected, the amount of encroachment (in sq m) is to be scaled and shown in the FD and CPST. In such a case, the strata lot and its area cannot include the part of the flat unit that encroaches onto adjacent land.
- (c) Where the structure of URA Conservation Site is reported to be encroaching onto State Land, the encroachment is allowed to stay. No TOL will be issued but the notice of encroachment will be inserted on the certificate of title(CT) / subsidiary certificate of title(SSCT).

2.3.3 Power of the Chief Surveyor in dealing with encroachment in survey

- (a) Pursuant to section 11D(3)(c) of the Boundaries and Survey Maps Act, the Chief Surveyor may refuse to approve any survey plan or assurance plan if an encroachment has been created by the purchaser or owner of a parcel of land being surveyed for any “relevant purpose”, which affects any parcel of land adjoining that parcel of land, and the registered surveyor who signs the plan has not certified that the encroachment has been resolved. The “relevant purpose” has been defined in section 11D(6) to be as follows:

- (i) obtaining a new State title for a parcel of land;
- (ii) amalgamating the parcel of land; or
- (iii) subdividing the parcel of land.

The Chief Surveyor may reject the job if the encroachment is not yet resolved at the time of submission.

- (b) Where the encroachment is onto adjoining State Land, the registered surveyor shall liaise with the purchaser or landowner to resolve the encroachment with the Commissioner of Lands. Please refer to Appendix H on SLA’s current policy for retention of encroachments from private properties onto/over/under state lands.
- (c) Where the encroachment is onto adjoining private land, the registered surveyor shall liaise with the purchaser or landowner to resolve the encroachment with the landowner of the adjoining land. The landowner of the adjoining land must be the party to confirm that the resolution has been made.
- (d) Documentary evidence confirming that the encroachment has been resolved must be produced.
- (e) Where encroachment is from an adjoining land onto the private land under survey, Registered Surveyors are required to submit to Chief Surveyor a copy of their letter notifying their clients/ land owner to resolve the encroachment with their neighbour.

2.3.4 Certificate in relation to encroachment

- (a) Rule 15 of the Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules stipulates that every survey plan submitted to the Chief Surveyor for approval shall be accompanied by a certificate signed by the registered surveyor in the form as prescribed therein. Registered surveyor must complete and submit the prescribed certificate for each job regardless of whether there is any encroachment or not.
- (b) Registered surveyors are to note that the certificate shall be completed according to what is intended for under the section 11D(3)(c); i.e. the encroachment is created by the purchaser or landowner of the lot under survey and the encroachment is onto

adjacent land. It is not intended for taking resolutions for other situation of encroachments such as the encroachment is caused by and from the adjoining land or it was created by persons other than the purchaser or landowner of the land under survey.

- (c) For submission in RS Portal, the encroachment information shall be provided in the LandXML and in the encroachment web form in RS Portal. The certificate in relation to encroachment file shall be generated and digitally signed by the registered surveyor when submitting the job.

For strata submission without LandXML, registered surveyor will need to fill in the encroachment information in the web form.

2.4 Allocation of lot numbers, activation of lot numbers and allocation of Strata Title Plan(STP) number

2.4.1 Application for lot numbers

- (a) Every registered surveyor or any representatives authorised by him shall obtain from Chief Surveyor all lot numbers to be used in connection with the survey he is to carry out through RS Portal.
- (b) Application shall be in accordance to the application of lot numbers module in RS Portal. Registered surveyor is required to submit the provisional boundaries in LandXML format (for land lot only). For strata, submission of LandXML is optional.

The Landxml file naming convention is as follows:

<RS short name>-<SVY file name>-<Abbreviation of submission type and running number>-<Land or Strata>

e.g. SKP-SVY1234-2017-LN001-Land.

SKP-SVY1234-2017-SN001-Strata.

- (c) Fee for application of lot numbers.

2.4.2 Application for new lot numbers at launch of sale

- (a) Registered surveyor shall apply for new land lot numbers and strata lot numbers before the development is launched for sale. The new lot numbers are issued upfront for purpose to uniquely identify the new land plots/ strata units for launch of sale and for registration of caveat. Unless their lots status have been updated to “live” in the Lot Base System by the Chief Surveyor, such lot numbers are provisional and should not be quoted for any purpose. An application for the land or strata lot numbers to be sold shall be accompanied by:
 - i For land and/or strata lots, written permission and the approved development plan. If other than for approved development case, the relevant plan referred to in the survey request.
 - ii For strata lots, in addition to (i) above, the approved building plan for the development or the certified true copy of the building plan for the development submitted to the Building and Construction Authority for approval.
- (b) The land or strata lots shall be identified with house/unit numbers on the approved development plan or the approved building plan.
- (c) The total number of land/ strata lot numbers applied shall tally with the total number of plots appearing on the approved development plan.

2.4.3 Application of lot number for HDB recess area

- (a) When applying for strata lot numbers for recess areas, registered surveyors shall comply with the following:
 - i. Provide a copy or portion of the CPST plan to show the relevant unit and indicate clearly the extent of the recess area to be surveyed;
 - ii. Provide the existing strata lot number and house number of the unit.

2.4.4 Activation of lot numbers

- (a) Registered Surveyor may apply to update lot status from “provisional” to “live” for purpose of lodging caveats through RS Portal. The application shall be accompanied by:

LandXML file containing the provisional boundaries with approved lot numbers(for land lots only). For strata, submission of LandXML is optional.

The Landxml file naming convention is as follows:

<RS short name>-<SVY file name>-<Abbreviation of submission type and running number>-<Land or Strata>

e.g. SKP-SVY1234-2017-AC001-Land.

SKP-SVY1234-2017-SA001-Strata.

- (i) Inland Revenue Authority of Singapore (IRAS) letter of approved development name or building name and house numbering.
 - (ii) Fee for activation of lot numbers.
- (b) For cases where strata lot numbers are allocated for new developments on en-bloc sale or HDB SER programme sites, the SSCTs or strata leases of the existing strata lots must be terminated or cancelled respectively before the application to make the new strata lots “live” can be submitted. The pre-condition is in CS Circular No.4/2007.
- (c) Registered surveyors are required to correlate the property addresses with the new lot numbers allocated at before launch of sale of a development.
The data format should be prepared in LandXML format and for strata submission without LandXML, in excel text file format. The respective formats for land lots and strata lots are shown below:

Correlation of lot numbers to addresses in LandXML

```

<Parcel ...="">
  <LocationAddress
    flatNumber="02"
    floorLevelNumber="05"
    numberFirst="35">
    <ComplexName desc="Wedge Mount Industrial Building"/>
    <RoadName roadName="Jalan Pemimpin"/>
    <AddressPoint pntRef="no" featureRef="addRef1"/>
  </LocationAddress>
  <Feature name="addRef1">
    <Property label="addressSource" value="IRAS"/>
    <Property label="buildingSource" value="URA"/>
    <Property label="postalcode" value="577176"/>
  </Feature>
  ...
</Parcel>

```

Correlating Accessory Lot to Strata Lot

Excel Filename: **Correlating_Accessory_Lot_to_Strata_Lot.xls**

Correlating Accessory Lot to Strata Lot	
Accessory_Lot_Number	Strata_Lot_Number

Column Name	Data Type	Maximum Characters Allowable	Example (Data)
Accessory_Lot_Number	String	Accessory -11	Accessory Lot: MK01-A0001M
Strata_Lot_Number	String	Strata -13	Strata Lot: MK01-U000001P

Activation of Strata/Accessory Lot Numbers (with/without Address)

Excel Filename: **Activation_of_Lot_Numbers.xls**

Activation of Land/Strata/Accessory Lot Numbers (with/without Address)								
Lot_Number	House_Number	Street_Name	Level_Number	Unit_Number	Postal_Code	Address_Source	Building_Name	Building_Source

Column Name	Data Type	Maximum Characters Allowable	Example (Data)
Lot_Number	String	Strata – 13 Accessory -11	Strata Lot: MK01-U000001P Accessory Lot: MK01-A0001M
House_Number	String	10	123A, 123
Street_Name	String	75	YISHUN STREET 72
Level_Number	String	3	B1, 10
Unit_Number	String	5	1234, 123A
Postal_Code	Numeric	6	760764
Address_Source	String	4(Auto Display)	IRAS
Building_Name	String	50	REVENUE HOUSE
Building_Source	String	4(Auto Display)	IRAS

2.4.5 Authorised usage of lot numbers

- (a) Registered surveyor shall not use any other lot numbers without the express sanction of the Chief Surveyor.
- (b) Registered surveyor shall not use or quote the lot number in any instrument or caveat to be lodged in the Land Titles Registry, unless the lot number or the relevant assurance plan, STP or CP has been approved by the Chief Surveyor.

2.4.6 Lot numbering system

The numbering of lot numbers, which is unique for every lot, shall be of the following formats:

- (a) Land lot(include airspace and subterranean lots)

	MK/TS	MK/TS No.	Lot No.	Check Digit
	↓	↓	↓	↓
Land Lot No.	A(2)	N(2)	N(5)	A(1)
:				
Example:	MK	18	12828T	
	MK	18	05422T	
			(Note: "0" in front of the lot number is required for correlation of property address text file and .svy file only)	

A(n) denotes n alphanumeric characters
N(n) denotes n numeric characters

(b) Strata lot

	MK/TS	MK/TS	Strata	Strata Lot	Check
	↓	No.	Lot	No.	Digit
Strata Lot	A(2)	↓	↓	↓	↓
No.		N(2)	U	N(6)	A(1)
Example:	MK	17	U	18118L	

(c) Accessory lot

	MK/TS	MK/TS	ALot	ALot No.	Check
	↓	No.	↓	↓	Digit
Accessory Lot No.	A(2)	↓	A	N(4)	↓
		N(2)	A		A(1)
Example:	TS	25	A	19W	

2.4.7 Display of old and present format lot numbers on Certified Plan (CP)

The relationship between the parent lot number in the old and present formats shall be incorporated in the history of subdivision of the CP as illustrated below:

Lot Number	On Plan	Allotted as/Subdivided into Lot	Amalgamated as Lot	Transferred as Lot	Lot Remarks
MK18-99899V[MK18-28-7]					

2.4.8 STP number

The STP number will be generated automatically by the system based on the purpose of survey when you creates a CPST submission in RS Portal. In the case of further subdivision or amalgamation of strata lots of an existing strata title development, the registered surveyor shall request the Chief Surveyor to release the current STP number of that development.

The STP number shall be shown at the space provided for on the 1st sheet of the STP and in LandXML for submission with LandXML.

2.5 Amalgamation of lots

(a) Amalgamation of land lots shall only be effected if the lots to be amalgamated satisfy the following conditions:

1. **Same land ownership**

(i.e. either State ownership, same private ownership, same statutory board, same company, same corporation or same trusteeship and the breakdown of shares for each owners are the same for all the lots).

- i. State ownership under different state land sub-ownership status cannot be amalgamated. The lots must be either all pure state land or all state land held in trust by the same statutory board. For such cases the registered surveyor when applying for new lot numbers should provide the proposed subdivision and amalgamation and vice versa. The Chief Surveyor will consider the proposal in consultation with Commissioner of Lands(COL).
- ii. Same company, same corporation or same trusteeship means a single registered entity; i.e. name of company, corporation, partnership or trusteeship must be the same.

2. **Same system of land registration**

(i.e. either registered land under Land Titles Act(LTA) or unregistered land under Registration of Deeds Act(ROD)).

- i. All registered land lots shall have live CTs.
- ii. All state land lots are unregistered lands.

3. **Same land tenure**

i.e. either freehold(Grant or GFS), Statutory Land Grant(SLG) or Leasehold(L) or State Land(SL).

- i. Grant and Grant-In-Fee Simple(GFS) titles are freehold lands and lots can be amalgamated. (Grant is also known as Indenture).
- ii. For leasehold land lots, their lease terms (e.g. different restrictive covenants) and expiry dates must be the same.
- iii. Registered sub-lease which will create reversionary interest and different sets of expiry dates, cannot be amalgamated.

Note : Registered sub-lease means the original landowner has leased his land be it freehold, SLG or leasehold property to another landowner(called sub-leasee) for a number of years(e.g. 60 years) with reversionary interest. At the end of the sub-lease(e.g. after 60 years), the land goes back to the original landowner. To detect for sub-lease, land lot with registered sub-lease will have 2 or more live CTs. Their CTs will give the details.

4. **Contiguous lots**

Amalgamation should form one closed polygon lot.

5. The above pre-conditions do not apply to ad-hoc synchronized cases for surrender and re-issue of titles. COL will need to state in the survey request that it is for synchronized issue of titles.

Note : Synchronized issue of titles means the original titles of the parent lots are surrendered to the State simultaneously with the new title issued to the amalgamated child lot. There is no time gap between surrender and re-issue.

- (b) Amalgamation of strata lots, or accessory lots, shall only be effected if the lots to be amalgamated satisfy the following conditions:

- i. The strata lots must be under the same ownership,
- ii. The strata lots are contiguous and residing on the same land lot, in which case the above pre-conditions (a)(2) to (4) for the land lot would have applied to the strata lots.

2.6 **Blocking-up survey of State land lot**

Blocking-up survey of State land lot shall facilitate further subdivision of the land and simplify lot management. Registered surveyors shall ensure that the proposed blocked-up boundaries are following the edge of the development outline, road network, etc.

2.7 **Registrar of Title Plan**

Registrar of Title (RT) plan may be prepared for the following survey:

- a) Subterranean lot;

- b) Airspace lot;
- c) Reclaimed land;
- d) Foreshore structures

Draft description is required for submission of reclaimed land and foreshore structures. Draft description will be generated from the information in LandXML in RS Portal. Fees payable to the Singapore Land Authority are posted on SLA website <http://www.sla.gov.sg>.

For Reclaimed land and Foreshore lot, the RT plans will be generated using the Plan Generation in the RS Portal.

For Subterranean and airspace lot, registered surveyor is required to upload the plans in DXF format in RS Portal and the system will convert the file to PDF.

The formats of RT plans for the survey above are shown at Appendixes B, C at the end of this directive.

The file format for RT to be submitted along with RT plan is LandXML format. The elements required are shown on the section under Cadastral Information File in Section 4.

The file naming convention is as follows:

<RS short name>-<SVYFilename>-<Plan number>.<ext>

e.g. SKP-SVY0234-2017-RT80080.xml

The correlation of land lot with RT number and area in LandXML is required.-Refer to "Parcel " element in SG LandXML mapping and structure. For RT, the plan area is to the nearest square metre and no decimal places to be inserted.

2.8 Resurvey of land lot required for

a) single land lot under sale of State Land; or

b) strata subdivision where there is no land subdivision

- (a) For single land lot under sale of State Land, the cadastral survey is conducted prior to construction and the site may be vacant. When the CP is approved, the registered surveyor concerned will have to draw the attention of the landowner that a resurvey is required when the construction is completed. The reasons for the resurvey are to reinstate the boundary marks which may have been disturbed or removed and to ascertain whether there is any encroachment due to construction.
- (b) "Single land lot" under sale of State Land refers to an alienated lot which when developed, will not be further subdivided into child lots. Examples of single lot are bungalow plot, petrol station, religious site, remnant land, etc. A resurvey is not required if the alienated lot will be further subdivided as the subsequent survey of the child lots will address the issues of lost or out-of-position boundary mark and any encroachment.
- (c) Under section 10(1) of the Boundaries and Survey Maps Act (Cap25), the landowner has the responsibility to preserve the boundary marks erected on the boundaries of the land. The preservation of the boundary marks would include that for single land lot surveyed for alienation and the resurvey would reinforce the requirement for the landowner to comply with the section.

- (d) The onus is on the registered surveyor concerned to initiate action for the resurvey as soon as the site permits. The survey fee payable to SLA is in accordance with the prescribed fee under the Boundaries and Survey Maps (Singapore Land Authority Fees) Rules.
- (e) Similarly, a resurvey of the land lot is required when a strata survey is conducted to subdivide the building within into strata lots and where there is no subdivision of the land lot consequent to the development. For such a strata development, the registered surveyor, when submitting the Strata Certified Plans to the Chief Surveyor, will include the submission of the CP for the resurvey. However, such resurvey is not required if the strata survey is for:
 - (i) HDB recess area or HDB Space Added Item(SAI);
 - (ii) subdivision of existing strata lot or strata provisional lot;
 - (iii) amalgamation of existing strata lot and or common property;
 - (iv) excision of strata lots for strata leases;
 - (v) excision of common property to form strata lot;
 - (vi) resurvey of strata lot ; or
 - (vii) registration of strata leases exceeding 7 years but not more than 21 years without sub-divisional approval.
 - (viii) HDB or private strata leases of part of building or part of estate.
- (f) In the event of any encroachment caused by the developer/ landowner, the registered surveyor shall liaise with the developer / landowner to resolve it before the resurvey is submitted to Chief Surveyor. The details of resolving the encroachment are in the respective content.

2.9 Survey for surrender and re-issue of title

- (a) A cadastral survey for surrender and re-issue of title of a land lot is not required if the lot CP is approved less than 20 years ago and surveyed under the SVY21 datum and does not involve High Water Mark(HWM).
- (b) A pair of title plans will be prepared from that CP.
- (c) This is also applicable to cases on expiry of leases.
- (d) Refer to SLA website for fee payable for the preparation.

2.10 Survey of balance lot

The coordinates of compiled balance lots are not required to be shown on CP when an existing lot is subdivided to excise a small plot from it. In the case of lots with island lots, the island lots' coordinates are not required to be shown on CP if the island lots are not the subject lots.

Although the coordinates of the compiled balance lots and island lots within them are not shown on the CP, the coordinates of these lots are still required in the LandXML.

2.11 Alteration of Mukim and Town Subdivision Boundaries

The survey is to be conducted in accordance with the provisions of the Boundaries and Survey Maps Act and its rules. SLA will levy a fee in accordance with the Boundaries and Survey Maps (Singapore Land Authority Fees) Rules and paragraph 7 of this directive.

Appendix D at the end of this Directive sets out the technical procedure for such a survey.

2.12 Errors in previous survey

When a registered surveyor discovers an error in a previous cadastral survey which would materially affects the accuracy of his cadastral survey, he is required:

- (a) provide the Chief Surveyor with a full report of the error together with all relevant information relating to the error, and
- (b) rectify the error only after Chief Surveyor has given instructions to do so.

2.13 Submission of Child Lots – Physical Parent Lots Information

In some survey jobs, the parent lots (termed as “physical parent lots”) may be amalgamated as a “dummy” lot for simultaneous subdivision into new child lots. The amalgamated “dummy” lot is to simplify, facilitate and comply with the subdivision and survey actions.

For registration of caveats, Certificate of Titles and other instruments against the child lots, the information of the “child lots-physical parent lots” relationship is required. This applies to land, strata and accessory lots. Registered Surveyors are required to indicate whether the child lot is derived from the whole or part of the Physical Parent Lots.

For illustration, please see Sketch PPL and sample letter format at Appendix L-1 and L-2. For submission with LandXML, registered surveyors are required to provide the “PhysicalRelationship” in the LandXML. See sample below:

```
<Property label="physicalRelation"  
value="MK28-07437T=MK28-07412N;MK28-07436P=MK28-07412N" />
```

Registered Surveyors are required to supply the “child lots-physical parent lots” information when submitting requests for:

- (a) Activation of the caveat child lots to live lots (where applicable); or
- (b) Approval of RT Plans (where applicable); or
- (c) Approval of CP / CPST.

The information is to be supplied at whichever request is submitted first and also send a copy of the letter to your clients (i.e. developers / landowners) for them to forward it to their solicitors.

For more details, see CS Circular No. 1/2011 and CS Circular No. 3/2011.

2.14 Need for Coordinates Verification for Refinement Purposes

Arising from the inherent non-homogeneous cadastral boundaries network in the past, there is a need to improve on the integrity of the coordinate cadastre system.

Differences between converted coordinates and found marks coordinates or the existing ground details e.g. drain, fences etc may result in 'false' encroachments which may require reconciliation of the lots.

To address this, Land Survey Division requires the coordinates to be verified on ground as part and parcel of the refinement process. to facilitate this, please note the following:

Registered surveyors (RS) are required to verify coordinates before carrying out cadastral and non-cadastral surveys;

Examples of non-cadastral are topographical, pilings, setting out for sewers, roads and boundary walls for new developments;

RSs are advised to obtain the information (e.g. Cassini CPs, status of lot/lots) from Land Survey Division before embarking on their survey;

RSs to pick up sufficient Cassini ground marks connected to at least 4 good ISN marks and submit the landXML file and detail sketches (if applicable) through CSMS RS Portal to Land Survey Division to facilitate refinement where necessary.

RSs who encounter any encroachments in the course of conducting the surveys are to refer to Land Survey Division with the relevant documents e.g. field details, sketches before proceeding with resolution action.

3. SURVEY OF LAND LOTS

All cadastral surveys conducted shall conform to these survey procedures, format and standards.

3.1 Plane coordinate system (SVY21 plane coordinate system)

(a) Projection

The plane coordinate system is based on the Transverse Mercator projection from geographical coordinates referenced to the WGS84 ellipsoid.

(b) Origin of projection

The origin of projection is an unmarked point having the following geographical coordinates referenced to the WGS84 ellipsoid.

Longitude	103° 50' 00"
Latitude	1° 22' 00"
False Origin (Easting)	28001.642 m
False Origin (Northing)	38744.572 m
Scale Factor at Central Meridian	1.00000000

3.2 Survey datum

(a) Reference spheroid

The reference spheroid is the WGS84 ellipsoid with the following definition:

Semi-major axis	6378137.0000 m
Semi-minor axis	6356752.3142 m
Flattening	1/298.257223563
Eccentricity	0.0818191908426

(b) SVY 21 datum

"SVY 21" is a geodetic coordinate datum based on the WGS84 ellipsoid and a reference point known as BASE7 (located at Pillar 7 Pierce Reservoir) with values fixed at:

Longitude	103° 49' 31.975227"	
Latitude	1° 22' 02.915414"	
Easting	27135.303 m	
Northing	38834.121 m	
Ellipsoidal height	26.824 m	
Reduced level (PLD)	17.113 m	
Geoidal Undulation	9.711 m	
Projection	Transverse Mercator	
Projection Origin (Unmarked point)	Longitude	103° 50' 00"
	Latitude	1° 22' 00"
False Coordinates of Projection Origin	Easting	28001.642mE
	Northing	38744.572mN

3.3 Survey control monuments

(a) Existing survey control network

- i. A network of 70 primary control points were surveyed and adjusted in the SVY21 datum. These control points are mainly on rooftops and other less accessible areas. Secondary control markers are emplaced at ground levels along major roads and are maintained by the Land Survey Division, SLA. The secondary control markers form a dense network of ground controls for routine surveys.
- ii. Registered surveyor shall check on the availability of control markers in the intended survey area.

(b) Establishment of ISN marker

In the event that there are insufficient ISN markers within the surveyed area, registered surveyors should install and survey the new markers using static DGPS technique as described in "Guidelines and Specifications for GPS Surveys of ISN Markers".

3.4 Traverse

(a) Conduct of traverse

Every cadastral survey shall comprise a closed loop traverse. The traverse shall commence using an arbitrary azimuth from a control point and terminate at the same point and the same reference azimuth. The length for each traverse line shall be at least 30m.

The on-line marks in traverses are permitted in traverse loop. However, on-line marks may be of less than 30m in length when conditions are not suitable for them to be more than 30m apart.

On-line marks are to be taken in for adjustment. Where on-line marks are not on-line after adjustment, the computed bearing of the long traverse line (>30 m) is to be adopted as back bearing. E.g . For stn 1-3-4-2. Stn 3 and 4 are on-line with stn 1-2. If stn 4-1 is taken as back bearing, then the computed bearing of stn 4-1 shall be adopted. Line 4-2 could then be taken as bearing for angle check even though it is a shorter line. The computed bearing usage is only permitted for on-line mark stations.

(b) Connection to ISN markers

- i. The traverse circuit shall be connected to at least 4 good ISN markers.
- ii. The subject lot under survey shall preferably be wholly enclosed by the ISN markers. In situations where this condition cannot be met, the subject lot shall, as far as practicable, be intersected by at least one line formed by the ISN markers. One-sided connection to ISN markers should be avoided, unless ground conditions do not permit such connections, e.g. foreshore lots. (see Figure 3-1)
- iii. Registered surveyor shall be required to establish new ISN markers if he is unable to meet the required 4 ISN markers. He shall process and submit the necessary documents as described in "Guidelines and Specifications for GPS Surveys of ISN Markers" to Land Survey Division for acceptance before submitting the cadastral job to Land Survey Division.

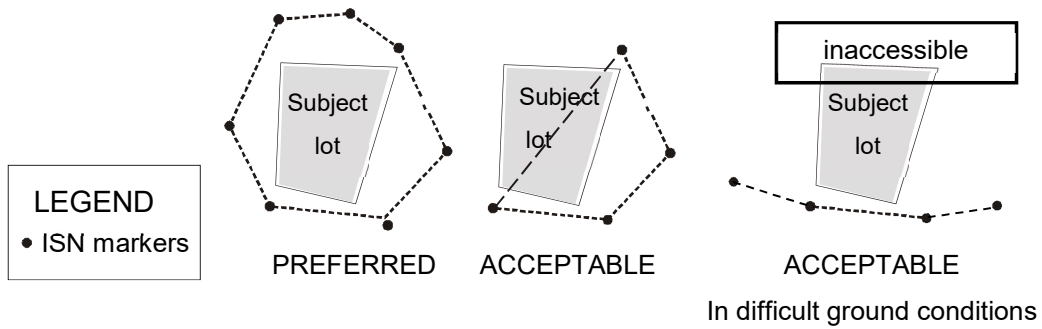


Figure 3-1

(c) Length of traverse

The length of every traverse loop must not exceed 2500 metres. For large projects, several traverse loops may be executed, each being connected to at least 4 ISN markers. (Figure 3-2)

Alternatively, tie-lines and/or sub-traverse loops of length less than 2500 metres may be surveyed to provide better controls. (Figure 3-3)

In the event that there are missing ISN marks around the lot under survey, traverse loops, each of which should be less than 2500 metres in length, can be run to connect to 4 ISN marks. (Figure 3-4)

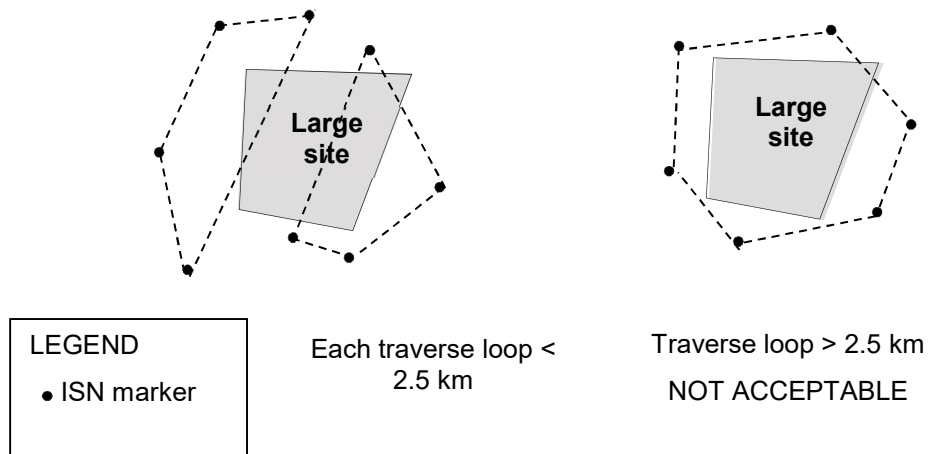


Figure 3-2

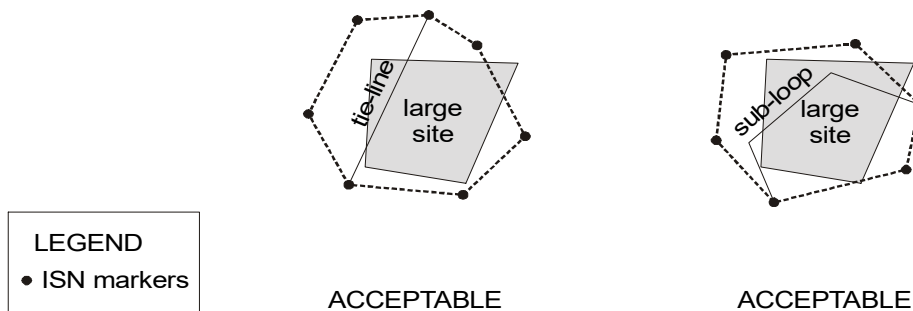


Figure 3-3

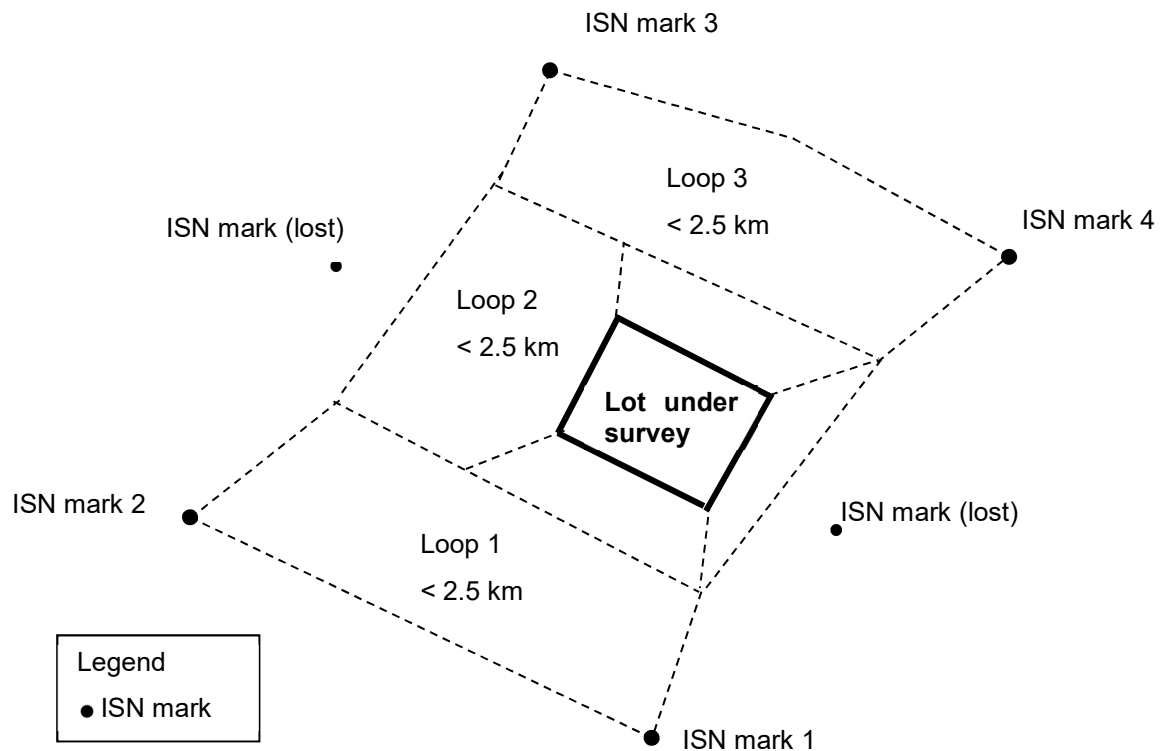


Figure 3-4

(d) Traverse adjustment

- i. The circuit, including sub-traverses, shall be adjusted simultaneously by a least-squares traverse method. The precision for angular and distance measurements specified by the manufacturer shall be used as weights in the adjustment (subject to calibration requirements).
- ii. The traverse station coordinates shall be transformed to the SVY21 plane coordinate system using a 4-parameter similarity least squares adjustment.
- iii. The survey results shall be adopted only if all the resultant residuals of the common points in a least-squares adjustment used to transform the survey coordinates to the ISN coordinates do not exceed 0.020m. It is also required that the adjustment passed the Chi-square test i.e. should not exceed the upper bound of the statistical test.
- iv. The adjusted coordinates shall be adopted for use in demarcation and re-fixation of boundary points, subject to the accuracy specifications being acceptable.

3.5 Side shots

(a) **ISN markers**

- i. Check

Side shots to the ISN markers shall have an independent check with another side shot from a different station on the traverse. The length of the side shot shall not exceed 50m. No double-checked radiations shall be allowed (Figure 3-5).

ii. **Numbering**

Side shot check stations shall be numbered with consecutive numbers from the previous station.

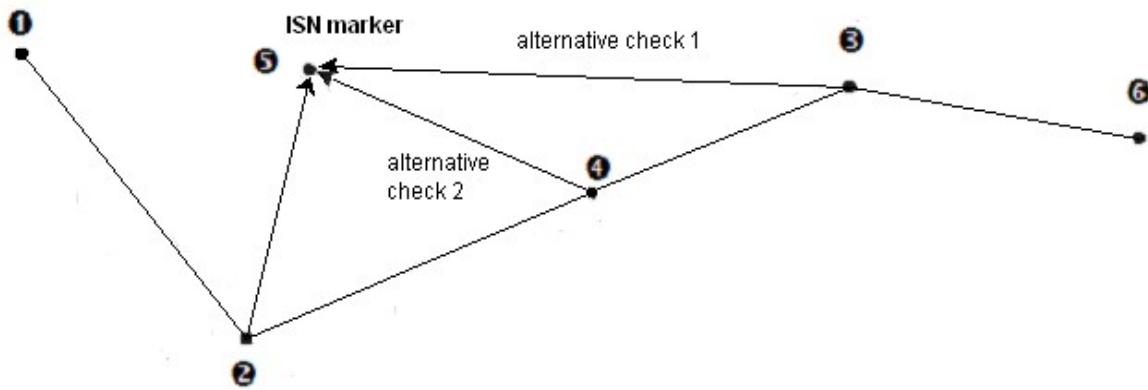


Figure 3-5

(b) **Found Marks**

Side shots to found marks do not need an independent check. For observation to found mark of subject or R/S lot, the distance shall not exceed 50m.

(c) **Demarcation of boundaries and exact fixation of wall, occupational details.**

i. **Maximum length of side shot**

Every independent vector (side shot) shall not exceed 50m in length and shall have an independent check.

ii. **Checks and numbering**

The check shall be done with a repeated measurement using a different reference point. Side shot check stations shall be numbered with consecutive numbers from the previous station. (Figure 3-6).

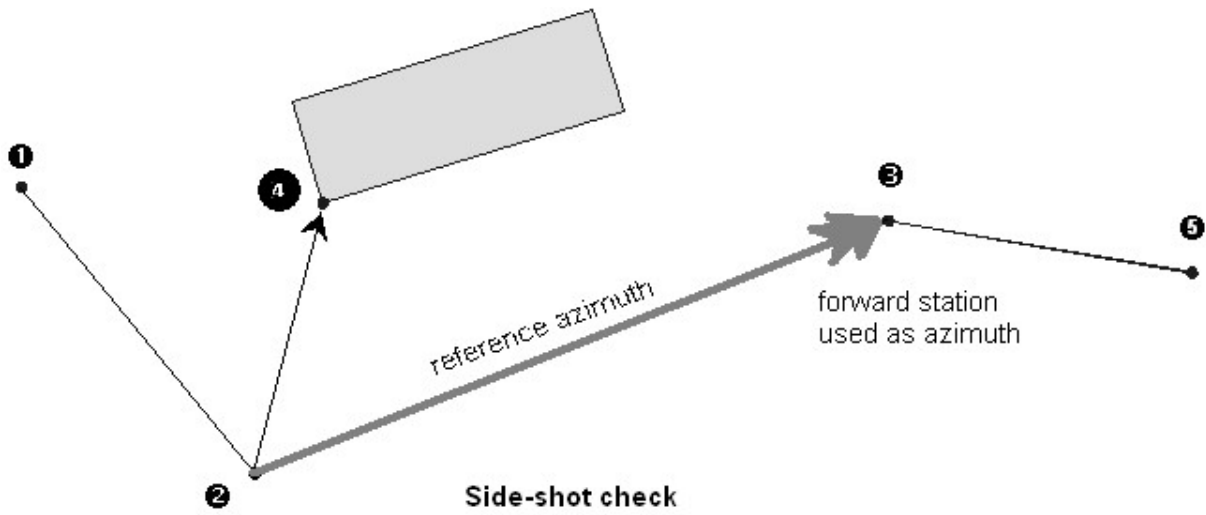
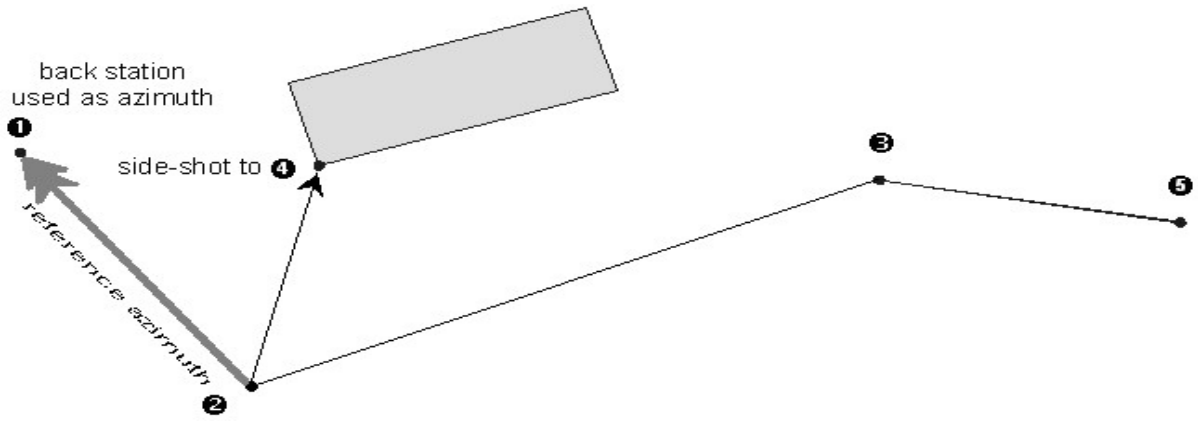


Figure 3-6

iii Extended Side Shot

Where site conditions obstruct line of sight to targets, an extended side-shot is permitted. The side-shot station shall conform to the procedure for side-shots except that the length of station 4-5 shall be at least 30m .

The extended side-shot shall be numbered with an increment of one from the previous station number. The length of the extended side-shot(stn 5-7) shall not exceed 50m. The extended side-shot shall be checked using a reference bearing of 00° 00' 00".(Figure 3-7).

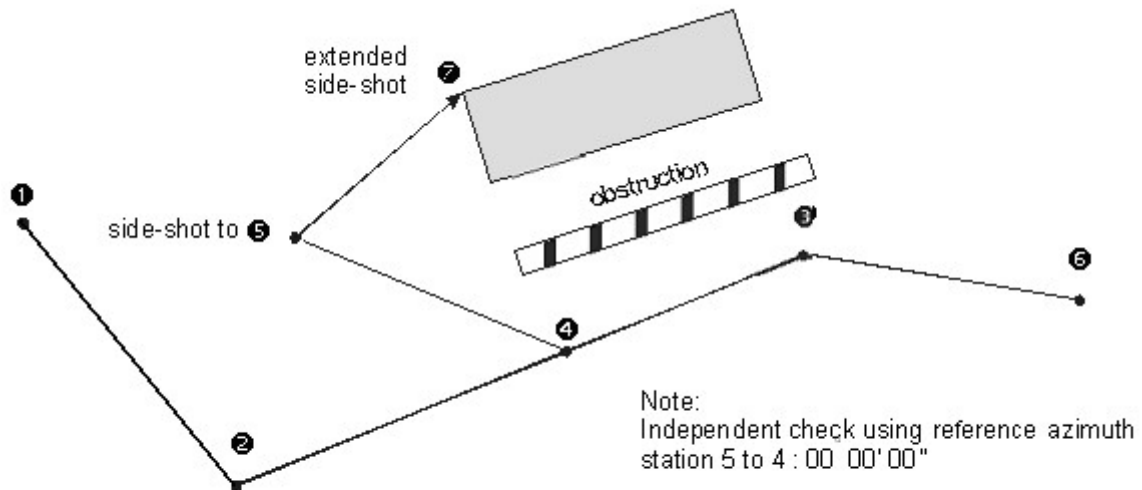


Figure 3-7

(d) **Survey to permanent fixtures**

Field sketches showing permanent features within 0.5 metres of boundaries shall be neatly drawn in accordance with the Rules.

3.6 Area

(a) **Area computation**

Areas shall be computed using any appropriate mathematical formula from the coordinates of the lot, provided the computed area shall not differ by more than one hundredth of a square metre when compared to the area computed by another alternative method. Coordinates correct to 3 places of decimal are to be used.

(b) **Areas after subdivision**

If a lot is subdivided into several lots, the area of each child lot shall be adopted in accordance with the computed new area.

(c) **Areas after lot surveyed under revision**

If a modern lot is surveyed under revision, the p.o. area is maintained. When a resurvey or sub-standard lot is modernised, adopt new computed area.

For surrender and reissue of title or alienation of full State Land lot, new computed area to be adopted.

(d) **Computation of lot area**

For lot with island lots within it, the area of the lot should be its computed area less the computed island lots' areas.

3.7 Accuracy specifications

- (a) the precision of every measured vector shall be such that the standard deviations of its length and direction do not exceed $5 \text{ mm} \pm 5 \text{ ppm}$ and ± 5 seconds respectively.
- (b) Error ellipse
 - (i) Wherever applicable, the position of every ISN marker adopted in the survey shall have an error ellipse with its semi-major axis not exceeding 0.020 metres.
 - (ii) Every point position shall be determined on the ground from any of the adjusted control points to within 0.030 metres.
- (c) Traverse angular misclose

The angular misclose must not exceed $10\sqrt{n}$ seconds where n is the number of traverse stations occupied.
- (d) Traverse fractional linear misclose

The fractional linear misclose of traverses shall be better than 1:20000 for main loop and sub-loops.

3.8 Boundary discrepancies

If there are differences between the dimensions of boundaries on the ground and those on the survey documents beyond stipulated tolerances, the registered surveyor shall take appropriate measures to determine whether the differences are due to encroachments, to movements of marks or to defects in the previous survey.

3.9 Survey of Resurvey lot

Resurvey lot is a lot which has not undergone a modern survey.

Registered Surveyor shall survey according to occupational details and the boundary lines and area of the lot are to follow closely to the boundaries and area depicted in the previous survey plan e.g. block sheet.

The proposed boundary lines and area of the lot in relation to the occupational details are to be forwarded to Chief Surveyor for approval before finalising the survey.

3.10 Survey of reclaimed land and foreshore lease

When the reclaimed land project has been completed, Registered Surveyor will carry out the cadastral survey of the reclaimed land. For cases involving High Water Mark (HWM), the levelling will adopt the nearest PLBM (Precise Level Benchmark) and close to another PLBM or witness marks.

The permissible closing error of the levelling for such purpose shall not exceed $\pm 15\sqrt{K}$ mm where K is the length of the level line in km. Registered surveyor may submit the levelling booking with the total distance of the level line as sketches or incorporate in the LandXML. For the LandXML, registered surveyor is to provide the level details and "totalDistance" of the level line.

Salient points of the HWM shall be surveyed and/or demarcated with authorised marks. The HWM shall be 0.96m above the Singapore Height Datum (SHD).

For foreshore lease structure e.g. jetty, the structure shall be surveyed and demarcated at salient points.

3.11 Survey of Subterranean and Airspace lot

The survey shall be carried out after the construction of the structures. All floors/stratums are to be surveyed. The details of the structures are to be surveyed and shown on the sketches.

In the case of subterranean lot, the boundaries of the lot are to include the thickness of walls. In the sketches, the thickness of walls are to be shown and a note stating the building or structural plan that the thickness of wall is adopted from is to be inserted in the sketches.

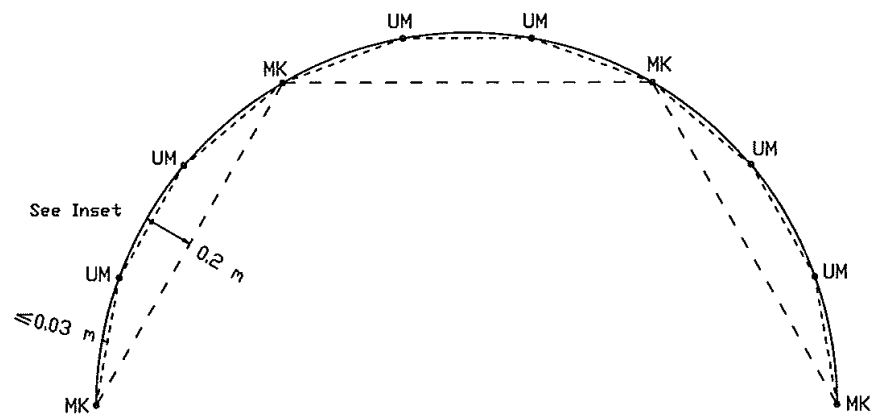
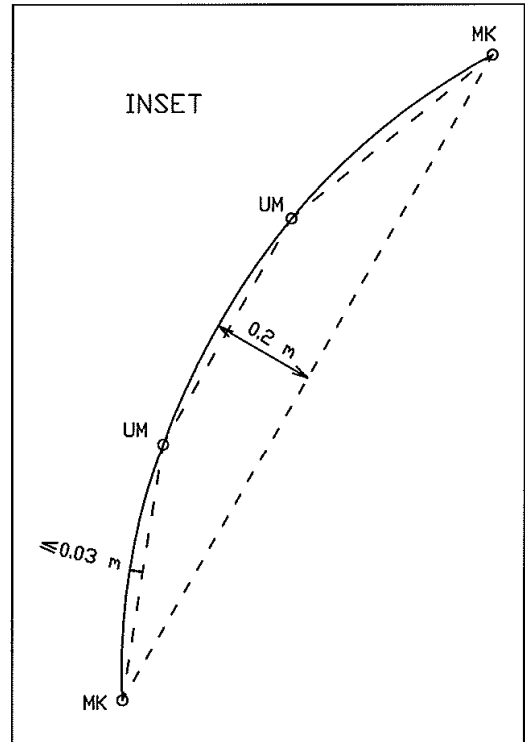
The determination of the reduced levels for each floor/stratum for both airspace and subterranean shall be based on nearby bench marks established by Chief Surveyor or other bench marks approved for use by the Chief Surveyor. The permissible closing error of the levelling for such purpose shall not exceed $\pm 15\sqrt{K}$ mm where K is the length of the level line in km. The requirement on submission of the levelling information is at section 3.10 above.

Where reduced levels for the lot could not be determined by levelling, other means can be utilized to determine the reduced levels subject to approval of the Chief Surveyor.

The lot information for each stratum is to be set-up in the LandXML. The outer most boundary line of the lot is also required to be set-up in the LandXML.

3.12 New Curve Boundary (Not applicable to P.O. Boundary)

New curve boundaries shall be marked by straight lines on ground such that no point on the curve shall be more than 20 cm from such straight lines. These points are to be demarcated on ground. More boundary points may be created between them to avoid encroachments. These additional points need not be demarcated on ground. They can be treated as unmarked(UM). See example on next page.



Note:

UM-Not Marked point

4. PLAN & FILE SUBMISSION

4.1 Plan scales

4.1.1 Built-up areas

Plans shall be drawn at scale of 1:100, 1:200 or 1:500.

4.1.2 For other surveys

Plans shall be drawn at scale of 1:1000, 1:2000, 1:5000 or 1:10000.

4.2 Drawing specifications

The following shall be adhered to when drafting plans:

4.2.1 Text specifications

Description of text	Height
Lot number	2.5 mm to 3.0 mm
Area	2.0 to 2.5 mm
Coordinates	2.0 mm
Mark description	1.8 mm
Road name and house number	3.0 mm
Extreme Grid lines and values (for RT plan only)	2.5 mm
Text in Schedule / History box (other than MK/TS and CP number, coordinates of origin)	2.5 mm
North point	4.0 mm
CP number in History box	12.0 mm

4.2.2 Line symbols

Description	Thickness
Mukim and Town Subdivision boundary	0.30 mm
Boundary	0.25 mm
Schedule / History box	0.25 mm

4.2.3 Symbols

Description	Size
Size of symbol mark	1.1 mm diameter

4.3 Information to be shown on plan

4.3.1 Plan headings

The heading of each certified plan shall include -

- i. the certified plan number allotted by the Chief Surveyor to that plan; and
- ii. the scale, in the form of a representative fraction.

4.3.2 Plan serial numbers

Every certified plan shall show a serial number which has been allotted by the Chief Surveyor. This number shall be shown towards the bottom of the plan.

4.3.3 Numerical information on plan

The numerical data essential on certified plans shall be clearly presented and shall include :

- i. Station numbers;
- ii. Coordinates of boundaries which can be tabulated or be placed alongside the boundaries on plan body;
- iii. the area of each lot under survey be shown beneath the lot number or, for clarity, be tabulated with the lot number;
- iv. the adjacent lot numbers;
- v. the lot numbers of lots under survey shall be significantly shown near the centre of the respective lots to which they refer;
- vi. occupational details need not be shown on Certified Plan; and
any other information, numerical or otherwise, that may be of relevance in locating boundaries or survey marks.

4.4 Other information

4.4.1 Other information on Certified Plan

The following information and references shall be shown on certified plans:

- (a) the North Point;
- (b) the name of the registered surveyor who conducted the survey and the date of the survey;
- (c) the Mukim and Town Subdivision boundaries;
- (d) the words: "All co-ordinates shown are based on SVY21 datum";
- (e) the survey marks by means of conventional signs and abbreviations;
- (f) the street names and house numbers;
- (g) Approved Plan, authorised plan or Requisition for Survey (R/S) Plan reference number, where applicable;
- (h) the file reference number of the Chief Surveyor;
- (i) the sketch number and pages; and

- (j) Bar scale for drawing with scale including amalgamation diagram. For sample see Appendix M.

4.4.2 Plan schedule

Every certified plan shall contain a schedule showing the following information: the original lot number and the number of the previous certified plan and, in the case of a subdivision and amalgamation, the new lot numbers shall also be shown.

4.4.3 Name on plans

Every certified plan shall bear the date of survey, the name of the registered surveyor in the certification and the date of certification. Sample of certified plan is in Appendix E.

4.4.4 Certification of survey documents

Certification on survey documents shall follow the certification as specified in section 38 of Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules 2005. In E-submission environment, the word " Digitally signed" is inserted. For more details, refer to the Boundaries and Survey Maps (Electronic Transmission) Rules.

4.5 File naming convention

The digital file shall be in ASCII format and shall be as follows:

<RS short name>-<SVYFilename>-<Plan number>.<ext>

e.g. SKP-SVY0123-2017-CP89000.xml

4.6 Cadastral Information File

The file shall follow the SG LandXML mapping and structure published in SLA website. For full details of the LandXML elements, please refer to the SG LandXML mapping and structure.

A LandXML file for use will contain the LandXML elements that are shown in the diagrams below in the order they appear in the LandXML schema. For certain submissions, other elements or properties may be required. Therefore the examples below may not be the full listing.

Figure 1 SG LandXML Elements Used

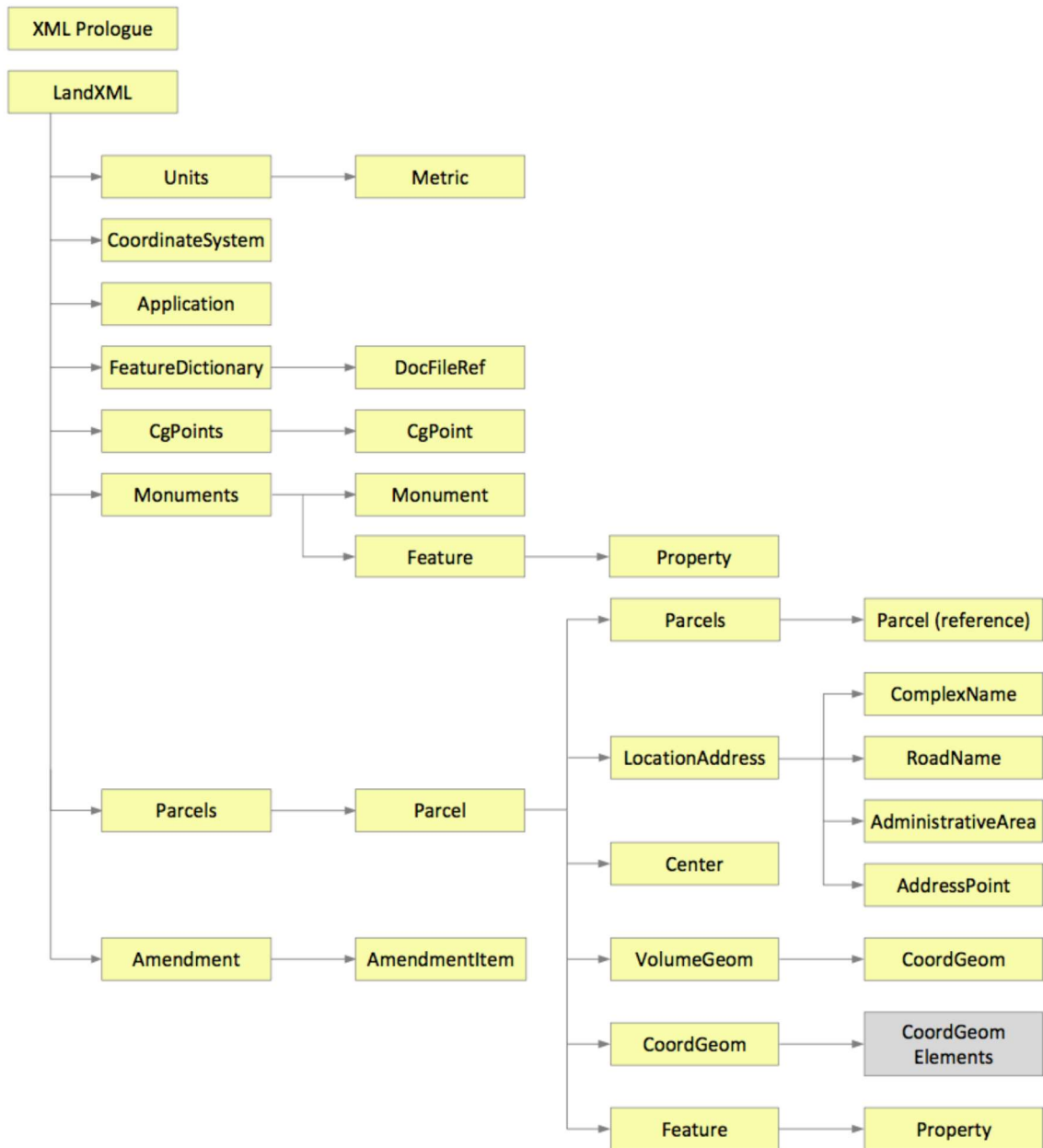


Figure 2 SG LandXML Elements Used (Continued)

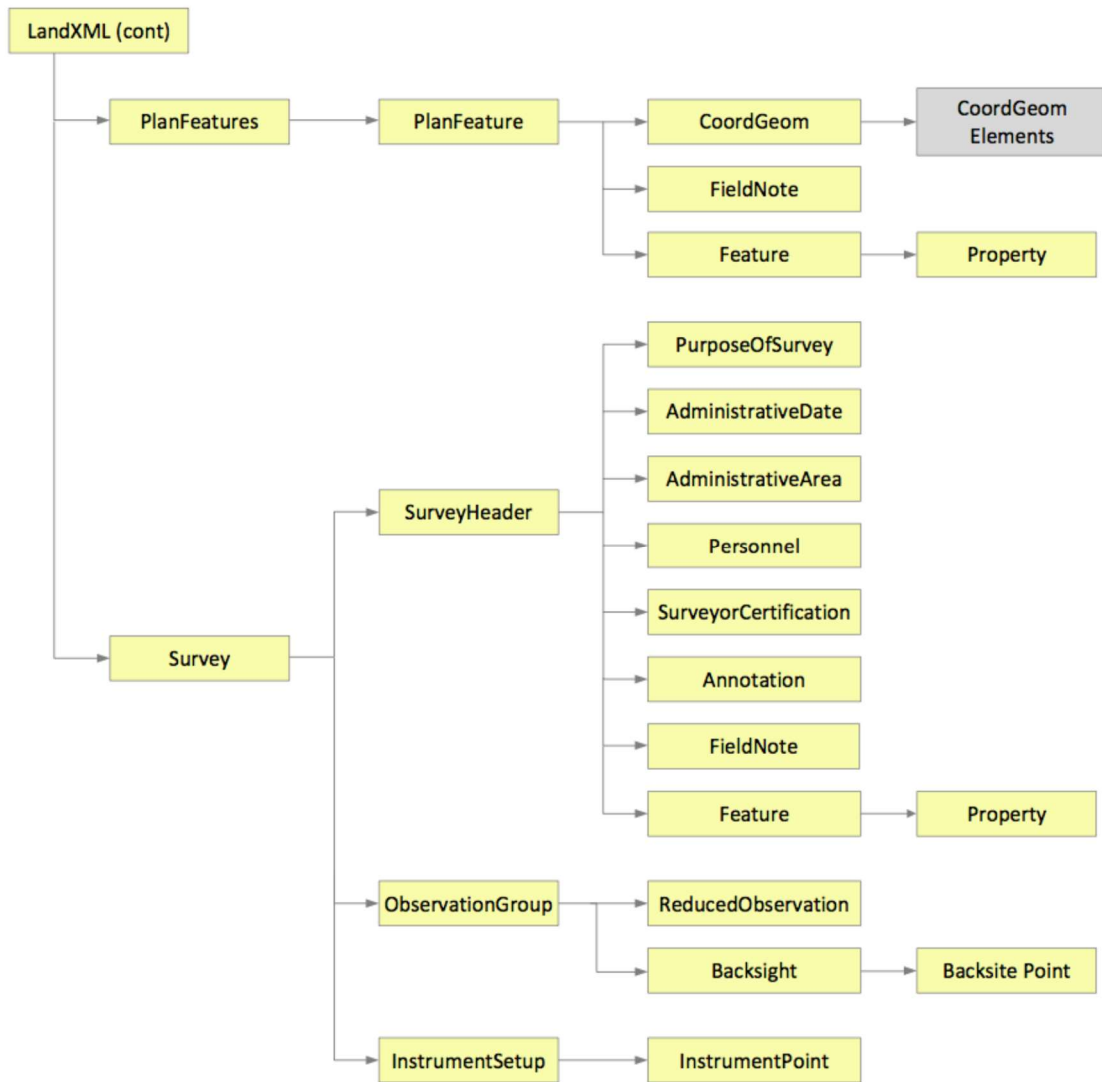
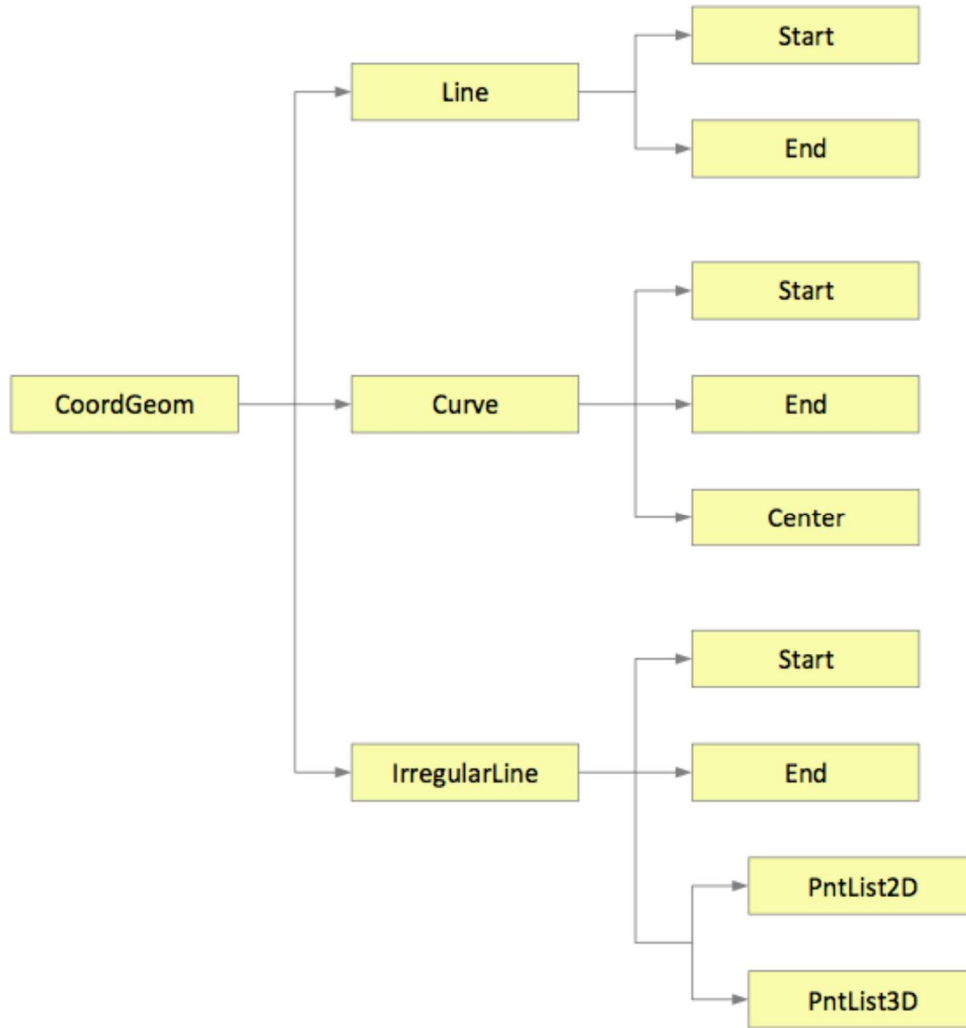


Figure 3 LandXML CoordGeom Elements



The Cadastral Information File should consist of the following besides other standard items:

(a) Station Information

CgPoint- CgPoint may represent boundary points, traverse points, reference marks, permanent survey marks and various administrative points. Elements link to CgPoints to attach survey information.

Example

```

<CgPoints>
  <CgPoint name="3" desc="final" code="L01" pntSurv="traverse">
    29568.716 30286.225
  </CgPoint>
  ...
  <CgPoint name="24" desc="final" code="L01" pntSurv="control">
    29568.716 30286.225 101.5
  </CgPoint>
</CgPoints>
  
```

CgPoint name is the station number.

desc	approvalStateType	The SLA class related to official status of the point.	allocation activation RT final dead	allocation activation Registration of Title final dead – historic.
------	-------------------	--	---	--

code	methodType	A combined methods categorisation. L – land H – high water mark F – foreshore S – strata V – void A – accessory 01 – surveyed, and demarcated under SVY21 datum. 02 – refined, points that are refined but not surveyed and demarcated under SVY21 datum. 03 – unknown, unrefined and surveyed under Cassini datum.	L01 L02 L03 H01 H02 H03 F01 F02 F03 S01 S02 S03 V01 V02 V03 A01 A02 A03	
------	------------	--	--	--

pntSurv	survPntType	The function the point serves in the survey.	traverse reference administrative control boundary monument (NA) sideshot (NA) natural boundary (NA)
---------	-------------	--	---

Coordinate values are a coordinate pair of the Northing followed by Easting.

Monument - The Monument element holds information on Survey Marks placed or referenced in the SLA surveys. A Monument is always linked to a CgPoint using the pntRef attribute, which is the station number. The CgPoint defines the survey mark's position and identification. Multiple Monuments can be linked to the same CgPoint.

A Monument may reference Feature elements under the Monuments element to encode complex situations, like vertical control witness marks. Other than that featureRef is not required.

Example

```
<Monuments>
  <Monument name="27" pntRef="33" featureRef="2"
            type="NL" state="found">
  </Monument>
</Monuments>
```

Monument name is to hold ISN number, unique number otherwise. Prefix of "SM" for horizontal control, and "VCP" for vertical control.

type	monumentType	This is a survey mark	CM SP NL SM MK PP OT UM TM BT	Concrete Marker Spike Nail ISN Marker Cut Mark Pipe Others Not Marked Temp mark, peg Bolt
state	monumentState	state of physical monument	unmarked found refixed new compiled	no mark P.O. marks original lost, replaced new mark placed from records

(b) Lot Information

Parcels - The Parcels element is a container for individual Parcel elements. Parcels containers can be nested within Parcel elements to capture parcel relationships.

Parcel - The Parcel element provides a basic unit to describe a spatial area. A Parcel element can contain a nested Parcels element that has Parcel child elements. This is how we will reference the internal (island) lots. There are fewer required attributes for these "sub" parcels, generally only requiring a name and pclRef.

Coordinate geometry(CoordGeom) used to define the lines that form each parcel are stipulated to be written in a counter-clockwise sequence in SG LandXML. For island lot set up, the sequence will be clockwise.

Parcel may have many Feature/Property sets.

Example

```
<Parcels>
  <Parcel
    name="TS30-00385M"
    desc="CP1234, CP2345"
    area="1245.8"
    class="final"
    parcelType ="land"
    parcelFormat="Standard">
    <CoordGeom>
      ...
    </CoordGeom>
  </Parcel>
  <Parcel/>
</Parcels>
```

```
<Line>
  <Start name="62" pntRef="62"/>
  <End pntRef="77"></End>
</Line>
<Line>
  <Start name="77" pntRef="77"/>
  <End pntRef="57"></End>
</Line>
...
```

If the parcel is a vacant lot, useOfParcel="vacant" is inserted in the parcel element.

In the case of airspace and subterranean lots with multiple levels, the part lot concept is to be used. Elevations are required to be submitted.

Example

```
<Parcel name="MK05-70002K-PT1" area="2000.0" ...>
  ...
  <Feature name="PartLot">
    <Property label="TotalArea" value="3000.0"/>
  </Feature>
</Parcel>
<Parcel name="MK05-70002K-PT2" area="1000.0" ...>
  ...
</Parcel>
<Parcel name="MK05-70002K-GE" area="2445.6" ...>
  ...
</Parcel>
```

Parcel name is Lot number. For allocation, lot names can follow a different pattern (Plot<alphanumeric>).

Parcel desc are the plans that show the parcel.

Parcel area is the legal area.

parcelFormat	parcelFormat	format of geometry description	standard surface multisurface extruded volume	2D land or 2D strata surface in 3D patches in 3D 2D with lower and upper elevations 3D Volume
parcelType	parcelTypeType	parcel type	land airspace subterranean empty strata accessory stateReserve foreshore reclaimed strataProvisional surveyDistrict building level common typicalStorey virtual voidSpace voidArea	standard land lot above ground 3D below ground 3D void within building related to strata restriction abutting coast land reclaimed from sea or other water bodies proposed strata lot survey district a building a building level common use areas typical storey virtual parcel referenced by a typical storey strata void space strata void area
class	parcelClass	state or role in the survey	parent interim final reference provisional other	parent of final lots temporary lot submitted new lot lot not in lineage or physical parent, but necessary for analysis Approved provisional lot to be used for analysis. Not a lot

Lots with Island lots

Example

```
<Parcel name="MK04-07254M" desc="CP87673" area="28292.3" class="final" parcelFormat="standard" parcelType="land">
  <CoordGeom>
  <Parcels>
    <Parcel name="MK04-03646V-island" pclRef="MK04-03646V"/>
    <Parcel name="MK04-03653K-island" pclRef="MK04-03653K"/>
  </Parcels>
</Parcel>
```

LocationAddress – It requires use of the child elements ComplexName, RoadName, and additional Property elements for the postal code and the sources of the building name and address.

Example

```
<Parcel ...="">
  <LocationAddress
    flatNumber="02"
    floorLevelNumber="05"
    numberFirst="35">
    <ComplexName desc="Wedge Mount Industrial Building"/>
    <RoadName roadName="Jalan Pemimpin"/>
    <AddressPoint pntRef="no" featureRef="addRef1"/>
  </LocationAddress>
  <Feature name="addRef1">
    <Property label="addressSource" value="IRAS"/>
    <Property label="buildingSource" value="URA"/>
    <Property label="postalcode" value="577176"/>
  </Feature>
  ...
</Parcel>
```

Balance Lot (Where applicable)

Example

```
<Feature name="Balance">
  <Property label="isBalanceLot" value="Y"/>
</Feature>
```

Old Lot Format Numbers (Where applicable)

Example

```
<Feature name="OldFormat">
  <Property label="oldFormatLotNumber" value="MK01-92334"/>
</Feature>
```

Survey Type

Example

```
<Feature name="SurveyType">
  <Property label="code" value="resurvey"/>
</Feature>
```

PlanFeatures - It is used for occupations, encroachments and where required, additional miscellaneous cartographic elements.

Examples

```
<PlanFeatures name="Occupations">
  <PlanFeature name="building1">
    <CoordGeom>
      <IrregularLine>
        <Start>32888.415 21005.778</Start>
        <End>32888.415 21005.778</End>
        <PntList2D>32888.415 21005.778 32888.415 21005.778 32888.415 21005.778 32887.816 21000.815 32887.816 21000.815 32889.152 21000.646 32889.152 21000.646
32888.087 20991.293 32888.087 20991.293 32857.658 20994.710 32857.658 20994.710 32858.961 21006.194 32858.961 21006.194 32871.393 21004.773 32871.393
21004.773 32871.173 21002.727 32871.173 21002.727 32878.378 21001.915 32878.378 21001.915 32878.869 21006.837 32878.869 21006.837 32888.415 21005.778
        </PntList2D>
      </IrregularLine>
    </CoordGeom>
    <Feature name="occProps">
      <Property label="Code" value="building"></Property>
      <Property label="Geometry" value="Polygon"></Property>
      <Property label="pclRef" value="MK05-09324K"></Property>
    </Feature>
  </PlanFeature>
</PlanFeatures>
```

```
<PlanFeatures name="Encroachments">
  <PlanFeature name="E1"
    desc="Part of fence encroaching onto lot MK10-123456M">
    <CoordGeom>
      <IrregularLine>
        <Start>38244.076 30474.841</Start>
        <End>38243.939 30475.207</End>
        <PntList2D>
          38244.076 30474.841
          38246.938 30476.324
          38246.938 30476.324
          38244.076 30474.841
        </PntList2D>
      </IrregularLine>
    </CoordGeom>
    <Feature name="encProps">
      <Property label="code" value="fence" />
      <Property label="geometry" value="polygon" />
      <Property label="pclRef" value="MK18-40001B" />
      <Property label="occRef" value="Fence1" />
      <Property label="area" value="3.4" />
    </Feature>
  </PlanFeature>
</PlanFeatures>
```

(c) Survey Information

SurveyHeader- The SurveyHeader element contains administrative information about the survey.

Example

```
<LandXML>
  <Survey>
    <SurveyHeader
      name="3786-2010"
      jurisdiction="Singapore"
      surveyorFirm="SOON PANG KIM REGISTERED SURVEYOR"
      surveyorReference="SPK1-2010"
      <PurposeOfSurvey name="CPLNDAPP" />
      <AdministrativeDate
        adminDateType="Commenced"
        adminDate="2010-12-18" />
      <AdministrativeDate
        adminDateType="Completed"
        adminDate="2010-12-21" />
      <Personnel role="Surveyor"
        name="SOON PANG KIM " />
      <Personnel role=" Authorised Assistant "
        name="CHIA SOH KING" />
    </SurveyHeader>
    <ObservationGroup/>
    <InstrumentSetup/>
  </Survey>
</LandXML>
```

SurveyHeader - The SurveyHeader name is the SVY file name.

PurposeOf Survey element describes the purpose of the survey. Refer to Appendix B in the SG LandXML mapping and structure for the list of purpose of survey.

The AdministrativeArea element contains the administrative areas relevant to this survey. Each entry can link to a parcel element that defines the boundaries of the administrative area. It is used for alteration of survey district boundaries and for allocation of lot under allotted lot.

Example

```
<LandXML>
  <Survey>
    <SurveyHeader>
      <AdministrativeArea
        adminAreaType="MK"
        adminAreaCode="4"
        adminAreaName="Tanglin"
        pclRef="MK4" />
      </SurveyHeader>
    <ObservationGroup/>
    <InstrumentSetup/>
  </Survey>
</LandXML>
```

Annotation - Annotation is a descriptive string use to describe an action on survey. This element can be used for a number of purposes: cartographic annotation on plans, specific legal text for certain parcel types, or for storing a list of plans used or referenced by a survey

Example

@type="AbuttalLine"

```
<Annotation type="AbuttalLine" name="" desc="33629.100 34631.591 33627.194 34621.774"/>
```

@type="AbuttalLot"

```
<Annotation type="AbuttalLot" name="MK23-06354T" desc="33716.567 34627.785"/>
```

@type="AmendmentNote"

```
<Annotation type="AmendmentNote" name="Note: Boundaries, coordinates and lot schedule of lots MK24-10896C, MK12-10854V amended by me on 19.04.2017" desc="33669.317 34618.715 33716.567 34627.785"/>
```

@type="Disclaimer"

```
<Annotation name="Line 1" type="Disclaimer" desc="Coordinates provided by the Chief Surveyor must be verified on site by a Registered Surveyor before adoption for use." />  
<Annotation name="Line 2" type="Disclaimer" desc="If the verification results are technically inadequate, please refer to CS's office." />
```

@type="HouseNumber"

```
<Annotation type="HouseNumber" name="55" desc="32869.664 21089.915" />
```

@type="HWMNote"

```
<Annotation type="HWMNote" name="H.W.M." desc="33669.317 34618.715 33716.567 34627.785"/>
```

@type="OccupationNote"

```
<Annotation type="OccupationNote" name="No details along boundary line" desc="33669.317 34618.715 33716.567 34627.785"/>
```

@type="ParcelNote"

```
<Annotation type="ParcelNote" name="n1" desc="Allocated For Reclaimed Land" pclRef="MK07-04606X"/>
```

@type="PlanNote"

```
<Annotation type="PlanNote" name="1. The common property extends to those parts indicated on the plans annexed hereto." desc="33629.100 34631.591 33627.194 34621.774"/>
```

@type="RoadLabel"

```
<Annotation type="RoadLabel" name="TUAS SOUTH BOULEVARD" desc="26292.012_3635.034 26733.526 3635.505"/>
```

SurveyorCertificate - The text contained in textCertificate should conform to the certification of the respective plan depicted in the Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules.

surveyDate – the date will appear on the generated plans. It is the same as “completed” AdministrativeDate.

Example

```
<SurveyorCertificate name="Cert1" certificateType="CP" textCertificate="I, Thomas Law Ah Weng, a surveyor registered under the Land Surveyors Act (Cap. 156), certify that this document has been prepared by me or under my immediate supervision, in accordance with the Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules 2005 (G.N. No. S 155/2005)." surveyDate="2017-09-12"/>
```

Transformation - The Transformation properties and results are grouped under a Feature @Transformation element under SurveyHeader.

Example

```
<Feature name="Transformation">
  <Feature name="Parameters">
    <Property label="a1" value="0.836544" />
    <Property label="b1" value="-0.547919" />
    <Property label="a2" value="212.398250" />
    <Property label="b2" value="-88.061250" />
  </Feature>
  <Feature name="Residuals">
    <Feature name="Residual">
      <Property label="station" value="1" />
      <Property label="northing" value="-0.001" />
      <Property label="easting" value="0.002" />
    </Feature>
    <Feature name="Residual">
      <Property label="station" value="7" />
      <Property label="northing" value="-0.001" />
      <Property label="easting" value="0.000" />
    </Feature>
    ... as many as control
  </Feature>
```

Misclose – Misclose of traverse loops.

Example

```
<Feature name="Misclosure">
  <Feature name="Misclose">
    <Property label="refName" value="Main" />
    <Property label="angularMisclose" value="-16" />
    <Property label="miscloseRatio" value="1:65787" />
  </Feature>
  <Feature name="Misclose">
    <Property label="refName" value="Sub1" />
    <Property label="angularMisclose" value="-20" />
    <Property label="miscloseRatio" value="1:44876" />
  </Feature>
```

AdjustedLines - The adjusted lines are the connecting lines between stations (correlating to the ReducedObservation) whose bearings and distances have been adjusted. They are subsumed under the CoordGeom element. The PlanFeature@name must be "AdjustedLines". Parent PlanFeatures must have name "Adjusted".

Example

```
<PlanFeatures name="Adjusted">
  <PlanFeature name=" AdjustedLines">
    <CoordGeom>
      <Line dir="200.0654" length="81.763">
        <Start pntRef="2" />
        <End pntRef="3" />
      </Line>
      <Line dir="199.3951" length="91.195">
        <Start pntRef="3" />
        <End pntRef="4" />
      </Line>
      ...
    </CoordGeom>
  </PlanFeature>
</PlanFeatures>
```

EDM - EDM calibration data are grouped under a Feature with a name of "EDM".

Example

```
<Feature name="EDM" ...
  <Feature name="Certificate">
    <Property label="certificateNumber" value="TTK0420
09"/>
    <Property label="organisation" value="owner of..." />
    <Property label="observer" value="name" />
    <Property label="date" value="YYYY-MM-DD" />
  </Feature>
</Feature>

<Feature name="Hardware">
  <Property label="tsModel" value="Nikon NPL-632"/>
  <Property label="tsSerialNumber" value="021178"/>
  <Property label="tsHtAboveBase" value=".225"/>
  <Property label="prismModel" value="Topcon"/>
  <Property label="numPrisms" value="1"/>
  <Property label="prismHtAboveBase" value=".225"/>
</Feature>

<Feature name="ResidualSeries">
  <Property label="series1"
    value="0.001, 0.000, 0.001, 0.002, 0.003, -0.002"/>
  <Property label="series2"
    value="0.001, -0.001, 0.002, 0.003, -0.001"/>
  <Property label="series3"
    value="-0.002, -0.001, 0.001, -0.004"/>
  <Property label="series4"
    value="0.000, 0.001, -0.003"/>
  <Property label="series5"
    value="0.004, -0.004"/>
  <Property label="series6"
    value="-0.001"/>
</Feature>
```

```

<Feature name="Constants">
  <Property label="addConst" value="0.001"/>
  <Property label="addConstStdDev" value="0.001"/>
  <Property label="scale" value=".225"/>
  <Property label="scaleStdDev" value="-1.1"/>
  <Property label="firstOrderCycCos" value=""/>
  <Property label="firstOrderCycSin" value=""/>
  <Property label="secondOrderCycCos" value=""/>
  <Property label="secondOrderCycSin" value=""/>
  <Property label="smdStdDev" value="-1.1"/>
</Feature>

<Feature name="Precisions">
  <Property label="direction" value="2"/>
  <Property label="a" value="3"/>
  <Property label="b" value="2"/>
  <Property label="c" value="2"/>
  <Property label="d" value="2"/>
</Feature>

```

InstrumentSetup – This element links observation setup points to a CgPoint. This is purely a structural requirement of LandXML to link observation start and end points to a physical location.

Example

```

<LandXML ...>
  <Survey ...>
    <InstrumentSetup
      id="IS-77"
      stationName="77"
      instrumentHeight="0">
      <InstrumentPoint pntRef="77" />
    </InstrumentSetup>
    <ObservationGroup .../>
    ...
  </Survey>
  ...
</LandXML>

```

ObservationGroup – It hold traverses, side-shots and observations. The stations are linked to the CgPoints by reference. The example here is for a Main Loop traverse.

```

<ObservationGroup id="Main">
  <Backsight circle="0.0000" setupID="IS-1">
    <BacksightPoint name="-1" pntRef="11"/>
  </Backsight>
  <ReducedObservation name="1" purpose="traverse" setupID="IS-1" targetSetupID="IS-2" azimuth="306.4217" horizDistance="78.102"/>
  <ReducedObservation name="2" purpose="traverse" setupID="IS-2" targetSetupID="IS-3" azimuth="301.5622" horizDistance="144.892"/>
  <ReducedObservation name="3" purpose="traverse" setupID="IS-3" targetSetupID="IS-4" azimuth="274.2929" horizDistance="118.343"/>
  <ReducedObservation name="4" purpose="traverse" setupID="IS-4" targetSetupID="IS-5" azimuth="11.2002" horizDistance="134.344"/>
  <ReducedObservation name="5" purpose="traverse" setupID="IS-5" targetSetupID="IS-6" azimuth="28.1543" horizDistance="105.709"/>
  <ReducedObservation name="6" purpose="traverse" setupID="IS-6" targetSetupID="IS-7" azimuth="111.4834" horizDistance="55.411"/>
  <ReducedObservation name="7" purpose="traverse" setupID="IS-7" targetSetupID="IS-8" azimuth="123.3842" horizDistance="186.394"/>
  <ReducedObservation name="8" purpose="traverse" setupID="IS-8" targetSetupID="IS-9" azimuth="147.1347" horizDistance="57.546"/>
  <ReducedObservation name="9" purpose="traverse" setupID="IS-9" targetSetupID="IS-10" azimuth="153.0930" horizDistance="63.212"/>
  <ReducedObservation name="10" purpose="traverse" setupID="IS-10" targetSetupID="IS-11" azimuth="215.0208" horizDistance="68.304"/>
  <ReducedObservation name="11" purpose="traverse" setupID="IS-11" targetSetupID="IS-1" azimuth="180.0021" horizDistance="72.879"/>
</ObservationGroup>

```

Id - ID value should be unique within the file. Must start with an alpha character and may not contain spaces.

The ID will be "Main", "Sub1", "Sub2", ... "Observation1" ... "SideShot1" ...

ReducedObservation element contains a reduced horizontal measurement being the bearing and distance. The measurement is related to CgPoint elements using references to InstrumentSetup elements for the setupID and targetSetupID attributes.

purpose	purposeType	enumeration of purpose in survey Note: use "normal" for SG OBS, observation or demarcation. Values not used in SG are labelled Not Applicable (NA).	normal check backsight foresight traverse sideshot resection (NA) levelLoop (NA) digitalLevel (NA) remoteElevation(NA) reciprocalObs (NA) topo (NA) cutSheets (NA)
---------	-------------	--	--

Parcel Lineage and Physical Relationship (Child lot – Physical Parent lots relationship)

Refer to SG LandXML mapping and structures for full details.

Example

```

<Feature name="Lineage">
  <Property label="lineage"
    value="MK28-07412N=MK28-07437T+MK28-07436P" />
  <Property label="physicalRelation"
    value="MK28-07437T=MK28-07412N;MK28-07436P=MK28-07412N" />
</Feature>

```

DocFileRef - The DocFileRef element is a reference to any external document file containing related information for the associated element. Associated files are referenced in DocFileRef elements contained in a Feature@name = "RefDocs" under the SurveyHeader.

Example

```
<Feature name="RefDoos">
  <DocFileRef name="Approved Plan (32A) in SLA/LPB/52.12.4-v9" fileType="ReferencePlan" location="."></DocFileRef>
</Feature>
```

Alteration of Survey District Boundary - Alteration of survey district boundary surveys can record the intended transfer as a listing in the SurveyHeader.

Example

Two parcel elements are to be added with `parcelType="surveyDistrict"`. The parcel with `class="parent"` indicates the existing Survey District line, while parcel with `class="final"` indicates the new Survey District line.



```
<Parcel parcelType="surveyDistrict" name="MK10" class="final" parcelFormat="standard">
....
</Parcel>
```

```
<Parcel parcelType="surveyDistrict" name="MK05" class="parent" parcelFormat="standard">
....
</Parcel>
```

4.7 Sketches

- (a) All field detail recordings are to be entered in the sketches (SK) pages. Traverse, demarcation and party-wall sketches are not required as these shall be captured in LandXML. All sketches and diagrams shall be drawn on A4 size with 20 mm margin (border edged in 4 point line) on all sides. Sketches should be in TIFF format, PDF or DXF format. For TIFF format, sketches shall be rasterised with resolution of 300 dpi and saved in uncompressed TIFF format. The files shall be named SK<CP number>-nnn.tif or SK<CP number>-nnn.dxf, where “nnn” are sequential numbers starting from (001). Example of detail sketches are in Appendix F-1 and F-2.
- (b) Certification

The first page of the Sketch of every survey shall bear the Registered Surveyor’s certification. No page of a Sketch should be left blank or filled with only the certification. All the pages of the Sketch should also contain the name of the Registered Surveyor, date and the text ‘digitally signed’. All sketches are to be digitally signed.

- (c) The text specifications, line and mark symbols shall follow those prescribed for the plan under item 4.2.

4.8 Encroachment

(a) Encroachment

Please refer to section 2.3.

(b) Encroachment report (when required)

An encroachment report shall consist of graphic sketches showing details and the extent of the encroachment. Sketches may not be to scale but the extent of the encroachment in relation to the boundary line must be clearly depicted and highlighted in yellow. The extent of encroachment area in sq m is to be inserted if required.

4.9 Submission

(a) Materials to be submitted

- i. Administrative documents e.g. Survey Report(in web form), Certification in relation to encroachment form(generated in RS Portal), Cadastral Information File in landXML and any other relevant documents, survey plans and sketch plans shall be submitted.

(b) Submission of jobs

All submission are to be through CSMS RS Portal. Submission via email is not allowed.

4.10 On-line boundary marks shown in survey documents

- (a) On-line boundary marks required to be shown on all survey documents (CP, SK or LandXML file) if they are shared with any adjoining lots. However if it is not (or no longer) shared with any adjoining lot, it is not required to show the on-line boundary mark.

- (b) For reference marks which are demarcated along the boundary where the boundary salient point cannot be marked due to obstruction, the requirements are as follows:

- i) For the LandXML, such points shall continue to be set-up under the Station Information with pntSurv="reference" but they are not to be set-up under the Lot Information.
- ii) The CP shall continue to show these on-line reference marks. A suffix within bracket, "(REF MK) is to be added to the description of these boundary marks. Example : SP(REF MK).

4.11 Incorporating Levelling pages as part of SK or as Levelling Details in LandXML file

Previously for cadastral survey jobs which involve levelling works e.g. survey of HWM boundaries, airspace lots and subterranean lots, it is required to submit the Level Book(LB). Instead the levelling pages are to be incorporated as part of the sketch(SK). The level details recording pages shall be numbered consecutively after the cadastral survey recording pages.

E.g: If the cadastral survey recording pages are from SK99999-001 to 034, the level details recording pages shall be numbered from SK99999-035 onwards. If additional

field work arising from query etc, the SK pages will continue from the last page number.

A sample of the level details recording page is in Appendix J.

See sample below for levelling details incorporated in the Cadastral Information File in LandXML:

Note that in the LandXML, the unit of “totalDistance” is metres.

```

<Feature name="LevellingDetails">
  <Feature name="Loop1">
    <Property label="from" value="VCP80172"/>
    <Property label="to" value="VCP80172"/>
    <Property label="misclose" value="0.002"/>
    <Property label="totalDistance" value="1300"/>
    <Feature name="VcpIntegrityCheck">
      <Feature name="VCP">
        <Property label="stn" value="VCP80172"/>
        <Property label="bs" value="1.463"/>
        <Property label="al" value="110.891"/>
      </Feature>
    <Feature name="detail">
      <Property label="stn" value="W2"/>
      <Property label="is" value="1.462"/>
      <Property label="rl" value="110.892"/>
      <Property label="al" value="110.894"/>
      <Property label="rmk" value="witness mark 2"/>
    </Feature>
    <Feature name="detail">
      <Property label="stn" value="W1"/>
      <Property label="is" value="1.492"/>
      <Property label="rl" value="110.862"/>
      <Property label="al" value="110.863"/>
      <Property label="rmk" value="witness mark 1"/>
    </Feature>
  </Feature>
  <Feature name="detail">
    <Property label="stn" value="VCP80172"/>
    <Property label="bs" value="1.538"/>
    <Property label="rl" value="110.891"/>
    <Property label="al" value="110.891"/>
  </Feature>
  <Feature name="detail">
    <Property label="stn" value="CP1"/>
    <Property label="bs" value="1.196"/>
    <Property label="is" value=""/>
    <Property label="fs" value="1.412"/>
    <Property label="rl" value="110.017"/>
    <Property label="al" value="110.017"/>
    <Property label="d" value=""/>
    <Property label="rmk" value="change point"/>
  </Feature>
</Feature>
</Feature>

```

5. STRATA SURVEY

5.1 Field survey procedures

(a) Accuracy of linear measurements

- i. Every strata lot shall be surveyed and the linear measurements of the survey rounded off to the nearest centimetre.
- ii. The total & internal length and width of the strata lot shall to be measured. The physical height shall be measured.

(b) Use of reflector-less total station

The use of reflector-less total station for strata survey is allowed. The field data collected shall be submitted on ASCII format for submission to Chief Surveyor.

The file shall be named according to the CPST number followed by an extension .job.

i.e. <CPST number>.job

(c) All field recordings are to be entered in the Field Detail(FD) pages. All FD pages shall be drawn on A4 size with 20 mm margin (border edged in 4 point line) on all sides and in TIFF format, PDF or DXF format. For TIFF format the FD pages should be rasterised with resolution of 300 dpi and saved in uncompressed TIFF format. The file shall be named <CPST number>-nnn.tif/jpeg/dxf , where 'nnn' are sequential numbers starting from (001). The first CPST No. of each job will be used as the FD No. The text specifications, line and mark symbols shall follow those prescribed for the plan under item 5.3.

To minimise information shown on FD, the following are not required to be shown on FD since these items are already shown on CPSTs :

- i. Site Plan showing the land lot ,area, boundaries, peripheral ground details and house number/s with building outline;
- ii Plan schedule and legend statement, i.e. house numbers, land lot and approved Certified Plan(CP) on where the building sits and , in the case of a strata subdivision and/or amalgamation, the new strata lot numbers;
- iii. Elevation Sketch depicting stratum heights and where applicable, tabulation of strata/accessory lot numbers to their respective flat unit numbers and tabulation of accessory lots made appurtenant to respective strata lots;

For the reference note to Sketches (SK) in relation to the survey of land lot, it is not required to be shown in the FD page for the survey of buildings outline.

Unit numbers to be entered in the FD for all the strata lots in the storey plan (non – typical and typical storey plan).

(d) Survey of buildings

- i. The building comprising the strata lots shall be fixed directly in relation to the boundaries of the lot unless ground circumstances do not permit such fixing, and all common properties which encroach onto adjacent land shall be surveyed.
- ii Strata survey for subdivision of building will require a resurvey of the land lot in situation as prescribed in para 2.8(e).

- iii. The amount of encroachment shall be measured, recorded and reported to the Chief Surveyor. An appropriate note stating the nature of encroachment shall be entered on the Site and Storey Plans in the FD diagram and on CPST and STP where applicable. Eg: Part of roof eave encroaching onto private lot 1234A.

Paragraph 2.3 on dealing with and resolving encroachments shall apply as regards how registered surveyors shall handle the encroachments.

(e) Identical strata lots

Where strata lots on the same storey or on different storey of a building are identical, only one such storey shall be depicted in the field book complete with dimensions, and all pages bearing diagrams of identical strata lots shall contain the following statement:

“All strata lots including those shown as ‘similar’ herein have been entered into and all relevant measurements have been fully made.”

(f) Strata lots involving land

Where the strata lots involve land, they shall be demarcated with the approved survey marks on the ground.

(g) Strata boundaries

Unless otherwise stipulated on the strata certified plan, the common boundary of any lot with another lot or with the common property shall be the centre of the floor, wall or ceiling, as the case may be.

Strata boundaries intended not to follow the centre of the floor, wall or ceiling, shall be in accordance with the subdivision plans as approved/authorised by the Chief Planner. The same statement must be stipulated in the field notes and plans.

(h) Certification

The first diagram page of the field notes of every survey shall bear the Registered Surveyor’s certification with entries of his name and date. The certification shall read as follows:

“I, , a surveyor registered under the Land Surveyors Act (Cap. 156), certify that these field notes and diagrams on pages to are a correct and complete record of the survey done by me, or under my immediate personal direction and supervision, in strict compliance with the Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules 2005 (G.N. No. S 155/2005). “

date

Registered Surveyor
(Digitally Signed)

5.2 Strata certified plan

(a) Every strata certified plan shall contain:

- (i) a site plan;
- (ii) a storey plan; and
- (iii) an elevation sketch.

(b) Plan format

Strata Certified Plans shall be drawn in the STP format size of 500mm X 353mm.

(c) Plan scales

Except under such circumstances that are, in the opinion of the Chief Surveyor, unusual, all plans shall be plotted according to the following scales:

- (i) for site plans — 1:200, 1:500 or 1:1,000; and
- (ii) for storey plans — 1:100 or 1:200.

(d) The scale on which a plan is drawn shall be so selected such that the area of each strata lot and all relevant details can be clearly seen.

(e) If on any part of a plan, measurements or details would otherwise be illegible or difficult to interpret, a diagram drawn on a scale larger than that of the plan, or drawn not to scale, may be added as an inset.

5.3 Drawing specifications for strata certified plan

The following shall be adhered to when drafting plans:

(a) Text specifications

Description of text	Height
Lot number and description of storey for Elevation sketch	2.5 mm to 3.0 mm
Area	2.0 to 2.5 mm
Corresponding Strata lot and area	2.0 mm
Header for storey and Elevation sketch	4.0 mm
Unit number, description of common property, height	2.0 mm
Text in Schedule / History box (other than MK/TS and CPST number)	2.5 mm
MK/TS in History box and-North point	4.0 mm
CPST number in History box	12.0 mm

(b) Line symbols

Description	Thickness
Boundary, wall and dash line of common property, North point	0.25 mm
Schedule / History box	0.25 mm

(c) Colour of text and line symbols

All text and line symbols shall be shown in black colour. Boundary shall be represented by firm lines and building and other details by broken lines.

5.4 Information to be shown on strata certified plans

(a) Plan headings

The heading of each strata certified plan shall include:

- i. the Mukim number or Town Subdivision number;
- ii. the scale, in the form of a representative fraction; and
- iii. the scales of the site and storey plans shall be shown below the respective headings.

(b) Plan serial numbers

Every strata certified plan shall be allotted a serial number issued by the Chief Surveyor. The serial number shall be known as the strata certified plan number.

(c) Other information

The following information and references shall be shown on strata certified plans:

- i. the North Point;
- ii. the name of the registered surveyor who conducted the survey and, where applicable, the name of the assistant employed by the registered surveyor who assisted in the conduct of the survey and the date of the completion of the survey;
- iii. the field book number and pages;
- iv. where applicable, the number on the approved building plans (which have been approved by the Commissioner of Building Control under the Building Control Act (Cap. 29)) from which the details on the strata certified plan have been compiled;
- v. where applicable, the number of the approved subdivision plan (which has been approved by the Chief Planner under the Planning Act (Cap. 232));
- vi. where applicable, the date of the plan for the subdivision of the building which has been authorized by a notification made by the Minister under section 21(6) of the Planning Act (Cap. 232); and
- vii. the relevant file reference number from the Singapore Land Authority.

(d) Plan schedule

Every strata certified plan shall contain a schedule showing the following information:

- i. the original strata lot number and the number of the previous strata certified plans and, in the case of a subdivision and amalgamation, the new strata lot numbers shall also be shown; and
- ii. any other notes relating to the strata lots under survey shall be made against the strata lots on the remarks column.

(e) Names on plans

Every strata certified plan shall bear the names of the draftsman and the person who checked the plan and the dates of completion.

(f) Certification of plans

Every strata certified plan shall bear a certificate containing the registered surveyor's stamp with entries of his signature and date in the following form:

"I,..... , a surveyor registered under the Land Surveyors Act (Cap. 156), certify that this plan correctly represents the survey done in strict compliance with the Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules 2005 (G.N. No. S 155/2005).

(date of certification)

Registered Surveyor.

(Digitally Signed)".

5.5 Information to be shown on site plans

Every site plan shall show:

- i. the numbers and boundaries of any Mukim and Town Subdivision;
- ii. the land lot number and the area of the land lot;
- iii. the boundary lines of the land lot on which the building is sited;
- iv. the outline of the building;
- v. the natural and artificial features that are found within 0.5 metre of the boundaries surveyed;
- vi. the encroachment, if any, into adjacent land lots and/or vice versa;
- vii. the street names and house numbers;
- viii. Field details(FD) references and
- ix. Scale of the Site Plan and Bar Scale.

5.6 Information to be shown on storey plans

Every storey plan shall show:

- i. details of the strata lots on every storey or where strata lots on different storeys are identical, the details of the strata lots on a typical storey plan;
- ii. strata lot numbers with their respective scaled areas and boundaries;

- iii. the area of each strata lot under survey shown beneath the strata lot number or, for clarity, tabulated with the strata lot number, and where a strata lot occupies more than one storey, its total area shall be tabulated:

House No	Strata Lot	Storey	Strata Area in Parts (sq m)	Total Strata Area (sq m)
100	U67890P	5th	113	164
		Attic	51	

- iv. Where the strata lot contains void space which is of exclusive use of the unit, the extent of the void shall be shown and described. The floor area, void area, total strata void area, total strata floor area and the total area of the strata lot (inclusive of the total strata void area) shall be tabulated:

House No	Strata Lot	Storey	Strata Area in Parts (sq m)			Total Strata Floor Area (sq m)	Total Strata Void Area (sq m)	Total Strata Area (sq m)
			Floor Area	Void Area	Sub-Total			
100	U123P	5th	118	0	118	238	1	239
		6th	120	1	121			

- v. the lot numbers of strata lots under survey shall be significantly shown near the centre of the respective strata lots to which they refer;
- vi. the adjacent strata lot numbers;
- vii. boundary marks planted for strata lots involving land by means of abbreviations, symbols and conventional signs used by the Singapore Land Authority; and
- viii. the outline of the common property and the words "common property" at appropriate places; and
- ix. Storey Plans are not required for flat roof and other storeys that contain only common property and without any strata lots.
- x. History box containing information such as Block/House number, road name, site plan number, elevation plan number, SLA/SVY number, Registered Surveyor's name, Chief Surveyor's name, plan scale, North point, MK/TS number, plan number and the note "Areas of Strata Lots are scaled only".
- xi. Bar Scale to be inserted.
- xii. Unit numbers of all strata lots for typical and non-typical storey.

5.7 Elevation sketches

- (a) Every strata certified plan shall, in addition to a site plan and a storey plan, show :
- (i) an elevation sketch containing the strata lot numbers;
- (ii) the corresponding unit numbers of all the storeys; and

(iii) the heights rounded off to the nearest centimetre. The height of the strata lot shall be compiled from the approved building plan. Note: The internal height as surveyed shall not be adopted.

- (b) Where it is not possible to show the strata lot numbers on the elevation sketch referred to in paragraph (a)(i), the strata lot numbers contained therein and their corresponding unit numbers shall be tabulated.
- (c) History box containing information such as Block/House number, road name, site plan number, storey plan numbers, SLA/SVY number, Registered Surveyor’s name, Chief Surveyor’s name, North point, MK/TS number, plan number and the note “ Areas of Strata Lots are scaled only”.

5.8 Accessory lots

Where strata development contains accessory lots, the accessory lot numbers shall be allotted. The accessory lots shall be surveyed and drawn on the storey plan. The accessory lot number, the strata lot which the accessory lot is made appurtenant to, the approved user and the floors shall be tabulated.

Accessory Lot	Appurtenant to Lot	Approved User	Storey
A1X	U12345P	Store	1 st

Where accessory lots consist of multiple storey with void areas, tabulation of the floor areas and void areas are to be shown.

5.9 Provisional lots in phased strata developments

For phased strata developments, Registered Surveyor shall put up the provisional lots of the future buildings on the Site Plan, Elevation Sketch and Storey Plan. As soon as the buildings are constructed, Registered Surveyor shall carry out the survey of the provisional lots.

5.10 Submission

Registered surveyor shall submit the text files through CSMS RS Portal containing the listing of the strata lots, the plan number, the strata areas and addresses. The strata void area of strata lots are to be inserted under the column “Plan_Area_Description” if the strata lots consist of strata void areas. Where a strata lot occupies more than one storey but does not contain any void area, it is not required to insert the strata void area under the column “Plan_Area_Description”.

The excel files format are shown below:

Updating Address for Strata/Accessory Lot (Not Applicable for Activation of Caveat Lot Stage)

Excel Filename: **Lot_Address.xls**

Updating Address for Strata/Accessory Lot (Not Applicable for Activation of Caveat Lot Stage)								
Lot_Number	House_Number	Street_Name	Level_Number	Unit_Number	Postal_Code	Address_Source	Building_Name	Building_Source

Column Name	Data Type	Maximum Characters Allowable	Example (Data)
Lot_Number	String	Strata – 13 Accessory -11	Strata Lot: MK01-U000001P Accessory Lot: MK01-A0001M
House_Number	String	10	123A, 123
Street_Name	String	75	YISHUN STREET 72
Level_Number	String	3	B1,10
Unit_Number	String	5	1234, 123A
Postal_Code	Numeric	6	760764
Address_Source	String	4 (Auto Display)	IRAS
Building_Name	String	50	REVENUE HOUSE
Building_Source	String	4 (Auto Display)	IRAS

Updating Accessory / Strata Lot with CPST Number and Area (Includes Dummy lots)

Excel Filename: **CPST_Information.xls**

Updating Accessory / Strata Lot with CPST Number and Area				
Lot_Number	Plan_Type	Plan_Number	Plan_Area	Plan_Area_Description

Column Name	Data Type	Maximum Characters Allowable	Example (Data)
Lot_Number	String	Strata – 13 Accessory -11	Strata Lot: MK01-U000001P Accessory Lot: MK01-A0001M
Plan_Type	String	4 (Auto Display)	CPST
Plan_Number	Numeric	5	12345
Plan_Area	Numeric	8	12345678
Plan_Area_Description	String	40	INCLUDES STRATA VOID OF 18 SQ M

5.11 Strata lot numbers without subdivision approval for leases between 7 and 21 years

5.11.1 Introduction

- (a) Under the Planning Act building owners can grant leases of a building or parts of a building as described in the Third Schedule of the Act, for up to 21 years, inclusive of the option to renew:
- i. without having to register the building as a strata development under the Land Titles (Strata) Act; and
 - ii. without having to obtain approval to subdivide the building under Section 14(4) of the Planning Act.

- (b) However, the leases, where they are for more than 7 years inclusive of the option to renew, may be registered under the Land Titles Act. For this purpose, strata lot numbers shall be required to identify the relevant parts of the building comprised in the leases to be registered at the Singapore Land Registry.

5.11.2 Application of new strata lot numbers

- (a) An application for the strata lot numbers for the part of the building to be leased shall be accompanied by:
 - i. a certified copy of the proposed lease;
 - ii. the lease agreement plan; and
 - iii. the approved building plan.
 - iv. LandXML (for submission with LandXML)
- (b) The lease agreement plan shall be endorsed by the building owner and the tenant.

5.11.3 Building with no strata lots

If the building has not been subdivided before, only the part comprised in the lease shall be identified with a strata lot number.

5.11.4 Building with strata lots

- (a) Only one strata lot affected

If an existing strata lot is partially affected by the lease, the portion comprised in the lease and the balance portion shall be identified with strata lots. Survey shall be carried out only for the strata lot comprised in the lease.

- (b) More than one strata lot affected

If the part covered by the lease stands on two existing strata lots, then two new strata lot numbers, (one from each strata parent lot), shall be issued to the relevant part covered by the lease.

- (c) Strata lots and common property affected

If the part covered by the lease covers part of an existing strata lot and part of the common properties, two new strata lot numbers, (one from the strata parent lot and the other from the common properties), shall be issued to the relevant part covered by the lease.

- (d) Cancellation of strata lot

If the lease expires or is terminated, the strata lot number issued shall be made a dead lot forthwith. If a new lease to be registered covers a different extent of an existing strata lot for which the previous lease has expired or terminated, or if a subdivision approval under the Planning Act has been obtained, you will need to apply for a new strata lot number.

5.12 Strata survey for subdivided building for registration under the Land Titles (Strata) Act.

- (a) This Part shall apply to the survey of every strata lot comprised in a subdivided building for registration under the Land Titles (Strata) Act. The items under Strata Survey above shall, where applicable, be complied with in all respects to the survey of every strata lot comprised in a subdivided building.

In this Part –

“strata subdivision” has the same meaning as in the Land Titles (Strata) Act (Cap. 158);

“strata title plan” has the same meaning as in the Land Titles (Strata) Act (Cap 158).

“subdivided building” has the same meaning as in the Land Titles (Strata) Act (Cap. 158).

For strata survey to meet the requirements of the Land Titles (Strata) Act, the STP and the CPST shall be prepared in one single set of plan document comprising multiple sheets such that the set represent one STP No. with consecutive sheet Nos. and each sheet of the STP shall carry a unique CPST No. The details of their requirements are elaborated in the paragraphs that follow.

- (b) Lodgement of strata certified plan under this Part

Every strata certified plan in relation to a survey of any strata lot comprised in a subdivided building, lodged in the Singapore Land Authority shall comply with the following requirements:

- (i) it shall bear a strata certified plan number which shall be endorsed on the bottom right-hand corner as “ST”;
- (ii) it shall state on the immediate left-hand side of the strata certified plan number endorsed on the strata certified plan, the Mukim or Town Subdivision of the land parcel; and
- (iii) it shall measure 500 millimetres in length by 353 millimetres in width and shall have clear margins on the face of each sheet of not less than 40 millimetres on the left-hand side and not less than 15 millimetres on the right-hand, at the top and at the bottom.

- (c) Lodgement of strata title plan (STP) under this Part

Registered Surveyors need only to submit one set of the STP. Every STP lodged in the Singapore Land Authority shall comply with the following requirements:

- (i) each sheet shall be numbered consecutively and the number shall be endorsed on the top right-hand corner of each sheet as “Sheet No.”;
- (ii) the first sheet shall contain the STP number, a plan heading, a site plan showing the occupational details along the land lot boundaries and the certifications;
- (iii) the second sheet shall contain a plan schedule of subdivision, a legend of the common property, an elevation sketch, and where applicable, a table setting out the provisional lots and a table of accessory lots;
- (iv) subsequent sheets shall contain storey plans; and
- (v) (where the strata lot occupies more than one storey) subsequent sheets shall contain a table showing –

(f) Format of STP

The sample format is in Appendix K-1 to K-4.

5.13 Strata survey of buildings in Cluster Housing

Approved cluster housing developments may contain detached (bungalow), semi-detached and terrace houses. For subdivision, each of these houses is allotted a strata lot No and surveyed for registration under the Land Titles (Strata) Act. Unlike conventional strata unit, such cluster housing unit can include open void space within the airspace of “box” format of the house. Also, strata boundaries may not follow the centre of the floor, wall or ceiling. As cluster housing developments can be compact and complex and also will differ from site to site, Registered Surveyors shall, in consultation with their clients, define and survey the exact extent of each strata lot consistent with the extent depicted in the sale and purchase agreement and also with the approved / authorised subdivision plan.

5.14 Strata Title Plan (Limited Common Property) – STP(LCP)

Pursuant to Section 78 of the Building Maintenance and Strata Management Act 2004 (BMSMA), the strata title plan showing common property designated as LCP shall be filed with the Chief Surveyor.

Registered Surveyors, who are engaged by their clients (land owners/ developers) to submit such strata title plans, termed as STP(LCP), to the Chief Surveyor for filing, shall prepare such STP(LCP) to meet the requirements of the BMSMA and any other technical requirements.

Chief Surveyor’s acceptance of the STP(LCP) shall not be taken to warrant or certify as to the correctness of the boundaries of the LCP or validity of the creation of such LCP and Chief Surveyor is not responsible for the contents in the STP(LCP).

For new strata developments involving LCP, please ensure that the STP and STP(LCP) are submitted simultaneously. The background and requirements are depicted in CS Circular Nos. 2/2008 and 3/2008. The CS Circulars are posted on SLA website : [Http://www.sla.gov.sg/](http://www.sla.gov.sg/)

5.15 Strata Lots with step-down structures constructed below the approved stratum

There are developments in which strata lots may contain step-down structures (such as swimming pool, lift pit, Jacuzzi, planter box, patio, etc).

For such cases, the structure which is for the exclusive use of the strata lot has its depth extending below the approved stratum. For example: A strata lot on 1st storey may have a private swimming pool with its depth below the ground level and occupying part of the basement floor below. In other cases, there may be no basement floor. The strata lot should be treated as on a single stratum including the depth of the swimming pool.

Using a strata lot with private swimming pool as an illustration, the Field Details and the CPST shall comply with the following requirements:

(a) In Field Details(FD)

- i) On Storey Plan - To describe and show the extent of the swimming pool and measurements of the swimming pool;

(b) On CPST (Elevation Sketch)

(i) At Legend - To insert a note. A sample of the note is as follows:-

“ The common property does not include the private swimming pools which are for the exclusive use of the respective strata lots and as indicated and described in the Storey Plan and Elevation Sketch ”;

(ii) At Elevation Sketch – To present the step-down view of the swimming pool clearly and state the depth of the pool (if tapering depths, show maximum and minimum dimensions). To show more than one view if necessary;

(c) On CPST (Storey Plan)

(i) To show the extent of the swimming pool line (dash lines), describe “PRIVATE SWIMMING POOL” and below it, insert within bracket the depth.

The sample FD, CPST for Elevation Sketch and Storey Plan are shown in Appendix N-1 to N-3. The samples are extracted from CS Circular No. 7/2011.

The same requirements shall apply to other types of step-down structures on any approved stratum where applicable.

However, in cases where a separate stratum is shown on the approved Building Plan for the base of the step-down structures, double stratum is to be adopted. The upper stratum of the step-down structure should be considered as void area if it is a void space.

5.16 Strata lot with Internal Staircase

The standing practice is that the strata lot on each stratum must include the space for its exclusive use on that stratum and that includes spaces for bay windows, staircase, void etc. For strata lot with 2 or more storeys, the staircase at the lower storey is to be included as strata area for the strata unit. For the upper storey, the opening on the upper storey to provide access via the staircase from the lower storey should be treated as void area.

You may consult SLA if your strata case scenario differs from the above.

5.17 CPST submission with LandXML (optional)

Registered surveyors are required to submit the LandXML together with the CPSTs, FDs and any other relevant supporting documents in the RS Portal.

The LandXML file shall follow the SG LandXML mapping and structure published in SLA website.

6 AMENDMENT OF APPROVED PLANS AND RELATED DOCUMENTS

- (a) When an error is found on approved plan, the Registered Surveyor for the plan shall carry out the necessary amendment on the approved plan and related documents if applicable.
- (b) The Registered Surveyor is required :
 - i) to cut by striking through the error data and insert the correct data in the plan and related documents if applicable;
 - ii) to insert a note e.g. Lot / Boundary / Area / Co-ordinates amended by me on dd/mm/yy :

Name

Registered Surveyor

(Digitally Signed)

Approved by

Soh Kheng Peng

Chief Surveyor

(Digitally Signed)


- iii) To submit through RS Portal with the payment of amendment fee.
- (c) To submit a new LandXML with error data being rectified.

7 SURVEY FEES

Gazetted and non-gazetted fees payable to the Singapore Land Authority are posted on SLA website <http://www.sla.gov.sg>.

Appendix A

Abbreviations and Symbols for Marks in Sketches/ Field Diagram / Certified Plans / LandXML

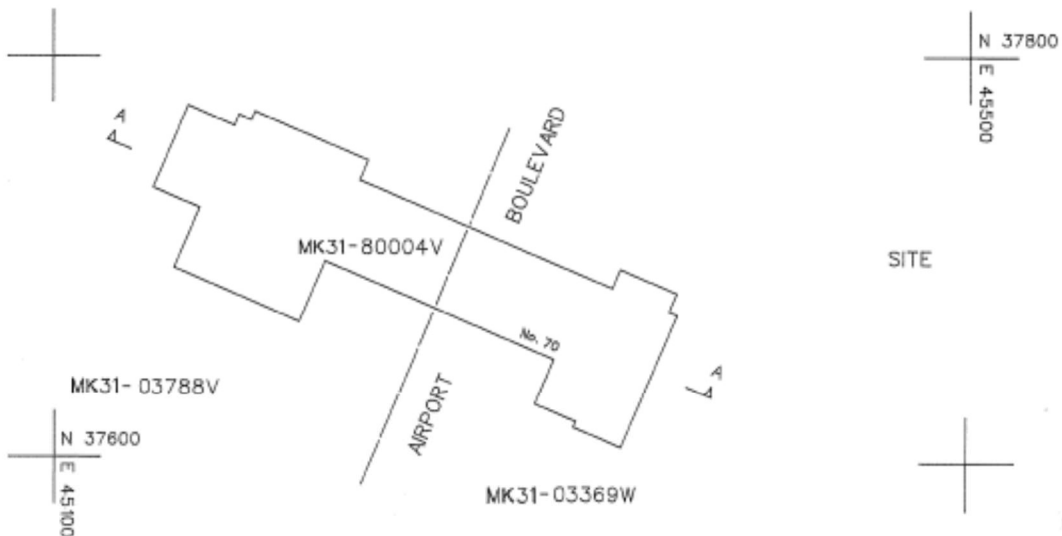
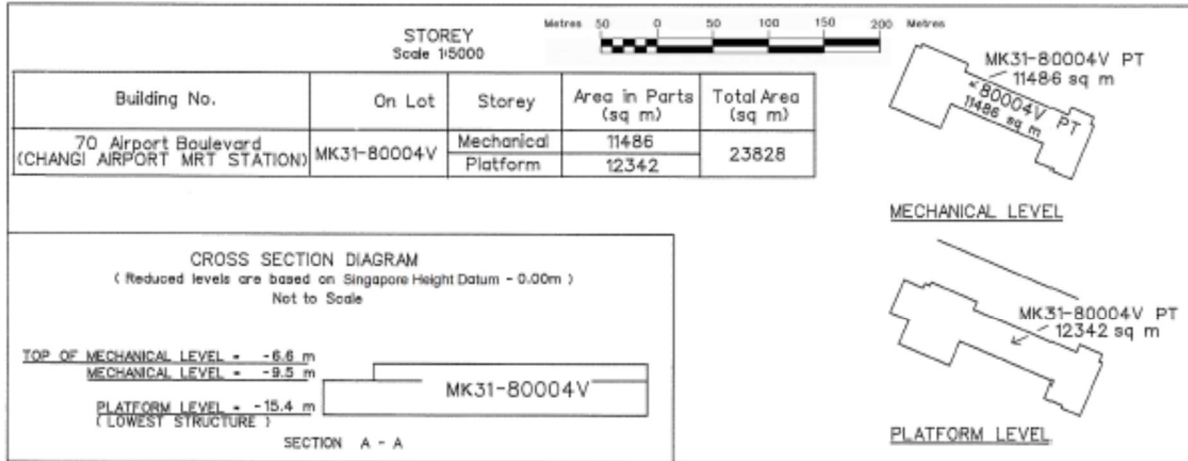
No	SURVEY MARKS	ON SKETCH / FIELD DIAGRAM	ON PLAN	LandXML
1	Cut Mark	N Cut Mk / O Cut Mk / Cut Mk Refxd / MK (REF MK)	MK / MK (REF MK)	MK
2	Spike	N Sp / O Sp / Sp Refxd / SP (REF MK)	SP / SP (REF MK)	SP
3	Nail	N NL / O NL / NL Refxd	NL/ NL(REF MK)	NL
4	Concrete Mark	NCM / OCM / CM Refxd / CM (REF MK)	CM	CM
		- / OCM <u>123</u> / OCM <u>123</u> Refxd 188 188	CM	CM
5	Pipe	N Pipe / O Pipe / Pipe Refxd	PP/ PP (REF MK)	PP
6	Stone	- / OS / OS Refxd	OT	OT
	Bolt	N Bolt / O Bolt / Bolt Refxd	BT/ BT(REF MK)	BT
7	Survey marker with number(for ISN)	 SM 12345 or SM 01234 (5 digit)	---	SM
8	Not Marked Point	UM	UM	UM
9	Temp Mark	Temp Mk	---	TM
10	Peg	Peg	---	TM

Symbol to be use for all mark description on sketch and plan – o (Hollow circle)

Symbol to be used for ISN marker on sketch - 

Appendix B

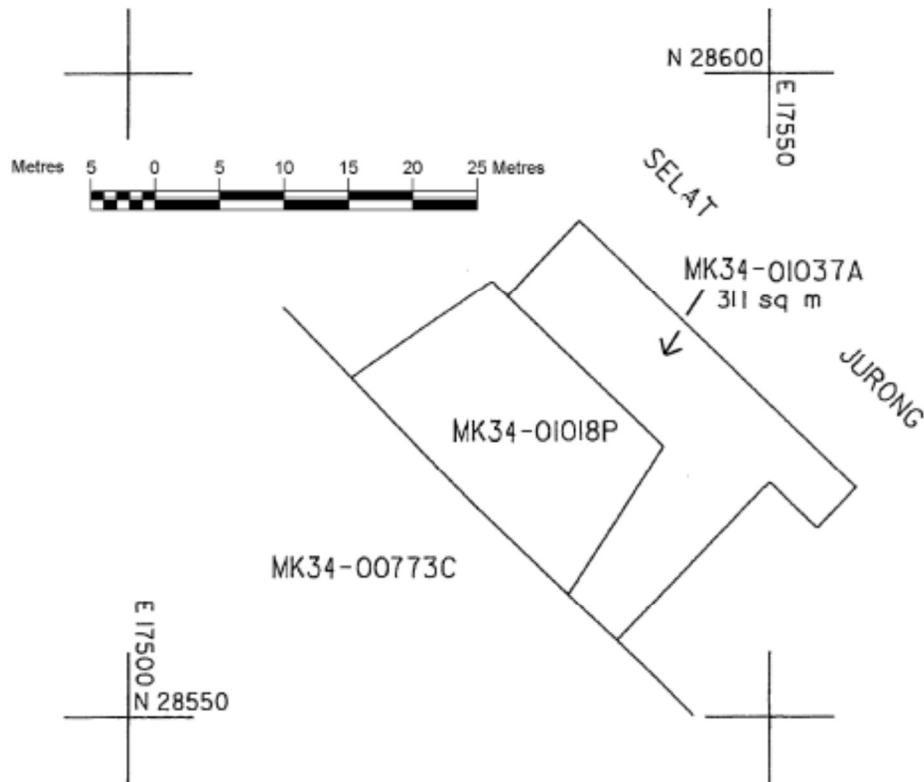
Lot Number	On Plan	Allotted as/ Subdivided into Lots	Amalgamated as Lot	Transferred as Lot	Lot Remarks
MK31-80001C MK31-80002M			MK31-80004V		Allotted for Subterranean Lot



All Coordinates shown are based on SVY 21 Datum	
Boundaries and area shown hereon are provisional and subject to alteration on final survey	
Reference Plan : Plan (S2) in L.O. (A) 121,138 & L504/CGALB/0002A	
SVY 0873-2001	Sheet No : 1/1
Scale 1 : 2000	Plan Size : A3
<p>DATE _____</p> <p>NAME _____</p> <p>Registered Surveyor (Digitally signed)</p>	<p>Approved</p> <p>_____ Soh Kheng Peng Chief Surveyor (Digitally signed)</p>
	R.T. 20000

APPENDIX C

Lot Number	On Plan	Allotted as/ Subdivided into Lots	Amalgamated as Lot	Transferred as Lot	Lot Remarks
		MK34-01037A			Allotted for Foreshore Lot



All Coordinates shown are based on SVY 21 Datum	
Boundaries and area shown hereon are provisional and subject to alteration on final survey	
Reference Plan : Plan (IF) in SLA/RS/43.2.139	
SVY1633-2001	Sheet No : 1/1
Scale 1 : 500	Plan Size : A3
_____ DATE _____ NAME Registered Surveyor (Digitally signed)	
N ↑ ———— ————	Approved _____ Soh Kheng Peng Chief Surveyor (Digitally signed)
R.T. 20002	

Procedure For Survey On Alteration of Mukim (MK) and Town Subdivision (TS) Boundaries

- 1 The Registered Surveyor undertaking a survey job which will later on require the alteration of MK/TS boundaries should liaise with the land owner/developer to initiate the proposed alteration as early as possible.

- 2 The registered surveyor will consider the best route for the alteration of MK/TS boundaries. He will propose the lots to be amalgamated or subdivided and to be transferred from one survey district to another. He will submit the plan showing the proposed alteration of the MK/TS boundaries with an explanatory note to the Chief Surveyor for consideration.

- 3 The Chief Surveyor will consider the proposal and will consult the Commissioner of Lands or Land Operation Division and the Land Titles Registry.

- 4 If the proposal is acceptable, the registered surveyor can proceed to submit through the RS Portal for allocation of lot numbers with the necessary supporting documents and fees. Once it is in order, the Chief Surveyor will allocate the new lot numbers.

- 5 The registered surveyor will carry out the survey action as follows:
 - a) No field work is required for the alteration if the lot to be transferred is an existing/full lot or a subsequent survey will follow when the site is developed. However, field work to mark out the new boundaries for the alteration is required for cases where the lots have to be subdivided for the alteration and that there will be no subsequent survey action after the transfer of lot is completed.

 - b) Certified plan and LandXML are to be put up. The certified plan should show the lot numbers, areas, the station numbers and coordinates.

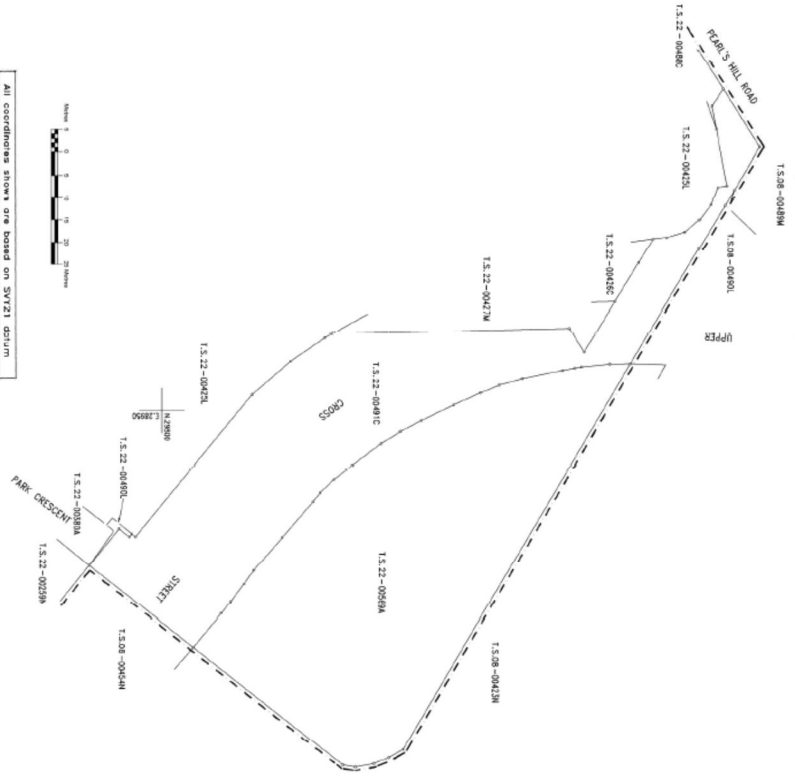
 - c) When a lot is subdivided for the purpose of transferring to another survey district, all the child lots are to be finalised and shown on plan. Coordinates are to be shown for the transferred lots.

 - d) A sample CP is attached on the next page.

 - e) The Chief Surveyor will put up the draft notice and order for publication in the gazette under section 12(6) of the Boundaries and Survey Maps Act. The fee payable is posted on SLA website [http:// www. sla.gov.sg](http://www.sla.gov.sg).

Lot Number	On/From Lots	Accepted/Proposed SA Lot	Preferred SA Lot	Lot Number
T.S.22-00481C	4312	T.S.08-00481C	T.S.08-00481C	
T.S.22-00481W	3518	T.S.22-0091A1.T.S.08-00481W		
T.S.22-00481M				

BEFORE



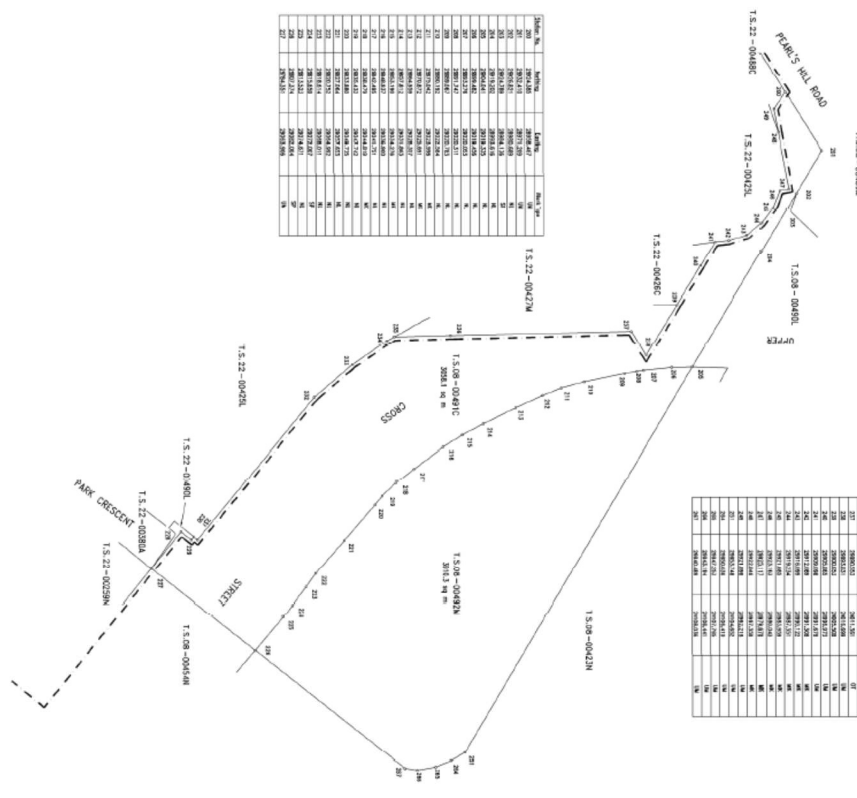
All coordinates shown are based on SVY21 datum
 OTHER SURVEYS:
 Reference Plan: Plan AK/A1/3542-ALT LUMBABY
 SVY 3198-2012 Sheet No: T/1
 Scale: 1 : 500 Plot Size: 1/1

I, **James A. Juvapor**, registered under the Land Survey Act, certify that the document has been prepared by me or under my immediate supervision, in accordance with the provisions of the Land Survey Act and the Land Survey Rules 2005 (O.N. No. 5 155/2005).

Registered Surveyor (Digital Stamp)
 Approved

Son, Kheng Peng
 (Digitally Signed)
CP 85379

AFTER



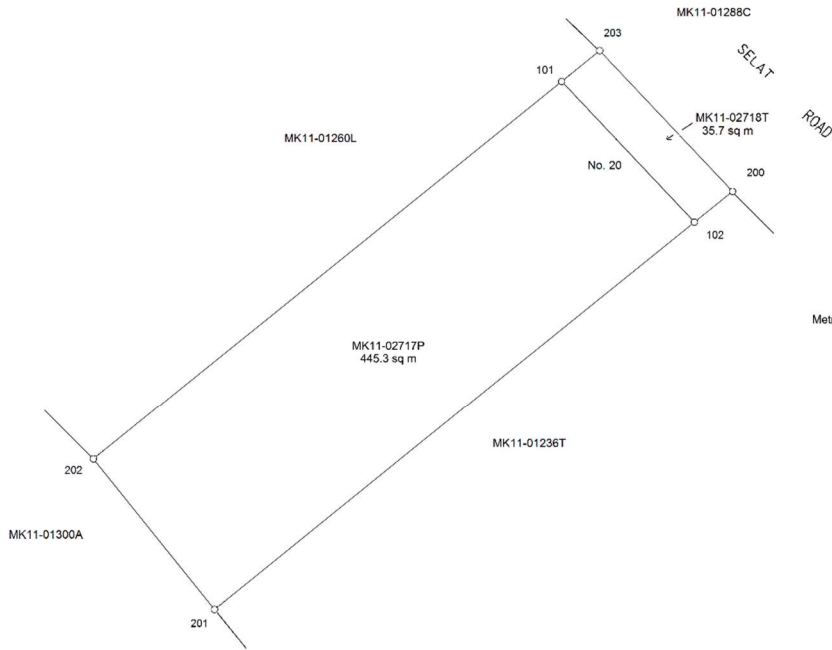
Station No.	Bearing	Distance	Area (sq. m)
201	285°42'48"	287.84	1.00
202	285°42'48"	287.84	1.00
203	285°42'48"	287.84	1.00
204	285°42'48"	287.84	1.00
205	285°42'48"	287.84	1.00
206	285°42'48"	287.84	1.00
207	285°42'48"	287.84	1.00
208	285°42'48"	287.84	1.00
209	285°42'48"	287.84	1.00
210	285°42'48"	287.84	1.00
211	285°42'48"	287.84	1.00
212	285°42'48"	287.84	1.00
213	285°42'48"	287.84	1.00
214	285°42'48"	287.84	1.00
215	285°42'48"	287.84	1.00
216	285°42'48"	287.84	1.00
217	285°42'48"	287.84	1.00
218	285°42'48"	287.84	1.00
219	285°42'48"	287.84	1.00
220	285°42'48"	287.84	1.00
221	285°42'48"	287.84	1.00
222	285°42'48"	287.84	1.00
223	285°42'48"	287.84	1.00
224	285°42'48"	287.84	1.00
225	285°42'48"	287.84	1.00
226	285°42'48"	287.84	1.00
227	285°42'48"	287.84	1.00
228	285°42'48"	287.84	1.00
229	285°42'48"	287.84	1.00
230	285°42'48"	287.84	1.00

Station No.	Bearing	Distance	Area (sq. m)
201	285°42'48"	287.84	1.00
202	285°42'48"	287.84	1.00
203	285°42'48"	287.84	1.00
204	285°42'48"	287.84	1.00
205	285°42'48"	287.84	1.00
206	285°42'48"	287.84	1.00
207	285°42'48"	287.84	1.00
208	285°42'48"	287.84	1.00
209	285°42'48"	287.84	1.00
210	285°42'48"	287.84	1.00
211	285°42'48"	287.84	1.00
212	285°42'48"	287.84	1.00
213	285°42'48"	287.84	1.00
214	285°42'48"	287.84	1.00
215	285°42'48"	287.84	1.00
216	285°42'48"	287.84	1.00
217	285°42'48"	287.84	1.00
218	285°42'48"	287.84	1.00
219	285°42'48"	287.84	1.00
220	285°42'48"	287.84	1.00
221	285°42'48"	287.84	1.00
222	285°42'48"	287.84	1.00
223	285°42'48"	287.84	1.00
224	285°42'48"	287.84	1.00
225	285°42'48"	287.84	1.00
226	285°42'48"	287.84	1.00
227	285°42'48"	287.84	1.00
228	285°42'48"	287.84	1.00
229	285°42'48"	287.84	1.00
230	285°42'48"	287.84	1.00

STATION NO.	NORTHING	EASTING	MARK TYPE
101	36142.309	22752.279	MK
102	36133.690	22765.453	NL
200	36135.560	22767.794	NL
201	36103.838	22745.910	MK
202	36119.072	22728.452	MK
203	36144.239	22759.620	NL

Appendix E

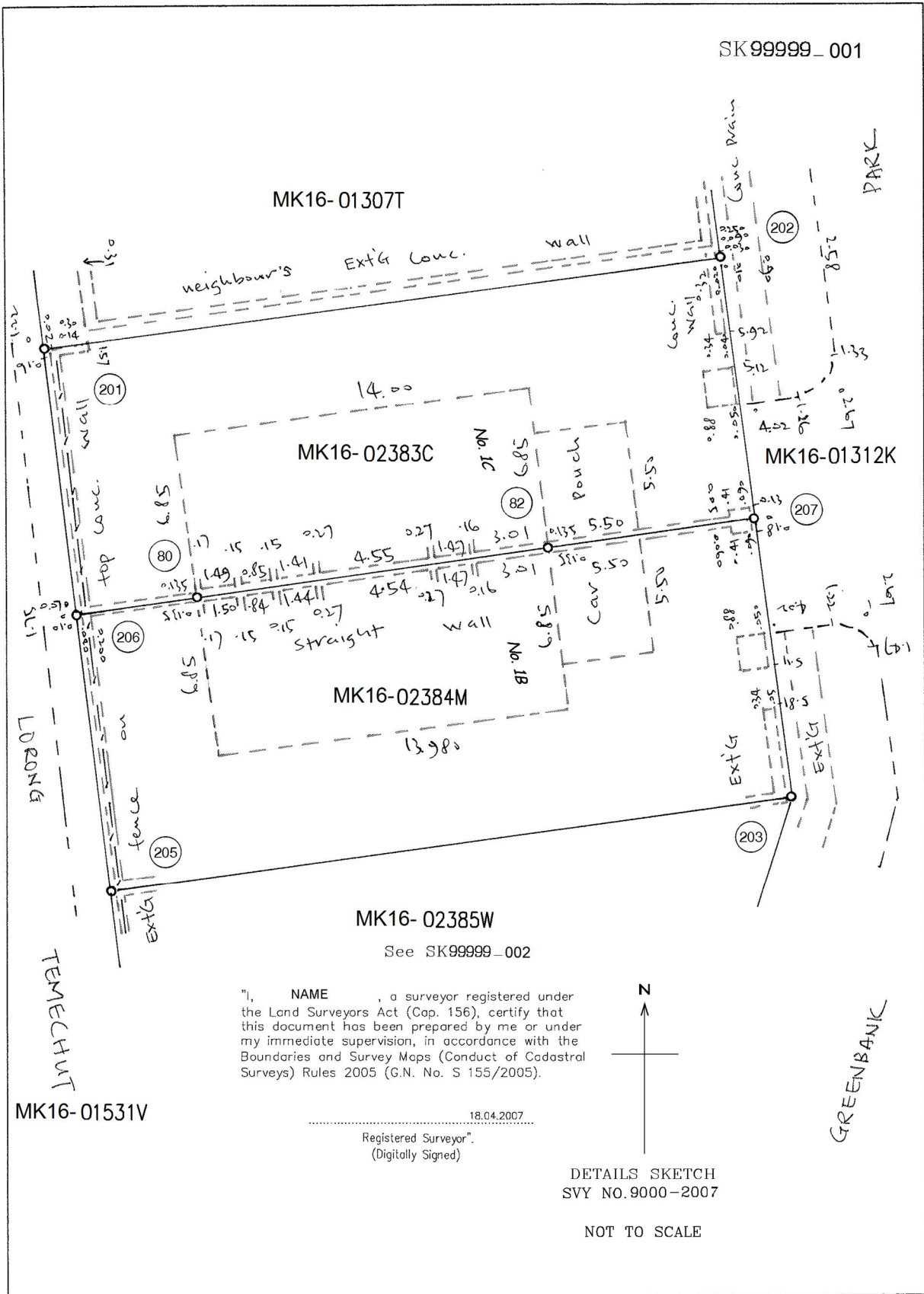
Lot Number	On Plan	Allotted As/Subdivided Into Lot	Amalgamated As Lot	Transferred As Lot	Lot Remarks
MK11-01220P	CP20200	MK11-02717P MK11-02718T			



Metres 2 0 2 4 6 8 10 Metres

All Coordinates shown are based on SVY21 Datum	
Date of Survey: 05/03/2017	
Reference Plan: Plan WPP1 ES20170122R0182.ent	
Sketch Plan No. SK100340-001 to SK100340-002	
SVY No.: 0952-2017	Sheet No.: 1/1
Scale: 1:200	Plan Size: A3
I, Name _____, a surveyor registered under the Land Surveyors Act (Cap. 156), certify that this document has been prepared by me or under my immediate supervision, in accordance with the Boundaries and Survey Maps (Conduct of Cadastral Surveys) Rules 2005 (G.N. No. S 155/2005).	
29/11/2017 Registered Surveyor (Digitally signed)	
Approved Soh Kheng Peng Chief Surveyor (Digitally Signed)	
CP100340	

806206ED00026656024F64FRB84B29D0BBA474D3676E2EC1D64CEFF356645F2D



SYMBOL SHEET

Description	Feature	Description	Feature
ROAD 1 To show road name eg: Sime Road 2 To describe type of road eg: Metalled		TRACK (To describe type of track. eg: Earth track)	
2.515 H.W.M 1 H.W.M Details 2 Boundary following H.W.M		RIVERS 1 Non-tidal 2 Tidal 3 To show name. eg: Singapore River (Note : Arrow pointing flow downstream)	
STATE RESERVE		LIFT OPENING ON STRATA PLAN 1 On all floors 2 On certain floors 3 Between floors	
GRID LINES 1 With or without coordinate values 2 With or without coordinate values (at edged of Plan)		SLOPE 1 Cutting 2 Embankment	
CADASTRAL MAP 1 With or without map numbers 2 With or without map numbers (at edged of Plan)		FENCE 1 Along a boundary 2 Not along a boundary 3 Not along a boundary but too close to be drawn separately (To describe type of fence. eg: MWF)	
BUILDING (To describe type of structure if it is not masonry eg: Wooden shed, zinc roof)		HEDGE 1 Along a boundary 2 Not along a boundary 3 Not along a boundary but too close to be drawn separately	
BOUNDARIES 1 Mukim and Town Subdivision 2 Lot boundary		FENCE & HEDGE 1 Along a boundary 2 Not along a boundary 3 Not along a boundary but too close to be drawn separately	
TRAVERSE 1 Side Shots 2 Offsets to details		FENCE 1 On top of a wall 2 Along a wall 3 Not along a wall 4 Not along a wall but too close to be drawn separately	
PARTY WALL		WALL (To describe wall eg: Retaining wall, garden wall)	

SLA'S CURRENT POLICY FOR RETENTION OF ENCROACHMENTS FROM PRIVATE PROPERTIES ONTO/ OVER/ UNDER STATE LANDS

1 The State continues to reserve its rights to require the removal of physical encroachments, regardless of nature and extent of these encroachments. Where such removal is assessed as not required, SLA may, at its discretion and subject to relevant authorities' clearances (like LTA, PUB etc) consider to regularise the encroachments through the ways mentioned in paras 2 to 5 below.

2 For encroachments from private properties onto/ over/ under State Lands with extents up to 3 cm, showing them in the SK sketches for submission to the Chief Surveyor, would be sufficient.

3 For encroachments with extents more than 3 cm and up to 10 cm, the owner of the encroaching property will be required to lodge a letter of undertaking with SLA to undertake the removal of encroachments as and when the State Land is required for developments and to reinstate the affected State Land to the full satisfaction of Collector of Land Revenue, SLA.

4 For encroachments with extents more than 10 cm, the owner of the encroaching property is required to take up a Temporary Occupation Licence (TOL) and pay the required TOL fees. In addition, the owner is also required to comply with a set of special conditions which will be made available to the owner for perusal upon SLA offer of TOL to him/ her. Depending on the nature of encroachments, SLA may either offer the owner a monthly TOL or a yearly TOL. The first payment of TOL fees shall be made to SLA by cheque. For subsequent months/ years of TOL fees, this shall be deducted through Inter-bank GIRO and thus the owner is required to complete and return an Inter-bank GIRO application form. Please note that currently, it is our requirement that subsequent payment of TOL fees be deducted electronically through Inter-bank GIRO.

5 Please also note that for those TOLs that have been issued at market rates for the retention of encroachments onto/ over/ under State Lands, SLA reserves its right to revise the TOL fees for the following situations:

- (a) every 3 years;
- (b) in the event where there are ownership changes due to sale of properties, etc, a new TOL may be issued (at SLA discretion and subject to other relevant authorities' clearances) to the new owner at the prevailing market rates to be decided by SLA

6 With effect from 1 Jan 2005, SLA had waived the requirement for owner of conserved property to take up a TOL for retention of encroachments from such properties. This waiver of TOL also applies to future buyers (owners) of such conserved properties.

7 Registered Surveyors are to advise their clients accordingly, should there be encroachments from their properties onto/ over/ under State Lands.

Appendix J

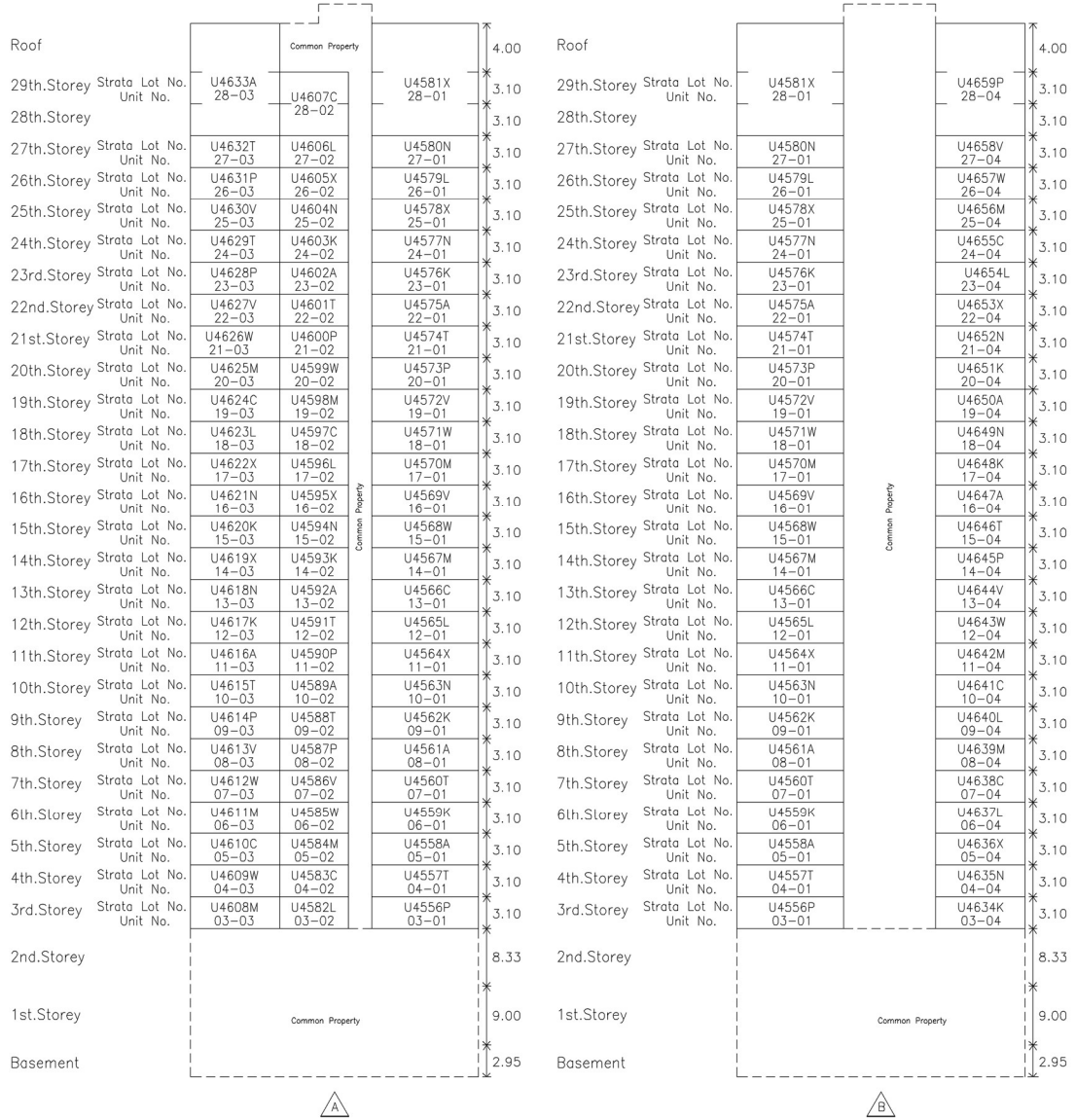
SVY 3400-2008					SK 82281-037			
RANGOON MRT STATION					LEVEL DETAILS			
Levels from PLBM 477 to SITE								
Station	Back Sight	Inter-mediate	Fore Sight	Rise/ Fall	Reduced Level	Adjusted Level	Distance	Remarks
PLBM 477	2.082					109.712		RL 9.712 po
O NI (400)		1.812		0.270		109.982		RL 9.981 po
FH10605		1.586		0.496		110.208		RL 10.253 po
CP 1	1.653		1.044	1.038		110.750		
CP 2	0.911		2.241	0.588-		110.162		
CP 3	1.110		1.980	1.069-		109.093		
CP 4	1.586		2.198	1.088-		108.004		
STN 21	2.021		1.342	0.244		108.248		N Cut Mk
CP 6	1.815		0.873	1.148		109.397		
CP 7	2.633		0.724	1.091		110.488		
CP 8	3.095		1.079	1.554		112.043		
CP 9	3.690		0.196	2.899		114.942		
TBM 'A'		1.433		2.257		117.200		
TBM 'B'	0.209		0.260	3.430		118.372		
TBM 'A'		1.381		1.172-		117.200		
CP 9	0.195		3.640	3.431-		114.942		
CP 8	1.069		3.094	2.899-		112.043		
CP 7	0.701		2.624	1.555-		110.488		
CP 6	0.868		1.793	1.092-		109.397		
STN 21	1.336		2.017	1.149-		108.248		N Cut Mk
CP 4	2.178		1.580	0.244-		108.004		
CP 3	1.954		1.089	1.089		109.093		
CP 2	2.288		0.885	1.069		110.162		
CP 1	1.056		1.699	0.589		110.750		
FH10605		1.599		0.543-		110.208		RL 10.253 po
400		1.825		0.769-		109.982		O NI RL 9.981 po
PLBM 477			2.095	1.039-		109.712		RL 9.712 po
						Total Distance = 1200m		
Surveyed by NAME			Continue on page		Computed by NAME			
Date 06.08.2008			05.09.2008 NAME Registered Surveyor (Digitally Signed)		Checked by NAME			

HOUSE NO.	ON LOT	ON PLAN	BUILDING SUBDIVIDED INTO STRATA LOTS
8	1052M	85726	U4556P TO U4659P

APPENDIX K-2

LEGEND

1. The common property extends to those parts indicated on the plans annexed hereto.
2. The common property includes driveways, bin centre, etc.

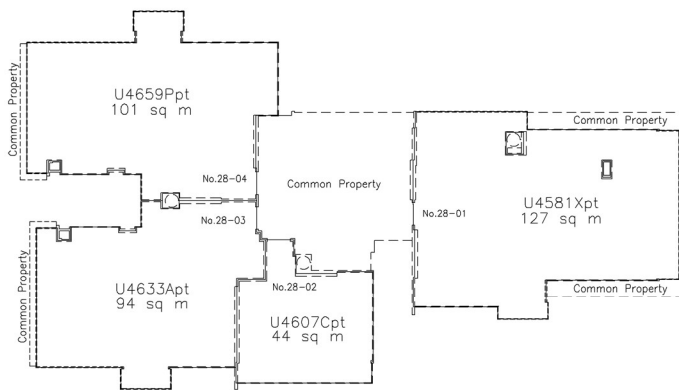


ELEVATION SKETCHES SHOWING STRATA LOTS & UNIT NOS.

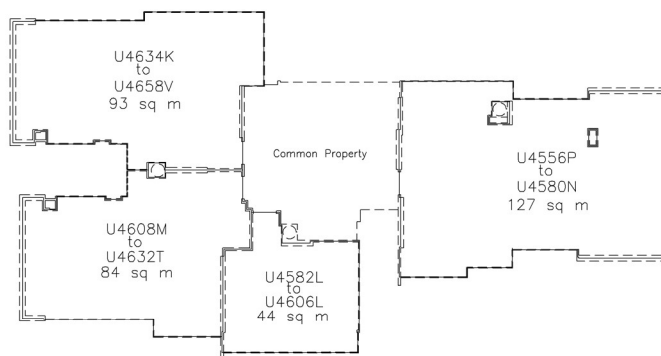
Areas of Strata Lots are scaled only	Approved Name Date Registered Surveyor (Digitally Signed) Soh Kheng Peng Chief Surveyor (Digitally Signed)	T.S. NO.29 ST.47393
Block / House No : 8		
Road Name : Irrawaddy Road		
Site Plan : ST.47392		
Storey Plans : ST.47394, ST.47395.		
SLA/SWY 3044-2009		

STOREY PLAN

APPENDIX K-3



28TH STOREY




TYPICAL STOREY

(Corresponding Strata Lots From 3rd to 27th Storeys Are identical)



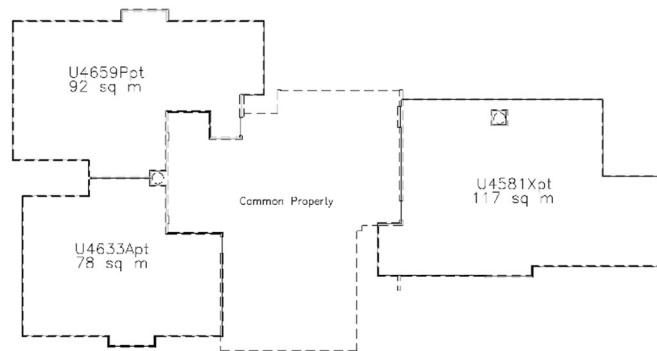
Note: For total areas of strata lots see tabulation on ST.47395

Areas of Strata Lots are scaled only		Name _____ Date _____ Registered Surveyor ("Digitally Signed")	Approved Soh Kheng Peng Chief Surveyor ("Digitally Signed")	 T.S. NO.29 ST.47394
Block / House No : 8				
Road Name : Irrawaddy Road				
Site Plan : ST.47392				
Elevation Sketch : ST.47393				
SLA/SVY 3044-2009	Scale 1:200			

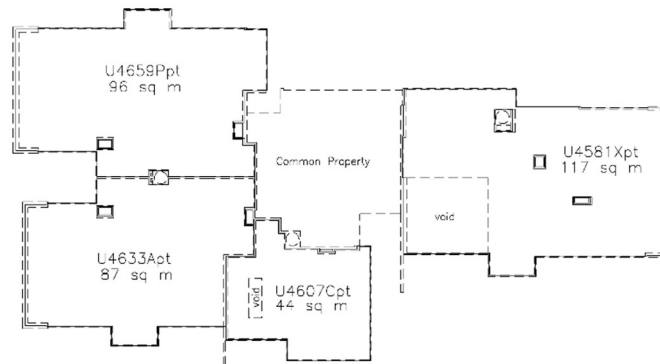
STOREY PLAN

APPENDIX K-4

House No.	Strata Lot	Storey	Strata Area In Parts(sq m)			Total Strata Void Area (sq m)	Total Strata Area (sq m)
			Floor Area	Void Area	Sub Total		
8	U4581X	28th	127	0	127	19	361
		29th	98	19	117		
		Roof	117	0	117		
	U4607C	28th	44	0	44	2	88
		29th	42	2	44		
		Roof	0	0	0		
	U4633A	28th	94	0	94	0	299
		29th	87	0	87		
		Roof	78	0	78		
	U4659P	28th	101	0	101	0	289
		29th	96	0	96		
		Roof	92	0	92		



ROOF

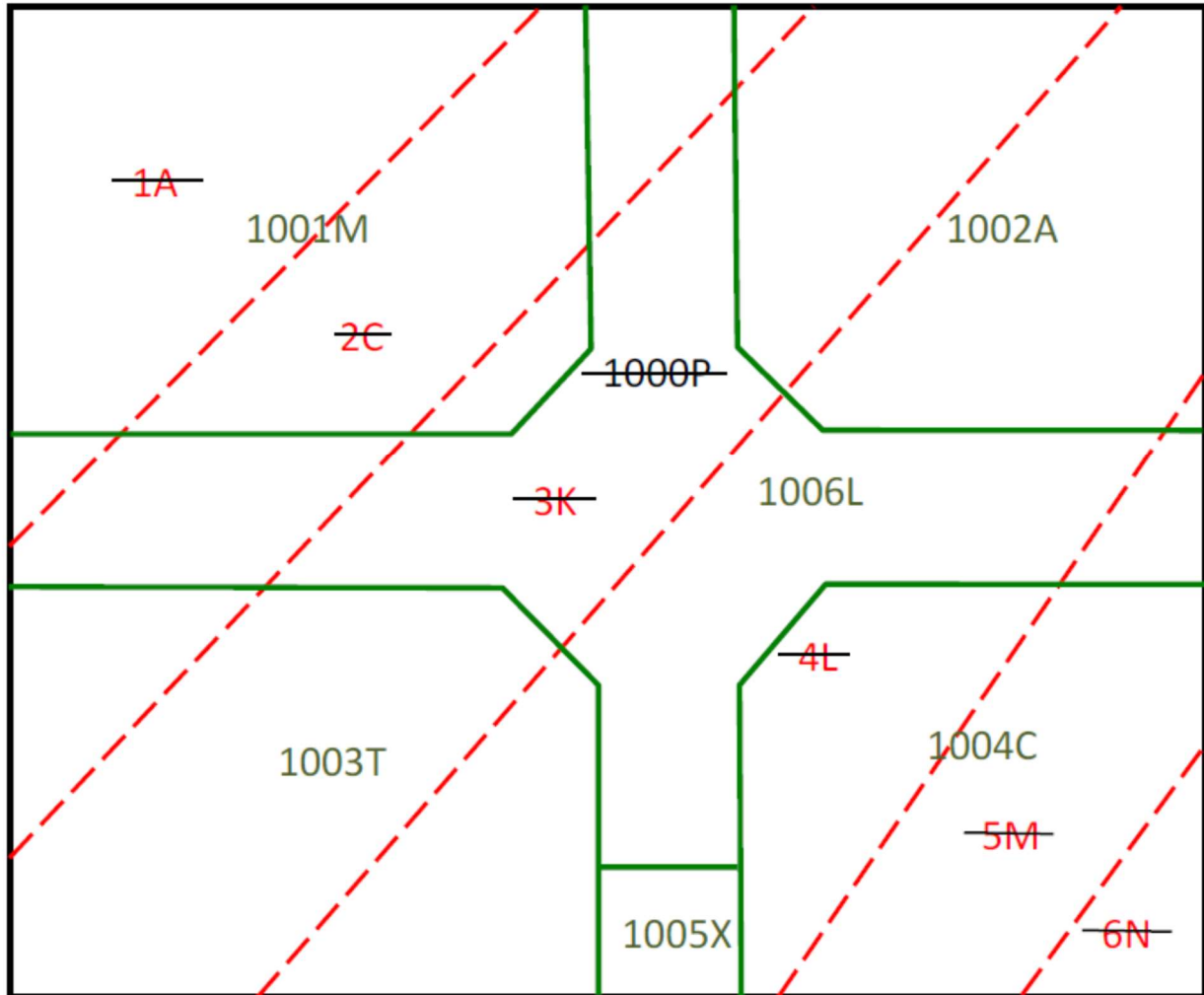


29TH STOREY



Areas of Strata Lots are scaled only		Name _____ Date _____ Registered Surveyor (Digitally Signed)	Approved Soh Kheng Peng Chief Surveyor (Digitally Signed)	 T.S. NO.29 ST.47395
Block / House No : 8				
Road Name : Traxoddy Road				
Site Plan : SI.47392				
Elevation Sketch : SI.47393				
SLA/SVY 3044-2009	Scale 1:200			

SKETCH PPL



Note:

- (a) Physical Parent Lots 1A to 6N are amalgamated as "Dummy" Lot 1000P.
- (b) Lot 1000P is subdivided into Child Lots 1001M to 1006L.

(SAMPLE OF LETTER FORMAT)

Our Ref: _____
 Your Ref: SLA/SVY _____

Date: _____

To: Chief Surveyor
 Singapore Land Authority

CHILD LOTS 1001M TO 1006L & PHYSICAL PARENT LOTS 1A TO 6N MK __ AT 22 XYZ ROAD

The “Child lots-Physical Parent Lots” relationship is as listed below. The relationship is subject to approval of the final survey.

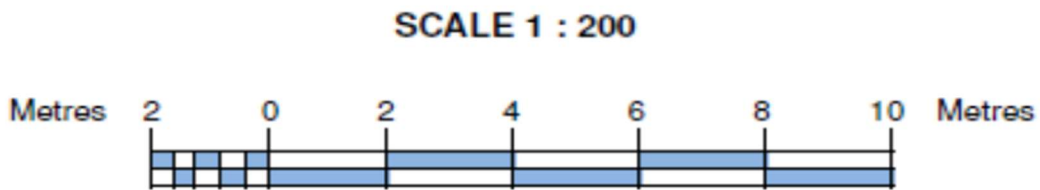
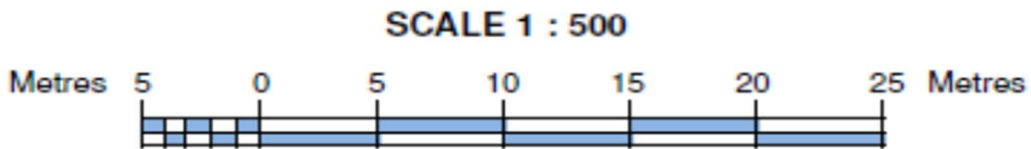
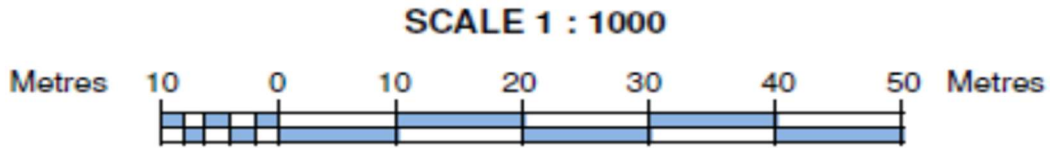
Yours faithfully,

 (Name)
 Registered Surveyor

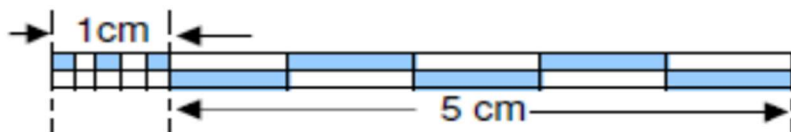
cc
Clients (Developers / Landowners)
 Please forward this letter to your Solicitors.

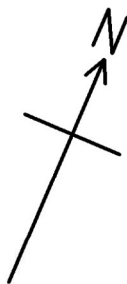
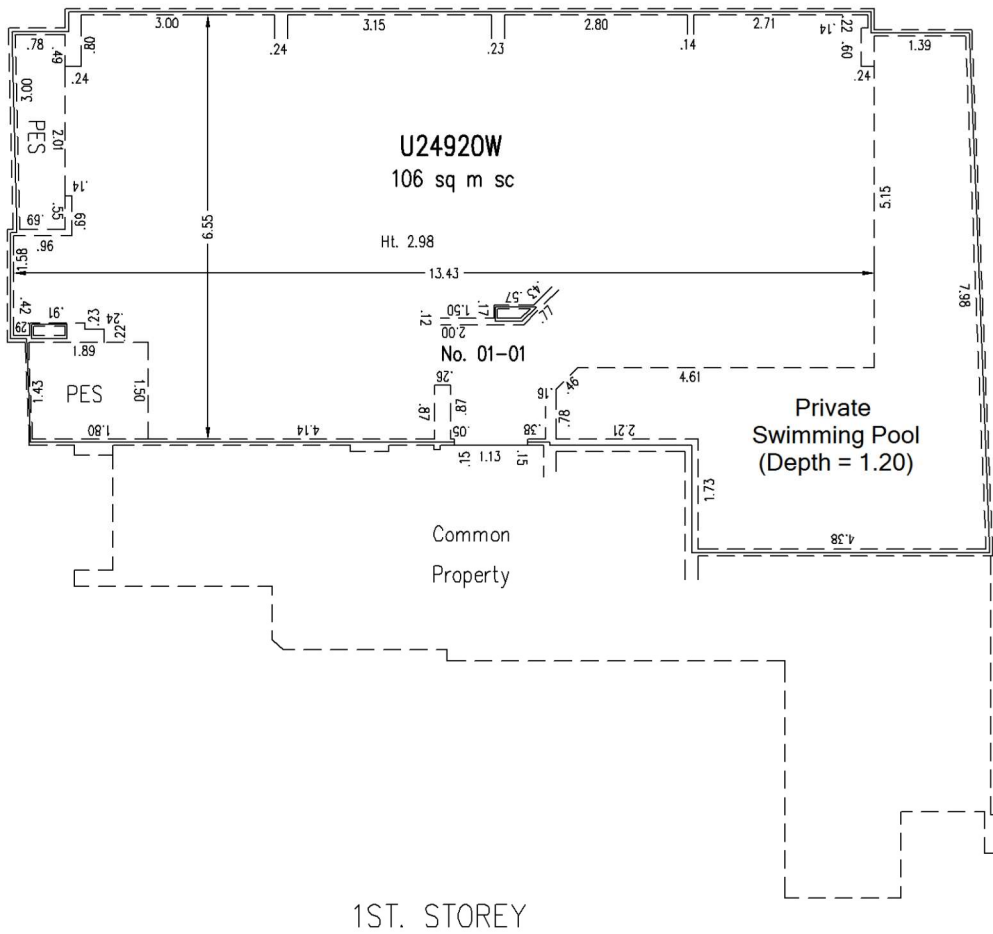
MK/TS No:		
No	Child Lot	Physical Parent Lot
1	1001M	Part of Lots 1A, 2C, 3K
2	1002A	Part of Lots 2C, 3K 4L, 5M
3	1003T	Part of Lots 2C, 3K, 4L
4	1004C	Part of Lots 4L, 5M and whole of Lot 6N
5	1005X	Part of Lot 4L
6	1006L	Part of Lots 1A, 2C, 3K, 4L, 5M

Sample Bar Scale
(For illustration only)



Bar Scale Length





Name _____ Date _____
Registered Surveyor
(Digitally Signed)

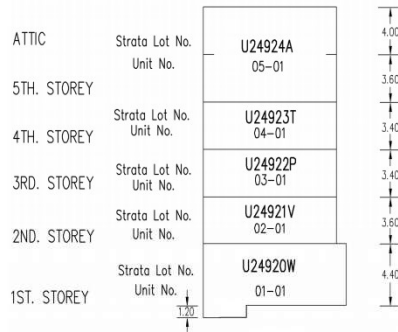
MUKIM No. 00	Not To Scale	
Surveyed By : Name	SVY No.0001-2011	Cad. Map No. : 1000
Date :		CPST No. : ST. 89999 to 90003

House No.	On Lot	On Plan	Building Subdivided Into Strata Lots
3	1000A	10000	U24920W TO U24924A

SAMPLE

LEGEND :

1. The common property extends to those parts indicated on the plans annexed hereto.
2. The common property includes driveways, car parks, etc.
3. The common property does not include the private swimming pool which is for the exclusive use of the strata lot and as indicated and described in the Storey Plan and Elevation Sketch.



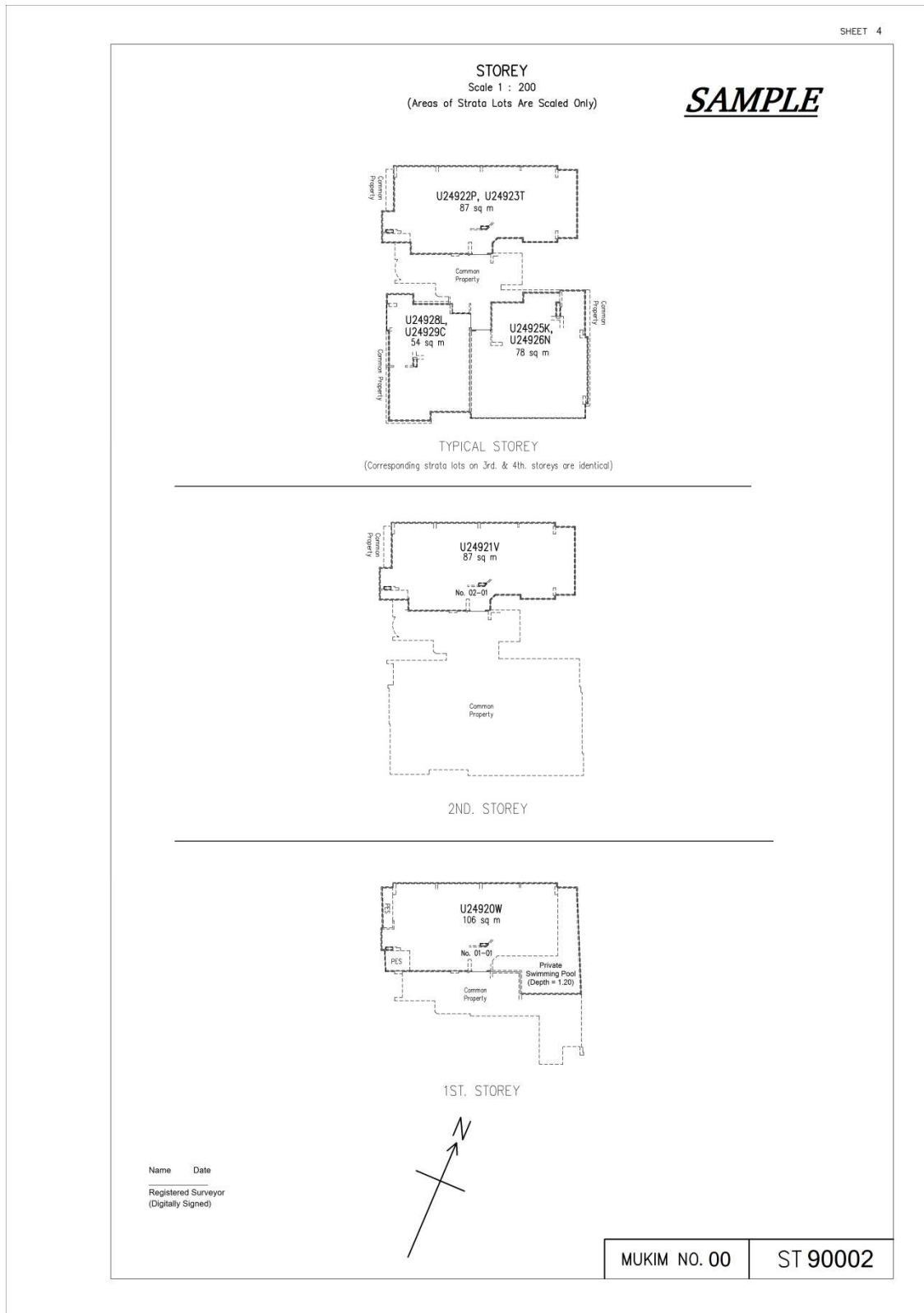
ELEVATION SKETCHES SHOWING STRATA LOTS & UNIT NUMBERS

Name _____ Date _____

Registered Surveyor
(Digitally Signed)

MUKIM NO. 00	ST 90000
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Note : The sample is taken from CS Circular 7/2011 before the new information/history box format at the bottom of the plan is implemented.



Note : The sample is taken from CS Circular 7/2011 before the new information/history box format at the bottom of the plan and bar scale is implemented.