

SG LandXML for Land Surveyors

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Training Room, SLA

The course aims to

- equip participants with deeper understanding about SG LandXML
- describe the enumeration lists
- inform participants the required information for different submission types
- train participants to rectify textual errors returned from the Portal (hands-on)
- assess the understanding of participants in SG LandXML

- The course does not teach you to create SG LandXML by hand from scratch. SG LandXML should be created by software.
- It is not advisable to edit observation data (e.g. traverse) in SG LandXML. The data should be converted directly from software.
- The details presented here may not be exclusive. Refer to the SG LandXML Specification at the SLA website for further details. If discrepancies occur between the slides and the specification, the slides shall supersede.
- The slides are subject to change. Please rest assured the change will be minimal if any.

Lecture Content

- LandXML Overview
- Plan Info, JOB and SVY in SG LandXML
- Enumeration Lists for <CGPoint>,<Monument>,<Parcel>,<ReducedObservation>
- Airspace, Subterranean, Elevation, and other elements
- Occupational Details and Encroachment
- Required Information in Different Submission Types
 - Land – LN, AC, RT and CP
 - Refinement
 - Control Points – Horizontal and Vertical
 - Strata – SN, SA and ST

XML (eXtensible Markup Language)

- it is a markup language, meaning it can mark sections with descriptive labels (e.g. person, address, phone)

```

<?xml version="1.0"? >
<person>
  <address>55 Newton Road</address>
  <phone>123456</phone>
</person>

```



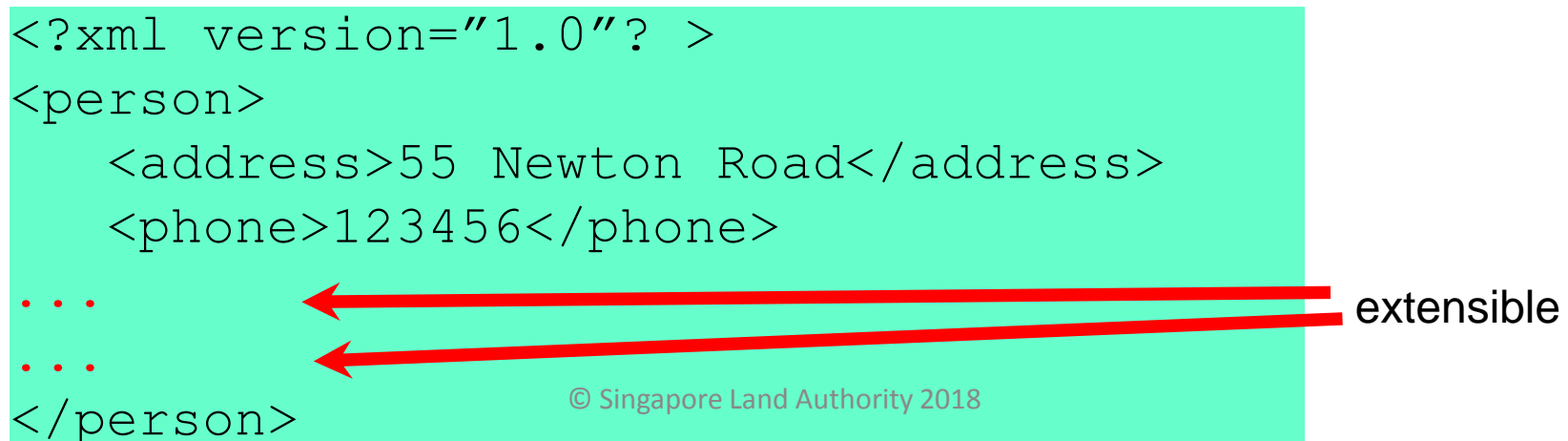
The diagram shows the XML code from the previous block. Three red arrows point from the word "sections" on the right to the opening tags of the root element (<person>), the inner element (<address>), and another inner element (<phone>).

- it is an extensible language, as it can add unlimited number of sections (e.g. address, phone, NRIC,)

```

<?xml version="1.0"? >
<person>
  <address>55 Newton Road</address>
  <phone>123456</phone>
  ...
  ...
</person>

```



The diagram shows the XML code from the previous block with two red arrows pointing from the word "extensible" on the right to the ellipsis (...) lines within the <person> element, indicating that more elements can be added.

Benefits of XML

- it is extensible and editable;
- it is an International Open Standard, thus not dependent on certain vendor;
- can be open by any text editors, e.g. Wordpad, NotePad, web browsers;
- easily translated into different formats;
- readable by humans and machines, thus understanding your data more closely and easily
- relatively smaller in file size

XML -> LandXML

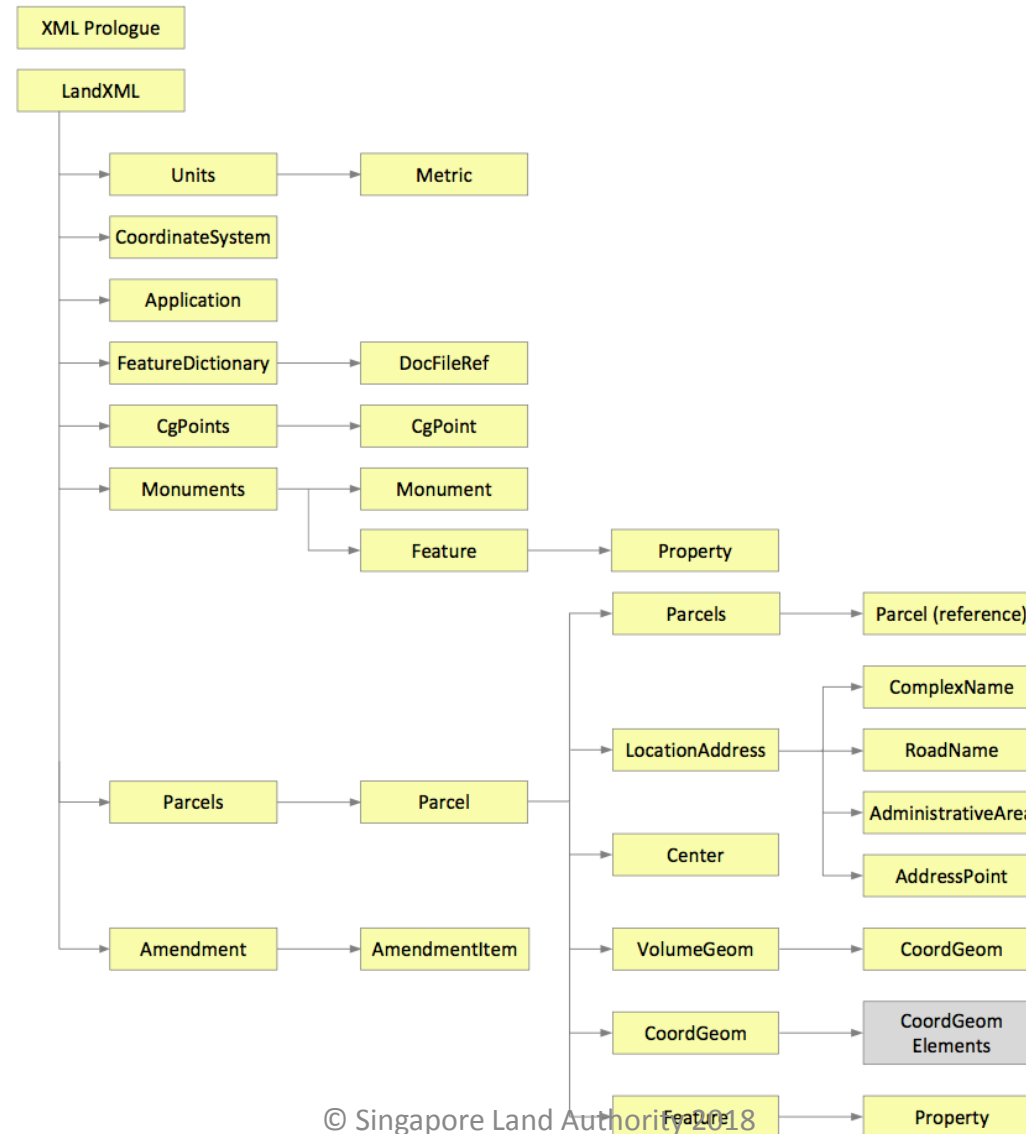
- an open data exchange for land development and transportation industries
- it is a XML format that is used to store land-related information, such as traverse, parcel, surveyor details
- supported by vendors such as Autodesk, Bentley, Trimble, Topcon, Leica
- was developed in July 2002
- a national standard in Australia and New Zealand for cadastral surveyors to submit their survey jobs. Based on the submission in LandXML, computer systems are able to process cadastral jobs automatically
- **SG LandXML software is locally supported by Dai (from AGEO), GPSLands and Listech Neo (with Leica Singapore)**

Government Agencies that support LandXML

- Australia - Intergovernmental Committee for Surveying and Mapping (ICSM)
<http://icsm-eplan.govspace.gov.au>
- British Columbia, Canada
- New Zealand - Land Information NZ's LandOnline.
<http://www.landonline.govt.nz>
- Singapore - Singapore Land Authority
- US Federal Highway Administration, US Environment Protection Agency, US Army Corp of Engineers

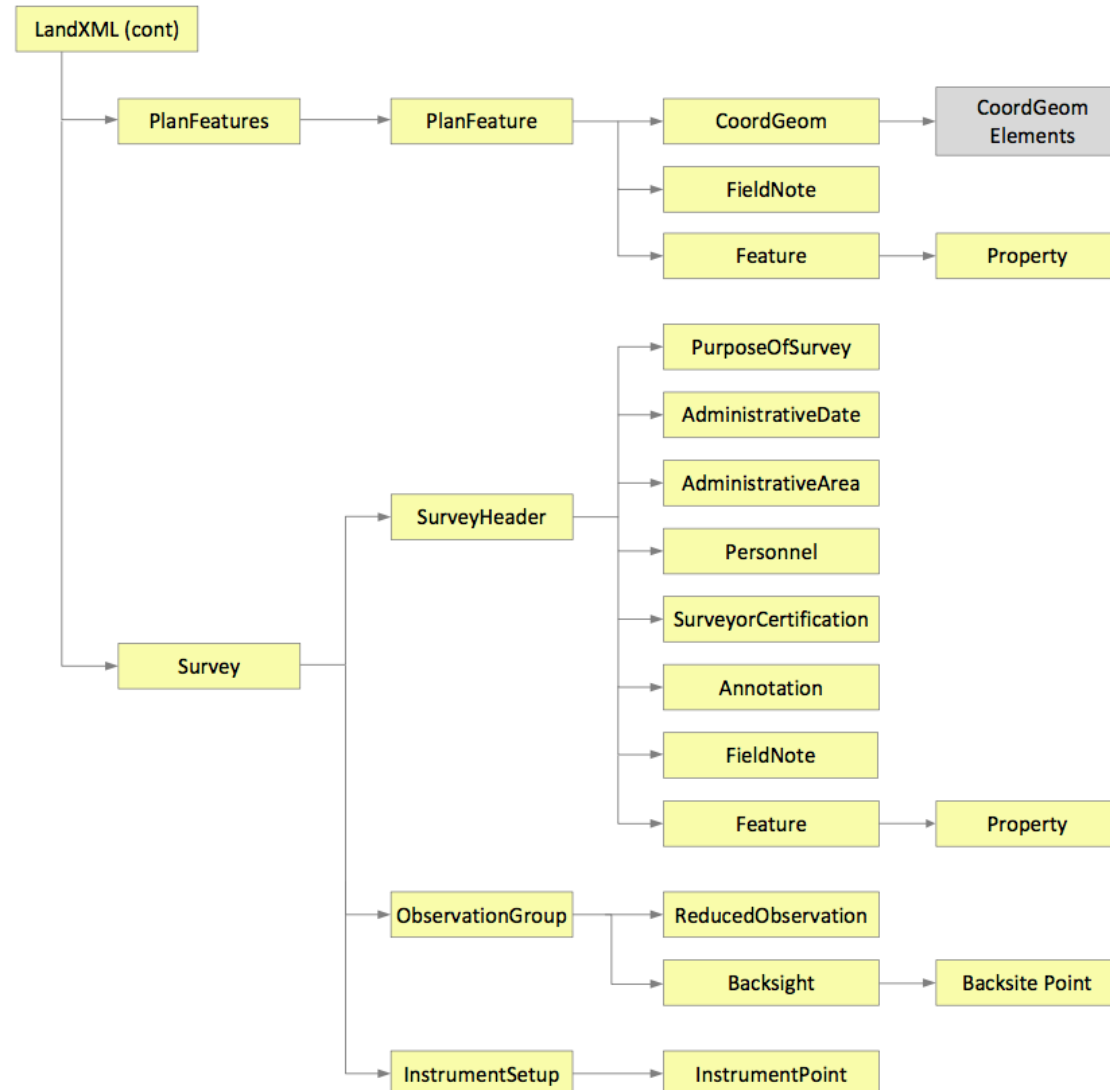
LandXML Tree Structure

Figure 1 SG LandXML Elements Used



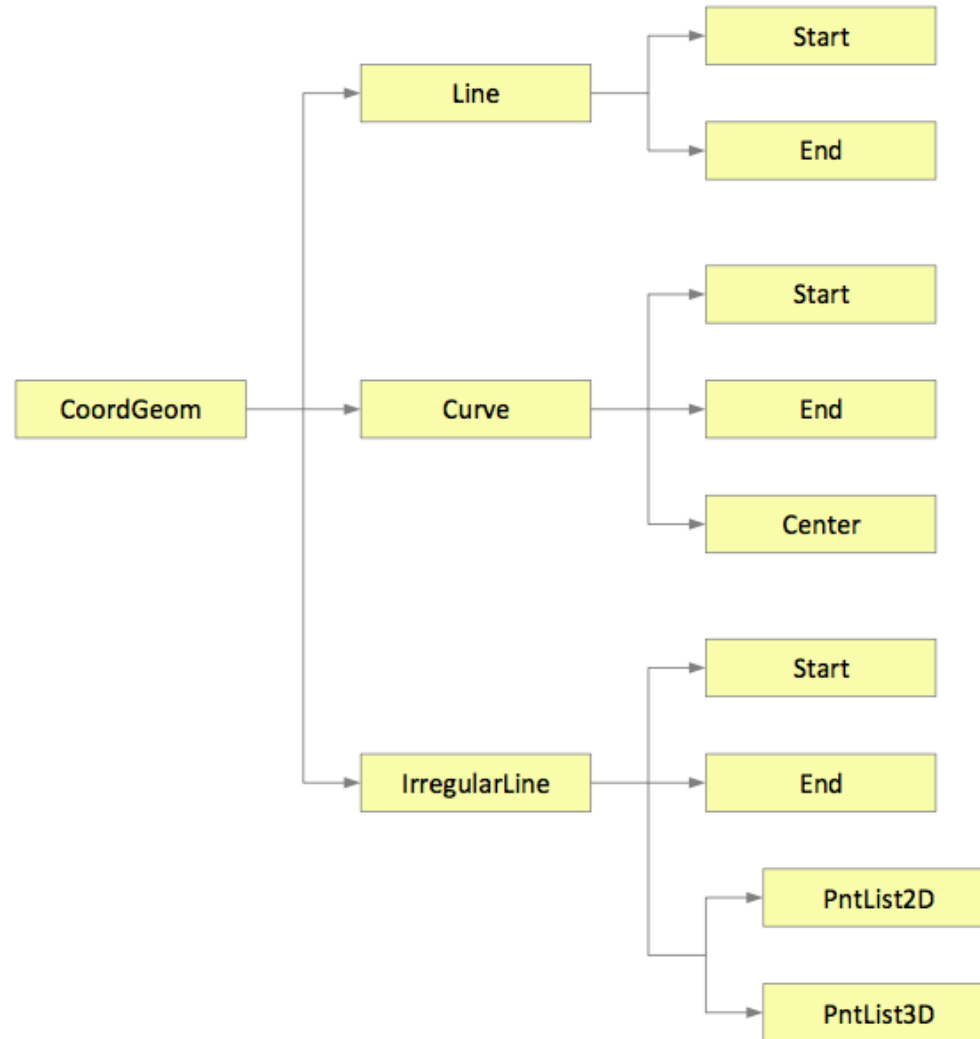
LandXML Tree Structure

Figure 2 SG LandXML Elements Used (Continued)



LandXML Tree Structure

Figure 3 LandXML CoordGeom Elements



SG LandXML Header

```
<?xml version="1.0" encoding="utf-8"?>
<LandXML xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.2" date="2017-12-15" time="11:29:07"
xsi:schemaLocation="http://www.landxml.org/schema/LandXML-1.2
http://www.landxml.org/schema/LandXML-1.2/LandXML-1.2.xsd" xmlns="http://www.landxml.org/schema/LandXML-1.2">
  <Units>
    <Metric linearUnit="meter" temperatureUnit="celsius" volumeUnit="cubicMeter" areaUnit="squareMeter"
    pressureUnit="milliBars" angularUnit="decimal dd.mm.ss" directionUnit="decimal dd.mm.ss" />
  </Units>
  <CoordinateSystem datum="SVY21" horizontalDatum="SVY21" verticalDatum="SHD" />
  <Application name="CSMS" manufacturer="SLA" version="1.0.0" manufacturerURL="www.SLA.gov.sg" />
```

Plan Info, JOB and SVY in SG LandXML

Plan Info in <CGPoint>, <Parcel>, <SurveyorCertificate>

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.3.1 (i)	Plan Headings	Plan	-	LandXML/Parcels/Parcel@name
4.3.2	Plan Serial Number	Plan	-	LandXML/Parcels/Parcel@desc
4.3.3 (i)	Station numbers	Plan	-	LandXML/CgPoints/CgPoint@name
4.3.3 (ii)	Coordinates of Boundaries	Plan	-	LandXML/CgPoints/CgPoint content
4.3.3 (iii)	Area of Lot	Plan	-	LandXML/Parcels/Parcel@area
4.4.4	Certification of survey documents	Plan	-	LandXML/Survey/SurveyHeader/SurveyorCertificate

```
<Parcel parcelType="reclaimed" name="MK07-04606X" desc="RT30065" area="192018" class="final" parcelFormat="standard">
```

```
<CgPoint name="201" desc="final" pntSurv="boundary" code="L01">26753.851 3576.549</CgPoint>
```

```
<SurveyorCertificate name="CPCertificate" certificateType="CP" textCertificate="I, HWANG HAUT ENG, 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="2017-10-01" />
```

Plan Info in <SurveyHeader>

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.4.1 (b)	Name of RS	Plan	-	LandXML/Survey/SurveyHeader/Personnel@role="Surveyor"
4.4.1 (b)	Name of Auth. Assistant	Plan	-	LandXML/Survey/SurveyHeader/Personnel@role="Authorised Assistant"
4.4.1 (b)	Date of Completion	Plan	-	LandXML/Survey/SurveyHeader/AdministrativeDate@adminDateType="Completed"
4.4.1 (f)	Street names	Plan	-	LandXML/Survey/SurveyHeader/Annotation@type="RoadLabel"
4.4.1 (f)	House numbers	Plan	-	LandXML/Survey/SurveyHeader/Annotation@type="HouseNumber"
4.4.1 (g)	Reference Plans	Plan	-	LandXML/Survey/SurveyHeader/Feature@name="RefDocs"
4.4.1 (h)	CS file reference number	Plan	-	LandXML/Survey/SurveyHeader@name
4.4.2 (a)	Plan schedule	Plan	-	LandXML/Survey/SurveyHeader/Feature@name="Lineage"

```

<SurveyHeader name="3897-2017" jurisdiction="Singapore" surveyorFirm="UNITED SURVEYORS PTE LTD" surveyorReference="12345">
  <Annotation type="ParcelNote" name="n1" desc="Allocated For Reclaimed Land" pclRef="MK07-04606X"/>
  <Annotation type="RoadLabel" name="TUAS SOUTH BOULEVARD" desc="26292.012 3635.034 26733.526 3635.505"/>
  <Annotation type="HouseNumber" desc="26808.126 3576.266"/>
  <AdministrativeDate adminDateType="Commenced" adminDate="2017-03-30" />
  <AdministrativeDate adminDateType="Completed" adminDate="2017-04-16" />
  <Personnel role="Surveyor" name="THOMAS LAW AH WENG" />
  <Personnel role="Authorised Assistant" name="Kim Dim Sung" />

```

```

<Feature name="Lineage">
  <Property label="lineage" value="NEW=MK07-04606X" />
</Feature>

```

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JOB in <SurveyHeader>

JOB

<SLA/SVY file number>

<date of commencement>

<date of completion>

<survey company>

<surveyor's name >

<authorised assistant's name, ,authorised assistant's name>
(comma delimited if more than one assistant)

END

```
<SurveyHeader name="3897-2017" jurisdiction="Singapore" surveyorFirm="UNITED SURVEYORS PTE LTD" surveyorReference="12345">
  <Annotation type="ParcelNote" name="n1" desc="Allocated For Reclaimed Land" pclRef="MK07-04606X"/>
  <Annotation type="RoadLabel" name="TUAS SOUTH BOULEVARD" desc="26292.012 3635.034 26733.526 3635.505"/>
  <Annotation type="HouseNumber" desc="26753.851 3576.549 26808.126 3576.266"/>
  <AdministrativeDate adminDateType="Commenced" adminDate="2017-03-30" />
  <AdministrativeDate adminDateType="Completed" adminDate="2017-04-16" />
  <Personnel role="Surveyor" name="THOMAS LAW AH WENG" />
  <Personnel role="Authorised Assistant" name="Kim Dim Sung" />
  ...
  ...
  ...
  <Feature name="Lineage">
    <Property label="lineage" value="NEW=MK07-04606X" />
  </Feature>
  <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="2017-04-16"/>
  <PurposeOfSurvey name="CPLNDPOL" />
</SurveyHeader>
```


JOB in <SurveyHeader>/Feature@name="EDM"

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.6 (a)	Job control	.job	JOB	LandXML/Survey/SurveyHeader LandXML/Survey/SurveyHeader/AdministrativeDate LandXML/Survey/SurveyHeader/Personnel
4.6 (b)	EDM calibration	.job	EDM	LandXML/Survey/SurveyHeader/Feature@name="EDM"
4.6 (c)	Instrument precision	.job	PRECISION	LandXML/Survey/SurveyHeader/Feature@name="EDM"/Feature@name="Precisions"

```

<Feature name="EDM">
  <Feature name="Certificate">
    <Property label="certificateNumber" value="Utd-12-01" />
    <Property label="organisation" value="United Surveyors Pte Ltd" />
    <Property label="observer" value="Yuan JinLian" />
    <Property label="date" value="16 March 2012" />
  </Feature>
  <Feature name="Hardware">
    <Property label="tsModel" value="Topcon GTS751" />
    <Property label="tsSerialNumber" value="780677" />
    <Property label="tsHtAboveBase" value="0.240" />
    <Property label="prismModel" value="Topcon" />
    <Property label="numPrisms" value="1" />
    <Property label="prismHtAboveBase" value="0.240" />
  </Feature>
  <Feature name="Residuals">
    <Property label="series1" value="0.000, 0.003, 0.003, 0.000, 0.002, -0.001" />
    <Property label="series2" value="0.003, 0.002, 0.001, 0.002, -0.004" />
    <Property label="series3" value="0.000, 0.000, 0.002, -0.003" />
    <Property label="series4" value="0.000, 0.002, -0.004" />
    <Property label="series5" value="0.002, -0.004" />
    <Property label="series6" value="-0.005" />
  </Feature>
  <Feature name="Constants">
    <Property label="addConst" value="0.000" />
    <Property label="addConstStdDev" value="0.001" />
    <Property label="scale" value="1.9" />
    <Property label="scaleStdDev" value="5.6" />
    <Property label="firstOrderCycCos" value="" />
    <Property label="firstOrderCycSin" value="" />
    <Property label="secondOrderCycCos" value="" />
    <Property label="secondOrderCycSin" value="" />
    <Property label="smStdDev" value="0.000" />
  </Feature>
  <Feature name="Precisions">
    <Property label="direction" value="1" />
    <Property label="a" value="2" />
    <Property label="b" value="2" />
    <Property label="c" value="2" />
    <Property label="d" value="2" />
  </Feature>
</Feature>
  
```

JOB in <SurveyHeader>/Feature@name="EDM"/ Feature@name="Certificate"

EDM

<certificate number*>

<organisation>

<observer>

<date>

```
<Feature name="EDM">
  <Feature name="Certificate">
    <Property label="certificateNumber" value="Utd-12-01" />
    <Property label="organisation" value="United Surveyors Pte Ltd" />
    <Property label="observer" value="Yuan JinLian" />
    <Property label="date" value="16 March 2012" />
  </Feature>
  <Feature name="Hardware">
  <Feature name="Residuals">
  <Feature name="Constants">
  <Feature name="Precisions">
</Feature>
```

JOB in <SurveyHeader>/Feature@name="EDM"/ Feature@name="Hardware"

<EDM model>, <serial number>, <height above base plate (m)>

<prism model>, <no. of prisms>, <height above base plate (m)>

```
<Feature name="EDM">
  <Feature name="Certificate">
  <Feature name="Hardware">
    <Property label="tsModel" value="Topcon GTS751" />
    <Property label="tsSerialNumber" value="7S0677" />
    <Property label="tsHtAboveBase" value="0.240" />
    <Property label="prismModel" value="Topcon" />
    <Property label="numPrisms" value="1" />
    <Property label="prismHtAboveBase" value="0.240" />
  </Feature>
  <Feature name="Residuals">
  <Feature name="Constants">
  <Feature name="Precisions">
</Feature>
```

JOB in <SurveyHeader>/Feature@name="EDM"/ Feature@name="Residuals"

```

<residuals 1-2>, <residuals 1-3>, ... , <residuals 1-7>
<residuals 2-3>, <residuals 2-4>, ... , <residuals 2-7>
<residuals 3-4>, <residuals 3-5>, ... , <residuals 3-7>
<residuals 4-5>, <residuals 4-6>, <residuals 4-7>
<residuals 5-6>, <residuals 5-7>
<residuals 6-7>

```

```

<Feature name="EDM">
  <Feature name="Certificate">
  <Feature name="Hardware">
  <Feature name="Residuals">
    <Property label="series1" value="0.000, 0.003, 0.003, 0.000, 0.002, -0.001" />
    <Property label="series2" value="0.003, 0.002, 0.001, 0.002, -0.004" />
    <Property label="series3" value="0.000, 0.000, 0.002, -0.003" />
    <Property label="series4" value="0.000, 0.002, -0.004" />
    <Property label="series5" value="0.002, -0.004" />
    <Property label="series6" value="-0.005" />
  </Feature>
  <Feature name="Constants">
  <Feature name="Precisions">
</Feature>

```

JOB in <SurveyHeader>/Feature@name="EDM"/ Feature@name="Constants"

```

<additive constant>
<standard deviation of additive constant>
<scale (ppm)>
<standard deviation of scale>
<1st order cyclic cosine coefficient (mm)>
<1st order cyclic sine coefficient (mm)>
<2nd order cyclic cosine coefficient (mm)>
<2nd order cyclic sine coefficient (mm)>
<standard deviation of single measured distance(mm)>

```

```

<Feature name="EDM">
  <Feature name="Certificate">
  <Feature name="Hardware">
  <Feature name="Residuals">
  <Feature name="Constants">
    <Property label="addConst" value="0.000" />
    <Property label="addConstStdDev" value="0.001" />
    <Property label="scale" value="1.9" />
    <Property label="scaleStdDev" value="5.6" />
    <Property label="firstOrderCycCos" value="" />
    <Property label="firstOrderCycSin" value="" />
    <Property label="secondOrderCycCos" value="" />
    <Property label="secondOrderCycSin" value="" />
    <Property label="smdStdDev" value="0.000" />
  </Feature>
  <Feature name="Singapore" value="Singapore Authority 2018" />
</Feature>

```

JOB in <SurveyHeader>/Feature@name="EDM"/ Feature@name="Precisions"

PRECISION

<direction (in seconds)> , <a (mm)> , <b (ppm)>
<c (mm)> , <d (mm)>

END

```
<Feature name="EDM">  
  <Feature name="Certificate">  
  <Feature name="Hardware">  
  <Feature name="Residuals">  
  <Feature name="Constants">  
  <Feature name="Precisions">  
    <Property label="direction" value="1" />  
    <Property label="a" value="2" />  
    <Property label="b" value="2" />  
    <Property label="c" value="2" />  
    <Property label="d" value="2" />  
  </Feature>  
</Feature>
```

JOB in <ObservationGroup>

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.6 (d)	Main traverse	.job	MAIN	LandXML/Survey/ObservationGroup@id="Main"
4.6 (e)	Sub traverse	.job	SUB	LandXML/Survey/ObservationGroup@id="Sub{n}"
4.6 (f)	Side-shot	.job	SS	LandXML/Survey/ObservationGroup@id="Sideshot{n}"
4.6 (g)	Observation	.job	OBS	LandXML/Survey/ObservationGroup@id="Observation{n}"

```

<ObservationGroup id="Main">
  <Backsight circle="359.5959" setupID="IS-2">
    <BacksightPoint name="-1" pntRef="1" />
  </Backsight>
  <ReducedObservation name="1" purpose="traverse" setupID="IS-2" targetSetupID="IS-3" azimuth="274.3806" horizDistance="132.322" />
  <ReducedObservation name="2" purpose="traverse" setupID="IS-3" targetSetupID="IS-4" azimuth="355.2733" horizDistance="86.009" />
  <ReducedObservation name="3" purpose="traverse" setupID="IS-4" targetSetupID="IS-5" azimuth="1.3610" horizDistance="68.438" />
  <ReducedObservation name="4" purpose="traverse" setupID="IS-5" targetSetupID="IS-6" azimuth="277.5657" horizDistance="115.332" />
  <ReducedObservation name="5" purpose="traverse" setupID="IS-6" targetSetupID="IS-7" azimuth="256.1905" horizDistance="77.132" />
  <ReducedObservation name="6" purpose="traverse" setupID="IS-7" targetSetupID="IS-8" azimuth="357.2847" horizDistance="37.468" />
  <ReducedObservation name="7" purpose="traverse" setupID="IS-8" targetSetupID="IS-9" azimuth="252.4140" horizDistance="43.322" />
  <ReducedObservation name="8" purpose="traverse" setupID="IS-9" targetSetupID="IS-10" azimuth="0.5626" horizDistance="108.797" />
  <ReducedObservation name="9" purpose="traverse" setupID="IS-10" targetSetupID="IS-11" azimuth="1.5953" horizDistance="165.482" />
  <ReducedObservation name="10" purpose="traverse" setupID="IS-11" targetSetupID="IS-12" azimuth="271.0347" horizDistance="133.820" />
  <ReducedObservation name="11" purpose="traverse" setupID="IS-12" targetSetupID="IS-13" azimuth="271.4643" horizDistance="115.809" />
  <ReducedObservation name="12" purpose="traverse" setupID="IS-13" targetSetupID="IS-14" azimuth="0.5837" horizDistance="114.628" />
  <ReducedObservation name="13" purpose="traverse" setupID="IS-14" targetSetupID="IS-15" azimuth="1.4431" horizDistance="143.826" />
  <ReducedObservation name="14" purpose="traverse" setupID="IS-15" targetSetupID="IS-16" azimuth="1.3213" horizDistance="241.169" />
  <ReducedObservation name="15" purpose="traverse" setupID="IS-16" targetSetupID="IS-17" azimuth="279.3458" horizDistance="128.567" />
  <ReducedObservation name="16" purpose="traverse" setupID="IS-17" targetSetupID="IS-18" azimuth="263.0752" horizDistance="101.164" />
  <ReducedObservation name="17" purpose="traverse" setupID="IS-18" targetSetupID="IS-19" azimuth="10.5618" horizDistance="114.060" />
  <ReducedObservation name="18" purpose="traverse" setupID="IS-19" targetSetupID="IS-20" azimuth="90.0049" horizDistance="176.450" />
  <ReducedObservation name="19" purpose="traverse" setupID="IS-20" targetSetupID="IS-21" azimuth="113.4318" horizDistance="116.644" />
  <ReducedObservation name="20" purpose="traverse" setupID="IS-21" targetSetupID="IS-22" azimuth="92.5028" horizDistance="139.801" />
  <ReducedObservation name="21" purpose="traverse" setupID="IS-22" targetSetupID="IS-23" azimuth="89.5045" horizDistance="157.332" />
  <ReducedObservation name="22" purpose="traverse" setupID="IS-23" targetSetupID="IS-24" azimuth="85.3943" horizDistance="105.211" />
  <ReducedObservation name="23" purpose="traverse" setupID="IS-24" targetSetupID="IS-25" azimuth="179.5656" horizDistance="89.875" />
  <ReducedObservation name="24" purpose="traverse" setupID="IS-25" targetSetupID="IS-26" azimuth="181.2630" horizDistance="181.563" />
  <ReducedObservation name="25" purpose="traverse" setupID="IS-26" targetSetupID="IS-27" azimuth="181.1958" horizDistance="181.167" />
  <ReducedObservation name="26" purpose="traverse" setupID="IS-27" targetSetupID="IS-28" azimuth="181.2147" horizDistance="136.788" />
  <ReducedObservation name="27" purpose="traverse" setupID="IS-28" targetSetupID="IS-29" azimuth="181.1805" horizDistance="235.501" />
  <ReducedObservation name="28" purpose="traverse" setupID="IS-29" targetSetupID="IS-30" azimuth="126.0837" horizDistance="95.874" />
  <ReducedObservation name="29" purpose="traverse" setupID="IS-30" targetSetupID="IS-1" azimuth="89.4819" horizDistance="58.483" />
  <ReducedObservation name="30" purpose="traverse" setupID="IS-1" targetSetupID="IS-2" azimuth="179.5941" horizDistance="161.476" />
</ObservationGroup>
<ObservationGroup id="Sub1">
<ObservationGroup id="Sub2">
<ObservationGroup id="Sub3">
<ObservationGroup id="Sideshot1">
  <Backsight circle="256.1905" setupID="IS-6">
    <BacksightPoint name="-1" pntRef="7" />
  </Backsight>
  <ReducedObservation name="42" purpose="sideshot" setupID="IS-6" targetSetupID="IS-50" azimuth="235.3753" horizDistance="36.073" />
</ObservationGroup>
  
```


JOB in ObservationGroup@id="Main", id="Sub1"...

MAIN

<1>, <REF>, <DDD.MMSS>

<from_stn>, <to_stn>, <DDD.MMSS>, <ddd.ddd>

< >

<1>, <REF>, <DDD.MMSS>

END

```
<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>
<ObservationGroup id="Sub1">
  <Backsight circle="303.3842" setupID="IS-8">
    <BacksightPoint name="-1" pntRef="7" />
  </Backsight>
  <ReducedObservation name="12" purpose="traverse" setupID="IS-8" targetSetupID="IS-12" azimuth="122.4919" horizDistance="207.514" />
  <ReducedObservation name="13" purpose="traverse" setupID="IS-12" targetSetupID="IS-13" azimuth="214.1609" horizDistance="287.190" />
  <ReducedObservation name="14" purpose="traverse" setupID="IS-13" targetSetupID="IS-14" azimuth="174.4608" horizDistance="81.419" />
  <ReducedObservation name="15" purpose="traverse" setupID="IS-14" targetSetupID="IS-15" azimuth="340.3632" horizDistance="106.229" />
  <ReducedObservation name="16" purpose="traverse" setupID="IS-15" targetSetupID="IS-1" azimuth="20.0911" horizDistance="103.421" />
  <ReducedObservation name="17" purpose="traverse" setupID="IS-1" targetSetupID="IS-11" azimuth="359.5955" horizDistance="72.877" />
</ObservationGroup>
```


SVY in PlanFeatures@name="Adjusted"/ PlanFeature@name="AdjustedLines"

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.7 (a)	Traverse adjustment	.svy	LINES	LandXML/PlanFeatures@name="Adjusted"/PlanFeature@name="AdjustedLines"

```
<PlanFeatures name="Adjusted">  
  <PlanFeature name="AdjustedLines">  
    <CoordGeom>  
      <Line dir="273.1608" length="132.320">  
      <Line dir="354.0536" length="86.009">  
      <Line dir="0.1410" length="68.438">  
      <Line dir="276.3448" length="115.331">  
      <Line dir="359.3503" length="53.006">  
      <Line dir="240.4712" length="35.661">  
      <Line dir="254.5652" length="77.132">  
      <Line dir="356.0642" length="37.466">  
      <Line dir="251.1943" length="43.322">  
      <Line dir="359.3441" length="108.795">  
        <Start pntRef="9" />  
        <End pntRef="10" />  
      </Line>  
    </CoordGeom>  
  </PlanFeature>  
</PlanFeatures>
```

SVY in PlanFeatures@name="Adjusted" / PlanFeature@name="AdjustedLines"

LINES

<from station>, <to station>, ~

<corrected distance (m)>, <corrected bearing (ddd.mmss)>

END

```
<PlanFeatures name="Adjusted">
  <PlanFeature name="AdjustedLines">
    <CoordGeom>
      <Line dir="273.1608" length="132.320">
      <Line dir="354.0536" length="86.009">
      <Line dir="0.1410" length="68.438">
      <Line dir="276.3448" length="115.331">
      <Line dir="359.3503" length="53.006">
      <Line dir="240.4712" length="35.661">
      <Line dir="254.5652" length="77.132">
      <Line dir="356.0642" length="37.466">
      <Line dir="251.1943" length="43.322">
      <Line dir="359.3441" length="108.795">
        <Start pntRef="9" />
        <End pntRef="10" />
      </Line>
    </CoordGeom>
  </PlanFeature>
</PlanFeatures>
```

SVY in <SurveyHeader>/Feature@name="Transformation"

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.7 (a)	Traverse adjustment	.svy	TRAVERSE	LandXML/Survey/SurveyHeader/Feature@name="Transformation"/Feature@name="Misclosure"
4.7 (b)	Transformation	.svy	PARAMETERS	LandXML/Survey/SurveyHeader/Feature@name="Transformation"/Feature@name="Parameters"
4.7 (b)	Transformation	.svy	RESIDUALS	LandXML/Survey/SurveyHeader/Feature@name="Transformation"/Feature@name="Residuals"

```

<Feature name="Transformation">
  <Feature name="Parameters">
    <Property label="a1" value="0.999738" />
    <Property label="b1" value="0.023877" />
    <Property label="a2" value="-26263.961000" />
    <Property label="b2" value="-3979.470250" />
  </Feature>
  <Feature name="Residuals">
    <Feature name="Residual">
      <Property label="station" value="2" />
      <Property label="northing" value="-0.005" />
      <Property label="easting" value="0.010" />
    </Feature>
    <Feature name="Residual">
      <Property label="station" value="24" />
      <Property label="northing" value="-0.009" />
      <Property label="easting" value="0.001" />
    </Feature>
    <Feature name="Residual">
      <Property label="station" value="15" />
      <Property label="northing" value="0.001" />
      <Property label="easting" value="-0.005" />
    </Feature>
    <Feature name="Residual">
      <Property label="station" value="10" />
      <Property label="northing" value="0.013" />
      <Property label="easting" value="-0.006" />
    </Feature>
  </Feature>
  <Feature name="Misclosure">
    <Feature>
      <Property label="refName" value="Main" />
      <Property label="angularMisclose" value="-18" />
      <Property label="miscloseRatio" value="1:68224" />
    </Feature>
  </Feature>
</Feature>
  
```

SVY in Feature@name="Transformation"/ Feature@Parameters,@Residuals, @Misclosure

PARAMETERS

<a1>, <b1>, <a2>, <b2>(to six decimal places)

END

RESIDUALS

<station>, <Northing-residuals (m)>, <Easting-residuals (m)>

< >

<station>, <Northing-residuals (m)>, <Easting-residuals (m)>

END

TRAVERSE

<angular misclose in seconds>, <FLM>

END

```

<Feature name="Transformation">
  <Feature name="Parameters">
    <Property label="a1" value="0.652864" />
    <Property label="b1" value="-0.757436" />
    <Property label="a2" value="-8820.312250" />
    <Property label="b2" value="2864.312000" />
  </Feature>
  <Feature name="Residuals">
    <Feature name="Residual">
      <Property label="station" value="4" />
      <Property label="northing" value="0.000" />
      <Property label="easting" value="-0.009" />
    </Feature>
    <Feature name="Residual">
      <Property label="station" value="17" />
      <Property label="northing" value="0.001" />
      <Property label="easting" value="0.009" />
    </Feature>
    <Feature name="Residual">
      <Property label="station" value="9" />
      <Property label="northing" value="0.003" />
      <Property label="easting" value="-0.009" />
    </Feature>
    <Feature name="Residual">
      <Property label="station" value="14" />
      <Property label="northing" value="-0.003" />
      <Property label="easting" value="0.009" />
    </Feature>
  </Feature>
  <Feature name="Misclosure">
    <Feature>
      <Property label="refName" value="Main" />
      <Property label="angularMisclose" value="21" />
      <Property label="miscloseRatio" value="1:94175" />
    </Feature>
  </Feature>
</Feature>

```

SVY in <CGPoint>, <Monument>

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.7 (c)	Coordinates	.svy	COORDINATES	LandXML/CgPoints LandXML/Monuments

COORDINATES

```
<station>, <northing>,<easting>, <point type>, ~ <point class>,  
<point flag>
```

```
< ..... >
```

```
<station>, <northing>,<easting>, <point type>, ~ <point class>,  
<point flag>
```

END

```
<CgPoints>  
  <CgPoint name="201" desc="final" pntSurv="boundary" code="L01">26753.851 3576.549</CgPoint>  
  <CgPoint name="202" desc="final" pntSurv="boundary" code="L01">26446.866 3576.512</CgPoint>  
</CgPoints>
```

```
<Monuments>  
  <Monument name="1" pntRef="201" type="SP" state="found" />  
  <Monument name="2" pntRef="202" type="NL" state="found" />  
</Monuments>
```

SVY in <Parcel>

LOT

<lot Number>, <area>, <area class> ~

<[CP Number1 + CP Number2 + CP Number3 +....]> ~

<station number, , station number>

END

```
<Parcel name="MK21-02622M" desc="CP86594" area="2000.0" class="reference" parcelFormat="standard" parcelType="land">
  <CoordGeom>
    <Line>
      <Start pntRef="127" />
      <End pntRef="128" />
    </Line>
    <Line>
      <Start pntRef="128" />
      <End pntRef="96" />
    </Line>
    <Line>
      <Start pntRef="96" />
      <End pntRef="95" />
    </Line>
    <Line>
      <Start pntRef="95" />
      <End pntRef="127" />
    </Line>
  </CoordGeom>
</Parcel>
```

SVY in <Parcel> (Island Lot)

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.7 (d)	Lot description	.svy	LOT	LandXML/Parcels
4.7 (e)	Island Lot	.svy	ISLAND	LandXML/Parcels LandXML/Parcels/Parcel/Parcels

```
<Parcel name="MK21-02622M" desc="CP86594" area="2000.0" class="reference" parcelFormat="standard" parcelType="land">
  <CoordGeom>
    <Line>
      <Start pntRef="127" />
      <End pntRef="128" />
    </Line>
    <Line>
      <Start pntRef="128" />
      <End pntRef="96" />
    </Line>
    <Line>
      <Start pntRef="96" />
      <End pntRef="95" />
    </Line>
    <Line>
      <Start pntRef="95" />
      <End pntRef="127" />
    </Line>
  </CoordGeom>
</Parcel>
```



```
<Parcel name="MK21-02983W" desc="CP89112" area="306357.5" class="final" parcelFormat="standard" parcelType="land">
  <CoordGeom>
  <Parcels>
    <Parcel name="MK21-02982M-island" pclRef="MK21-02982M" />
    <Parcel name="MK21-02627A-island" pclRef="MK21-02627A" />
    <Parcel name="MK21-02456L-island" pclRef="MK21-02456L" />
    <Parcel name="MK21-02622M-island" pclRef="MK21-02622M" />
    <Parcel name="MK21-02561X-island" pclRef="MK21-02561X" />
    <Parcel name="MK21-02457C-island" pclRef="MK21-02457C" />
    <Parcel name="MK21-02455X-island" pclRef="MK21-02455X" />
    <Parcel name="MK21-02797N-island" pclRef="MK21-02797N" />
  </Parcels>
  </CoordGeom>
</Parcel>
```

Island lot - <Parcel><Parcels><Parcel>(pclRef)

ISLAND

```

<lot number>, <lot number of lot which contains it>
< ... >
<lot number>, <lot number of lot which contains it>

```

END

```

<Parcel name="MK21-02983W" desc="CP89112" area="306357.5" class="final" parcelFormat="standard" parcelType="land">
  <CoordGeom>
  <Parcels>
    <Parcel name="MK21-02982M-island" pclRef="MK21-02982M" />
    <Parcel name="MK21-02627A-island" pclRef="MK21-02627A" />
    <Parcel name="MK21-02456L-island" pclRef="MK21-02456L" />
    <Parcel name="MK21-02622M-island" pclRef="MK21-02622M" />
    <Parcel name="MK21-02561X-island" pclRef="MK21-02561X" />
    <Parcel name="MK21-02457C-island" pclRef="MK21-02457C" />
    <Parcel name="MK21-02455X-island" pclRef="MK21-02455X" />
    <Parcel name="MK21-02797N-island" pclRef="MK21-02797N" />
  </Parcels>
</Parcel>

```

```

<Parcel name="MK21-02622M" desc="CP86594" area="2000.0" class="reference" parcelFormat="standard" parcelType="land">
  <CoordGeom>
  <Line>
    <Start pntRef="127" />
    <End pntRef="128" />
  </Line>
  <Line>
    <Start pntRef="128" />
    <End pntRef="96" />
  </Line>
  <Line>
    <Start pntRef="96" />
    <End pntRef="95" />
  </Line>
  <Line>
    <Start pntRef="95" />
    <End pntRef="127" />
  </Line>
</CoordGeom>
</Parcel>

```


Encroachment Report in PlanFeature@name="Occupations", = "Encroachments"

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.9 (b)	Encroachment report	-	-	LandXML/PlanFeatures@name="Encroachments"/PlanFeature LandXML/PlanFeatures@name="Encroachments"/PlanFeature/Feature@name="encProps"

```

<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="MK05-09324R"></Property>
</Feature>
</PlanFeature>
</PlanFeatures>
    
```

owning parcel

```

<PlanFeatures name="Encroachments">
<PlanFeature desc="The area enclosed by building" name="E9">
<CoordGeom>
<IrregularLine>
<Start>32888.297 21004.805</Start>
<End>32888.297 21004.805</End>
<PntList2D>32888.297 21004.805 32887.816 21000.815 32889.152 21000.646 32888.087 20991.293 32857.658 20994.710 32858.961 21006.194 32871.393 21004.773
32871.173 21002.727 32878.378 21001.915 32878.773 21005.875 32872.616 21006.567 32873.547 21014.849 32857.328 21016.694 32854.571 20992.168 32889.935
20988.194 32891.767 21004.415 32888.297 21004.805 </PntList2D>
</IrregularLine>
</CoordGeom>
<Feature name="encProps">
<Property label="Code" value="building"></Property>
<Property label="Geometry" value="Polygon"></Property>
<Property label="pclRef" value="MK05-09323V"></Property>
<Property label="occRef" value="building1"></Property>
<Property label="area" value="363.3"></Property>
<Property label="length" value="12.313"></Property>
<Property label="length" value="3.980"></Property>
</Feature>
</PlanFeature>
</PlanFeatures>
    
```

encroached parcel

optional

Address & Level Book in <LocationAddress>, Feature@name="LevellingDetails"

CSD v4.0 section	Description	File	Block in JOB/SVY	SG LandXML Element or Attribute
4.10 (a)	Lot Address	.xls	-	LandXML/Parcels/Parcel/LocationAddress
4.12	Level Book	-	-	LandXML/Survey/SurveyHeader/Feature@name="LevellingDetails"

```
<LocationAddress flatNumber="02" floorLevelNumber="05" numberFirst="35">
  <ComplexName desc="Wedge Mount Industrial Building"/>
  <RoadName>Jalan Pemimpin</RoadName>
  <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>
```

```
<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>
    <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>
```

<LocationAddress>

Updating Address for Land/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

```
<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>
```

<LevellingDetails>

```

<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>
  
```

SVY 3443-2006 SK 86390-034

LEVEL DETAILS

Levels from VCP 80172 to VCP 80172

Station	Back Sight	Inter-mediate	Fore Sight	Rise/Fall	Reduced Level	Adjusted Level	Distance	Remarks
VCP 80172	1.463					110.891		
W2		1.462		+0.001	110.892	110.894		witness Mark 2
W1		1.492		-0.30	110.862	110.863		witness Mark 1
VCP 80172	1.538				110.891	110.891		
C.P. 1	1.196		1.412	+1.26	110.017	110.017		Change point
C.P. 2	1.371		1.450	-0.251	110.763	110.763		Change point
C.P. 3	1.370		1.400	-0.029	110.734	110.734		Change point
C.P. 4	1.443		1.449	-0.079	110.655	110.654		Change point
C.P. 5	1.354		1.376	+0.027	110.702	110.701		change point
C.P. 6	1.924		1.415	-0.061	110.641	110.640		change point
C.P. 7	1.205		1.282	+0.077	111.283	111.282		Change point
C.P. 8	1.036		1.056	+0.219	111.532	111.531		Change point
C.P. 9	1.331		1.198	-0.162	111.370	111.369		change point
Stn 28	1.349		1.711	-0.372	110.978	110.999 ^{used}		change point
C.P. 10	1.353		1.251	+0.098	111.096	111.094		change point
Stn 10	1.413		1.722	-0.269	110.727	110.726 ^{used}		N. Curt Mk
Stn 8	1.094		1.493	-0.080	110.647	110.645		N. Curt Mk

Enumeration lists for

<CGPoint>

<Monument>

<Parcel>

<ReducedObservation>

CGPoint@desc, CGPoint@pntSurv

```

<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>
    
```

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.
------	-------------------	--	---	--

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

```

<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>
    
```

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

Monument@type, Monument@state

```

<Monuments>
  <Monument name="1" pntRef="201" type="SP" state="found" />
  <Monument name="2" pntRef="202" type="NL" state="found" />
</Monuments>
  
```

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

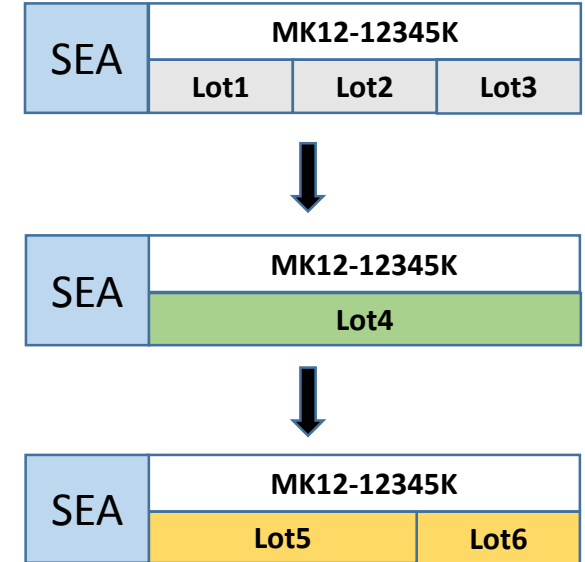
Parcel@parcelFormat

```
<Parcel name="MK21-02622M" desc="CP86594" area="2000.0" class="reference" parcelFormat="standard" parcelType="land">
  <CoordGeom>
    <Line>
      <Start pntRef="127" />
      <End pntRef="128" />
    </Line>
    <Line>
      <Start pntRef="128" />
      <End pntRef="96" />
    </Line>
    <Line>
      <Start pntRef="96" />
      <End pntRef="95" />
    </Line>
    <Line>
      <Start pntRef="95" />
      <End pntRef="127" />
    </Line>
  </CoordGeom>
</Parcel>
```

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
--------------	--------------	--------------------------------	---	--

Parcel@class

```
<Parcel name="MK21-02622M" desc="CP86594" area="2000.0" class="reference" parcelFormat="standard" parcelType="land">
  <CoordGeom>
    <Line>
      <Start pntRef="127" />
      <End pntRef="128" />
    </Line>
    <Line>
      <Start pntRef="128" />
      <End pntRef="96" />
    </Line>
    <Line>
      <Start pntRef="96" />
      <End pntRef="95" />
    </Line>
    <Line>
      <Start pntRef="95" />
      <End pntRef="127" />
    </Line>
  </CoordGeom>
</Parcel>
```



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
			reference	lot not in lineage or physical parent, but necessary for analysis

- class="parent": Lot1, Lot2, Lot3
- class="interim": Lot4
- class="final": Lot5, Lot6
- class="reference": MK12-12345K
- class="other": "SEA"

Parcel@parcelType

```

<Parcel name="MK21-02622M" desc="CP86594" area="2000.0"
class="reference" parcelFormat="standard" parcelType="land">
  <CoordGeom>
    <Line>
      <Start pntRef="127" />
      <End pntRef="128" />
    </Line>
    <Line>
      <Start pntRef="128" />
      <End pntRef="96" />
    </Line>
    <Line>
      <Start pntRef="96" />
      <End pntRef="95" />
    </Line>
    <Line>
      <Start pntRef="95" />
      <End pntRef="127" />
    </Line>
  </CoordGeom>
</Parcel>

```

parcelType	parcelTypeType	parcel type		
			land	standard land lot
			airspace	above ground 3D
			subterranean	below ground 3D
			empty	void
			strata	within building
			accessory	related to strata
			stateReserve	restriction
			foreshore	abutting coast
			reclaimed	land reclaimed from sea or other water bodies
			strataProvisional	proposed strata lot
			surveyDistrict	survey district
			building	a building
			level	a building level
			common	common use areas
			typicalStorey	typical storey
			virtual	virtual parcel referenced by a typical storey
			voidSpace	strata void space
			voidArea	strata void area

ReducedObservation@purpose

```

<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>

```

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)
---------	-------------	--	--

Airspace and Subterranean

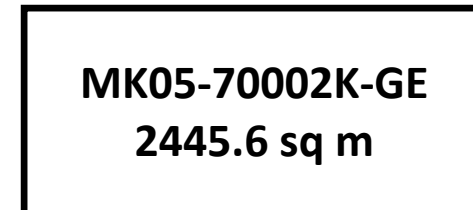
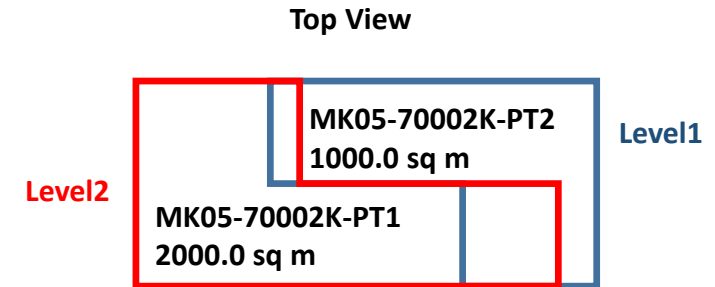
Airspace and Subterranean Lots

In the case of airspace and subterranean lots where there are multiple levels, Feature@name="Part Lot" should be added with "TotalArea"=total area of all part lots

```

<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>

```



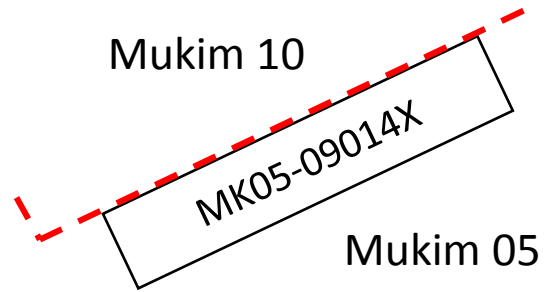
<SurveyHeader>/Feature@name="Elevations"

For airspace and subterranean scenarios, elevations are required

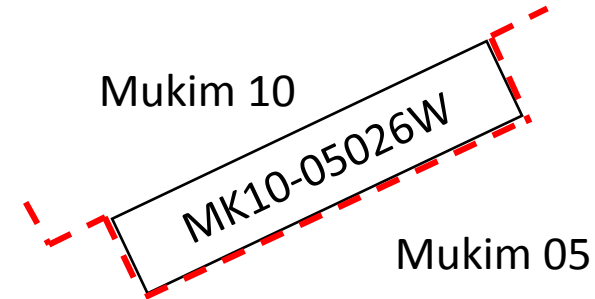
```
<SurveyHeader>  
...  
  <Feature name="Elevations">  
    <Property label="level 1" value="9.5"/>  
    <Property label="level 2" value="13.5"/>  
    <Property label="level 3" value="17.34"/>  
    <Property label="level 3 false ceiling" value="19.0"/>  
    <Property label="level 4" value="19.34"/>  
  </Feature>  
</SurveyHeader>
```

Alteration of Survey District

BEFORE



AFTER



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

....

```
</Parcel>
```

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

....

```
</Parcel>
```


Other Elements:

Lineage,
physicalRelation,
FieldNote,
Balance,
OldFormat,
SurveyType,
Annotation,
Reference Plan,
SurveyorCertificate,
PurposeOfSurvey

<SurveyHeader>/Feature@name="Lineage"/ Property@label="lineage"

Process	Value
Subdivision	$P1=P2+P3$
Amalgamation	$P1+P2=P3$
Alteration	$P1=P2$
Verification	$P1=P1$
Allocation	$NEW=P1$

- Should follow the sequence of process. E.g. Subdivision then amalgamation: "P1=P2+P3; P2+P3+P4=P5"
- Child lots on the right of the equation

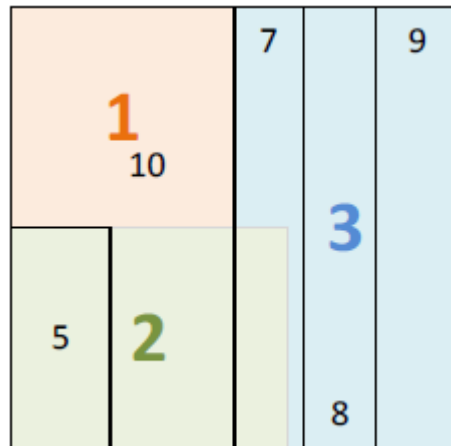
Example: Subdivision Case

Lot	Here Subdivided Into Lots
MK28-07412N	MK28-07436P, MK28-07437T

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

<SurveyHeader>/Feature@name="Lineage"/ Property@label="physicalRelation"

The physical relation is defined as the child lot is on the left side and the parent lot is on the right side.



Parent Lots = Lot1, Lot2, Lot3

Child Lots = Lot5, Lot7, Lot8, Lot9, Lot10

Physical relation = Lot10=Lot1+Lot2; Lot7=Lot2+Lot3;
Lot5=Lot2; Lot8=Lot3; Lot9=Lot3

Example: lineage vs. physicalRelation

```
<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>
```

<Parcel>/Feature@name=Balance, @name=OldFormat, @name=SurveyType

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

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

Feature@name = "SurveyType"	surveyTypeType		resurvey substandard modern	resurveyed substandard survey modern survey
--------------------------------	----------------	--	-----------------------------------	---

```
<Feature name="OldFormat">
  <Property label="oldFormatLotNumber" value="4287/U71" />
</Feature>
```

Example for Balance Lot

```
<Parcel name="MK05-09320V" desc="CP90024" area="966.4" class="final"
parcelFormat="standard" parcelType="land">
  <CoordGeom>
    <Line>
      <Start pntRef="111" />
      <End pntRef="110" />
    </Line>
    <Line>
      <Start pntRef="110" />
      <End pntRef="107" />
    </Line>
    <Line>
      <Start pntRef="107" />
      <End pntRef="106" />
    </Line>
    <Line>
      <Start pntRef="106" />
      <End pntRef="111" />
    </Line>
  </CoordGeom>
  <Feature name="Balance">
    <Property label="isBalanceLot" value="Y" />
  </Feature>
</Parcel>
```

<SurveyHeader>/<FieldNote>

For adding Survey Description

```
<SurveyHeader name="0264-2017" jurisdiction="Singapore" surveyorFirm="KH Pte Ltd." surveyorReference="0264-2017">  
  <AdministrativeDate adminDateType="Commenced" adminDate="2017-07-15" />  
  <AdministrativeDate adminDateType="Completed" adminDate="2017-08-03" />  
  <Personnel role="Surveyor" name="Thomas Law Ah Weng" />  
  <Personnel role="Authorised Assistant" name="Kim Dim Sung" />  
  <FieldNote>This is for survey description</FieldNote>
```

<SurveyHeader>/<Annotation>

@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"/>
```

<SurveyHeader>/Feature@name="RefDocs", <SurveyHeader>/<SurveyorCertificate>

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

```
<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"/>
```

Generated through Online
Plan Generation

All Coordinates shown are based on SVY21 Datum	
Date of Survey: 12/09/2017	
Reference Plan: Approved Plan (32A) in SLA/LPB/52.12.4-v9	
SVY No.:3849-2017	Sheet No.:1/1
Scale : 1:1000	Plan Size :A3
<p>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).</p>	
<p>12/09/2017 Registered Surveyor (Digitally signed) Approved</p>	
	<p>Soh Kheng Peng Chief Surveyor (Digitally Signed)</p>

<SurveyHeader>/PurposeOfSurvey@name

LNLNDLAM	LN,LND,LAM	Get Lot Number	Land Lot	Land Allocation for Ministri
LNLNDONR	LN,LND,ONR	Get Lot Number	Land Lot	Owner's requests
LNLNDBUS	LN,LND,BUS	Get Lot Number	Land Lot	Blocking up survey
LNLNDVFS	LN,LND,VFS	Get Lot Number	Land Lot	Verification survey
LNLNDALN	LN,LND,ALN	Get Lot Number	Land Lot	Alienation
LNLNDAPP	LN,LND,APP	Get Lot Number	Land Lot	Approved plan
LNLNDAOB	LN,LND,AOB	Get Lot Number	Land Lot	Alteration of MK/TS Bound
LNLNDPOL	LN,LND,POL	Get Lot Number	Land Lot	Proclamation of Land
LNLNDRDC	LN,LND,RDC	Get Lot Number	Land Lot	Road Declaration
LNLNDAQN	LN,LND,AQN	Get Lot Number	Land Lot	Acquisition
LNLNDRLM	LN,LND,RLM	Get Lot Number	Land Lot	Return of Land from Minist
SNPTERSD	SN,PTE,RSD	Get Lot Number	Strata Private	Residential Development
SNPTEIDS	SN,PTE,IDS	Get Lot Number	Strata Private	Industrial
SNPTEMDM	SN,PTE,MDM	Get Lot Number	Strata Private	Mixed Development
SNPTECMC	SN,PTE,CMC	Get Lot Number	Strata Private	Commercial
SNPTECHS	SN,PTE,CHS	Get Lot Number	Strata Private	Cluster Housing
SNPTESTL	SN,PTE,STL	Get Lot Number	Strata Private	Strata Lease
SNPTESDV	SN,PTE,SDV	Get Lot Number	Strata Private	Subdivision existing strata l
SNPTEAML	SN,PTE,AML	Get Lot Number	Strata Private	Amalgamation existing stra
SNPTERSV	SN,PTE,RSV	Get Lot Number	Strata Private	Resurvey existing strata lot
SNPTEPDV	SN,PTE,PDV	Get Lot Number	Strata Private	Phase Development
SNHDBNHD	SN,HDB,NHD	Get Lot Number	Strata HDB	HDB Development
SNHDBRSV	SN,HDB,RSV	Get Lot Number	Strata HDB	Resurvey of HDB strata lots
SNHDBRCA	SN,HDB,RCA	Get Lot Number	Strata HDB	Recess area
SNHDBAML	SN,HDB,AML	Get Lot Number	Strata HDB	Amalgamation of Adjoining
SNHDBSAI	SN,HDB,SAI	Get Lot Number	Strata HDB	Space Adding Item
SNHDBHUD	SN,HDB,HUD	Get Lot Number	Strata HDB	Privatization of HUDC
SNHDBSDV	SN,HDB,SDV	Get Lot Number	Strata HDB	Subdivision of existing HDB
ACLNDLAM	AC,LND,LAM	Activation	Land Lot	Land Allocation for Ministri
ACLNDONR	AC,LND,ONR	Activation	Land Lot	Owner's requests
ACLNDBUS	AC,LND,BUS	Activation	Land Lot	Blocking up survey

ACLNDVFS	AC,LND,VFS	Activation	Land Lot	Verification survey
ACLNDALN	AC,LND,ALN	Activation	Land Lot	Alienation
ACLNDAPP	AC,LND,APP	Activation	Land Lot	Approved plan
ACLNDAOB	AC,LND,AOB	Activation	Land Lot	Alteration of MK/TS Boundary
ACLNDPOL	AC,LND,POL	Activation	Land Lot	Proclamation of Land
ACLNDRDC	AC,LND,RDC	Activation	Land Lot	Road Declaration
ACLNDAQN	AC,LND,AQN	Activation	Land Lot	Acquisition
ACLNDRLM	AC,LND,RLM	Activation	Land Lot	Return of Land from Ministries
SAPTERS	SA,PTE,RSD	Activation	Strata Private	Residential Development
SAPTEIDS	SA,PTE,IDS	Activation	Strata Private	Industrial
SAPTEMDM	SA,PTE,MDM	Activation	Strata Private	Mixed Development
SAPTECMC	SA,PTE,CMC	Activation	Strata Private	Commercial
SAPTECHS	SA,PTE,CHS	Activation	Strata Private	Cluster Housing
SAPTESTL	SA,PTE,STL	Activation	Strata Private	Strata Lease
SAPTESDV	SA,PTE,SDV	Activation	Strata Private	Subdivision existing strata lots
SAPTEAML	SA,PTE,AML	Activation	Strata Private	Amalgamation existing strata lots
SAPTERS	SA,PTE,RSV	Activation	Strata Private	Resurvey existing strata lots
SAPTEPDV	SA,PTE,PDV	Activation	Strata Private	Phase Development
SAHDBNHD	SA,HDB,NHD	Activation	Strata HDB	New HDB Development
SAHDBRSV	SA,HDB,RSV	Activation	Strata HDB	Resurvey of HDB strata lots
SAHDBRCA	SA,HDB,RCA	Activation	Strata HDB	Recess area
SAHDBAML	SA,HDB,AML	Activation	Strata HDB	Amalgamation of Adjoining lots
SAHDBSAI	SA,HDB,SAI	Activation	Strata HDB	Space Adding Item
SAHDBHUD	SA,HDB,HUD	Activation	Strata HDB	Privatization of HUDC
SAHDBSDV	SA,HDB,SDV	Activation	Strata HDB	Subdivision of existing HDB block
RTLNDPOL	RT,LND,POL	Registration of Tile Plan	Land Lot	Proclamation of Land
RTLNDALN	RT,LND,ALN	Registration of Tile Plan	Land Lot	Alienation
CPLNDLAM	CP,LND,LAM	Certified Plan	Land Lot	Land Allocation for Ministries
CPLNDONR	CP,LND,ONR	Certified Plan	Land Lot	Owner's requests
CPLNDBUS	CP,LND,BUS	Certified Plan	Land Lot	Blocking up survey
CPLNDVFS	CP,LND,VFS	Certified Plan	Land Lot	Verification survey
CPLNDALN	CP,LND,ALN	Certified Plan	Land Lot	Alienation
CPLNDAPP	CP,LND,APP	Certified Plan	Land Lot	Approved plan
CPLNDAOB	CP,LND,AOB	Certified Plan	Land Lot	Alteration of MK/TS Boundary
CPLNDPOL	CP,LND,POL	Certified Plan	Land Lot	Proclamation of Land
CPLNDRDC	CP,LND,RDC	Certified Plan	Land Lot	Road Declaration
CPLNDAQN	CP,LND,AQN	Certified Plan	Land Lot	Acquisition
CPLNDRLM	CP,LND,RLM	Certified Plan	Land Lot	Return of Land from Ministries
STPTERSD	ST,PTE,RSD	Strata Certified Plan	Strata Private	Residential Development
STPTEIDS	ST,PTE,IDS	Strata Certified Plan	Strata Private	Industrial
STPTEMDM	ST,PTE,MDM	Strata Certified Plan	Strata Private	Mixed Development
STPTECMC	ST,PTE,CMC	Strata Certified Plan	Strata Private	Commercial

STPTECHS	ST,PTE,CHS	Strata Certified Plan	Strata Private	Cluster Housing
STPTESTL	ST,PTE,STL	Strata Certified Plan	Strata Private	Strata Lease
STPTESDV	ST,PTE,SDV	Strata Certified Plan	Strata Private	Subdivision existing strata lots
STPTEAML	ST,PTE,AML	Strata Certified Plan	Strata Private	Amalgamation existing strata lots
STPTERSV	ST,PTE,RSV	Strata Certified Plan	Strata Private	Resurvey existing strata lots
STPTEPDV	ST,PTE,PDV	Strata Certified Plan	Strata Private	Phase Development
STHDBNHD	ST,HDB,NHD	Strata Certified Plan	Strata HDB	New HDB Development
STHDBRSV	ST,HDB,RSV	Strata Certified Plan	Strata HDB	Resurvey of HDB strata lots
STHDBRCA	ST,HDB,RCA	Strata Certified Plan	Strata HDB	Recess area
STHDBAML	ST,HDB,AML	Strata Certified Plan	Strata HDB	Amalgamation of Adjoining lots
STHDBSAI	ST,HDB,SAI	Strata Certified Plan	Strata HDB	Space Adding Item
STHDBHUD	ST,HDB,HUD	Strata Certified Plan	Strata HDB	Privatization of HUDC
STHDBSDV	ST,HDB,SDV	Strata Certified Plan	Strata HDB	Subdivision of existing HDB block
LCPTMDM	LC,PTE,MDM	Strata Certified Plan (LCP)	Strata Private	Subdivision of existing HDB block
RFLNDFDM	RF,LND,FDM	Refinement	Land Lot	Refinement of Land lot found marks
GSCPSHCP	GS,CPS,HCP	GNSS Observations	Control Point	Horizontal Control Point
GSCPSVCP	GS,CPS,VCP	GNSS Observations	Control Point	Vertical Control Point

<PurposeOfSurvey name="CPLNDAPP"/>

Occupational Details & Encroachment

PlanFeatures@name="Occupations"

```

<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>

```

<IrregularLine>...<PntList2D></IrregularLine>

```

<PlanFeatures name="Occupations">
  <PlanFeature name="Fence1">
    <CoordGeom>
      <Line>
        <Start>38247.074 30475.959</Start>
        <End>38244.076 30474.841</End>
      </Line>
      <Line>
        <Start>38246.938 30476.324</Start>
        <End>38251.719 30463.484</End>
      </Line>
      <Line>
        <Start>38244.075 30474.841</Start>
        <End>38243.939 30475.207</End>
      </Line>
      <Line>
        <Start>38246.938 30476.324</Start>
        <End>38243.939 30475.207</End>
      </Line>
    </CoordGeom>
    <Feature name="occProps">
      <Property label="code" value="fence" />
    </Feature>
  </PlanFeature>
</PlanFeatures>

```

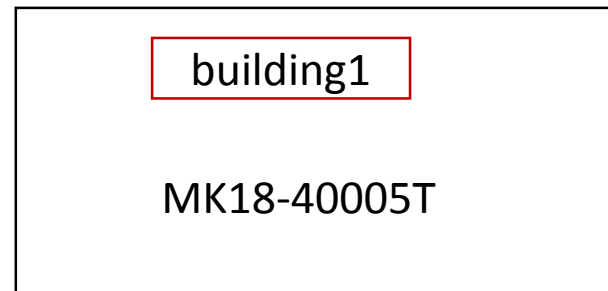
<Line><Start><End></Line>

Two methods to encode coordinates for Occupations

PlanFeatures@name="Occupations"/ Feature@name="occProps"

```
<Feature name="occProps">
  <Property label="code" value="building" />
  <Property label="geometry" value="polygon" />
  <Property label="pclRef" value="MK18-40005T" />
</Feature>
```

Owning parcel



code	occCodeType	This is a jurisdictional list of the classes of occupations.	party-wall
			outer-wall
			inner-wall
			fence
			inner-drain
			outer-drain
			eave
			kerb
			building
			flower-box
			footpath
			column
			other
geometry	geomType	SG jurisdiction list of the geometry classes used to define occupations and encroachments.	polygon
			line
			point

PlanFeatures@name="Encroachments"

```
<PlanFeatures name="Encroachments">
  <PlanFeature desc="The area enclosed by building" name="E9">
    <CoordGeom>
      <IrregularLine>
        <Start>32888.297 21004.805</Start>
        <End>32888.297 21004.805</End>
        <PntList2D>32888.297 21004.805 32887.816 21000.815 32889.152 21000.646 32888.087 20991.293 32857.658 20994.710 32858.961 21006.194 32871.393 21004.773
32871.173 21002.727 32878.378 21001.915 32878.773 21005.875 32872.616 21006.567 32873.547 21014.849 32857.328 21016.694 32854.571 20992.168 32889.935
20988.194 32891.767 21004.415 32888.297 21004.805 </PntList2D>
      </IrregularLine>
    </CoordGeom>
    <Feature name="encProps">
      <Property label="Code" value="building"></Property>
      <Property label="Geometry" value="Polygon"></Property>
      <Property label="pclRef" value="MK05-09323V"></Property>
      <Property label="occRef" value="building1"></Property>
      <Property label="area" value="363.3"></Property>
      <Property label="length" value="12.313"></Property>
      <Property label="length" value="3.980"></Property>
    </Feature>
  </PlanFeature>
</PlanFeatures>
```

Like Occupations, two methods to encode coordinates

- i. <PntList2D>
- ii. <Line><Start><End></Line>

PlanFeatures@name="Encroachments"/ Feature@name="encProps"

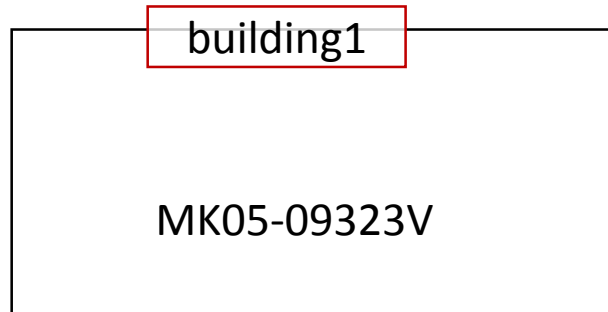
```

<Feature name="encProps">
  <Property label="Code" value="building"></Property>
  <Property label="Geometry" value="Polygon"></Property>
  <Property label="pclRef" value="MK05-09323V"></Property>
  <Property label="occRef" value="building1"></Property>
  <Property label="area" value="363.3"></Property>
  <Property label="length" value="12.313"></Property>
  <Property label="length" value="3.980"></Property>
</Feature>
  
```

Encroached
parcel
(@pclRef)

Optional attributes
(@area, @length)

Encroaching object
(@occRef)



code	occCodeType	This is a jurisdictional list of the classes of occupations.	party-wall
			outer-wall
			inner-wall
			fence
			inner-drain
			outer-drain
			eave
			kerb
			building
			flower-box
			footpath
			column
			other
geometry	geomType	SG jurisdiction list of the geometry classes used to define occupations and encroachments.	polygon
			line
			point

Required Information in Different Submission Types

Get Lot Number (LN) – Point (Land)

For new point

<CgPoint name="118" desc="allocation" pntSurv="boundary" code="L03">

<Monument name="201" pntRef="118" type="UM" state="new" />

For existing point

<CgPoint name="103" desc="final" pntSurv="boundary" code="L01">

<Monument name="200" pntRef="103" type="MK" state="found" />

Purpose of Survey

LNLNDLAM	LN,LND,LAM	Get Lot Number	Land Lot	Land Allocation for Ministries
LNLNDONR	LN,LND,ONR	Get Lot Number	Land Lot	Owner's requests
LNLNDBUS	LN,LND,BUS	Get Lot Number	Land Lot	Blocking up survey
LNLNDVFS	LN,LND,VFS	Get Lot Number	Land Lot	Verification survey
LNLNDALN	LN,LND,ALN	Get Lot Number	Land Lot	Alienation
LNLNDAPP	LN,LND,APP	Get Lot Number	Land Lot	Approved plan
LNLNDAOB	LN,LND,AOB	Get Lot Number	Land Lot	Alteration of MK/TS Boundary
LNLNDPOL	LN,LND,POL	Get Lot Number	Land Lot	Proclamation of Land
LNLNDRDC	LN,LND,RDC	Get Lot Number	Land Lot	Road Declaration
LNLNDAQN	LN,LND,AQN	Get Lot Number	Land Lot	Acquisition
LNLNDRLM	LN,LND,RLM	Get Lot Number	Land Lot	Return of Land from Ministries

Get Lot Number (LN) – Parcel & SurveyHeader (Land)

For new parcel

```
<Parcel name="Plot1" class="final" parcelFormat="standard" parcelType="land">
```

For existing parcel

```
<Parcel name="MK05-03371K" class="parent" parcelFormat="standard" parcelType="land" >
```

SurveyHeader

```
<SurveyHeader name="3767-2017" jurisdiction="Singapore" surveyorFirm="SKH Firm"  
surveyorReference="KH3767-2017 ">
```

```
  <Personnel role="Surveyor" name="Soon Kean Huat"/>
```

```
  <Feature name="Lineage">
```

```
    <Property label="lineage" value="MK05-03371K=Plot1+Plot2"/>
```

```
    <Property label="physicalRelation" value="Plot1=MK05-03371K"/>
```

```
  </Feature>
```

```
  <PurposeOfSurvey name="LNLNDAPP"/>
```

```
</SurveyHeader>
```


Activation (AC) – Point (Land)

For new point

<CgPoint name="118" desc="activation" pntSurv="boundary" code="L03">

<Monument name="201" pntRef="118" type="UM" state="new" />

For existing point

<CgPoint name="103" desc="final" pntSurv="boundary" code="L01">

<Monument name="200" pntRef="103" type="MK" state="found" />

ACLNDLAM	AC,LND,LAM	Activation	Land Lot	Land Allocation for Ministries
ACLNDONR	AC,LND,ONR	Activation	Land Lot	Owner's requests
ACLNDBUS	AC,LND,BUS	Activation	Land Lot	Blocking up survey
ACLNDVFS	AC,LND,VFS	Activation	Land Lot	Verification survey
ACLNDALN	AC,LND,ALN	Activation	Land Lot	Alienation
ACLNDAPP	AC,LND,APP	Activation	Land Lot	Approved plan
ACLNDAOB	AC,LND,AOB	Activation	Land Lot	Alteration of MK/TS Boundary
ACLNDPOL	AC,LND,POL	Activation	Land Lot	Proclamation of Land
ACLNDRDC	AC,LND,RDC	Activation	Land Lot	Road Declaration
ACLNDAQN	AC,LND,AQN	Activation	Land Lot	Acquisition
ACLNDRLM	AC,LND,RLM	Activation	Land Lot	Return of Land from Ministries

Activation (AC)– Parcel & SurveyHeader (Land)

For new parcel

```
<Parcel name="MK05-12345K" class="final" parcelFormat="standard" parcelType="land">
```

For existing parcel

```
<Parcel name="MK05-03371K" class="parent" parcelFormat="standard" parcelType="land" >
```

SurveyHeader

```
<SurveyHeader name="3767-2017" jurisdiction="Singapore" surveyorFirm="SKH Firm"  
surveyorReference="KH3767-2017 ">  
  <Personnel role="Surveyor" name="Soon Kean Huat"/>  
  <Feature name="Lineage">  
    <Property label="lineage" value="MK05-03371K=MK05-12345K+MK05-23456J"/>  
    <Property label="physicalRelation" value="MK05-12345K=MK05-03371K"/>  
  </Feature>  
  <PurposeOfSurvey name="ACLNDAPP"/>  
</SurveyHeader>
```

RT – Point

For new point

```
<CgPoint name="118" desc="RT" pntSurv="boundary" code="L03">
```

```
<Monument name="201" pntRef="118" type="UM" state="new" />
```

For existing point

```
<CgPoint name="103" desc="final" pntSurv="boundary" code="L01">
```

```
<Monument name="200" pntRef="103" type="MK" state="found" />
```

RTLNDPOL	RT,LND,POL	Registration of Tile Plan	Land Lot	Proclamation of Land
RTLNDALN	RT,LND,ALN	Registration of Tile Plan	Land Lot	Alienation

RT – <Parcel> & <SurveyHeader>

For new parcel

```
<Parcel name="MK05-12345K" desc="RT12345" area="188" class="final" parcelFormat="standard"
parcelType="foreshore">
```

For existing parcel

```
<Parcel name="MK05-03371K" desc="CP45678" area="567.8" class="parent" parcelFormat="standard"
parcelType="foreshore" >
```

SurveyHeader

```
<SurveyHeader name="3767-2017" jurisdiction="Singapore" surveyorFirm="SKH Firm"
surveyorReference="KH3767-2017 ">
  <Personnel role="Surveyor" name="Soon Kean Huat"/>
  <Feature name="Lineage">
    <Property label="lineage" value="MK05-03371K=MK05-12345K+MK05-23456J"/>
    <Property label="physicalRelation" value="MK05-12345K=MK05-03371K"/>
  </Feature>
  <PurposeOfSurvey name="RTLNDPOL"/>
  <Annotation name="n1" desc="Allocated for Foreshore" type="ParcelNote" pclRef="MK05-12345K"/>
  ...
</SurveyHeader>
```

CP – Point

For new point

<CgPoint name="118" desc="final" pntSurv="boundary" code="L01">

<Monument name="201" pntRef="118" type="MK" state="new" />

For existing point

<CgPoint name="103" desc="final" pntSurv="boundary" code="L01">

<Monument name="200" pntRef="103" type="MK" state="found" />

CPLNDLAM	CP,LND,LAM	Certified Plan	Land Lot	Land Allocation for Ministries
CPLNDONR	CP,LND,ONR	Certified Plan	Land Lot	Owner's requests
CPLNDBUS	CP,LND,BUS	Certified Plan	Land Lot	Blocking up survey
CPLNDVFS	CP,LND,VFS	Certified Plan	Land Lot	Verification survey
CPLNDALN	CP,LND,ALN	Certified Plan	Land Lot	Alienation
CPLNDAPP	CP,LND,APP	Certified Plan	Land Lot	Approved plan
CPLNDAOB	CP,LND,AOB	Certified Plan	Land Lot	Alteration of MK/TS Boundary
CPLNDPOL	CP,LND,POL	Certified Plan	Land Lot	Proclamation of Land
CPLNDRDC	CP,LND,RDC	Certified Plan	Land Lot	Road Declaration
CPLNDAQN	CP,LND,AQN	Certified Plan	Land Lot	Acquisition
CPLNDRLM	CP,LND,RLM	Certified Plan	Land Lot	Return of Land from Ministries

CP – <Parcel> & PlanFeatures@name="Adjusted"

For new parcel

```
<Parcel name="MK05-12345K" desc="CP12345" area="188.2" class="final" parcelFormat="standard"  
parcelType="foreshore">
```

For existing parcel

```
<Parcel name="MK05-03371K" desc="CP45678" area="567.8" class="parent" parcelFormat="standard"  
parcelType="foreshore" >
```

PlanFeatures@name="Adjusted"

```
<PlanFeatures name="Adjusted">  
  <PlanFeature name="AdjustedLines">  
    <CoordGeom> ..... </CoordGeom>  
  </PlanFeature>  
</PlanFeatures>
```

CP – <SurveyHeader> #1

SurveyHeader

```

<SurveyHeader name="3767-2017" jurisdiction="Singapore" surveyorFirm="SKH Firm"
surveyorReference="KH3767-2017 ">
  <AdministrativeDate adminDateType="Commenced" adminDate="2017-07-15" />
  <AdministrativeDate adminDateType="Completed" adminDate="2017-08-03" />
  <Personnel role="Surveyor" name="Soon Kean Huat"/>
  <Personnel role="Authorised Assistant" name="Soon Kean Huat"/>
  <Feature name="Lineage">
    <Property label="lineage" value="MK05-03371K=MK05-12345K+MK05-23456J"/>
    <Property label="physicalRelation" value="MK05-12345K=MK05-03371K"/>
  </Feature>
  <PurposeOfSurvey name="CPLNDAPP"/>

```

.....

CP – <SurveyHeader> (cont.)

SurveyHeader

.....

```

<Annotation name="a note on the plan. " type="PlanNote desc="33629.100 34631.591 33627.194 34621.774" />
<Annotation name="2" type="HouseNumber" desc="39448.182 27432.105"/>
<Annotation name="n1" type="ParcelNote" desc="Allocated for Airspace" pclRef="MK05-12345K"/>
<Annotation name="MK18-18120A" type="AbuttalLot" desc="39438.678 27426.721"/>
<Annotation name="SERAYA CRESCENT" type="RoadLabel" desc="39438.566 27439.196 39438.994 27447.800"/>
<Annotation name="" type="AbuttalLine" desc="39446.418 27454.916 39445.512 27454.961"/>
<SurveyorCertificate name="CPCertificate" 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="2018-01-15" />
<Feature name="RefDocs">
  <DocFileRef name="Approved Plan (32A) in SLA/LPB/52.12.4-v9" fileType="ReferencePlan" location="."></DocFileRef>
</Feature>
<Feature name="Transformation"> ...</Feature>
<Feature name="EDM"> ... </Feature>
</SurveyHeader>

```


CP – <InstrumentSetup>,<ObservationGroup>

InstrumentSetup

```
<InstrumentSetup id="IS-1" stationName="1" instrumentHeight="0">
  <InstrumentPoint pntRef="1" />
</InstrumentSetup>
```

.....

.....

ObservationGroup

```
<ObservationGroup id="Main">
  <Backsight circle="0.0000" setupID="IS-1">... </Backsight>
  <ReducedObservation name="9" purpose="traverse" setupID="IS-9" targetSetupID="IS-10"
  azimuth="153.0930" horizDistance="63.212" />
```

...

...

```
</ObservationGroup>
```

.....

.....

Refinement (RF)

- <CGPoints>
- <Monuments>
- <AdjustedLines>
- <SurveyHeader>
 - <AdministrativeDate>
 - <Personel>
 - <Transformation>
 - <EDM>
 - <PurposeOfSurvey>
- <ObservationGroup>
- <InstrumentSetup>
- <Occupations> (optional)

```

<CgPoints>
<Monuments>
<PlanFeatures name="Adjusted">
<Survey>
  <SurveyHeader name="3889-2017" jurisdiction="Singapore" surveyorFirm="LSB exam"
  surveyorReference="3889-2017">
    <AdministrativeDate adminDateType="Commenced" adminDate="2017-10-17" />
    <AdministrativeDate adminDateType="Completed" adminDate="2017-11-01" />
    <Personnel role="Surveyor" name="JOSE LEO CHEE HEAN" />
    <Feature name="Transformation">
    <Feature name="EDM">
    <PurposeOfSurvey name="RFLNDFDM" />
  </SurveyHeader>
  <InstrumentSetup id="IS-515" stationName="515" instrumentHeight="0">
    <InstrumentPoint pntRef="515" />
  </InstrumentSetup>
  ...
  ...
  <ObservationGroup id="Main">
  <ObservationGroup id="Sub1">
  <ObservationGroup id="Sideshot1">
    <Backsight circle="224.0913" setupID="IS-3">
      <BacksightPoint name="-1" pntRef="2" />
    </Backsight>
    <ReducedObservation name="33" purpose="sideshot" setupID="IS-3" targetSetupID="
    IS-501" azimuth="169.5301" horizDistance="3.721" />
  </ObservationGroup>
  </ObservationGroup>
</Survey>
  
```

RELNDFDM © Singapore Land Authority 2018	RF.LND.FDM	Refinement	Land Lot	Refinement of Land Lot found marks.
---	------------	------------	----------	-------------------------------------

ISN Markers (Horizontal Control Point) (GS)

= ddd mm ss.sssss

```
<CgPoint name="1" desc="activation" code="L01" latitude="1.193495496" longitude="103.435877903" ellipsoidHeight="12.695"
pntSurv="control">34289.704 16834.905</CgPoint>
```

Control point Northing Easting latitude longitude ellipsoidHeight

Control Point Number

```
<Monuments>
<Monument name="SM20013" pntRef="1" type="SM" state="found" featureRef="66" desc="Ayer Rajah Expressway (near LP 69)"/>
<Feature name="66">
<Property label="Remarks" value="the sky is clear"/>
</Feature>
</Monuments>
```

remarks

survey date = completed date

```
<SurveyHeader name="3772-2017" jurisdiction="Singapore" surveyorFirm="Thomas Law Ah Weng">
<AdministrativeDate adminDateType="Commenced" adminDate="2017-03-12"/>
<AdministrativeDate adminDateType="Completed" adminDate="2017-04-12"/>
<Personnel role="Surveyor" name="Thomas Law Ah Weng"/>
<Personnel role="Authorised Assistant" name="Fauzan Bin Jumaat" />
</SurveyHeader>
```

surveyor name authorised assistant name

GSCPSHCP	GS,CPS,HCP	GNSS Observations	Control Point	Horizontal Control Point
----------	------------	----------------------	---------------	--------------------------

Vertical Control Point

```
<CgPoint name="42" desc="final" code="L01" pntSurv="control" latitude="1.185175076" longitude="103.504251959"
ellipsoidHeight="">32962.452 29316.093 3.557</CgPoint>
</CgPoints>
```

= ddd mm ss.sssss

SVY21 Coordinates (m) : N 32962.452 : E 29316.093	
WGS84 DATUM	
Latitude	:N 1° 18' 51.75076"
Longitude	:E 103° 50' 42.51959"

VCP No: 80188
Reduced Level (m): 3.557 Mark Type :BOLT
Vertical Accuracy : +/- 5 mm (95% confidence level)
Locality : THOMSON ROAD/SUFFOLK ROAD

```
<Monuments>
...
<Monument name="VCP80188" pntRef="42" featureRef="VCP80188" type="BT" desc="Thomson Road/Suffolk Road"></Monument>
<Feature name="VCP80188">
  <Feature name="W1">
    <Property label="MarkType" value="BT"/>
    <Property label="RelativeHeight" value="-0.701"/>
    <Property label="ReducedLevel" value="2.856"/>
  </Feature>
  <Feature name="W2">
    <Property label="MarkType" value="BT"/>
    <Property label="RelativeHeight" value="-0.193"/>
    <Property label="ReducedLevel" value="3.364"/>
  </Feature>
  <Feature name="W3">
    <Property label="MarkType" value="BT"/>
    <Property label="RelativeHeight" value="-1.032"/>
    <Property label="ReducedLevel" value="2.525"/>
  </Feature>
  <Feature name="W4">
    <Property label="MarkType" value="BT"/>
    <Property label="RelativeHeight" value="0.412"/>
    <Property label="ReducedLevel" value="3.969"/>
  </Feature>
  <DocFileRef name="StationDiagram_80188.jpg" location="." fileFormat="JPEG"/>
  <DocFileRef name="LocationMap_80188.jpg" location="." fileFormat="JPEG"/>
  <DocFileRef name="SitePlan_80188.jpg" location="." fileFormat="JPEG"/>
</Feature>
...
</Monuments>
```

Witness Mark 1(W1) Mark Type : BOLT Height Relative to VCP: -0.701 Reduced Level (m) : 2.856	Witness Mark 2(W2) Mark Type : BOLT Height Relative to VCP: -0.193 Reduced Level (m) : 3.364
Witness Mark 3(W3) Mark Type : BOLT Height Relative to VCP: -1.032 Reduced Level (m) : 2.525	Witness Mark 4(W4) Mark Type : BOLT Height Relative to VCP: 0.412 Reduced Level (m) : 3.969

It is optional to define the documents here. But the document must be uploaded at the RS Portal

Get Lot Number (Strata) (SN)

- To include Feature@name="CPST" and Feature@name="Lineage"/Property@label="lineage"

```

<Feature name="CPST">
  <Property label="LandLotNumber" value="MK18-17971X, MK18-17970N"/>
  <Property label="StrataLotCount" value="8"/>
  <Property label="AccessLotCount" value="2"/>
  <Property label="ProvisionalLotCount" value="0"/>
</Feature>

<Feature name="Lineage">
  <Property label="lineage"
  value="NEW=Unit1;NEW=Unit2;NEW=Unit3;NEW=Unit4;NEW=Unit5;
  NEW=Unit6;NEW=Unit7;NEW=Unit8;NEW=UnitA1;NEW=UnitA2"/>
</Feature>

```

SNPTERSD	SN,PTE,RSD	Get Lot Number	Strata Private	Residential Development
SNPTEIDS	SN,PTE,IDS	Get Lot Number	Strata Private	Industrial
SNPTMMDM	SN,PTE,MDM	Get Lot Number	Strata Private	Mixed Development
SNPTECMC	SN,PTE,CMC	Get Lot Number	Strata Private	Commercial
SNPTECHS	SN,PTE,CHS	Get Lot Number	Strata Private	Cluster Housing
SNPTESTL	SN,PTE,STL	Get Lot Number	Strata Private	Strata Lease
SNPTESDV	SN,PTE,SDV	Get Lot Number	Strata Private	Subdivision existing strata lots
SNPTEAML	SN,PTE,AML	Get Lot Number	Strata Private	Amalgamation existing strata lots
SNPTERSV	SN,PTE,RSV	Get Lot Number	Strata Private	Resurvey existing strata lots
SNPTEPDV	SN,PTE,PDV	Get Lot Number	Strata Private	Phase Development
SNHDBNHD	SN,HDB,NHD	Get Lot Number	Strata HDB	HDB Development
SNHDBRSV	SN,HDB,RSV	Get Lot Number	Strata HDB	Resurvey of HDB strata lots
SNHDBRCA	SN,HDB,RCA	Get Lot Number	Strata HDB	Recess area
SNHDBAML	SN,HDB,AML	Get Lot Number	Strata HDB	Amalgamation of Adjoining lots
SNHDBSAI	SN,HDB,SAI	Get Lot Number	Strata HDB	Space Adding Item
SNHDBHUD	SN,HDB,HUD	Get Lot Number	Strata HDB	Privatization of HUDC
SNHDBSDV	SN,HDB,SDV	Get Lot Number	Strata HDB	Subdivision of existing HDB block

- To include the geometry of residing land lots (<Cgpoint><Monument><Parcel>)

Activation (Strata) (SA)

- To include Feature@name="CPST" and Feature@name="Lineage"/Property@label="lineage"

```
<Feature name="CPST">
  <Property label="LandLotNumber" value="MK18-17971X, MK18-17970N"/>
</Feature>
```

```
<Feature name="Lineage">
  <Property label="lineage" value="NEW=MK18-
  U120000K;NEW=MK18-U120001N;NEW=MK18-
  U120002X;NEW=MK18-U120003L;NEW=MK18-
  U120005M;NEW=MK18-U120006W;NEW=MK18-
  U120007V;NEW=MK18-U120008P;NEW=MK18-
  U120010V;NEW=MK18-U120011P;NEW=MK18-A1100K;NEW=MK18-
  A1101N;NEW=MK18-A1102X;NEW=MK18-A1103L;NEW=MK18-
  A1104C;NEW=NEW=MK18-U120012T"/>
</Feature>
```

SAPTERS	SA,PTE,RSD	Activation	Strata Private	Residential Development
SAPTEIDS	SA,PTE,IDS	Activation	Strata Private	Industrial
SAPTEMDM	SA,PTE,MDM	Activation	Strata Private	Mixed Development
SAPTECMC	SA,PTE,CMC	Activation	Strata Private	Commercial
SAPTECHS	SA,PTE,CHS	Activation	Strata Private	Cluster Housing
SAPTESTL	SA,PTE,STL	Activation	Strata Private	Strata Lease
SAPTESDV	SA,PTE,SDV	Activation	Strata Private	Subdivision existing strata lots
SAPTEAML	SA,PTE,AML	Activation	Strata Private	Amalgamation existing strata lots
SAPTERSV	SA,PTE,RSV	Activation	Strata Private	Resurvey existing strata lots
SAPTEPDV	SA,PTE,PDV	Activation	Strata Private	Phase Development
SAHDBNHD	SA,HDB,NHD	Activation	Strata HDB	New HDB Development
SAHDBRSV	SA,HDB,RSV	Activation	Strata HDB	Resurvey of HDB strata lots
SAHDBRCA	SA,HDB,RCA	Activation	Strata HDB	Recess area
SAHDBAML	SA,HDB,AML	Activation	Strata HDB	Amalgamation of Adjoining lots
SAHDBSAI	SA,HDB,SAI	Activation	Strata HDB	Space Adding Item
SAHDBHUD	SA,HDB,HUD	Activation	Strata HDB	Privatization of HUDC
SAHDBSDV	SA,HDB,SDV	Activation	Strata HDB	Subdivision of existing HDB block

- To include the geometry of residing land lots (<Cgpoint><Monument><Parcel>)
- To include <Parcel> for strata lots with address details if any (no geometry required)

- To include STP Number in CPST submission, use Feature@name="STP"

```
<SurveyHeader>  
  ...  
  <Feature name="STP">  
    <Property label="STPNumber" value="STP1234"/>  
    <Property label="LandLotNumber"  
      value="MK18-40000A, MK18-40001B,MK18-40002C"/>  
  </Feature>  
</SurveyHeader>
```


Strata Certified Plan (ST)

Description	SG LandXML Element or Attribute
STP Feature	LandXML/Survey/SurveyHeader/Feature@name="STP"
CPST Feature	LandXML/Survey/SurveyHeader/Feature@name="CPST"
Building	LandXML/Survey/Parcel@parcelType="building"
Level	LandXML/Survey/Parcel@parcelType="level"
Strata Lots	LandXML/Survey/Parcel@parcelType="strata"
Accessory Lots	LandXML/Survey/Parcel@parcelType="accessory"
Common Properties	LandXML/Survey/Parcel@parcelType="common"
Void Areas	LandXML/Survey/Parcel@parcelType="voidArea"

Relationship between Building, Level and Strata Lot

Building Outline

```
<Parcel name="300" desc="ST101313, ST101314"  
class="other" parcelFormat="standard"  
parcelType="building" buildingNo="300"  
buildingLevelNo="outline">
```

Strata Unit

```
<Parcel name="MK18-U120000K" desc="ST101313,  
ST101314" area="314" class="final"  
parcelFormat="extruded" parcelType="strata"  
buildingNo="300" buildingLevelNo="01">
```

Level Outline

```
<Parcel name="300-01" desc="ST101313,  
ST101314" class="other" parcelFormat="extruded"  
parcelType="level" buildingNo="300"  
buildingLevelNo="01">
```

Relationship between Building, Level and Common Properties

Building Outline

```
<Parcel name="300" desc="ST101313, ST101314"  
class="other" parcelFormat="standard"  
parcelType="building" buildingNo="300"  
buildingLevelNo="outline">
```

Common
Properties

```
<Parcel name="CA01" desc="ST101313, ST101314"  
class="reference" parcelFormat="extruded"  
parcelType="common" buildingNo="300"  
buildingLevelNo="01">
```

Level Outline

```
<Parcel name="300-01" desc="ST101313,  
ST101314" class="other" parcelFormat="extruded"  
parcelType="level" buildingNo="300"  
buildingLevelNo="01">
```

Relationship between Strata and Accessory Lots

Strata Lot

```
<Parcel name="MK18-U120000K" desc="ST101313,  
ST101314" area="314" class="final"  
parcelFormat="extruded" parcelType="strata"  
buildingNo="300" buildingLevelNo="01">
```

Accessory
Lot

```
<Parcel name="MK18-A1102N" desc="ST101313, ST101314" class="final"  
parcelFormat="extruded" parcelType="accessory" buildingNo="300"  
buildingLevelNo="05">  
...  
...  
<Feature name="AppurtenantTo">  
  <Property label="pclRef" value="MK18-U120000K"/>  
  <Property label="pclRef" value="MK18-U120019C"/>  
</Feature>  
</Parcel>
```

Relationship between Strata and Void

Strata Lot

```

<Parcel name="MK18-U120000K" desc="ST101313, ST101314"
area="314" class="final" parcelFormat="extruded"
parcelType="strata" buildingNo="300" buildingLevelNo="01">
...
<Parcels>
  <Parcel name="voidArea2" pclRef="VA04"/>
</Parcels>
</Parcel>

```

Void Area

```

<Parcel name="VA04" desc="ST101313, ST101314" area="80"
class="reference" parcelFormat="extruded" parcelType="voidArea"
buildingNo="300" buildingLevelNo="01">

```

ST – Point

For new point

<CgPoint name="118" desc="final" pntSurv="boundary" code="S01">

<Monument name="201" pntRef="118" type="UM" state="new" />

For existing point

<CgPoint name="103" desc="final" pntSurv="boundary" code="S01">

<Monument name="200" pntRef="103" type="UM" state="compiled" />

STPTERSD	ST,PTE,RSD	Strata Certified Plan	Strata Private	Residential Development
STPTEIDS	ST,PTE,IDS	Strata Certified Plan	Strata Private	Industrial
STPTEMDM	ST,PTE,MDM	Strata Certified Plan	Strata Private	Mixed Development
STPTECMC	ST,PTE,CMC	Strata Certified Plan	Strata Private	Commercial

STPTECHS	ST,PTE,CHS	Strata Certified Plan	Strata Private	Cluster Housing
STPTESTL	ST,PTE,STL	Strata Certified Plan	Strata Private	Strata Lease
STPTESDV	ST,PTE,SDV	Strata Certified Plan	Strata Private	Subdivision existing strata lots
STPTEAML	ST,PTE,AML	Strata Certified Plan	Strata Private	Amalgamation existing strata lots
STPTERSV	ST,PTE,RSV	Strata Certified Plan	Strata Private	Resurvey existing strata lots
STPTEPDV	ST,PTE,PDV	Strata Certified Plan	Strata Private	Phase Development
STHDBNHD	ST,HDB,NHD	Strata Certified Plan	Strata HDB	New HDB Development
STHDBRSV	ST,HDB,RSV	Strata Certified Plan	Strata HDB	Resurvey of HDB strata lots
STHDBRCA	ST,HDB,RCA	Strata Certified Plan	Strata HDB	Recess area
STHDBAML	ST,HDB,AML	Strata Certified Plan	Strata HDB	Amalgamation of Adjoining lots
STHDBSAI	ST,HDB,SAI	Strata Certified Plan	Strata HDB	Space Adding Item
STHDBHUD	ST,HDB,HUD	Strata Certified Plan	Strata HDB	Privatization of HUDC
STHDBSDV	ST,HDB,SDV	Strata Certified Plan	Strata HDB	Subdivision of existing HDB block

ST – <Parcel> & PlanFeatures@name="Adjusted"

For new parcel

```
<Parcel name="MK05-U012345K" desc="ST12345" area="188" class="final" parcelFormat="extruded"
parcelType="strata">
```

For existing parcel

```
<Parcel name="MK05-U103371K" desc="ST45678" area="567" class="parent" parcelFormat="extruded"
parcelType="strata" >
```

PlanFeatures@name="Adjusted"

```
<PlanFeatures name="Adjusted">
  <PlanFeature name="AdjustedLines">
    <CoordGeom> ..... </CoordGeom>
  </PlanFeature>
</PlanFeatures>
```

ST – <SurveyHeader> #1

SurveyHeader

```
<SurveyHeader name="3767-2017" jurisdiction="Singapore" surveyorFirm="SKH Firm"
surveyorReference="KH3767-2017 ">
  <AdministrativeDate adminDateType="Commenced" adminDate="2017-07-15" />
  <AdministrativeDate adminDateType="Completed" adminDate="2017-08-03" />
  <Personnel role="Surveyor" name="Soon Kean Huat"/>
  <Personnel role="Authorised Assistant" name="Soon Kean Huat"/>
  <Feature name="Lineage">
    <Property label="lineage" value="MK05-U103371K=MK05-U012345K+MK05-U023456J"/>
  </Feature>
  <Feature name="CPST">
    <Property label="LandLotNumber" value="MK05-09331A"/>
  </Feature>
  <PurposeOfSurvey name="STPTMMDM"/>
```

.....

ST – <SurveyHeader> (cont.)

SurveyHeader

.....

```
<Annotation name="a note on the plan. " type="PlanNote desc="33629.100 34631.591 33627.194 34621.774" />
```

```
<Annotation name="2" type="HouseNumber" desc="39448.182 27432.105"/>
```

....

```
<SurveyorCertificate name="STCertificate" certificateType="CPST" textCertificate="I, Thomas Law Ah Weng, 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)."
```

```
surveyDate="2018-01-15" />
```

```
<Feature name="RefDocs">
```

```
<DocFileRef name="Approved Plan (32A)...." fileType="ReferencePlan" location="."></DocFileRef>
```

```
</Feature>
```

```
<Feature name="Transformation"> ...</Feature>
```

```
<Feature name="EDM"> ... </Feature>
```

```
</SurveyHeader>
```


ST – <InstrumentSetup>,<ObservationGroup>

InstrumentSetup

```
<InstrumentSetup id="IS-1" stationName="1" instrumentHeight="0">
  <InstrumentPoint pntRef="1" />
</InstrumentSetup>
```

.....

.....

ObservationGroup

```
<ObservationGroup id="Main">
  <Backsight circle="0.0000" setupID="IS-1">... </Backsight>
  <ReducedObservation name="9" purpose="traverse" setupID="IS-9" targetSetupID="IS-10"
  azimuth="153.0930" horizDistance="63.212" />
```

...

...

```
</ObservationGroup>
```

.....

.....

Thank you

Soon Kean Huat

soon_kean_huat@sla.gov.sg