# Landonline and LandXML Import

Surveyors and developers reference document

Version v 1.3

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August 2011

## Landonline and LandXML Import

This document has been prepared to help surveyors and LandXML developers understand the interaction between the LandXML elements and attributes and how Landonline interprets them when an XML file is imported into an *e-survey*.

| Issue History | | | |
|---|---|---|---|
| Issue | Date | Section No. | Summary of Changes / Amendments |
| 0.1 | 1-10-07 | 1 | Incorporating changes for LandXML Schema v1.1 |
| 1.0 | 15-3-10 | 1, 3(3), 4, 5, 9.4, 9.5, 10.4, 10.5 10.8, 12.6, 12.7, 12.10, 12.11, 14.6, 14.7, 14.8, 15, 15.1, 15.9, 15.10, 18 | Incorporating changes for LandXML Schema v 1.2 and new Rules for Cadastral Survey 2010 |
| 1.1 | 19-3-10 | 12.12 | Replaced second sentence in point 3 with regards to retaining uniqueness of Mark Names. |
| | | 12.10 | Amended spelling error in LandXML Schema attribute list (disturbedMonument="") |
| 1.2 | 25-6-2010 | 12.11 | Amended table showing 'Expected value in XML file' for 'replacedMonument' from 'node oID' to 'mark oID' |
| 1.3 | 15-8-2011 | 12.11 | Amending Mark State to 'Old' for Renewed/Replaced marks |

## Landonline

Landonline is an online service for surveyors, lawyers, Territorial Authorities and other land professionals, providing access to New Zealand's authoritative database for land title and survey information. It enables land professionals to search and lodge title dealings and survey data digitally.

## 1. Import background

Landonline has the ability for surveyors to import their surveys directly into Landonline.

To ensure that minimal work is required by the surveyor after dataset upload, the structure chosen for the dataset format needed to represent the majority of the survey information required by Land Information New Zealand (LINZ). The elements and structures of LandXML fulfill this requirement; hence the Landonline application uses LandXML as its transfer format.

LandXML (www.LandXML.org) is an industry-driven XML format intended to facilitate the exchange of data during the Land Planning, Civil Engineering and Land Survey Process.

The Landonline survey exchange format is based around XML. XML (eXtensible Markup Language) is a simple markup language that can be used to store and transfer information between parties. As XML formats are based around non-proprietary plain text files they generally encourage the exchange of data.

The LandXML Schema was developed by Autodesk in conjunction with W3C (World Wide Web Consortium www.w3.org) and consultation with other software developers, vendors and users involved with civil engineering and surveying for land development.

LINZ has participated in the development of LandXML so that it incorporates the data elements required by Landonline. This also ensured that LandXML would fulfill the LINZ requirement for importing surveys into Landonline.

Prior to v3.4 release, Landonline has been able to support two LandXML Schema versions – v1.0 and v1.1

Landonline v3.4 will be able to import three LandXML Schema versions - v1.0, v 1.1 and now v1.2

The XML files are validated against the LandXML Schema. The LandXML Schema has elements and attributes that map to Landonline values. These Landonline values populate relevant fields within Landonline. The LandXML schema also has elements and attributes that do not map to Landonline values as LandXML is used by other similarly related professions.

The LandXML Schema cannot cater for every field in Landonline, the user still needs to do some editing in Landonline. The amount of editing will vary depending on the software used to create the XML file.  It is important to note that many of the values that have been created in Landonline v3.4 to support the new Rules for Cadastral Survey 2010 are not catered for in the fixed enumeration lists in LandXML Schema v1.0.  Consequently if LandXML Schema v1.0 is used for

importing, a significant amount of editing will be required by the surveyor to populate all the new values.

Other than just complying with the LandXML Schema, Landonline has its own set of rules to apply when the XML file is imported.

Landonline has been designed to allow the manual input of survey data through the capture screens. When imported, an XML file reduces this manual capture by automatically populating the fields within screens. Landonline has also been designed to accept XML files that do not fully utilise all elements and attributes LandXML caters for. This allows the surveyor to complete the remaining survey capture in Landonline.

## 2. Benefits of importing a LandXML file into Landonline

The benefits of using LandXML compliant survey software to create a LandXML file to import into Landonline are:

- reduced editing in Landonline that equates to;
- reduced time required in Landonline.

If survey data surrounding the proposed new survey has been extracted from Landonline, more elements and attributes can be incorporated into the new XML file to be imported into Landonline.

If an XML file is not extracted the following can not be done automatically:

- linking captured marks to the Landonline marks
- populating the adopted bearing and distance sources
- populating and editing existing mark descriptions
- populating parcel details for 'Extinguished', 'Referenced', 'Affected' and 'Encroached' parcels
- populating title details in the Comprised in References for the 'Extinguished', 'Referenced', 'Affected' and 'Encroached' parcels

The values for these fields can be manually entered in the survey software, but this defeats the purpose of extracting the XML file from Landonline.

XML files are extracted from Landonline at a point in time. If an extracted XML file has been used to create a new survey and you know or suspect there have been other approved surveys that affect your survey, another more recent extract should be obtained prior to mark linking in preparation for creating a new XML file for import.

## 3. What Landonline functions can LandXML fulfill?

Landonline allows fields to be populated automatically without the need to open the screen. However, checks in the form of pre-validation rules can be run to identify the mandatory fields that were not populated.

The following Landonline fields and functions can be incorporated in LandXML file:

1. Survey details including:
   - survey description
   - survey finish date
   - surveyor reference
   - surveyor registration
   - survey class including multiple class survey
   - coordinate system
   - type of dataset

2. Spatial window details:
   - survey references for the new survey
   - parcel labels for created parcels added.

3. Mark capture including:
   - mark point numbers
   - mark names
   - mark condition, state, type and purpose
   - disturbed marks
   - replaced marks
   - mark descriptions
   - mark coordinates
   - mark linking
   - linking of disturbed and renewed marks

4. Observation capture including:
   - right line, bearing and distances
   - arc observations, chord bearing, arc length, radius
   - observation type
   - bearing and distance sources
   - bearing and chord bearing corrections
   - observation layers
   - observation survey class including multiple class surveys
   - equipment type
   - irregular boundaries
   - balance parcels.

5. Parcel capture including:
   - creation of new parcels
   - parcel areas
   - parcel state
   - parcel class
   - donut parcels
   - identification of existing parcels
   - parcel linking
   - comprised in references.

## 4. What Landonline functions are not catered for by LandXML?

LandXML and Landonline cannot cater for functions specific to LINZ and the New Zealand survey system. Some functions must be carried out in Landonline.

They are the capture of:

- Land District
- Territorial Authority
- submitting surveyor
- 3D surveys
- enabled users to the *e-survey*
- new title allocation
- complex appellations for created parcels
- appellations for created balance road and hydro parcels
- legal firm/agent
- old cadastral datum surveys – not supported.

## 5. What needs to be done in Landonline before importing a LandXML file?

Before an XML file can be imported into Landonline, the *e-survey* must have a pre-allocated survey number.

To pre-allocate a survey number the following fields must be populated:

- survey file reference
- survey purpose
- Land District
- type of dataset
- survey description
- surveyor
- surveyor's firm
- primary contact.

The following fields will be overwritten on import of an XML file if the information is included in the XML file:

- survey file reference
- accreditation status
- survey description.

Landonline will also overwrite any other data that may have been entered into other fields. Therefore, the XML file should be imported before the remaining survey details are completed.

Landonline does not support the import of partial files. Therefore, it is recommended that the XML file should be imported when the survey has been completed in survey software.

## 6. How does Landonline interpret LandXML?

The LandXML schema element and attribute mappings are interpreted by Landonline when the XML is imported.

LandXML schema enumeration ⟶ Landonline value ⟶ Landonline field

The LandXML schema enumeration gets changed to a Landonline value that is recognised and gets populated into the Landonline field upon import. This process is known as parsing.

LandXML schema has elements and attributes that the surveyor chooses from a set list and some elements and attributes that the surveyor can enter as free text values.

The following list of elements and attributes have set values from which the user selects one option:

- arc direction
- equipment
- monument condition
- monument purpose
- monument state
- monument type
- observation type
- parcel state type
- survey type
- parcel class

The following list of elements and attributes can be entered as free text values by the surveyor and should adhere to Landonline conventions. Examples are:

- mark name
- mark description
- adopted bearing and adopted distance source
- bearing correction
- survey date

All elements and attributes have a one-to-one mapping with Landonline values with the exception of Parcel Class. Parcel Class will map to two Landonline values that populate two Landonline fields.

LandXML schema enumeration ⟶ Landonline value ⟶ Landonline field

⟶ Landonline value ⟶ Landonline field

Depending on the survey purpose of the *e-survey,* the parcel class will map to different Landonline Parcel Intent and Topology Classes.

There are instances when the Landonline value will not populate the Landonline field for Parcel Intent and Topology Class because there is more than one option that the values could populate. This forces the surveyor to make a decision and populate the field rather than Landonline populating it incorrectly.

## 7. What gets imported into Landonline?

Upon import, Landonline validates the XML file being imported. It will validate against the LandXML schema and the Landonline rules set by LINZ. The XML file must be compliant with the schema and the rules.

If the import fails due to non-compliance with LandXML schema, the error messages will not advise the surveyor of the problem. All Landonline recognises is that it is not a compliant file and will not import it.

If the import fails due to non-compliance with Landonline rules, the verification process will identify where it has failed, and some failures generate specific error messages advising the user where the problem is.

The LandXML schema was developed with other professions in mind other than just New Zealand surveyors. The LandXML schema has many more elements and attributes in it than Landonline needs or uses.

For the software developers, the schema is a useful document that indicates whether the element or attribute is imported. The elements and attributes have the following import code:

- NI – Not imported
- Op – Optional
- Rm – Recommended
- CR – Conditionally Required
- R – Required.

Not Imported
Landonline will not use or record information contained by the element or attribute. If the element or attribute is populated, Landonline will ignore that information. The element or attribute may still be required for a valid LandXML file.

Optional
Landonline does not require the information described by the element or attribute to load the XML file. However, it will record that information if it exists. Landonline provides tools to add or edit optional information once the XML file has been loaded.

Recommended
Landonline does not require the information described by the element or attribute to load the XML file. However, if provided this information will allow Landonline to perform additional automated processing of the digital cadastral survey dataset

Conditionally Required
The information described by the sub-element or attribute is required if certain conditions are met.

Required
The information described by the element or attribute must be provided before Landonline can correctly load the XML file. This is the minimum amount an XML file could contain to import into Landonline.

Each software vendor will have made the decision on how many elements and attributes to include in their software. The purpose of the additional

recommended elements and attributes is to minimise the number of manual edits the surveyor would otherwise have to perform before the digital cadastral survey dataset could be formally submitted to LINZ for validation and approval.

An XML file that is compliant may only contain the minimum 'Required' elements and attributes. So while the file is compliant, the surveyor will need to carry out more editing in Landonline than another surveyor with software that caters for the 'Required', 'Conditionally Required', 'Recommended' and 'Optional' elements and attributes.

## 8. What needs to be done in Landonline after importing a LandXML file?

Landonline allows fields to be populated automatically without the need to open the screen. After an XML file has been imported into Landonline, there is still work required before the surveyor can start to prepare digital survey plans. The amount of editing will:

- be determined by the survey software used to create the XML file
- depend on the survey purpose and the mappings applicable to that survey
- depend on the pre-validation report failures.

The first prompt after successfully importing an XML file is to pre-validate. Pre-validating the *e-survey* at this stage will identify the fields not populated by the XML file. These fields may not have been populated because the software used to create the XML file may not support those elements or attributes.

Other pre-validation rules that always run identify that:

- a parcel requires re-linking – this ensures that all mandatory marks along the parcel boundaries that were not needed to be captured by the survey have been included to maintain topology. This only applies if the survey purpose indicates that new parcels are required.
- a plan graphic has not been attached or plan generation has not been carried out.

A total of 24 pre-validation 'Y' rules run against the *e-survey* when imported. These 'Y' rules check the LandXML file data and identify what information is missing from Landonline mandatory fields. The survey business rules known as 'C' rules may also run checking the survey against Landonline data.

## 9. LandXML import process

The following documents the XML import process:

### 9.1 Survey Information tab

Create the *e-survey* to pre-allocate a survey number to allow the file to be imported. The correct survey purpose needs to be selected as parcel class mappings are dependent on the survey purpose.

## 9.2 Import Dataset tab

The import dataset tab allows you to browse for your XML file to import. The XML file must be stored on a local drive.

The import progress displays and will identify the first point of failure if the file does not comply with the LandXML schema or if Landonline cannot create the correct spatial topology.

Pre-validate the *e-survey* when prompted to.

## 9.3 Pre-validate tab

View the pre-validation report to identify any missing or incorrect data.

## 9.4 TA Certification tab

Enter the correct Territorial Authority

## 9.5 Survey Header screen

In the Survey Header screen:
Complete the following fields that are not imported as part of your XML file;
• Territorial Authority

Complete, edit or check the following fields that may or may not have been included in your XML file. XML file editing in Landonline may vary depending on the survey software used to create the XML file. Check the following fields;
• survey class
• survey finish date
• coordinate system
• referenced surveys including bearing correction
• comprised in reference

Referenced surveys and their bearing corrections should be entered/edited in the Survey Header screen prior to any edits in the Traverse Bdy Capture screen.

## 9.6 Mark List and Mark Detail screen

Marks imported into Landonline may need to be edited to ensure the correct attributes are in the correct field.
Examples:
• Mark Type Abbrev, Mark No, Mark Plan Ref for a mark – this ensures that future users will be able to correctly search for the mark
• Mark Type, Mark State, Condition, Purpose and Description are supplied correct for this survey.

Link the marks to Landonline marks where necessary either in the Mark Detail screen or in the Spatial Window.

## 9.7 Traverse Boundary Capture screen

Pre-validation Rule Y002 will list the observations that do not have information supplied by the XML file that are mandatory fields for Landonline.

Ensure that the following fields are populated with correct information for the survey:
Bearing Type & Source, Distance Type & Source, Bearing Correction, Survey Class, Layer and Equipment.

## 9.8 Spatial Window screen

Check the layout of the data is what was expected and has been displayed according to the underlying data accuracy. Depending on the survey software used check visually that all the;
- marks have been correctly linked
- survey references displayed in an appropriate position
- parcels linked

Complete the above actions if they were not included as part of the XML file.

## 9.9 Parcel List and Parcel Detail screen

Ensure that all parcels are recorded in the Parcel List screen.

Mandatory missed marks are automatically searched for by Landonline when the first parcel is linked, provided the underlying parcels have been identified as being 'Extinguished'. With an XML file imported, Landonline forces the surveyor to re-link a parcel to pick up on the mandatory missed marks that may not have been included in the extracted XML file.

Surveyors will need to:
1. ensure the extinguished/referenced/affected/encroached parcel information is correct
2. ensure the created parcels have the correct;
   - action
   - parcel intent
   - topology class
   - appellation format;
3. re-link a parcel to ensure mandatory missed marks are included and optional marks appear for selection.

## 10. How does Landonline and LandXML deal with Survey Information details?

### 10.1 Survey description

If the survey description is included in the XML file, Landonline will use this description and will overwrite what was entered when the *e-survey* was pre-allocated. If this description is incorrect, it can be edited in Landonline after the XML file is imported.

If the survey software used to create the XML does not support the survey description, or it was not utilised in the survey software, Landonline will retain the survey description entered when the *e-survey* was pre-allocated.

Landonline allows the use of ampersands '&' in the survey description.

XML Attribute is desc and is optional in the XML file
Example – SurveyHeader desc="Lots 1 & 2 being subdivision of Lot 99 DP 1234"

## 10.2   Survey finish date

The XML file requires both date and time to validate against the LandXML schema.   The date component of the endTime attribute is imported into Landonline. The time component of the endTime attribute is not imported into Landonline.

If the endTime attribute is not included in the XML file the date must be entered in Landonline.

XML Attribute is endTime and is optional in the XML file.
Example – SurveyHeader endTime="2004-07-25T16:38:10"

## 10.3   Surveyor reference

If the surveyor reference is included in the XML file, Landonline will overwrite the reference entered when the *e-survey* was pre-allocated.

If the survey software used to create the XML does not support the surveyor reference, or it was not utilised in the survey software, Landonline will retain the surveyor reference entered when the *e-survey* was pre-allocated.

XML Attribute is surveyorReference and is optional in the XML file.
Example – SurveyHeader surveyorReference="Roberts Stage 1"

## 10.4   Surveyor registration

LINZ has defaulted the Accreditation Status field to 'Accredited' and made it non-editable.

If the surveyor's registration is included in the XML file, Landonline will ignore the value in the XML file and retain the default of 'Accredited'.

XML Attribute is surveyorRegistration and is not imported in the XML file for Landonline use.
Example if included – SurveyHeader surveyorRegistration="Accredited" will default to 'Accredited.

## 10.5   Survey class

All surveys require a survey class to be stated. If the survey class is included in the XML file, Landonline will populate the Survey Class field with this value. This value is the survey class that is applied to the entire survey.

If the XML file does not contain the survey class for the survey, it must be added by the surveyor in Landonline.

If a survey class has been entered in Landonline after pre-allocation but before importing the XML file, Landonline will overwrite the survey class entered prior to importing the XML file.

Multiple class surveys can be catered for by changing the class of survey on an observation basis.

XML Attribute is class and is optional in the XML file.
Example – SurveyHeader class="A">

## 10.6   Referenced surveys

Referenced surveys identify the surveys used to support the new survey work. The information entered against a referenced survey may include the;

- survey number
- Land District and
- bearing correction.

The referenced surveys will only populate if the survey number is valid for the current Land District when the XML file is imported. Landonline only allows the entry of valid referenced surveys. Until such time as Landonline allows the entry of field book references in this field then the import of these references will not be allowed either. A Y Rule failure will occur if an invalid reference is used.

The referenced surveys will only populate the bearing correction if there is;
- a valid bearing correction
- only one bearing correction for that survey

Therefore referenced surveys with different bearing corrections on an observation basis will need one of the bearing corrections entered in the referenced surveys field. Generally this value would be the bearing correction that is applied to the majority of the observations.

The referenced surveys entered in the Survey Header screen are used for selection for adopted bearing and distance sources.

If the XML file does not contain any referenced surveys for the survey, they must be added by the surveyor in Landonline. The referenced surveys should be added to the Survey Header screen after import but prior to editing the observations. Each individual observation may need to be updated manually if not included in the XML file.

XML Attributes are adoptedAzimuthSurvey and adoptedSurvey, and all are optional in the XML file.
Example – ReducedObservation adoptedAzimuthSurvey="DP 23575"
Example – ReducedObservation adoptedDistanceSurvey="DP 86001"
Example – ReducedArcObservation adoptedSurvey="DP 85918"

XML Attribute is azimuthAdoptionFactor and is optional in the XML file.
Example – ReducedObservation azimuthAdoptionFactor="0"
Example – ReducedArcObservation azimuthAdoptionFactor="0"

XML Attribute is adoptedDistanceSurvey and is optional in the XML file but is not used to populate the Bearing Correction field for the Referenced Survey.

## 10.7   Coordinate system

Landonline only allows XML files to contain the coordinate systems with datums in NZGD1949 or NZGD2000. The XML file must contain both the coordinate system name (ie code) and the coordinate system description (full name and datum). It must also contain the coordinate system origin point (false origin).

If the coordinate system is not included in the XML file it is recommended that the coordinate system is entered in the Survey Header screen prior to importing the XML file. It is important that the correct coordinate system is entered.

Both are required or the XML file will not import into Landonline. However, both required fields are only recommended elements in the LandXML schema. The file would not contain one without the other.

Landonline import does not support:
- mixed datums for bearings and coordinates
- old cadastral datum.

XML Attribute is name and desc and both are recommended in the XML file.
Example – CoordinateSystem name="WELLTM2000" desc="Wellington 2000"
Example – False origin <Start>800000 400000</Start>

## 10.8   Type of Dataset

Landonline no longer has Compiled and Computed as types of dataset.  It has two types of dataset, Survey and Parcels without Survey Information to indicate how the survey was carried out.

XML Attribute is type and is optional in the XML file.
Example – SurveyHeader type="surveyed"
Example – SurveyHeader type="parcels without survey info"

## 11.   How does Landonline and LandXML deal with Spatial Information?

## 11.1   Spatial survey references

All surveys require a minimum of one spatial survey reference for the new survey to be placed in the spatial window. Survey references are required to shown so other Landonline users are aware of surveys in the areas that may be required for definitions for new surveys.

Survey software has the ability to include a survey reference in the XML file that, when imported, will display as a label in the provisional layer in the spatial window.

The survey software can determine a mathematical calculation of the centre of the parcels and convert this into a coordinate in terms of the surveys coordinate system. This coordinate value is identified as the attribute 'MapPoint' in the XML file.

This works for surveys with parcels in their parcel list. However, the position may not always be the best place for it spatially. If there are no parcels, it is preferable that a 'MapPoint' coordinate is not calculated by the survey software.

If the survey software used to create the XML does not support the survey reference, or it was not utilised in the survey software, the surveyor must add the survey reference in Landonline.

Adding a survey reference in Landonline is the best way to ensure it is placed in a suitable position and that the reference does not mask other important information. A reference that is in the XML file that when viewed in Landonline is not in a suitable position can be deleted in Landonline.

There is no limit to the number of survey references in the XML file that are imported into Landonline. However, once imported Landonline restricts this to a maximum of 20.

XML Element is MapPoint and is optional in the XML file.
Example – <MapPoint>805960.39855 402260.7648</MapPoint>

## 11.2   Parcel labels

All created parcels require a parcel label to be placed in the spatial window. If the Center element is provided in the XML file, Landonline will use the coordinates provided to place the parcel label. Only one parcel label per parcel is needed.

Parcels with topology require parcel labels. Created flats and units that do not have topology do not need a parcel label but do need a survey references for the survey.

Parcels existing in Landonline that will be extinguished or referenced by the new survey do not need a parcel label to be supplied by the XML file. Landonline already has a label for these parcels.

If the survey software used to create the XML does not support the parcel label, or it was not utilised in the survey software, Landonline will mathematically calculate a parcel label for created parcels. This label will appear in the mathematical centre of the parcel.

Parcel labels from the XML file that are not in a suitable position in the spatial display can be moved to another position in Landonline.

XML Element is Center and is optional in the XML file.
Example – <Center>805973.8908 402293.7151</Center>

## 12.   How does Landonline and LandXML deal with Mark details?

LandXML schema requires at least one mark in the LandXML file for it to import into Landonline.

## 12.1   Mark point numbers

Marks all require a unique mark point numbers. Landonline requires that the mark number must be a whole pure numeric integer so that the mark point numbers used by the surveyor are retained upon import. This helps when identifying the errors relating to marks by their mark number in the pre-validation report.

In the XML file, the attributes Monument pntRef and CgPoint name must not contain the survey mark name and they must be the same for each point. Landonline will display an error message advising this if the XML file contains the survey mark point number in the Monument pntRef and CgPoint name attributes.

XML Attribute is name and is required in the XML file.
XML Attribute is pntRef and is required in the XML file.
Example – CgPoint name="1" and Monument pntRef="1"

The following attributes identify the 'From' and 'To' marks in the XML file:

- ReducedObservation setupID="a11" – where a1 is the mark number prefix and 1 is the 'From' mark.
- TargetPoint pntRef="2" - where 2 is the 'To' mark.

XML Attribute is setupID and is required in the XML file.
XML Element is pntRef and is required in the XML file.
Example – ReducedObservation setupID="a11" and TargetPoint pntRef="2"


## 12.2   Mark names
Mark names in the LandXML file must be unique. A mark in Landonline that is not unique must be made unique to enable it to import into Landonline.

Mark Names in Landonline are made up of three components:
- Mark Type Abbreviation eg PEG, IT, LP, UNMK
- Mark Number eg 1, 2, IV, VII
- Mark Plan Reference eg DP 123456.

The surveyor may need to manually make the mark names unique. Survey software can incorporate checks in their software to ensure that the mark names are unique.

Existing mark names that contain a symbol must be edited to remove the symbol. This may cause a mark name conflict that will be highlighted at pre-validation and should be covered in the survey report. These marks have been previously entered into Landonline before the use of XML was implemented into Landonline.

Generally the non-uniqueness is because the mark does not have a mark number. Surveys carried out prior to Landonline did not require marks to have a unique name. To make this name unique to comply with LandXML schema and the Cadastral Survey Guidelines – *e-survey*, marks with non-unique names can be made unique by inserting a mark number in round brackets.

The round brackets indicate that the mark has been made unique by a subsequent survey and not by the original survey.

There is no requirement to remove the mark number in brackets in Landonline. If Landonline reports a mark name conflict, this can be explained in the survey report for the *e-survey*.

By including the mark number in brackets, it will also help with the mark name parsing into the correct fields. See Table 1 – Mark Name parsing.

Mark names are not to have the prefix 'O' for and old mark. Nor should they have the word 'adopted' or 'adpt' as part of the name. The mark state field caters for this state.

In the XML file the Monument name and the SurveyMonument mntRef must be the same for each mark.

Mark names and mark numbers must not include any special characters. Examples of mark names and numbers that **must not** be used are;

- Mark name 'L&S' should use 'L and S'
- Mark number '1/R/2' should use any numeric number

XML Attributes are name and mntRef and are required in the XML file.
Example – Monument name="IT VII DP 332665" and
SurveyMonument mntRef="IT VII DP 332665"

## 12.3   New marks

At the time of capture the surveyor may not have pre-allocated the *e-survey* so the new marks do not have a Mark Plan Reference.

Landonline does not populate the 'New' marks with the survey reference of the survey. If Landonline populated it and the XML file contained it, the mark plan reference number would appear twice in Landonline upon import.

To reduce the editing in Landonline, the XML file could contain the new survey reference as part of the mark name. To do this the user would:

- pre-allocate the *e-survey* to obtain a survey reference and note the *e-survey* reference
- include the *e-survey* reference for the 'New' marks in their survey software before writing to XML.

It is important that the correct survey number is entered in the survey software and imported into the correct *e-survey*. Otherwise, the new marks may have the wrong survey reference.

If the XML does not contain the mark name new survey reference as part of the mark name, the user would enter the mark plan reference in Landonline. It is important to enter the correct survey number in the field, or the new marks may have the wrong survey reference.

Survey software could incorporate checks based on the mark state for the new mark, which would be 'New', and default all new marks mark plan reference to the pre-allocated survey number. This would reduce the amount editing required in Landonline and in survey software.

## 12.4   Mark type

All marks in Landonline require Mark Type to be recorded against them. If the mark type is included in the XML file, Landonline will populate the Mark Type field with this value.

If the survey software used to create the XML does not support the mark type, or it was not utilised in the survey software, Landonline will default the type to 'Not Specified'. The marks will all need editing to their correct mark type in Landonline.

The LandXML mark type attributes are similar to the Landonline mark type values.

XML Attribute is type and is recommended in the XML file.
Example – Monument type="tube"

## 12.5   Mark condition

All marks in Landonline require Mark Condition to be recorded against them. If the mark condition is included in the XML file, Landonline will populate the Mark Condition field with this value.

If the survey software used to create the XML does not support the mark condition, or it was not utilised in the survey software, Landonline will default the mark condition to 'Reliable'. Some of the marks will need editing to their correct mark condition in Landonline.

The LandXML mark condition attributes are similar to the Landonline mark condition values.

XML Attribute is condition and is recommended in the XML file.
Example –  Monument condition="reliable""

## 12.6   Mark purpose

All marks in Landonline require Mark Purpose to be recorded against them. The mark purpose together with the observation in its correct observation layer determine that topology is formed. If the mark purpose is included in the XML file, Landonline will populate the Mark Purpose field with this value.

The LandXML mark purpose attributes are similar to the Landonline mark purpose values, and they map one for one.

XML Attribute is purpose and is required in the XML file.
Example – SurveyMonument  purpose="non boundary"

## 12.7   Mark state

All marks in Landonline require Mark State to be recorded against them. The mark state reflects the current state of the mark as identified by the current survey.

The LandXML mark state attributes are similar to the Landonline mark state values. However, they do not map one for one.

If the mark state is not supported by the survey software used to create the XML, or it was not utilised in the survey software, Landonline will default the mark state to 'Old'. Some of the marks will need editing to their correct mark state in Landonline.

Disturbed and Renewed marks are not linked via the normal linking process that assumes a one-to-one relationship between the node and the mark. Disturbed and Renewed marks, while identified as such in the XML file, are mapped to mark state 'New' and Mark State 'Old' respectively upon import into Landonline.

XML Attribute is state and is optional in the XML file.
Example – SurveyMonument state="original"

## 12.8   Mark descriptions

Marks in Landonline may have a description as supplied by the surveyor. The description is for the mark as determined by the current survey.

Descriptions are recorded against marks and held in Landonline. When extracted from Landonline, these marks will have the descriptions included in the extracted XML file. If this XML file is read into survey software that supports XML and the marks are linked with a Node oID and Mark oID, the description as held by Landonline can be identified and populated. This description as held by Landonline can be retained or edited.

Marks without a description and new marks can have their description added in the survey software.

Descriptions must not include any special characters. Examples of descriptions that **must not** be used are;

- 'tack & ↑' should use 'tack and arrow'
- 'disc +1.5 in fence' should use 'disc up 1.5 in fence'

XML Attribute is desc and is optional in the XML file.
Example – Monument desc="Down 0.4 in seal""

## 12.9   Mark coordinates

Marks require coordinates in the XML file. LandXML Schema and Landonline do not allow duplicate coordinates in the XML file.

Coordinates are listed in the XML file under CgPoint 805973.72 402426.52 for each mark.

## 12.10 Disturbed marks

A disturbed mark is a mark that physically exists but is not in its original position as defined by previous surveys. A mark can only be identified as disturbed if the mark is in Landonline. The mark must have been recorded as reliable.

A disturbed mark in an XML file indicates to Landonline that the mark will be retaining the same mark name but is actually in a different position. The XML file will contain two marks in the XML file;

1. The 'adopted' position of the mark and will be linked to the Landonline position
2. The 'found' position of the mark and will be in a new Landonline position

The relationship between these two marks is captured in Landonline using the Disturbed functionality in the Mark Reliability Details area of the Mark Detail screen.

A disturbed mark retains the mark oID (ie name) but is given a new node oID (ie position).

The LandXML schema includes the following attributes under sub element SurveyMonument and maps them as shown;

| LandXML schema attribute | Expected value in XML file | Landonline value |
|---|---|---|
| state="" | disturbed | Mark State 'New' |
| disturbedMonument="" | Monument oID (ie mark oID) | LOL Mark |
| disturbedDate="" | Date in yyyy-mm-dd | Date |
| disturbedAnnotation=" " | Description limited to 50 characters | Annotation |

A disturbed boundary mark is captured as a non boundary mark because the disturbed position does not make up part of the primary parcel, ie it does not form the parcel topology. The observations to the disturbed marks should be traverse observations.

LandXML has a rule that requires all mark names to be unique. To adhere to this rule to enable the XML file to be successfully imported two marks captured that have the same mark name (but different position) will need to have unique names. The marks once in Landonline can be edited to reflect the Landonline mark name held for it.

XML Attributes are;
- state which is recommended
- disturbedMonument which is recommended
- disturbedDate which is optional
- disturbedAnnotation which is optional

Example - state="disturbed" disturbedMonument="25208631" disturbedDate="2005-04-01" disturbedAnnotation="Node oID 25208631 and Mark oID 25208631"

## 12.11 Renewed marks

A renewed mark is a mark that physically replaces a mark that has been found in the field and exists in Landonline.

A renewed mark in an XML file indicates to Landonline that the mark was found and replaced by another mark in the same position. The XML file will contain one mark and it will be described by its new attributes given by the surveyor.

The relationship between the mark that was found and the new mark placed is captured in Landonline using the Renewed functionality in the Mark Reliability Details area of the Mark Detail screen.

A renewed mark retains the node oID (ie position) but is given a new mark oID (ie name).

The LandXML schema includes the following attributes under sub element SurveyMonument and maps them as shown;

| LandXML schema attribute | Expected value in XML file | Landonline value |
|---|---|---|
| state="" | replaced | Mark State 'Old' |
| replacedMonument="" | CgPoint oID (ie mark oID) | LOL Mark |
| replacedDate="" | Date in yyyy-mm-dd | Date |
| replacedAnnotation="" | Description limited to 50 characters | Annotation |

A mark that has been placed in the field in the marks calculated position (ie mark is not found) must not be identified as 'renewed'. This mark would have the Landonline Action of 'Original'.

XML Attributes are;
- state which is recommended
- replacedMonument which is recommended
- replacedDate which is optional
- replacedAnnotation which is optional

Example - state="replaced" replacedMonument="25206216" replacedDate="2005-04-02" replacedAnnotation=" Node oID 25206216 and Mark oID 25206216"/>

### 12.12 Mark parsing

All the mark information gets parsed into Landonline fields upon import. Landonline contains three fields for the mark name, yet many marks in Landonline do not follow mark naming convention. Therefore, the mark name may be parsed incorrectly.

As examples of mark names entered in survey software and imported, Landonline will parse the marks as follows:

| XML Mark Name | Landonline Mark Type Abbrev | Landonline Mark Number | Landonline Plan Reference |
|---|---|---|---|
| LP IV DP 56789 | LP | V | DP 56789 |
| IS 1 [1] | IS | 1 | |
| IS 1 DP 400000 [2] | IS | 1 | DP 400000 |
| PEG 5 [1] | PEG | 5 | |
| PEG 5 DP 400000 [2] | PEG | 5 | DP 400000 |
| PEG DP 4567 [4] | PEG | DP | 4567 |
| PEG (1) DP 4567 [3] | PEG | (1) | DP 4567 |
| IT DP 2345 [4] | IT | DP | 2345 |
| TRIG 160821 [5] | TRIG | 160821 | |
| IT No Rec | IT | No | Rec |

**Table 1 – Mark Name parsing**

Example above for IS 1 [2] and PEG 5 [2] uses DP 400000 as pre-allocated survey number.

[1]   New marks that have not had the pre-allocated Landonline Survey number in the XML File. These marks can be allocated the *e-survey* number in Landonline or even by the survey software if the *e-survey* is pre-allocated.

2    New marks that have had the pre-allocated Landonline Survey number DP 400000 entered in the XML File.

3    Existing marks without a unique mark name are given a unique number so it can be imported into Landonline. In this example, the mark number has been shown in brackets. There is no requirement to remove the mark number in brackets in Landonline. If Landonline reports a mark name conflict, this can be explained in the survey report for the *e-survey*.

4    Marks that do not have a mark number and are unique will parse incorrectly. These marks need editing in Landonline to ensure all three individual fields are correct.

5    Trigs do not need any editing because trigs are geodetic marks that do not get their mark name upgraded by the new survey.

## 13.    How does Landonline and LandXML link Marks?

Landonline uses the Node oID and the Mark oID of the existing Landonline mark. The marks in the XML file that correspond with a Landonline mark, and are determined to be reliable, will have these oIDs referenced against them to automatically link the marks upon import into Landonline.

If only the Node oID (CgPoint oID) or the Mark oID (Monument oID) is in the XML file, the mark will appear to be linked in Landonline but actually needs to be unlinked and re-linked. This will maintain the one-to-one relationship between the mark and the node.

If the survey software used to create the XML does not support mark linking, or it was not utilised in the survey software, the marks will need to be linked using Landonline.

Upon import, Landonline will identify marks that may not have been linked and those that have been linked to more than one Landonline mark.

XML Attributes are oID and are recommended in the XML file.
Example – CgPoint oID=" 37773137" and Monument oID=" 37724010"

## 14.    How does Landonline and LandXML deal with Observation details?

Many elements and attributes make up the observation details. Including observation details in the XML file can reduce the manual capture of data in Landonline.

### 14.1   Right line bearings and distances

Right line bearings and distance are imported into Landonline provided both the end marks are identified and have a coordinate.

The following attributes identify the 'From' and 'To' marks in the XML file:
ReducedObservation setupID="a11" – where a1 is the mark number prefix for XML and 1 is the 'From' mark.
TargetPoint pntRef="2" – where 2 is the 'To' mark.

An observation may contain a bearing or a distance only. However, more often than not the observation will contain both a bearing and a distance.

All bearings should be shown in degrees, minutes, and seconds. All distances captured should be reduced to sea level and be in metres.

Observations that have a total distance along a boundary when each part has been included are not required and will fail parcel topology rules. Therefore, Landonline will not import the XML file. This also applies to total arc observations.

XML Attribute is azimuth and is conditionally required in the XML file.
XML Attribute is horizDistance and is conditionally required in the XML file.
Example – ReducedObservation azimuth="212.5650" horizDistance="24.18"

## 14.2   Arc observations, chord bearing, arc length, radius and rotation

Arc observations that include the chordAzimuth, radius, length and rotation are imported into Landonline provided both the end marks are identified and have a coordinate. An arc observation requires all four components of the arc details to be in the XML file.

XML Attributes are chordAzimuth, radius, length and rot, and all are required in the XML file.
Example – ReducedArcObservation chordAzimuth="348.2940" radius="6.1" length="9.57" rot="cw"

## 14.3   Observation type

Bearings and distances (right lines and arcs) require an observation type. The observation type indicates the method used to obtain the observation dimensions.

LandXML supports combinations of bearing and distance types for the observation. Where the bearing type is 'measured' or 'calculated' a bearing or distance source should not be supplied ie an adopedAzimuthSurvey, adoptedDistanceSurvey or adoptedSurvey.

XML Attributes are azimuthType, distanceType, and arcType, and all are recommended in the XML file.
Example – ReducedObservation azimuthType="adopted" distanceType=" calculated "
Example – ReducedArcObservation arcType="calculated"

## 14.4   Bearing and distance sources

Bearing and distance sources can be populated if the azimuth type is adopted. Survey software can build in checks to ensure the fields have values if other fields are populated. This will reduce the editing effort required in Landonline.

These values will only import into Landonline if the value is a valid source plan for the Land District selected when the *e-survey* was pre-allocated. These values will populate for each observation and will also populate the list of referenced surveys in the Survey Header screen in Landonline.

If bearing and distance source is not supported by the survey software used to create the XML, or it was not utilised in the survey software, the bearing and distance source will need to be added using Landonline. Bearing and distance

sources not included in the XML file for adopted observations will be identified in the pre-validation report upon importing the XML file into Landonline.

The referenced surveys should be added to the Survey Header after import but prior to adding the observation bearing and distance sources. Each individual observation will need to be updated manually if not included in the XML file.

XML Attributes are adoptedAzimuthSurvey, adoptedDistanceSurvey, and adoptedSurvey, and all are optional in the XML file.
Example – ReducedObservation adoptedAzimuthSurvey="DP 23575" adoptedDistanceSurvey="DP 23575"
Example – ReducedArcObservation adoptedSurvey="DP 23575"


## 14.5   Bearing and chord bearing corrections

Bearing and chord bearing corrections can be included with the observation information in the XML file.

Positive bearing corrections in the XML file do not require a plus symbol in front of them. No symbol in front of the bearing correction implies a positive correction. A negative symbol in front of the bearing correction will import with the negative symbol.

Landonline cannot identify the bearing correction for a survey reference where a user has identified different bearing corrections for different observations adopted from the same survey reference.

Each observation from that survey can have a different bearing correction and these will map for each observation. As soon as there is more than one bearing correction for a survey, Landonline cannot populate the bearing correction for the referenced survey in the Survey Header screen because it does not know which the correct one is.

If there is only one valid bearing correction for a survey, this value will populate for each observation and will also populate the list of referenced surveys in Landonline.

If the survey software used to create the XML does not support bearing correction, or it was not utilised in the survey software, the bearing correction will need to be added using Landonline. Bearing corrections not included in the XML file for adopted observations will be identified in the pre-validation report upon importing the XML file into Landonline.

Landonline requires a bearing with no bearing correction to be applied to have a bearing correction of '0' entered.

XML Attribute is azimuthAdoptionFactor and is optional in the XML file.
Example – ReducedObservation azimuthAdoptionFactor="0"
Example – ReducedArcObservation azimuthAdoptionFactor="0"

## 14.6 Observation survey class

Landonline can map the observation survey class for an observation.

If the survey software used to create the XML does not support the survey class for an observation, or it was not utilised in the survey software, Landonline will default the survey class to the survey class specified for the survey.

If the survey software used to create the XML does not support survey class for the observation, or it was not utilised in the survey software, the survey class for the observation will need to be added using Landonline.

XML Attribute is azimuthAccClass and is optional in the XML file.
Example – ReducedObservation azimuthAccClass="D"
Example – ReducedArcObservation azimuthAccClass="B"

## 14.7 Observation survey class including multiple class surveys

Landonline can map a different survey class for an observation where the observation survey class differs from the survey class for the entire survey.

The XML file may have a class of survey for the survey. This class of survey may or may not map to each observation. So if there are one or more observations with a different class of survey, this will be applied on an observation basis in the XML file.

XML Attribute is azimuthAccClass and is optional in the XML file.
Example for survey – SurveyHeader class="A"
Example for observational basis – ReducedObservation azimuthAccClass="D"
Example for observational basis – ReducedArcObservation azimuthAccClass="B"

## 14.8 Equipment type

Landonline requires an equipment type for each observation. LandXML can support this value in the XML file.

The LandXML equipmentUsed attributes are similar to the Landonline equipment type values.

If the survey software used to create the XML does not support the equipment type, or it was not utilised in the survey software, Landonline will default the type to 'unknown'. The equipment type will need editing to their correct equipment type in Landonline.

XML Attribute is equipmentUsed and is optional in the XML file.
Example – ReducedObservation equipmentUsed="theodolite EDM"
Example – ReducedArcObservation equipmentUsed="old adopted"

## 14.9 Irregular boundaries

Irregular boundaries need to have a start ('From' mark) and end ('To' mark) point of the parcel boundary line. Irregular boundaries do not require observations so the boundary information is in the parcel element of the XML file.

If the parcel including the irregular boundary is not included in the LandXML file then the irregular boundary will not come through into Landonline and will need to be captured in Landonline.

It is identified as an irregular line and contains coordinates of the vertices in a 2D point list.

Ensure irregular boundaries are captured in the correct direction from the 'start' and 'end' point.

XML Element is PntList2D and is conditionally required in the XML file.
Example – <PntList2D> 879309.7888 425157.6082 879314.6704 425163.9842 879323.9356 425169.1647 879323.8359 425169.2643 879315.7663 425173.4486 879310.8847 425173.4486

### 14.10 Balance parcels

Parcels in an XML file can be made up of:

- observations or
- parcel boundary lines or
- combination of observations and parcel boundary lines – eg a primary parcel with an irregular boundary, balance road parcel.

Balance parcels are generally combinations of observations and parcel boundary lines. The ability to create balance parcels is determined by the survey software used.

## 15.    How does Landonline and LandXML deal with Parcel details?

LandXML schema requires a parcel entry in the XML file for it to import into Landonline.

The majority of surveys will have created parcels and extinguished parcels in the *e-survey*. Some *e-surveys* may only have referenced parcels. A small percentage of surveys will not require any parcel to be listed in Landonline.

To abide to the LandXML rule that requires a parcel in the XML file, some *e-surveys* will have parcel entries that will require deleting from Landonline.

An example of this would be an *e-survey* with the survey purpose of Survey Information.

A slightly different example would be an *e-survey* with the survey purpose of Monumentation CSD or Boundary Reinstatement – full CSD, where the referenced parcel is not included in the XML file. Landonline will populate a created parcel in the parcel list. This parcel will have to be deleted and the referenced parcel captured.

## 15.1  Created parcel details

Parcel appellations for created parcels in Landonline are made up of the following components:

- part indicator
- parcel type
- parcel number
- plan type
- plan number.

Created balance parcels retain their current name but prefixed with 'Part'. Created balance parcels may have simple or complex appellations.

Upon import all created parcels will have the survey and title checkbox fields in the parcel details screen checked. This implies that both the appellation (being survey checkbox) and legal description (being the title checkbox) is the same and is being created for this parcel. Created hydro or road parcels require these check boxes to be unchecked as appellation and legal descriptions are not required for these parcels.

The survey reference (plan reference) for created parcels do not need to have the new survey reference as part of parcel name. Landonline will update the parcel name with the plan reference for these parcels.

When creating an appellation for a parcel there are five components to parcel that has the Appellation Format of 'Simple'. The parcel may or may not be a part parcel that may also be considered 'Simple'.  The Landonline parcel type is one part of the XML Parcel name.

The five components are explained below;

| Landonline field | Requirement |
|---|---|
| Part Indicator | If Part or Pt is used the appellation format defaults to Other indicating a complex appellation. Check the Part Indicator in Landonline rather than including it in the created parcel appellation in the LandXML file |
| Parcel Type | Not required if parcel Type is Lot (but is preferable for consistency |
| Parcel Number | As provided by the surveyor |
| Plan Type | Not required as Landonline will populate this field every time. |
| Plan Number | Not required as Landonline will populate this field every time. |

The following parcel types map directly to the parcel type in Landonline when used as the first part of the appellation in the LandXML file.

| LandXML Appellation Name | Landonline Parcel Type |
|---|---|
| Area | Area |
| Esplanade Strip | Esplanade Strip |
| Lot | Lot |
| Marginal Strip | Marginal Strip |
| Principal Unit | Principal |
| Section | Section |
| Unit | Unit |

Attribute is name and is required in the XML file.
Example – Parcel name="Lot 2"

Example – Parcel name="Area 6"
Example – Parcel name="Section 5"

## 15.2   Created hydro and road parcel details

Upon import hydro and road parcels will have the survey and title checkboxes checked. However hydro and road parcels do not require appellations or legal descriptions to be created.

These parcels will need to be deleted and captured again in Landonline so that the;

- parcel id created instead of the appellation and legal description is correct
- the appellation format is correct
- the survey and title checkboxes are unchecked

Even though the parcel details are not correct for the hydro and road parcel it is still recommended that they are included as a parcel so that the observation layers map and topology is formed for these parcels.

## 15.3   Complex appellations

Created balance parcels may have a complex appellation. Landonline cannot correctly deal with complex appellations as the number of possible variations of fields and options are too great to correctly populate each parcel name into the correct Landonline fields.

Therefore complex appellations will need to be added in Landonline. However it is recommended that these parcels are included in the XML file so the observation layers map and topology is formed for these parcels. After import the parcels should then be deleted and then added again using Landonline functionality.

## 15.4   Parcel area

Parcel areas are imported into Landonline for newly created parcels. Not all parcels require an area to be supplied.

The areas can be rounded, edited or deleted in survey software prior to importing into Landonline. This will reduce the editing in Landonline. The units for the areas in the XML file are square metres however Landonline converts the areas to Hectares upon import.

If areas are supplied for parcels in the XML file that are not required, the areas should be deleted in Landonline.

If the survey software used to create the XML does not support area, or it was not utilised in the survey software, the area will need to be added in Landonline where applicable.

XML Attribute is area and is conditionally required in the XML file.
Example – Parcel area="464"

## 15.5   Parcel state

Parcel State indicates how the survey affects all the parcels, ie the parcel action.
XML supports parcel state for importing into Landonline.

The LandXML parcel state attributes are similar to the Landonline parcel state values.

XML Attribute is state and is required in the XML file.
Example – Parcel state="created"

## 15.6   Parcel class

Parcel Class indicates the use of the parcel. Landonline uses this information in combination with the Survey Purpose to derive the Parcel Intent as well as the Topology Class.

XML Attribute is class and is recommended in the XML file.
Example – Parcel class="allotment"

## 15.7   Donut parcels

Donut parcels are parcels inside parcels that are not connected by parcel boundaries of the same topology. They are two independent parcel rings. Examples in Landonline are islands in the middle of a lake or utility parcels (eg aerial or transmitter sites) inside an existing parcel.

Surveys may indirectly incorporate donut parcels by virtue of exclusion. The subject parcels may border a parcel not subject to the survey. Example; the subdivision may exclude the island or aerial or transmitter site but all parcels surrounding the island, aerial or transmitter may be subject to the subdivision.

When a parcel is re-linked in Landonline to pass the Y015 pre-validation rule Landonline will do a check for any mandatory and optional missed marks. Any marks bounding the extents of the subdivision can be included however any mandatory and optional missed marks that fall on the inner boundary of a donut parcel will need to be included by calculation into the survey.

The parcel element in the LandXML schema allows for more than one closed loop of lines to be defined within one parcel.

Areas for the parcels should be checked to ensure the outer parcel does not contain the area of the donut parcel if it is not required.

## 15.8   Parcel class parsing

Parcel Class will map to two Landonline values that populate two Landonline fields.

Depending on the survey purpose of the *e-survey,* the parcel class will map to different Landonline Parcel Intent and Topology Classes.

There are instances when the Landonline value will not populate the Landonline field for Parcel Intent and Topology Class because there is more than one option that the values could populate. This forces the surveyor to make a decision and populate the field rather than Landonline populating it incorrectly.

The effect of the Landonline fields not populating means that the observation layers for the parcel will not map. This is because parcel topology could not be determined. Landonline will default all observation layers to the traverse layer

when the observations should map to 'Primary' or 'Non-primary' or combinations thereof.

Examples of XML parcel class mappings to Landonline values based on survey purpose are shown in the table below:

| XML Parcel Class | Landonline Survey Purpose | Landonline Parcel Intent | Landonline Topology Class |
|---|---|---|---|
| allotment | LT Subdivision | Fee Simple Title | Primary |
| easement | LT Subdivision | Easement | Secondary |
| accessory building | Complete Stage Unit Plan | Accessory Unit | No Topology |
| building | Complete Stage Unit Plan | Principal unit | No Topology |

**Table 2 – XML parcel class mappings to Landonline values based on survey purpose**

Example: An XML file with a parcel with parcel class 'allotment' will map to different parcel intents based on survey purpose as shown in the table below:

| XML Parcel Class | Survey Purpose | Landonline Parcel Intent | Landonline Topology Class |
|---|---|---|---|
| Allotment | LT Subdivision | Fee Simple Title | Primary |
| Allotment | Amalgamation | Maori | Primary |

**Table 3 – XML parcel class 'Allotment' mappings to Landonline values based on survey purpose**

## 15.9  Parcel parsing

Only created parcels with simple appellations including those with the suffix 'Part' can be correctly parsed into Landonline.

Landonline will populate the *e-survey* Landonline Plan Type and Plan Number automatically for imported parcels. This will not apply for every parcel imported, so some editing of parcels will be required.

Landonline will also populate the parcel type if a parcel type is not supplied. However, it will populate it with 'Lot'. Therefore, it may need editing in Landonline if it is incorrect. If the parcel type is supplied, Landonline will use it.

Plan Type and Plan Number are populated automatically by Landonline. If the plan type and plan number are included by the surveyor Landonline will treat the appellation as if it is a complex appellation and cannot parse it correctly. Parcel Type and Parcel Number is all that is required for the parcel 'name' entry in a LandXML file.

Attribute is name and is required in the XML file.
Example – Parcel name="Lot 1"
Example – Parcel name="Area A"
Example – Parcel name="Section 1"

## 15.10 Created parcel simple appellation parsing

Examples of parcel names that parse correctly are shown below:

| XML Parcel Name | Part | Landonline Parcel Type | Landonline Parcel Number | Landonline Plan Type | Landonline Plan Number |
|---|---|---|---|---|---|
| 1 | | Lot | 1 | DP/SO/ML | Pre-allocated e-survey number |
| Lot 1 | | Lot | 1 | DP/SO/ML | Pre-allocated e-survey number |
| LOT 1 | | Lot | 1 | DP/SO/ML | Pre-allocated e-survey number |
| Part Lot 1 | √ | Lot | 1 | DP/SO/ML | Pre-allocated e-survey number |
| Section 2 | | Section | 2 | DP/SO/ML | Pre-allocated e-survey number |
| Part Section 2 | √ | Section | 2 | DP/SO/ML | Pre-allocated e-survey number |
| Area A | | Area | A | DP/SO/ML | Pre-allocated e-survey number |

**Table 4 – Correct parsing of parcel names**

Examples of parcel names that do not parse as expected are shown below:

| XML Parcel Name | Part | Landonline Parcel Type | Landonline Parcel Number | Landonline Plan Type | Landonline Plan Number |
|---|---|---|---|---|---|
| Part 2[1] | | Part | 2 | DP/SO/ML | Pre-allocated e-survey number |
| 1[2] | | Lot | 1 | SO | Pre-allocated e-survey number |
| A[3] | | Lot | A | DP | Pre-allocated e-survey number |

**Table 5 – Incorrect parsing of parcel names**

[1]    Part 2 – where the user expected Landonline to insert Lot to show - Part Lot 2
[2]    For Section – where the survey purpose creates an SO plan
[3]    For Area – where the survey purpose creates a DP plan and this parcel is an easement.

## 15.11 Created parcel complex appellation parsing

Complex appellations for created parcels cannot be parsed into Landonline. Landonline will use the parcel name that was supplied by the XML file. That parcel will need to be deleted in Landonline and added with the correct appellation.

A legalisation survey may create a complex appellation for the balance parcel. This complex appellation will not be recognised so the Appellation Format will display as 'Other'. The Appellation Format should display as 'General' and will therefore require editing in Landonline.

Examples of parcel names that do not parse correctly are shown below:

| XML Parcel Name | Landonline Appellation | Appellation Format |
|---|---|---|
| part lot 1[1] | part lot 1 | Other |
| Part Section 36 Block I Oamaru SD[2] | Part Section 36 Block I Oamaru SD | Other |
| Parcel id: 32850122[3] | Parcel id: 32850122 | Other |

**Table 6 – Parsing of complex appellations**

[1]   While this is a simple appellation the values in lower case are not recognised and do not parse correctly.

[2]   This parcel appellation in Landonline is Part Section 36 Block I Oamaru Survey District.

[3]   This type of parcel name would be used for a balance road or hydro parcel. You must use Landonline to capture this parcel. This is so that you can uncheck the Survey and Title checkboxes and ensure an appellation is not created. Even though the parcel name is incorrect, the observation layers will still map.

However, the complex appellation for the created parcel should be entered in the survey software, even though it cannot parse correctly, so that parcel lines are created to make up the topology. If the topology is determined, the observation layers can be mapped rather than all appearing in the traverse layer in Landonline. Deleting and adding a parcel may be less effort than identifying each observation and editing the layers.

## 15.12 Comprised in References

The comprised in reference for a parcel with a title can be included in the XML file. This field is not used for created parcels. It is not validated upon import until pre-validation is run for the C19 Business Rules provided the extinguished, affected, referenced or encroached parcel is captured.

If a parcel is identified as being extinguished, affected, referenced or encroached a certificate of title reference can be included in the parcel that will map to the Comprised in References in Landonline.

Only title references can be entered in this field as gazettes and the document references do not map to type 'Gazette'. The reference to the titles limitations must be done in Landonline. The validation of the comprised in reference is done during pre-validation and not at the import stage.

Only one title can be mapped to Landonline for each parcel. For parcels with multiple references the remaining title references will have to be entered in Landonline.

XML attribute is name and is optional in the XML file
Example - Title name="WN16B/1165"

## 16.    How does Landonline and LandXML link new Parcels?

Landonline requires new parcels to have a start and end point for each line. It also requires the points to be joined by parcel boundary lines.

The points and lines must form a closed loop.

Parcel topology must be maintained, and by ensuring the points and lines form a closed loop that does not loop back onto itself. The lines must coincide with boundary observations where boundary observations are provided or they may just be parcel boundary lines.

XML Attribute is Line Start pntRef and End pntRef and are required in the XML file.
Example Start pntRef="24" and End pntRef="27"

## 17. How does Landonline and LandXML identify extinguished, referenced, affected and encroached Parcels?

Landonline uses the parcel oID when importing a parcel that is to be extinguished or referenced.

XML Attribute is oID and is recommended in the XML file.
Example – Parcel oID="6705781"

### 17.1 Extinguished and referenced parcel parsing

The following happens to parcels upon import:

- simple appellations with correct parcel oIDs will parse correctly
- simple appellations with incorrect parcel oIDs will parse incorrectly
- complex appellations with correct parcel oIDs will parse correctly because it uses the Landonline oID to find the information to populate the fields
- complex appellations with incorrect parcel oIDs will parse incorrectly.

If the parcel oID for the extinguished parcel is incorrect, Landonline will populate the parcel details with the name supplied by the XML file and will not be able to identify the current parcel intent for the parcel. Landonline will also show it with the Appellation Format 'Other'. It will not be able to extinguish this parcel so the parcel will need to be deleted and captured as an extinguished parcel correctly in Landonline.

Therefore, the only editing required of extinguished parcels is if the parcel oID is incorrect or not supplied.

### 17.2 Affected and encroached parcel parsing

Affected and Encroached parcels will also map the Appellation Format to 'Other' regardless if the parcel oID is supplied and correct or not. Editing of these parcels in every situation is required in Landonline.

## 18. How does observation layer mapping work?

Parcel topology must be formed and parcels created to allow observation layers to map. Observation layer mappings will only map for parcel observations and for traverse observations, but not combinations of parcels and traverse observations.

Observation layer mappings require the reduced (or arc) observation 'coordGeomRefs' value to equal the parcel 'coordGeom name' value. To keep things simple the value allocated by the survey software developers should start from 1 and reflect the parcel list order.

If there is no 'coordGeomRefs' for a reduced or arc observation it is mapped to the traverse layer in Landonline upon import.

Partially created parcels (ie those with only partial topology formed) will map observations to the traverse layer in Landonline upon import.

If parcel capture is not supported by the survey software used to create the XML, or it was not utilised in the survey software, Landonline will map all observations to the traverse layer. These observations will require their layers to be edited in Landonline.

Combinations of parcel and traverse layers can only be edited in Landonline.

Based on the Parcel Class in the XML file the observation layer will be determined upon import. Examples are:

- a parcel class of 'allotment' when mapped to the observations that make up that allotment will result in an observation layer of primary
- a parcel class of 'easement' when mapped to the observations that make up that easement will result in an observation layer of secondary.

If an observation that is in a parcel with the parcel class of 'allotment' and in a parcel with the parcel class of 'easement' the observation will map to both primary and secondary layers upon import.

Examples of LandXML parcel class and observation layer mapping:

- Parcel 1 has been captured as an 'Allotment' with the intention of being a Primary parcel in the Primary layer
- Parcel 2 has been captured as an 'Easement' with the intention of being a Non Primary parcel in the Secondary layer
- Parcel 3 has been captured as an 'Easement Centerline' with the intention of being a Non Primary parcel in the Secondary layer,

| Observation Parcel References | Parcel State | Parcel Class | Landonline Observation Layer |
|---|---|---|---|
| 1 | created | allotment | 1, - Pri |
| 2 | created | easement | 2, - Sec |
| 3 | created | easement centerline | 4, - SecCL |
| Blank | N/A | N/A | 0, - Tra |

**Table 7 – Individual LandXML parcel class and observation layer mapping**

Examples of combinations to observation parcel references:

| Observation Parcel References | Landonline Observation Layer |
|---|---|
| 1 2 | 3, - Pri,Sec |
| 1 2 3 | 84, - Prim,Sec,SecCL |

**Table 8 – Combinations of LandXML parcel class and observation layer mapping**

XML Attribute is Parcel CoordGeom name and is conditionally required in the XML file.
Example – CoordGeom name="6"

XML Attribute is ReducedObservation (or Arc) coordGeomRefs and is recommended in the XML file.
Example – coordGeomRefs="6"

## 19. Use of special characters

Some special characters may have been used in Landonline fields when data has been entered through the conversion process or manual plan capture.

### 19.1 Special characters catered for

The LandXML schema requires the following symbols that are catered for by Landonline by changing the way the symbol is displayed on extract and import in the LandXML file;

- & ampersand is catered for by &amp;
- "" words inside quotations in a free text field are catered for by &quot;&quot;
- < less than brackets is catered for by &lt;
- > greater than brackets is catered for by &gt;
- ' minutes is catered for by &apos;
- " seconds are catered for by &quot;

If Landonline has changed the symbol to adhere to LandXML schema standards the same change is required for import. These characters have specific meanings and tasks and need to be changed accordingly to be interpreted correctly by Landonline.

The following are catered for by Landonline on extract and import and can also be catered for in survey software;

- ? question mark
- + plus
- - minus
- / forward slash
- \ back slash

The forward and back slash has specific meanings and tasks but do not need to be changed accordingly to be interpreted correctly by Landonline. Some of these characters will need their fields to be re-entered once in Landonline, example a Survey reference with a / in it, ML 44/2 will not fail import but will not populate the Landonline field.

## 19.2   Special characters not recommended

The following symbols are **not recommended** to be used;

- ↑ arrow
- superscript
- subscript

Superscripts that have been used as text to indicate and area in square metres should be avoided in all areas of Landonline. Landonline records areas in Hectares to the nearest 0.0001 Ha.

It is also recommended that carriage returns are not used in the mark description field.

## 19.3   Special characters not catered for

The following symbol is **not catered** for by Landonline and will fail import;

- ° deg

Landonline advises exactly where the first fail in the LandXML file occurs when the file is imported by identifying a line number and a character position.