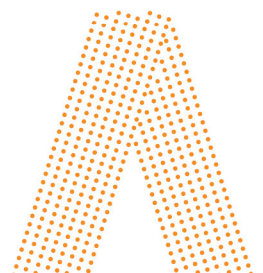


NZTraverse 9.1

Documentation on the use of this software
together with **Magnet Office** for processing data
for digital lodgement into Landonline.



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NZTraverse

Version 9.1

These notes relate to **NZTraverse 9 – Build Date December 2021** and to the minor upgrade **NZTraverse 9.1 – Build July 2022**

However most of these notes are applicable to working with the functions in NZTraverse versions 7 and 8.

NZTraverse 9.x works alongside the database structure created for **Version 6** and **Version 7** of Topcon's **Magnet Office**

Version 9.x is essential for supporting the 2021 Cadastral Survey Rules and Landonline

This document includes extended notes on the procedures needed to use **NZTraverse** and **MAGNET Office** to interface with LINZ's Landonline database.

INTRODUCTION:

NZTraverse 9.x is designed and written by Hale & Associates (Computer Resources) Ltd to support the 2021 Cadastral Survey Rules and Land Information New Zealand's Landonline system.

However it may also be used to process any standard vector and traverse data, with the ability to output traverse sheets, reports and plans, often needed for clients, and other data required in **MAGNET Office**.

The software is designed to maximise the interface with LandXML files extracted from LINZ's Landonline database.

The imported data is used, along with new data entered and designed in **NZTraverse** and **MAGNET Office**, to create a LandXML file for digital lodgement into the Landonline database.

NZTraverse supports the specific functions in the LandXML schema required to exchange a dataset between Landonline and the **NZTraverse / MAGNET Office** software.

MAGNET Office is owned, designed and written by Topcon Positioning Systems Inc.



INSTALLATION:

Please install **NZTraverse 9.1** from the installation set downloaded from our website.

Please start the installation using the “Run as Administrator” option on the right click menu.

NZTraverse must be installed in the folder (or the equivalent alternative you have chosen for your Magnet Office installation):

\Program Files\MAGNET\Office\Master\AddOns\NZTraverse

Please follow the instructions in the Installation PDF and also the onscreen prompts during the installation.

A. LICENCE FOR NZTRAVERSE

A separate licence of **NZTraverse** is required for each computer running the software.

The licence file to enable use of **NZTraverse** is provided either as a file on your existing USB key holding a **MAGNET Office** license or via a serial number entered against your installation.

The **NZTraverse** licence works with the **Magnet_Office.lic** in the ‘License’ (with an S) folder on your USB key.

Please read “**Installing NZTraverse 9.PDF**” for the instructions on obtaining a licence to run **NZTraverse 9.1**

Licensing for NZTraverse v9.1

Please note:

- License on USB key: you will need to obtain an updated license for **NZTraverse 9.1** to work with the Magnet_Office license (Magnet_Office.lic).
- License held on hard drive: you will need a new Activation Number to match the new Registration Number for **NZTraverse 9.1**
- V8.2 introduced a new Network licensing system for those users with multiple licenses. New license files are needed for **NZTraverse 9.1**



B. NEW FUNCTIONS IN NZTRAVERSE

Most of the options in **NZTraverse 9.x** were originally added to work with Landonline in May 2010 in **NZTraverse 7**. These are listed as **B.1.** to **B.9.**

A number of these items have been updated in **NZTraverse 9.x** to work with 2021 Cadastral Survey Rules and Landonline.

Other items are listed from **B.10.** depending on the version they were introduced.

B.1. Accuracy Reporting

To assist surveyors to check datasets for compliance with the accuracy standards laid down in the 2010 Rules, **NZTraverse 7** introduced accuracy checks in the Reduction and Reporting options. The onscreen Reduction Results check the residuals of the adjusted data against the allowed standards for both Non-Boundary observations and for Boundary observations. The latter items are checked relative to the Class of the Survey, or the Class of the Parcel.

Errors are reported onscreen and extensively listed in the 'Standard Adjustment Report'.

Parcel checks are reported separately in the 'Parcel Report'

*** Accuracy Standards updated for 2021 Cadastral Survey Rules see **B.50.**

B.2. Least Squares Adjustment

NZTraverse maintains the Bowditch Adjustment routine as the standard reduction and adjustment method for all datasets. However it also contains a Least Squares Adjustment which can be selected for particular Traverse grids.

The 'Traverse' grid is maintained for the data entry of either traverse data or for radiations / vectors. If a traverse grid is set to be adjusted by the Least Squares routine, then multiple observations may be made to any point. This would not be accepted if the data is adjusted by the Bowditch routine.

Many datasets will provide suitable data using the Bowditch method of adjustment. In other datasets it is not necessary to check all observations by Least Squares. Most of these may only need the Non-Boundary observations adjusted using a Least Squares adjustment, with the remainder adjusted by Bowditch.

Data entry in a traverse grid allows the surveyor to enter vectors for Least Squares Adjustment as radiations. If multiple traverses are used for such data, the Least Squares Adjustment reads all these radiations together. It does not treat each Traverse grid separately.

Radiations can be marked as either 'GPS' or 'EDM' using the Type column.

Traverses for reduction using the Least Squares Adjustment are flagged as such in the **Edit / Sequences** routine.

The results of the Least Squares Adjustment are shown in the 'Least Squares Report'. Accuracy checks on the same data are also shown in the 'Standard Adjustment Report'.



B.3. Landonline Mark Purpose (replaced by B.45.)

The Mark Purpose pick list contains the following:

For Non-Boundary purposes

- > PRM Permanent Reference Mark
- > Witness Witness Mark
- > Non Bdy Non Boundary Mark (replaces old Traverse purpose)
- > PRM/Bdy PRM also a Boundary mark
- > Witness/Bdy Witness also a Boundary Mark

For Boundary purposes

- > Bdy Survey Boundary mark defined by Survey
- > Bdy Adopt Boundary mark defined by Adoption
- > Bound Accept Boundary Accepted

The default Purpose is set as:

‘PRM’ in the Purpose field for a new Fixed Point.

‘Non Bdy’ in the Purpose field in the Traverse grid.

The Purpose for boundary marks in a parcel read from Magnet Office into NZTraverse defaults to ‘Bdy Survey’ instead of the previous ‘Boundary’. All marks that are already defined in **NZTraverse** use the Purpose you have already allocated to the mark.

Water or irregular boundaries are labelled within **NZTraverse** as ‘Natural’ only as a means of controlling the nodes of these boundaries within a parcel in **NZTraverse**.

‘Natural’ is not a LOL Purpose and no point in a Traverse grid should be set to ‘Natural’

1. PLEASE NOTE: Most extracts from Landonline still contain the previous Mark Purpose values so the surveyor should modify required marks to the new Mark Purpose values.

B.4. Survey Class

The Survey Class settings are A, B, C and D.

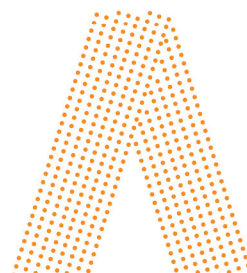
The Survey Class for the dataset is set on the **Info** Tab.

Individual Parcels may be modified to a different Survey Class if necessary.

B.5. Parcel Class

The Parcel Class pick list has been extended to include:

- > Esplanade Strip
- > Marginal Strip
- > Residue Parcel



> Restrictive Area

B.6. Equipment

The Equipment list now includes:

> Old Adopted

B.7. Parcel Names

Secondary and Tertiary parcels should not be named 'Marked A' or 'Marked B'.

They must be named 'Area A' or 'Area B'

To enable the required names for parcels and their associated Parcel Class, the **NZTraverse** option **Magnet Office / Read Lots** checks the 'Code' field you have set for a parcel inserted in Magnet Office and applies settings in **NZTraverse** as follows:

| <u>Magnet Office:</u> | <u>NZTraverse:</u> | |
|-----------------------|--------------------|---------------------|
| <u>Lot: Code</u> | <u>Parcel name</u> | <u>Parcel Class</u> |
| Field left blank | Lot | Allotment |
| Section | Section | Legalisation |
| Easement | Area | Easement |
| Covenant | Area | Covenant |

B.8. LandXML Schema

NZTraverse supports the import of LandXML files using LandXML Schemas 1.0, 1.1 and 1.2. Export to LandXML for import into Landonline uses LandXML Schema 1.2

B.9. Allocate Mark Numbers (replaced by B.51.)

This has been adjusted so that any new Non-Boundary Marks have unique Mark Numbers. The new requirement is to ensure that you cannot have IT 1 and IS 1 and IR 1 as new mark numbers. They are now defined as IT 1, IS 2 and IR 3.

B.10. Coordinate Systems supported

The "Datum" list includes:

- NZ Geodetic Datum 2000 - for extract from and import to LOL
- NZ Geodetic Datum 1949 - for extract from LOL
- NZ Map Grid - for extract from LOL and spatial display and use in Magnet Office
- NZ Transverse Mercator 2000 - for extract from LOL and spatial display and use in Magnet Office



The selected “Datum” may be saved to the *NZTraverse Default.ini* file as the default setting for future jobs.

B.11. Mark State

The Mark State uses the word ‘Old’ instead of ‘Original’ to match the setting for an old mark in Landonline. [Please note: ‘Old’ is written as ‘Original’ in the exported LandXML file as required by the LandXML Schema]

B.12. Import LandXML File


When an extract from Landonline is imported into **NZTraverse** the marks labelled ‘SDC’ have a light green background in the Survey Order column.

B.13. Save XML data to Magnet Office

When the option on the **Setup** Tab ‘Save Refs to Magnet Office’ is not ticked, the Plan Refs for marks are not saved to Magnet Office. However the Parcel names of the imported LandXML dataset are still saved.

When this option is ticked the Plan Refs are saved to the Note field for each point.

B.14. Redo

Edit / Redo option reverses one or multiple *Undo* keystrokes in the active Window, as long as the relevant window has remained open. The hotkey Ctrl-Y or the icon  can also be used.

B.15. Copy Column

The option **Edit / Copy Column** now works in the Distance units column of the Traverse grid. Useful to set multiple data to L for links.

B.16. Alpha Mark Numbers

Lower case alpha Mark numbers are supported. Imported datasets from Landonline hold the lower case of any alpha or alphanumeric mark number. The Mark Number pick list holds both upper and lower case versions of an alpha if both used in a dataset. Eg. A and a, or 4B and 4b.

B.17. Peg Ties

Any Peg Tie points that are only found in Magnet Office are loaded into the All Points mark list as **G** points during the operation **Reduction / Reduce All**. These marks have their Mark Names, Numbers and Plan Refs checked for uniqueness and ensures that the option **Reduction / Allocate Mark Numbers** checks this data.



B.18. Grid Size and Fonts

Windows / Change Grid Font lets you modify the size of the fonts used in the various grid style windows within **NZTraverse**. We recommend you only change the font style if essential, but do increase the size if you need to get larger text at the resolution you are using for your monitor. The text and row depths are modified to the increased size. Alternatively drag a row or column width to suit. These are automatically held as the default in this version.

B.19. Reduction Report Warnings

Reduction Report message warns you if the new Survey Number for the dataset has not been entered in the **Info** Tab. Other warnings should be worked through to ensure data is suitable for output to a LandXML file for Landonline. Always check the end of the report for messages warning of incomplete data prior to export to a LandXML file.

B.20. Bearings

Option to set bearings to one decimal part of a second added for those datasets using GPS and long distances. All output data will also use this precision for bearings. See **F.5**

B.21. Additional Least Squares Settings

Several users asked us to extend the options to enable weightings for different specifications of data when computing an adjustment using Least Squares. These were added in **NZTraverse 7.1**. The options enable surveyors to specify their own required weightings for different types of vectors. See **F.5.1c**

B.22. Export to LandXML (replaced by B.49.)

Much of the data in Landonline still has the old monument purposes used for a mark. When an extract from Landonline is imported into **NZTraverse** the purpose of marks are imported and may still be defined as 'Traverse' or 'Boundary' or 'Origin' – **NZTraverse** simply reads the purposes from the LandXML file.

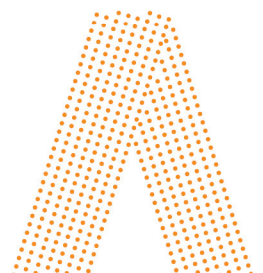
If these marks are used in your working data in new traverse grids or parcel grids you will have to modify the Purpose to a current acceptable value.

NZTraverse makes a check when you export a LandXML file. If it finds any mark set to 'Traverse' or 'Boundary' or 'Origin' a warning is displayed at the foot of the Reduction Results.

This prevents inadvertent lodging of data which uses unacceptable purpose values and prevents you from getting a requisition!

B.23. Mark State

Three additional settings for Mark State: Disturbed, Replaced and Renewed.



To set one of these options for a particular mark, modify the mark state in the 'Point PopUp' for a point in the points list. Alternatively select the 'Line PopUp' in the Traverse Grid. Click on **Check Point** button and then edit the 'Mark State' on the Point PopUp. OK returns via the Line PopUp.

The above Mark States are labeled at the RHS of the Reduction Report for a traverse in the Type field as:

Replaced: R Disturbed: D Renewed: E

B.24. Tooltip to assist with Accuracy Warnings

The Accuracy Warnings for each Traverse Grid in the Reduction Report are shown in Red. Place the cursor on the red cell to see the reason for the warning.

B.25. Find and Replace [see B.41 and B.52]

New items added to the 'Find' list:

- 'Mark Purpose' to find and replace the older Purpose settings
- 'oID' to find the point with a known Landonline oID designation

B.26. Checks prior to Export to LandXML [see B.49]

Any checks that fail are listed at the foot of the Reduction Report.

New checks ensure no 'PRM' or 'Witness' mark is set as 'Adopted'. This is not an error that prevents you writing the LandXML file, but it does warn you about the settings you have made, and may prevent you getting a requisition.

[The following items were modified in **NZTraverse 7.4**]

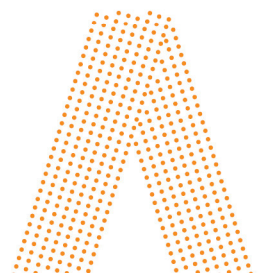
B.27. New Layers created for Imported LandXML data

As requested by various users: When a LandXML Extract from Landonline is imported into NZTraverse, a new structure is used for the various **Magnet Office** layers generated to hold the different types of Parcel.

This new feature reads the Landonline extract during the import procedure and checks through the various parcels included in the extract. The layers, and user defined colour and line styles, are allocated during the import procedure to hold the points, lines and arcs associated with the different class of parcel. These layers with their properties are created when the data is saved in **Magnet Office**. For more detail please go to **D.4.1b.5**

B.28. Option to Convert Route directly to a new Traverse Grid

As requested by several users, to cut down on the number of mouse clicks, we have introduced a quick option to convert a string via the Route function to a new Traverse Grid. When a string, read into NZTraverse from Magnet Office, is selected in the option **Insert / Route from Magnet Office Strings**, the Route window is opened and the following question is displayed "Would you like to create a traverse from xxx with default settings?" Yes or No



If 'Yes' a new Traverse Grid is created immediately and its window is opened. The Route window is still open behind the traverse to allow you to check the route computation.

If 'No' the full routine for converting a route to a traverse is required.

You still need to use the full routine to convert a route as radiations within a grid, for example from GPS data.

B.29. Issue with using arcs in new Parcels

Please note that current versions of Magnet Office do not record the rotation of the arc in the Lots Report, so we advise that you do not use **File / Import / Magnet Office Parcels** as all arcs will be set to CCW. As long as you are aware of this you can however edit the CW or CCW value for the arc in the Line PopUp within the imported Lot.

B.30. Plan References written as Notes

The previous database interface only allowed us to write the Plan References through to Magnet Office as text linked to a point. The new interface allows the use of the 'Note' field to attach the Plan Reference to a point.

The Parcel details for parcels imported from Landonline are displayed in the 'Note' field, attached to a point at the the centroid of the parcel.

If the option *Save Refs to Magnet Office* is activated on the **Setup** Tab, then the Plan References for marks are written to the 'Note' field. The Mark Name and Number is written to the 'Code' field. These two fields can have their annotation activated and displayed for all or selected points written from NZTraverse.

[The following features are only available in **NZTraverse 8** interfaced with **Magnet Office v4.2** and later]

B.31. Connect to Magnet Office

The wording on the Magnet Office menu and its icon have been modified in NZTraverse version 8 to Connect to Magnet Office

B.32. Removal of reference to Civilcad

The wording of menu items and routines has been modified to remove references to Civilcad. All menu items, messages and instructions only use the name 'Magnet Office'.

NZTraverse 8 does not interface with any version of Civilcad. It will only interface with Magnet Office v4.2 and later.

B.33. Addition of Chatham Islands

Chatham Islands Transverse Mercator 2000 circuit has been added. However please leave the datum set to Geodetic 2000 for import and export for this circuit. The correct settings for this circuit are made in the exported XML file.



[When datum set to NZTM an import of an XML file does work but no export of data can be made to an XML file as it cannot be imported into Landonline.]

B.34. Changes to Interface with Magnet Office

Topcon has developed a new database for version 4 datasets. This has required NZTraverse to be modified to work effectively with this new format. Speed became an issue for some users during the transfer of data from NZTraverse 7 to Magnet Office v4.

A number of changes have been made to the interface structure and to the way NZTraverse 8 delivers data into the project file in Magnet Office v4.2 This results in much increased speed in the writing of files.

B.35. Coordinate check of G points

G points are Magnet Office created points that are used within NZTraverse. Occasionally users have moved a G point and failed to update the coordinates in NZTraverse using the Synchronise option. NZTraverse now automatically checks these coordinates as part of the Save Data routine to ensure integrity of the dataset. However the user must remember to check all other calculations that might have been made based on the old position of the point, such as Read Strings to calculate and create data in NZTraverse or Read Lots. However this new functionality ensures peg tie computations to G points are accurate.

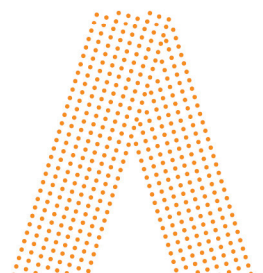
[These following features are only available in **NZTraverse 8.1** interfaced with **Magnet Office v4.2** and later]

B.36. Renaming Symbols to Monument

The columns headed 'Symbol' in the Points lists and the Traverse Grid have been renamed 'Monument'. This will assist our newer users of NZTraverse who were not sure where to set the Monument Type. Many users no longer set symbols for display in Magnet Office and only use the Landonline types of Monument. In this case the user will have the option *Use monuments/symbols table* inactive on the **Setup** Tab.

Other long time users still apply the name of a Magnet Office symbol to display a symbol on a mark on the graphics screen and also have the option *Use monuments/symbols table* ticked on the **Setup** Tab. This activates the *Monument Types/Symbols* list on the **Settings** menu. Alternatively create symbols in Magnet Office with the same name as the Landonline monuments.

See **D.4.1a**



B.37. New Registration of NZTraverse Licence

A new Licence is required to run **NZTraverse 8.1**

Please read the PDF file **Installing NZTraverse 81.PDF** for details

B.38. Width of column with Tabs widened

The column that contains the lists of Traverses and Parcels has 4 Tabs across its foot. The column has been widened to show all 4 Tabs.

B.39. Check Lots routine (further change in v8.3)

Although we have warned users to ignore the Check results for Parcels that include Natural Boundaries we do get queries about the results, especially as the area cannot be accurate.

When running the Check Lots routine, **NZTraverse 8.1** was changed to ignore any parcel that contains Natural Boundaries.

Natural Boundaries contain nodes that have specified coordinates so no lot close should be performed on parcels that include these nodes. The details for Parcels containing Natural Boundaries were also excluded from the Parcels Report.

After requests from users **NZTraverse 8.3** has reinstated detail of parcels containing Natural Boundaries in the Parcels Report.

No close is available in such Parcels so the observed detail is displayed in the report for all right line vectors but there is no accuracy or residual data. The natural boundary nodes are listed but only the coordinates of the nodes and point numbers are displayed.

The area of the parcel as defined in Magnet Office is the appropriate area to use for such parcels. This is the value imported when the option **Magnet Office / Read Lots** is used and is displayed in the header for such a Parcel with a calculated Perimeter.

B.40. Write Mark data to point description field in Magnet Office

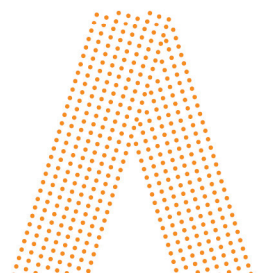
Version 4.3.1 introduced the option to display the contents of the point description field onscreen via a setting in the Hot Button.

The **Setup** Tab now includes the option *Write Mark details to Description field* and below it *Include oID*.

When this option is ticked, the Mark Name, Mark Number and Plan Reference are written as a string of text to the Magnet Office *Description* field. eg. PEG XXXVA SO 11178

If the option *Include oID* is also ticked, then the oID of points imported from Landonline is added to the string. eg. PEG XXXVA SO 11178 oID: 24225352

This can assist with tracking issues and reporting them to Landonline.



B.41. Add new option to Find function

NZTraverse 8.1 introduces a new option in the **Find** function to assist users to find and view the details of a point in the appropriate Reduction result.

The option *Show in Traverse report* is added as an option at the foot of the **Find** screen.

When searching for a point by number or other details, tick *Show in Traverse report* and two windows are opened. The point is highlighted in the traverse grid in the lower window with the corresponding traverse opened from the reduction report in the upper window.

B.42. New Network License

NZTraverse 8.2 introduces a new network licensing system for users who run Magnet Office with network licensing or multiple licenses.

B.43. Default.ini file

NZTraverse 8.2 fixes an issue when reading the Default.ini file to set parameters for a new job. If the Circuit = Mt Eden, the District will now be set correctly for either North Auckland or South Auckland.

B.44. Equipment Setting from imported Landonline Extract

NZTraverse 8.2 now fills the Equipment field in the Line PopUp if a vector record in the Landonline extract has this data. This data will display when a 'route' is inserted and saved to a traverse. In a new traverse the Source is set to Adopted, by default, and the equipment data is shown for the relevant record. If the Source is reset by a user to Measured, the equipment field is cleared to allow the new survey to set the Equipment.

If the Source remains as Adopted the imported equipment setting is held.

*** [December 2021/2022: The following changes have been made to version 9 to update NZTraverse to handle the new **2021 Cadastral Survey Rules**]

B.45. Landonline Mark Purposes (replaces B.3.)

The Mark Purpose pick list has been changed:

For Non-Boundary purposes

- PRM Permanent Reference Mark
- CSNM/VCM Cadastral Survey Network Mark / Vertical Control Mark
- Non Bdy Non Boundary Mark
- PRM/Bdy PRM also a Boundary mark

For Boundary purposes



- Boundary Boundary mark (all other boundary purposes have been removed)

The default Purpose is set as:

‘PRM’ in the Purpose field for a new Fixed Point.

‘Non Bdy’ in the Purpose field in the Traverse grid.

‘Natural’ is not a LOL Purpose and no point in a Traverse grid should be set to ‘Natural’. ‘Natural’ is only used as a Purpose in the Points list and Parcel screen to assist with defining natural boundaries within a parcel.

PLEASE NOTE: Most extracts from Landonline will contain the previous Mark Purpose values so the surveyor should modify any marks used in the new dataset to the 2021 Mark Purpose values.

B.46. Landonline Mark Conditions

There have been minor changes in the Landonline settings for Mark Conditions. Corrected to latest settings in **9.1**

- ‘Not found’ : this displays on the picklist in **NZTraverse** but is defined as ‘searched for and not found’ in the exported LandXML file
- ‘Reliably Placed’ : this displays on the picklist in **NZTraverse** in v9, corrected in v9.1
- ‘Impracticable to mark’ : new option on **NZTraverse** picklist in v9, corrected in v9.1
- ‘Mark Found’ : new option on **NZTraverse** picklist in v9.1
- ‘Dangerous’ : new option on **NZTraverse** picklist in v9.1

B.47. Right line boundaries intersecting natural boundaries

Landonline has one addition to the Survey Classes for use only in datasets with new parcels containing natural boundaries.

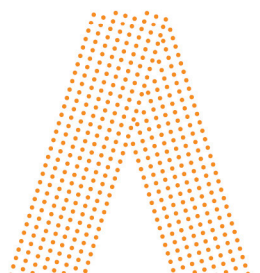
Survey Classes AD, BD and CD have been added. These must be applied to the individual right line boundary vector that intersects with a natural boundary. This enables the bearing of the right line to be defined by A, B or C and the distance to be defined as D.

Each existing right line vector that defines the start and end point of a natural boundary and any new right line vector defining a point on the natural boundary where a new boundary intersects the natural boundary must be defined with AD, BD or CD.

To enable this setting, a new field and picklist has been added to the Line PopUP in a Parcel. By default the setting is ‘Parcel’, setting boundary lines to the Survey Class of the Parcel.

The picklist enables the user to set the value AD, BD or CD to the appropriate right line vectors that intersect the natural boundary in the new parcels.

Some datasets will contain multiple class parcels so the onus is on the user to set the correct setting.



B.48. Height limited parcels

Where a primary or non-primary parcel is height-limited, the pre-fix 'Height Limited' must be used in the appellation. The user can edit the parcel name in **NZTraverse**. Prefix **HL** to the parcel name imported from Magnet Office. This will be processed correctly when the LandXML is imported into Landonline.

B.49. Export to LandXML (replaces B.22.)

When an extract from Landonline is imported into **NZTraverse** the purpose of marks are imported and may still be defined as 'Traverse' or 'Witness' or 'Boundary defined by survey' and other Boundary purposes. **NZTraverse** simply reads the purposes directly from the LandXML file.

If these marks are used in your working data in new traverse grids or parcel grids you will have to modify the Purpose to a current acceptable value.

NZTraverse makes a check when you export a LandXML file. It has been modified to check for Purposes that are no longer acceptable for a lodgement to Landonline using CSR 2021.

If it finds any mark set to 'Traverse' or 'Witness' or 'Origin' or the 2010 boundary purposes a warning is displayed at the foot of the Reduction Results.

This prevents inadvertent lodging of data which uses unacceptable purpose values.

B.50. Accuracy Standards 2021

The Accuracy Standards have been changed for 2021 Cadastral Survey Rules.

NZTraverse 9 now checks and computes these new accuracy tolerances.

The vector residual is computed for each observation in a Traverse Grid and this is displayed in the Reduction Report. The Accuracy Tolerance limit is computed for the same vector and displayed to the right of the Vector Residual.

Any vector observation that breaks the Accuracy Tolerance Limit is highlighted with a red marker and the tool tip explains the error. **See F.1. and F.2.**

The various reports have been updated to display the new Accuracy Tolerances.

B.51. Allocate Mark Numbers (replaces B.9.)

The 2021 Cadastral Survey Rules require the following:

"Unique survey mark name requirements applying to non-boundary marks have been extended to boundary marks"

NZTraverse 9 has been changed; "Allocate Mark Numbers" provides unique numbers for all new non-boundary and boundary marks. Existing marks which have no number are then allocated a number in brackets – similar to previous versions.



If you prefer to add numbers to your new marks please make sure all the numbers are unique. If you prefer to add numbers to some of the monumented marks and leave others, the “Allocate Mark Numbers” routine will check that it does not duplicate a number you have entered.

B.52. Find and Replace

NZTraverse 9 has added a further option to the Find and Replace option. There is an additional field that allows a search for a point/mark in the Points lists or the point/mark used in a traverse grid in the current sequence. This enables users to search for a mark by name from the imported LandXML data.

B.53. New License for v9

All users need to update their existing licenses to enable them to run **NZTraverse v9**

NZTraverse v9.1 uses the **v9** license.

*** [July 2022: The following minor changes have been made to version **9.1**]

B.54. Export to LandXML

This has been modified to enable a Condition setting of ‘Mark Found’ for marks that are defined as ‘Old’ if the Condition field is not set for Old marks.

To summarise- if no value has been set for Condition by the user:

‘Old’ marks set to **Mark Found**

‘New’ and ‘Adopted’ marks set to **Reliably placed**

‘Not monumented’ marks set to **Not specified**

Any mark with Condition set by the user holds that defined condition in the LandXML file.

B.55. Check Lots

If the user answers ‘Yes’ to the question “Should the Lot areas be placed with the computed areas” the area of any parcel containing natural boundaries is no longer modified and set to 1.00. **NZTraverse 9.1** holds the area and perimeter value read in from Magnet Office. The user can still edit this area if needed.

B.56. Read Lots from Magnet Office

By default, any new G points read into **NZTraverse** from Magnet Office have the Purpose set in **NZTraverse** to ‘Non Bdy’.

In **v9.1** when Magnet Office G points come into **NZTraverse** using the Read Lots routine, these new boundary points will have Purpose = Boundary



A G flagged point is a point/mark created in Magnet Office and used in NZTraverse. It still stays owned by Magnet Office but used by NZTraverse.

NOTE: Natural Boundary nodes when created in Magnet Office should be given a point code = NATBDY. This will ensure that the Purpose and Source are correctly set to 'Natural' when read into NZTraverse.

C. HINTS FOR USERS:

Here is a brief list of the functions you need to become familiar with if you are a new user of **NZTraverse**

Menu options are defined as **File / New Job** denoting **File** pull-down menu and option **New Job**.

Each topic also has a reference to a following section for further detail on how the option works.

C.1. Create New Job

File / New Job – make sure the Datum, Circuit and Land District are selected correctly. This information – and that entered on the **Info** Tab may be saved to the file called “NZTraverse Default.ini” using the **Save as Default** button on the **Info** Tab.

The settings in this file are used as the default when you create another new job; these settings may then be modified as necessary in the new job.

The library files used by **NZTraverse** are “NZTraverse.ini”, “NZTraverse Default.ini”, “NZTraverse Styles.ini”, “NZTraverseLOL.ini” and “NZTraverse Least Squares.ini”.

The folder for these files is usually the same folder where **NZTraverse** is installed.

Check if your company or organisation has its own defined library; if so, use them instead of the sample files provided with **NZTraverse**.

See section **D.2**.

C.2. Data entry grids

The data entry grids are designed to handle the various attributes and information needed for interfacing with Landonline.

Survey Mark – this is divided into three columns to control the format for the Survey Mark, as required by the LandXML schema. A Mark must have a unique name for import into Landonline.

The **Fixed Point** grid and the **Traverse** grid have data columns to accommodate the extra data for digital lodgement, such as Purpose and Source.

The Settings for Datum and Land District are found on the **Scale** Tab, together with Projection Scale settings.

The Landonline fields for Survey Number, Equipment and Survey Class are found on the **Info** Tab.

See section **E.1**.



C.3. Functionality

The functionality of the routines depends on whether you have imported existing data from the Landonline database or you are entering existing data manually from other records, such as paper plans or traverse sheets.

See section **D.2.**

C.4. Setup Tab – Save Reminder

The **Setup** Tab includes a save reminder similar to that in **Magnet Office**. Enable the option and set a time in minutes. If the data has been edited, and after the specified time has elapsed, a message is displayed asking if you wish to save the **NZTraverse** file. You can confirm or reject the save.

C.5. Setup Tab - Bearing Rounding Table

The Bearing Rounding Table on the **Setup** Tab allows up to 6 steps in the Distance series. These settings are used for missing line computations. Observations are not modified.

C.6. Setup Tab - Interface to Magnet Office

The “NZTraverse.ini” file holds various settings, including properties and parameters for the interface with Magnet Office. You can edit these items from within **NZTraverse** from the **Interface to Magnet Office** button on the **Setup** Tab.

See section **D.4.1.b**

C.7. Setup Tab - Plan References saved to Magnet Office

There is an option on the **Setup** Tab called *Save Refs to Magnet Office*.

If this field is unticked, the Plan References for survey marks are not written into Magnet Office.

However the Survey Numbers for the parcels are transferred from the Imported LandXML sequence to the point at the centroid of each parcel.

Activate this item to write the plan references for each survey mark to the ‘Note’ field of the point in **Magnet Office**. The annotation for both the Code and Note can be activated and displayed in Magnet Office.

This functionality applies to the options to write imported LandXML data to Magnet Office (**Magnet Office / XML to Magnet Office**) and saving computed data to Magnet Office (*Save Data*)

Magnet Office v4.3.1 introduced the option to display the data held for the Description of a point, onscreen beside the point. See option in the Magnet Office *Hot Button*.

NZTraverse v8.1 added a new option to the **Setup** Tab called *Write Mark details to Description field*. If this field is ticked the Mark Name, Mark Number and Plan Reference are written to the *Description* field of the record for the point in Magnet Office.



If the option *Include oID* is ticked the oID of a mark from Landonline is added to the detail in the *Description* field, to assist with tracking issues and reporting them to Landonline.

See section **D.5.2**.

C.8. Settings menu

The **Settings** menu holds options to assist with appropriate settings for your data.

The options are: *Bearing Corrections*, *Allocate Mark Numbers*, *Delete List Entry*, *Delete Unused List Entries*, *Styles Library*, *Landonline Monument Types/Symbols* and *Least Squares Settings*.

See section **E.6.**, **E.13.3.**, **G.2.** and **F.5.1**.

C.9. Settings – LOL Monuments / Magnet Office symbols

The “NZTraverseLOL.ini” file holds the translation table for converting Landonline Monument Types to Magnet Office symbols during LandXML Import and vice versa when exporting to a LandXML file. This function can be disabled on the **Settings** Tab so only Landonline monument names are used.

Setup or edit the file within **NZTraverse** using **Settings / Monument Types/Symbols**

See section **D.4.1.a**

C.10. Styles

The Traverse grid has a column called **Styles**. The Style allocated to a line of data sets the colour, line style, point layer, line layer and annotation parameters for the data when saved to **Magnet Office**.

The **Styles** library is user defined and is set up in the option on the **Settings** menu. The Styles are setup in one job and then saved to the file “NZTraverse Styles.ini” using the button **Save as Default**. The Styles are then available for use in all jobs.

The Styles library also includes a button **Load from Default**. This button reads the library from the “NZTraverse Styles.ini” file and updates any Styles already embedded in an older job.

Equipment can be included in a style. This is ideal for datasets where both GPS and EDM equipment are used. Equipment may be set for a calculated style (used for GPS vectors) and for an adopted style where the original equipment is known.

See section **E.6**.

C.11. PopUp screen for each mark

A popup screen containing further data is available for each mark in the **Fixed Point**, **All Points** or **Used Points** window. This information includes the oID (identification number) allocated to the mark by Landonline, and the imported mark details, including its coordinates computed by Landonline. These can be reset if needed.

A condition and description may be added to the mark details for export to the LandXML file. To display this additional data, right click in the grey field at the left hand end of the point’s data line in the Points list.



The PopUp box includes the option to edit the data of several selected marks in the Points list. In this case, the fields available for editing are restricted to Mark State, Condition and Description.

C.12. PopUp screen for each observation

A popup screen containing further data is available for each observation or vector line in a **Traverse** grid or each boundary line in a **Parcel**. This information includes the source for the bearing and distance, with options to set different sources to the bearing and distance in an observation. Separate plan references may be set for the adopted bearing and distance used for an observation.

If more than one equipment type is used for measurements, the equipment may be allocated in the PopUp screen.

Where a parcel (lot) includes an arc boundary, arc details are shown in the PopUp screen.

To display this additional data, right click in the grey field at the left hand end of the data line in the Traverse grid or Parcel grid.

The sources for the bearing and distance of adopted lines are carried through into the PopUp screen for any observations adopted from the imported data.

The PopUp box includes the option to edit the data of several selected lines of a traverse. In this case, the fields available for editing are restricted to Bearing and Distance Type, Bearing and Distance Adopted Sources, and Equipment.

The **Check Point** button opens the PopUp Point box for the target mark, defined by the line in the Traverse grid. Mark State, Condition and Description can be modified for the point.

The Mark State can be defined for each mark after data entry is complete using **Reduction / Assign Mark State**. It sets the Mark State for each point from the data in the Traverse Grid, using the settings in the Plan Ref. and Source fields. However the results can be edited as required for individual marks eg. Replaced, renewed, disturbed.

The PopUp screen holds any previously set Bearing and Distance sources in the fields even when the Source for the line is no longer set to Adopted.

See section **E.11.** and **E.12.**

C.13. Windows menu - Close All Windows

Windows / Close All Windows closes all the currently open windows (traverses, parcels, peg ties, routes) except the Points window, which remains open at all times.

Please note that the **Undo** and **Redo** functions are no longer available once the relevant window has been closed.

C.14. Windows menu – Change Grid Font

Windows / Change Grid Font allows you to modify the size of the fonts used in the various grid style windows within **NZTraverse**. Only change the font style if essential, but increase the size if you need to. The text is modified to the increased size.



The column widths and row depths can be moved by the user to suit the data. All the settings are automatically held for future use of **NZTraverse**.

Defaults can be reset if necessary.

C.15. Importing a LandXML file

File / Import / LandXML allows you to import a LandXML file, which you have extracted from the Landonline database. This file contains a dataset representing the survey marks, observations / vectors and boundary data for the existing parcels held in Landonline, together with appropriate underlying data.

NZTraverse 9 is also configured to process data from Landonline extracted in NZ Map Grid or NZ Transverse Mercator 2000 projections, for display and use in **Magnet Office**.

See section **D.3**.

C.16. Importing a LandXML file

Options are added to the “NZTraverse.ini” file that let you set specific colours to marks with a Survey Order between 1 and 6, and a colour and line style for lines on specified LOL layers.

The **Setup** Tab includes the *Interface to Magnet Office* button to enable you to set these functions correctly in the “NZTraverse.ini” file from within **NZTraverse**.

Any SDC data is marked with a light green background in the Survey Order column

Monument descriptions imported from Landonline are displayed on the Point PopUp screen for the Mark. These descriptions may be edited as required prior to export back to Landonline.

Any Natural Boundary nodes imported from Landonline have the Mark Name set to NATBDY to assist with boundary definition if re-used in a new parcel.

See section **D.4.1.b** and **E.10.3**.

C.17. Exclude Parcels from Imported XML data

Edit / Sequences allows you to mark selected Lots or other Parcels as **Excluded** in the Imported LandXML sequence. The excluded parcels and their relevant boundary data are omitted from **Magnet Office** when the option **Magnet Office / XML to Magnet Office** is run. See section **D.5**.

C.18. Transfer imported XML data to Magnet Office

Magnet Office / XML to Magnet Office writes the imported Landonline dataset into the Survey View of the current job in **Magnet Office**, as a spatial or graphic record and for further use as the job proceeds.

Set the sequence called **Imported LandXML Data** as the active sequence before you use this option. Also make sure that **NZTraverse** is connected to **Magnet Office** and the correct job is the current job open in the Survey View.



A point imported from LandXML file is written to **Magnet Office** even if the imported dataset has no observed line or lot boundary connected to the point. This function is necessary for data in non SDC areas, and optionally allows you to extract a dataset from Landonline containing only Marks.

See section **D.5**.

C.19. Read Strings

The option **Magnet Office / Read Strings** reads the strings on the active layers in the connected **Magnet Office** job to the list in the option **Insert / Route from Magnet Office Strings**. This option replaces the previous option to Load a “string” report.

If any string contains a **Magnet Office** point number (eg. pt no. 146) that duplicates the **NZTraverse** point number (eg pt no. NZ146), the *Read Strings* routine lists the point(s) and abandons the option. This function has been added to prevent incorrect data being defined by the string.

Read Strings option lists the number of strings found in **Magnet Office** and ready for use by **Insert / Route from Magnet Office Strings**.

See section **E.4.2**.

C.20. Routes from Magnet Office strings

Insert / Route from Magnet Office Strings - this option removes the need to type the point numbers directly into the Route grid in **NZTraverse**.

Strings can be created in **Magnet Office** to define the path of a traverse through a series of existing points; these are usually those imported from Landonline. These strings define a route that is converted into a traverse in **NZTraverse** using the marks and observations from the imported dataset.

This procedure may also be used for data imported into **Magnet Office** from other sources, such as GPS.

See section **E.4**.

C.21. Radiations / Vectors

Traverse grids that are to be adjusted using the Least Squares routine may contain a traverse loop or multiple radiations from a Survey Mark and multiple vectors to a mark.

The vectors / radiations are defined as such using the ‘Type’ field set to either **GPS** for GPS vectors or to **EDM** for shots from Total Station EDM data. When a radiation in a traverse grid is set to either GPS or EDM, the radiation will not be listed in the Peg Tie View.

The vectors are exported to the LandXML file as observations.

See section **E.5**.

C.22. Calculate Route as Radiations

A **Magnet Office** string may be read into the Route grid and computed using this option so that the first point on the string is tied to all subsequent points on the string.



Once calculated, the route is saved in a traverse grid with all the radiations set with the 'Type' field set to **GPS** or **EDM** from the first point. The surveyor can select the appropriate Type when the Route is converted to a traverse.

If the data is for Peg Ties set the 'type' field to **Peg Tie**. The points are then saved into the Peg Tie View screen.

See section **E.4.4**.

C.23. Editing Imported Data

You may edit the Mark Name, Number and Plan Reference of an imported Mark that is set to **I** in the **All Points** grid. This is often necessary as data from Landonline may not have the full detail for a Mark, and the user needs to be able to address this issue. If the mark is used in a traverse, its Mark Name, Number and Plan Ref. may be updated in the traverse grid. This will automatically update the mark name in the Points list.

F (Fixed) point can be set back to **I** (Imported) point in the **Used Points** list.

This is useful where you have selected the wrong point at the start or end of a route, or need to extend a traverse created by a route. Its coordinates may also be reset to those imported from the Landonline extract.

See section **E.4.5**.

C.24. Segment a Line

There is an option on the **Edit** menu called *Segment Line*. This option splits an observation line into two segments, creating the new inserted line and a new mark. This is ideal for dividing existing boundaries.

If **Edit / Segment Line** is selected while a line is highlighted in the Traverse Grid, a data entry box asks you to enter the length of the first segment of the line. A new line is inserted above the highlighted line with the new distance, reducing the original distance to the remainder of the segment.

The bearing, symbol, purpose, source, style, colour, line style, point layer, and line layer are copied from the original line to the inserted line. You can then edit such items as symbol, purpose, source and style.

Segment Line holds the source of the Bearing as Adopted, if the source of the original line was set as Adopted. The Distance for each segment has the source set to Calculated.

The *Segment Line* data entry box also allows you to specify the Mark State of the existing end point of the second segment as 'Old' or 'Adopted'. A 'Continue' option allows multiple segmenting of one line.

If the existing end point of the second segment is already defined as 'New' and its Source is 'Calculated' or 'Measured', these settings are held.

See section **E.8.1**.



C.25. Parcels read from Magnet Office

Once you have designed and created the new parcels in **Magnet Office** using the option **Design / Subdivision / Lot by Interior Point**, they can be read directly into the current sequence in **NZTraverse** using **Magnet Office / Read Lots**. [The option **File / Import / Magnet Office parcels** from a List of Lots is now obsolete and is removed in v9]

These parcels may have their names, state, class and area edited within **NZTraverse**, if necessary.

If this option is run after Lots have already been imported, existing Lots with the same name are overwritten and the information updated. Or you can delete the Lots in **NZTraverse** before importing them again.

Lots that are to be Extinguished may be copied from the imported sequence to the working sequence within **NZTraverse**, using **Edit / Sequences**.

If any lot contains a **Magnet Office** point number that duplicates an **NZTraverse** point number, the import routine lists the point(s) and abandons the import. This option has been added to prevent incorrect data being exported to a LandXML file.

See sections **E.8.**, **E.9.** and **E.13.4.**

C.26. Convert a Route to a Parcel

This option allows you to save a route as a Parcel. This is a quick method for creating lots or easements in **NZTraverse** in simple jobs, without the need to insert lots in the **Magnet Office** data.

This option should be used only for very simple situations. In most projects we recommend you create lots in **Magnet Office** and then read these into **NZTraverse**.

Any lot containing an **arc** should ideally be created in **Magnet Office** and then read into **NZTraverse** to get the appropriate results for transfer to Landonline, although the ability to convert a line to an arc in a parcel was reintroduced in v7.3 See Line PopUp

C.27. Check Lots

When Lots have been imported, a full Reduction is completed for the current dataset in **NZTraverse**, followed by the **Reduction / Check Lot** routine. This displays the closure of each Lot based on the bearing and distance defined for each leg of the lot.

The details of the lot check may be saved to a file using **File / Parcels Report** or printed on the Traverse Sheets. The Parcel Report also contains a check on the accuracy of the observations against the standards laid down in the Cadastral Survey Rules 2021.

When the option **Reduction / Reduce All** is re-run the data in the Check Lot routine is cleared to ensure the data is always consistent with the reduction.

NZTraverse ignores parcels containing Natural Boundaries during the Check Lot routine. Running a close through such a parcel does not give relevant results. However the observed boundary data for the parcel is in the Parcel Report.

See section **E.10.2.** and **E.14.2.**



C.28. Notepad displays Report

The text file, created by a report option on the **File / Export** menu, is automatically opened in Notepad. The results of the two Standard Reports, the two Parcels Reports and the Least Squares Report can be saved and viewed in this way, and then printed if required.

See section **E.14**.

C.29. Natural (Irregular) Boundaries in Lots

If the points used to define Natural Boundary nodes have their code set to NATBDY, the *Read Lots* routine automatically sets the Purpose and Source values for these points to “Natural”. This function applies to **Magnet Office** points defining the nodes of a natural boundary and to points already in **NZTraverse** from imported data.

Natural Boundary nodes imported from Landonline automatically have the Mark Name set to NATBDY to assist with this option. If the natural boundary nodes are labelled NATBDY, the *Read Lots* routine arranges the lot (parcel) to ensure the lot does not start and end on a Natural Boundary node. See section **E.10.3**.

To comply with the 2021 Cadastral Survey Rules, a field has been added to the Line PopUp in a Parcel. Any right line boundary vector that intersects with a natural boundary must be set with a Survey Class where the bearing is that of the parcel (A, B or C) and the distance is set to D. The setting for this right line boundary vector is AD, BD or CD.

The user needs to set this option for the correct boundary vector in a parcel.

C.30. Traverse Sheets

You can choose to add the point numbers to the final format of traverse sheet (always shown in the draft format).


You can also print the details of the lot closes at the end of the traverse sheet (both final and draft formats).

Set these parameters using **File / Sheet Options**.

This option also allows you to set the coordinate and distance precision to 3 decimal places. The default is set to 2 decimal places.

See section **E.14.1** and **E.14.2**

C.31. Modify Bearings

Edit / Modify Bearings or the icon  lets you modify the bearing on a highlighted selection of lines in a traverse grid by the value entered in the *Modify Bearing* data entry box.

See section **E.13.3.a**.



C.32. Find / Replace

The option **Edit / Find/Replace** can be activated by the short cut **Ctrl-F** or the icon 

This function includes options to find and replace “Monuments” to enable you to replace the Monument Type for a series of marks, “Mark Purpose” to update the old, pre-2021, purpose types and “old” to find a particular mark with a known old.

A field enables *Show in Traverse report*. When this is ticked two windows are opened. The point is highlighted in the traverse grid in the lower window with the corresponding traverse opened from the reduction report in the upper window.

If *Check Lots* has been run before *Find/Replace* the search runs through the traverse grids and through the Parcels.

Set the option to Points to search for a mark in the points list, or set the option Sequence to search in the Traverse grids. If the current Sequence is the Imported LandXML Sequence then the search is made in this data.

C.33. Peg Tie Window

A copy/paste option is active in the **View / Peg Ties** window. The Tied points can be copied and pasted to another Tie Point.

C.34. Plan References for Magnet Office points

If **Magnet Office** created points (eg. using GPS) have been used in **NZTraverse** in routes/traverses, and the user has defined the Mark Name, Number and Plan Ref for these points within **NZTraverse**, the data is written to **Magnet Office** and updated during the *Save Data* procedure.

When the option *Read Lots* is used, the Mark Name, number and Plan Ref is now taken from the NZTraverse data, as Plan Refs. are not available in Magnet Office.

If no data for the Mark detail is available in NZTraverse, the code from the Magnet Office point is used. You may need to check this data.

However remember that the option **Magnet Office / Synchronise Data** is available where you have used a Magnet Office point in NZTraverse and need to update its details within NZTraverse, because the data has been modified in Magnet Office. This could apply to coordinates, code, colour, symbol etc. The Survey Mark Name, number and Plan Ref fields are not updated as you may have edited these in **NZTraverse**.

C.35. Allocate Mark Numbers

When the option **Settings / Allocate Mark Numbers** is run, existing and new marks are handled separately. This routine also allocates the new Survey number from the **Info** Tab to all points without Plan Refs.

All new Non-Boundary Marks and new Boundary marks are now treated as one series of marks with a single series of numbers to comply with the 2021 Cadastral Survey Rules.



All marks are checked to ensure that there are no duplications. New marks are allocated numbers before the existing marks.

Old and Adopted Marks have the allocated Mark Number in brackets.

The mark numbers are allocated in such a way that all survey marks will be unique for each point used in the LandXML export. Any marks with names that are not unique are listed at the end of the Reduction Results.

See section **G**.

C.36. Exporting to a LandXML file

File / Export / LandXML allows you to export the completed dataset for the new survey to a LandXML file. This file may then be imported into the Landonline database. Once imported you may complete additional data entry, edit any of the imported data, and view the spatial data prior to plan generation, validation and final digital lodgement.

NZTraverse applies a number of rules to write the correct data in the LandXML file. These include the Mark State, the Type of Monument, the condition of the monument, the source for the bearing and distance of the observation, as well as checks for allocating individual numbering of marks to make each mark name unique.

NZTraverse checks that the new Survey Number is not included in the appellation of new parcels. Landonline needs to apply this as part of the import process.

An error is also recorded if a 'PRM' is defined as adopted.

The Export to LandXML has been modified to enable a Condition setting of 'Mark Found' for marks that are defined as 'Old' if the Condition field is not set for Old marks.

To summarise:

If no value has been set for Condition by the user:

'Old' marks set to **Mark Found**

'New' and 'Adopted' marks set to **Reliably placed**

'Not monumented' marks set to **Not specified**

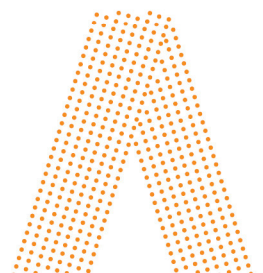
Any mark with Condition set by the user has that defined condition used in the LandXML file.

A further check is undertaken when the dataset includes Natural Boundaries. Any point in a traverse defined with Purpose or Source as 'Natural' would create an error when the data is imported into Landonline. No right line point can be used as a natural boundary node.

Any error is listed at the end of the Reduction Results report onscreen.

Any parcels set as 'Excluded' will be excluded from the data in the LandXML file.

See section **G**.



C.37. Checking a LandXML file

The option **File / Import / LandXML** file will also read a LandXML file exported from **NZTraverse**. This allows a user to check a LandXML file rejected during the import into Landonline, by importing the LandXML file into a new **NZTraverse** dataset.

The XML data should be saved to a new **Magnet Office** job to view possible reasons for the rejection. This process helps with checks on the geometrical layout of lots, overlapping boundary lines and duplicate points, but does not help you solve all errors.

D. IMPORTING DATA FROM LANDONLINE

Introduction

When you extract a dataset from Landonline you should use the Survey Data Extraction page to select an **area of interest**. This option gives you the latest data for all entities in the area. If you select individual surveys you get duplicated information and may miss out important data.

D.1. Extracting Data from Landonline

Select the Area of Interest required in the spatial view and from the **Tools** menu pick the option to *Extract Data*. On the Survey Data Extraction page, set the Extract Type to “Area of Interest” and then click the button labelled “Select Area of Interest”.

Make sure you set the correct ‘Extract Options’ near the foot of the page.

Set the radio button to the option **All**

Select a coordinate system from the pick list, to set the appropriate circuit and datum for the extracted data.

NOTE: Do **not** leave the coordinate system set to the default NZGD 2000 – if you do, you do not get the correct Geodetic coordinates, just the Longitude and Latitude values.

NZTraverse 9 supports LandXML Schema 1.1 or 1.2 for the extract of data from the current Landonline release.

However it will also import your previous extracts in Schema 1.0

Choose a suitable delivery option for the extract.




D.2. Create new data files

1. Create a new Magnet Office project

Create a new project in **Magnet Office** and use **File / Save As** to name the dataset (the project file name has the extension .mjo)

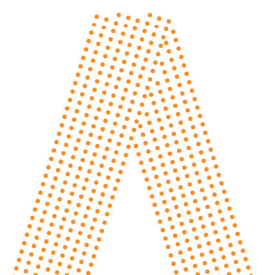
2. Create a new NZTraverse job

Now open NZTraverse. The simplest way to do this is to select the option **Survey / Manual Entry / NZTraverse** or the icon  from the Survey View in **Magnet Office**.

[You can add this icon to your Modules Toolbar in **Magnet Office** if you have not already done so. Use the option **View / Toolbar**. The icon can be found on the Survey category list.]

Now create a new job in **NZTraverse** and set the Datum, Circuit and Land District to match the dataset that is imported from Landonline, or to suit the data that will be manually entered into NZTraverse.

Use **File / Save As** to name the **NZTraverse** dataset (*.nzt).



[If the name of the file matches that used for the Magnet Office (*.mjo) file, the NZTraverse dataset is opened automatically when you start NZTraverse from the **Magnet Office Manual Entry** menu or the icon in future sessions of this job.]

D.3. Import the LandXML file

1. In NZTraverse, select **File / Import / LandXML**. Change, if necessary, to the drive and folder holding the required LandXML file and open the file.

The data in this file is read into the **NZTraverse** job. The dataset is imported as listed in section **D.4**.

There should be no problems importing such a file; if you do have a file extracted from Landonline which fails to import correctly, please send the file to magnetsupport@aptella.com

by email and we will check it out for you.

Did you set the Coordinate System correctly in Landonline prior to extracting data?

WARNING: You should not import the LandXML file from Landonline directly into **Magnet Office**. The special format of the Landonline version of the LandXML schema is only handled by **NZTraverse**. The **Magnet Office Import** routine only processes the standard CAD formats supported by the LandXML schema.

2. **NZTraverse** allows you to import more than one LandXML file into the same NZTraverse job. This is a useful feature if the first set of data did not extend far enough and you now find that more data is required to be extracted from Landonline.

A second Imported Sequence is created containing the Parcels and Observations. If these duplicate the imported data in the first Imported Sequence then they are marked (2). If data is imported three times, it is marked as a third duplicate (3)

NZTraverse checks the second import against the oIDs of the individual marks so that the marks are not duplicated. Only new marks that were not in the first dataset will be listed with new point numbers.

NOTE: However natural boundary nodes will be duplicated, so be aware of this.

D.4. Check the imported data

The data imported from a LandXML file into the **NZTraverse** job is written into three specific areas:

D.4.1. Imported Sequence - Marks

Each Survey Mark or Node defined in the LandXML file is allocated a Point number for use in NZTraverse and Magnet Office.



This point number starts at 1 by default. If you wish to allocate a different number sequence, change the setting of “Next Point to Use” on the **Setup** Tab in NZTraverse, before importing data.

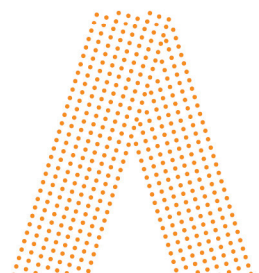
NOTE: If you need to define separate number ranges in Magnet Office and NZTraverse always make the start point in Magnet Office higher than that in NZTraverse. Set the *Next Point Number* in the Hot Button (Red Square icon) in **Magnet Office** eg. Set point numbers to 500 or 1000 and those in **NZTraverse** will then be allocated point numbers in the 1-499 or 1-999 range.

The two databases should be connected whenever you are entering data into NZTraverse so that data can be retrieved from Magnet Office and point numbers checked to ensure they are not duplicated.

| Point No. | Type | Northing | Easting | Level | Mark Name | Mark No. | Plan Ref. | Monument | Purpose | Colour | Survey Order | Layer Name |
|-----------|------|------------|------------|-------|-----------|----------|-----------|----------|------------|---------------|--------------|-------------|
| 1 | I | 807069.127 | 368806.312 | | IS | II | DPS 1141 | Spike | Non Bdy | Light Cyan | 5 | LoL Travers |
| 2 | I | 807108.630 | 368780.480 | | IT | T022 | SO 59993 | Tube | Non Bdy | Light Cyan | 5 | LoL Travers |
| 3 | I | 807231.065 | 368732.972 | | SS | 46 | SO 56301 | Unknown | Non Bdy | Light Cyan | 5 | LoL Travers |
| 4 | I | 807209.200 | 368752.641 | | IS | VIII | DPS 2467 | Spike | Traverse | Light Magenta | 6 | LoL Travers |
| 5 | I | 807035.394 | 368813.826 | | PLUG | I | SO 60401 | Plug | Origin | Light Magenta | 6 | LoL Travers |
| 6 | I | 807221.742 | 368739.936 | | IB | II | SO 335581 | Spike | Origin/Wit | Light Magenta | 6 | LoL Travers |
| 7 | I | 807225.141 | 368740.542 | | IT | I | DP 331646 | Tube | Witness | Light Magenta | 6 | LoL Travers |
| 8 | I | 807213.039 | 368734.535 | | IS | XXXI | SO 38022 | Spike | Traverse | Light Magenta | 6 | LoL Travers |
| 9 | I | 807229.784 | 368743.689 | | IS | XXX | SO 38022 | Spike | Traverse | Light Magenta | 6 | LoL Travers |
| 10 | I | 807096.714 | 368801.758 | | IT | | DPS 114 | Tube | Traverse | Light Magenta | 6 | LoL Travers |
| 11 | I | 807028.531 | 368816.293 | | IB | VII | DPS 72376 | Spike | Traverse | Light Magenta | 6 | LoL Travers |
| 12 | I | 807242.745 | 368904.267 | | IB | I | SO 335581 | Spike | Witness | Light Magenta | 6 | LoL Travers |
| 13 | I | 807038.245 | 368903.009 | | PLUG | II | SO 60401 | Plug | Origin | Light Magenta | 6 | LoL Travers |
| 14 | I | 807033.514 | 368903.442 | | IS | IX | DPS 72376 | Spike | Traverse | Light Magenta | 6 | LoL Travers |
| 15 | I | 807140.504 | 368888.323 | | | | DPS 72376 | Unknown | Boundary | Light Grey | 7i | LoL Lot Bdy |
| 16 | I | 807162.367 | 368886.868 | | | | DPS 72376 | Unknown | Boundary | Light Grey | 7i | LoL Lot Bdy |
| 17 | I | 807050.697 | 368888.379 | | | | DPS 72376 | Unknown | Boundary | Light Grey | 7i | LoL Lot Bdy |
| 18 | I | 807075.033 | 368892.690 | | | | DPS 72376 | Unknown | Boundary | Light Grey | 7i | LoL Lot Bdy |
| 19 | I | 807218.920 | 368897.526 | | | | DPS 72376 | Unknown | Boundary | Light Grey | 7i | LoL Lot Bdy |
| 20 | I | 807163.259 | 368898.834 | | | | DPS 72376 | Unknown | Boundary | Light Grey | 7i | LoL Lot Bdy |

Data allocated in **Fixed Points** grid for each node:

| | |
|-----------------------|---|
| Point No | ID number unique to each mark or node – set by NZTraverse |
| Type | Imported data set to type = I Field is: Highlighted in Yellow for all marks with oIDs Highlighted in White for all Natural (Irregular) Boundary nodes |
| Northing | Northing coordinate value in specified coordinate system |
| Easting | Easting coordinate value in specified coordinate system |
| Level | No data imported |
| Mark Name | Name held for Survey Mark in Landonline – usually an abbreviation for the type of mark |
| Mark Number | Number held for Survey Mark in Landonline |
| Plan Reference | Plan Reference held for Survey Mark in Landonline |



| | |
|---------------------|---|
| Monument | <p>This column may be set to one of the Landonline Monument types or to a symbol defined in the Magnet Office library.</p> <p>If the option <i>Use monuments/symbols table</i> is unticked on the Setup Tab, this column expects you to select only the standard Landonline monument types.</p> <p>If the option <i>Use monuments/symbols table</i> is activated on the Setup Tab, the entry in this column is matched to the Magnet Office symbol using the settings in the file “NZTraverseLOL.ini” (in the NZTraverse folder). See D.4.1.a below</p> |
| Purpose | <p>Purpose of Mark – mixture of old and new purposes: PRM, Witness, Non Bdy, Traverse, Boundary, Bdy Survey, Natural boundary and combinations eg Witness/Bdy</p> <p>The older Mark Purposes are still held in data extracted from Landonline</p> |
| Colour | <p>Default colour is set to Light Grey for use in Magnet Office.</p> <p>A different colour can be set for each Survey Order between 1 and 6 in the file “NZTraverse.ini” (in the NZTraverse program folder). See D.4.1.b below</p> |
| Survey Order | <p>Survey Order of the mark as held in Landonline.</p> <p>Field is highlighted in Pale Green for all “SDC” marks</p> |
| Layer | <p>Point layer set for use in Magnet Office. This setting is taken from the Purpose of the mark.</p> <p>Purpose = PRM, Witness, Non Bdy or Traverse, point is placed in the layer “Lol Traverse”</p> <p>Purpose = Boundary, Bdy Survey, or Bdy Adopt; the point is placed in a layer that responds to the class of Parcel</p> <p>See D.4.1.b below</p> <p>Purpose = Natural – the node is defined in an imported parcel to define an Irregular boundary – node is in the layer “Lol Nat Bdy”</p> <p>There is no observation / vector associated with a Natural Boundary node</p> |
| PopUp page | <p>Access the PopUp page for any point using the right mouse button click at left end of the row. This page holds further information about the point including:</p> <p>oID : the Landonline identifier for this mark</p> <p>Mark State and Condition</p> |



| | |
|--|---|
| | Description : Any description held by Landonline to assist with monument identification |
|--|---|

D.4.1.a NZTraverseLOL.ini file

This file is held in the NZTraverse folder (usually \Program Files\Magnet\Office\Master\AddOns\NZTraverse).

It is a simple text file that can be edited by using the function **Settings / Monument Types/Symbols**

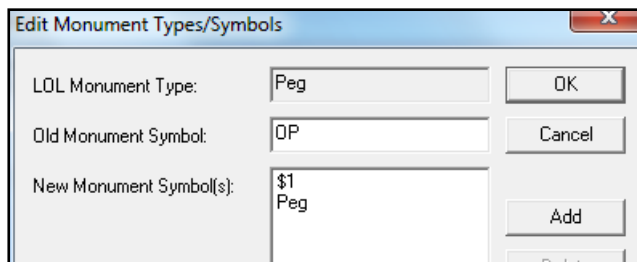
NOTE: If you do not require a translation between the Landonline monument type and your Magnet Office symbol names, make sure the option *Use monuments/symbols table* is not activated on the **Setup** Tab

The first column - "LOL Monument Type" – lists the Monument Types used by Landonline.

The second column - "Existing/Old Magnet Office Symbol" - displays a Magnet Office symbol from your Magnet Office library to represent the LOL monument when data is imported from Landonline or entered manually into the dataset.

The third column - "New Magnet Office Symbol(s)" - displays a Magnet Office symbol or symbols that you normally allocate to a new mark in the dataset. More than one symbol may be set for one monument type.

To edit the Magnet Office symbol for a Monument type, highlight the monument and click the *Edit* button.



Now edit the Old symbol or click *Add* button to enter new symbols. The file is updated immediately when you click **OK** to exit the option.

Each monument type should have unique symbols to make this work well.

Here is the format for the "NZTraverseLOL.ini" example file written by the option on the **Settings** menu.

Tube = OIT, IT
Spike = OIS, IS
Peg = OP, Peg, \$1
Post = \$FILL, Post
Plaque = ORM, RM



Plug = OLP, LP

Disk = OD, Disk

Nail = ON, Nail

Pin = OS, Pin

Not monumented = Unmarked, _!NONE, Not Monumented

When data is imported from Landonline, the monument type in the LandXML file is matched against this file and the appropriate OLD symbol is set for the mark in the Fixed Point list in NZTraverse.

When data is exported to a LandXML file, the symbol set for a mark in NZTraverse is matched against this file and the appropriate Landonline Monument Type is used in the exported LandXML file. Any old and new symbols used in the Symbol column are converted to the correct Monument Type required by Landonline.

NOTE: Please make sure you have added the option “Not monumented” to the end of your existing NZTraverseLOL.ini files. [You may need to do this in Notepad if you have an existing file without this entry] This ensures ‘Not monumented’ or ‘Unmarked’ points are correctly shown in Landonline.

_!NONE is the Magnet Office setting for a point with no symbol set.

D.4.1.b NZTraverse.ini file

This file is held in the NZTraverse folder (usually \Program Files\Magnet\Office\Master\AddOns\NZTraverse). It is a simple text file that can be edited by you from various settings within NZTraverse. The settings in this file will be the default settings in any new job.

Most of the entries in this file are controlled by the settings on the **Setup** Tab in NZTraverse, and are updated from this Tab using the button *Save As Default* or the button *Interface to Magnet Office*.

The following items should be edited using the button *Interface to Magnet Office*:



Interface to Magnet Office

Default point mark: 2 - Empty circle

Colour names and line widths:

| Colour | Line width |
|---------|------------|
| Blue | 0.25mm |
| Green | 0.35mm |
| Cyan | 0.50mm |
| Red | 0.70mm |
| Magenta | 0.35mm |

Peg tie preferences:

Magnet Office layer to use: PEG_TIES

Line style to use: Dash

Colour to use: Light Blue

Colours to use for Landonline Survey Orders:

| Survey order | Colour |
|--------------|------------|
| 1 | Light Red |
| 2 | Light Red |
| 3 | Light Red |
| 4 | Yellow |
| 5 | Light Blue |

Settings for imported Landonline layers:

| Line Layer | Line Style | Colour |
|------------------|------------|---------------|
| LOL BOUNDARY | SOLID | Light Grey |
| LOL COVENANT | SOLID | Magenta |
| LOL EASEMENT | SOLID | Light Magenta |
| LOL LOT BDY | SOLID | Light Cyan |
| LOL NAT BDY | SOLID | Green |
| LOL SECTION B... | SOLID | Cyan |
| LOL TRAVERSE | DASH | Light Green |

1. Default point mark

The default setting uses the small empty circle as the point mark for all NZTraverse points saved to Magnet Office. To edit this setting open the pick list and make a selection.

2. Colour names and line widths

The list displays the colours available for selection in NZTraverse. When data is saved to Magnet Office, the line width allocated to each colour is used for lines of that colour in Magnet Office.

To edit the line width for a colour, highlight the colour and click the Edit button.

Select line width

Choose the line width for Light Red:

0.70mm

Now edit the line width from the pick list or type in the required line width.



NOTE: Only line widths listed on the pick list in Magnet Office are recognised. To add a new line width in Magnet Office, type it into the line width field on the 'Properties' toolbar. This line width is then available for all new projects.

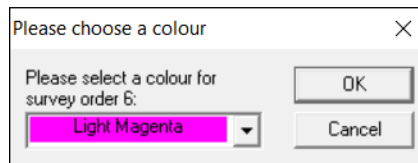
3. Peg tie preferences

Peg ties defined between an NZTraverse mark and a Magnet Office created point can have the tie line automatically created by NZTraverse when data is saved to Magnet Office. This option is activated by ticking the item *Annotate Peg Ties* in the **Setup** Tab. Three settings are available. Edit the Layer name, line style or colour if necessary.

4. Colours to use for Landonline Survey Orders

The default colour for marks imported into NZTraverse from a Landonline extract is Light Grey. You can set your own preferred colour for those Marks with a Survey Order of 1 to 6.

To edit the colour for a mark with a particular Survey Order, highlight the Survey Order and click the *Edit* button.



Now edit the colour from the pick list. The colour is applied to the points when the data is imported into NZTraverse from the LandXML file.

5. Settings for imported Landonline layers

The default colour for all lines imported into NZTraverse from a Landonline extract is Light Grey. You can set your own preferred colour and line styles for the lines on specified layers for saving to Magnet Office.

NZTraverse allows the user to set layers for the boundary lines. These layer names are dependent on the Parcel class for the boundary line.

Lot (allotment): boundary lines go to LOL LOT BDY layer

Section (legalisation): boundary lines go to LOL SECTION BDY layer

Easement: boundary lines go to LOL EASEMENT layer

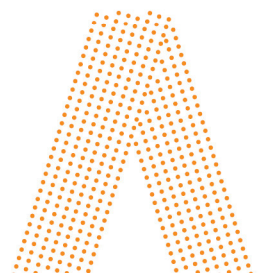
Covenant: boundary lines go to LOL COVENANT layer

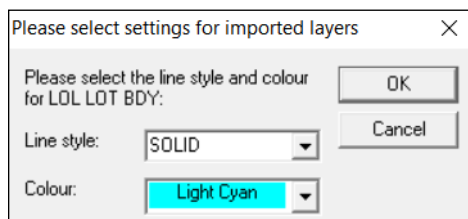
Any other parcel class: boundary lines go to LOL BOUNDARY layer

Where a boundary line is shared by two parcels of different class, the first parcel class processed will dictate the layer used. The order of processing is as above.

To edit the settings, highlight the layer name and click the *Edit* button.

Now edit the line style and colour from the pick lists.





In the example above, all lines on the LOL LOT BDY layer in Magnet Office will be displayed in colour – Light Cyan and use a Solid line style, and all lines on the LOL TRAVERSE layer will be displayed in colour - Light Green and use a Dash line style. Natural Boundaries on the LOL NAT BDY layer will be displayed in colour – Green and use a Solid line style.

NOTE: The settings are applied to the lines when the data is imported into NZTraverse from the extracted LandXML file.

D.4.1.c NZTraverse Default.ini file


This file is held in the NZTraverse folder (usually \Program Files\Magnet\Office\Master \AddOns\NZTraverse). It is a simple text file that is created or updated from data on the **Scale** and **Info** Tabs. The data held in this file defines Circuit, District, Surveyor Name, Basis (if any), the Origin Northing coordinate and the Origin Easting coordinate, and the Datum.

The settings in this file are the default settings in any new job. This file may be updated from the **Info** Tab using the button, *Save As Default*.

NOTE: Once you have set up the NZTraverse.ini, NZTraverseLOL.ini and NZTraverse Default.ini files, you should take backup copies of the files. These files can be copied to other computers in an office, so that all users of **Magnet Office** and **NZTraverse** are using the same settings.

D.4.2. Imported Sequence - Observations

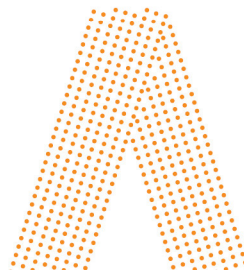
The Sequence list at the left side of the screen always has a Standard Sequence which is where the working data is created. A second Sequence called **Imported LandXML Data** holds the imported observations from each monument after importing an extract from Landonline.

Each setup station in the database is listed with its NZTraverse point number and the Survey Mark details. They are marked with an icon representing you taking an observation 

Open the Imported LandXML Data sequence and then click the Mark name to open the grid for each setup station and view the observation or observations from that mark.

Each line is defined as a Side Shot in the Type column as each line of data represents a radiation / vector from the setup station, the first point in the grid.

The data cannot be altered, although a line of data can be copied and pasted to a traverse in the Standard Sequence. This data is also used for adoptions or to define a traverse for re-measuring, using the **NZTraverse** Route functions.



When a point number from the imported dataset is used in the new working dataset, it will use the attributes from the imported data.

| | |
|-------------------------|----------------------|
| Pt 5: PLUG I SO 60401 | Pt 7: IT I DP 331646 |
| Pt 6: IB II SO 335581 | |
| Pt 7: IT I DP 331646 | |
| Pt 8: IS XXXI SO 38022 | |
| Pt 9: IS XXX SO 38022 | |
| Pt 10: IT DPS 114 | |
| Pt 11: IB VII DPS 72376 | |
| Pt 13: PLUG II SO 60401 | |
| Pt 14: IS IX DPS 72376 | |
| Pt 15: DPS 72376 | |
| Pt 16: DPS 72376 | |
| Pt 17: DPS 72376 | |
| Pt 18: DPS 72376 | |
| Pt 19: DPS 72376 | |
| Pt 20: DPS 72376 | |
| Pt 21: DPS 72376 | |

| Bearing | Distance | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose |
|----------|----------|-------|-----------|----------|-----------|------|----------|----------|
| 75.4600 | 47.160 | m 88 | PEG | IE | DP 331646 | Side | Tube | Witness |
| 80.2240 | 84.880 | m 89 | PEG | IG | DP 331646 | Side | Peg | Boundary |
| 80.4520 | 90.850 | m 36 | PEG | | DP 331646 | Side | Peg | Traverse |
| 120.4850 | 35.500 | m 90 | PEG | 9 | SO 340574 | Side | Peg | Boundary |

| Bearing | Distance | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose |
|----------|----------|-------|-----------|----------|-----------|------|----------|----------|
| 337.3230 | 211.700 | m 3 | SS | 46 | SO 56301 | Side | Unknown | Non Bdy |
| 160.0700 | 7.290 | m 11 | IB | VII | DPS 72376 | Side | Spike | Traverse |
| 338.5240 | 203.410 | m 7 | IT | I | DP 331646 | Side | Tube | Witness |
| 88.1030 | 89.230 | m 13 | PLUG | II | SO 60401 | Side | Plug | Origin |


Data allocated to each observation:


| | |
|-----------------------|---|
| Bearing | Reduced bearing observation from setup station |
| Distance | Reduced distance observation from setup station |
| Point No | NZTraverse number unique to end point of this observation |
| Mark Name | Name for Survey Mark of target point in Landonline |
| Mark Number | Number for Survey Mark of target point in Landonline |
| Plan Reference | Plan Reference for Survey Mark of target point in Landonline |
| Type | Set as Side Shot as these are radiations from the first point |
| Monument | <p>If the option <i>Use monuments/symbols table</i> is unticked on the Setup Tab, this column displays only the standard Landonline monument types.</p> <p>If the option <i>Use monuments/symbols table</i> is activated on the Setup Tab, the entry in this column is matched to the Magnet Office symbol using the settings in the file "NZTraverseLOL.ini" (in the NZTraverse folder). See D.4.1.a above</p> |
| Purpose | Purpose of Mark – this includes the new Purposes such as PRM, Non Bdy, Boundary but may also include the old Purposes such as Origin, Traverse, Bdy by Survey, Witness or a combination of these purposes |
| Source | Source of observation – Measured, Adopted or Calculated – as held in Landonline |
| Colour | Default colour is set to Light Grey for use in Magnet Office. A different colour may be allocated for each LOL layer in the file " NZTraverse.ini " (in the NZTraverse program folder) See D.4.1.b above |



| | |
|--------------------|---|
| Line style | Default line style is set to Solid for use in Magnet Office. A different line style may be allocated for each LOL layer in the file “ NZTraverse.ini ” See D.4.1.b above |
| Line Layer | Layers set for use in Magnet Office – some layers will be set to either “LoI Traverse” or “LoI Lot Bdy” depending on the information in the LandXML dataset. The “LoI Traverse” layer should technically be called “LoI Non Boundary” but we have held the original name to avoid confusion. |
| Point Layer | Point layer set for use in Magnet Office. The layer is taken from the Purpose of the mark and is set in the Points Grid. See D.4.1 |
| PopUp page | Access the PopUp page for any line of data using a right mouse button click at left end of the row. This page holds further information about the observation including: oID : the Landonline identifier for the target mark Bearing Type / Distance Type : The type of the observation as held in Landonline – Measured, Adopted or Calculated Adopted Bearing Source / Adopted Distance Source : The plan source of adopted observations Line type / Arc type : Recorded with appropriate data for a line observation or boundary, or for an arc boundary |

D.4.3. Imported Sequence – Parcels

The Sequence called **Imported LandXML Data** also holds details of the parcels imported from the LandXML file. The Parcels are listed at the top of the sequence, and are marked with a scroll icon . Click the Parcel name to open the grid for the Parcel.

| | | | | | | | | | | | |
|------------------|--|---------|--------------|----------|-----------------------|-----------|------------------|-----------|---------|----------|----------|
| Lot 4 DPS 72376 |  Lot 11 DPS 72376 | | | | | | | | | | |
| Lot 5 DPS 72376 | State: Existing | | Class: Other | | Survey Class: Default | | Area: 600.000000 | | OID: 44 | | |
| Lot 6 DPS 72376 | | Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose |
| Lot 7 DPS 72376 | | | | | 99 | PEG | | DPS 72376 | | Peg | Boundary |
| Lot 8 DPS 72376 | | | | | 20 | PEG | | DPS 72376 | | Peg | Boundary |
| Lot 9 DPS 72376 | | | 356.1100 | 21.900 m | 102 | PEG | | DPS 72376 | | Peg | Boundary |
| Lot 10 DPS 72376 | | | 86.0600 | 27.390 m | 103 | PEG | | DPS 72376 | | Peg | Boundary |
| Lot 11 DPS 72376 | | | 176.0640 | 21.900 m | 99 | PEG | | DPS 72376 | | Peg | Boundary |
| Lot 12 DPS 72376 | | | 266.0600 | 27.420 m | | | | DPS 72376 | | Peg | Boundary |
| Lot 13 DPS 72376 | | * | | | | | | | | | |

The parcel lists the points in the order of closure around the parcel with the observed bearing and distance of the recorded boundaries, or a calculated distance between the coordinate values of the nodes. The Parcel State, Parcel class and Area are shown.

Data allocated to each observation:



- The detail matches the data in the lists of Imported Points and Imported Observations. If the Bearing and Distance of the Parcel Boundary is held in the Imported Observations list, the Source of the boundary line is initially set to “Adopted”. This may be modified later as required to “Measured”.
- If no bearing and distance is held for the Parcel Boundary, the source is set to “Calculated” to show that the boundary line is computed from the coordinates of the end points of the line.
- If the parcel contains an arc boundary this will have the distance field highlighted in Light Cyan and the arc details shown in the PopUp. Arcs will be created when the imported data is written to Magnet Office.
- A parcel may also contain natural or irregular boundaries. These are usually along streams, rivers, MHW lines and other features where the data held for the boundary in Landonline is simply a series of coordinate points joined by lines.
- A Natural Boundary is defined by a start point and an end point, both of which will be right line marks, with points in between these two marks defined as Natural Boundary nodes. These nodes are labelled with the Purpose and Source set to “Natural” and the Mark Name is set to “NATBDY”.
- Although a bearing and distance is displayed in the Parcel grid, these are computed by **NZTraverse** from the coordinates of the natural boundary nodes. They are displayed for your information only; they should not be treated as observed measurements.

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|----------|------------|
| 95.4536 | 90.959 | m | 308 | PEG | | DP 123456 | | Unknown | Boundary | Calculated |
| 175.2705 | 43.542 | m | 602 | NATBDY | | | | | Natural | Natural |
| 10.2929 | 1.291 | m | 603 | NATBDY | | | | | Natural | Natural |
| 57.0155 | 10.454 | m | 604 | NATBDY | | | | | Natural | Natural |
| 61.2008 | 25.452 | m | 605 | NATBDY | | | | | Natural | Natural |
| 55.5422 | 9.680 | m | 606 | NATBDY | | | | | Natural | Natural |
| 59.5546 | 21.738 | m | 607 | NATBDY | | | | | Natural | Natural |

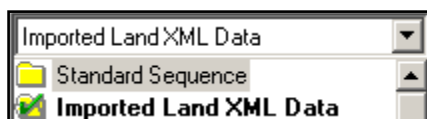
D. 5. Transfer data to Magnet Office

The imported data is written to **Magnet Office** as a spatial record and to assist with data selection for the new survey.

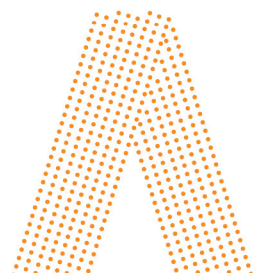
Now, check that the correct project is current in the Survey View of **Magnet Office**.

D.5.1. Write imported data to Magnet Office


Set **Imported LandXML Data** as the current sequence with the green tick displayed on the folder.



To do this, select **Imported LandXML Data** from the sequence pick list (above the Standard Sequence folder and name)



Make sure that **NZTraverse** and **Magnet Office** are connected

Magnet Office / *Connect to Magnet Office* – the *Connect* button  should be depressed

Then select **Magnet Office** / *XML to Magnet Office*. The imported data is written into the **Magnet Office** database.

NOTE: If you do not require all the imported parcels written as spatial data into Magnet Office, exclude them using **Edit** / *Sequences*, before you save the XML data to Magnet Office.

NOTE: It is unlikely that you need each line in the LandXML file annotated with the imported bearing and distance. If this data is not required, untick the box beside *Annotate Magnet Office data* on the **Setup** Tab before transferring data.

Turn this option off if you find that it takes a long time to save data from NZTraverse to Magnet Office.

NOTE: If you do not want the Plan References for each mark written to the Note field of a point, untick the option *Save refs to Magnet Office* on the **Setup** Tab.

D.5.2. Check the data in Magnet Office

When **NZTraverse** has completed the save, click the button for Magnet Office on the Windows Taskbar to make it the current window. Double click the scroll wheel on the mouse to Zoom Extents and view the data. Leave **NZTraverse** open.

Points

Each mark or node is defined in Magnet Office with NZ in front of the point number. For example, point **34** in the imported data in NZTraverse will be numbered **NZ34** in Magnet Office.

Mark Names and Numbers

The Mark Name and Mark Number for each mark or node in NZTraverse are written into the *Code* field of the point in Magnet Office.

Plan References

Plan References for the Mark are written to the 'Note' field of the point. To display the Code and Note together onscreen in Magnet Office, turn on these options in the Hot Button.

To define this data for printing on a plan, select the required Points and use right click menu and click *Properties* to open the Property Manager to set the Annotation of Code and Note to 'True'. Activate the overall display of the annotation for Code and Notes in the Hot Button.

[You can choose to write the Plan References to Magnet Office. Check the **Setup** Tab – tick the option *Save refs to Magnet Office* to confirm the action described above, or untick the option so that no plan references are written into Magnet Office for the survey marks.]

NZTraverse 8.1 introduced a new option to save Mark Name, Mark Number and Plan Ref in one string into the Point Description field in Magnet Office. Activate this option by ticking the box beside *Write*



mark details to Description field on the **Setup** Tab. The description can be displayed onscreen in Magnet Office via the option in the Hot Button.

Arcs

Any parcels containing arcs have the arc created as a 2 point arc with centre point in **Magnet Office**. The centre point of the arc is numbered with the start and end point numbers such as NZARC66T67 for arc from pt66 to pt67. The centre points are on the NZARCS layer.

Lot Names

Various layers are created for the data including LOL PARCELS – this layer holds the parcel appellation at the centroid of the parcel. This appellation is written to the 'Note' field of the point in Magnet Office.

Turn off the LOL PARCELS layer to hide the display.

Hydro Parcels

As Hydro parcels often have natural (irregular) boundary nodes that duplicate the nodes on the adjacent lot(s), any Hydro parcel in the dataset is saved on to the 'Hydro' layer. You can turn this layer off to avoid confusion with the natural boundary nodes of the lot(s). A Hydro parcel is either named Hydro or has its Class set to 'Hydrography'.

E. CREATING NEW DATA BASED ON IMPORTED LANDONLINE DATA

E.1. Create traverses in the Standard Sequence

1. Select the appropriate settings on the **Scale** Tab for this survey. Make sure the Datum and Circuit are set correctly before selecting the appropriate Scale Type.



Enter appropriate data on the **Info** Tab

Enter the Surveyor's name if not set

Enter the description for the Survey. This data is transferred to the Survey Header in Landonline via the LandXML file

Enter the **Survey Number** allocated to this Survey in Landonline. [Use 'Create Survey' in Landonline to obtain this number]

Type this in as "DP number" or "SO number" etc. Leave a space as shown. Do not use LT (instructed by Landonline)

Set the **Equipment** to that used for all measured vectors or to the most used equipment type

Set **Survey Class** for this dataset

NOTE: The fields marked with red arrows are essential to get correct results with the accuracy testing in NZTraverse and to lodge data in Landonline.

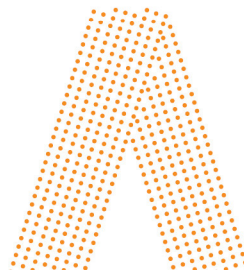
- On the **Sequences** Tab set Standard Sequence as the current sequence. Select this from the sequence pick list.

Create new traverse grids as required, taking note of the following methods.

E.2. Insert traverse using measured data and some imported monuments

E.2.1 New Traverse

- Create a new traverse using **Insert / Traverse** or the icon
- Select the "Fixed Point" for the start of the traverse – this will usually be an imported point of suitable Survey Order. Enter this point number in the Point Column on the first line of the traverse grid. On the next line, type in the reduced bearing and vector distance measured to the first monument but make sure you type in the point number allocated to the mark, if it is in the **Imported LandXML Data** sequence.



NOTE: If **NZTraverse** allocates a new point number as you type, it can be edited to the required “imported” number. Simply overwrite the new number before moving the cursor to a new line.

The data held for the relevant point number is displayed for the Mark Name, Mark Number and Plan Reference, and for the Symbol, Colour and Point Layer. The last three settings can be edited as required. Alternatively use the **Style** option now or after completing the traverse data entry. See **E.6**.

If the mark is not in the imported sequence, allow **NZTraverse** to automatically allocate a new point number.

- Continue to enter further lines of data into the Traverse grid, to complete and close the traverse on to a “Fixed Point”. This will be the start point number of the traverse or another imported point of suitable Survey Order, or another Fixed Point manually entered by the user.

The Purpose of any manually entered Fixed Point defaults to “PRM”, otherwise the Purpose is taken from the imported mark. As data is entered the Purpose of the next mark is set to “Non Bdy” and the Source is set to “Measured”. You should edit the purpose settings as necessary. Make sure you use a 2021 CSR Purpose.


By default the line style of the observation is set to “Solid” and the Line Layer and Point Layer are set to “NZTrav”. These settings may be changed now or later, using the **Style** option. See **E.6**.

- Data entry for each line is only completed when the cursor moves to another line (usually one line up or down) in the traverse grid. At this stage the point number is confirmed or allocated.

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source | Style |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|----------|----------|-------|
| | | | 1 | IS | II | DPS 1141 | | Spike | Non Bdy | | |
| 166.1200 | 41.800 | m | 11 | IB | VII | DPS 72376 | | Spike | Traverse | Measured | Trav |
| 337.3820 | 219.000 | m | 3 | SS | 46 | SO 56301 | | Unknown | Witness | Measured | Trav |
| 155.3800 | 177.770 | m | 1 | IS | II | DPS 1141 | | Spike | Non Bdy | Measured | Trav |

[In this example, all points are from the imported dataset. Note that many of the LandXML extracts still contain the old ‘Purpose’ attributes, as shown above, and you will need to edit them to a current Purpose]

E.2.2 Data Reduction

- Initial checks for misclose of a traverse can be found by using **Reduction / Reduce Current** or the icon  This applies a Bowditch adjustment to the traverse.


[This option is only available when a traverse is the current window.] Check the misclose of the traverse. Any data in the traverse may be edited as required.

- When the first traverse is reduced any imported point used as a “Fixed Point” is changed from type **I** to type **F** in the Fixed Points listing.

All imported points used in the body of the traverse are changed from type **I** to type **Blank** (normal traverse point). These are displayed in the All Points or Used Points listing.



NOTE: It is important to use the allocated point number for all imported data used in the new working sequence (usually Standard Sequence). This will hold on to the oID number required to identify and link the mark when it returns to the Landonline database. The oID is currently 8 characters in length so not easy to work with – it is displayed on the PopUp screen.

3. All the traverses in a sequence may be reduced using **Reduction / Reduce All** or the icon 
4. Check that you have the Projection Scale Factor set correctly for the dataset. See section **E.13.2**


NOTE: Further information on the allocation of Mark Names, Monument types, Purpose, Source settings etc is laid out in section **E.12**.

E.3. Create traverses from imported data

We recommend you use one of the two Route creation routines to take observations and marks directly from the imported data. This is especially effective with SDC data; it speeds up data entry and reduces data entry typing mistakes.


The Route creation and computation work as follows:

E.3.1. Create Route

Select **Insert / Route** or the icon  and type the appropriate point numbers into the point column in the order of the points around the traverse.

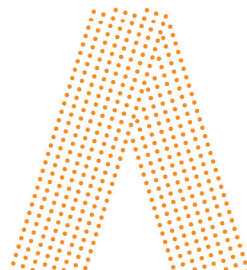
Select these from the list of imported data to define the route around the traverse and close to the starting mark or another imported mark. The mark data is displayed from the data held in the points listing.

E.3.2. Calculate Route as Traverse

When the traverse is complete, select **Insert / Calculate Route as Traverse** or click on the icon  to read the data directly from the imported dataset. Each line is coloured according to the source of the bearings and distances used for the observation.

Yellow Yellow - the observation between the two entered points has been taken directly from the imported dataset – the Source is set to “Adopted” by default but may be changed later. For example, the observation may be surveyed in the field and the source changed to “Measured”, with the bearing and distance edited to match your field observations.

Blue Blue – no observation exists in the imported dataset between the two marks specified, so the observation has been calculated between the two point coordinates in the imported dataset (or new NZTraverse entered data, if appropriate) – the Source is set to “Calculated” by default, but may be edited.



Green Green - the observation already exists in the new data entered in the Standard Sequence dataset and uses that observed bearing and distance.

If Green is displayed it means that a previous traverse already contains the same observation between the two points. This could cause an error.

Red Red - the observation can only be calculated between two point coordinates, where one or both of the points is in the Magnet Office database or is a G type point (Magnet Office point) already used in NZTraverse – the Source is set to “Calculated” by default.

If you realise that an incorrect point has been entered in the route, click OK, then edit the point number and re-calculate the route.

In the following example, point 16 may be the incorrect number as it is shown as calculated and all observations are expected to be contained in the imported data. So this number would be edited to the correct number, and the route re-calculated.

| Bearing | Distance | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|----------|----------|-------|-----------|----------|-----------|------|----------|------------|------------|
| | | 15 | PLUG | I | SO 60401 | | OLP | Origin | |
| 338.5240 | 203.410 | m 18 | IT | I | DP 331646 | | OIT | Origin/Wit | Adopted |
| 34.0745 | 5.609 | m 16 | IS | XXX | SO 38022 | | OIS | Traverse | Calculated |
| 86.0600 | 86.990 | m 101 | IT | | DP 15123 | | OIT | Traverse | Adopted |

NZTraverse

Route reduction complete.
1 calculated line is highlighted blue.
2 adopted lines are highlighted yellow.

OK

E.3.3. Convert Route to Traverse

Now select **Insert / Convert Route to Traverse** or the icon to save the Route as a new Traverse. To save the Traverse you must select “Yes” to the question about converting Graphics or Imported Points to normal traverse points.

Imported points in the body of any traverse are changed from type **I** to type **Blank**

Any Magnet Office created points used in the body of the traverse are changed from type **G** to type **Blank**.

You may also round calculated observations to match the Bearing Rounding Table defined in the **Setup** Tab.



E.3.4. Check this New Traverse

Open the new traverse from the Sequence list and check the data. Any data can be modified as required. The Route option is simply a quick method of entering data into a traverse grid, carrying forward all the existing information held for the points and observations from the imported LandXML file from Landonline. When the traverse is reduced any imported point used as a “Fixed Point” is changed from type I to type F

E.4. Routes from Magnet Office Strings

Instead of finding point numbers and then typing them into the Route grid, you can create strings to represent the required traverses through the imported dataset displayed in the **Magnet Office** Survey View. You can also bring data through into **NZTraverse** from GPS or other field data imported into Magnet Office.

A Magnet Office string may be processed in NZTraverse as a traverse from the start point of the traverse to form a loop back to this point, or to another known point, or alternatively it can be processed as a series of radiations from the first point in the string, to all the remaining points in the string.

Here are the procedures:

E.4.1. Create Strings

1. Create a new layer in **Magnet Office** and define a colour and any other parameters required for the strings.
2. Use **Insert / String** and click on the points displayed in Magnet Office in the correct order for your traverse.

In most cases you should click on the points rather than the lines to ensure you pick up the exact point required in the traverse that is created from the string.

A long boundary string may be picked up by clicking on a line. To stop the string running away with itself, use the right click context menu before you select the line. On the menu click *Select Path by Two Ends* to control the line selection.

On the last point of the close, right click and insert the string – allocate the string a unique name before you save it. eg. You may call the strings R1, R2, R3 or T1, T2, T3 or whatever you like. Numbering the strings assists you in processing them in the correct order. Type the name of the string into the ‘Name’ field.

You may need to reset the layer and colour of your string to your selected values. If lines are clicked to define the strings instead of points, the layer and colour of the first line in the string are set for the new string.

NOTE: As these strings are simply used as a method of creating traverses in NZTraverse they should be created on a separate layer to other data, so that they can be isolated from other strings in the job.


3. Save as many strings as needed to define the routes (traverse closes), naming each one uniquely.



E.4.2. Read Strings into NZTraverse

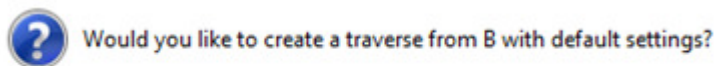
1. Check the **Magnet Office** job for any strings not required in NZTraverse. Turn off the layers for these unwanted strings.
2. In **NZTraverse**, select **Magnet Office / Read Strings**. This option reads the strings into NZTraverse, and reports the number of strings found.

E.4.3. Routes from Magnet Office Strings

1. Now select the option **Insert / Route from Magnet Office Strings** or the icon  and pick the first string by name from the list. The point numbers defining the selected string are displayed in the Route grid.



There is also a quick option for converting a route into a traverse grid.

When using “Route from string”, the Route Window is opened when a string is selected from the list. For example for String B the question will be:




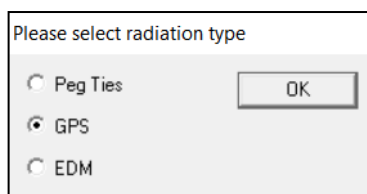
If you answer ‘No’ the full routine for converting a route to a traverse proceeds, as described above. You need to use this option to convert a route as radiations within a grid. Eg. GPS data.

If you answer ‘Yes’, a new Traverse Grid is created immediately and its window is opened. The Route window is still open behind the traverse to allow you to check the route computation.

2. If using the full routine, now select the option **Insert / Calculate Route as Traverse** or click on the icon  to calculate the route and then **Insert / Convert Route to Traverse** or the icon  to create a traverse grid as explained in options **E.3.2** and **E.3.3** above.
3. Process each string in turn as a route and build up the individual traverses required.

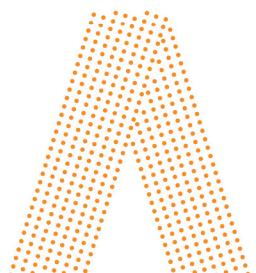
E.4.4. Calculate Route as Radiations


1. To achieve this, define a string in **Magnet Office** so that the first point on the string represents the station point which is tied to all subsequent points on the string, as radial observations / vectors. This could be GPS data.
2. In **NZTraverse** process the route using the option **Insert / Calculate Route as Radiations** or use the icon 



Select a radiation type from the list.

The selected type is held in the ‘Type’ field for each radiation processed by the route.



Once calculated, use **Insert / Convert Route to Traverse** or the icon  so that the route is saved in a traverse grid with all the observations set as radiations (vectors) from the first point in the traverse.

3. This function is ideal for GPS vectors – the Style used for this data can have GPS set as the equipment. If the radiations are GPS vectors, the “Type” for each radiation is set to **GPS** in the resulting traverse grid. This traverse grid should then be set for Least Squares Adjustment. See **E.5.(6)**
4. Alternatively if inputting EDM vectors for a Least Square Adjustment, process as in 2 above and set the “Type” for each radiation to **EDM** in the resulting traverse grid.
5. If a string is processed as a route and calculated using this routine, with Peg Ties selected for the radiation type, the resulting data is automatically entered into the Peg Tie screen. This procedure may be used to enter Magnet Office point numbers into the Peg Tie View screen.

In this case, you should not convert the route to a traverse; simply discard the route. The entries will remain in the Peg Tie screen.

E.4.5. Resetting point data to its imported status

After running one of the above procedures you may find that you have incorrectly selected points for your traverse grids. If you need to modify the settings now held for the Points data you can correct the settings of a point to its imported status.

F (Fixed) point can be set back to **I** (Imported) point in the **All Points** or **Used Points** list. This would be necessary if you have selected the wrong point at the start or end of a route, or you need to extend a traverse created by a route.

The point coordinates may also be reset to those imported from the LandXML file from the Point Popup screen, using the button *Restore Original Coordinates*

E.5. Creating traverses from new data

E.5.1. Traverses

Create new traverses in the usual way by typing data directly into a Traverse grid. **NZTraverse** allocates new point numbers to the data as you enter it.

Make sure that appropriate existing point numbers are used for the opening and closing points of the traverse.

E.5.2. Vectors / Radial Observations

1. If entering a series of vectors / radial observations from the one point, enter the point number on the first line of a traverse grid and then enter each vector on subsequent lines of the grid. Set the “Type” to the appropriate radiation type, such as GPS or EDM, depending on the equipment being used.



The data with the Type = **GPS** is handled in the order of the traverses in the Standard Sequence, so that the radiations are displayed in this order on a Traverse Sheet or Report print out.

Radiations with Type = **GPS** are not treated as Peg Ties so are not entered in the Peg Tie View. These radiations are written directly to the LandXML file as vectors.

Any data with the Type = **EDM** is handled identically to Type = **GPS**. It would be used for radial vectors from Total Station data. The equipment is set to Theodolite EDM instead of GPS.

2. **NZTraverse** can run a Least Squares Adjustment routine on specified traverse grids in the dataset. It is expected that the vectors / radial observations created as in 1. above would be computed using a Least Squares Adjustment.

Traverse grids that are to be adjusted by the Least Squares option may be entered either as traverse closes in the normal way, or as a series of radial observations as explained in 1. above.

3. Use of Least Squares Adjustment enables the surveyor to record multiple vector observations to a mark from two or more positions. These may be observations between multiple non-boundary marks that are needed to prove accuracy.

E.5.3. Peg Ties

1. Peg Tie radiations may be entered from a point within a traverse. Such radiations are entered (on a line or lines immediately following the point from which they radiate) and set as *Peg Ties* using the "Type" column in the traverse grid.

Peg Ties entered into the body of a traverse use the Source you have set for the peg tie in the traverse grid.

2. If no observation exists for the peg tie, you can enter suitable point numbers into the option **View / Peg Ties**. Peg Ties to either **Magnet Office** or **NZTraverse** created marks – such as referencing the pegs on the boundaries of new lots – are exported into the LandXML dataset as "Measured" observations.

Magnet Office points used in this way are read into the **NZTraverse** Points List as **G** points so that the Mark details may be checked prior to exporting to a LandXML file.

E.5.4. Side Shots

Radiations may be set as *Side Shots* using the "Type" column in the traverse grid. These radiations transfer data into Magnet Office but are **not** exported into the LandXML dataset. These observations are ideal for defining occupation.

NOTE: Traverses marked as Omitted in the option **Edit / Sequences** have data computed and transferred to Magnet Office but this data is **not** exported into the LandXML dataset. (or printed on a Traverse Sheet)

This function is ideal where data needs to be calculated but is not part of the lodgement into Landonline.



E.6. Styles

The Styles library lets you use a predefined Style to set **Magnet Office** properties on each line of a traverse grid. The style automatically sets the Colour, Line Style, Line Layer, and Annotate flag for the line, and the Point Layer for the target point, created by the observation of the line.

Styles that are used for measured observations or calculated GPS vectors or known adopted observations may also have the Equipment set. This is optional. If not set in this way, the vector is labelled with the default equipment setting from the **Info** tab in the LandXML file.

E.6.1. Style Library

A Style library should be set up in one job and saved as a default for all subsequent jobs into a file called **NZTraverse Styles.ini** (in the NZTraverse folder – this folder is usually called \Program Files\Magnet\Office\Master \AddOns\NZTraverse).

A Style may be given any alphanumeric name you wish – it should be easy to remember and obvious. If each label starts with a different character or number then you can simply type the lead character in the Style field to set the Style. For example, B for Boundary style, C for Calculated, T for Traverse. This means that the data in the 5 columns to the right of the Style column change to reflect the style as soon as the cursor is moved to the next or previous row of the grid.

Set up the Style Library in the option **Settings / Styles**. Click **New** button to open a dialog box to set up the parameters for each style.

When all the styles have been entered, use the **Save As Default** button to save the data into the **NZTraverse Styles.ini** file.

Styles can be edited by selecting a style and clicking the **Edit** button.

If the Styles have been modified in your office, they can be updated in an early job from the current **NZTraverse Styles.ini** file. Click on the button **Load from Default** to do this.



NOTE: once this Library has been set up and you do not want the default styles to be modified in any way, set the styles **NZTraverse Styles.ini** file to "read only". The styles library can be created on one computer in your office and copied to the computer of other users, so you all use the same settings.

And make a backup of the file

| Style | Colour | Line Style | Line Layer | Point Layer | Annotate | Equipment... |
|-----------|--------------|------------|------------|-------------|----------|--------------|
| Ad2Bdy | White | Solid | NZTrav | BDY | Yes | |
| Bdy | Light Red | Solid | BDY | BDY | Yes | |
| Bldg | Red | Solid | NZTrav | NZTrav | Yes | |
| Calc | Light Mag... | Solid | BDY | BDY | Yes | |
| DTrav | White | Solid | NZTrav | NZTrav | Yes | |
| Ease | Light Cyan | Solid | EMNT | BDY | Yes | |
| GPS | Magenta | Longdash | GPS | BDY | No | GPS |
| Pegtie | Light Blue | Dash | PEG_TIES | BDY | Yes | |
| SS | Cyan | Solid | SIDE | OCCN | Yes | |
| Trav | White | Dash | NZTrav | NZTrav | Yes | |
| VCovenant | Brown | Solid | COVENANT | BDY | Yes | |
| XTrav2bdy | White | Dash | NZTrav | BDY | Yes | |


E.6.2. Using Styles

Set the style on each line of a traverse grid. Use the 'Style' column located after the 'Source' column to set the 5 columns of data to the right of the 'Style' column.

You can edit the 5 parameters after a style is initially set and these remain "edited" unless the option **Edit / Reapply All Styles** is used.

Any line may be set to a simple default style, if needed. Just define a suitable style to act as your default setting.

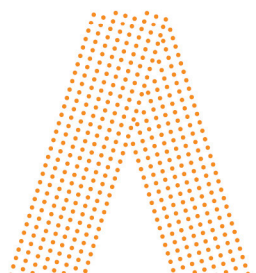
E.7. Saving data to Magnet Office

When you have built the traverses from routes or data entry, run the option **Reduction / Reduce All** or the icon  to display the Reduction Results.

Check the results of any traverse by clicking it in the list in the Reduction Report. This will display the details and accuracy associated with each observation.

Also check the end of the report for further information about the reduction. If the reduction is completed successfully the words "Reduction Complete" display at the end of the onscreen report.

IMPORTANT: For further detail on how the accuracy tests are applied, please go to the pages in section F.



Now save the data to Magnet Office using **Magnet Office / Save Data** or the icon 

NOTE: The 'Save Data' options are only accessible if the Reduction was completed without error and the focus of the mouse cursor is in the **left hand frame** of the Reduction Report. [Click on one of the traverses in this frame to achieve this.]

If errors occur in the reduction, work through the detail supplied in the reduction report and correct the problems. Click on the icon to the left of a traverse in the left hand frame to display the error detail for the traverse in the right hand frame.

Other errors reported at the end of the Reduction Report relate to settings that need to be addressed before data can be exported to a LandXML file.


If you require each line annotated in Magnet Office with the observed bearing and distance defined in NZTraverse, tick the box beside "Annotate Magnet Office data" on the **Setup** Tab before transferring data.

E.8. Introduce new data

When creating subdivided lots and easements within the boundary of an existing lot, there are several methods available for introducing the new boundary pegs and other data into the existing boundary already defined in a traverse grid. The method you choose depends on the job in hand.

E.8.1. Create new data within NZTraverse

If you have picked up the existing boundary of the lot in a traverse or traverses, the new pegs for the subdivided lot should be inserted within the appropriate traverse grid or grids. The following procedure is a quick and easy way to ensure the data sent to Landonline is defined exactly as you want it.

1. Use the option **Edit / Segment Line** or icon  to split the existing boundary line.

| T5:Traverse: 5 | | | | | | | | | |
|----------------|----------|----------|---|-------|-----------|----------|-----------|------|------------|
| | Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Purpose |
| | 176.0840 | 48.280 | m | 65 | PEG | | DPS 2467 | Peg | Bdy Survey |
| | | | | 63 | PEG | | DPS 2467 | Peg | Bdy Survey |
| | 86.0800 | 17.100 | m | 76 | PEG | | DPS 2467 | Peg | Bdy Survey |
| | 356.0840 | 48.280 | m | 77 | PEG | | DPS 2467 | Peg | Bdy Survey |

2. Highlight the existing boundary line in the Traverse Grid and select the option **Segment Line**. A data entry box displays. Enter the length of the first segment of the line. The existing length of the line is reduced by this amount.



Enter segmented line length

Please enter the length of the first line segment:

25.15

Overall length: 48.280m Second segment length: 23.130m

Mark state of point at end of second segment:

☐ Old

☒ Adopted

☐ Continue to segment along line

OK Cancel

Set the Mark State (Old or Adopted) for the point at the end of the second segment and click OK.

A new line is inserted above the highlighted line with the new distance. The original distance is reduced for the remaining segment.

If one line is to be segmented into more than two segments, tick '*Continue to segment along line*' to process multiple segments.

| T5: Traverse: 5 | | | | | | | | | | |
|-----------------|----------|----------|---|-------|-----------|----------|-----------|------|----------|------------|
| | Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose |
| | | | | 65 | PEG | | DPS 2467 | | Peg | Bdy Survey |
| | 176.0840 | 25.150 | m | 128 | | | | | Peg | Bdy Survey |
| ▶ | 176.0840 | 23.130 | m | 63 | PEG | | DPS 2467 | | Peg | Bdy Survey |
| | 86.0800 | 17.100 | m | 76 | PEG | | DPS 2467 | | Peg | Bdy Survey |
| | 356.0840 | 48.280 | m | 77 | PEG | | DPS 2467 | | Peg | Bdy Survey |
| * | | | | | | | | | | |

- The bearing, monument, purpose, style, colour, line style, point layer, and line layer are copied from the original line to the inserted line. You can then enter the mark details and edit such items as monument, purpose, source and style.
- The Source of both segments of the line is set to 'Calculated'. However, the data in the PopUp screen holds the source of the Bearing as 'Adopted', if the source of the original line was set as 'Adopted'. The Distance for each segment has the source set to 'Calculated'.
- If the existing end point of the second segment is already defined as 'New' and its Source is 'Calculated' or 'Measured', these settings are held.
- When the modified traverse data is reduced and saved to Magnet Office, the original marks and line work are updated in Magnet Office.

NOTE: See E.12. for an explanation of how you can automatically use **NZTraverse** to control the source settings to achieve the observation and mark state settings needed by Landonline.

E.8.2. Create new data within Magnet Office

Design new lots in **Magnet Office** using various tools including **Design / Subdivision / Lot Layout (min area)**. This process inserts new points into existing boundary lines, segmenting these lines. Depending on the next process chosen, these new points could have their Mark name and Mark number entered into the Code field and also have the Symbol set to ensure the correct Monument Type is allocated. See **D.4.1.a.**



This data may then be handled in one of three ways:

E.8.2.a. Enter data in NZTraverse

Check the boundary details for the new lots. You can use the option **Design / Subdivision / Subdivision Lot Report** to create a printout of the new boundary details.

Now Undo the inserted Lots and new points in Magnet Office. Then use **Edit / Segment Line** in **NZTraverse** as explained in **E.8.1.** to create the new pegs in the appropriate boundary lines in the relevant traverses, leaving NZTraverse to provide the point numbers. When all data is entered, run **Reduction / Reduce All** and then **Magnet Office / Save Data** to redefine the new peg points and segmented boundary lines in Magnet Office.

E.8.2.b. Edit traverse data in NZTraverse

Use **Edit / Segment Line** in **NZTraverse** to insert the new pegs into the appropriate boundary line in the traverse. The segmented line creates a new point number, but edit this number to that of the point number created in Magnet Office for this mark. When all data is entered, run **Reduction / Reduce All** and then **Magnet Office / Save Data**.

The Magnet Office (G) point computed by you in Magnet Office is converted to an NZTraverse controlled point so that you can close /adjust the point, but it remains in Magnet Office without the NZ prefix.

E.8.2.c. New data is held in the new lots

The new points created in Magnet Office are not input into the **NZTraverse** dataset as part of a traverse, but are imported from Magnet Office as part of the parcel data.

Create the new boundary peg positions and any unmarked points for easements. Make sure the original boundary lines are segmented at these new points, and the required code and symbol are defined for the points.

NOTE: If you use this third method you need to check if the original boundaries of the lot are in a traverse. If they are all in one traverse, this traverse should be Omitted using **Edit / Sequences**. The data remains in **NZTraverse** and **Magnet Office** but is not written into the LandXML file. The boundary data is taken from the Lot grid instead. You must not have the original boundary line and the new, replacement boundary lines in the LandXML file for Landonline.

NOTE: Take care in using this third method as it might not give you the best results to show that your data is in line with the 2021 Cadastral Survey Rules.

E.8.3. Insert Lots

When the new boundaries of parcels have been created in Magnet Office, you need to define the parcels as “Lots” using the option **Design / Subdivision / Lot by Interior Point**.



Always define the lots on a separate layer. Eg. 'Lots' Do not define on the BDY layer.

E.8.3.a. Lot numbers

- Each Lot should be named with a unique number. Easements and Covenants are named with an alpha character. Sections are numbered.

Do not name the parcel "Lot 5", just label the parcel "5". NZTraverse automatically calls the parcel "Lot 5".
- For display in Magnet Office the word LOT may be entered as a Prefix in the **Settings / Annotation / Lot** screen if needed.

E.8.3.b. Easements

When using *Lot by Interior Point* to define easement parcels, Magnet Office does not let you define a 'Lot' within a 'Lot'. However, if you define the Allotment on its own layer (eg. LOTS), then turn this layer OFF and define the Easements on a new layer (eg. EASEMENT) you will succeed.

The BDY (boundary) layer will hold the points which are common to the Primary, Secondary and Tertiary parcels, so this layer needs to be on when creating Easements or Covenants.

Both layers can then be turned on before proceeding to **E.9**.

E.8.3.c. Use the 'Edit Lot' Code field

The "Code" field on the **Edit Lot** screen in Magnet Office should be used to define a parcel with a name other than "Lot".

Please add a word to the **Code** field as follows:

- If the parcel is an Allotment, leave the Code field blank; this is the default. The Parcel is called 'LOT *number*' and the Parcel Class is set to "Allotment" in NZTraverse.
- If the parcel is an Easement, type 'Easement' into the Code field. The Parcel is called 'AREA *alpha*' and the Parcel Class is set to "Easement" in NZTraverse.
- If the parcel is a Covenant, type 'Covenant' into the Code field. The Parcel is called 'AREA *alpha*' and the Parcel Class is set to "Covenant" in NZTraverse.
- If the parcel is for Legalisation, type 'Section' into the Code field. The Parcel is called 'SECTION *number*' and the Parcel Class is set to "Legalisation" in NZTraverse.

When the parcels are read into **NZTraverse**, the parcels are named appropriately and the Parcel Class is set correctly.

NOTE: Do not specify the DP number for the inserted Lots. Landonline automatically adds the new Plan reference to all new Lots. Landonline does not like the Plan Reference allocated in the LandXML file. NZTraverse checks for this during the *Export / LandXML* routine



E.9. Import Parcels into NZTraverse

In **Magnet Office** make sure that the layers containing the new lots, easements, covenants, sections etc are active.

In **NZTraverse**, make sure that the correct working sequence is the active sequence, then select **Magnet Office / Read Lots**. The Parcels on the active layers in Magnet Office are read into the sequence list in NZTraverse, and displayed below the Traverse list.

| Lot 2 | | | | | | | | | | |
|--------|----------|----------|-----------|---------------|----------|-----------|------------|----------|---------|------------|
| State: | Created | Class: | Allotment | Survey Class: | Default | Area: | 400.000000 | | | |
| | Bearing | Distance | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
| ▶ | | | 63 | PEG | (4) | DPS 24E | | Unknown | Bdy Sur | |
| | 356.0840 | 23.430 m | 124 | AD | 1 | DP 5214 | | Unknown | Bdy Sur | Calculated |
| | 86.0800 | 13.100 m | 127 | UNMK | 1 | DP 5214 | | Unknown | Bdy Sur | Calculated |
| | 86.0800 | 4.000 m | 125 | AD | 2 | DP 5214 | | Unknown | Bdy Sur | Calculated |
| | 176.0840 | 23.430 m | 76 | PEG | (6) | DPS 24E | | Unknown | Bdy Sur | Calculated |
| | 266.0800 | 17.100 m | 63 | PEG | (4) | DPS 24E | | Unknown | Bdy Sur | Adopted |
| * | | | | | | | | | | |

The bearing and distance data for each parcel boundary is allocated as follows:

1. All observations entered in the traverse grids in the working sequence are checked. If a boundary line is found, its "observed" bearings and distances are used for the lot boundary line, together with the Mark details, Purpose and Source.
2. If no boundary data is found for the line, and the job contains data imported from Landonline, the imported observation is allocated.
3. Failing the above, the bearing and distance is computed as a missing line between the known coordinates of the points in Magnet Office; the bearing and distance is rounded using the rounding table in the **Setup** Tab.

NOTE: In the above example the Monument field should be set for each Mark and the Purpose would need to be corrected to 2021 CSR value 'Boundary'

E.9.1. Arc Boundaries

Arc boundaries should be created in Magnet Office so that they are defined in the inserted parcel within Magnet Office. When the parcels are read into **NZTraverse** (using **Magnet Office / Read Lots**) the correct entity details for the arc are defined within the parcel for transfer to the LandXML file.

The arc is displayed in the parcel with a Bright Cyan colour in the Distance column. Check the arc definition in the Line PopUp.

Please check that the direction of the arc is correctly defined in the Line PopUp.

CW=clockwise CCW=counter=clockwise

NOTE: An arc cannot be defined in a traverse grid.



Please make sure you do not have a chord and an arc defined in **NZTraverse** between the same two point numbers.

E.9.2. Convert a Route to a Parcel

This option allows you to save a route as a Parcel. This is a quick method for creating lots or easements in **NZTraverse** in simple jobs, without the need to insert lots in the **Magnet Office** data.

This option should be used only for very simple situations. In most projects we recommend you create lots in **Magnet Office** and then read these into **NZTraverse**.

Any lot containing an arc should ideally be created in Magnet Office and then read into NZTraverse to get the appropriate results for transfer to Landonline, although the ability to convert a line to an arc in a parcel is available in the **Line PopUp**.

E.10. Check the Parcels in NZTraverse

Always check the parcel details once you have read them into **NZTraverse**.

E.10.1. Parcel Names and settings

1. Each parcel has settings at the top of the Parcel grid.
2. Make sure that you check the Parcel **State**, the Parcel **Class** – critically important, and the **Survey Class** of the Lot, Easement or other Parcel.
3. The Parcel **State** and the Parcel **Class** will be set appropriately if the Code field on the *Insert Lot* screen in Magnet Office is used. See **E.8.3**. However some Parcel Classes have to be set from the pick list.
4. The Survey Class can be left as “Default” which sets the Survey Class to that specified for the dataset on the **Info** tab, or it could be changed to another Survey Class if relevant for a particular parcel. Edit settings if necessary.
5. Where two parcels have different settings for the Survey Class any common boundary line uses the higher class value.
6. Check the **Area**; this is imported from Magnet Office by the *Read Lots* option. It may be checked using the option **Reduction / Check Lots** (see section **10.2**.)

Alternatively modify the area as required to a whole number of square metres. The LandXML file format requires square metres but the square metre value is later converted to hectares by Landonline.

7. These parcel settings are critical – when the data is imported into Landonline, the Parcel Class is used to define the Topology Layer setting for each line in the Vector Capture screen.

Lines in Lots are set to Primary, lines in Easements are set to Secondary, lines in Covenants are set to Tertiary, those common to both a Primary and Secondary parcel are set as Primary-Secondary and so on.



NOTE: THIS IS THE ONLY WAY THAT THE TOPOLOGY LAYER CAN BE SET IN LANDONLINE FROM THE IMPORTED LANDXML FILE.

Do not get confused between the term 'layers' used in Magnet Office or defined in NZTraverse and the 'topology layers' in Landonline.

They are quite different.

8. If necessary you can rename the parcels/lots imported from Magnet Office to the exact name required. Highlight the name in the Sequence list and use **Edit / Rename**.
9. If you need to edit a parcel the new definition of the parcel can be re-read into NZTraverse by running *Read Lots* again. The existing lot data is overwritten.
10. However if more extensive editing is required you can remove all the previously imported parcels using **Edit / Sequences**. Select the Parcels and then click Remove button.

NOTE: Do **not** enter the Plan Reference for the new parcel; Landonline must allocate this during the import procedure.

E.10.2. Check Lot Closes

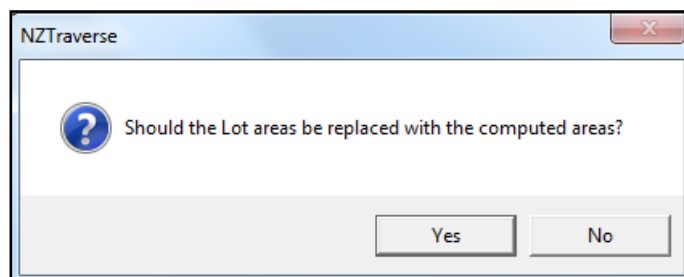
The parcels defined in the working Sequence can be checked to confirm a suitable Lot closure. The routine also gives you the option to set the area of each lot to the area calculated during Check Lots. The area is rounded down to the whole square metre. (If less than 1 sq. metre - 1 sq metre is set).

NOTE: 'Check Lots' computes the area after it has run a close around the lot boundary.

However this routine will not compute a close for any parcel containing **natural boundaries**. Please check the area against the area displayed in the Magnet Office lot report. This is especially important when working with large rural lots. In these cases, do **NOT** recompute the area using Check Lots.

1. First run **Reduction / Reduce All** to complete a reduction of all the traverse data in the working sequence. Then run **Reduction / Check Lots**.





2. If you are not sure at this stage, click “No” to display the closure information. The routine can be run again to update the areas if required, or the areas can be edited individually in the header of each lot.
3. Click on a parcel name in the Reduction Results to display the details of the lot and accuracy checks. [See Section F.]
4. The Check Lot data can be written to a report using **File / Export / Parcels Report**. Highlight the Lots required in the report and continue to create a text file. This file is opened by Notepad.
5. The Check Lot detail in the Reduction Results screen is cleared whenever a new Reduction is run.

E.10.3. Natural / Irregular Boundaries

A Natural or Irregular Boundary may only be defined in a LandXML file as a part of the relevant Lot/Easement written as a parcel. Natural boundary detail only exists in the parcel as a list of coordinates for the nodes. They have no point number, or mark detail associated with them in the LandXML file.

WARNING: The natural boundary nodes must never be points used in a traverse grid or defined as peg ties

Natural or irregular boundaries are usually along streams, rivers, MHW lines and other features where the data held for the boundary in Landonline is simply a series of coordinate points joined by lines. In general, these are water boundaries.

In a parcel, a Natural Boundary is defined by a start point and an end point, both of which are observed right line points, often Unmarked, with points in between these two marks defined as Natural Boundary nodes.

4. The natural boundary nodes in parcels imported from Landonline have the Mark Name set to “NATBDY” by **NZTraverse**. This name is transferred to the code of these nodes in Magnet Office when *XML to Magnet Office* is run.
5. If a natural boundary is defined within Magnet Office from surveyed or river fixing data, the nodes of a natural boundary should be edited to set their Codes to NATBDY before parcels are transferred to NZTraverse.
6. All boundary vectors of parcels created by Magnet Office, including sections of Natural Boundaries, must be defined as Lines in Magnet Office; do not define them as strings.



7. Make sure that the codes of the start point and end point of a natural boundary are set to UNMK (unmarked point) or other mark names associated with these observed (right line) points. These points are essential when defining a natural boundary.
8. Any point on the natural boundary where a new parcel boundary (Lot or Easement) intersects the natural boundary must be set as Unmarked or Pegged points – they are not natural boundary nodes. In effect these points become the start and end points of sections of natural boundary. You must have an observation to this right line point.
9. Any parcel comprising only natural boundaries (such as a Hydro parcel) must have a minimum of two unmarked points to act as start and end points of a natural boundary. These points are defined by observations from other known points.
10. A natural boundary cannot start and end on the same point. Landonline does not accept this.
11. If the nodes are labelled with NATBDY as explained above, **Magnet Office / Read Lots** assigns the Purpose and Source of these nodes to “Natural” within **NZTraverse**. The start and end points of any section of Natural Boundary have Purpose set to “Boundary” (as set for these points in the traverse grid) and Source set to “Calculated”.

NOTE: Although a bearing and distance is displayed in the Lot grid, these are computed by **NZTraverse** from the coordinates of the natural boundary nodes. They are displayed for your information only, and should not be treated as observed measurements.


E.10.3.a. Manually setting Purpose and Source in Parcels

If you did not use the above labelling convention, you will need to do the following:

1. Check the data in Magnet Office to find the point number for the first and last Natural boundary nodes in a section of natural boundary.
2. Open the relevant parcel in NZTraverse and, at the first Natural boundary node in the parcel, set the “Source” and “Purpose” to Natural. You can type in N and use the down arrow key followed by N or Ctrl-D to repeat this procedure for each node on the natural boundary, stopping at the last natural boundary node.
3. Alternatively, set the “Source” for the first Natural boundary node to Natural, and use the Copy Column command to populate the column from the first to the last Natural boundary node with the setting = Natural. Then repeat for the “Purpose” column. See notes below.
4. The “right line” point acting as the start point of the natural boundary is the point on the line prior to the first natural boundary node. Set its “Purpose” to the appropriate Bdy attribute and its “Source” to Calculated, if not defined elsewhere.
5. The “right line” point acting as the end point of the natural boundary is the point after the last natural boundary node. Set its “Purpose” to the appropriate Bdy attribute and its “Source” to Calculated, if not defined elsewhere.

[To use Copy Column, set the Source or Purpose column for the first Natural Boundary node to Natural. Then left click in the grey box at the left hand end of this line. The line is highlighted.



Now hold down the Ctrl key and left click in the grey box at the left hand end line for the last Natural Boundary node. Click on the Copy Column icon  and confirm the copy.]

E.10.3.b. Natural / Irregular Boundary essentials

Any point with the settings “Source” = Natural and “Purpose” = Natural is written as an irregular boundary node in the Parcel definition in the LandXML file. These nodes are only listed as coordinates in the body of the Parcel, with no entry anywhere else in the LandXML file. Each irregular boundary has an observed or calculated mark (right line point) to define its start and end point, with natural boundary nodes in between them.

WARNING: A point used as a natural boundary node must not appear in any traverse grid, and must not be defined as a peg tie.

E.10.3.c. Right line boundary intersection with Natural Boundary

New rules supporting CSR 2021 specify a new Survey Class attribute to be used on any right line boundary vector that intersects with a Natural Boundary. This right line boundary vector can be one of the following:


- Right Line boundary vector defining the start point of a natural boundary line, often an unmarked point.
- Right Line boundary vector defining the end point of a natural boundary line, often an unmarked point.
- Right Line boundary vector intersecting an existing natural boundary line, to subdivide the natural boundary for new lots. A new marked or unmarked point is created at the intersection point.

Each of these boundary lines must be annotated with a new survey class AD, BD or CD. The bearing is defined as A, B or C dependent on the survey class of the parcel and D is the distance survey class.

E.10.3.d. Setting Survey Class for right line boundary vector

To enable this setting, a new field with a picklist has been added to the Line PopUP in a Parcel. By default the setting is ‘Parcel’, setting boundary lines to the Survey Class of the Parcel. This is the correct setting for all right line boundary vectors in a parcel other than those that intersect with a natural boundary.

The picklist enables the user to set the value AD, BD or CD to the appropriate right line vectors that intersect the natural boundary in the new parcels.

| | | | | | | | | | | | |
|---|---------|-------|---|----|--------|---|-----------|--|---------|----------|------------|
|  | 16.3300 | 3.018 | m | 36 | UNMK | 2 | DP 349890 | | Not Moi | Boundary | Calculated |
| | 78.1600 | 9.190 | m | 74 | NATBDY | | | | _INONE | Natural | Natural |
| | 82.3400 | 3.260 | m | 75 | NATBDY | | | | _INONE | Natural | Natural |
| | 92.2200 | 3.380 | m | 76 | NATBDY | | | | _INONE | Natural | Natural |




The above portion of a lot shows the 'start' point of a natural boundary line where the right line boundary vector intersects with the first natural boundary node.

Right click on the grey box at the left end of the line to bring up the Line Popup.

Additional Line Data

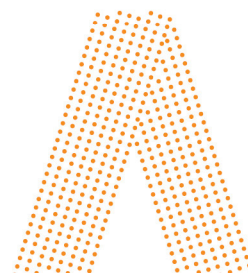
| | | |
|--------------------------|------------------|--------------|
| Point number: | 36 | OK |
| oID: | | Cancel |
| Point mark state: | | Check Point |
| Bearing type: | Calculated | |
| Adopted bearing source: | | |
| Distance type: | Calculated | Survey Class |
| Adopted distance source: | | BD |
| Monument: | UNMK 2 DP 349890 | Parcel |
| Line type: | Straight Line | AD |
| | | BD |
| | | CD |

Open the Survey Class picklist and set the Survey Class to BD (in this example the parcel is Class B)

| | | | | | | | | | | | |
|---|----------|--------|---|----|--------|---|-----------|--|---------|----------|------------|
| | 140.2000 | 14.440 | m | 92 | NATBDY | | | | _INONE | Natural | Natural |
| | 140.2800 | 13.590 | m | 93 | NATBDY | | | | _INONE | Natural | Natural |
| | 139.4000 | 10.550 | m | 94 | NATBDY | | | | _INONE | Natural | Natural |
| | 135.5200 | 0.760 | m | 52 | UNMK | 1 | DP 349890 | | Not Moi | Boundary | Calculated |
|  | 206.0000 | 12.600 | m | 13 | PEG | A | DP 349890 | | Peg | Boundary | Calculated |
| | 206.0000 | 24.860 | m | 12 | PEG | B | DP 349890 | | Peg | Boundary | Calculated |

The above portion of a lot shows the 'end' point of a natural boundary line where the right line boundary vector intersects with the last natural boundary node. However in this case the vector is that from the last point 52 to the end of the right line point 13. Make sure the correct line is set as shown on the Line PopUp.

Right click on the grey box at the left end of the line to bring up the Line PopUp.



Set the right line boundary vector to Survey Class BD (or AD or CD dependent on the class of the parcel)

In this example the line 13 to 52 is a common line to two lots, so is also set for the second lot.

Some datasets will contain multiple class parcels so the onus is on the user to set the correct setting.

E.10.4. Reorder Lots

If you have a parcel containing a Natural boundary it is important that the parcel starts on a right line mark and ends on that same mark. It must not start and end on a Natural Boundary Node.

When the parcel is defined in Magnet Office, the parcel may have been saved using a Natural Boundary node as the start/end point; there is no information in Magnet Office to tell it otherwise.

NZTraverse automatically reorders such a parcel when you run **Magnet Office / Read Lots** to import the lots from Magnet Office, but only if the natural boundary node points are coded NATBDY.

If the parcel needs to be modified in **NZTraverse** to start on a right line mark - preferably a monumented mark - you should highlight the line with this mark number on it in the parcel and then select the option **Edit / Reorder Lot**. The parcel is modified to start on the selected mark and end on the same mark.

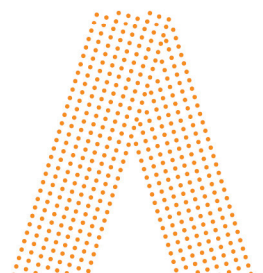
E.11. Assign Mark State

Before the LandXML file is created for transfer to Landonline, you must make sure that appropriate settings are specified for all the marks, monuments and observation settings. The Popup screens in the Points and Traverse grids assist in controlling some of these settings.

The option **Reduction / Assign Mark State** applies the rules devised within **NZTraverse** for transfer of data to Landonline [see comments in the **Appendix A**]

Do not run this routine until you have completed data entry and defined appropriate settings for the Purpose of each mark and the Source of each line in the traverse grids. Make sure you have entered the Mark Name, and Plan References of any existing marks and applied new point numbers where necessary using **Settings / Allocate Mark Numbers**.

New marks are assumed to be those without a Plan Reference or with a Plan Reference that matches the Survey Number in the **Info** Tab.



The option **Settings / Allocate Mark Numbers** also writes the new Plan Reference from the **Info** Tab in the Plan Ref. field of all new marks.

1. Once data entry is completed, select the option **Reduction / Reduce All** and then select the option **Reduction / Assign Mark State**. This option is only available after *Reduce All* has been run.
2. The rules as explained in Appendix A are applied - as if exporting to a LandXML file - and the mark state is set for each point. This setting also displays on the Line PopUp screen from the traverse grid.
3. A button is available on the Line PopUp screen called *Check Point*. Click this button to open the Point PopUp screen for the target mark defined by the line. If the Mark State is edited by you at this time, the edited value is held, even if the option **Assign Mark State** is re-run. The Condition and Description of the monument may also be entered at this stage.

Point no. of target mark

State of this mark: *New*

Bearing: *Adopted*

Source: *DPS 2467*

Distance: *Calculated*

Monument details

Vector detail

If these settings are made in the Point PopUp, they will not be changed unless you edit this field again

E.12. Quality Control

The following detail helps you complete a Quality Assurance check on your dataset.

Please follow these suggestions with care as the software is structured so that you can comply with all these settings within **NZTraverse**, to minimise editing once the data is in Landonline.

To access a PopUp screen, right click with the mouse in the grey column at the left hand end of a line in the Points grid or Traverse grid.

NOTE: The PopUp window in the Points grid allows you to change the default setting for the Mark State to a value other than the defaults as explained below. The settings that you define in the PopUp window take precedence over default settings. See section **E.11**.



E.12.1. Mark details

The Mark details are as follows:

Mark Name:

12. Each mark used in a traverse grid or parcel should have a suitable name describing the monument, such as IT, PEG, IS, LP, DISK, POST. If you use O to prefix the name such as OIT or OLP, **NZTraverse** strips the O from the Mark when writing the LandXML file. (Landonline does not require the O).
13. Unmonumented nodes should be given the Mark Name: UNMK
14. Natural Boundary nodes do not require Mark details, although a Name/Code set to NATBDY assists during import of lots from Magnet Office.

Mark Number:

15. Existing Non-boundary marks are usually numbered IT IV or IS XI or IT 3. Existing Boundary marks may have no number.
16. Landonline requires each mark in a dataset to be uniquely labelled and **NZTraverse** can do this for you. See option **G.2**.

Plan Reference:

17. All existing marks should have the appropriate plan reference defined. Some of the boundary marks of older work imported from Landonline may not have Plan References entered so you need to enter them. The Plan Reference should be entered as DP 12345 (with a space).
18. New marks have the new Survey Number applied to all marks that have the Plan Reference field left blank, when the option **Settings / Allocate Mark Numbers** is run. The Survey Number is taken from the **Info** Tab. It is important to make sure only New marks have the Plan Ref. field left blank.
19. If this function is not used, the Plan Ref is added by **File / Export / LandXML**.

Mark State:

The mark state is set by **NZTraverse** using the option **Reduction / Assign Mark State** [see **E.11.**] by applying the following rules:

- The plan reference for the point (in the Traverse Grid) is checked against the new Survey Number in the **Info** Tab and the Source set on the same line of the grid.
- If the Plan Reference is blank, or the Plan Reference matches the Survey Number, the mark state is set to "NEW"
- If the Plan Reference does not match the Survey Number and the Source is set to "Adopted" in the Source column of the traverse grid, the mark state is set to "ADOPTED"
- If the Plan Reference does not match the Survey Number and the Source is set to "Measured" or "Calculated" in the Source column of the traverse grid, the mark state is set to "OLD"
- The Mark State may be edited in the Point PopUp screen.
- Disturbed, Renewed and Replaced are valid as Mark States in the PopUp.



Mark Purpose:

20. The Purpose must be set for each mark in the traverse grid.
21. Data imported from Landonline often contains the older attributes for the Purpose. These should be changed to use the new 2021 Purposes.
22. Use the **Edit / Find** routine to find an old Purpose and replace with a new Purpose.
23. The default Purpose for Non-Boundary Marks is now 'Non Bdy'.
24. The default Purpose for Boundary Marks is now 'Boundary'.

E.12.2. Monument details

The Monument details are as follows:

Monument Type:

25. The monument types are specific in Landonline. You can use these Monument Types directly for your data using the "symbol" field. These types are:
Plaque, Tube, Spike, Plug, Peg, Disk, Nail, Pin, and Post
26. Unmarked points should use 'Not Monumented'
27. **NZTraverse** allows you to use your Magnet Office symbols instead of these monument types, using the mapping file *NZTraverseLOL.ini*. See **D.4.1.a**.
28. Any unmarked point must be set to "Not monumented" or a suitable Magnet Office symbol specified for this purpose, such as `_!NONE`. This will become "Unmarked" when Landonline reads the LandXML file.
29. Please do not use "Unmarked" in **NZTraverse** unless you have this matched to "Not monumented" in the mapping file *NZTraverseLOL.ini*. [Landonline reads "Unmarked" as "Unknown" but will read "Not monumented" as "Unmarked"!]
30. If you do not want to use the Magnet Office symbols and only want to use the Landonline monument types, you should go to the *Settings* Tab and untick the option 'Use monuments/symbols table'.

Monument Condition:

31. **NZTraverse** sets 3 conditions by default: 'Mark Found', 'Reliably Placed' and 'Not specified'.
32. For any new mark, defined as 'Not monumented', **NZTraverse** sets the condition to 'Not specified'. Some marks may need to be reset to the new condition: 'Impracticable to mark'.
33. If a condition is not set for an 'Old' mark, **NZTraverse** sets the condition in the LandXML file to 'Mark Found'
34. For other marks that are 'New' or 'Adopted', the condition is set to 'Reliably placed'. It is assumed that if you are adopting a mark, then it is a 'Reliably placed' mark.



35. Setting 'Not Found' writes the setting as 'searched for and not found' in the exported LandXML file for Landonline.
36. If you need to change the setting of the condition defined by the above rules, open the PopUp screen for the mark in the Points grid and set the condition. This edited setting overwrites and holds over any default rules.

Monument Description:

37. By default **NZTraverse** defines no description for the monument. If you need to enter a description of a monument, open the PopUp screen for the mark in the Points grid or from the Traverse grid, and enter the description as a text string.
38. Imported descriptions are held with the Mark, unless you edit them.

E.12.3. Observation / line details

The Observation details are as follows:

Bearing and Distance:

39. Each Landonline Reduced Observation or Vector (right line) is taken from the bearing and distance of an observation entered into a traverse grid, or from the bearing and distance set for a boundary line in a parcel.
40. Only one Reduced Observation record is defined in the LandXML file for a line between any two points. So an observation of a boundary line in a traverse and the same line in a parcel is written as the one Reduced Observation record in the LandXML file.

Source:

The setting in the Source field controls certain parameters associated with the Reduced Observation data written in the LandXML file, as follows:

Source field = Measured:

41. The bearing and distance type are set to "Measured".
42. The Equipment setting is taken from the default setting on the **Info** Tab.
43. If different equipment is used for some observations, either open the Line PopUp screen for the observation in the Traverse grid and set the equipment, or control the equipment setting using a 'Style'.

Source field = Calculated

44. The bearing and distance type are set to "Calculated".
45. If an Equipment setting is defined for the line in the PopUp screen, the equipment record is set for the calculated line in the LandXML file. This is ideal for GPS data, where you are using calculated vectors between adjacent non-boundary or boundary marks. A suitable 'Style' can be set up to allocate the equipment.

Source field = Adopted

46. The bearing and distance type are set to "Adopted".



47. The Adopted Survey Number for the bearing and distance values are taken from the imported data. If not available, the Plan Reference of the target point of the observation is used; so make sure that the correct Plan Reference is entered for the point.
48. If different Adopted Survey Numbers are to be set for the bearing and distance, open the PopUp screen for the observation in the Traverse grid and change the appropriate field(s).
49. If the bearing is adopted and the distance is calculated, open the PopUp screen for the observation in the Traverse grid and change the appropriate field.
50. If the Equipment value is recorded for a vector in the imported Landonline extract, this is carried through to the Line PopUp screen.
51. The Bearing Correction Factor is set as 0.00 unless a correction is set for a particular Plan Reference in the option **Settings / Bearing Corrections**. See **E.13.3**.

E.13. Further settings

Always make sure that you have set the following items correctly in your dataset.

E.13.1. Info Tab

Check that the correct settings have been entered.

Survey Number:

52. Please make sure the **Survey Number** allocated for this Survey in Landonline has been entered correctly. This should be in the format DP 123456 with a space between DP and the survey number.
53. All marks that have NO plan reference specified in the Traverse grid and the Points grid are treated as “new” marks; the Plan Reference is set to the Survey Number when the option **Settings / Allocate Mark Numbers** is run. If you have entered the Plan Reference for these new marks, they remain flagged as “new” marks as all Plan References are matched against the Survey Number on the **Info** Tab when the numbering option is run.
54. Make sure that all existing marks do have a Plan Reference allocated to ensure they are not given the new Survey Number.

Equipment:

55. Select the **Equipment** most used in this survey from the pick list. When the LandXML file is written, all Measured lines have the equipment set to this value.
56. All Adopted lines have the equipment set to “Unknown” in Landonline, unless the Equipment field is set in the PopUp screen. Eg. From imported data.
57. All Calculated lines are set to “Unknown” unless the Equipment field is set in the PopUp screen for calculated GPS lines.
58. The **Equipment** can be set in a ‘Style’ for measured, adopted or calculated lines. This is most useful where GPS has been used for some data.

Survey Class:



59. Select the **Survey Class** for this dataset from the pick list. This is the setting in the Survey Header in Landonline. When the LandXML file is written, each observed vector will have its Survey Class defined to match this class.
60. Each parcel has this Default class defined unless you edit a parcel to another Survey Class. Where a boundary line is used for two or more parcels with different Survey Classes applied, the higher class is used. These settings can be modified in the Vector Capture screen in Landonline, if necessary.
61. It is essential that the **Survey Class** is correctly selected. The 2021 Cadastral Survey Rules require accuracy standards to be applied that are dependent on this Survey Class.
62. **NZTraverse** checks the accuracy of the dataset against the rules laid down for a particular Survey Class.

E.13.2. Scale Tab

Make sure the **Scale** tab is set up correctly. It is important that the Datum, Circuit and Land District are correct. Set the Projection Scale Factor as required. This should be set when the job is started, but always check at this stage to ensure you have the correct settings.

You can define the projection Scale Factor using one of three methods. The method is selected using the **Scale Type** pick list. The options are:

The image displays three side-by-side screenshots of the 'Scale' tab in a software interface, each showing a different 'Scale Type' selected in the 'Scale Type' dropdown menu.

- Entered:** The 'Scale Type' is 'Entered'. The 'Scale Factor' is 1.000000. The 'Datum' is 'Geodetic 2000', 'Circuit' is 'Bay of Plenty', 'Northing' is 800000.000, 'Easting' is 400000.000, and 'Land District' is 'South Auckla'.
- By Circuit:** The 'Scale Type' is 'By Circuit'. The 'Scale Factor' is 0.9999054. The 'Datum' is 'Geodetic 2000', 'Circuit' is 'Mt Eden', 'Northing' is 823020.000, 'Easting' is 379135.000, and 'Land District' is 'North Auckla'.
- By Line:** The 'Scale Type' is 'By Line'. The 'Scale Factor' is empty. The 'Datum' is 'Geodetic 2000', 'Circuit' is 'Mt Eden', 'Northing' is 800000.000, 'Easting' is 400000.000, and 'Land District' is 'South Auckla'.

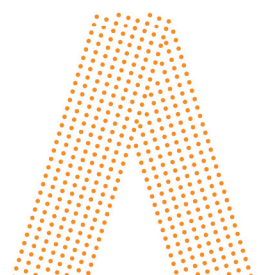
Each screenshot has a bottom navigation bar with buttons for 'Sequences', 'Scale', 'Info', and navigation arrows.

Entered

By Circuit

By Line

63. **Entered:** Enter the Scale Factor in the Scale Factor field. This value is applied to all the distance data during calculation.
64. **By Circuit:** Enter the coordinates of the approximate mid-point of the job in the **Northing** and **Easting** fields. The Scale Factor is computed depending on the Circuit set in the **Circuit** field and the **Geodetic Datum** set for the job. This computed value is applied to all the distance data during calculation.



65. **By Line:** The Scale Factor is computed and applied to each traverse line depending on the coordinates of the mid-point of that line. It is essential that the Circuit is set correctly in the **Circuit** field and the correct **Geodetic Datum** is set for the job.
66. **Magnet Office:** The scale factor is written into Magnet Office during the options **Magnet Office / Save Data** and **Magnet Office / XML to Magnet Office**. The scale factor is written in Magnet Office into the field **Projection Scale Factor** in **Settings / Project Settings / Unit settings**.
67. When the Scale Factor is set to "By Line", no computed scale factor is available when data from an imported Landonline extract is first saved to Magnet Office. In this case, the default scale factor for the circuit is used.

E.13.3. Bearing Corrections

By default all the bearing corrections for data adopted from existing plans are set to 0.0000. This means that every observation that contains adopted data has an appropriate bearing correction set in the Vector Capture screen in Landonline.

If you need to set a Bearing Correction for data adopted from a particular plan, please select **Settings / Bearing Corrections**.


All the plans in the dataset are listed. Double click the appropriate plan and enter the bearing correction as DDD.MMSS. You may use a minus sign but do not enter a plus sign.

This value is then used as the bearing correction recorded in the LandXML file for all adopted data from this plan.

However you should check that the corrected bearing is entered in the bearing column of the traverse grid. Please note that some imported data may not have the correction applied to the bearing so you need to check these values. Edit them where necessary if you are adopting through bearings from old datasets.

E.13.3.a. Modify Bearing

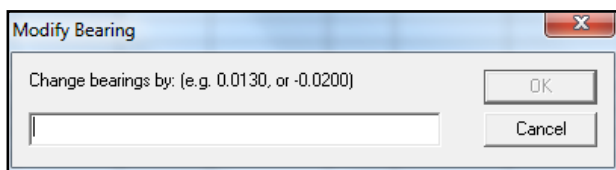
You can reverse any bearing already entered into a traverse grid by inserting a minus sign in front of the bearing and pressing the 'Enter' key.

Or you can modify any bearing already entered into a traverse grid by using the option **Edit / Modify Bearing** or the icon .

This function enables you to modify the bearing on a selection of lines in a traverse grid by the value entered in the *Modify Bearing* data entry box.

Select the lines of data you wish to edit in the traverse grid using normal Windows selection methods (select the first row, then hold down the Shift key and select the last row, or use the Ctrl key to select individual rows). Select the menu option or the icon to enter the bearing change.





If the bearing change is negative, enter a minus sign before the degree value of change. If the bearing change is positive, do not use the plus sign before the degree value of change. The value is entered as DDD.MMSS

E.13.4. Extinguished Parcels

Existing Parcels may be transferred from the Imported LandXML Sequence to the working Sequence. To do this open **Edit / Sequences** and have the Imported Sequence in one list and the working sequence (usually the Standard Sequence) in the other list.

Highlight the parcel or parcels in the Imported list and click **Add** button to add it (or them) to the working sequence. Then close the option. The parcel(s) will now be in the working sequence. The parcel header may have the State set to "Existing" and Class set to "Other". Change these to appropriate settings (eg. Extinguished and Allotment) prior to exporting data to the LandXML file. This ensures that the "extinguished" lot is listed in the Parcel List screen with its existing Title information.

E.14. Reports

Various reports and lists of data may be extracted from **NZTraverse**. These may be used for checking purposes or for addition to the Survey Report.

The Reports on the **File / Export** menu include all the necessary Accuracy checks needed by the Cadastral Survey Rules 2021.

The features for checking Accuracy are covered in detail in section **F**.

E.14.1. List of Traverse Close Details

1. To create a text file containing details of the Traverse data, run **Reduction / Reduce All** and then select **File / Export / Standard Adjustment Report**. Specify the name of the text file and then select all or some of the traverses listed. Click OK to create the file in the defined folder. This file is opened with Notepad.

[Please read section **F**. for further information on this report.]

2. The Standard Adjustment Report needs to be set to print in Landscape mode on A4 paper, and the default margins in Notepad may need to be reduced so that no word wrap takes place.

To print a report on A4 paper in Portrait mode, select **File / Export / Summary: Standard Report**.

3. To print out the details in a Traverse Sheet format, run **Reduce All** and then select **File / Print Preview** (to check the format) or **File / Print** to print out to a selected printer. Various options can be chosen on the *Sheet Options* page.



4. A draft format may be printed using **File / Sheet Options** to change to this format, prior to printing. The draft format excludes the table layout, uses only one page header and labels each mark with the point number.
5. The default setting in **NZTraverse** for the Traverse Sheets format uses 2 decimal precision. This may be changed to 3 decimal precision in **File / Sheet Options**.
6. Point numbers may be included on the full layout (final) traverse sheet. To print the point numbers, tick the option "Point Numbers" in **File / Sheet Options** before printing the Sheet.

E.14.2. List of Lot Closes

1. To create a text file containing the details of the Lot closes, run **Reduction / Reduce All** and **Reduction / Check Lots**, then select **File / Export / Parcel Report**. Specify the name of the text file and then select all or some of the parcels listed. Click OK to create the file in the defined folder. This file is opened with Notepad.
[Please read section **F.** for further information on this report.]
2. The Parcel Report needs to be set to print in Landscape mode on A4 paper, and the default margins in Notepad may need to be reduced so that no word wrap takes place.
To print a report on A4 paper in Portrait mode, select **File / Export / Summary: Parcel Report**.
3. The details of the Lot Closes may also be printed at the end of the Traverse Sheets. They can be included in both Final and Draft format Traverse Sheets. To print these details, tick the option "Print Lots" in **File / Sheet Options** before printing the Sheet. The Lot details only print on the traverse sheet if you have completed the *Check Lots* procedure prior to printing.

E.14.3. List of Peg Ties

These can be selected from the *Standard Adjustment Report* option and saved to a text file.

E.14.4. List of Mark Details

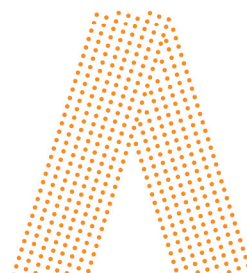
Mark data lists can be created from the Fixed Point or All Points or Used Points Windows.

Select the lines of data required using normal Windows selection methods (select the first row, then hold down the Shift key and select the last row, or use the Ctrl key to select individual rows), then copy this data to the Windows clipboard using **Edit / Copy** (or Ctrl-C) and paste it into either Wordpad, Word or Excel using **Edit / Paste** (or Ctrl-V)

There are a few tricks to getting good results in the chosen software:

Word (or Notepad or Wordpad)

Use **File / Page Setup** or **Page Layout / Orientation** and set the paper orientation to Landscape. Select All the data and change the Font to a Fixed Width font such as Courier New or Lucida Console or Microsoft Sans Serif. Set the font size to fit the data on the paper (usually 8 or 9) depending on the font used.



Excel:

As the data is "tab delimited" it easily pastes into an Excel spreadsheet. Reduce the text size to 8 if too large, and Left Justify the alignment of the columns. You may need to change the format of the Northing and Easting columns to "Number" style. You can then remove any column of data that you do not need in your print out. eg. the Type, Colour and Layer name columns may be deleted.

Use **File / Page Setup** or **Page Layout / Orientation** and set the paper orientation to Landscape if the data does not fit on a Portrait page.

E.14.5. Create PDF Files

If PDF files are required, you can use a PDF print routine such as CutePDF. This product is available from the Internet and is installed as a printer on your list of available printers. Simply set appropriate page sizes and orientation and print – then specify a file name for the resulting document.

F. REDUCTION OF DATA AND ACCURACY TESTS

NZTraverse 7 was significantly modified in 2010 to assist with producing a dataset to meet the 2010 Rules for Cadastral Survey and the latest Release of Landonline.

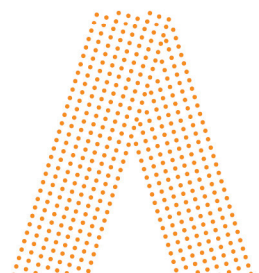
A major requirement of the new rules was the implementation of specific accuracy standards that must be met for the dataset that is imported into Landonline.

NZTraverse 9 has been modified to use the accuracy standards in the Cadastral Survey Rules 2021

To enable you to check on the accuracy of your dataset prior to sending data to Landonline we have provided a number of features.

These include:

- A **Least Squares Adjustment** option
- The **Bowditch Reduction and Adjustment** is held as the default reduction and adjustment method for all datasets
- Changes to the onscreen Reduction Results to display the adjusted bearing and distance data for each observation with the bearing and distance residuals, and the displayed vector residual compared against the computed accuracy limit for the vector.
- A **Standard Adjustment Report** that lists all the detail of the onscreen Reduction Results for each Traverse grid in turn. Each traverse is headed with a statement or statements to help you analyse any problems with data within the traverse. The Report also includes an overall summary of the Accuracy results for the data within the report. The Report usually requires output in Landscape mode.
- A condensed version of the above report to print in portrait mode to A4 paper. This report is called **Summary: Standard Report**



- A **Parcels Report** that is similar in format to the above report but it only lists the details for the Parcels that have been assessed by the routine Check Lots.
- A condensed version of the above report to print in portrait mode to A4 paper. This report is called **Summary: Parcels Report**
- A **Least Squares Report** that details on the observations included in the Traverse grids flagged for Adjustment by Least Squares.

F.1. Accuracy Reporting - Onscreen

To assist surveyors to check datasets for compliance with the accuracy standards laid down in the 2021 Rules, **NZTraverse** includes the accuracy checks in the Reduction and Reporting options.

The onscreen Reduction Results check the residuals of the data against the allowed standards for Non-Boundary observations, and Boundary observations. The latter items are checked relative to the Class of the Survey.

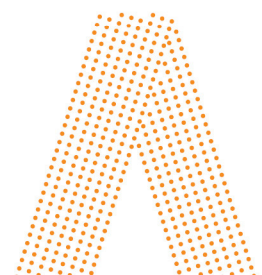
Please note the accuracy figures shown are displayed as a guide to the surveyor's work. Some vectors may not have an accuracy shown if there is no specific tolerance in the accuracy standards for such a vector.

To check the accuracy of data, run the option **Reduction / Reduce All**.

The Reduction Results might look like this.

| Reduction of Standard Sequence | | | | |
|--------------------------------|----------------------------|----------------------|----------|----------|
| Standard Sequence | Beginning Reduction..... | | | |
| R T1:Traverse: 1 | T1:Traverse: 1; | Misclose 1:9338.465 | N -0.029 | E -0.037 |
| R T2:Traverse: 2 | Reduced | | | |
| R T3:Traverse: 3 | T2:Traverse: 2; | Misclose 1:44715.948 | N 0.000 | E 0.004 |
| R T4:Traverse: 4 | Reduced | | | |
| R T5:Traverse: 5 | T3:Traverse: 3; | Misclose 1:7908.161 | N -0.020 | E -0.006 |
| R T6:Traverse: 6 | Reduced | | | |
| | T4:Traverse: 4; | Misclose 1:1715.520 | N -0.072 | E -0.001 |
| | Reduced | | | |
| | T5:Traverse: 5; | Misclose 1:11402.688 | N -0.010 | E 0.000 |
| | Reduced | | | |
| | T6:Traverse: 6; | Misclose 1:3051.424 | N -0.006 | E 0.000 |
| | Reduced | | | |
| | *** REDUCTION COMPLETE *** | | | |

To check on the detail of a traverse, click on the name of the traverse in the left frame of the report. The information is as shown below.



| T3: Traverse: 3: Summary | | | | | | | | | |
|--------------------------|----------|--------------|----------|------------|-----------|--------|-----------------------|-----------|------------------|
| Misclose Information | | | | | | | Reduction Information | | |
| Northing | Easting | Bearing | Distance | Accuracy | Perimeter | | Area | Perimeter | |
| -0.020 | -0.006 | 196.4457 | 0.021 | 1:7908.161 | | | 166.750 | 242.237 | 166.758 |
| | | | | | | | | | |
| Results | | | | | | | | | |
| Observed Data | | Reduced Data | | Residuals | | | Accuracy | Line Data | |
| Bearing | Distance | Bearing | Distance | Bearing | Distance | Vector | Tolerance | Point | Survey Marks |
| | | | | | | | | | Type |
| 34.0800 | 5.610m | 34.0752 | 5.611m | -0.0008 | 0.001 | 0.001 | 0.0253 | 7 | IT I DP 331646 |
| 86.0600 | 86.990m | 86.0536 | 86.994m | -0.0024 | 0.004 | 0.011 | 0.0293 | 9 | IS XXX SO 38022 |
| 86.0400 | 23.710m | 86.0336 | 23.711m | -0.0024 | 0.001 | 0.003 | 0.0262 | 94 | IT (94) DP 15123 |
| 83.5030 | 50.440m | 83.5006 | 50.442m | -0.0024 | 0.002 | 0.006 | 0.0275 | 25 | IS IV DPS 1141 |
| | | | | | | | | 12 | IB I SO 335581 |

- The column headed 'Reduced Data' shows the adjusted Bearing and Distance for each observation. The reduced coordinates are accessed with the slide bar.
- The column headed 'Residuals' shows the bearing and distance residuals between the Observed observation and the Adjusted observation and the Vector residual between the observed coordinate and reduced coordinate for this vector.
- The column headed 'Accuracy Tolerance' displays the limit for the horizontal accuracy tolerance for each vector.
- The accuracy tolerance calculations are based on the Accuracy Standards defined in the 2021 Cadastral Survey Rules.
- The Type column displays characters as a guide to the Source and type of observation. [It may be necessary to slide the bottom bar to the right to see all these items.]
 - 1st character: 'Source' setting for the Observation. M)easured, A)dopted, C)alculated.
 - 2nd character: the category of the Observation. N)on-Boundary, B)oundary.
 - 3rd character: if available the Mark State of the point observed by the observation is shown. O)ld, N)ew, A)dopted, R)eplaced, D)isturbed, rE)newed.
 - 4th entry: if the observation is a radiation this is marked as Side, Peg, GPS or EDM

See **Part 4 Subpart 2** of the 2021 Cadastral Survey Rules for the various accuracy standards used.

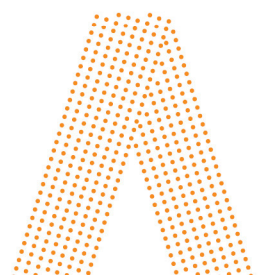
F.2. Display of Errors

If there is a Vector residual that is outside the limit for the horizontal accuracy tolerance for each vector, the Traverse Grid is labelled with a cyan question mark.

 T3: Traverse: 3

Open the traverse to check out the error; it is highlighted in Red

'Vector Residuals'



| Results | | | | | | | | | | |
|---------------|----------|--------------|----------|-----------|----------|----------|-----------|-----------|------------------|------|
| Observed Data | | Reduced Data | | Residuals | | | Accuracy | Line Data | | |
| Bearing | Distance | Bearing | Distance | Bearing | Distance | Vector | Tolerance | Point | Survey Marks | Type |
| 34.0800 | 5.610m | 34.0851 | 5.612m | 0.0051 | 0.002 | 0.002 | 0.0253 | 7 | IT I DP 331646 | |
| 86.0600 | 86.990m | 86.0536 | 87.025m | -0.0024 | 0.035 | 0.037### | 0.0293 | 9 | IS XXX SO 38022 | M NO |
| 86.0400 | 23.650m | 86.0336 | 23.660m | -0.0024 | 0.010 | 0.010 | 0.0262 | 94 | IT (94) DP 15123 | M NO |
| 83.5030 | 50.440m | 83.5009 | 50.461m | -0.0021 | 0.021 | 0.021 | 0.0275 | 25 | IS IV DPS 1141 | M NO |
| | | | | | | | | 12 | IB I SO 335581 | M NO |

In this case the accuracy tolerance is 0.0293m or 29.3mm for an observation between these two non boundary marks 9 and 94. The vector residual is 0.037m or 37mm. This is above the tolerance limit but is well below the maximum limit of 0.2m.

If the same marks were not measured but adopted the computations would be:

| Results | | | | | | | | | | |
|---------------|----------|--------------|----------|-----------|----------|--------|-----------|-----------|------------------|------|
| Observed Data | | Reduced Data | | Residuals | | | Accuracy | Line Data | | |
| Bearing | Distance | Bearing | Distance | Bearing | Distance | Vector | Tolerance | Point | Survey Marks | Type |
| 34.0800 | 5.610m | 34.0851 | 5.612m | 0.0051 | 0.002 | 0.002 | 0.0258 | 7 | IT I DP 331646 | |
| 86.0600 | 86.990m | 86.0536 | 87.025m | -0.0024 | 0.035 | 0.037 | 0.0380 | 9 | IS XXX SO 38022 | A NO |
| 86.0400 | 23.650m | 86.0336 | 23.660m | -0.0024 | 0.010 | 0.010 | 0.0285 | 94 | IT (94) DP 15123 | A NO |
| 83.5030 | 50.440m | 83.5009 | 50.461m | -0.0021 | 0.021 | 0.021 | 0.0326 | 25 | IS IV DPS 1141 | A NO |
| | | | | | | | | 12 | IB I SO 335581 | A NO |

In this case the vector from mark 9 to 94 is within tolerance so no error is displayed.

The symbol in a highlighted field determines if the error is outside acceptable accuracy tolerances.

NON-BOUNDARY

For observations between two **Non-boundary** marks (Rules 19 and 20) these are:

indicates that the residual is beyond the 100% expected accuracy

indicates that the residual is beyond the maximum cut off value

[This is a simplified accuracy computation with the 95% tolerance no longer in use for 2021 CSR.]

BOUNDARY

For observations between two **Boundary** (Rule 27) marks these are:

indicates that the residual is beyond the 100% expected accuracy

BOUNDARY REFERENCING

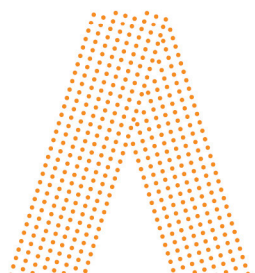
For observations between a **PRM** mark and a **Boundary** mark the boundary referencing test applies. (Rule 21) There is a single value for this test dependent on the Survey class of the parcel, so the vector observation either passes or fails. Such a failure is marked with **###**

| Results | | | | | | | | | | |
|---------------|----------|--------------|----------|-----------|----------|----------|-----------|-----------|------------------|------|
| Observed Data | | Reduced Data | | Residuals | | | Accuracy | Line Data | | |
| Bearing | Distance | Bearing | Distance | Bearing | Distance | Vector | Tolerance | Point | Survey Marks | Type |
| 86.0600 | 11.380m | 86.0400 | 11.348m | -0.0200 | -0.032 | 0.033### | 0.0300 | 4 | IS VIII DPS 2467 | |
| 86.0600 | 20.000m | 86.0400 | 19.943m | -0.0200 | -0.057 | 0.058 | 0.0630 | 38 | PEG VII DPS 2467 | A BA |
| | | | | | | | | 87 | PEG 8 SO 340574 | A BA |

In this example the Survey Class = A

Boundary referencing: Residual = 0.033### shows failure against the absolute tolerance of 0.03m

Any PRM outside the valid distance for boundary referencing, per Class rules, is ignored.



PLEASE NOTE: NZTraverse provides the information as a guide – it is up to the surveyor to check out the errors. The error checking NZTraverse provides is to assist you to make decisions in reviewing your data.

TOOL TIP

A tool tip assists you with remembering what the various symbols mean. Hold the cursor in a red filled field in a reduced traverse to display the tooltip.

| | | | |
|--|-------|----------|--------|
| -0.0944 | 0.003 | 0.015 | 0.0300 |
| -0.0944 | 0.009 | 0.047### | 0.0274 |
| Residual is beyond 100% expected accuracy. | | | |

F.3. Adjustment Report

There are two reports that are used for normal datasets where no Least Squares Adjustments have been used.

DETAILED REPORT OF DATA

The main report is **File / Export / Standard Adjustment Report**.

The *Standard Adjustment Report* gives you a comprehensive report on the reduction and adjustment of all the data in the working sequence and includes all the traverse grids regardless of whether the data has been adjusted by Bowditch or Least Squares.

Points to note:

- The Report is written to a text file and opens in Notepad
- The Report includes all the traverse grid data by default but the user can select a group of traverse grids if preferred.
- Peg Ties can be included. Tick the relevant box.
- The report can be written to a text file in a format that opens effectively in a spreadsheet. Tick the relevant box.
- The format of the report fits on **A4** in **Landscape** mode. You may need to change the Page Setup for the report within Notepad. Set the mode to **Landscape** and reset the left and right margins to say 5mm or reduce the font size, to prevent word wrap when the report is printed.

Information shown in report:

1. Each traverse grid is headed with a statement or statements to report either compliancy with the tolerance limit for horizontal accuracy or the errors found. Each Traverse grid is listed in order even if some data is reduced by Least Squares and other data by Bowditch.



- The errors listed onscreen are also in the report, and the header of each traverse grid highlights these.
- The end of the report contains a Summary of the observations included and any accuracy errors that have been established. It helps you check out any issues in the dataset.

See example on the next page:

Summary of T2:Traverse: 2

All vectors are within the tolerance limit for horizontal accuracy.

Misclose Information

| Northing | Easting | Bearing | Distance | Accuracy | Perimeter |
|----------|---------|---------|----------|-------------|-----------|
| 0.000 | 0.004 | 93.2456 | 0.004 | 1:44715.948 | 192.350 |

Reduction Information

| Area | Perimeter |
|----------|-----------|
| 1117.198 | 192.352 |

Results:

| Observed Data | | Reduced Data | | Residuals | | | | | Accuracy | Details | | |
|---------------|----------|--------------|------------|-----------|----------|---------|-------|--------|-----------|---------|------------------|------|
| Bearing | Distance | Northing | Easting | Bearing | Distance | Brg | Dist | Vector | Tolerance | Point | Survey Marks | Type |
| | | 807069.127 | 368806.312 | | | | | | | 1 | IS II DPS 1141 | |
| 350.3700 | 27.970m | 807096.723 | 368801.751 | 350.3656 | 27.970 | -0.0005 | 0.000 | 0.001 | 0.0264 | 10 | IT DPS 1141 | M NO |
| 336.2500 | 122.730m | 807209.202 | 368752.646 | 336.2456 | 122.731 | -0.0004 | 0.001 | 0.003 | 0.0311 | 4 | IS VIII DPS 2467 | M NO |
| 281.5430 | 18.530m | 807213.026 | 368734.515 | 281.5429 | 18.530 | -0.0001 | 0.000 | 0.000 | 0.0259 | 8 | IS XXXI SO 38022 | M NO |

This is the statement you want to see!

All vectors are within the tolerance limit for horizontal accuracy.

SUMMARY REPORT

There is a condensed version of the Standard Adjustment Report.

This report is **File / Export / Summary: Standard Report.**



It is designed for printing in **Portrait** mode to an **A4** sheet. In Page Setup in Notepad check that the left and right margins are set to a suitable setting or change the font size to prevent word wrap when the report is printed.

LEAST SQUARES REPORT

There is a separate report for listing the data that has been reduced using the Least Squares Adjustment routine. This is **File / Export / Least Squares Report**.

It only includes the data from the traverse grids that have been Adjusted by the Least Squares computation.

[See section **F.5.2.**]

F.4. Parcels Report

There is a separate report for checking the accuracy of the parcels list. This is **File / Export / Parcels Report**.

After you have run *Reduce All* and *Check Lots*, the Parcels Report provides details of all Parcels; it has a similar layout to the Standard Adjustment Report.

It only has the Parcels selected by the user in this report. Please remember to exclude any Extinguished parcels that have been added to the working sequence.

SUMMARY REPORT

There is a condensed version of the Parcel Report.

This report is **File / Export / Summary: Parcel Report**.

It is designed for printing in **Portrait** mode to an **A4** sheet. In Page Setup in Notepad check that the left and right margins are set to a suitable setting or change the font size to prevent word wrap when the report is printed.

PLEASE NOTE: It is essential that the *Check Lots* function is run again after you have re-run the *Reduce All* function, otherwise there will be no data on the report. The *Reduce All* function clears any previously computed *Check Lots* detail.

F.5. Least Squares Adjustment

NZTraverse 8 kept the Bowditch method as the default reduction and adjustment method for all datasets. However it also introduced a Least Squares Adjustment which you can apply to selected Traverse grids.



The Traverse grid is maintained for the data entry of either traverse data or for radiations / vectors. If a traverse grid is set to be adjusted by the Least Squares routine, then multiple observations may be made to any point.

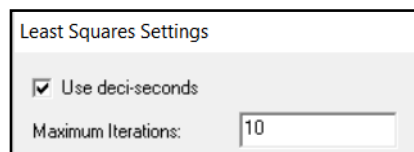
This would not be accepted if the same data in a traverse grid is set for adjustment by the Bowditch routine.

Please consider the following:

- Many datasets still provide suitable data for lodgment in Landonline using the Bowditch method of adjustment.
- For other datasets it may only be necessary to set your Non-Boundary observations to be adjusted using a Least Squares adjustment, especially if GPS is used; the remaining data may be adjusted by Bowditch.
- You may enter observations for adjustment by Least Squares Adjustment as radiations within a traverse grid. If multiple traverses are used for such data, the Least Squares Adjustment reads all these radiations together. It does not treat each Traverse grid separately in the computation.
- Such Radiations should be marked as either 'GPS' or 'EDM' using the Type column, dependent on the type of equipment used.

Bearings

Now that more users are working with GPS for cadastral work, the distances can be long i.e. multiple kilometres. The bearing measured becomes much more critical with such distances. So we have introduced the option to record a decimal part of a second. i.e. DDD.MMSSs where s = one decimal part of a second.



Least Squares Settings

☒ Use deci-seconds

Maximum Iterations:

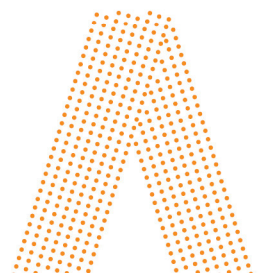
To activate this option in a job tick the checkbox 'Use deci-seconds' on the **Settings / Least Squares Settings** screen.

The 'Bearing' column in a Traverse grid now allows entry of this extra decimal position.

Eg. Bearing entered is 123.45326


Represents: 123° 45' 32.6"

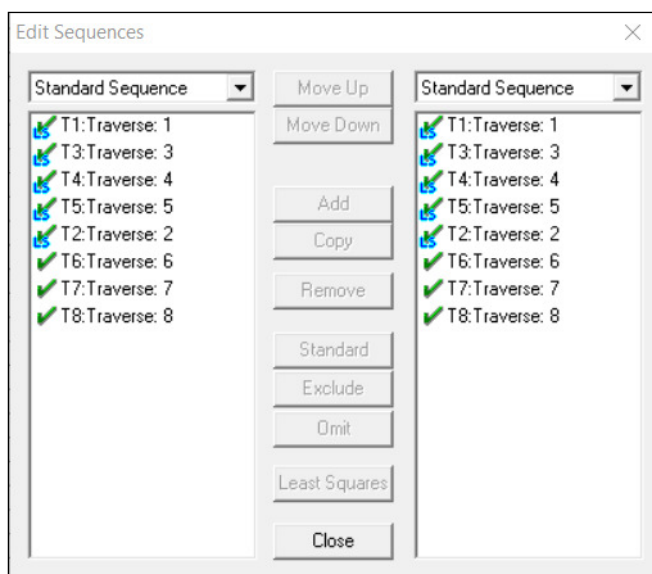
All references to bearings in reports and data exported to LandXML display the bearing with the additional deci-second.



F.5.1. Least Squares Procedures

To mark selected Traverse grids for adjustment by Least Squares go to **Edit / Sequences**. Highlight the Traverses required and click the “Least Squares” button.

The selected Traverse grids are marked with a bright cyan LS as shown:  T2:Traverse: 2



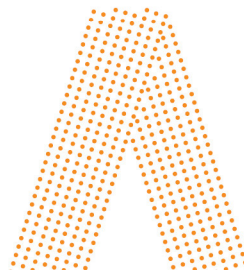
In this example, the first 5 traverse grids contain GPS vectors and are adjusted by Least Squares. The last 3 traverse grids will be reduced and adjusted using the Bowditch formula.

F.5.1a Least Squares Settings

It is important that you make sure that the expected errors are set for the Least Squares computation.

Go to **Settings / Least Squares Settings** before running your computation.

These settings relate to the expected error level provided in the documentation of your survey equipment manufacturer. The values applied depend on whether you have set the Equipment setting to GPS or EDM (Total Station)



The image shows a 'Least Squares Settings' dialog box with the following fields and buttons:

- ☐ Use deci-seconds
- Maximum Iterations: 10
- ☐ Use alternative settings
- Theodolite EDM Equipment:
 - Angular Error (seconds): 5
 - Distance Error (mm): 5
 - +ppm: 2
- GPS Equipment:
 - Angular Error (seconds): 5
 - Distance Error (mm): 5
 - +ppm: 2
- Buttons: OK, Cancel, Alternative Settings, Save as Default

The settings shown above are the defaults:

- Use deci-seconds Default to nearest second. Tick for nearest 0.1 of a second.
- Maximum Iterations: 10 iterations - the recommended setting
- Angular Error: Expected angular error in seconds
- Distance Error: Expected distance error in millimeters
- +ppm The additional “parts per million” value that is dependent on the length of the observation.

Enter the expected error levels for your EDM equipment and the separate entry for your GPS equipment.

The appropriate error levels are used as weighting in the Least Squares computation

These settings are held until you edit them. If edited, the settings are held in the saved job data.

To save these settings as a default for all new jobs, please click the “Save as Default” button.

The Least Squares Adjustment needs to read the **Source** set for each observation. So complete these settings before running the computation.

Make sure that the **Source** is set to ‘Measured’ for all observations you have measured in the field. Any observations set to ‘Adopted’ or ‘Calculated’ with no Equipment set, do not use the Error Settings as above.

These observations use:

- Angular Error: 10 seconds
- Distance Error: 10 mm
- +ppm 40



This allows suitable weighting to favour your measured observations over the adopted or unknown observations.

F.5.1b Least Squares Reduction and Adjustment

1. Once Traverses have been selected for adjustment by Least Squares, the **Reduce Current** and **Reduce All** routines apply the Least Squares reduction and adjustment to these Traverses.
Any Traverse grids that are not set for Least Square adjustment continue to be adjusted using the Bowditch formula, after the Least Squares routine is complete. The coordinates of these points adjusted by Least Squares are used by the Bowditch traverses as necessary.
2. When the dataset has a mix of Least Squares and Bowditch, the LS marked traverse grids should be above the Bowditch traverses in the sequence.
3. The results of the Least Squares Adjustment are displayed in the 'Least Squares Report'. Accuracy checks on the same data are also displayed in the 'Standard Adjustment Report'.

F.5.1c Alternative Weighting Options

NZTraverse has separate error settings for Measured GPS and Measured EDM. They are the default settings for any new job as described above.

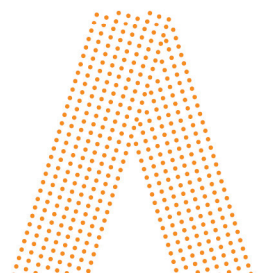
There is an option called 'Alternative Settings' on the **Settings / Least Squares Settings** screen. This feature enables weightings for different specifications of data when computing an adjustment using Least Squares.



To activate these alternative settings tick the checkbox 'Use alternative settings'

Then click on the **Alternative Settings** button to open up a new screen

This screen enables options to define and allocate specified weighting/error settings for particular types of vector records in your **NZTraverse** traverse grids



The left hand side lists the particular types of vectors:

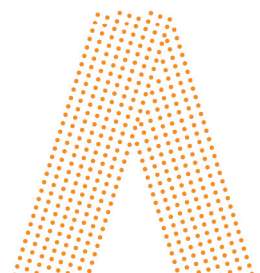
- **GPS Measured:** the vector is defined with Source = *Measured* and its Equipment = *GPS*. The equipment should be set to *GPS* in the Line PopUp; if not set for the individual Line, the equipment setting on the Info Tab is used.
- **EDM Measured:** the vector is defined with Source = *Measured* and its Equipment = *Theodolite EDM*. The equipment should be set to *Theodolite EDM* in the Line PopUp; if not set for the individual Line, the equipment setting on the Info Tab is used.
- **GPS Adopted:** the vector is defined with Source = *Adopted*. The equipment should be set to *GPS* in the Line PopUp; if no equipment is set for the individual Line, the 'All Others' settings is used.
- **EDM Adopted:** the vector is defined with Source = *Adopted*. The equipment should be set to *Theodolite EDM* in the Line PopUp; if no equipment is set for the individual Line, the 'All Others' settings is used.
- **Other Adopted:** the vector is defined with Source = *Adopted*. The equipment is set to another equipment type such as *Theodolite Band* in the Line PopUp; if no equipment is set for the individual Line, the 'All Others' settings is used.
- **All Others:** all other vectors that have Source = *Adopted* or *Calculated* with no equipment defined.

When any one of these vector types is selected, its default error settings are displayed in the area to the right of the vector list, as shown above for **GPS Measured**. These error settings may be updated and saved as future defaults using the **Save as Defaults** button.

The file holding the settings is saved into the folder `..\AddOns\NZTraverse` and is called `NZTraverse Least Squares.ini`.

Library of LS Error Settings

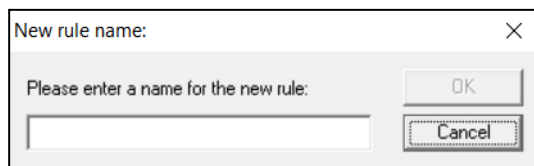
The *Alternative Least Squares Settings* screen has options so that you can set up other named weighting styles for input into other jobs where the defaults are not suitable.



For example, set the Source = Adopted, Equipment = Theodolite EDM and set the errors to Angular = 30, Distance = 10 and ppm = 10

Then click the button **Save as new rule**

Enter a suitable name for this new rule eg. Adopt-EDM and click **OK**



This rule could be used in a new job where you would like the type 'EDM Adopted' to use this error setting.

To use this setting in a job, set the Type to 'EDM Adopted', select 'Adopt-EDM' from the current Rule picklist and then click the button **Copy from rule**

The 'EDM Adopted' type is now updated with the error settings from the saved rule.

F.5.1d Checks for using Alternative Settings

These are the important procedures that need to be checked to ensure the LS settings are correctly applied.

- Tick '*Use alternative settings*' checkbox
- Click **Alternative Settings** button
- Check that correct error settings are defined for each of the LS Types
- Check that *Equipment* is correctly defined on the **Info** Tab
- In each Traverse defined for adjustment by Least Squares (in **Edit** / *Sequence* option) make sure the Source settings are correct for each vector
- If any Measured vector has an alternative Equipment to the **Info** Tab, apply an Equipment setting on the Line PopUp – (could use a user defined Style for this)
- Any Adopted vector that has a known Equipment setting can also be set appropriately with a Style to ensure the Equipment field is applied in the Line PopUp.
- Run **Reduction** / *Reduce All*, to apply these weightings in the Least Square Adjustment program.

F.5.2. Least Squares Report

After you have completed the option **Reduce All** and checked your onscreen data you can write this report using **File** / *Export* / *Least Squares Report*.



It includes only the data from the traverse grids that have been Adjusted by the Least Squares computation. Briefly, the report displays:

- Fixed Stations are listed.
- Angular observations are listed with expected angular error

| From Pt | To Pt | Azimuth | A-Priori Std. Error |
|---------|-------|----------|---------------------|
| 11 | 9 | 335.3800 | 5.00 |
| 9 | 15 | 157.3230 | 5.00 |
| 11 | 13 | 350.3700 | 5.00 |

- Distance observations are listed with expected distance error + ppm

| From Pt | To Pt | Distance | A-Priori Std. Error |
|---------|-------|----------|---------------------|
| 11 | 9 | 177.770 | 0.0054 |
| 9 | 15 | 211.700 | 0.0054 |
| 11 | 13 | 27.970 | 0.0051 |

- Details on the total number of observations – better results are obtained with a reasonable number of redundant observations (observing to the same point more than once)

Adjustment Summary

| | | |
|-------------------------|---|----|
| Convergence Iterations | : | 3 |
| Number of Observations | : | 56 |
| Number of Unknowns | : | 36 |
| Number of Redundant Obs | : | 20 |

- Further statistical data: Sum of Squares Standard (Studentized) Residuals, Reference Variance, and Chi-square test

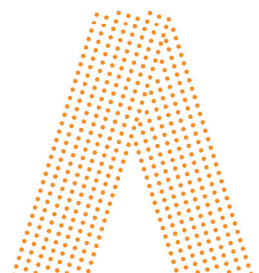
| Observation Type | Number of obs | Sum of squared std res |
|------------------|---------------|------------------------|
| Angle | 20 | 0.1931 |
| Distance | 20 | 1.2268 |
| Total | 40 | 1.4199 |

Estimated reference variance: 0.2368

Chi-Square test at 5.00% significance level: Passed

Test statistic: 0.4867

Lower bound: 0.4541



Upper bound: 1.5518

- A list of the adjusted coordinates of all the points

Adjusted Coordinates (Metres)

| Station | Northing | Easting |
|---------|------------|------------|
| 9 | 807231.080 | 368732.961 |
| 13 | 807096.740 | 368801.749 |
| 15 | 807035.411 | 368813.818 |

- You now get a full list of the adjusted Azimuth Observations with residuals and the Studentized Residuals – the latter gives you a guide to the potential for problems with observations.

Adjusted Observations and Residuals

Adjusted Azimuth Observations

| From Pt | To Pt | Measured | Adjusted | Unit:sec | A-Priori | Studentized |
|---------|-------|----------|----------|----------|-----------|-------------|
| | | Bearing | Bearing | Residual | Std.Error | Residual |
| 11 | 9 | 335.3800 | 335.3800 | 0.03 | 5.00 | 0.0 |
| 9 | 15 | 157.3230 | 157.3252 | 22.06 | 5.00 | 4.4 |
| 15 | 11 | 347.2700 | 347.2657 | -3.12 | 5.00 | 0.6 |

- This is followed by a full list of the adjusted Distance Observations with residuals and the Studentized Residuals – the latter gives you a guide to the potential for problems with observations.

Adjusted Distance Observations (Metres)

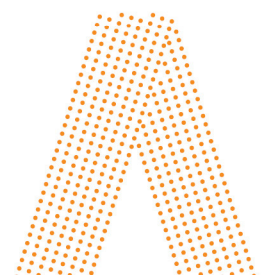
| From Pt | To Pt | Measured | Adjusted | Residual | A-Priori | Studentized |
|---------|-------|----------|----------|----------|-----------|-------------|
| | | Distance | Distance | | Std.Error | Residual |
| 11 | 9 | 177.7700 | 177.7895 | 0.0195 | 0.0054 | 3.6 |
| 9 | 15 | 211.7000 | 211.7172 | 0.0172 | 0.0054 | 3.2 |
| 15 | 11 | 34.5600 | 34.5414 | -0.0186 | 0.0051 | 3.7 |

- Any observations – angular or distance with a Studentized Residual of more than 1.0 shows that the Residual for the observation is more than the expected Std Error. [Studentized Residual = Residual / Std Error.]
- The end of the report provides Error Ellipses for each coordinate and the Error Ellipses for the observations between each pair of coordinates

Station Coordinates Error Ellipses (Metres)

95% Confidence Level

Semi-Major Semi-Minor Azimuth of



| Station | Axis | Axis | Major Axis |
|---------|--------|--------|------------|
| 8 | 0.0197 | 0.0152 | 100.5949 |
| 10 | 0.0236 | 0.0175 | 133.1736 |

Relative Coordinates Error Ellipses (Metres)
95% Confidence Level

| From | To | Semi-Major Axis | Semi-Minor Axis | Azimuth of Major Axis |
|------|----|--------------------|--------------------|--------------------------|
| 8 | 11 | 0.0110 | 0.0022 | 166.1007 |
| 9 | 11 | 0.0205 | 0.0168 | 118.3803 |

G. EXPORTING DATA TO LANDONLINE


G.1. Check the data for export

Always check the dataset using the various report options in section F. above.

NZTraverse 9 makes a number of checks to prevent you writing the LandXML file if certain settings have been omitted, but it cannot check for incorrect or inaccurate data.

A number of issues are listed at the end of the Reduction Report until they have been dealt with. Any further errors are listed when you use the option **File / Export / LandXML**

The procedure checks items such as unique mark names & numbers (see **G.2**), points set with Purpose as PRM which are also set as 'Adopted', points that appear to be 'new' set as 'Adopted' (this can occur if no plan reference is allocated to the adopted point so always check this out), natural boundary nodes appearing in a traverse, or a traverse point incorrectly labelled as a natural boundary node.

The option **Edit / Find/Replace**  is ideal for checking which traverse or parcel contains a particular point number. This option also lets you find and replace Mark Names, Plan References, Purpose settings and Symbols (Monument Types). You can also find which point has a known Landonline oID.

G.2. Unique Mark Numbers

You can, if you prefer, allocate your own suitable Mark Numbers to all the new marks in your dataset, before running this routine.

Each mark read into Landonline from a LandXML file must be uniquely labelled within the dataset by its mark name, mark number and plan reference. This means that all marks must be uniquely numbered even if a mark represents an existing monument which had no number assigned to it. The import of the file into Landonline **fails** if this rule is not adhered to.

When you Export from **NZTraverse** to a LandXML file, the first process checks for unique mark numbers. If a problem is found these are immediately reported at the foot of the Reduction Results report, and the export routine terminates.



This activates the option **Edit / Allocate Mark Numbers**. If you use this option all existing marks are numbered with the number in brackets eg. (9) - while all new marks are numbered with no brackets eg. 5

In **NZTraverse 9** we have implemented the requirement for all new Non-Boundary and Boundary Marks to be numbered in a series. They need to be numbered as IT 1, IS 2, IR 3, PEG 4, PEG 5, AD 6, AD 7, UNMK 8, UNMK 9 etc. This was different in the previous versions.

The Survey Number from the **Info** Tab is copied to the Plan Ref. field of all new marks if it is not already allocated.

Existing marks which have no numbering are now considered. The routine starts at (1) and all the numbers allocated for existing marks are in brackets as required by Landonline.

You can of course do your own numbering if you prefer, especially for new non-boundary marks.

NOTE: Do not run the option **Edit / Allocate Mark Numbers** until all other data entry is complete, so that the best result can be applied to your data.

G.3. Create the LandXML file

Ideally you will complete all the data in **NZTraverse** and **Magnet Office** – including all the monuments, observations and parcels – prior to importing data into Landonline. However, we have developed the system so that you can do the basic calculations in **NZTraverse** and export to a LandXML file. You do not have to complete every detail before transferring data to Landonline as data can be completed in that environment. However the checks stated in **G.2** are still applied. Users report that completing as much work as possible in **NZTraverse** speeds up the operation once in Landonline.

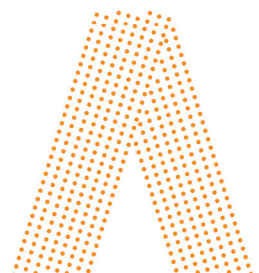
Make sure you run **Reduction / Reduce All** first. Select **File / Export / LandXML** to create the file and give it a suitable name. You then import this file directly into the Survey you have created in Landonline. The data is captured into the various data screens in the Cadastral Survey Capture Tool and checked in the Spatial View.

Please check the data in Landonline and edit the data for final data entry and validation, prior to production of plans and final lodgement.

Some of the data required in Landonline may not be available in **NZTraverse** so you will need to fill in these additional fields. Data can also be fine-tuned as required.

NOTE: If you do not define Lots in **Magnet Office** and **NZTraverse** the Topology Layer setting in the Vector Capture screen will not be set correctly. It will stay at '0-Nbdy' for all data, and you will then have to edit each boundary line as you define the lots.

Warning: You cannot import a LandXML file into a Survey in Landonline if data is already in that Survey, unless you are prepared to completely overwrite the previously imported data. So



we suggest you do no editing in Landonline if you have further work to do in a dataset in **NZTraverse** and **Magnet Office**.

G.4. Errors with import into Landonline

If the LandXML file does not import into Landonline, you receive an error message. These error messages usually point to some specific problem with the LandXML file. In most cases the error can be rectified by working through the dataset in **NZTraverse** and **Magnet Office**.

The error messages are often obtuse, so please contact us for a translation!

Quick checks if you have an error:

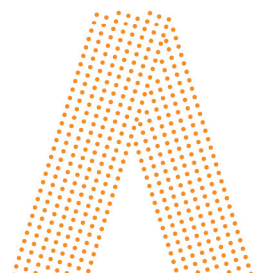
1. Test the import of a LandXML file written from **NZTraverse** with the **oID** numbers excluded from the dataset.

Tick the option *Exclude oID* records on the **Setup** tab and export the LandXML file again. If this successfully imports, the linking of marks via oIDs may be the cause of the problem. Perhaps the wrong point number was used, taking the incorrect oID with it. [Remember to untick the *Exclude oID* records option once you have corrected the problem.]
2. Test the import of a LandXML file written from **NZTraverse** with the parcels excluded from the dataset. Use **Edit / Sequences** and highlight the parcels in the working sequence. Set these as 'Excluded', and export the LandXML file again. If this successfully imports, the linking of parcels may be the cause of the problem. Are any parcels defined with incorrect marks + oIDs? Are there parcels overlapping each other or themselves? [Remember to reset the Parcels to 'Standard' once you have corrected the problem.]
3. Set up a new **Magnet Office** project and a new **NZTraverse** job. Import the LandXML file previously written by NZTraverse into the new job. Then write the LandXML data into the new Magnet Office job. Check the data for duplicated points, crossing boundary lines etc.
4. If the dataset contains Natural Boundaries, make sure you have no Natural Boundary nodes used as a point in a Traverse. Check the other rules about Natural Boundaries in section **E.10.3**.
5. If the Landonline error message relates to the spatial display of parcels then the dataset should have been imported into the various Capture screens in Landonline. However you may need to unlink all the parcels before you can access the Spatial View. These errors may be linked with those listed in 1. and 2. above.

H. CREATING NEW DATA WITH NO IMPORTED LANDONLINE DATA

Datasets can be built in **NZTraverse** in the usual way without data being imported from Landonline.

This is often essential outside the SDC area where no suitable data is available for you to use. In some cases, you need to use a mix of imported data, data taken off plans and your own measured data.



When the dataset is complete, you can export the LandXML file from **NZTraverse** for loading into the Cadastral Survey Capture Tool in Landonline. Additional data may need to be entered to complete the dataset in Landonline. If you have no imported data in **NZTraverse** and **Magnet Office**, then all linking has to take place in Landonline.

The procedures for collating such a dataset are similar to those documented in sections **E.**, **F.** and **G.**

Please read these items, especially those that apply to your particular work.

I. FEEDBACK

We have worked hard to ensure that **NZTraverse 9** interfaces effectively with the latest Landonline Release and that it supports the 2021 Cadastral Survey Rules. We have also ensured that it runs with the recent versions of **Magnet Office**.

Please contact us if you have any queries, suggestions, brickbats or bouquets!

If you have more suggestions, please itemise them on an email and send to magnetsupport@aptella.com

APPENDIX A

Using the Source setting to control State of Mark

NZTraverse sets many values by default, using specified rules. This means that you do not have to set a mark state for each mark, or the bearing and distance type for each observation. By setting some defaults that apply to 98% of the data, we have minimised the amount of data entry required.

However you may use the PopUp window to make specific alterations to some of the observations. These changes overrule the default settings. This allows you to define the variable combinations of mark state, bearing type or distance type required in the final 2% of cases.

In the rules below, BT = Bearing Type and DT = Distance Type

Here are the default rules. They are applied by the option **Reduction / Assign Mark State** – they are explained below and then listed in a table as a quick guide:

1. An existing mark is measured in the field.

Source = **Measured**

Point has existing plan reference



| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|---------|----------|
| 166.1200 | 41.800 | m | 11 | IB | VII | DPS 72376 | | Spike | Non Bdy | Measured |

Additional Line Data

Point number: 11

oID: 1427722

Point mark state: Old

Bearing type: Measured

Adopted bearing source:

Distance type: Measured

Adopted distance source:

Monument: IB VII DPS 72376

Line type: Straight Line

Line Bearing: 166.1200

Line Distance: 41.800 m

Equipment used:

Bearing and distance types are set to **Measured**
as per setting in Source field

(see PopUp screen at left)

Result in LOL:

Mark State = **Old**

BT = **M** DT = **M**

Equipment used for observation set by default
from Info tab, or individually by Style or by user
in PopUp screen

- A new mark is created and measured in the field.

Source = **Measured** Point has no plan reference

[The new Survey Number allocated by Landonline when you Create a Survey is added from the
Info Tab when Mark Numbers are allocated]

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|---------|----------|
| 254.2500 | 59.600 | m | 140 | IS | | | | Spike | Non Bdy | Measured |



Additional Line Data

Point number: 140 OK

oID: Cancel

Point mark state: New Check Point

Bearing type: Measured

Adopted bearing source:

Distance type: Measured

Adopted distance source:

Monument: IS DP 393249

Line type: Straight Line

Line Bearing: 254.2500

Line Distance: 59.600 m

Equipment used:

<< Previous Line Next Line >>

Bearing and distance types are set to **Measured** as per setting in Source field

(see PopUp screen at left)

Plan Reference read from Survey Number set in **Info** Tab

Result in LOL:

Mark State = **New**

BT = **M** DT = **M**

Equipment used for observation set by default from Info tab, or individually by Style or by user in PopUp screen

3. An existing mark is calculated; it is on a parcel boundary.

Source = **Calculated**

Point has existing plan reference

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|----------|------------|
| 176.0840 | 23.400 | m | 63 | PEG | | DPS 2467 | | Peg | Boundary | Calculated |



Additional Line Data

Point number: 63 OK

oID: 27976796 Cancel

Point mark state: Old Check Point

Bearing type: Calculated

Adopted bearing source:

Distance type: Calculated

Adopted distance source:

Monument: PEG DPS 2467

Line type: Straight Line

Line Bearing: 176.0840

Line Distance: 23.400 m

Equipment used:

<< Previous Line Next Line >>

Bearing and distance types are set to **Calculated**
as per setting in Source field
(see PopUp screen at left)

Result in LOL:

Mark State = **Old**

BT = **C** DT = **C**

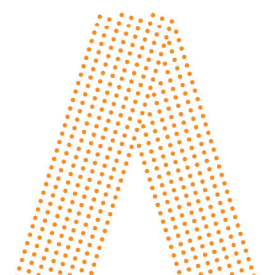
4. A new mark is calculated as the result

of a computation

Source = **Calculated**

Point has no plan reference

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|----------|
| 176.0840 | 24.880 | m | 123 | AD | | | | Disk | Boundary |



Additional Line Data

Point number: 123

olD:

Point mark state: New

Bearing type: Calculated

Adopted bearing source:

Distance type: Calculated

Adopted distance source:

Monument: AD DP 393249

Line type: Straight Line

Line Bearing: 176.0840

Line Distance: 24.880 m

Equipment used:

<< Previous Line Next Line >>

OK
Cancel
Check Point

Bearing and distance types are set to **Calculated** as per setting in Source field (see PopUp screen at left)

Plan Reference read from Survey Number set in **Info** Tab

Result in LOL:

Mark State = **New**

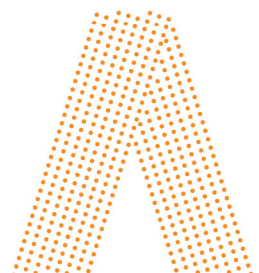
BT = **C** DT = **C**

5. A mark is adopted from existing data

Source = **Adopted**

Point has existing plan reference

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|---------|---------|
| 336.2500 | 122.730 | m | 4 | IS | VIII | DPS 2467 | | Spike | Non Bdy | Adopted |



Additional Line Data

Point number: 4 OK

oID: 1436496 Cancel

Point mark state: Old Check Point

Bearing type: Adopted

Adopted bearing source: DPS 2467

Distance type: Adopted

Adopted distance source: DPS 2467

Monument: IS VIII DPS 2467

Line type: Straight Line

Line Bearing: 336.2500

Line Distance: 122.730 m

Equipment used:

<< Previous Line Next Line >>

Bearing and distance types are set to **Adopted** as per setting in Source field

(see PopUp screen at left)

Adopted Bearing and Distance Source are set to Plan Reference of target point unless available in the record from imported data.

Edit 'source' fields if bearing and distance are adopted from different plans.

Result in LOL:

Mark State = **Adopted**

BT = A DT = A

6.A mark is adopted from existing data.

Bearing = adopted, Distance = calculated

Source = **Adopted**

Point has existing plan reference

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|---------|----------|---|-------|-----------|----------|-----------|------|----------|----------|---------|
| 86.0800 | 17.100 | m | 65 | PEG | | DPS 2467 | | Peg | Boundary | Adopted |

Additional Line Data

Point number: 65 OK

oID: 27976772 Cancel

Point mark state: Adopted Check Point

Bearing type: Adopted

Adopted bearing source: DPS 2467

Distance type: Calculated

Adopted distance source:

Monument: PEG DPS 2467

Line type: Straight Line

Line Bearing: 86.0800

Line Distance: 17.100 m

Equipment used:

<< Previous Line Next Line >>

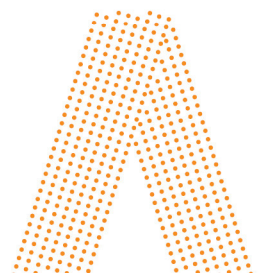
Bearing and distance types are set to **Adopted** as per setting in Source field

Distance type now edited to Calculated in PopUp screen.

Result in LOL:

Mark State = **Adopted**

BT = A DT = C



7. A mark is an old mark. Bearing = adopted, Distance = calculated

Source = **Calculated**

Point has existing plan reference

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|---------|----------|---|-------|-----------|----------|-----------|------|----------|----------|------------|
| 86.0800 | 12.500 | m | 77 | PEG | | DPS 2467 | | Peg | Boundary | Calculated |

Additional Line Data

Point number: 77

oldID: 27976901

Point mark state: Old

Bearing type: Adopted ▼

Adopted bearing source: DPS 2467 ▼

Distance type: Calculated ▼

Adopted distance source: ▼

Monument: PEG DPS 2467

Line type: Straight Line ▼

Line Bearing: 86.0800

Line Distance: 12.500 m

Equipment used: ▼

<< Previous Line Next Line >>

Bearing and distance types are set to **Calculated** as per setting in Source field

Edit the Bearing type to **Adopted** and select the Adopted Bearing Source from pick list in the PopUp screen, if not already set during import.

Distance remains as **Calculated**.

Result in LOL:

Mark State = **Old**

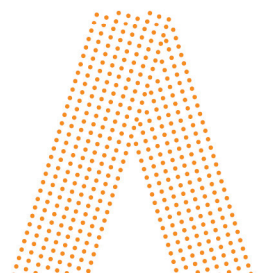
BT = **A** DT = **C**

8. The mark is a new mark. Bearing = adopted, Distance = calculated

Source = **Calculated** Point has no plan reference or has new plan reference

| Bearing | Distance | | Point | Mark Name | Mark No. | Plan Ref. | Type | Monument | Purpose | Source |
|----------|----------|---|-------|-----------|----------|-----------|------|----------|----------|------------|
| 356.0840 | 23.400 | m | 124 | AD | 124 | DP 393249 | | Disk | Boundary | Calculated |

New mark created by segmenting an existing boundary line.



Additional Line Data

| | | |
|--------------------------|------------------|--------------|
| Point number: | 124 | OK |
| oID: | | Cancel |
| Point mark state: | New | Check Point |
| Bearing type: | Adopted | |
| Adopted bearing source: | DPS 2467 | |
| Distance type: | Calculated | |
| Adopted distance source: | | |
| Monument: | AD 124 DP 393249 | |
| Line type: | Straight Line | |
| Line Bearing: | 356.0840 | |
| Line Distance: | 23.400 | m |
| Equipment used: | | |
| << Previous Line | | Next Line >> |

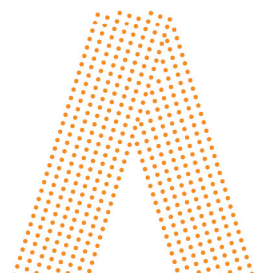
If the line is segmented, the Bearing is set to Adopted and the Distance is set to **Calculated**

Result in LOL:

Mark State = **New**

BT = **A** DT = **C**

You can have modifications based on the above with bearing calculated and distance adopted, or an adopted bearing and distance.



THE ABOVE DETAILS ARE TABULATED HERE:

| MARK STATE | BT | DT | SOURCE | PLAN REF Target Pt | POPUP Bearing | POPUP Distance | ADOPTED Brg Plan | ADOPTED Dist Plan |
|------------|----|----|------------|--------------------------|------------------|-------------------|---|---|
| Old | M | M | Measured | Existing ref. | Measured | Measured | | |
| New | M | M | Measured | No ref. or new ref. used | Measured | Measured | | |
| Old | C | C | Calculated | Existing ref. | Calculated | Calculated | | |
| New | C | C | Calculated | No ref. or new ref. used | Calculated | Calculated | | |
| Adopt | A | A | Adopted | Existing ref. | Adopted | Adopted | Imported from Landonline, or Plan Ref of target pt., or edited by you | Imported from Landonline, or Plan Ref of target pt., or edited by you |
| Adopt | A | C | Adopted | Existing ref. | Adopted | Calculated | Imported from Landonline, or Plan Ref of target pt., or edited by you | |
| Old | A | C | Calculated | Existing ref. | Adopted | Calculated | Imported from Landonline, or Plan Ref of target pt., or edited by you | |
| Old | A | A | Calculated | Existing ref. | Adopted | Adopted | Imported from Landonline, or Plan Ref of target pt., or edited by you | Imported from Landonline, or Plan Ref of target pt., or edited by you |
| New | A | C | Calculated | No ref. or new ref. used | Adopted | Calculated | Imported from Landonline, or Plan Ref of target pt., or edited by you | |
| New | A | A | Calculated | No ref. or new ref. used | Adopted | Adopted | Imported from Landonline, or Plan Ref of target pt., or edited by you | Imported from Landonline, or Plan Ref of target pt., or edited by you |

NOTE: However please remember that settings for the mark are taken from the first occurrence of the mark in the order of the traverse grids in the working sequence.











