12d Model
Civil and Surveying Software

Public Works Guidelines

12D Standards and Procedures

Version 15.0
14 October 2025

12d Model
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Public Works 12d Standards and Procedures Guidelines

V15.0 October 25

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Version number	Description of Revision	Prepared By	Date
0.01	Internal review	TJB	21/07/2025
0.02	Issued for Councils Review	TJB	15/08/2025
1	Issued for use	TJB	14/10/2025

1.0 INTRODUCTION

1.1 Purpose

The intended use of this guideline and its attachments is to provide guidance to operators in the preparation of their 3d modelling and associated exports. This is done by setting common standards like string and model naming conventions.

Whilst applying designs may vary, ensuring these common parameters are followed maintains consistency in the electronic data and documentation. Which in turn allows easier data/project handover between operators, maintains standards of exports, and promotes efficient quality control procedures.

Using the naming standards is mandatory, these conventions do allow flexibility to accommodate single operator areas or multiple operator areas and is identified in this document.

1.2 Objectives

This guideline is to stipulate a standardised system and set out minimum requirement for all data that are submitted in The Public Works Standard's.

- The production of design must be definitive. It must be undertaken in such a way as to ensure that the design concepts for the project can be clearly understood, specified for construction, and satisfactorily built as per the Public Works Standard's.
- The information shown in the Models and Exports must be logically collected on discrete layers. Illogical and onerous grouping of information on the data must be avoided. Drawings Exports must be on A1 size sheets and must be suitable for colour printing to A3 paper size without loss of clarity.
- BIM, ADAC and IFC exports to include the required and or option attribute information per the PW requirements

1.3 Design and Presentation Software

This Public Works guideline is orientated around the 12d Model software, with support to exports on other CAD software as the standard for the delivery of all PW projects from survey through planning, design, tendering, construction, As Constructed and archival activities.

The primary function of design and presentation software, is to support the design development process, including the production of:

- Project drawings, and
- The project electronic model.
- Production of the project electronic model assists in:
- Checking all aspects of the design in a three-dimensional project electronic model
- Visualising the proposal in the community engagement process
- Production of contract drawings, including visualisation
- Production of cross sections at any scale, frequency or skew

- Integration of design variations during construction, and
- Production of As Constructed drawings from the project electronic model.

1.4 References

This guideline must be read in conjunction with the following documents:

- PW Survey Guidelines - Codes
- PW Survey Guidelines – Asset Capture
- AS5488 SUI Standard

Other Standards may include:

- Technical Drawing Standard AS1100.
- ISO19650

1.5 Design requirements

This Public Works Guideline is to provide consistency and uniformity in its approach to the supply of Design data and exports.

Of paramount importance is the high quality of the exports for each facet of design for construction projects. This can only be undertaken by a systematic approach to and standardisation of the preparation of construction exports for each project.

This manual should contain enough scope for users to commence design to achieve the desired result. This reference guide assumes that the person reading this has basic knowledge of how to use 12D Model, and CAD.

2.0 12D MODEL STARTUP

2.1 General 12d Model Project Startup

12d Model projects should be run from a location on a Network or in a CDE (common data environment). They should be saved and closed, and if using a CDE, checked in at the end of the workday at a minimum. This ensures the projects are backed up and allows model and tin data to be shared between multiple operators.

A design type or area is to be run in its own project, that is, one project per working folder. This allows defined separation of the data files and allows easy sharing between operators.

Survey and other external data are also to be setup in separate projects. This promotes this data as read only but still allows seamless updates to be shared between all operators.

In the projects:

- Fill in the project details as required
- Use the Project Description panel to record specific information about the project. This will also ensure smooth handovers between operators if required and keeps vital information with the project. Types of information that can be recorded here, are:
    - What standards are used
    - Variations to Standards
    - Variations to standard naming conventions
    - Map grid information
    - Survey updates, from and why, etc.

2.2 Support Files

The Public Works Standard 12d Model files is the standard Setup and Library files that are shipped and installed with the 12d Model software. These files have been developed in conjunction with the local government authorities to be a common standard.

Any changes to these files for your company specific additions or modifications should be placed into a specified **User** and **User_Lib** folder that will then override the installed files. These User and User_Lib folders can be specified either via an **env.4d** file (environment file) or by using a start up **env_configs.4d** file (Configuration file). A **User** and **User_Lib** folder may be kept in a company Library location or in the project for specific project modifications and or for easier archiving purposes.

Note: If using company overriding setup files, these should be checked against the installed files for updates, when the 12d Model software is updated also.

To define a User and or User_lib path in the env.4d or env_configs.4d file they are defined with the variables:

User	-> **USER_4d**	-> Define by path, Fixed or relative.
User_lib	-> **USER_LIB_4d**	-> Define by path, Fixed or relative.

Installed Locations

Setup files are looked for when 12d Model fires up. They define many of its features.

For standard Setup files shipped with 12d Model, they are located in:

C:\Program Files\12d\12dmodel\15.00\set_ups

The only exceptions to copying and changing these files are the **fonts.4d**, **linestyl.4d**, **plotters.4d**, **plotsymb.4d**, **symbol.4d**, **survey.4d**, **textstyl.4d**, **texture.4d** and **toolbars.4d** files. To add your own to these files you can use a silent include file. By creating your own file with a prefix "**user_**" to the above files, 12d Model will automatically include them with the shipped items.

e.g. By putting your own line styles in a file called "**user_linestyl.4d**", placed in the user folder, 12d Model will add them to the shipped line styles.

Library files, unlike Setup files which are only access when a project is opened, can be accessed or updated and read again during the use of the 12d Model project. These typically include items like map files or plotting files.

For standard Library files shipped with 12d Model, they are located in:

C:\Program Files\12d\12dmodel\15.00\library

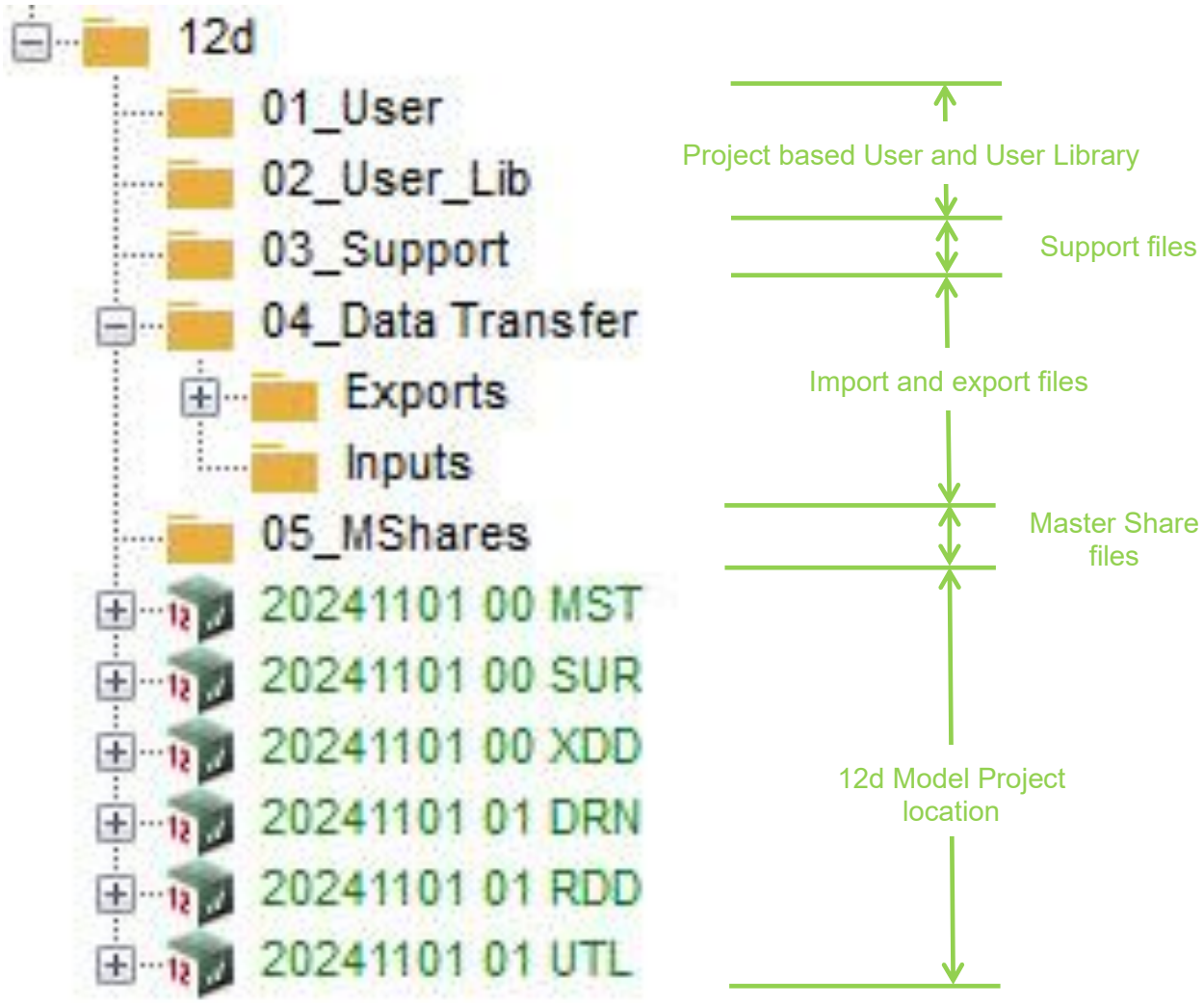
For corrections, suggestions or more information on the standards setup files shipped with 12d Model, please go to the 12d Model Forum:

https://forums.12dmodel.com/viewforum.php?f=49&sid=6ebd0e21a4c70389cd09bf18cb748eb9

2.3 Folder Structure

The following is a suggested folder structure for the 12d Model area of a Job, and its potential contents.

The following are examples of typical folder layouts.



User and User Library Folders – If project base User and User Library folders are not required these will be located in the company Library. These contain the Setup and Library files for 12d Model. For any setup file not found it will use the shipped file as a default.

Support Folder – Contains Standards and other general reference material for the 12d Model projects. Examples:

- Current Design Standards and Typical drawings, e.g. Austroads
- Deliverable Spreadsheets
- Calculation spreadsheets
- Verification spreadsheets
- Title block spreadsheet/CSV file

Import and Export Folders – Exports, temporary holding area for 12d Export files

- 12da
- IFC
- Reports
- PDFs

Files can then be moved from this area to final processing or reference locations.

For Import files, provides a standard read in area for the data incoming from external parties for the 12d Model Projects. Can be used for Chains, etc.

Master Share folder – Standard location for writing and reference Master Share files.

12d Model Projects – Standard location for saving to. See **Project Naming** for naming convention.

2.4 Project Naming

12d project names are constructed by two mandatory and two optional fields.

1. **Job/Project Number**
   - Company defined
   - Generally Numeric characters but can contain Alpha characters
2. **Area / Zone or Stage code**
   - Up to 4 Numeric or Alpha characters
   - Used to define geographic boundaries. E.g. Zone 01, 02 or 1000, 2000. Or Area A, B, etc.
   - Codes are passed through to Models and Reference strings. E.g. Apply/Strings/RS**01**A01, tin/Design/**1000**.
3. **Discipline Code Descriptor**
   - Three Alpha characters
   - Identifies type of project
   - Even on small projects data should be managed in individual projects, shouldn't be bundled into one project. You never know when are secondary Designer might be required to assist.
4. **Description**
   - Should only be used where required for clarification. E.g. identifying design options.
   - Character limit should be enforced. E.g. maximum 15 Characters.
   - For Survey Field pickup and Setout projects, description is the Surveyors name/Initials.

Discipline Codes List

CAD = Drafting Project (Can also be used for plotting)
CIV = Civil Design
DRN = Drainage Design
EWD = Earthworks Design
GIS = GIS Data
GTD = Geotechnical Data
MST = Master Project (Used for Sharing everything into)
RDD = Road Design
SUR = Survey Data
SFP = Survey Field Pickup Data
SET = Survey Setout Data
TRD = Track design (Rail)
UTL = Utilities / Services Design
XDD = External Design Data (Design data received from external companies, etc)
XTR = External References (CAD Xrefs read in)

Example Project naming

12345678 01 RDD HIGHWAY	- Design highway project area/zone 1
12345678 01 RDD LOCAL ROADS	- Design local roads project area/zone 1
12345678 01 CIV	- Small project example, Footpath upgrade
12345678 01 DRN DRIANAGE	- Stormwater design project area/zone 1
12345678 01 DRN SEWER	- Sewer design project area/zone 1
12345678 01 UTL WATER	- Proposed water network project area/zone 1
12345678 01 UTL LIGHTING	- Proposed lighting project area/zone 1
12345678 01 XDD LIGHTING	- Lighting project from an external consultant
12345678 00 MST	- Final project data, shared in from working projects
12345678 00 GIS	- Project wide GIS information
12345678 00 SUR FEATURES	- Final project wide survey data.
12345678 00 SUR LIDAR	- Project wide lidar data
12345678 01 SFP JOE BLOGGS	- Individual survey fields pickup in area/zone 1
12345678 00 MST FIELD PICKUP	- Project wide shared in field pickup data

2.5 Standard Views

The standard for naming views is to name **permanent** views, and leave **temporary** views as a number. **Warning**, temporary views can be deleted at any time. A permanent view is generally organised by the model information turned on inside it.

12d Model starts up with the standard views:

SURVEY	Plan survey data
DESIGN	Plan design data (Usually Apply Models)
LS	Long Section
XS	Cross section
3D	Standard Perspective OpenGL View
1	Unnamed plan view (*Rename it to make it a permanent view*)

These views are created on start-up via the setup file **setups.4d**

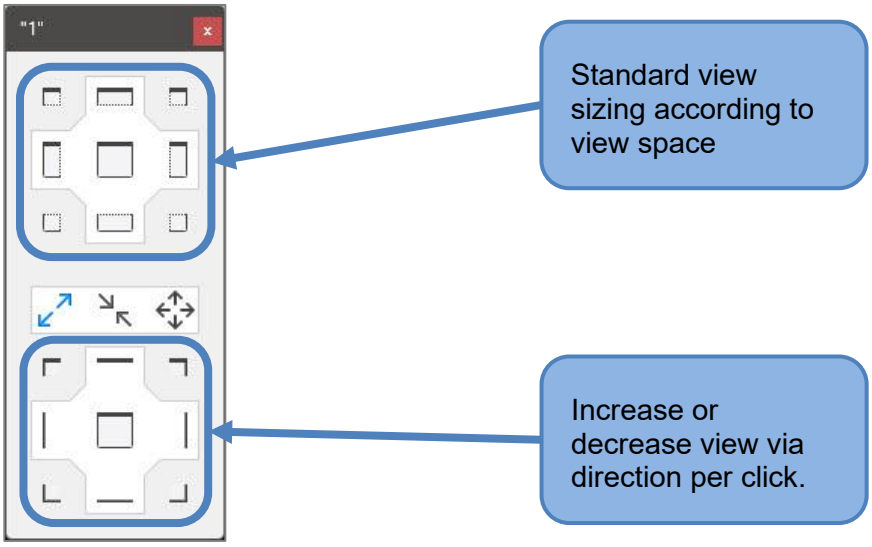
The Operator can then create other or remove required views from that point. These might include, but not limited to:

ALIGNMENTS	Plan view for Reference Strings
FINAL DESIGN	Plan view for combined, cleaned design strings
PLOT	Plan view for plot preview prior to exporting

View Control

12d Model Views come with a standard View Control. This enables easy re-sizing for the views.

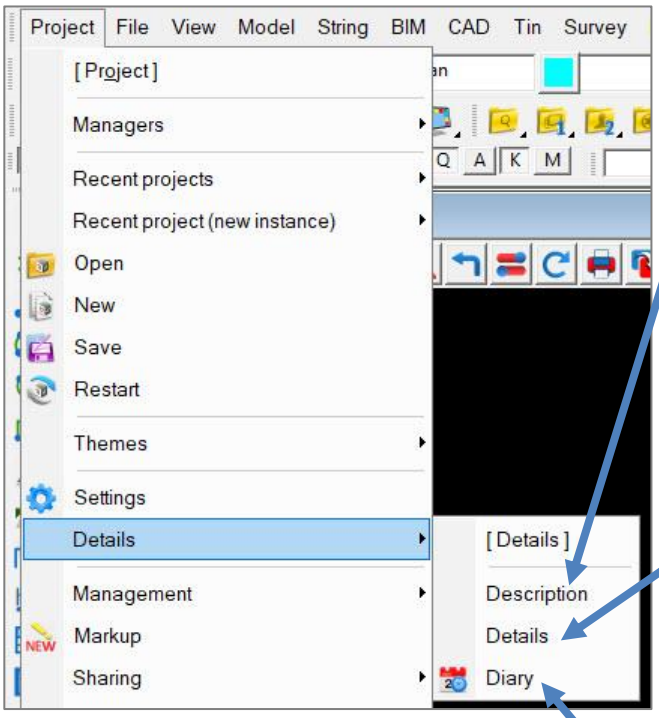
Each view has it as the most right view button 



3.0 PROJECT DOCUMENTATION

For Audit trial items such as Information sources, Design requirements, record of amendments and milestone events in the project's history, it is essential that 12d Model projects be well documented.

12d Model provides several tools to assist with these. Depending on the type of information to be documented, **Project => Details**



Project Description

General information on the project. Relevant standards used. Documentation of variants of standard conventions and general notes or information sources relevant to the project.

Project Details

List information regarding Titles, project creation date, Designer's name, etc.

Project Diary

Records events such as Design changes or project milestones.

You can also view the Description and Details panels here.

Note: Project Diary maybe replaced by a CDE e.g. 12d Synergy, which has built in revision history.

3.1 Project Details

The Project Details is launched automatically when a new project is created.

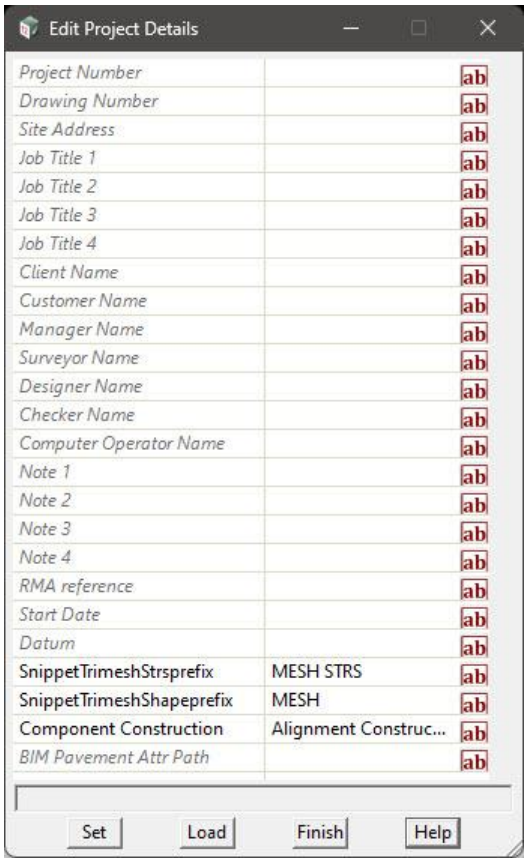
The default for this file is located at,

C:\Program Files\12d\12dmodel\15.00\set_ups\project_details.dtl

It can be modified to suit Company requirements, However, Although the field names may change, certain fields are mandatory:

- Project Number
- Job Title 1
- Designer Name
- Start Date

Other fields such as Job Title 2,3 & 4 maybe be required if zones or other descriptions are necessary.



This information is essential for creation details, however it can also be referred to in title blocks.

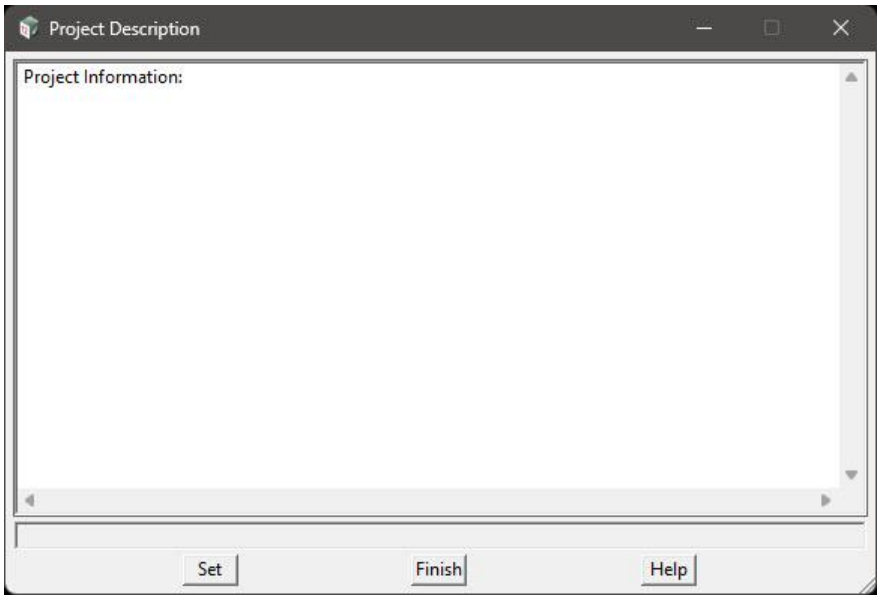
Do Not close the panel without filling out the required information. **<Set>** to save changes.

3.2 Project Description

The text inside the Project Description Panel is saved in the **project.txt** file saved in the "**.project**" folder.

This is important to supplement the Project Details Panel, containing additional information on data to the project, design notes, Standards used and any nonstandard changes.

It is critical to maintain this information as it is important to the audit trail and handover between Designers if required.



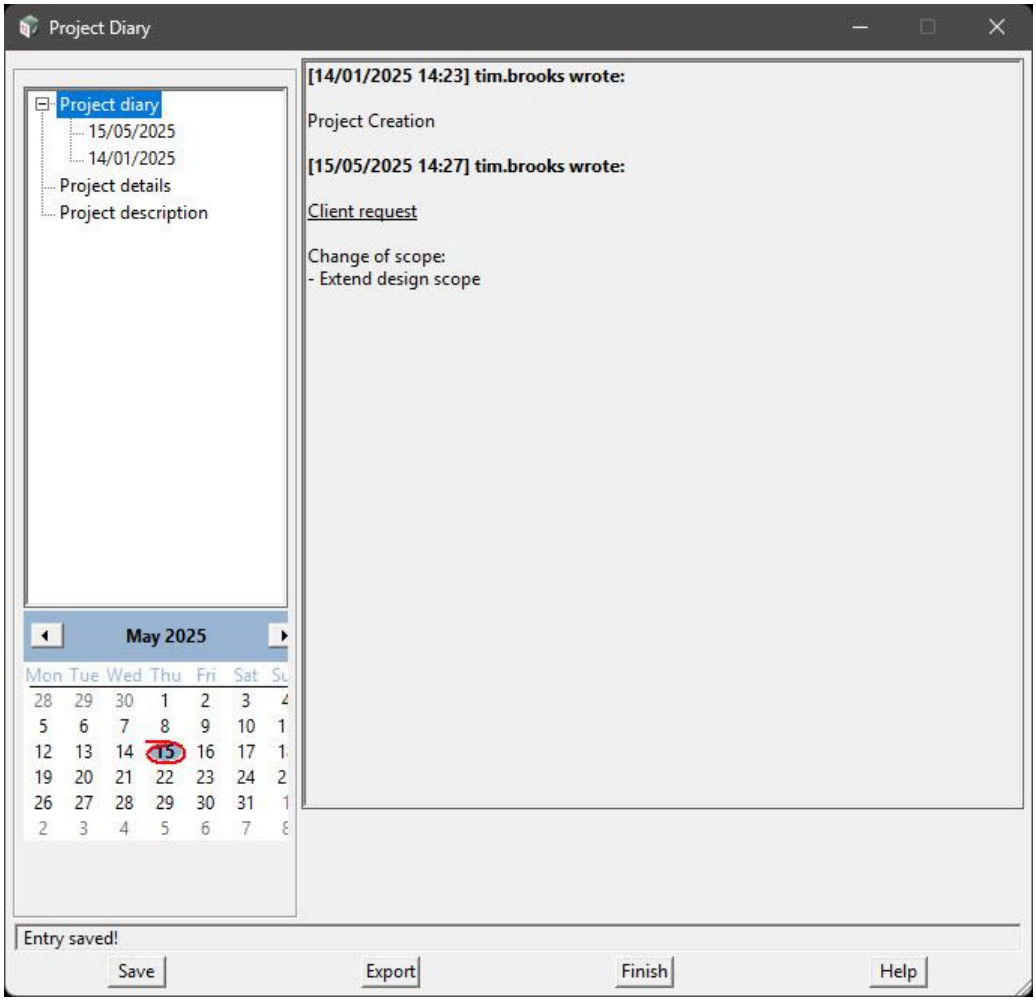
Example notes:

1. Design or Survey notes
    - Area/Zone notes
    - Standards Used
    - Information on important design changes
    - Survey information – Source, Updates, Grid.
2. Model Naming
    - Non Standard naming
3. String Naming
    - Extra or nonstandard inclusions
    - Temporary strings notes
4. Snippet or Template Notes
5. MTF or Apply functions Information
6. Mapping files
7. Design Options

3.3 Project Diary

The Project Diary is used to log Milestone events or changes to the project.

Note: Not required is using a Common Data Environment (CDE) like 12d Synergy as these items can be recorded as part of the Check In details.



Events recorded could include:

- Milestone Events
- Import changes, Import for retrieval revision progress or backup data
- Data received or updated by external parties
- Handover to another Designer.

4.0 STRING NAMING

The default string naming convention is shipped with 12d Model in the **names.4d** file. This also includes the default Model naming convention.

Additions to the naming convention must be documented in the **Project Description**. Requests to add them permanently to the shipped standards can be done via 12d Model forum:

https://forums.12dmodel.com/viewforum.php?f=49&sid=6ebd0e21a4c70389cd09bf18cb748eb9

No exceptions to the standard naming convention are excepted. Using this standard is essential in effective electronic design and allows the use of mapping files to regulate data exports, e.g. to CAD.

4.1 Civil Design Sting Naming

The string naming convention is split into the following categories:

Design

- Reference / Alignment Strings
- Feature Strings
- Contour Strings
- CAD Strings

Survey

- Feature Strings
- Contour Strings

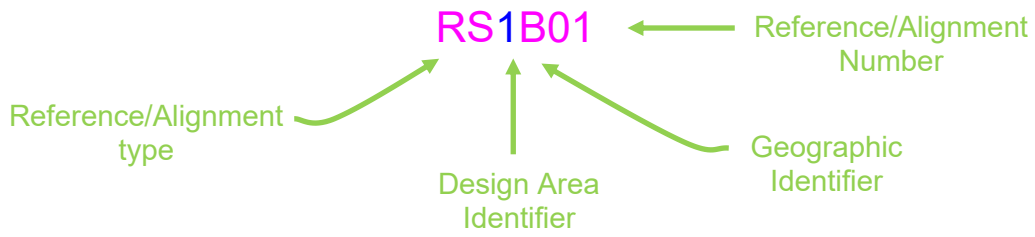
4.2 Design Strings

Reference / Alignment Strings

Reference strings have **Mandatory** fields and an **Optional** field.

Notes: Only Super Alignments to be used.

Reference strings are not to be duplicated in a project.

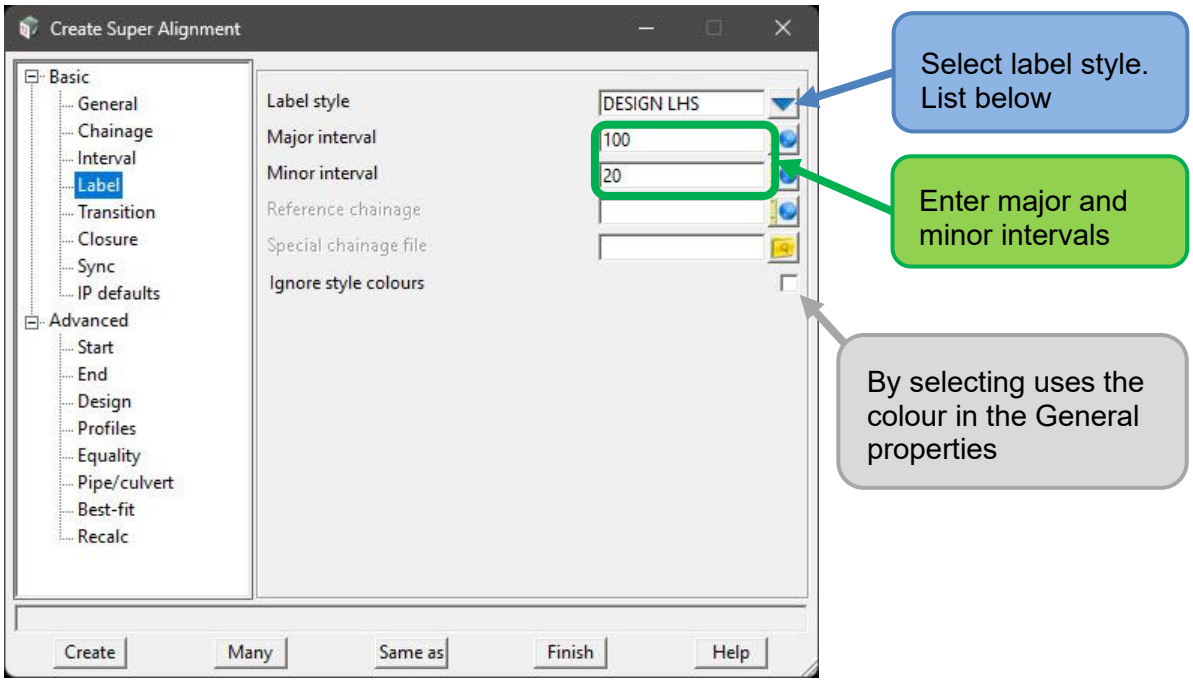


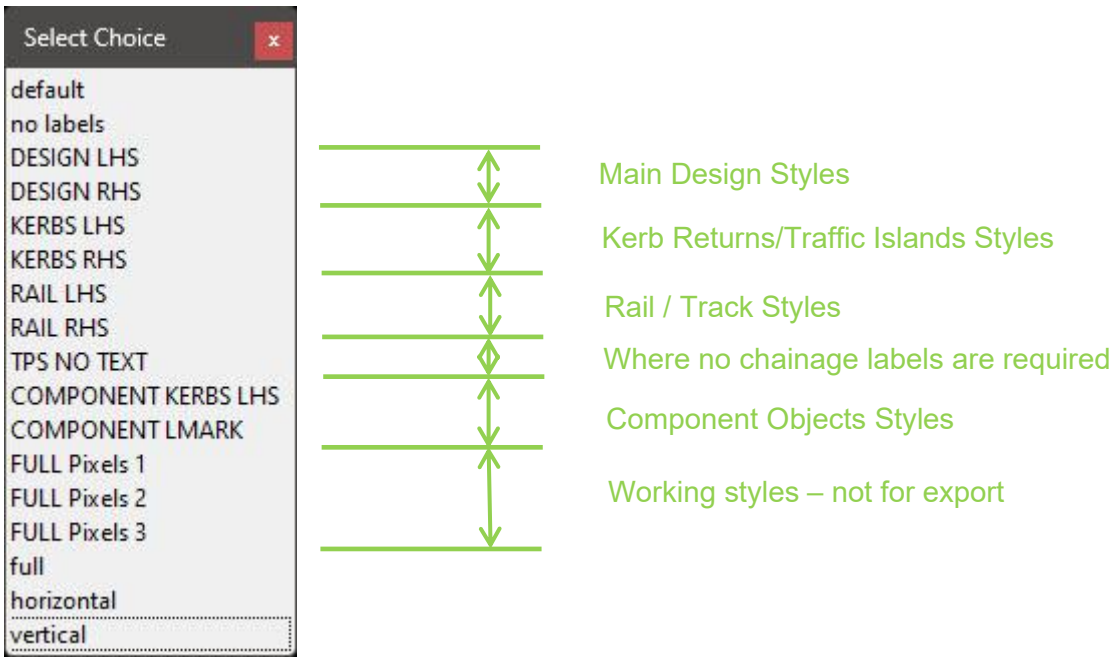
5. **Type** – The prefix to a Reference/Alignment string will depend on selection from the **names => Alignment** group to define the type of alignment line. Always starts with "**RS**".
    - **RS** - Reference/Alignment String, main alignments
    - **RSC** – Reference String Construction aid
    - **RSK** - Reference Kerb alignment
    - **RSP** - Reference Pathway String
    - **RST** - Reference Traffic Island String
    - **RSW** - Reference Retaining Wall String
    - **RSDRIVE** – Reference Drive String
    - **RSD** - Reference Drainage String
    - **RSV** - Reference Vehicle path String
    - **MS** - Modifier String
    - **HS** - Hinge String

    For any other type use prefix "**RS**" followed by another third character that represents the Reference String. If this occurs document in the **Project Description Panel**.
6. **Area ID** – For Complex or multiple Area/Zone Projects this Optional field enables unique naming. For single area jobs this is not required. Will either be a single numeric or alpha character to create a unique name.
7. **Geographic ID** – This field indicates where the Reference/Alignment string is located.
8. **Number** – The last two characters of the string name are a unique identifier for alignments using the same Geographic ID.

Assigning Styles to Reference / Alignment Strings

In the Super Alignment properties Reference strings Must be assigned a style which controls the automatic chainage labels, start, end and tangent point symbols. These styles are controlled by the 12d Model setup file **astyles.4d**.





Design Feature Strings

Design feature string names consist of a minimum of two fields. However, extra fields can be added for descriptive reasons.

- The prefix characters come directly from the naming convention in the names.4d file and define the feature type. See **Design Feature List**.

  Example "**KL**" is Lip of Kerb.

- An option next field can be added for descriptive or unique naming purposes if multiple same string types are required. This is what the "*" denotes in the feature list.

  Example **KLB1** or **EC1 & EC2**. Where "**B1**" define type of kerb if not using attributes and "**1**" & "**2**" represent multiple edge of carriageways.

- The last field is for any string created via a Template or Template Snippet. This is a single "**L**" or "**R**" that defines whether the string is to the left or right of the Reference String. If using Templates defined left hand and right hand Templates should be created with the L and R suffix on the strings, not applied in the Apply MTF function.

  Example **KLL** and **KLR**, lip of Kerb Left and Lip of Kerb Right.

Example string name created from a Apply function would be **KLL** but could also be **KLB1L**.

KLL is Lip of Kerb Left

KLB1L is Lip of Kerb, type B1 on the Left side.

For anything different, missing/alternate feature name, second field descriptors, it should be documented in the **Project Description Panel**.

Design Feature List

NAME	BASE MODEL NAME	FEATURE
BDYST*	Design/Boundary/SURFACE TYPE	[BDYST] Surface Treatment Boundary
RP RES	Cadastral/Proposed/BOUNDARY	[RP RES] Resumption Boundary
RP EMT	Cadastral/Proposed/BOUNDARY	[RP EMT] Resumption Easement Boundary
BRA*	Design/BRIDGE	[BRA] Bridge Abutment
BRC*	Design/BRIDGE	[BRC] Bridge Column
BRD*	Design/BRIDGE	[BRD] Bridge Deck
BRHT*	Design/BRIDGE	[BRHT] Bridge Headstock Top
BRHB*	Design/BRIDGE	[BRHB] Bridge Headstock Bottom
BRRS*	Design/BRIDGE	[BRRS] Bridge Expansion Joint
BRS*	Design/BRIDGE	[BRS] Bridge Soffit
BEA*	Design/BUILDING	[BEA] building Eaves
BPD*	Design/BUILDING	[BPD] Building Pad
BWL*	Design/BUILDING	[BWL] Building Wall
BSD*	Design/BUILDING	[BSD] Building shed - Bus Shelter
BB*	Design/EARTHWORKS	[BB] Bottom of Bank
BNI*	Design/EARTHWORKS	[BNI] Benching Inside
BNO*	Design/EARTHWORKS	[BNO] Benching Outside
DB*	Design/EARTHWORKS	[DB] Open Drain Back
DF*	Design/EARTHWORKS	[DF] Open Drain Front
DI*	Design/EARTHWORKS	[DI] Open Drain Invert
EBM*	Design/EARTHWORKS	[EBM] Edge of Berm
INT*	Design/EARTHWORKS	[INT] Interface
FCW*	Design/Furniture/FENCE	[FCW] Chainwire Fence
FN*	Design/Furniture/FENCE	[FN] Fence
FWM*	Design/Furniture/FENCE	[FWM] Weldmesh Fence
HR*	Design/Furniture/FENCE	[HR] Handrail
BCB*	Design/Furniture/BARRIER	[BCB] Concrete Barrier
BLD*	Design/Furniture/FENCE	[BLD] Bollard
BNB*	Design/Furniture/BARRIER	[BNB] Noise barrier
BTB*	Design/Furniture/BARRIER	[BTB] Thrie Beam barrier
BT*	Design/EARTHWORKS	[BT] Top of Bank
BWB*	Design/Furniture/BARRIER	[BWB] W Beam barrier
BWR*	Design/Furniture/BARRIER	[BWR] Wire Rope Barrier
HMP*	Design/Furniture/ROAD	[HMP] Hazard marker post
RGS*	Design/Furniture/ROAD	[RGS] Sign
WMP*	Design/Furniture/ROAD	[WMP] Width marker post
WLSTP1*	Design/Furniture/ROAD	[WLSTP1] Wheelstop 1.4m
WLSTP2*	Design/Furniture/ROAD	[WLSTP2] Wheelstop 2.0m
DWY*	Design/DRIVEWAYS	[DWY] Driveway Crossing
PR*	Design/RAMPS	[PR] Pram Ramp Crossing
L1*	Design/Line Marking/LINES	[L1] Lane Lane 3x9
CHEV*	Design/Line Marking/LINES	[CHEV] Chevron
LCY*	Design/Line Marking/LINES	[LCY] Cycle Line

LC*	Design/Line Marking/LINES	[LC] Continuity Lines 1x3
LB*	Design/Line Marking/LINES	[LB] Bus Line
LE*	Design/Line Marking/LINES	[LE] Edge Line
LNP*	Design/Line Marking/LINES	[LNP] No Parking Line 1
LN*	Design/Line Marking/LINES	[LN] Continuous Lines
LGW*	Design/Line Marking/LINES	[LGW] Give Way Line 300 Wide
LHD*	Design/Line Marking/LINES	[LHD] Holding Line 200 Wide
LHM*	Design/Line Marking/LINES	[LHM] Hump Marking
LD*	Design/Line Marking/LINES	[LD] Double Barrier Line
LL*	Design/Line Marking/LINES	[LL] Barrier Line Broken Left
LR*	Design/Line Marking/LINES	[LR] Barrier Line Broken Right
LML*	Design/Line Marking/LINES	[LML] Median Line
LPL	Design/Line Marking/LINES	[LPL] Parking Bays LHS
LPR	Design/Line Marking/LINES	[LPR] Parking Bays RHS
LPS*	Design/Line Marking/LINES	[LPS] Pedestrian Crossing Line - Signals
LSP*	Design/Line Marking/LINES	[LSP] Stop Line 300 Wide
LS*	Design/Line Marking/LINES	[LS] Separation - Centre Line
LT*	Design/Line Marking/LINES	[LT] Turning Line
LZ*	Design/Line Marking/LINES	[LZ] Pedestrian Crossing
LPB*	Design/Line Marking/PAVE	[LPB] Bus Lane Surface Treatment
LPCH*	Design/Line Marking/PAVE	[LPCH] Cycle Lane Pattern Surface Treatment
LPC*	Design/Line Marking/PAVE	[LPC] Cycle Lane Surface Treatment
LPO*	Design/Line Marking/PAVE	[LPO] Other Surface Treatment
LPTS*	Design/Line Marking/PAVE	[LPTS] Special Surface Treatment
ARROWL*	Design/Line Marking/SYMBOLS	[ARROWL] Left Arrow
ARROWR*	Design/Line Marking/SYMBOLS	[ARROWR] Right Arrow
ARROWSRL*	Design/Line Marking/SYMBOLS	[ARROWSRL] Straight Right Left Arrow
ARROWSL*	Design/Line Marking/SYMBOLS	[ARROWSL] Straight Left Arrow
ARROWSR*	Design/Line Marking/SYMBOLS	[ARROWSR] Straight Right Arrow
ARROWUT*	Design/Line Marking/SYMBOLS	[ARROWUT] U-Turn Arrow
ARROW*	Design/Line Marking/SYMBOLS	[ARROW] Straight Arrow
BIKE*	Design/Line Marking/SYMBOLS	[BIKE] Bicycle Symbol
DPB*	Design/Line Marking/SYMBOLS	[DPB] Disabled Parking Bay Symbol
FHMK*	Design/Line Marking/SYMBOLS	[FHMK] Fire Hydrant Mark
FHTMK*	Design/Line Marking/SYMBOLS	[FHTMK] Fire Hydrant Triangle Mark
PED*	Design/Line Marking/SYMBOLS	[PED] Pedestrian Symbol
VLMK*	Design/Line Marking/SYMBOLS	[VLMK] Sluice Valve Mark
VLTMK*	Design/Line Marking/SYMBOLS	[VLTMK] Sluice Valve Triangle Mark
BAB*	Design/RAIL	[BAB] Bottom of Ballast
BAT*	Design/RAIL	[BAT] Top of Ballast
REF*	Design/RAIL	[REF] Edge of Formation
RLR*	Design/RAIL	[RL] Light Rail Lines (The Rail)
RR*	Design/RAIL	[RT] Rail Lines (The Rail)
CG*	Design/ROADS	[CG] Change of Grade
CR*	Design/ROADS	[CR] Crown of Road

EB*	Design/ROADS	[EB] Edge of Bitumen
EC*	Design/ROADS	[EC] Edge of Carriageway - Lane
EG*	Design/ROADS	[EG] Edge of Gravel
ES*	Design/ROADS	[ES] Edge of Shoulder
ET*	Design/ROADS	[ET] Edge of Track - Unsealed
EV*	Design/ROADS	[EV] Edge of Verge
EX*	Design/ROADS	[EX] Edge of Footway
FB*	Design/ROADS	[FB] Back of Footpath
FP*	Design/ROADS	[FP] Front of Footpath
KBM*	Design/ROADS	[KBM] Back of Median Kerb
KBN*	Design/ROADS	[KBN] Back of Nib Kerb
KB*	Design/ROADS	[KB] Back of Kerb
KFM*	Design/ROADS	[KFM] Face of Median Kerb
KF*	Design/ROADS	[KF] Face of Kerb
KI*	Design/ROADS	[KI] Invert of Kerb
KLM*	Design/ROADS	[KLM] Lip of Median Kerb
KL*	Design/ROADS	[KL] Lip of Kerb
KTM*	Design/ROADS	[KTM] Top of Median Kerb
KT*	Design/ROADS	[KT] Top of Kerb
SC*	Design/ROADS	[SC] Sawcut Line
VCE*	Design/ROADS	[VCE] Edge of Vee Channel
VCI*	Design/ROADS	[VCI] Invert of Vee Channel
SG*	Design/SUBGRADE	[SG] Subgrade
CWB*	Design/WALLS	[CWB] Bottom of Concrete Retaining Wall
CWT*	Design/WALLS	[CWT] Top of Concrete Retaining Wall
GWB*	Design/WALLS	[GWB] Bottom of Wall Gabion
GWT*	Design/WALLS	[GWT] Top of Wall Gabion
TWB*	Design/WALLS	[TWB] Bottom of Wall Timber Pole
TWT*	Design/WALLS	[TWT] Top of Wall Timber Pole
RWB*	Design/WALLS	[RWB] Bottom of Retaining Wall
RWT*	Design/WALLS	[RWT] Top of Retaining Wall
S CN*	Sewer/CONCEPT DESIGN	[S CN] Sewer Concept Design
S DS*	Sewer/DESIGN	[S DS] Sewer Design
S TBA*	Sewer/ABANDONED	[S TBA] Sewer plant to be Abandoned
S MH*	Sewer/MAINTENANCE HOLE	[S MH] Sewer Maintenance Hole - Access Chamber
S REM*	Sewer/REMOVED	[S REM] Sewer plant to be Removed
S PMA*	Sewer/PRESSURE MAIN	[S PMA] Sewer Pressure Main Design
S PMC*	Sewer/PRESSURE MAIN CONCEPT	[S PMC] Sewer Pressure Main Concept Design
S PM*	Sewer/PRESSURE MAIN	[S PM] Sewer Pressure Main
S VP*	Sewer/VENT POLE	[S VP] Sewer Vent Pole
S V*	Sewer/PRESSURE VALVE	[S V] Sewer Pressure Valve
SW MH*	Storm/MAINTENANCE HOLE	[SW MH] Stormwater Maintenance Hole - Access Chamber
SW PIT*	Storm/PIT	[SW PIT] Stormwater Pit
SW HA*	Storm/HEADWALL APRON	[SW HA] Stormwater Headwall Apron
SW HB*	Storm/HEADWALL BOTTOM	[SW HB] Stormwater Headwall Bottom

SW HT*	Storm/HEADWALL TOP	[SW HT] Stormwater Headwall Top
SW TRNT*	Storm/TRENCH TOP	[SW TRNT] Stormwater Trench Top
SW TRNB*	Storm/TRENCH BOTTOM	[SW TRNB] Stormwater Trench Bot
SW SD*	Storm/SUBSOIL DRAIN	[SW SD] Subsoil - Side Drain
SW CL*	Storm/Catchment/LABELS	[SW CL] Stormwater Catchment Labels
SW C3*	Storm/Catchment/POLYGONS SET 3	[SW C3] Stormwater Catchment Polygons Set 3
SW C2*	Storm/Catchment/POLYGONS SET 2	[SW C2] Stormwater Catchment Polygons Set 2
SW C1*	Storm/Catchment/POLYGONS SET 1	[SW C1] Stormwater Catchment Polygons Set 1
SW TCP3*	Storm/TC/STRINGS PERVIOUS SET 3	[SW TCP3] TC Strings Pervious Set 3
SW TCP2*	Storm/TC/STRINGS PERVIOUS SET 2	[SW TCP2] TC Strings Pervious Set 2
SW TCP*	Storm/TC/STRINGS PERVIOUS	[SW TCP] TC Strings Pervious
SW TCI3*	Storm/TC/STRINGS IMPERVIOUS SET 3	[SW TCI3] TC Strings Impervious Set 3
SW TCI2*	Storm/TC/STRINGS IMPERVIOUS SET 2	[SW TCI2] TC Strings Impervious Set 2
SW TCI*	Storm/TC/STRINGS IMPERVIOUS	[SW TCI] TC Strings Impervious
SW BP*	Storm/BYPASS FLOW	[SW BY] Stormwater Overland - Bypass Flow Strings
SW*	Storm/PIPE	[SW] Stormwater Strings - Pipe
2DBC UNIQUE NAME	2D/BC	[2DBC UNIQUE NAME] 2d Boundary Condition
2DSA UNIQUE NAME	2D/SA	[2DSA UNIQUE NAME] 2d SA Boundary
2DCODE	2D/CODE	[2DCA] 2d Active Cell Area
2DGE	2D/LOC	[2DGE] 2d Grid Extents Location
2DIWL	2D/IWL	[2DIWL] 2d Initial Water Levels
2DMAT	2D/MAT	[2DMAT] 2d Material Area
2DPO UNIQUE NAME	2D/PO	[2DPO UNIQUE NAME] 2d Plot Output Location
2DQNL	2D/QNL	[2DQNL] 2d Quadtree Level
2DRF UNIQUE NAME	2D/SA RF	[2DRF UNIQUE NAME] 2d Rainfall
2DSOIL	2D/SOIL	[2DSOIL] 2d Soil Type
2DVZSH	2D/VZSH	[2DVZSH] 2d Variable Z Shape String
2DGULLY	2D/ZSH GULLY	[2DGULLY] 2d Z Shape Gulley String
2DRIDGE	2D/ZSH RIDGE	[2DRIDGE] 2d Z Shape Ridge String
2DZSH	2D/ZSH	[2DSA UNIQUE NAME] 2d Z Shape String
T CCTV*	Utilities/Communications/CC TV	[T CCTV] Closed Circuit TV
T CN*	Utilities/Communications/CONCEPT DESIGN	[T CN] Communications Concept Design
T DS*	Utilities/Communications/DESIGN	[T DS] Communications Design
T OF*	Utilities/Communications/OPTIC FIBRE	[T OF] Optic Fibre Line
T REM*	Utilities/Communications/REMOVED	[T REM] Communications Plant to be Removed
T TBA*	Utilities/Communications/ABANDONED	[T TBA] Communications Plant to be Abandoned
E CN*	Utilities/Electricity/CONCEPT DESIGN	[E CN] Electricity Concept Design
E DUCT*	Utilities/Electricity/POWER DUCT	[E DUCT] Electricity Power Duct
E DS*	Utilities/Electricity/DESIGN	[E DS] Electricity Design
E LP*	Utilities/Electricity/LIGHT POLE	[E LP] Light Pole
E LOC*	Utilities/Electricity/UNDERGROUND LINE	[E LOC] Electricity Line - Underground
E OH*	Utilities/Electricity/OVERHEAD LINE	[E OH] Electricity Line - Overhead
E PIT*	Utilities/Electricity/PIT	[E PIT] Electricity Pit
E PP*	Utilities/Electricity/POWER POLE	[E PP] Power Pole

E REM*	Utilities/Electricity/REMOVED	[E REM] Electricity Plant to be Removed
E TBA*	Utilities/Electricity/ABANDONED	[E TBA] Electricity Plant to be Abandoned
G CN*	Utilities/Gas/CONCEPT DESIGN	[G CN] Gas Concept Design
G DS*	Utilities/Gas/DESIGN	[G DS] Gas Design
G REM*	Utilities/Gas/REMOVED	[G REM] Gas Plant to be Removed
G TBA*	Utilities/Gas/ABANDONED	[G TBA] Gas to be Abandoned
P CN*	Utilities/Petroleum/CONCEPT DESIGN	[P CN] Petroleum Concept Design
P DS*	Utilities/Petroleum/DESIGN	[P DS] Petroleum Design
P REM*	Utilities/Petroleum/REMOVED	[P REM] Petroleum Plant to be Removed
P TBA*	Utilities/Petroleum/ABANDONED	[P TBA] Petroleum to be Abandoned
R CN*	Utilities/Recycled Water/CONCEPT DESIGN	[R CN] Recycled Water Concept Design
R DS*	Utilities/Recycled Water/DESIGN	[R DS] Recycled Water Design
R REM*	Utilities/Recycled Water/REMOVED	[R REM] Recycled Water to be Removed
R TBA*	Utilities/Recycled Water/ABANDONED	[R TBA] Recycled Water to be Abandoned
TS CN*	Utilities/Traffic/CONCEPT DESIGN	[TS CN] Traffic Signals Concept Design
TS DS*	Utilities/Traffic/DESIGN	[TS DS] Traffic Signals Design
TS REM*	Utilities/Traffic/REMOVED	[TS REM] Traffic Signals Plant to be Removed
TS TBA*	Utilities/Traffic/ABANDONED	[TS TBA] Traffic Signals Plant to be Abandoned
W CN*	Utilities/Water/PIPES	[W CN] Water Concept Design
W CON*	Utilities/Water/PIPES	[W CON] Water Lot Connection
W DS*	Utilities/Water/PIPES	[W DS] Water Design
W FH*	Utilities/Water/VALVES	[W FH] Water Fire Hydrant
W TBA*	Utilities/Water/ABANDONED	[W TBA] Water Plant to be Abandoned
W REM*	Utilities/Water/REMOVED	[W REM] Water Plant to be Removed
W VL*	Utilities/Water/VALVES	[W VL] Water Sluice Valve

Base Model names do not apply if created via the Apply MTF Function

Contour Strings

Design contours create in 12d Model via the **Tin => Contour => Contour, Smooth and Label** function.

NAME	BASE MODEL NAME	FEATURE
CNT MAJOR*	Contours/Proposed/MAJOR	[CNT MAJOR] Contour Major
CNT MINOR*	Contours/Proposed/MINOR	[CNT MINOR] Contour Minor
CNT LABEL*	Contours/Proposed/MAJOR	[CNT LABEL] Contour Labels
CNTLL	Contours/LABEL LINES	[CNTLL] Contour Label Lines

CAD Strings

Although not limited to, for features created in 12d Model not normally created from a Apply MTF function, e.g. CAD items. Base models included.

Any extra strings created to be documented in the **Project Description**.

NAME SHORTCUT	NAME	BASE MODEL NAME	FEATURE
AREA	BDY AREA	CAD/Boundary/AREA	[AREA] Boundary Area
B	BREAKLINE	tin/BREAKLINE	[B] Breakline
C	CONSTRUCT	CAD/Construct/LINE	[C] Construction Line
CN	NUMBERS	Plot/Setout/NUMBERS	[CN] Setout Numbers
CT	TABLE	Plot/Setout/TABLES	[CT] Setout Table
L	LINE	CAD/LINE	[L] Cad Line
TY	TEMP	CAD/Temp/LINE	[TY] Temporary Line
XS	XS CH	CAD/CROSS SECTION	[XS] Cross Section Line
	DIM	CAD/DIMENSION	[DIM] Dimensions
	DIMT	CAD/DIMENSION	[DIMT] Dimension Text
	DLO*	CAD/LEADERS	[DLO] Leader Open
	DLS*	CAD/LEADERS	[DLS] Leader Solid
	TX1.8	CAD/TEXT/18	[TX1.8] Text 1.8mm
	TX2.5	CAD/TEXT/25	[TX2.5] Text 2.5mm
	TX3.5	CAD/TEXT/35	[TX3.5] Text 3.5mm
	TX5.0	CAD/TEXT/5	[TX5.0] Text 5.0mm
	TX7.0	CAD/TEXT/7	[TX7.0] Text 7.0mm
	TX10	CAD/TEXT/10	[TX10] Text 10mm
	TXB	CAD/TEXT/BACKGROUND	[TXB] Text Background
DIS	DISCLAIMER	Plot/DISCLAIMER	[DIS] Disclaimer
DRA	DRAFT	Plot/DRAFT	[DRA] Draft
GRIDS	GRIDS	Plot/GRIDS	[GRIDS] Grid Lines
NPT	NORTH POINT	Plot/NORTH POINT	[NPT] North Point
	SCALE	Plot/SCALE	[SCALE] Scale Bar
	PLOTCUT*	Plot/CUTS	[PLOT CUT] Long and Cross section Labels
	PLOT*	Plot/GENERAL	[PLOT] Plot
TBLK	TITLE	Plot/Title/BLOCK	[TBLK] Title Block
BDYC	BDY CON	Boundary/CONST	[BDY CON] Construction
BDYR	BDY RAS	Boundary/RASTER	[BDY RAS] Raster
BDYGIS	BDY GIS	Boundary/GIS	[BDY GIS] GIS Boundary Information
BDYINT	BDY INT	Boundary/INTEREST	[BDY INT] Boundary of Interest
BDYREL	BDY REL	Boundary/AIR RELIABILITY	[BDY REL] Air Photo Unreliable Data Area
BDYTIN	BDY TIN	Boundary/TIN	[BDY TIN] Tin Boundary
BDYDATA	BDY DATA	Boundary/DATA	[BDY DATA] Data Boundary
BDYNULL	BDY NULL	Boundary/NULL	[BDY NULL] Null Boundary
	BDY*	Boundary/BOUNDARY	[BDY] Boundary
HT	HATCH	CAD/HATCH	[HT] Hatch
	INTS	CAD/TADPOLES	[INTS] Interface Symbol

RAILC	Rail	CAD/RAIL	[RAILC] Rail
BAC	Barrier	CAD/ROAD	[BAC] Barrier
BKC	Back of kerb	CAD/ROAD	[BKC] Kerb Back
CARC	Car	CAD/ROAD CAR	[CARC] Car
CHLC	Channel	CAD/WATERWAY	[CHLC] Channel
CLC	Centre line	CAD/ROAD	[CLC] Centre Line
CONC	Concrete	CAD/PATH	[CONC] Concrete
DCC	Dish channel	CAD/WATERWAY	[DCC] Dish Channel
DWC	Driveway	CAD/DRIVEWAY	[DWC] Driveway
EBC	Bush	CAD/VEGETATION	[EBC] Bush
ECC	Concrete	CAD/PATH	[ECC] Edge of Concrete
GBC	Garden Bed	CAD/VEGETATION	[EGB] Garden Bed
EGC	Garden Edge	CAD/VEGETATION	[EGC] Garden Edge
EMC	Metal	CAD/ROAD	[EMC] Edge of Metal
ESC	Seal	CAD/ROAD	[ESC] Edge of Seal
ETC	Track	CAD/PATH	[ETC] Edge of Track
FPC	Footpath	CAD/PATH	[FPC] Edge of Footpath
GLC	Ground level	CAD/SPOTHEIGHT	[GLC] Ground Level
KIC	Invert of kerb	CAD/ROAD	[KIC] Kerb Invert
INVC	Invert	CAD/MISC	[INVC] Invert
SBC	Speed Bump	CAD/ROAD	[SBC] Speed Bump
KC	Kerb	CAD/ROAD	[KC] Kerb
KXC	Kerb crossing	CAD/ROAD	[KXC] Kerb Crossing
KLC	Lip of kerb	CAD/ROAD	[KLC] Kerb Lip
KTC	Kerb of top	CAD/ROAD	[KTC] Kerb Top
NIBC	Nib wall	CAD/BANK	[NIBC] Nib Wall
PEDXC	Crossing	CAD/ROAD MARKING	[PEDXC] Crossing
PRC	Pram Ramp	CAD/PRAM RAMPS	[PRC] Pram Ramp Crossing
RMPC	Ramp	CAD/ROAD	[RMPC] Ramp
SKIDC	Skid	CAD/ROAD	[SKIDC] Skid
TIC	Traffic island	CAD/ROAD	[TIC] Traffic Island
AVC	Air valve	CAD/UT AIR	[AVC] Air Valve
CULVC	Culvert	CAD/WATERWAY	[CULVC] Culvert
DPC	Down pipe	CAD/UT	[DPC] Down Pipe
DRNC	Drain	CAD/WATERWAY	[DRNC] Drain
FC	Fibre	CAD/UT FIBRE	[FC] Fibre
GC	Existing gas	CAD/UT GAS	[GC] Gas
PC	Existing power	CAD/UT POWER	[PC] Power
SSC	Existing sewer	CAD/UT SEWER	[SSC] Sewer
SWC	Existing stormwater	CAD/UT STORMWATER	[SWC] Stormwater
MHC	Manhole	CAD/UT	[MHC] Manhole
MHSSC	Sewer Manhole	CAD/UT SEWER	[MHSSC] Manhole Sewer
MHSWC	Stormwater Manhole	CAD/UT STORMWATER	[MHSWC] Manhole Stormwater
SUMPC	Sump	CAD/UT	[SUMPC] Sump
TC	Existing telecom	CAD/UT TELECOM	[TC] Telephone

WC	Existing water	CAD/UT WATER	[WC] Water
FHC	Fire hydrant	CAD/UT	[FHC] Fire Hydrant
GMC	Gas meter	CAD/UT	[GMC] Gas Meter
GTC	Gully trap	CAD/UT	[GTC] Gully Trap
GVC	Gas valve	CAD/UT	[GVC] Gas Valve
HWC	Headwall	CAD/BANK	[HWC] Headwall
KSC	Kerb sump	CAD/UT	[KSC] Kerb Sump
KSWC	Kerb stormwater outlet	CAD/ UT	[KSWC] Kerb Stormwater Outlet
TRC	Tree	CAD/VEGETATION	[TRC] Tree
TFC	Turf	CAD/VEGETATION	[TFC] Turf
XREF	Xref	CAD/XREF	[XREF] Xref
VP	Viewport	CAD/VIEWPORT	[VP] Viewport

4.3 Survey Strings

Design teams will need to know string codes mainly to identify what the feature is. This will also be aided by the model grouping they will be in. The String list below also includes the standard model.

Some codes for Survey, generally around features like services or Utilities could have addition to the code. E.g. Pipe or Culvert size including material type.

- A Stormwater Pipe would have the Prefix **DR LOC**
- Then could be follow by the pipe size **DR LOC600**
- Could also have a suffix of material type **DR LOC600RCP**

This would allow mapping files to apply a pipe or culvert dimensions to the Super String.

Survey Feature List

NAME	MODEL NAME	FEATURE
SV COV	Cadastral/Survey/BOUNDARY	[SV COV] Covenant Boundary
SV DB	Cadastral/DCDB/BOUNDARY	[SV DB] DCDB Boundary
SV RL	Cadastral/Survey/CONNECTION	[SV RL] Reference Line
SV RPC	Cadastral/Survey/CONNECTION	[SV RPC] Registered Plan Connection
SV RPE	Cadastral/Survey/BOUNDARY	[SV RPE] Easement Boundary
SV RPP	Cadastral/Survey/BOUNDARY	[SV RPP] Parcel Boundary
SV RPR	Cadastral/Survey/BOUNDARY	[SV RPR] Road Boundary
SV RP	Cadastral/Survey/BOUNDARY	[SV RP] Cadastral Boundary
SV RPS	Cadastral/Survey/BOUNDARY	[SV RPS] Secondary Interest
BR AB	survey/Bridge/ABUTMENT	[BR AB] Bridge Abutment
BR DK	survey/Bridge/DECK	[BR DK] Bridge Deck
BR NDF	survey/Bridge/NON DEFINED	[BR NDF] Non Defined - Strung
BR PAR	survey/Bridge/PARAPET	[BR PAR] Bridge Parapet
BR PRS	survey/Bridge/PIER	[BR PRS] Bridge Pier Strung
BR PR	survey/Bridge/PIER	[BR PR] Bridge Pier

BR SOF	survey/Bridge/SOFFIT	[BR SOF] Bridge Structure Soffit
BR STR	survey/Bridge/STRUCTURE	[BR STR] Bridge Structure
BU AF	survey/Building/AWNING	[BU AF] Awing Face
BU AP	survey/Building/AWNING	[BU AP] Awning Posts
BU COLS	survey/Building/COLUMN	[BU COLS] Building Column
BU DK	survey/Building/DECK	[BU DK] Building Deck
BU DR1	survey/Building/DOOR	[BU DR1] Building Door Single
BU DR2	survey/Building/DOOR	[BU DR2] Building Door Double
BU DRR	survey/Building/DOOR	[BU DRS] Building Roller Door
BU DRN	survey/Building/DOOR	[BU DRN] Building Door Non Standard
BU DRS	survey/Building/DOOR	[BU DRS] Building Door Strung
BU DR	survey/Building/DOOR	[BU DR] Building Door
BU DRO	survey/Building/DOOR	[BU DRO] Building Door Opening
BU EAV	survey/Building/EAVES	[BU EAV] Building Eaves
BU FLR	survey/Building/FLOOR	[BU FLR] Floor Level
BU GUT	survey/Building/GUTTER	[BU GUT] Building Gutter
BU LN	survey/Building/LINE	[BU LN] Building Line
BU NDFS	survey/Building/NON DEFINED	[BU NDFS] Non Defined Strung
BU NDF	survey/Building/NON DEFINED	[BU NDF] Non Defined
BU RFS	survey/Building/ROOF	[BU RFS] Building Roof Strung
BU RF	survey/Building/ROOF	[BU RF] Building Roof Point
BU RWB	survey/Building/RETAINING WALL	[BU RWB] Retaining Wall Base
BU RWT	survey/Building/RETAINING WALL	[BU RWT] Retaining Wall Top
BU SHD	survey/Building/SHED	[BU SHD] Building Shed
BU SILL	survey/Building/SILL	[BU SILL] Building Sill
BU STP	survey/Building/STEPS	[BU STP] Steps
BU TAN	survey/Building/TANK	[BU TAN] Tank
CK FLDS	survey/Creek/MARKS	[CK FLDS] Flood Level or Debris Mark Line
CK FLD	survey/Creek/MARKS	[CK FLD] Flood Level or Debris Mark Point
CK INV	survey/Creek/INVERT	[CK INV] Invert - Base
CK MHG	survey/Creek/MARKS	[CK MHG] Maximum Height Guage
CK NDFS	survey/Creek/NDF	[CK NDFS] Creek NDF Strung
CK NDF	survey/Creek/NDF	[CK NDF] Creek NDF Point
CK SEC	survey/Creek/SECTION	[CK SEC] Creek Cross Section
CK TOE	survey/Creek/BANKS	[CK TOE] Creek Toe of Bank
CK TOP	survey/Creek/BANKS	[CK TOP] Creek Top of Bank
CK WE	survey/Creek/EDGE	[CK WE] Creek - Water Edge
CS BASE	survey/Construct/BASE	[CS BAS] Base Layer
CS SB	survey/Construct/SUBBASE	[CS SB] Sub Base
CS SG	survey/Construct/SUB GRADE	[CS SG] Sub Grade Bottom of Box
CS LSB	survey/Construct/LOW SUB BASE	[CS LSB] Lower Sub Base
CS FSL	survey/Construct/FSL	[CS FSL] Finished Surface Level
CS UNS	survey/Construct/UNSUITABLE	[CS UNS] Unsuitable Strung
CS UN	survey/Construct/UNSUITABLE	[CS UN] Unsuitable
CS STKS	survey/Construct/STAKED	[CS STKS] As Staked Strung

CS STK	survey/Construct/STAKED	[CS STK] As Staked
FE BOLS	survey/Fence/BOLLARD	[FE BOLS] Bollard Fence Line
FE BOL	survey/Fence/BOLLARD	[FE BOL] Bollard
FE GAS	survey/Fence/GATE	[FE GAS] Gate (Strung)
FE GR	survey/Fence/SAFETY	[FE GR] Safety Fence
FE HR	survey/Fence/HAND RAIL	[FE HR] Hand Rail
FE LN	survey/Fence/FENCE	[FE LN] Fence Line
FE LO	survey/Fence/LOG	[FE LO] Log Fence
FE NDF	survey/Fence/GENERAL	[FE NDF] Fence General Point
FE P	survey/Fence/POST	[FE P] Post
RD AS	survey/Road Furniture/BARRIERS	[RD AS] Armour Barrier
RD CB	survey/Road Furniture/BARRIERS	[RD CB] Concrete barrier
RD DPTH	survey/Road Furniture/SIGNS	[RD DPTH] Water Over Road Depth Indicator
RD GP	survey/Road Furniture/SIGNS	[RD GP] Guide Post
RD GRD	survey/Road Furniture/GRID	[RD GRD] Road Grid
RD GR	survey/Road Furniture/BARRIERS	[RD GR] Armco Guard Rail
RD BWR	survey/Road Furniture/BARRIERS	[RD BWR] Wire Rope Barrier
RD SG	survey/Road Furniture/SIGNS	[RD SG] Sign No Attributes
RD SNGM	survey/Road Furniture/SIGNS	[RD SNGM] Sign Multi Post
RD SNG	survey/Road Furniture/SIGNS	[RD SNG] Sign
RD SNS	survey/Road Furniture/SIGNS	[RD SNS] Sign Strung - Multi Posts
GN BIN	survey/General/OBJECTS	[GN BIN] Rubbish Bin
GN GPS	survey/General/POINTS	[GN GPS] GPS Point
GN GS	survey/General/SIGN	[GN GS] Sign
GN NDFS	survey/General/POINTS	[GN NDFS] General Non defined (Strung)
GN NDF	survey/General/POINTS	[GN NDF] General Non Defined
GN MBS	survey/General/OBJECTS	[GN MBS] Post Mail Box Strung
GN MB	survey/General/OBJECTS	[GN MB] Post Mail Box
GN PHOTO	survey/General/PHOTO	[GN PHOTO] Photo Representation
GN POTSL	survey/General/POINTS	[GN POTSL] Pothole
GN STL	survey/General/OBJECTS	[GN STL] Street Light
GN VP	survey/General/OBJECTS	[GN VP] General Vent Pipe
GO BH	survey/Geotech/BORE HOLE	[GO BH] Bore Hole
GO CON	survey/Geotech/LEACHATE	[GO CON] Leachate Pipe
GO GW	survey/Geotech/GAS WELL	[GO GW] Gas Well
GO LMH	survey/Geotech/LEACHATE	[GO LMH] Leachate Manhole
GO MP	survey/Geotech/MONITORING	[GO MP] Monitoring Point
GO NDF	survey/Geotech/MONITORING	[GO NDFS] Geotech Undefined Point (Strung)
GO NDF	survey/Geotech/MONITORING	[GO NDF] Geotech Undefined Point
GO PIT	survey/Geotech/PIT	[GO PIT] Geotech Pit
GO WMP	survey/Geotech/MONITORING	[GO WMP] Water Monitoring Point
HY EPS	survey/Hydro/ENVIRO	[HY EPS] Environment Protection Strung
HY EP	survey/Hydro/ENVIRO	[HY EP] Environmental Protection
HY JET	survey/Hydro/FEATURES	[HY JET] Jetty
HY MK	survey/Hydro/MARKS	[HY MK] Navigation Markers

HY PON	survey/Hydro/FEATURES	[HY PON] Pontoon
HY RAM	survey/Hydro/FEATURES	[HY RAM] Ramp
HY ROC	survey/Hydro/FEATURES	[HY ROC] Rock
HY SL	survey/Hydro/FEATURES	[HY SL] Surface
HY TG	survey/Hydro/MARKS	[HY TG] Tide gauge - Flood depth
HY WL	survey/Hydro/MARKS	[HY WL] Water Level
HY WM	survey/Hydro/MARKS	[HY WM] Water Marker
LM BB	survey/Pave Marking/LINES	[LM BB] Double (Barrier both Directions)
LM BL	survey/Pave Marking/LINES	[LM BL] Double Broken (Barrier Left Direction)
LM BR	survey/Pave Marking/LINES	[LM BR] Double Broken (Barrier Right Direction)
LM BUS	survey/Pave Marking/LINES	[LM BUS] Bus Stop Line
LM CL	survey/Pave Marking/LINES	[LM CL] Continuity Line
LM EL	survey/Pave Marking/LINES	[LM EL] Exit Line
LM HLL	survey/Pave Marking/LINES	[LM HLL] Holding Line 300mm
LM HLS	survey/Pave Marking/LINES	[LM HLS] Holding Line 200mm
LM LL	survey/Pave Marking/LINES	[LM LL] Lane Line
LM NDF	survey/Pave Marking/LINES	[LM NDF] Linemarking Non Defined line
LM PCS	survey/Pave Marking/LINES	[LM PCS] Pedestrian Crossing at Signals
LM PKL	survey/Pave Marking/LINES	[LM PKL] Parking Bay Line LHS
LM PKR	survey/Pave Marking/LINES	[LM PKL] Parking Bay Line RHS
LM SB	survey/Pave Marking/LINES	[LM SB] Stop Bar
LM SLB	survey/Pave Marking/LINES	[LM LSB] Single Broken (Separation)
LM S	survey/Pave Marking/LINES	[LM S] Single Unbroken (SOLID)
LM TL	survey/Pave Marking/LINES	[LM TL] Turning Line
LM ZL	survey/Pave Marking/LINES	[LM ZL] Zone Line
PM AS	survey/Pave Marking/SYMBOLS	[PM AS] Pavement Arrows Multiple
PM A	survey/Pave Marking/SYMBOLS	[PM A] Pavement Arrows
PM BK	survey/Pave Marking/SYMBOLS	[PM BK] Bike Symbol
PM CV	survey/Pave Marking/SYMBOLS	[PM CV] Chevron
PM COL	survey/Pave Marking/PAVE	[PM COL] Pavement Colour Outline
PM DA	survey/Pave Marking/SYMBOLS	[PM DA] Disable Parking
PM HM	survey/Pave Marking/MARKS	[PM HM] Hydrant Marker
PM THM	survey/Pave Marking/MARKS	[PMTHM] Hydrant triangle mark
PM LT	survey/Pave Marking/SYMBOLS	[PM LT] Left Turn Arrow
PM ML	survey/Pave Marking/SYMBOLS	[PM ML] Merge Left Arrow
PM MR	survey/Pave Marking/SYMBOLS	[PM MR] Merge Right Arrow
PM NDF	survey/Pave Mark/NON DEFINED	[PM NDF] Pavement Non Defined Point
PM PED	survey/Pave Marking/SYMBOLS	[PM PED] Pedestrian symbol
PM RT	survey/Pave Marking/SYMBOLS	[PM RT] Right Turn Arrow
PM SRL	survey/Pave Marking/SYMBOLS	[PM SRL] Straight Right Left Arrow
PM SL	survey/Pave Marking/SYMBOLS	[PM SL] Straight Left Arrow
PM SR	survey/Pave Marking/SYMBOLS	[PM SR] Straight Right Arrow
PM S	survey/Pave Marking/SYMBOLS	[PM S] Straight Arrow
PM TAC	survey/Pave Marking/MARKS	[PM TAC] Tactile
PM UT	survey/Pave Marking/SYMBOLS	[PM UT] U-Turn Arrow

PM TXT	survey/Pave Marking/TEXT	[PM TXT] Text on Road
PM ZC	survey/Pave Marking/SYMBOLS	[PM ZC] Zebra Crossing
SV BASE STATION	survey/Marks/BASE STATION	[SV BASE] Base Station
SV BM	survey/Marks/BENCH	[SV BM] Bench Marks
SV BS	survey/Marks/BACK SIGHTS	[SV BS] Survey Backsight Points
SV CHS	survey/Marks/CHECKS	[SV CHS] Survey Check (Strung)
SV CH	survey/Marks/CHECKS	[SV CH] Survey Check
SV CP	survey/Marks/CONTROL POINTS	[SV CP] Control Points
SV CS	survey/Marks/CADASTRAL	[SV CS] Cadastral marks
SV PSM	survey/Marks/PERMANENT	[SV PSM] Permanent Marks
SV RO	survey/Marks/REF OBJECTS OBSERVED	[SV RO] Reference Objects Observed
SV RE	survey/Marks/REF OBJECTS EXIST	[SV RE] Reference Objects Existing
SV TVL	survey/Marks/TRAVERSE LINES	[SV TVL] Traverse Lines
SV IB	survey/Marks/IRON	[SV IB] Iron Bar
SV IR	survey/Marks/IRON	[SV IR] Iron Rod
SV IS	survey/Marks/IRON	[SV IS] Iron Spike
SV IT	survey/Marks/IRON	[SV IT] Iron Tube
SV OIB	survey/Marks/ORIGINAL	[SV OIB] Original - Old Iron Bar
SV OIR	survey/Marks/ORIGINAL	[SV OIR] Original - Old Iron Rod
SV OIS	survey/Marks/ORIGINAL	[SV OIS] Original - Old Iron Spike
SV OIT	survey/Marks/ORIGINAL	[SV OIT] Original - Old Iron Tube
SV OP	survey/Marks/ORIGINAL	[SV OP] Original - Old Peg
SV ORT	survey/Marks/ORIGINAL	[SV ORT] Original - Old Reference Tree
SV PEG	survey/Marks/PEG	[SV PEG] Peg
SV RM	survey/Marks/ROUND	[SV RM] Round Mark
SV RT	survey/Marks/REF TREE	[SV RT] Reference Tree
SV TMP	survey/Marks/TEMP	[SV TMP] Temp Control Point
SV TRIG	survey/Marks/TRIG	[SV TRIG] Trig
PK EQ	survey/Parks/PLAY EQUIP	[PK EQ] Playground Equipment
PK FE	survey/Parks/FIT EQUIP	[PK FE] Parks - Fitness Equipment
PK FN	survey/Parks/FURNITURE	[PK FN] Parks - Landscape Furniture
PK F	survey/Parks/FEATURE	[PK F] Parks - Landscape Feature
PK NDF	survey/Parks/GENERAL POINT	[PK NDF] Parks General Point
RW BAB	survey/Railway/BALLAST	[RW BAB] Railway Ballast Bottom (Strung)
RW BAT	survey/Railway/BALLAST	[RW BAT] Railway Ballast Top (Strung)
RW BOM	survey/Railway/FEATURES	[RW BOM] Railway Boom Gate - one shot and width
RW CG	survey/Railway/COMMS	[RW CG] Railway Signal Box Comms General
RW CON	survey/Railway/COMMS	[RW CON] Railway Conduit observed
RW IJT	survey/Railway/RAIL	[RW IJT] Railway Line Isolator Joint - one shot
RW JT	survey/Railway/RAIL	[RW JT] Railway Line Joint - one shot
RW KP	survey/Railway/FEATURES	[RW KP] Railway Kilometer Post
RW LN	survey/Railway/RAIL	[RW LN] Railway Line
RW MAS	survey/Railway/FEATURES	[RW MAS] Railway Mast Arm
RW NDF	survey/Railway/FEATURES	[RW NDF] Railway General Point
RW PITS	survey/Railway/COMMS	[RW PITS] Railway Pit (Strung)

RW PIT	survey/Railway/COMMS	[RW PIT] Railway Pit
RW R	survey/Railway/RAIL	[RW R] Railway Rail
RW SIG	survey/Railway/FEATURES	[RW SIG] Railway Signals
RW SGN	survey/Railway/FEATURES	[RW SGN] Railway Sign for Trains
RW SL	survey/Railway/RAIL	[RW SL] Railway Sleeper
RW SWL	survey/Railway/FEATURES	[RW SWL] Railway Switch Lever
RW TOS	survey/Railway/RAIL	[RW TOS] Railway Toe of Switch or Point of Switch
RD CG	survey/Road/LANE FEATURES	[RD CG] Change of Grade
RD CI	survey/Road/KERBS	[RD CI] Concrete Invert - Spoon Drain
RD EB	survey/Road/LANE FEATURES	[RD EB] Edge of Bitumen
RD EG	survey/Road/LANE FEATURES	[RD EG] Edge of Unsealed Road
RD ES	survey/Road/LANE FEATURES	[RD ES] Edge of shoulder
RD ET	survey/Road/LANE FEATURES	[RD ET] Edge of Track
RD EV	survey/Road/VERGE	[RD EV] Edge of Verge
RD KB	survey/Road/KERBS	[RD KB] Kerb Back
RD KI	survey/Road/KERBS	[RD KI] Kerb Invert - Nominal Face
RD KL	survey/Road/KERBS	[RD KL] Kerb Lip
RD KO	survey/Road/KERBS	[RD KO] Kerb Only - Face
RD KT	survey/Road/KERBS	[RD KT] Kerb Top
RD LE	survey/Road/SPOT LEVEL	[RD LE] Spot Level
RD NDFS	survey/Road/GENERAL POINT	[RD NDFS] Road General Strung
RD NDF	survey/Road/GENERAL POINT	[RD NDF] Road General Point
RD FP	survey/Road/FLUSH POINT	[RD FP] Road Flush Point
RD RC	survey/Road/LANE FEATURES	[RD RC] Road Crown
RD SUBDR	survey/Road/ROAD SUB DR	[RD SUBDR] Road Sub Drain
SP BA	survey/Stockpile/BASE	[SP BA] Stockpile Base
SP CG	survey/Stockpile/TOP	[SP CG] Stockpile
SP LE	survey/Stockpile/TOP	[SP LE] Stockpile Spot Level
SF AP	survey/Points/AERIAL	[SF AP] Aerial Photography Point
SF CE	survey/Surface/CONCRETE	[SF CE] Concrete Slab
SF CG	survey/Surface/CHANGE GRADE	[SF CG] Change of Grade
SF DW	survey/Surface/CONCRETE	[SF DW] Driveways
SF EF	survey/Surface/CONCRETE	[SF EF] Edge of Failure
SF EOR	survey/Surface/ROCK	[SF EOR] Edge of Rock - Stone
SF EOW	survey/Surface/WATER	[SF EOW] Edge of Water
SF FP	survey/Surface/FOOTPATHS	[SF FP] Footpaths
SF HP	survey/Points/HYDROGRAPHIC	[SF HP] Hydrographic Point
SF IOD	survey/Surface/DRAINS	[SF IOD] Invert of Drain
SF LE	survey/Surface/SPOT LEVEL	[SF LE] Surface Level - Spot Level
SF LP	survey/Points/LIDAR	[SF LP] LIDAR Point
SF MP	survey/Points/MOBILE SCAN	[SF MP] Mobile Scanning Point
SF NDF	survey/Surface/GENERAL POINT	[SF NDF] General Non Defined Point
SF RWB	survey/Surface/RETAINING WALLS	[SF RWB] Retaining Wall Base
SF RWT	survey/Surface/RETAINING WALLS	[SF RWT] Retaining Wall Top
SF TOE	survey/Surface/BANK	[SF TOE] Toe of Bank

SF TOP	survey/Surface/BANK	[SF TOP] Top of Bank
TN CB	survey/Tunnel/FEATURES	[TN CB] Tunnel Cabinet
TN COM	survey/Tunnel/UTILITIES	[TN COM] Tunnel Comms
TN CON	survey/Tunnel/UTILITIES	[TN CON] Tunnel Conduit OBS
TN DOR	survey/Tunnel/FEATURES	[TN DOR] Tunnel Door
TN DORS	survey/Tunnel/FEATURES	[TN DORS] Tunnel Door(s)
TN FS	survey/Tunnel/UTILITIES	[TN FS] Tunnel Fire Service
TN FW	survey/Tunnel/STRUCTURE	[TN FW] Tunnel Fascia Wall
TN LIN	survey/Tunnel/STRUCTURE	[TN LIN] Tunnel Linning
TN LOC	survey/Tunnel/STRUCTURE	[TN LOC] Tunnel S/L
TN NDF	survey/Tunnel/FEATURES	[TN NDF] Tunnel Non Defined
TN RF	survey/Tunnel/STRUCTURE	[TN RF] Tunnel Roof
TN VS	survey/Tunnel/FEATURES	[TN VS] Tunnel Ventilation System
VE CAN	survey/Vegetation/TREES	[VE CAN] Tree Canopy Strung
VE CU	survey/Vegetation/CULTIVATION	[VE CU] Edge of Cultivation
VE EV	survey/Vegetation/VEGETATION	[VE EV] Edge of Vegetation
VE GE	survey/Vegetation/GARDEN	[VE GE] Garden Edge
VE ROT	survey/Vegetation/TREES	[VE ROT] Tree Roots (Strung)
VE SHR	survey/Vegetation/TREES	[VE SHR] Shrub
VE SRZ	survey/Vegetation/ZONES	[VE SRZ] Tree Structural Root Zone
VE TPZ	survey/Vegetation/ZONES	[VE TPZ] Tree Protection Zone
VE TRE	survey/Vegetation/TREES	[VE TRE] Trees
VE TRS	survey/Vegetation/TREES	[VE TRS] Trees Strung
SE EDS	survey/Sewer/Located/EFFLUENT	[SE EDS] Sewer Effluent Disposal
SE GT	survey/Sewer/Located/PIT	[SE GT] Sewer Pit
SE ILC	survey/Sewer/Levels/INVERT CHAMBER	[SE ILC] Sewer Invert Level of Chamber
SE IL	survey/Sewer/Levels/INVERT	[SE IL] Invert (Single Point)
SE IO	survey/Sewer/Feature/INSPECTION OPENING	[SE IO] Sewer Inspection Opening
SE LOC	survey/Sewer/Located/PIPE	[SE LOC] Sewer Located - Quality TBA
SE MHC	survey/Sewer/Located/CHAMBER	[SE MHC] Sewer Manhole Chamber Extents
SE MHS	survey/Sewer/Located/MANHOLE	[SE MHS] Sewer Manhole (Strung)
SE MH	survey/Sewer/Located/MANHOLE	[SE MH] Sewer Manhole
SE NDF	survey/Sewer/Feature/GENERAL POINT	[SE NDF] Sewer General Point
SE OR	survey/Sewer/Feature/OVERFLOW	[SE OR] Sewer Overflow
SE PH	survey/Sewer/Located/POTHOLE	[SE PH] Pothole
SE PR	survey/Sewer/Located/PIPE RECYCLED	[SE PR] Sewer Pipe Recycled
SE P	survey/Sewer/Located/PIPE	[SE P] Sewer Pipe
SE RES	survey/Sewer/Located/RECLAIMED EFFLUENT	[SE RES] Sewer Reclaimed Effluent
SE STR	survey/Sewer/Located/STRUCTURE	[SE STR] Sewerage Structure
SE PITRDN	survey/Sewer/Located/PIT ROUND	[SE PITRDN] Sewer Round Pit
SE PM	survey/Sewer/Located/PRESSURE MAIN	[SE PM] Sewer Pressure Main
SE TANS	survey/Sewer/Located/SEPTIC TANK	[SE TANS] Septic Tank (Strung)
SE TAN	survey/Sewer/Located/SEPTIC TANK	[SE TAN] Septic Tank
SE VP	survey/Sewer/Feature/VENT POLE	[SE VP] Sewer Vent Pole
SE V	survey/Sewer/Feature/PRESSURE VALVE	[SE V] Sewer Pressure Valve

S EX	Sewer/Non Survey/DBYD	[S EX] Sewer plotted from DBYD
S LOCP	Sewer/Non Survey/PLOTTED	[S LOCP] Sewer plotted
DR APR	survey/Drainage/Located/APRON	[DR APR] Structure Inlet - Outlet Apron
DR BC	survey/Drainage/Located/BOX CULVERT	[DR BC] Box Culvert (Strung)
DR END	survey/Drainage/Located/END STRUCTURE	[DR END] Drain End Structure
DR FI	survey/Drainage/Located/FIELD INLET	[DR FI] Drainage Field Inlet
DR FLDS	survey/Drainage/Levels/FLOOD LINE	[DR FLDS] Flood Level or Debris line
DR FLD	survey/Drainage/Levels/FLOOD MARK	[DR FLD] Flood Level or Debris Mark
DR GT	survey/Drainage/Located/GULLY TRAP	[DR GT] Gully Trap - Catch Pit
DR HW	survey/Drainage/Located/HEADWALL	[DR HW] Structure Inlet - Outlet Headwall
DR ILC	survey/Drainage/Levels/INVERT CHAMBER	[DR ILC] Drainage IL Invert Level of Chamber
DR IL	survey/Drainage/Levels/INVERT	[DR IL] Invert (Single Point)
DR LOC	survey/Drainage/Located/PIPE	[DR LOC] Drainage Located Pipe - Quality TBA
DR MHC	survey/Drainage/Located/MANHOLE	[DR MHC] Drainage Manhole Chamber (Strung)
DR MHS	survey/Drainage/Located/MANHOLE	[DR MHS] Drainage Manhole (Strung)
DR MH	survey/Drainage/Located/MANHOLE	[DR MH] Drainage Manhole (Single Point)
DR MK	survey/Drainage/Feature/MARKER	[DR MK] Drainage Marker
DR NDF	survey/Drainage/Feature/GENERAL POINT	[DR NDF] Drainage General Strung
DR NDF	survey/Drainage/Feature/GENERAL POINT	[DR NDF] Drainage General Point
DR NDF	survey/Drainage/Feature/GENERAL POINT	[DR NDF] Drainage General Point
DR OC	survey/Drainage/Located/OPEN CHANNEL	[DR OC] Open Channel
DR PH	survey/Drainage/Located/POTHOLE	[DR PH] Drainage Pothole
DR P	survey/Drainage/Located/PIPE	[DR P] Drainage Pipe (strung)
DR WW	survey/Drainage/Located/WINGWALL	[DR WW] Structure Inlet - Outlet Wingwall
DR DPO	survey/Drainage/Located/OUTLET	[DR DPO] Down Pipe Outlet
DR DP	survey/Drainage/Feature/DOWN PIPE	[DR DP] Down Pipe
DR SP	survey/Drainage/Feature/STONE PITCH	[DR SP] Stone pitching
DR SSD	survey/Drainage/Located/SUBSOIL DRAIN	[DR SSD] Sub Soil Drain
DR EX	Storm/Non Survey/DBYD	[DR EX] Drainage plotted from Digital - DBYD
DR LOCP	Storm/Non Survey/PLOTTED	[DR LOCP] Drainage Service Plotted
CO BOX	survey/Utilities/Communications/Located/TELEPHONE BOX	[CO BOX] Telephone Box
CO CCVT	survey/Utilities/Communications/Feature/CC TV	[CO CCTV] Closed Circuit TV
CO CON	survey/Utilities/Communications/Located/TELEPHONE CONDUIT	[CO CON] Telephone Conduit Observed - Quality TBA
CO NDF	survey/Utilities/Communications/Located/GENERAL POINT	[CO NDF] General Point
CO OF	survey/Utilities/Communications/Located/OPTIC FIBRE	[CO OF] Optic Fibre Line
CO OH	survey/Utilities/Communications/Located/TELEPHONE LINE	[CO OH] Telephone Line Observed
CO LOC	survey/Utilities/Communications/Located/TELEPHONE SERVICES	[CO LOC] Telephone Located Services - Quality TBA
CO MHS	survey/Utilities/Communications/Located/MANHOLE	[CO MHS] Manhole (Strung)
CO MH	survey/Utilities/Communications/Located/MANHOLE	[CO MH] Manhole
CO PH	survey/Utilities/Communications/Located/COMMS POTHOLE	[CO PH] Comms Pothole
CO PILS	survey/Utilities/Communications/Located/PILLAR	[CO PILS] Pillar - Strung
CO PIL	survey/Utilities/Communications/Located/PILLAR	[CO PIL] Pillar
CO PITS	survey/Utilities/Communications/Located/TELEPHONE PIT	[CO PITS] Telephone Pit (Strung)
CO PIT	survey/Utilities/Communications/Located/TELEPHONE PIT	[CO PIT] Telephone Pit
CO P	survey/Utilities/Communications/Located/POLE	[CO P] Pole

CO MHC	survey/Utilities/Communications/Located/TELEPHONE MANHOLE EXTENTS	[CO MHC] Telephone Manhole Chamber Extents
CO MK	survey/Utilities/Communications/Located/TELEPHONE CABLE MARKER	[CO MK] Telephone Cable Marker
T EX	Utilities/Communications/Non Survey/DBYD	[T EX] Communications Plotted from Digital - DBYD
T LOCP	Utilities/Communications/Non Survey/PLOTTED	[T LOCP] Communications Plotted
EL CON	survey/Utilities/Electricity/Located/CONDUIT	[EL CON] Electrical Conduit Observed - Quality TBA
EL H	survey/Utilities/Electricity/Located/POLE	[EL H] Pole High Voltage
EL LHS	survey/Utilities/Electricity/Located/POLE	[EL LHS] Pole Low V. High V. S.L.
EL LHT	survey/Utilities/Electricity/Located/POLE	[EL LHT] Pole Low V. High V. Transformer
EL LHTS	survey/Utilities/Electricity/Located/POLE	[EL LHTS] Pole Low V. High V. Transformer S.L.
EL LH	survey/Utilities/Electricity/Located/POLE	[EL LH] Pole Low & High Voltage
EL LL	survey/Utilities/Electricity/Located/POLE	[EL LL] Low Voltage Light in Ground
EL LS	survey/Utilities/Electricity/Located/POLE	[EL LS] Pole Low Voltage & Street Light
EL LOC	survey/Utilities/Electricity/Located/SERVICE	[EL LOC] Service Located Electricity
EL L	survey/Utilities/Electricity/Located/POLE	[EL L] Pole Low Voltage
EL MHS	survey/Utilities/Electricity/Located/MANHOLE	[EL MHS] Manhole (Strung)
EL MK	survey/Utilities/Electricity/Feature/MARKER	[EL MK] Electrical Marker
EL NDF	survey/Utilities/Electricity/Feature/NON DEFINED	[EL NDFS] Non Defined Feature (Strung)
EL NDF	survey/Utilities/Electricity/Feature/NON DEFINED	[EL NDF] Non Defined Feature (Point)
EL OH	survey/Utilities/Electricity/Located/OVERHEAD	[EL OH] Located Overhead Electricity
EL PH	survey/Utilities/Electricity/Located/POTHOLE	[EL PH] Electrical Pothole
EL PILS	survey/Utilities/Electricity/Located/PILLAR	[EL PILS] Pillar - Strung
EL PIL	survey/Utilities/Electricity/Located/PILLAR	[EL PIL] Pillar
EL PITS	survey/Utilities/Electricity/Located/PIT	[EL PITS] Electrical Pit (Strung)
EL PIT	survey/Utilities/Electricity/Located/PIT	[EL PIT] Electrical Pit
EL PP	survey/Utilities/Electricity/Located/POLE	[EL PP] Electrical Power Pole
EL PTR	survey/Utilities/Electricity/Located/PAD	[EL PTR] Electrical Pad Transformer
EL SO	survey/Utilities/Electricity/Located/POLE	[EL SO] Electricity Pole - Light Only
EL STAY	survey/Utilities/Electricity/Located/POLE	[EL STAY] Electricity Stay Pole - Wire
EL TOW	survey/Utilities/Electricity/Located/TOWER	[EL TOW] Tower
E EX	Utilities/Electricity/Non Survey/DBYD	[E EX] Electricity Plotted from Digital - DBYD
E LOCP	Utilities/Electricity/Non Survey/PLOTTED	[E LOCP] Electricity Plotted
GA LOC	survey/Utilities/Gas/Located/SERVICE	[GA LOC] Gas Located Service - Quality TBA
GA MHS	survey/Utilities/Gas/Located/MANHOLE	[GA MHS] Gas Manhole (Strung)
GA MH	survey/Utilities/Gas/Located/MANHOLE	[GA MH] Gas Manhole
GA MK	survey/Utilities/Gas/Feature/MARKER	[GA MK] Gas Marker
GA MT	survey/Utilities/Gas/Feature/METER	[GA MT] Gas Meter
GA NDFS	survey/Utilities/Gas/Feature/GENERAL POINT	[GA NDFS] Gas General (Strung)
GA NDF	survey/Utilities/Gas/Feature/GENERAL POINT	[GA NDF] Gas General Point
GA PH	survey/Utilities/Gas/Located/POTHOLE	[GA PH] Gas Pothole
GA PITS	survey/Utilities/Gas/Located/PIT	[GA PITS] Gas Pit Strung
GA PIT	survey/Utilities/Gas/Located/PIT	[GA PIT] Gas Pit
GA P	survey/Utilities/Gas/Located/PIPE	[GA P] Gas Pipe Observed
GA SN	survey/Utilities/Gas/Feature/MARKER SIGN	[GA SN] Gas Marker Sign
GA SYP	survey/Utilities/Gas/Feature/SYPHON	[GA SYP] Gas Syphon
GA TST	survey/Utilities/Gas/Feature/TEST	[GA TST] Gas Test

GA V	survey/Utilities/Gas/Feature/VALVE	[GA V] Gas Valve
G EX	Utilities/Gas/Non Survey/DBYD	[G EX] Gas Plotted from Digital - DBYD
G LOCP	Utilities/Gas/Non Survey/PLOTTED	[G LOCP] Gas Plotted
LF BH	survey/Utilities/Landfill/Feature/BORE HOLE	[LF BH] Landfill Bore Hole
LF GW	survey/Utilities/Landfill/Feature/GAS WELL	[LF GW] Landfill Gas Well
LF GF	survey/Utilities/Landfill/Located/GAS FLOW LINE	[LF GF] Landfill Gas Flow Line
LF GH	survey/Utilities/Landfill/Located/GAS HEAD LINE	[LF GH] Landfill Gas Head Line
LF GM	survey/Utilities/Landfill/Feature/GAS MANIFOLD	[LF GM] Landfill Gas Manifold
LF LIN	survey/Utilities/Landfill/Feature/LINER	[LF LIN] Landfill Liner
LF LMHS	survey/Utilities/Landfill/Located/LEACHATE MH	[LF LMHS] Landfill Leachate MH (Strung)
LF LMH	survey/Utilities/Landfill/Located/LEACHATE MH	[LF LMH] Landfill Leachate MH
LF LP	survey/Utilities/Landfill/Located/LEACHATE PIPE	[LF LP] Landfill Leachate Pipe
LF MPW	survey/Utilities/Landfill/Feature/WATER MONITORING PT	[LF MPW] Landfill Water Monitoring Point
LF MP	survey/Utilities/Landfill/Feature/MONITORING PT	[LF MP] Landfill Monitoring Point
LF WP	survey/Utilities/Landfill/Located/GROUND WATER PIPE	[LF WP] Landfill Ground Water Pipe
PE CON	survey/Utilities/Petroleum/Located/CONDUIT	[PE CON] Petroleum Conduit Observed
PE LOC	survey/Utilities/Petroleum/Located/SERVICE	[PE LOC] Petroleum Located Service - Quality TBA
PE MK	survey/Utilities/Petroleum/Feature/MARKER	[PE MK] Petroleum Supply Marker
PE NDF	survey/Utilities/Petroleum/Feature/GENERAL POINT	[PE NDF] Petroleum General Point
PE PH	survey/Utilities/Petroleum/Located/POTHOLE	[PE PH] Pothole
PE TANS	survey/Utilities/Petroleum/Located/TANK	[PE TANS] Petroleum Tank (Strung)
PE TAN	survey/Utilities/Petroleum/Located/TANK	[PE TAN] Petroleum Tank
PE V	survey/Utilities/Petroleum/Feature/VALVE	[PE V] Petroleum Valve
P EX	Utilities/Petroleum/Non Survey/DBYD	[P EX] Petroleum Plotted from Digital - DBYD
P LOCP	Utilities/Petroleum/Non Survey/PLOTTED	[P LOCP] Petroleum Plotted
RE CON	survey/Utilities/Recycled Water/Located/CONDUIT	[RE CON] Conduit Observed
RE LOC	survey/Utilities/Recycled Water/Located/SERVICE	[RE LOC] Recycled Water Located Service - Quality TBA
RE SMH	survey/Utilities/Recycled Water/Located/MANHOLE	[RE SMH] Manhole (strung)
RE MH	survey/Utilities/Recycled Water/Located/MANHOLE	[RE MH] Manhole
RE MK	survey/Utilities/Recycled Water/Located/MARKER	[RE MK] Recycled Water Supply Marker
RE MT	survey/Utilities/Recycled Water/Feature/METER	[RE MT] Recycled Water Meter
RE NDF	survey/Utilities/Recycled Water/Located/POINT	[RE NDF] General Point
RE PH	survey/Utilities/Recycled Water/Located/POTHOLE	[RE PH] Pothole
RE V	survey/Utilities/Recycled Water/Feature/VALVE	[RE V] Valve
R EX	Utilities/Recycled Water/Non Survey/DBYD	[R EX] Recycled Water Plotted from Digital - DBYD
R LOCP	Utilities/Recycled Water/Non Survey/PLOTTED	[R LOCP] Recycled Water Plotted
TR CB	survey/Utilities/Traffic/Feature/CONTROLLER	[TR CB] Traffic Lights Controller
TR CAM	survey/Utilities/Traffic/Feature/CAMERA	[TR CAM] Traffic Camera
TR CON	survey/Utilities/Traffic/Located/CONDUIT	[TR CON] Traffic Conduit
TR LOC	survey/Utilities/Traffic/Located/SERVICE	[TR LOC] Traffic Service Located - Quality TBA
TR LTSL	survey/Utilities/Traffic/Feature/STREET LIGHT	[TR LTSL] Joint Use Traffic Light - Street Light
TR LT	survey/Utilities/Traffic/Feature/TRAFFIC LIGHT	[TR LT] Traffic Lights
TR PITS	survey/Utilities/Traffic/Feature/PIT	[TR PITS] Traffic Pit (Strung)
TR PIT	survey/Utilities/Traffic/Feature/PIT	[TR PIT] Traffic Pit
TR P	survey/Utilities/Traffic/Feature/POST	[TR P] Traffic Post

TR PKM	survey/Utilities/Traffic/Feature/METER	[TR PKM] Parking Meter
TR NDF	survey/Utilities/Traffic/Located/POINT	[TR NDF] General Point
TS EX	Utilities/Traffic/Non Survey/DBYD	[TS EX] Traffic Signals Plotted from Digital - DBYD
TS LOCP	Utilities/Traffic/Non Survey/PLOTTED	[TS LOCP] Traffic Signals Plotted
FS FH	survey/Utilities/Fire/Feature/MARKER	[FS FH] Fire Hydrant
FS GEN	survey/Utilities/Fire/Feature/GENERAL	[FS GEN] Fire Service General Feature Strung
FS LOC	survey/Utilities/Fire/Located/PIPE	[FS LOC] Fire Located Service - Quality TBA
FS MK	survey/Utilities/Fire/Feature/MARKER	[FS MK] Fire Supply Marker
FS NDF	survey/Utilities/Fire/Located/POINT	[FS NDF] General Point
FS PS	survey/Utilities/Fire/Located/PIPE	[FS PS] Fire Service Pipe (Strung)
FS P	survey/Utilities/Fire/Located/PIPE	[FS P] Fire Service Pipe (Point)
FS TANK	survey/Utilities/Fire/Feature/TANK	[FS TANK] Fire Tank
FS V	survey/Utilities/Fire/Fittings/VALVE	[FS V] Fire Valve
IR CON	survey/Utilities/Water/Irrigation/CONDUIT	[IR CON] Irrigation Conduit located
IR GA	survey/Utilities/Water/Irrigation/GENERAL	[IR GA] Irrigation General
IR IS	survey/Utilities/Water/Irrigation/SPRINKLER	[IR IS] Irrigation Sprinkler
WS BH	survey/Utilities/Water/Feature/BORE	[WS BH] Water Bore
WS CON	survey/Utilities/Water/Feature/CONDUIT	[WS CON] Conduit Observed
WS DF	survey/Utilities/Water/Fittings/DRINKING	[WS DF] Water Drinking Fountain
WS LOC	survey/Utilities/Water/Located/PIPE	[WS LOC] Water Located Service - Quality TBA
WS MHS	survey/Utilities/Water/Feature/MANHOLE	[WS MHS] Manhole (Strung)
WS MH	survey/Utilities/Water/Feature/MANHOLE	[WS MH] Manhole
WS MK	survey/Utilities/Water/Located/MARKER	[WS MK] Water Supply Marker
WS MT	survey/Utilities/Water/Fittings/Meter	[WS MT] Water Meter
WS NDF	survey/Utilities/Water/Located/POINT	[WS NDF] General Point
WS PH	survey/Utilities/Water/Located/POTHOLE	[WS PH] Water Pothole
WS PITS	survey/Utilities/Water/Feature/PIT	[WS PITS] Water Pit (Strung)
WS PIT	survey/Utilities/Water/Feature/PIT	[WS PIT] Water Pit
WS TANK	survey/Utilities/Water/Feature/TANK	[WS TANK] Water Tank
WS TAP	survey/Utilities/Water/Fittings/TAP	[WS TAP] Tap
WS V	survey/Utilities/Water/Fittings/VALVE	[WS V] Valve
W EX	Utilities/Water/Non Survey/DBYD	[W EX] Water Plotted from Digital - DBYD
W LOCP	Utilities/Water/Non Survey/PLOTTED	[W LOCP] Water Plotted
UN EX	Utilities/Non Survey/Unknown/DBYD	[UN EX] Unknown from Digital - DBYD
UN LOCP	Utilities/Non Survey/Unknown/PLOTTED	[UN LOCP] Unknown Plotted
UN CON	survey/Utilities/Unknown/Feature/CONDUIT	[UN CON] Unknown Conduit
UN LOC	survey/Utilities/Unknown/Feature/SERVICE	[UN LOC] Service Located Unknown Pipes - Quality TBA
UN MHS	survey/Utilities/Unknown/Feature/MANHOLE	[UN MHS] Unknown Manhole (Strung)
UN MH	survey/Utilities/Unknown/Feature/MANHOLE	[UN MH] Unknown Manhole
UN MK	survey/Utilities/Unknown/Feature/MARKER	[UN MK] Unknown Marker Post
UN OH	survey/Utilities/Unknown/Feature/OVERHEAD	[UN OH] Unknown Overhead
UN PITS	survey/Utilities/Unknown/Feature/PIT	[UN PITS] Unknown Pit (Strung)
UN PIT	survey/Utilities/Unknown/Feature/PIT	[UN PIT] Unknown Pit
UN POL	survey/Utilities/Unknown/Feature/POLE	[UN POL] Unknown Pole
UN POT	survey/Utilities/Unknown/Locate/POTHOLE	[UN POT] Service Pothole

UN STR	survey/Utilities/Unknown/Building/STRUCTURE	[UN STR] Unknown Structure
UN V	survey/Utilities/Unknown/Fittings/VALVE	[UN V] Unknown Valve

Survey Contour List

Existing contours created in 12d Model via the **Tin => Contour => Contour, Smooth and Label**

NAME	MODEL NAME	FEATURE
SV MAJ	Contours/Survey/MAJOR	[SV MAJ] Survey Major Contour
SV MIN	Contours/Survey/MINOR	[SV MIN] Survey Minor Contour
SV LAB	Contours/Survey/MAJOR	[SV LAB] Survey Contour Label

5.0 MODEL NAMING

Whilst the default model naming conventions are part of the **names.4d** file, there are other ways models are created in 12d Model e.g. through functions like the Apply MTF and other 12d Model tools.

There can also be additions done to the default model naming conventions to help identify owners or if various 12d Model design projects are required for large or multiple zoned breakups.

Overall, the grouping of the model tree will use a mixed camel case for the branches with the end branch will be all upper case.

Examples

- Alignment/ROADS
- Design/Furniture/BARRIER
- Survey models don't start with a capital – survey/Road/KERBS
- Tin models don't start with a capital – tin/Design/Roads

5.1 Survey Models

All survey Models to have the Prefix "**survey/**"

- If the Survey is split into Zones/Areas, the reference is to be added as a model branch after the Survey/ e.g. **survey/01/**

See survey string names for other default model names. Differences to be documented in the **Project Description**.

There are some exceptions where there might be like grouping required for proposed features like cadastral boundaries.

Examples:

- Cadastral/Survey/BOUNDARY - Cadastral/Proposed/BOUNDARY
- Cadastral/Survey/LOT NUMBERS - Cadastral/Proposed/LOT NUMBERS
- Contours/Survey/MAJOR – Contours/Proposed/MAJOR
- Contours/Survey/MINOR – Contours/Proposed/MINOR

For Survey Contours the models are:

- Contours/Survey/MAJOR
- Contours/Survey/MINOR

If different intervals are required a prefix group could be added:

- Contours/Survey/**100mm**/MAJOR

Survey Triangulation Models

All triangulation models start with "**tin/**".

For the general survey triangulation created from feature pick up models from the **Tin => Create => Triangulate Data**.

- **tin/Existing/SURVEY**

Other survey features may require different triangulations. These could be for calculation, visual or other feature data.

- **tin/Existing/LIDAR** - Flown laser survey surface
- **tin/Existing/STRIP** - Translated survey surface for topsoil stripping
- **tin/Existing/PAVEMENT** - to display existing road areas in plan or sections

When different surface tins need to be combined a Super tin will need to be created. All Super tins to be prefixed with "**tin/Super/**".

- **tin/Super/Existing/SURVEY COMBINED** - Combined survey features and lidar data.

Survey models and tin updates should be created via a Chain. See **10.0 Chains** area.

Note: Survey tin models don't need to be shared out. This automatically happens when the tin is shared.

5.2 Design Models

See the **names.4d** for default proposed and CAD model naming. The CAD string naming also has a list of the default models names. The **names.4d** file also sets the default the colour, linestyle and or symbol.

Key	Att Key	Name	Model	Colour	Point Line	Linestyle	Weight	Comment
BWB*	optional	optional	Design/Furniture/BARRIER	red	line	W_BEAM_L	optional	[BWB] W Beam barrier
BWR*	optional	optional	Design/Furniture/BARRIER	red	Line	WIRE_ROPE	optional	[BWR] Wire Rope Barrier
HMP*	optional	optional	Design/Furniture/ROAD	dark red	point	0	optional	[HMP] Hazard marker post
RGS*	optional	optional	Design/Furniture/ROAD	acad 010	point	0	optional	[RGS] Sign
WMP*	optional	optional	Design/Furniture/ROAD	dark red	point	0	optional	[WMP] Width marker post
WLSTP1*	optional	optional	Design/Furniture/ROAD	dark red	point	0	optional	[WLSTP1] Wheelstop 1.4m
WLSTP2*	optional	optional	Design/Furniture/ROAD	dark red	point	0	optional	[WLSTP2] Wheelstop 2.0m
L1*	optional	optional	Design/Line Marking/LINES	acad 132	line	LANE BROKEN	optional	[L1] Lane Lane 3x9
CHEV*	optional	optional	Design/Line Marking/LINES	acad 132	line	1	optional	[CHEV] Chevron
LCY*	optional	optional	Design/Line Marking/LINES	acad 132	line	1	optional	[LCY] Cycle Line
LC*	optional	optional	Design/Line Marking/LINES	acad 132	line	CONTINUITY DESIGN	optional	[LC] Continuity Lines 1x3
LB*	optional	optional	Design/Line Marking/LINES	acad 030	line	1	optional	[LB] Bus Line
LE*	optional	optional	Design/Line Marking/LINES	acad 132	line	1	optional	[LE] Edge line
LN*	optional	optional	Design/Line Marking/LINES	acad 132	line	1	optional	[LN] Continuous Lines
LGW*	optional	optional	Design/Line Marking/LINES	acad 132	line	GIVE WAY DESIGN	optional	[LGW] Give Way line 300 wide
LHD*	optional	optional	Design/Line Marking/LINES	acad 132	line	HOLDING DESIGN	optional	[LHD] Holding line 200 wide

String name

Model name

Colour

Linestyle

Again, manual proposed models will generally start with "**Design/**" and drafting models start with "**CAD/**", there can be other types of groupings created from other features.

The default models can also be added to or used as a Prefix, just like the string names.

Alignment Models, prefix with **Alignment/** and generally associated with the string type prefix:

- **Alignment/CONSTRUCTION**
- **Alignment/KERBS**
- **Alignment/PATHS**
- **Alignment/TRAFFIC**
- **Alignment/WALL**
- **Alignment/DRIVE**
- **Alignment/DRAINAGE**
- **Alignment/VPATH**
- **Alignment/ROADS**
- **Alignment/MODIFIERS**
- **Alignment/HINGE**

Note: Area or Zones can be introduced into models to separate for sharing purposes.

- **Alignment/Area ID/ROADS**

Other models and models Prefixes:

Cadastral/Proposed/*	- Proposed Cadastral models Prefix
Contours/Proposed//MAJOR	- Proposed Major contour model
Contours/Proposed//MINOR	- Proposed Minor contour model
Boundary/*	- Proposed boundary models
Fence/*	- Models for fencing design strings
Plot/*	- Plotting models
Sight/*	- Sight distance checks
Trimesh/*	- Proposed Trimesh models

Service and Utility Models:

Sewer/*	- Proposed Sewer models Prefix
Storm/*	- Proposed Stormwater models Prefix
Utilities/Communications/*	- Proposed communications models Prefix
Utilities/Electricity/*	- Proposed electrical models Prefix
Utilities/Gas/*	- Proposed gas models Prefix
Utilities/Petroleum/*	- Proposed petroleum models Prefix
Utilities/Recycled Water/*	- Proposed recycled water models Prefix
Utilities/Traffic/*	- Proposed traffic signal models Prefix
Utilities/Water/*	- Proposed water models Prefix

Note: Although attributes are an effective way to associate service providers to a string, If visual separation is desired then extra tree groupings can be added to a model name.

e.g. **Utilities/Communications/Telstra/***

Proposed models are not only created manually but also through design tools like the Apply Function and MTF and Pavement Manager. These various features can have different ways to set the Models.

Apply Many Defaults

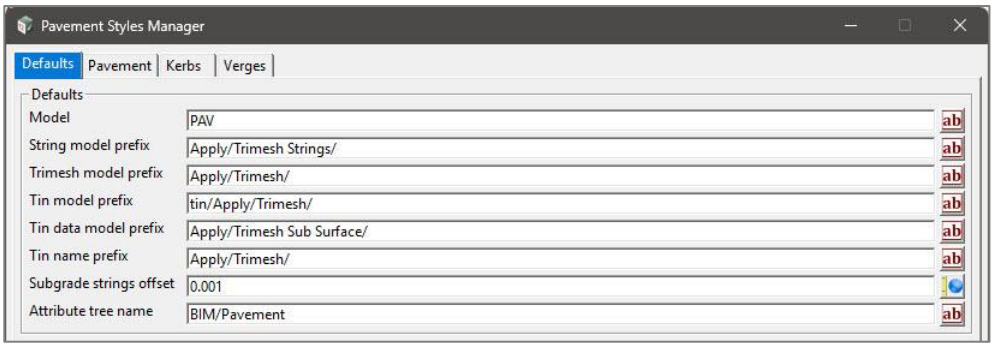
The apply function models are controlled by the **apply many defaults.4d** file. This file is shipped with the 12d Model setups. These models are all prefixed with "**Apply/**".

The "*****" suffix represents the alignment name.

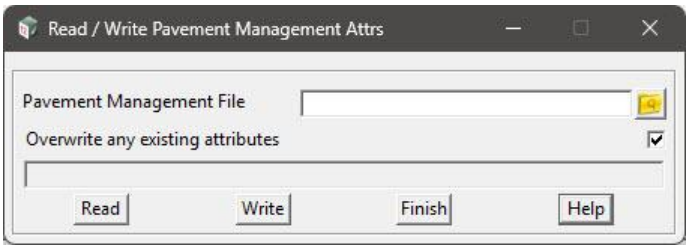
- **Apply/Strings/***
- **Apply/Sections/***
- **Apply/VIS Polygons/*** - The Alignment name can be removed to have a combined model for all
- **Apply/Road Boundaries/***- The Alignment name can be removed to have a combined model for all
- **Apply/Tadpoles/*** - The Alignment name can be removed to have a combined model for all

Pavement Manager

The pavement models are defined in the defaults tab of the Pavement manager. The Pavement Manager is found in the Design menu **Design => Pavement => Pavement styles manager**



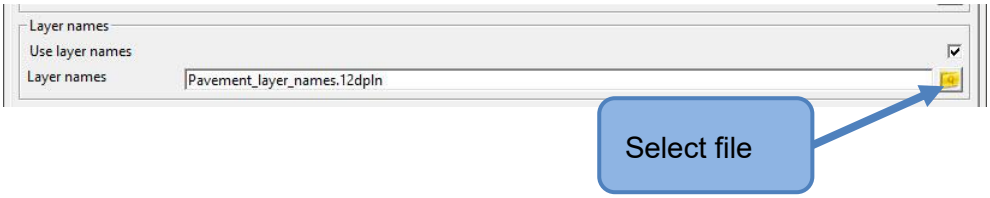
The above are the standard pavement models names. If your company wishes to modify these, they can be changed and write out a new Pavement Style via the **Design => Pavement => Read/Write Pavement Manager**.



Your new **Pavement Style.12dpmn** file can be read in to maintain consistency on all projects.

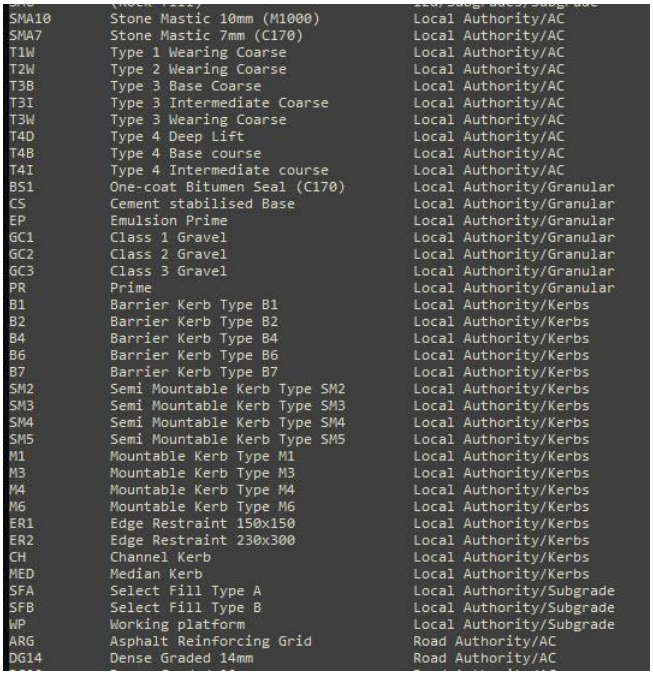
Pavement Layer Names

12d Model ships with an example Pavement Layer Names file.



It is a simple choice list for pavements, kerbs and verges. The Pavement Layer Names file is a text editable file conforming of three columns:

Abbreviated Name **Description** **Choice Group List**



SMA10	Stone Mastic 10mm (M1000)	Local Authority/AC
SMA7	Stone Mastic 7mm (C170)	Local Authority/AC
T1W	Type 1 Wearing Coarse	Local Authority/AC
T2W	Type 2 Wearing Coarse	Local Authority/AC
T3B	Type 3 Base Coarse	Local Authority/AC
T3I	Type 3 Intermediate Coarse	Local Authority/AC
T3W	Type 3 Wearing Coarse	Local Authority/AC
T4D	Type 4 Deep Lift	Local Authority/AC
T4B	Type 4 Base course	Local Authority/AC
T4I	Type 4 Intermediate course	Local Authority/AC
BS1	One-coat Bitumen Seal (C170)	Local Authority/Granular
CS	Cement stabilised Base	Local Authority/Granular
EP	Emulsion Prime	Local Authority/Granular
GC1	Class 1 Gravel	Local Authority/Granular
GC2	Class 2 Gravel	Local Authority/Granular
GC3	Class 3 Gravel	Local Authority/Granular
PR	Prime	Local Authority/Granular
B1	Barrier Kerb Type B1	Local Authority/Kerbs
B2	Barrier Kerb Type B2	Local Authority/Kerbs
B4	Barrier Kerb Type B4	Local Authority/Kerbs
B6	Barrier Kerb Type B6	Local Authority/Kerbs
B7	Barrier Kerb Type B7	Local Authority/Kerbs
SM2	Semi Mountable Kerb Type SM2	Local Authority/Kerbs
SM3	Semi Mountable Kerb Type SM3	Local Authority/Kerbs
SM4	Semi Mountable Kerb Type SM4	Local Authority/Kerbs
SM5	Semi Mountable Kerb Type SM5	Local Authority/Kerbs
M1	Mountable Kerb Type M1	Local Authority/Kerbs
M3	Mountable Kerb Type M3	Local Authority/Kerbs
M4	Mountable Kerb Type M4	Local Authority/Kerbs
M6	Mountable Kerb Type M6	Local Authority/Kerbs
ER1	Edge Restraint 150x150	Local Authority/Kerbs
ER2	Edge Restraint 230x300	Local Authority/Kerbs
CH	Channel Kerb	Local Authority/Kerbs
MED	Median Kerb	Local Authority/Kerbs
SFA	Select Fill Type A	Local Authority/Subgrade
SFB	Select Fill Type B	Local Authority/Subgrade
WP	Working platform	Local Authority/Subgrade
ARG	Asphalt Reinforcing Grid	Road Authority/AC
DG14	Dense Graded 14mm	Road Authority/AC

A Pavement Layer Names file can be created to suit your Companies requirements for each Client or all Clients using the Groups to separate. These files can be kept in in your Company User Lib folder for selection.

5.3 Design Tins

See design tin naming. "*" represents alignment name.

9. **tin/Apply/*** - Created from the apply function per alignment
10. **tin/Design/[DESCRIPTION]** - Final design tin
11. **tin/Design/Area ID/[DESCRIPTION]** - Final design tin with area/zones
12. **tin/Apply/Trimesh/*[PAVE TYPE]** - Pavement tins see Pavement Manager

Supertins have a prefix tin/Super/Design.

- **tin/Super/Design/[DESCRIPTION]** - Combinations of Design tins
- **tin/Super/Design/Area ID/[DESCRIPTION]** - Combination of Design tins in a area/zone
- **tin/Super/COMBINE** - Combination of Design and Survey tins

6.0 DESIGN FUNCTIONS

Most of the working design models are created from **Apply MTF** functions. There are other functions that create the model names. These are to follow standard naming conventions.

6.1 Function naming

General Functions

Prefixes for general function naming:

- Contour/Proposed/* Proposed Contours
- Contour/Existing/* Existing Contours
- Component/* Component design object function
- Pave/* Pavement by Tin colour
- Widening/* Widening function (Creates Tin envelops)
- Inter/* Interface function
- Table/**[Type]**/* Setout table for Super Alignments
- Ramps/* Pedestrian ramp function

Apply MTF

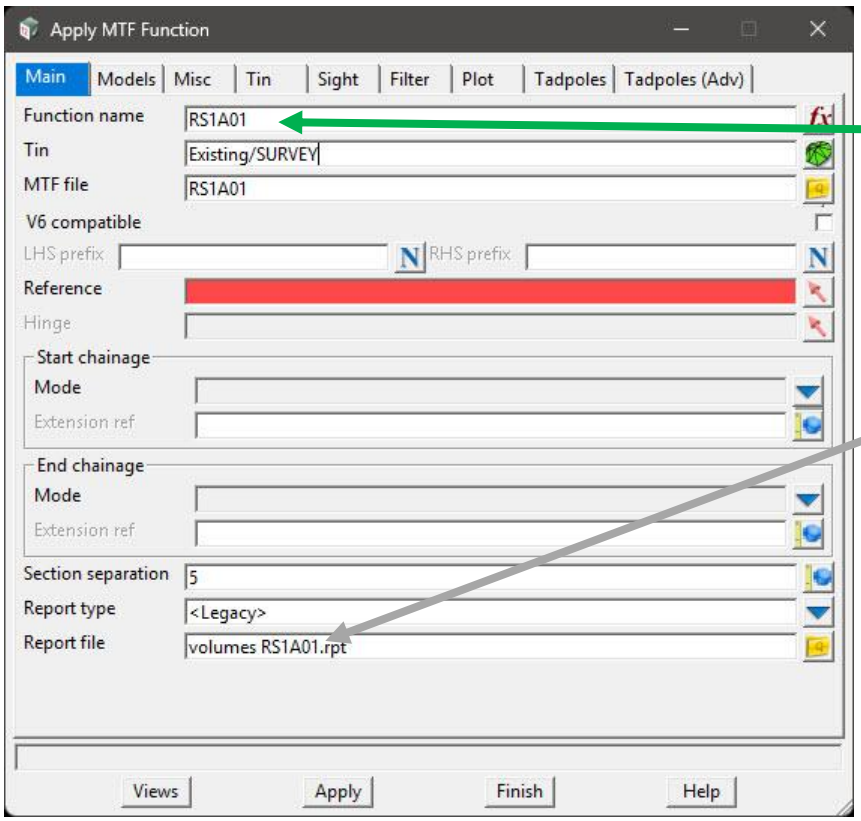
Design Apply MTF function naming:

- Apply/**a**Hwy/* Highway design strings function
- Apply/**a**Mwy/* Motorway design strings function
- Apply/**a**Roads/* General Road design strings function
- Apply/**b**Kerbs/* Kerb Return design strings function
- Apply/**c**Traffic/* Traffic Island design strings function
- Apply/**d**Drain/* Drainage channel strings function
- Apply/Pave/* Separate apply function pavement snippets
- Apply/Xfall/* Crossfall strings function

- The optional component is for list order
- "*" represents alignment name.

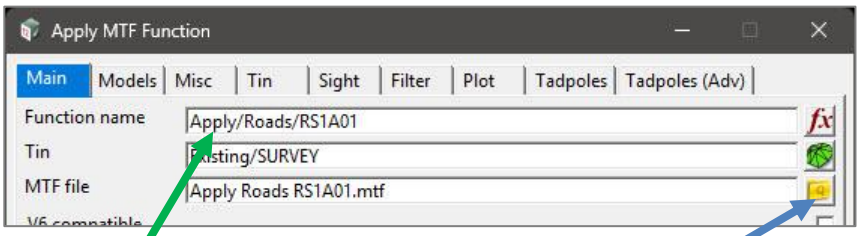
Default settings for the Apply MTF function can be altered under, **Design => Apply => Defaults => Apply MTF Defaults**. The shipped version has been set as a base default to comply with the Public Works naming standards. However, if modifications are required. the new **apply_many_defaults.4d** file should be kept in the Company **User** folder for consistency settings for all Users.

The Apply MTF function, **Design => Apply => Apply MTF**



Initially type the name of the Alignment. Then select **<Enter>**

Note: This will populate the required fields in the Apply function



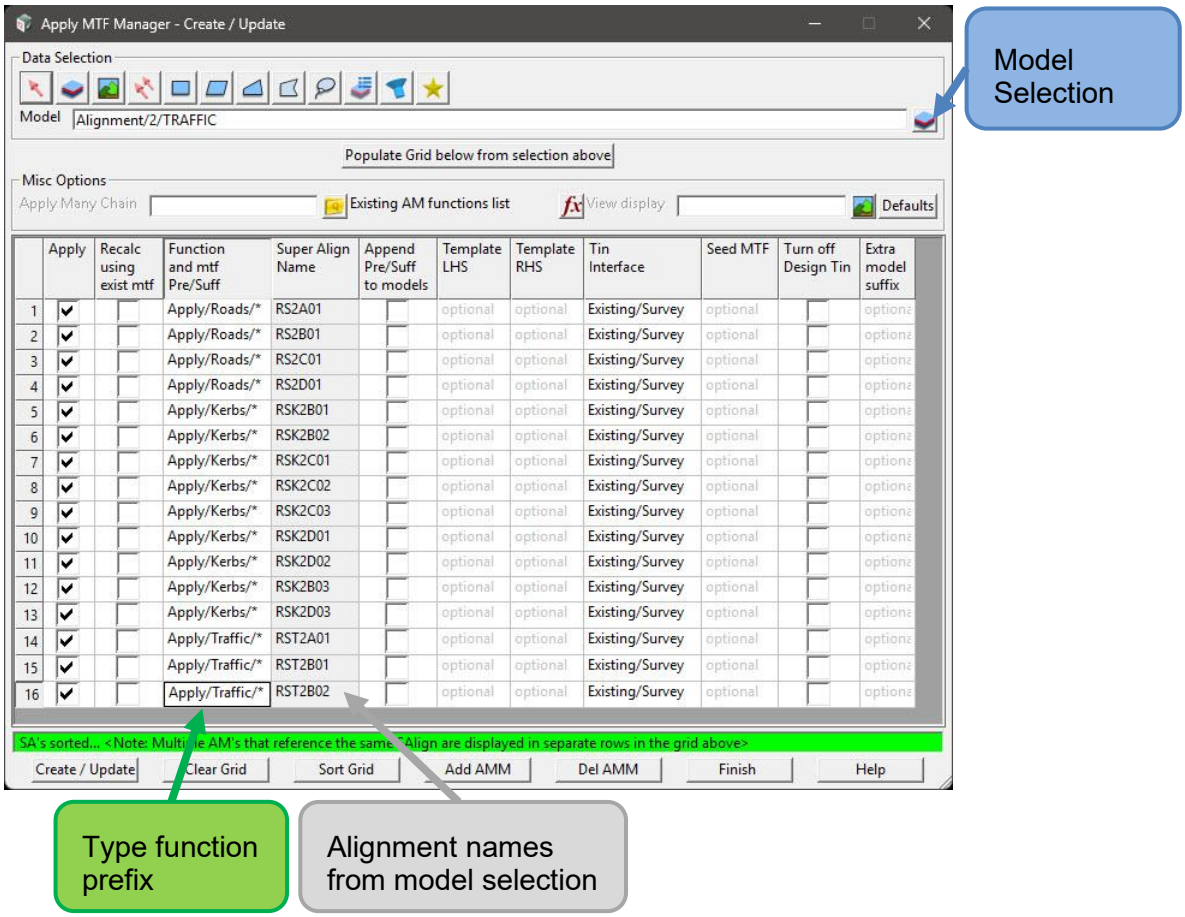
Add final name

Select matching MTF file

MTF Manager

If using the Apply MTF Manager to create functions and MTF files, then the above is not required. The Apply MTF Manager still use the Apply MTF Defaults to create its models.

Design => Apply => Apply MTF Manager



TIN Functions

TIN function naming:

- tin/Existing/* Existing / Survey tins
- tin/Design/* Proposed tins

F.Y.I.

The "*" is for the description. It could also include an extra grouping to represent an area or zone. E.g. tin/Design/01/ROADS

Note: Additions functions are to be documented in the

Project Description Panel

6.2 MTF Naming

MTFs are created to run in the Apply functions and should follow the same naming as the functions with the “/” replaced with a space. These represent the action they are performing on an alignment.

e.g. Function **Apply/Roads/RSA01** would contain MTF **Apply Roads RSA01**

When MTFs are run in the Apply functions they are to run with **NO** errors.

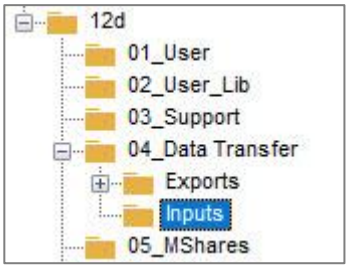
7.0 DATA IMPORT AND EXPORT

7.1 Data Import

Data importing is important to synchronize data across different areas, disciplines and external consultants and existing features.

There are numerous file types that might be received, e.g. general data files, dat or txt formats or 3d dwg or dxf files. These are to be processed and read into 12d Model Projects for ease of sharing between all Users on a project. the Projects using naming rules SUR, XDD and XTR are to be used for this purpose.

All files for importing are to be located under the **04_Data Transfer/Inputs** folder.



Using this input folder allows for easy data update in the reference projects via chains.

See 10.0 Chains

External Data

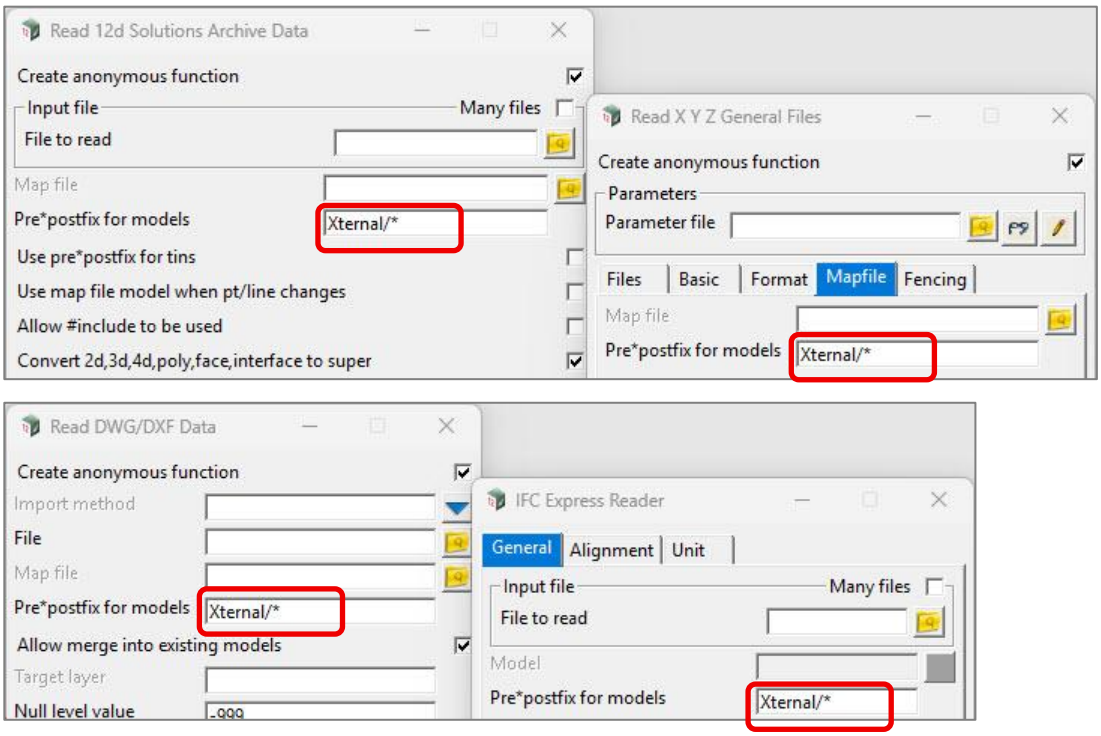
Excluding survey data, Data read in from the Import folder from external sources are to go into 12d Model projects e.g. [Project No.] XDD

This data can be received in many types, e.g. 12da, IFC, 2d/3d DWG or DXF files or other xyz type files.

For any data read in, the model names are to be prefixed. This prefix is **Xternal/Type/***

The optional **Type** is to group the data. It could also include sub groups e.g. **Xternal/Utilities/Gas/***

For 12da data this might just be a simple Prefix to add to the models, otherwise a mapfile file can be applied when reading the data in.



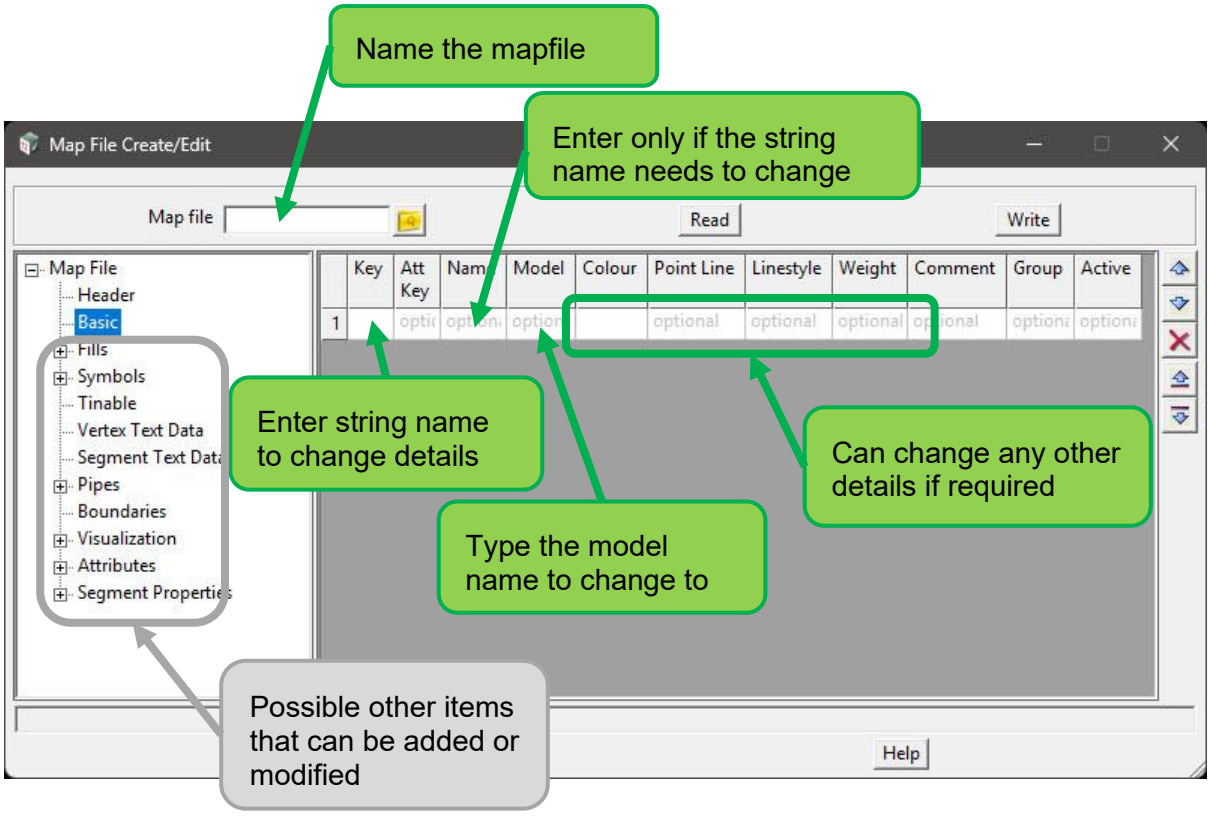
If the import data is already model named appropriate, then a simple prefix can be used as shown here.

If more complex data fixes are required, then using a Map file when importing the data is to be used. Mapfiles can be created under **File => Map Files => Create/edit**.

There are several Public Works standard map files shipped with 12d Model to use or be an example.

- **PW_DESIGN.mapfile** - Primary for the Apply MTF function. Maps template or snippet template strings to plottable colours and applies line styles, etc.
- **PW_SURVEY.mapfile** - For survey data import to make PW compliant.
- **PW_SURVEY_GREY.mapfile** - Same as the PW_SURVEY.mapfile, however changes string colours to grey colours. (mainly used for export design plots)

Simple mapfiles can be created if just being used to prefix models. These can then be saved to the company **User_Lib** or **Customer_Lib** folders for use on other projects if required.



7.2 Sharing

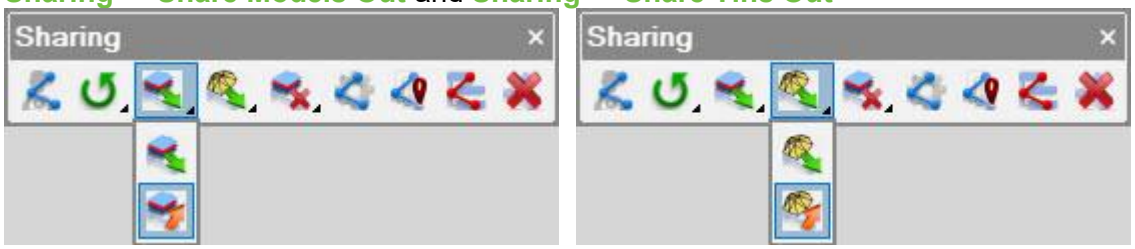
Sharing Models and Tins into your project from other projects means you can have copies of the data that update if changed in the origin projects. This means the copies are not uncontrolled duplicates.

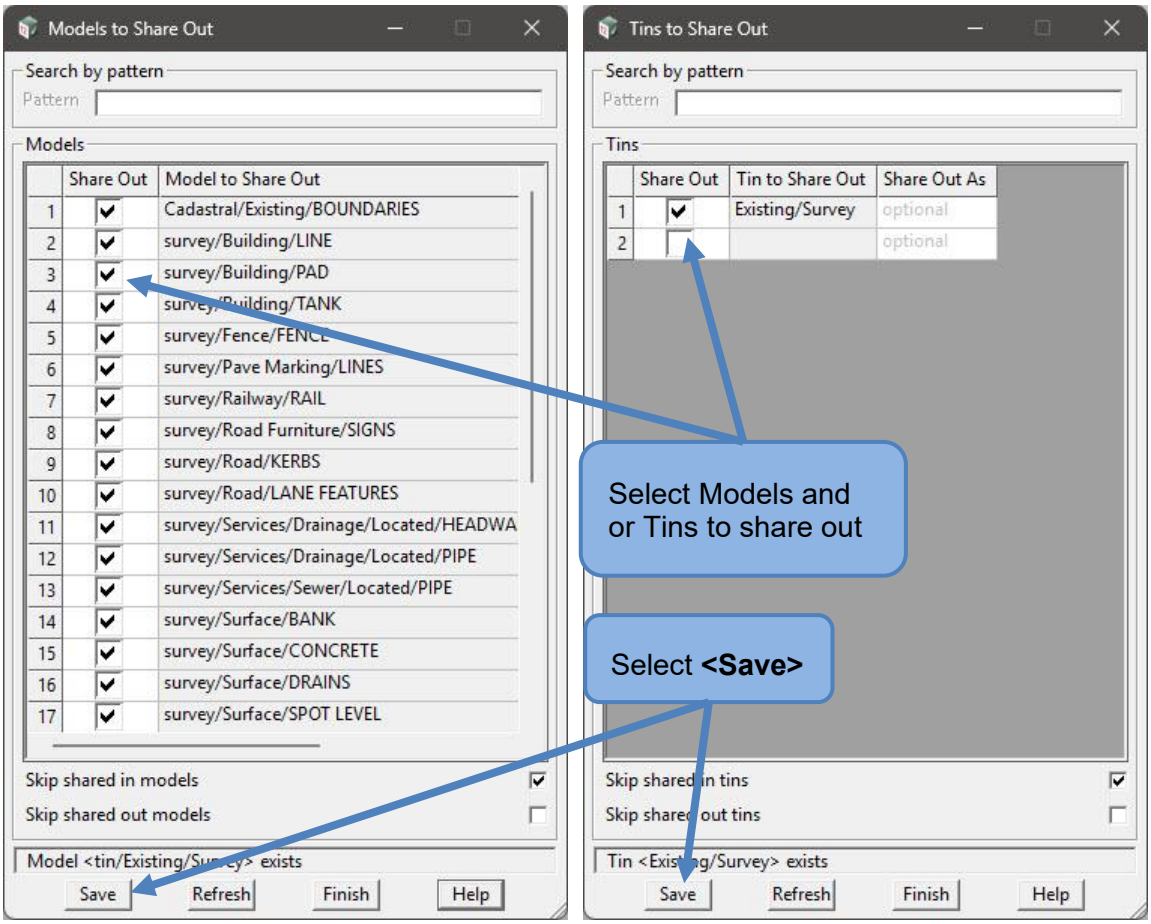
There are two ways to share in Models and Tins, either through **Direct sharing** or by using **Master shares**. In both cases the data must first be shared out from the origin projects.

Sharing Out

Sharing data out is done via **Project => Sharing => Share models out** and **Project => Sharing => Share tins out** . Or, he Sharing Toolbar

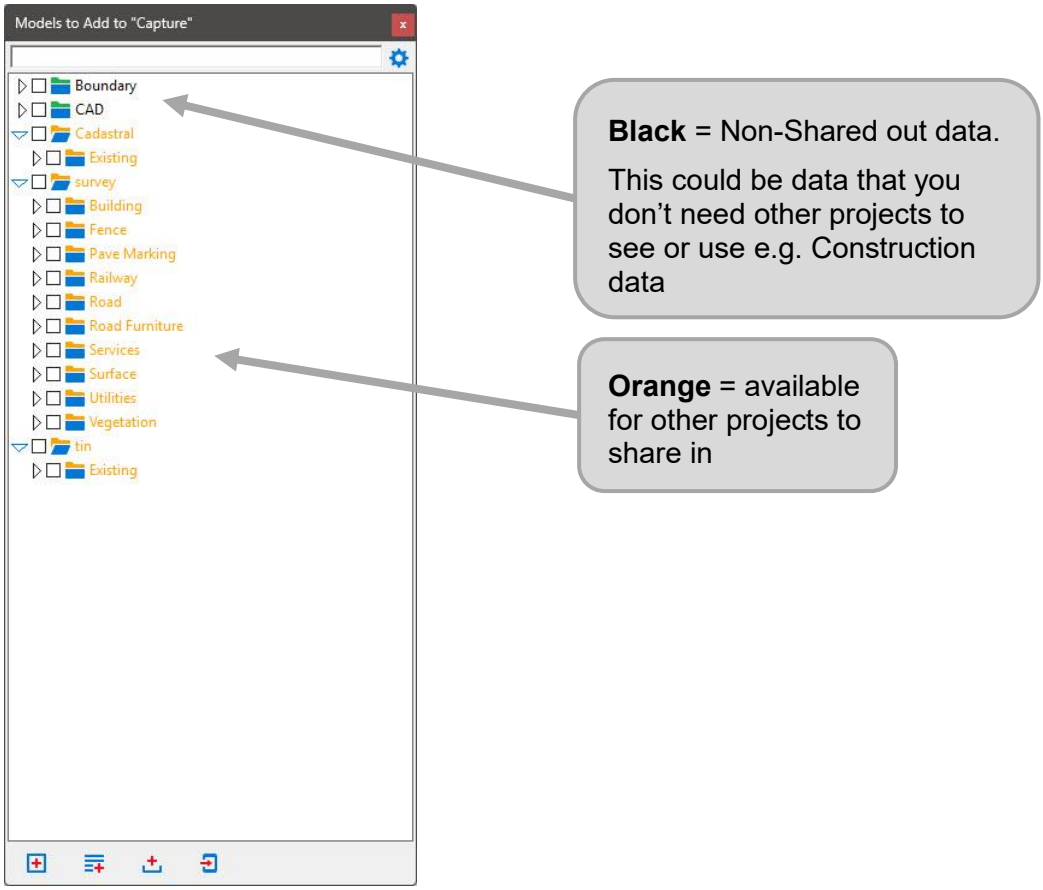
Sharing -> Share Models Out and **Sharing -> Share Tins Out**





In the Share Models Out, there is **No** need to share out the Tin models. Tin models are automatically done when the Tin is Shared in.

Once Models and Tins are shared out the colour display in the model list changes colour from black to an orange representation.

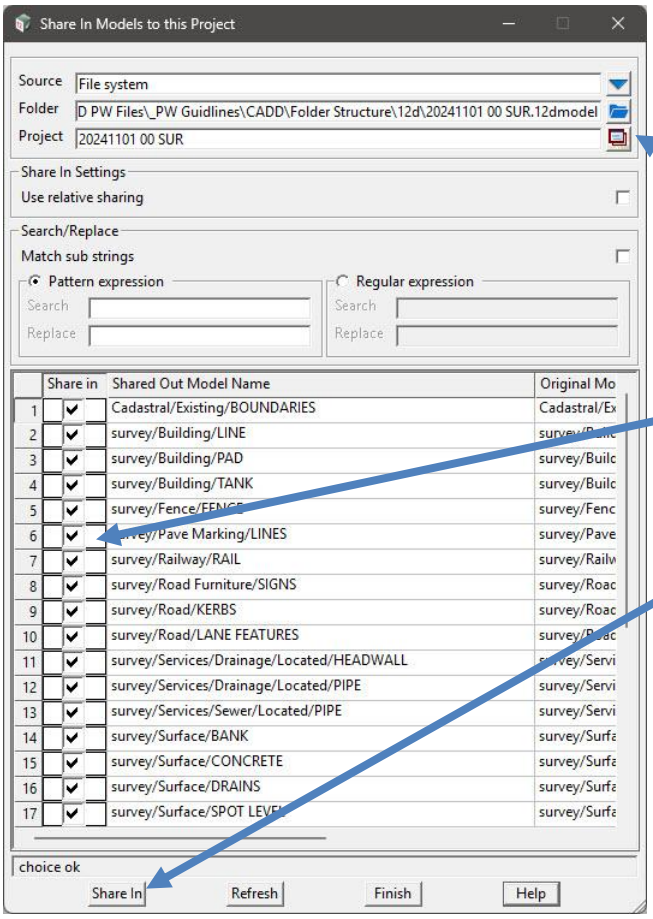


Direct Shares

From your own project you can use direct shares to share in other projects models and Tins that have been made available. This method means that you the User chooses which Models and Tins you want to share in and requires you to check when other data is made available.

Sharing data out is done via **Project => Sharing => Share models In** and **Project => Sharing => Share tins In** . Or, he Sharing Toolbar

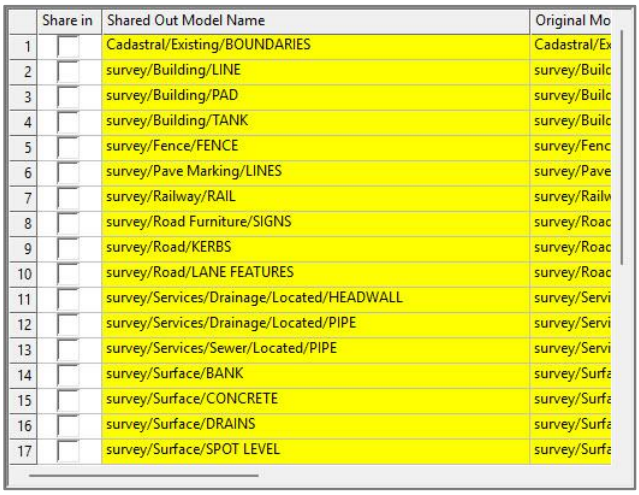
Sharing -> Share Models In and **Sharing -> Share Tins In**



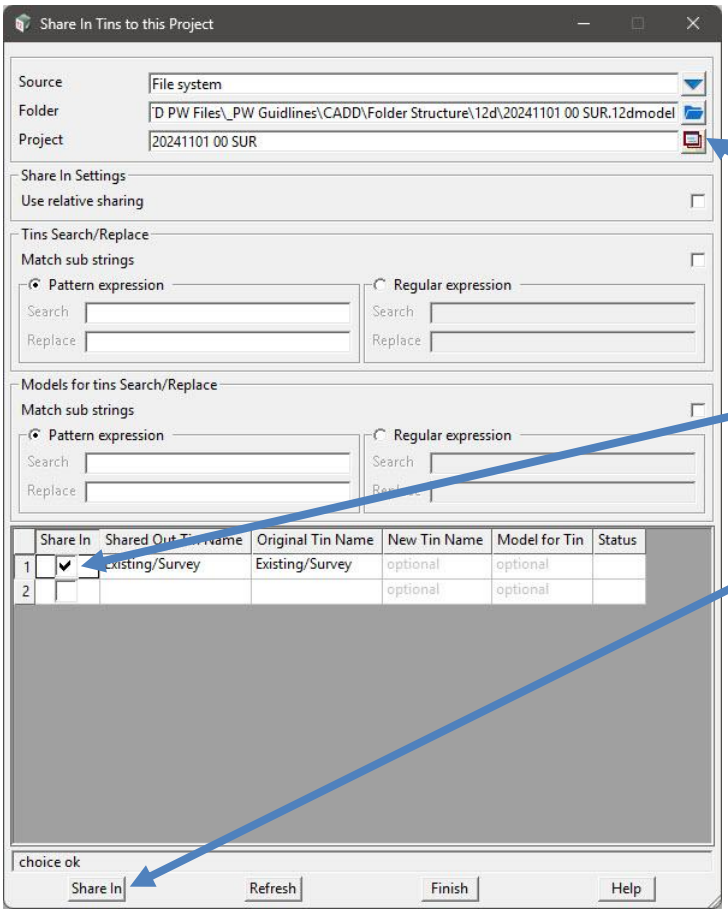
Select project

Select models to share in

<Share in>



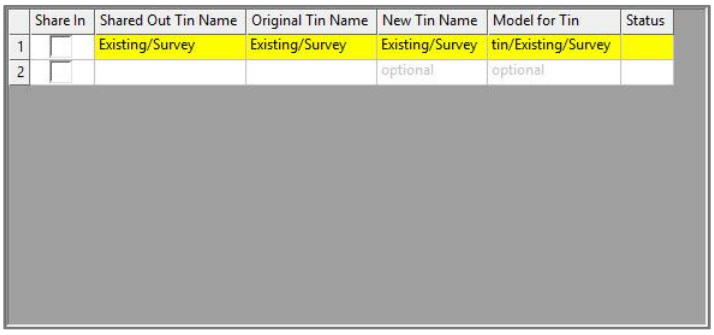
When the Models are shared in, they will appear highlighted.



Select project

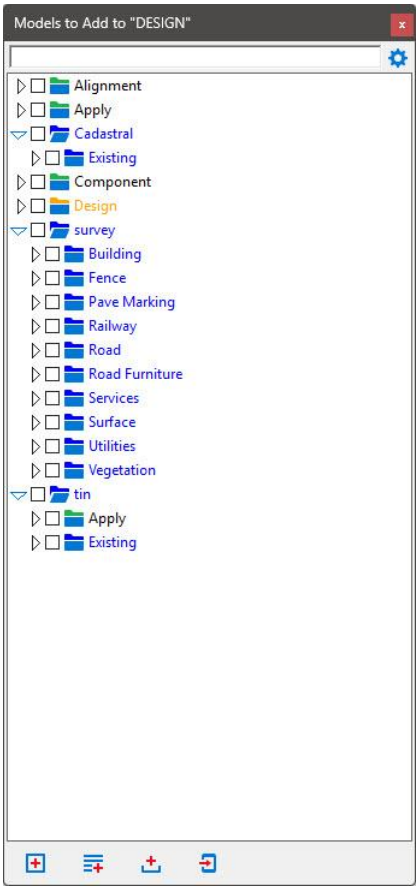
Select Tins to share in

<Share in>



When the Tins are shared in, they will appear highlighted.

When models and Tins are shared in, they display in a **blue** colour in the model list.



Master Shares

A Master Share file is a file that contains Projects Models and Tins, this file can be updated to add or remove Models or Tins at any stage. Unlike direct sharing, if a user subscribes their project to a Master Share file, they will get the data that is in it automatically. Models and Tins can be added or removed from a Master share file at any stage and the Projects subscribed to it will automatically get updated.

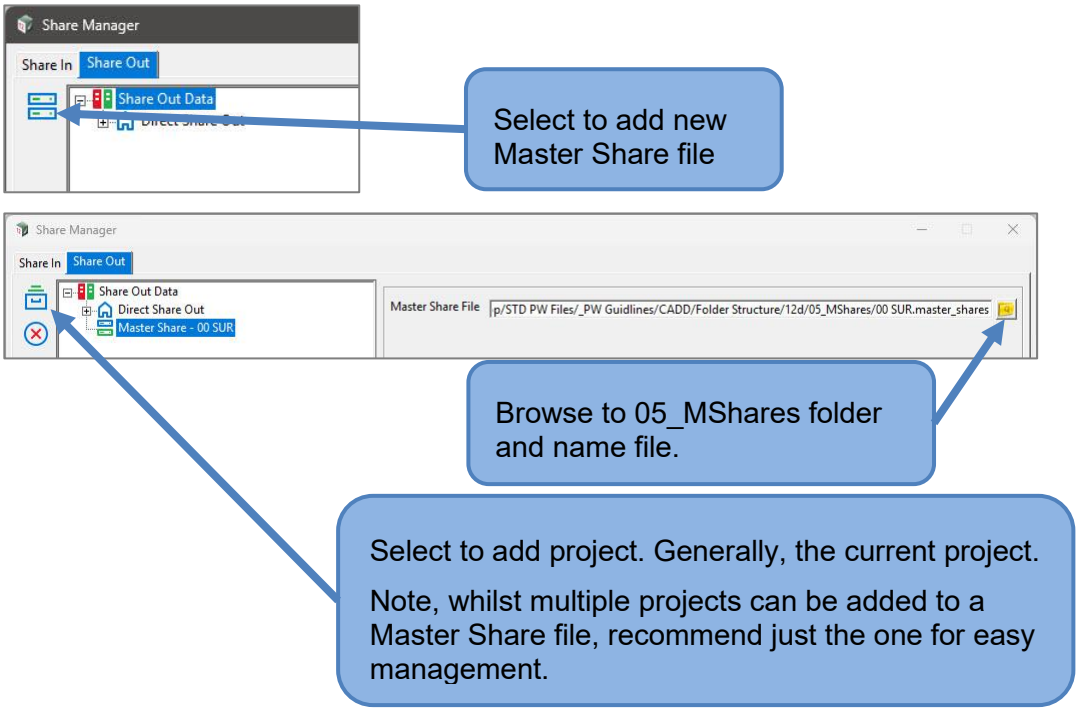
As noted previously, a Master share file does not make a Model or Tin available, this is done via sharing out first. Once this is done the Models and Tins can be added to a Master Share file.

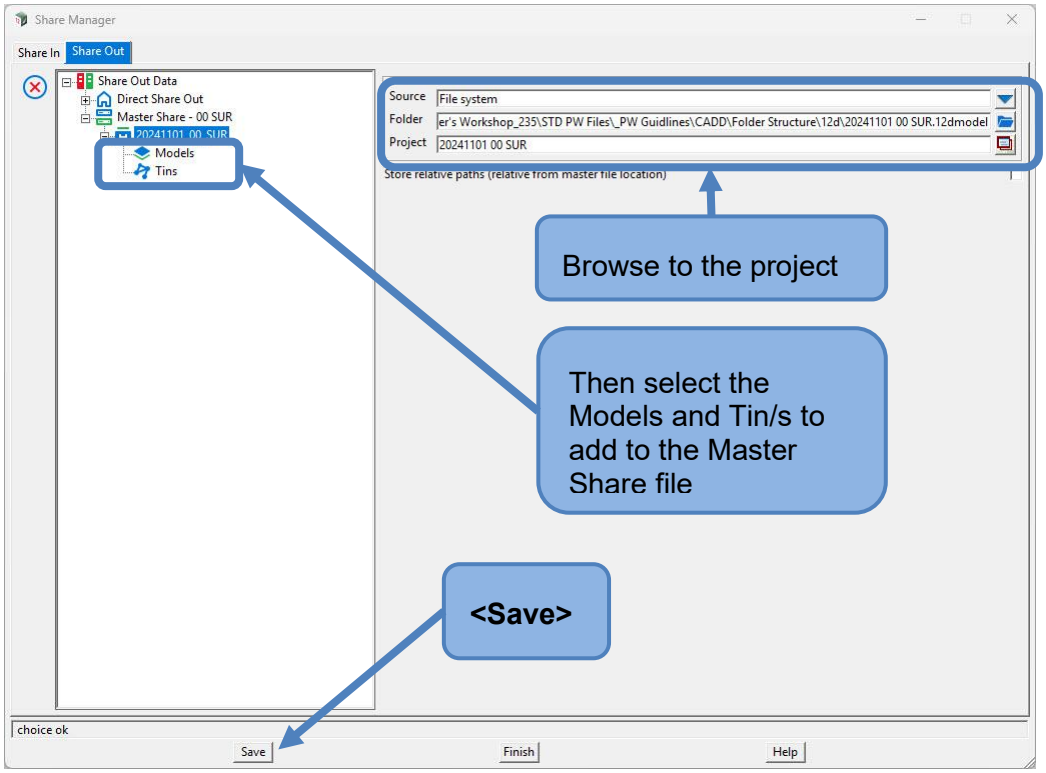
Master Share files are created and subscribed to through the Share Manger in 12d Model V15.

Project => Sharing => Share manager, or toolbar

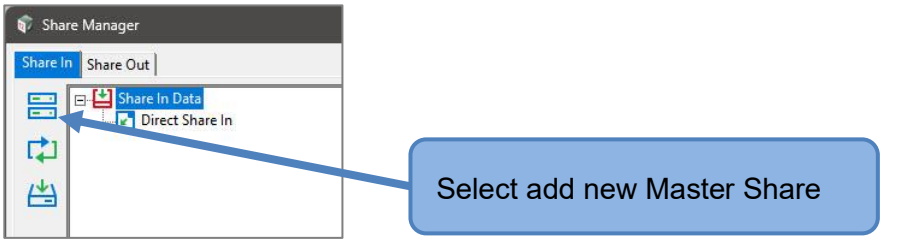
Sharing -> Share Management

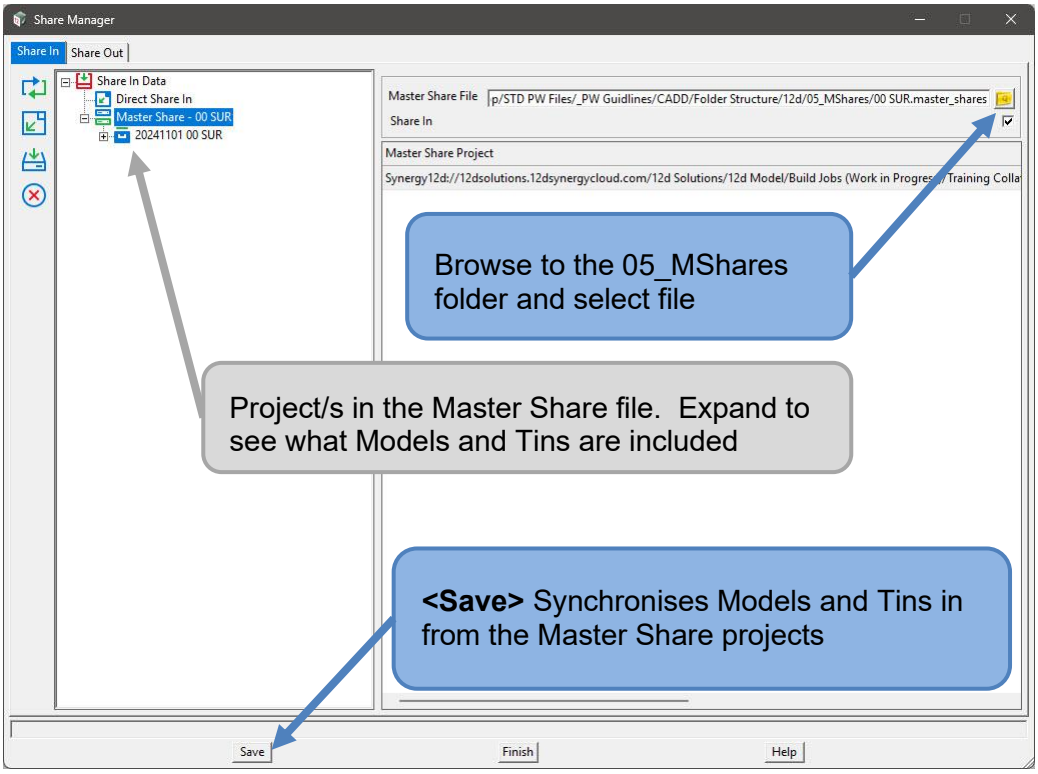
To create a Master Share file, go to the **Share Out** tab.

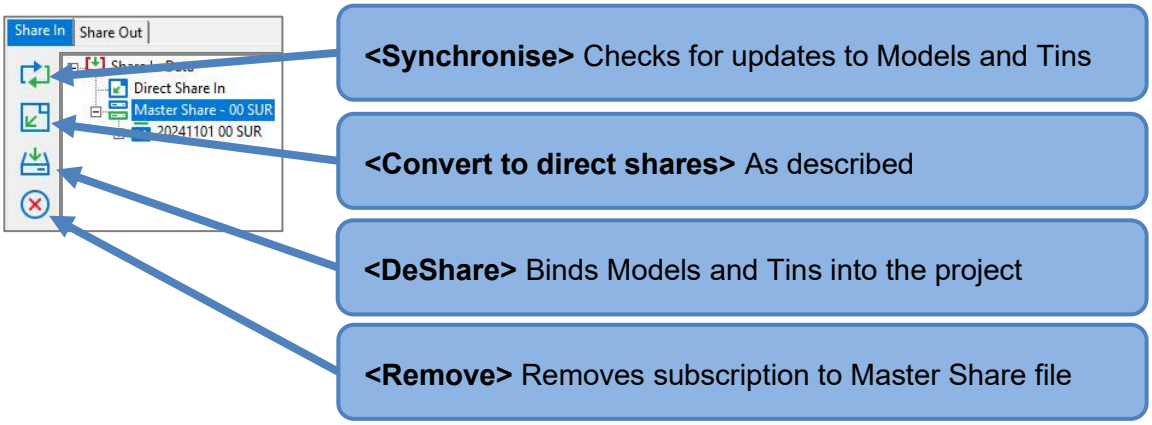




To subscribe to a Master Share file, go to the **Share In** tab.



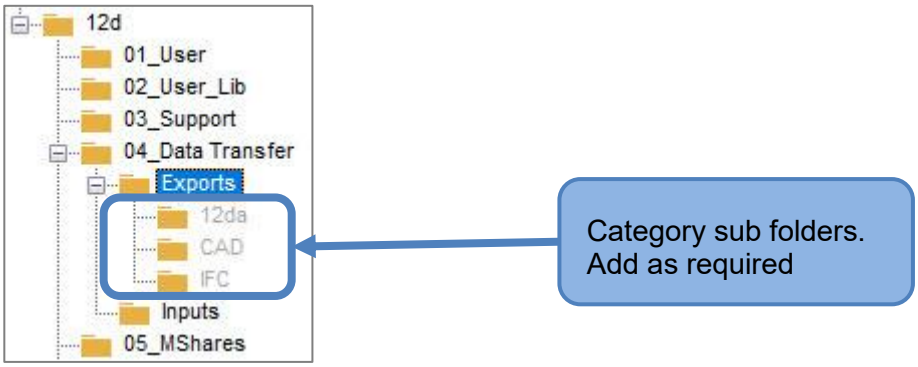




The Models and Tins shared in from a Master share file are still displayed in the blue colour as per direct sharing in.

7.3 Data Export

Exported data from the 12d Model projects is to be saved to the **04_Data Transfer/Export** folder and then under the appropriate category sub folders. These locations are **NOT** a reference location for the Project but a checking location for the 12d Users. When the User is ready, they can copy these files to there required reference folders on the network or Common Data Environment. This controls when the data is ready to be referenced (The data may also be required to pass through the ISO 19650 checks prior to being in a sharing state).



All data exports are to be recorded in a Chain to automate the export and control/record the data that is being exported. See **10.0 Chains**. For this reason, no dates should be included in file names.

While file naming rules may vary depending on the project, the base PW standard is as follows:

[Project Number]-[Export Type]-[Area No.]-[Description]

Export Type Codes:

DA - Design Alignments
DP - Design Plans
DC - Design Cross Sections
DL - Design Long Sections
SP - Survey Plans
XP - External data plans

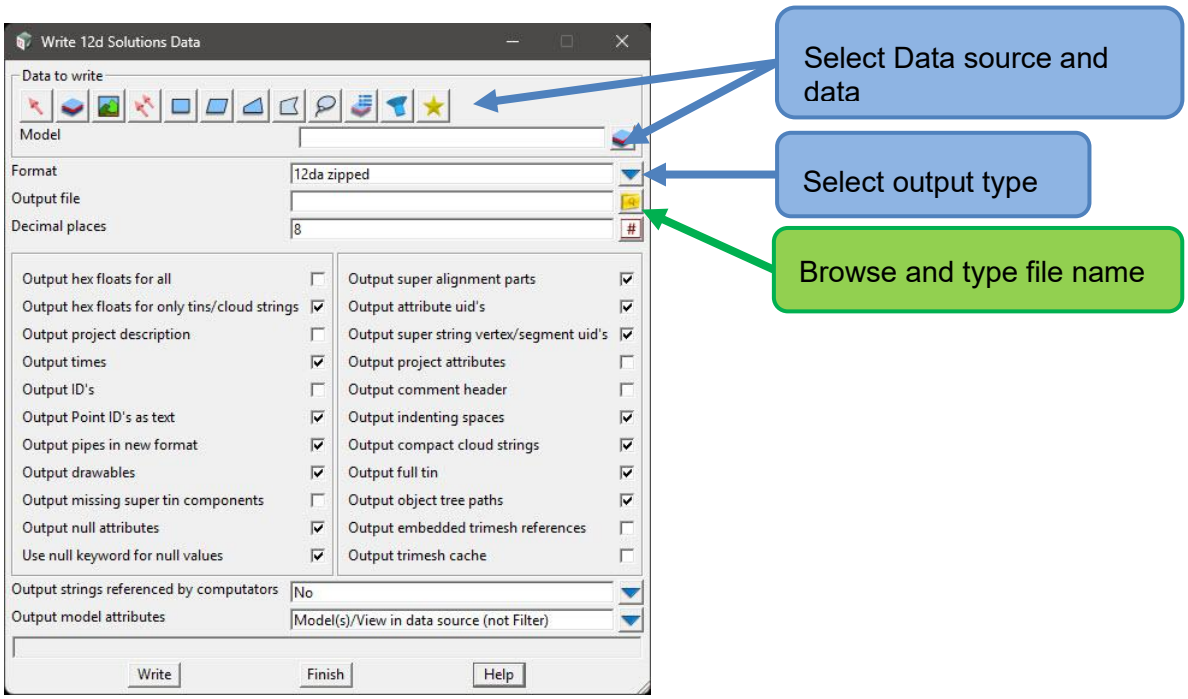
Examples:

12345678-DP-A-CONTOURS-2D.12da
12345678-DP-DESIGN.12da
DA-01-ROADS.12da

12d Data

A 12da or 12daz (compressed) files are defined and published by 12d Solutions to allow data to be easily transferred from other programmes to 12d Model. A 12da file can contain all the entities from a strings name, colour, line style and symbol, including coordinates, models name, attributes, Trimeshes and Tins, etc.

Found under the **File => Output 12d** or **File => Date output => 12d => 12d archive data**



BIM Data

The Standard format for BIM exports is IFC.

ADAC

For ADAC production see the **PW Guidelines – Asset Capture**

Cad data

For offices exporting the 12d data for CAD Xrefs here is a guide. If producing the final PDF via 12d Model through MPS (Multipage Plots) then refer to **9.4 MPS (Multipage Plots)**.

For DWG exports for Xref purposes the same naming rules are to apply however a "**X-**" prefix is to be added.

Examples:

X-12345678-DP-DESIGN.dwg

X-DL-RSA01.dwg

Provided the Public Works naming convention is used for 12d Model strings, Standard export files are shipped to map 12d strings to CAD layers. This is done via an acadmf file which matches layers already set in a dwt file.

For the line types from 12d Model to match CAD, first download the CAD line style shape files from the 12d Model forum site:

https://forums.12dmodel.com/download/file.php?id=1122

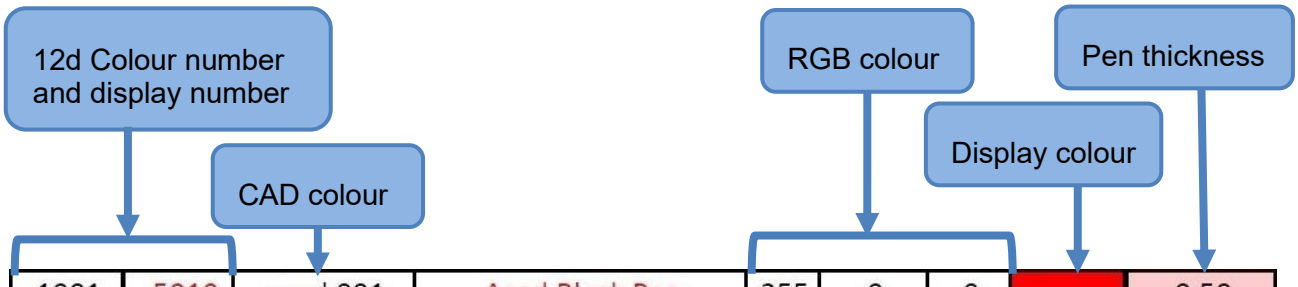
This is a zip file **PW_CAD_Files.zip**. This file contained:

- Shapes folder
- PW_Linetypes.lin
- PW-A1.ctb
- PW-A3.ctb
- CAD pen widths.jpg

The CTB files included, are for A1 and A3 plotting.

Set the Line style and CTB files to the required CAD support paths.

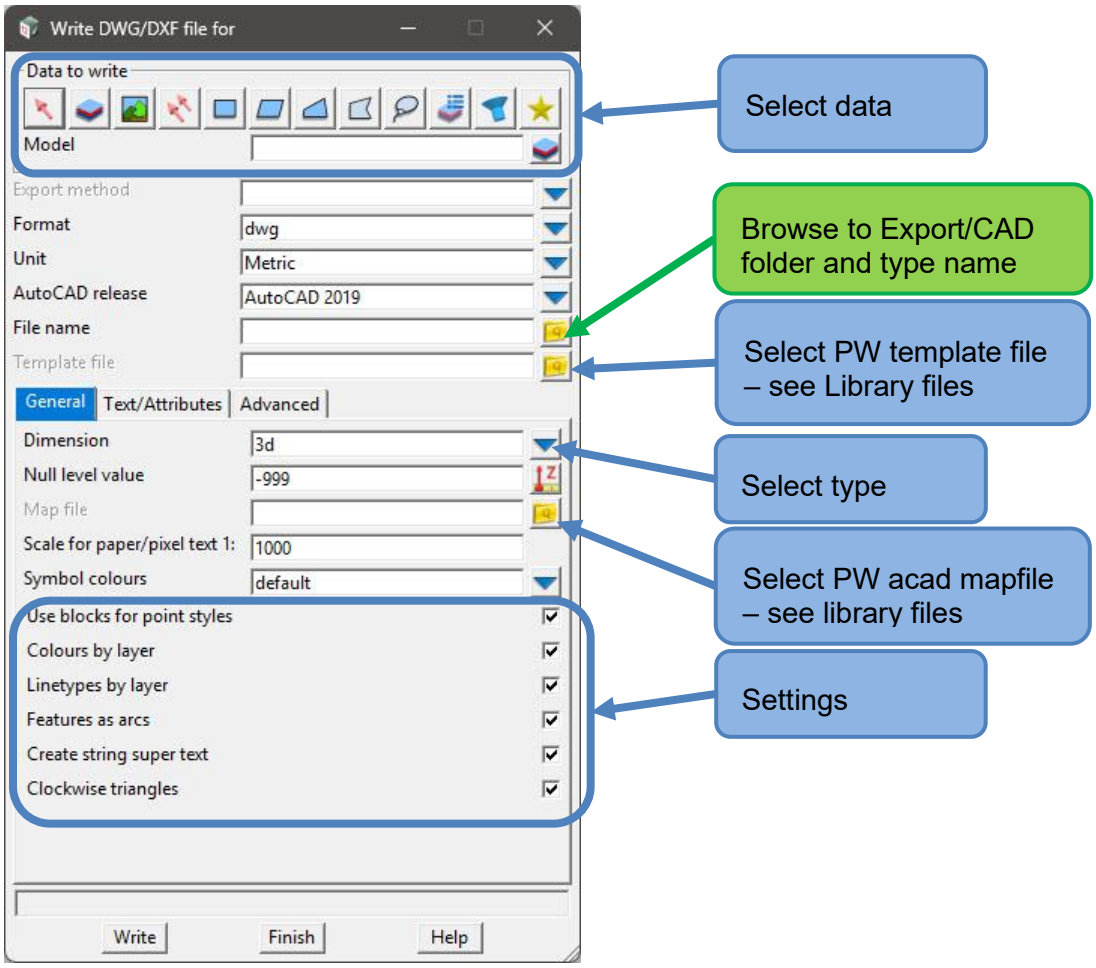
The included image is a visual guide to the standard black pens and widths set to match 12d.

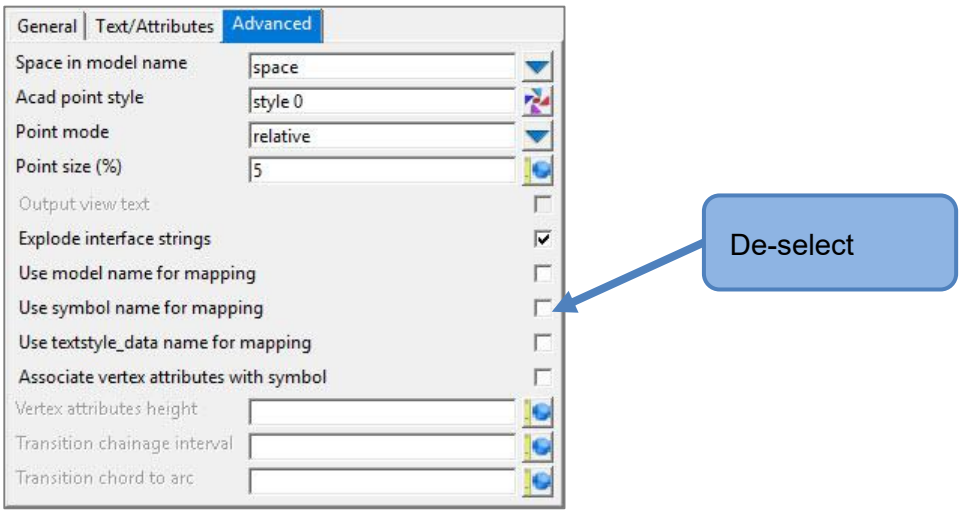


1001	-5010	acad 001	Acad Black Pen	255	0	0		0.50
1030	-5009	acad 032	Acad Black Pen	255	127	0		1.00
1002	-5008	acad 002	Acad Black Pen	255	255	0		0.35
1003	-5007	acad 003	Acad Black Pen	0	255	0		0.50
1004	-5006	acad 004	Acad Black Pen	0	255	255		0.25
1005	-5005	acad 005	Acad Black Pen	0	0	255		0.70
1006	-5004	acad 006	Acad Black Pen	255	0	255		0.35
1007	-5003	acad 007	Acad Black Pen	255	255	255		0.25
1008	-5002	acad 008	Acad Black Pen	128	128	128		0.18
1009	-5001	acad 009	Acad Black Pen	192	192	192		0.13

For DWG export, **File => Data Output => DWG/DXF/DXB => DWG/DXF/DXB**

Or Toolbar, **Quick Access -> Data Export -> DWG/DXF Export**





PW Library **[Lib]** files for exporting 12d strings to CAD.

Dwt files included:

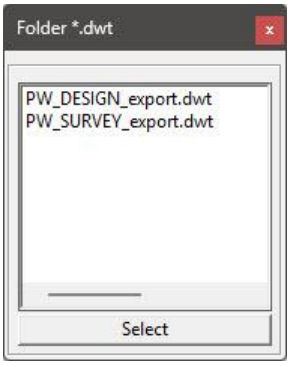
PW_DESIGN_export.dwt - Design strings output

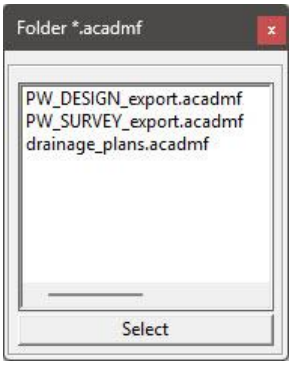
PW_SURVEY_export.dwt - Survey strings output

Each dwt file has a matching acadmf file:

PW_DESIGN_export.acadmf - Design 12d String to CAD layers

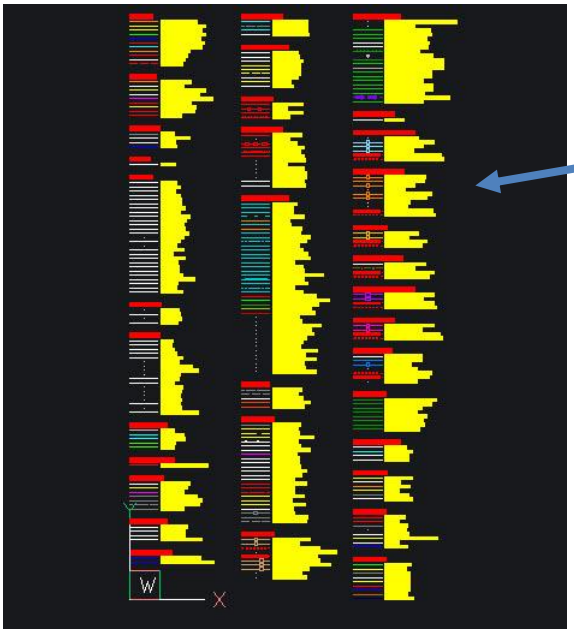
PW_SURVEY_export.acadmf - Survey 12d strings to CAD layers





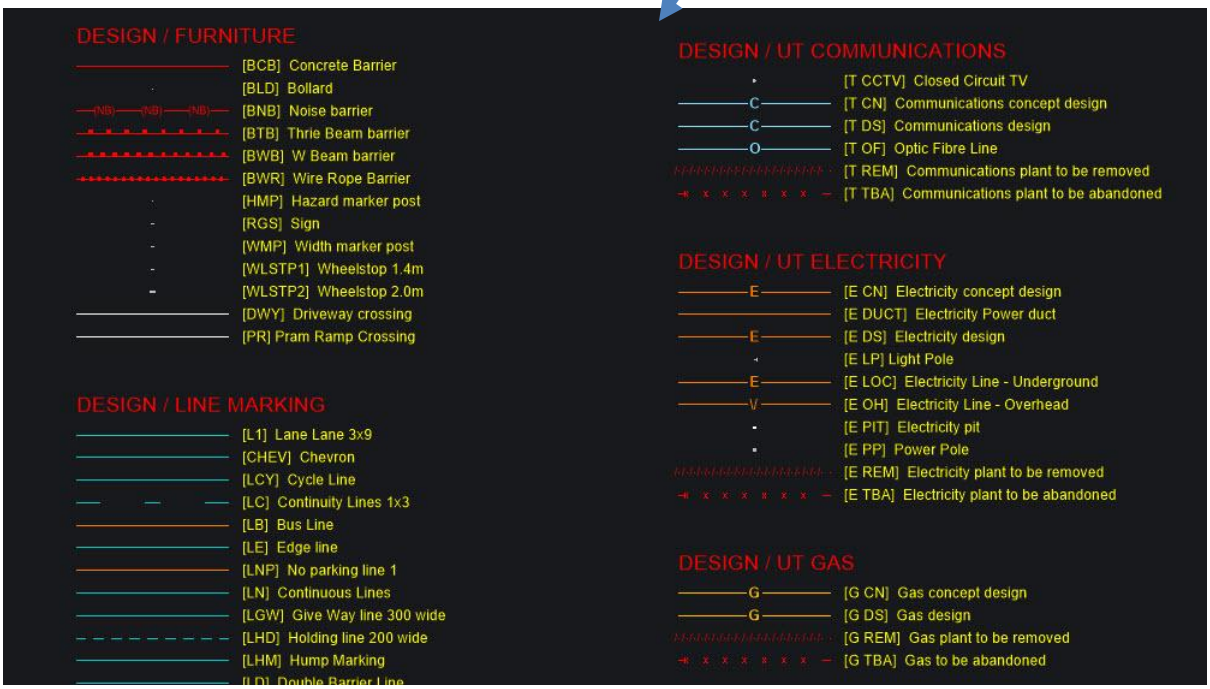
Note: Survey CAD exports to default colours. If exporting survey for design Xref use, the user will have to change the CAD layer colours to desired grey colours for existing features. Suggest matching colours to **PW_SURVEY_GREY.mapfile**

Design dwt

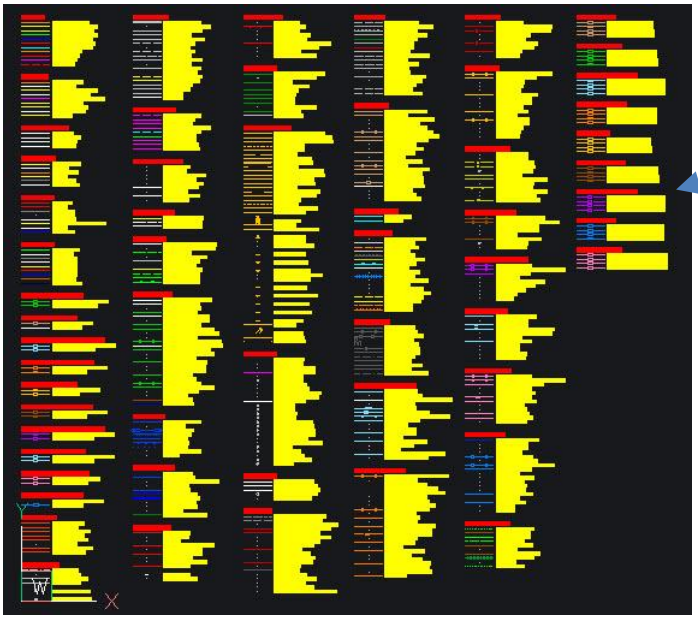


dwt legend inserted at 0,0

Detail



Survey dwt

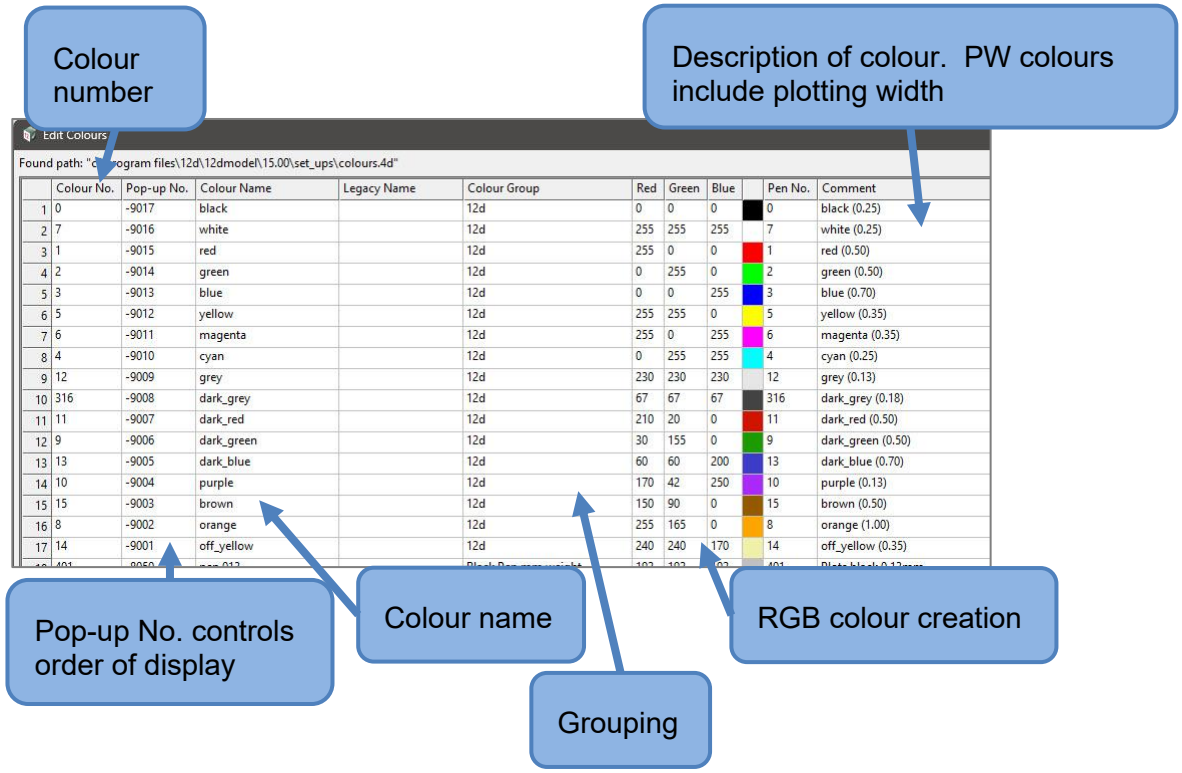


dwt legend inserted at 0,0

Detail

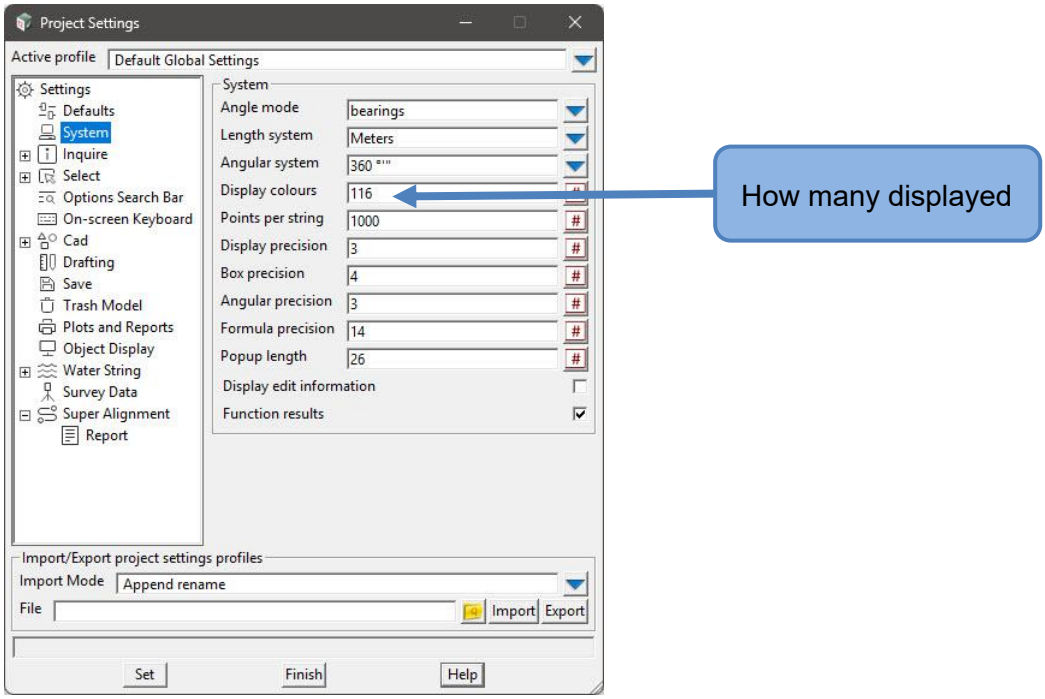
8.0 STANDARD COLOURS AND PEN WIDTHS

The colours.4d file shipped with 12d Model comes with the standard display, plotting, Visualisation and SUI colours required for projects. It also contains 100s more colours.



	Colour No.	Pop-up No.	Colour Name	Legacy Name	Colour Group	Red	Green	Blue	Pen No.	Comment
1	0	-9017	black		12d	0	0	0	0	black (0.25)
2	7	-9016	white		12d	255	255	255	7	white (0.25)
3	1	-9015	red		12d	255	0	0	1	red (0.50)
4	2	-9014	green		12d	0	255	0	2	green (0.50)
5	3	-9013	blue		12d	0	0	255	3	blue (0.70)
6	5	-9012	yellow		12d	255	255	0	5	yellow (0.35)
7	6	-9011	magenta		12d	255	0	255	6	magenta (0.35)
8	4	-9010	cyan		12d	0	255	255	4	cyan (0.25)
9	12	-9009	grey		12d	230	230	230	12	grey (0.13)
10	316	-9008	dark_grey		12d	67	67	67	316	dark_grey (0.18)
11	11	-9007	dark_red		12d	210	20	0	11	dark_red (0.50)
12	9	-9006	dark_green		12d	30	155	0	9	dark_green (0.50)
13	13	-9005	dark_blue		12d	60	60	200	13	dark_blue (0.70)
14	10	-9004	purple		12d	170	42	250	10	purple (0.13)
15	15	-9003	brown		12d	150	90	0	15	brown (0.50)
16	8	-9002	orange		12d	255	165	0	8	orange (1.00)
17	14	-9001	off_yellow		12d	240	240	170	14	off_yellow (0.35)

How many colours that are displayed when you select a colour box is controlled through the **Project Settings** under, **System => Display colours** (default = 116)



8.1 12d Colours

Standard 12d Model colours used visually but have been assigned pen widths so that they can be used in general.

	Colour No.	Pop-up No.	Colour Name	Legacy Name	Colour Group	Red	Green	Blue		Pen No.	Comment
1	0	-9017	black		12d	0	0	0		0	black (0.25)
2	7	-9016	white		12d	255	255	255		7	white (0.25)
3	1	-9015	red		12d	255	0	0		1	red (0.50)
4	2	-9014	green		12d	0	255	0		2	green (0.50)
5	3	-9013	blue		12d	0	0	255		3	blue (0.70)
6	5	-9012	yellow		12d	255	255	0		5	yellow (0.35)
7	6	-9011	magenta		12d	255	0	255		6	magenta (0.35)
8	4	-9010	cyan		12d	0	255	255		4	cyan (0.25)
9	12	-9009	grey		12d	230	230	230		12	grey (0.13)
10	316	-9008	dark_grey		12d	67	67	67		316	dark_grey (0.18)
11	11	-9007	dark_red		12d	210	20	0		11	dark_red (0.50)
12	9	-9006	dark_green		12d	30	155	0		9	dark_green (0.50)
13	13	-9005	dark_blue		12d	60	60	200		13	dark_blue (0.70)
14	10	-9004	purple		12d	170	42	250		10	purple (0.13)
15	15	-9003	brown		12d	150	90	0		15	brown (0.50)
16	8	-9002	orange		12d	255	165	0		8	orange (1.00)
17	14	-9001	off_yellow		12d	240	240	170		14	off_yellow (0.35)

28	350	-8005	shade 0		Shading	255	255	255		350	grey shade 0% (white, plots white)
29	351	-8004	shade 16		Shading	214	214	214		351	grey shade 16%
30	352	-8003	shade 32		Shading	173	173	173		352	grey shade 32%
31	353	-8002	shade 48		Shading	132	132	132		353	grey shade 48%
32	354	-8001	shade 64		Shading	91	91	91		354	grey shade 64%

Refer to the plot map files for pen widths and colours.

8.2 Plotting Colours

Specific colours set for known plotting widths. These include black pen widths to match CAD outputs.

18	401	-8050	pen 013		Black Pen mm weight	192	192	192		401	Plots black 0.13mm
19	402	-8049	pen 018		Black Pen mm weight	128	128	128		402	Plots black 0.18mm
20	403	-8048	pen 025		Black Pen mm weight	255	255	255		403	Plots black 0.25mm
21	404	-8047	pen 025a		Black Pen mm weight	0	255	255		404	Plots black 0.25mm
22	405	-8046	pen 035		Black Pen mm weight	255	255	0		405	Plots black 0.35mm
23	406	-8045	pen 035a		Black Pen mm weight	255	0	255		406	Plots black 0.35mm
24	407	-8044	pen 050		Black Pen mm weight	255	0	0		407	Plots black 0.50mm
25	410	-8043	pen 050a		Black Pen mm weight	0	255	0		410	Plots black 0.50mm
26	408	-8042	pen 070		Black Pen mm weight	0	0	255		408	Plots black 0.70mm
27	409	-8041	pen 100		Black Pen mm weight	255	127	0		409	Plots black 1.00mm

97	1001	-5010	acad 001		Acad Black Pen	255	0	0		1001	acad red (0.50)
98	1002	-5009	acad 002		Acad Black Pen	255	255	0		1002	acad yellow (0.35)
99	1003	-5008	acad 003		Acad Black Pen	0	255	0		1003	acad green (0.50)
100	1004	-5007	acad 004		Acad Black Pen	0	255	255		1004	acad cyan (0.25)
101	1005	-5006	acad 005		Acad Black Pen	0	0	255		1005	acad blue (0.70)
102	1006	-5005	acad 006		Acad Black Pen	255	0	255		1006	acad magenta (0.35)
103	1007	-5004	acad 007		Acad Black Pen	255	255	255		1007	acad white (0.25)
104	1008	-5003	acad 008		Acad Black Pen	128	128	128		1008	acad dark grey (0.18)
105	1009	-5002	acad 009		Acad Black Pen	192	192	192		1009	acad light grey (0.13)
106	1032	-5001	acad 032		Acad Black Pen	204	102	0		1032	acad orange (1.00)

367	422	-3009	txt 018		Black Text mm height	128	128	128	422	Plots black text
368	423	-3008	txt 025		Black Text mm height	255	255	255	423	Plots black text
369	424	-3007	txt 025a		Black Text mm height	0	255	255	424	Plots black text
370	425	-3006	txt 035		Black Text mm height	255	255	0	425	Plots black text
371	426	-3005	txt 035a		Black Text mm height	255	0	255	426	Plots black text
372	427	-3004	txt 050		Black Text mm height	255	0	0	427	Plots black text
373	430	-3003	txt 050a		Black Text mm height	0	255	0	430	Plots black text
374	428	-3002	txt 070		Black Text mm height	0	0	255	428	Plots black text
375	429	-3001	txt 100		Black Text mm height	255	127	0	429	Plots black text

The above colours are set to match the ACAD CTB file so 12d Model plots match CAD plots.

There are also colours used for plotting from the PPF files. See Plotting section.

The below are the Colours assigned to the PPF files.

376	901	-938	ppf_design		PPF	255	63	0	901	
377	902	-937	ppf_design_surface		PPF	255	63	0	902	
378	907	-936	ppf_survey_surface		PPF	150	90	0	907	
379	924	-935	ppf_subgrade_surface		PPF	255	165	0	924	
380	925	-934	ppf_finished_surface		PPF	255	63	0	925	
381	903	-933	ppf_design_drainage		PPF	240	150	0	903	
382	904	-932	ppf_design_drainage_hgl		PPF	0	255	255	904	
383	905	-931	ppf_design_sewer		PPF	204	102	0	905	
384	906	-930	ppf_design_pipeline		PPF	170	42	250	906	
385	908	-929	ppf_uprights		PPF	0	90	0	908	
386	926	-928	ppf_arrows		PPF	0	255	255	926	
387	909	-927	ppf_box_linework		PPF	0	0	255	909	
388	927	-926	ppf_datum_line		PPF	255	0	255	927	
389	910	-925	ppf_text_small		PPF	150	150	150	910	
390	911	-924	ppf_text_med		PPF	200	200	0	911	
391	912	-923	ppf_text_large		PPF	180	0	0	912	
392	913	-922	ppf_services		PPF	159	159	0	913	
393	928	-921	ppf_services_design		PPF	60	60	200	928	
394	929	-920	ppf_services_survey		PPF	173	173	173	929	
395	918	-919	ppf_symbols		PPF	0	127	255	918	
396	914	-918	ppf_offset_left		PPF	200	0	0	914	
397	915	-917	ppf_offset_right		PPF	0	200	0	915	
398	930	-916	ppf_superelev_centre		PPF	255	255	255	930	
399	931	-915	ppf_superelev_common		PPF	0	201	201	931	
400	932	-914	ppf_superelev_left		PPF	201	0	0	932	
401	933	-913	ppf_superelev_right		PPF	0	201	0	933	
402	916	-912	ppf_hatch_cut		PPF	100	0	0	916	
403	917	-911	ppf_hatch_fill		PPF	0	100	0	917	
404	919	-910	ppf_aux_surface1		PPF	91	91	91	919	
405	920	-909	ppf_aux_surface2		PPF	132	132	132	920	
406	921	-908	ppf_aux_surface3		PPF	173	173	173	921	
407	922	-907	ppf_aux_surface4		PPF	214	214	214	922	
408	923	-906	ppf_title_block		PPF	60	60	200	923	
409	934	-905	ppf_grids		PPF	255	143	92	934	
410	935	-904	ppf_overlay1		PPF	255	255	255	935	Plots white (for overlays on dark rasters, etc)
411	936	-903	ppf_overlay2		PPF	255	255	0	936	Plots yellow (for overlays on dark rasters, etc)
412	937	-902	ppf_contour_minor		PPF	132	132	132	937	Darker on screen, Lighter on plots
413	938	-901	ppf_contour_major		PPF	214	214	214	938	Lighter on screen, Darker on plots

8.3 SUI Colours

Surface Utility colours are the Australian Standard AS5488 colours for utility types.

The primary colours for SUI AS5488 are:

Communications (White)	
Drainage (Green)	
Electricity (Orange)	
Fire Service (Red)	
Gas (Yellow)	
Petroleum (Brown)	
Recycled Water (Purple)	
Sewer (Cream)	
Unidentified Services (Pink)	
Water (blue)	

Due to plot ability, the Public Works has modified some these colours to display as the following:

Utility	SUI Colour	PW Colour
Communications (White)		
Drainage (Green)		
Electricity (Orange)		
Fire Service (Red)		
Gas (Yellow)		
Petroleum (Brown)		
Recycled Water (Purple)		
Sewer (Cream)		
Unidentified Services (Pink)		
Water (blue)		

8.4 Visualisation Colours

Visualisation colours are used initially in Templates or Snippet Templates to set polygon colours for colouring of Tins. If you have the Visualisation module in 12d Model these colours can be used with the shipped **texture_map.4d** file to associate the colours to textures for Visualisation like 3d drive throughs.

33	501	-6064	vis grass	grass	Visualisation	52	80	8		501
34	502	-6063	vis grass1	grass1	Visualisation	74	105	11		502
35	503	-6062	vis grass2	grass2	Visualisation	96	130	14		503
36	538	-6061	vis grass3	grass3	Visualisation	118	155	17		538
37	539	-6060	vis grass4	grass4	Visualisation	140	180	20		539
38	540	-6059	vis grass5	grass5	Visualisation	162	205	23		540
39	541	-6058	vis grass6	grass6	Visualisation	184	230	26		541
40	542	-6057	vis grass7	grass7	Visualisation	206	255	29		542
41	518	-6056	vis concrete	concrete	Visualisation	218	216	155		518
42	504	-6055	vis concrete1	concrete1	Visualisation	201	199	143		504
43	505	-6054	vis concrete2	concrete2	Visualisation	184	182	131		505
44	551	-6053	vis concrete3	concrete3	Visualisation	167	165	119		551
45	552	-6052	vis concrete4	concrete4	Visualisation	150	148	107		552
46	509	-6051	vis stone1	stone1	Visualisation	144	104	36		509
47	510	-6050	vis stone2	stone2	Visualisation	167	121	41		510
48	543	-6049	vis stone3	stone3	Visualisation	190	138	46		543
49	544	-6048	vis stone4	stone4	Visualisation	213	155	51		544
50	545	-6047	vis stone5	stone5	Visualisation	236	172	56		545
51	511	-6046	vis dirt1	dirt1	Visualisation	209	0	0		511
52	512	-6045	vis dirt2	dirt2	Visualisation	159	0	0		512
53	549	-6044	vis dirt3	dirt3	Visualisation	109	0	0		549
54	550	-6043	vis dirt4	dirt4	Visualisation	59	0	0		550
55	513	-6042	vis sand1	sand1	Visualisation	220	209	27		513
56	514	-6041	vis sand2	sand2	Visualisation	197	187	28		514
57	547	-6040	vis sand3	sand3	Visualisation	174	165	29		547
58	515	-6039	vis rock1	rock1	Visualisation	171	102	0		515
59	516	-6038	vis rock2	rock2	Visualisation	192	115	0		516
60	546	-6037	vis rock3	rock3	Visualisation	212	128	0		546
61	507	-6036	vis steel	steel	Visualisation	165	165	165		507
62	508	-6035	vis steel blue	steel blue	Visualisation	205	205	255		508
63	558	-6034	vis granular1	granular1	Visualisation	121	104	120		558
64	559	-6033	vis granular2	granular2	Visualisation	141	124	130		559
65	560	-6032	vis granular3	granular3	Visualisation	161	144	140		560
66	520	-6031	vis rd bitumen	rd bitumen	Visualisation	70	77	83		520

67	521	-6030	vis rd asphalt	rd asphalt	Visualisation	70	77	83		521	
68	535	-6029	vis rd asphalt2	rd asphalt2	Visualisation	70	77	83		535	
69	522	-6028	vis rd shoulder	rd shoulder	Visualisation	146	162	175		522	
70	555	-6027	vis bitumen	bitumen	Visualisation	70	77	83		555	
71	553	-6026	vis asphalt	asphalt	Visualisation	70	77	83		553	
72	554	-6025	vis shoulder	shoulder	Visualisation	146	162	175		554	
73	556	-6024	vis pavement green	vis coloured bitumen	Visualisation	5	138	88		556	AS2700 G27 Homebush Green, previously (86,141,108)
74	561	-6023	vis pavement red		Visualisation	167	59	59		561	AS2700 R14 Waratah
75	564	-6022	vis pavement red2	vis asphalt red	Visualisation	150	100	90		564	red asphalt used in Western Australia
76	562	-6021	vis pavement yellow		Visualisation	232	173	0		562	AS2700 Y12 Wattle
77	563	-6020	vis pavement pink		Visualisation	215	158	133		563	AS2700 R42 Salmon Pink
78	557	-6019	vis old pavement	old pavement	Visualisation	155	31	127		557	
79	519	-6018	vis paving	paving	Visualisation	135	11	107		519	
80	517	-6017	vis batter	batter	Visualisation	255	227	156		517	
81	536	-6016	vis ballast	ballast	Visualisation	146	162	175		536	
82	548	-6015	vis beach	beach	Visualisation	225	169	95		548	
83	523	-6014	vis water1	water1	Visualisation	11	145	234		523	
84	524	-6013	vis water2	water2	Visualisation	9	120	195		524	
85	506	-6012	vis sky	sky	Visualisation	206	207	255		506	
86	537	-6011	vis hole	hole	Visualisation	6	0	6		537	
87	525	-6010	vis colourbond	colourbond	Visualisation	106	161	118		525	
88	526	-6009	vis roof tile grey	roof tile grey	Visualisation	131	115	102		526	
89	527	-6008	vis roof tile red	roof tile red	Visualisation	154	87	71		527	
90	528	-6007	vis roof tile green	roof tile green	Visualisation	109	129	78		528	
91	529	-6006	vis h dark blue	h dark blue	Visualisation	44	76	87		529	
92	530	-6005	vis h caramel	h caramel	Visualisation	218	211	185		530	
93	531	-6004	vis h light brown	h light brown	Visualisation	141	92	60		531	
94	532	-6003	vis h cream	h cream	Visualisation	248	229	186		532	
95	533	-6002	vis h beige	h beige	Visualisation	193	172	115		533	
96	534	-6001	vis h dark green	h dark green	Visualisation	91	87	58		534	

9.0 PLOTTING

12d Model ships with the Public Works standard plot files for the mapping of pen widths and colours, and the Plot Parameter Files (PPF) for printing PDF files for Plans, Long and Cross Sections.

There are also standard files included for exporting CAD dwg files.

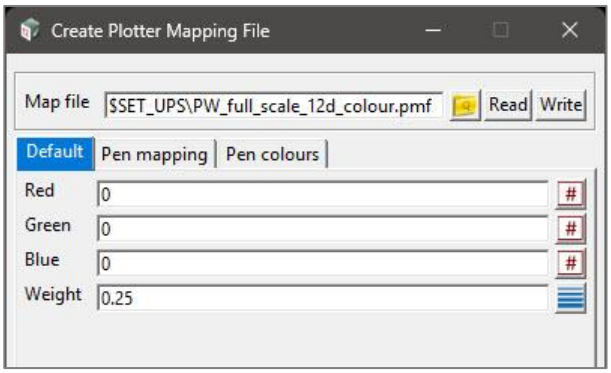
9.1 Plot Map Files

The Public Works Standards includes two full size pen Plotter Map Files (pmf) and two half size pen widths pmf's. One of each for in black pen only and one of each for plotting in colour.

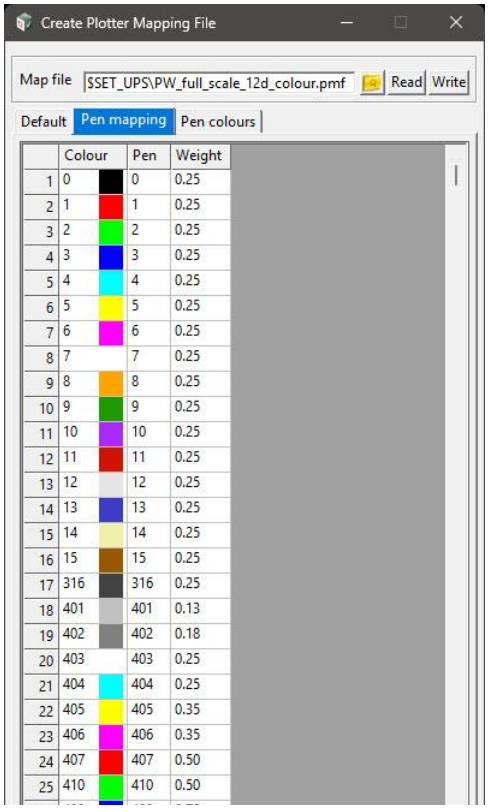
- **PW_full_scale_12d_black.pmf**
- **PW_full_scale_12d_colour.pmf**
- **PW_half_scale_12d_black.pmf**
- **PW_half_scale_12d_colour.pmf**

To see the setups for these read them in using **Plot => Plotting Setups => Plotter mapping editor** .

On the **Default** tab indicates the default pen width if not assigned.

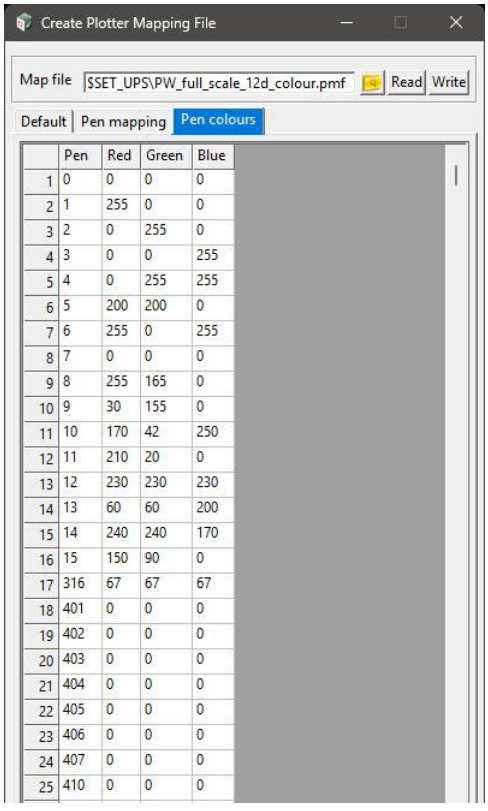


Pen mapping tab, indicates pen number and weight assigned:



	Colour	Pen	Weight
1	0	0	0.25
2	1	1	0.25
3	2	2	0.25
4	3	3	0.25
5	4	4	0.25
6	5	5	0.25
7	6	6	0.25
8	7	7	0.25
9	8	8	0.25
10	9	9	0.25
11	10	10	0.25
12	11	11	0.25
13	12	12	0.25
14	13	13	0.25
15	14	14	0.25
16	15	15	0.25
17	316	316	0.25
18	401	401	0.13
19	402	402	0.18
20	403	403	0.25
21	404	404	0.25
22	405	405	0.35
23	406	406	0.35
24	407	407	0.50
25	410	410	0.50

Pen colours tab, indicates the colour it will plot. Set as RGB:



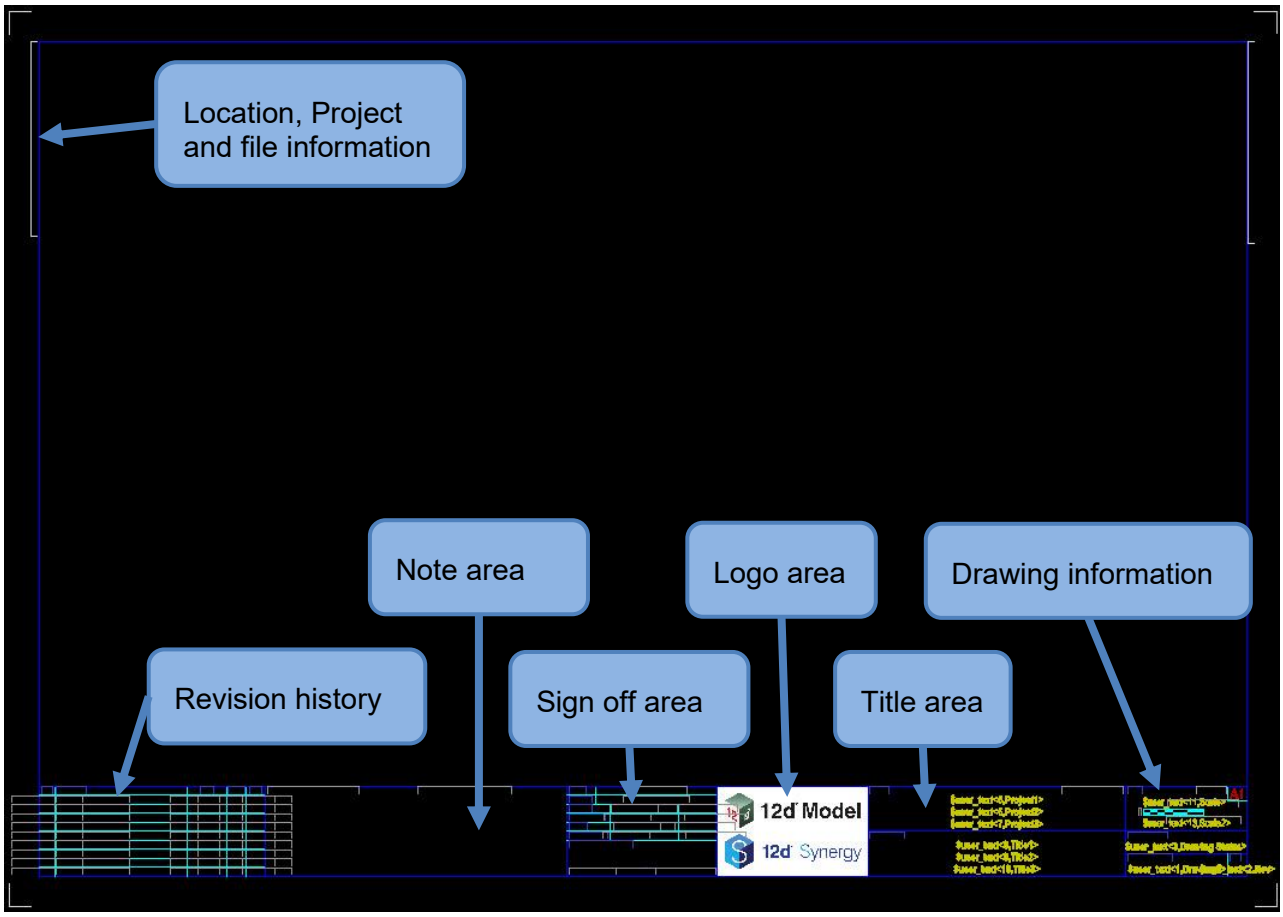
	Pen	Red	Green	Blue
1	0	0	0	0
2	1	255	0	0
3	2	0	255	0
4	3	0	0	255
5	4	0	255	255
6	5	200	200	0
7	6	255	0	255
8	7	0	0	0
9	8	255	165	0
10	9	30	155	0
11	10	170	42	250
12	11	210	20	0
13	12	230	230	230
14	13	60	60	200
15	14	240	240	170
16	15	150	90	0
17	316	67	67	67
18	401	0	0	0
19	402	0	0	0
20	403	0	0	0
21	404	0	0	0
22	405	0	0	0
23	406	0	0	0
24	407	0	0	0
25	410	0	0	0

9.2 Title Block File

The Public Works also has standard title blocks that ships with 12d Model. They can be found in the Library:

- **12d_PW_A1_title_block.tbf**
- **12d_PW_A3_title_block.tbf**

To See, **Plot => Plotting Setups => Read title block file**



This title block can be used as is. If changes are made it can be saved as your company standard, **Plot => Plotting Setups => Create/edit title block file**

The TBF files include text for the items listed in the above picture. This text can be filled out manually in the PPF or via a spreadsheet register, see Plot Parameter Files.

To use the text in a PPF it must include certain criteria:

<$Option,Title Reference>

1. The TBF Text must be surrounded in**<>**
2. Option Text
   - **$user_text** – User defined text
   - **$project_detail_(*Project Detail name*)** – Fill in via the Project Details.

- **$12d_synergy_Job_(*Attribute name*)** – Getting information from 12d Synergy Job attributes.

9.3 Plot Parameter Files

The Public Works Standards includes base Plot Parameter Files (PPF) for plotting Plans, Long and Cross Sections. These PPFs can be used as is or modified to suit individual company requirements. If changes are required, save the new base PPFs to the companies User Library or Customer Library folders.

Plan PPF

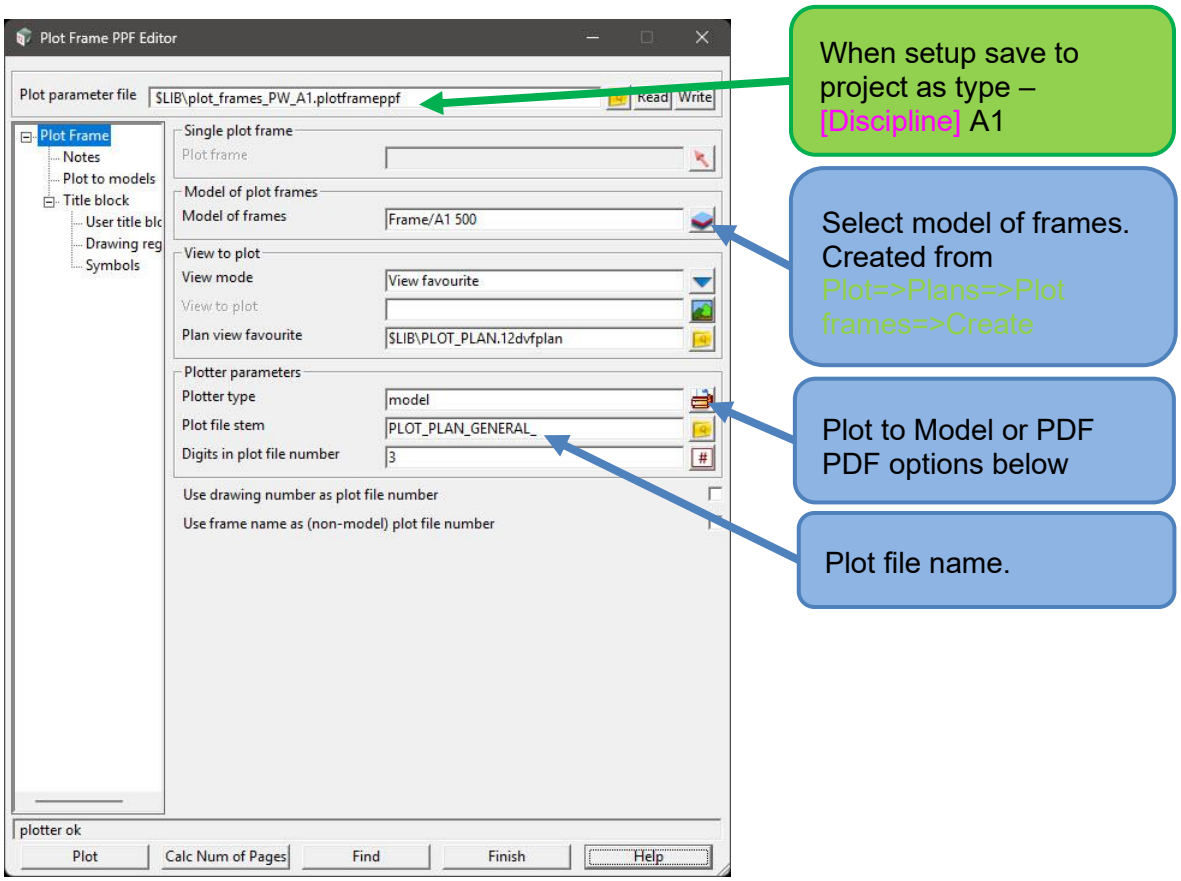
The standard Plan PPFs found in the Library:

- **plot_frames_PW_A1.plotframeppf**
- **plot_frames_PW_A3.plotframeppf**

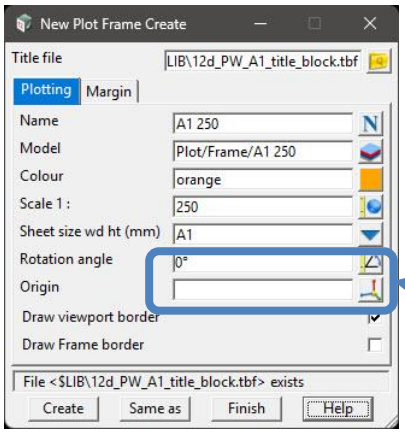
Prior to creating plan plots, Setup a Plot view, e.g. **PLOT** :

- add the models required
- Set the view rotation
- Apply mapfile/s to set pens/colours (If required)
- Save a view favourite – **PLOT PLAN [Discipline] [Sheet No.]** – (using Single frame)

Read in the above standard plan PPFs:



Model of frames:



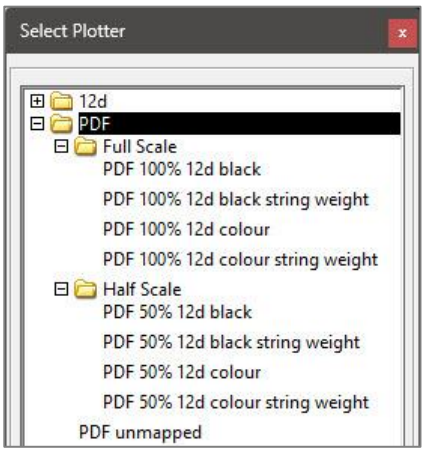
Example plot frame Create

Model Name: Plot/Frame/[SIZE] [SCALE]

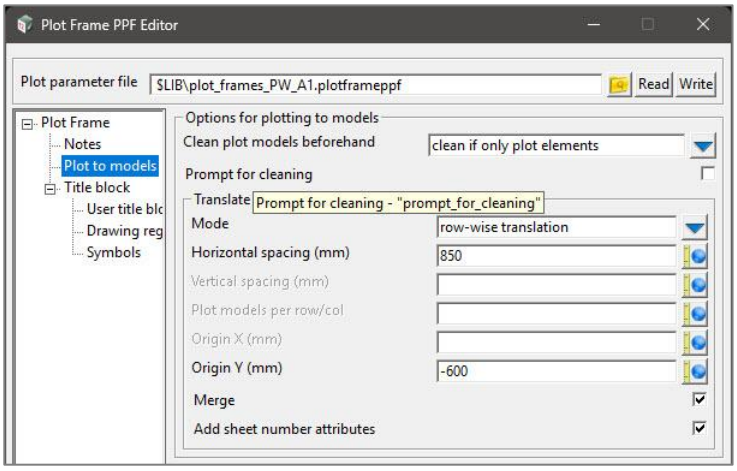
Pick location information

The primary output is PDF. Model is used for checking or prior to outputting to DWG for sketches, see CAD exports. Plot file stem:

- PDF – See Export naming convention
- Model - Plot/**[Export Type]/[Description]**

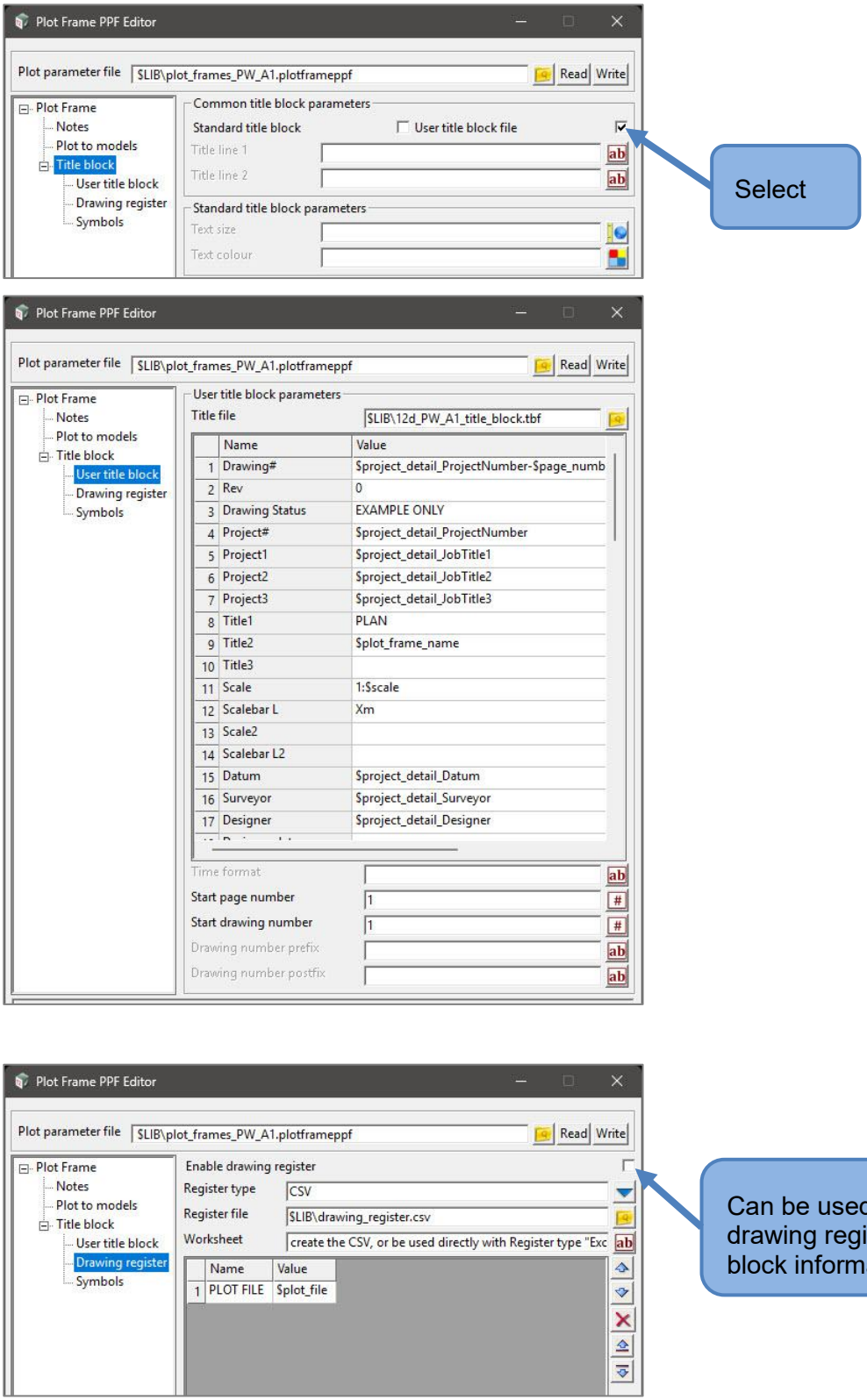


PDF output options
100% - for A1
50% - for A3



Plot to models used if plotting to models

Using a Title Block:



Long Sections (PPF)

There is substantial setting up to create long section PPFs. The Public Works standards have included numerous options to minimise time in producing the outputs required.

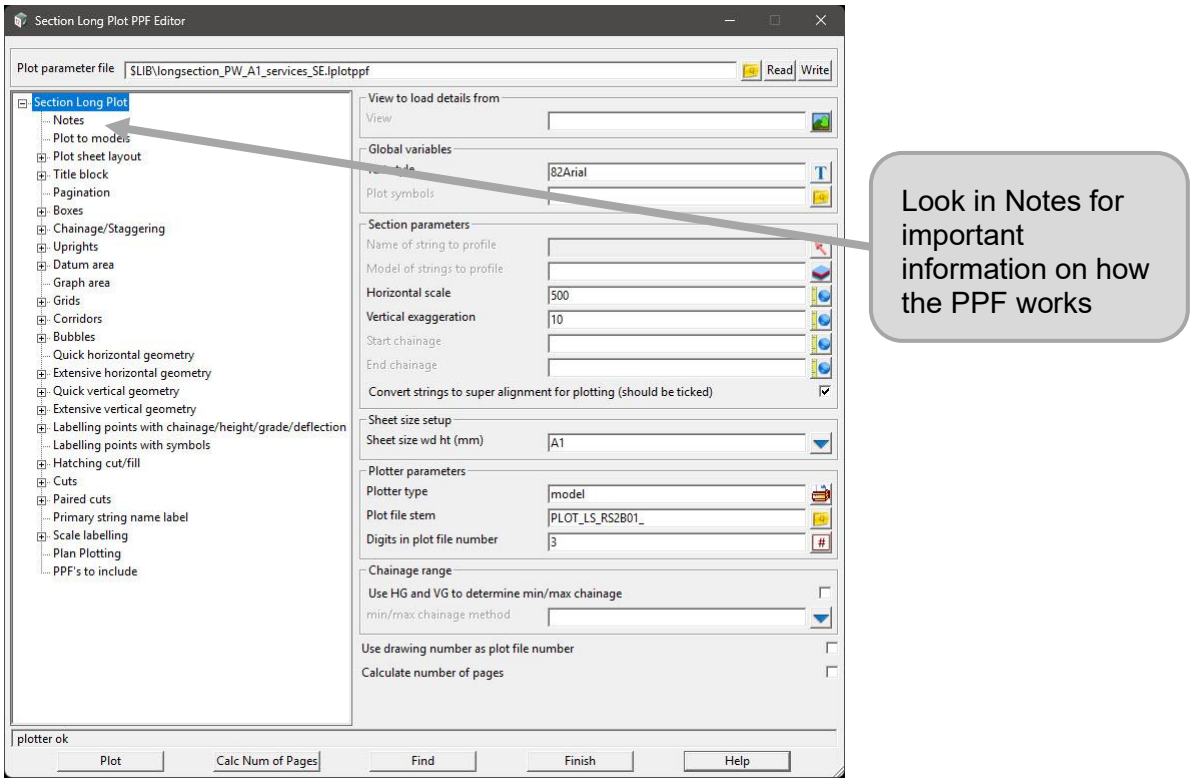
The standard Long Section PPFs found in the Library:

- **longsection_PW_A1_basic.lplotppf**
- **longsection_PW_A1_basic_SE.lplotppf**
- **longsection_PW_A1_services.lplotppf**
- **longsection_PW_A1_services_SE.lplotppf**
- **longsection_PW_A3_basic.lplotppf**
- **longsection_PW_A3_basic_SE.lplotppf**
- **longsection_PW_A3_services.lplotppf**
- **longsection_PW_A3_services_SE.lplotppf**

As noted, there is two plot sheet sizes for **A1** and **A3**.

The different types represented are: (See notes section in PPFs)

- **basics** - Minimal labelling via the Cuts branch.
- **basics_SE** - As per the services option, includes Super elevation diagram box.
- **services** - For detailed labelling via the Cuts branch. It provides a dedicated area for labelling cuts with staggered uprights. Used with a chain to for pre-processing of cut strings, e.g. services.
- **services_SE** - As per the services option, also includes Super elevation diagram box.



Look in Notes for important information on how the PPF works

Any base changes made to the standard library long section PPFs should be saved to your company User Library for future base reference.

Naming:

LS-**[Company name]**-**[Sheet Size]**-**[Type]**.lplotppf

For project specific change, the PPF should be saved to the working project.

Naming:

LS-**[Sheet Size]**-**[Alignment name]**-**[Type]**.lplotppf

Cross Sections (PPF)

There is substantial setting up to create Cross section PPFs. The Public Works standards have included numerous options to minimise time in producing the outputs required.

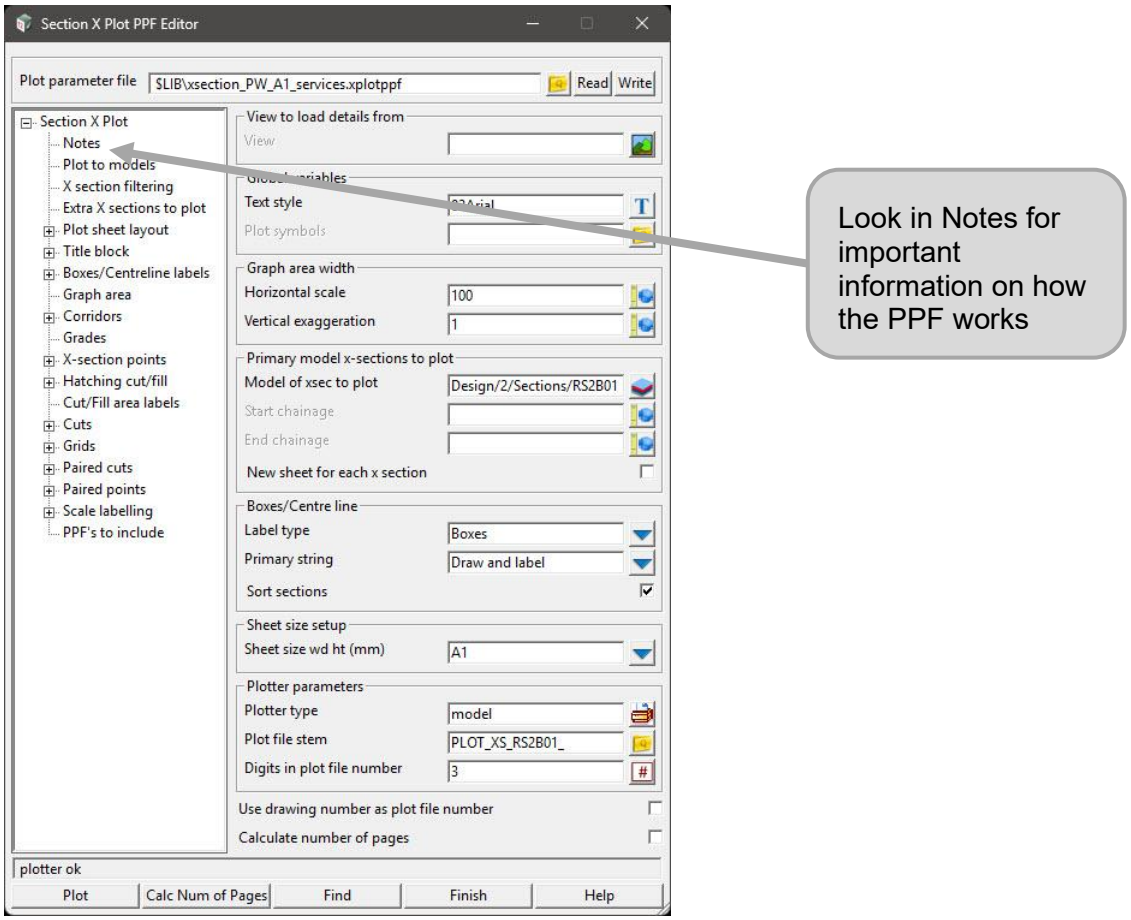
The standard Long Section PPFs found in the Library:

- **xsection_PW_A1_basic.lplotppf**
- **xsection_PW_A1_services.lplotppf**
- **xsection_PW_A3_basic.lplotppf**
- **xsection_PW_A3_services.lplotppf**

As noted, there is two plot sheet sizes for **A1** and **A3**.

The different types represented are: (See notes section in PPFs)

- **basics** - Minimal labelling via the Cuts branch.
- **services** - For detailed labelling via the Cuts branch. It provides a dedicated area for labelling cuts with staggered uprights. Used with a chain to for pre-processing of cut strings, e.g. services.



Any base changes made to the standard library Cross section PPFs should be saved to your company User Library for future base reference.

Naming:

XS-**[Company name]**-**[Sheet Size]**-**[Type]**.lplotppf

For project specific change, the PPF should be saved to the working project.

Naming:

XS-**[Sheet Size]**-**[Alignment name]**-**[Type]**.lplotppf

Drawing Register

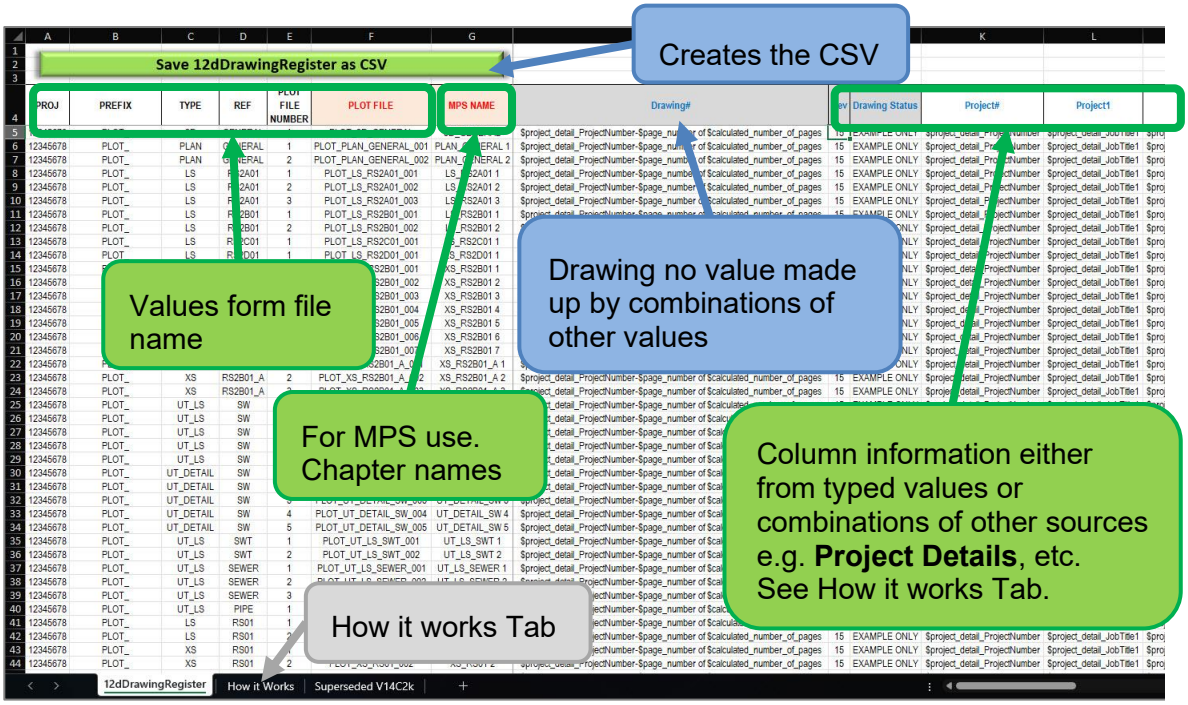
An option for filling out title blocks more automatically for multiple sheets is to use a drawing register. This is done using a CSV file, although this CSV file can be created using an excel or macro enabled excel file. These files link to filling out title block information via the Text in the Title Block File (TBF).

The 12d Model Library contains an examples:

- **drawing_register.xlsm**
- **drawing_register.xls**
- **drawing_register.csv**

The drawing register file should be copied from the 12d Model Library to the working folder or, if project specific, the User Library or Customer User Library of your project so that is not in a read only location.

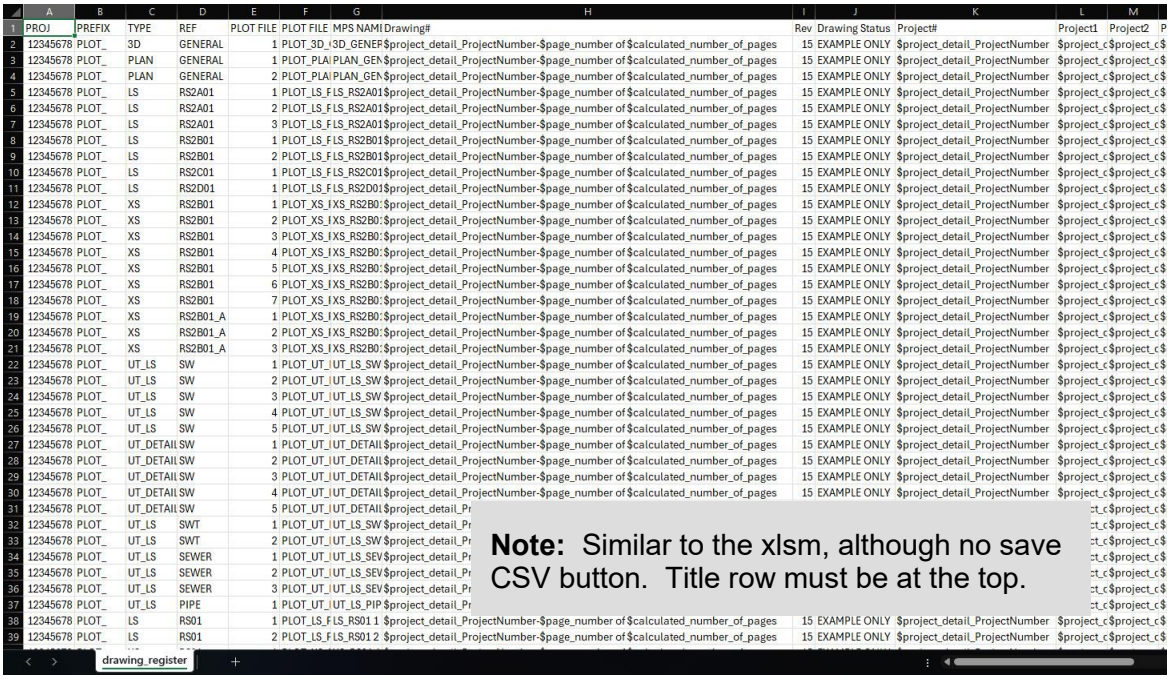
Excel (Macro enabled) register example:



The Save as CSV button is a macro.

Excel formulae can be used to create values in all formats of the excels files, e.g. a Concatenate function, the combining to two or more cells into one cell. Can be used for total sheets etc.

CSV/XLS register example:



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	PROJ	PREFIX	TYPE	REF	PLOT FILE	PLOT FILE	MPS NAME	Drawing#	Rev	Drawing Status	Project#	Project1	Project2
2	12345678	PLOT_	3D	GENERAL	1	PLOT_3D_	3D_GENER	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
3	12345678	PLOT_	PLAN	GENERAL	1	PLOT_PLA	PLAN_GEN	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
4	12345678	PLOT_	PLAN	GENERAL	2	PLOT_PLA	PLAN_GEN	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
5	12345678	PLOT_	LS	RS2A01	1	PLOT_LS_F	LS_RS2A01	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
6	12345678	PLOT_	LS	RS2A01	2	PLOT_LS_F	LS_RS2A01	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
7	12345678	PLOT_	LS	RS2A01	3	PLOT_LS_F	LS_RS2A01	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
8	12345678	PLOT_	LS	RS2B01	1	PLOT_LS_F	LS_RS2B01	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
9	12345678	PLOT_	LS	RS2B01	2	PLOT_LS_F	LS_RS2B01	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
10	12345678	PLOT_	LS	RS2C01	1	PLOT_LS_F	LS_RS2C01	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
11	12345678	PLOT_	LS	RS2D01	1	PLOT_LS_F	LS_RS2D01	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
12	12345678	PLOT_	XS	RS2B01	1	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
13	12345678	PLOT_	XS	RS2B01	2	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
14	12345678	PLOT_	XS	RS2B01	3	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
15	12345678	PLOT_	XS	RS2B01	4	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
16	12345678	PLOT_	XS	RS2B01	5	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
17	12345678	PLOT_	XS	RS2B01	6	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
18	12345678	PLOT_	XS	RS2B01	7	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
19	12345678	PLOT_	XS	RS2B01_A	1	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
20	12345678	PLOT_	XS	RS2B01_A	2	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
21	12345678	PLOT_	XS	RS2B01_A	3	PLOT_XS_I	XS_RS2B0	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
22	12345678	PLOT_	UT_LS	SW	1	PLOT_UT_I	UT_LS_SW	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
23	12345678	PLOT_	UT_LS	SW	2	PLOT_UT_I	UT_LS_SW	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
24	12345678	PLOT_	UT_LS	SW	3	PLOT_UT_I	UT_LS_SW	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
25	12345678	PLOT_	UT_LS	SW	4	PLOT_UT_I	UT_LS_SW	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
26	12345678	PLOT_	UT_LS	SW	5	PLOT_UT_I	UT_LS_SW	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
27	12345678	PLOT_	UT_DETAIL	SW	1	PLOT_UT_I	UT_DETAIL	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
28	12345678	PLOT_	UT_DETAIL	SW	2	PLOT_UT_I	UT_DETAIL	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
29	12345678	PLOT_	UT_DETAIL	SW	3	PLOT_UT_I	UT_DETAIL	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
30	12345678	PLOT_	UT_DETAIL	SW	4	PLOT_UT_I	UT_DETAIL	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
31	12345678	PLOT_	UT_DETAIL	SW	5	PLOT_UT_I	UT_DETAIL	$project_detail_Pr					ct_c$project_c$
32	12345678	PLOT_	UT_LS	SWT	1	PLOT_UT_I	UT_LS_SW	$project_detail_Pr					ct_c$project_c$
33	12345678	PLOT_	UT_LS	SWT	2	PLOT_UT_I	UT_LS_SW	$project_detail_Pr					ct_c$project_c$
34	12345678	PLOT_	UT_LS	SEWER	1	PLOT_UT_I	UT_LS_SEV	$project_detail_Pr					ct_c$project_c$
35	12345678	PLOT_	UT_LS	SEWER	2	PLOT_UT_I	UT_LS_SEV	$project_detail_Pr					ct_c$project_c$
36	12345678	PLOT_	UT_LS	SEWER	3	PLOT_UT_I	UT_LS_SEV	$project_detail_Pr					ct_c$project_c$
37	12345678	PLOT_	UT_LS	PIPE	1	PLOT_UT_I	UT_LS_PIP	$project_detail_Pr					ct_c$project_c$
38	12345678	PLOT_	LS	RS01	1	PLOT_LS_F	LS_RS01 1	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c
39	12345678	PLOT_	LS	RS01	2	PLOT_LS_F	LS_RS01 2	$project_detail_ProjectNumber-$page_number of $calculated_number_of_pages	15	EXAMPLE ONLY	$project_detail_ProjectNumber	$project_c	$project_c

drawing_register

Note: Similar to the xlsm, although no save CSV button. Title row must be at the top.

9.4 MPS (Multipage Plots)

MPS is a way to directly output 12d data to final PDFs. The outputs include multiple types, e.g. plans, sections and 3d PDF. The Public Works standards ship with an A1 and A3 example in the Library [Lib].

- **Plot_PW_examples_A1.12dmpsf**
- **Plot_PW_examples_A3.12dmpsf**

Any base changes made to the standard library MPS files should be saved to your company User Library for future base reference.

Naming:

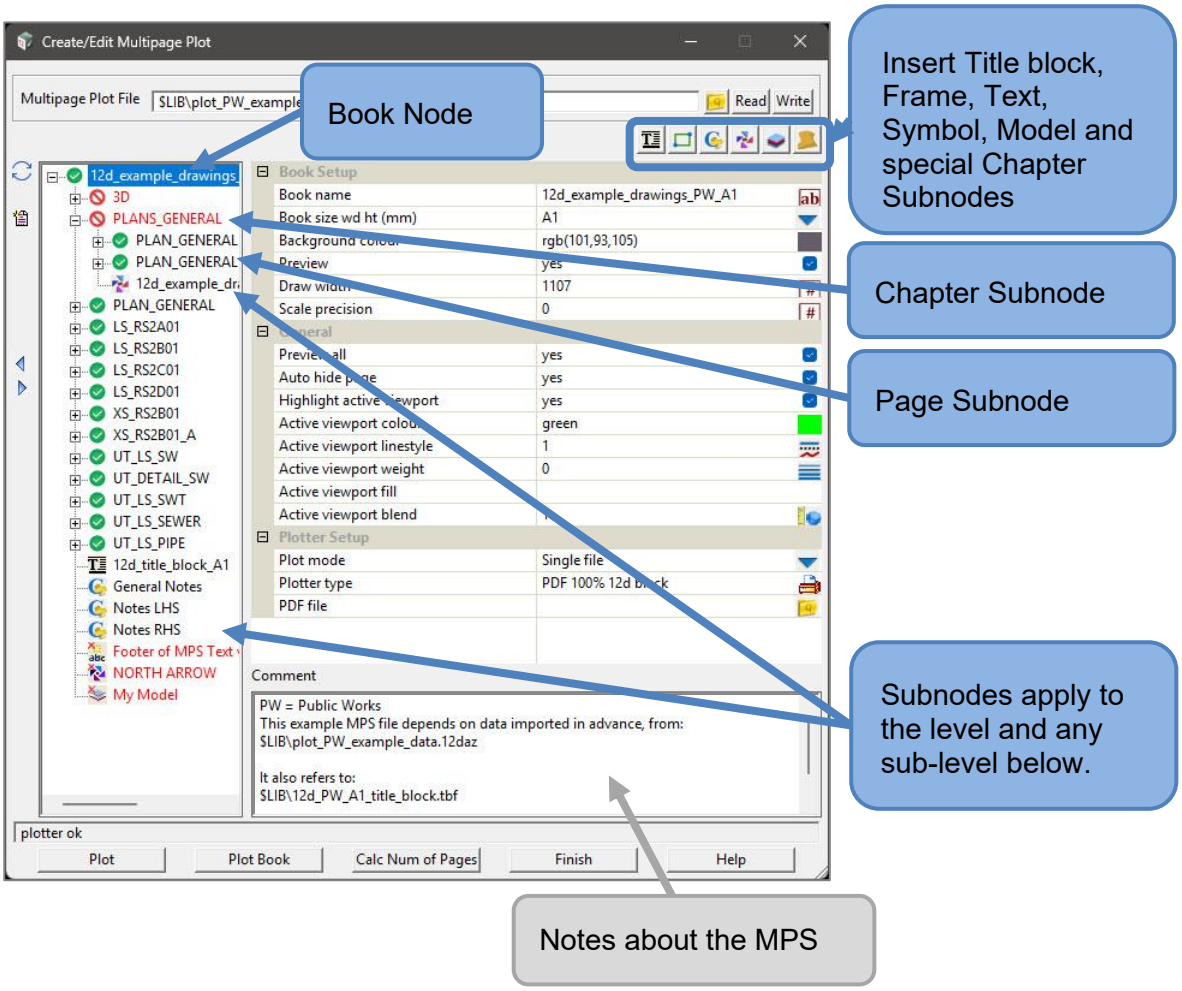
Plot-**[Company name]**-**[Sheet Size]**-**[Type]**.12dmpsf

For project specific change, the PPF should be saved to the working project.

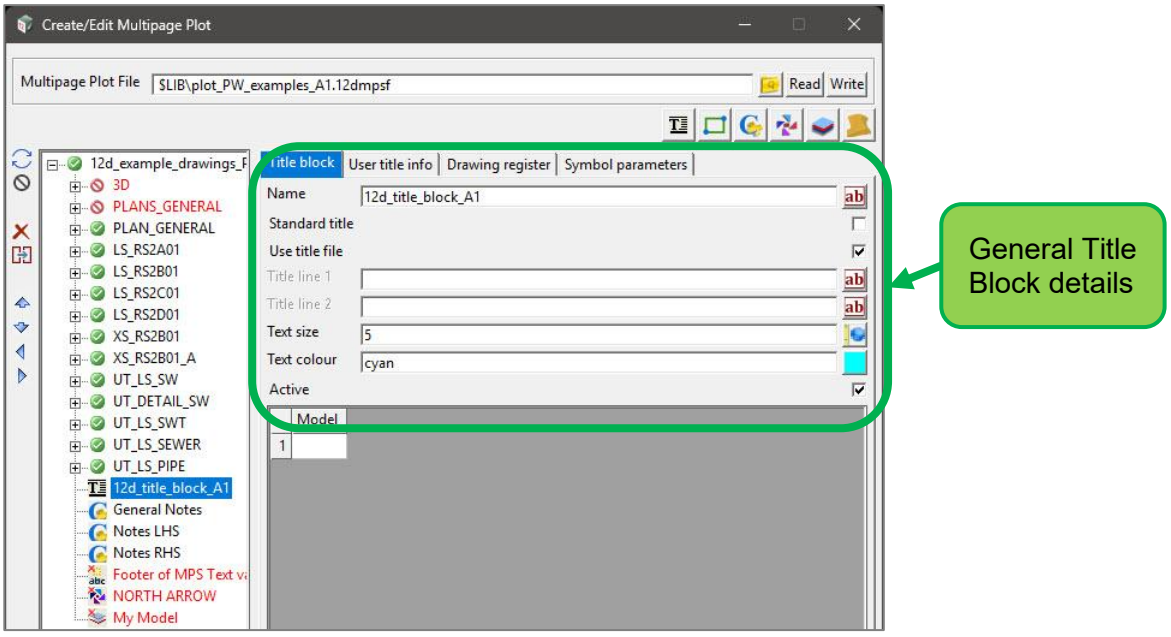
Naming:

Plot-**[Sheet Size]**-**[Type]**.12dmpsf

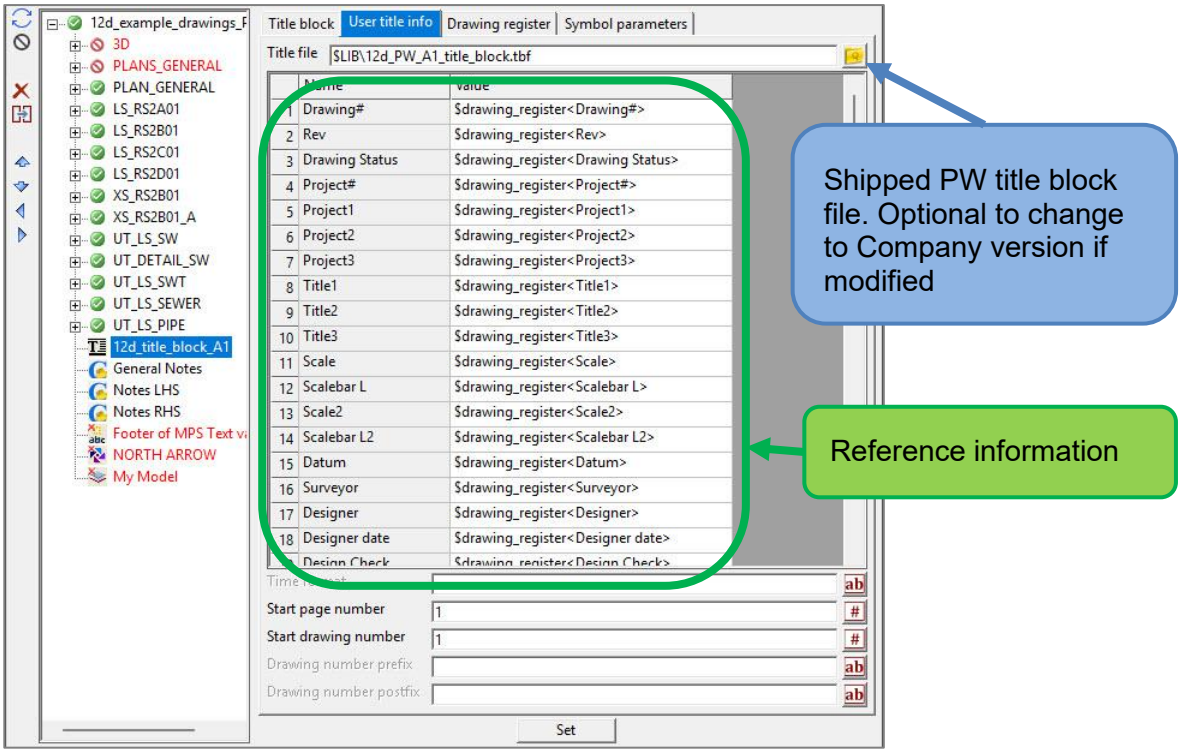
Example MPS:


Create/Edit Multipage Plot
Multipage Plot File
Read
Write
Book Node
Insert Title block, Frame, Text, Symbol, Model and special Chapter Subnodes
Chapter Subnode
Page Subnode
Subnodes apply to the level and any sub-level below.
Notes about the MPS
12d_example_drawings
3D
PLANS_GENERAL
PLAN_GENERAL
PLAN_GENERAL
PLAN_GENERAL
LS_RS2A01
LS_RS2B01
LS_RS2C01
LS_RS2D01
XS_RS2B01
XS_RS2B01_A
UT_LS_SW
UT_DETAIL_SW
UT_LS_SWT
UT_LS_SEWER
UT_LS_PIPE
12d_title_block_A1
General Notes
Notes LHS
Notes RHS
Footer of MPS Text
NORTH ARROW
My Model
Book Setup
Book name
12d_example_drawings_PW_A1
Book size wd ht (mm)
A1
Preview
yes
Draw width
1107
Scale precision
0
Auto hide page
yes
Highlight active viewport
yes
Active viewport colour
green
Active viewport linestyle
1
Active viewport weight
0
Active viewport fill
Active viewport blend
Plotter Setup
Plot mode
Single file
PDF file
Comment
PW = Public Works
This example MPS file depends on data imported in advance, from:
$LIB\plot_PW_example_data.12daz
It also refers to:
$LIB\12d_PW_A1_title_block.tbf
plotter ok
Plot
Plot Book
Calc Num of Pages
Finish
Help

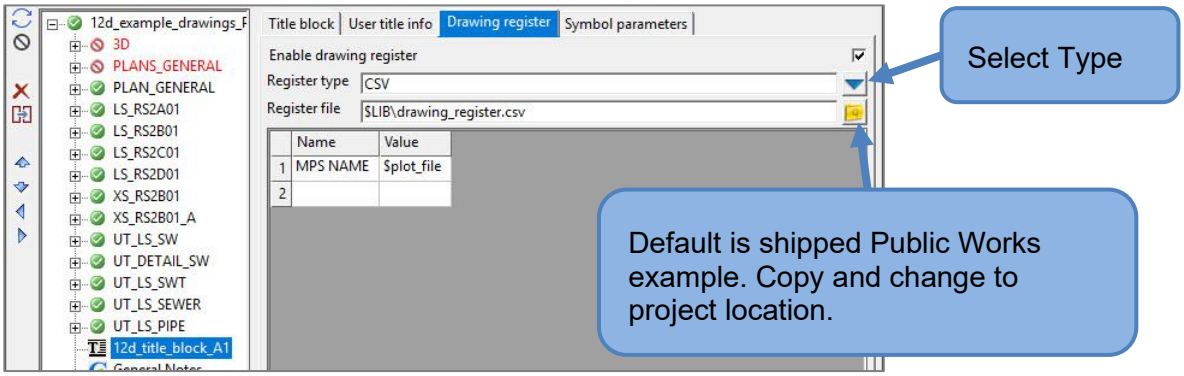
The Public Works MPS example uses a drawing register to populate the title block information, see **Drawing register**.



Title Block Information.



Drawing register.



10.0 CHAINS

Chains are a documented ordered process of user defined commands in producing a design or required exports. Any repetitive tasks should be Chained.

The default location for a saved Chain is the Working folder of the 12d Model Project. However, Chains for common tasks or a base standard of Chain can be kept in a **User Lib** or **Customer Lib**.

10.1 Design Chains

All Design work is to be Chained.

There are two types of Chains, Master Chains and Component Chains.

Master Chains are used to group the Component to complete a task, e.g. Design.

Naming:

- 000 DESIGN — Runs all design Chains to Recalc the entire project
- 100 PLOT — Plotting master Chain
- 200 EXPORT — Write all files for external issuing
- 300 REPORT — Creates all reports, e.g. Volume, sight distance.

Component Chains are sub parts, or specific areas of a project that can be run for targeted updates when the entire project doesn't require the update.

Example Design Chain naming:

- 010 DES Mainline — Main carriageway on highway or motorway
- 010 DES Area 1 — Area 1 design
- 020 DES Interchange A — Interchange design
- 020 DES Area 2 — Area 2 design

Note: Component design chains may not be required if design projects are small.

Example Plot Chain naming:

- 110 Plot Plans — Write all plan plots to dwg or MPS execute
- 120 Plot LS — Plots all Long Sections
- 130 Plot XS — Plots all Cross Sections

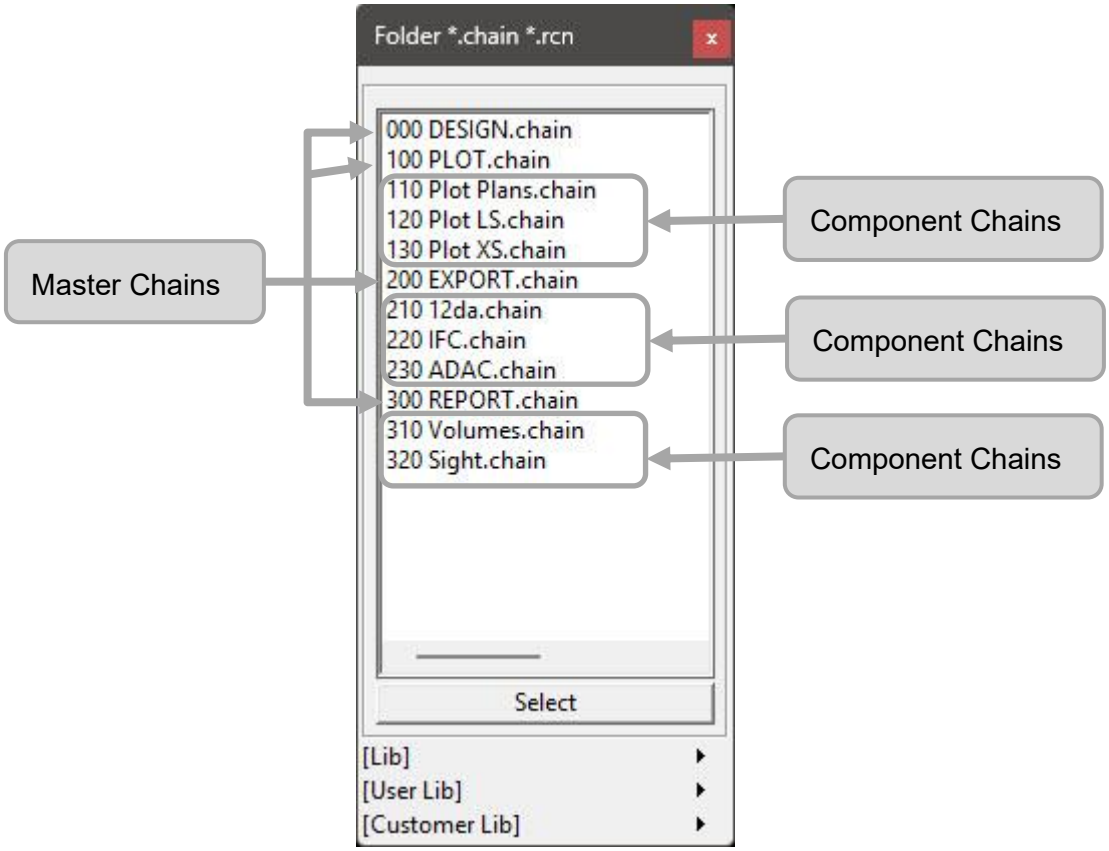
Example Export and Report naming Chains:

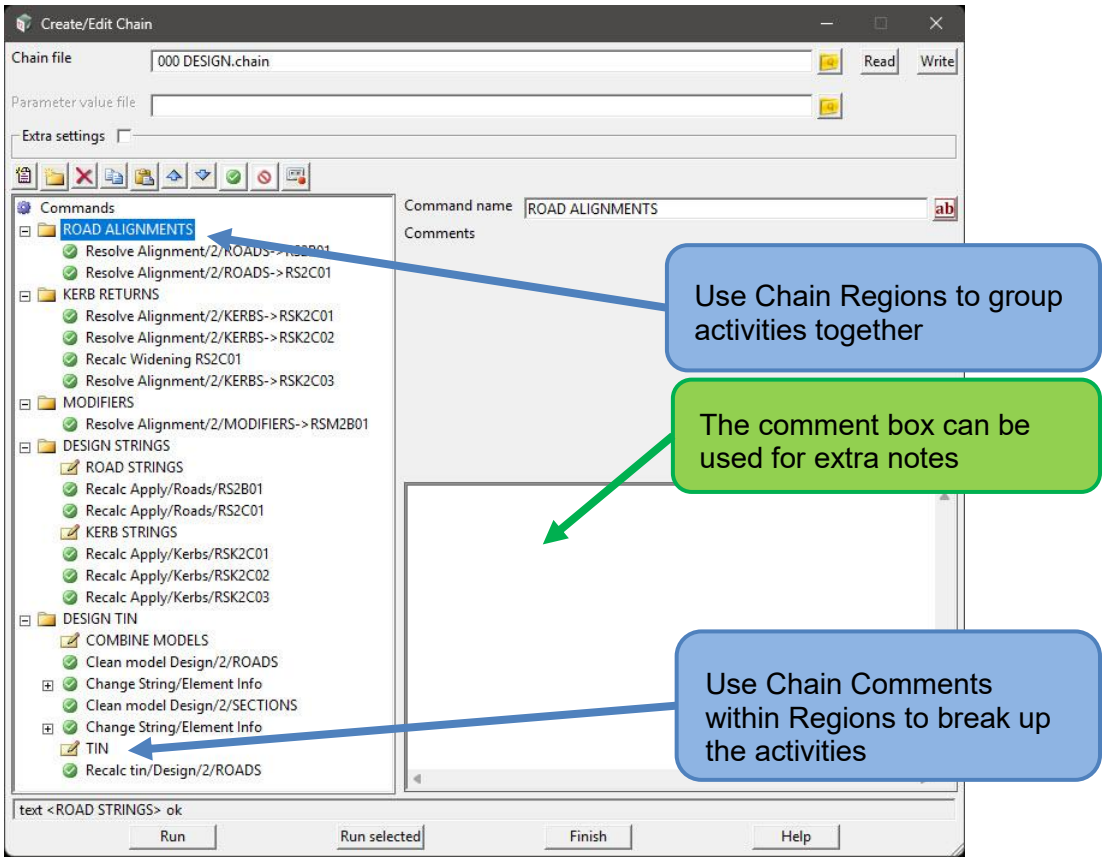
- 210 12da — Writes 12da file exports for the project
- 220 IFC — Writes IFC file exports for the project

- 230 ADAC — Write ADAC exports
- 310 Volumes — Writes Volumes reports for design
- 320 Sight — Writes Sight distance check reports

Design Chains are not limited to the above and further Master Chains can be added with their optional Component Chains if required.

The third number can also be used if further sub Component Chains are required for a process.





Note: The design chains are your ordered process of how the Design works. Make sure it is documented as if you might be taking over the Design.

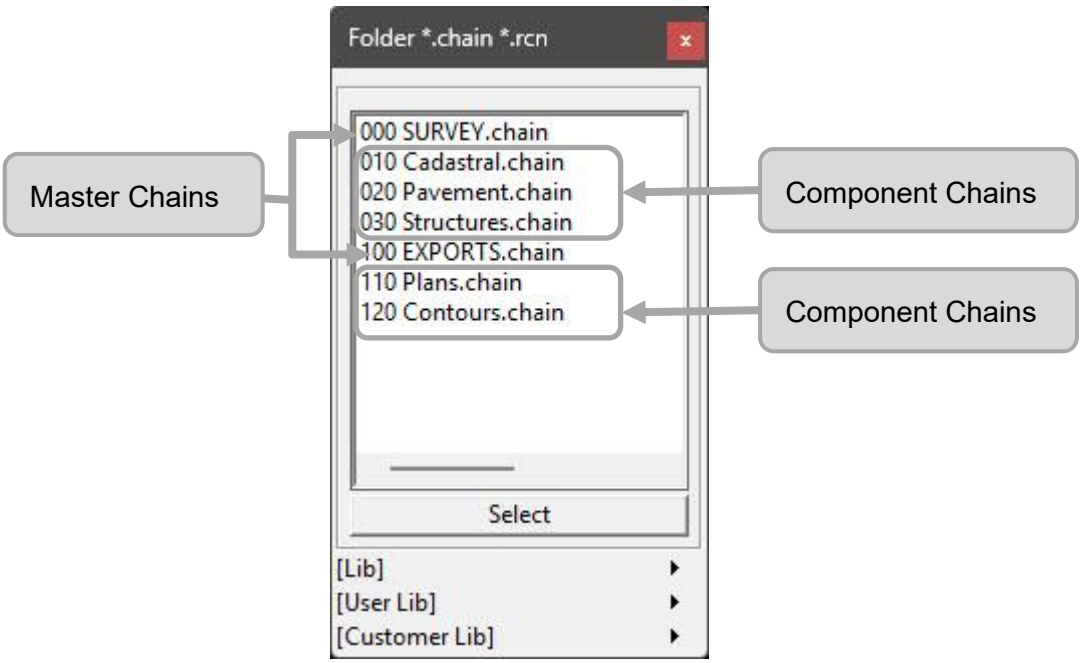
10.2 Survey Chains

Survey Data, whether received from an internal or external source is to be controlled via a Chain also. Benefits include:

- Identifies the data source via paths and comments
- Updates are easily processed
- Applied Map files can control consistency across string and model naming
- Survey TIN surface is updated with the data and optionally copied and translated to create a striped surface.

When power of the Chain update is combined with Model sharing, survey data revisions are easy to control.

Example Survey Chains:



As per the Design Chains, the **Master** Chains run the **Component** Chains. The Master Chain in this case can also just contain the survey data import and main existing surface triangulation. This could also be done in a Component Chain, e.g. 010 Survey.

In this example the optional Component Chains do:

- **010 Cadastral** - Can import cadastral boundaries if required and drape them onto the existing surface for use in cross sections.
- **020 Pavement** - Identifies the existing pavement surface and creates a triangulation of that area. Can be used for display information in plans and cross sections.
- **030 Structures** - Creates triangulated surfaces of the top and soffit of the existing bridges. Can be used for display and also clearance checks.
- **110 Plans** - Export of 2d and 3d survey data to required files
- **120 Contours** - Update and export require contour files in 2d and 3d.

11.0 EXAMPLE PLOTS

11.1 Design Plots

11.2 Survey Plots

NOTES: