



**ACT**  
Government

# Ref 11 Toolkit User Guide

## Reference Document 11 Compliance Tools for AutoCAD

TRANSPORT CANBERRA AND CITY SERVICES

Version 1.0



**ACT**  
Government

Transport Canberra  
and City Services

## Document Information

### **Review and Approval**

Date approved:

Date effective:

Approved by: John Bowdery, Director - Innovation and Customer Experience

Review period: As required

### **Document Details**

Content owner: John Bowdery, Director - Innovation and Customer Experience

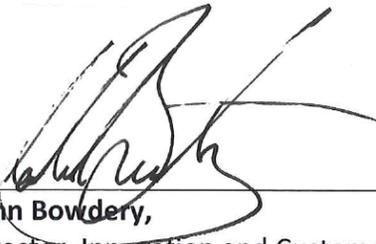
Contact: Paul Dowling (02) 6207 6558 [Paul.Dowling@act.gov.au](mailto:Paul.Dowling@act.gov.au)

### **Version Control**

Version	Issue Date	Author	Details
1.0	November 2017	Paul Dowling	Final Version

Please note: The current version of this document is on the Transport Canberra and City Services website. Printed copies may be out of date, please check before using.

### **Approved by:**



John Bowdery,  
Director, Innovation and Customer Experience  
Transport Canberra and City Services

9 November 2017

Date

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## 1.0 Overview of the Ref 11 Toolkit

### 1.1 What is the Ref 11 Toolkit used for?

The Ref 11 Toolkit is an AutoCAD add-on developed by Transport Canberra and City Services (TCCS) for use by consultants in creating summary drawings to meet TCCS Reference Document 11 (Ref 11) compliance requirements.

Ref 11 has strict spatial and attribute requirements ensuring consistent high-quality information is loaded efficiently into the TCCS asset management system.

### 1.2 How does the Ref 11 Toolkit work?

The Ref 11 Toolkit consists of a partial AutoCAD menu, custom functions and configuration files. Presently it requires AutoCAD to fully function because it has been developed using AutoLISP and VisualLISP and generates custom dialog boxes for editing block attributes on the fly. The Toolkit requires minimal mandatory installation steps plus optional configuration for further customisation. The Toolkit's AutoCAD menu and configuration files are generated from the ACDC database to enable consistency with the Open Spatial validation processes used by TCCS. This structure enables the Toolkit to be updated easier across users with minimal effort.

### 1.3 Ref 11 Toolkit development history

Ref 11 Toolkit was primarily developed by a small team within TCCS, Innovation and Customer Experience, Asset and Data Integration as well as Rod Mertin from RD Gossip.

The Ref 11 Toolkit also contains some lines of third party code the ACT Government has been permitted to use by Lee Mac Programming <http://lee-mac.com> (conditions apply) and Tharwat Al Sharouf <https://autolispprograms.wordpress.com>

The development of the Ref 11 Toolkit arose from another project to update the Ref 11 Standard along with the TCCS database configuration of the Open Spatial ACDC product / portal validation set.

The main objectives of the Ref 11 Update project were:

- Rewrite Ref 11 standard to be more transparent, accurate and require less interaction to obtain information;
- Improve validation rates on the Open Spatial 'As Constructed Portal' for TCCS projects;
- Improve consistency between Ref 11 document, AutoCAD menus and validation configurations; and
- Eliminate the need for summary drawings to contain all Ref 11 layers;
- Make it more efficient to create summary drawings and update the asset management system.

In 2016 whilst working on these main objectives, the first breakthrough was made creating a dialog box to edit a Ref 11 basketball court block with drop-down lists to select attribute values from. This innovation proved popular with consultants that previewed the prototype.

Development progressed quickly creating dialog boxes on the fly with drop-down list values and built in validation for all Ref 11 standard blocks. In mid-2017 Rodney Mertin from RD Gossip enhanced the Toolkit, developing tools to streamline workflows automating insertion of Ref 11 blocks onto associated line work. Shortly after, beta testing was carried out with approximately a dozen consultants forming the Ref 11 Pilot Working Group. The beta testing again proved popular with positive feedback and suggestions resulting in further refinement of the Toolkit. Original objectives appear to have been achieved with the release of the new Ref 11 Reference document and the Ref 11 Toolkit.

Organisations and teams that contributed to the development and improvement of the Ref 11 Toolkit

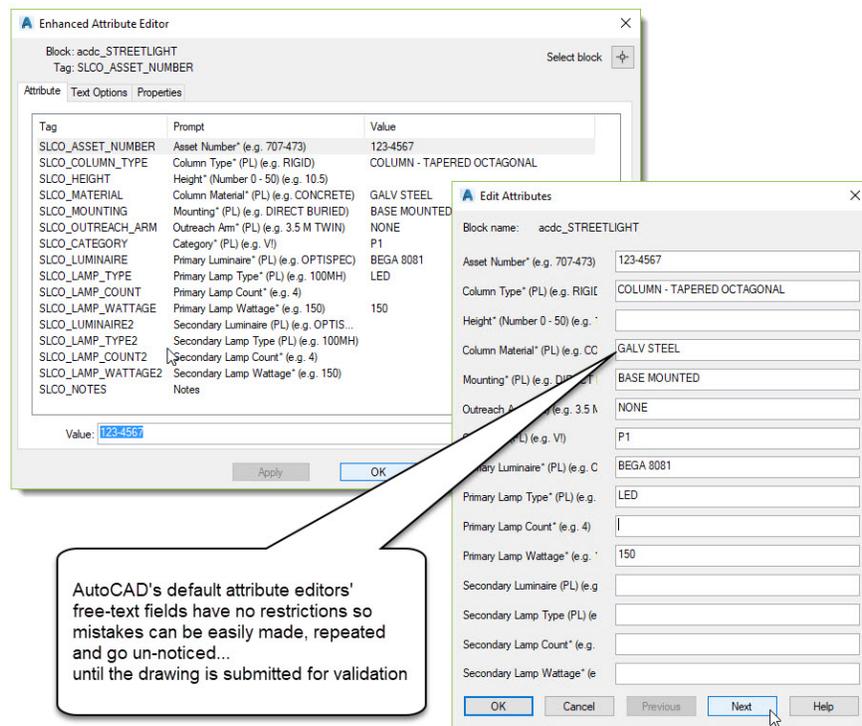
Organisation	Team	
 <p><b>ACT</b> Government Transport Canberra and City Services</p>	Paul Dowling Adam Sorensen	Ricardo Colarina Rodney Mertin
 <p>OpenSpatial</p>	Ian Edwards	Johan Nel
 <p>Consulting Engineers</p>	Martin Gordon	Rodney Mertin
<p><b><i>Ref 11 Pilot Working Group</i></b></p>	Aurecon Calibre Consulting Canberra Metro Construction Coleman Engineering Indesco Consulting Engineers Opus	R.D. Gossip redbox design group Sellick Consultants SMEC Australia Spacelab
 <p>Lee Mac Programming</p>	Lee Mac Programming	
 <p>t</p>	Tharwat Al Shoufi	

## 1.4 Why was the Ref 11 Toolkit developed?

The Ref 11 Toolkit was developed because consultants struggled producing summary drawings that complied with the 2015 Ref 11 standard. The previous process was time-consuming and demanded continual interaction with multiple standard documents and filtering data in a spreadsheet to obtain required information. Typing and formatting mistakes were often repeated across numerous blocks throughout the drawing. These would go un-noticed until validation errors within the drawings were identified on the Open Spatial 'As Constructed Portal'.

Fixing the issues would generally require considerable rework and multiple resubmissions.

Entering information in AutoCAD's default attribute editor or enhanced attribute editor is also a time-consuming process and mistakes can be easily made. The user interfaces rely on text boxes where the user types free-text for each attribute. They allow any type of data type to be entered (character, date, real, integer) into any attribute and provide no functionality to ensure data quality and consistency.



## 1.5 What are the benefits in using the Ref 11 Toolkit?

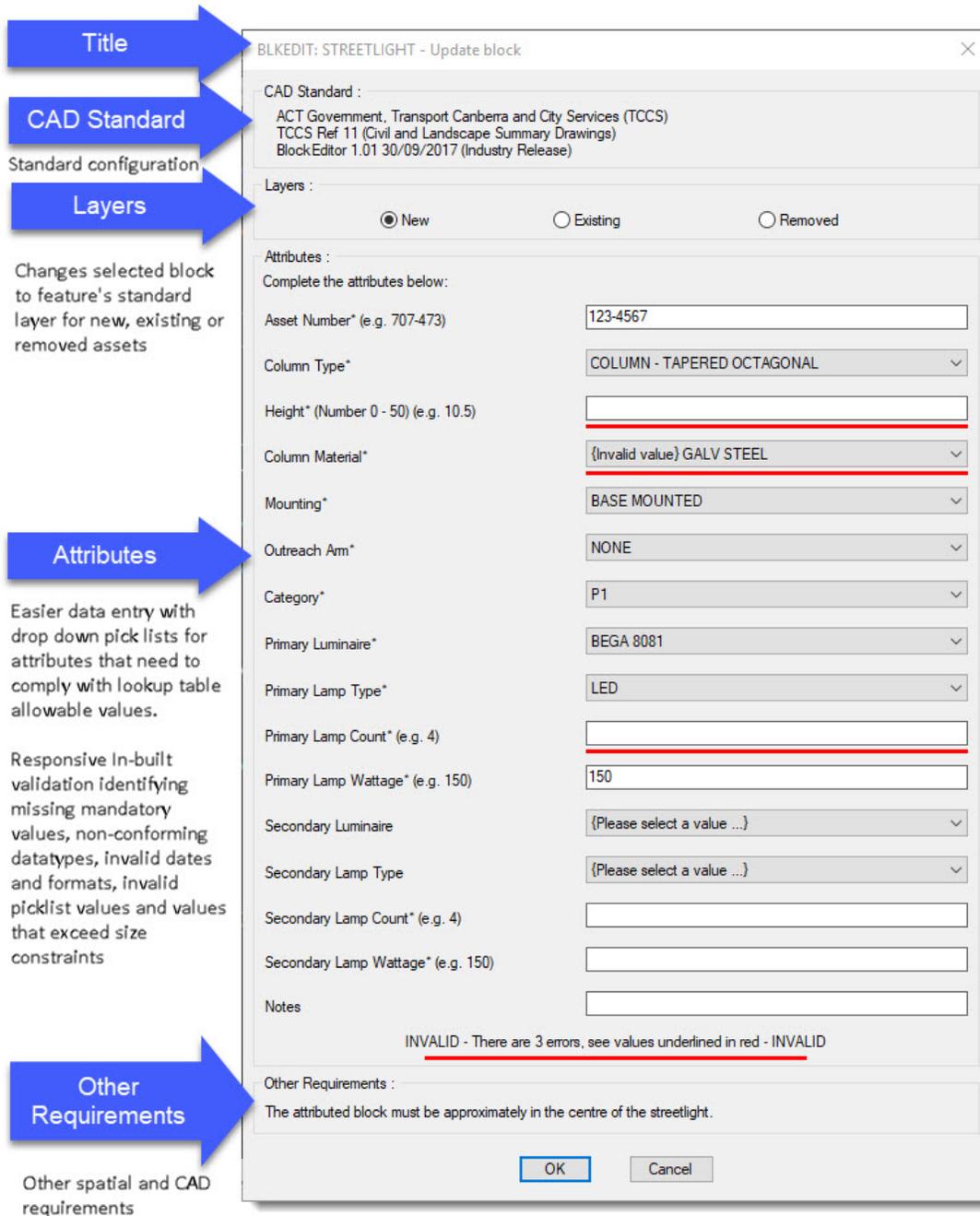
The main benefits the Ref 11 Toolkit provides is enabling users to create compliant summary drawings faster and require less time interacting with the Ref 11 Standard to enter accurate attribute values. The Ref 11 Toolkit has several tools and a new AutoCAD menu created to support streamlined workflows and easier data entry.

The main benefits of the toolkit include:

- Custom dialog boxes have drop down pick lists to make entering attribute values easier.
- Custom dialog boxes automatically place blocks on standard layers.
- Custom dialog boxes have built in validation identifying missing mandatory information, non-standard values and data type / field length discrepancies.
- Custom dialog boxes remove accidental leading and trailing spaces when data is entered.
- Custom dialog boxes include additional information to enable less interaction with standards.
- Configuration compliant with the Ref 11 standard; Open Spatial 'As Constructed Portal' [www.asconstructed.com](http://www.asconstructed.com) and the Open Spatial ACDC system used to validate summary drawings submitted to TCCS.
- Custom AutoCAD menu and tools to draw, insert and update data for Ref 11 Summary Drawings.
- Toolkit configuration files generated from data within TCCS ACDC database for consistency.
- Can be used with / without using drawing templates.
- Enables improved workflows when converting office drawings to Ref 11 Summary Drawings.
- Automatically places blocks in correct locations relative to associated line work.
- Values users seldom used can be hidden from appearing in drop down pick lists.
- Improved block attribute prompts.
- Easier for consultants to produce summary drawings internally or outsource if desired.

### I.5.1 Improved data entry

The **BLKEDIT** function - Custom dialogue boxes to edit Ref 11 standard block attributes using drop down pick lists.



**Title**  
Changes selected block to feature's standard layer for new, existing or removed assets

**CAD Standard**  
Standard configuration

**Layers**

**Attributes**  
Easier data entry with drop down pick lists for attributes that need to comply with lookup table allowable values.  
Responsive In-built validation identifying missing mandatory values, non-conforming datatypes, invalid dates and formats, invalid picklist values and values that exceed size constraints

**Other Requirements**  
Other spatial and CAD requirements

**BLKEDIT: STREETLIGHT - Update block**

CAD Standard :  
ACT Government, Transport Canberra and City Services (TCCS)  
TCCS Ref 11 (Civil and Landscape Summary Drawings)  
BlockEditor 1.01 30/09/2017 (Industry Release)

Layers :  
 New  Existing  Removed

Attributes :  
Complete the attributes below:

Asset Number* (e.g. 707-473)	123-4567
Column Type*	COLUMN - TAPERED OCTAGONAL
Height* (Number 0 - 50) (e.g. 10.5)	
Column Material*	{Invalid value} GALV STEEL
Mounting*	BASE MOUNTED
Outreach Arm*	NONE
Category*	P1
Primary Luminaire*	BEGA 8081
Primary Lamp Type*	LED
Primary Lamp Count* (e.g. 4)	
Primary Lamp Wattage* (e.g. 150)	150
Secondary Luminaire	{Please select a value ...}
Secondary Lamp Type	{Please select a value ...}
Secondary Lamp Count* (e.g. 4)	
Secondary Lamp Wattage* (e.g. 150)	
Notes	

INVALID - There are 3 errors, see values underlined in red - INVALID

Other Requirements :  
The attributed block must be approximately in the centre of the streetlight.

OK Cancel

This overcomes the frustration CAD users experienced having to continually refer to the previous standard documentation and spreadsheet to enter data in the free text fields via AutoCAD's standard Edit Attributes dialog boxes.

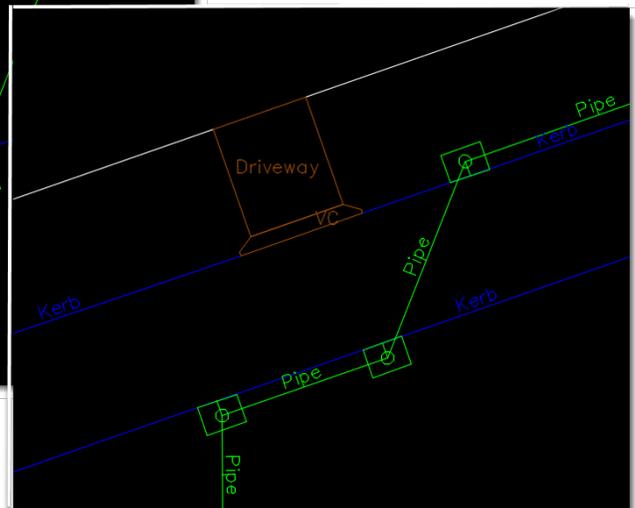
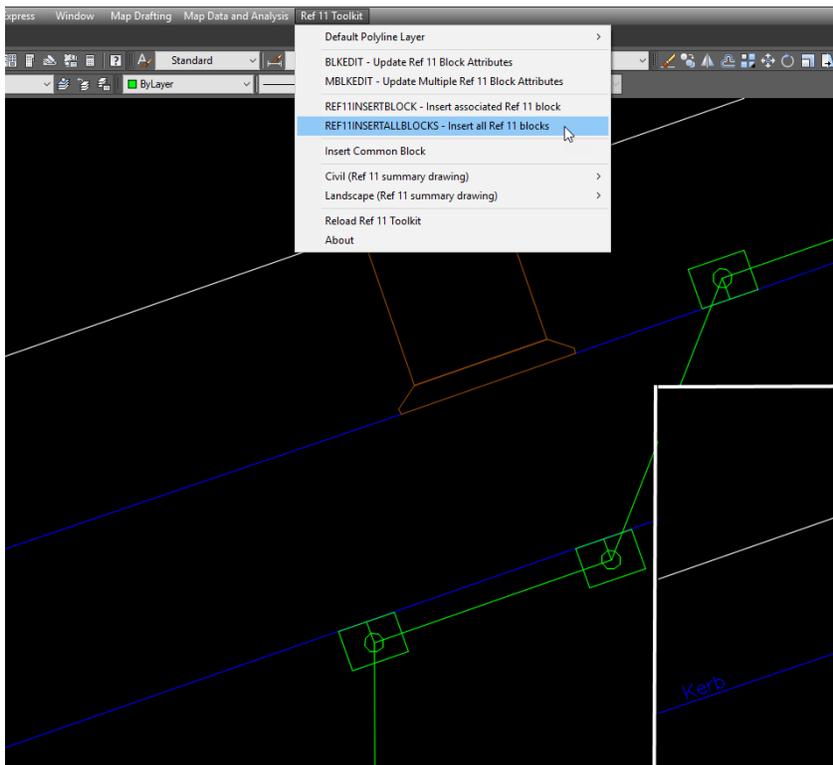
The BLKEDIT also has the functionality to update multiple blocks simultaneously.

## Automated insertion of attributed blocks

### The **Ref11InsertAllBlocks** function –

- Inserts Ref 11 attributed blocks onto all Ref 11 features (lines, closed polylines) that are missing associated blocks.
- Moves Ref 11 blocks associated with linear features to the midpoint of a segment to comply with the Open Spatial ACDC spatial validation rules.
- Inserts Ref 11 attributed blocks onto non-standard blocks on Ref 11 layers that are missing standard blocks. (e.g. If consultant's sump block was on the layer `acdc_SW_SUMP_NEW` and did not have a block `acdc_SW_SUMP` at the same insertion point, the routine would insert the block `acdc_SW_SUMP` at that location)
- Saves user manually inserting attributed blocks for each feature from the Ref 11 Toolkit menu.

**“Ref11InsertAllBlocks inserts attributed blocks on all Ref 11 line-work “**



## 1.6 Requesting additional values for drop-down lists

Where additional values need to be added to the drop-down lists, email requests to [TCCS.AssetInformation@act.gov.au](mailto:TCCS.AssetInformation@act.gov.au) specifying the following information:

- Standard Ref 11 Block;
- Attribute;
- Lookup table name; and
- Proposed additional value(s)

Refer to the relevant section for the specific asset and in the Ref 11 document to locate the, block, attribute and lookup table information

**Streetlight attribute information**

The streetlight block `acdc_STREETLIGHT` has 16 attributes. The table below lists each of these attributes and their requirements.

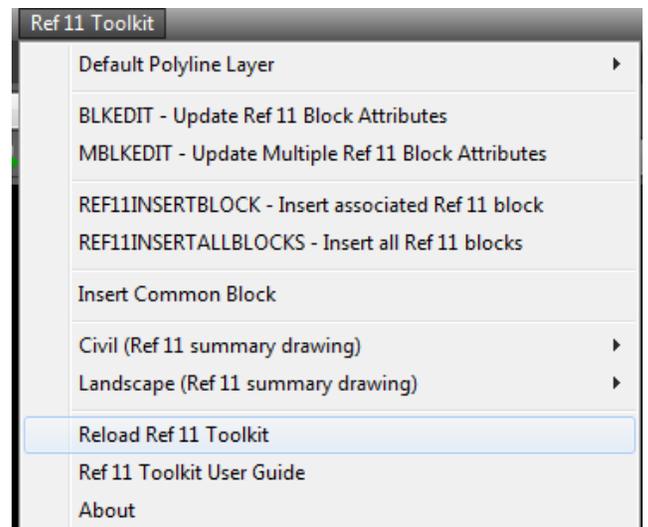
**Table 86** Streetlight block `acdc_STREETLIGHT` attributes

Block Attribute	Attribute Label	Data Type	Max Length	Lookup Tables/Picklists
SLCO_ASSET_NUMBER	Asset Number	Character	80	
SLCO_COLUMN_TYPE	Column Type	Character	80	Yes LU_TRITS12_COLUMN
SLCO_HEIGHT	Height	Real	5.2	
SLCO_CATEGORY	Category	Character	5	Yes LU_TRITS12_CATEGORY
SLCO_MATERIAL	Column Material	Character	80	Yes LU_TRITS12_COLMATRI
SLCO_OUTREACH_ARM	Outreach Arm	Character	80	Yes LU_STRLGHT_OUTREACH
SLCO_MOUNTING	Mounting	Character	80	Yes LU_STRLGHT_MOUNTING
SLCO_LUMINAIRE	Primary Luminaire	Character	80	Yes LU_TRITS12_LUMINAIRES
SLCO_LUMINAIRE2	Secondary Luminaire	Character	120	Yes LU_TRITS12_LUMINAIRES
SLCO_LAMP_TYPE	Primary Lamp Type	Character	80	Yes LU_TRITS12_LAMPTYPE
SLCO_LAMP_TYPE2	Secondary Lamp Type	Character	80	Yes LU_TRITS12_LAMPTYPE
SLCO_LAMP_COUNT	Primary Lamp Count	Integer	4	

Updated INI files will be provided within 1 – 5 days. There may be a short delay before the Open Spatial validation portal is updated. It is recommended to create a backup of the old INI files prior to replacing them with the new INI files in case values have been hidden from lookup tables (see 7.3 Hiding values from drop-down lists)

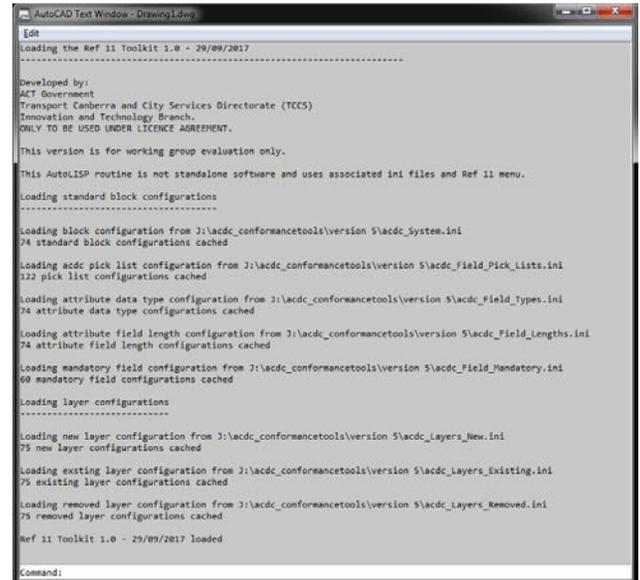
Replace the existing INI files with the update one or update the new values to your original INI files.

Clicking **Reload Ref 11 Toolkit** from the Ref 11 Toolkit menu will reload the new INI files.



After clicking Reload Ref 11 Toolkit switching to the AutoCAD Text Window (F2) displays information about the Ref 11 Toolkit configuration and the location of the INI files that have been loaded.

Ensure you copied the new INI files to these locations.



```

AutoCAD Text Window - Drawing1.dwg
Edit
Loading the Ref 11 Toolkit 1.0 - 29/09/2017
-----
Developed by:
ACT Government
Transport Canberra and City Services Directorate (TCCS)
Innovation and Technology Branch.
ONLY TO BE USED UNDER LICENCE AGREEMENT.

This version is for working group evaluation only.

This AutoLISP routine is not standalone software and uses associated ini files and Ref 11 menu.

Loading standard block configurations
-----
Loading block configuration from J:\acdc_conformancetools\version 5\acdc_System.ini
74 standard block configurations cached

Loading acdc pick list configuration from J:\acdc_conformancetools\version 5\acdc_Field_Pick_Lists.ini
122 pick list configurations cached

Loading attribute data type configuration from J:\acdc_conformancetools\version 5\acdc_Field_Types.ini
74 attribute data type configurations cached

Loading attribute field length configuration from J:\acdc_conformancetools\version 5\acdc_Field_Lengths.ini
74 attribute field length configurations cached

Loading mandatory field configuration from J:\acdc_conformancetools\version 5\acdc_Field_Mandatory.ini
60 mandatory field configurations cached

Loading layer configurations
-----
Loading new layer configuration from J:\acdc_conformancetools\version 5\acdc_Layers_New.ini
75 new layer configurations cached

Loading existing layer configuration from J:\acdc_conformancetools\version 5\acdc_Layers_Existing.ini
75 existing layer configurations cached

Loading removed layer configuration from J:\acdc_conformancetools\version 5\acdc_Layers_Removed.ini
75 removed layer configurations cached

Ref 11 Toolkit 1.0 - 29/09/2017 loaded

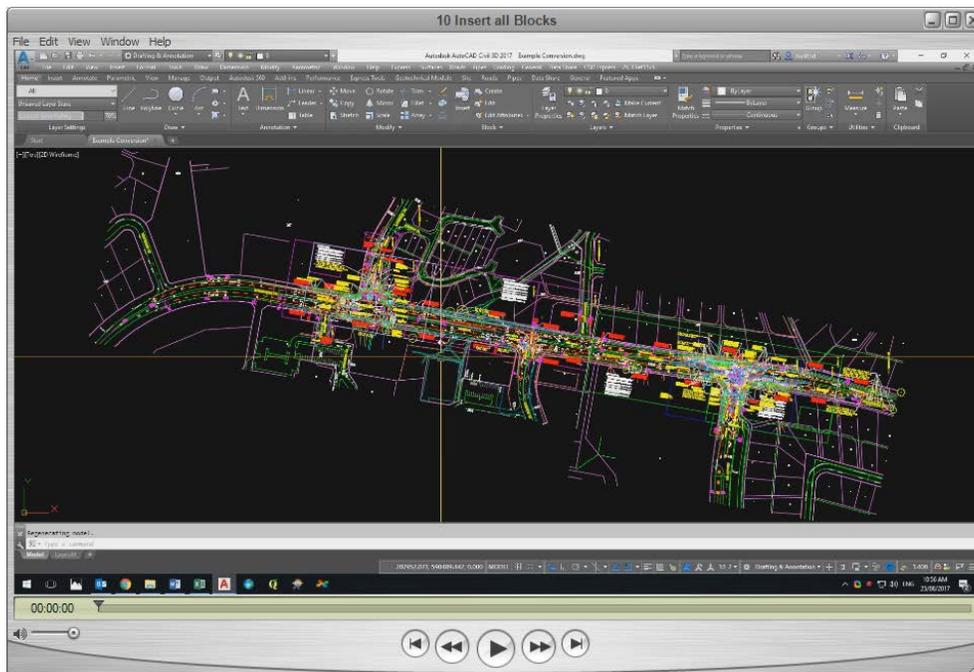
Command:
  
```

## 1.7 Ref 11 Toolkit tips and tricks videos

Approximately a dozen Ref 11 tips and tricks videos have been created by Rodney Mertin from RD Gossip demonstrating alternative methods in preparing Ref 11 summary drawings.

These are available to download from the Open Spatial Portal

<https://www.asconstructed.com/#/downdocuments>



## 1.8 Can the Ref 11 Toolkit be used with other standards?

Currently the Toolkit is only configured to work with TCCS Summary Drawings.

Additional functionality has been developed for the Toolkit to be used with multiple standards but is yet to be implemented in the production version.

## 2.0 Reference Document 11 and Summary Drawings

### 2.1 About reference document 11 (Ref 11)

Reference Document 11 specifies standard CAD blocks, layer naming conventions, units, coordinate systems, spatial representation and required attribute data for each asset to be used in a summary drawing.

The latest version of Ref 11 has been rewritten and restructured to make the requirements transparent and enable users to obtain required information with minimal interaction.

Asset specific requirements are collated to support information being efficiently transmitted to subconsultants or specialist contractors. The transparency of requirements should encourage collaboration between TCCS, utility providers, consultants and contractors to improve and harmonise requirements across the industries in future updates.

Layer	Description	Linetype	Colour
acdc_BRIDGE_NEW	New bridges	Continuous	34
acdc_BRIDGE_EXG	Existing bridges	Continuous	33
acdc_BRIDGE_REM	Removed bridges	Demolished	Red

Block Attribute	Attribute Label	Data Type	Max Length	Lookup Tables / Picklists
BRDG_NUMBER	Bridge Number	Character		
BRDG_NAME	Bridge Name	Character	50	
BRDG_TYPE	Structure Type	Character	60	Yes LU_BRIDGE_STRUCTURE_TYPE
BRDG_FUNCTION	Structure Function	Character	50	Yes LU_BRIDGE_STRUCTURE_FUNCT
BRDG_SUPERSTRUCTURE	Superstructure Material	Character	60	Yes LU_BRIDGE_SUPERSTRUCTURE_MAT
BRDG_SPANS	Number of Spans	Integer		
BRDG_PERS	Number of Piers	Integer		
BRDG_LENGTH	Length (m)	Real		
BRDG_WIDTH	Width (m)	Real		
BRDG_MIN_CLEARANCE	Minimum Clearance (m)	Real		
BRDG_WEARING_SURFACE	Wearing Surface	Character	60	Yes LU_BRIDGE_WEARING_SURFACE
BRDG_DECK_MATERIAL	Deck Material	Character	60	Yes LU_BRIDGE_DECK_MATERIAL
BRDG_LANES	Number of Lanes	Integer		
BRDG_FOOTPATHS	Number of Footpaths	Integer		

Lookup Table	Values	
LU_BRIDGE_DECK_MATERIAL	NONE BONDECK/REINFORCED CONCRETE BRIDGEWOOD FIBRE REINFORCED PLASTIC (FRP) MASONRY OR BRICK PRESTRESSED CONCRETE REINFORCED CONCRETE SELECTED BACKFILL STEEL TIMBER	
LU_BRIDGE_STRUCTURE_FUNCT	ANIMAL CROSSING PEDESTRIAN BRIDGE ROAD BRIDGE	
LU_BRIDGE_STRUCTURE_TYPE	ARCH BRIDGE BEBO ARCH BOX CULVERT BRIDGE CABLE STAYED BRIDGE CANTILEVER SPAN BRIDGE CLASSIC ARCH (HUMES) COMBINED PIPE BOX CULVERT CONCRETE BOX CULVERT CONCRETE PIPE CULVERT CONCRETE SLAB CULVERT - COMBINATION CULVERT FOOTBRIDGE DECK UNIT BRIDGE	FOOTBRIDGE GIRDER - SIMPLY SUPPORTED GIRDER CONTINUOUS L/LEVEL CROSSING NOVA SPAN ARCH (STEEL) PIPE CULVERT POLYGONAL ARCH SLAB BRIDGE STEEL PIPE CULVERT SUSPENSION TRUSS BRIDGE TUNNEL VEHICLE TUNNEL
LU_BRIDGE_SUPERSTRUCTURE_MAT	NONE MASONRY OR BRICK POST TENSIONED CONCRETE PRESTRESSED CONCRETE	REINFORCED CONCRETE STEEL TIMBER
LU_BRIDGE_WEARING_SURFACE	NONE ASPHALT BOMANITE GRAVEL MASONRY	PRESTRESSED CONCRETE REINFORCED CONCRETE SPRAYED SEAL TILED TIMBER

## 2.2 What are Ref 11 summary drawings?

Ref 11 Summary drawings are used to automate loading work as executed spatial and attribute data depicting new, removed or amended municipal assets within the submission into the TCCS asset management system and GIS systems.

Ref 11 summary drawings are works as executed (WAE) CAD files in AutoCAD DWG format that must comply with TCCS reference document 11 requirements. Consultants can confirm summary drawings meet compliance requirements by submitting them online via the Open Spatial ACDC Portal <http://asconstructed.com> which validates them in approx. 5 minutes.

Summary drawings can be in a single drawing representing both civil and landscape works or separated into a civil summary drawing and a landscape summary drawing. These are submitted as part of operational acceptance WAE records (see Reference Document 8 and Reference Document 11)

Future works must not be shown but pre-existing assets or features not changed by the development may be shown if needed as contextual data for the current works on the appropriate layers.

These drawings must pass automated validation processes and reviewed by TCCS to be accepted. Current validation configuration only validates CAD data on assets associated New or Removed layers. CAD data representing existing assets are not validated.

## 2.3 Other works as executed drawings submitted to TCCS

The Ref 11 Toolkit and Ref 11 document requirements only apply to summary drawings and not other works as executed drawings produced and submitted as part of operational acceptance.

## 3.0 Validation Requirements

Refer to the latest Reference Document 11 for full requirements.

### 3.1 What elements are validated?

The first validation check is ensuring the common block exists in the summary drawing with mandatory project information. If this requirement is not met, the validation process immediately rejects the submission without performing any more checks.

Ref 11 block names are hardcoded into the validation rules. If block names are changed they will fail validation and will not work with the Ref 11 Toolkit tools.

Ref 11 block attributes are hardcoded into the validation rules. If attribute names are changed they will fail validation and associated drop-down lists will not work with the Ref 11 Toolkit tools. If additional attributes are added to blocks are ignored in the validation process.

If WAE information is outside the spatial extents of the ACT in the Stromlo projection it will fail validation.

Validation rules that apply to attribute values are:

- Data type (integer, real, character, date, logical);
- Lookup table values must match exactly (including case);
- Field length; and
- Mandatory attributes are entered.

Each standard feature has specific geometry constraints (line, lightweight polylines, blocks, closed polylines) and whether they require associated blocks are hard coded in the validation rules.

Ref 11 layers are hardcoded into the validation rules.

All features on non-standard layers are ignored in the validation process.

Ref 11 blocks on incorrect layers will fail validation.

Colours and linetypes for layers and features can be changed without effecting validation.

Drop-down lists / lookup table values are hardcoded into the validation rules. Values that are modified or added without being requested through [TCCS.AssetInformation@act.gov.au](mailto:TCCS.AssetInformation@act.gov.au) will fail validation until the changes are made on the portal and the TCCS on premise ACDC database.

Ref 11 line work and attributed blocks representing New and Removed assets are validated.

The Toolkit allows for features to be drawn on Existing layers although they do not get validated. This may change in future updates to the TCCS configuration of the Toolkit and Open Spatial's ACDC system and online portal.

### 3.2 How are Ref 11 summary drawings validated?

Validation of the summary drawings uses the Open Spatial As Constructed Design Certification (ACDC) solution with ACDC on the desktop and pre-validation via its companion ACDC Validation Portal <http://asconstructed.com>

When consultants submit summary drawings via the ACDC Validation Portal, it generally only takes 5 minutes to validate them.

This provides users rapid compliance feedback on their drawing instead of the previous process which had a 10 day turn around period.

Engineers/consultants can run validation prior to plan submittal and can get a log and drawing showing non-conformance to the standard.

Errors and inconsistencies are automatically and consistently flagged before submittal.

Consultants do not incur fees for multiple submissions via the ACDC portal.



Name	Status	Id	Description	Num.	Rev.	Project	Developer	Submission Date	
▼ Landscape Su...	🔍	12048	Landscape sum...	1234	1	TCCS Ref 11 Val...	ACT Governmen...	Sep 28, 2017	Action ▼

#### Result Summary

Entities Processed	829
Entities Analysed	584
Entities Outside Extents	0
<hr/>	
Percentage Passed	100%
Entities Passed	584
<hr/>	
Entities Failed	0



Certified

Project Name	TCCS Ref 11 V...
Validation Set	ACDC_ACTTC...
Date Certified	28-Sep-2017
Status	Passed

Drawing Name	Landscape Summary example - NEW...
Submitted By	ACT Government – Transport Canberra and City Services (TCCS)
Submitted For	ACT Government – Transport Canberra and City Services (TCCS)
User Name	Paul Dowling

## 4.0 System Requirements

### 4.1 Hardware and software requirements

#### Operating Systems:

- Microsoft® Windows® 10 (32-bit & 64-bit)
- Microsoft Windows 8/8.1 (32-bit & 64-bit)
- Microsoft Windows 7 (32-bit & 64-bit)

#### Software:

- AutoCAD and its vertical products which support AutoLISP/VisualLISP
- Ref 11 Toolkit

#### Monitor Resolution:

- 1920 x 1200 or higher recommended (for correct display of dialog boxes)

### 4.2 Compatibility with other CAD packages

The software has undergone testing in AutoCAD which is used within the ACT Government and by the majority of consultants that supply works as executed (WAE) drawings to TCCS. The Toolkit uses AutoLISP and VisualLISP and generates custom dialog boxes for editing block attributes on the fly.

There are other CAD Software including ProgeCAD and BricsCAD with limited AutoLISP capabilities that may prevent the Toolkit working due to the use of several VisualLISP commands. The dialog boxes may also display differently.

During early development, TCCS had some degree of success testing the Toolkit's BLKEDIT function with these CAD packages. Unfortunately, as additional functionality was added to meet industry expectations, some of the code became no longer compatible with these products.

AutoCAD LT is also not compatible with the Ref 11 Toolkit due to its lack of support for AutoLISP and VisualLISP.

### 4.3 Alternative options

Whilst the Toolkit is not compatible with AutoCAD LT or several other CAD packages, an alternative AutoCAD LT menu enables users to draw line work and associated attributed blocks on correct layers but does not have any other Toolkit functionality.

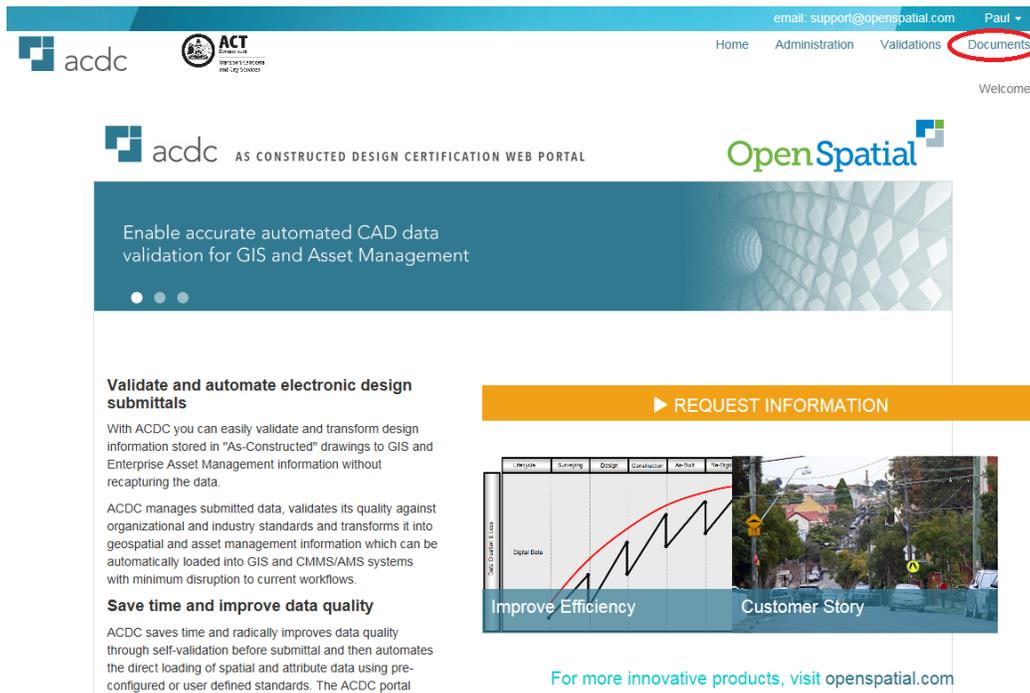
The new Ref 11 standard requirements are more transparent and accessible with asset requirements collated for easy reference. This enables lookup table values to be easily copy and pasted into AutoCAD attributes.

## 5.0 Installation

### 5.1 Downloading the Ref 11 Toolkit

The Ref 11 Toolkit can be downloaded from the Open Spatial As Constructed Portal by consultants who are registered to submit TCCS summary drawings.

- Step 1. Login to <http://asconstructed.com> the Open Spatial as constructed portal
- Step 2. Click the Documents tab
- Step 3. From the Documents page download the Ref 11 Toolkit files, standard blocks, tips and tricks videos and documentation.



email: [support@openspatial.com](mailto:support@openspatial.com) Paul ▾

Home Administration Validations **Documents**

Welcome

acdc AS CONSTRUCTED DESIGN CERTIFICATION WEB PORTAL OpenSpatial

Enable accurate automated CAD data validation for GIS and Asset Management

**Validate and automate electronic design submittals**

With ACDC you can easily validate and transform design information stored in "As-Constructed" drawings to GIS and Enterprise Asset Management information without recapturing the data.

ACDC manages submitted data, validates its quality against organizational and industry standards and transforms it into geospatial and asset management information which can be automatically loaded into GIS and CMMS/AMS systems with minimum disruption to current workflows.

**Save time and improve data quality**

ACDC saves time and radically improves data quality through self-validation before submittal and then automates the direct loading of spatial and attribute data using pre-configured or user defined standards. The ACDC portal

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## 5.2 Ref 11 Toolkit end user licence agreement

### 1. Background

1.1 The Territory has developed the Ref 11 Toolkit (“the software”) for use in AutoCAD and its vertical products which support AutoLISP/Visual LISP. The purpose of the software is to overcome difficulties consultants experienced when preparing AutoCAD drawings to meet TCCS Reference 11 (“Ref 11”) compliance requirements. The software provides a degree of automation and data entry validation using the latest Ref 11 standard blocks, menus and toolkit configuration files.

### 2. Grant of licence and acceptance

2.1 The Territory grants you a non-exclusive, non-transferable, limited purpose licence to use the software in object file form only, and any accompanying documentation and/or materials, but only for the purpose of preparing AutoCAD drawings to meet TCCS Ref 11 compliance requirements. You must not use the software for any other purpose without the Territory’s written consent by the Director of Innovation and Customer Experience, Transport Canberra and City Services Directorate or person with the appropriate delegation. You accept the terms of this agreement by copying, downloading, installing or using the software or by signing a printed copy of this agreement. You must not copy, download, install or use the software if you are not willing to be bound by the terms of this agreement.

### 3. SOFTWARE DISCLAIMER

3.1 THE TERRITORY PROVIDES THE SOFTWARE ON AN “AS IS” AND “AS AVAILABLE” BASIS. THE SOFTWARE MAY CONTAIN DEFECTS OR ERRORS AND MAY NOT FUNCTION AS INTENDED.

3.2 YOU AGREE TO UPDATE THE SOFTWARE WHENEVER THE TERRITORY NOTIFIES YOU THAT AN UPDATE IS AVAILABLE FOR DOWNLOAD.

3.3 YOU AGREE TO SAFEGUARD YOUR DATA, TO USE CAUTION AND NOT TO RELY IN ANY WAY ON THE CORRECT FUNCTIONING OR PERFORMANCE OF THE SOFTWARE AND/OR ANY ACCOMPANYING DOCUMENTATION OR MATERIALS.

### 5.3 Installing the Ref 11 Toolkit and Ref 11 standard blocks

- Step 1. Extract the Ref 11 Toolkit files from Ref11Toolkit.zip to a centralized location on your local drive or network drive.
- Step 2. Extract the Ref 11 standard blocks from Ref 11 Beta Blocks.zip to a centralized location on your local drive or network drive.
- Step 3. In AutoCAD enter the command Options to open the options dialog box.
- Step 4. From the Files tab, select Support File Search Path folder and select Add, followed by Browse.
- Step 5. Navigate to the folder location the toolkit files were saved to in Step 1 then Click Ok.
- Step 6. Use the Move Up button in the Options dialog box to move this folder towards the top of the list of Support File Search Path folders.
- Step 7. Repeat steps 4 – 6 for the folder location used in Step 2 for the Ref 11 standard blocks.
- Step 8. From the Files tab, select Trusted Locations and select Add, followed by Browse.
- Step 9. Navigate to the folder location the toolkit files were extracted to in Step 1 then Click Ok.
- Step 10. In AutoCAD enter the command **CUI** to display the Customise User Interface dialog box.
- Step 11. From the Customize tab, click Load partial customization file icon.
- Step 12. Navigate to the folder the toolkit was extracted to in step 1 and select the file Ref\_11\_Toolkit.mnu then click the Open button.
- Step 13. In the customization window click the Apply button. The new menu item now appears in the AutoCAD menu bar.

#### Caution!



**DO NOT** use AutoCAD's **MENU** command to load the Ref 11Toolkit Menu.

The **MENU** command replaces all your current menus with the menu being loaded!

Instead, the **MENULOAD** function can be used to add the Ref11 Toolkit as a partial menu.

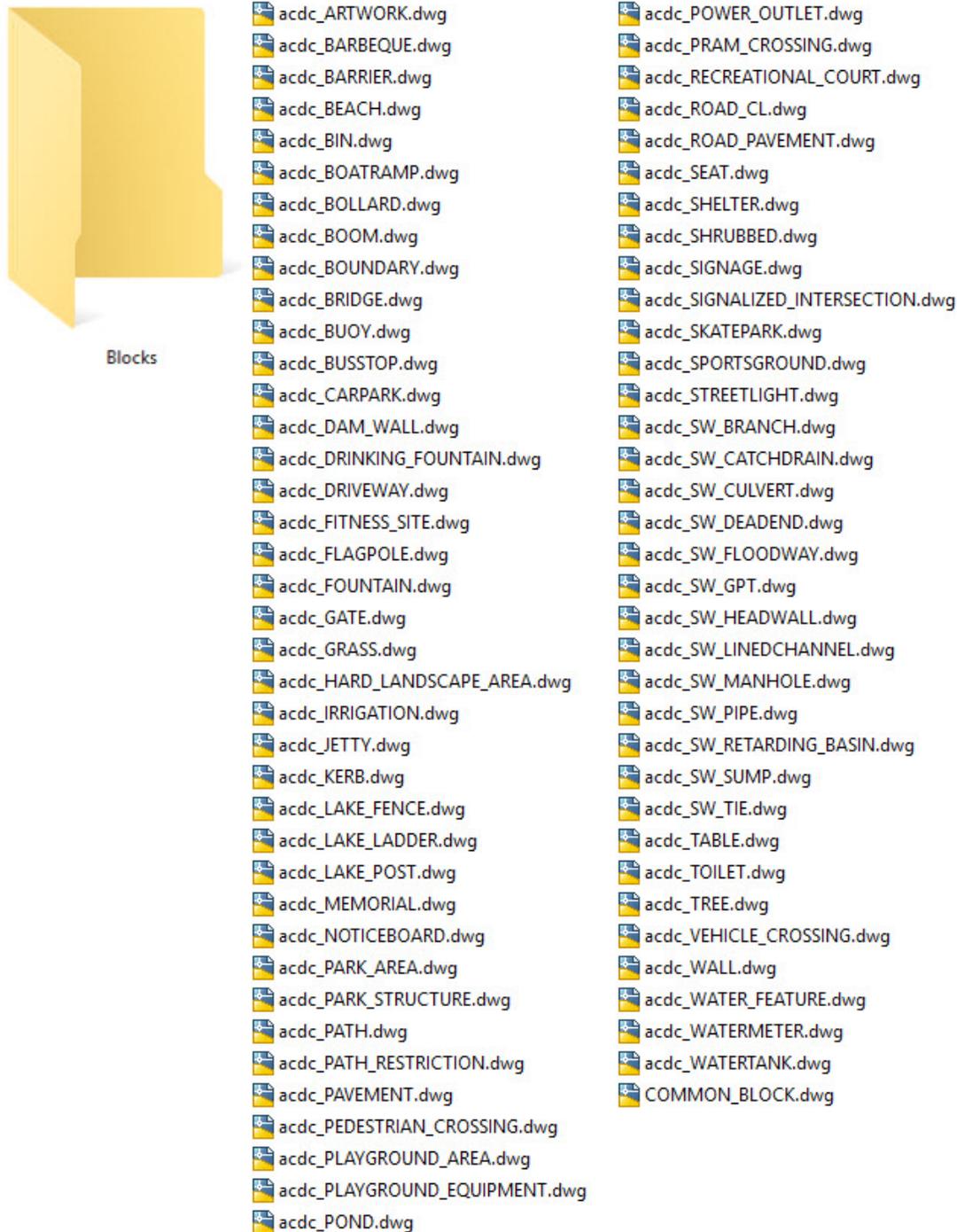
## 5.4 Ref 11 Toolkit files

The table below displays the files which make up the Ref 11 Toolkit.

Configuration File	Purpose of File
Ref_11_Toolkit.fas	This is the main Ref 11 Toolkit software. It contains all the Toolkits custom functions and preloads the Toolkit's INI files into memory for the current AutoCAD session.
Ref_11_Toolkit.mnu	Ref 11 Toolkit AutoCAD menu.
Ref_11_Toolkit.mnl	This file enables the Ref_11_Toolkit AutoLISP routine functions to be run on demand from the command line.
acdc_System.ini	Stores the standard's Block Names, Lookup tables, layer names and spatial definitions for each block.
acdc_Field_Pick_Lists.ini	Stores the standard's lookup table requirements for block attributes.
acdc_Field_Lengths.ini	Stores the standard's field length requirements for block attributes.
acdc_Field_Mandatory.ini	Stores the standard's mandatory attribute requirements for block attributes.
acdc_Field_Types.ini	Stores the standard's field types requirements for block attributes.
acdc_Layers_Existing.ini	Stores the standard's layer properties for Existing features.
acdc_Layers_New.ini	Stores the standard's layer properties for New features.
acdc_Layers_Removed.ini	Stores the standard's layer properties for Removed features.
acdc_About.txt	Stores information about the Ref 11 Toolkit used in the About dialog box.
acdc_Message_Box.DCL	Dialog box for warnings.
Ref_11_Validated_Layers.dws	AutoCAD standards file with New and Removed layers that can be used with the Laytrans command to convert office layers to Ref 11 standard layers.
Ref_11_Validated_Layers.dwg	Drawing with New and Removed layers that can be used with AutoCAD's Design Centre to copy layers into the summary drawing if desired.
Ref_11_All_Layers.dws	AutoCAD standards file with New, Existing and Removed layers that can be used with the Laytrans command to convert office layers to Ref 11 standard layers.
Ref_11_All_Layers.dwg	Drawing with New, Existing and Removed layers that can be used with AutoCAD's Design Centre to copy layers into the summary drawing if desired.

## 5.5 Ref 11 standard blocks

The Ref 11 Toolkit requires the latest Ref 11 CAD blocks to function. Naming conventions for blocks are now more intuitive and consistent as shown below. Blocks have also been enhanced with more explanatory attribute prompts.



## 6.0 Optional Configuration (recommended)

### 6.1 Using aliases for Ref 11 Toolkit commands

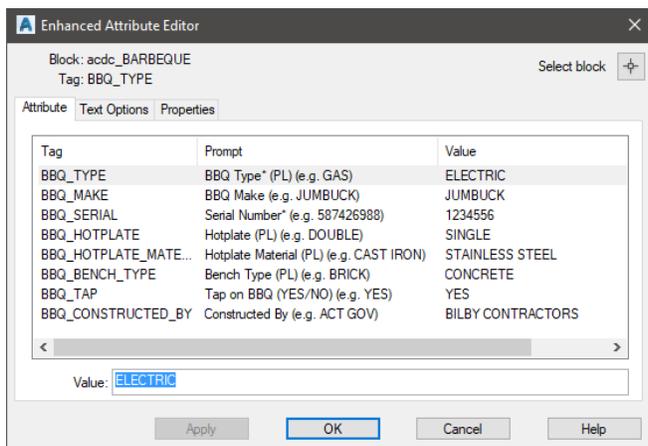
Long distinctive command names have been used for the following Ref 11 Toolkit functions to avoid potential conflicts with users' existing commands, functions or aliases:

- REF11INSERTBLOCK
- REF11INSERTALLBLOCKS

Users that prefer to key in commands may create command aliases for these functions.

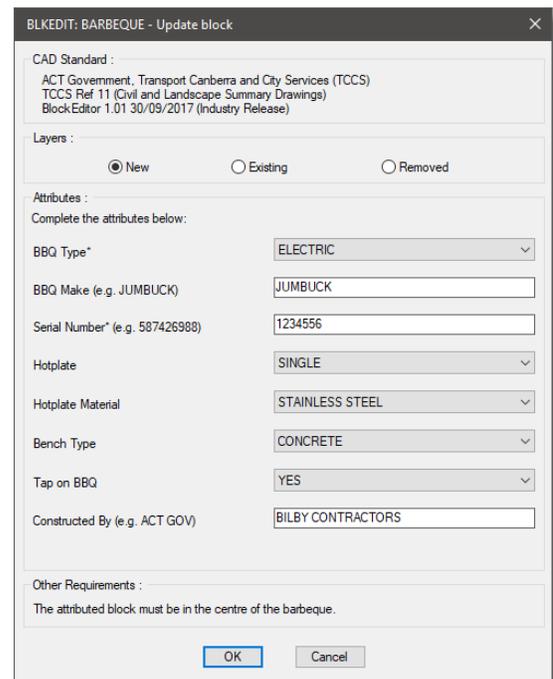
Command aliases are shortened versions of the full-length commands and are completely customizable. Refer to AutoCAD's help documentation on how to create command aliases.

### 6.2 Configuring CUI to use BLKEDIT when double clicking Ref 11 blocks

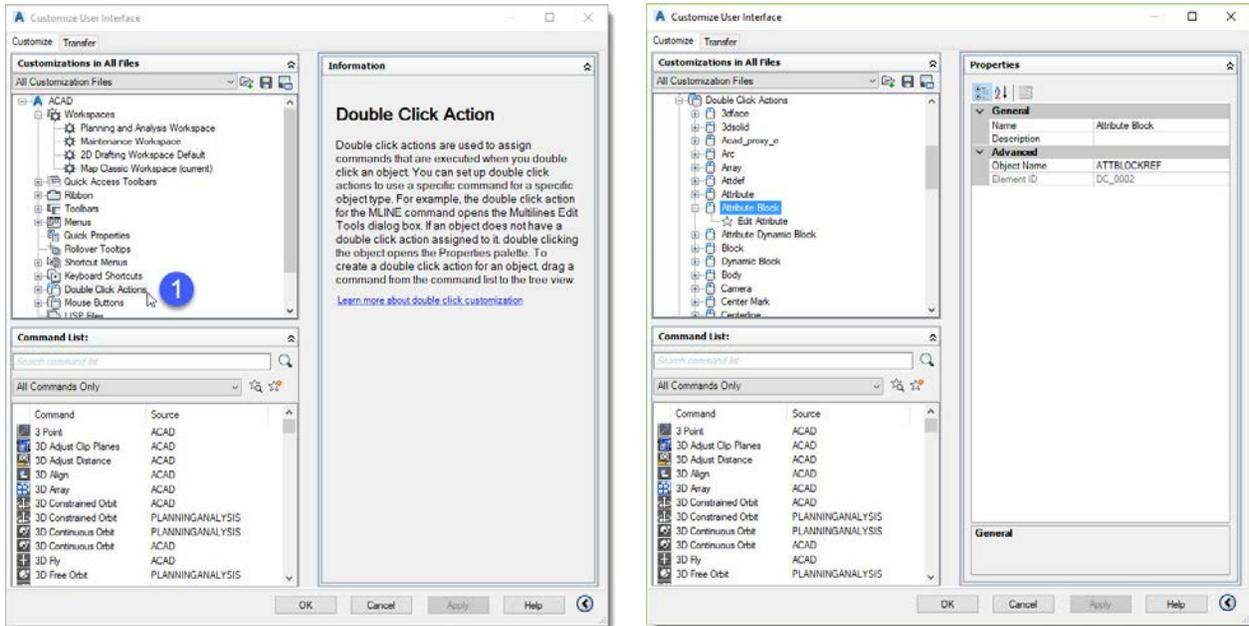


By default, the enhanced attribute editor displays if users double click on any AutoCAD block in a drawing as shown below.

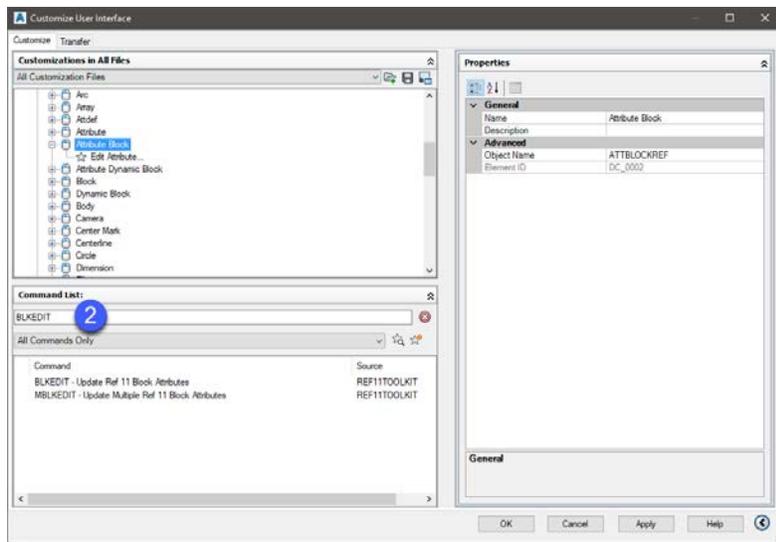
AutoCAD's double click action can be configured to use the BLKEDIT function by default for Ref 11 standard blocks and AutoCAD's enhanced attribute editor for all other blocks.



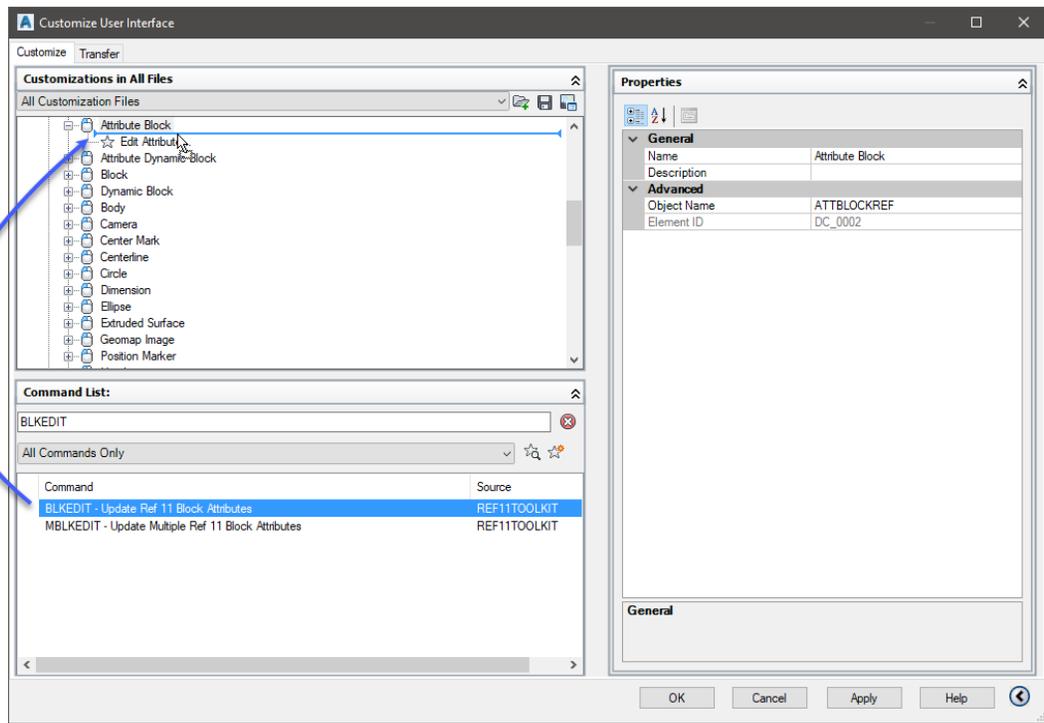
To configure AutoCAD's double click action for attributed blocks, Type CUI to open the Customize User Interface.



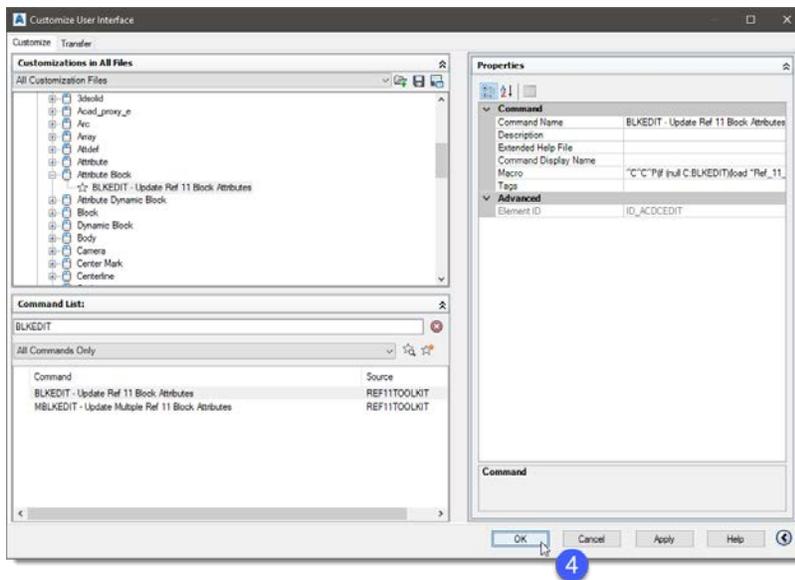
Step 1. From the Customize tab, Expand Double Click Actions, then Attribute Block



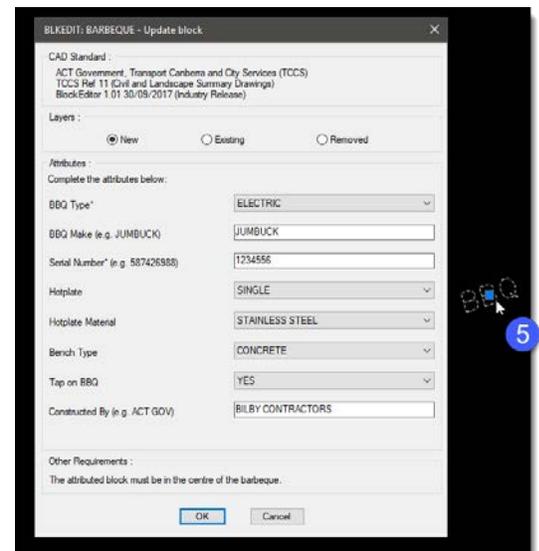
Step 2. Type BLKEDIT in the Command List text box



Step 3. Drag BLKEDIT to below the Attribute Block



Step 4. Click OK



Step 5. Double click any Ref 11 Attributed block to confirm the BLKEDIT dialog box displays

## 7.0 Advanced Optional Configuration

- Warning about making advanced optional configuration changes
- Hiding values from drop-down lists
- Using alternative layer colours and linetypes
- Changing appearance of Ref 11 blocks
- Adding additional block attributes

### 7.1 Warning about making advanced optional configuration changes



#### **Caution!**

Making any of the changes in this section should be undertaken carefully and fully tested to avoid impacting on the functionality of the Ref 11 Toolkit or introduce unwanted validation errors.

This section covers advanced optional configuration changes consultants may wish to implement to closer align summary drawing appearance with their office standards or other stakeholder requirements.

TCCS recommend users provide suggestions for block symbology, colours, linetypes and block attributes for consideration in future releases of the Ref 11 standard.

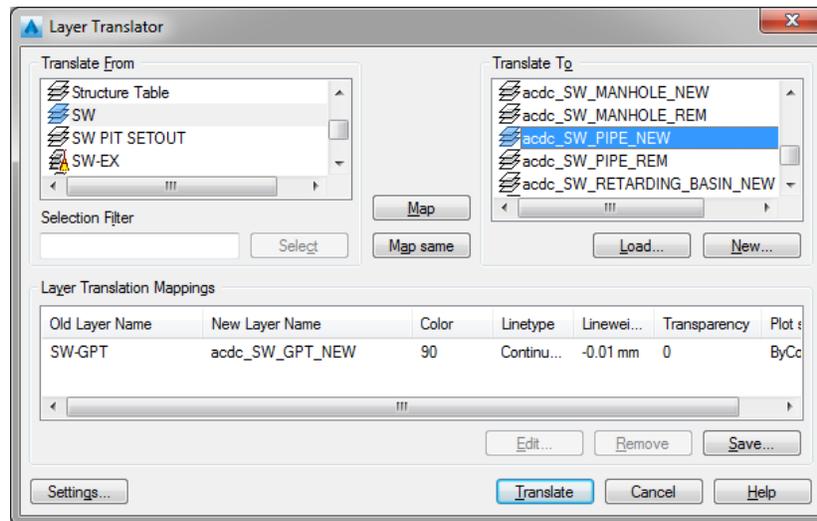
### 7.2 Creating layer translation maps

One configuration process that can partially streamline workflows is creating layer translation maps with AutoCAD's Laytrans command to translate your office standard layers to the new Ref 11 standard layers (use Ref\_11\_Validated\_Layers.dws).

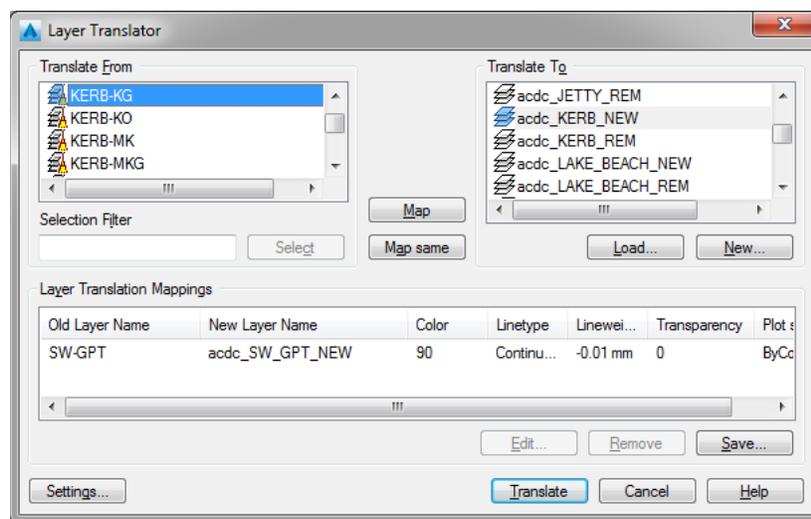


#### **Avoid using original production drawings when creating layer translation maps or translating drawing layers.**

The Laytrans command's translate button replaces drawing layers to mapped layers. Instead use **copies** of production drawings or drawing templates when using the Laytrans command.



Users may prefer this where there is a 1 to 1 match between office layers and Ref 11 layers.



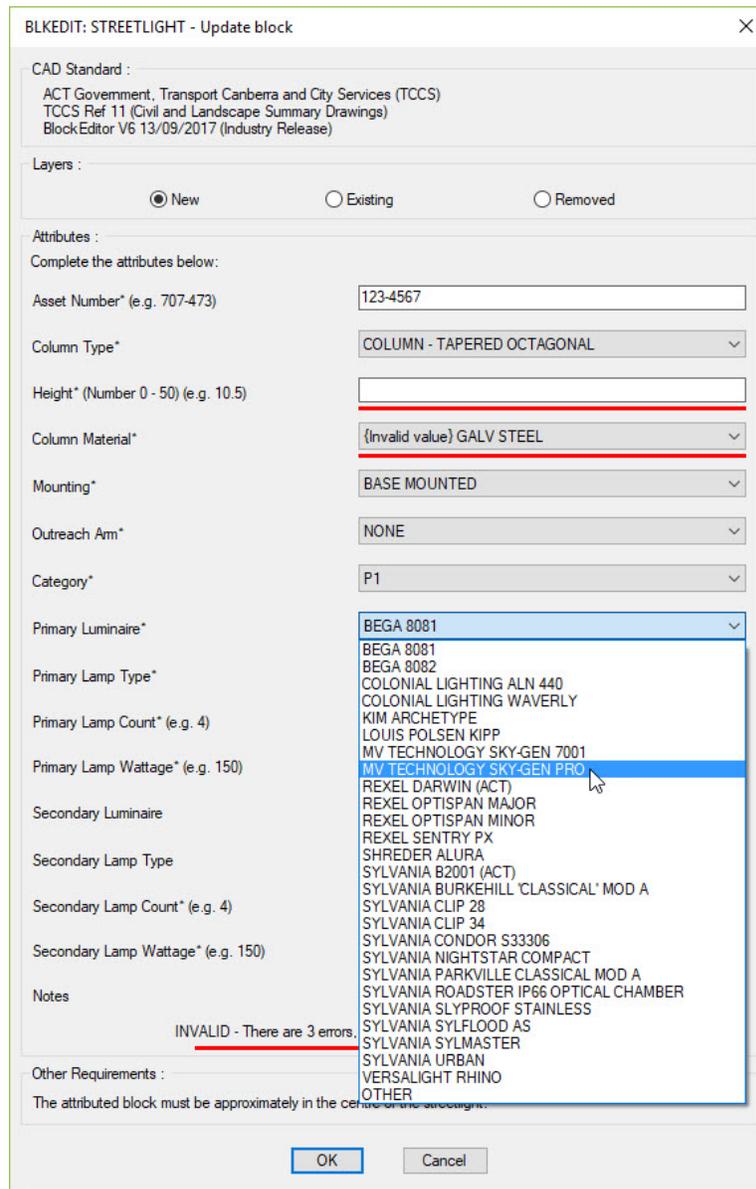
Consideration should be given to mapping many (office standard layers) to 1 (Ref 11 standard layers). A combination of methods may be required to accurately convert line work and blocks from office layers to Ref 11 layers. (See Ref 11 Tips and Tricks videos)

i.e. numerous office kerb layers – to one Ref 11 kerb layer `acdc_KERB_NEW`

The layer translation map can then be reused when producing Ref 11 summary drawings and the Ref 11 Toolkit's `REF11INSERTALLBLOCKS` function may be run to automatically insert standard Ref 11 blocks for all standard Ref 11 features in the drawing.

### 7.3 Hiding values from drop-down lists

Some drop-down lists contain several dozen values. If users regularly only use a handful of values, the **acdc\_Field\_Pick\_Lists.ini** file can be configured to hide unwanted values from the drop-down lists (*or change the list order moving commonly used values up*).



For the purpose of this example, the Colonial and Rexel luminaires will be hidden from the Primary Luminaire and Secondary Luminaire drop-down lists.

Use the Ref 11 document to locate the required lookup table to be filtered

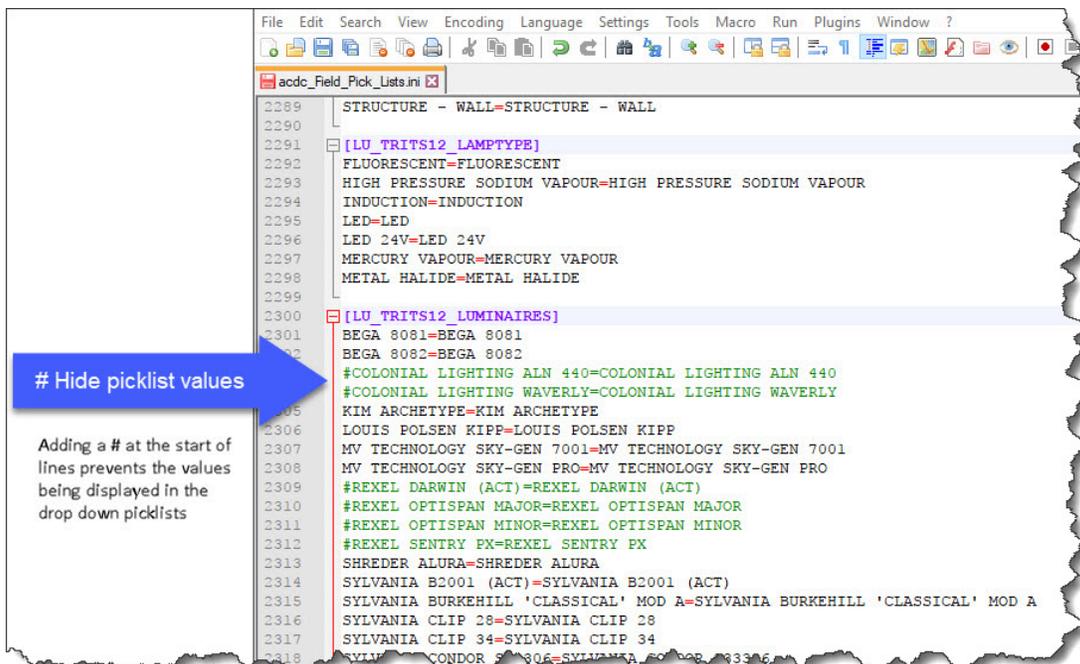
**Streetlight attribute information**

The streetlight block **acdc\_STREETLIGHT** has 16 attributes. The table below lists each of these attributes and their requirements.

**Table 86** Streetlight block acdc\_STREETLIGHT attributes

Block Attribute	Attribute Label	Data Type	Max Length	Lookup Tables/Picklists
SLCO_ASSET_NUMBER	Asset Number	Character	80	
SLCO_COLUMN_TYPE	Column Type	Character	80	Yes LU_TRITS12_COLUMN
SLCO_HEIGHT	Height	Real	5.2	
SLCO_CATEGORY	Category	Character	5	Yes LU_TRITS12_CATEGORY
SLCO_MATERIAL	Column Material	Character	80	Yes LU_TRITS12_COLMATERIAL
SLCO_OUTREACH_ARM	Outreach Arm	Character	80	Yes LU_STRLIGHT_OUTREACH
SLCO_MOUNTING	Mounting	Character	80	Yes LU_STRLIGHT_MOUNTING
SLCO_LUMINAIRE	Primary Luminaire	Character	80	Yes LU_TRITS12_LUMINAIRES
SLCO_LUMINAIRE2	Secondary Luminaire	Character	120	Yes LU_TRITS12_LUMINAIRES
SLCO_LAMP_TYPE	Primary Lamp Type	Character	80	Yes LU_TRITS12_LAMPTYPE
SLCO_LAMP_TYPE2	Secondary Lamp Type	Character	80	Yes LU_TRITS12_LAMPTYPE
SLCO_LAMP_COUNT	Primary Lamp Count	Integer	4	

Open the **acdc\_Field\_Pick\_Lists.ini** configuration file in a text editor like Notepad++ or Notepad  
Search for the required lookup table



```

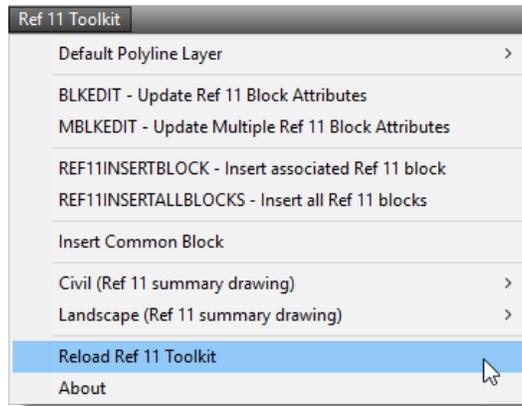
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
acdc_Field_Pick_Lists.ini
2289 STRUCTURE - WALL=STRUCTURE - WALL
2290
2291 [LU_TRITS12_LAMPTYPE]
2292 FLUORESCENT=FLUORESCENT
2293 HIGH PRESSURE SODIUM VAPOUR=HIGH PRESSURE SODIUM VAPOUR
2294 INDUCTION=INDUCTION
2295 LED=LED
2296 LED 24V=LED 24V
2297 MERCURY VAPOUR=MERCURY VAPOUR
2298 METAL HALIDE=METAL HALIDE
2299
2300 [LU_TRITS12_LUMINAIRES]
2301 BEGA 8081=BEGA 8081
2302 BEGA 8082=BEGA 8082
2303 #COLONIAL LIGHTING ALN 440=COLONIAL LIGHTING ALN 440
2304 #COLONIAL LIGHTING WAVERLY=COLONIAL LIGHTING WAVERLY
2305 KIM ARCHETYPE=KIM ARCHETYPE
2306 LOUIS POLSEN KIPP=LOUIS POLSEN KIPP
2307 MV TECHNOLOGY SKY-GEN 7001=MV TECHNOLOGY SKY-GEN 7001
2308 MV TECHNOLOGY SKY-GEN PRO=MV TECHNOLOGY SKY-GEN PRO
2309 #REXEL DARWIN (ACT)=REXEL DARWIN (ACT)
2310 #REXEL OPTISPAN MAJOR=REXEL OPTISPAN MAJOR
2311 #REXEL OPTISPAN MINOR=REXEL OPTISPAN MINOR
2312 #REXEL SENTRY PX=REXEL SENTRY PX
2313 SHREDDER ALURA=SHREDDER ALURA
2314 SYLVANIA B2001 (ACT)=SYLVANIA B2001 (ACT)
2315 SYLVANIA BURKEHILL 'CLASSICAL' MOD A=SYLVANIA BURKEHILL 'CLASSICAL' MOD A
2316 SYLVANIA CLIP 28=SYLVANIA CLIP 28
2317 SYLVANIA CLIP 34=SYLVANIA CLIP 34
2318 SYLVANIA CONDOR 5000=SYLVANIA CONDOR 5000

```

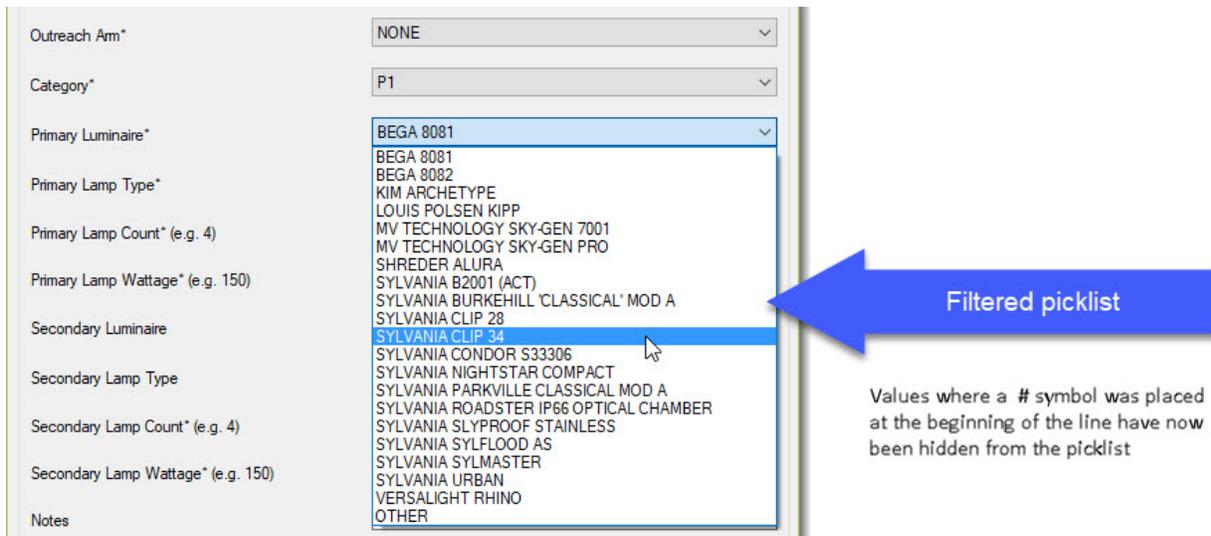
# Hide picklist values

Adding a # at the start of lines prevents the values being displayed in the drop down picklists

Add a # at the beginning of the lines to hide values from all drop-down lists that use the modified lookup table. Save and close the **acdc\_Field\_Pick\_Lists.ini** configuration file.



From the Ref 11 Toolkit menu, click **Reload Ref 11 Toolkit** to load the new changes in the drop-down pick lists.



Values where a # was added at the start of lines have now been hidden from all drop-down lists that use the modified lookup table.

## 7.4 Using alternative layer colours and linetypes

Many consultants will have refined layer colours and linetypes they are used to working with or adopt to comply with other WAE / utility provider requirements.

TCCS welcome suggestions to improve / harmonise layer colours and linetype requirements.

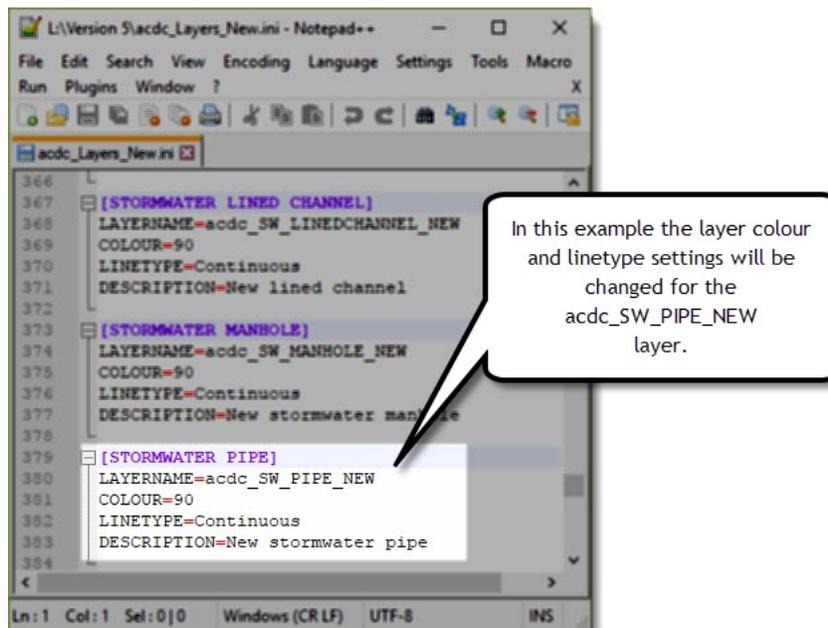
**TCCS ACDC configuration validation rules do not check layer colours or linetypes.**

Therefore, users can opt to adopt other colours and linetypes.

Whilst this can be achieved using drawing templates or temporarily via AutoCAD's Layer Properties Manager and other methods.

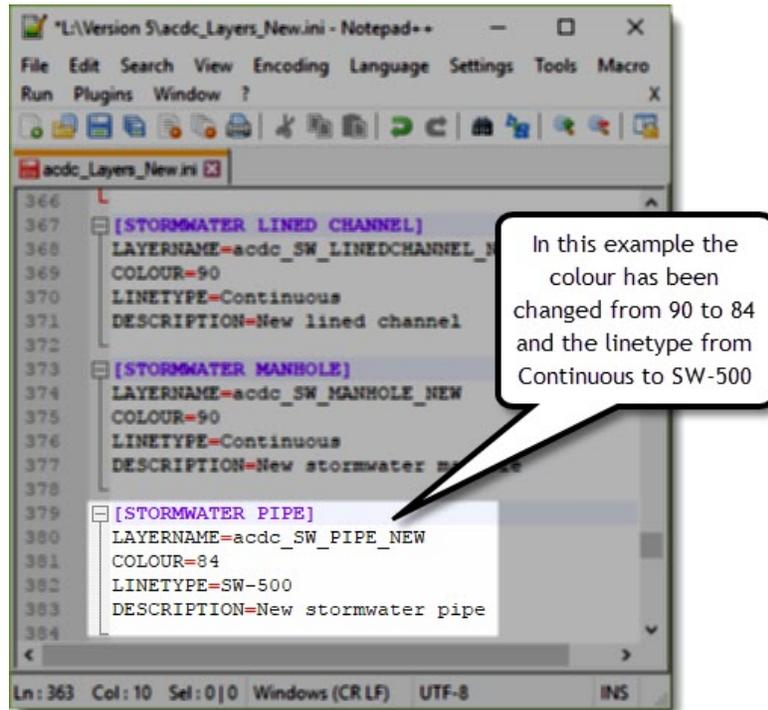
An alternative way is to edit COLOUR and LINETYPE values within these configuration files in a text editor:

- acdc\_Layers\_New.ini
- acdc\_Layers\_Existing.ini
- acdc\_Layers\_Removed.ini



```
L:\Version 5\acdc_Layers_New.ini - Notepad++
File Edit Search View Encoding Language Settings Tools Macro
Run Plugins Window ?
acdc_Layers_New.ini
366
367 [STORMWATER LINED CHANNEL]
368 LAYERNAME=acdc_SW_LINEDCHANNEL_NEW
369 COLOUR=90
370 LINETYPE=Continuous
371 DESCRIPTION=New lined channel
372
373 [STORMWATER MANHOLE]
374 LAYERNAME=acdc_SW_MANHOLE_NEW
375 COLOUR=90
376 LINETYPE=Continuous
377 DESCRIPTION=New stormwater manhole
378
379 [STORMWATER PIPE]
380 LAYERNAME=acdc_SW_PIPE_NEW
381 COLOUR=90
382 LINETYPE=Continuous
383 DESCRIPTION=New stormwater pipe
384
Ln: 1 Col: 1 Sel: 0|0 Windows (CRLF) UTF-8 INS
```

In this example the layer colour and linetype settings will be changed for the acdc\_SW\_PIPE\_NEW layer.



To avoid potential problems using the Ref 11 Toolkit with custom linetype configurations, ensure the linetypes exist in the summary drawings prior to using the Toolkit. If you are converting a drawing it is likely your office standard linetypes will already be loaded in the drawing.

## 7.5 Changing appearance of Ref 11 blocks

TCCS advise against changing the appearance of attributed blocks but welcome suggestions to improve / harmonise attribute requirements.

Summary drawings are primarily data loading drawings to update asset data into the asset management system, instead of drawings intended to be printed.

**TCCS ACDC configuration validation rules do not check for standard block symbology.**

The appearance of the standard blocks are less graphic than the way similar features are represented in other design and construction drawings. Users may wish to change the appearance of them making them more or less symbolic.

**Ref 11 standard block names must not be changed** since they are hard-coded in the ACDC validation rules.

**The insertion point is to remain in the centre of the block** (*excluding headwalls which is at the end of the pipe / culvert*) since this represents the location the feature will be inserted into the asset management system. If changing the appearance of blocks, check functionality of the Ref 11 Toolkit still works for the updated blocks. If the Ref 11 Toolkit and menus no longer work with the modified blocks revert back to the standard block.

## 7.6 Adding additional block attributes

TCCS advise against adding additional block attributes but welcome suggestions to improve / harmonise attribute requirements.

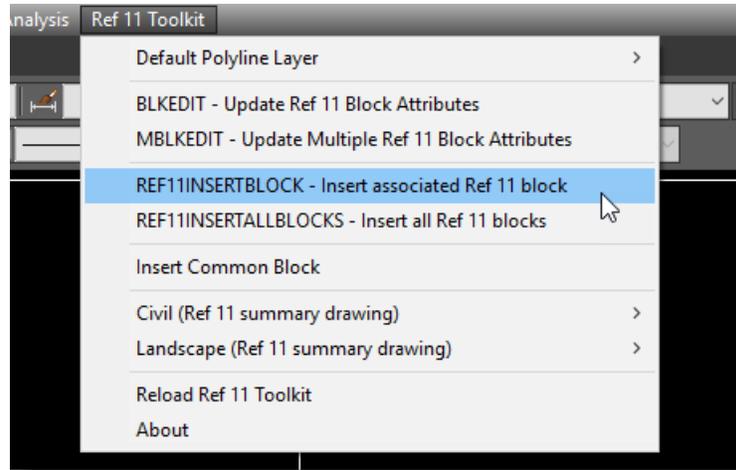
**Ref 11 standard block attribute names must not be changed** since they are hard-coded in the ACDC validation rules.

Adding additional attributes should not impact on the validation rules but the additional information will not be loaded into the asset management system.

If adding additional attributes to blocks, check functionality of the Ref 11 Toolkit still works for the updated blocks. If the Ref 11 Toolkit and menus no longer work with the modified blocks revert back to the standard block.

## 8.0 Ref 11 Toolkit AutoCAD Menu

The Ref 11 Toolkit menu shown below contains the following menu items.



- Default Polyline Layer
- BLKEDIT – Update Ref 11 Block Attributes
- MBLKEDIT – Update Multiple Ref 11 Block Attributes
- REF11INSERTBLOCK – Insert associated Ref 11 Block Attributes
- REF11INSERTALLBLOCKS – Insert all Ref 11 Blocks
- Reload Ref 11 Toolkit
- Insert Common Block
- Civil (Ref 11 summary drawings)
- Landscape (Ref 11 summary drawings)
- About

## 8.1 Default Polyline Layer

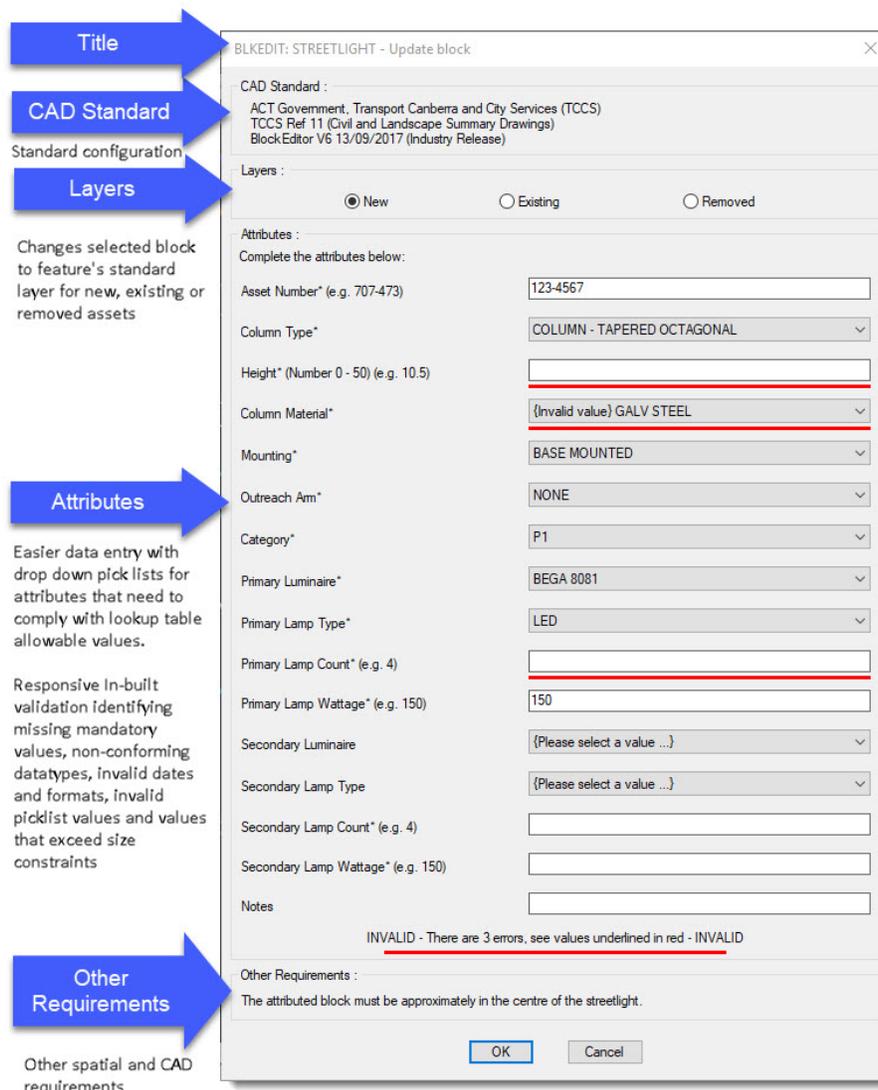
Clicking **Default Polyline Layer** expands the menu to display **Prompt, New, Existing** and **Removed** options.

By default, drawing a linear/closed polyline feature from the Ref 11 Toolkit menu; the default layer will use the layer associated with new assets.

Users can change the default polyline layer during the drawings session from the Ref 11 Toolkit menu by clicking Default Polyline Layer and selecting either Prompt, New, Existing or Removed.

## 8.2 BLKEDIT – Update Ref 11 Block Attributes

Clicking **BLKEDIT – Update Ref 11 Block Attributes** runs the **BLKEDIT** command for editing Ref 11 Standard blocks.



The screenshot shows the 'BLKEDIT: STREETLIGHT - Update block' dialog box. It is annotated with blue arrows and text boxes explaining various parts of the interface:

- Title:** Points to the dialog title bar.
- CAD Standard:** Points to the 'CAD Standard' section, which lists 'ACT Government, Transport Canberra and City Services (TCCS)', 'TCCS Ref 11 (Civil and Landscape Summary Drawings)', and 'BlockEditor V6 13/09/2017 (Industry Release)'.
- Standard configuration:** Points to the 'Layers' section, which has radio buttons for 'New' (selected), 'Existing', and 'Removed'.
- Layers:** Points to the 'Layers' section.
- Attributes:** Points to the 'Attributes' section, which contains a list of fields with drop-down pick lists and text boxes. A red underline is visible under the 'Column Material' field, which contains the text '{Invalid value} GALV STEEL'.
- Other Requirements:** Points to the 'Other Requirements' section at the bottom, which states 'The attributed block must be approximately in the centre of the streetlight.'

Additional text annotations on the left side of the dialog box:

- 'Changes selected block to feature's standard layer for new, existing or removed assets' is positioned next to the 'Layers' section.
- 'Easier data entry with drop down pick lists for attributes that need to comply with lookup table allowable values.' is positioned next to the 'Attributes' section.
- 'Responsive In-built validation identifying missing mandatory values, non-conforming datatypes, invalid dates and formats, invalid picklist values and values that exceed size constraints' is positioned next to the 'Attributes' section.
- 'Other spatial and CAD requirements' is positioned next to the 'Other Requirements' section.

At the bottom of the dialog box, there is a status message: 'INVALID - There are 3 errors. see values underlined in red - INVALID'. Below this are 'OK' and 'Cancel' buttons.

The BLKEDIT dialog box enables users to change the block's layer to new, existing or removed assets by clicking on the respective radio button in the layers pane.

The attributes pane features drop-down lists where attributes need to comply with values from Ref 11 lookup tables.

Validation rules that apply to free-text attribute values are:

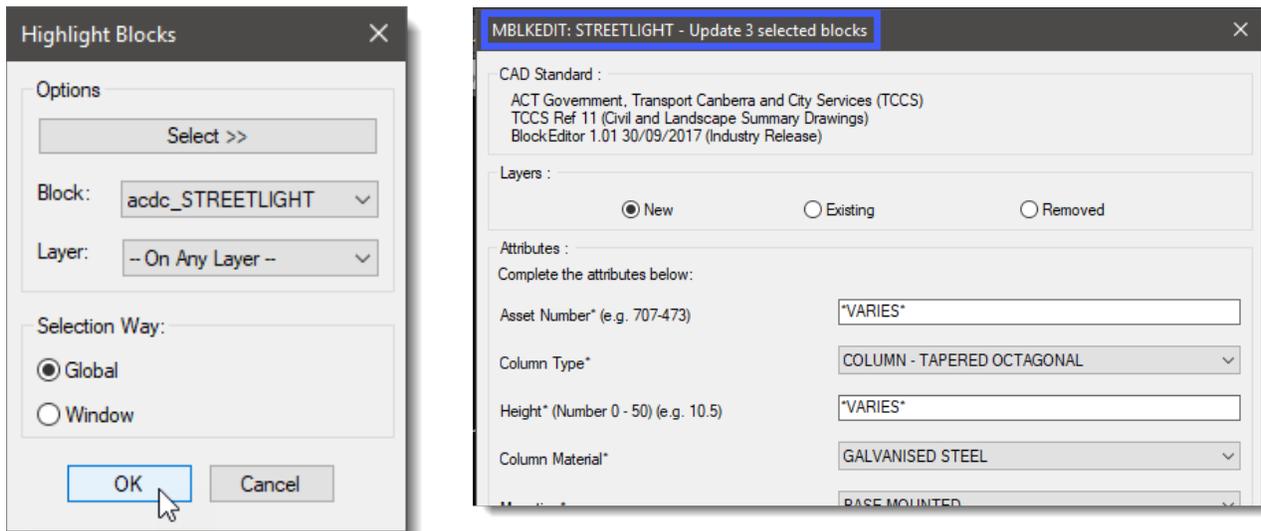
- Data type (integer, real, character, date, logical);
- Lookup table values must match exactly (including case) and
- Field length;

Missing mandatory information, and invalid values are highlighted in red

Selecting multiple blocks then running the BLKEDIT command will enable multiple blocks to be edited at once.

### 8.3 MBLKEDIT – Update Multiple Ref 11 Block Attributes

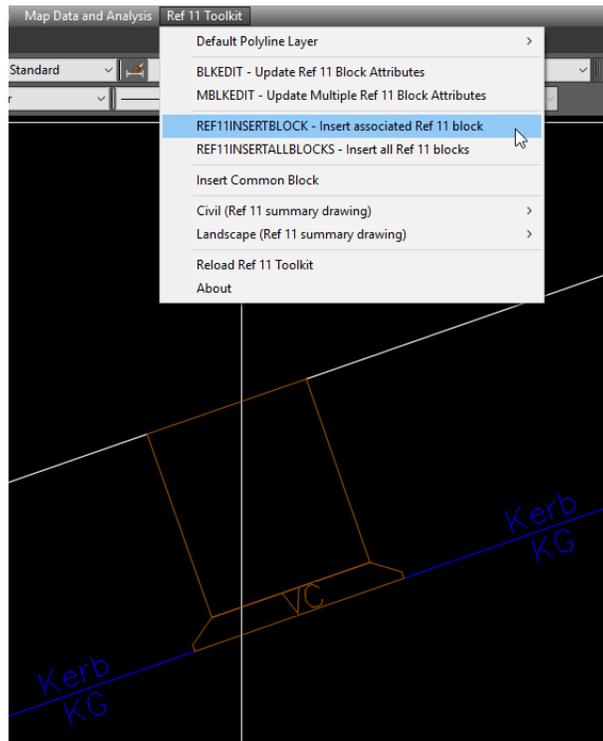
Clicking **MBLKEDIT – Update Multiple Ref 11 Block Attributes** also allows for multiple blocks to be edited at once. Selections can be filtered by layer, window or all blocks with similar to the selected block



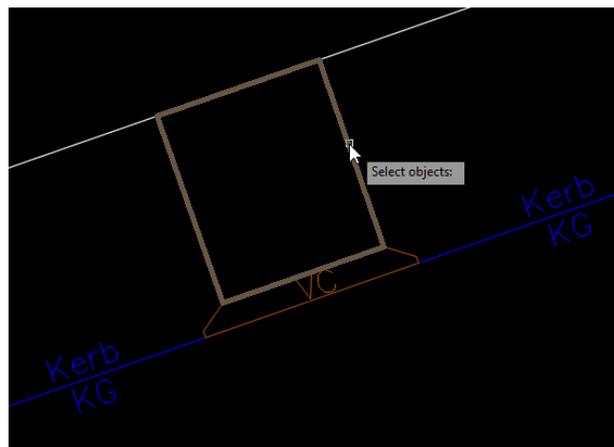
After the initial filtering has been completed the MBLKEDIT / BLKEDIT dialog box appears for updating attributes. Care must be taken when updating values with dissimilar values (\*VARIES\*)

## 8.4 REF11INSERTBLOCK – Insert associated Ref 11 Block Attributes

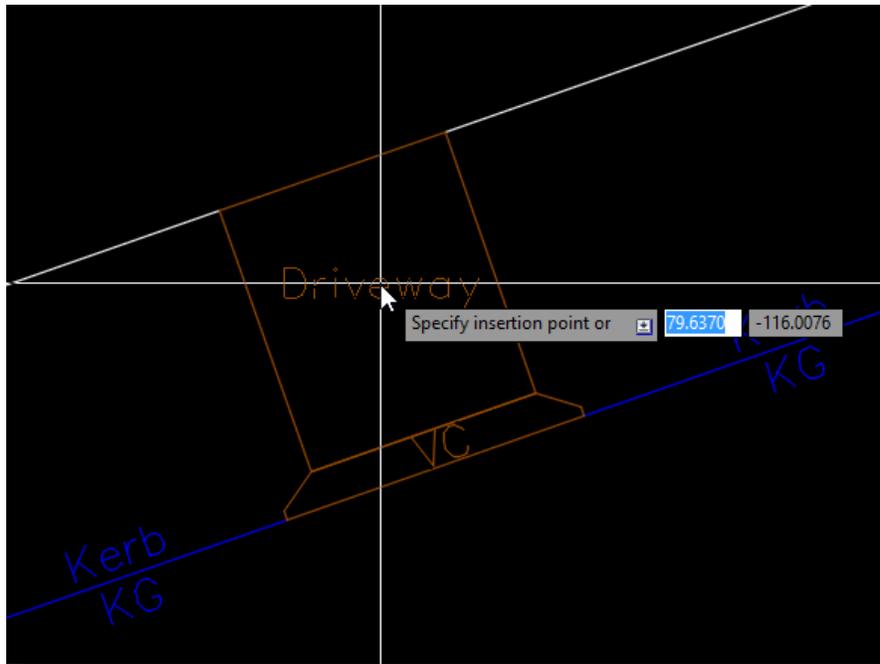
Click **REF11INSERTBLOCK – Insert associated Ref 11 Block Attributes** to insert the appropriate Ref 11 block by picking the corresponding line, closed polyline or lightweight polyline. The BLKEDIT dialog box will display for the user to enter attribute values specifying as constructed information.



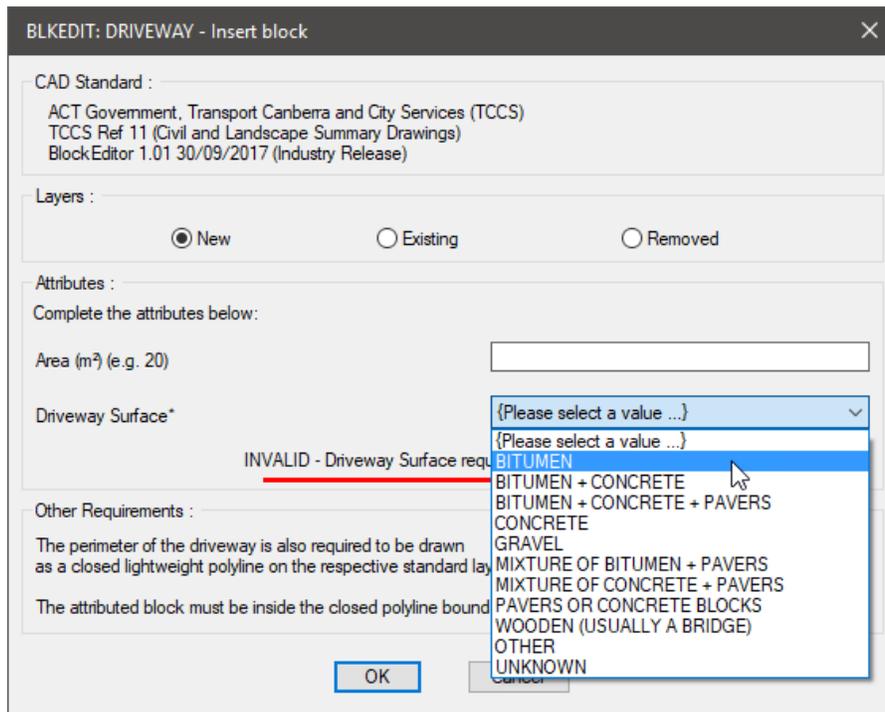
From the Ref 11 Toolkit menu, click **REF11INSERTBLOCK – Insert associated Ref 11 Block Attributes**



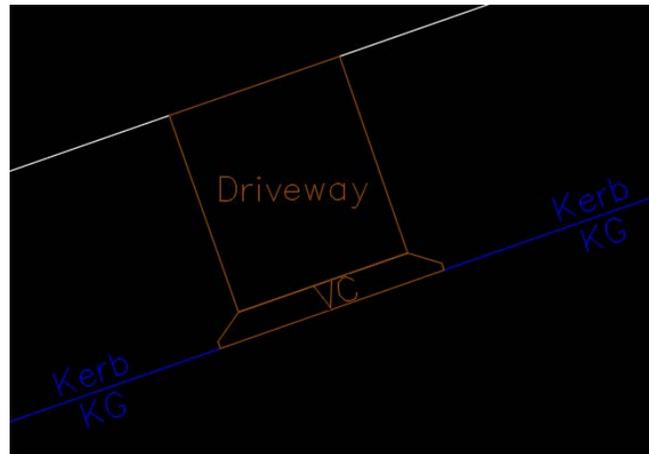
Select object on a standard Ref 11 layer



Specify the insertion point for the associated block



BLKEDIT dialog box appears for as constructed information to be completed



Associated attribute block added to selected Ref 11 object.

**TIP:** When using this function with Ref 11 lines or lightweight polyline linear entities, to avoid an unnecessary spatial error, ensure block is inserted at a midpoint along one of the features segments.

## 8.5 REF11INSERTALLBLOCKS – Insert all Ref 11 Blocks

Click **REF11INSERTALLBLOCKS – Insert all Ref 11 Block Attributes** to insert the appropriate Ref 11 blocks for all corresponding line, closed polyline or lightweight polyline objects that do not have an associated block already associated with them. The user must then enter attribute values specifying as constructed information.

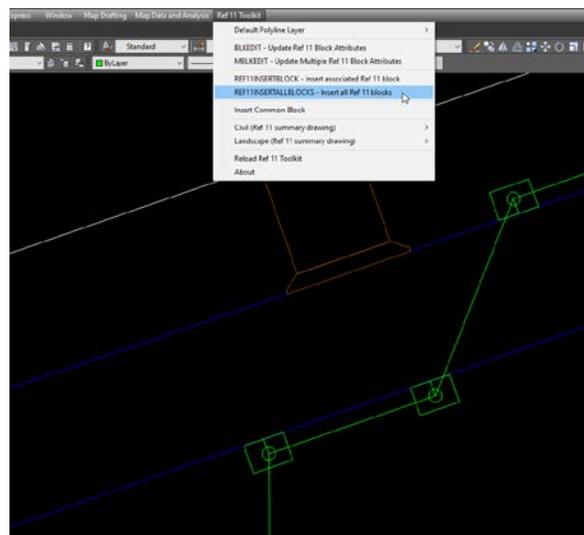
The Ref11InsertAllBlocks function:

- Inserts Ref 11 attributed blocks onto all Ref 11 features (lines, closed polylines) that are missing associated blocks.
- Moves Ref 11 blocks associated with linear features to the midpoint of a segment to comply with the Open Spatial ACDC spatial validation rules.
- Inserts Ref 11 attributed blocks onto non-standard blocks on Ref 11 layers that are missing standard blocks. (e.g. If consultant's sump block was on the layer `acdc_SW_SUMP_NEW` and did not have a block `acdc_SW_SUMP` at the same insertion point, the routine would insert the block `acdc_SW_SUMP` at that location)
- Saves user manually inserting attributed blocks for each feature from the Ref 11 Toolkit menu.

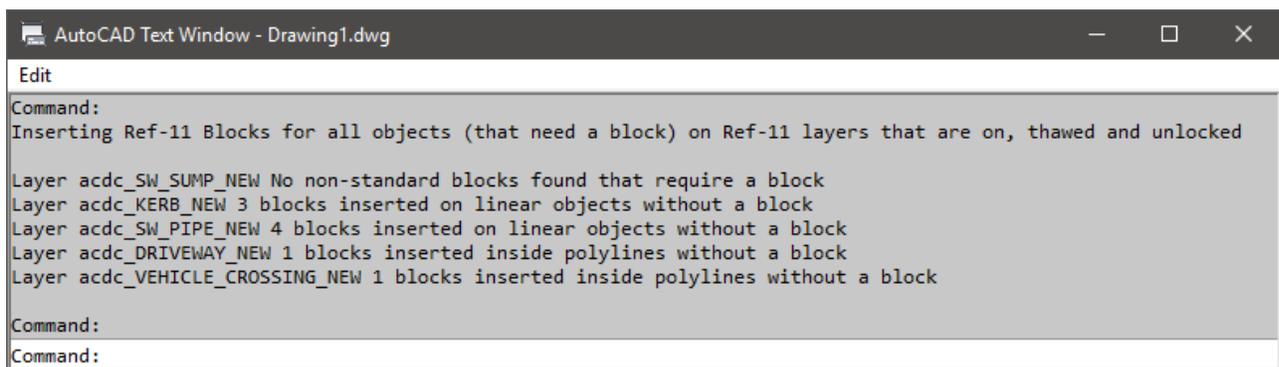
The **Ref11InsertAllBlocks** function –

- Inserts Ref 11 attributed blocks onto all Ref 11 features (lines, closed polylines) that are missing associated blocks.
- Moves Ref 11 blocks associated with linear features to the midpoint of a segment to comply with the Open Spatial ACDC spatial validation rules.
- Inserts Ref 11 attributed blocks onto non-standard blocks on Ref 11 layers that are missing standard blocks. (e.g. If consultant’s sump block was on the layer `acdc_SW_SUMP_NEW` and did not have a block `acdc_SW_SUMP` at the same insertion point, the routine would insert the block `acdc_SW_SUMP` at that location)
- Saves user manually inserting attributed blocks for each feature from the Ref 11 Toolkit menu.

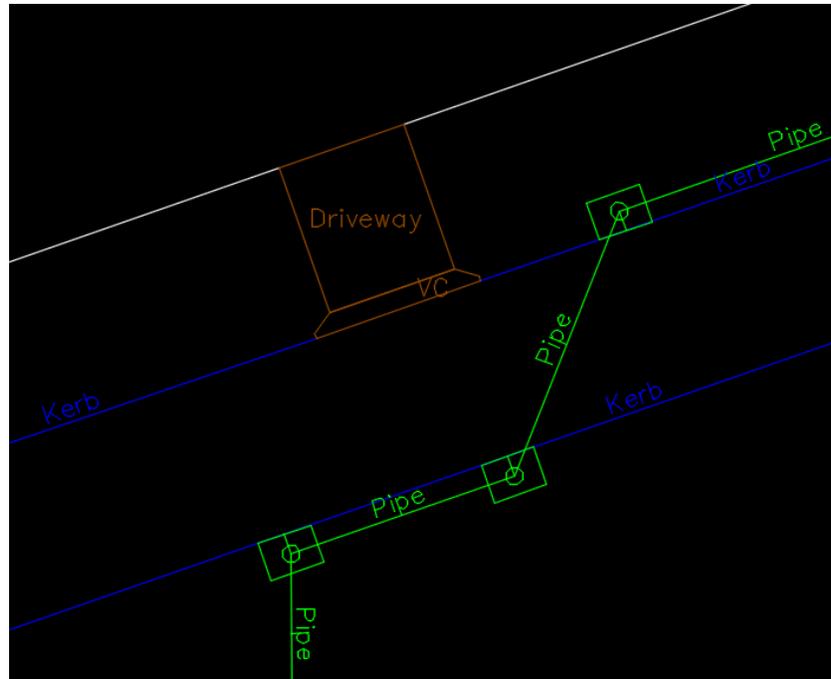
**“Ref11InsertAllBlocks inserts attributed blocks on all Ref 11 line-work “**



From the Ref 11 Toolkit menu, click **REF11INSERTALLBLOCKS – Insert all Ref 11 Block Attributes**



After the **REF11INSERTALLBLOCKS** has been run. The AutoCAD Text Window displays reporting the number of Ref 11 standard blocks the function inserted on each standard layer



The associated Ref 11 blocks have been inserted for all corresponding line, closed polyline or lightweight polyline objects where an associated block was missing. The user must then enter attribute values specifying as constructed information.

**Note:** This routine has built in island detection - to recognise closed polylines within other closed polylines as islands. Open Spatial are including capability into their next upgrade to the ACDC desktop product and portal. Until then users need to do a workaround to enable geometry with islands to pass validation.

**TIP:** Using this routine after using the AutoCAD laytrans function to convert entitles from office layers to ref 11 layers can avoid users redrawing line work on Ref 11 layers or manually inserting Ref 11 blocks.

## 8.6 Reload Ref 11 Toolkit

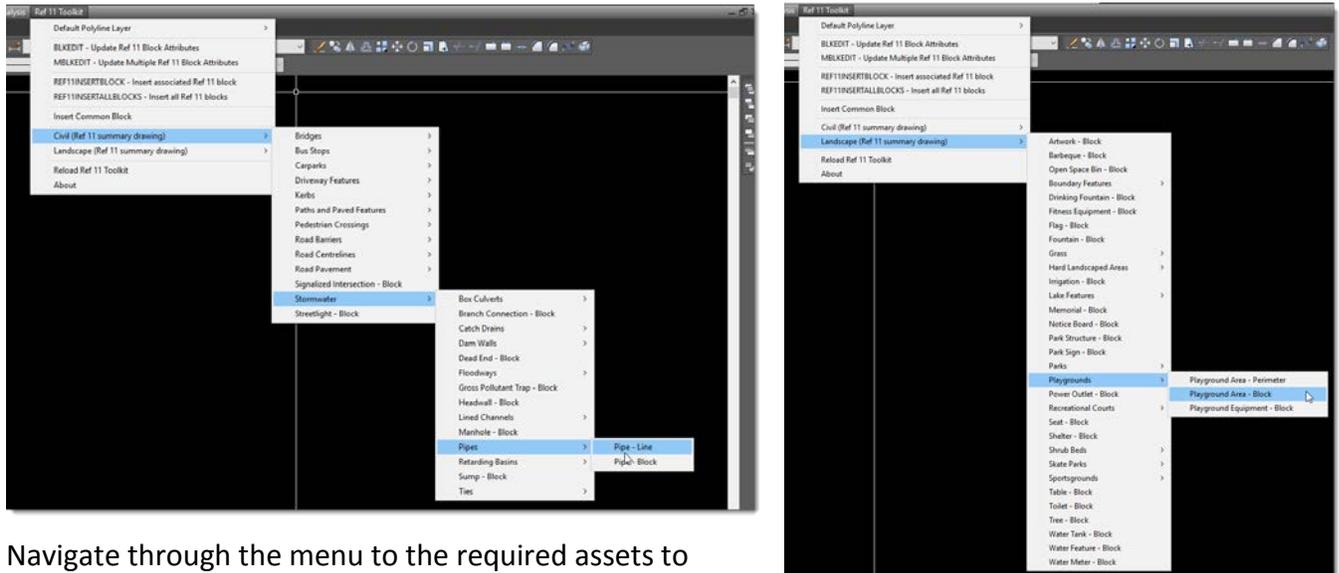
Click **Reload Ref 11 Toolkit** to run the Ref11Toolkit Lisp routine reloading all the configurations from the Toolkit's ini files into memory. Generally, this is not required unless changes are made to the ini files whilst within a drawing for example if hiding rarely used lookup table values from pick lists. (See [Hiding values from drop-down lists](#))

## 8.7 Insert Common Block

Click **Insert Common Block** to insert the common block, then displaying the BLKEDIT dialog box to enter project information relating to the summary drawing.

## 8.8 Civil and landscape (Ref 11 summary drawings)

From the Ref 11 Toolkit menu, civil and landscape features have been separated to match the Ref 11 Reference document structure.



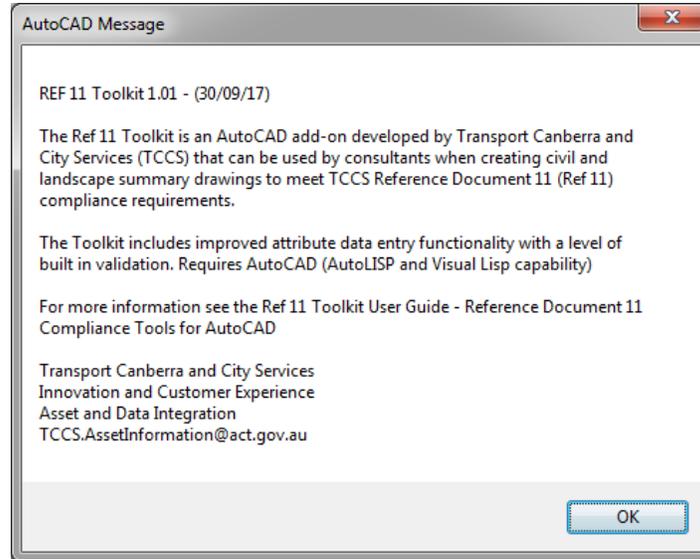
Navigate through the menu to the required assets to draw geometry and insert attributed blocks automatically on the correct layers. Some features are represented as a block, others have a block and polyline / closed polyline.

Assets within the summary drawing are represented in the following ways:

Asset representation	Description
 <p>Attributed block</p>	Asset is represented by the required standard Ref 11 block with attribute values specifying as constructed information.
 <p>Linear feature with attributed block</p>	Asset is represented by a linear feature (line, lightweight polyline) with the required standard Ref 11 block inserted at a midpoint along one of the features segments with attribute values specifying as constructed information.
 <p>Closed polyline feature with attributed block</p>	Asset is represented by a closed lightweight polyline signifying the perimeter with the required standard Ref 11 block inserted inside with attribute values specifying as constructed information.
 <p>Graphics only linear feature</p>	Asset is represented by a linear feature (line, lightweight polyline) and does not require an attributed block.

## 8.9 About

Click **About** to display a message box providing information about this release of the Toolkit.



## 9.0 Converting features to comply with Ref 11 requirements

There are various methods for creating completed Ref 11 Documents.

Workflows for some example methods have been created to give consultants a starting point.

### 9.1 Translating office layers to Ref 11 layers

The AutoCAD Layer Translator (LAYTRANS) can be used to convert the layers in the current drawing to the layer names and layer properties from a specified drawing or standards file.

For example, it could be used to convert the layers from an office standard to the Ref 11 layers. Be aware some AutoCAD objects (e.g. Hatches) will need to be changed to the correct object type as well (refer to the workflow for converting hatches to closed polylines)

#### 9.1.1 Workflow - Creating a Saved “Layer Translator” layer mapping

**Step 1.** In AutoCAD, open a drawing that contains in-house or office standard layers

**Step 2.** Run the **LAYTRANS** command which will open the layer translator dialog box

**Step 3.** click the **Load** button

**Step 4.** Navigate to and select the **Ref11LayerTemplate.dwg** file provided in the Ref 11 Toolkit

**Step 5.** Select a layer or layers in the **Translate From** box on the left (layers in the current drawing)

**Step 6.** Select a layer in the **Translate To** box on the right (layers loaded from step 4.)

**Step 7.** Click **Map** (this will create a mapping in the **Layer Translation Mappings** at the bottom of the dialog box)

**Step 8.** Repeat steps 5 – 7 until all the required layers have been mapped.

**Step 9.** Click **Save button** to save the mappings as a DWS file to reuse the mappings without having to create them again

#### 9.1.2 LAYTRANS – using the “Layer Translator” tool to convert layers to the Ref 11 Standard

**Step 1.** Open a copy of the drawing you wish to translate

**Step 2.** Run the **LAYTRANS** command which will open the layer translator dialog box

**Step 3.** Load the previously saved “Layer translation Mappings” OR

**Step 4.** Create layer mapping (see Workflow - Creating a Saved “Layer Translator” layer mapping)

**Step 5.** Edit the layer mappings if necessary

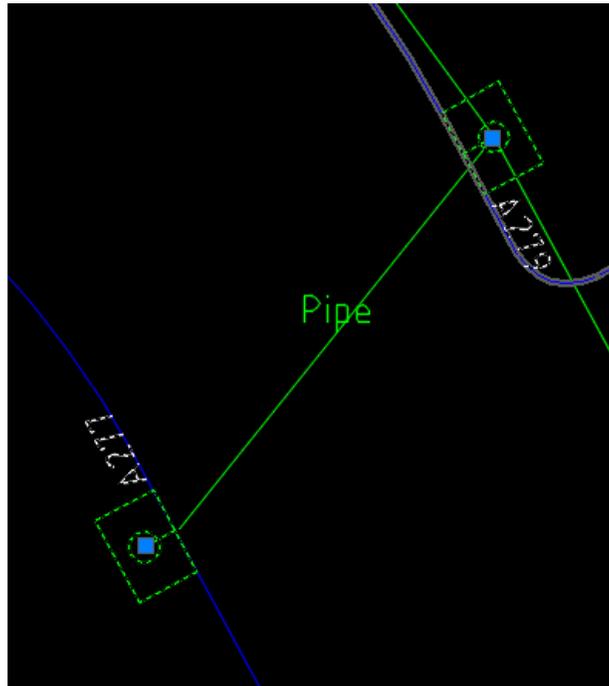
**Step 6.** Translate

**Step 7.** Save the layer mapping if required

## 9.2 Batch loading Ref 11 blocks onto features

- Create a drawing with all objects on the correct Ref 11 layers
- Ensure all objects are of the correct type (e.g. paved areas on acdc\_PAVEMENT\_NEW layer should only contain closed polylines and the associated acdc\_PAVEMENT block)
- Ensure the blocks have the same insertion points (especially sumps - centre of feature, not on kerb line at middle of inlet)
- Turn off or freeze REF 11 layers that you do not wish to create blocks
- Run the **REF11INSERTALLBLOCKS** command from the drop-down menu or from the command line
- The command will create new blocks where there isn't one already
- For non-standard Ref11 Blocks on a Ref11 Layer for point assets (e.g. Public Lighting) the routine will insert the correct block for the layer at the same insertion point as the non-standard block (if there isn't one already there)
- For polylines on a Ref11 Layer for linear assets (e.g. stormwater pipes on acdc\_SW\_PIPE\_NEW layer) the routine will create the correct block for the same layer on a midpoint of that object (if there isn't one on a midpoint already)
- For polylines on a Ref11 Layer for linear assets (e.g. stormwater pipes on acdc\_SW\_PIPE\_NEW layer) if there is an associated block that is not on the midpoint of a segment, the routine will move the associated block to the midpoint of a segment to comply with the Open Spatial ACDC spatial validation rules.
- For closed polylines on a Ref11 Layer for closed polylines (e.g. PAVED\_AREA) the routine will create a block at a suitable location inside the polyline (if there isn't a block with an insertion point inside the polyline already)
- The routine also has built in island detection - to recognise closed polylines within other closed polylines as islands. Open Spatial are including capability into their next upgrade to the ACDC desktop product and portal. Until then users need to do a workaround to enable geometry with islands to pass validation.
- Read the command line – The routine will provide a list of what blocks were created for each layer and if any errors were found

### 9.3 Changing block insertion points before batch inserting Ref 11 blocks



The insertion point for the Ref 11 stormwater sump block **acdc\_SW\_SUMP** and the majority of other Ref 11 Standard blocks are in the centre of the feature.



Some consultant's blocks for stormwater sumps have the insertion point on the kerb line at the middle of the sump inlet.



This can cause an issue when using the REF11INSERTALLBLOCKS routine since it will place the Ref 11 stormwater sump block in the wrong location straddling the kerb line.

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### Change Block Base Point

PROGRAM SYSTEM	CBP / CBPR
CURRENT VERSION	1.5
Download	<a href="#">changeblockinsertion-1.5.zip</a>
View HTML Version	<a href="#">ChangeBlockBasePoint-1.5.html</a>
Donate	<a href="#">Donate</a>

This program is also available at the Autodesk Exchange App Store

#### Program Description

This program allows the user to change the position of the block base point for all references of a block definition in a drawing.

The program offers two commands:

**CBP: Change Base Point**

This command will retain the insertion point coordinates for all references of the selected block. Hence visually, the block components will be moved around the insertion point when the base point position is changed.

**CBPR: Change Base Point retain Reference position**

This command will retain the position of each reference of the selected block. That is, the visual position of all block reference geometry will remain unchanged when the position of the block base point is altered.

Upon issuing one of the above commands at the AutoCAD command-line, the program will prompt the user to select a block for which to change the base point position.

Following a valid selection, the user is then prompted to specify a new location for the base point, relative to the selected block reference.

The block definition (and block reference depending on the command used) will then be modified to reflect the new block base point position.

If the selected block is attributed, an `ATTRSINC` operation will also be performed to ensure all attributes are in the correct positions relative to the new base point.

Finally, the active viewport is regenerated to reflect the changes throughout all references of the block.

The program will furthermore perform successfully with rotated & scaled block references, constructed in any UCS plane.

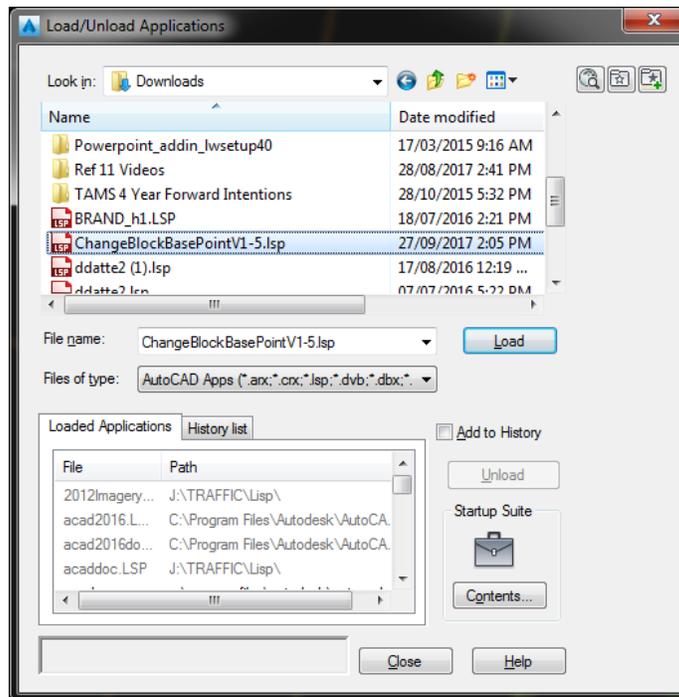
**Please Note:** A `REGEN` is required if the `UCS` command is used to undo the operations performed by this program.

#### Demonstration

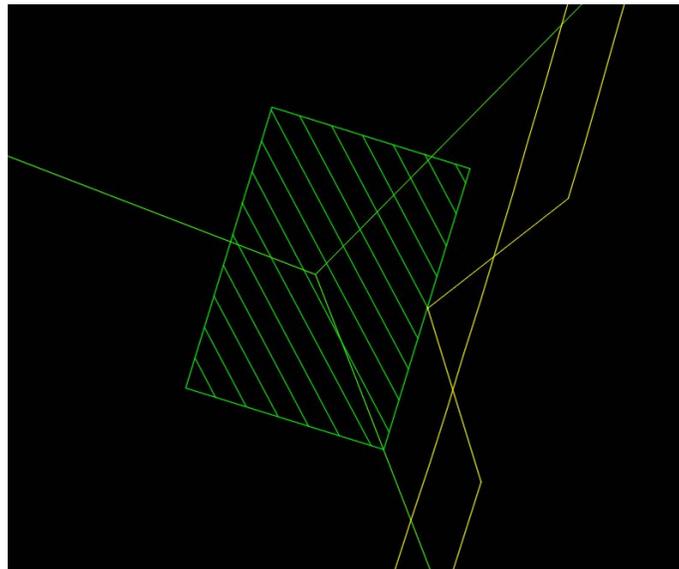
Block Reference  
Position is Retained

Lee Mac Programming has a useful lisp routine that can overcome this issue  
Change Block Base Point <http://lee-mac.com/changeblockinsertion.html>

Download the routine from the link above.



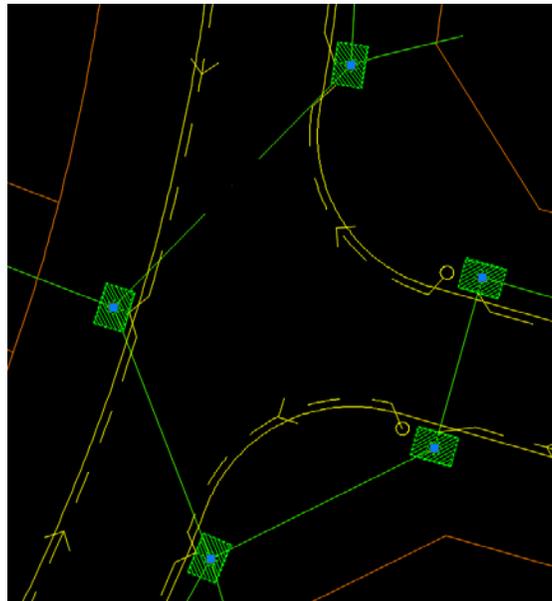
Load the routine ChangeBlockBasePointV1-5.lsp



Then use the function CBPR and select the block to which needs the insertion point changed.  
Pick the new insertion point (middle of the sump / where pipes join)



The insertion points for all instances of that block have now changed.



The Ref11INSERTALLBLOCKS now inserts the Ref 11 acdc\_SW\_SUMP blocks in the correct location.

## 10.0 Resources

### 10.1 Definition of terms

Term	Definition
TCCS	See Transport Canberra and City Services
ACDC	Open Spatial As-Constructed Design Certification product
Ref 11	Reference Document 11 - Drafting Requirements for Summary Drawings
Ref 11 Toolkit	Reference Document 11 - Compliance Tools for AutoCAD
Summary Drawing	Ref 11 Summary drawings are data loading drawings used to streamline loading work as executed spatial and attribute data for new, removed or amended municipal assets into the TCCS asset management system and GIS systems.
WAE	Works as Executed, or As Constructed
AutoCAD	Industry leading computer aided drafting (CAD) software by AutoDesk
AutoLISP	LISP (List Processing) programming language used to customise AutoCAD
Open Spatial	Open Spatial provides geospatial engineering solutions for managing spatial data from survey through design, construction and data management. Their technologies are based on risk-averse, ubiquitous platforms that bridge the gap between CAD, GIS, BIM and asset management applications. Utilising open standards and engineering best practices, Open Spatial deliver fit-for-purpose solutions with a focus on productivity improvements, definable return on investment and long-term savings.
Transport Canberra and City Services	Transport Canberra and City Services (TCCS) is a diverse directorate within the ACT Government responsible for managing roads, footpaths, street lights, cycle paths, active travel and the public transport network (ACTION buses and the light rail project).
VisualLISP	Lisp based programming language with enhanced functionality.

### 10.2 Relevant resources

Website / Document	Location
Transport Canberra and City Services Website	<a href="http://www.tccs.act.gov.au">http://www.tccs.act.gov.au</a>
Open Spatial Validation Portal	<a href="http://asconstructed.com">http://asconstructed.com</a>
Open Spatial ACDC (As-Constructed Design Certification)	<a href="http://www.openspatial.com/products.html#acdc">http://www.openspatial.com/products.html#acdc</a>
Lee Mac Programming - Change Block Base Point	<a href="http://lee-mac.com/changeblockinsertion.html">http://lee-mac.com/changeblockinsertion.html</a>