Parcel/Easement Creation Data Entry/Maintenance and DXF Exporting In ArcGIS
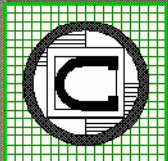
Nick Tonias, P.E.

The CEDRA Corporation

1985 The CEDRA Corporation is established.

1987 CEDRA begins a long standing relationship with ESRI.

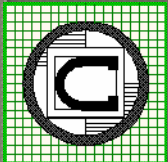**1993** CEDRA becomes an authorized ESRI Business Partner and Developer.

CEDRA offers engineering/GIS solutions in the form of software and services to governmental agencies, engineering consultants, tax assessors, oil companies and various utility enterprises.
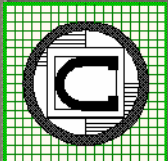
Stuart asks how to perform

Parcel Easement Creation

Parcel/Easement Creation

Legal Description with Metes and Bounds

COMMENCING at the Southwest (SW) comer of said Southwest Quarter (SW/4); THENCE North 00°12'58" West along the West line of said Southwest Quarter (SW/4), a distance of 1,320.62 feet; THENCE South 89°36'42" East along the South line of said Unrecorded Plat of Centennial Industrial Addition, a distance of 1,312.91 feet to the Point of Beginning; THENCE from said Point of Beginning South 89°36'42" East along the South line of said Unrecorded Plat of Centennial Industrial Addition, continuing Easterly along said line, a distance of 15.00 feet; THENCE South 00°12'47" East, a distance of 230.66 feet; THENCE along a curve to the left in a Southwesterly direction with a radius of 125.00 feet an arc distance of 21.34 feet; said arc being subtended by a chord bearing South 44°30'15" West and a chord distance of 21.32 feet; THENCE North 00°12'47" West, a distance of 245.97 feet to the Point or Place of Beginning.
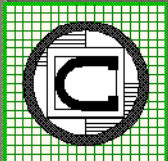
Parcel/Easement Creation

Legal Description Comprised of

    2 Tie Line Courses,

    3 Line Courses, and

    1 Course defined by a Curve

Parcel/Easement Creation

Table Entry Form With ability To Add, Modify and Delete Rows

Parcel and Traverse Course Entry Form

Course Number	Lines			Tangent Curves (Radius and 1 of the other 3)				Non-Tangent Curves (Chord Direction, Radius and 1 of the other 3)			
	Direction	Distance	Radius	Arc Length	Chord Length	Central Angle	Chord Direction	Arc Length	Chord Length	Central Angle	
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Pan X (+ Right, - Left): 0.0   Pan Y (+ Up, - Down): 0.0   Zoom (> 1 In, < 1 Out): 1.0   # Tie-Line Courses: 0

Total Length: 0.00000   Closure Distance: 0.00000   Error of Closure: 0.00000

Buttons: OK, Cancel, Add, Delete, Insert, Draw, Zoom To, Report

Pick the POC or POB then Click the Add button to add Rows

Ability to specify Lines, Tangent Curves and non-Tangent Curves in a spreadsheet environment

Parcel/Easement Creation

Each course is entered on a row and the Report button is used to Save/Recall

Appropriate columns are filled in for a specific type of feature

Parcel and Traverse Course Entry Form

Course Number	Direction	Distance	Radius	Arc Length	Chord Length	Central Angle	Chord Direction	Arc Length	Chord Length	Central Angle
				Lines			**Tangent Curves** Radius and 1 of the other 3		**Non-Tangent Curves** Chord Direction, Radius and 1 of the other 3	
1	N 00 12 58 W	1320.62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	S 89 36 42 E	1312.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	S 89 36 42 E	15.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	S 00 12 47 E	230.66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	-125.00	0.0	0.0	0.0	S 44 30 15 W	0.0	21.32	0.0
6	N 00 12 47 W	245.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Buttons: OK, Cancel, Add, Delete, Insert, Draw, Zoom To, Report

Pan X (+ Right, - Left): 0.0   Pan Y (+ Up, - Down): 0.0   Zoom (> 1 In, < 1 Out): 1.0   # Tie-Line Courses: 0

Total Length=3146.50593   Distance to Close=1852.34730 DX=1307.89691 DY=1311.71499 SW 44 54 59.4   Error of Closure 1.2

As a course is entered it is drawn in red

Parcel/Easement Creation

Closure information appears at the bottom of the form

Number of Tie-Lines Effects the Closure

This legal contains 2 tie-line courses

Parcel/Easement Creation

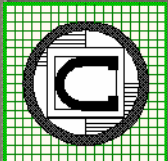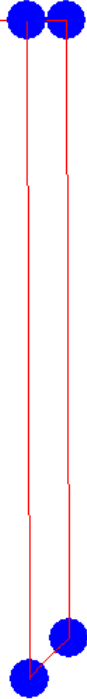**Blue markers appear at the Start and End points of a Course denoting PC and PT locations**

Parcel and Traverse Course Entry Form

Course Number	Lines Direction	Lines Distance	Tangent Curves Radius	Tangent Curves Arc Length	Tangent Curves Chord Length	Tangent Curves Central Angle	Non-Tangent Curves Chord Direction	Non-Tangent Curves Arc Length	Non-Tangent Curves Chord Length	Non-Tangent Curves Central Angle
				Radius and 1 of the other 3			*Chord Direction, Radius and 1 of the other 3*			
1	N 00 12 58 W	1320.62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	S 89 36 42 E	1312.91	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	S 89 36 42 E	15.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	S 00 12 47 E	230.66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	-125.00	0.0	0.0	0.0	S 44 30 15 W	0.0	21.32	0.0
6	N 00 12 47 W	245.97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Buttons: OK, Cancel, Add, Delete, Insert, Draw, Zoom To, Report
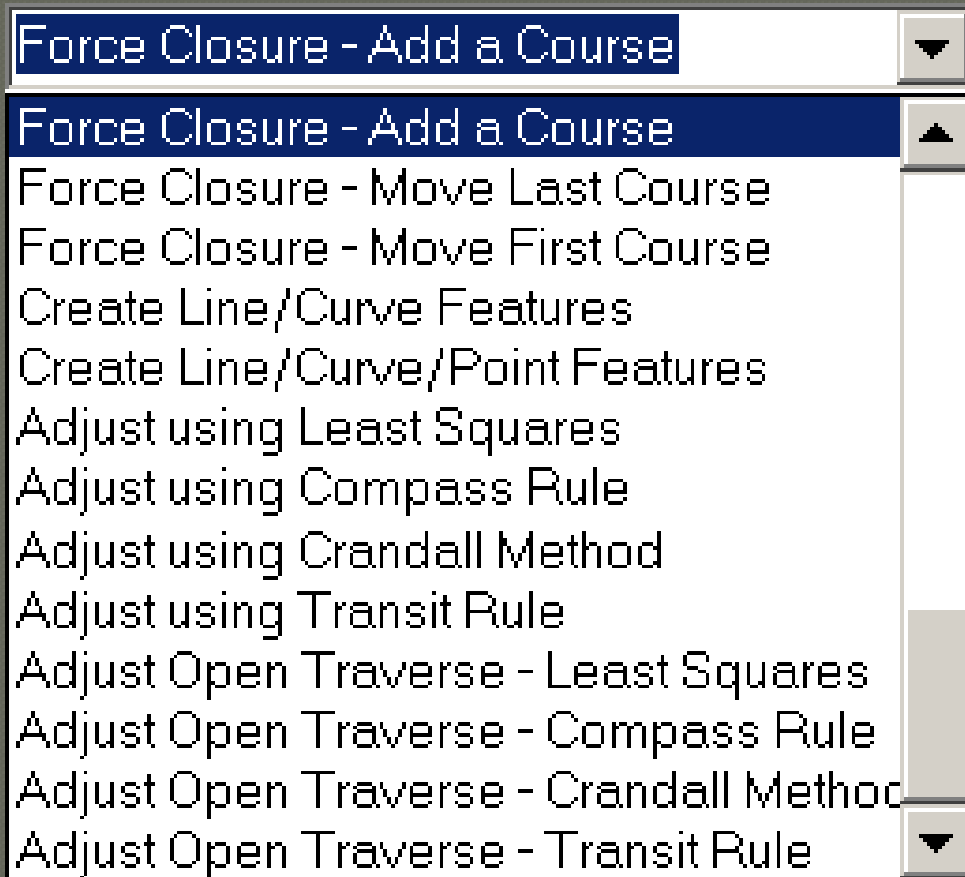
Pan X (+ Right, - Left): 0.0   Pan Y (+ Up, - Down): 25   Zoom (> 1 In, < 1 Out): 1.1   # Tie-Line Courses: 2

Total Length=512.97593   Distance to Close=0.00332   DX=0.00177   DY=0.00282   SE 32 5 27.2   Error of Closure 1:154294
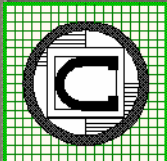
Parcel/Easement Creation

Force Closure - Add a Course ▼

Force Closure - Add a Course
Force Closure - Move Last Course
Force Closure - Move First Course
Create Line/Curve Features
Create Line/Curve/Point Features
Adjust using Least Squares
Adjust using Compass Rule
Adjust using Crandall Method
Adjust using Transit Rule
Adjust Open Traverse - Least Squares
Adjust Open Traverse - Compass Rule
Adjust Open Traverse - Crandall Method
Adjust Open Traverse - Transit Rule

When a Parcel or Traverse does not close, the user has the option of performing an adjustment or creating individual features

Parcel/Easement Creation

```
                              Parcel Course Report File

Parcel ID: 1

                Lines                    Tangent Curves              Non-Tangent Curves
                                   Radius and 1 of the other 3  Chord Direction, Radius and 1 of the other 3

Course    Direction    Distance   Radius     Arc      Chord    Central     Chord       Arc      Chord    Central
Number                                      Length    Length    Angle    Direction    Length   Length    Angle


Tie-Line Courses

   1   N 00 12 58  W  1320.62     0.0       0.0       0.0       0.0          0.0       0.0       0.0       0.0
   2   S 89 36 42  E  1312.91     0.0       0.0       0.0       0.0          0.0       0.0       0.0       0.0

Parcel Courses

   3      S 89 36 42 E   15.00     0.0       0.0       0.0       0.0          0.0       0.0       0.0       0.0
   4      S 00 12 47 E  230.66     0.0       0.0       0.0       0.0          0.0       0.0       0.0       0.0
   5            0.0      0.0    -125.00      0.0       0.0       0.0  S 44 30 15 W      0.0      21.32      0.0
   6   N 00 12 47 W  245.97       0.0       0.0       0.0       0.0          0.0       0.0       0.0       0.0

Distance to Close=0.00332    DX=0.00177    DY=0.00282    SE 32 5 27.2
Total Length=512.97593
Error of Closure 1:154294

Number of Tie-Lines=2
Tie-Line Start Bearing=N 00 12 58 W
Tie-Line Start Distance=1320.62
Tie-Line End Bearing=S 89 36 42 E
Tie-Line End Distance=1312.91

Parcel/Traverse Start Bearing=S 89 36 42 E
Parcel/Traverse Start Distance=15.00
Parcel/Traverse End Bearing=N 00 12 47 W
Parcel/Traverse End Distance=245.97
```

Legal Descriptions can be saved and recalled based upon a user-defined filename
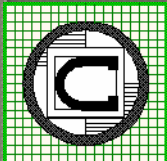
Parcel/Easement Creation

Legal Description with Aliquots

The Southwest Quarter (SW/4) of the Northwest Quarter (NW/4) of Section Seventeen (17), Township Fourteen (14) North, Range One (1) West…
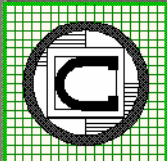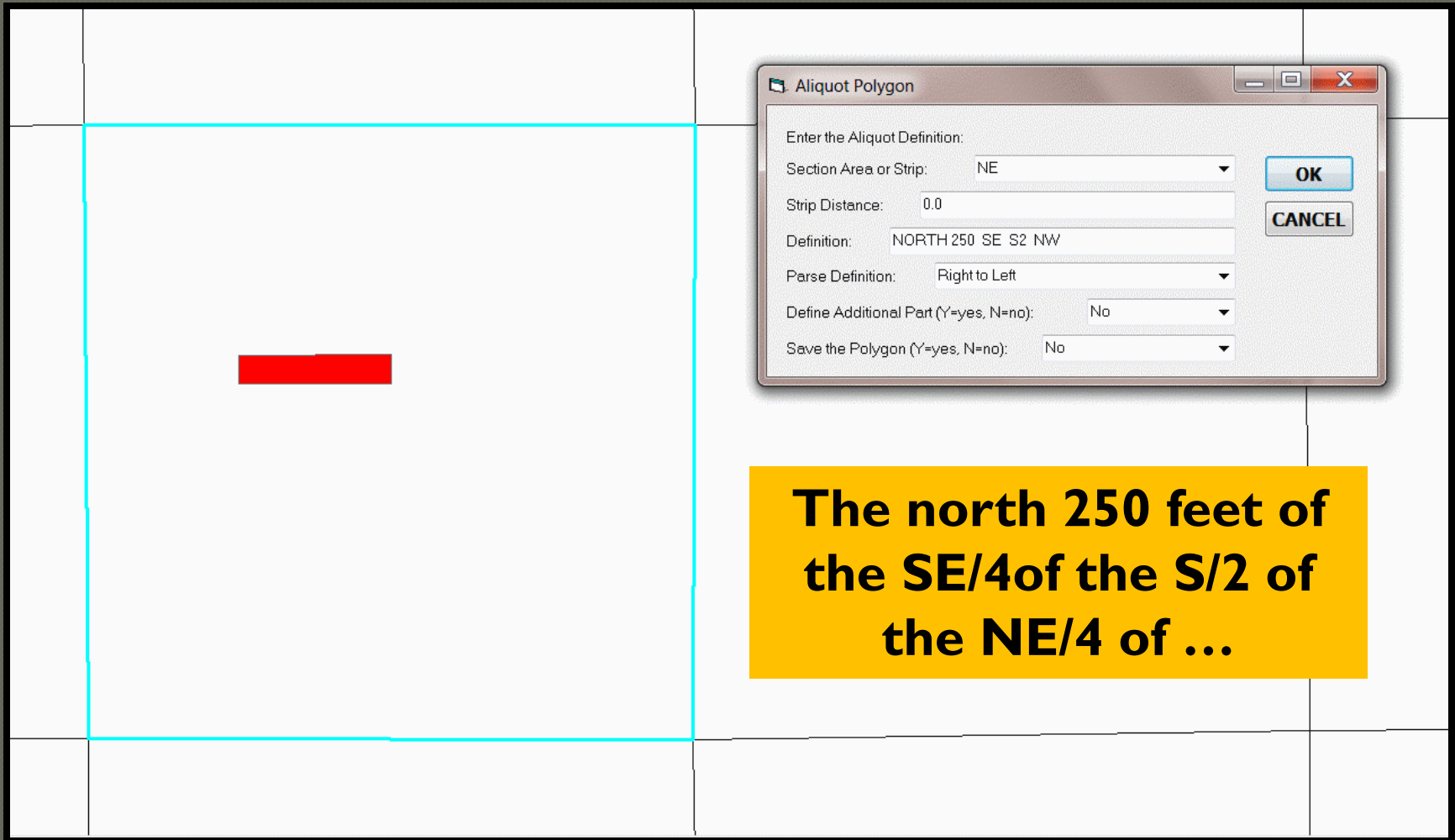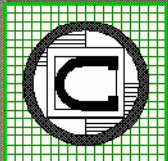
Parcel/Easement Creation

Aliquot Polygon

Enter the Aliquot Definition:

Section Area or Strip:	NE
Strip Distance:	0.0
Definition:	SW NW
Parse Definition:	Right to Left
Define Additional Part (Y=yes, N=no):	No
Save the Polygon (Y=yes, N=no):	No

OK
CANCEL
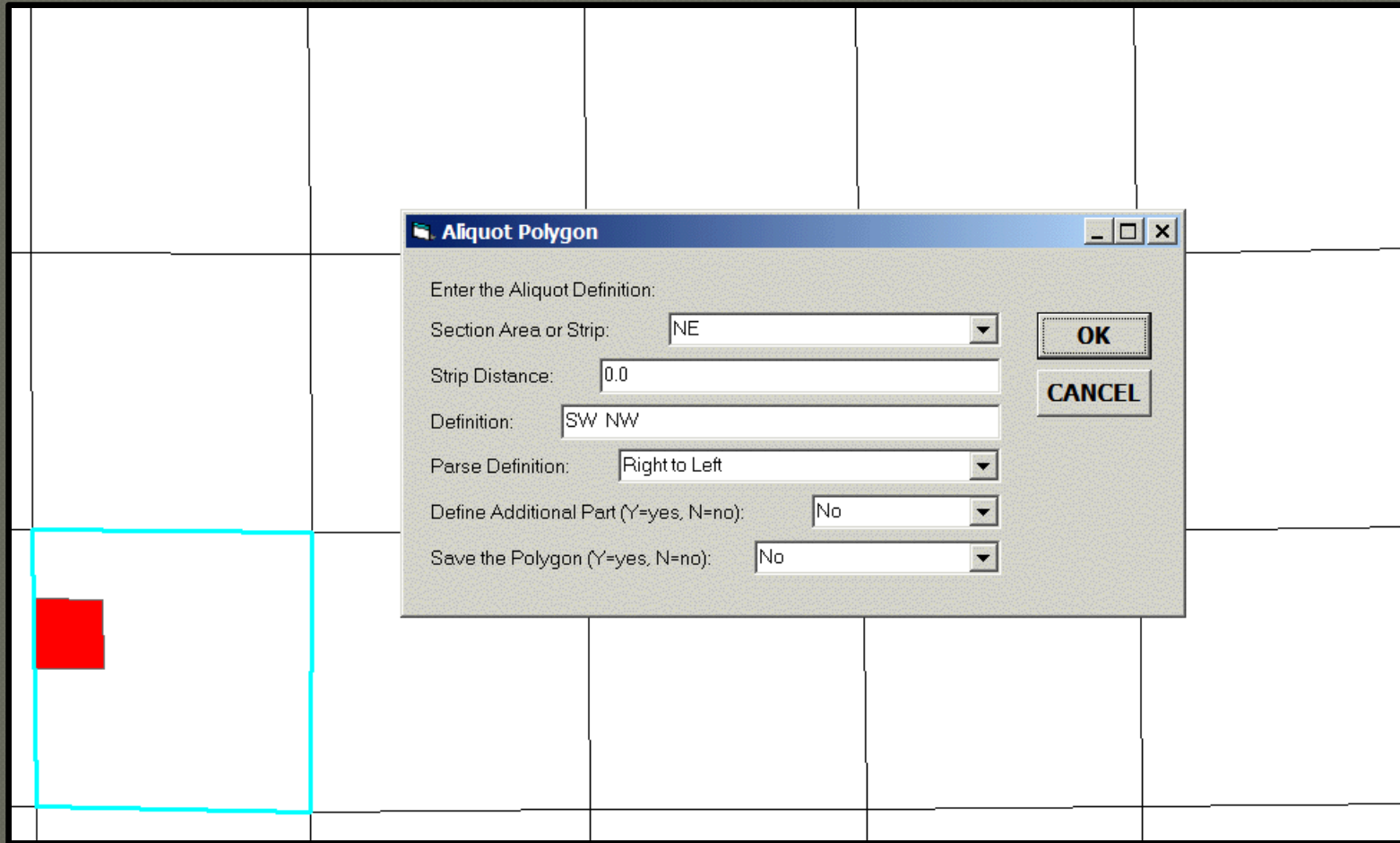
Interactively processing an Aliquot Description

Parcel/Easement Creation

Aliquot Polygon

Enter the Aliquot Definition:

Section Area or Strip:	NE
Strip Distance:	0.0
Definition:	NORTH 250 SE S2 NW
Parse Definition:	Right to Left
Define Additional Part (Y=yes, N=no):	No
Save the Polygon (Y=yes, N=no):	No

OK   CANCEL

The north 250 feet of the SE/4of the S/2 of the NE/4 of …
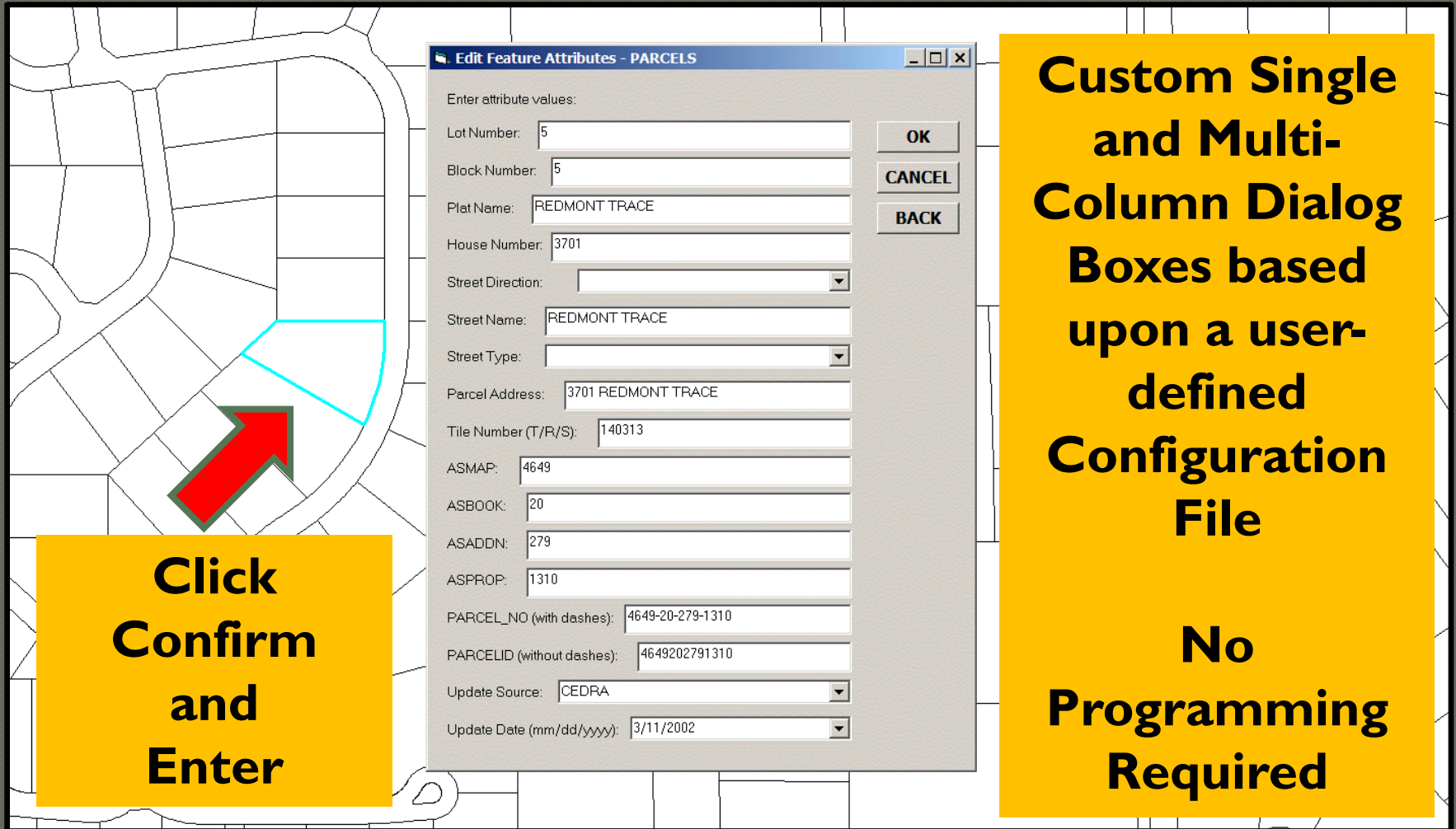
Emma asks how to perform

Data Entry and Data Maintenance

Data Entry and Data Maintenance

Edit Feature Attributes - PARCELS

Enter attribute values:

Field	Value
Lot Number:	5
Block Number:	5
Plat Name:	REDMONT TRACE
House Number:	3701
Street Direction:	
Street Name:	REDMONT TRACE
Street Type:	
Parcel Address:	3701 REDMONT TRACE
Tile Number (T/R/S):	140313
ASMAP:	4649
ASBOOK:	20
ASADDN:	279
ASPROP:	1310
PARCEL_NO (with dashes):	4649-20-279-1310
PARCELID (without dashes):	4649202791310
Update Source:	CEDRA
Update Date (mm/dd/yyyy):	3/11/2002

OK CANCEL BACK

Click Confirm and Enter

Custom Single and Multi-Column Dialog Boxes based upon a user-defined Configuration File

No Programming Required

Data Entry and Data Maintenance

Example of a Multi-Column Dialog Box with Custom Labels and Drop-Down Lists

No Programming Required

Data Entry and Data Maintenance

Data Entry in a JavaScript based Web Application
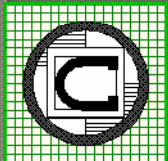
Data Entry and Data Maintenance

```
/*
/* Start of Layer Definition
THEME
parcels
/*
/* Set the Parcel's Lot
LOTNUM
Lot Number:
/*
/* Set the Parcel's Block
BLOCKNUM
Block Number:
REMEMBER_LAST
/*
/* Set the Parcel's Plat Name
PLAT_NAME
Plat Name:
REMEMBER_LAST
```

Keyword
Name of Layer

Name of Attribute
Attribute Label

Keyword

User-Specifications are Stored in a Text File called THEMES.TXT

Data Entry and Data Maintenance

Keyword	Description
RANGE	Specify Valid Numeric Range
CHOICES	Drop-Down List
CHOICES_WHEN	Conditional Drop-Down List
DEFAULT	Default Value to be Assigned
REMEMBER_LAST	Remember Last Value Entered
ATTRIBUTE_EQUATION	Evaluate an Equation
TRANSFER	Evaluate using a Spatial Search

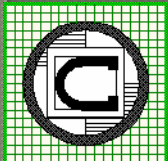**Enhanced Attribute Control Keywords**
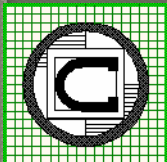
Data Entry and Data Maintenance

```
/*
/* Set the Parcel's Street Direction
ST_DIR
Street Direction:
CHOICES

N
S
E
W
NE
SE
SW
NW
END
REMEMBER_LAST
```

Name of Attribute
Attribute Label
Keyword

Choices

Keyword
Keywood

Specification of a Custom Drop-Down List

Data Entry and Data Maintenance

```
/* Definition for Field A
A
Attribute A:
/* Definition for Field B
B
Attribute B:
CHOICES
1
2
3
4
CHOICES_WHEN,Attribute A:,2
AAA
BBB
CCC
DDD
CHOICES_WHEN,Attribute A:,3
111
222
333
444
END
```

**Name of Attribute
Attribute Label**

**Name of Attribute
Attribute Label**

Default Choices Displayed

**Default Choices when
Attribute A is equal to 2**

**Default Choices when
Attribute A is equal to 3**

Data Entry and Data Maintenance

DEFAULT ADDONE
DEFAULT CURRENT_DATE
DEFAULT RETURN_LENGTH
DEFAULT RETURN_AREA
DEFAULT RETURN_AREA_UNITS
DEFAULT RETURN_X
DEFAULT RETURN_Y
DEFAULT RETURN_X_DD
DEFAULT RETURN_Y_DD
DEFAULT RETURN_X_DMS
DEFAULT RETURN_Y_DMS
DEFAULT RETURN_X_LONG
DEFAULT RETURN_Y_LAT

DEFAULT RETURN_XS
DEFAULT RETURN_YS
DEFAULT RETURN_XS_DD
DEFAULT RETURN_YS_DD
DEFAULT RETURN_XS_DMS
DEFAULT RETURN_YS_DMS
DEFAULT RETURN_XS_LONG
DEFAULT RETURN_YS_LAT

DEFAULT RETURN_XE
DEFAULT RETURN_YE
DEFAULT RETURN_XE_DD
DEFAULT RETURN_YE_DD
DEFAULT RETURN_XE_DMS
DEFAULT RETURN_YE_DMS
DEFAULT RETURN_XE_LONG
DEFAULT RETURN_YE_LAT
DEFAULT RETURN_XM
DEFAULT RETURN_YM
DEFAULT RETURN_XM_DD
DEFAULT RETURN_YM_DD
DEFAULT RETURN_XM_DMS
DEFAULT RETURN_YM_DMS
DEFAULT RETURN_XM_LONG
DEFAULT RETURN_YM_LAT

The keyword DEFAULT can be followed with an Explicit Value or one of the above Options
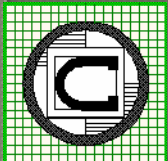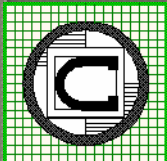
Data Entry and Data Maintenance

```
/*
/* Set the Parcel's Street Address
PARCEL_ADD
Parcel Address:
ATTRIBUTE_EQUATION
TRIM(HOUSENO)+" "+TRIM(ST_DIR)+" "+TRIM(ST_NAME)+" "+TRIM(ST_TYPE)
```
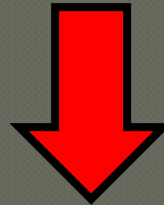
The keyword ATTRIBUTE_EQUATION enables the user to populate an attribute by evaluating an equation which can be comprised of intrinsic functions, operators, other attribute names and conditionals.
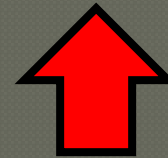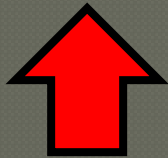
Data Entry and Data Maintenance

Mathematical Operators

1. ^   Exponentiation
2. /   Division
3. *   Multiplication
4. +   Addition
5. -   Subtraction

The Boolean Operators

1. =   Equality
2. <   Less than
3. >   Greater than
4. <= Less than or equal to
5. >= Greater than or equal to
6. <> Not equal to

The keyword ATTRIBUTE_EQUATION supported Mathematical Operations and Boolean Operators
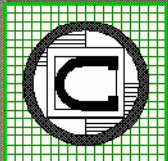
Example of a Nested Conditional Expression
IF(Q2=2.5,0.9,IF(Q2=4.5,0.78,IF(Q2=1.9,0.97,IF(Q2=2.5,(Q2^-0.092*1.0808),4.0))))

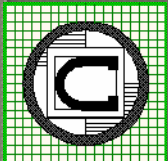# Data Entry and Data Maintenance

Intrinsic Functions

ABS = absolute value of a number
ACOS = arc cosine of a number expressed in radians
ASIN = arc sine of a number expressed in radians
ATAN = arc tangent of a number expressed in radians
CHR = character associated with the specified numeric character code
COS = cosine of a number expressed in decimal degrees
DEG2RAD = conversion of degrees to radians
LEFTPADxx = returns a string of xx characters with leading zeroes to pad the string
LEN = returns the number of characters in a string
RAD2DEG = conversion of radians to degrees
RIGHTPADxx = returns a string of xx characters with trailing zeroes to pad the string
ROUND = rounding up of a number to the nearest whole number
SIN = sine of a number expressed in decimal degrees
SQRT = square root of a number greater than zero
TAN = tangent of a number expressed in decimal degrees

Data Entry and Data Maintenance

Intrinsic Functions

TRUNCATE   =   truncation of a number
STRING   =   treat the value as a string, not as a numeric value
TRIM   =   remove leading and trailing blanks from the value
TRIML1   =   remove the first character in a string
TRIML2   =   remove the first two characters in a string
TRIML3   =   remove the first three characters in a string
TRIML4   =   remove the first four characters in a string
TRIML5   =   remove the first five characters in a string
TRIML6   =   remove the first six characters in a string
TRIMR1   =   remove the last character in a string
TRIMR2   =   remove the last two characters in a string
TRIMR3   =   remove the last three characters in a string
TRIMR4   =   remove the last four characters in a string
TRIMR5   =   remove the last five characters in a string
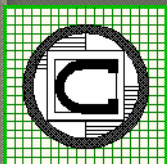TRIMR6   =   remove the last six characters in a string

Esther the Wonder Pig asks how to perform

DXF Exporting

Contact Esther at: https://www.facebook.com/estherthewonderpig/photos_stream?ref=page_internal

DXF Exporting

Create DXF File

DXF Filename: `C:\TMP\Layers.dxf`

Browse...

☐ Trim Layer Names to maximum of 8 characters
☑ Export Selected Graphics (Marker, Pen, Fill and Text)
☐ Export for importing into CEDRA I-series software
☐ Export Attributes

ARA
ARCLENGTH
AZIMUTH
Angle
AnnotationClassID

☑ Export Features displayed in the Current Extent
☑ Export using same Coordinate System as the Data Frame
☑ Use Data Frame's Rotation Value when Exporting
☑ Export Classes as Separate Layers
☐ Export Line Widths for the Active Layers
☑ Export Point Layer Symbology as Blocks
☑ Export Polygons with Hatches
☐ Version 11 and 12 Compatible
☑ Assign Feature Color based upon Layer Color

Text Width Scale Factor (Auto or > 0): `Auto`
Default Text Font: ● Basic   ○ Arial   ○ Times

OK   CANCEL

Execute from Data or Layout View

All Visible Layers Processed
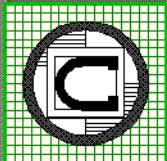
Attributes exported as Blocks

Symbols exported as Blocks

Annotation exported as Text

Labels exported as Text

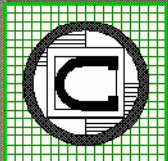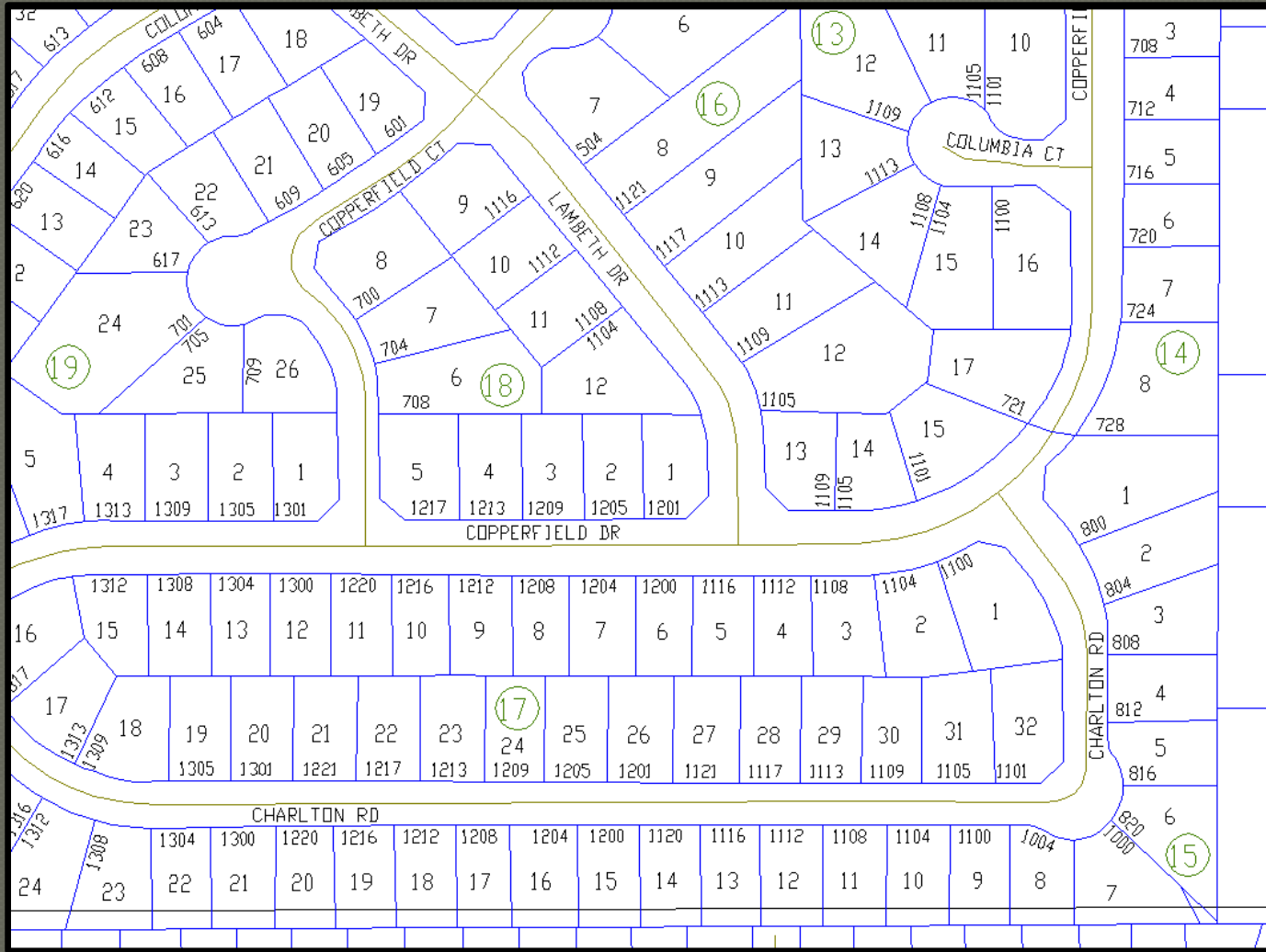**3D features Z values are exported**

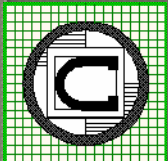**Line Widths can be exported**

DXF Exporting

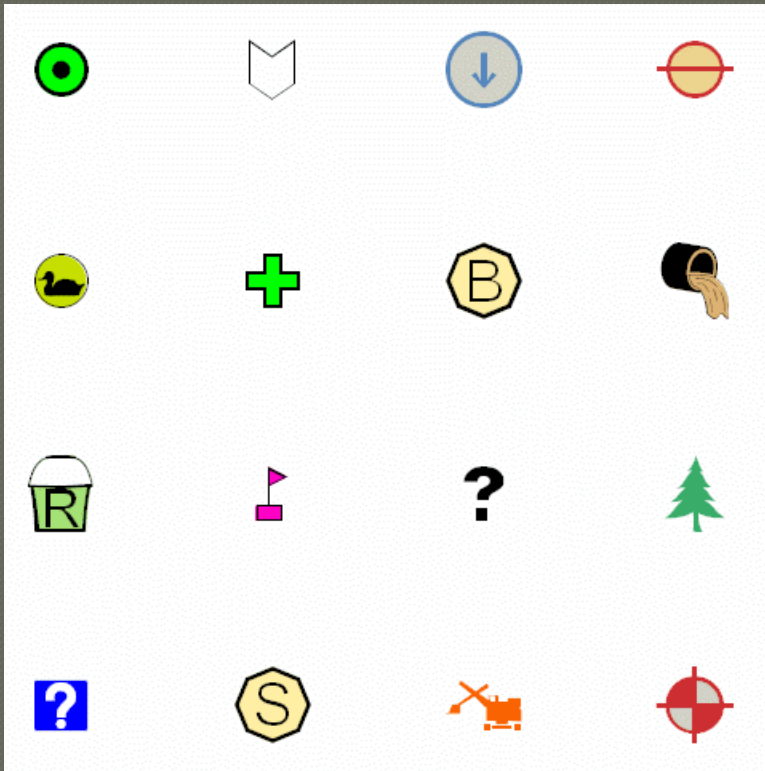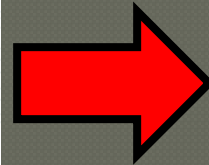**Data displayed within ArcGIS**

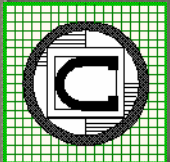# DXF Exporting

Data displayed within AutoCAD

DXF Exporting

Symbols displayed within ArcGIS

Symbols displayed within AutoCAD

DXF Exporting

```
/*
/* BLACK
/*
33554432    255
33580677    255
13160660    255
11558400    255
/*
/* LIGHT BLACK
/*
38686286    252
/*
/* BROWN
/*
33577630    34
33580677    34
36590241    34
```

RGB   AutoCAD

The user is able to create a **Color Mapping Definition File** which enables the user to map a specific **AutoCAD** color to an **ArcGIS RGB** value.

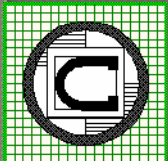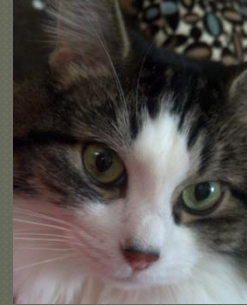This information is stored in the **RGBMAP.TXT** file

Summary

It is possible to customize ArcGIS in a variety of manners to add specific functionality not available in native ArcGIS.

This can be a specific tool or command or a complete application.

ArcGIS provides the user-interface and database functionality for customization.

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