






# Working with InRoads Survey

- General InRoads Survey Orientation
- Key Functionality Overview
  - ♣ Collecting Data
  - ♣ Coding Field Data
  - ♣ Loading Data Collector files
  - ♣ Displaying the Survey Data
  - ♣ Digital Terrain Models
  - ♣ Geometry Data

## InRoads Survey - Purpose

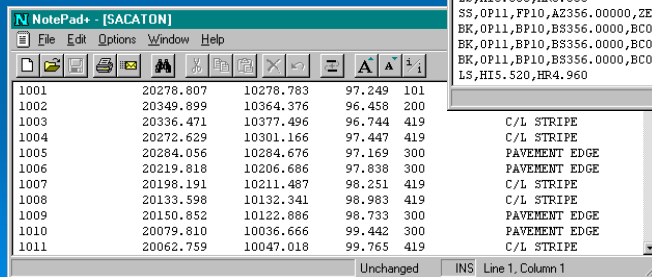
- Breakdown & process field collected data
  - ♣ Create **CAD** base file 
  - ♣ Build a **Surface** Model 
  - ♣ Create **Geometry** Data 

# Data Collector Files

- Survey supports downloading of data from many electronic data collectors
  - ▲ SDMS (.cal)
  - ▲ Sokkia SDR (\*.sdr)
  - ▲ Trimble DC (\*.dc)
  - ▲ SMI Raw (\*.raw)
  - ▲ LISCAD GSI Format (\*.gsi)
  - ▲ Wild GRE (\*.gre)
  - ▲ AASHTO SDMS (\*.sdm)
  - ▲ Zeiss REC500 (\*.zss)
  - ▲ Geodimeter (Topography) (\*.raw)
  - ▲ Nikon (\*.mwd)
  - ▲ TopCon FC4 (\*.fc4)

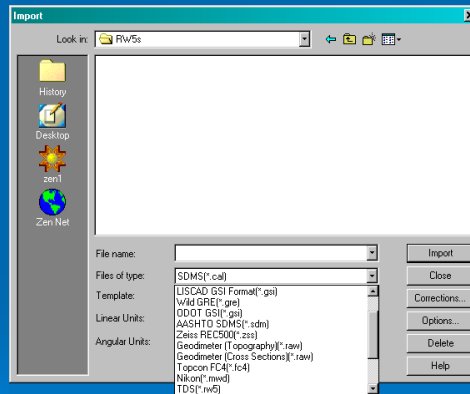
# Loading Data Collector Files

- The field data files that InRoads Survey reads must be ASCII



# Importing Data

- The Import command allows the selection of the file to be loaded



# The In-Survey Fieldbook

- The *Fieldbook* lists the data imported from the field info
- Station & Observation data can be viewed and edited

Fieldbook Data - Main Street Realignment Project

Stations:

Station Name	Nothing	Easting	Elevation	Code	Status	Backsight Point	Backsight
56	374051.15	709254.33	652.7218	CP	N	55	172°30'15"
10	374504.11	709262.22	645.6240	CP	FN	56	180°59'23"
79	375223.33	706240.36	534.9000	322	FN	49	139°00'31"

Change:

Observations:

Point Name	Nothing	Easting	Elevation	Code	Status	Horizontal Obs.	Vertical Obs.	Slope Dis.
49	374329.84	705357.71	540.7700	104	S	0°00'00"		
100	375097.61	706346.06	534.3366	104	S	8°27'46"	90°13'40"	136.5600
101	375072.05	706336.09	534.1525	104	P	8°29'38"	90°18'40"	178.1850
102	375093.44	706320.35	533.7570	104	P	9°21'57"	90°30'43"	152.5500
103	375095.65	706316.32	533.7506	104	P	10°14'34"	90°30'43"	148.5650
104	375094.71	706312.23	533.6971	104	P	11°47'40"	90°29'32"	147.3400
105	375086.94	706302.10	534.3078	104	P	16°38'15"	90°18'39"	149.7150
106	375080.30	706297.72	534.6545	104	P	19°06'29"	90°10'23"	154.1050
107	375073.07	706296.54	534.6850	104	P	20°29'37"	90°04'57"	160.4200
108	375066.42	706288.82	535.0299	104	P	20°33'32"	90°01'51"	167.4400
109	375053.97	706307.08	535.2541	104	P	19°29'23"	89°57'28"	182.0300
110	375046.15	706313.49	535.3096	104	P	18°39'44"	89°56'36"	191.6750

# Correction 'Phase 1'

- The Fieldbook is '*Cleaned Up*' in two distinct phases:
  - **Plan View** – Planimetric 'visual' line work and graphics ... the Drafting / Drawing
  - **3D** – Elevational corrections via the DTM
- The **Plan View** clean-up is first...

# Correcting Code Errors

- The values for any shot can be edited to allow for necessary changes or additions

**Edit Observation**

Point Name:

Type:

Horizontal Observation:

Vertical Observation:

Slope Distance:

Code:

Target Height:

Northing:

Easting:

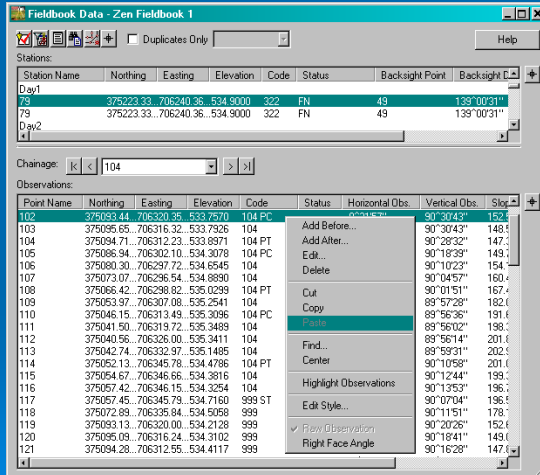
Elevation:

Notes:

Attributes:

Code	Name	Value
501	Size	12"
	Type	MAPLE
	Drip	6

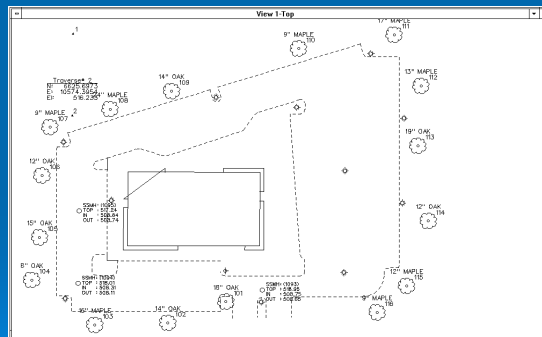
# Fieldbook Edits



- Any changes are made in the In-Survey Fieldbook
- The original field collection file is not changed

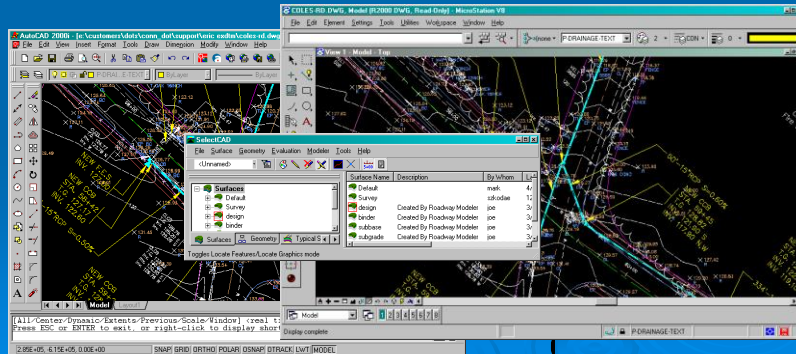
# Graphical data

- CAD is just a viewing mechanism for Survey



# In-Survey and CAD

- Starting InRoads Survey will load the 'Defaulted' CAD package as well as In-Survey
- 2 Separate Programs are running!!

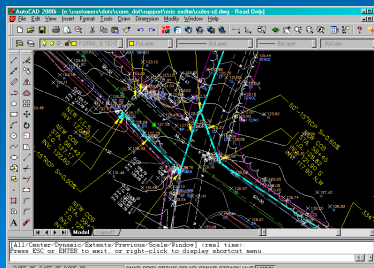
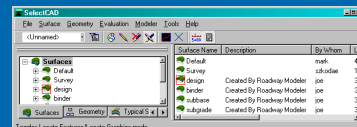


© 2011 Zen Engineering

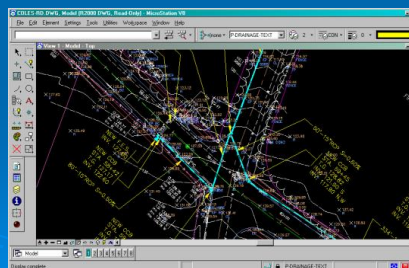
Page 1-11  
27 Oct 11

# In-Survey versus CAD

- InRoads Survey handles the 'Engineering'
- CAD is the viewer



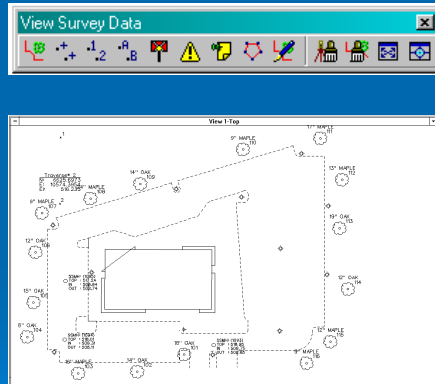
© 2011 Zen Engineering



Page 1-12  
27 Oct 11

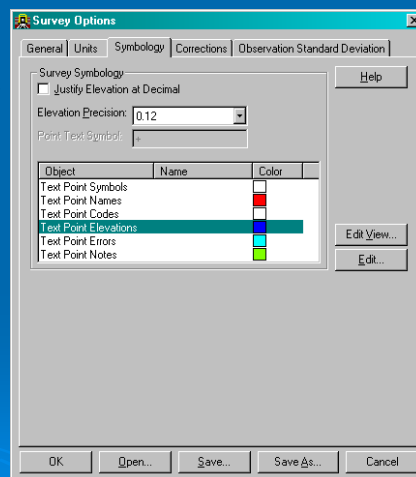
# Viewing Fieldbook Data

- The *Survey > View Survey Data* from the Main Menu & the View Survey Data toolbar allows the display of the field book data
- These views are 'temporary' graphics and can be toggled on & off



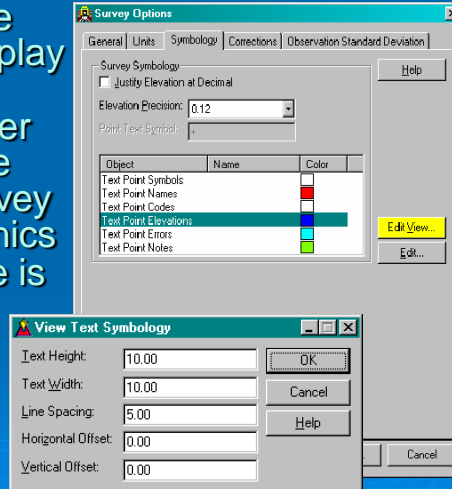
# Viewing Fieldbook Data (symbology)

- Symbology for some of these graphics are under *Tools > Survey Options*
  - The *Text Symbology* Tab defines the Symbols, Codes, Notes, Points, Elevations and Errors.



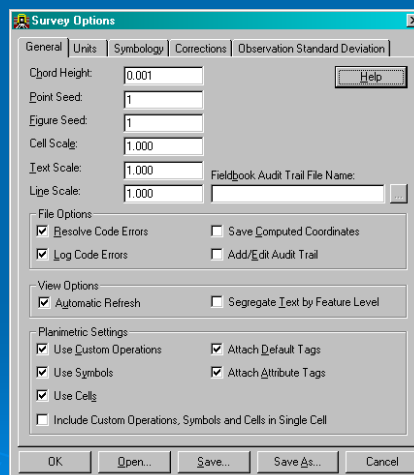
# Viewing Fieldbook Data (Text Sizes)

- Text has a 'View' size for the temporary display under '*Edit View...*'
- The text size set under '*Edit...*' determine the setting when the Survey is committed to graphics
- MicroStation text size is 'view independent' and will remain this size independent of zooming in or out.
  - (sorry ACAD users)



# Viewing Fieldbook Data (Planimetrics)

- The *General* tab settings deal with:
  - Global Scale factors tied into the display
  - Settings related to Error checking
  - Various plan display of the Fieldbook data





# Coding - Who is ...?



FEATURE DEFINITION	ALPHA CODE	NUMERIC CODE
ANCHOR	ANCHOR / AN	1
ANTENNA	ANTENNA	2
APPROACH	APPR	3
ASSUMED CORNER	ACORN	4
AZMUTH MARKER	AZMKR	5
BBO GRILL / FIREPLACE	BGRILL	6
BEARING TREE	BTREE	7
BENCH MARK	BENCHMK	8
BOX CULVERT	BOXCUL	9
BRIDGE	BRIDGE	10
BRUSH	BRUSH	11
BUILDINGS	BULDS	12
BULK TANK	BULKTK	13
CATTLE GUARD	CATGRD	14
CEMETERY	CEMTRY	15
CENTERLINE	CL	16
CISTERN	CISTRN	17
CLOTHES LINE	CLOSLN	18
COMMERCIAL SIGN DOUBLE FACE	CMNSDP	19
COMMERCIAL SIGN ONE POST	CMNSOP	20
COMMERCIAL SIGN OVERHEAD	CMNSOH	21
COMMERCIAL SIGN TWO POST	CMNSTP	22
CONCRETE SYMBOL	CONC	23
CREEK EDGE	CREEK	24
CURB GUTTER LEFT	CGL	25
CURB GUTTER RIGHT	CGR	26
CURB LEFT	CURL	27
CURB RIGHT	CURR	28
DAM GRADE/DIKE/LEVEE	DAM	29
DITCH BLOCK	DITCHBK	30
DRAINAGE PROFILE	DRAINAGE	31
DROP INLET	DROPIN	32
DISCON (BREAKLINE)	DISCON / DS	33
EDGE OF ASPHALT	EDGEAS / EA	34
EDGE OF CONCRETE	EDGECON / EC	35
EDGE OF GRAVEL	EDGEGR / EG	36
EDGE OF OTHER	EDGEOT / EO	149
EDGE OF SHOULDER	EDGEOS / ES	150

## Show of hands:

- Who has a standard field coding list?
- Who uses their field coding standards?

# Coding is the Key!!

## Coding is how In-Survey interprets the collected data

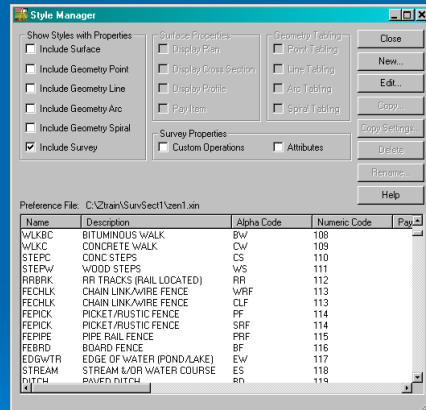
- Good coding makes the interpretation more accurate
- Lack of, or poor coding makes it more difficult



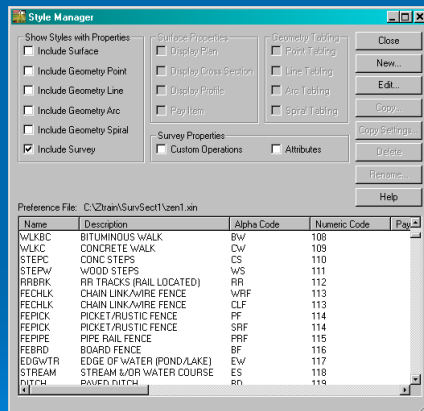
# The Brains of In-Survey

- The *Style Manager* defines how the field Coding is interpreted

- For CAD Display
- For Surface creation
- For Geometry

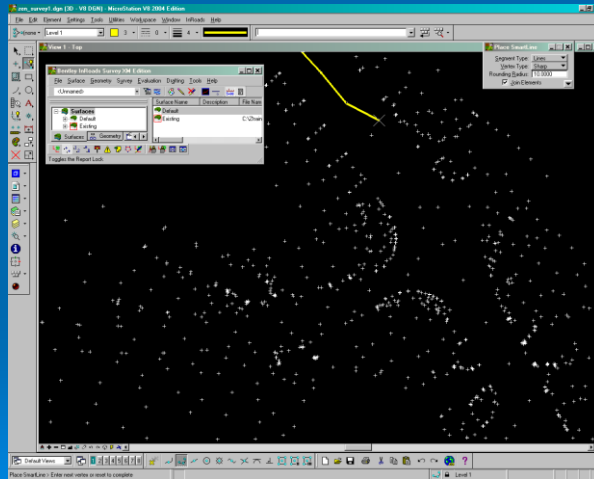


## Survey Field Codes



- Each shot collected in the field is represented by an item in this manager
- The table defines the characteristics for each field item

# Drafting - Who is ...?



● Show of hands:

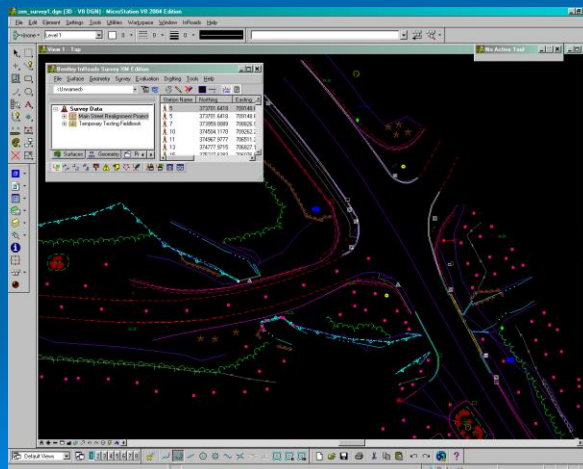
▲ Who takes the field data and 'draws' the survey manually?

© 2011 Zen Engineering

Page 1-21  
27 Oct 11

# Graphical data

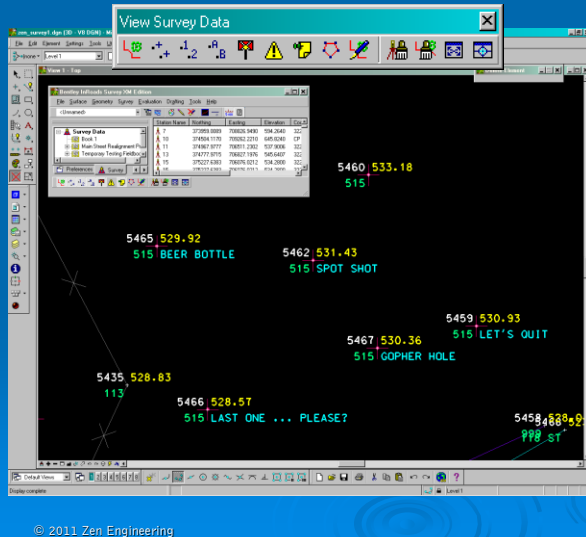
- CAD is used as a viewing mechanism for InRoads Survey
- The CAD file isn't part of the survey database



© 2011 Zen Engineering

Page 1-22  
27 Oct 11

# Viewing Fieldbook Data



## View:

- Plan drawing
- Shot locations
- Point Number
- Point Coding
- Elevation
- Notes
- Error Messages
- Traverses

Page 1-23  
27 Oct 11

# Correction 'Phase 2'

- The Fieldbook is '*Cleaned Up*' in two distinct phases:
  - **Plan View** – Planimetric 'visual' line work and graphics ... the Drafting / Drawing
  - **3D** – Elevational corrections via the DTM
- The **Elevational Aspect** clean-up is next...
  - IF 3D is required by the scope of the project

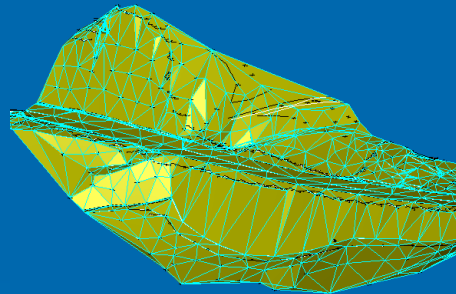
© 2011 Zen Engineering

Page 1-24  
27 Oct 11

# Surfaces - Who is ...?

- Show of hands:

- ▲ Who has to view contours of their survey?
- ▲ Who has to build 3D Surface models of their Survey data?

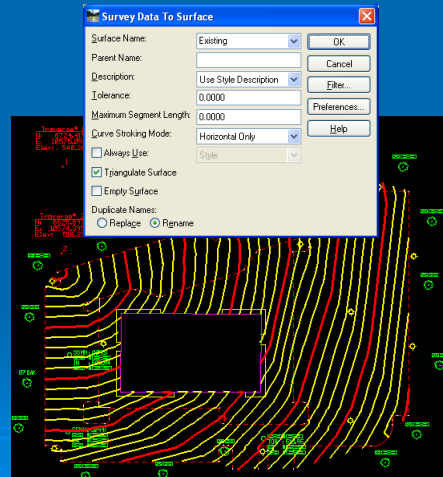


## Surface Basics

- Survey can create a **Digital Terrain Model (.dtm)** from the collected field data
- The surfaces that are created can be used in InRoads, InRail, Site, Storm & Sanitary ... etc.
- There are different point *Types* that Survey can use to build the 3D Model
  - ▲ Point locations, Breaklines, closed shapes, Excluded...
- Each point *Type* relates to the kind of data that is collected in the field and how that data should be incorporated into the surface model.

# Creating a Surface Model - DTM

- The *Survey Data to Surface* command creates a DTM based on the field data
  - Then use any **Surface** commands on the main menu
- The DTM is based on the field Coding



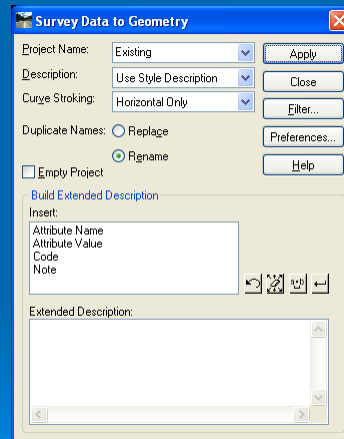
## Geometry - Who is ...?

- Show of hands:
  - Who has to display the geometrics of their survey data?
  - Who has to input Traversing, Legal Descriptions, Control Points or control lines in addition to the data collected in the field?



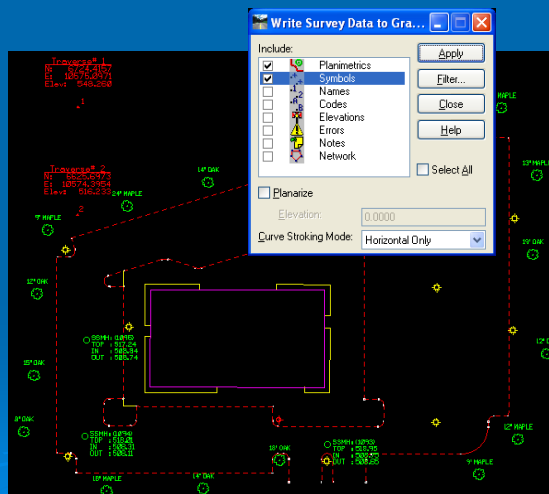
# Creating a Geometry File - ALG

- The *Survey Data to Geometry* command creates geometry based on the field collected data
  - Then use any **Geometry** commands on the main menu
- Every shot can be pushed into the ALG



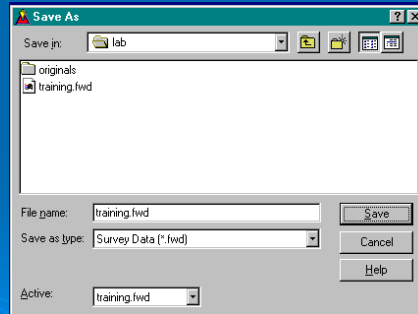
# Write the Drawing to CAD

- *Survey > View Survey Data > Write Survey Data to Graphics* saves your viewable data to the CAD file
- The Fieldbook viewing is temporary until this step is done



# Saving a Survey Fieldbook - .fwd

- The *File > Save As* command allows you to create an **FWD** that contains all the field book data
- The **.fwd** file can be open into later Survey sessions and all the changes & data will be present



# Key InRoads Survey File Types

- **.XIN** – Configuration file
  - Survey Coding list
  - CAD presentation controls
  - Units, prism corrections & other info about the survey
- **.FWD** – Survey project file
  - Coordinates, Station & Observation data
- **.DTM** – 3D Surface model created from the collected fieldbook data
- **.ALG** – Geometry Project created from the collected fieldbook data
- **.DGN or .DWG** – CAD graphics file



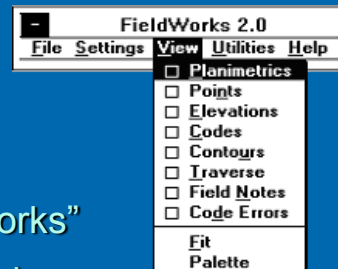
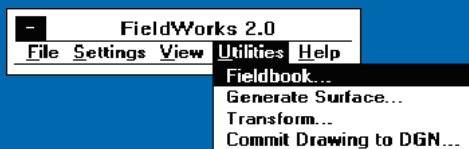
# Basic Workflow

- **Collect the field data** and export an ASCII file
  - ♣ ASCII files are imported and processed by In-Survey
- **Import** the ASCII field data into InRoads Survey
  - ♣ This creates an InRoads Survey Fieldbook
- **Edit / Correct / Add / Adjust** the data
  - ♣ The InRoads Survey Fieldbook contains the final work
- **Display the CAD Graphics** with InRoads Survey
- **Create the Surface Model** with InRoads Survey
- **Create any Geometry** with InRoads Survey

© 2011 Zen Engineering

Page 1-33  
27 Oct 11

# In-Survey Historical Note

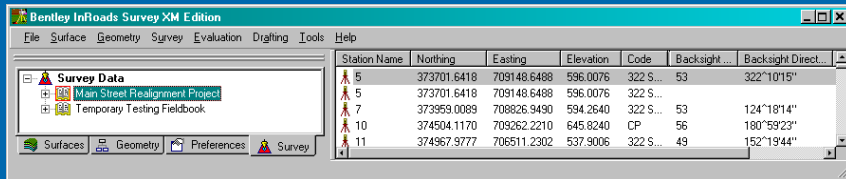


- In-Survey used to be “FieldWorks”
- FieldWorks had very basic tools  
...and sometimes too basic

© 2011 Zen Engineering

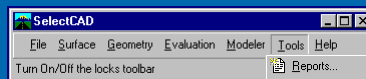
Page 1-34  
27 Oct 11

# InRoads Survey Now



- FieldWorks has evolved to include key 'InRoads' functionality useful to a Survey department
- This software evolution resulted in **InRoads Survey**

# InRoads Locks



- In-Survey > Tools > Locks*
- These controls regulate the output, input or processing of certain In-Survey commands
- These Locks apply primarily to the exported data



# Basic Workflow - Summary

- Many types of data collectors ASCII Files can be loaded
- ASCII files imported into Survey are not processed until all the files have been read into memory
- Errors in the data can be corrected as the files are being processed or later in the Fieldbook
- Graphics that Survey produces from the on-line Fieldbook are 'temporary' and are not written to a design file until using the *Write Survey Data...* command.
- Data added to a digital terrain model is controlled by the DTM feature associated with a particular field code
- The Geometry can be saved from the collected field data

## Lab 1.4 - Overview

- Establishing the Project Default settings
- Import a field collected file
- View the imported data
- Getting familiar with the In-Survey fieldbook
- Taking a first look at the Style Manager
- Exporting a digital terrain model (surface)
- Exporting a Geometry data file
- Saving all the created data

...Get started on page 49