# Chapter 3

- **Establishing Existing Conditions Using Survey Data**
  - Topics
    - What is survey data?
    - Creating a survey database
    - Importing survey data
    - Automating field to finish
    - Editing survey points
   - Editing survey figures
    - Creating additional points

What Is Survey Data?

- Ever play connect-the-dots?

- Surveyors make the dots for a map; the dots are survey data.

- Survey dots are 3D; they contain x, y, and z coordinate information.
- They can be used to make a 3D picture, map, or drawing that represents the shape of the ground surface and any features that appear on it.
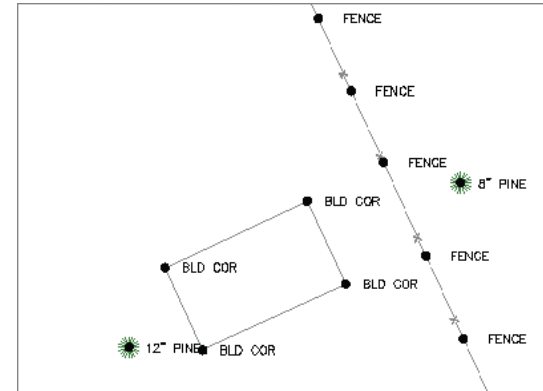
Creating a Survey Database

- Survey data is stored outside the drawing in a *survey database*.

- The survey database stores the raw survey data.

- The survey database also stores any relationships between the data and what is displayed in the drawing.

- Survey data is considered "sacred." Keeping it outside the drawing helps to protect its integrity.
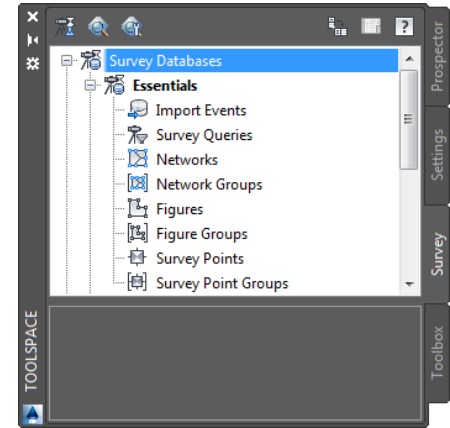
Importing Survey Data

- Survey data is *imported* into a survey database.

- It can be inserted into the drawing at the same time.

- Several types of data can be imported into a survey database:
    - Field Book File (legacy Autodesk proprietary)
    - LandXML
    - Point file (text file)
    - Points from a drawing
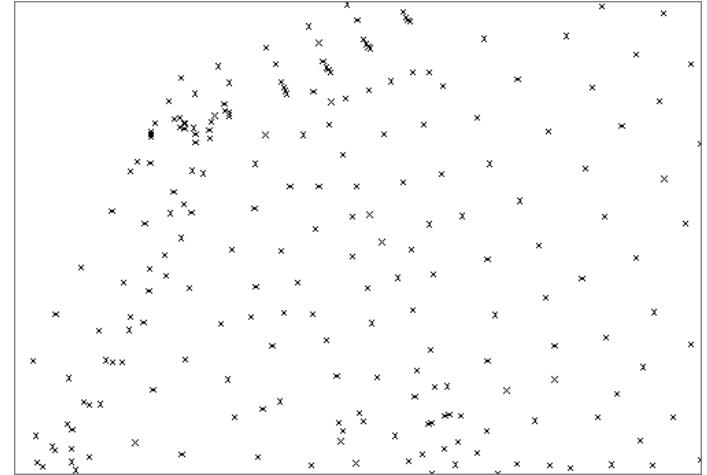
Automating Field to Finish

- Many of the procedures used to turn raw field data into a drawing can be automated.

- This includes the following:
  - Placing points on certain layers
  - Converting short field descriptions to long office descriptions
  - Inserting symbols for manholes, power poles, and so on
  - Drawing lines to create fences, edges of pavement, and so on
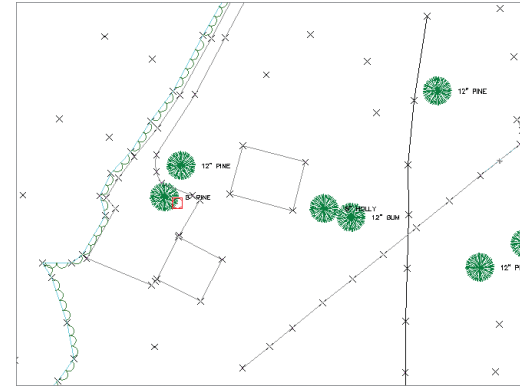
Automating Field to Finish

- Civil 3D contains several tools to accomplish this automation:

    - Linework code sets
    - Point styles
    - Point label styles
    - Description keys
    - Figure prefix database
    - Point groups

Automating Field to Finish

- Linework Code Set
  - Translates field codes into automatic drawing commands in Civil 3D
  - BEG = Begin figure, BCV = Begin curve, and so on

Automating Field to Finish

- Point styles
  - Can utilize AutoCAD blocks for markers enabling symbols to represent manholes, fire hydrants, power poles, and so on

- Point label styles
  - Can automatically place annotation next to a point such as a label indicating type and size next to a tree symbol

Automating Field to Finish

- Description keys
  - Based on a matching field code, a description key will do the following:
    - » Place a point on specific layer
    - » Apply a specific point style (possibly one that uses a symbol)
    - » Apply a specific point label style
    - » Rewrite an abbreviated field description into a more understandable full description (for example, MH becomes Manhole)
   - » Rotate the point
    - » Scale the point

Automating Field to Finish

- Figure Prefix Database
  - Based on a matching field code, the figure prefix database will do the following:
    - » Place a survey figure on a specific layer
    - » Apply a specific survey figure style
    - » Identify a survey figure as a breakline, or not
    - » Identify a survey figure as a parcel, or not
   - » Place a survey figure within a specific site (explained later)

Automating Field to Finish

- Point Groups
  - Generally, point groups are used to sort points by a variety of properties.
  - Typically they are sorted by description.
  - Points within a group can be automatically assigned a point style or point label style, provided these properties are listed as <default> within the description keys and/or point properties.
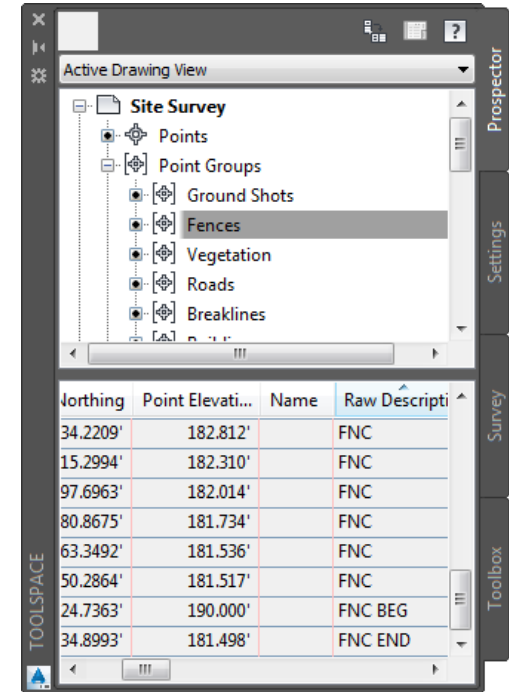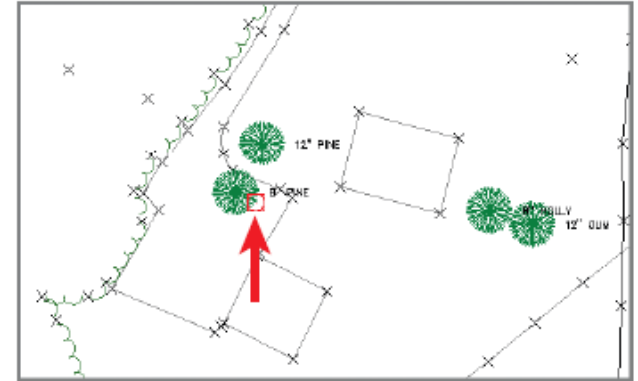
Editing Survey Points

- Special commands are required to edit survey points.

- These commands involve the survey database.

- A COGO (coordinate geometry) point is another, more generic type of point that does not have such editing restrictions.

- Although COGO points are more convenient to work with, when integrity matters, they fall short.
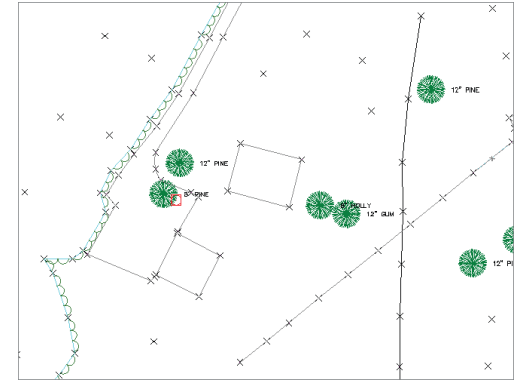
Editing Survey Figures

- Survey figures are stored within the survey database and are derived from points and linework codes.

- They do not *require* special editing commands, but it is highly recommended that you use the special commands provided for them.
- This will ensure that the drawing stays in sync with the survey database.

Creating Additional Points

- Importing survey data is not the only way to create points in your drawing.
- You can use the Point Creation Tools command to access many point creation methods.
- This includes creating points manually, on a surface, along an alignment, and many, many others.
- You can also bypass the survey database by using the Point Creation Tools command to import point files.