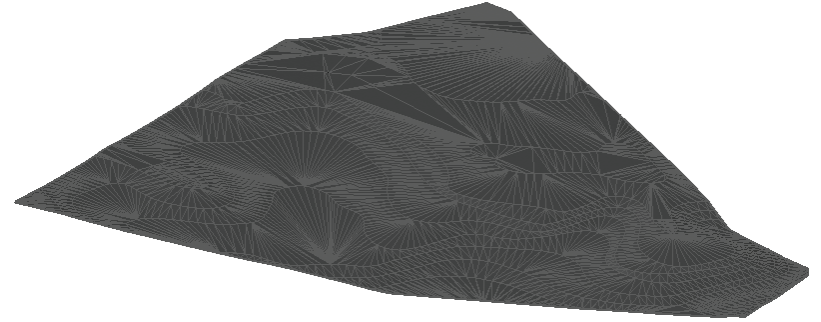# Chapter 2

- Leveraging a Dynamic Environment
  - Topics
    - Connecting objects and styles
    - Connecting labels and label styles
    - Connecting objects to objects
    - Connecting objects to labels
    - The richness of the 3D model
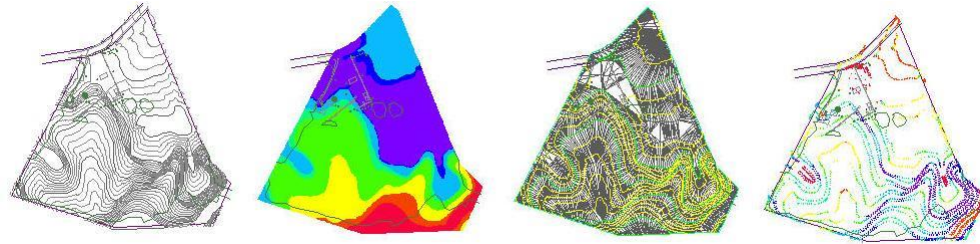   - Sharing data in a dynamic environment

Connecting Objects and Styles

- Object: An intelligent piece of your design model that stores information about itself
- Style: A collection of settings controlling the appearance and behavior of a Civil 3D object
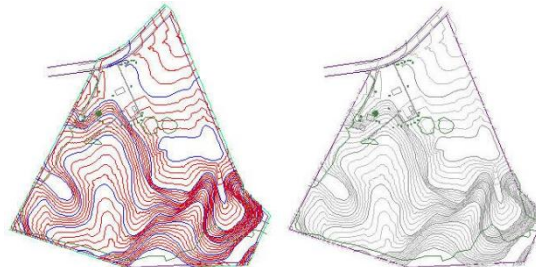
Connecting Objects and Styles

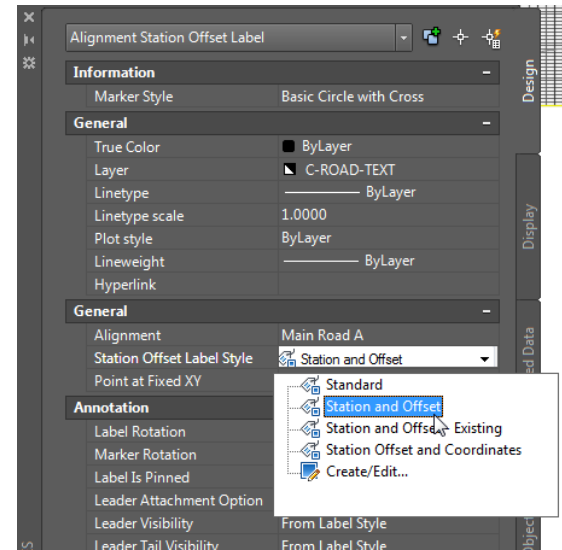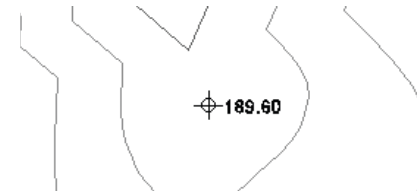- Change the appearance and behavior of an object by assigning a different style to it.

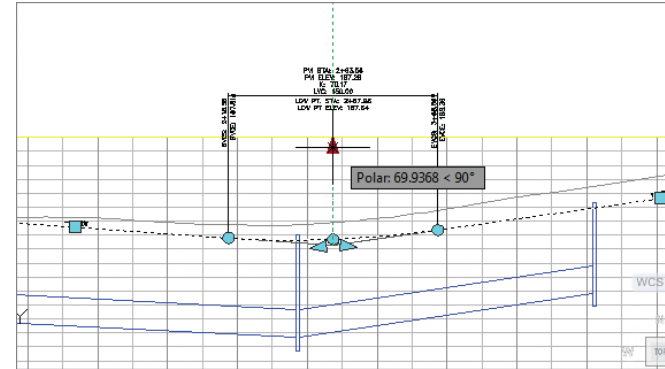- When a style changes, all objects that reference that style also change.

Labels and Label Styles

- Labels are objects too.

- They are also controlled by styles.

- Styles control how a label looks and what information it contains.

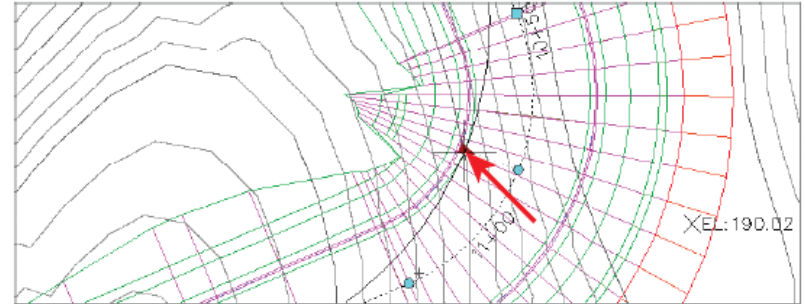- Styles can be assigned using the AutoCAD Properties window.

Connecting Objects to Objects

- The power of Civil 3D is in the ability of its objects to interact with one another.

- A project is a collection of mini-designs.
- Civil 3D enables these mini-designs to be dynamically connected.
- Editing one mini-design can automatically update others that are related to it.

Connecting Objects to Labels

- Labels also form a dynamic relationship with the objects that they annotate.

- When an object changes, its labels update automatically.
- Labels are important; they are what is used to build the project.
- They must be correct; having them dynamically linked to the design helps ensure that they are.

The Richness of the 3D Model

- In recent years, the industry has slowly evolved from 2D design to 3D design.

- Many people you will work with may still think about design in 2D.

- Civil 3D provides huge opportunities but only if you build and leverage a 3D model.

- The initial design of a 3D model will take more time when compared to "traditional" methods.

- Subsequent designs, redesigns, and adjustments will be much quicker.

- In the long term, 3D design is much more efficient.

The Richness of the 3D Model

– Some common industry practices are not possible without a 3D dynamic model.

- Building information modeling (BIM): Intelligent models used for design, construction, and facilities management
- GPS-guided machine control: 3D computer models uploaded to earthmoving machines
- Construction simulation: Staging and planning of materials and activities
- Visualization: 3D renderings and animations

Sharing Data

- Data shortcuts are links that can be used to show and use one drawing's data in another.

- An instance of one drawing's data in another is called a *data reference*.

- Data shortcuts and data references allow multiple people to work on different aspects of the same project simultaneously, in a team environment.