Introduction

Getting to know you

Earthwork has inherited its layout from its ancestors, Sitework 98 and Edge. The primary Earthwork user interface is divided into two parts: (1) a main entry/edit area and (2) a point list and line or area editor on the right. Additionally, you will find a menu structure which will look similar to most Windows applications. You actually won't need to access this menu structure very much at all to do a dirt takeoff calculation.

This is because Agtek has given three things to help. The first is a row of navigation buttons which you will find just under the menu bar. The second is a row of entry and edit assistant buttons. You will find these on the left side of the main window (or possibly on the top of the screen adjacent to the navigation buttons in certain wider monitor resolutions). You can hold your mouse pointer over any button in the top row or left column to see a description of its function appear. The third thing is the guide, which you will find just to the right of the Help menu. We describe the guide in detail in the next section.

The color of the background in the main screen is descriptive of the function you are about to perform.

- A **blue background means that you are in "edit" mode.** This mode gives you an opportunity to adjust, manipulate, modify, offset, move, fix, or otherwise fiddle with any point or line that you have already entered. Clicking on any object immediately selects it. Right-clicking on any selected object pops up a menu of functions you can apply to the selected object. When you see a blue background, you want to use your computer's mouse.

- A **black background means that you are in "entry" mode.** In this mode you will enter new information such as data lines and points or perimeters, borders, and regions. When you see a black background, you want to use the 16-button cursor attached to your digitizer.

At its most simple level, data will be divided into existing and design surfaces. We do this to unclutter the screen and organize what is on the paper. Within each surface, you will find one or more layers. We further divide our data into layers so we won't accidentally click on the wrong thing and break something and also so that we can get at elements that are placed directly on top of one another.
How not to build a better mousetrap: using the Guide to do exactly the same as what you've always done, except different

The way we do dirt takeoff calculations really hasn't changed very much in the past few thousand years. What has changed is how fast we can do them. The faster the computer, the less time you have to spend sitting in front of it, and the more time you can spend on the golf course. Rather than spending several weeks coming up to speed with a new application and overcoming unexpected behaviors, just use the guide to tell you what to do next. There's really nothing wrong with doing things the new way and the old-fashioned way at the same time.

The guide is simply a recipe for everything you need to do to finish a takeoff calculation. At any time during the takeoff process, you can open up the Guide to see what you are in the process of doing and what you should do next. More to the point, at any time during the takeoff process, you should open up the guide to see what to do next! By clicking on an item in the guide, we are immediately taken to the correct surface, layer, mode and settings for the selected function. In some cases, the Guide is performing two steps for us simultaneously. We strongly encourage you to use the Guide.

The Guide has four basic parts:

1) Setup: Name the job, enable the tablet, and scale the drawing.
2) Original ground: Enter site boundary, Enter existing topo, Enter stripping area
3) Design: Enter design data, Enter grading perimeter, Deduct structural section
4) Results: Review graphics, Compute volumes

We will accomplish our takeoff by going step-by-step through the guide.

Tutorial

Our tutorial assumes that you have already installed the Earthwork software, the WinTab software, and the security key drivers, as well as confirmed that the tablet is working according to the guidelines for configuration. If any of these have not been accomplished, please refer to the appendix at the end of this document.

I. Setup

Gentlemen, start your engines: creating a new job

Whenever you open Earthwork, the system asks you a sensible question. You can choose to open an existing file or to create a new one. (Actually, a third choice is that you can decide that opening Earthwork was a mistake in the first place, in
which case you can close the application entirely. But we assume that you wouldn't be this far in the tutorial if you felt that way!) Create a new file by clicking on the NEW button. Then tell Earthwork the name for your new job. You should create an appropriate name that describes your site, and then click on OK.

At this point, you may see the Tablet Scaling window appear. Or you may not. If it appears, go ahead and press Cancel.

**You look a lot smaller in person: scaling the tablet**

When we’re digitizing, we need to explain to the computer somehow what exactly moving an inch on the tablet means. Otherwise, it simply thinks that an inch is an inch. There are a couple ways to do this. The old-school way is to find a convenient 90-degree angle on the plan, measure up a known distance for the given scale, measure out a known distance, and then tell the system what the coordinates of these three points are. We use a 90-degree angle because it’s easy. (Imagine trying to find that middle point at someplace other than zero-zero.)

The more useful way is only available to you if you have three known points on your plan. If you can find three sets of northing and easting coordinates, use them! Not only is this easier to enter (since you don't have to measure and mark anything on your paper), but your result will be more accurate, since you'll be asking the computer what your scale is, instead of telling it what you think it is.

At this point, it is time to go to the guide and select Enable Tablet. This step happens so fast that the system immediately kicks you to step 3, Scale Drawing. Whichever method you used for selecting your three points, you can actually enter those points in any order you want (even though the screen is arranged in a convenient "L" shape). Just be sure you select them on the paper in the same order you typed them in.

After typing in the northing and easting coordinates of the three points, click on OK and then press enter over each point in turn. After you enter the location of the third point, the system will inform you what it thinks the scale of the drawing is.

If the scale is remotely close to what you were expecting, you may choose to click on OK.

If it is not, you may want to choose Rescale instead. If you rescale, check to see that you typed the three points in correctly, that you clicked on them in the correct locations, that you clicked on them in the same order you typed them in, and that you're sure your tablet works. (As a note, if you continuously get the same remarkably incorrect answers and you are *sure* that you typed the coordinates in correctly and entered the locations correctly, it is a good sign that your digitizer board may be going bad.)
II. Existing Ground

You don't need to color inside the lines: establishing the site boundary

At this point, you will see a crosshair on a black background. A crosshair is a signal to you that the system is about to receive data as soon as you begin feeding it points by pressing or holding down Enter on your 16-button cursor. You may or may not know why there is a crosshair on the screen. But it would be useful to know how to get rid of that crosshair! Quite simply, we need to tell the system that we're done using the crosshair to enter data and are now ready to do something else. Click on the blank key whenever you want to inform the system that you're done entering data.

When you click the blank key, your crosshair will become the familiar arrow, the mouse pointer. Now you can go up to the guide and open it up. Select the step that says Enter Site Boundary.

The Site Boundary is essentially a non-entity. This is not a construction concept. It's merely a margin for displaying data on the screen, specifically for defining where we'll stop displaying 3D data in the three-dimensional views. The rule of thumb is that the site boundary needs to be at least a little bit bigger than the area where you'll be doing your grading. It can be a lot bigger, but a slight margin around your grading area will be sufficient. If it's much larger, it just means you've got a great big view on the screen of the world all around the job site.

If you're working with a plan that doesn't show a site boundary (and most of them won't), it's fine just to draw a circle or a square around all the data on the paper. Start entering the region at any point, and go either clockwise or counter-clockwise. It doesn't matter which direction you go. When you've entered the last point, even if you're not near the point where you started, press the blank key and the area will close itself up.

Up, up, and away: Two ways to enter topography

In the old days, back when computers were slow and passenger pigeons still carried messages, Agtek's EDGE software limited you to 6,000 points per job. This required you to be fairly frugal with entering points along a contour line. Back then, the only way to enter points was with the Point Placement method.

To enter a line using point placement, as the name implies, you'd simply click on points along the line, as often as you wanted to, as you moved the 16-button cursor along the line. It was as accurate as you wanted to be, but it was tedious, and it
was really hard on your index finger.

Fast forward to the future (which, of course, will be the present by the time you read this), and we no longer have to worry about a practical limit to the number of points. Computers are faster, and they have more memory. There's a new method called Streaming Mode. In this mode, you simply place the cursor at the beginning of a line, hold down the enter key, and trace in the line.

But wait...there's a catch!

It turns out that streaming mode is fantastic for entering curved contours. But streaming mode is remarkably pathetic for entering straight lines. And the reason is because the human hand is very twitchy.

So when we're entering original ground, we do well to take advantage of the fact that a computer is still better than we are at making straight lines. We'll use streaming mode on any curves, but if the contour goes straight, we'll lift up off the enter key and use point placement, just clicking on the points of the line where the angle changes.

The other thing we'll apply here is a little military strategy, charging up the hill. Let's start with the contour at the lowest elevation. Enter the elevation of the contour line on the 16-button cursor, and notice on the screen that the arrow has now automatically changed to a crosshair, waiting to accept points.