DIGITIZER SETUP AND OPERATIONS

Use the digitizer and accessories with care. The following instructions are provided to help users get up running quickly without too many questions.

DIGITIZER SETUP

1. Locate the digitizer active area. For wooden digitizers, the active area is defined by the four right angle lines etched few inches in from the digitizer corners, and by watching for the red light on the stylus (pen) as it goes on and off. For rollup digitizer, the active area is marked by the grid. Tape the plastic menu sheet horizontally to the digitizer lower right or left corner. Stay ½ an inch away from the corner to make sure you are in the digitizer active area.

2. The digitizer is running all the time. You do not have to shut it (off). However, we recommend that you connect it to a power bar or surge protector and use that for power control purposes.

3. For wooden tabletop digitizers, these are magnetic in nature and hence, you should not place any magnetic media such as diskettes or computers on top of the digitizers.

4. For rollup plastic digitizer, these are based on static electricity; therefore, they should not be placed on metal table tops as well as the user should avoid marking the drawings with pencil. The lead in pencils is an excellent static conductor and that may affect the digitizer accuracy.
LESSON 1: GETTING STARTED

1. Tape the drawing

2. On the drawing, determine two reference points. Once these are set and entered in the system, they practically cannot be changed. (See Appendix A for notes on special cases).

3. Make sure that they are far apart from each other. If you have control point on the drawing, use them for reference point.

4. Determine what units are to be used.

5. Activate the WinTab mouse controls

6. Access Paydirt Preferences and then More Preference to set up Metric or Imperial units as below: (You can change the project units at any future date).

![More Preferences](image)

7. Leave all other setting as above. XYZ is the coordinates system for North America where X is the Easterly direction and Y is the Northerly direction. YXZ is the coordinates system for Europe. NEZ is the surveyor units and are the norm for field data.

8. Make sure that the points are entered in the following order: Lower left hand corner and top right hand corner. If this order is reversed at a later stage, the cursor movement on screen will be reversed creating digitizer data entry control problems.

9. Create a project and enter scale value. If scale is not accurate or available, use AutoScale.

10. Access the Digitize button and select to digitize AOI. Make sure to enter the borders of the site as your AOI 1 and make it the Master. You will need to digitizer the reference points at
this stage. It is advisable that you do not use the Daylight option. This will avoid complications when reports are printed.

11. Enter Master Area of Interest. There can be only one Master area of interest.

12. Start entering your entities and data including spot revelations, contours, boreholes, topsoil and any existing structures.

13. All existing topsoil should be entered as layers on the Existing surface. Paydirt will calculate the top soil strip volume and exclude it from Cut & Fill calculations.

14. As for topsoil re-spread, enter the layers on the Proposal Surface.

15. To allow for the use of (+, -, _ and .) keys on the 16 button cursor, access the Cursor Remap set-up and make sure to check the bottom box for Sitework 3.x interval method.

LESSON II: TOP SOIL HANDLING
If the above Layers under structure - Do Not Affect Subgrade box is checked, then you have to increase the thickness of the concrete in the structure to include the thickness of the base so that it will affect the grade. The benefit of this is that topsoil re-spread can be picked up all over the site without excluding the structure areas. You have to watch for parking lot areas. These have to be excluded.

If the Affect sub grade option is checked, then you have to exclude the structure and parking lot from the top soil re-spread.

When entering the building, you may add the thickness of the base to your concrete. This is applicable as based on how the Paydirt reference are set with regard to layer affecting the sub grade or not.

LESSON III: PARKING LOTS

For the parking lot, the given elevations are for the top of the asphalt. Layers will not provide any elevations. You will need slopping lines and then use as many layers as needed to enter granular material and Asphalt. The software will account for layer thickness from the final cut and fill calculations.

If the given elevations are for the bottom of the asphalt, then you do not need to enter the asphalt layer and the same apply to granular underneath the asphalt.
LESSON IV: ENTITIES AND LAYERS

Paydirt uses the following entities: Structures and Layers and Area of Interest. All entities are closed shapes and can be copied from one to another to speed up data entry.

Paydirt will not calculate earth volumes unless elevation data is provided. This can only be provided from Contours, Spot elevations, Structures, Slopping lines and Areas.

Layers are floaters: Layers do not contribute any elevation data. They float on the surface and follow the topography. Layers however provide the thickness of such material that the Paydirt has to consider in calculating its Cut & Fill volumes.

Off course, top soil is not part of the cut and fill volumes since it is removed first, stock piled on the site and is re-spread later on.

If a concrete island is located in the middle of an asphalt layer, the user has to exclude the island area from being included in the asphalt calculation. This is carried out by drawing construction lines so as to exclude the island.

LESSON V: CONTROL POINT

Control Points are used to orient the drawing to field North orientation. Paydirt will orient the drawing with North to the top of screen. Control points allow the user to change that. Control points may be used as reference points too.

LESSON VI: SPECIAL CASES

1. RETAINING WALLS:

To handle linear structures like a retaining wall, you will need to enter two slopping lines in a direction parallel to the wall. One slopping line will follow the surface elevations of the high side of the wall and the other will follow the surface elevations of the low side of the wall. The wall height is immaterial to cut and fill calculations. Make sure that the two sloping lines are few centimetres apart.

LESSON VII: REPORTS
1. To print reports, close the Surface Data screen and return to Paydirt opening screen.

2. When printing Areas and Volumes report, access the Display Options and always re-set the Display Options to include all layers; otherwise, the system will remember the layers that were included in the first run of the report.

3. If you use a Shrink/Swell factor in the Site Balance you must use that same factor when running a Project Summary Report.

4. To balance Top Soil stripping and re-spreading, run the initial Material report and then go back to the Proposed surface and modify layer thickness and run the Material report again. Do this trial and error procedure till the two quantities match or come close to each other.

5. The 3D picture for the existing and proposed surfaces represent the surfaces after topsoil stripping, i.e.: it has already been lowered by the topsoil thickness removed. For proposed the 3D shows the surface without any layers or topsoil re-spread. Always, the 3D-report shows sub-grade surface.

APPENDIX A: MULTIPLE DRAWING, UNITS AND SCALE HANDLING
1. **If you have two drawings, one for existing topography and one for proposed and they both have different scale but same units:** You will have to select two reference points that are well identified on both drawings. Use the existing plan and enter all data under and then tape the proposed plan and just enter the reference points from this drawing. This will align the two drawings to the proper scale.

2. **If you have two drawings, one for existing topography and one for proposed and they both have different scale and different units, say Metric for Existing and Imperial for Proposed:** As above, you will have to select two reference points that are well identified on both drawings. Use the existing plan and enter all data under the metric units and scale and then tape the Proposed plan and just enter the reference points from this drawing. This will align the two drawings to the proper Metric scale and units.

   Since the proposed elevations are in Imperial units, you will need to convert them manually to Metric before entering them or once the Proposed drawing is set on the digitizer and is located, you can go back to Preferences and change system units to Imperial units. This will convert both Existing and Proposed surfaces to Imperial units and allow you to enter your Imperial elevations into the system. Once the data is entered, you can convert units again to Metric units and print your reports.

3. **If your drawing is too large to fit the digitizer:** Use a Match line to split the project into two areas. Identify two reference points on the Match line and then enter the data on the left side of the reference points and then shift the drawing, re-digitize the reference points and enter the data for the right side. This will work for one large drawing or two drawing sheets only.

4. **If you have more than two sheets,** you will have to use filed co-ordinate data and use X,Y,Z co-ordinates if available or you can put each sheet on one drawing all within the same project and then use two reports to span across several drawings. The two reports are: Material Summary and Total Volumes reports.

5. When using Match lines, you **can not digitize a Master Area of Interest** using the digitizer mode. Once all data is entered, you have to use the Screen Edit mode and the mouse to enter the Master AOI.

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**APPENDIX B: DEFINITIONS**
Contour: A continuous line that has a constant elevation.

Sloping Line: a line of constant slope between two points such as curb, gutter flowlines, housing development property lines and roadway crests to flowlines.

Sloping Area: an area that has a constant slope like a loading dock structure, dam crests, driveways or embankments sides.

APPENDIX C: CALCWORK REPORTS

To avoid the 6 pages style report, access the file menu and Save the report as a text file and open the file in Lotus or Excel. This can also be carried out with Math Tool reports.

APPENDIX D: TRENCH CALCULATOR
The following shows that if you enter the trench widths, the software will calculate the slopes and the excavation-backfill volumes.

The following is based on entering slopes as a percentages. The software would calculate the trench width at the top. The slopes can be entered in either way. As a percentage or as a rise over run.