Reconciling more than a decade of field-school stratigraphic drawings: A case study using AutoCAD.

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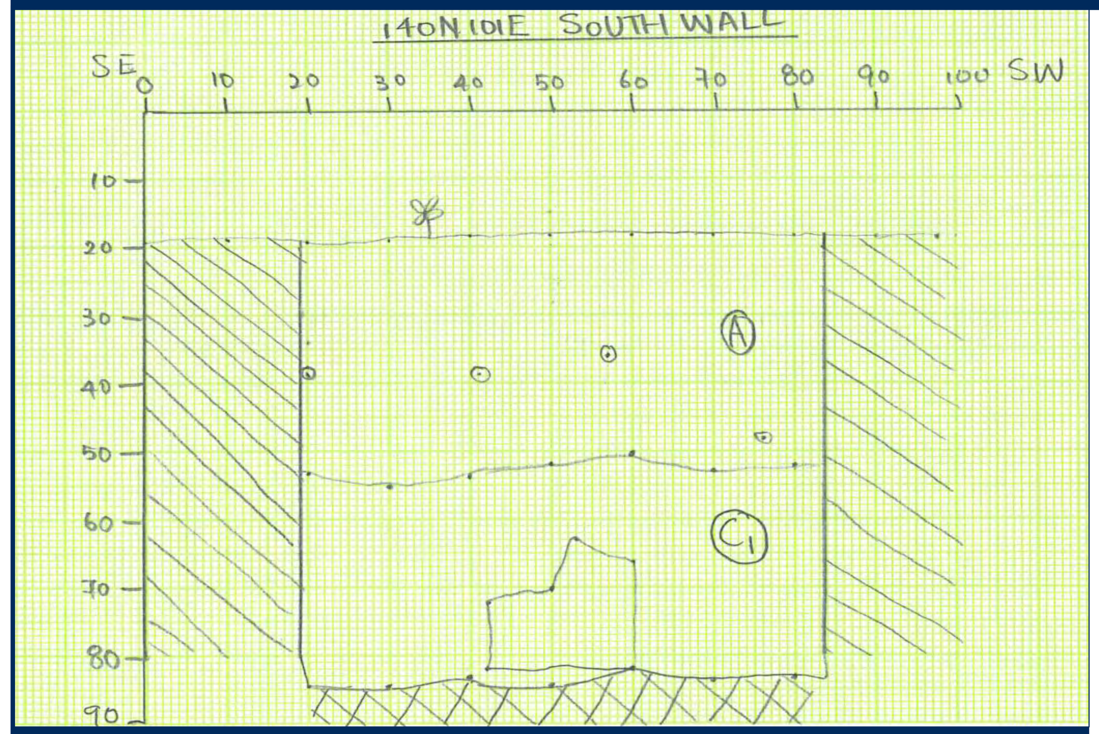
Land Acknowledgement

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca and the Mississaugas of the Credit. Today, this meeting place is still the home of many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

Introduction

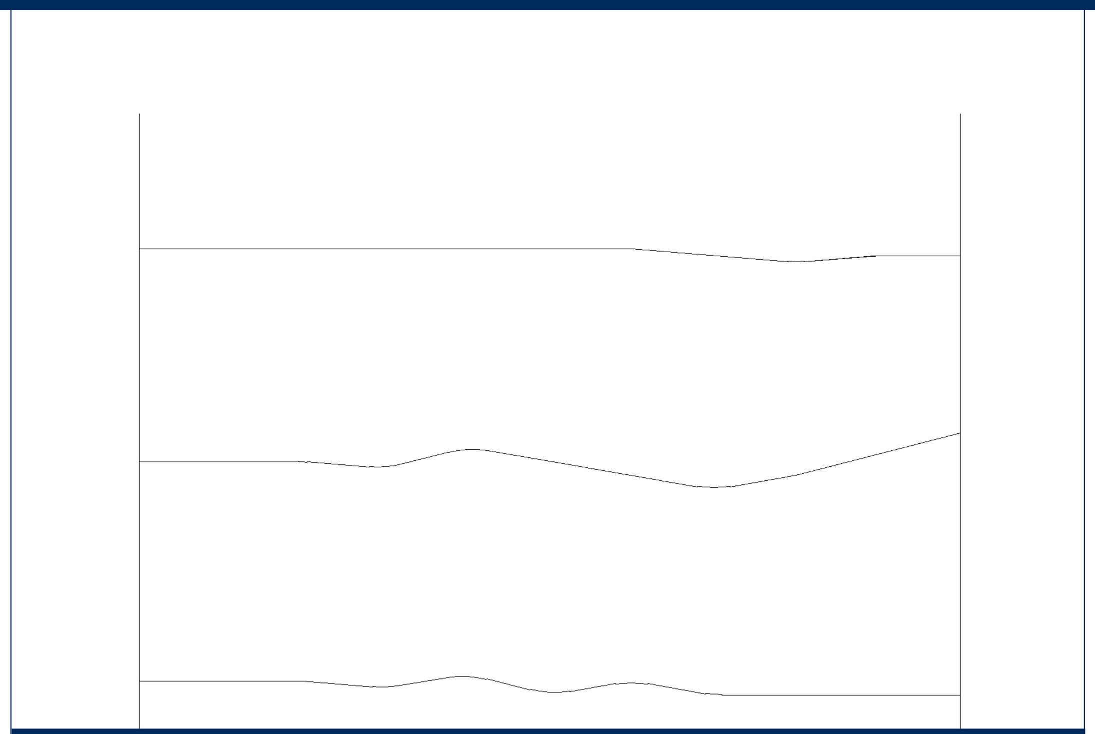
- This poster presents a case study of using AutoCAD in an archeological setting by providing the step-by-step process of combining several years of stratigraphic profile drawings from the University of Toronto Mississauga archaeology field school. The steps presented here are specifically for subsurface soil layer analysis and identifying patterns. The preciseness of the program is also being presented and its further benefits in other aspects of archaeological analysis
- These profile drawings come from the Schreiber Wood Project, specifically from a 20th century midden with a high density of artifacts including brick, glass fragments, and various metal artifacts. The purpose of this case study was to identify the extent of a subsurface feature (i.e. the midden). In total, nine 2D renderings were completed to attempt to map the midden feature with the ability to build upon the renderings as more excavations are completed. Further attempts are currently being made to create a subsequent 3D rendering for 3D printing.
- AutoCAD is a computer assisted design software used by various professional fields to create large scalable technical drawings.
- Used in fields such as architecture, engineering, and graphic design as it can create scaled 2D and 3D rendering with mathematical precision and no minimum unit of measurement.
- AutoCAD was introduced in 1982 and has been used in numerous archeological presentations since including artifact reconstruction, soil layers, feature reconstruction, site mapping, and subsurface renderings (Beex, 1995; Rua & Alvito, 2011; Zhao & Lyu, 2021).

Method / Step by Step Process



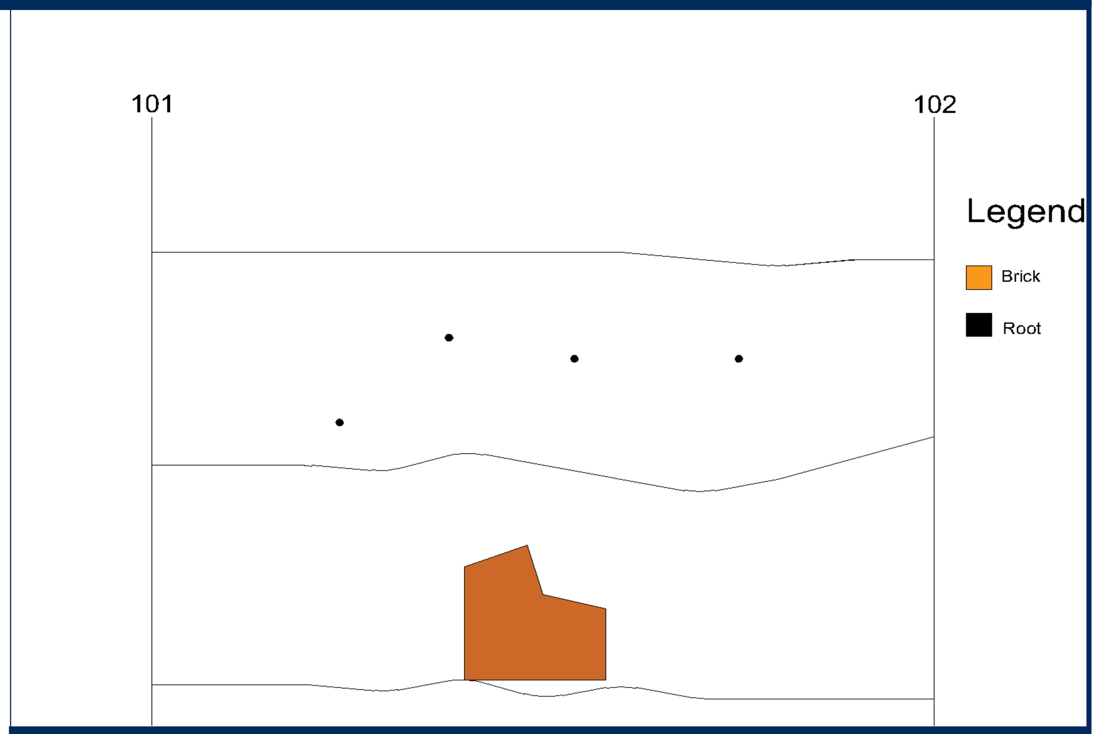
Step 1

Stratigraphic profile drawings are recorded at the time of excavation by the students. For this case study, a string was used between corner stakes and vertical measurements between the string and layers was recorded every 5-20 cm horizontally. Generally, there should be three layers of soil including the topsoil and midden layers where artifact density will be the highest. Subsoil sees a drop in artifact density to nearly zero. Inclusions including roots, rocks, and patches of cultural aspects (bricks, coal, glass) are included.



Step 2

The profile drawing is mapped into the software. It is completed in the same method as the excavation profile drawing. The individual dots are mapped onto the grid and lines and various shapes are used to connect these dots. As abrupt and sharp edges or corners appear unnatural, it should be rounded out with the fillet tool at a factor of 5 units. Limits of excavation, below the excavation line and baulks should be identified with a crossed pattern by utilizing the 'hatch' tool.

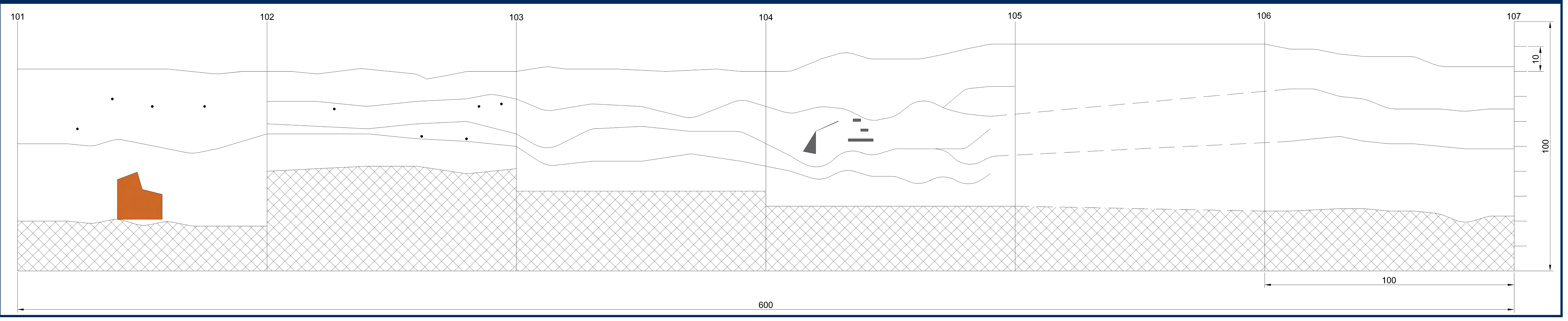


Step 3

Natural and cultural inclusions from the stratigraphic profile can now be added in filterable layers. This can be done by placing lines and shapes onto different layers. Layers can be labelled based on its category (natural / cultural / metal / root etc.). Once a layer is selected, these inclusions are drawn into the plot grid. The hatch tool can apply colours to identify different types of inclusions. Legends are then critical for identifying types of inclusions.

Step 4

Renderings can be easily combined along the same datum line (ex. 100N or 107E). The single excavation renderings are copied in its entirety and pasted in a new plot grid side by side to identify soil patterns. Soil layers between units normally line up near perfectly and can be connected along the datum point. There is a chance for observer error in the recording of the original profile drawings that may lead to varying layers. These extended renderings can be combined with the perpendicular renderings to create a 3D model of an entire site and can be 3D printed.



Discussion

- AutoCAD has many benefits and features that makes it superior to other similar programs offered in the industry. The infinite scale allows for precision for both entire site and single unit renderings. AutoCAD, like other software, is also capable of layering (filtering the product for arbitrary factors), which allows analysis of artifact locations, density, and soil stratigraphy. Beyond these features, the parent company for AutoCAD (AutoDesk) has a multitude of other programs including Fusion which can be used to create perfect 3D models of artifacts.
- There are several examples of archeological articles utilizing this type of program for a variety of reasons. Most notably is Beex (1995) who uses it for a very similar purpose as this case study by having a soil layer cross section in which he claims that archaeologists can "walk" through the sites (pg 105). Other examples include Zhao & Lyu (2021) and Rua & Alvito (2011) who both demonstrate similar benefits to AutoCAD and Fusion in their work digitizing renderings of the Japanese Jōmon pottery and Roman *villa* of Freiria through AutoCAD.
- In conclusion, both this example and previously conducted work by Beex (1995), Rua & Alvito (2011), Zhao & Lyu (2021) demonstrate that the AutoCAD program has benefits for all types of analysis from artifacts, structures, soil types, and subsurface features such as middens.

Acknowledgements

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