

## EaES 350 Laboratory 9: Cross section

Six months after your first job, your consulting business is still in good shape. Your subtle game plan has worked out, and you are contacted by the same geotechnical company again. They have taken your advice seriously and have drilled a line of section with 21 boreholes that connects and goes beyond the two cores you have interpreted before. Due to a persistent foot injury, their sedimentologist has in the meantime returned from the NBA, and his first task upon return was to describe the new cores. His sedimentological knowledge has become a bit rusty, so he has limited himself to a description of sediment textures. Actually, his knowledge has deteriorated to such a degree that he is unable to produce a decent cross section from the new data. So there you come in the picture again!

The horizontal scale is 1:10,000 and the vertical scale is 1:50, yielding a vertical exaggeration of 200. The orientation of the cross section is south (left) to north (right). The legend, which is in Dutch, shows a fairly detailed subdivision of sediment textures. For your purpose, you can lump a number of them together in order to arrive at the following categories: peat (V1, V2, V3); clay (H1, H2, ZK, MK); silty clay or sandy clay (LK, ZZL, MZL, LZL); sand (UFZ, ZFZ, MZ, Z, IGHZ, MGHZ, SGHZ, GZ, ZV, VZ). Note that the other units in the legend do not occur in this particular cross section. In some cases, you will find it necessary to generalize a little bit, i.e., allowing thin layers of a different texture in your textural units. Furthermore, you can ignore the symbols adjacent to the logs. Finally, make sure that you keep different genetic units (e.g., channel belts, crevasse splays) separate, even if they consist of the same texture.

Some pointers:

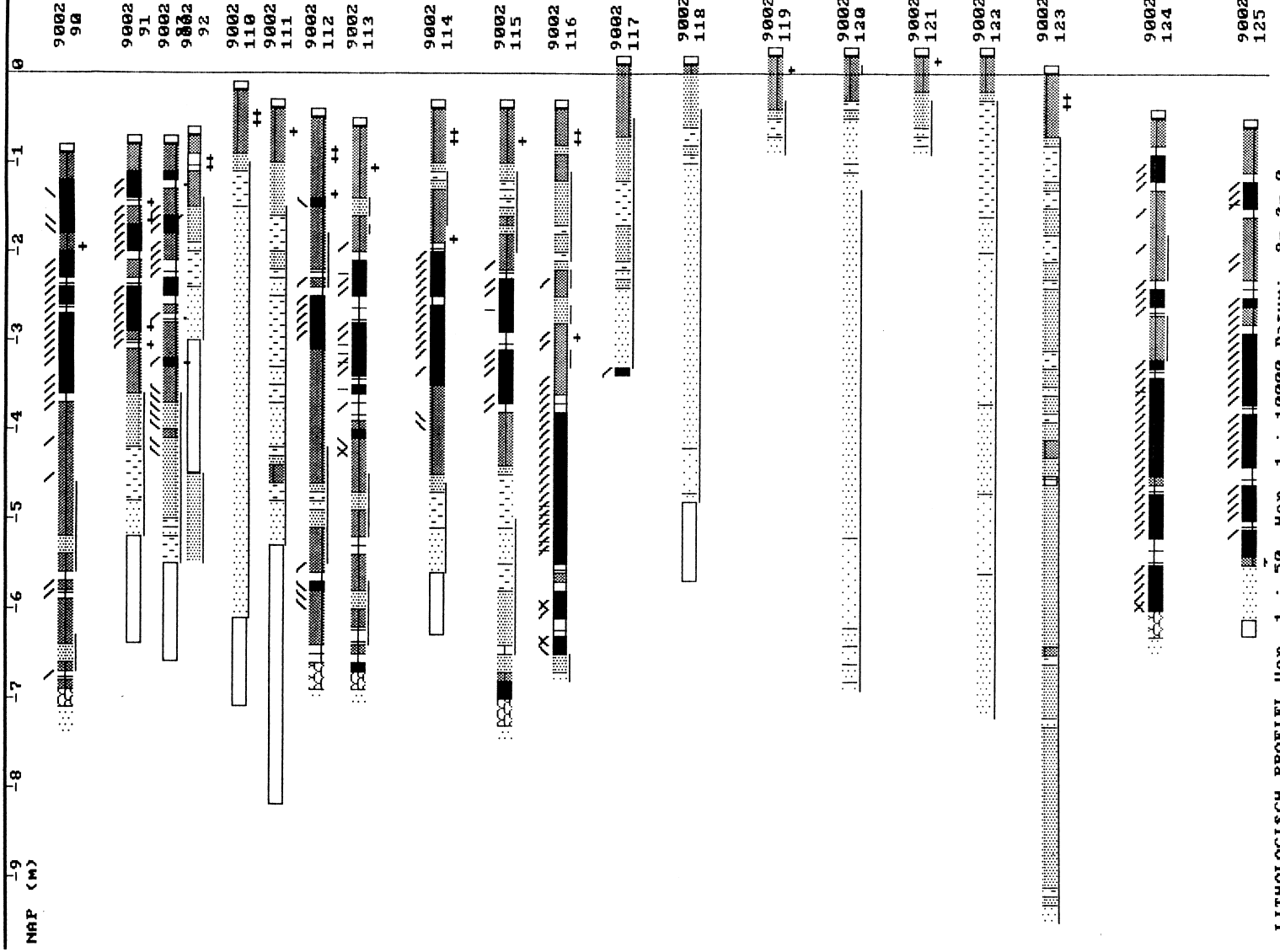
- Correlate the different textural units based on the genetic model of fluvial deposits (e.g., Figs 5.9 and 9.15 from the textbook), keeping in mind the vertical exaggeration.
- Start off with delineating the major features, like the land surface, the top of the Pleistocene basement, and the major sand bodies. It is widely known from previous studies that the top of the sandy, Pleistocene basement mostly consists of a thin layer of organic-rich sand (ZV, VZ).
- Open rectangles (commonly at the base of logs) indicate no recovery; in such cases you can assume the presence of sand of unknown grain size.
- Keep in mind the role of differential compaction: very limited in sand, but substantial in clays and especially peats.
- Avoid too much interpretation and correlation **underneath** logs.
- Don't expect that there is only one unique solution as to how to draw such cross sections. There are many roads that lead to Rome!

Your task is to interpret the sedimentary architecture, and to answer the following specific questions: (1) could the two major sand bodies belong to the same channel belt? (2) can anything be said concerning fluvial style(s)? (3) what advice would you provide in the context of conditions for construction and foundation in the area of the cross section and its surroundings? Finally, could you comment on the value of the

architectural-element approach based on the cross section, as opposed to the one-dimensional data of the two sedimentary logs you had available initially.

**LEGENDA VAN LITHOLOGISCH PROFIEL**

	Uenige klei, kleiig veen en veen U1 U2 U3		Fijn zand en matig grof zand UFZ ZFZ FZ MZ Z
	Humeuze klei, humusrijke klei H1 H2		Zeer grof zand IGHZ MGHZ SCHZ CZ
	Humusrijk zand, venig zand, zandig veen ZU VZ		Grind ZFG FG GG IZHG MZHG SZHG ST
	Zware klei ZK MK		Lemig zand ULZ MLZ ILZ LZ
	Lichte klei LK		Zandige leem    /-r     =Ca2 ZL LL L        \-h    +=1kl --z    z=zand
	Zware zavel, lichte zavel ZZL MZL LZL		Siltige leem ZSL LSL SL



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