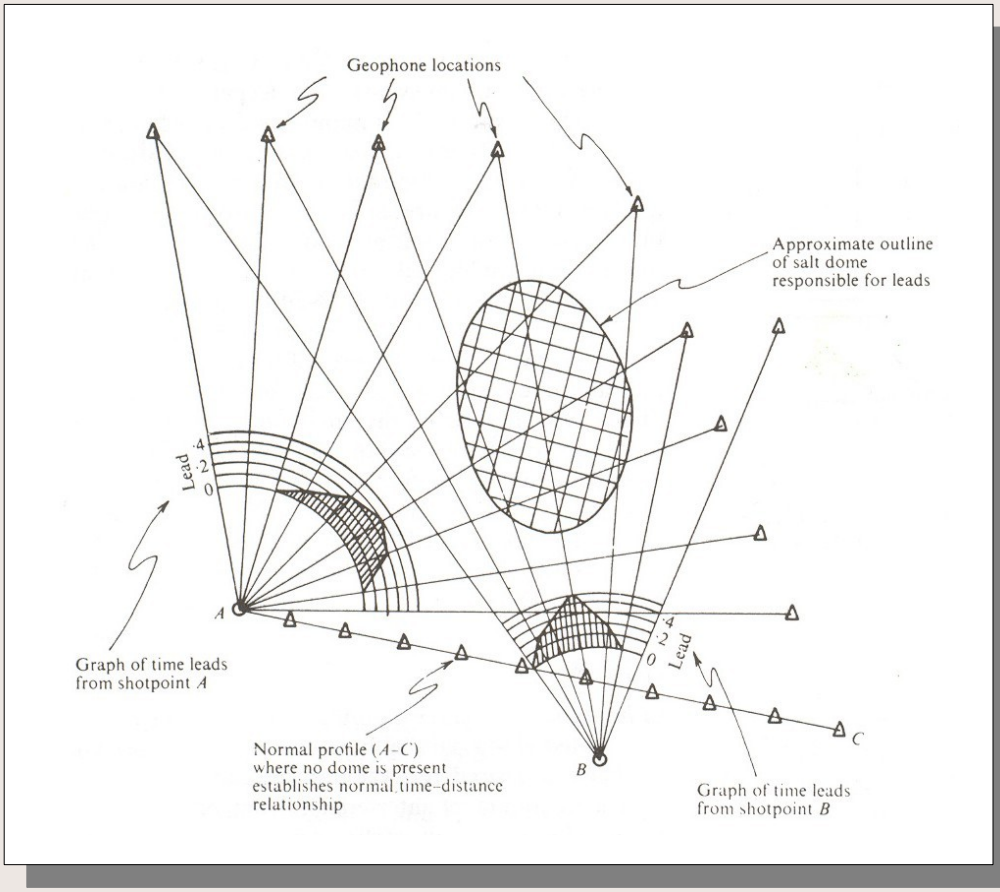
Refraction Seismics - Applications and Case Studies

- Location of a salt dome;
- Permitting a wast disposal site (Lankston, 1990);
- Study of rock rippability.

- Reading:
  - Reynolds, Section 5.5

Locating salt domes

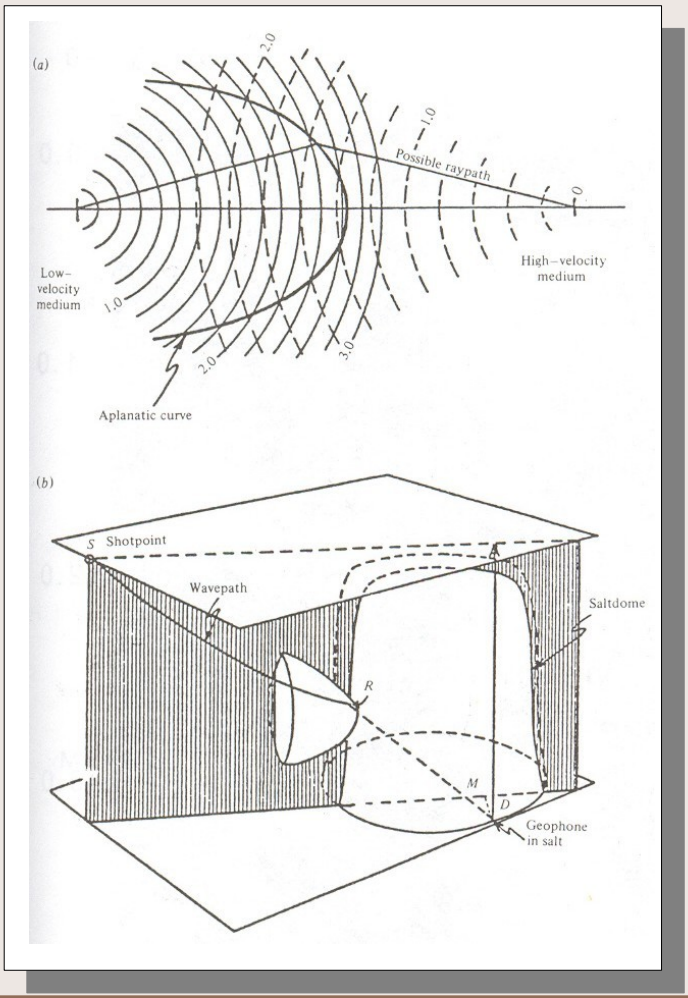
- Salt has a very high velocity (~5 km/s) compared to the surrounding sediments (~3-4 km/s)
  - Therefore, it can be identified by *travel-time advances* (called '*leads*') for rays propagating through it;
  - Performed in *broadside* shooting.
  - Not for accurate delineation of salt dome edges.



Delineating edges of salt domes

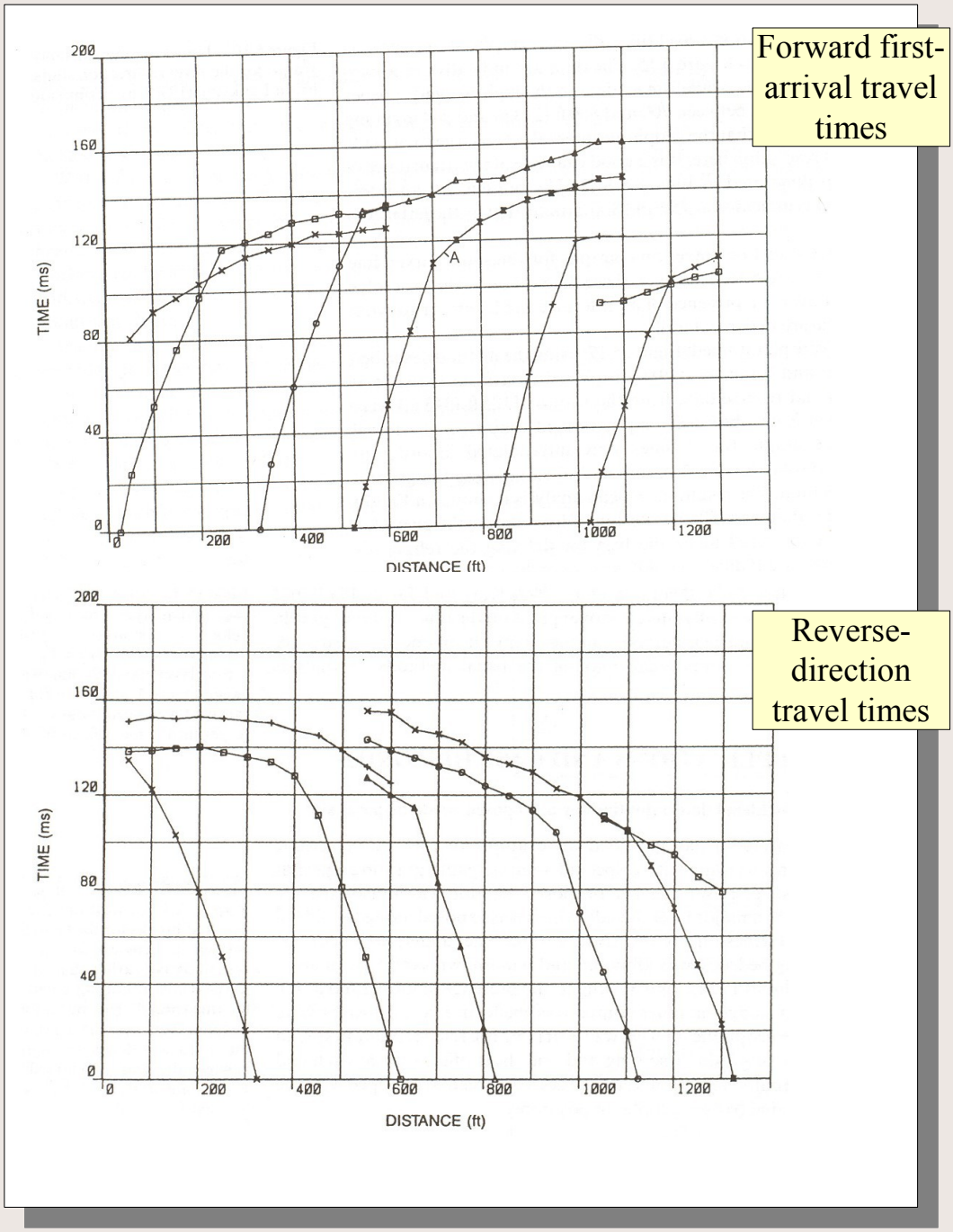
"salt proximity study"

- By placing a geophone in a borehole within the salt dome, its edges can be delineated by firing around it and measuring the first-arrival travel times through it (Gardner, 1949)
  - This method is a predecessor of today's travel-time tomography.

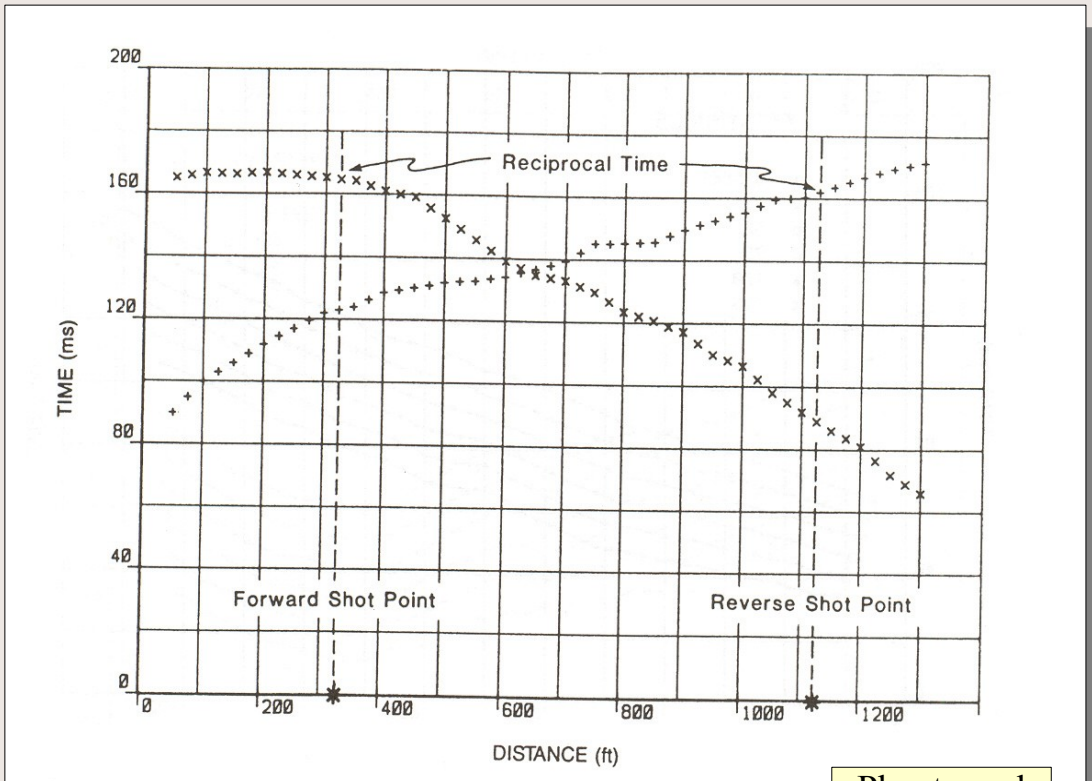


Refraction survey on a proposed waste disposal site

(Lankston, 1990), recorded travel times

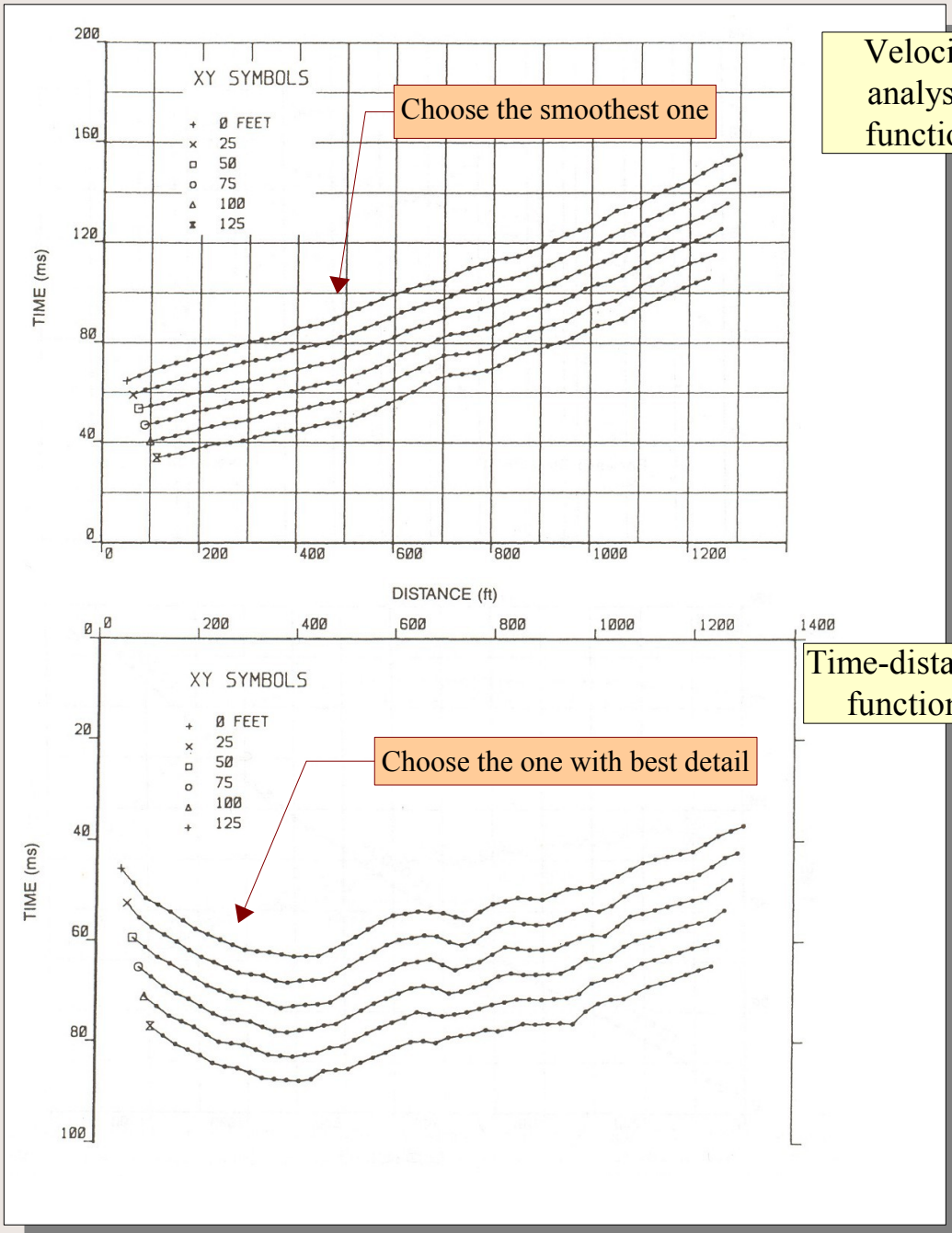


Refraction survey on a proposed waste disposal site (Lankston, 1990)

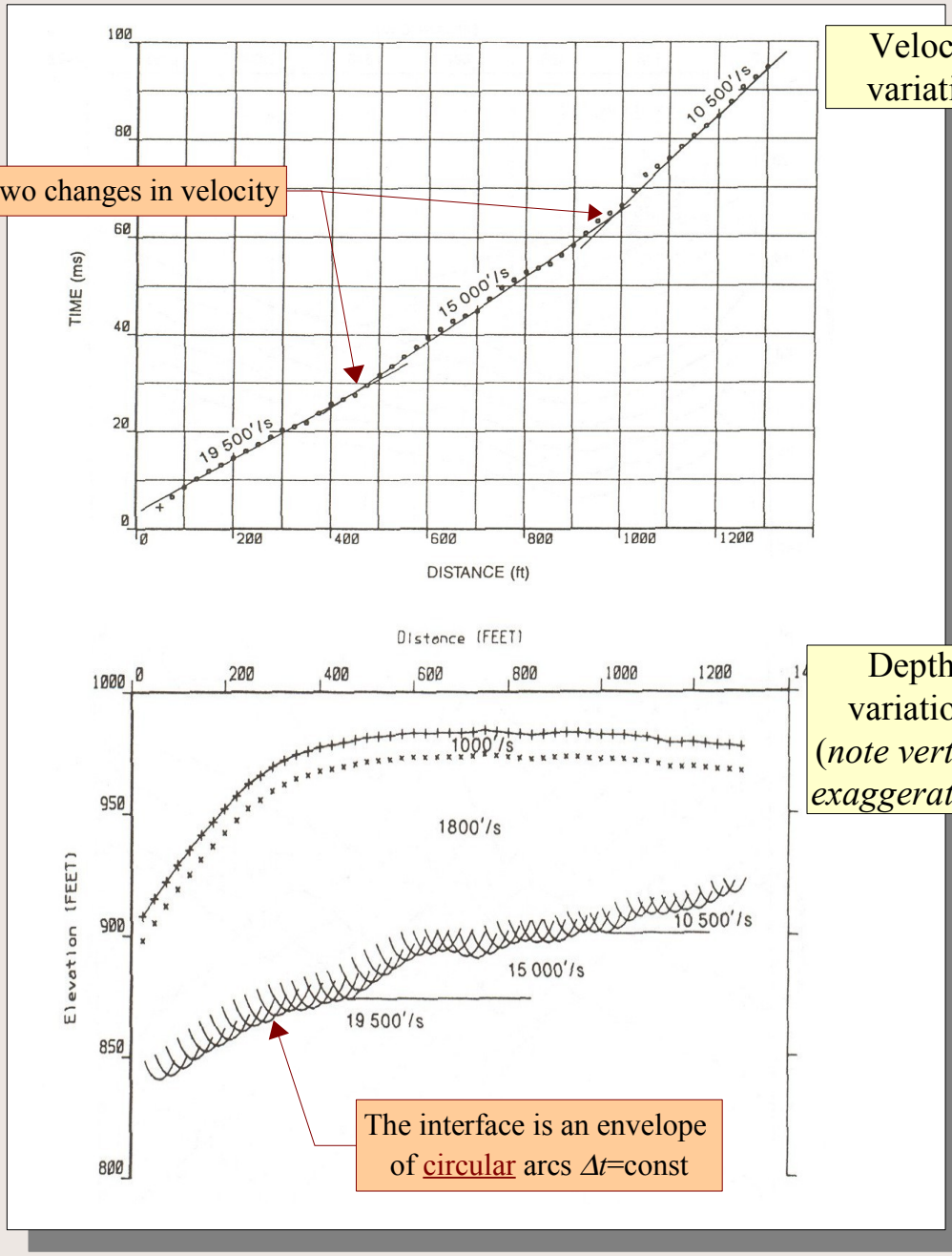


Phantomed forward- and reverse-direction first-arrival travel times

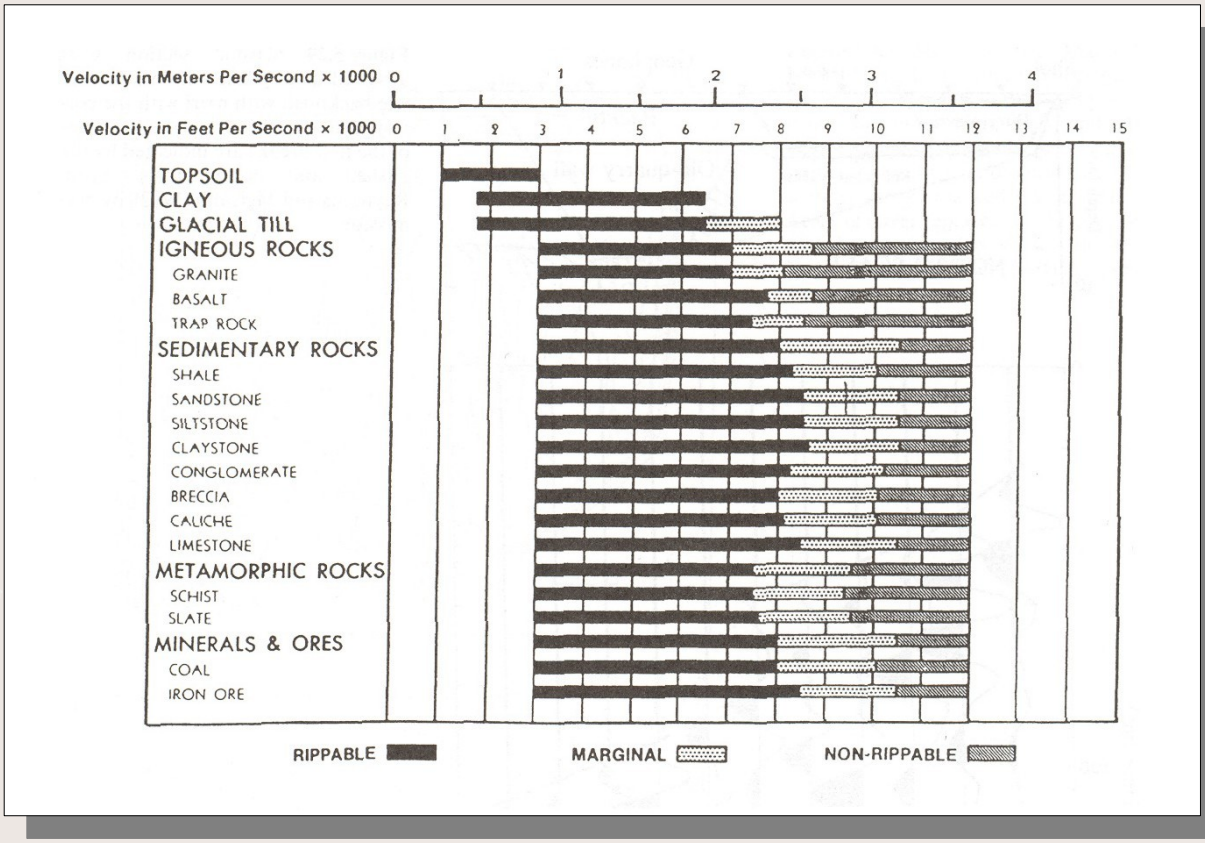
Refraction survey on a proposed waste disposal site (Lankston, 1990), velocity analysis



Refraction survey over a proposed waste disposal site (Lankston, 1990), results



Rock Rippability



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