Evidence for Multiple Glacial Advances and Ice Loading From a Buried Valley in Southern Manhattan

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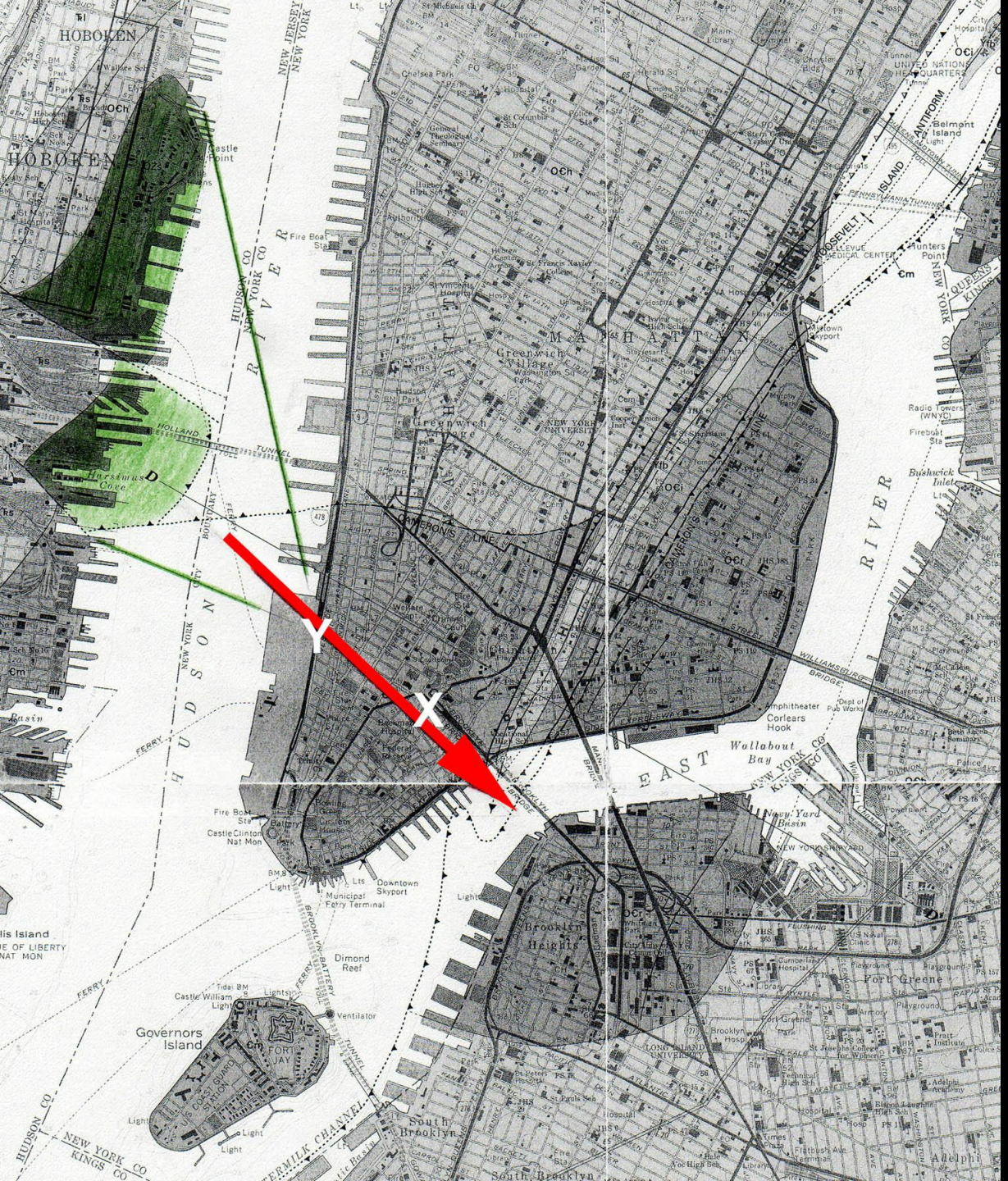
Charles Merguerian

Hofstra Geology

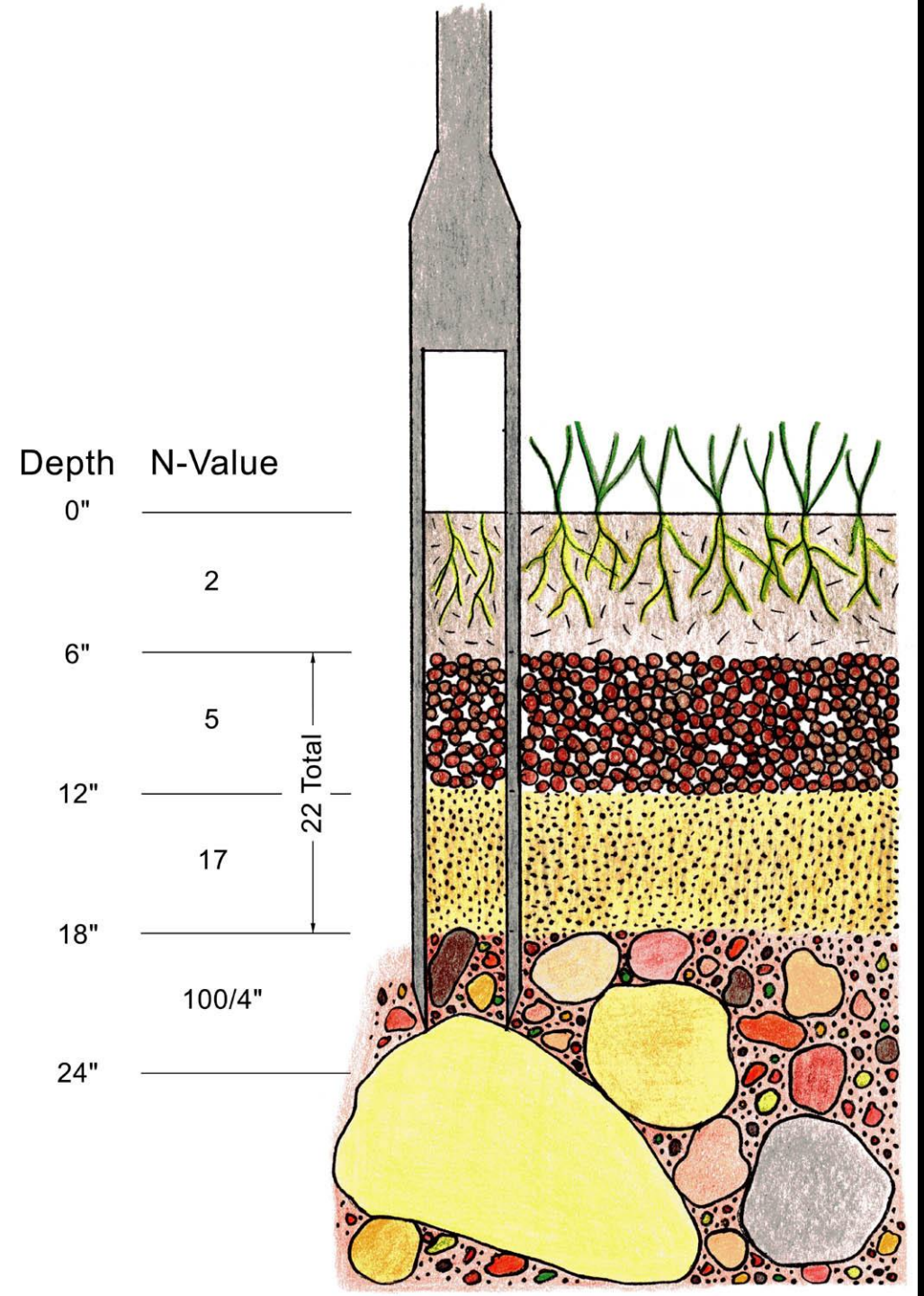


X Marks Buried Valley Site

NW-SE Trend Parallel to Late Brittle Faults

Carved By Old Glacier

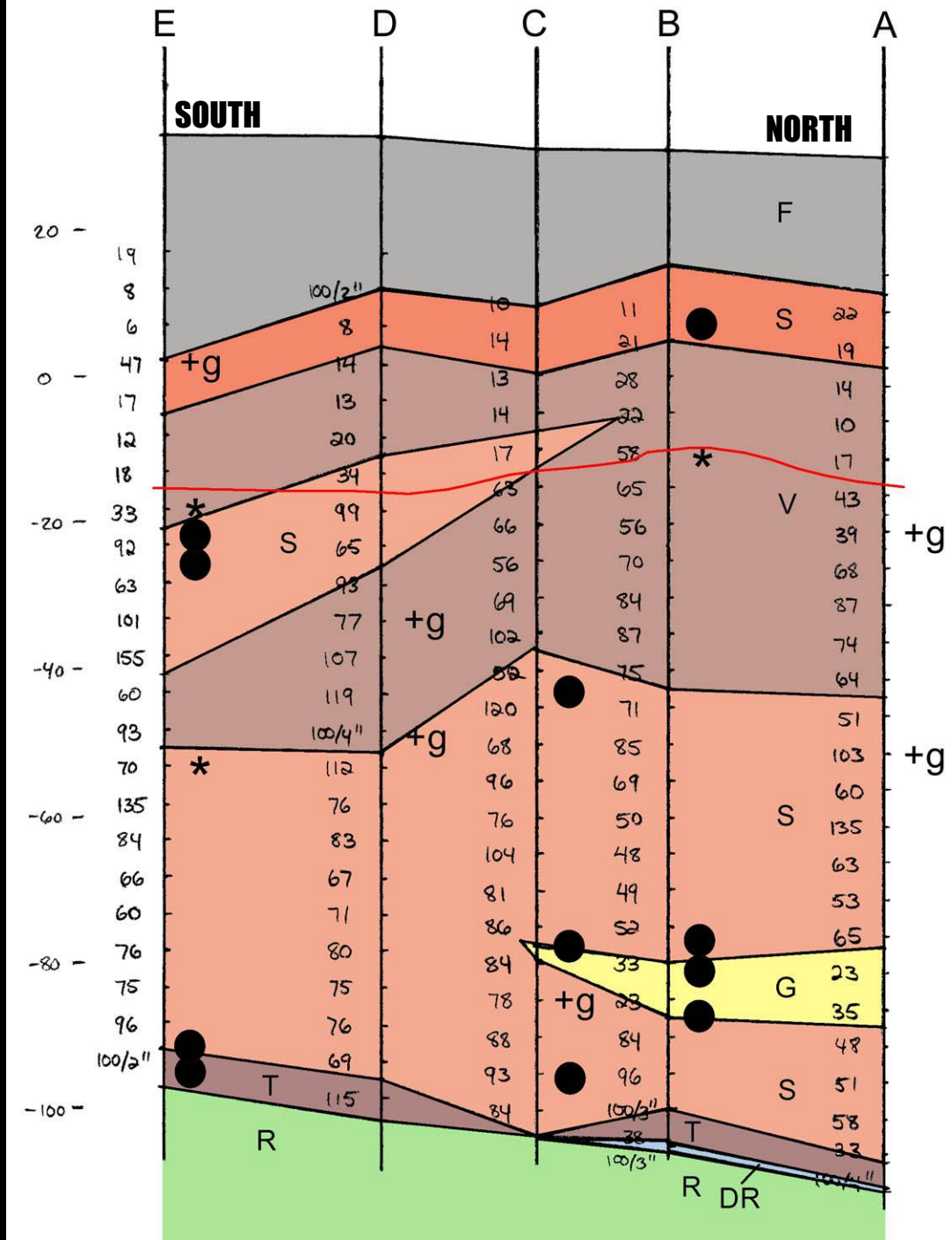
Backfilled by Younger Glaciers



Blow Counts Depend on Soil Type And Density

Standard Penetration Test

N-value = Total Blows Between 6” and 18”



West Edge of Site

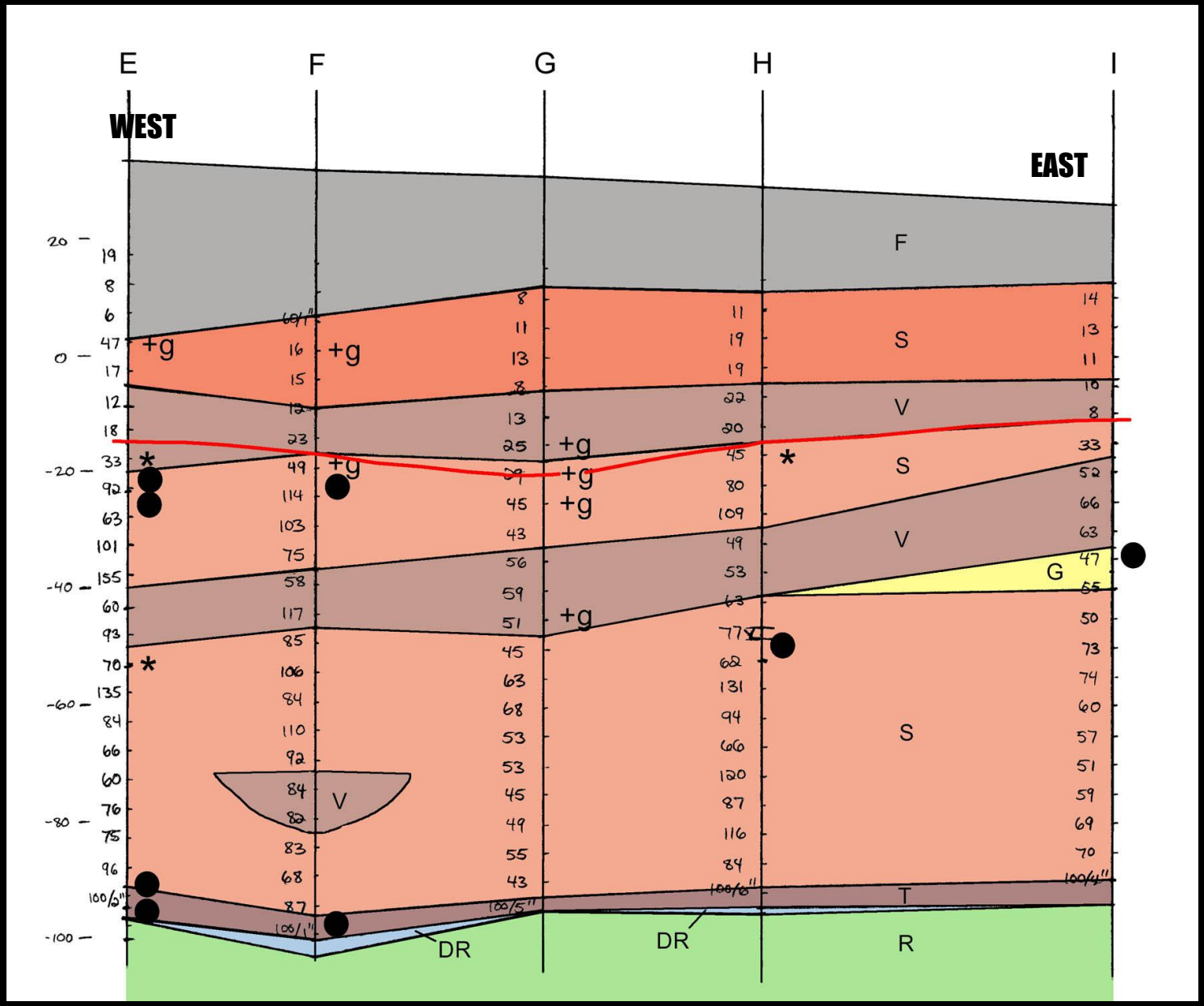
Upper Varves

Lower Varves

Serpentinite Gravel in Till

Typical NYC Basal Till

South Edge of Site

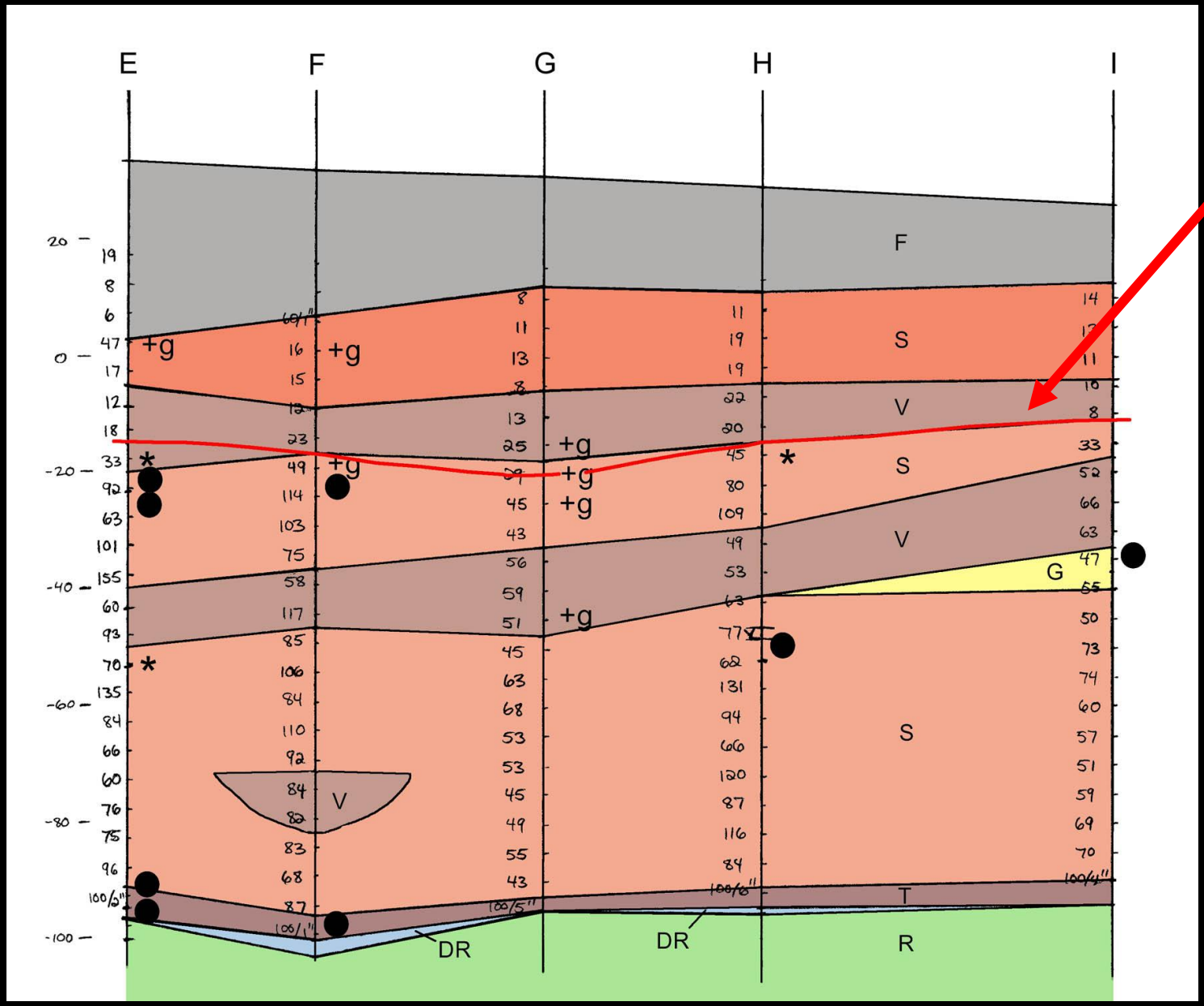


Upper Varve/Till

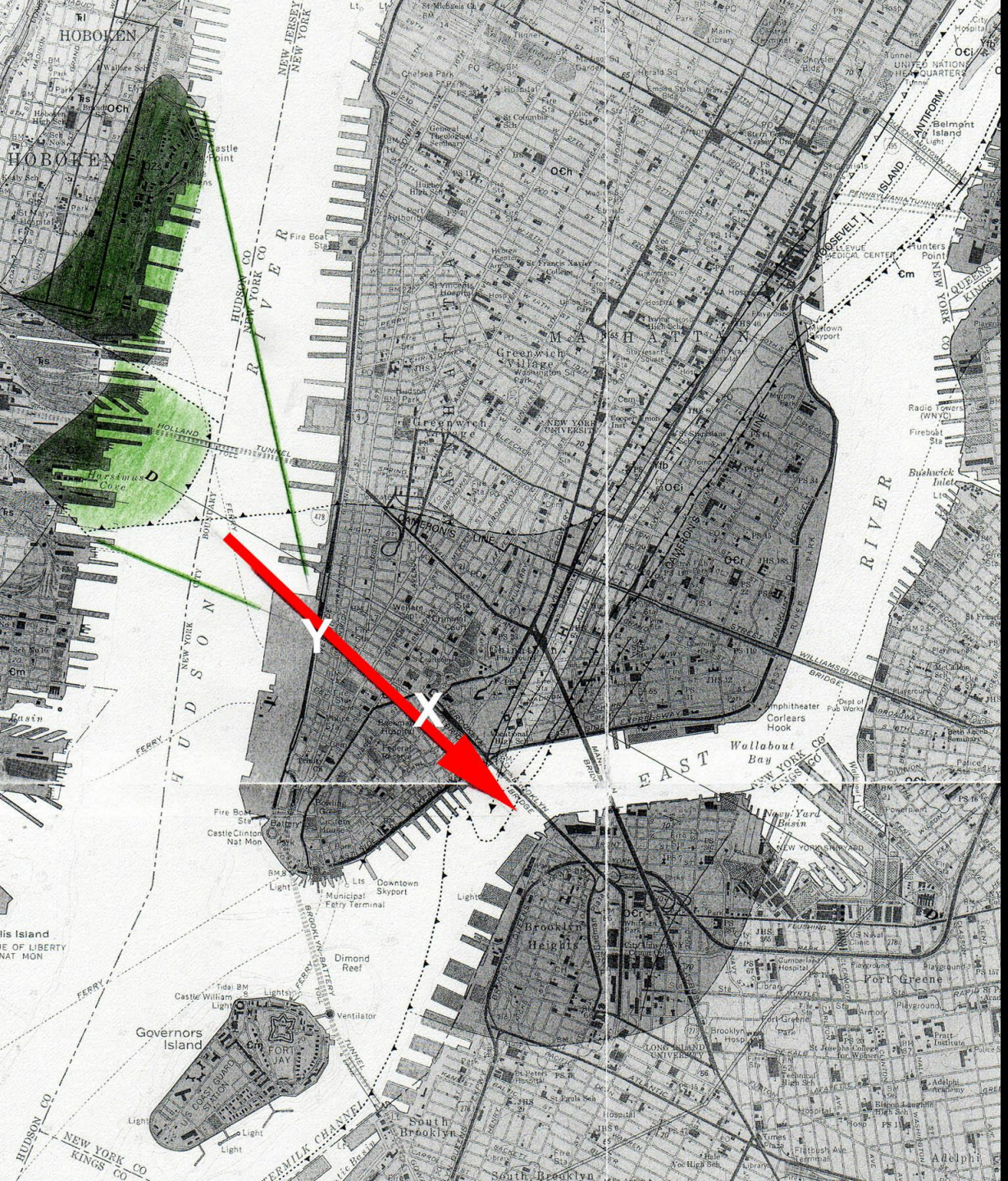
Lower Varve/Till


OTHS & .1
100THS FT. .2
PAT.NO. .3
2,713,208

South Edge of Site



Higher N-Values Below Red Line



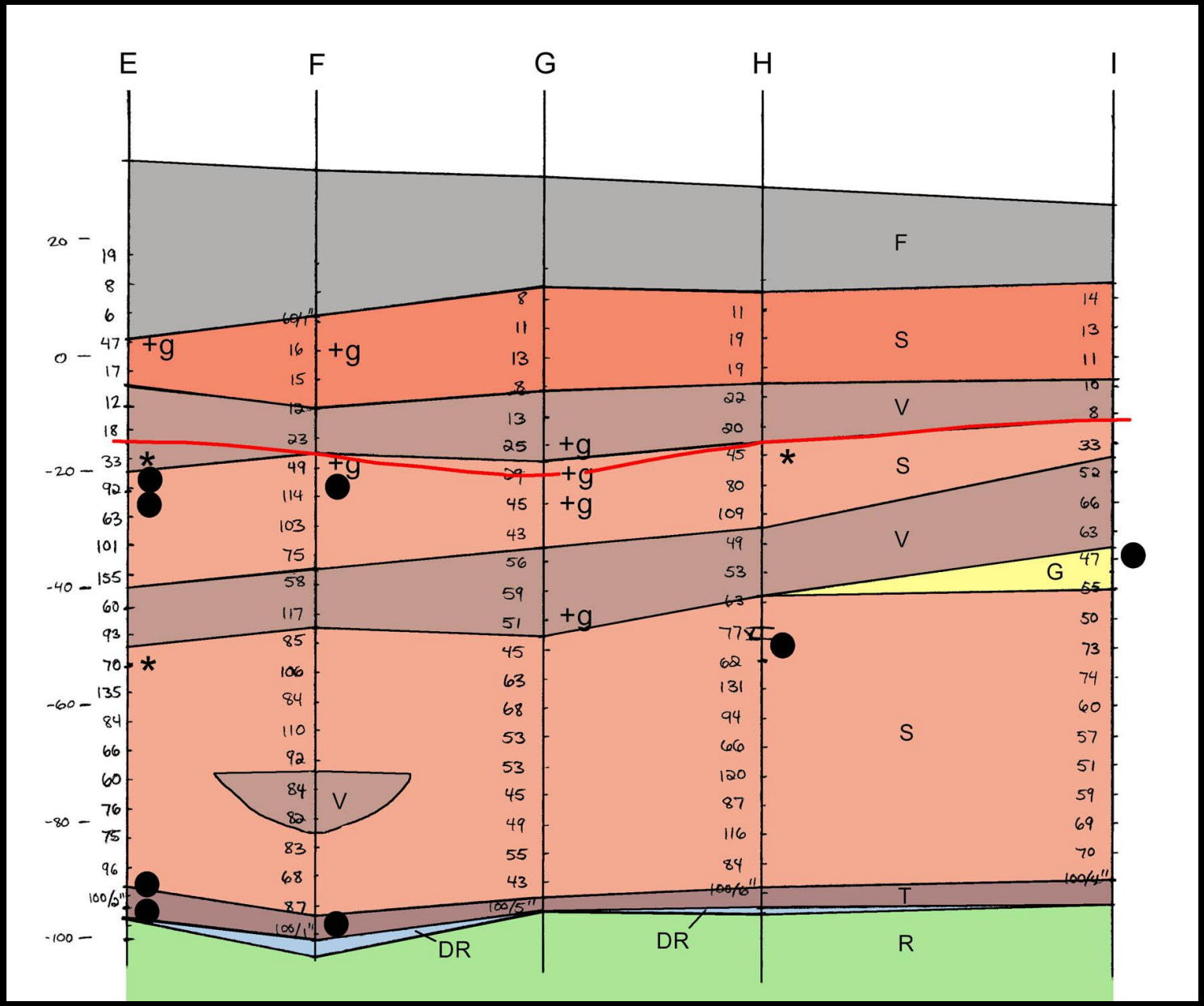
Buried Valley

Carved By Old Glacier

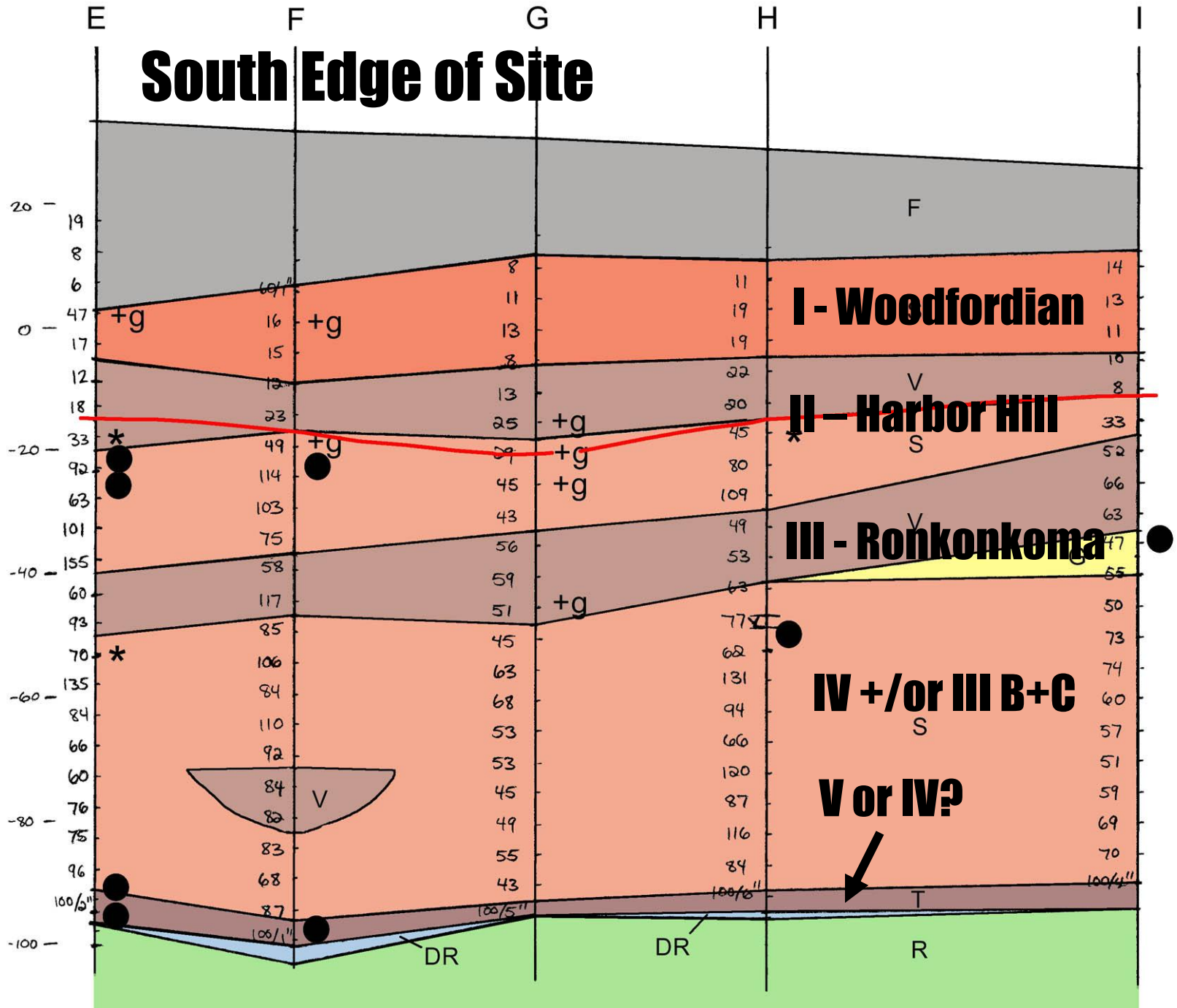
Backfilled by Younger Glaciers

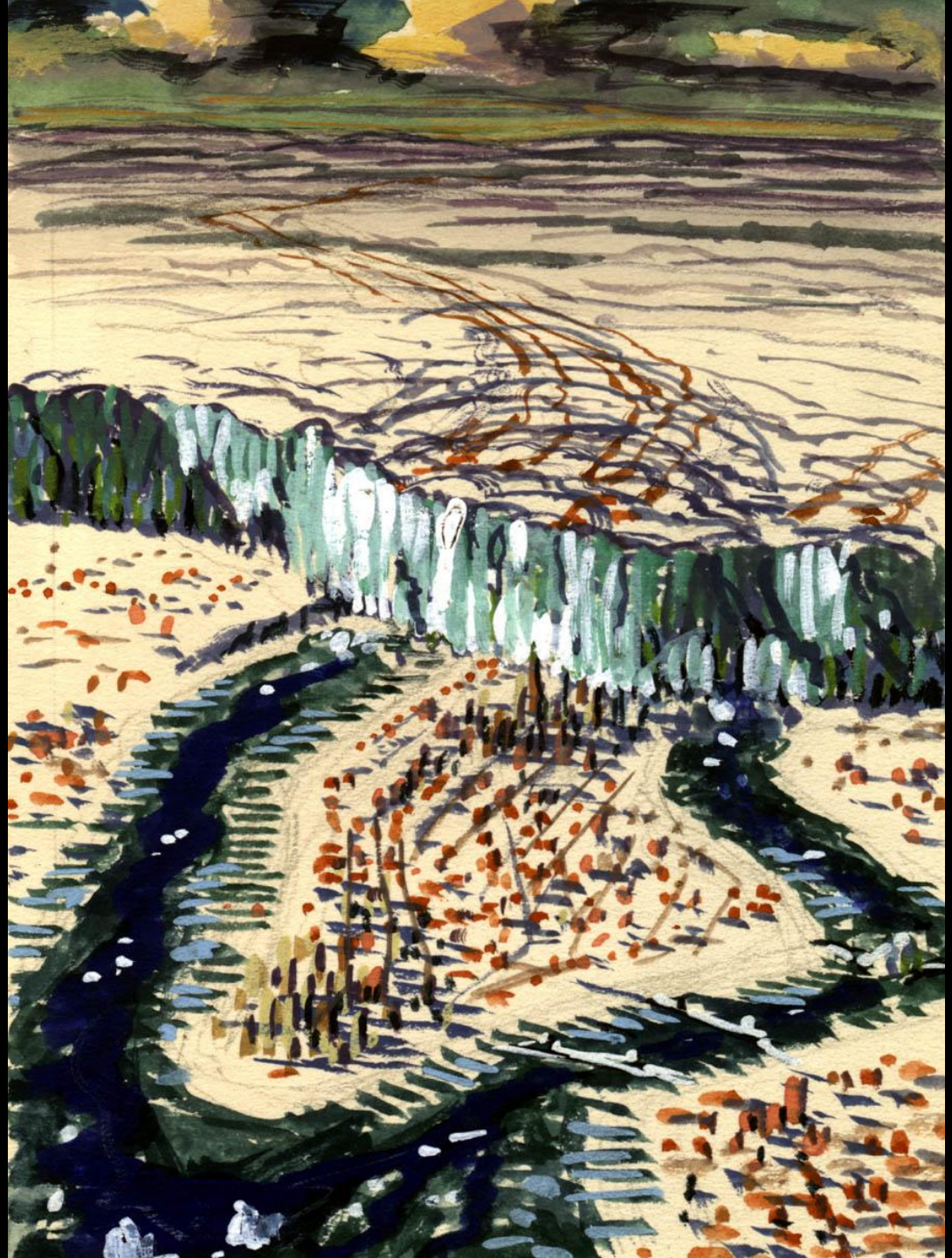
Sites in Valley Contain NJ Serpentinite In Till

South Edge of Site

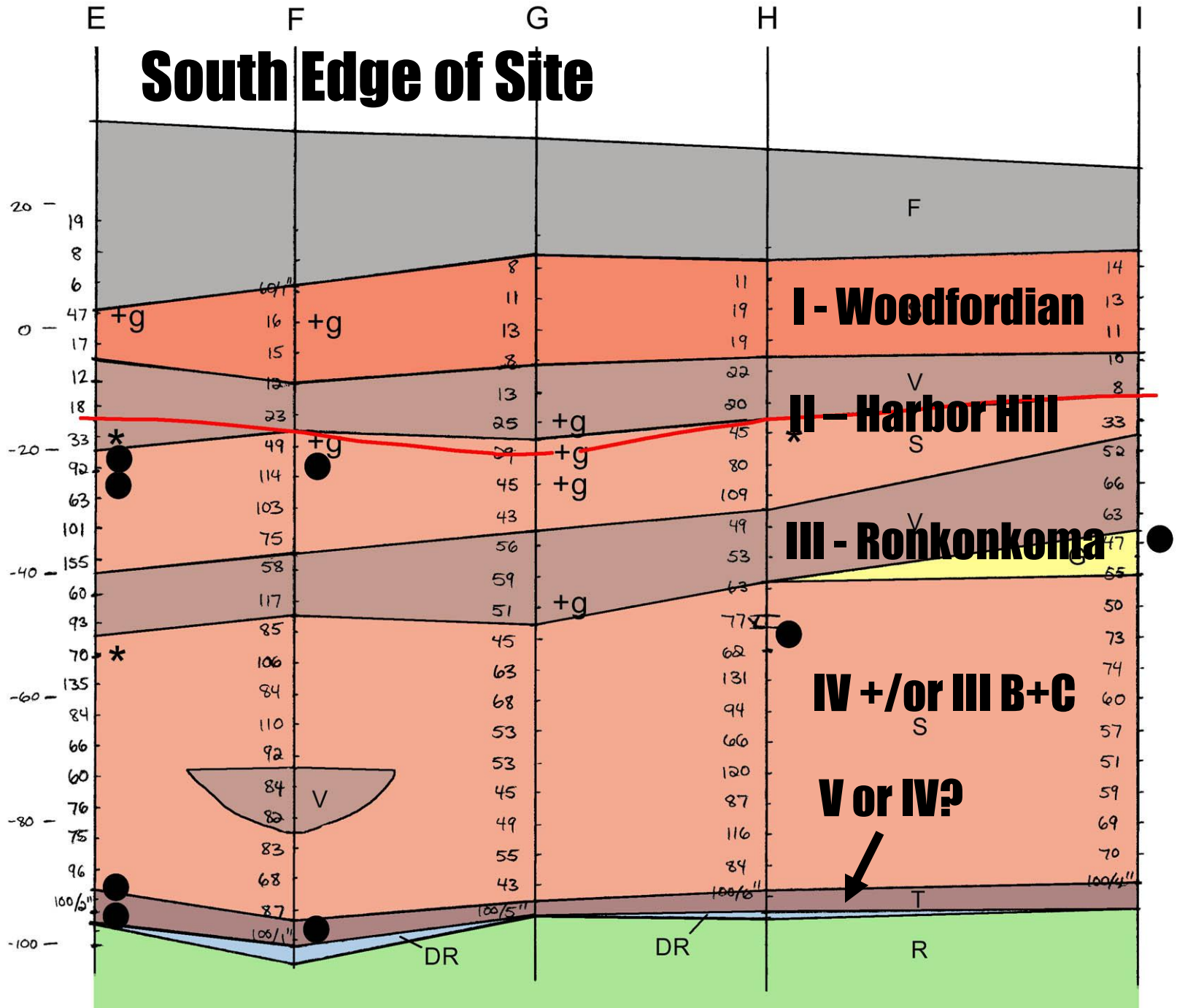


Higher Shear Wave Velocities Below Lower Varve/Till


E
F
G
H
I
South Edge of Site
I - Woodfordian
II – Harbor Hill
III - Ronkonkoma
IV +/or III B+C
V or IV?
F
V
S
T
R
DR
DR
+g
20
0
-20
-40
-60
-80
-100



Future Loading Problems?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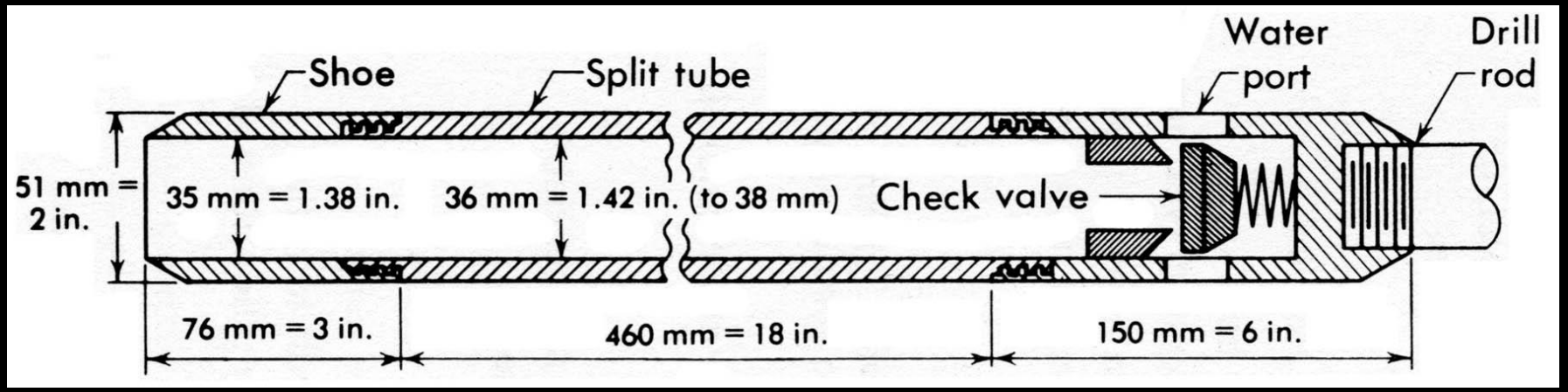
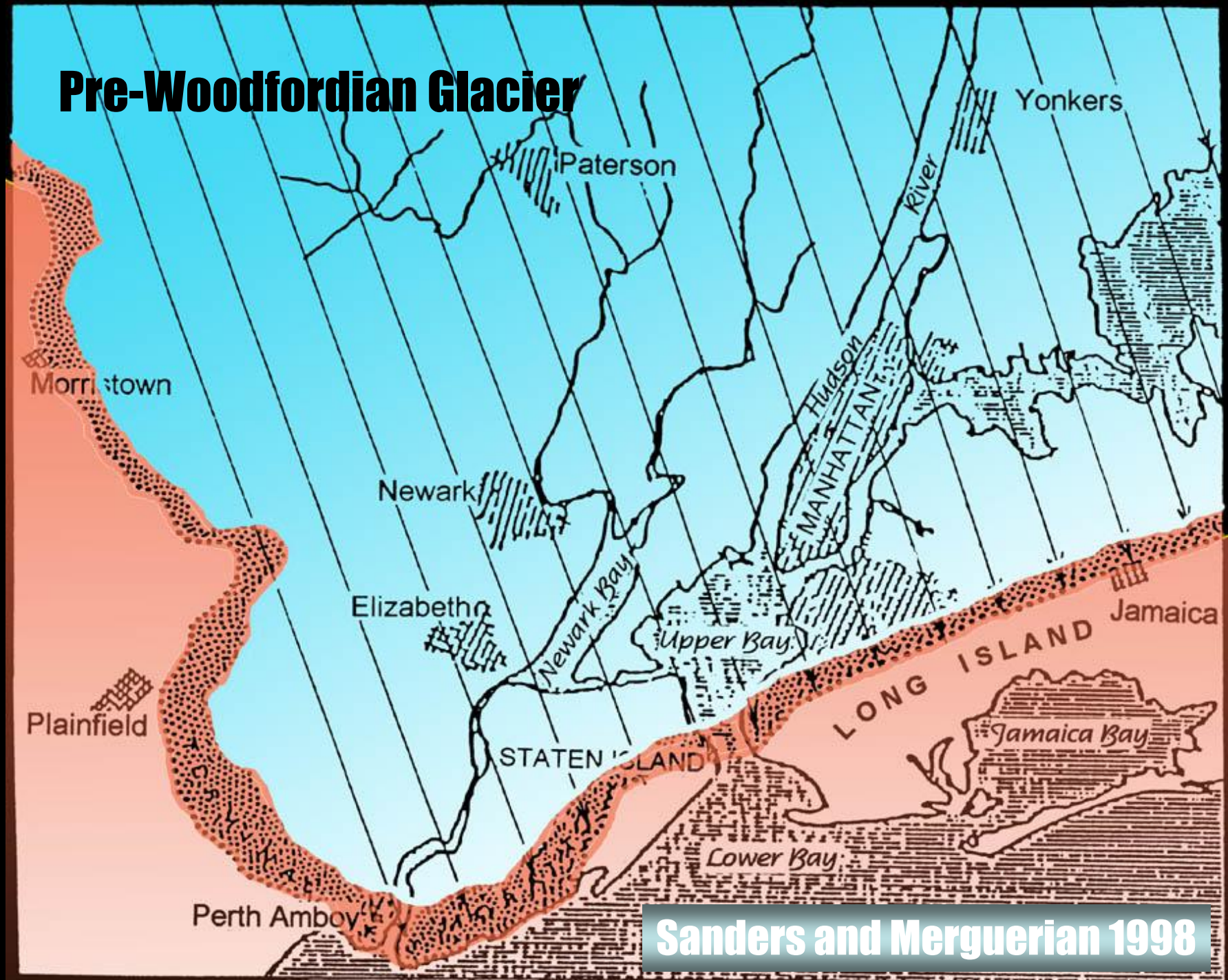
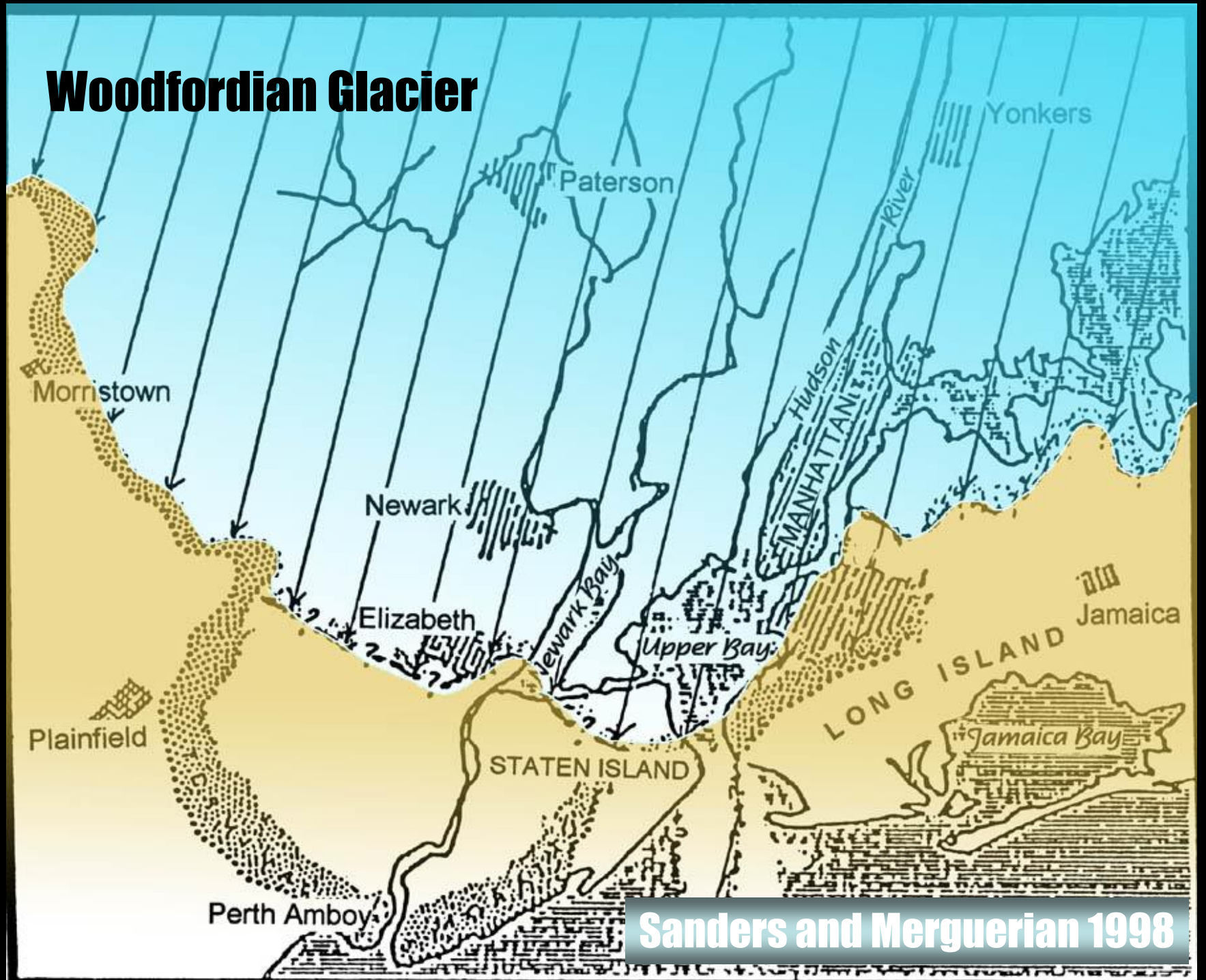
DR
+g
20
0
-20
-40
-60
-80
-100

Split-Spoon Sampler
Used in Standard Penetration Test




10THS &
.1
100THS FT.
.2
PAT.NO.
.3


Pre-Woodfordian Glacier
Yonkers
Paterson
Hudson River
MANHATTAN
Morristown
Newark
Elizabeth
Newark Bay
Upper Bay
Jamaica
LONG ISLAND
Plainfield
Jamaica Bay
STATEN ISLAND
Lower Bay
Perth Amboy
Sanders and Merguerian 1998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Jamaica
LONG ISLAND
Plainfield
Jamaica Bay
STATEN ISLAND
Perth Amboy
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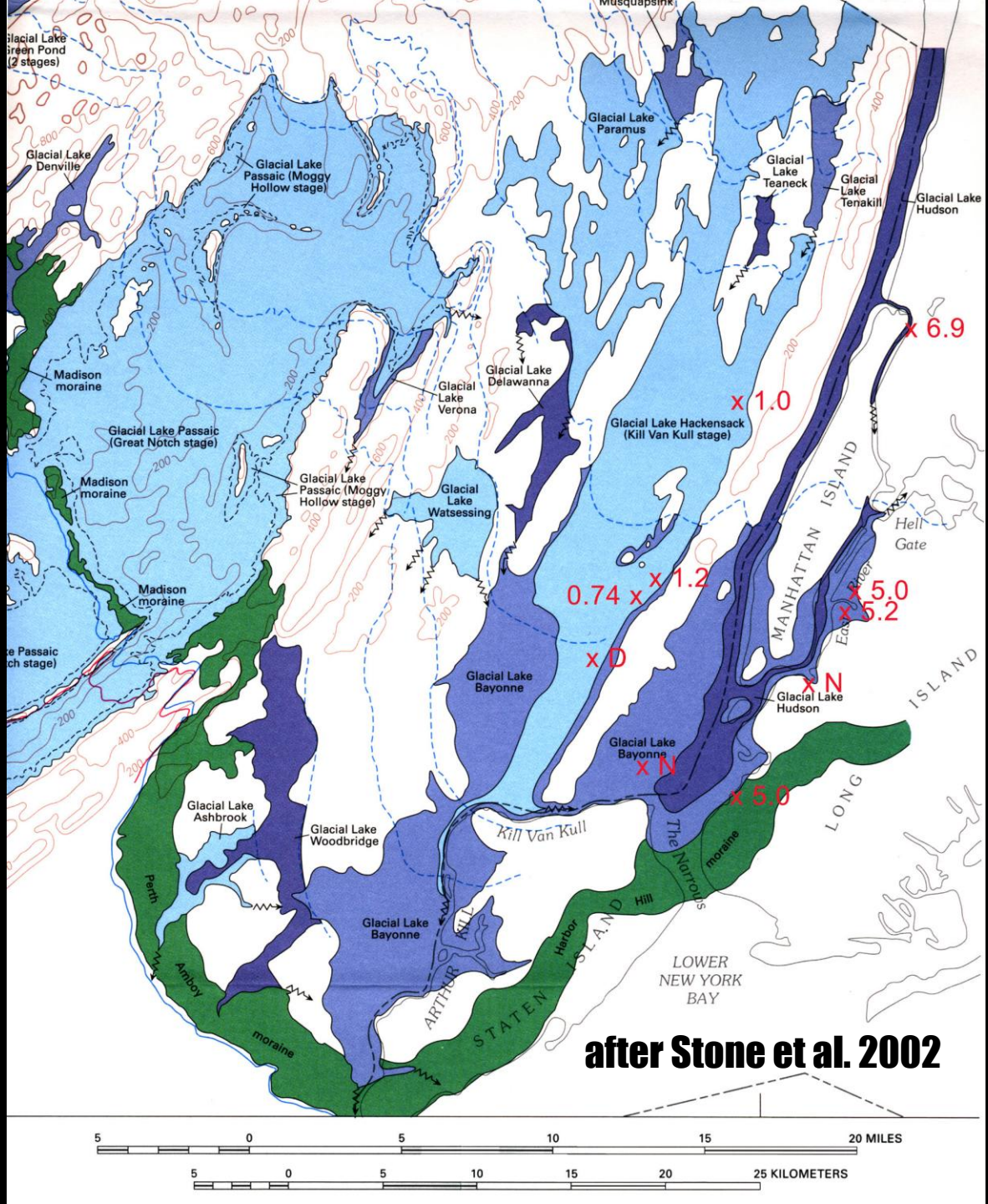
NYC's Varved Soils Experienced Loads 5-10 tsf > Existing Overburden

He Concluded That A Younger Glacier Must Have Caused Excess Loading!



Lake Bayonne

Hell Gate Spillway

Lake Hackensack (West)

Lake Hudson (East)