

MASW Analysis for 1-D Shear-Velocity (V_s) Profiling (Site B18)



Sample Full 1D MASW Report

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Disclaimer

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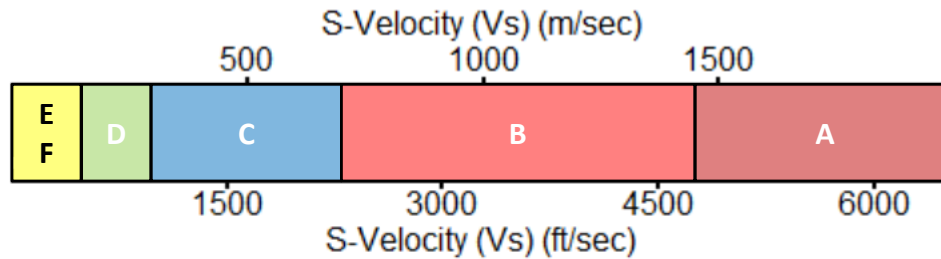
Report to

Anonymous Company

Summary

- MASW data set acquired site B18 has been processed to produce **1-D shear-wave velocity (Vs) profile**.
- **Eight field records of 24-channel acquisition with 1-m receiver spacing** were acquired at the site with both **forward** and **reverse** shot records (four records on each side).
- All eight records were first encoded for **source/receiver (SR) configuration**. They were then processed to produce corresponding number of dispersion images, which were stacked to produce **one stacked dispersion image of the highest quality for the site**.
- **One fundamental mode (M0) dispersion curve** was extracted from the stacked dispersion image, which was then inverted to produce **one 1-D shear-wave velocity (Vs) profile**.
- Quality of data was “**EXCELLENT**” for all obtained records with very high signal-to-noise (SN) ratios for the fundamental-mode dispersion energy.
- A chart of **source/receiver (SR) setup** has been displayed in this report. Then, the corresponding **dispersion image** and **extracted dispersion curve** have been displayed along with the final **1-D Vs profile**. **Numerical values** of Vs are presented in a separate table.
- **According to the analyzed 1-D Vs profile**, top 5-m of subsurface consists of **very soft soil** with velocities (Vs's) in 100-110 m/sec, followed by materials with higher velocities (Vs's) in 170-180 m/sec that can be **soft-stiff soil**. These materials are then followed by stiffer materials at about 15-m depth that have velocities in 340-350 m/sec, indicating **very stiff soil**. **No competent bedrock** (e.g., $V_s \geq 1000$ m/sec) is observed, at least, for the investigated depth range of 20-m.
- From this 1-D Vs profile, the average Vs for top 30-m depths (i.e., V_s^{30-m}) is calculated as **$V_s^{30-m} = 208$ m/sec**, which puts the site into **class D (“Stiff Soil”)** according to the seismic site classification codes adopted by **National Earthquake Hazard Reduction Program (NEHRP) and the International Building Code (IBC)**. The classification table is presented after summary.

Seismic Site Classification ($V_s^{30\text{-m}}$ or $V_s^{100\text{-ft}}$)



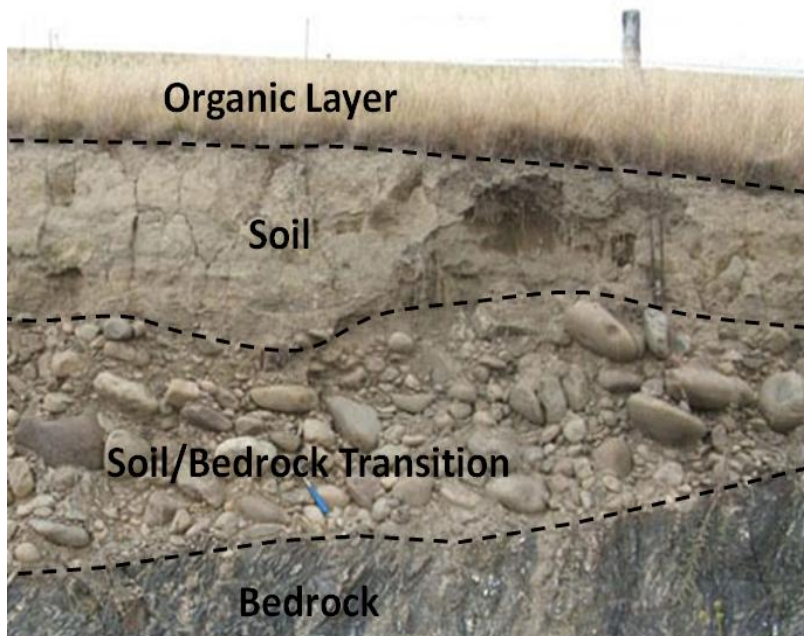
NEHRP* Seismic site classification based on shear-velocity (V_s) ranges.

Site Class	S-Velocity (V_s) (ft/sec)	S-Velocity (V_s) (m/sec)
A (Hard Rock)	> 5,000	> 1500
B (Rock)	2,500 – 5000	760 – 1500
C (Very Dense Soil and Soft Rock)	1,200 – 2,500	360 – 760
D (Stiff Soil)	600 – 1,200	180 – 360
E (Soft Clay Soil)	< 600	< 180
F (Soils Requiring Add'l Response)	< 600, and meeting some additional conditions.	< 180, and meeting some additional conditions.

* National Earthquake Hazard Reduction Program (www.nehrp.gov)

Table of Typical Near-Surface Materials and “Approximate” Seismic Velocity (V_s)

- $V_s \leq 100$ m/s – “extremely soft” soil
- 100 m/s $\leq V_s \leq 200$ m/s – “soft” soil
- 200 m/s $\leq V_s \leq 300$ m/s – “stiff” soil
- 300 m/s $\leq V_s \leq 500$ m/s – “weathered” zone
- 500 m/s $\leq V_s$ – “rock”
- 1000 m/s $\leq V_s$ – “competent” rock

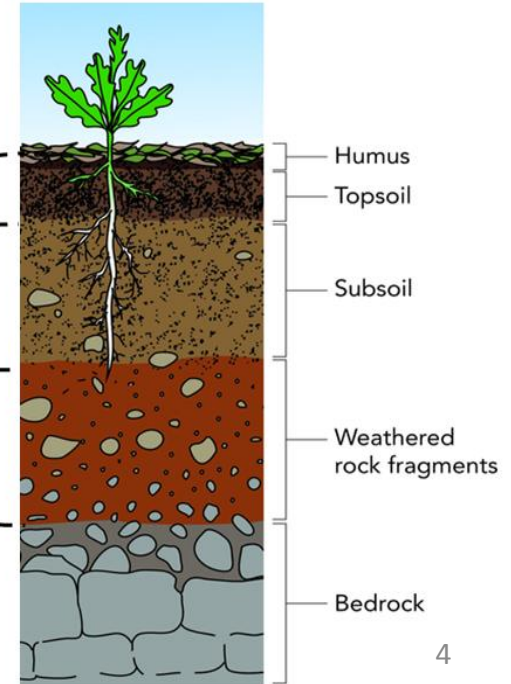


50 m/s $\leq V_s \leq 100$ m/s

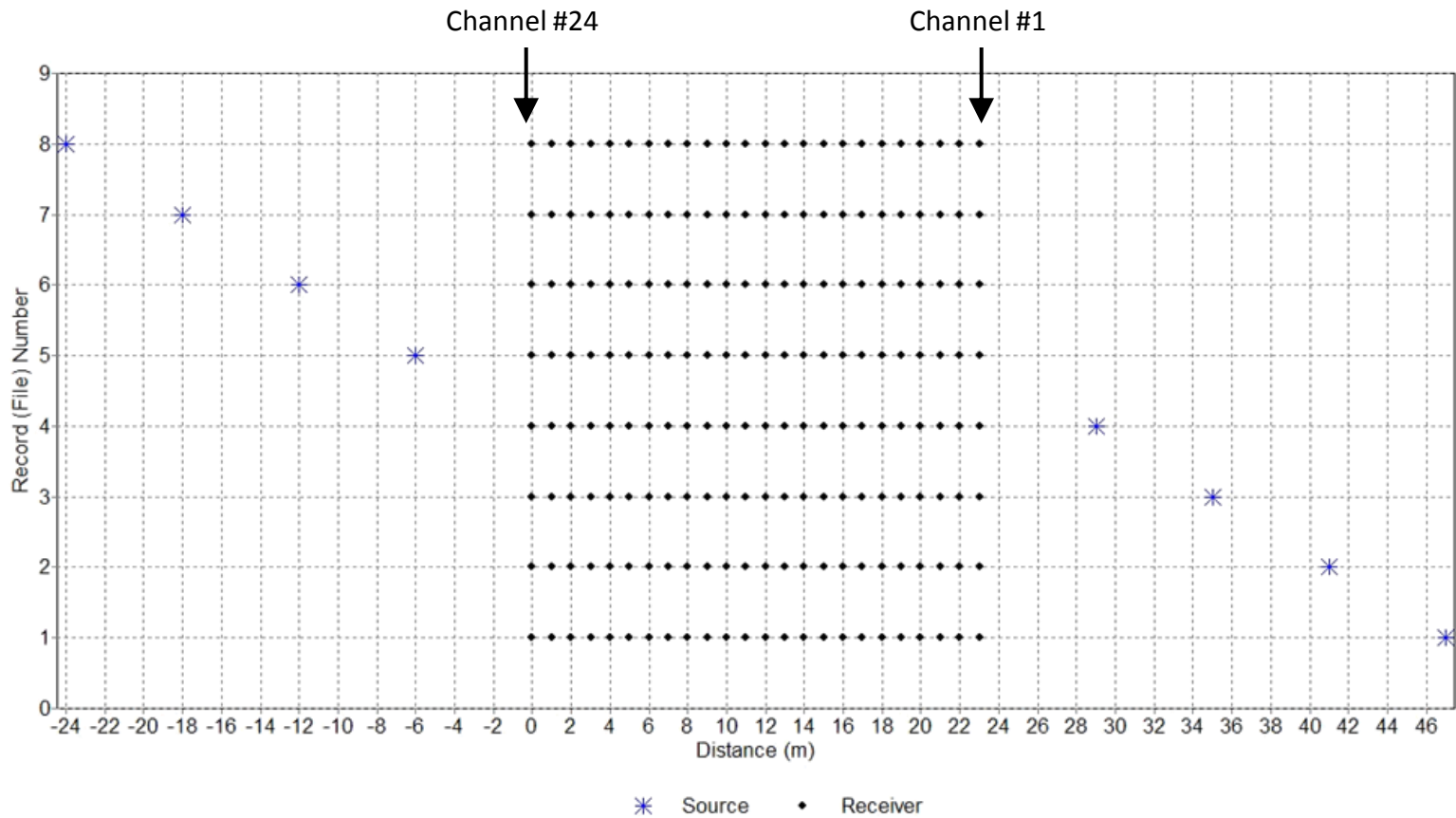
100 m/s $\leq V_s \leq 300$ m/s

300 m/s $\leq V_s \leq 500$ m/s

500 m/s $\leq V_s \leq 2000$ m/s



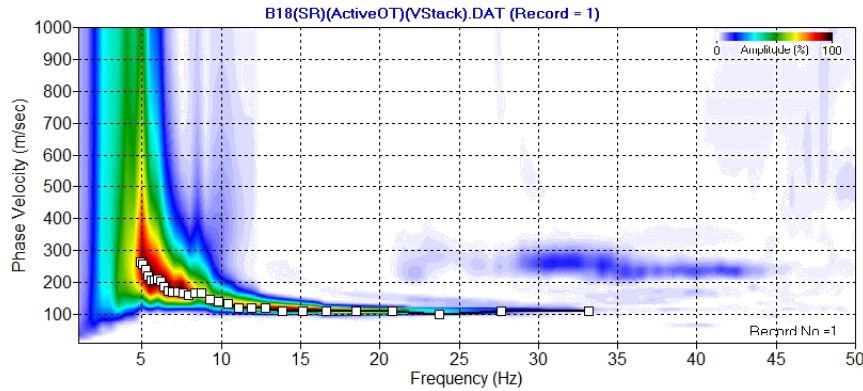
Source/Receiver (SR) Setup (Site B18)



1-D Shear-Velocity (V_s) Profile (Site B18)

All eight (8) records' dispersion images are stacked and one fundamental-mode (M0) dispersion curve is extracted from the stacked image (shown below). A 1-D shear-velocity (V_s) profile of **10-layer** model is obtained for a maximum investigation depth (Z_{max}) of 20-m from the extracted curve and displayed at the bottom. Z_{max} is determined from a simultaneous consideration of offset range for receiver spread, source offset, and lowest frequency (and corresponding phase velocity) of extracted dispersion curve.

Dispersion



1-D
 V_s Profile

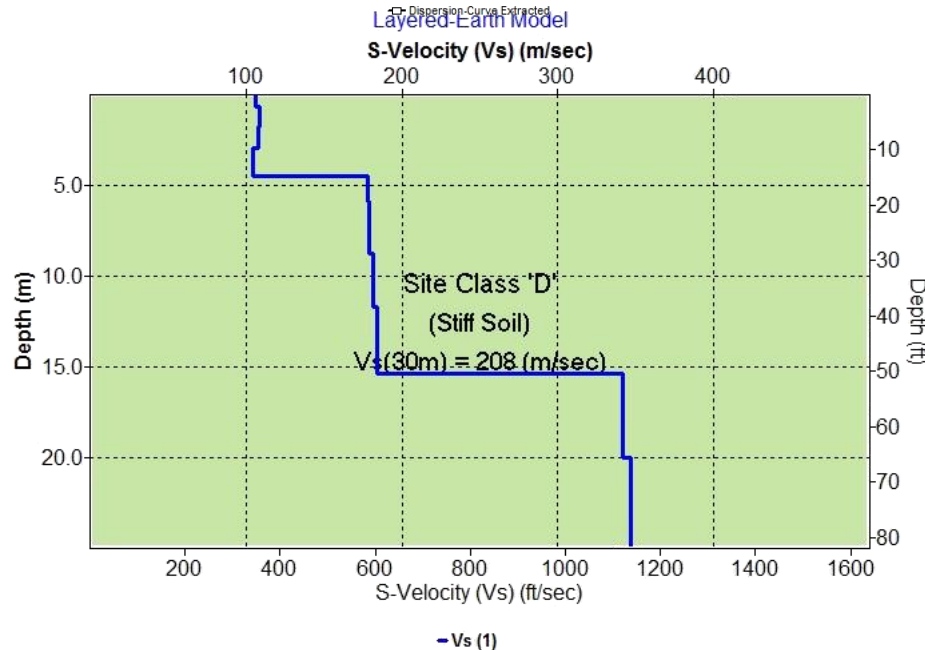


Table of V_s Values

No.	Depth (m)	Final V_s (m/sec)
1	0.632	106.18
2	1.744	108.82
3	2.955	107.45
4	4.469	104.71
5	5.91	177.86
6	8.727	179.24
7	11.684	181.52
8	15.38	184.46
9	20	342.01
10	HS*	346.58

*HS: half space