Strategies for Remediating Compromised Soils in the Landscape

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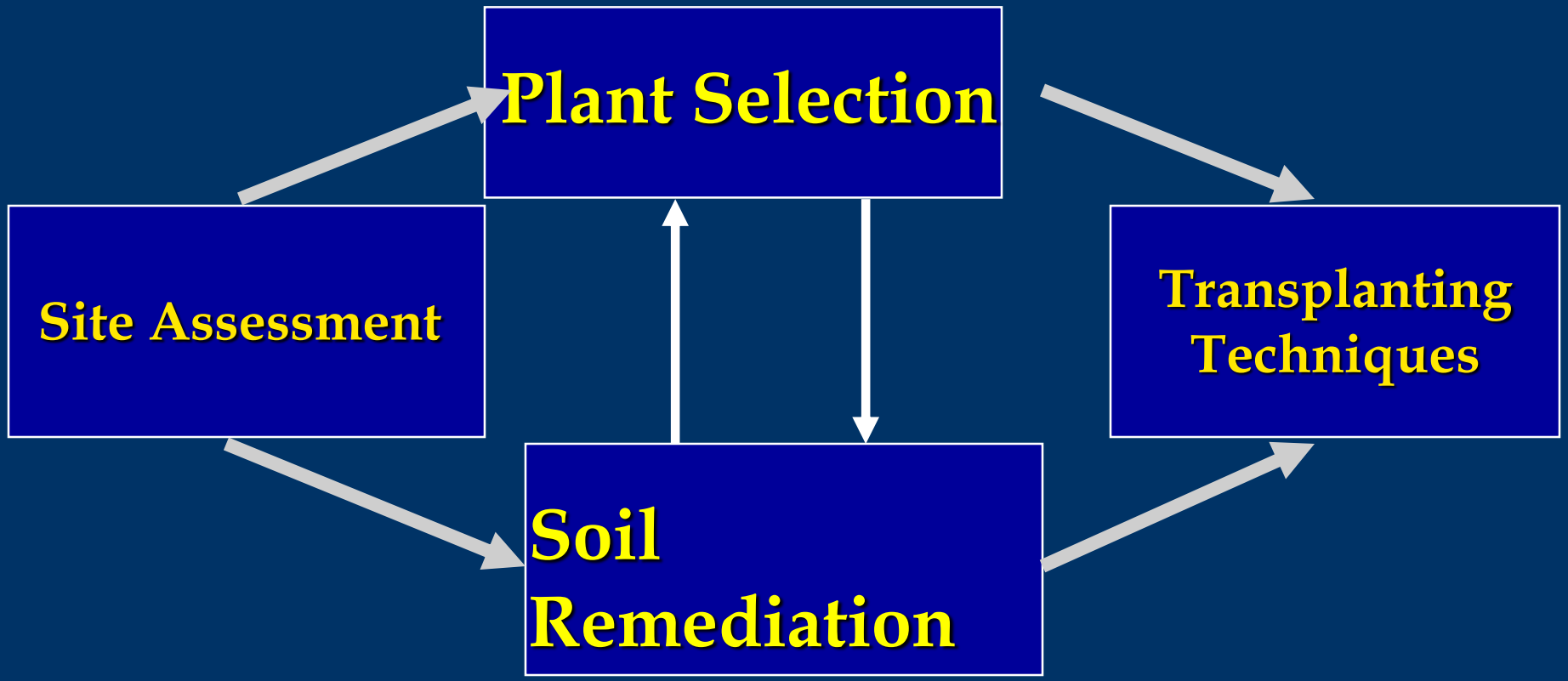
Site Assessment: understanding site opportunities and limitations


Or, how do you go from this to…


…this ?

Landscape Establishment Process



Limits of Plant Selection

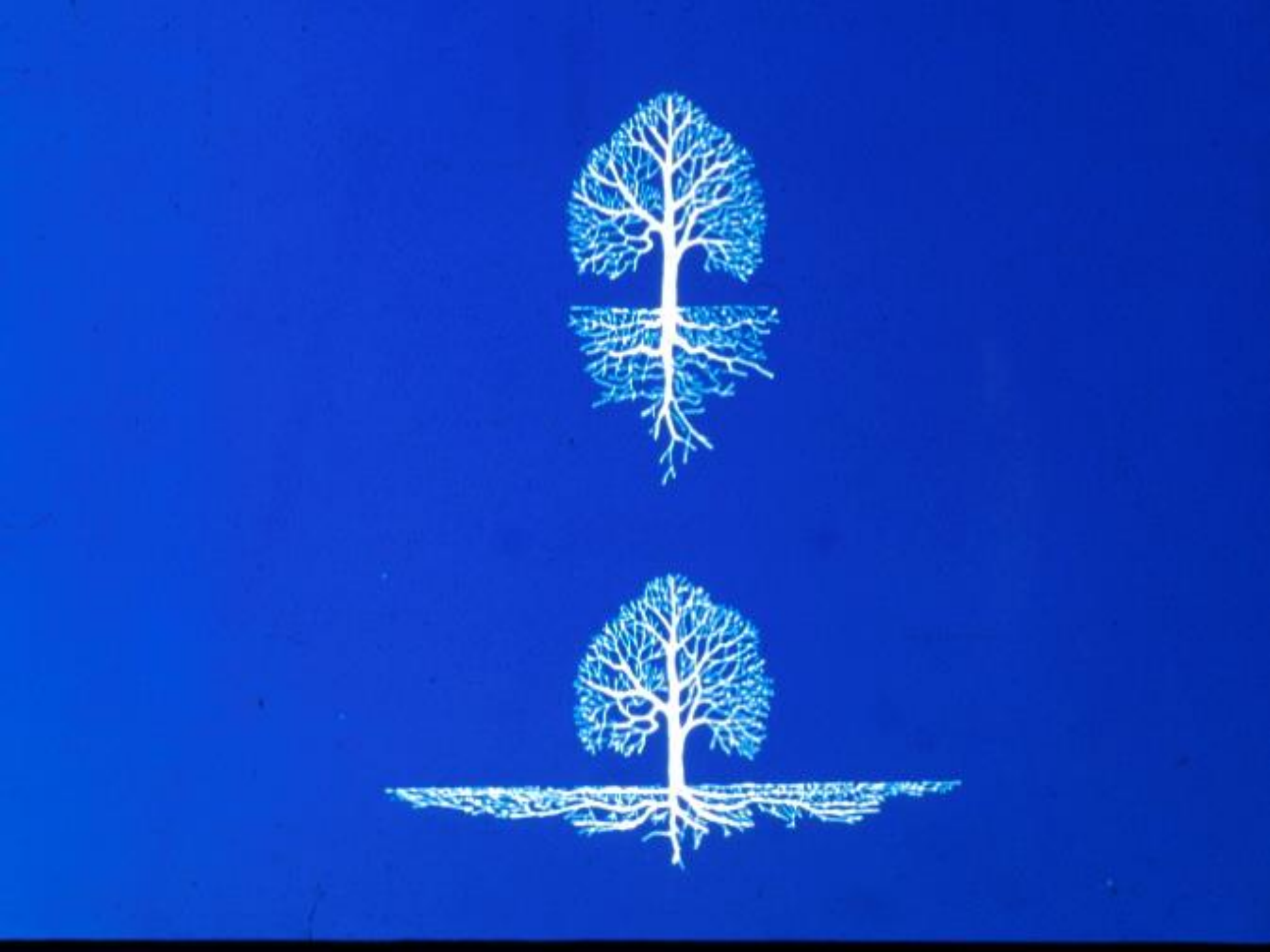
- Insects/diseases Yes
- Size Yes
- Heat/Cold Yes
- Poor Drainage Yes (fewer options)
- Dry Soils Yes (up to a point)
- pH Yes
- Salt Somewhat
- Soil Compaction NO

(physical impedance)

SOIL TRUMPS TREES!

Remediating Compacted Soil

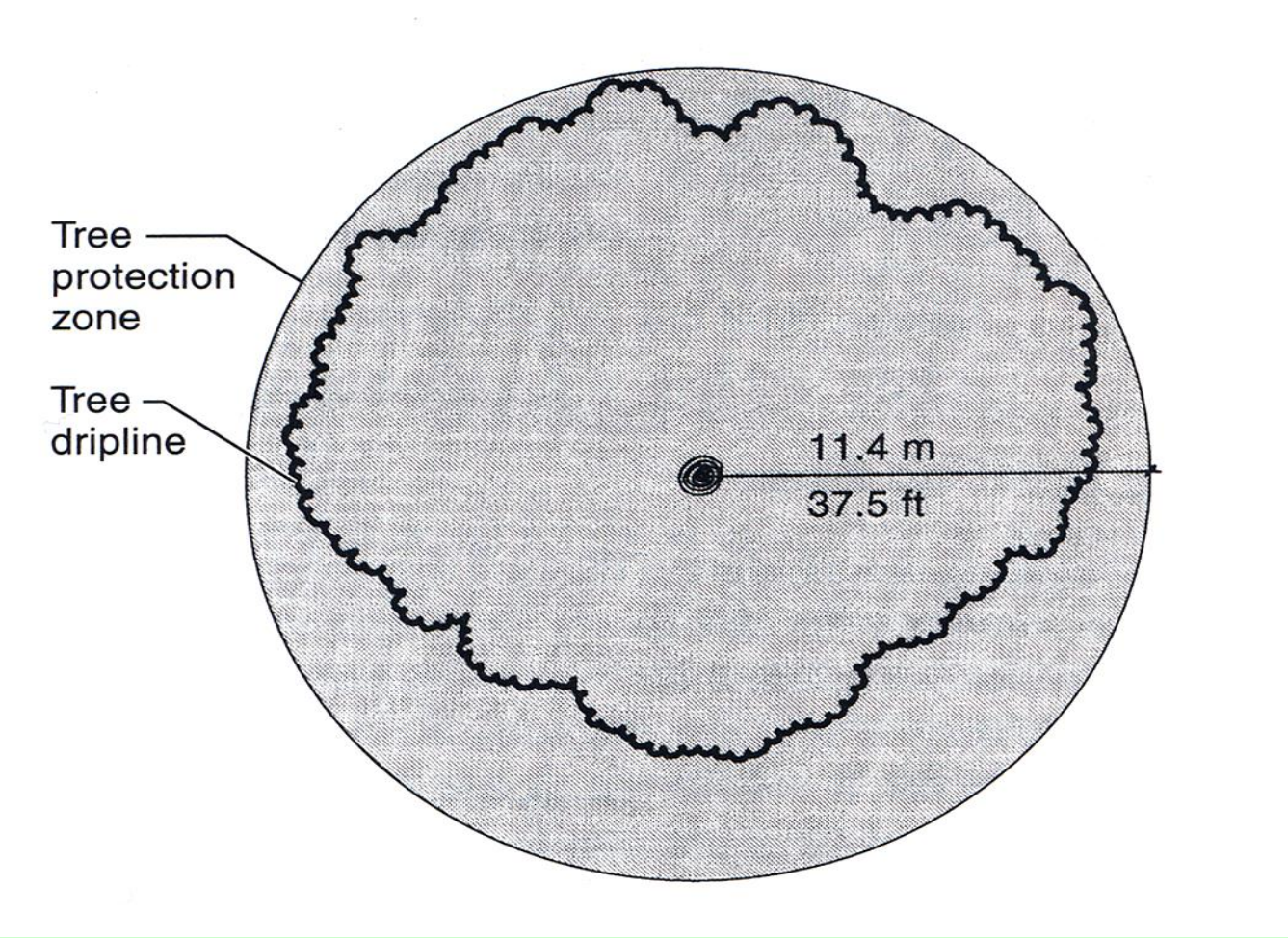
- Protect soil structure during construction
- Design for adequate volume
- Soil replacement
- Soil amendment
- ‘Bury’ the soil
- Appropriate plant selection




KwikFill
verizon
verizon
GMC

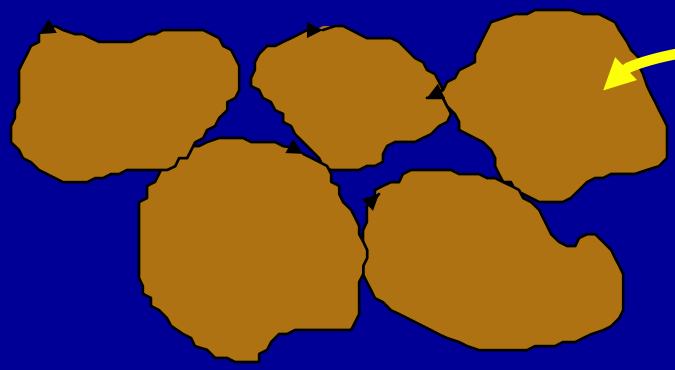
Tree protection zone

- DBH x 1.5'= radius of protection



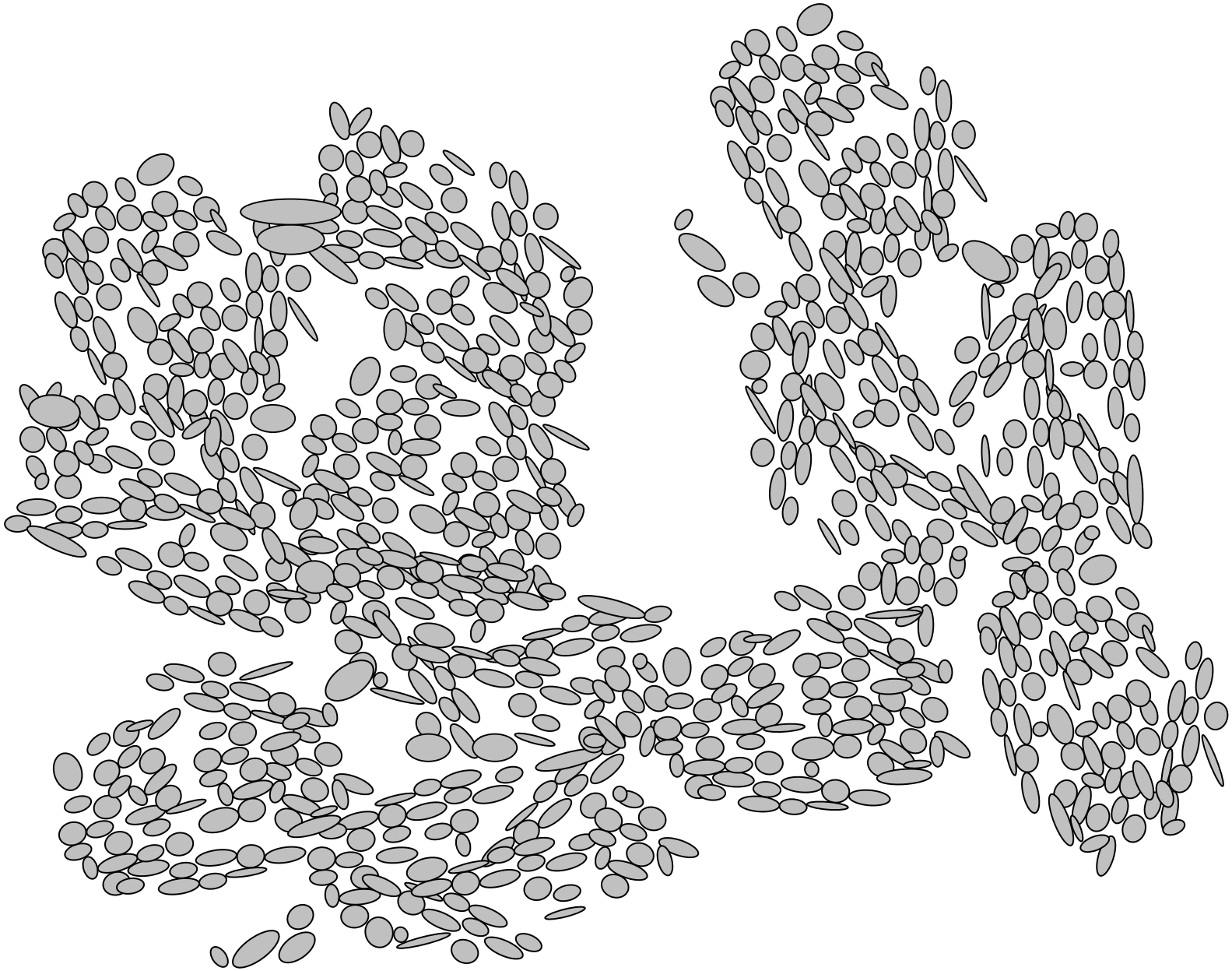
Micropores

- the small spaces within a ped
- where most of the plant-available water is held
- hold water under tension



Micropores are the tiny spaces *within* a ped

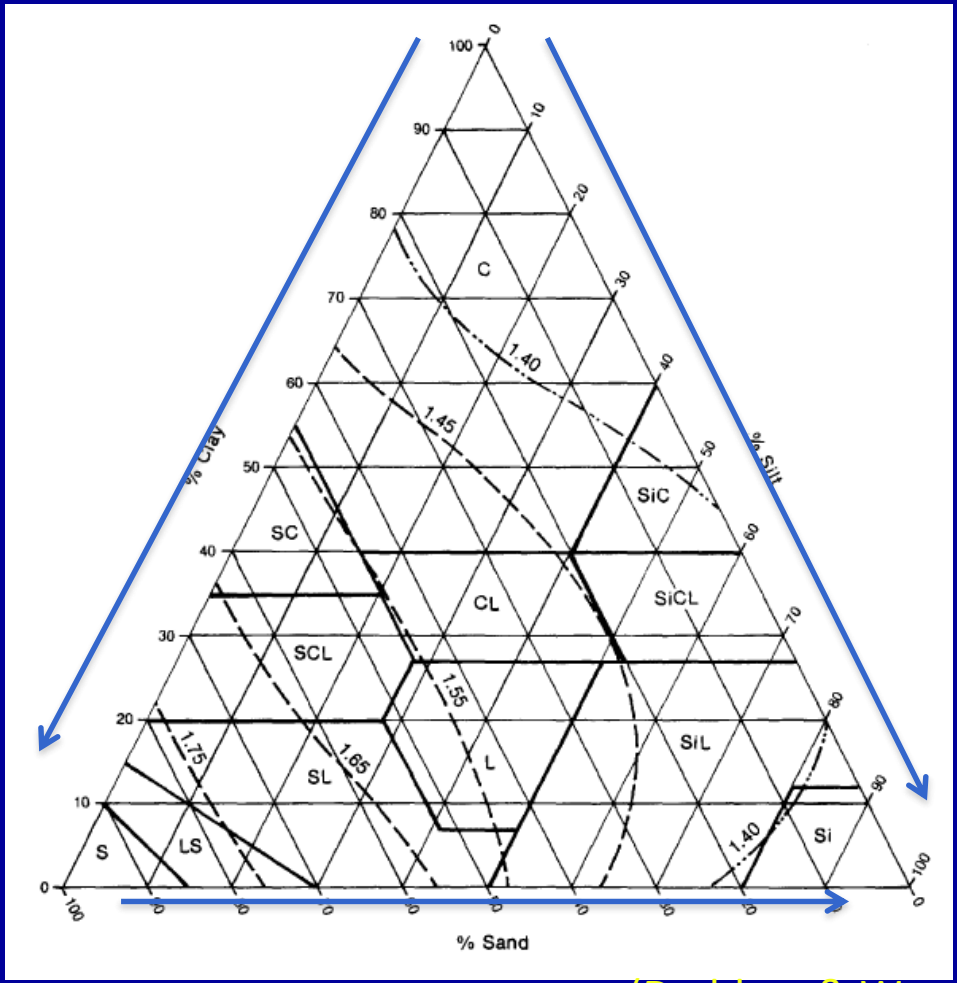
Soil ped or crumb



Compacted soil showing loss of


Bassuk

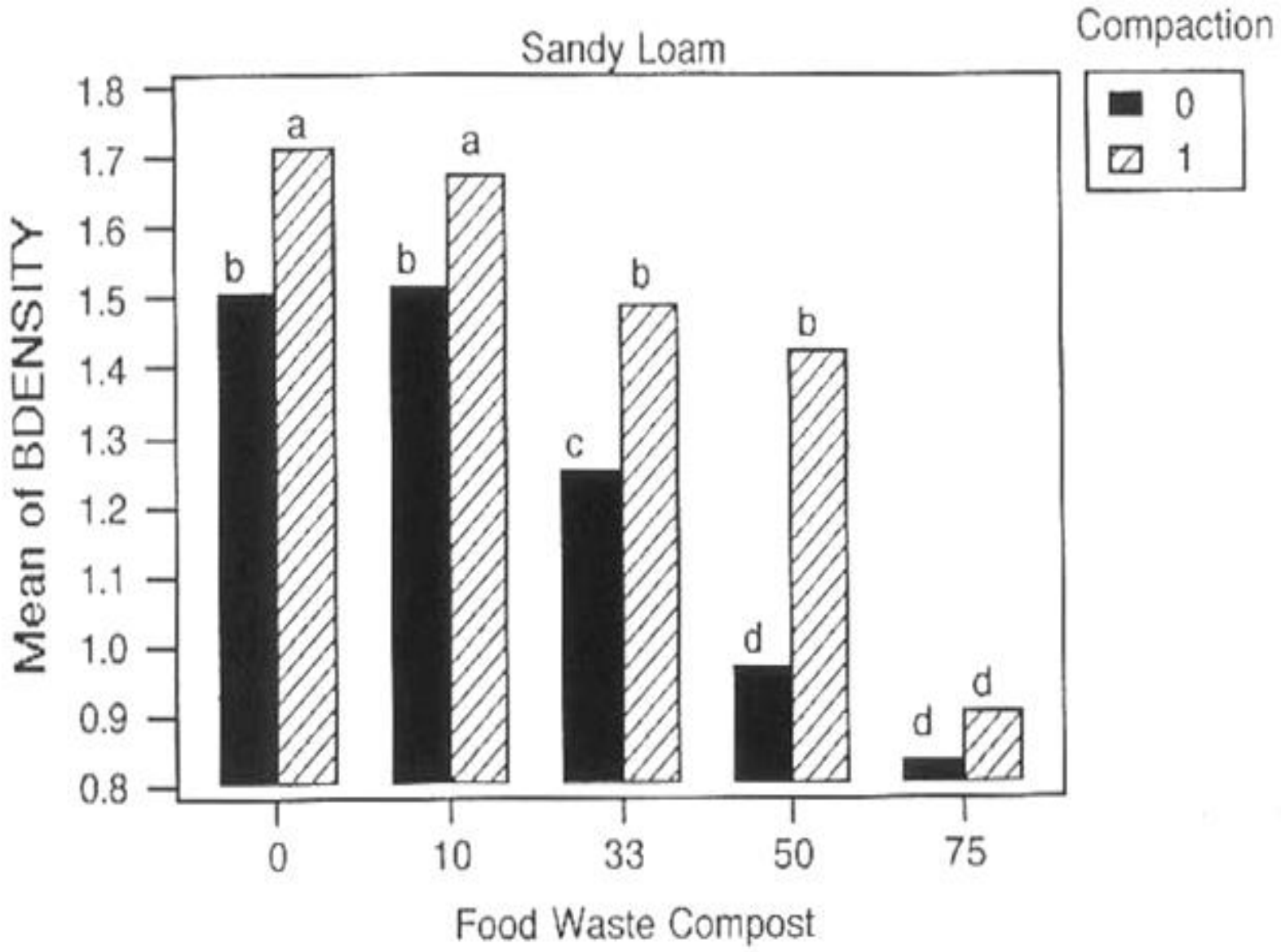
Root Limiting Bulk Density by Textural Class



Texture	Bulk Density (g/cm^3)
Sand	1.75
Silt	1.40
Clay	1.40

(Daddow & Warrington, 1983)

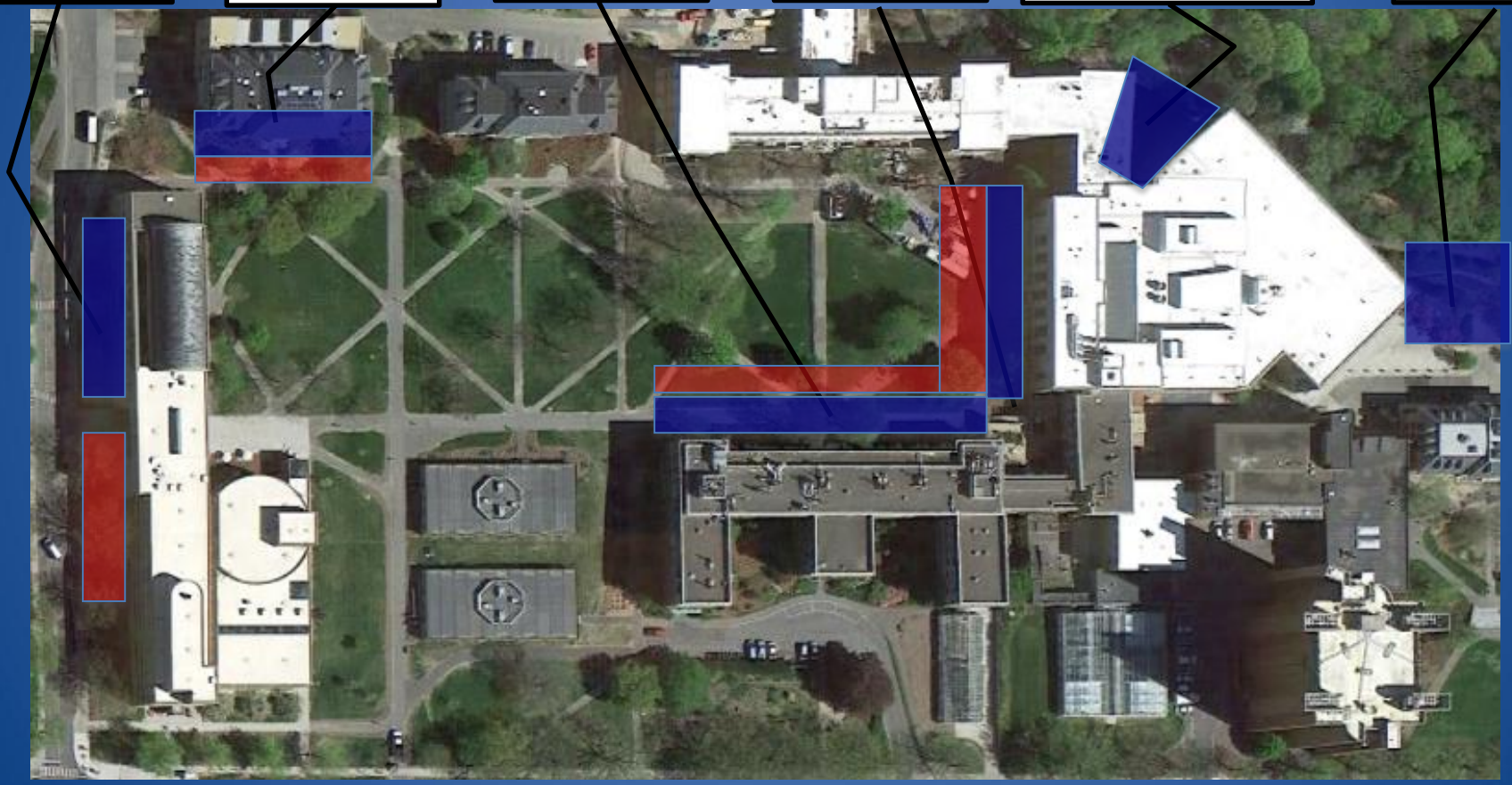
Effects of organic amendments on bulk density



Scoop & Dump Technique

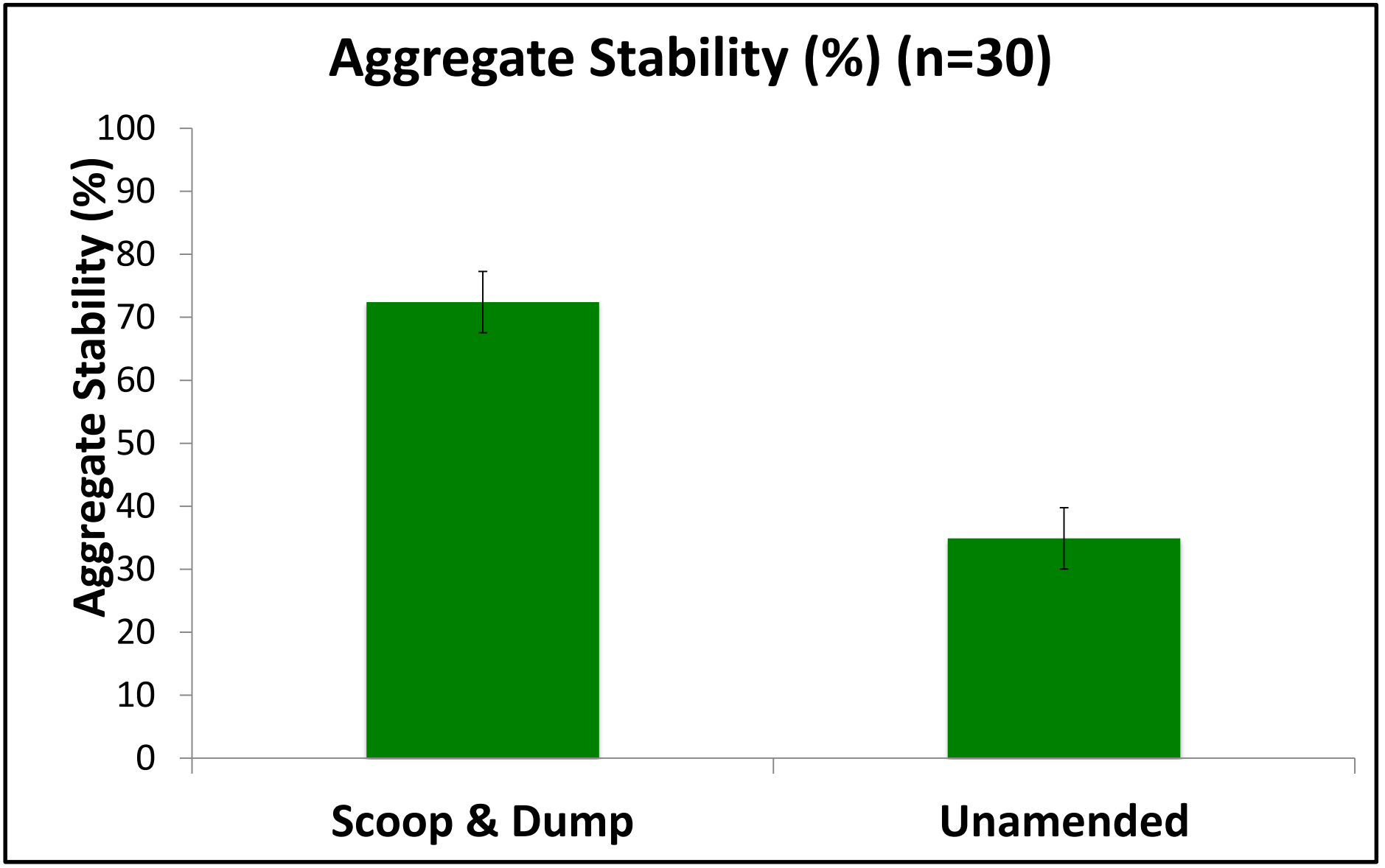
- **Apply 6-8” of compost to compacted soil**
- **Use backhoe bucket to dig down to 18”**
- **Mulched added every year to replenish organic matter**

Study Sites

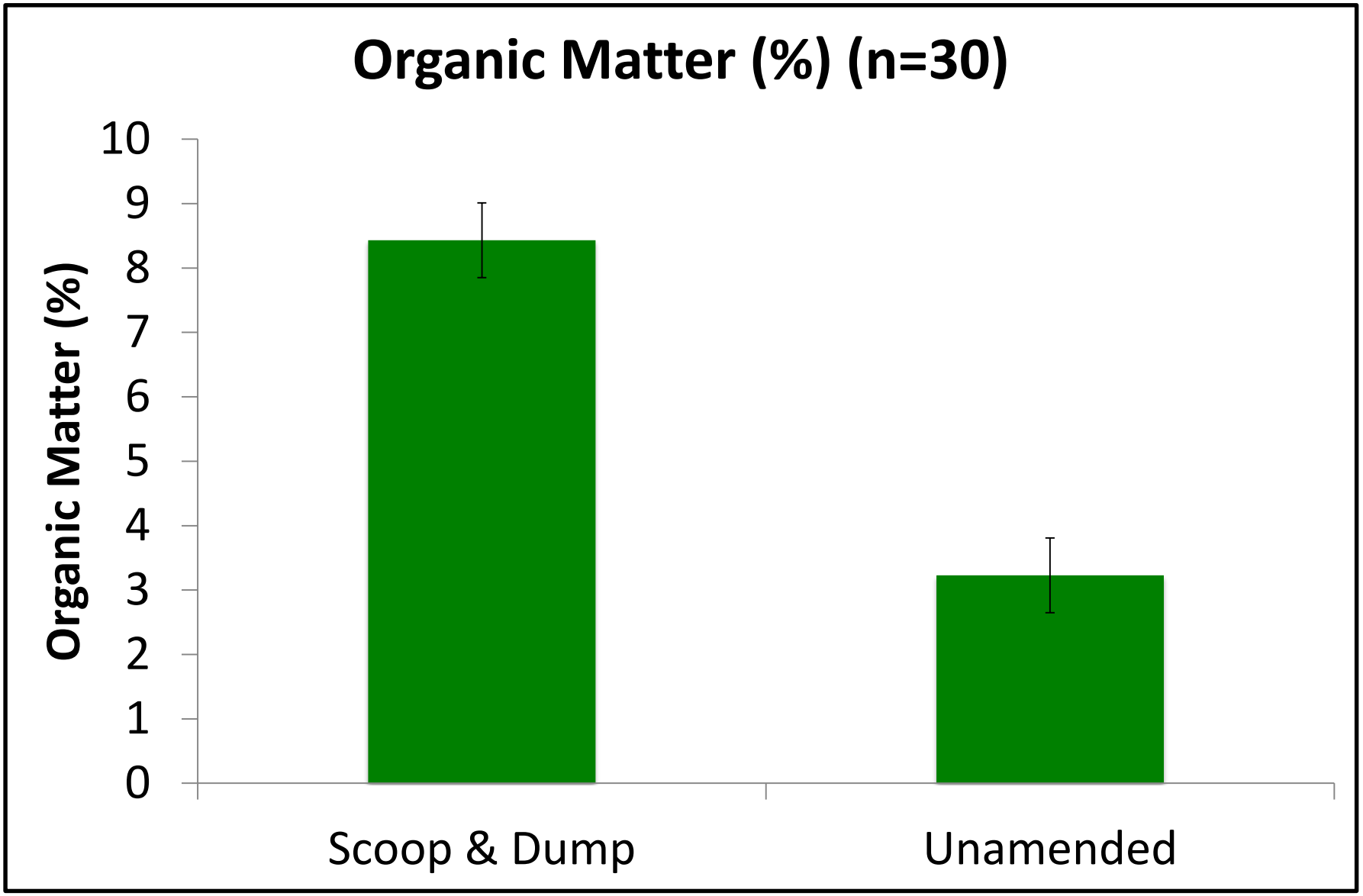


= Study Site (n=6)

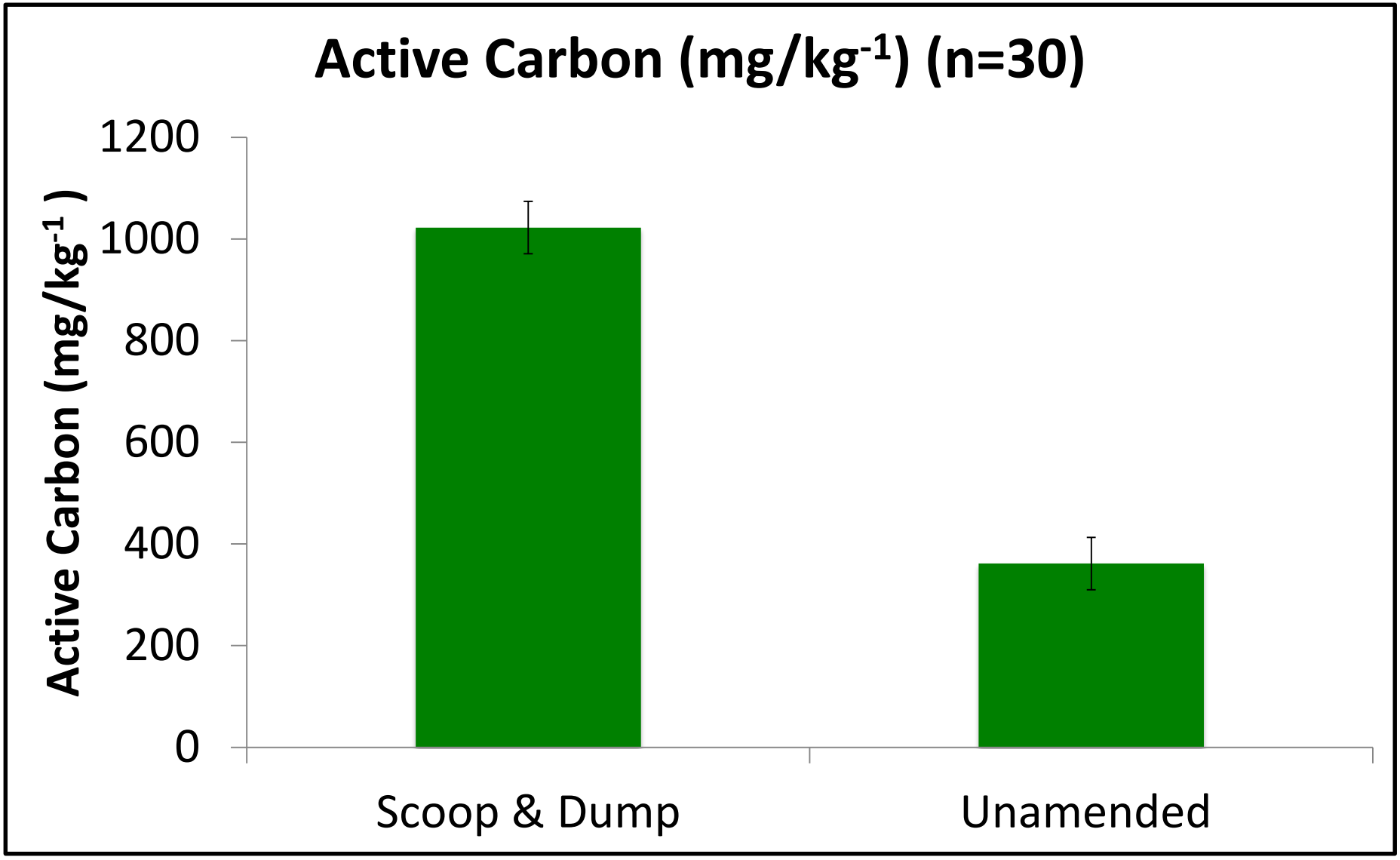
= Control (n=4)



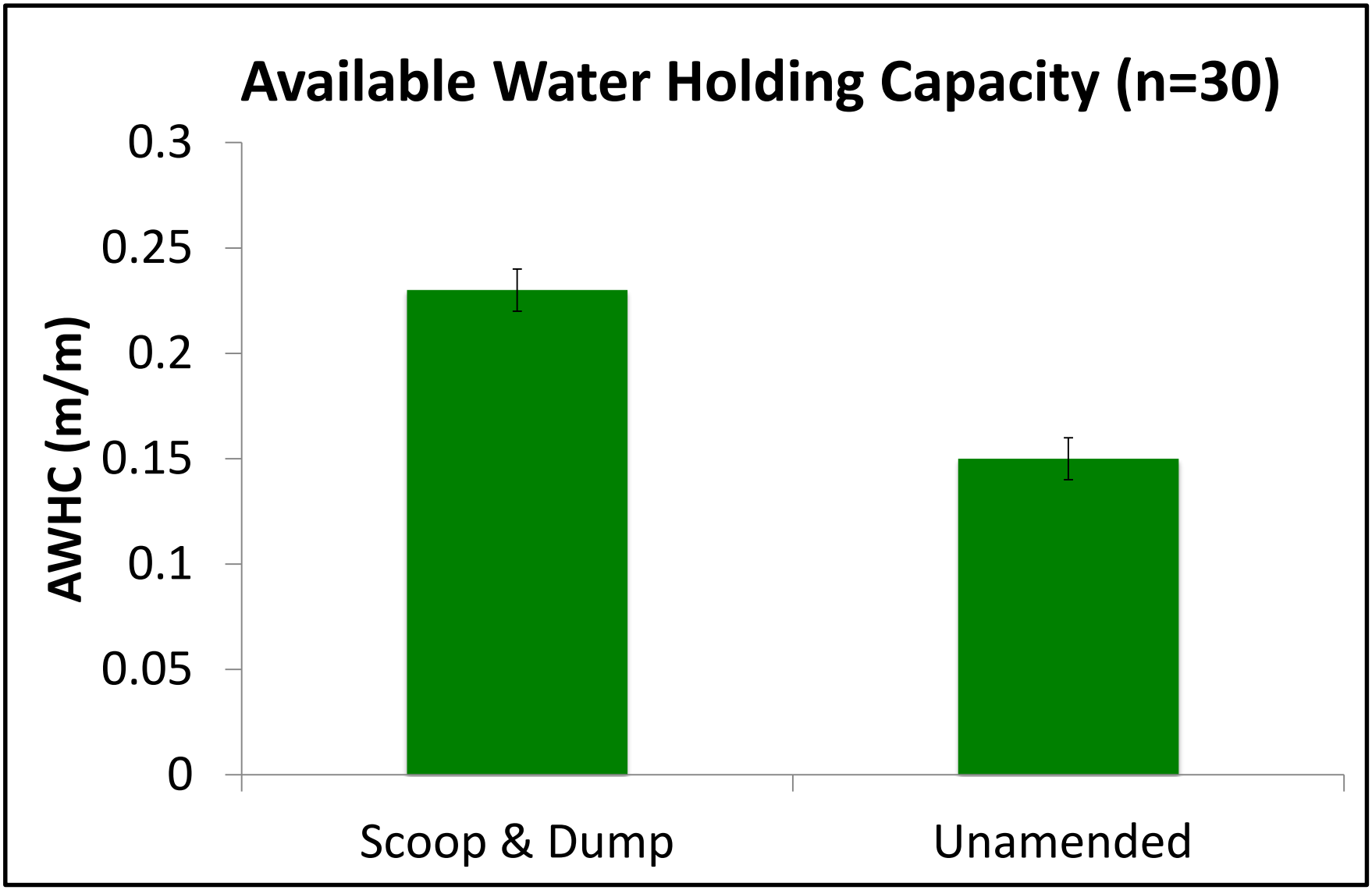
Scoop & Dump	Unamended	Std. Err.	P Value
72.41	**34.90**	**4.88**	**<.0001**



Scoop & Dump	Unamended	Std. Err.	P Value
8.43	**3.23**	**0.58**	**<.0001**

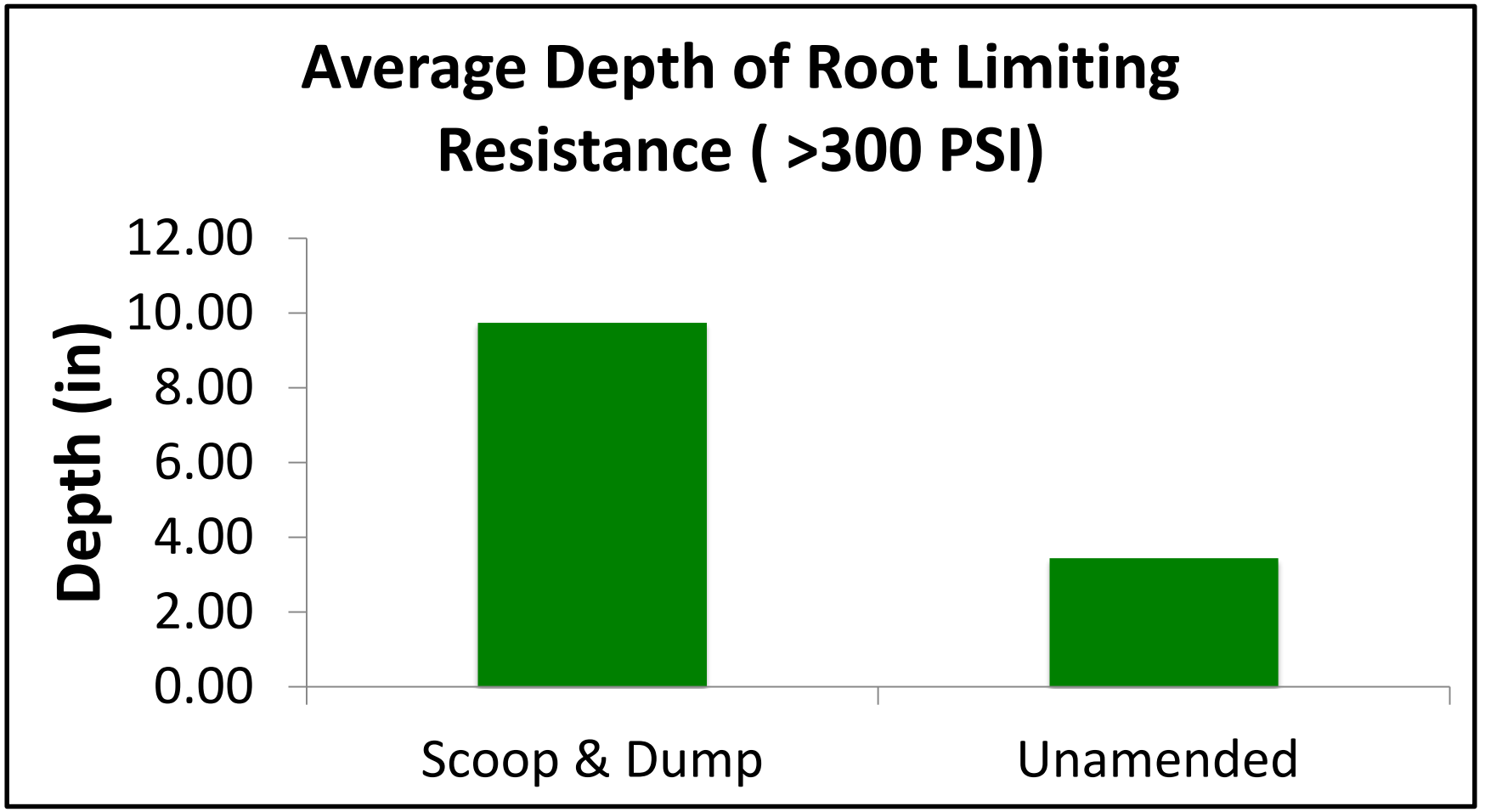


Scoop & Dump	Unamended	Std. Err.	P Value
1022.47	**361.60**	**51.51**	**<.0001**

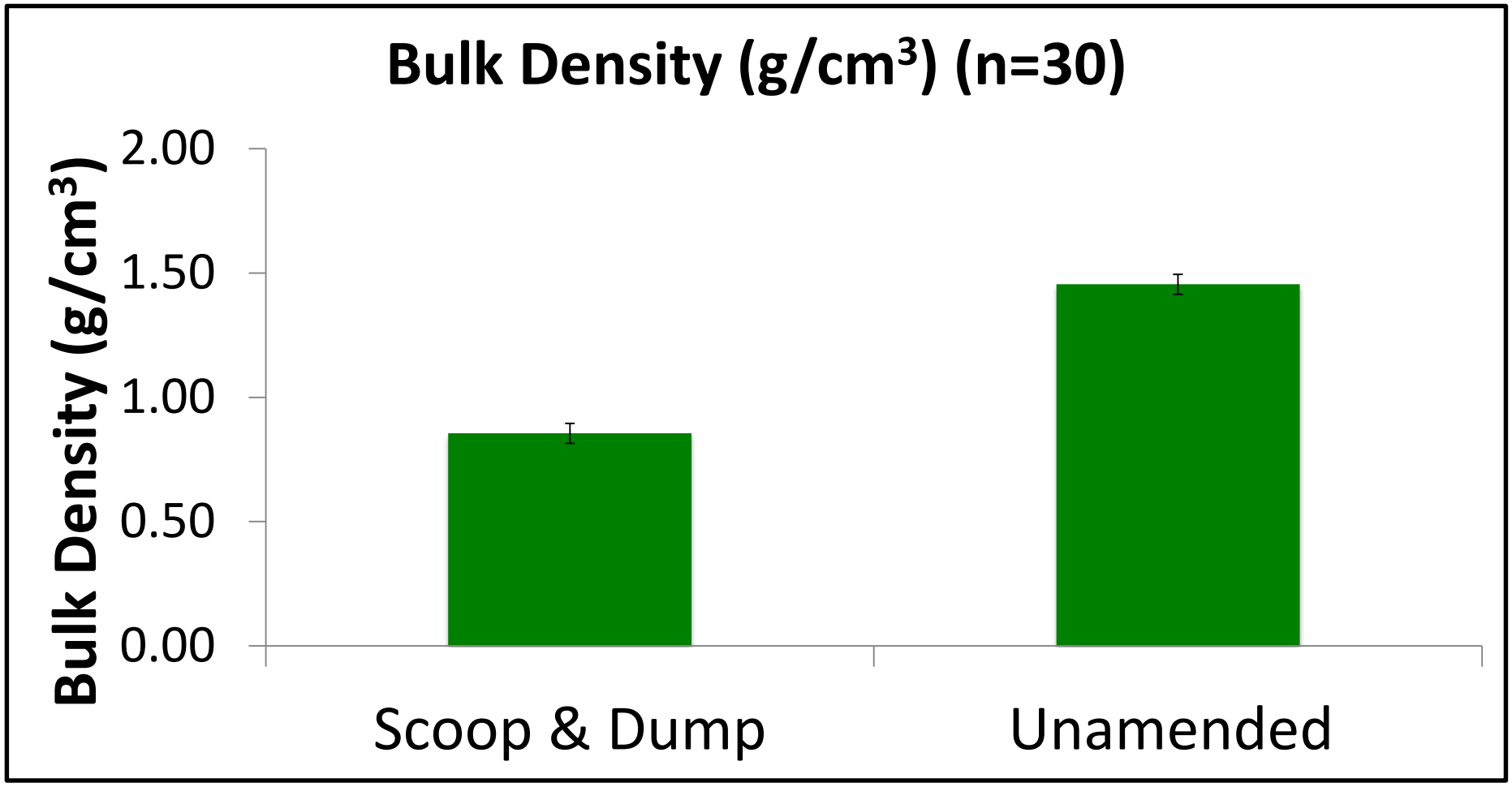


Scoop & Dump	Unamended	Std. Err.	P Value
0.23	**0.15**	**0.01**	**<.0001**

Resistance (Penetrometer)



Treatment	Mean	St. Dev.
Scoop & Dump	9.74	2.24
Unamended	3.44	1.65



Avg. Bulk Density

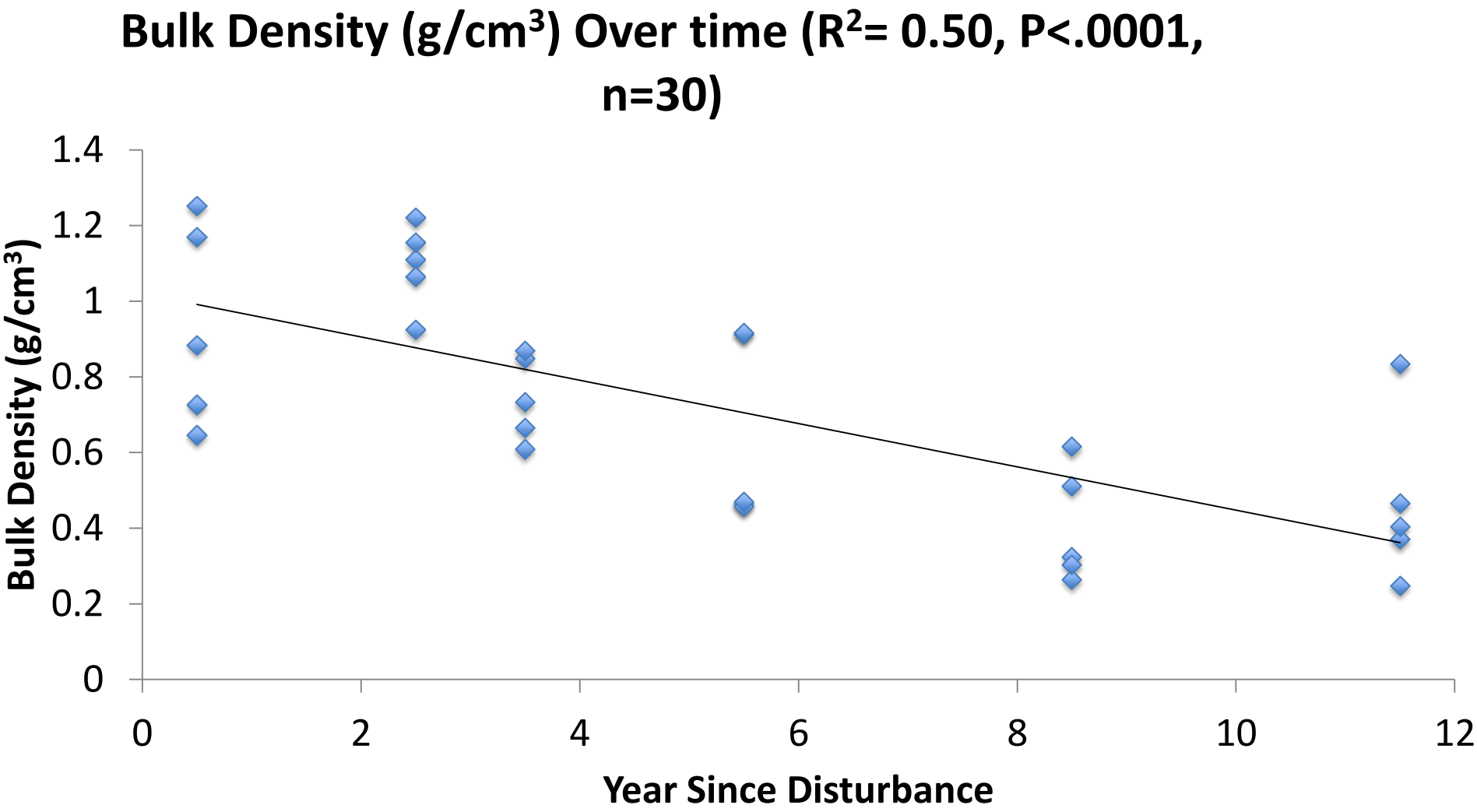
S&D	Unam.	Std. Err.
0.89	1.47	0.06

Root Limiting Bulk Density

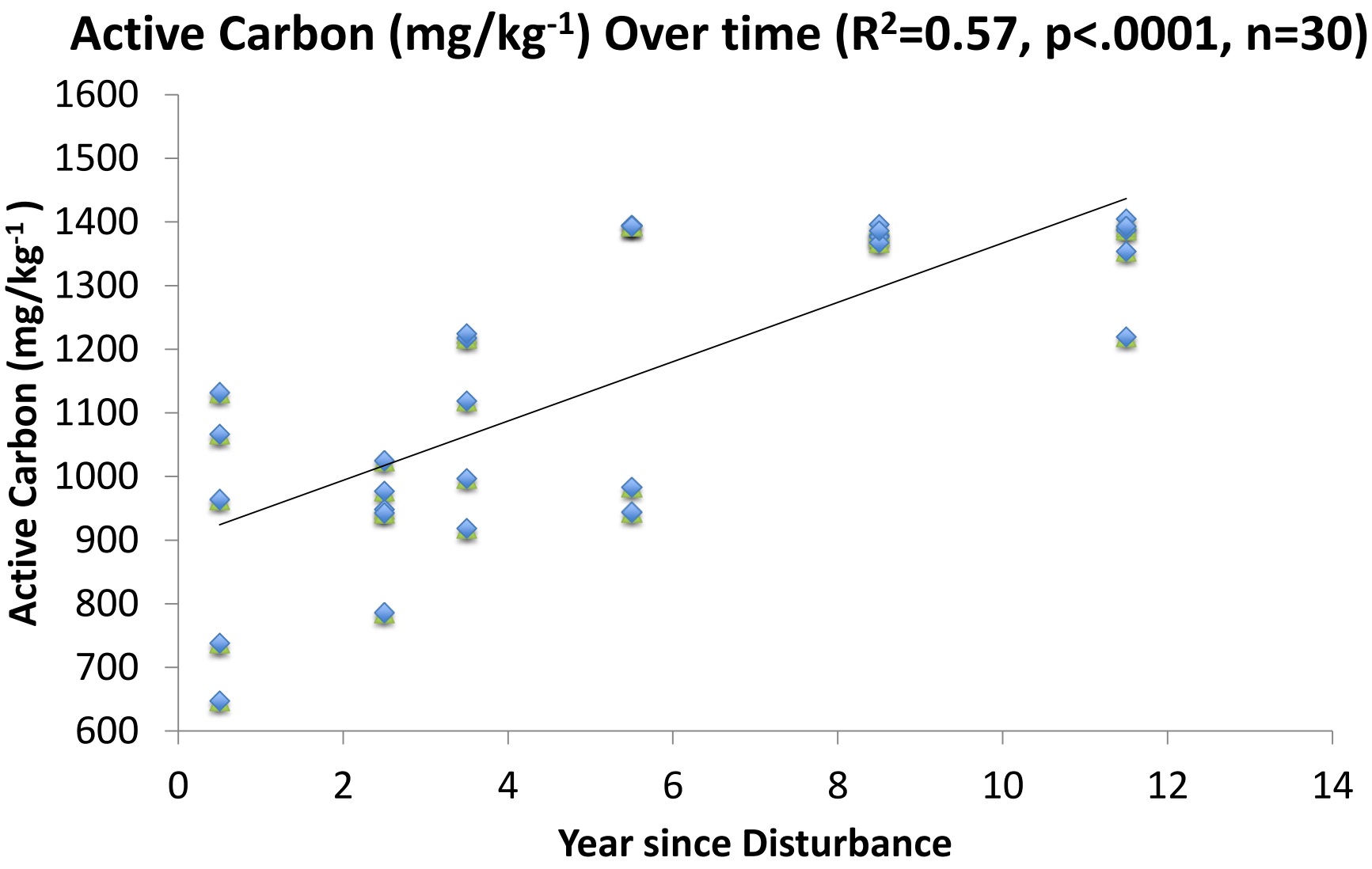
Texture	Bulk Density
Sand	1.75 (g/cm³)
Silt & Clay	1.40 (g/cm³)

Scoop & Dump Over Time

Bulk Density



Active Carbon

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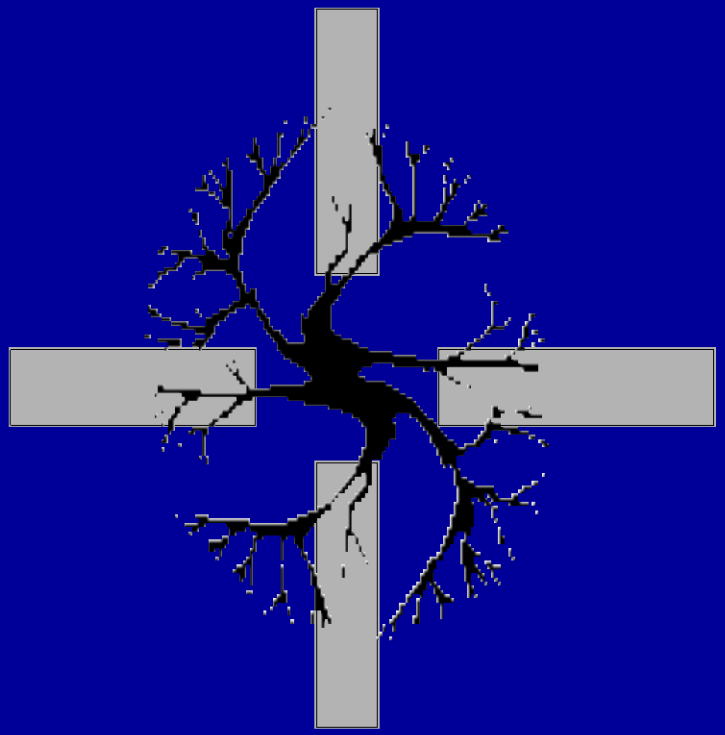
Amending a Soil

- **incorporate at least 33- 50 % by volume of a well composted organic matter**
- **amend over a site, never amend a hole**
- **work in to a depth of at least 18 inches**
- **be sure that excess water in soil can drain**
  - **sufficient topography to drain water**
  - **Use French drains where appropriate**
  - **install sub-surface drainage just above unamended soil**

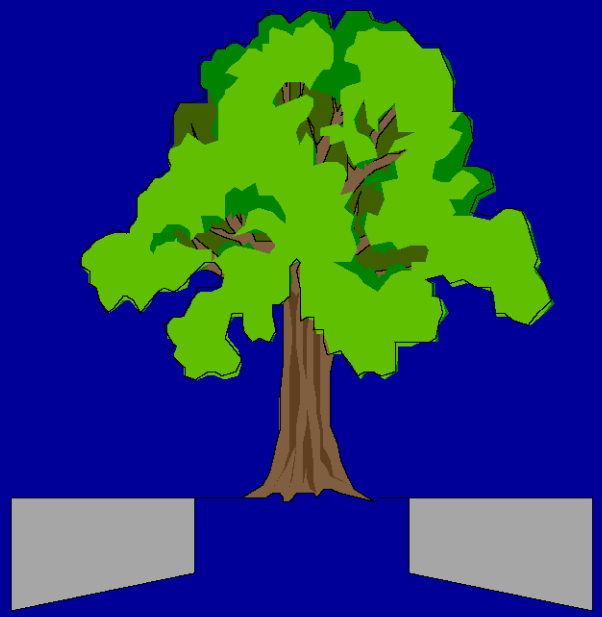
Benefits of Preparing a Landscape Bed

- **provides greater rooting volume for plants**
- **easier for plant roots to establish**
- **more consistent water movement into bed**
- **easy to plant once bed is prepared**

Radial Trenching



Radial trenching--plan view

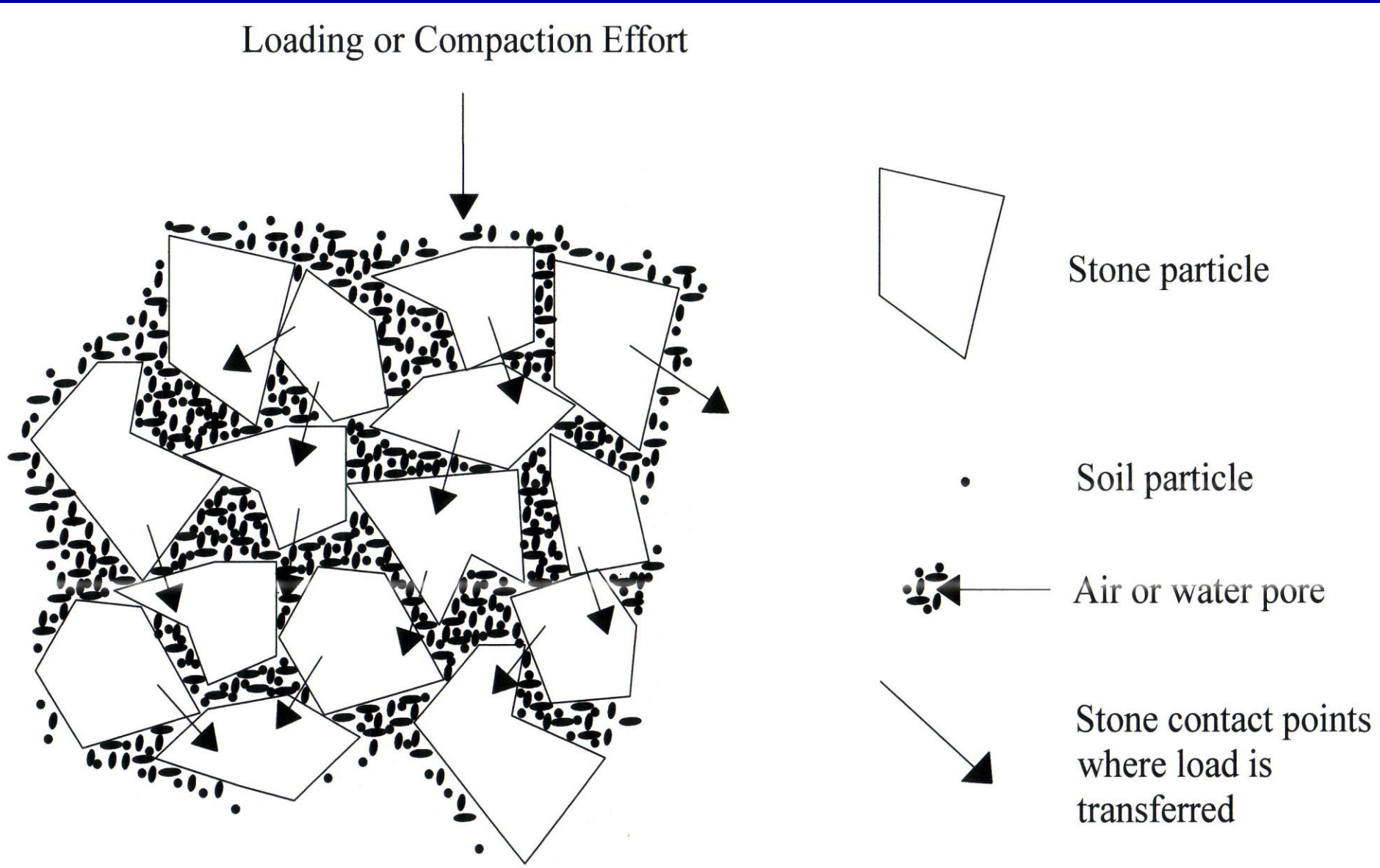


Radial trenching--section

Required compaction prior to laying pavement.

How Much Soil Does a Tree Need?

2 cubic feet of soil for every 1 square foot of crown projection


Loading or Compaction Effort
Stone particle
Soil particle
Air or water pore
Stone contact points where load is transferred

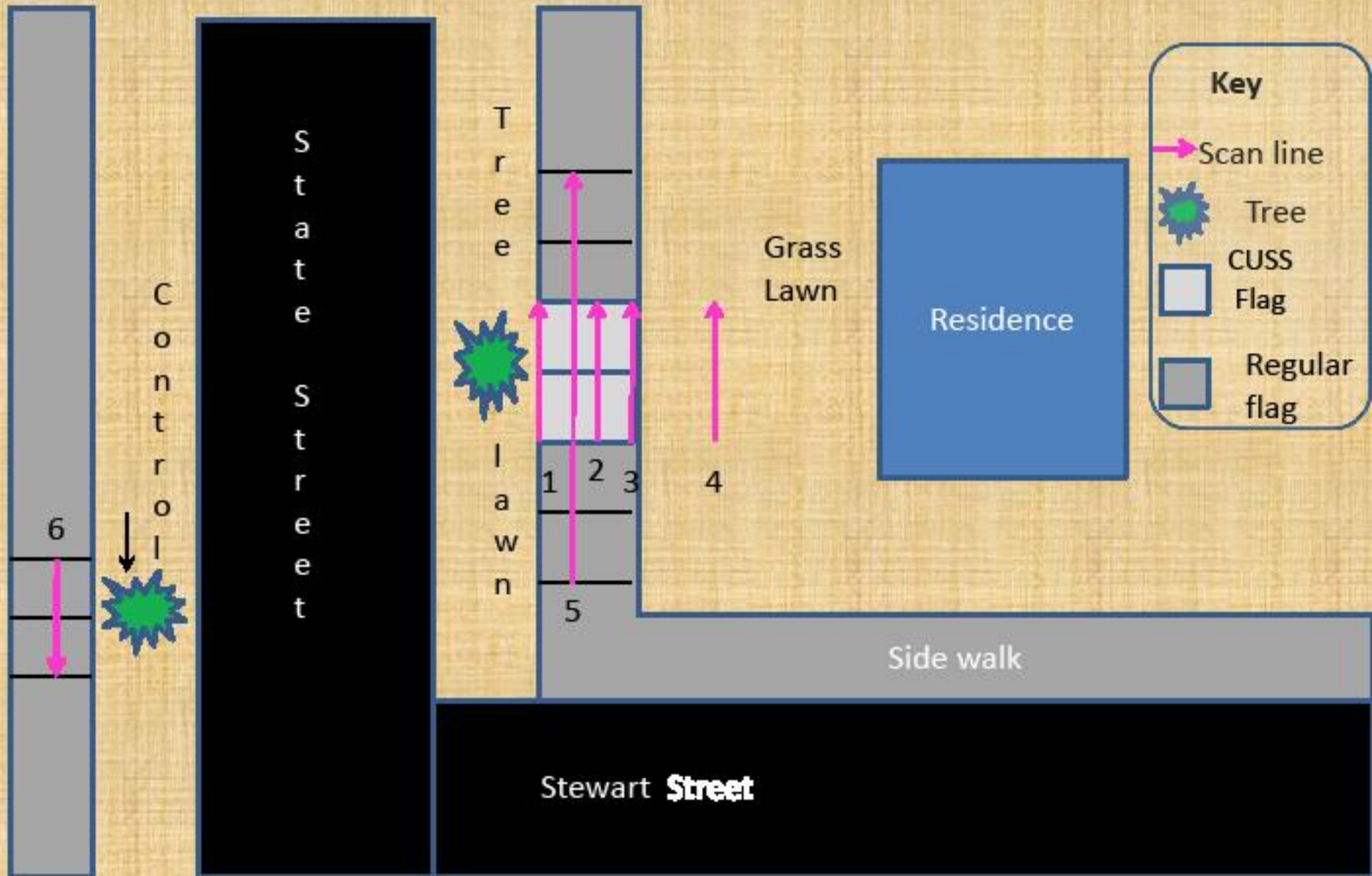
Roots growing through CU-Structural Soil


FORD
SURESKY
TRUCK
CENTER
GOSHEN,N.Y.

Ithaca, NY plaza with trees in structural soil

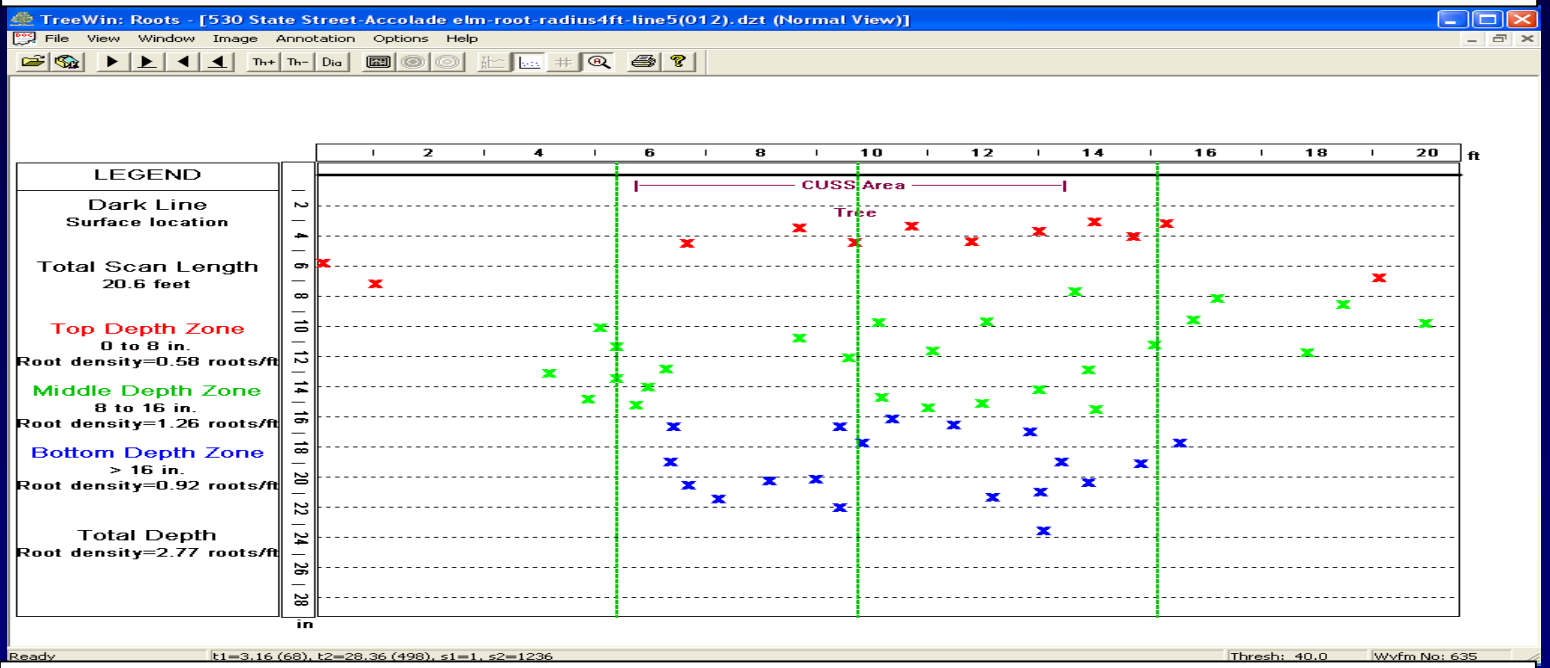
Frontier Elms in in CU-Structural Soil planted 8 years

530 State Street Accolade™ Elm

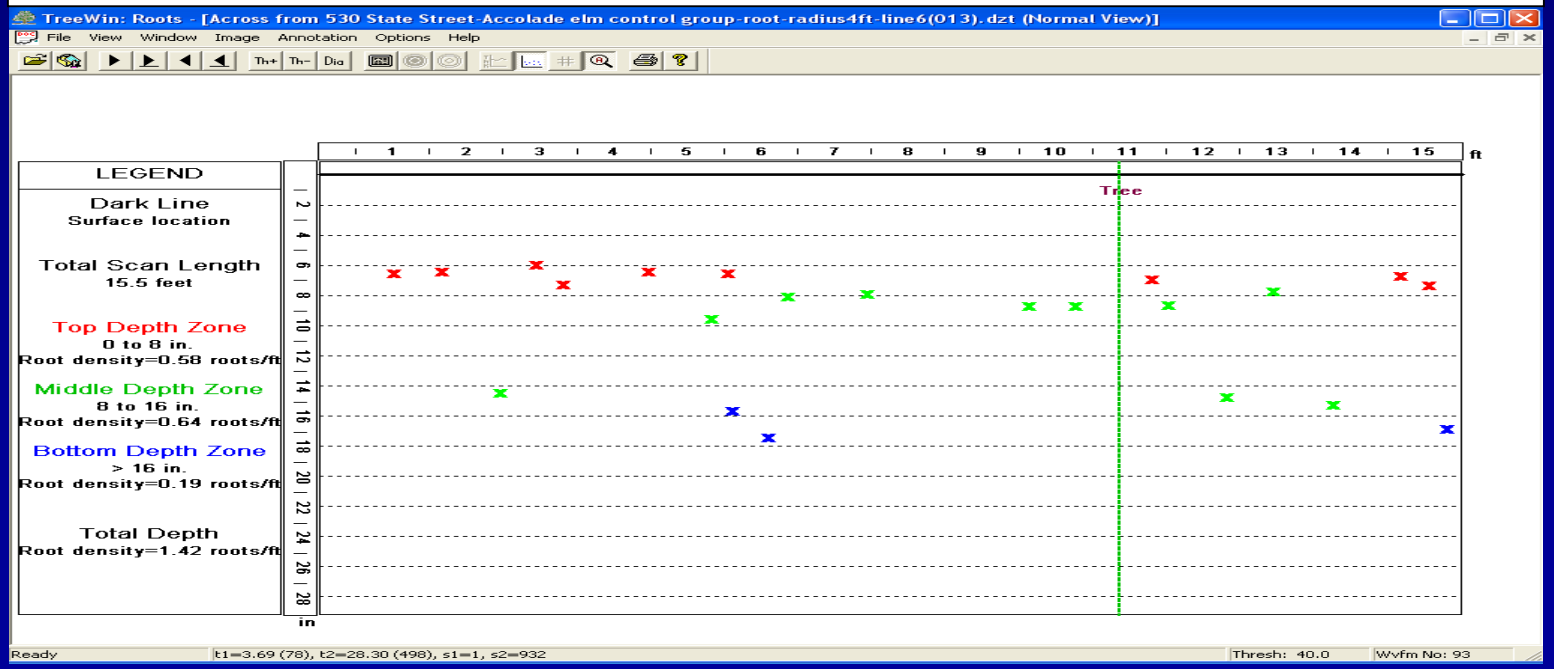



TREE
WORK
AHEAD

530 State Street - Scan # 5 - Length = 20.6ft - July 3 '08



530 State Street - Scan # 6 - Length = 15.5ft - July 3 '08




S&F
S&F


S&F

Porous Asphalt Research -

Planting in CU-Structural Soil


08.08.2012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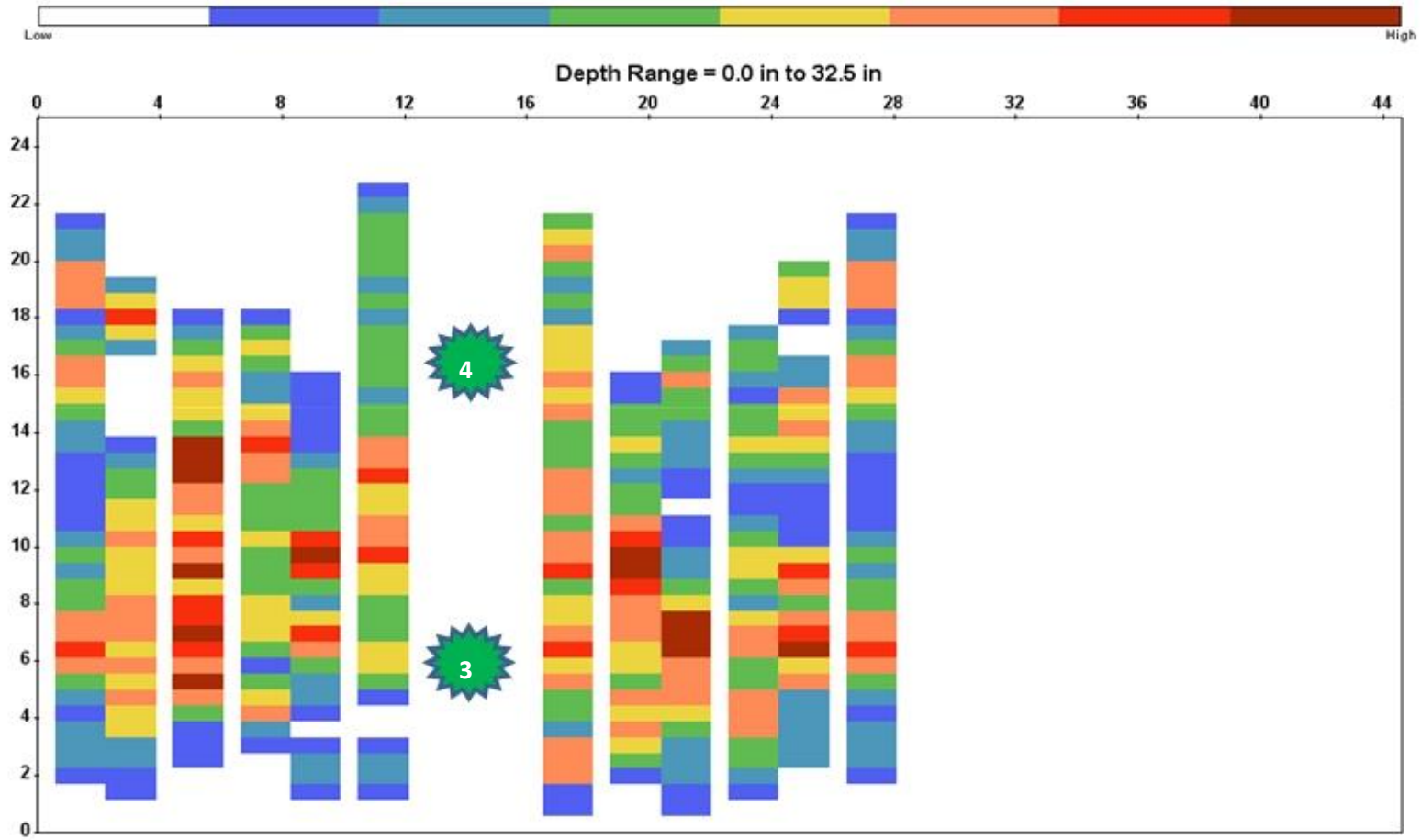
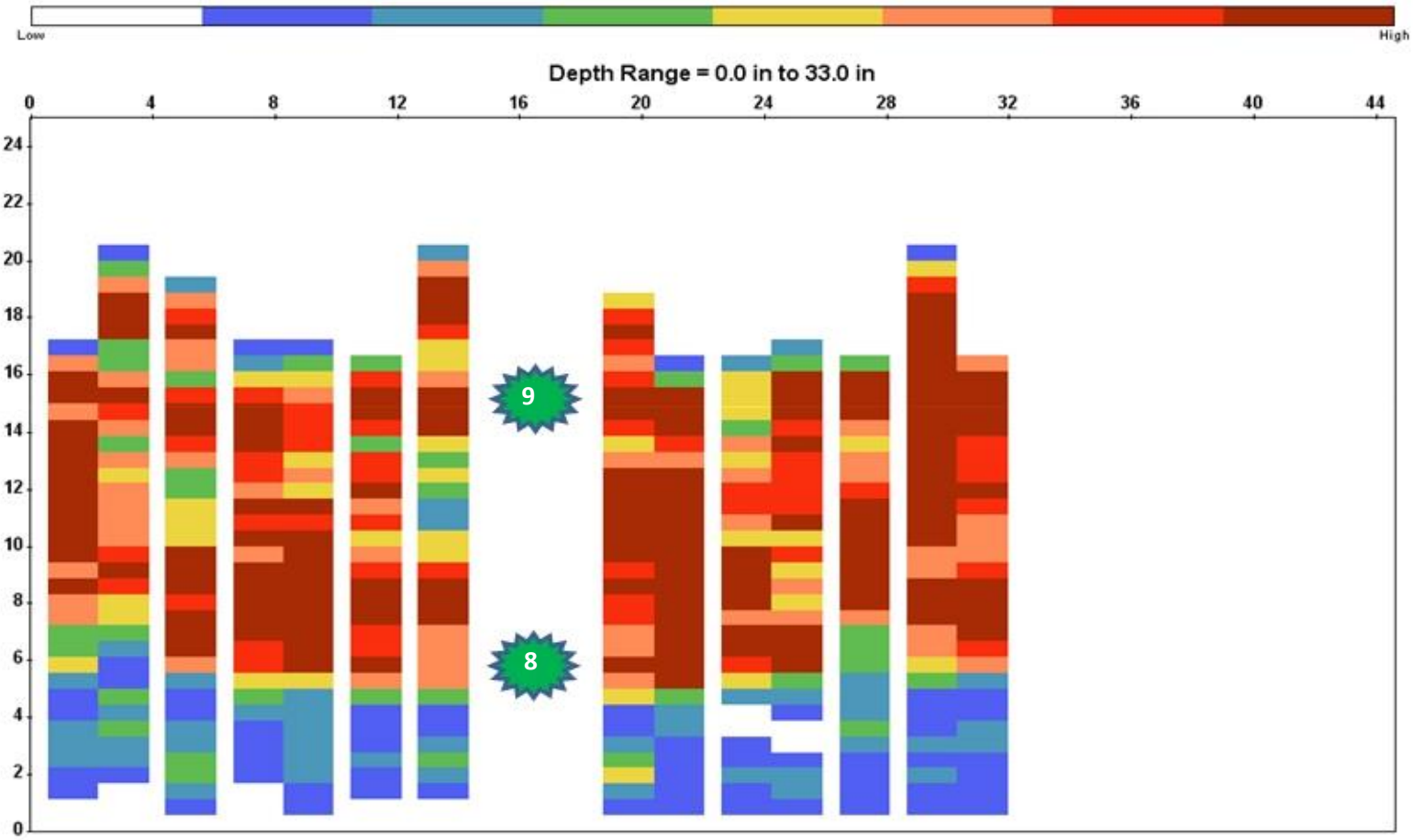
Non-Porous Lot. Root Density



Note: not to scale

Porous Lot. Root Density



Note: not to scale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