AN URBAN SOIL PRIMER

IDENTIFYING & SOLVING PROBLEMS IN URBAN RIGHTS OF WAY

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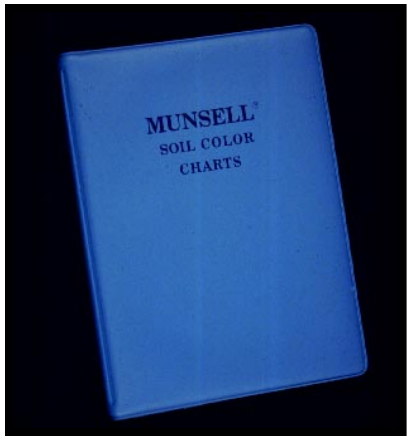
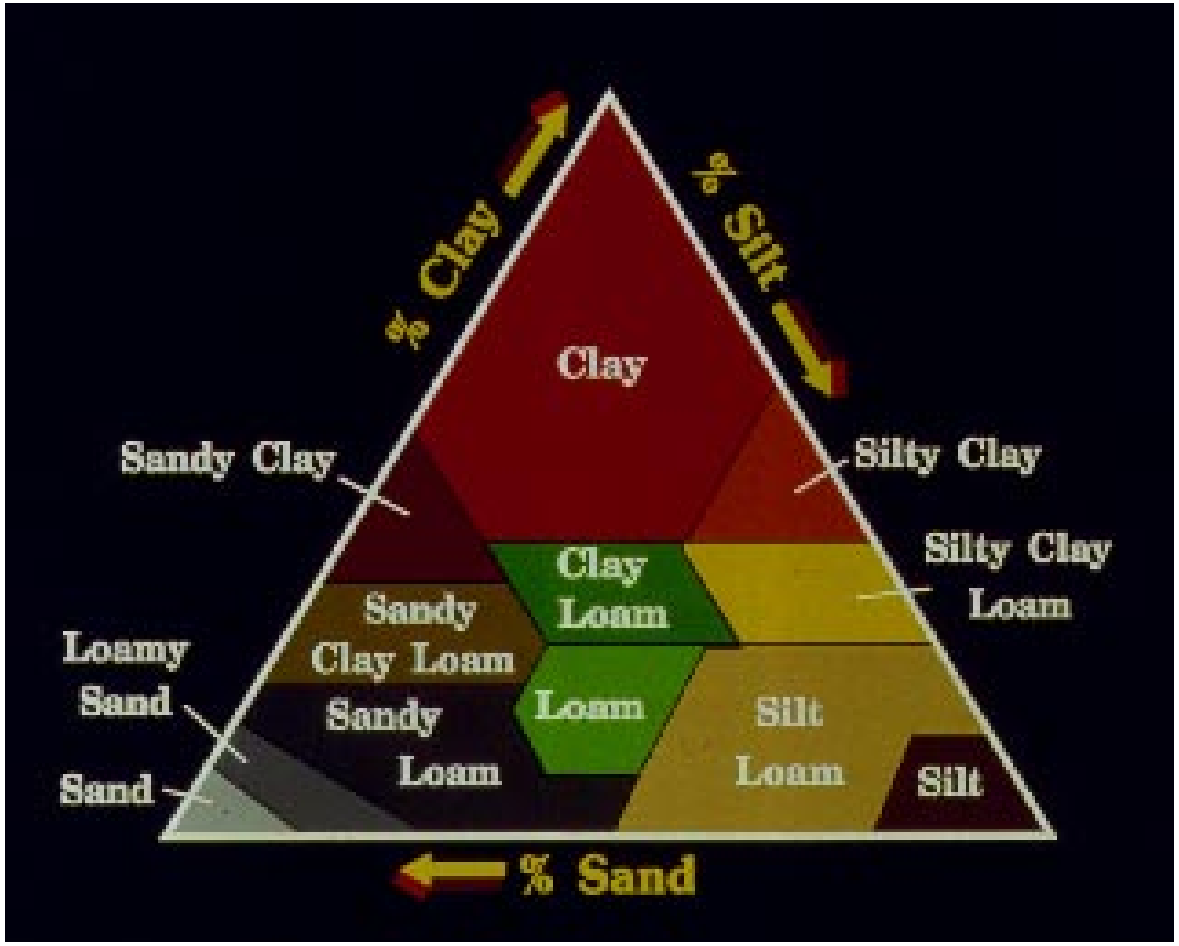
Soil Color



Textural Triangle



Field Soil Texture Test

1

2

3

4

5

Granular Structure

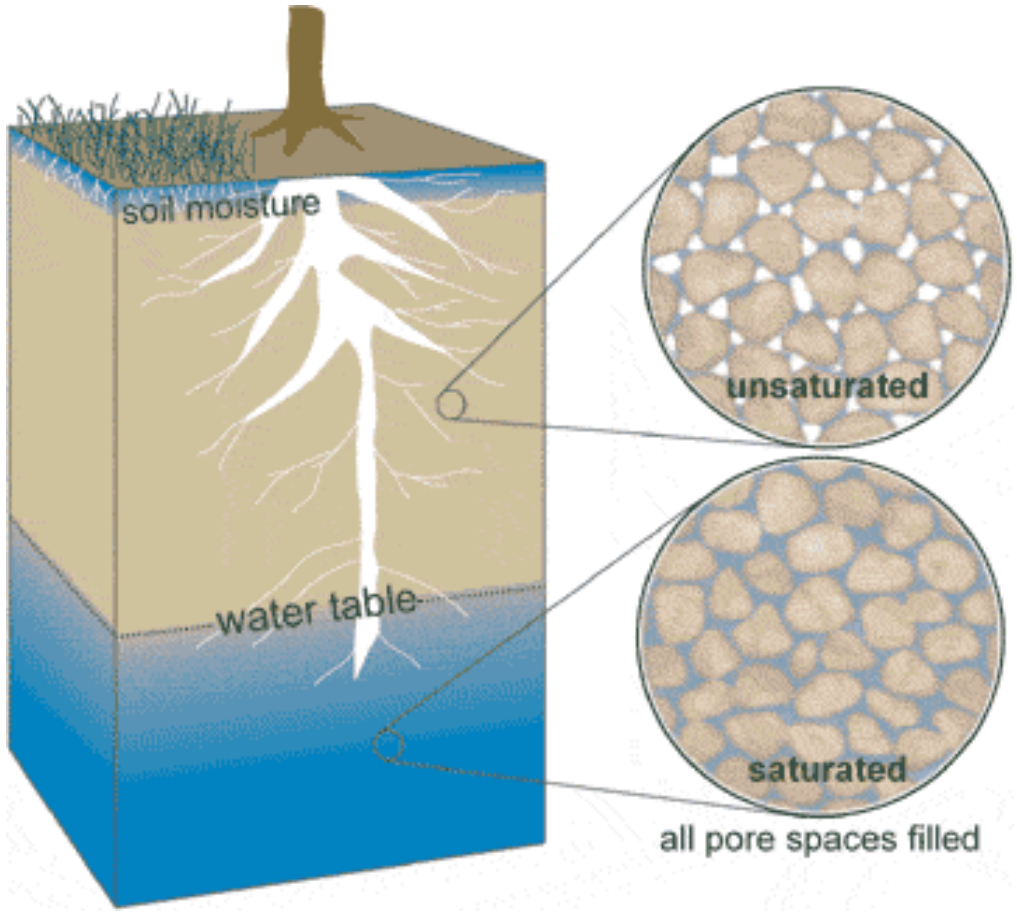
Platy Structure

Blocky Structure

Angular

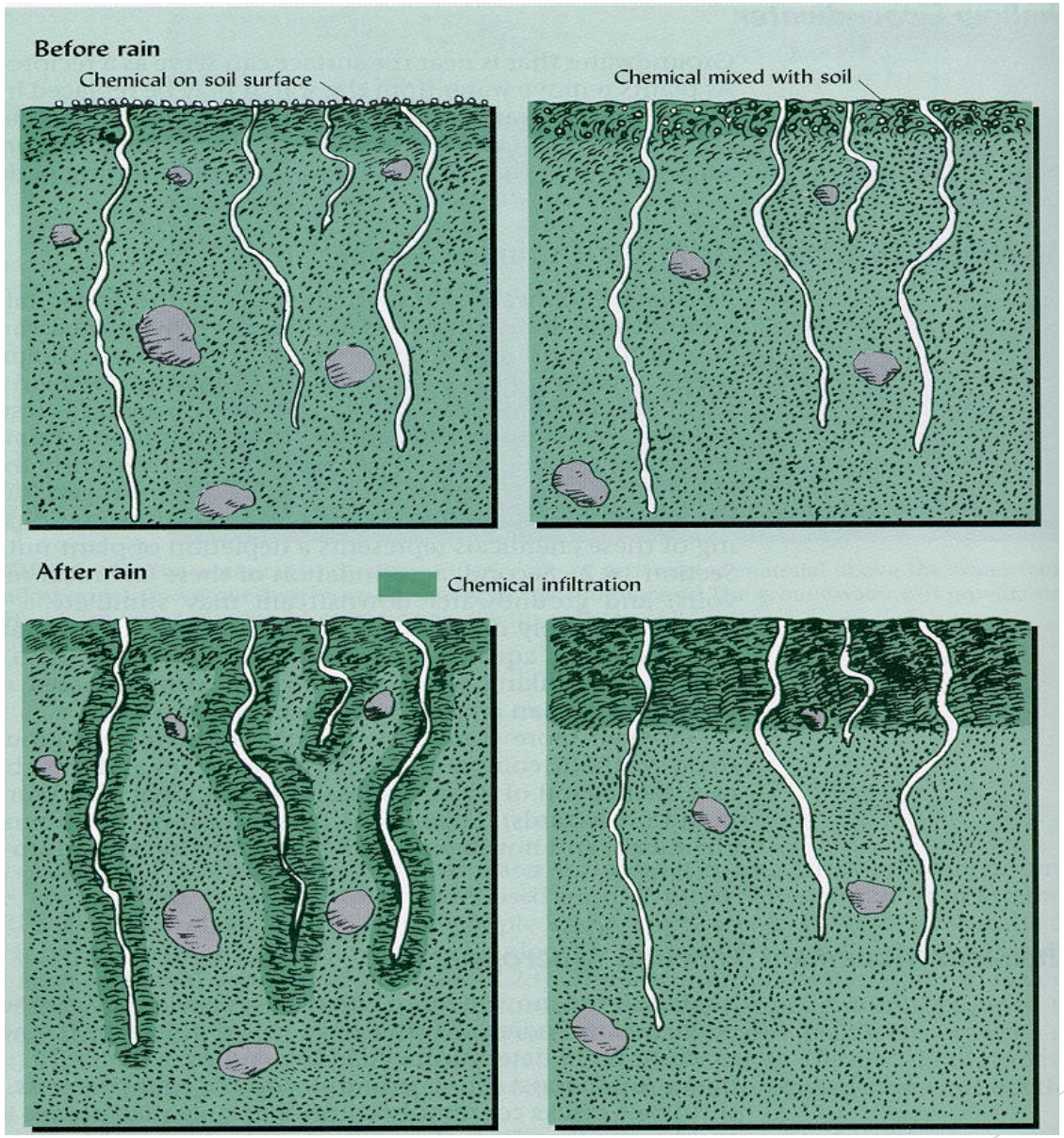
Subangular

Prismatic Structure


soil moisture
water table
unsaturated
saturated
all pore spaces filled

Pore Space = Preferential Flow

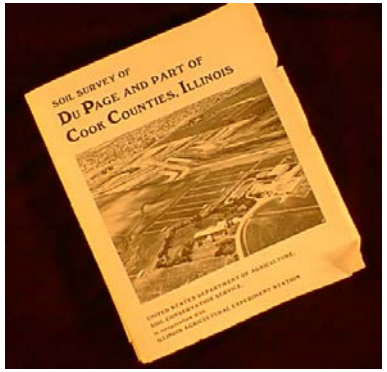
Chemical Movement Through Macropores

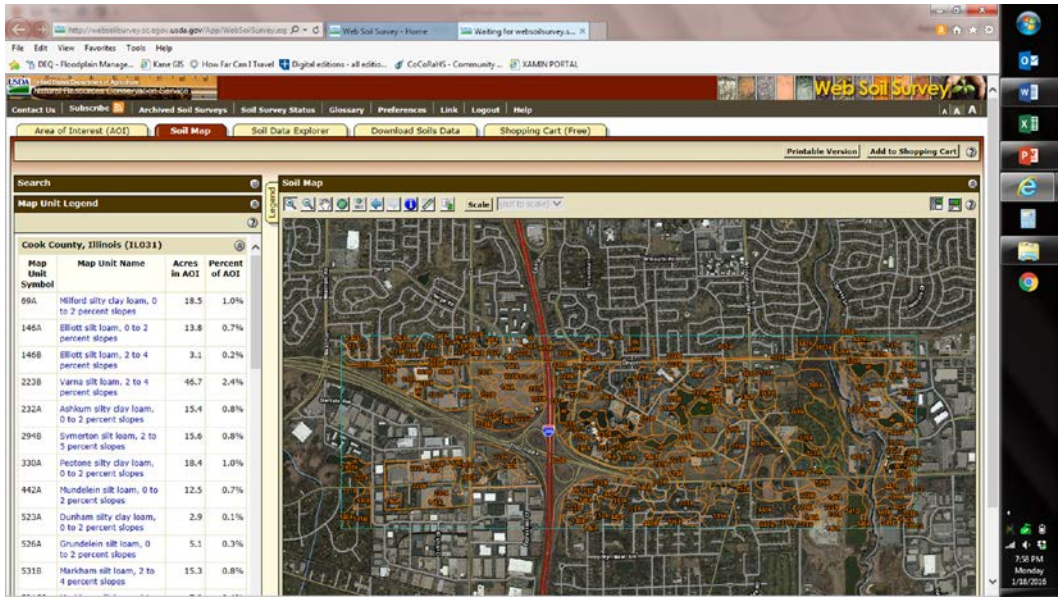


Site Analysis

- Gather Published Information
  - Preliminary Design showing ROW limits
  - Historic site information
  - Drainage Sytems and Easements including Tiles and Storm Sewers
  - Overland flow routes
  - Subsurface Drains including mutual drains and tiles controlled by drainage districts
- On-site Evaluation
  - Soil physical characteristics
  - Soil drainage
  - External factors affecting soil conditions

The Value of Soil Survey





- Soil Identification Data
- Pre-existing Drainage Conditions
- Sources of On-Site Materials
- Information Concerning the Physical and Chemical Soil Characteristics

Search

Map Unit Legend

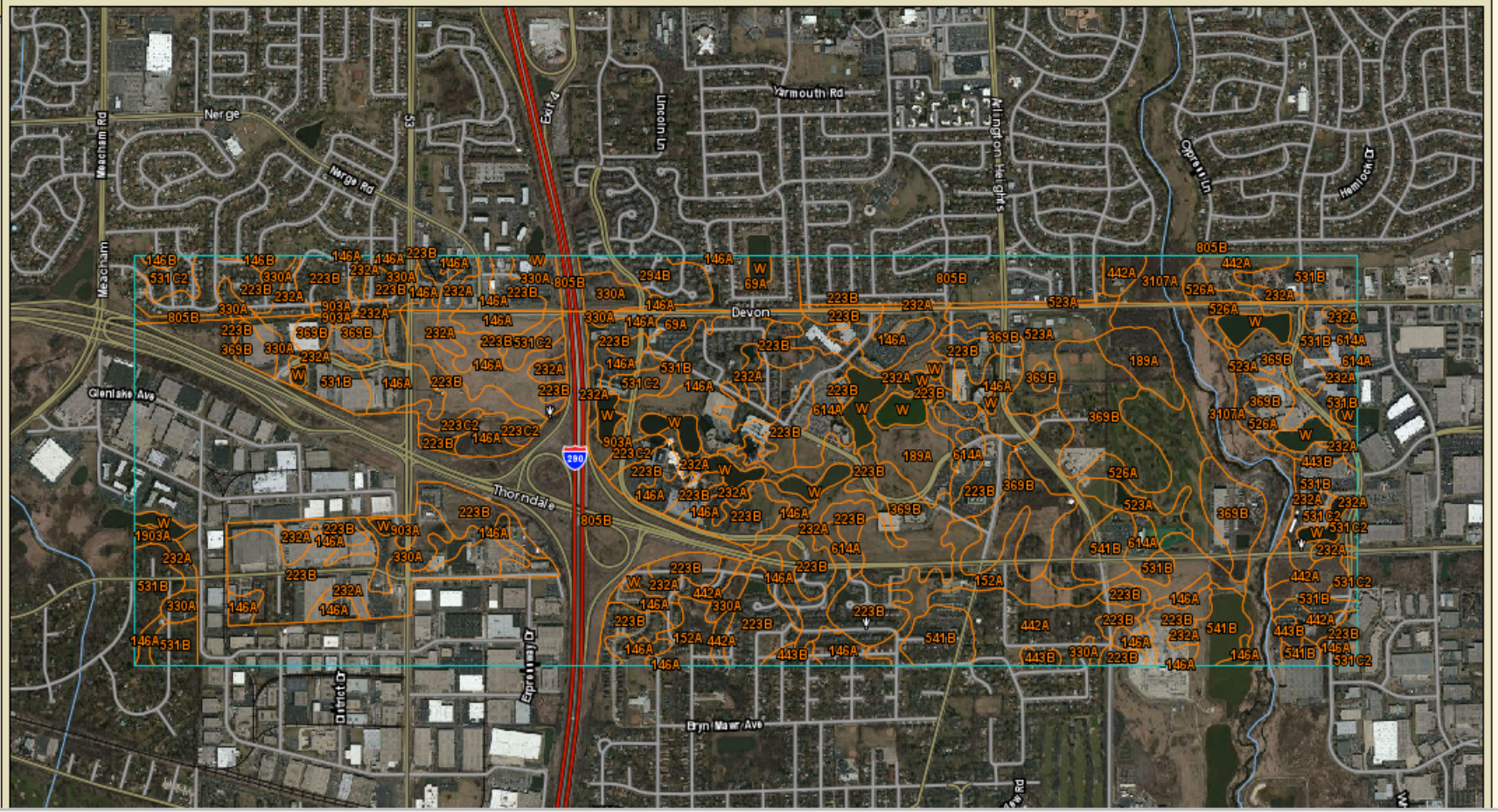
Cook County, Illinois (IL031)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
69A	Milford silty clay loam, 0 to 2 percent slopes	18.5	1.0%
146A	Elliott silt loam, 0 to 2 percent slopes	13.8	0.7%
146B	Elliott silt loam, 2 to 4 percent slopes	3.1	0.2%
223B	Varna silt loam, 2 to 4 percent slopes	46.7	2.4%
232A	Ashkum silty clay loam, 0 to 2 percent slopes	15.4	0.8%
294B	Symerton silt loam, 2 to 5 percent slopes	15.6	0.8%
330A	Peotone silty clay loam, 0 to 2 percent slopes	18.4	1.0%
442A	Mundelein silt loam, 0 to 2 percent slopes	12.5	0.7%
523A	Dunham silty clay loam, 0 to 2 percent slopes	2.9	0.1%
526A	Grundelein silt loam, 0 to 2 percent slopes	5.1	0.3%
531B	Markham silt loam, 2 to 4 percent slopes	15.3	0.8%

Soil Map

Legend

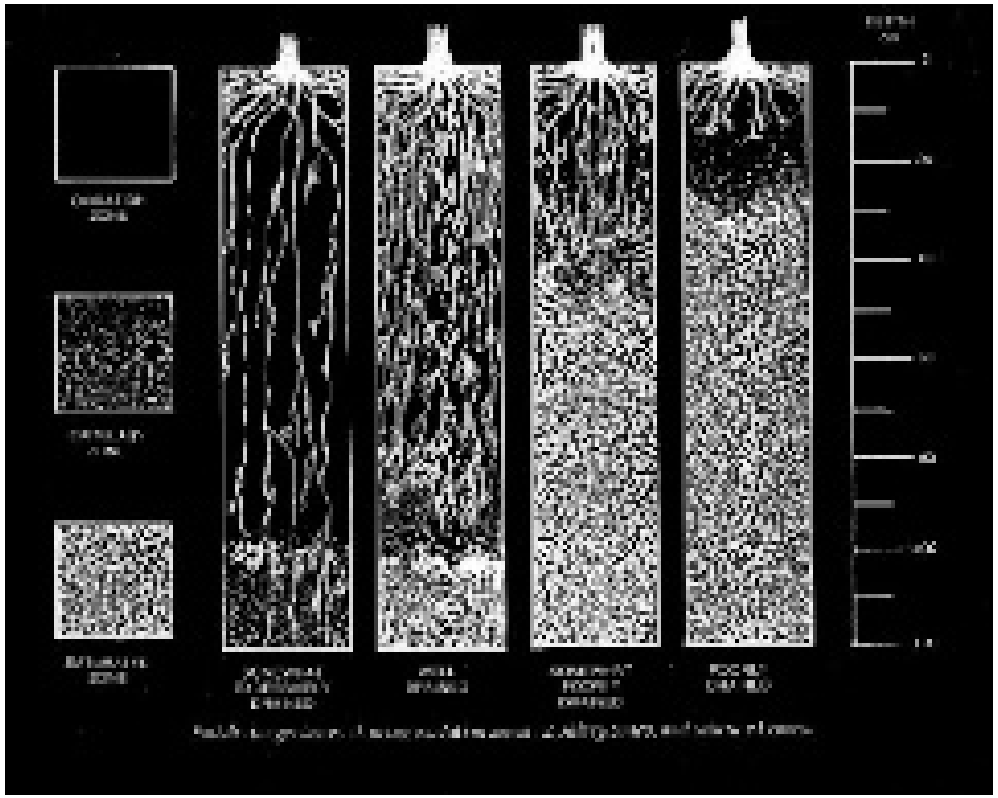
Scale (not to scale)



Web Soil Survey Based on Published Data
websoilsurvey.nrcs.usda.gov/

Understand Drainage

Drainage Classes



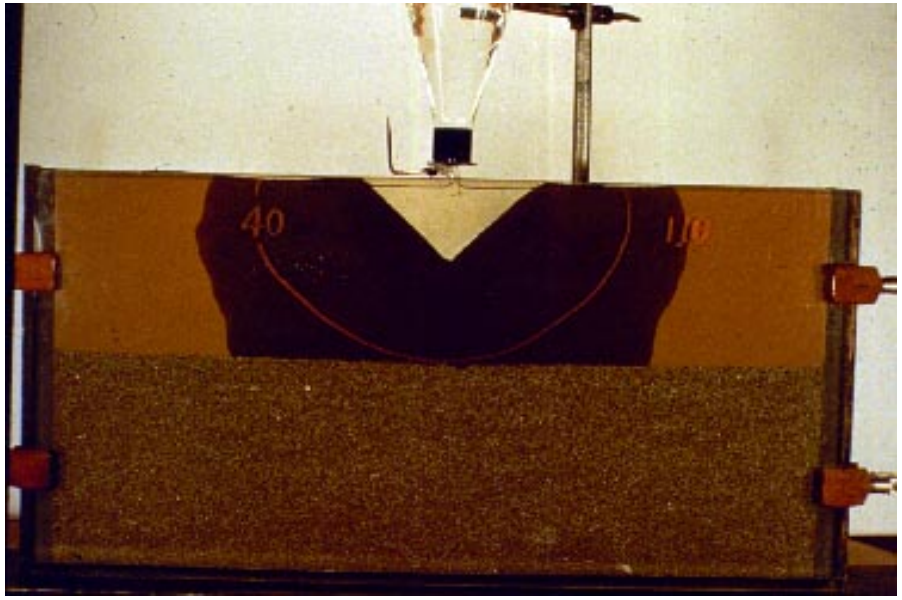
- Well Drained = Optimum Rooting Depth
- Moderately Well = Slightly Reduced Rooting Depth
- Somewhat Poorly = Restricted Rooting
- Poorly = Severely Restricted Rooting

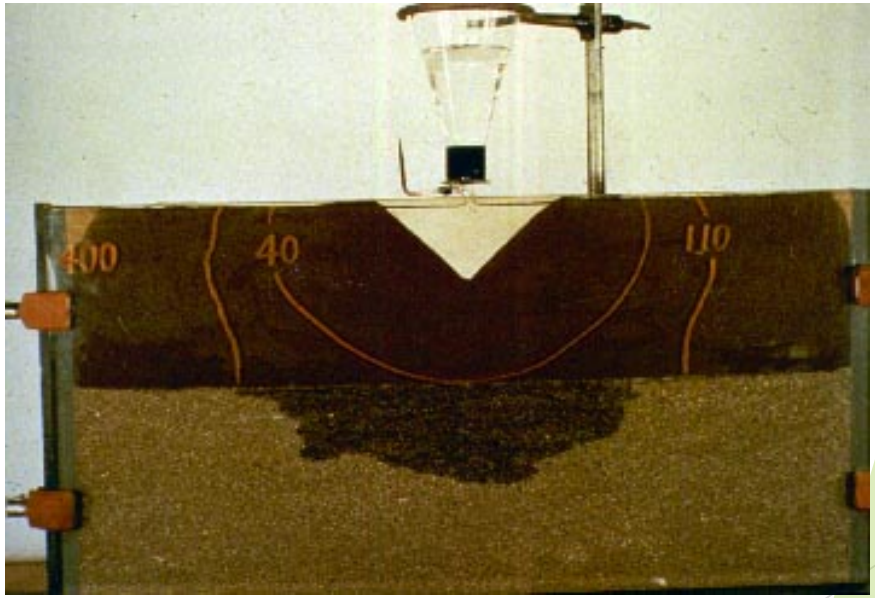
Seasonal High Water Table

Vadose Zone

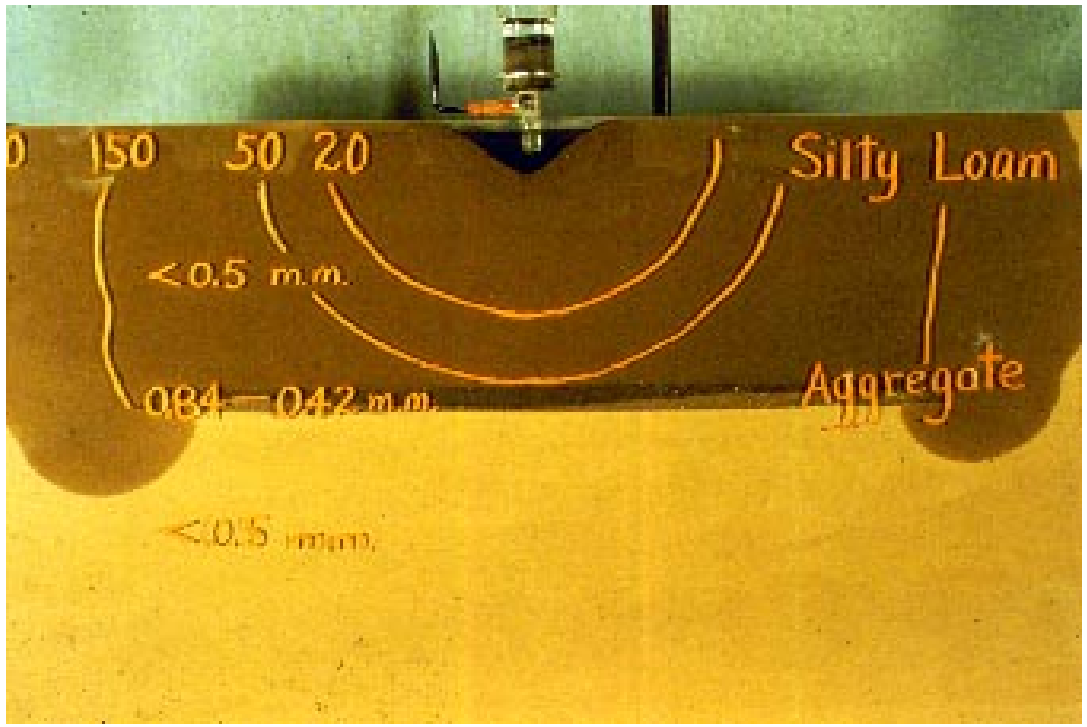
Saturated Zone

Textural Discontinuity





Textural Discontinuity

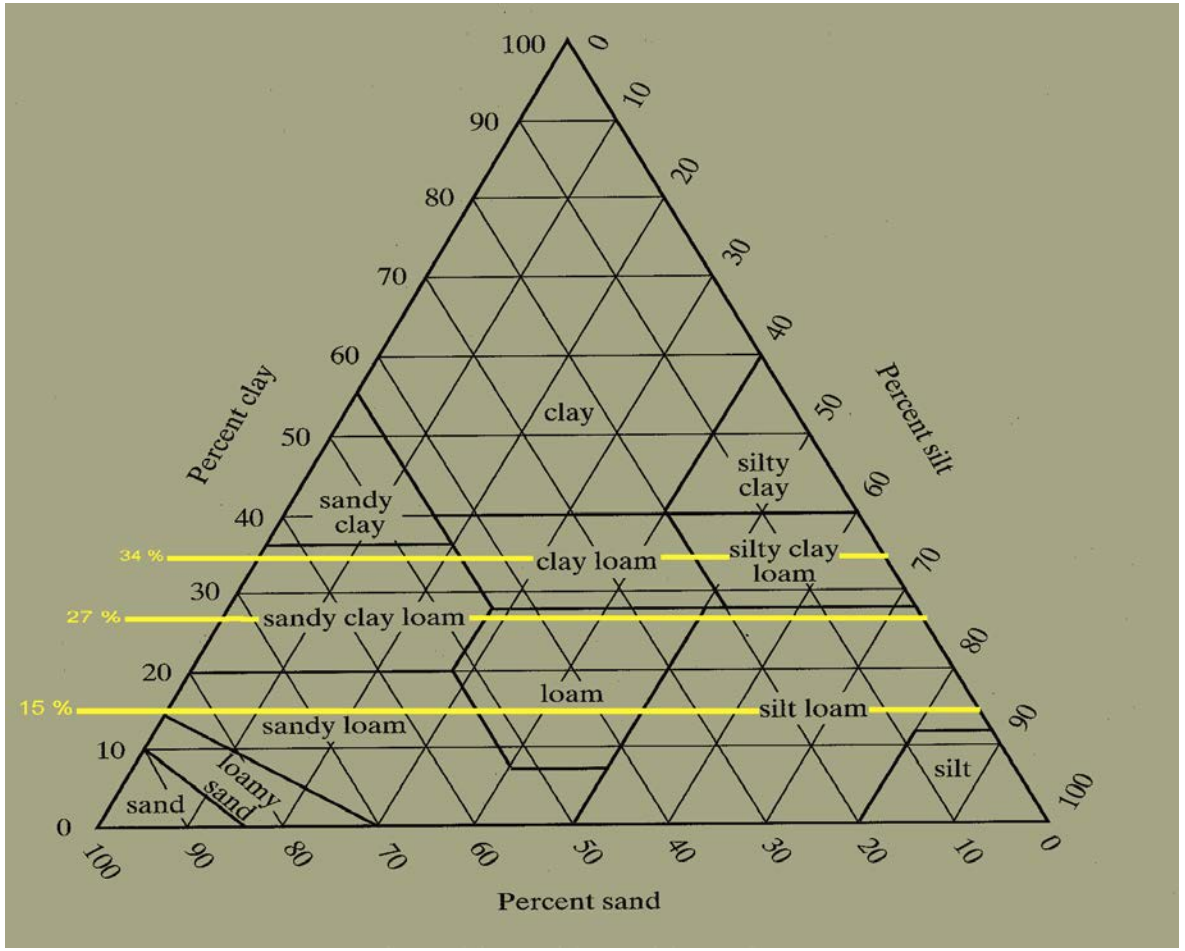


- Fine-Textured Soil
- Coarse-Textured Lens
- Fine-Textured Soil

Salt-Affected Soil Classification

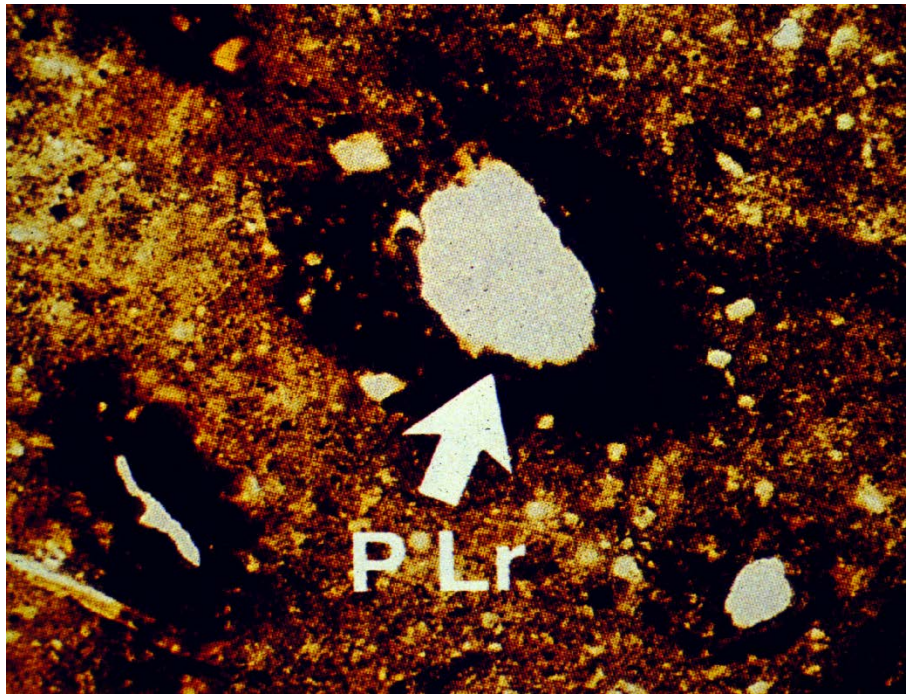
Classification	Conductivity (mmhos/cm)	Soil pH	Exchangeable Sodium Percentage	Soil Physical Condition
Saline	>4.0	<8.5	<15	Normal
Sodic	<4.0	>8.5	>15	Poor
Saline-sodic	>4.0	<8.5	>15	Normal

Critical Textural Limits



Pore Lining Effects

- Silt + Clay Clogs the Pore
- Fine Organic Matter Seals the Pore
- Carbonate Fills
- Carbonate Cements



Optimal Topsoil Conditions

- High Organic Matter Content
- Low Clay Content
- Moderate Silt Content
- Natural Condition – Stable Aggregates
- Well Developed Macropores
- Moderate to Moderately Rapid Permeability
- Good Internal Drainage
- Stripped Not Pulverized
- Less than 5 Percent Gravel

IDOT Topsoil Material Specification

1081.05 Topsoil and Compost. Topsoil and compost shall be according to the following.

(a) Topsoil. Topsoil shall be loamy soil from the A horizon of soil profiles of local soils. **Loamy soil and the A horizon soil profile are defined in the Geotechnical Manual. The loamy soil shall have an organic content between one and ten percent according to AASHTO T 194. It shall be relatively free from large roots, sticks, weeds, brush, or stones larger than 1 in. (25 mm) in diameter, or other litter and waste products.** At least 90 percent shall pass the No. 10 (2.00 mm) sieve according to ITP 27, and the pH shall be between 5.0 and 8.0 according to ASTM D 4972.

Topsoil shall be capable of supporting and germinating vegetation.

Soil Physical Properties Affecting Plant Establishment

- Soil Texture
- Soil Structure
- Bulk Density
- Lithologic Discontinuity (Textural)
- Internal Drainage
- Consistence
- Plasticity

BOSTON HARBOR PROJECT

PROCESSED LOAM SOIL

FAILURE ON A 2:1 SLOPE

WHAT IS THE CAUSE OF POOR DRAINAGE??

PUTTING IN THE FIX...

NEW LOAM MIX