In Situ Testbeds

- Background
  - Variations in the design of in situ soil moisture networks results in uncertainty in large scale estimates from these networks. Some study of how intercomparisons of these sensors can be made is necessary.
  - A sub-group of the C/V Working Group was formed (led by M. Cosh, ARS) and consists of the leads of the various participating networks, the C/V WG Chair and Project Lead, and other interested C/C WG members.
  - Objective: Demonstrate how differences in sensor design, installation, and spatial sampling area influence the soil moisture data record for an in situ network.
  - A site will be identified and instrumentation installed before June 2010 and if possible operated throughout the SMAP project duration. Support will be provided for installation and operational costs.
  - 42 scientists from around the world have joined the In Situ Testbed Sub-Group of the C/V Working Group with representatives from most of the major soil moisture networks. Memberships is always open.

In Situ Testbeds

- Plans and Timeline:
  - Summer of 2009: Current network resource review
  - Fall of 2009: Visit Site and develop testbed design including replication and depth
  - Winter of 2009: Procure sensors for installation
  - Spring of 2010: Instrumentation installed and quality controlled
  - Summer of 2010: Intensive observational periods, possibly 2 week-long study periods.
  - Fall of 2010: Analyze results and determine re-evaluate needs/plans.

Marena In Situ Sensor Testbed

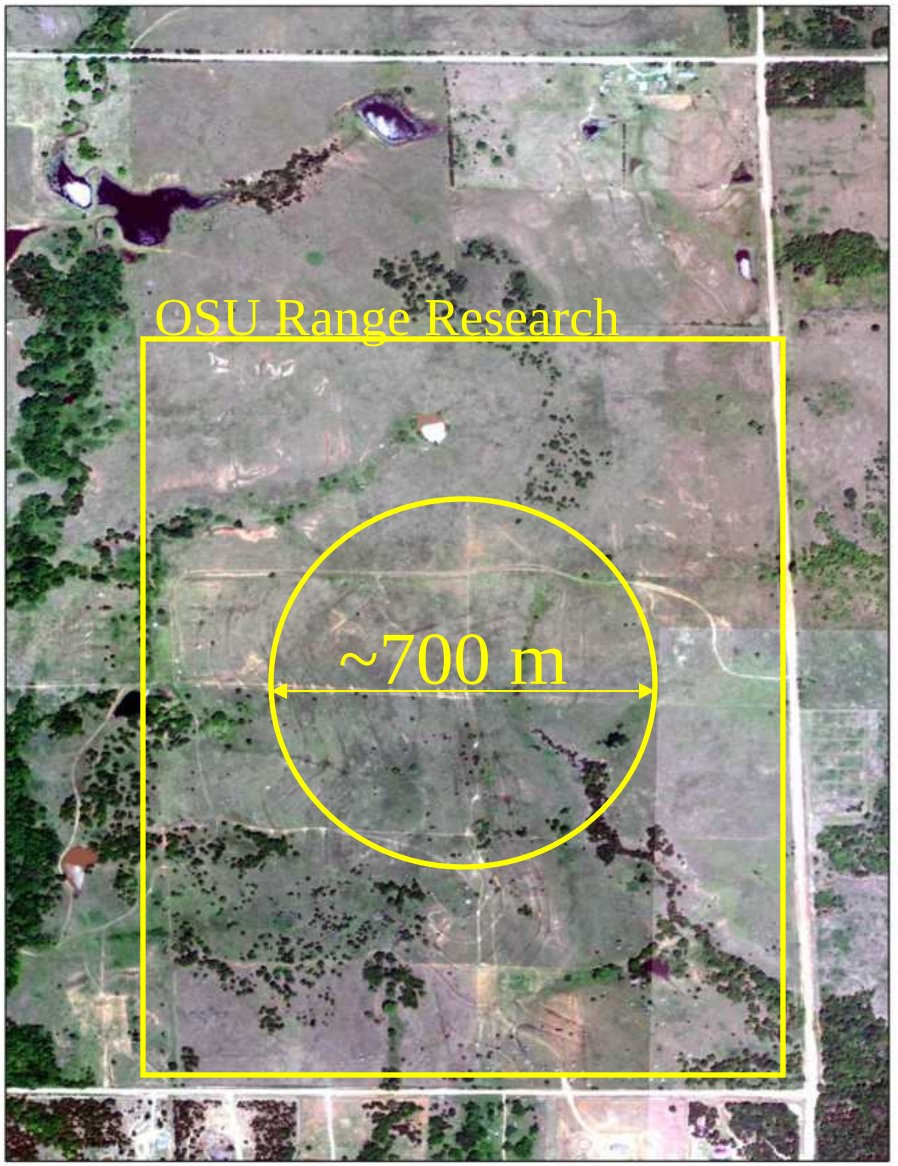
Marena, Oklahoma

- Managed by Oklahoma State University Range Research Station
- Rangeland/Pasture
- Oklahoma Mesonet MARE site in field
- Two NOAA CRN stations nearby
- Local support from OSU Dept. Plant and Soil Science (Ochsner)

Site Visit on October 27th: Cosh, Ochsner, Basara, Braun

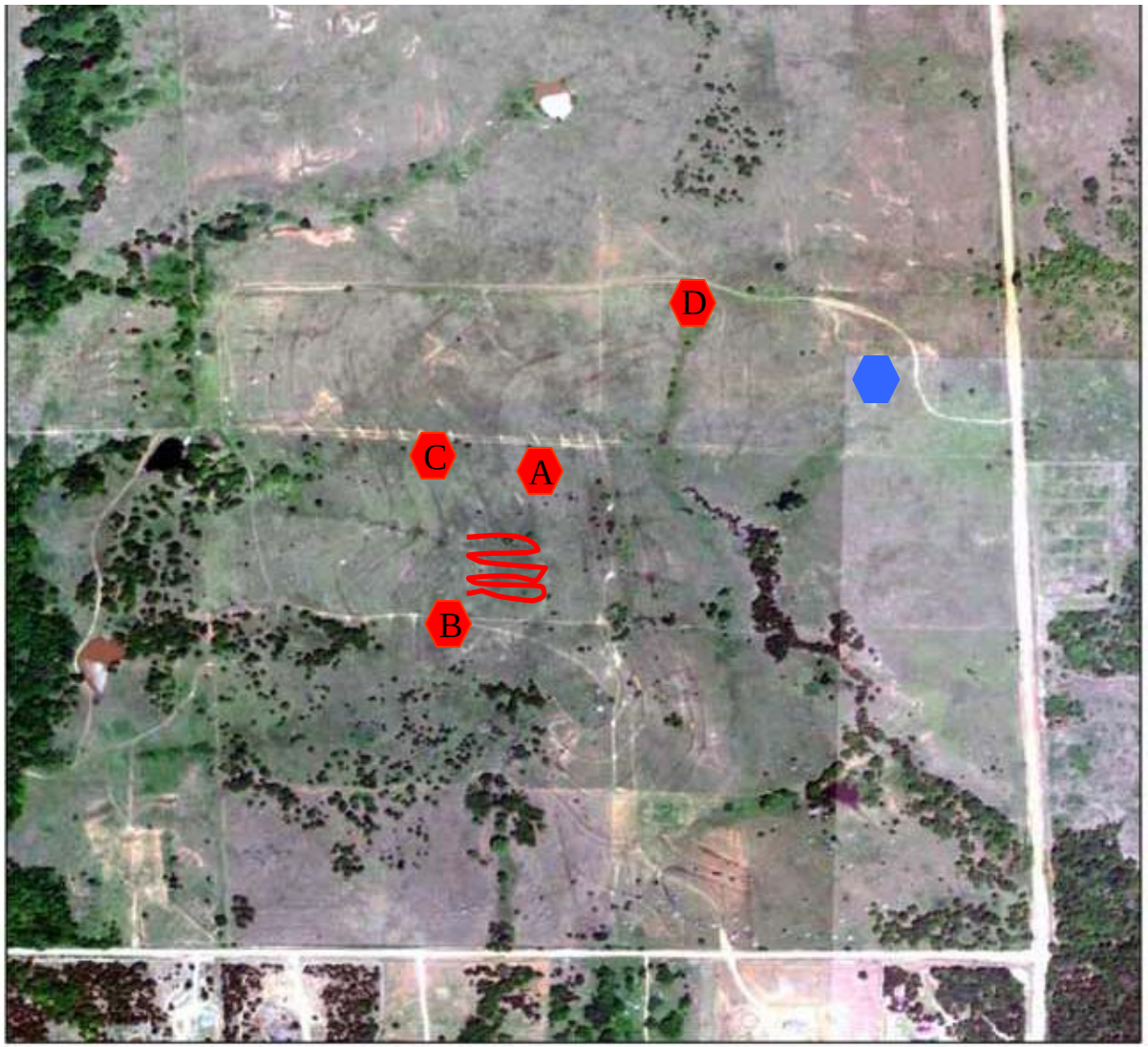
Marena Study Region

- Low topographic relief
- Rangeland
- Mesonet Site

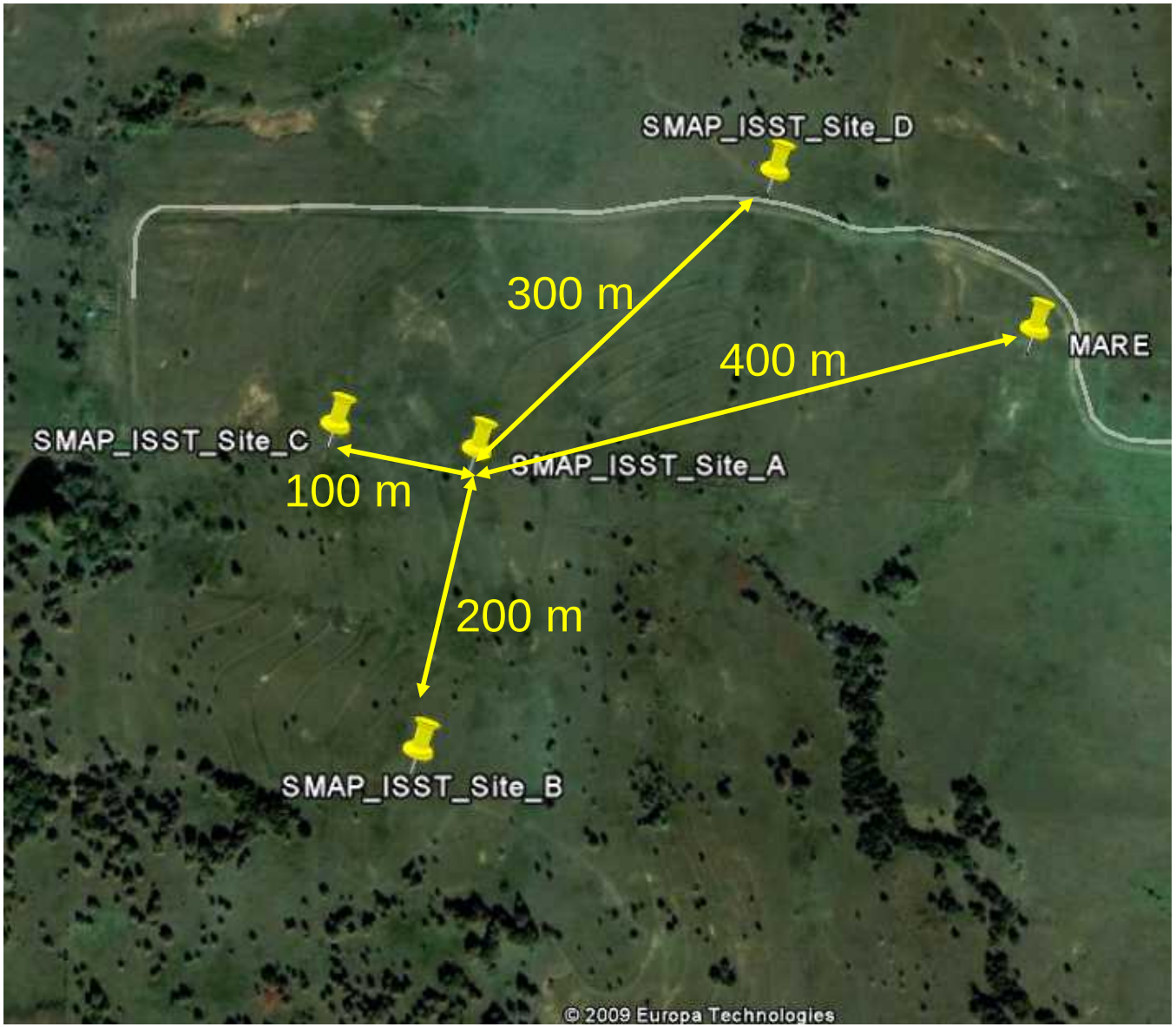


Stations

- ISST Station
- Mesonet Station
- Passive DTS



Other View of Field



Site A pre-install

Site A mid-install

Sensors

The following sensors may be included in the testbed

- Stevens Water Hydra Probes
- Delta-T Theta Probes
- Decagon EC-TM probes
- Sentek EnvironSMART
- Campbell CS615/CS616 TDRs
- Traditional TDR System
- CS 229-L heat dissipation senors (OK Mesonet)
- Acclima Sensor
- Passive Distributer Temperature Sensor System
- GPS reflectometers
- COSMOS system
- ASSH System (TRIME PICO32)
- Climate Reference Network Station (Hydra)

Base Station - Sensors

The following sensors may be included in the testbed

- Stevens Water Hydra Probes (6)
- Delta-T Theta Probes (5)
- Decagon EC-TM probes (5)
- Sentek EnviroSMART Capacitance Probes (4)
- Campbell CS615/CS616 TDRs (5)
- CS 229-L heat dissipation senors (OK Mesonet) (5)
- Acclima Sensor (5)

Common Depths of 5, 10, 20, 50, 100 cm, with some sampling at 2.5 cm with Hydra.

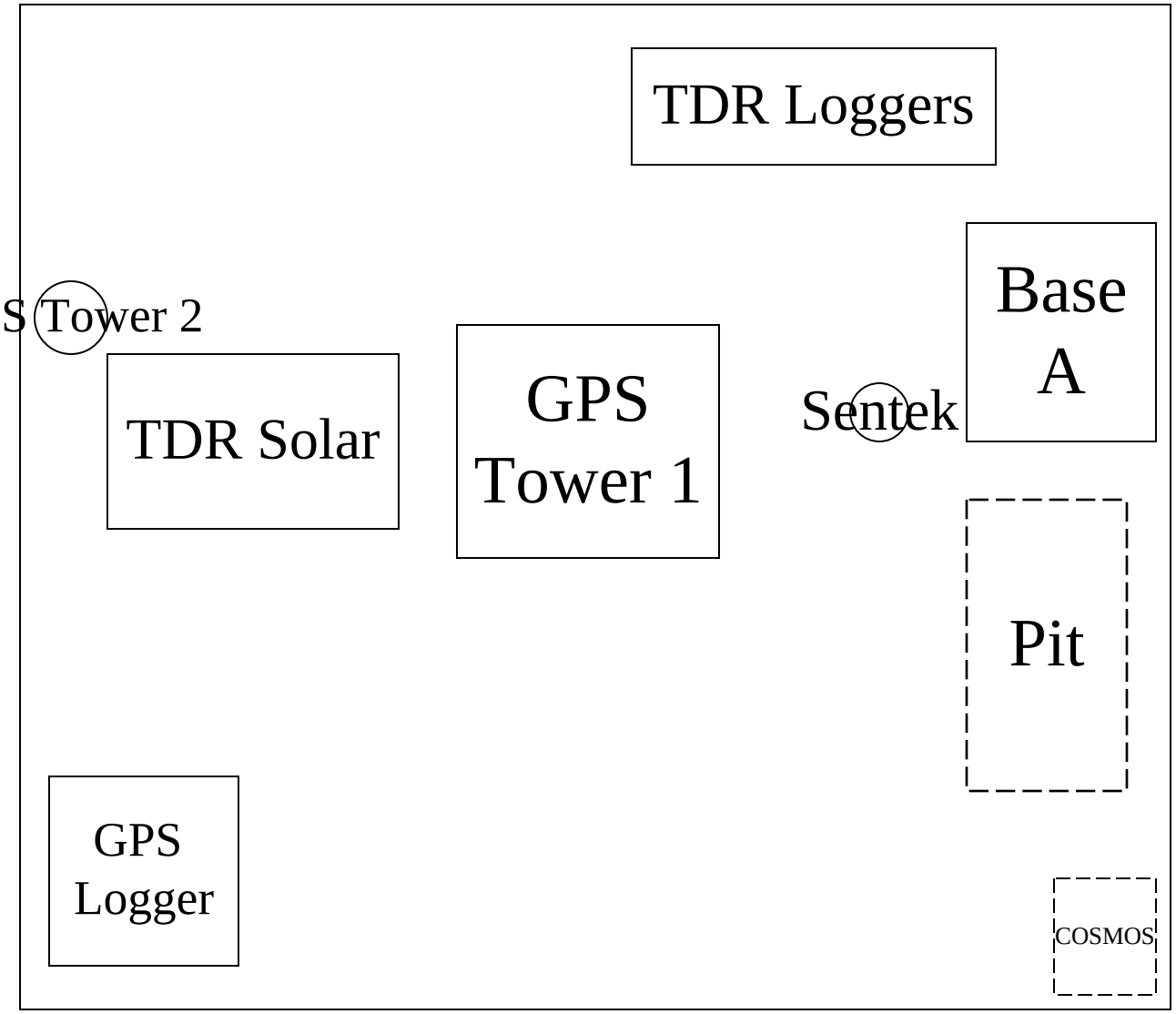
Station Distribution

Site A	Site B	Site C	Site D
Base	Base	Base	Base
GPS	ASSH	GPS	GPS
COSMOS	Passive DTS*		CRN
ASSH			
TDR system			

Installation in May 2010 with intensive ground sampling campaigns in Summer 2010

Site A

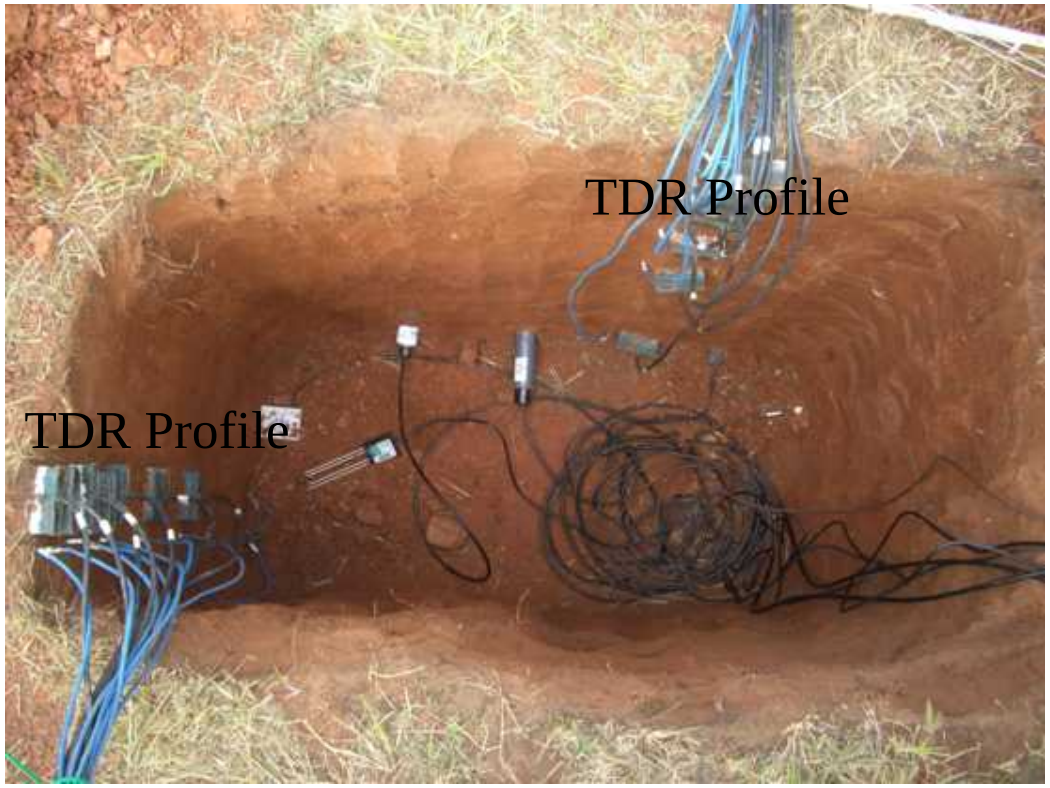
Site A Schematic



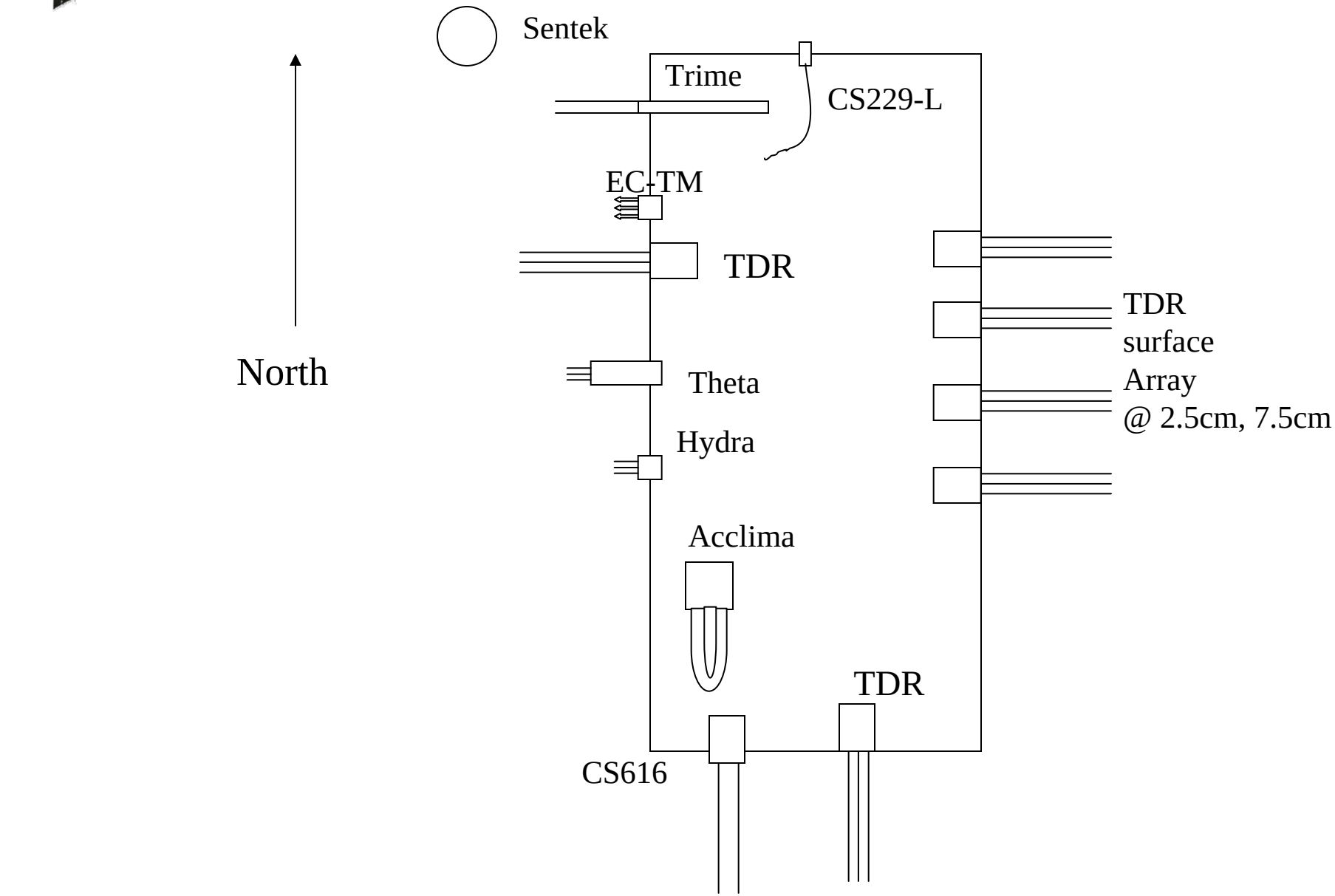
Depths - Base A

- 2.5 cm *
- 5 cm
- 10 cm
- 20 cm
- 50 cm
- 90 cm

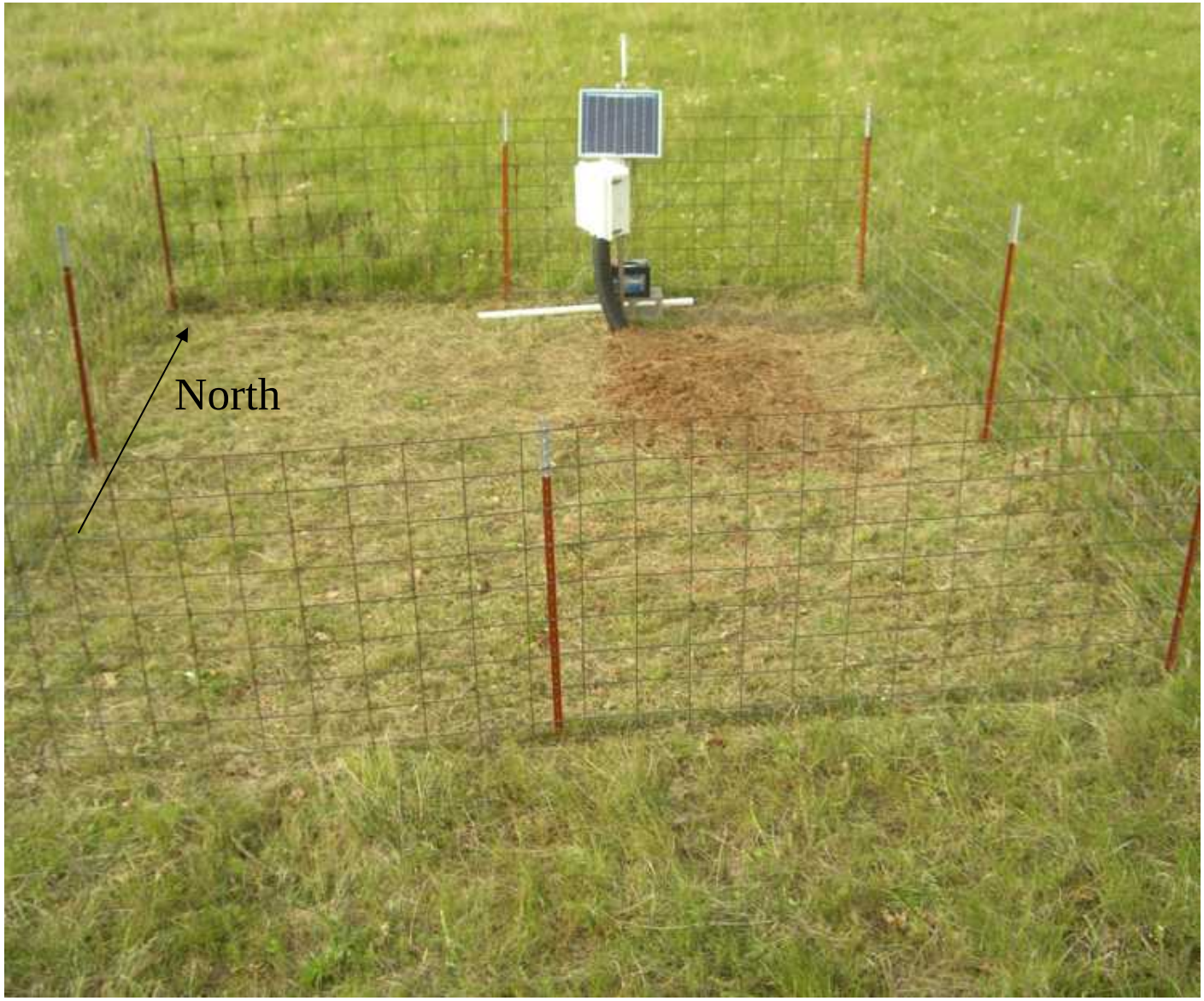
Site A Pit and TDR Profile Installations



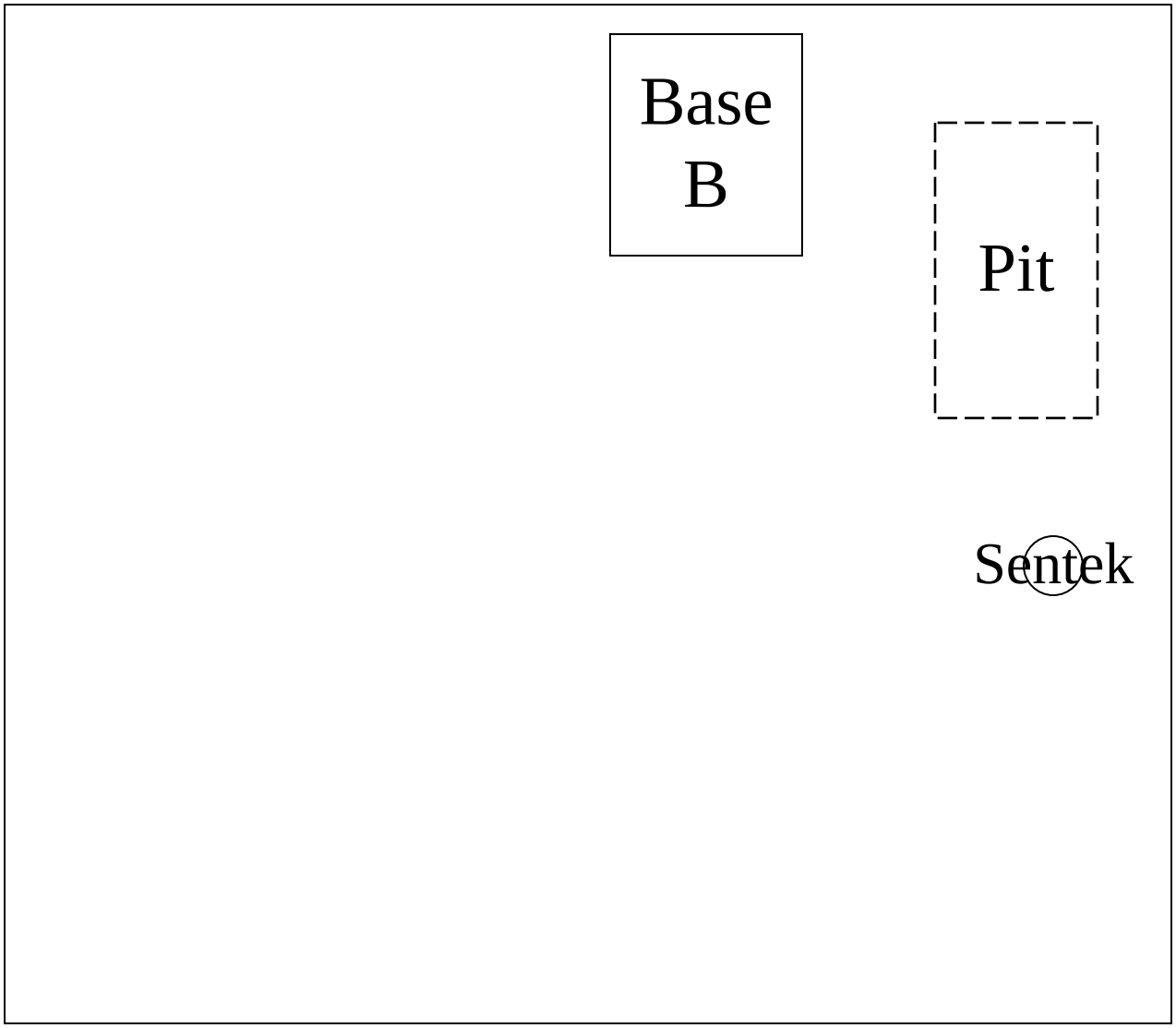
Pit A Schematic



Site B



Site B Schematic

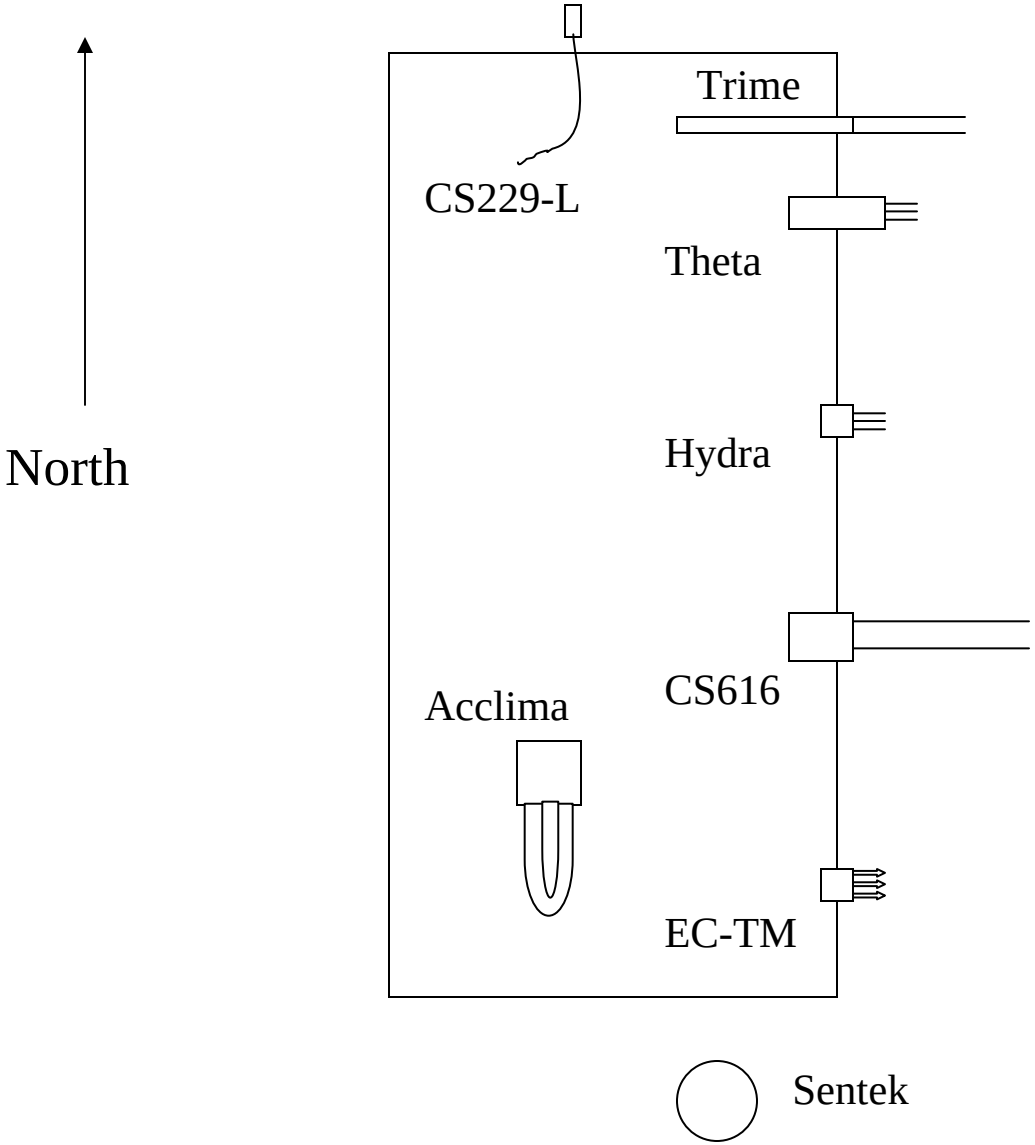


Depths - Base B

- 2.5 cm *
- 5 cm
- 10 cm
- 20 cm
- 50 cm
- 100 cm

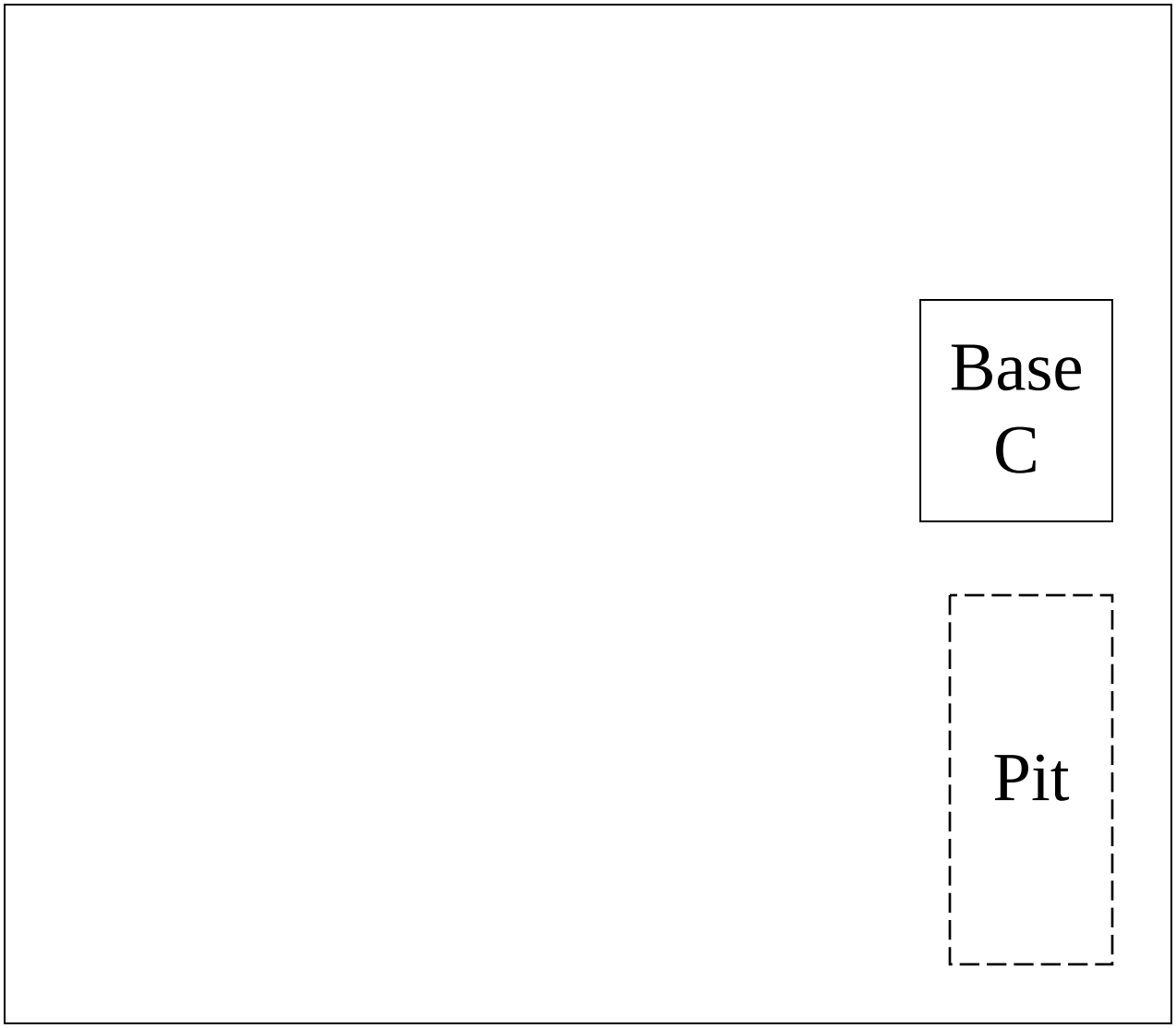
Base Pit B

Pit B Schematic




North

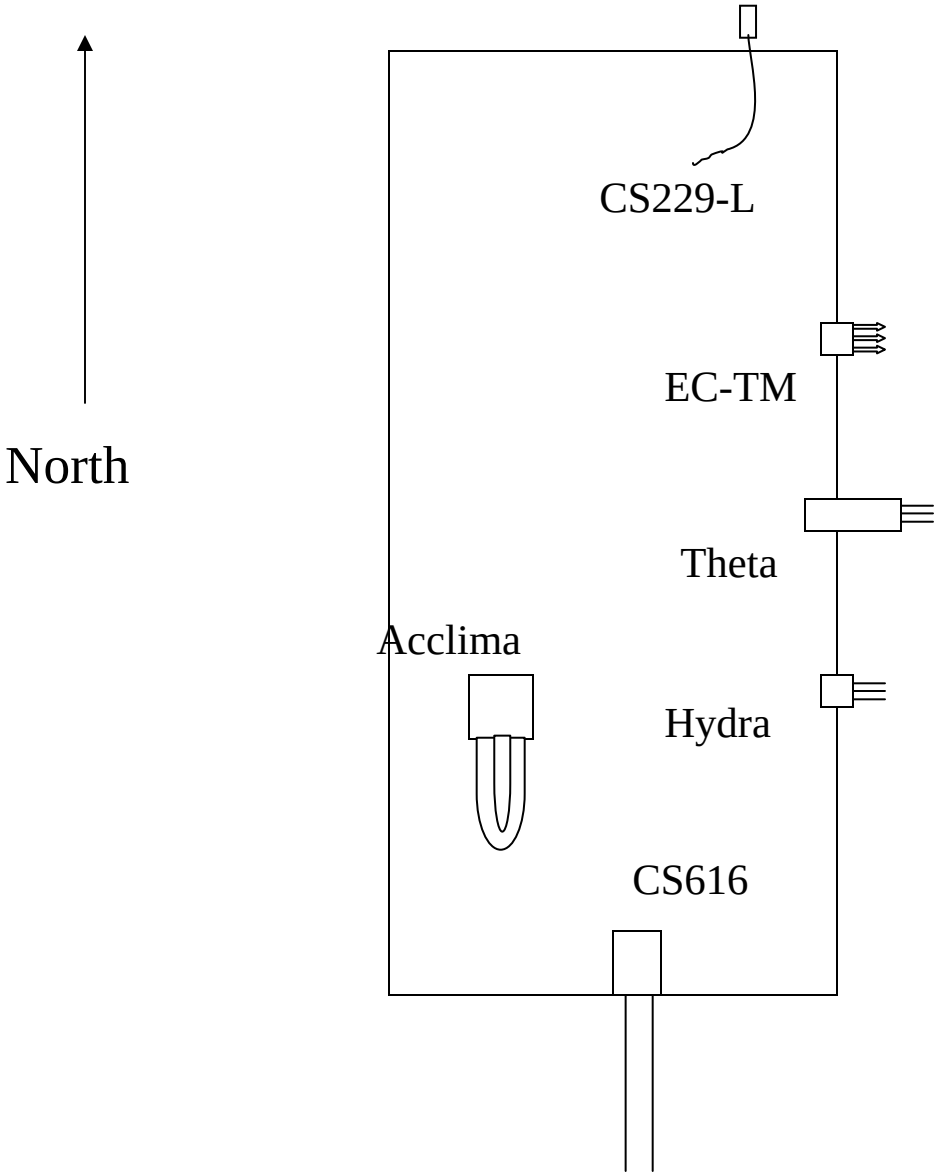
Site C Schematic



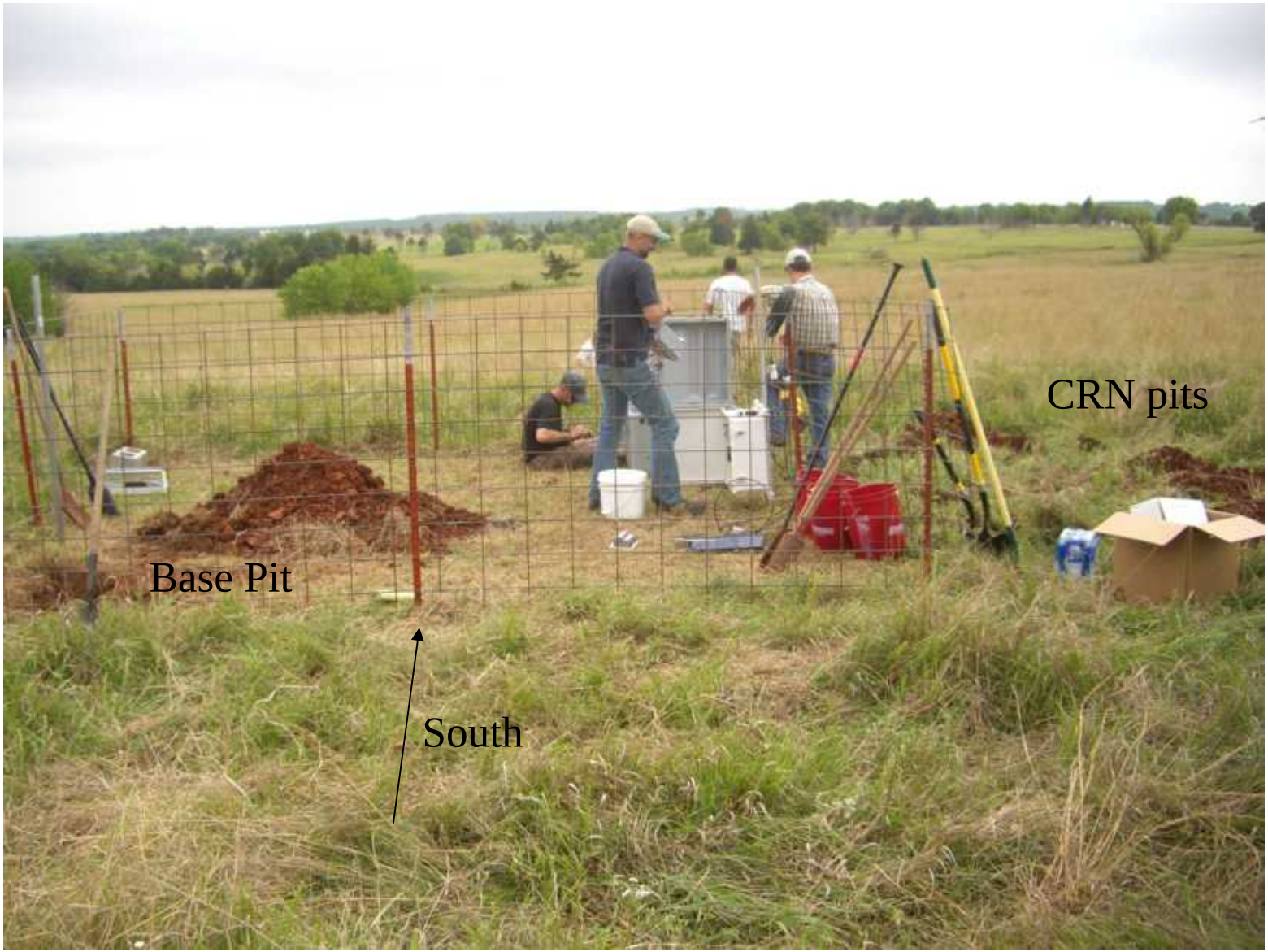
Depths - Base C

- 2.5 cm *
- 5 cm
- 10 cm
- 20 cm
- 30 cm
- 40 cm

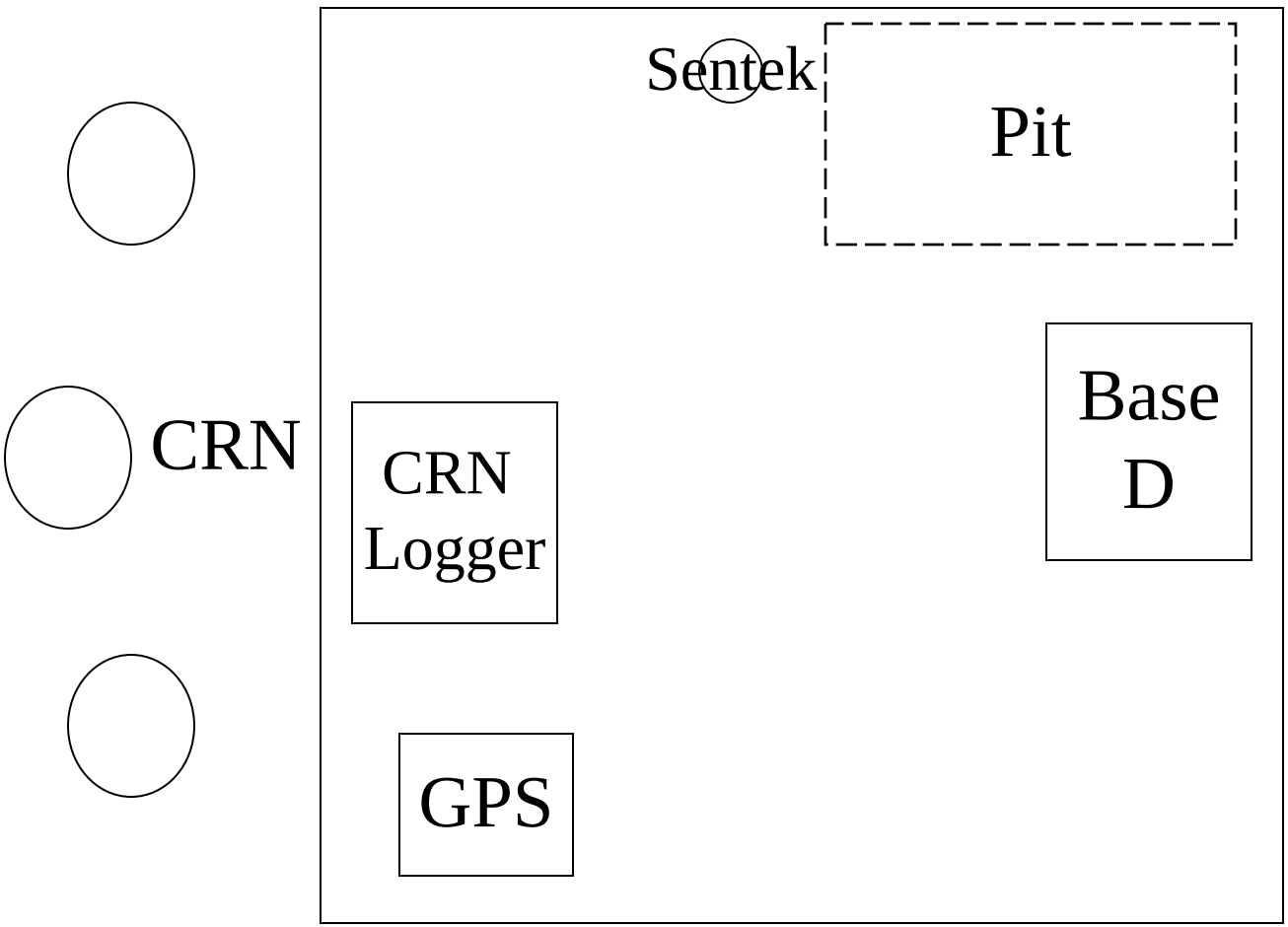
Pit C Schematic



Site C



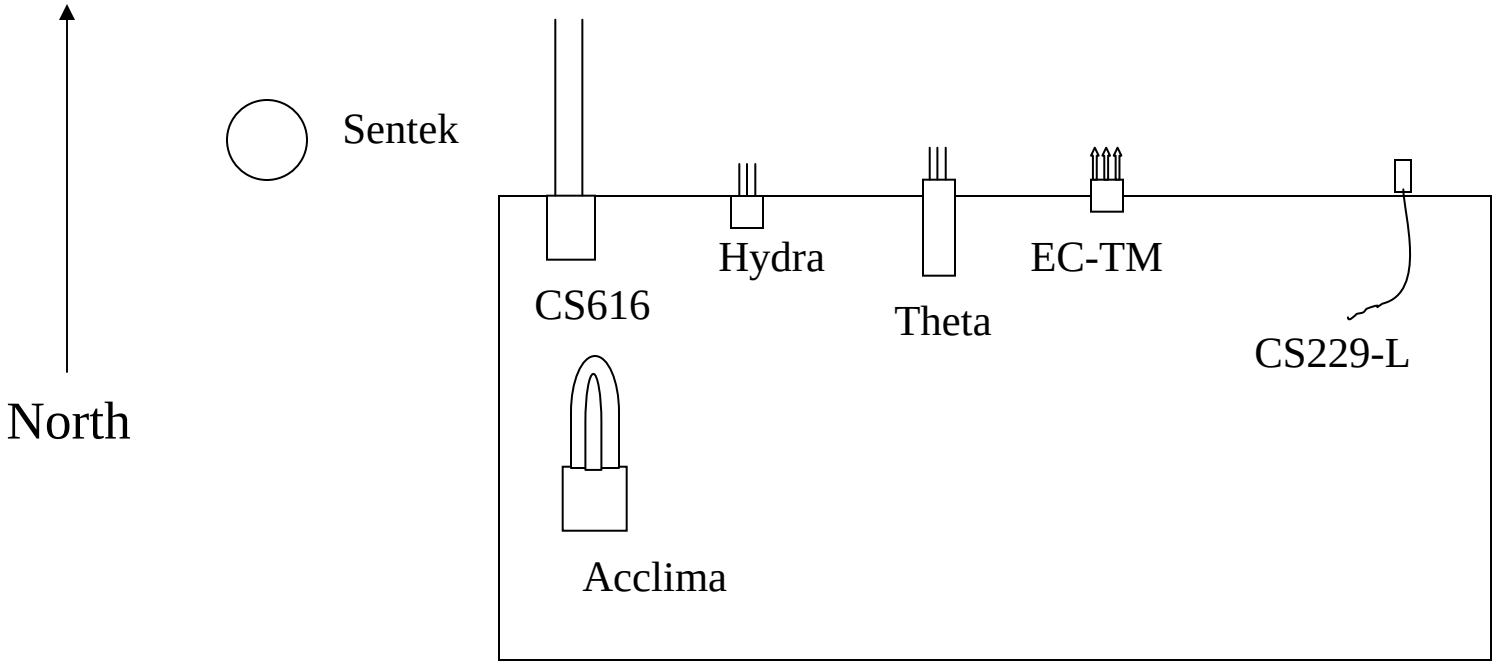
Site D Schematic



Depths - Base D

- 2.5 cm *
- 5 cm
- 10 cm
- 20 cm
- 30 cm
- 40 cm

Pit D Schematic



CRN Installation