

Designing and creating the North Wyke Farm Platform

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NORTH WYKE
RESEARCH



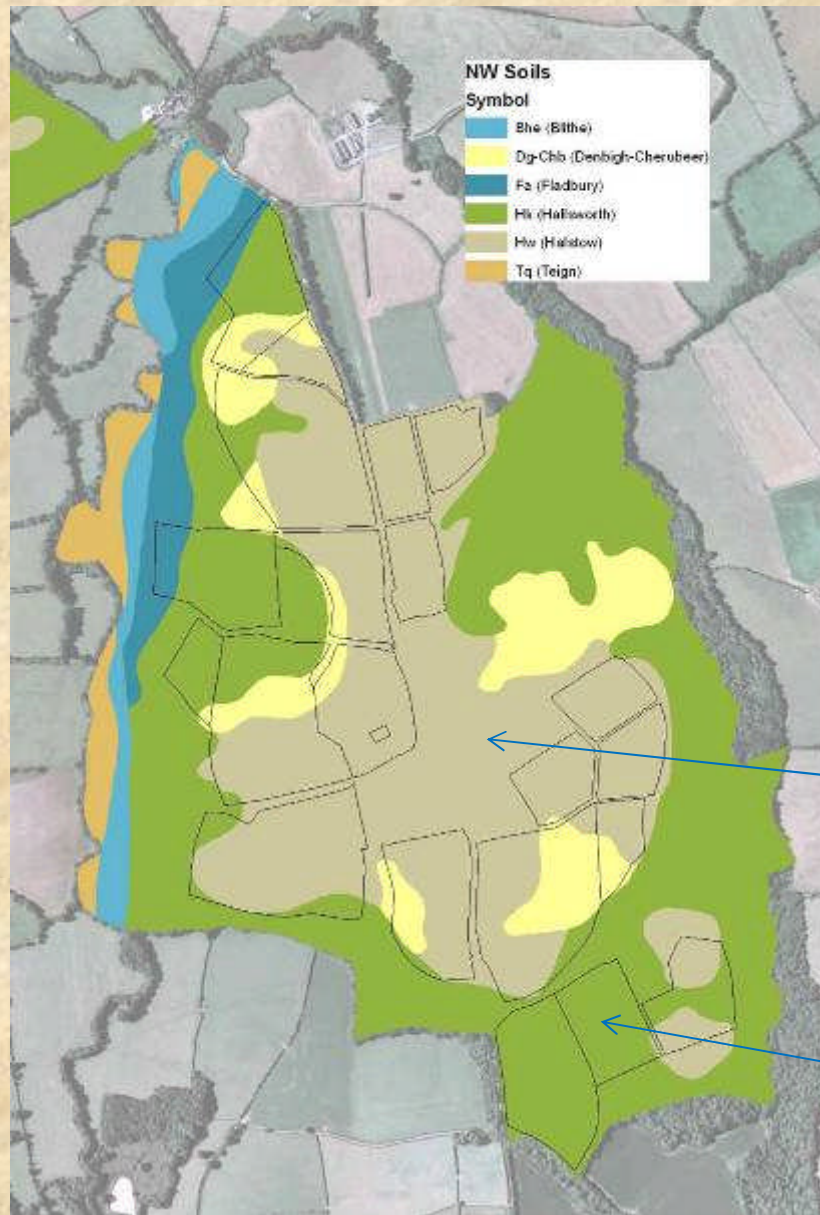
The North Wyke Farm Platform

A large, farm-scale experiment - established during 2010 as a UK national capability for collaborative research, training and knowledge exchange in agro-environmental sciences.

Addresses agricultural productivity and ecosystem responses to different management practices.



Soils



Halstow soil series

Topsoil: slightly stony, silty clay loam

Subsoil: moderately permeable, mottled stony clay or silty clay; prominently mottled and slowly permeable below 40cm

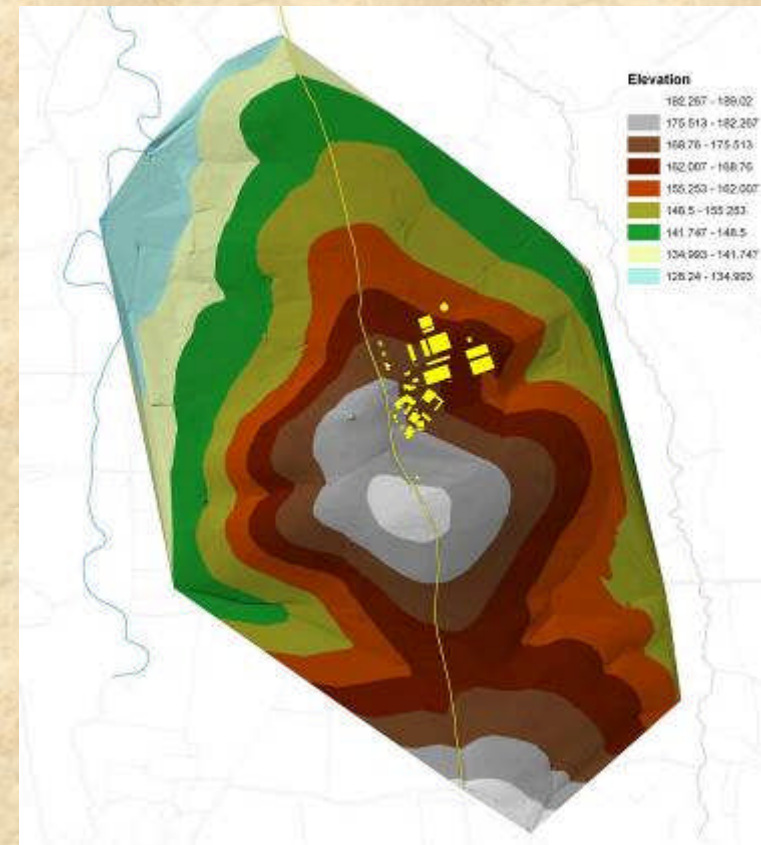
Hallsworth soil series

Topsoil: slightly stony clay or clay loam

Subsoil: slowly permeable prominently mottled stony clay

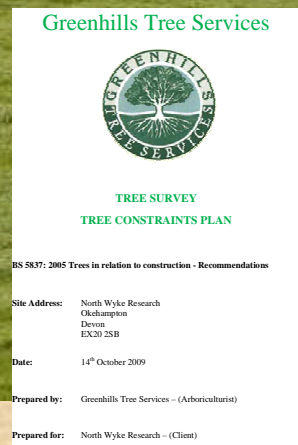
Topographical survey and hydrological assessment

Position and elevation were determined on >6000 locations across the potential fields

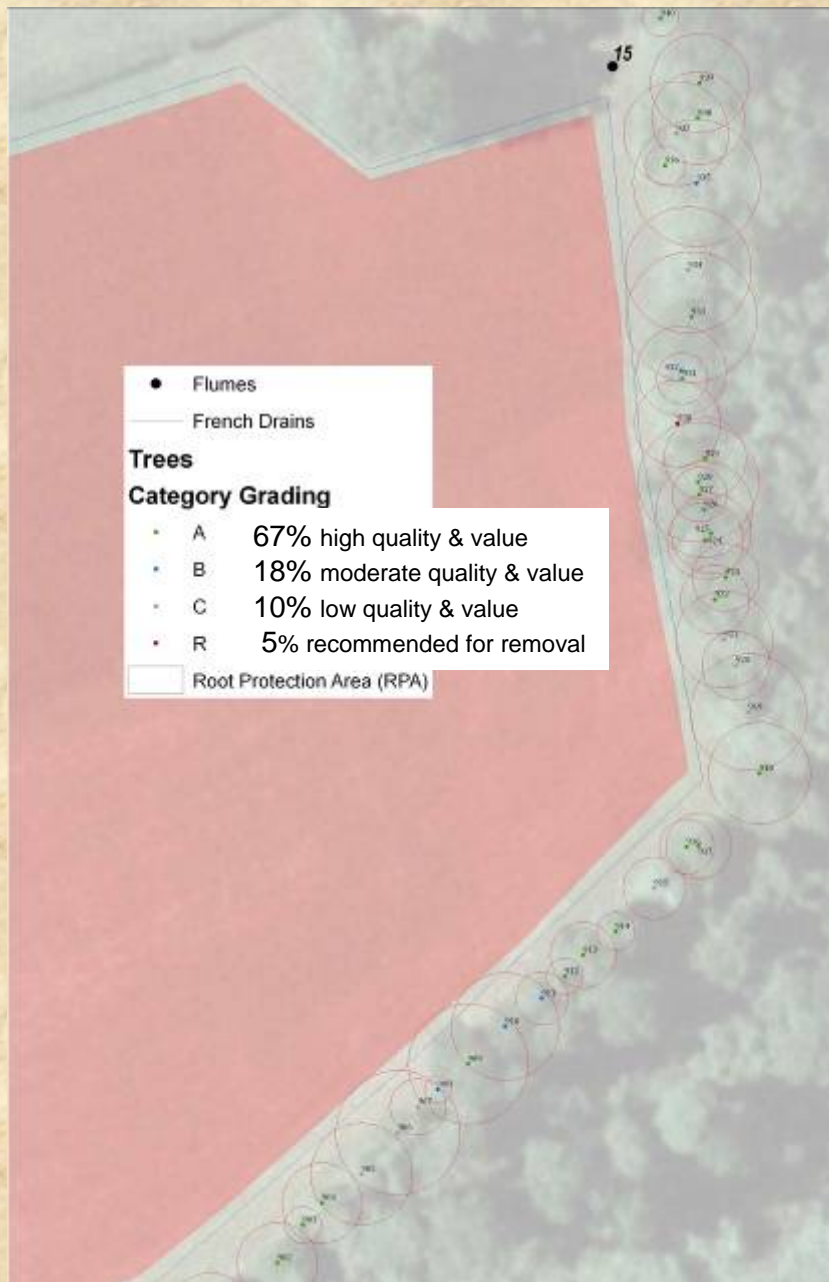


Planning permission

- Environment Agency - Flood Defence Consent
- tree species and condition survey; constraints plan in relation to Root Protection Areas
- Habitat and Protected Species surveys
- Environmental Impact Assessment - including Archaeological Survey and Groundworks Mitigation Plan



Trees



Constraints Plan

Survey location, species, dimensions, age class, condition and remaining contribution in years.

Protection Plan and Arboricultural Method Statement

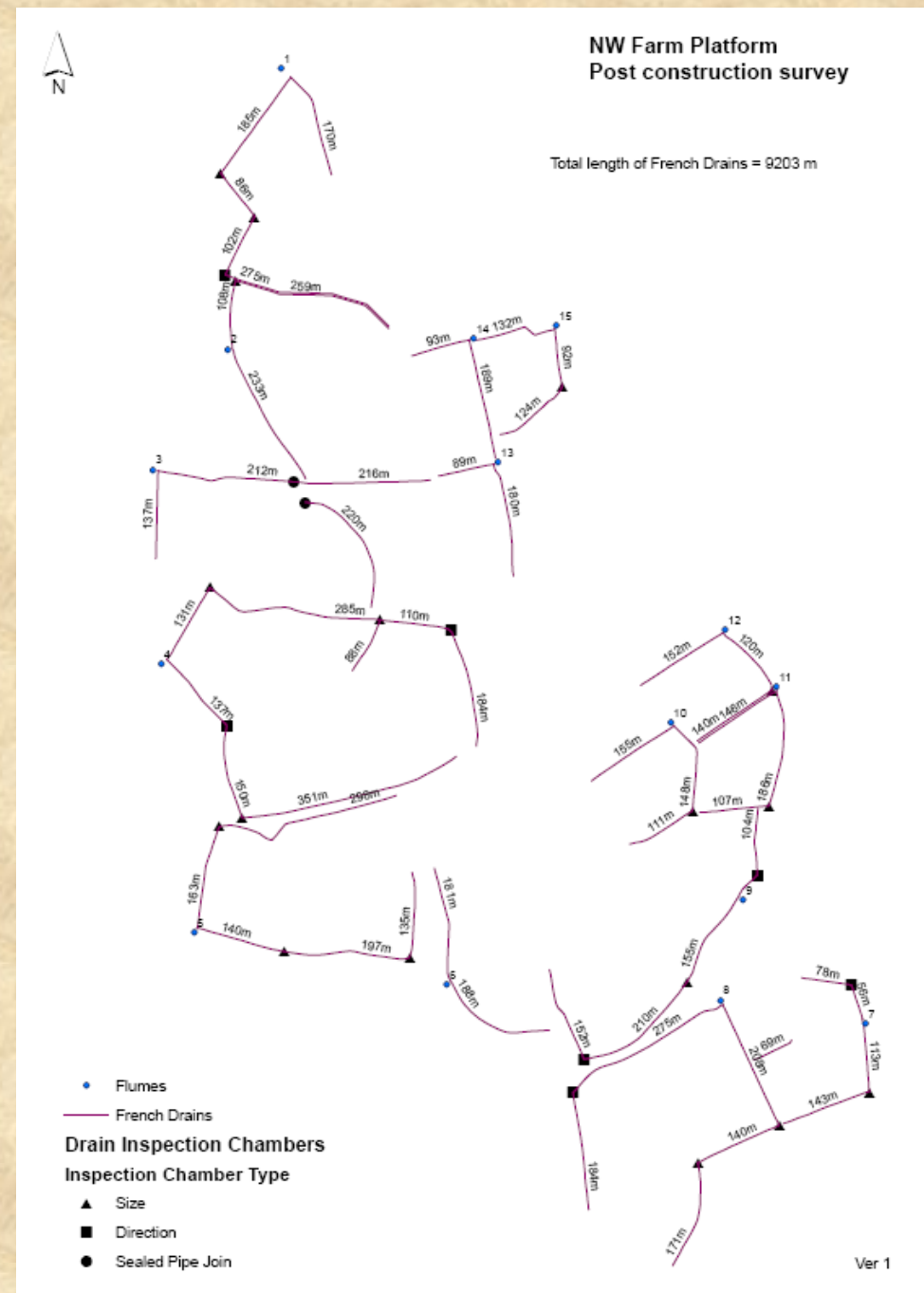
Document how the trees are to be protected from inadvertent damage.

Trees

	% of trees	Root Protection Area (radius in metres)
English Oak	50	7.5
Common Ash	18	5.4
Beech	6	7.3
Silver Birch	6	4.1
Hawthorn	3	3.0
Sycamore	3	6.2
Goat Willow	2	4.4
Common Sallow	2	4.3
Holly	2	2.8

Identify RPA of those trees adjoining areas of excavation to establish whether there is a possible conflict with trees of landscape importance.

French drains



Flow measurement - H flumes

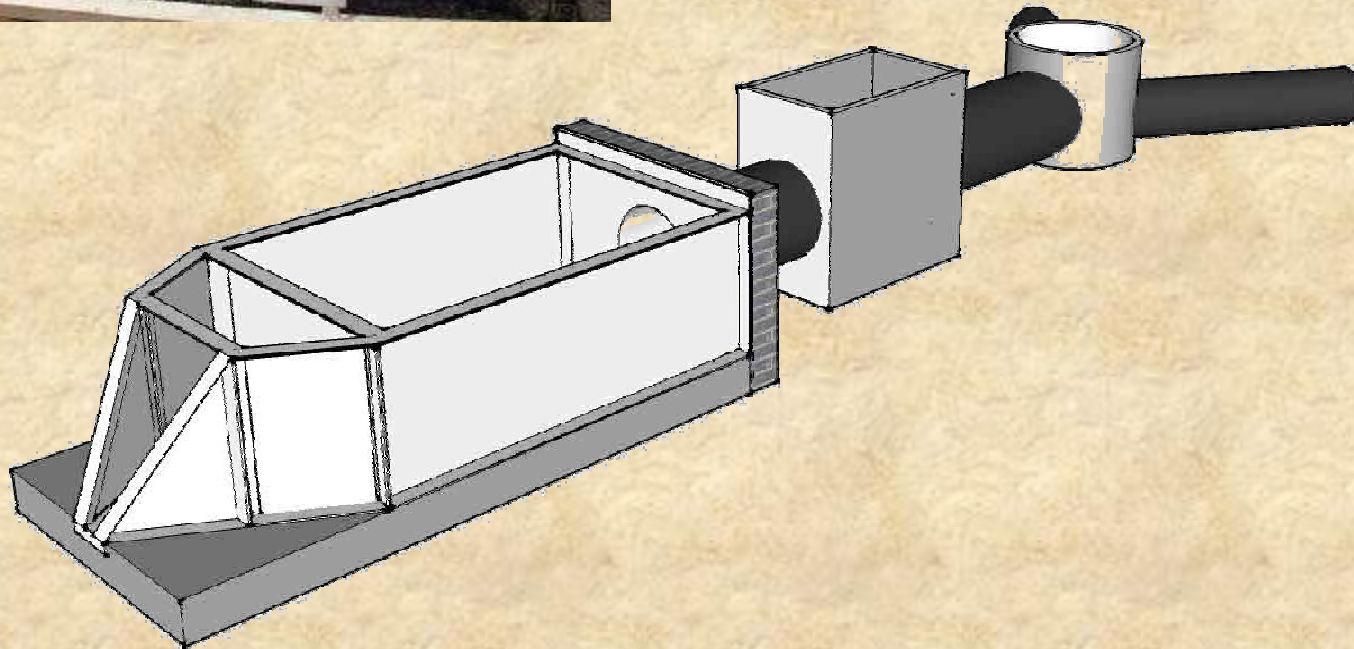


15 flumes

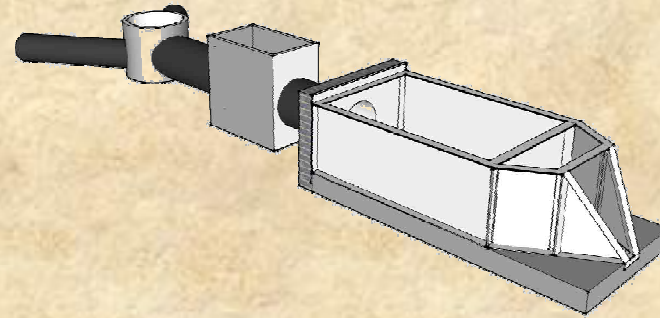
8 @ 1'6" (450mm)

6 @ 2'0" (600mm)

1 @ 2'6" (750mm)



Installing H flumes

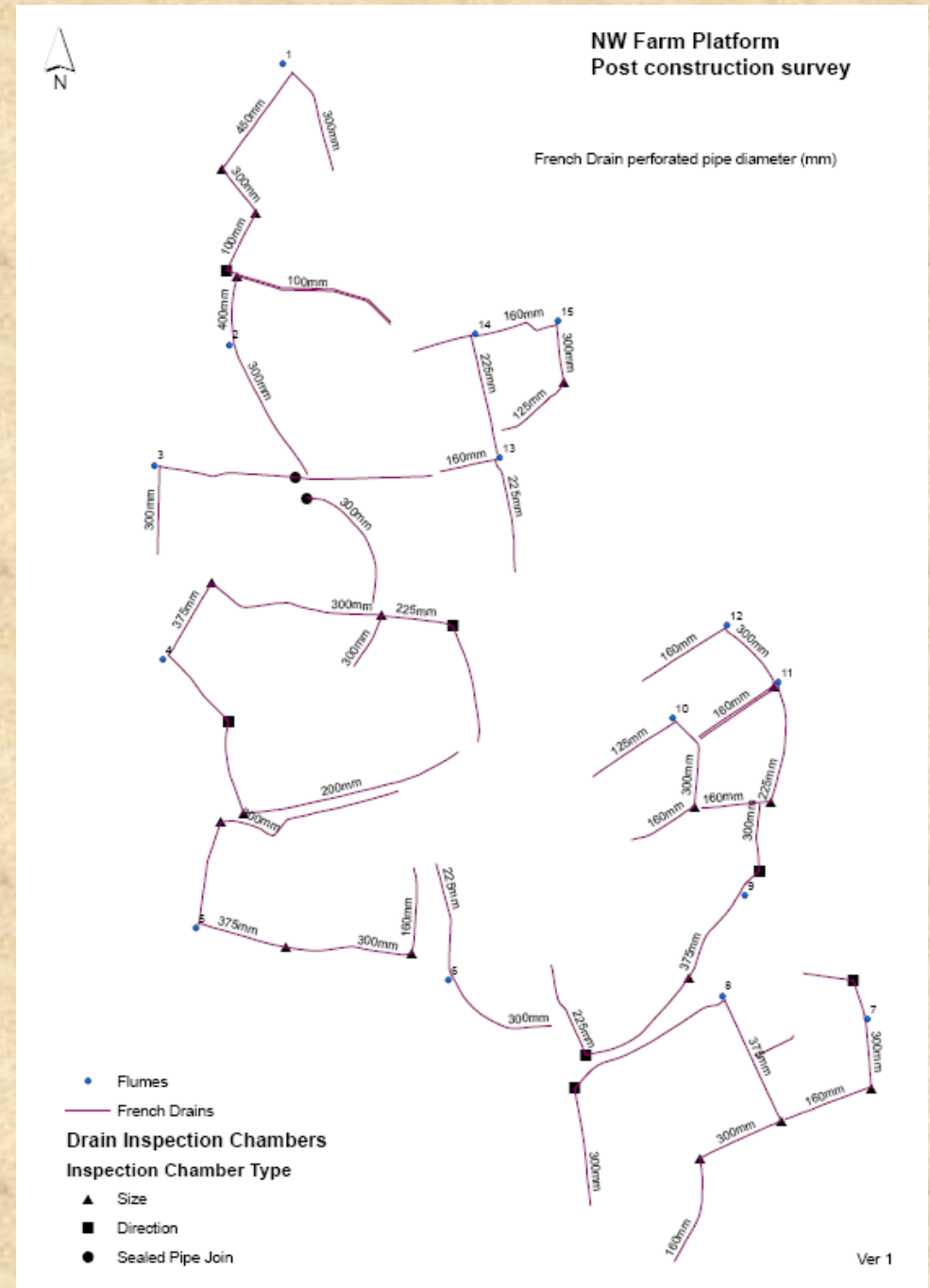


French Drains

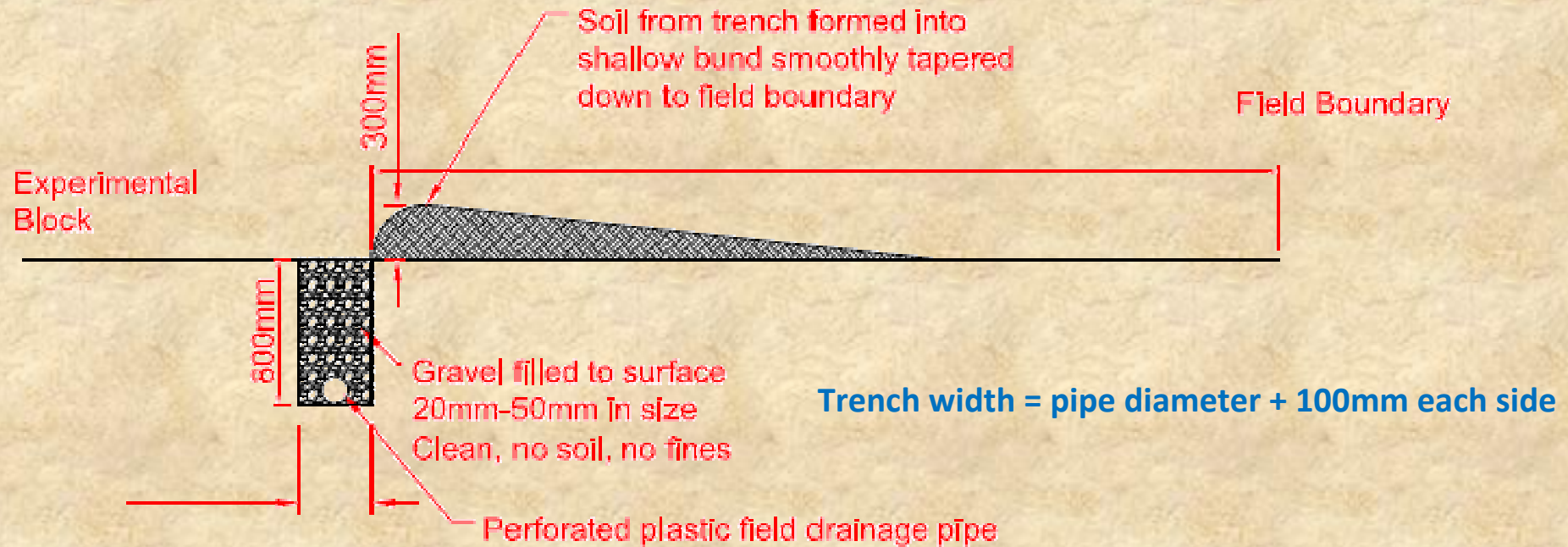
- pipe sizes



Pipe diameter = 100, 160, 200, 225, 300, 375, 400 and 450 mm



French drains – bund and dimensions



Pipe diameter (mm)	Trench width (mm)
100	300
160	360
200	400
225	425
300	500
375	575
400	600
450	650



French drains - construction



9203 metres of damp proof membrane



5056 tonnes of 20 – 50 mm clean stone



Back-to-back French Drains on watersheds

Post-construction soil compaction amelioration



Water flow and chemistry



Flume area – accessed by service tracks



Bubbler flowmeter



Sequential/composite sampler

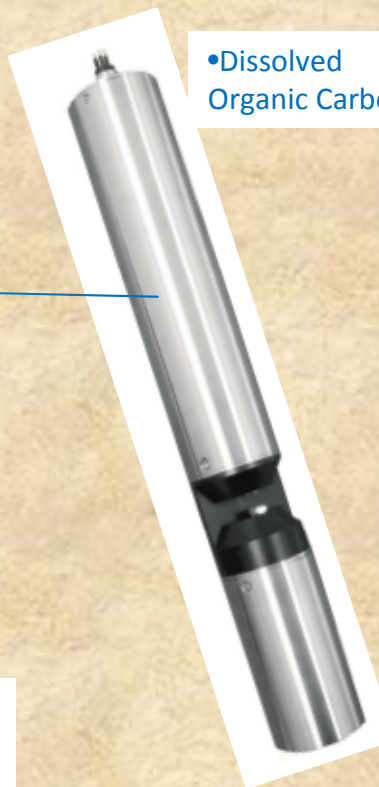
Core water data parameters



•Nitrate



Flow cell



•Dissolved Organic Carbon



•Temperature
•Conductivity
•Turbidity
•pH
•Dissolved O₂
•Ammonium



•Total-P
•Ortho-P

Rainfall, soil moisture and soil temperature

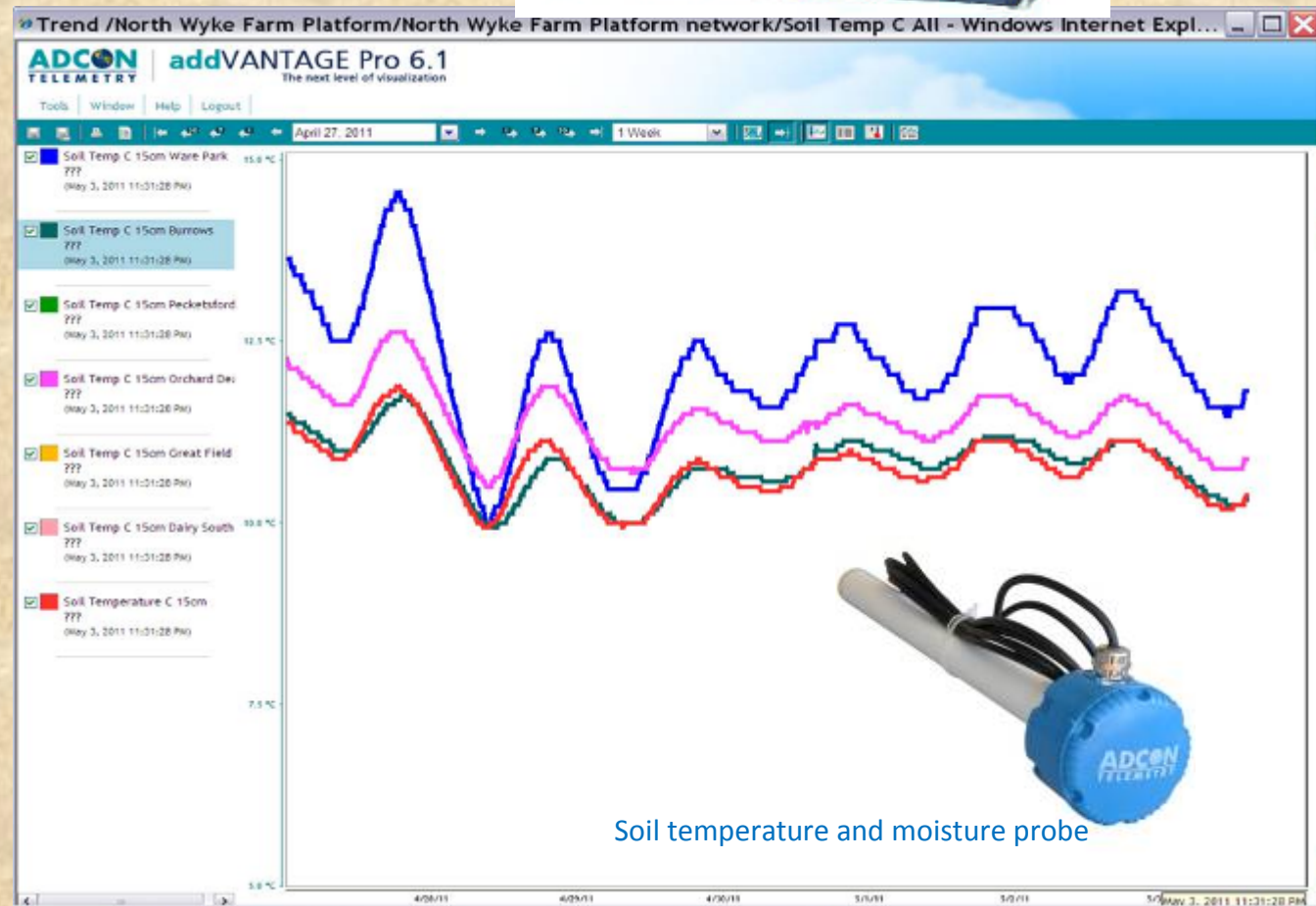


Relay station



Rain gauge

Real-time data via RadioTelemetry



Soil temperature and moisture probe

Emissions – CO₂ and N₂O



Three mobile laboratories – each containing an automated soil CO₂ flux system with 12 chambers



Photoacoustic infrared field gas monitor to measure N₂O.



Multiplexer and analyser control unit



Baseline years – Apr 2011 to Mar 2013

Livestock continuously stocked
- follow sward height guidelines

50 ewes and their twin lambs

25 yearling suckler beef cattle

200 kg N fertiliser per ha

First silage cut – 2/3rds of area

Second silage cut – 1/3rd of area

FYM applied to silage stubble

Farm gate balances:

- Money
- Energy
- C
- N
- P