

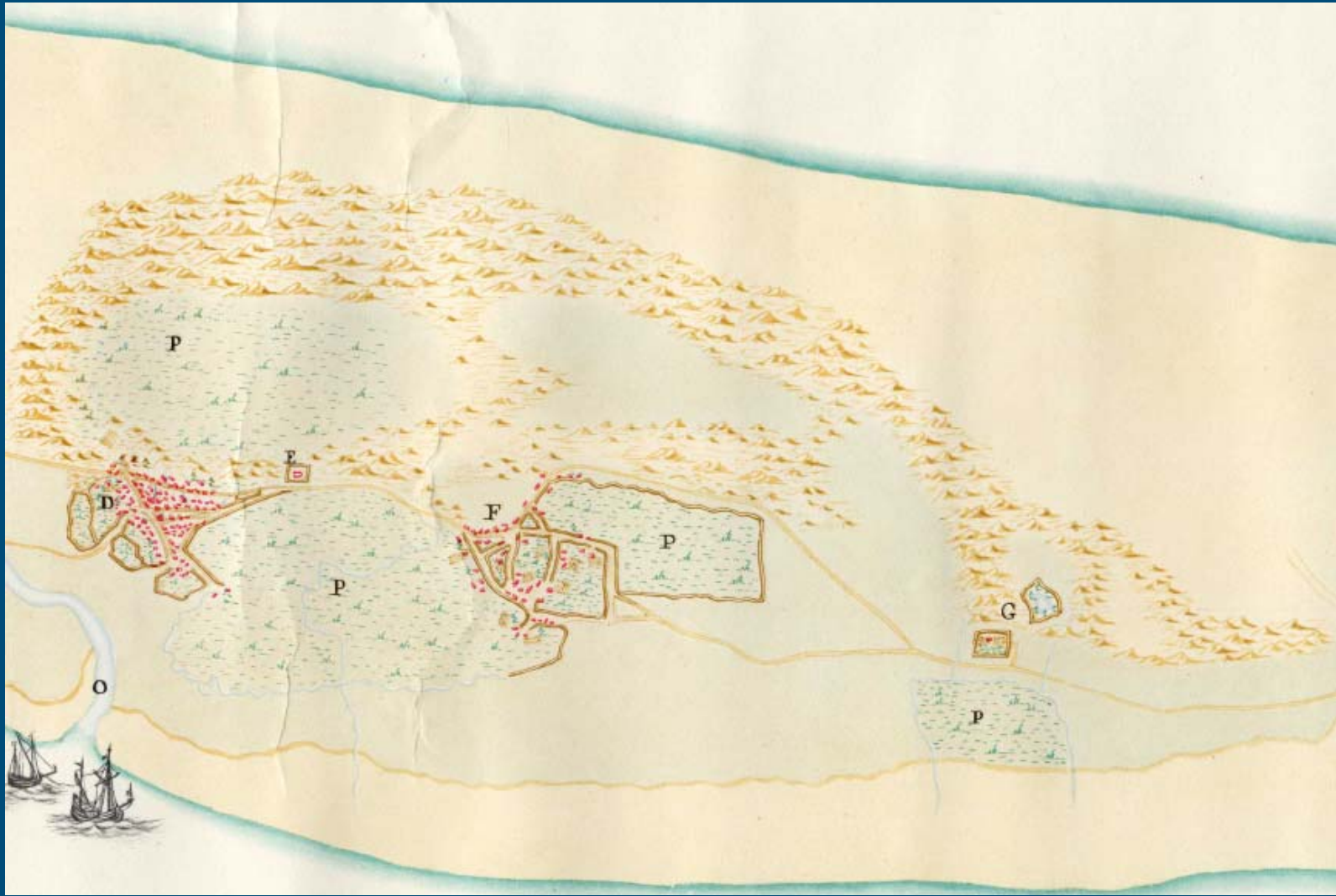
Dikes

starting with Ameland

Ameland (ECONAT2000)
February 2008
Joep Frissel & Pieter Slim



Amelandt P. de la Rive 1731



Ameland Brouwer dissertatie 1936

AMELAND

EEN SOCIAAL-GEOGRAFISCHE STUDIE
VAN EEN WADDENEILAND

DOOR

DR D. A. BROUWER



H. J. PARIS
AMSTERDAM—MCMXXXVI



De Zuid-Akkers te Buren.
De oude zeedijk is nog gedeeltelijk blijven staan.



De oude zeedijk om de Zuid-Akkers te Buren. De buiten
(zee)kant is steil.

Man made Ameland: connecting 3 islands

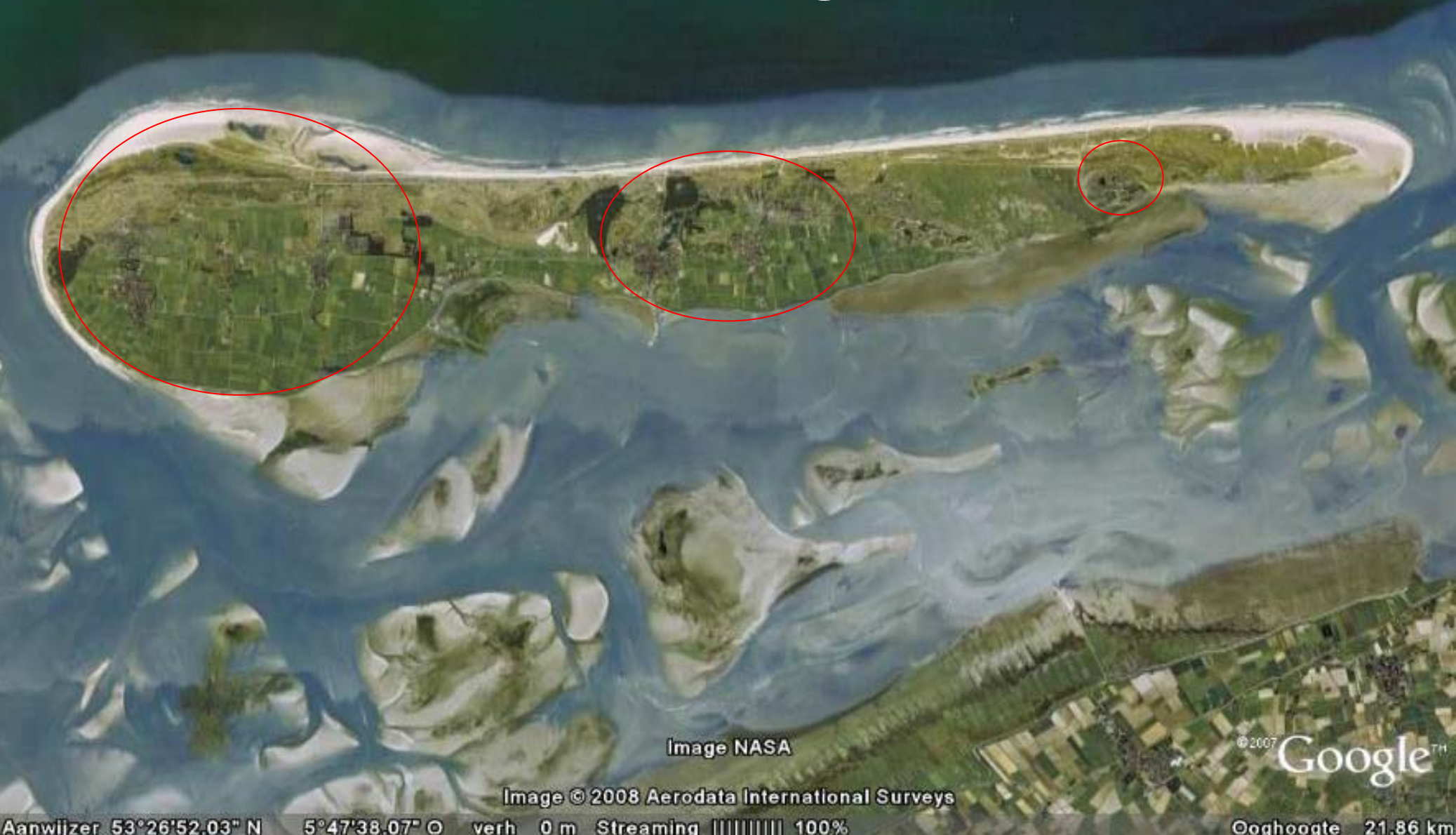


Image NASA

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Aanwijzer 53°26'52.03" N 5°47'38.07" O verh 0 m Streaming 100%

Ooghoogte 21.86 km

Man made Ameland: connecting western & middle part by sand dikes



Man made Ameland: connecting middle & eastern part by sand dikes

1960-70

1882-88

Image © 2008 TerraMetrics

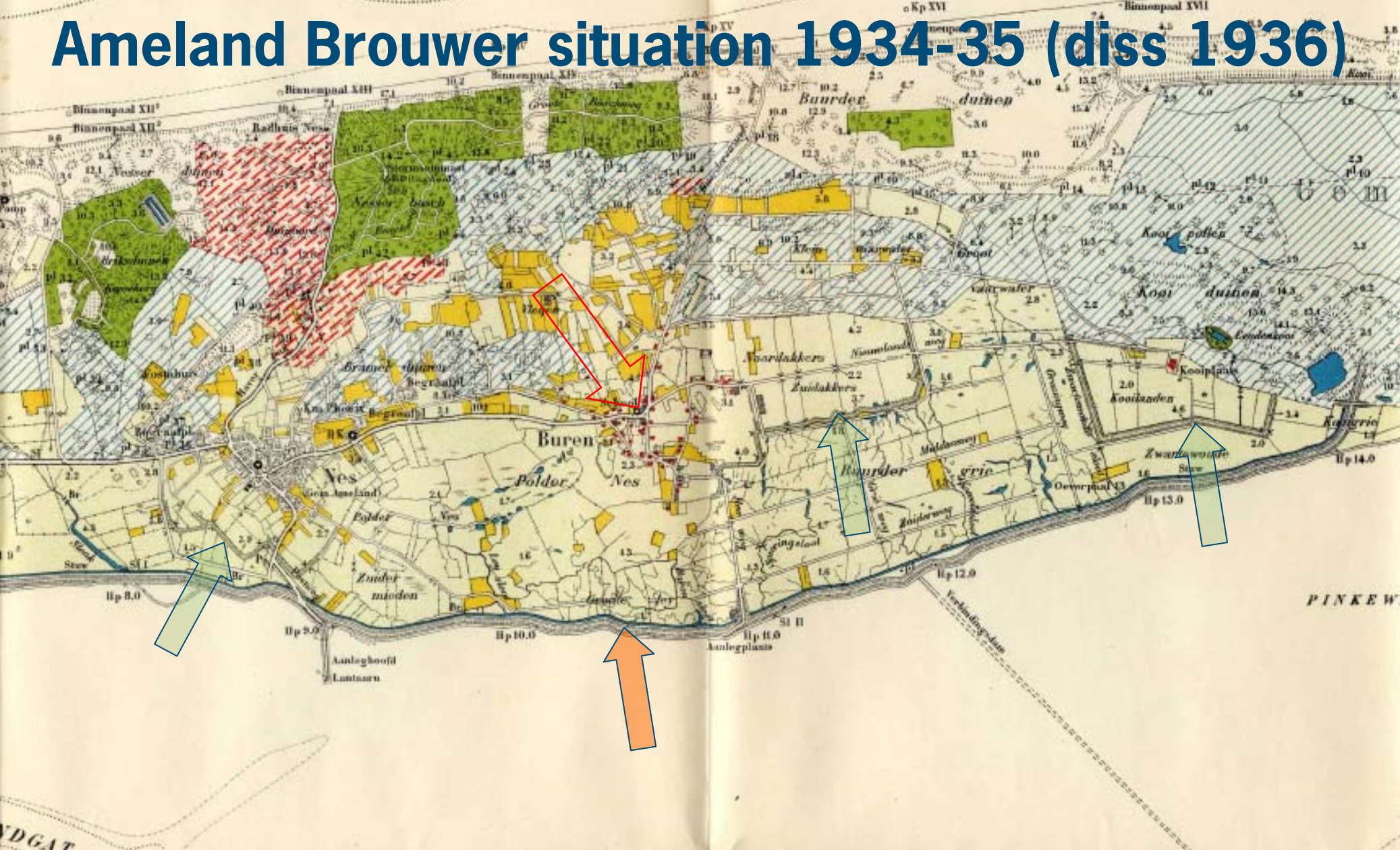
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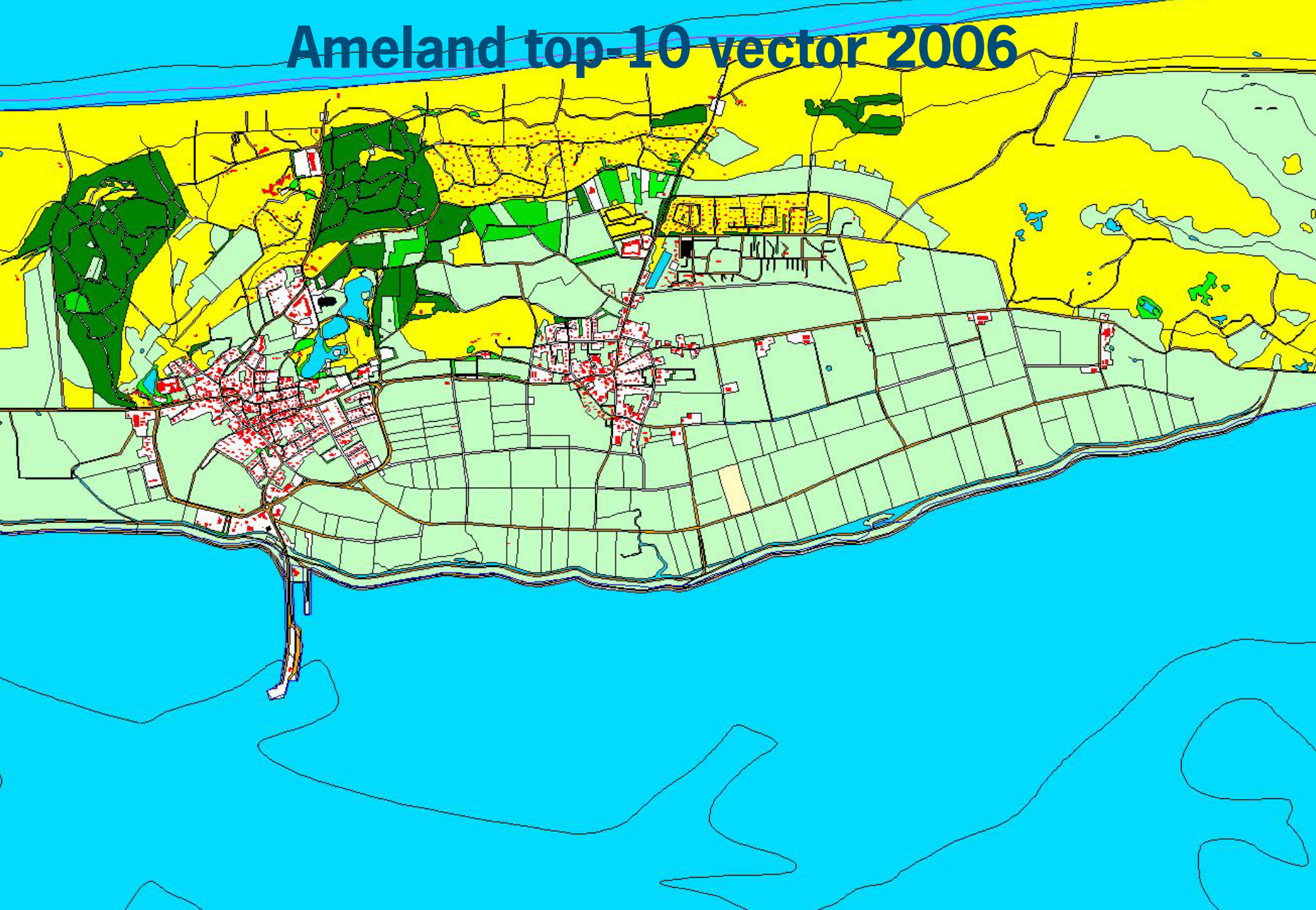
Aanwizer 53°27'23.43" N 5°51'42.66" O verh 1 m Streaming 100%

Ooghoogte 3.99 km

Ameland Brouwer situation 1934-35 (diss 1936)



Ameland top-10 vector 2006



L 'Delta dike' (1988-92) vs. remnant 'new dike' (1926-30)

R 'Delta dike' connecting dunes: Kooigrie (no dike at all)



Ameland 'Deltakering' Kooидуinen (1988-89)

Design: predecessor Alterra



Fore shore = climate buffer!



Dikes: 'Hondsbossche Zeewering'



Dikes: 'Hondsbossche Zeewering'



Friesland



Friesland





How strong is 'grass' ?



- Resistance against erosion is determined by the connection between soil and plant roots

see also 'Regulation Testing on Safety' (Voorschrift Toetsen op Veiligheid)

Quality of the grassland on the dikes



- Quality of the clay
- Management
 - Fertilizing (artificial)
 - Meadow or pasture
 - Voles and moles
 - General management

Experiment testing resistance against erosion



Experiment testing resistance against erosion



Zeeland



Zeeland



Not only problems with 'grass'



Resistance against erosion, following 'Regulation Testing on Safety'



- Field survey
 - Vegetation
 - Coverage
 - Intensity of rooting

- Calculating data for defining sod quality

Field survey



Sod quality depending on management
hay making with fertilising

heavy grazing



Sod quality depending on management mulching ('klepelmaaïen')



Sod quality depending on management

moderate grazing



hay making without fertilising



Sod quality depending on management

hay making without fertilising: positive results



Sod quality depending on management grazing without and with light fertilising: positive results



Hay making without fertilising: flowering dikes !



Thank You for attention

Contact Alterra

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