

Spiekhout en Beks (2013), Vaststellen technische en operationele consequenties betreffende het Gasunie transportsysteem tgv. van aardbevingen tot Richter 5 veroorzaakt door het Groningen gasveldas-veld en consequenties voor operations DNV Kema rapportage

STOWA. (2007) Leidraad toetsen op veiligheid regionale waterkeringen. Stowa rapportnummer ORK 2007-02, 2007

van Tuijn, J. (2013) Effecten van aardbevingen op hoogspanningsinfrastructuur in Nederland, Tennet rapport PU-AM'13-1962013, versie 1.0. Datum 5 maart 2013

Verheij, H.J., Diermanse, F., van Eck, T., de Lange, G., Lindenberg, J., Simmelink, H.J. en

Weerts, H. J. T. (2002) Invloed van aardbevingen op overstromingsrisico's. WL|Delft Hydraulics i.s.m GeoDelft, NITG-TNO en KNMI. Q3177, december 2002

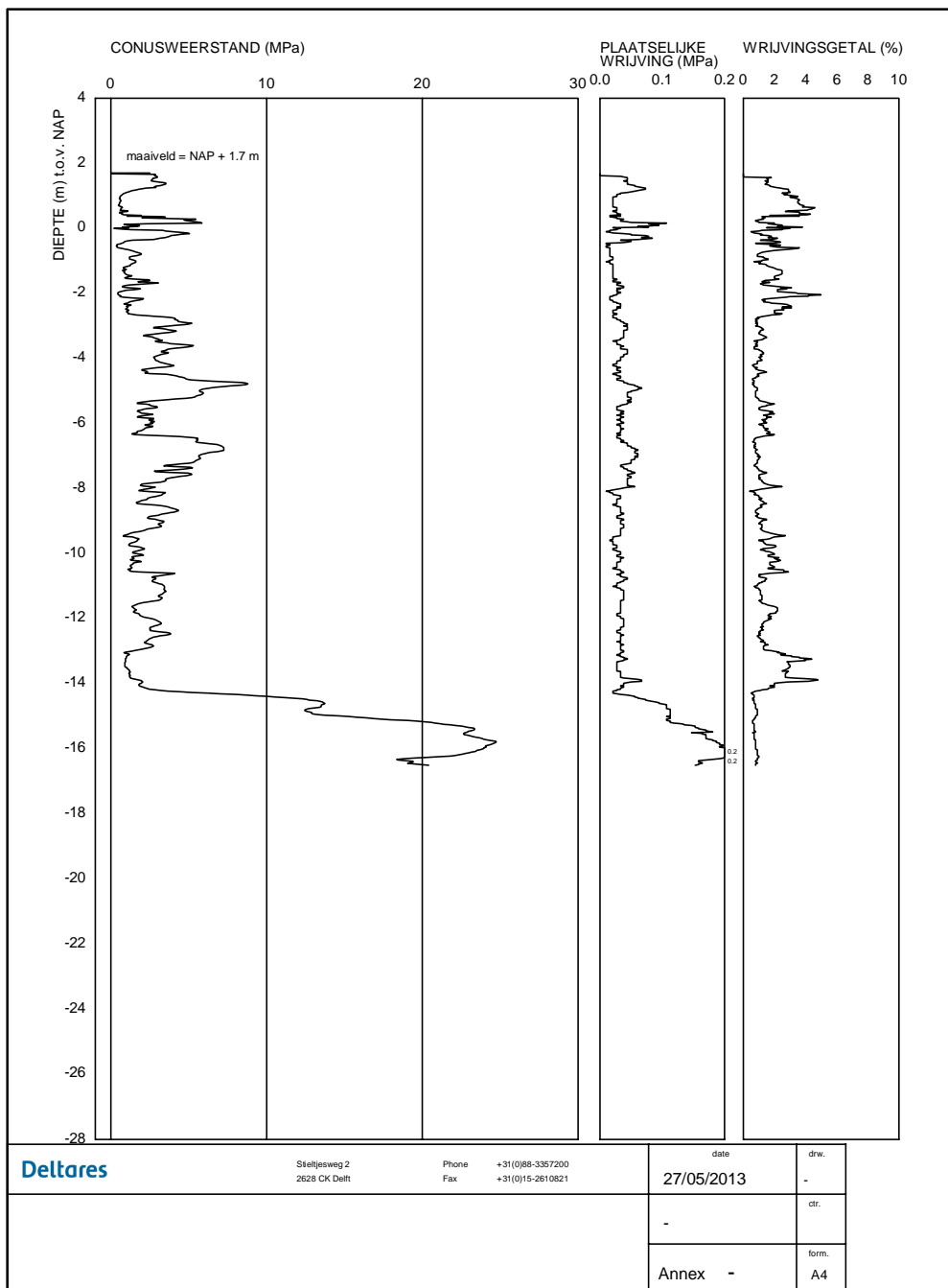
Wang and O'Rourke (1978) Overview of buried pipelines under seismic loading, Journal of Technic. Council of ASCE Vol 104. TC1

Wassing, Maljes, Westerhof, Bosch, Weerts. (2003) Seismic hazard van geïnduceerde aardbevingen, rapportage fase 1, TNO rapport NITG 03-185-C

Youd, T., Idriss, I., Andrus, R., Arango, I., Castro, G., Christian, J., Dobry, R., Finn, W., Harder, L., Jr., Hynes, M., Ishihara, K., Koester, J., Liao, S., Marcuson, W., III, Martin, G., Mitchell, J., Moriwaki, Y., Power, M., Robertson, P., Seed, R., and Stokoe, K., II (2001). Liquefaction resistance of soils: Summary report from the 1996 NCEER and 1998 NCEER/NSF workshops on evaluation of liquefaction resistance of soils. J. Geotech. Geoenviron. Eng. , 127 (10), 817–833

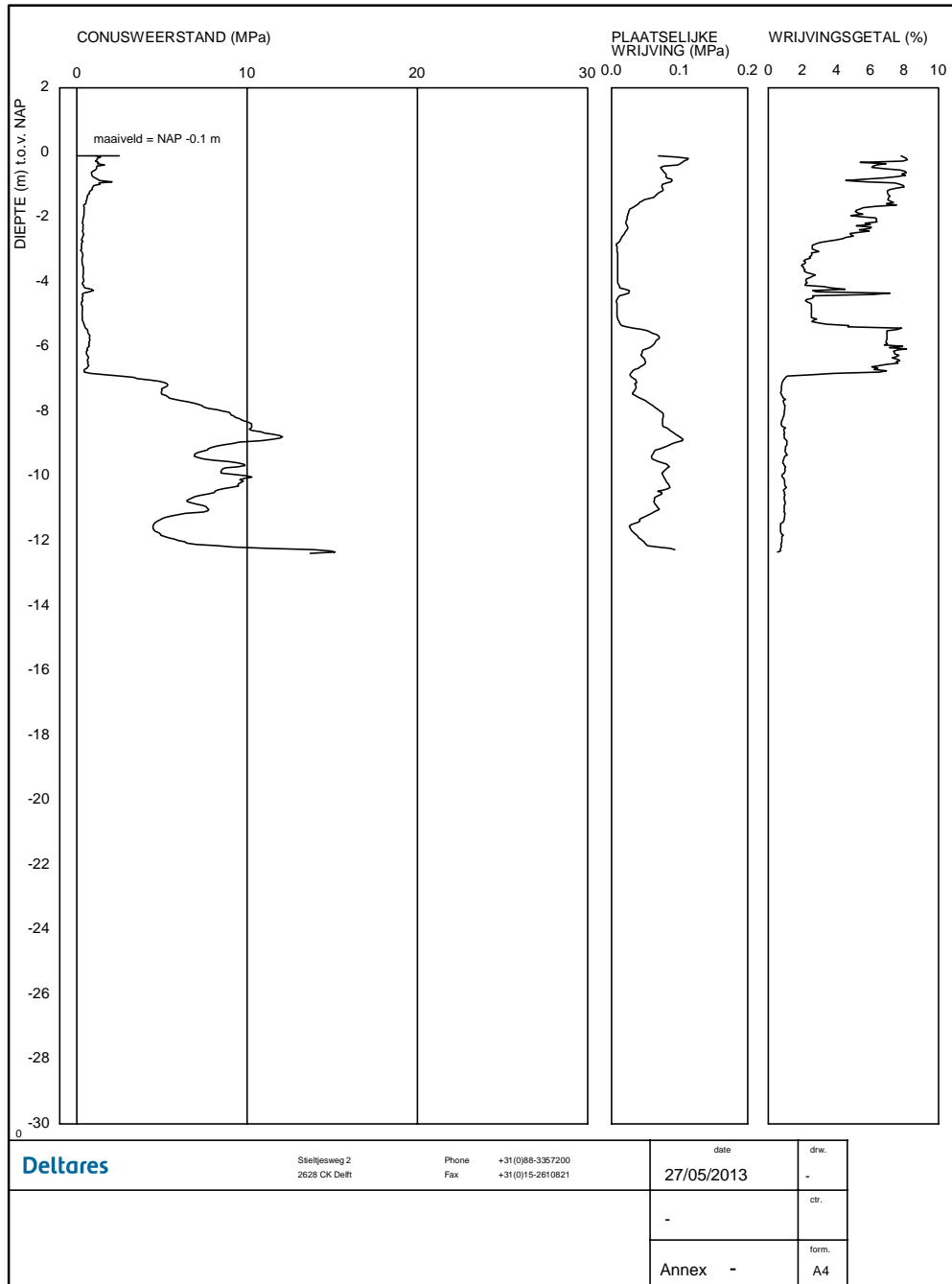
A Sonderingen 5 Representatieve Grondprofielen

Sondering S03D00023, Profiel 'Klei stijf'

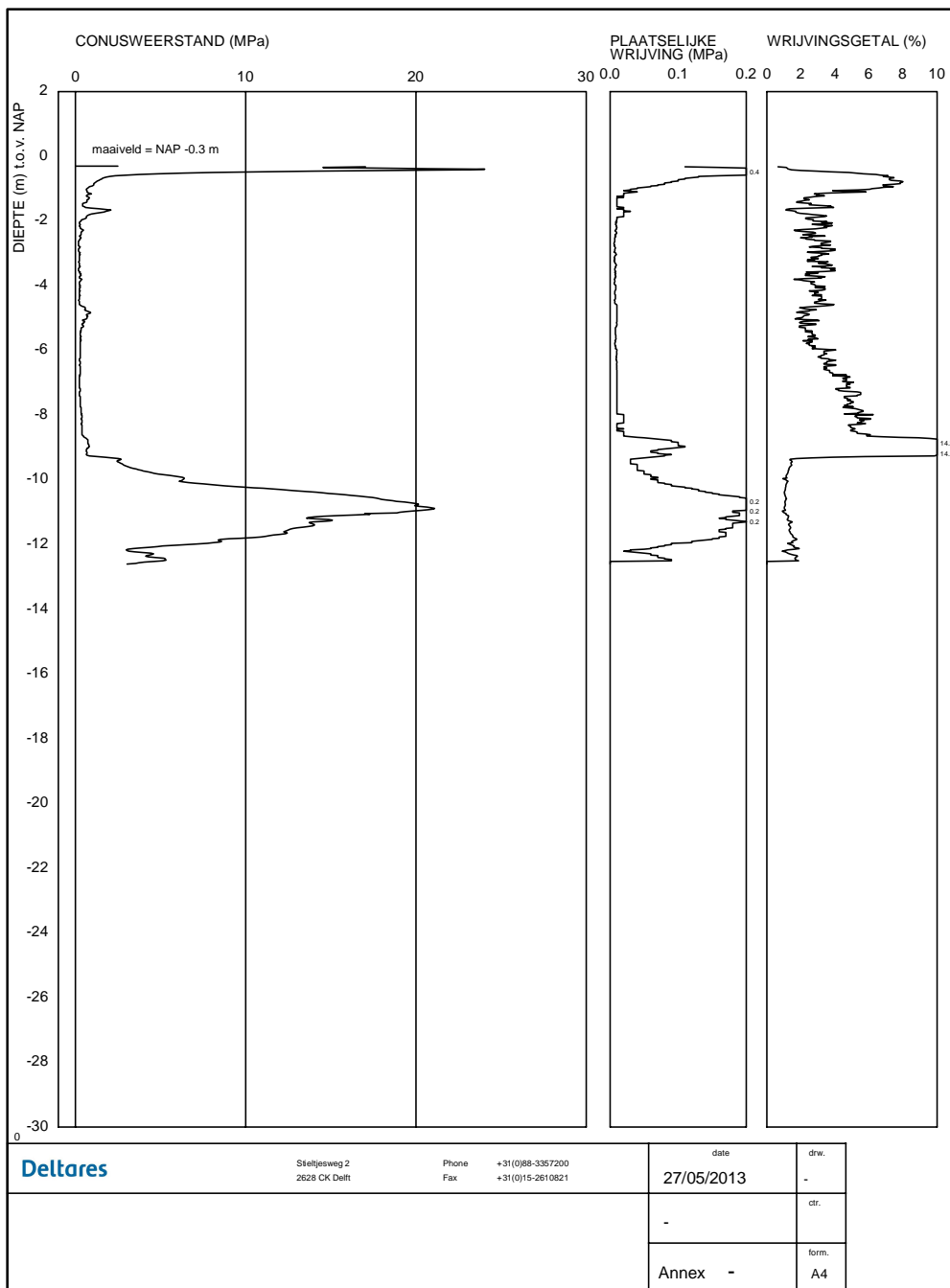


S03D00023

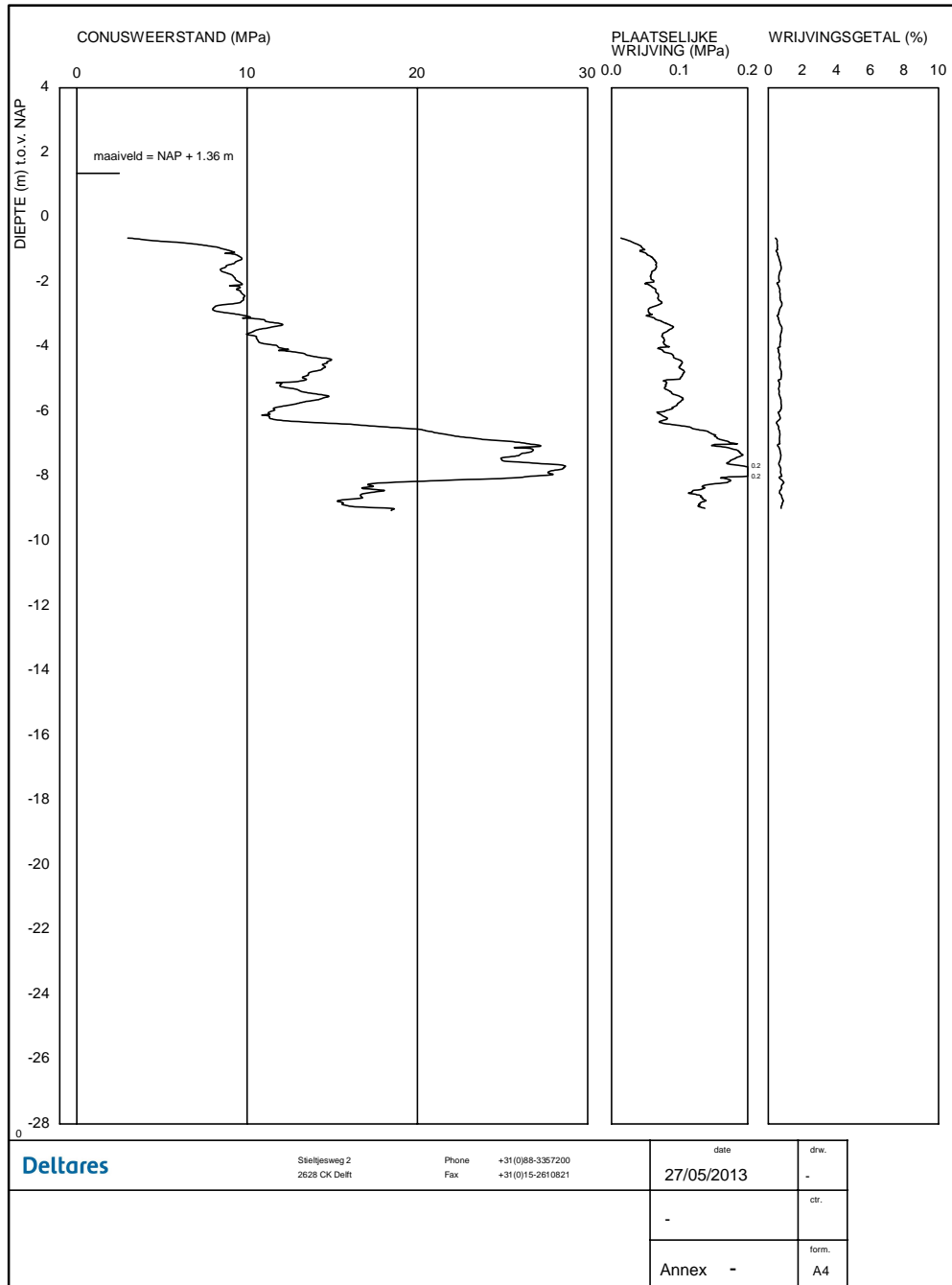
Sondering S07H00011, Profiel 'Veen'



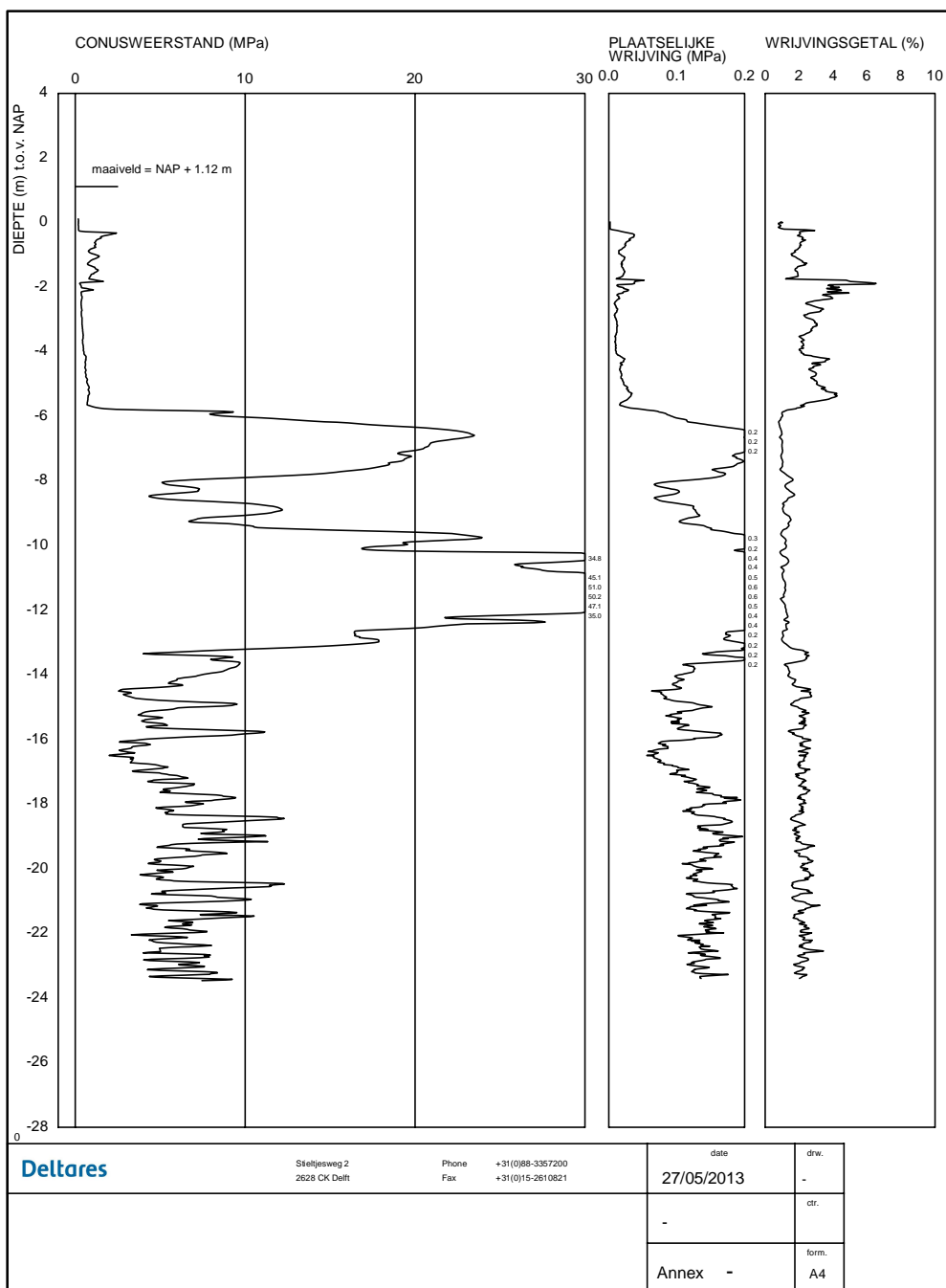
Sondering S07B00018, Profiel 'Slap diep'



Sondering S12E00029, Profiel 'Zand'



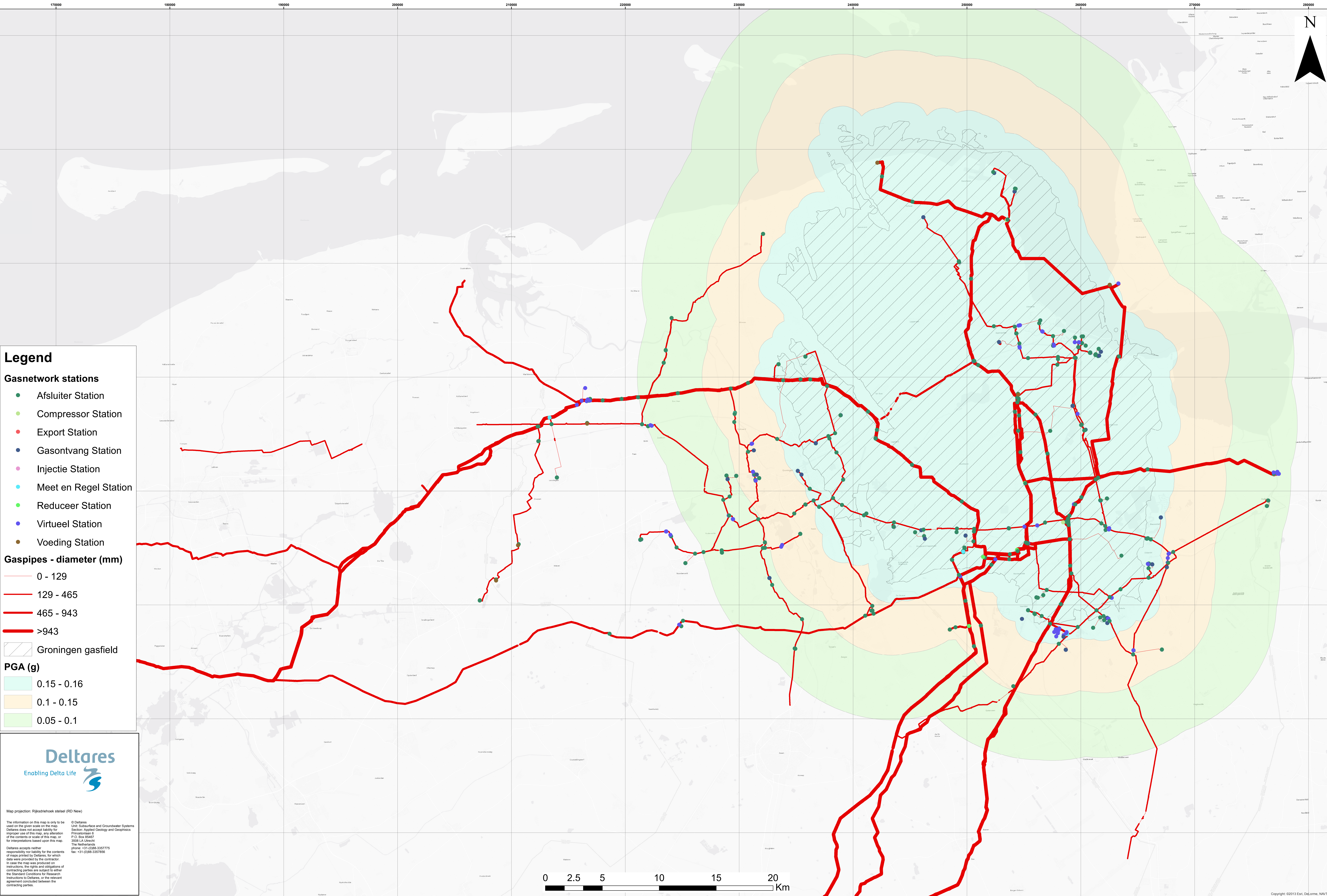
Sondering S07D00034, Profiel 'Slap ondiep'



B Kaarten aardbevingsinvloed op Gasunienetwerk

B.1 Magnitude =3,5

Peak Ground Acceleration, mean + 1 st. dev. acc. to Akkar et al. (2013); $M_w = 3.5$, focal depth 3 km, $V_{s30} = 184$ m/s



Legend

Gasnetwork stations

- Afsluiter Station
- Compressor Station
- Export Station
- Gasontvang Station
- Injectie Station
- Meet en Regel Station
- Reduceer Station
- Virtueel Station
- Voeding Station

Gaspipes - diameter (mm)

- 0 - 129
- 129 - 465
- 465 - 943
- >943

▨ Groningen gasfield

PGA (g)

- 0.15 - 0.16
- 0.1 - 0.15
- 0.05 - 0.1

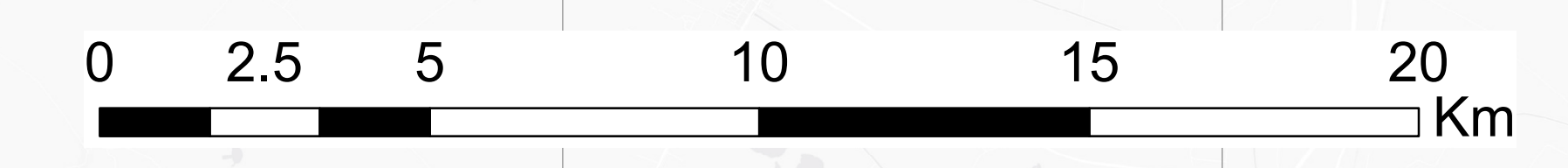
Deltares
Enabling Delta Life

Map projection: Rijksdriehoek streef (RD New)

The information on this map is only to be used on the given scale on the map. Deltares does not accept liability for incorrect use of this map, any alteration of the contents or scale of this map, or for interpretations based upon this map.

Deltares accepts neither responsibility nor liability for the contents of maps produced by Deltares, for which one was provided by the contractor. In case the map was produced on instructions, the rights and obligations of contracting parties are subject to either the Standard Conditions for Research Instructions to Deltares, or the relevant agreement concluded between the contracting parties.

© Deltares
Unit: Subsurface and Groundwater Systems
Section: Applied Geology and Geophysics
P.O. Box 85467
5000 LA Utrecht
The Netherlands
phone: +31 (0)88-3337775
fax: +31 (0)88-3337856



B.2 Magnitude =5,0