

Order : 1901679
Location : Rotterdam
Project : Formaline storage tanks

Subject : Results of soil investigation for the construction of
2 formaline storage tanks
at
ROTTERDAM

Commissioned by : Hexion Pernis Rotterdam
Attn: I. Chamberlain
Seattleweg 17
3195 ND PERNIS ROTTERDAM
NL

Author : L. van Sörsen de Koste (088-5130240)

File : R1901679-01

Date : 17 september 2019

MOS GRONDMECHANICA B.V.

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Branch office Suriname Ds Martin Luther Kingweg 150

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7604 PJ Almelo
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1. INVESTIGATION ASSIGNMENT

For the above-mentioned project, Mos Grondmechanica B.V. has carried out a soil investigation as commissioned. The commission included the following elements:

- General preparations, desk study, localizing cables and pipes, KLIC-notification
- Setting-out and levelling of 6 locations with respect to RD and NAP
- 6 CPT's to a depth of ground level – 35 m including measurement of the local sleeve friction
- Pre-digging of the CPT sites
- Advice

2. EXECUTED SOIL INVESTIGATION

Surveying

The commissioner provided a drawing of the project area. Using the provided drawing Mos Grondmechanica notified the Kadaster through a KLIC - notification (Dutch excavation regulation).

The temporary bench-markings of the intended research locations were set out and levelled by our survey department using GPS-RTK equipment. These locations are presented in the site plan drawing, which is included in this report.

CPT soundings

On September 4th 2019 Mos Grondmechanica executed the CPT's numbered 1 through 6 to a depth of approximately ground level –35 m.

The CPT rig which executed the above mentioned CPT's has a pressure capacity of 200 kN. During the execution of a CPT, the time, cone resistance (q_c), local sleeve friction (f_s) and the angle (°) of the penetration path with respect to the vertical (i) are measured per 20 mm penetration and saved.

Using the measured cone resistance and local sleeve friction, the friction ratio ($R_f = f_s / q_c * 100\%$) is calculated. The friction ratio (R_f) in combination with the cone resistance (q_c) provides insight in the soil types present. In the Netherlands, common, normally consolidated soil types can be indicatively linked to the following range of friction ratio's:

Sand: 0,5% - 1,5%	Clay / Loam: 2% - 4%	Peat: 8% - 10%
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The CPT's are executed in accordance to Application class 3, type TE1 of NEN-EN-ISO 22476-1.

Due to the possible presence of cables and pipes, the CPT locations were pre-digged to a depth of approximately ground level –2 m by the site contractor.

Advice

The advice will be reported separately.

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L. van Sörnsen de Korte (088-5130240)



Rotterdam, 17 september 2019

Mos Grondmechanica B.V.

Checked by M. van Es



Content:

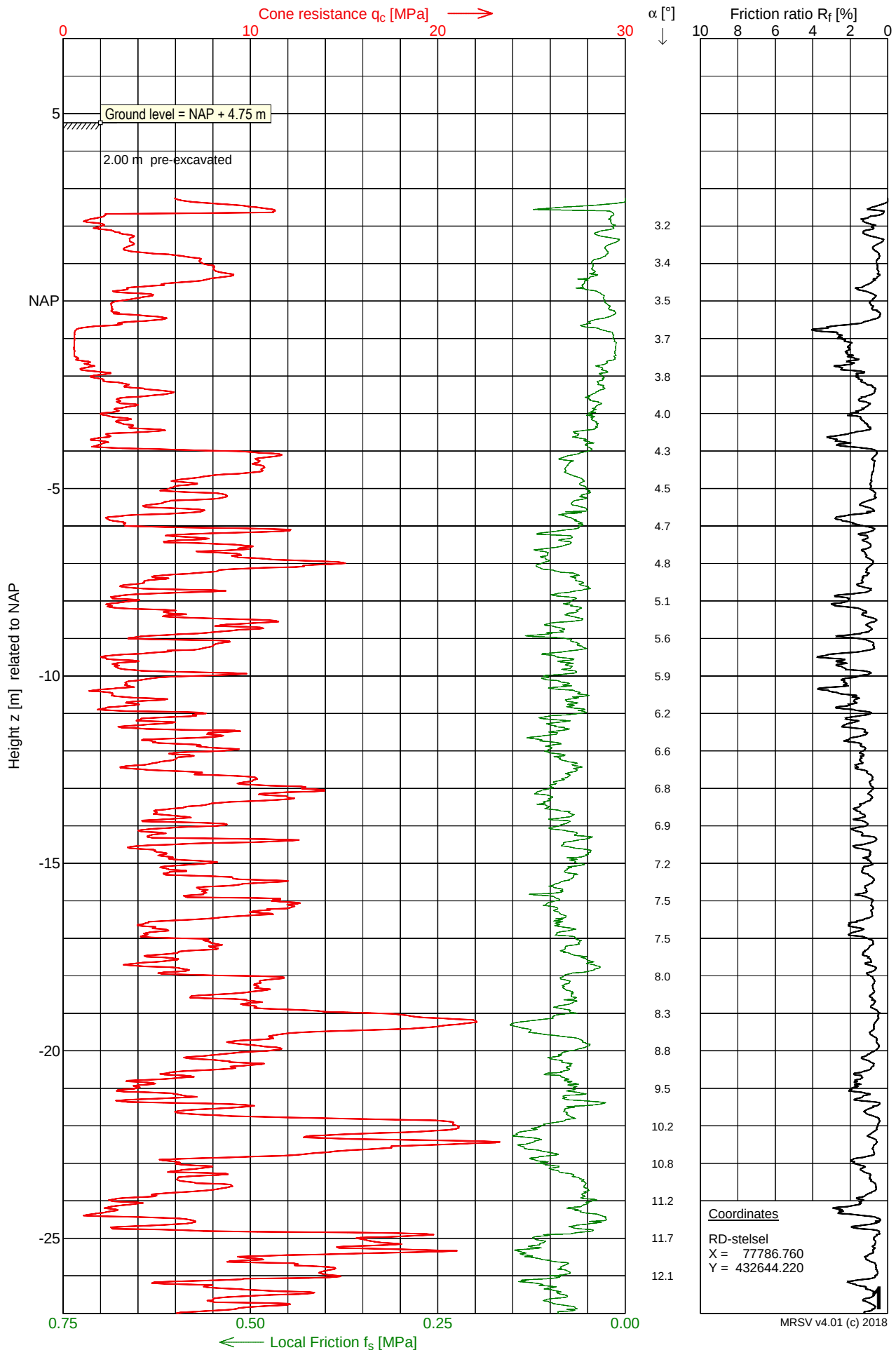
- CPT diagrams
- Coordinates and elevations
- Site plan

CPT 1

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
Page : 1 of 2

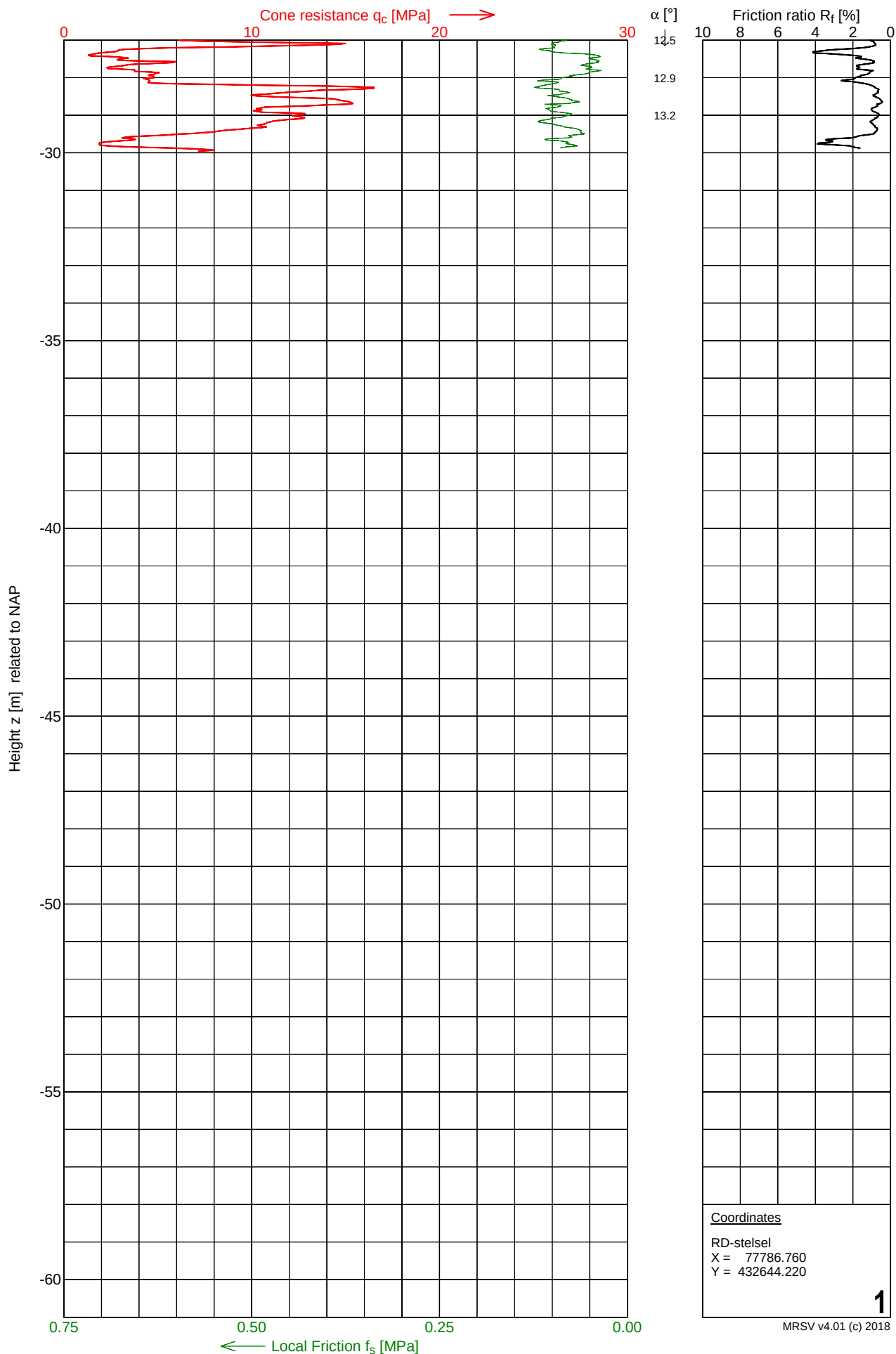


CPT 1

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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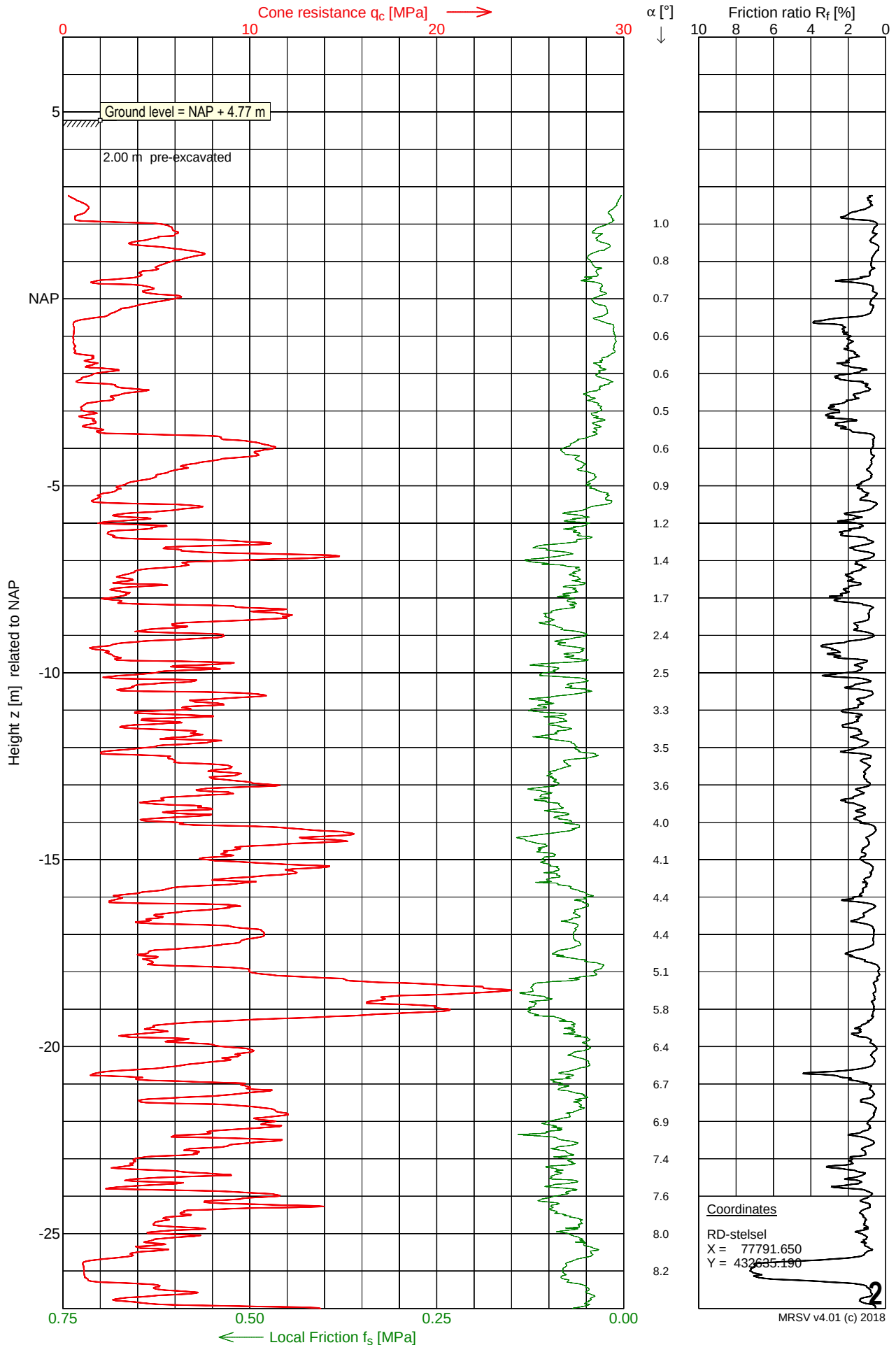


CPT 2

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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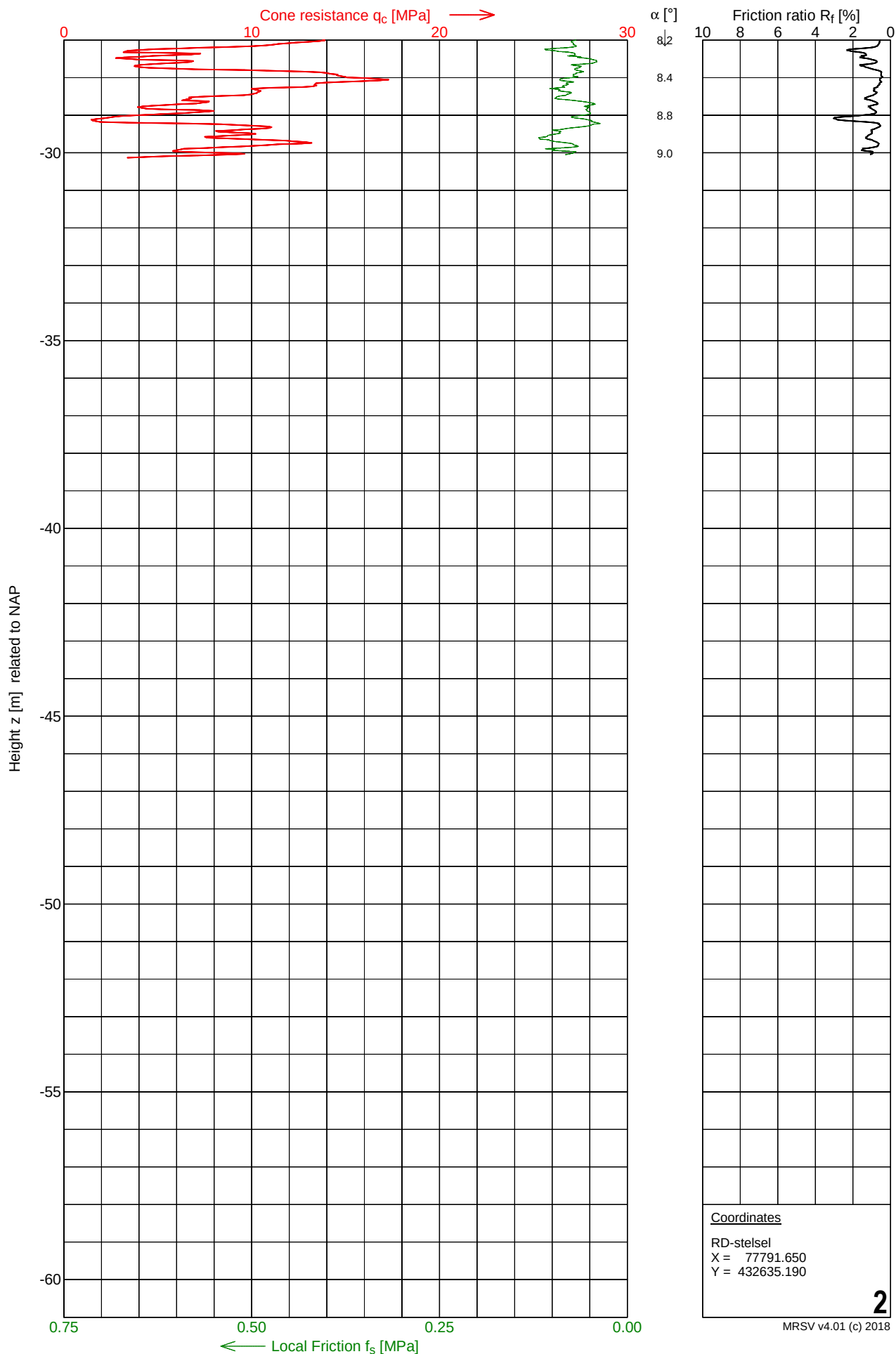


CPT 2

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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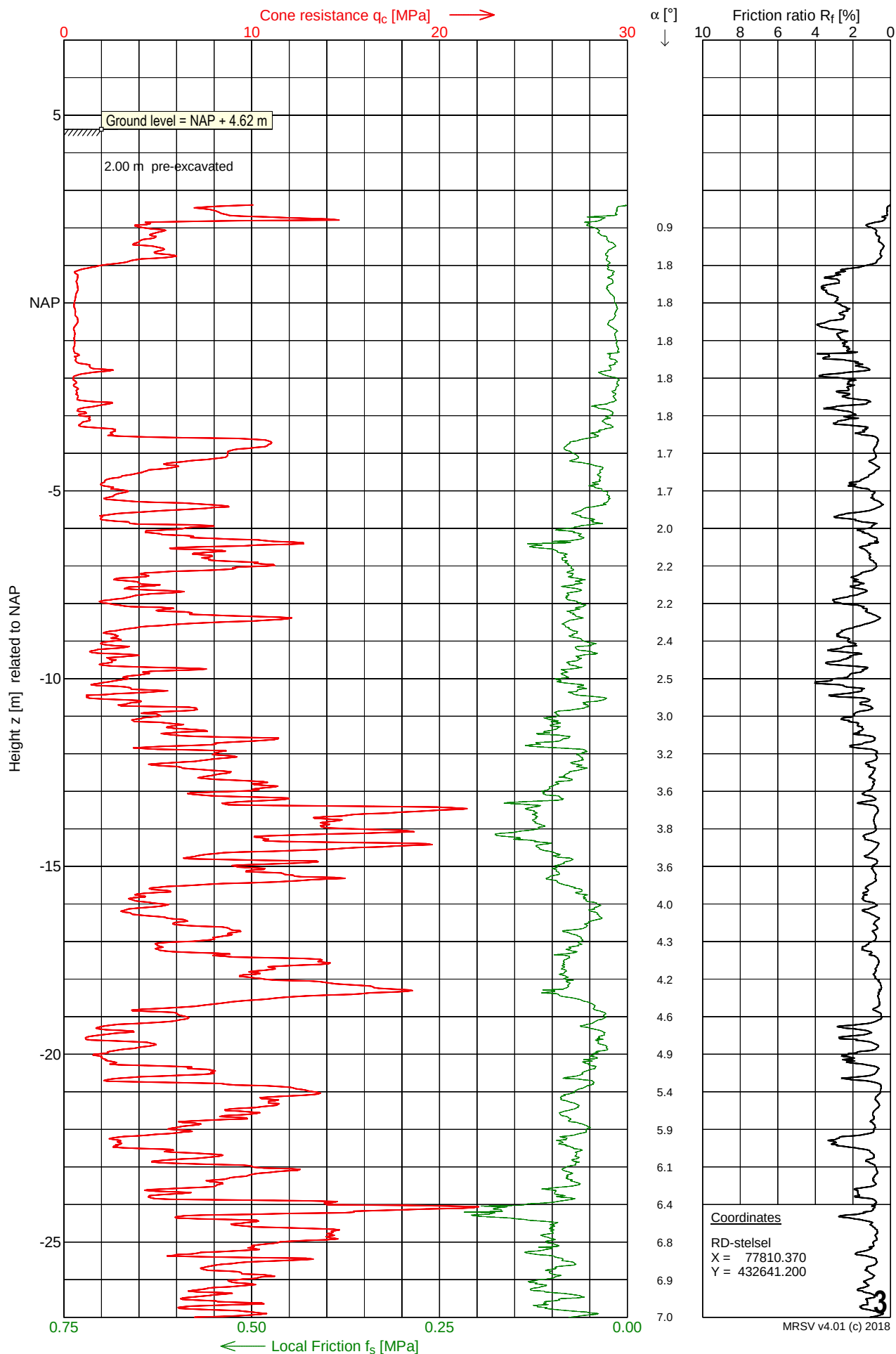


CPT 3

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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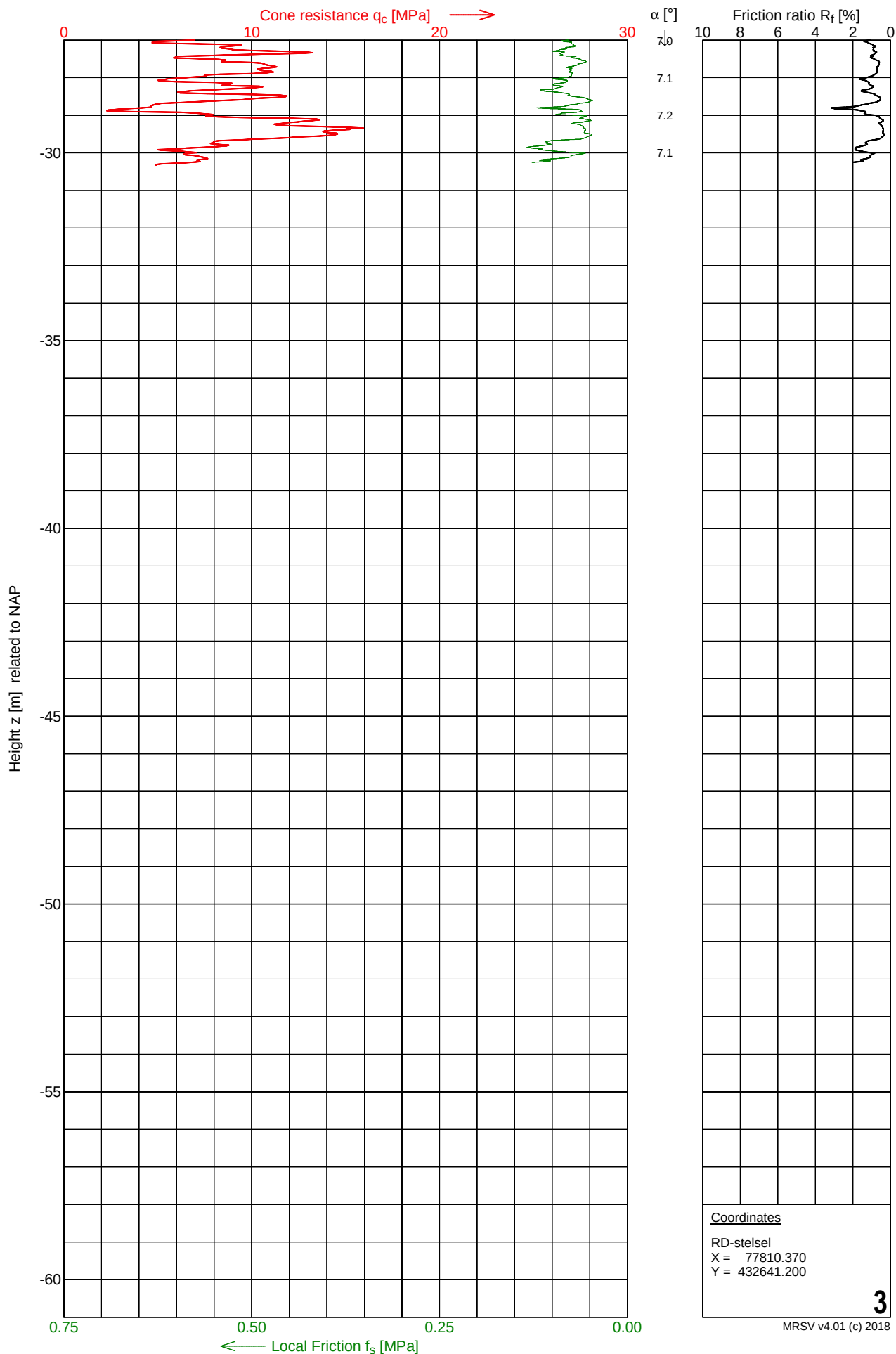


CPT 3

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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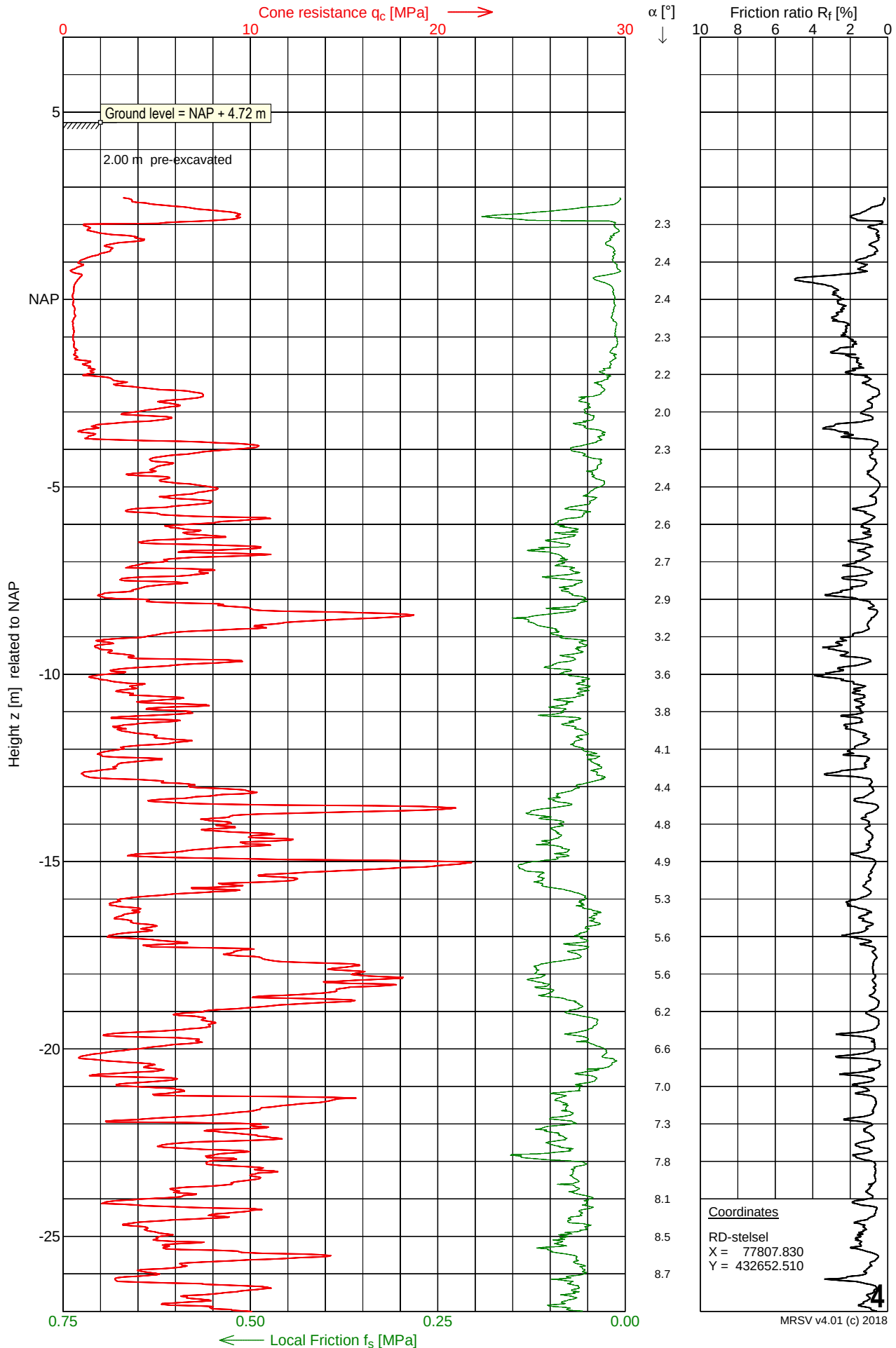


CPT 4

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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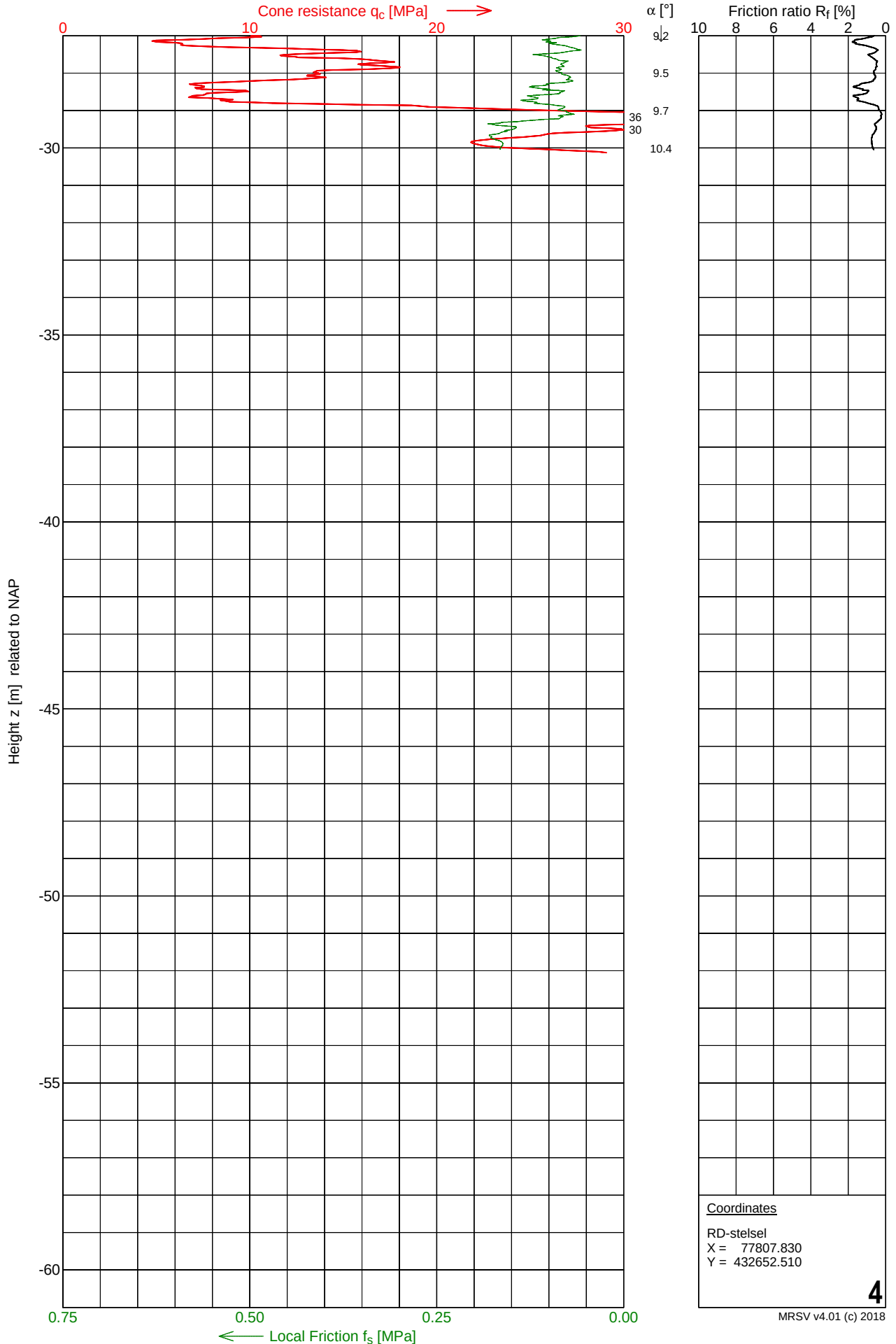


CPT 4

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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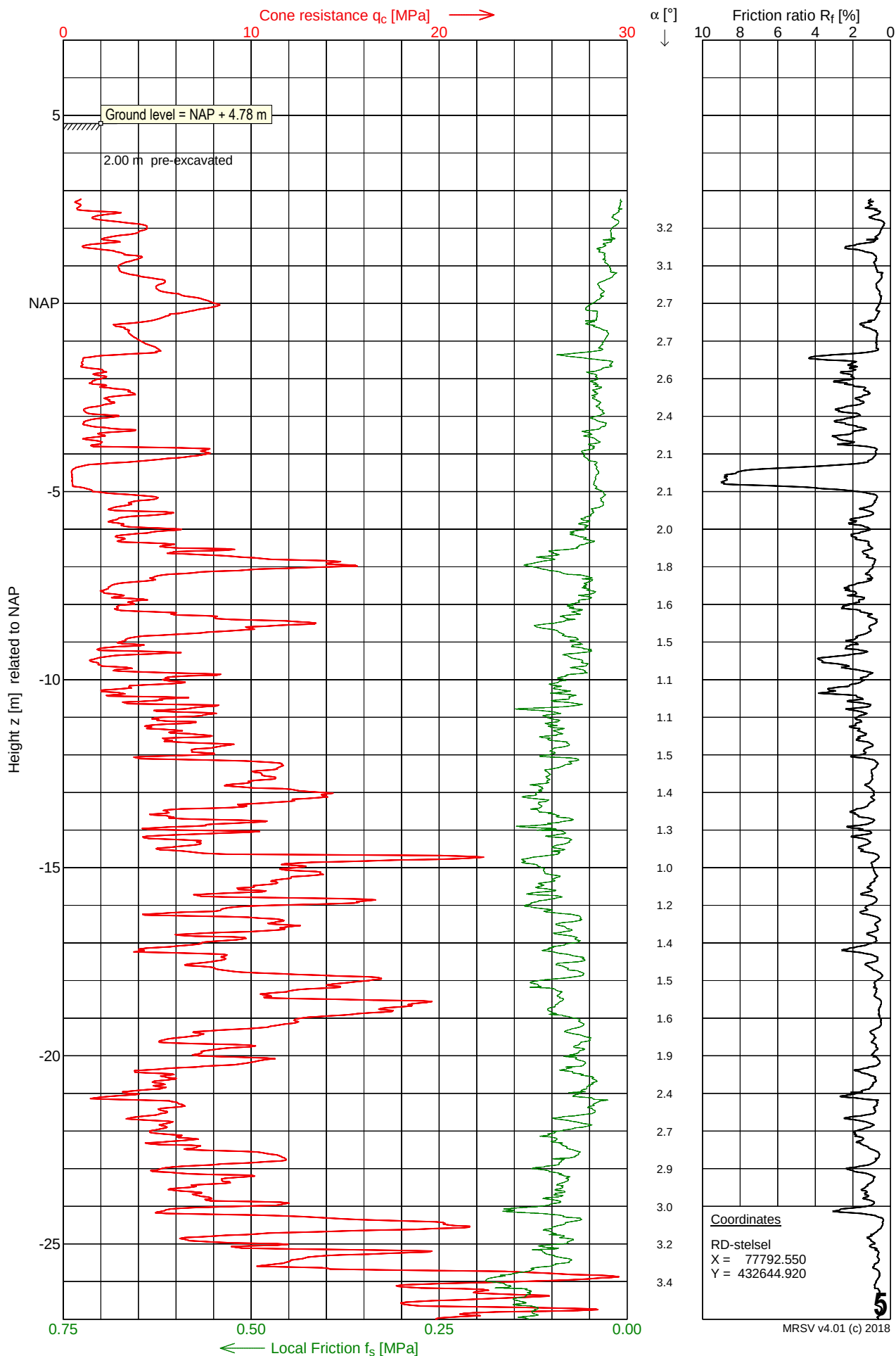


CPT 5

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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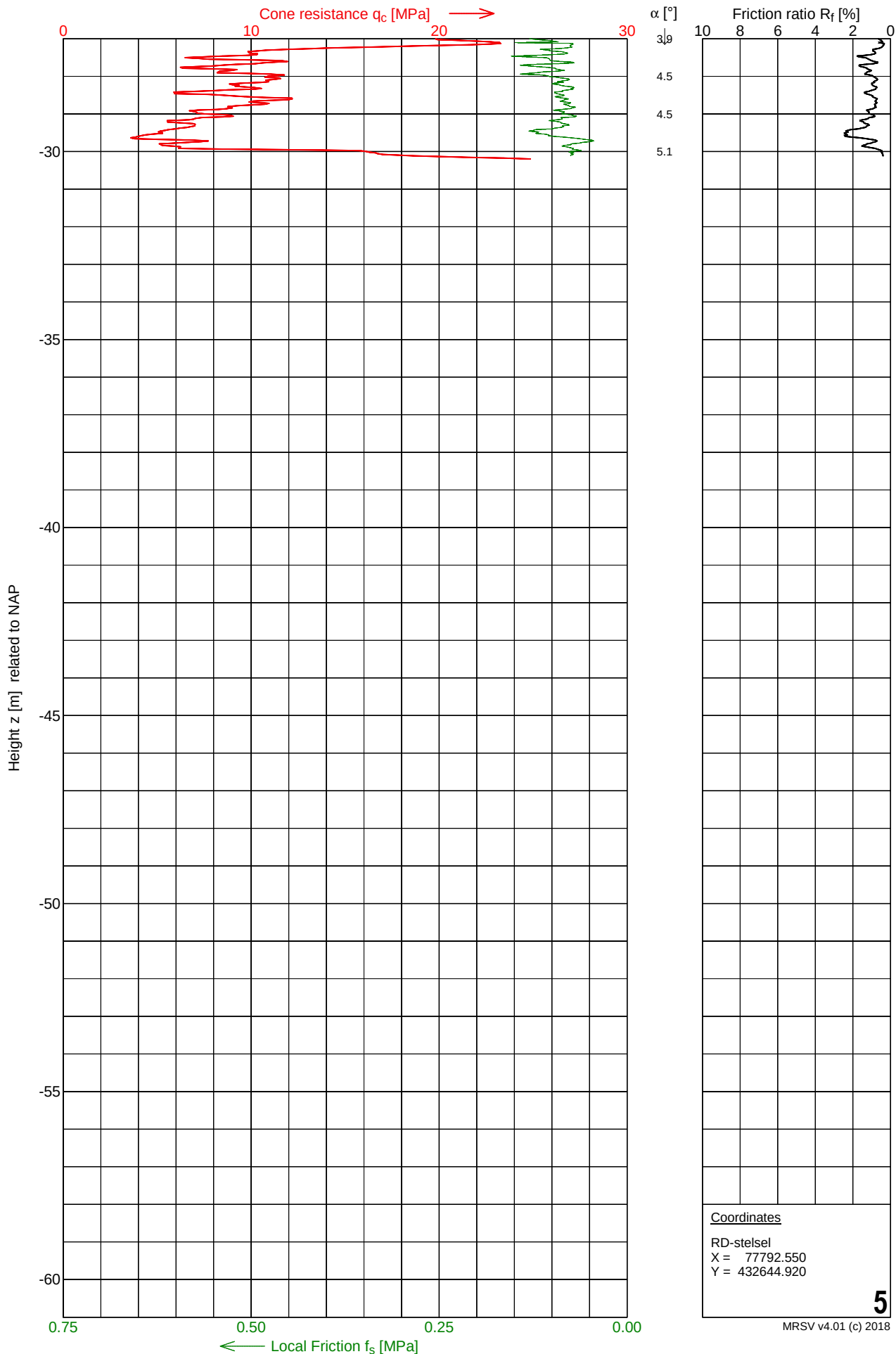


CPT 5

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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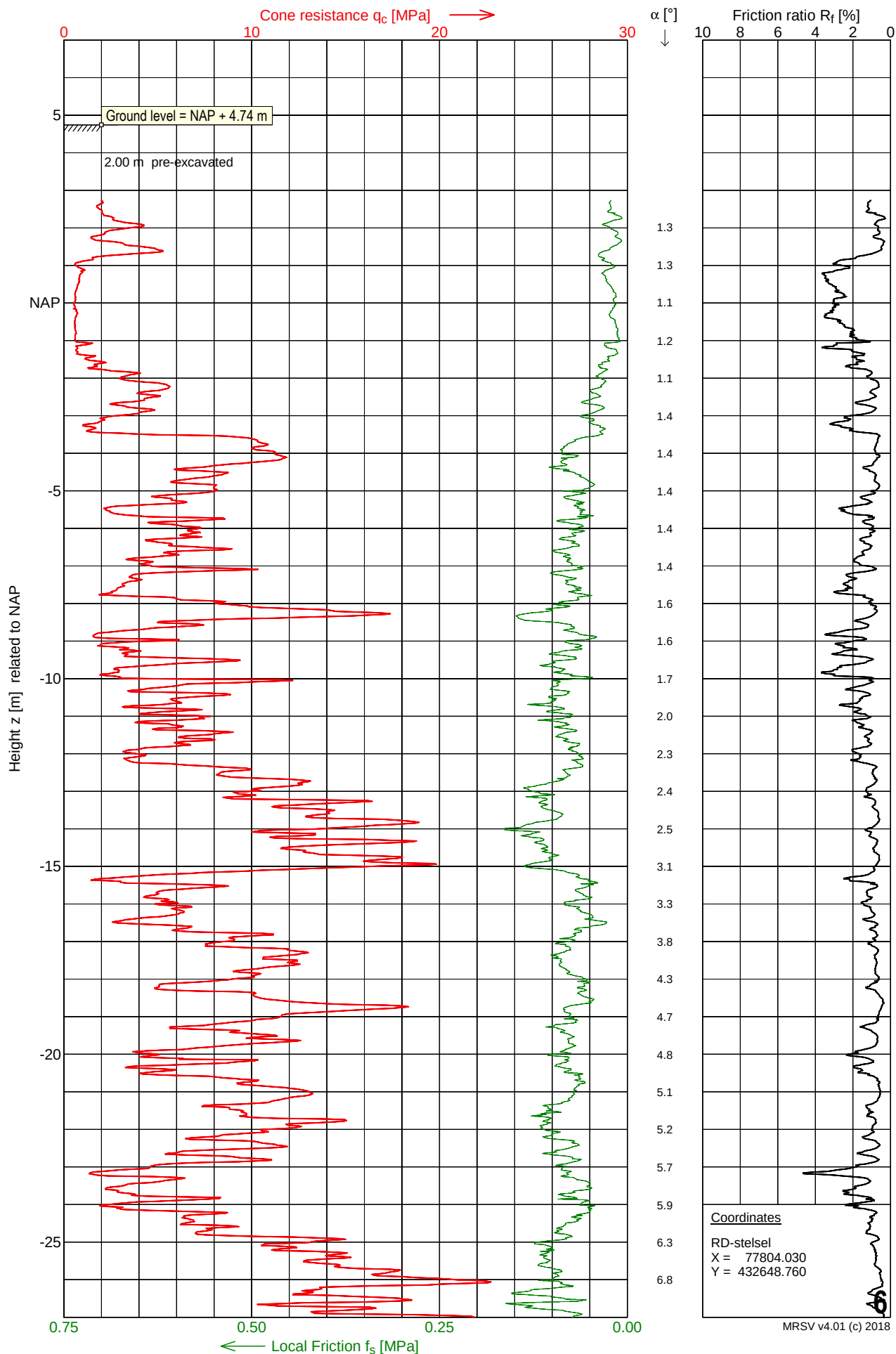


CPT 6

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
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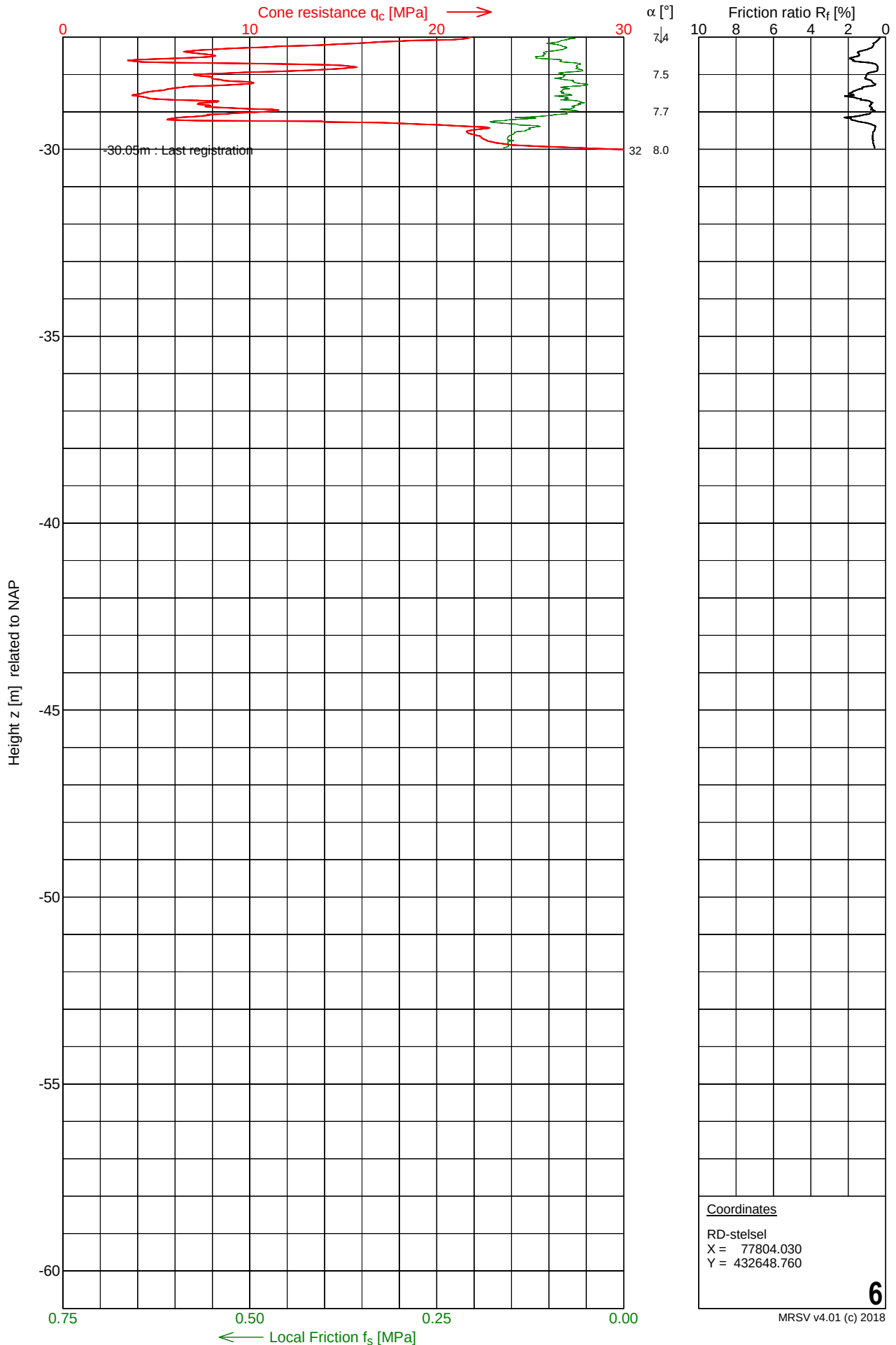


CPT 6

Project No : 1901679
Location : Rotterdam
Date : 04-09-2019
Project : Storage tank capacity

Cone number : DP15-CFPTxy.70051
Cone type : Electric
Cone surface : 1500 mm²

NEN-EN-ISO-22476-1
Class 3, type TE1
CPT App. : SW5
Page : 2 of 2



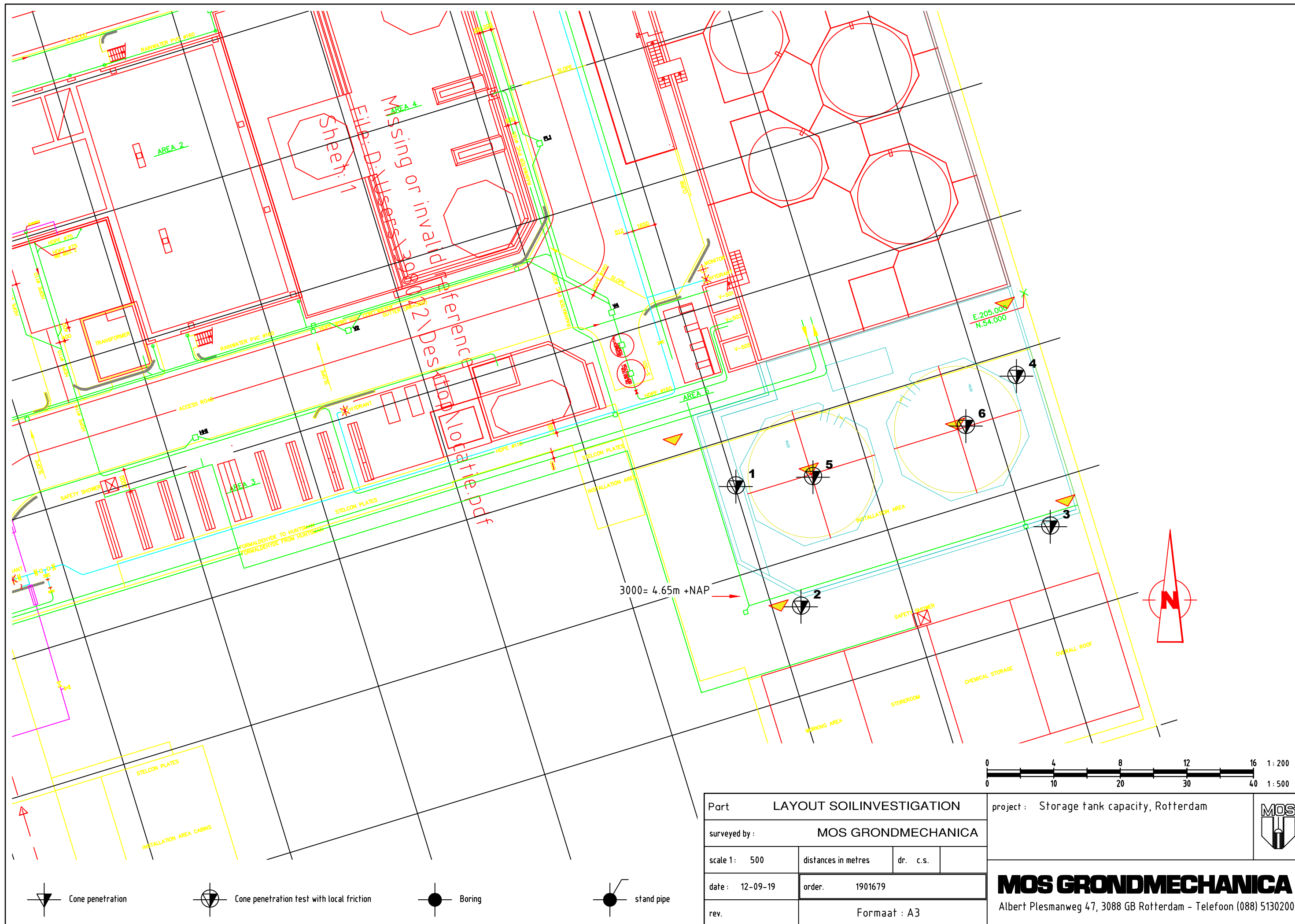
Order 1901679
Place Botlek Rotterdam
Date 02-09-2019
Project Storage tank capacity

Measurement performed in RD system

CPT No.	X [m] measured	Y [m] measured	Z [m] R. To NAP
1	77786.76	432644.22	4.75
2	77791.65	432635.19	4.77
3	77810.37	432641.20	4.62
4	77807.83	432652.51	4.72
5	77792.55	432644.92	4.78
6	77804.03	432648.76	4.74

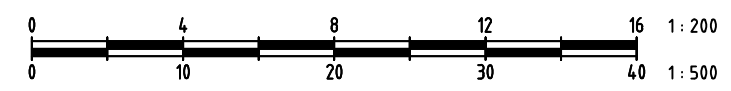
Point No.	X [m] measured	Y [m] measured	Z [m] R. To NAP	Description
3000	77787.05	432635.98	4.65	sewer well

Name fixed point -
Level fixed point -
Given by Rijkswaterstaat
Leveled by M. Blaak
Date of leveling 02-09-2019
Description fixed point Measurement performed with Leica RTK GPS system



File: D:\Projects\39002\Descriptie\Notatie.pdf
Missing or invalid reference

3000 = 4.65m +NAP



Part LAYOUT SOILINVESTIGATION				project : Storage tank capacity, Rotterdam	
surveyed by : MOS GRONDMECHANICA					
scale 1 : 500	distances in metres	dr. c.s.		MOS GRONDMECHANICA Albert Plesmanweg 47, 3088 GB Rotterdam – Telefoon (088) 5130200	
date : 12-09-19	order. 1901679				
rev.	Formaat : A3				

MOS GRONDMECHANICA B.V.

Hieronder treft u de dienstverlening van Mos Grondmechanica b.v. aan. Voor specifieke diensten die niet direct in het overzicht terug zijn te vinden kunt u uiteraard vrijblijvend contact met ons opnemen.



VELDWERK

Sonderen op land, water en in beperkte ruimte, elektrisch, waterspanning, dissipatie, seismisch, magnetisch, geleidbaarheid, Bolconus, T-bar en slagsonderen

Geotechnisch boren en (on)geroerde monsternamen
Peilbuizen en waterspanningsmeters plaatsen
X, Y en Z metingen en Lintvoegmetingen
Plaatdruk-, CBR- en CPM proeven
In situ doorlatenheidspoeven

LABORATORIUM

Classificatie proeven (o.a. vol. gewicht, KVD, PI)
Samendrukkingsproeven (Oedometer en CRS)
Triaxiaalproeven
DS en DSS-proeven
Doorlatenheidspoeven
Dichtheidsbepaling (Proctor en CBR)
Cementbentoniet onderzoek

GEOMONITORING

Deformatiemeting (inclino- en extensometing)
(Grond)waterspanningsmeting
Zettingsmonitoring
Trillingsmonitoring (SBR)
Akoestisch doormeten van palen (CUR 109)
Online meetgegevens via portal

MILIEU (MOS MILIEU B.V.)

Verkennd-, nader- en saneringsonderzoek
Partijkeuringen besluit bodemkwaliteit (Bbk)
Saneringsbegeleiding. Waterbodemonderzoek.
Vergunning aanvragen.
2nd Opinion / Contra-Expertise Bodemonderzoeken.

GEOTECHNISCH ADVIES

Paalfundering
Fundering op staal
Grondkerende constructies
Bouwputontwerp
Omgevingsbeïnvloeding (Plaxis)
Zettingsanalyse (bouwrijp maken, opslagtanks)
Taludstabiliteit
Tankbouwadvies
Trillingsprognose
Schade expertise
Review en 2nd Opinion

GEOHYDROLOGISCH ADVIES

Bemalingen (incl. retourbemalingen)
Vergunningsaanvragen
Pompproeven
Warmte Koude Opslag
Omgekeerde Osmose.
Barrièrewerking
Drainage
Infiltratie hemelwater

BEMALINGEN (MOS GRONDWATERTECHNIEK)

Bronbemaling
Ondergrondse energie-opslag
Pomp- en leidingsystemen
Brandputten

OVERIG

Uitvoeringsbegeleiding

Meer weten? Bezoek onze website www.mosgeo.com
Vragen? Mail ons op info@mosgeo.com
Offerte aanvragen? Mail ons op offerte@mosgeo.com

Mos Grondmechanica opereert structureel vanuit 5 vestigingen in Nederland en in Suriname. Via het zusterbedrijf Mosgeo b.v. worden wereldwijd projecten uitgevoerd, daar waar onze specifieke kennis en ervaring wordt gevraagd.

MOS GRONDMECHANICA B.V.

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Vestiging Almelo	Het Wendelgoor 13	7604 PJ	Almelo
Vestiging Amsterdam	Pleimuiden 8B	1046 AG	Amsterdam
Mosgeo B.V.	Albert Plesmanweg 47	3088 GB	Rotterdam
Vestiging Suriname	Ds Martin Luther Kingweg 150	District Wanica	Suriname

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