

## **Forsmark site investigation**

# **Compilation and visualisation of cross discipline borehole data using WellCad**

## **Boreholes KFM01A–KFM07A**

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December 2006

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*Keywords:* WellCad, data compilation, geology, geophysics, chemistry, hydrogeology.

This report concerns a study which was conducted for SKB. The conclusions and viewpoints presented in the report are those of the authors and do not necessarily coincide with those of the client.

Data in SKB's database can be changed for different reasons. Minor changes in SKB's database will not necessarily result in a revised report. Data revisions may also be presented as supplements, available at [www.skb.se](http://www.skb.se).

A pdf version of this document can be downloaded from [www.skb.se](http://www.skb.se).

## **Abstract**

This report compiles and visualizes bedrock data from different earth science disciplines. Simple figures highlight a sample of cross-discipline borehole data from borehole KFM01A–KFM07A. The displayed data are acquired within the Forsmark data freeze 2.1 and are all results from activities performed within the site investigation at Forsmark.

## Sammanfattning

Denna rapport sammanställer och visualiserar data från ett flertal geovetenskapliga ämnesområden. Lättförståliga figurer lyfter fram borrhålsdata från borrhålen KFM01A–KFM07A, insamlade genom olika aktiviteter inom platsundersökningen i Forsmark till och med datafrys 2.1.

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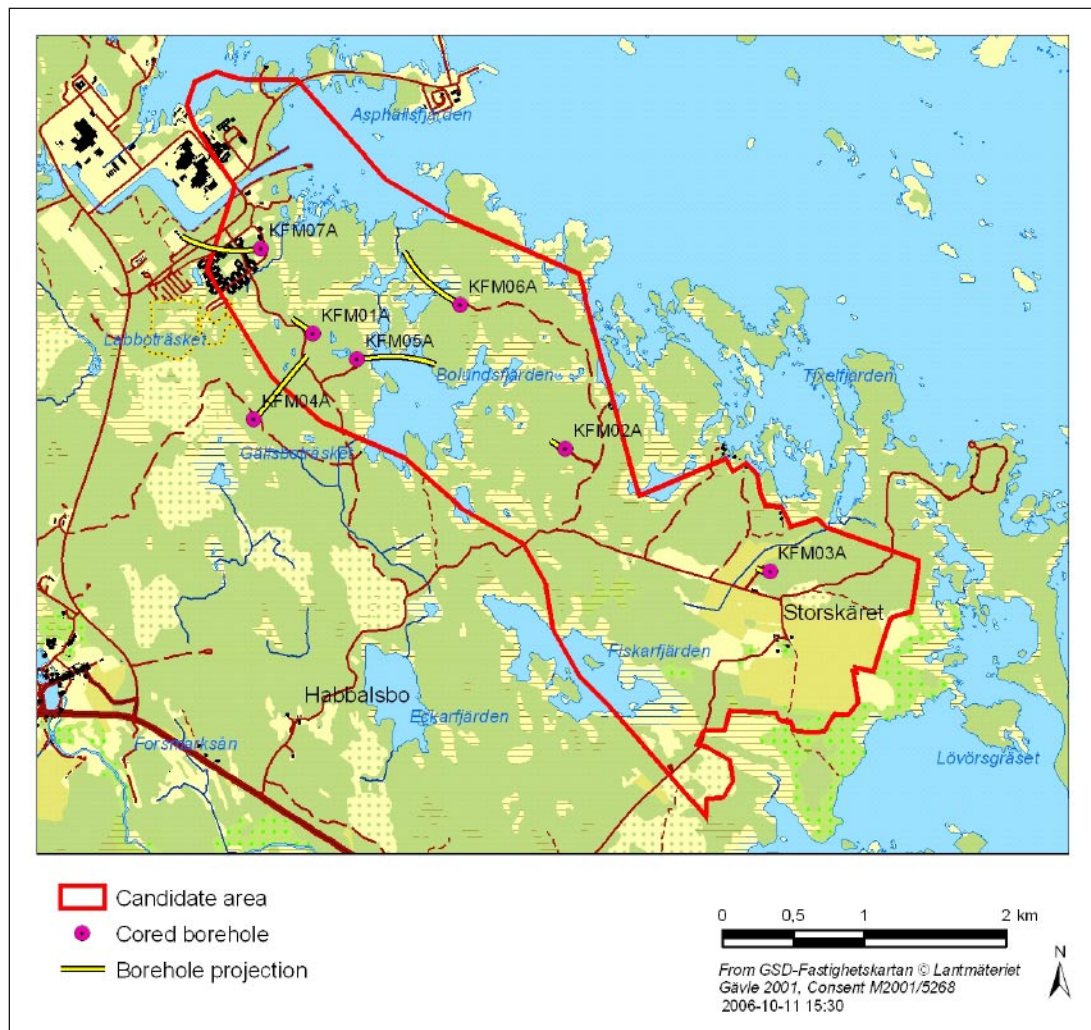
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# 1 Introduction

This report compiles and visualises bedrock data from different earth science disciplines. All data are previously reported in SKB primary data reports and no new data are presented in this report.

The displayed data represent a selected number of activities performed within the site investigation at Forsmark in boreholes KFM01A–KFM07A, see Figure 1-1 and belong to the Forsmark data freeze 2.1.



**Figure 1-1.** General overview over Forsmark site investigation area. The boreholes KFM01A to KFM07A are displayed with horizontal component.

## **2 Objective and scope**

Cross-discipline borehole data plots are readily constructed by using the code WellCad, which can be programmed to fetch data from SKB's data base Sicada. The cross-discipline data plots presented in this report are just examples, displaying borehole data gathered in the cored boreholes KFM01A–07A and represent different earth science disciplines: geology, geophysics, hydrogeology and hydrochemistry.

The objective of the report is to demonstrate the power of cross-discipline borehole data plots. It is suggested that such plots are produced on a more regular basis to provide data base users an easy overview of available borehole data suitable for further analyses.



## 3 Execution

### 3.1 General

Data from boreholes KFM01A–KFM07A acquired up to data freeze 2.1 were extracted from the Sicada database and printed (see appendices) using a specially designed script in the code WellCad.

### 3.2 Data handling

The selected borehole data presented in Chapter 4 are displayed in reference to both borehole length and elevation with regard to RHB70. In Table 3-1 all parameters are briefly described and the individual Sicada reference is given.

**Table 3-1. Brief description of presented parameters.**

Header text	Brief description of parameter	Parameter/Table name in the Sicada database	General comments
<b>Length (m.f.ToC)</b>	Length coordinate along the borehole, measured from top of borehole e.g. top of casing		
<b>Elevation (m, RHB70)</b>	Elevation coordinate in RHB 70		
<b>Rock type (&gt; 1 m)</b>	Rock type	Table "p_rock"	Type of rock e.g. Granite, Pegmatite, Amphibolite etc
<b>Open crush</b>	Occurrence of open crush (non cohesive parts) in the core	Table "p_freq_1m"	Number of open fractures in crush section
<b>Open fractures (fr/m)</b>	Frequency of open fractures in the core	Table "p_freq_1m" open_frac + open_partly in table	Number of fractures interpreted as in situ open or open partly
<b>DZ</b>	Borehole interval interpreted as deformation zone	Table "p_one_hole_interpret"	The deformation zones are interpreted at single hole interpretation activities as:  Borehole interval with increased fracture frequency (brittle) and/or ductile deformation
<b>Rock resistivity (<math>\Omega</math>m)</b>	Resistivity of surrounding rock with little influence of borehole fluid conductivity	Activity type: GP162 "focued_resistivity"	Can be used for detection of low resistivity features such as fractured or mineralised rock
<b>Natural Flow (m<sup>3</sup>/s)</b>	Flow rate in fractures during undisturbed conditions (no pumping in borehole). Measured with Posiva Flow Logg	Activity type: HY680 "natural_flow_rate_q0" from table: "plu_pfl_diff_seq_flo"	The method locates hydraulic conductive fractures contributing to water inflows/outflows to/from the borehole and measures their flow rate under natural conditions
<b>PFL f Transmissivity (m<sup>2</sup>/s)</b>	Fracture transmissivity during steady state conditions. Measured with Posiva Flow Logg	Activity type: HY685 Table "p_transmissivity" evalu_method_t = 'Tda'	Transmissivity of inferred flow anomaly

Header text	Brief description of parameter	Parameter/Table name in the Sicada database	General comments
<b>PSS Transmissivity (m<sup>2</sup>/s)</b>	Section transmissivity derived from double packer injection tests. (normally 100, 20 and 5 m sections)	Activity type: HY660 Table "p_transmissivity" evalu_method_t = 'Moye'	Steady state evaluation method, transmissivity based on Moye
<b>EC (mS/m)</b>	Electric conductivity of water sample	Activity type: WC040 "el_cond_sel"	Electric conductivity measured in situ
<b>Packer position</b>	Positions of installed packers separating sections individually monitored in the HMS (Hydro Monitoring System)	Table "sections_installed", view "packers_all"	Positions of installed packers at time of printing

### 3.3 Analyses and interpretations

No analyses and interpretations of the displayed data are made in the scope of this work. However, the data presented are often interpretations, with different models and with different assumptions. All data are further described in each individual primary data report, see Table 3-2. All reports are available, and possible to download from [www.skb.se](http://www.skb.se).

**Table 3-2. Reference P-reports for displayed data.**

Parameter	Original SKB P-data report for displayed data sets						
	KFM01A	KFM02A	KFM03A	KFM04A	KFM05A	KFM06A	KFM07A
<b>Rock type</b>	P-03-23	P-03-98	P-03-116	P-04-115	P-04-295	P-05-101	P-05-102
<b>Open crush</b>	P-03-23	P-03-98	P-03-116	P-04-115	P-04-295	P-05-101	P-05-102
<b>Open Fractures</b>	P-03-23	P-03-98	P-03-116	P-04-115	P-04-295	P-05-101	P-05-102
<b>DZ</b>	P-04-116	P-04-117	P-04-118	P-04-119	P-04-296	P-05-132	P-05-157
<b>Rock resistivity</b>	P-03-103	P-04-97	P-04-97	P-04-144	P-04-153	P-04-144	P-05-159
<b>Natural Flow</b>	P-03-28	P-04-188	P-04-189	P-04-190	P-04-191	P-05-15	P-05-63
<b>PFL f</b>	P-03-28	P-04-188	P-04-189	P-04-190	P-04-191	P-05-15	P-05-63
<b>Transmissivity</b>	P-04-193						
<b>PSS Transmissivity</b>	P-04-95	P-04-100	P-04-194	P-04-293	P-05-56	P-05-165	P-05-133
<b>EC</b>	P-03-94	P-04-70	P-04-108	P-04-109	P-05-79	P-05-178	P-05-170

## 4 Results

The data compilation plots are, for each borehole, displayed in an overview plot of the entire borehole, followed by five figures covering a 200 m section length.

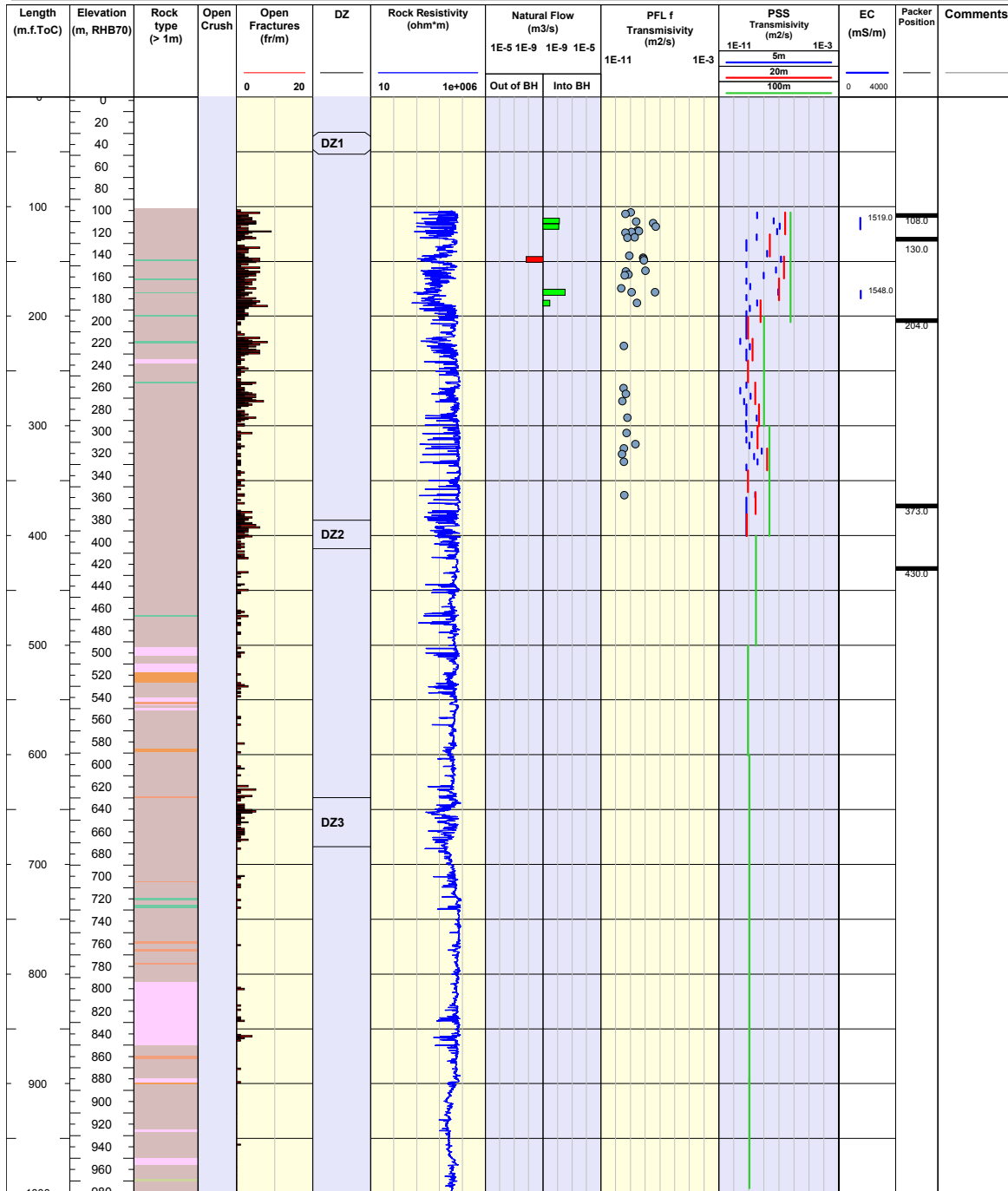
# 4.1 KFM01A

## 4.1.1 KFM01A, 0–1,001 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-05-07 09:30:00
	Borehole	KFM01A	Northing [m]	6699529.81	Drilling Stop Date	2002-06-10 12:50:00
	Diameter [mm]	76	Easting [m]	1631397.16	Packer Installation Date	
	Length [m]	1001.490	Inclination [°]	-84.72	Plot Date	2006-08-08 21:18:51
	Bearing [°]	318.35	Elevation [m.a.s.l.]	3.13		

### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Calc-silicate rock (skarn)

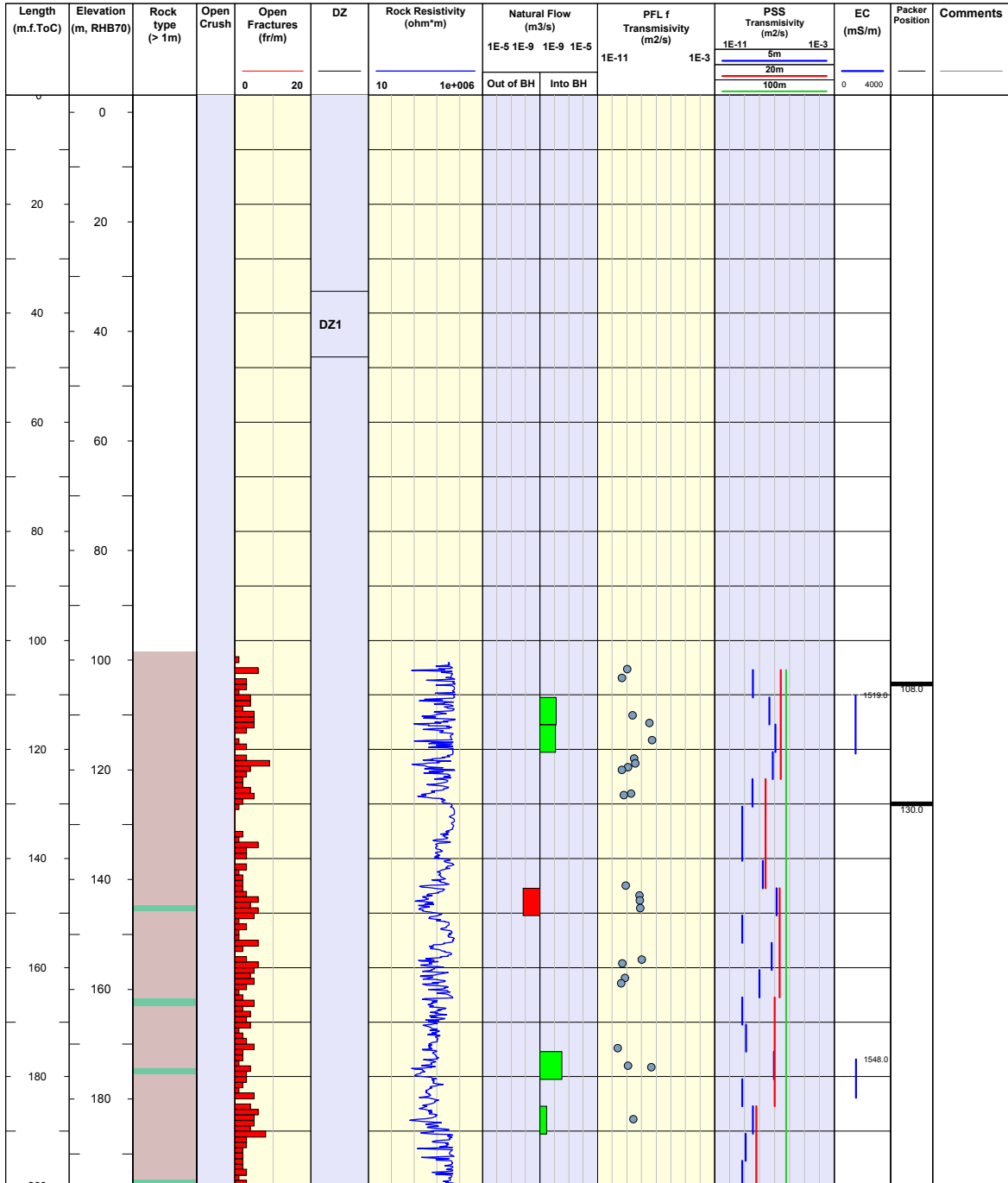


### 4.1.2 KFM01A, 0–200 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-05-07 09:30:00
	Borehole	KFM01A	Northing [m]	6699529.81	Drilling Stop Date	2002-06-10 12:50:00
	Diameter [mm]	76	Easting [m]	1631397.16	Packer Installation Date	
	Length [m]	1001.490	Inclination [°]	-84.72	Plot Date	2006-08-08 21:18:51
	Bearing [°]	318.35	Elevation [m.a.s.l.]	3.13		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Calc-silicate rock (skarn)



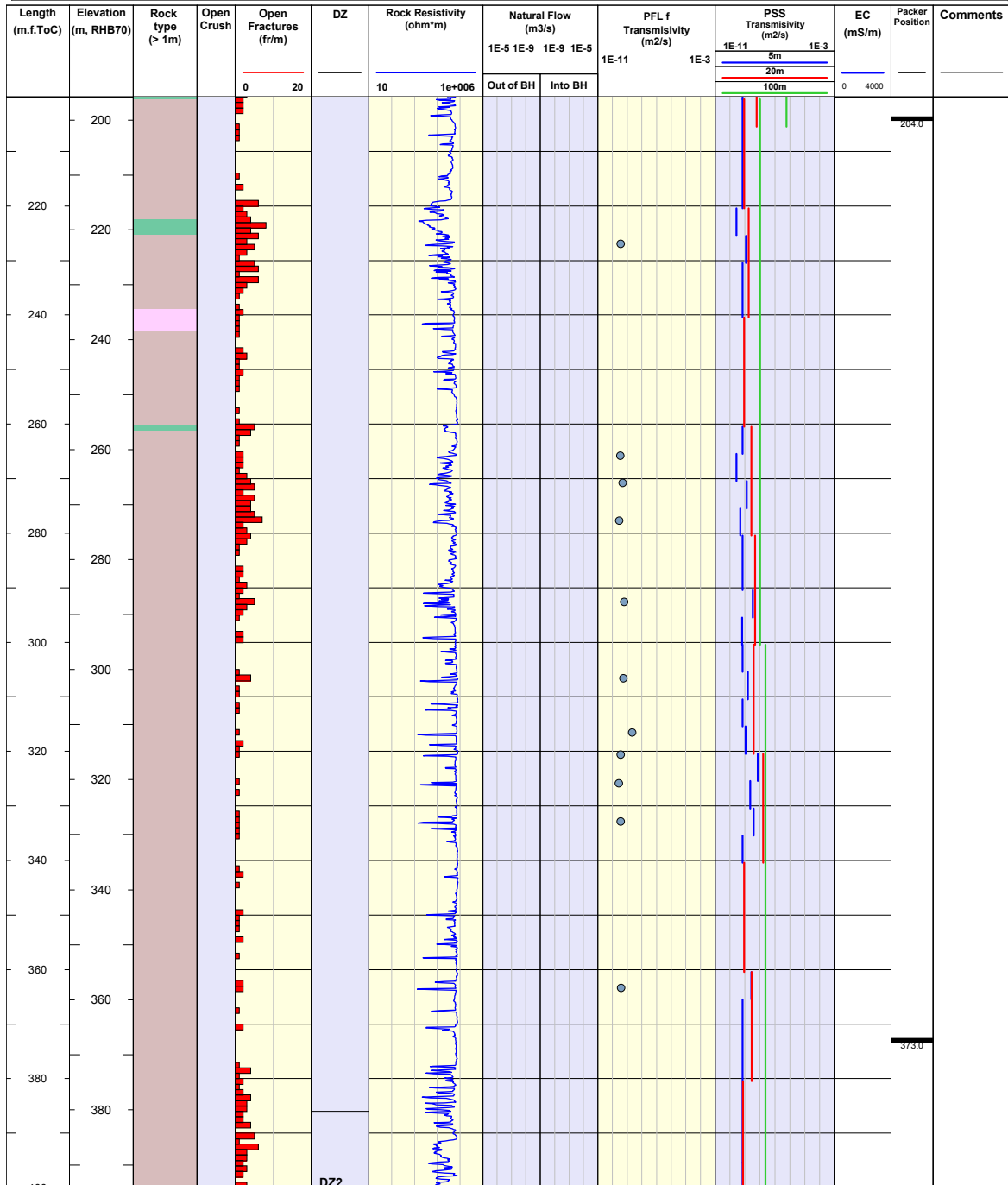
### 4.1.3 KFM01A, 200–400 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-05-07 09:30:00
Borehole	KFM01A	Northing [m]	669529.81	Drilling Stop Date	2002-06-10 12:50:00
Diameter [mm]	76	Easting [m]	1631397.16	Packer Installation Date	
Length [m]	1001.490	Inclination [°]	-84.72	Plot Date	2006-08-08 21:18:51
Bearing [°]	318.35	Elevation [m.a.s.l.]	3.13		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Calc-silicate rock (skarn)

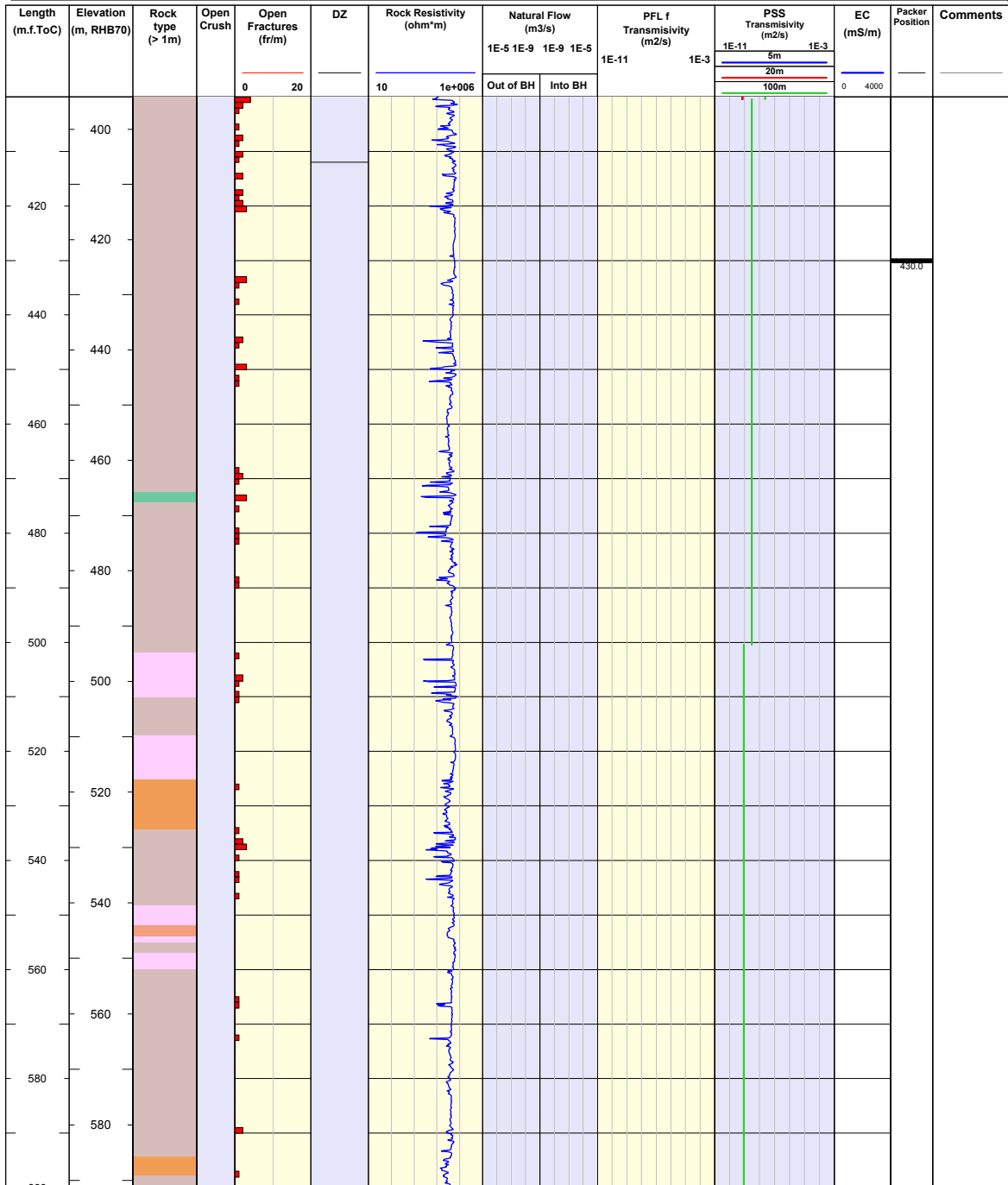


### 4.1.4 KFM01A, 400–600 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-05-07 09:30:00
	Borehole	KFM01A	Northing [m]	6699529.81	Drilling Stop Date	2002-06-10 12:50:00
	Diameter [mm]	76	Easting [m]	1631397.16	Packer Installation Date	
	Length [m]	1001.490	Inclination [°]	-84.72	Plot Date	2006-08-08 21:18:51
	Bearing [°]	318.35	Elevation [m.a.s.l.]	3.13		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Calc-silicate rock (skarn)



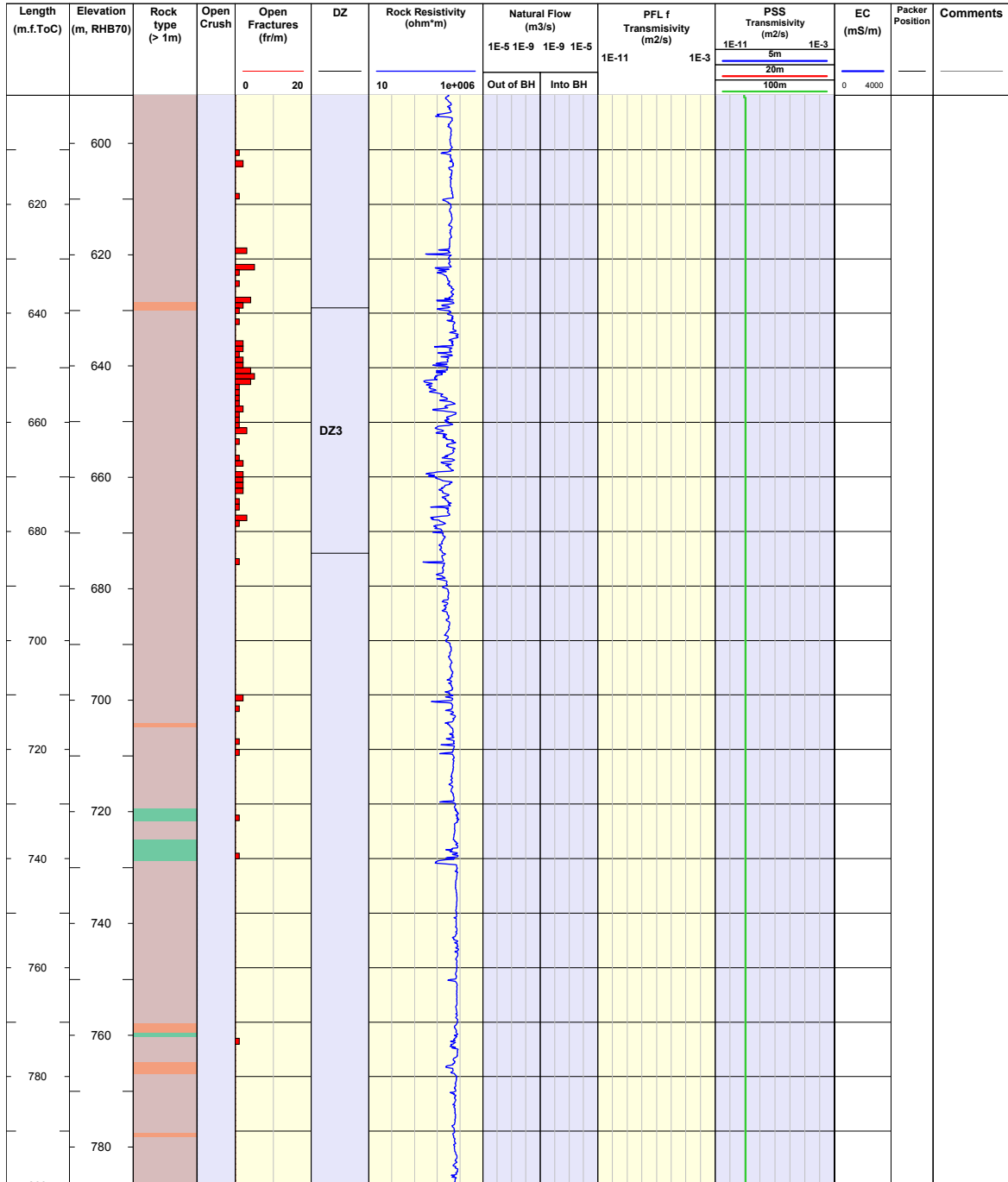
### 4.1.5 KFM01A, 600–800 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-05-07 09:30:00
Borehole	KFM01A	Northing [m]	6699529.81	Drilling Stop Date	2002-06-10 12:50:00
Diameter [mm]	76	Easting [m]	1631397.16	Packer Installation Date	
Length [m]	1001.490	Inclination [°]	-84.72	Plot Date	2006-08-08 21:18:51
Bearing [°]	318.35	Elevation [m.a.s.l.]	3.13		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Calc-silicate rock (skarn)





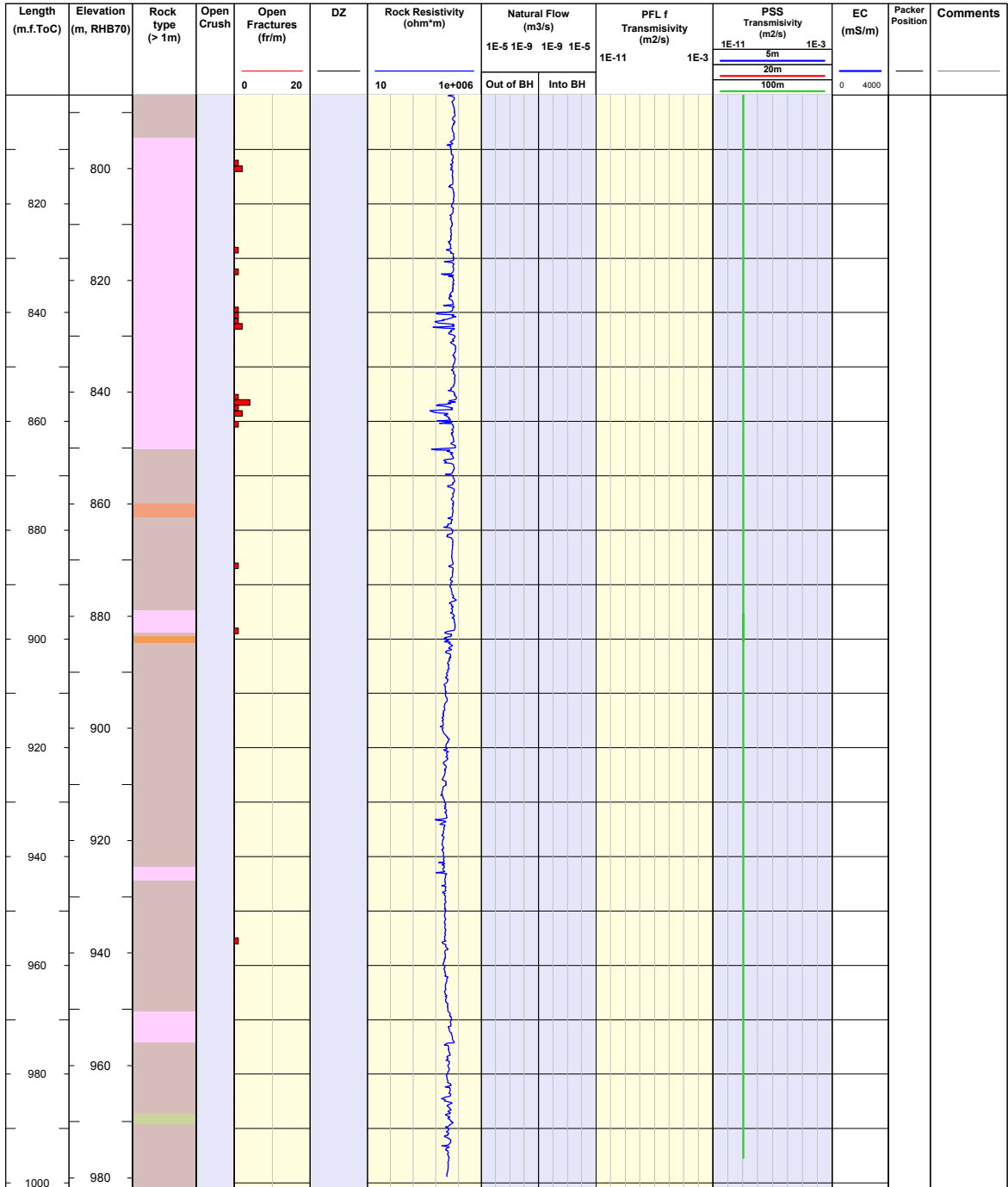
### 4.1.6 KFM01A, 800–1,001 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-05-07 09:30:00
Borehole	KFM01A	Northing [m]	6699529.81	Drilling Stop Date	2002-06-10 12:50:00
Diameter [mm]	76	Easting [m]	1631397.16	Packer Installation Date	
Length [m]	1001.490	Inclination [°]	-84.72	Plot Date	2006-08-08 21:18:51
Bearing [°]	318.35	Elevation [m.a.s.l.]	3.13		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Calc-silicate rock (skarn)



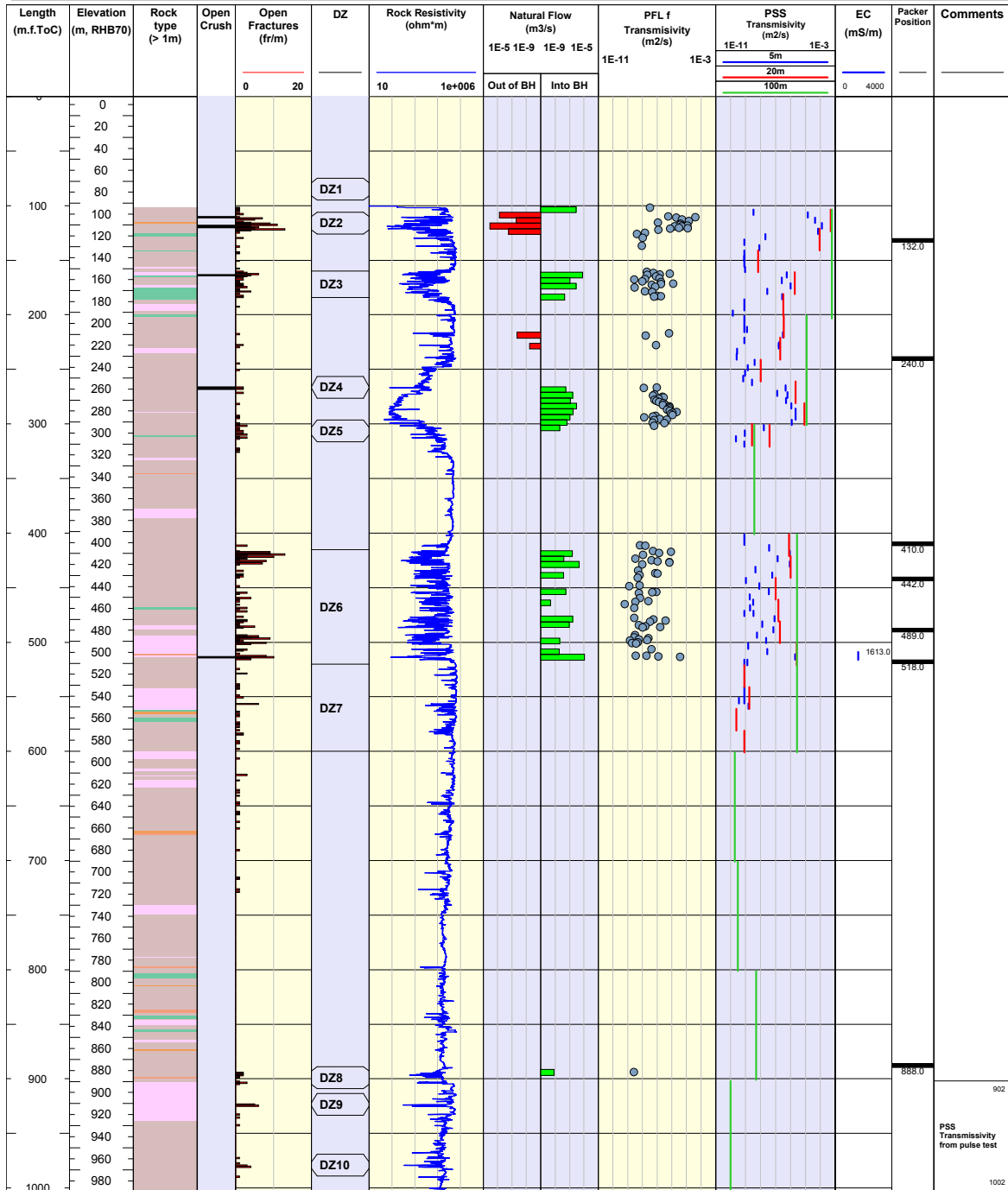
## 4.2 KFM02A

### 4.2.1 KFM02A, 0–1,002 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-11-20 14:03:00
	Borehole	KFM02A	Northing [m]	6698712.50	Drilling Stop Date	2002-11-26 11:35:00
	Diameter [mm]	77	Easting [m]	1633182.86	Packer Installation Date	
	Length [m]	1002.440	Inclination [°]	-85.37	Plot Date	2006-08-08 21:18:51
	Bearing [°]	275.76	Elevation [m.a.s.l.]	7.35		

#### ROCKTYPE






	Granite, fine- to medium-grained		Amphibolite
	Pegmatite, pegmatitic granite		
	Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained		
	Granite to granodiorite, metamorphic, medium-grained		

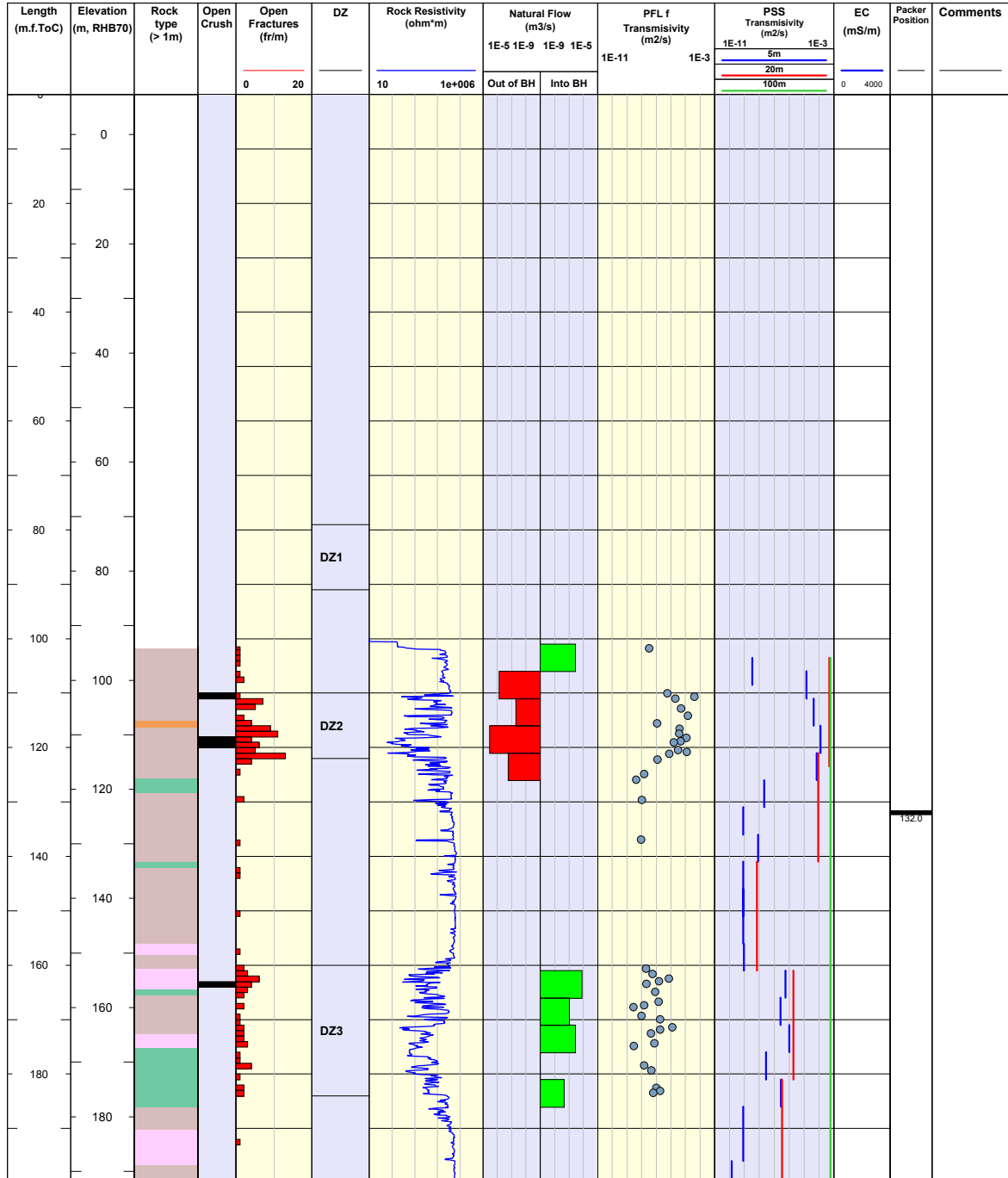


## 4.2.2 KFM02A, 0–200 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-11-20 14:03:00
	Borehole	KFM02A	Northing [m]	6698712.50	Drilling Stop Date	2002-11-26 11:35:00
	Diameter [mm]	77	Easting [m]	1633182.86	Packer Installation Date	
	Length [m]	1002.440	Inclination [°]	-85.37	Plot Date	2006-08-08 21:18:51
	Bearing [°]	275.76	Elevation [m.a.s.l.]	7.35		

### ROCKTYPE

	Granite, fine- to medium-grained		Amphibolite
	Pegmatite, pegmatitic granite		
	Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained		
	Granite to granodiorite, metamorphic, medium-grained		



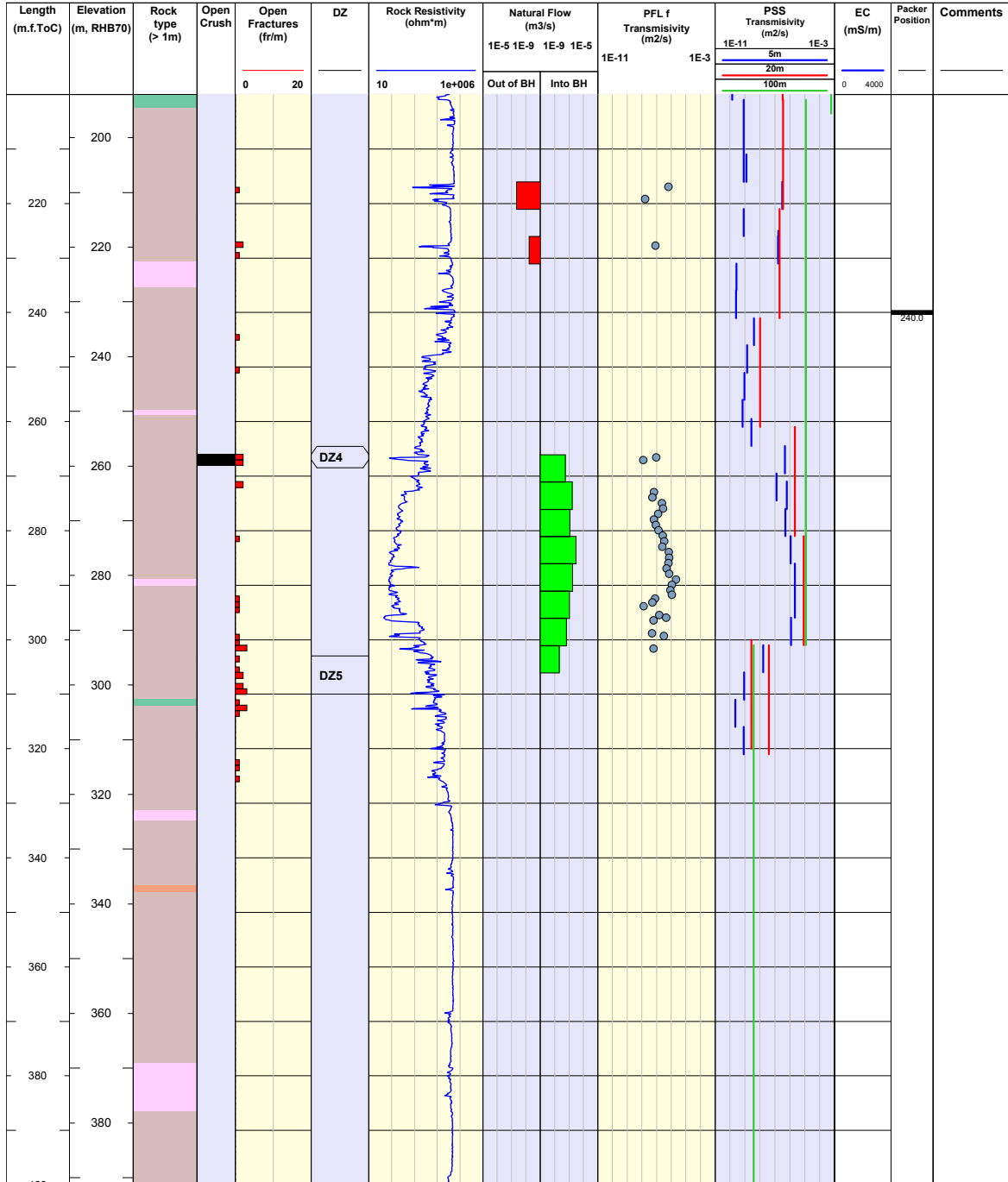
### 4.2.3 KFM02A, 200–400 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-11-20 14:03:00
Borehole	KFM02A	Northing [m]	6698712.50	Drilling Stop Date	2002-11-26 11:35:00
Diameter [mm]	77	Easting [m]	1633182.86	Packer Installation Date	
Length [m]	1002.440	Inclination [°]	-85.37	Plot Date	2006-08-08 21:18:51
Bearing [°]	275.76	Elevation [m.a.s.l.]	7.35		

#### ROCKTYPE

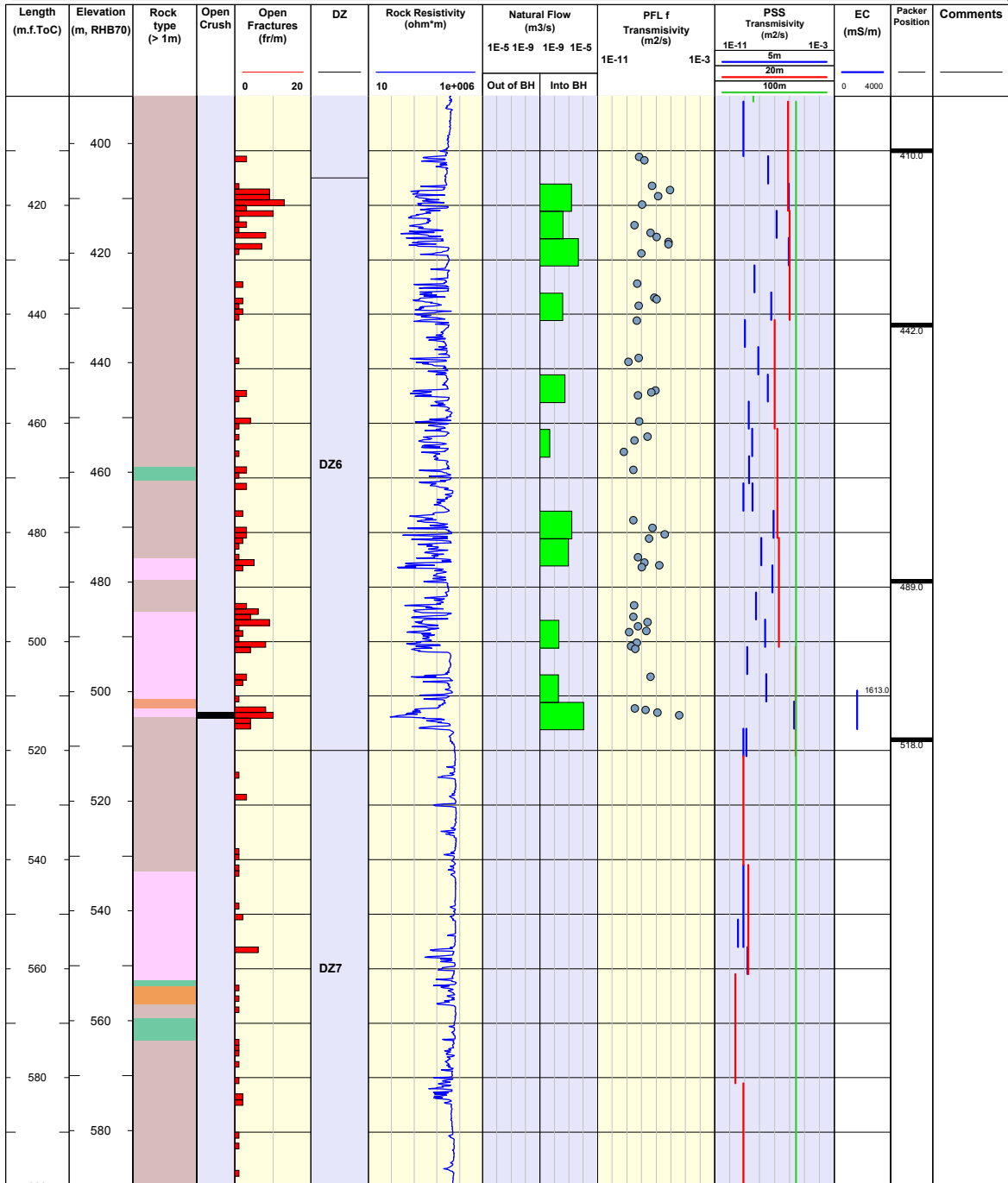
- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite



### 4.2.4 KFM02A, 400–600 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-11-20 14:03:00
	Borehole	KFM02A	Northing [m]	6698712.50	Drilling Stop Date	2002-11-26 11:35:00
	Diameter [mm]	77	Easting [m]	1633182.86	Packer Installation Date	
	Length [m]	1002.440	Inclination [°]	-85.37	Plot Date	2006-08-08 21:18:51
	Bearing [°]	275.76	Elevation [m.a.s.l.]	7.35		

ROCKTYPE	
<span style="display:inline-block; width:15px; height:10px; background-color: #e67e22; border:1px solid black;"></span> Granite, fine- to medium-grained	<span style="display:inline-block; width:15px; height:10px; background-color: #27ae60; border:1px solid black;"></span> Amphibolite
<span style="display:inline-block; width:15px; height:10px; background-color: #f1c40f; border:1px solid black;"></span> Pegmatite, pegmatitic granite	
<span style="display:inline-block; width:15px; height:10px; background-color: #f080f0; border:1px solid black;"></span> Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	
<span style="display:inline-block; width:15px; height:10px; background-color: #a67c52; border:1px solid black;"></span> Granite to granodiorite, metamorphic, medium-grained	



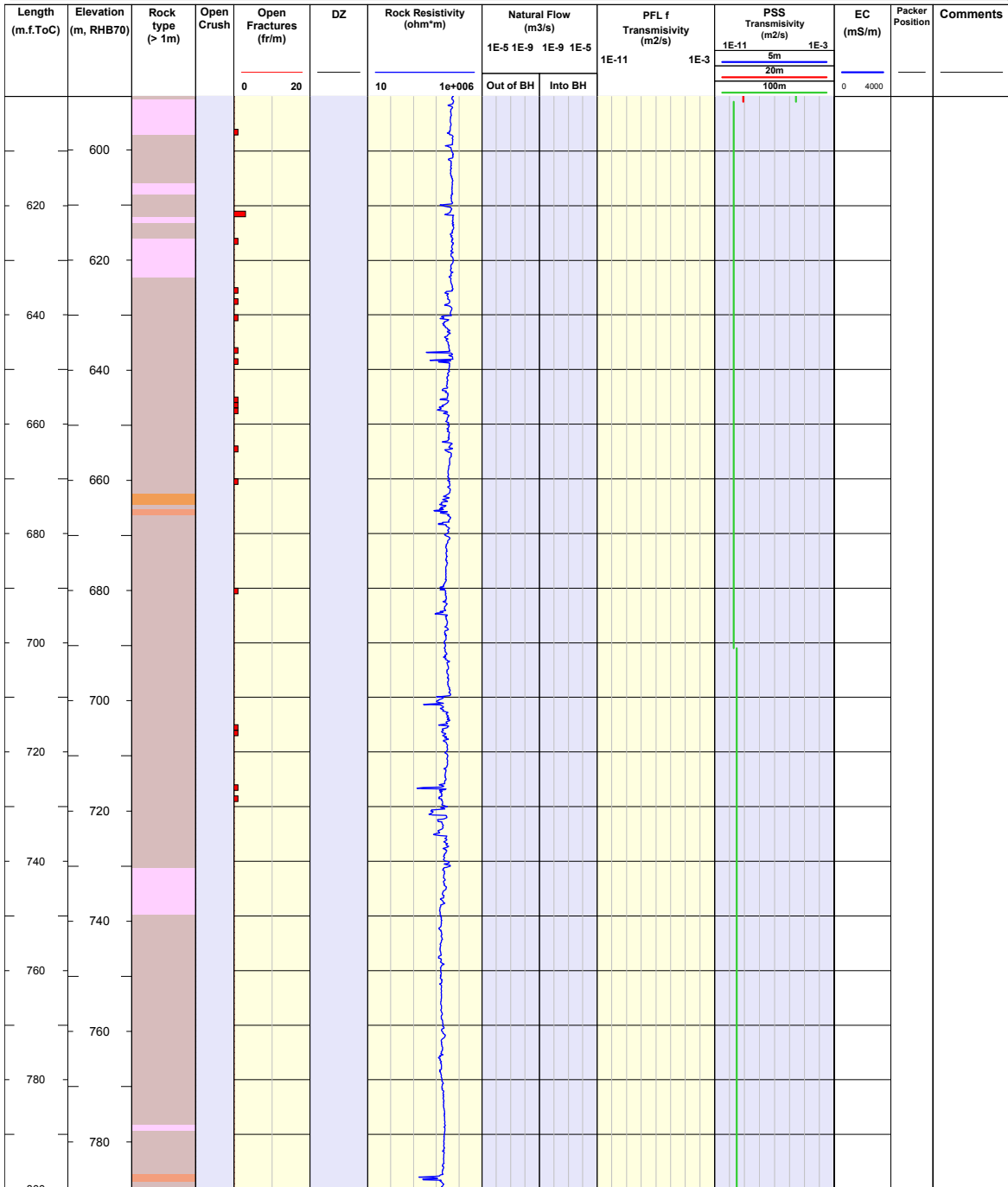
### 4.2.5 KFM02A, 600–800 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-11-20 14:03:00
Borehole	KFM02A	Northing [m]	6698712.50	Drilling Stop Date	2002-11-26 11:35:00
Diameter [mm]	77	Easting [m]	1633182.86	Packer Installation Date	
Length [m]	1002.440	Inclination [°]	-85.37	Plot Date	2006-08-08 21:18:51
Bearing [°]	275.76	Elevation [m.a.s.l.]	7.35		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite



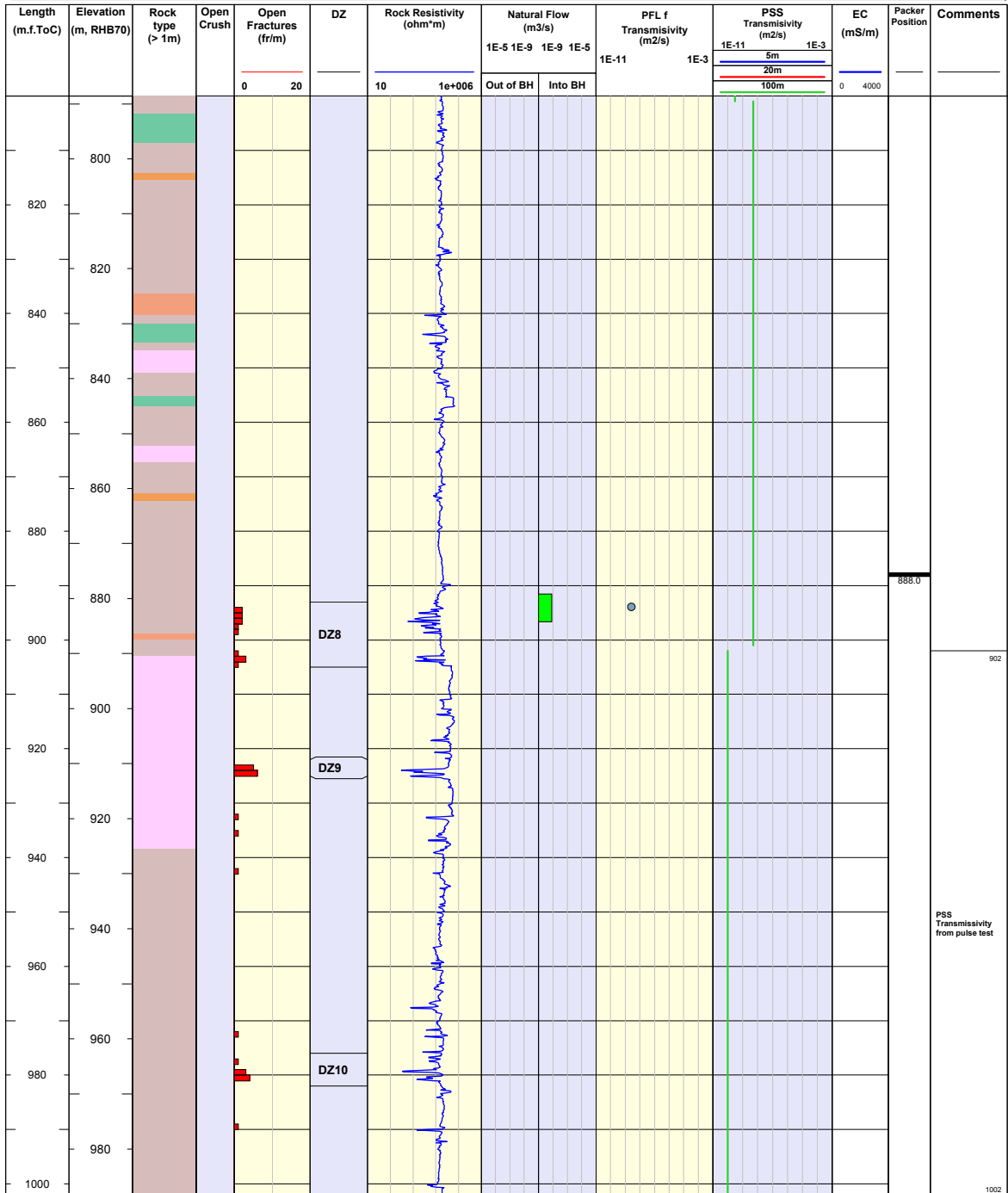
### 4.2.6 KFM02A, 800–1,002 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2002-11-20 14:03:00
Borehole	KFM02A	Northing [m]	6698712.50	Drilling Stop Date	2002-11-26 11:35:00
Diameter [mm]	77	Easting [m]	1633182.86	Packer Installation Date	
Length [m]	1002.440	Inclination [°]	-85.37	Plot Date	2006-08-08 21:18:51
Bearing [°]	275.76	Elevation [m.a.s.l.]	7.35		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite



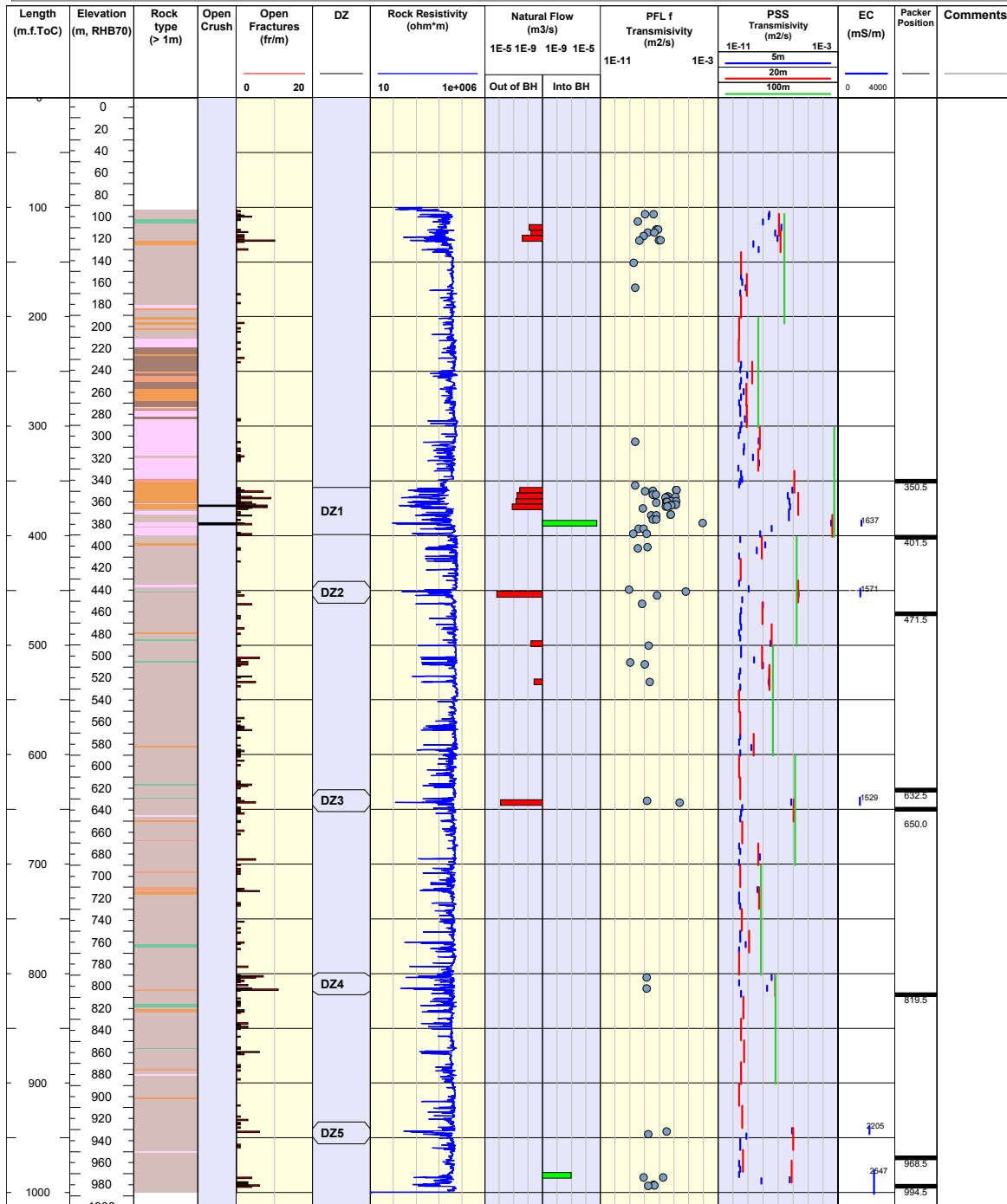
# 4.3 KFM03A

## 4.3.1 KFM03A, 0–1,001 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-03-18 09:10:00
	Borehole	KFM03A	Northing [m]	6697852.10	Drilling Stop Date	2003-03-28 14:30:00
	Diameter [mm]	77	Easting [m]	1634630.74	Packer Installation Date	
	Length [m]	1001.190	Inclination [°]	-85.74	Plot Date	2006-08-08 21:18:51
	Bearing [°]	271.52	Elevation [m.a.s.l.]	8.29		

### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Tonalite to granodiorite, metamorphic
- Amphibolite





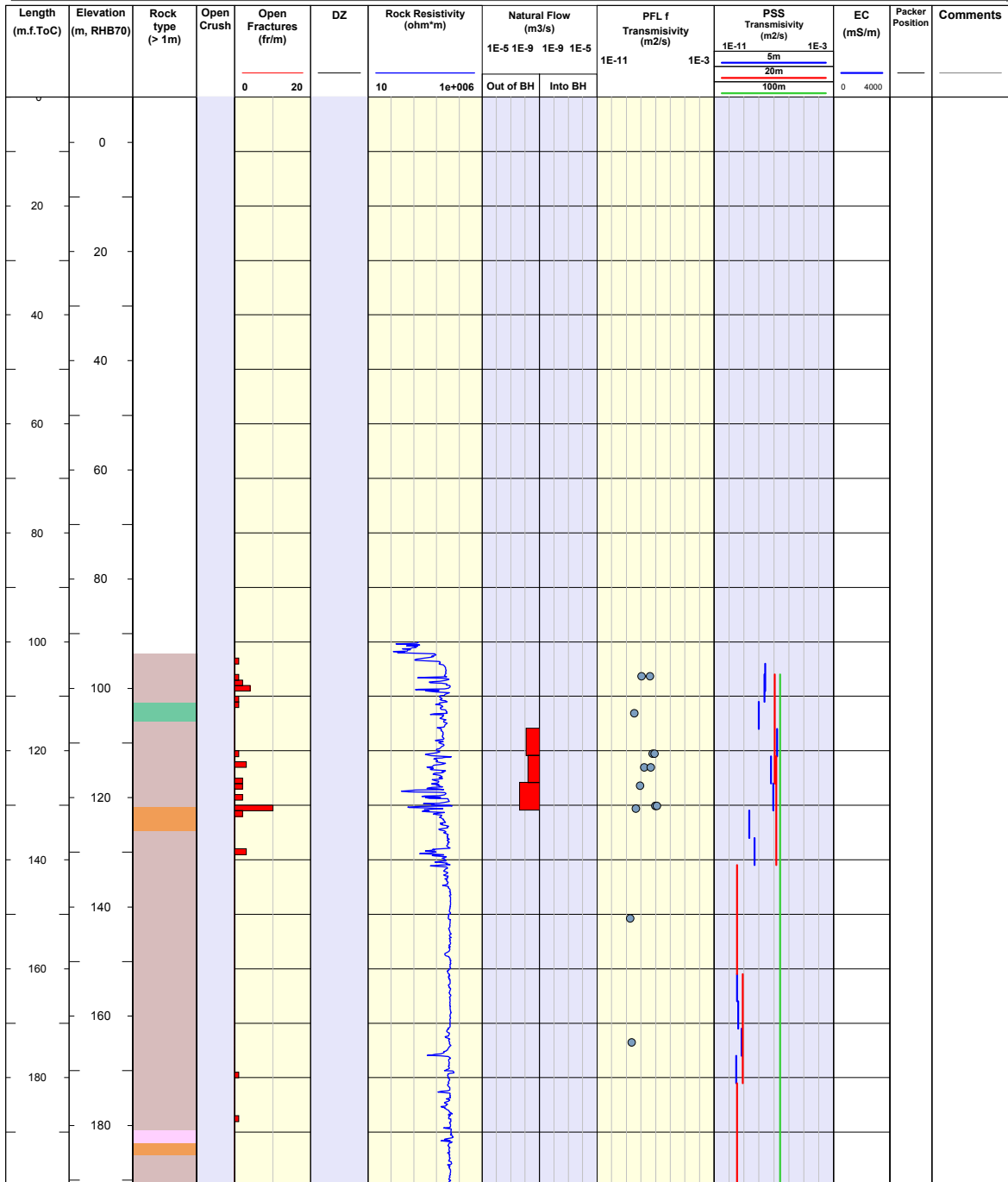
### 4.3.2 KFM03A, 0–200 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-03-18 09:10:00
Borehole	KFM03A	Northing [m]	6697852.10	Drilling Stop Date	2003-03-28 14:30:00
Diameter [mm]	77	Easting [m]	1634630.74	Packer Installation Date	
Length [m]	1001.190	Inclination [°]	-85.74	Plot Date	2006-08-08 21:18:51
Bearing [°]	271.52	Elevation [m.a.s.l.]	8.29		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Tonalite to granodiorite, metamorphic
- Amphibolite



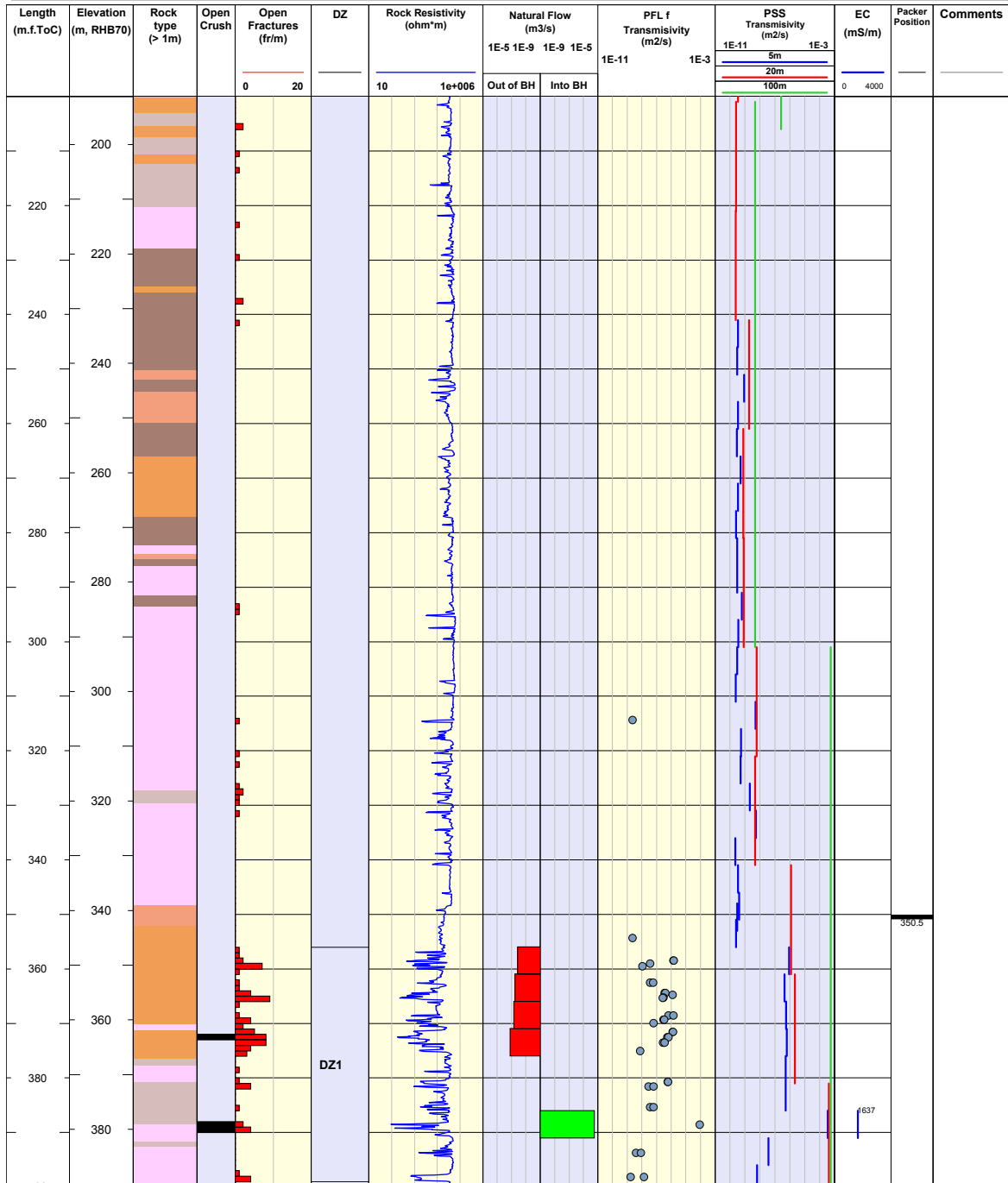
### 4.3.3 KFM03A, 200–400 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-03-18 09:10:00
Borehole	KFM03A	Northing [m]	6697852.10	Drilling Stop Date	2003-03-28 14:30:00
Diameter [mm]	77	Easting [m]	1634630.74	Packer Installation Date	
Length [m]	1001.190	Inclination [°]	-85.74	Plot Date	2006-08-08 21:18:51
Bearing [°]	271.52	Elevation [m.a.s.l.]	8.29		

#### ROCKTYPE







- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Tonalite to granodiorite, metamorphic
- Amphibolite

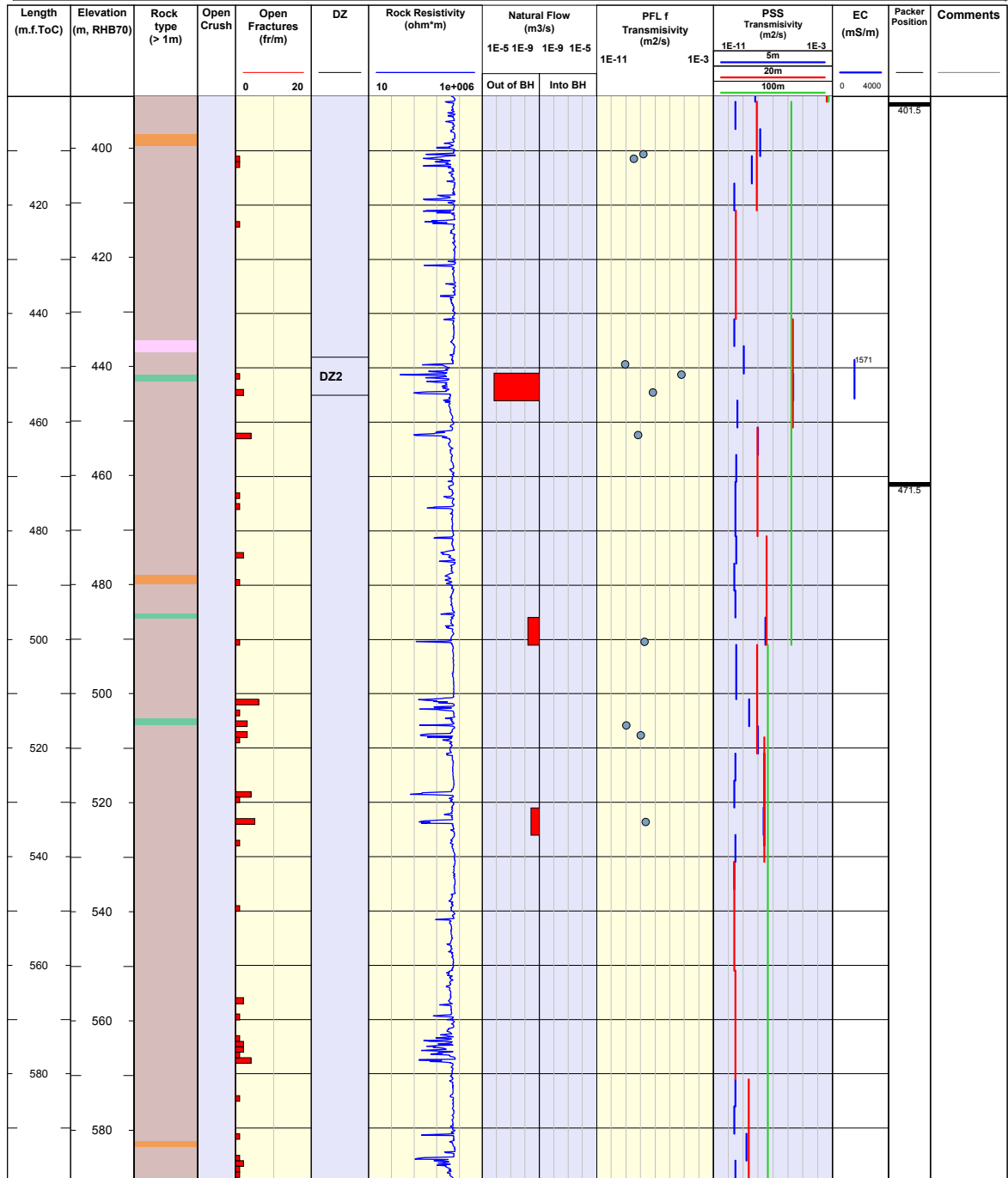


### 4.3.4 KFM03A, 400–600 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-03-18 09:10:00
	Borehole	KFM03A	Northing [m]	6697852.10	Drilling Stop Date	2003-03-28 14:30:00
	Diameter [mm]	77	Easting [m]	1634630.74	Packer Installation Date	
	Length [m]	1001.190	Inclination [°]	-85.74	Plot Date	2006-08-08 21:18:51
	Bearing [°]	271.52	Elevation [m.a.s.l.]	8.29		

#### ROCKTYPE

 Granite, fine- to medium-grained	 Tonalite to granodiorite, metamorphic
 Pegmatite, pegmatitic granite	 Amphibolite
 Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	
 Granite to granodiorite, metamorphic, medium-grained	

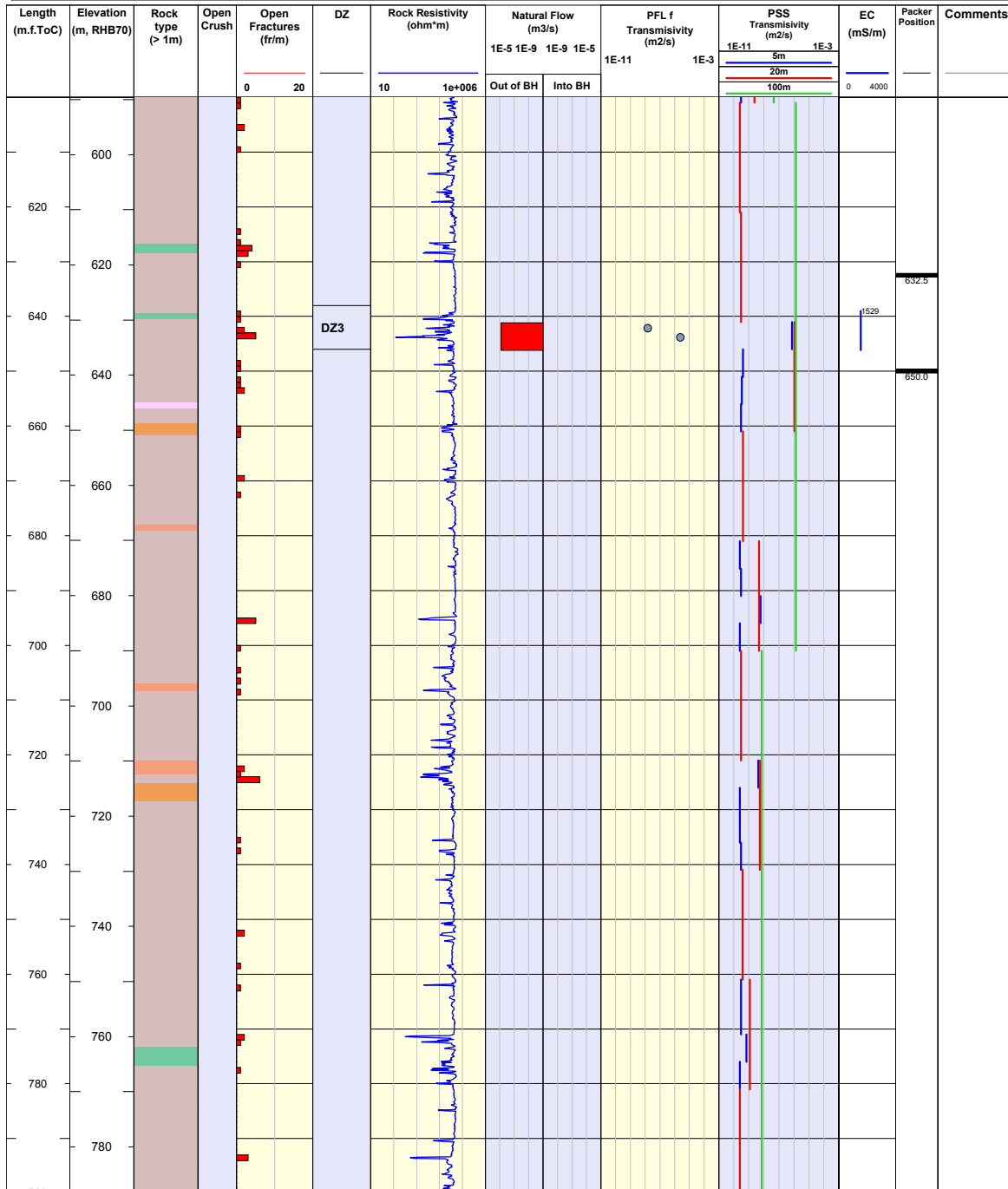


### 4.3.5 KFM03A, 600–800 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-03-18 09:10:00
	Borehole	KFM03A	Northing [m]	6697852.10	Drilling Stop Date	2003-03-28 14:30:00
	Diameter [mm]	77	Easting [m]	1634630.74	Packer Installation Date	
	Length [m]	1001.190	Inclination [°]	-85.74	Plot Date	2006-08-08 21:18:51
	Bearing [°]	271.52	Elevation [m.a.s.l.]	8.29		

#### ROCKTYPE

	Granite, fine- to medium-grained		Tonalite to granodiorite, metamorphic
	Pegmatite, pegmatitic granite		Amphibolite
	Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained		
	Granite to granodiorite, metamorphic, medium-grained		



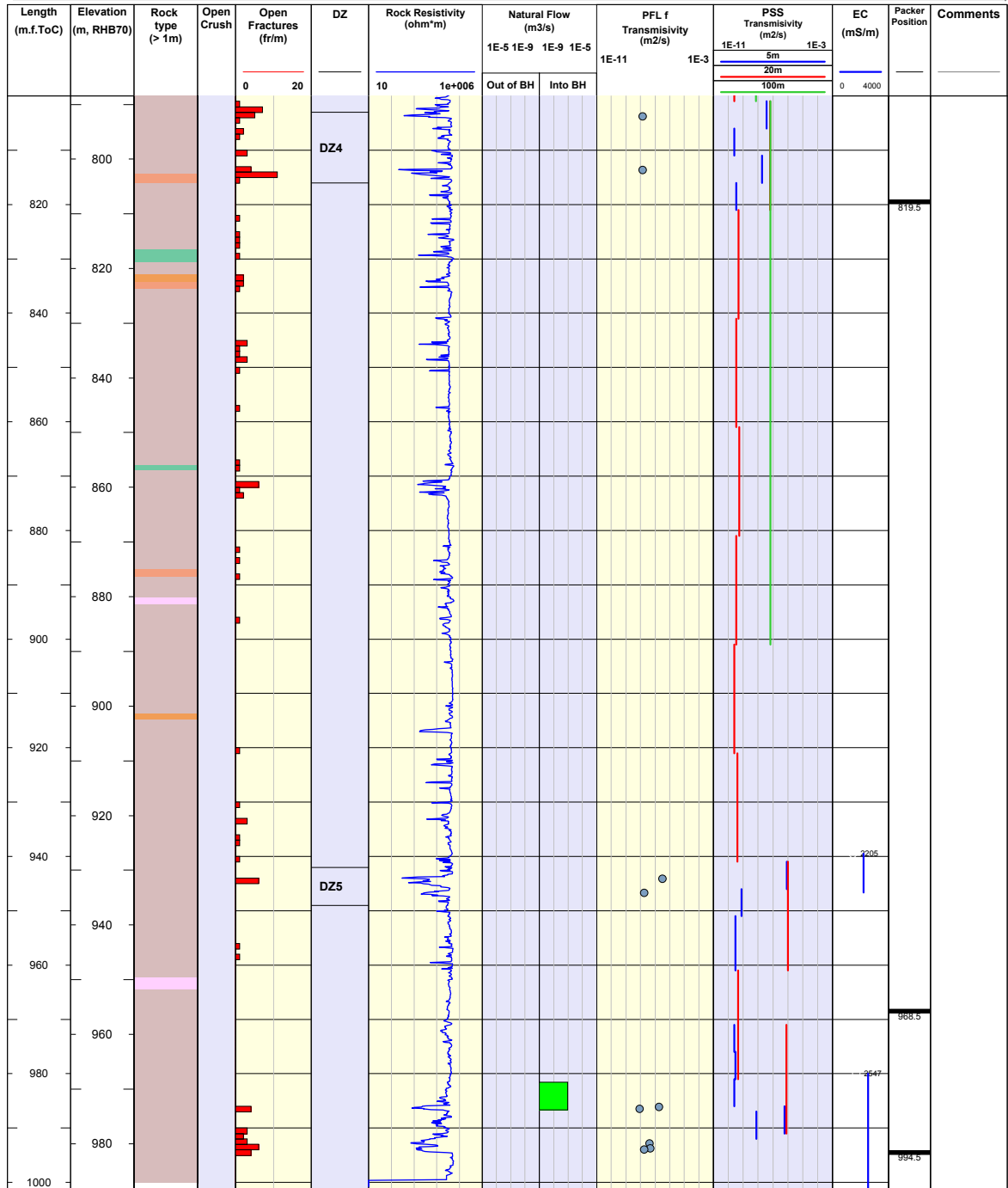
### 4.3.6 KFM03A, 800–1,001 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-03-18 09:10:00
Borehole	KFM03A	Northing [m]	6697852.10	Drilling Stop Date	2003-03-28 14:30:00
Diameter [mm]	77	Easting [m]	1634630.74	Packer Installation Date	
Length [m]	1001.190	Inclination [°]	-85.74	Plot Date	2006-08-08 21:18:51
Bearing [°]	271.52	Elevation [m.a.s.l.]	8.29		

#### ROCKTYPE

Granite, fine- to medium-grained	Tonalite to granodiorite, metamorphic
Pegmatite, pegmatitic granite	Amphibolite
Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	
Granite to granodiorite, metamorphic, medium-grained	








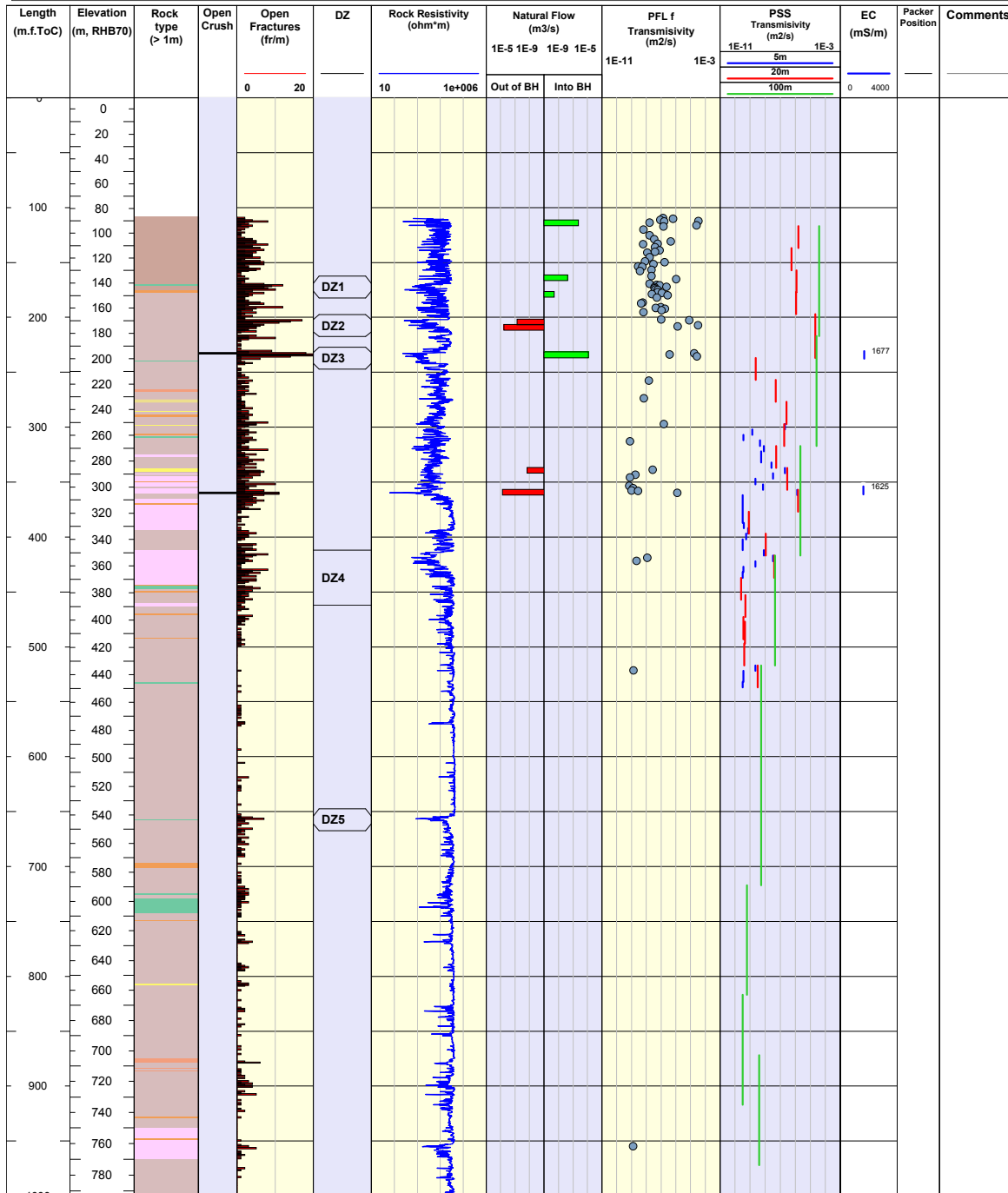
## 4.4 KFM04A

### 4.4.1 KFM04A, 0–1,001m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-05-20 07:00:00
	Borehole	KFM04A	Northing [m]	6698921.74	Drilling Stop Date	2003-06-30 17:40:00
	Diameter [mm]	77	Easting [m]	1630978.96	Packer Installation Date	
	Length [m]	1001.420	Inclination [°]	-60.07	Plot Date	2006-08-08 21:18:51
	Bearing [°]	45.24	Elevation [m.a.s.l.]	8.77		

#### ROCKTYPE

 Granite, fine- to medium-grained	 Granodiorite, metamorphic
 Pegmatite, pegmatitic granite	 Amphibolite
 Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	 Felsic to intermediate volcanic rock, metamorphic
 Granite to granodiorite, metamorphic, medium-grained	



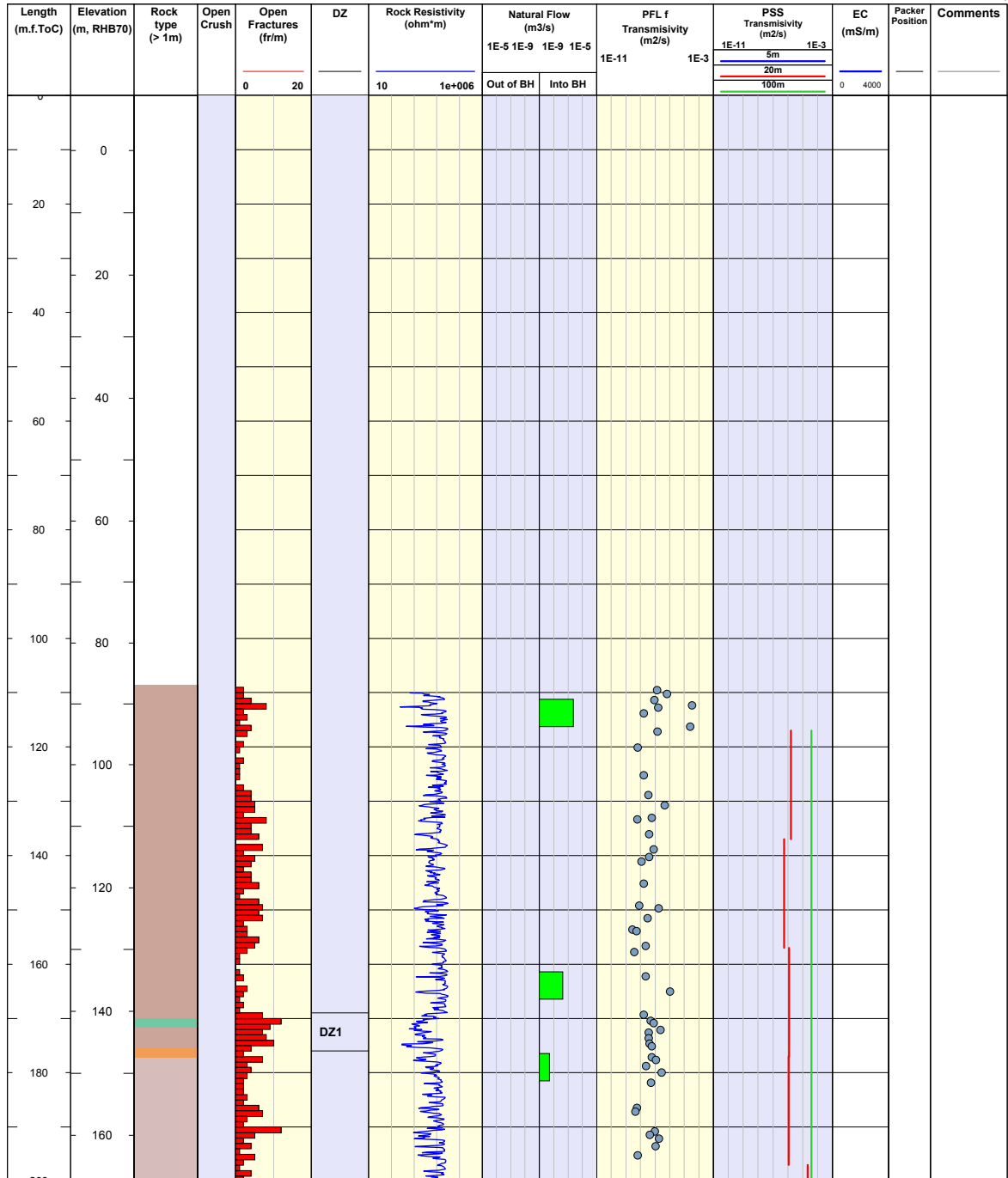
### 4.4.2 KFM04A, 0–200 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-05-20 07:00:00
Borehole	KFM04A	Northing [m]	6698921.74	Drilling Stop Date	2003-06-30 17:40:00
Diameter [mm]	77	Easting [m]	1630978.96	Packer Installation Date	
Length [m]	1001.420	Inclination [°]	-60.07	Plot Date	2006-08-08 21:18:51
Bearing [°]	45.24	Elevation [m.a.s.l.]	8.77		

#### ROCKTYPE






- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Granodiorite, metamorphic
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic

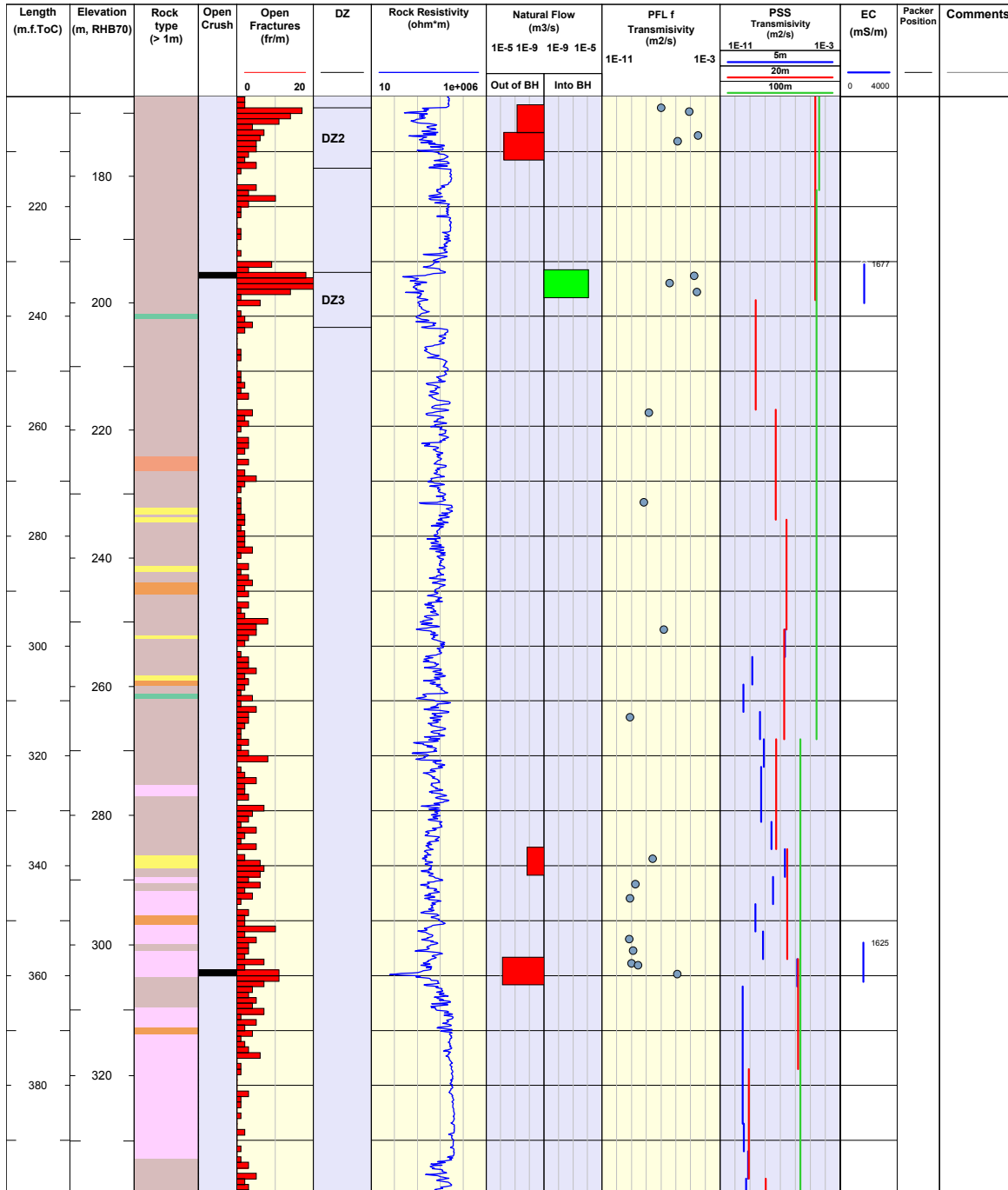


### 4.4.3 KFM04A, 200–400 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-05-20 07:00:00
	Borehole	KFM04A	Northing [m]	6698921.74	Drilling Stop Date	2003-06-30 17:40:00
	Diameter [mm]	77	Easting [m]	1630978.96	Packer Installation Date	
	Length [m]	1001.420	Inclination [°]	-60.07	Plot Date	2006-08-08 21:18:51
	Bearing [°]	45.24	Elevation [m.a.s.l.]	8.77		

#### ROCKTYPE

 Granite, fine- to medium-grained	 Granodiorite, metamorphic
 Pegmatite, pegmatitic granite	 Amphibolite
 Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	 Felsic to intermediate volcanic rock, metamorphic
 Granite to granodiorite, metamorphic, medium-grained	





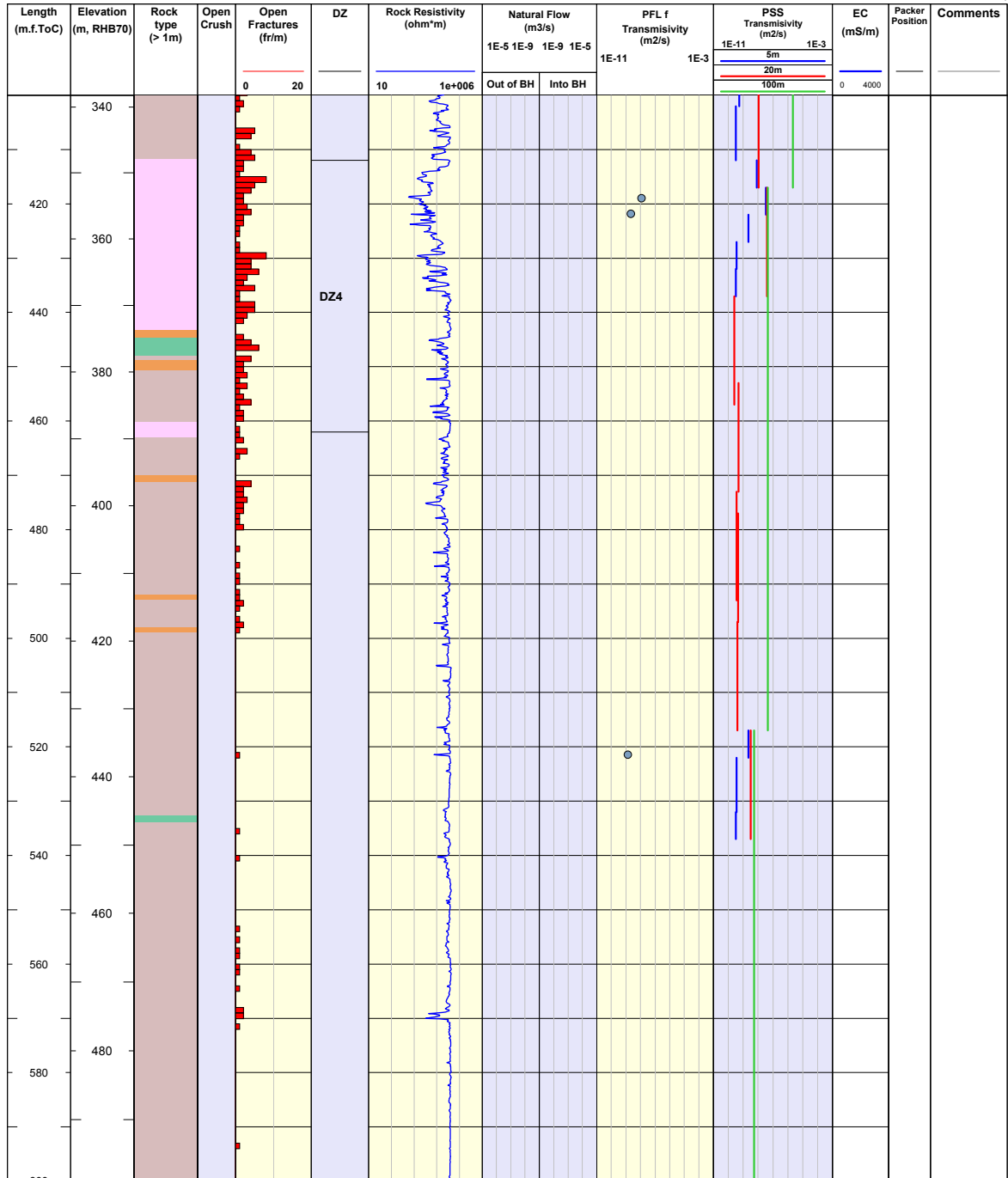
#### 4.4.4 KFM04A, 400–600 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-05-20 07:00:00
Borehole	KFM04A	Northing [m]	6698921.74	Drilling Stop Date	2003-06-30 17:40:00
Diameter [mm]	77	Easting [m]	1630978.96	Packer Installation Date	
Length [m]	1001.420	Inclination [°]	-60.07	Plot Date	2006-08-08 21:18:51
Bearing [°]	45.24	Elevation [m.a.s.l.]	8.77		

#### ROCKTYPE

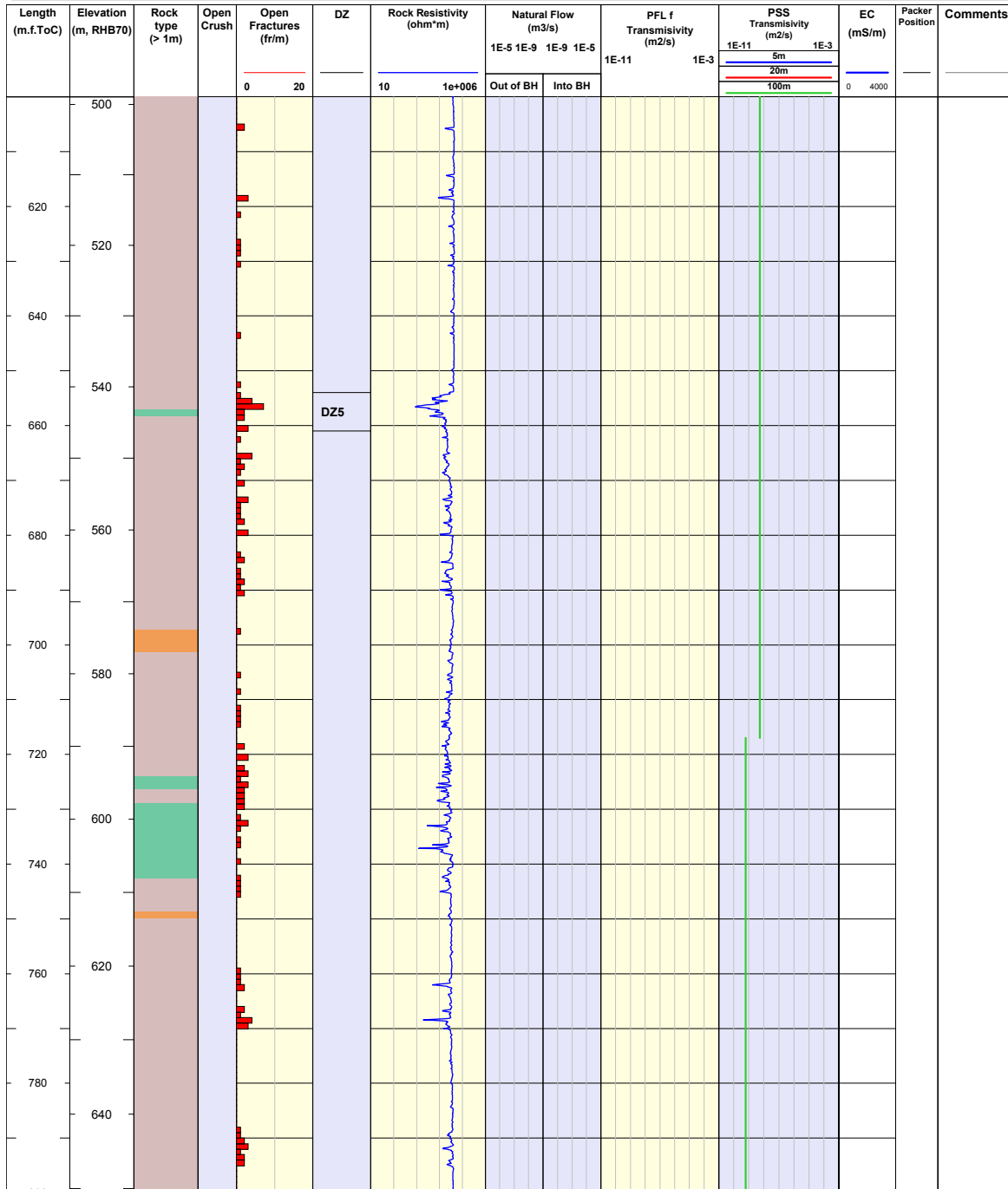
Granite, fine- to medium-grained	Granodiorite, metamorphic
Pegmatite, pegmatitic granite	Amphibolite
Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	Felsic to intermediate volcanic rock, metamorphic
Granite to granodiorite, metamorphic, medium-grained	



### 4.4.5 KFM04A, 600–800 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-05-20 07:00:00
	Borehole	KFM04A	Northing [m]	6698921.74	Drilling Stop Date	2003-06-30 17:40:00
	Diameter [mm]	77	Easting [m]	1630978.96	Packer Installation Date	
	Length [m]	1001.420	Inclination [°]	-60.07	Plot Date	2006-08-08 21:18:51
	Bearing [°]	45.24	Elevation [m.a.s.l.]	8.77		

ROCKTYPE	
	Granite, fine- to medium-grained
	Pegmatite, pegmatitic granite
	Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
	Granite to granodiorite, metamorphic, medium-grained
	Granodiorite, metamorphic
	Amphibolite
	Felsic to intermediate volcanic rock, metamorphic

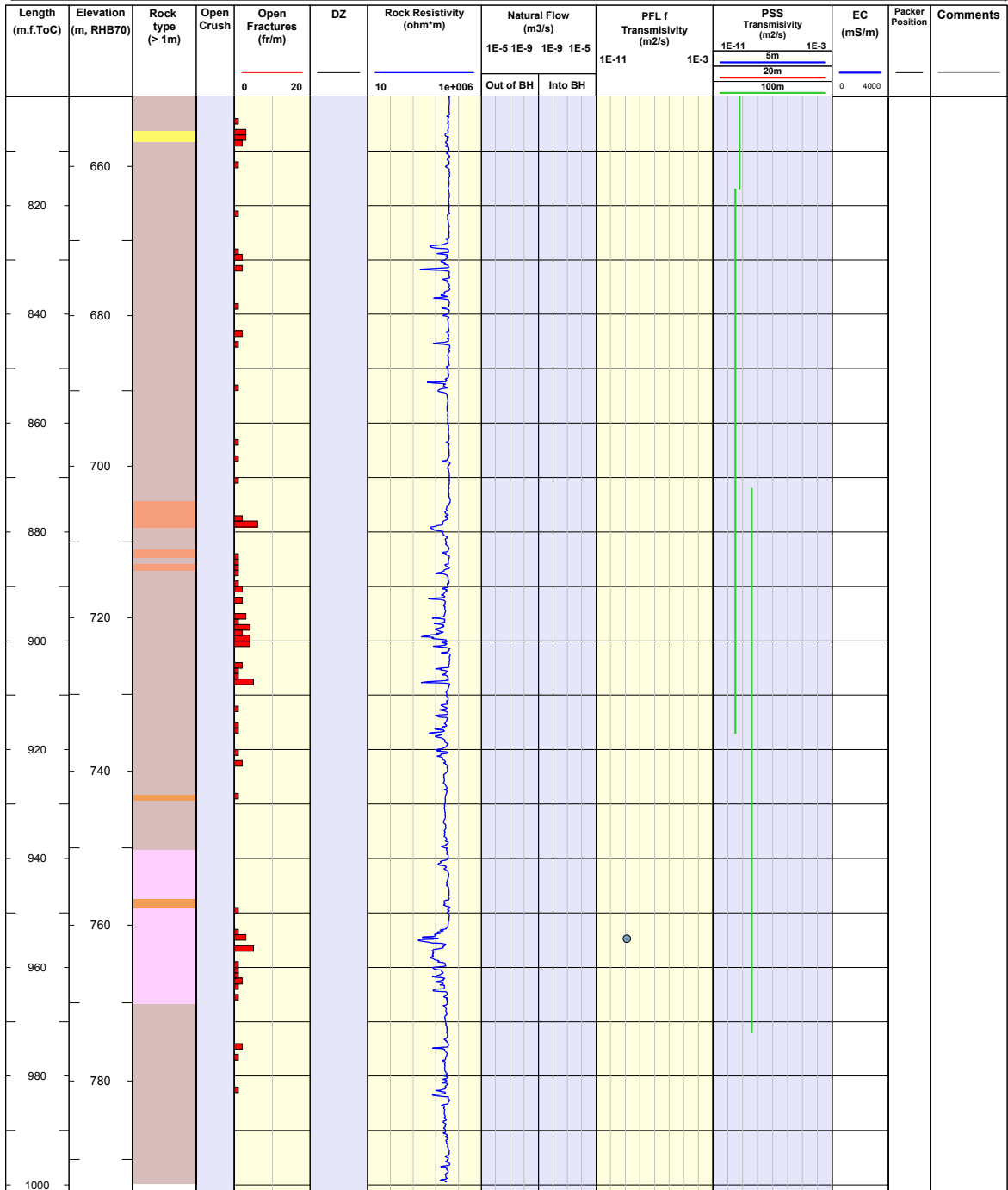


### 4.4.6 KFM04A, 800–1,001 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-05-20 07:00:00
	Borehole	KFM04A	Northing [m]	6698921.74	Drilling Stop Date	2003-06-30 17:40:00
	Diameter [mm]	77	Easting [m]	1630978.96	Packer Installation Date	
	Length [m]	1001.420	Inclination [°]	-60.07	Plot Date	2006-08-08 21:18:51
	Bearing [°]	45.24	Elevation [m.a.s.l.]	8.77		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Granodiorite, metamorphic
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic



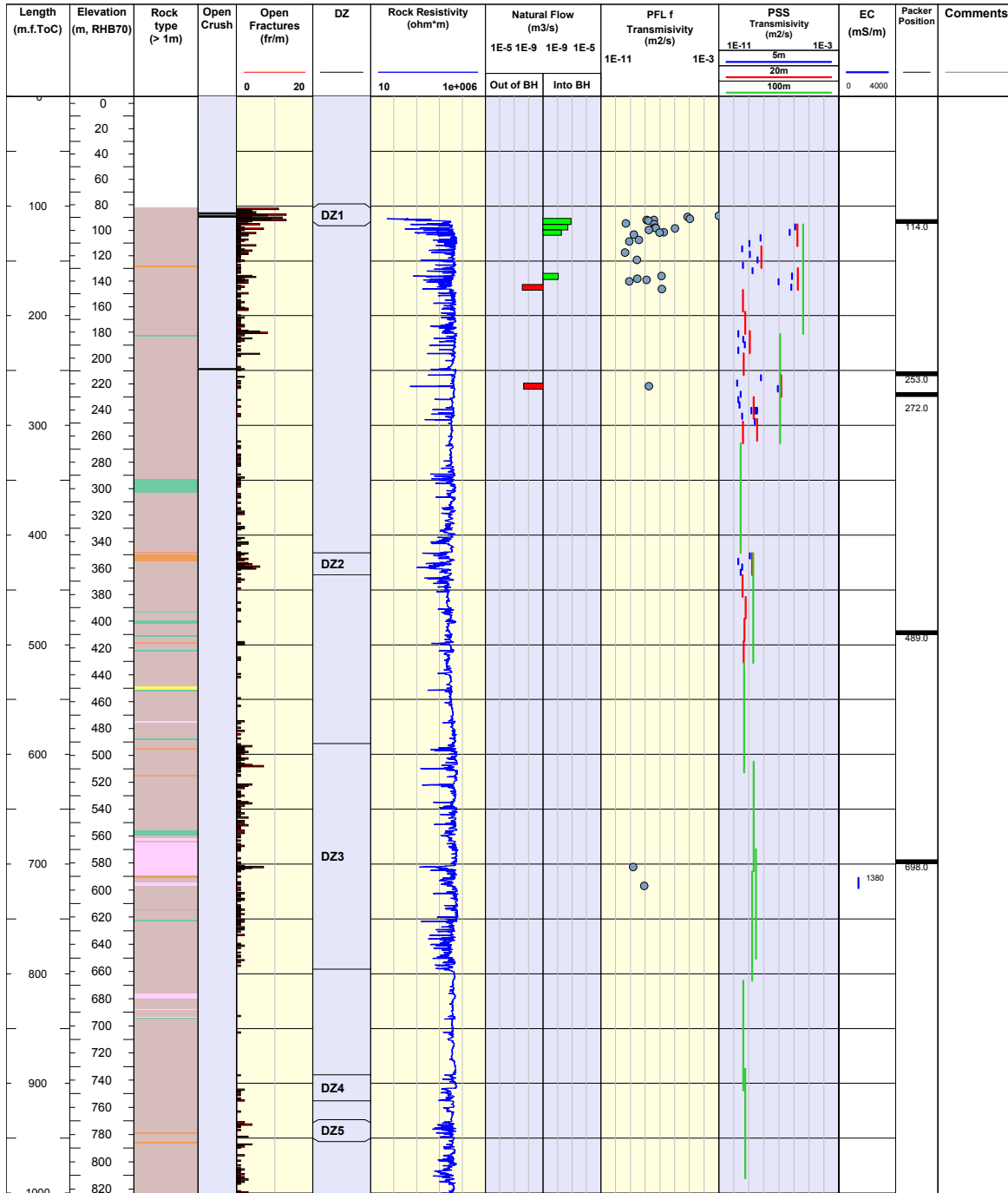
# 4.5 KFM05A

## 4.5.1 KFM05A, 0–1,002 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-23 14:30:00
	Borehole	KFM05A	Northing [m]	6699344.85	Drilling Stop Date	2003-12-16 08:35:00
	Diameter [mm]	77	Easting [m]	1631710.80	Packer Installation Date	
	Length [m]	1002.710	Inclination [°]	-59.79	Plot Date	2006-08-08 21:18:51
	Bearing [°]	80.90	Elevation [m.a.s.l.]	5.53		

### ROCKTYPE

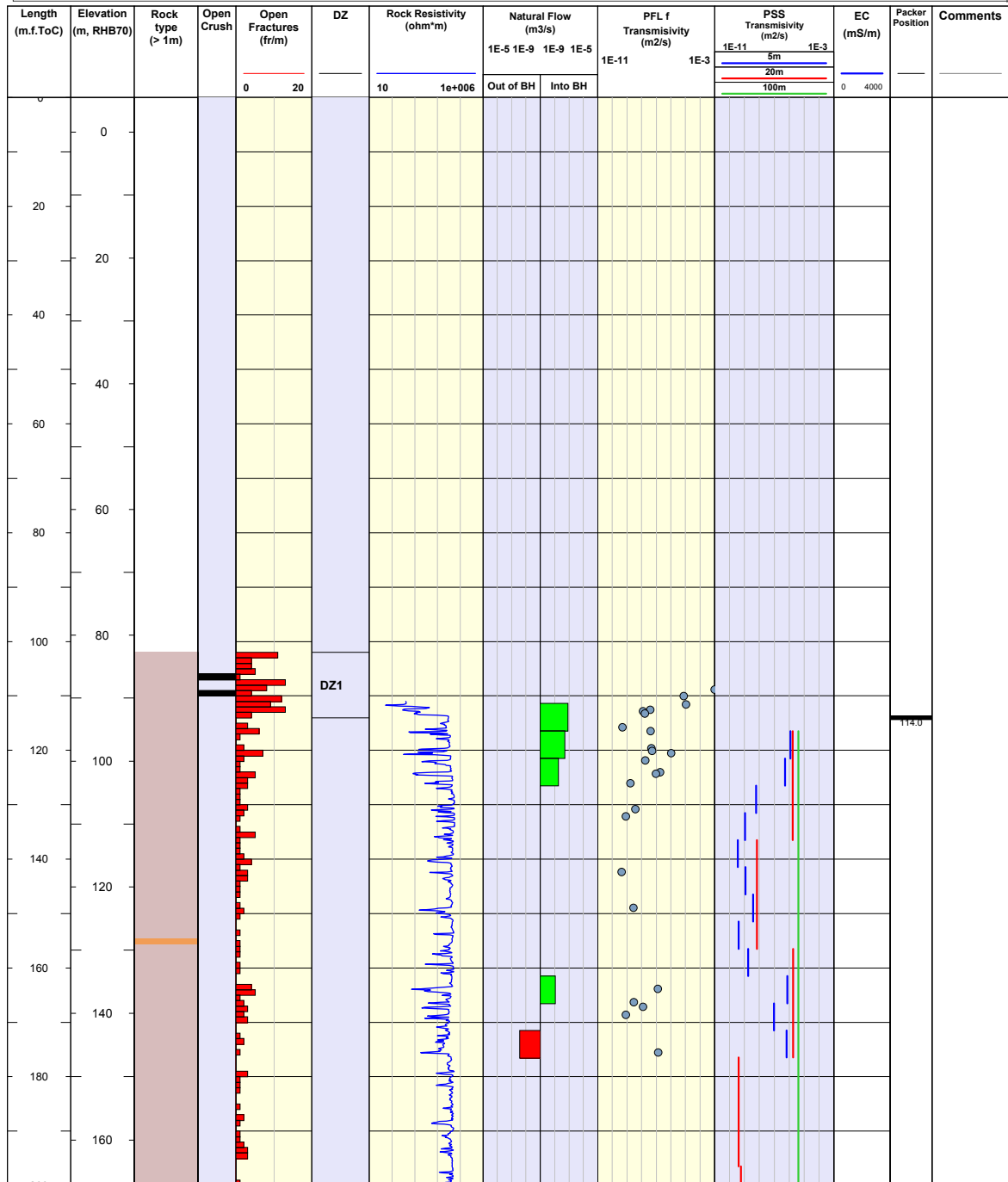
- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic



### 4.5.2 KFM05A, 0–200 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-23 14:30:00
	Borehole	KFM05A	Northing [m]	6699344.85	Drilling Stop Date	2003-12-16 08:35:00
	Diameter [mm]	77	Easting [m]	1631710.80	Packer Installation Date	
	Length [m]	1002.710	Inclination [°]	-59.79	Plot Date	2006-08-08 21:18:51
	Bearing [°]	80.90	Elevation [m.a.s.l.]	5.53		

ROCKTYPE	
<span style="display:inline-block; width:15px; height:10px; background-color:orange; border:1px solid black;"></span> Granite, fine- to medium-grained	<span style="display:inline-block; width:15px; height:10px; background-color:green; border:1px solid black;"></span> Amphibolite
<span style="display:inline-block; width:15px; height:10px; background-color:lightblue; border:1px solid black;"></span> Pegmatite, pegmatitic granite	<span style="display:inline-block; width:15px; height:10px; background-color:yellow; border:1px solid black;"></span> Felsic to intermediate volcanic rock, metamorphic
<span style="display:inline-block; width:15px; height:10px; background-color:lightpurple; border:1px solid black;"></span> Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	
<span style="display:inline-block; width:15px; height:10px; background-color:lightgrey; border:1px solid black;"></span> Granite to granodiorite, metamorphic, medium-grained	



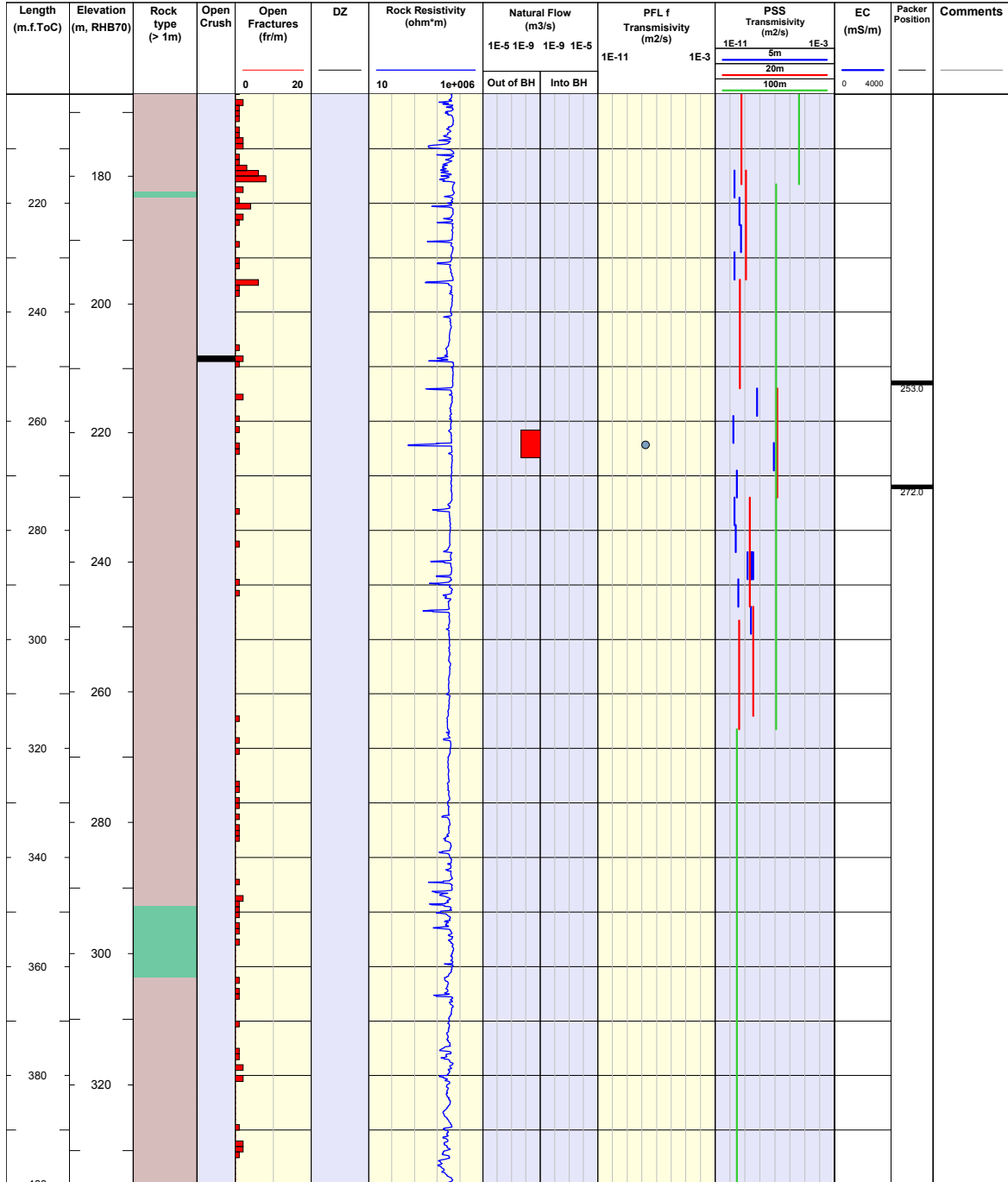
### 4.5.3 KFM05A, 200–400 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-23 14:30:00
Borehole	KFM05A	Northing [m]	6699344.85	Drilling Stop Date	2003-12-16 08:35:00
Diameter [mm]	77	Easting [m]	1631710.80	Packer Installation Date	
Length [m]	1002.710	Inclination [°]	-59.79	Plot Date	2006-08-08 21:18:51
Bearing [°]	80.90	Elevation [m.a.s.l.]	5.53		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Amphibolite
- Pegmatite, pegmatitic granite
- Felsic to intermediate volcanic rock, metamorphic
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained



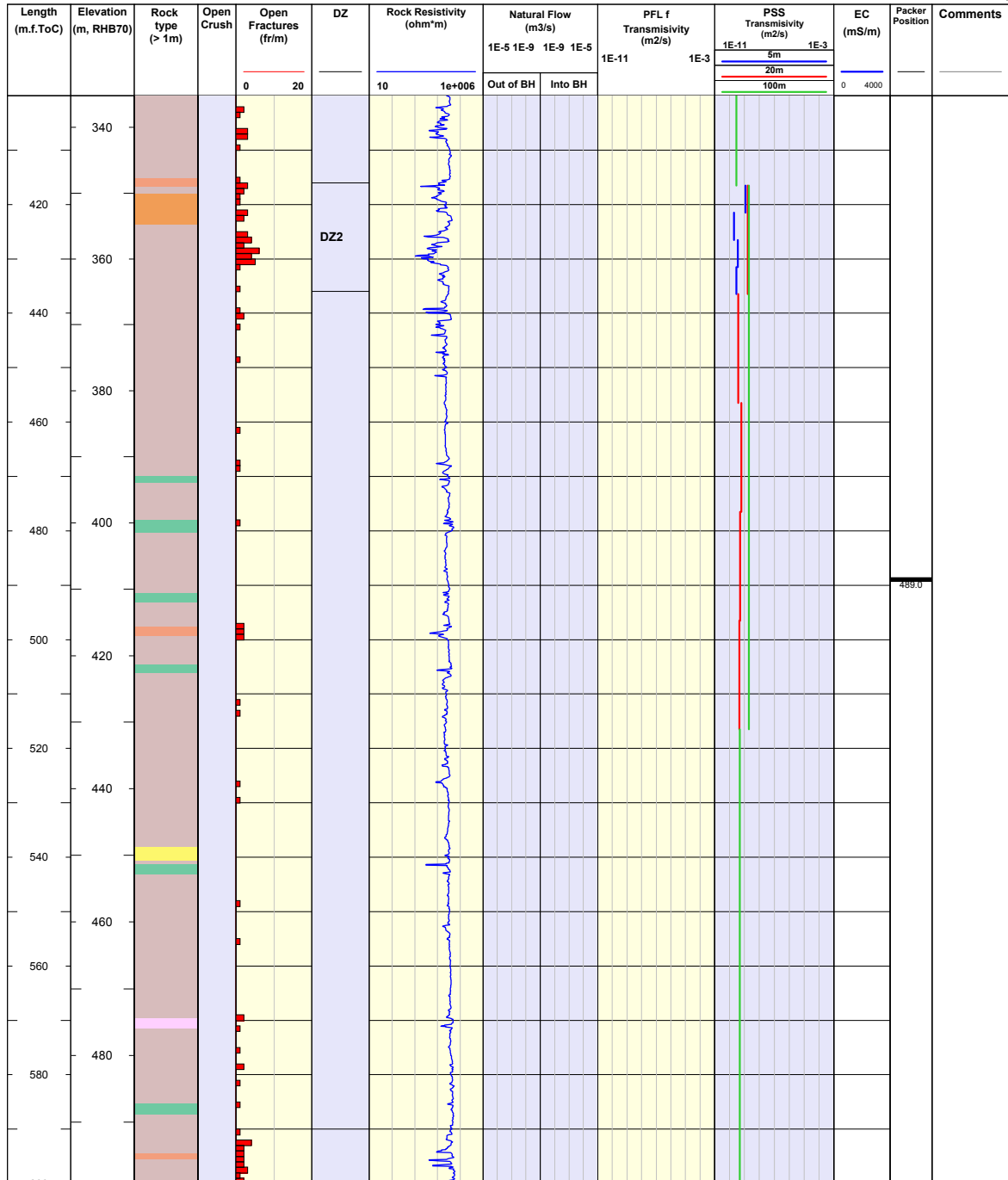
### 4.5.4 KFM05A, 400–600 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-23 14:30:00
Borehole	KFM05A	Northing [m]	6699344.85	Drilling Stop Date	2003-12-16 08:35:00
Diameter [mm]	77	Easting [m]	1631710.80	Packer Installation Date	
Length [m]	1002.710	Inclination [°]	-59.79	Plot Date	2006-08-08 21:18:51
Bearing [°]	80.90	Elevation [m.a.s.l.]	5.53		

#### ROCKTYPE

Granite, fine- to medium-grained	Amphibolite
Pegmatite, pegmatitic granite	Felsic to intermediate volcanic rock, metamorphic
Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	
Granite to granodiorite, metamorphic, medium-grained	



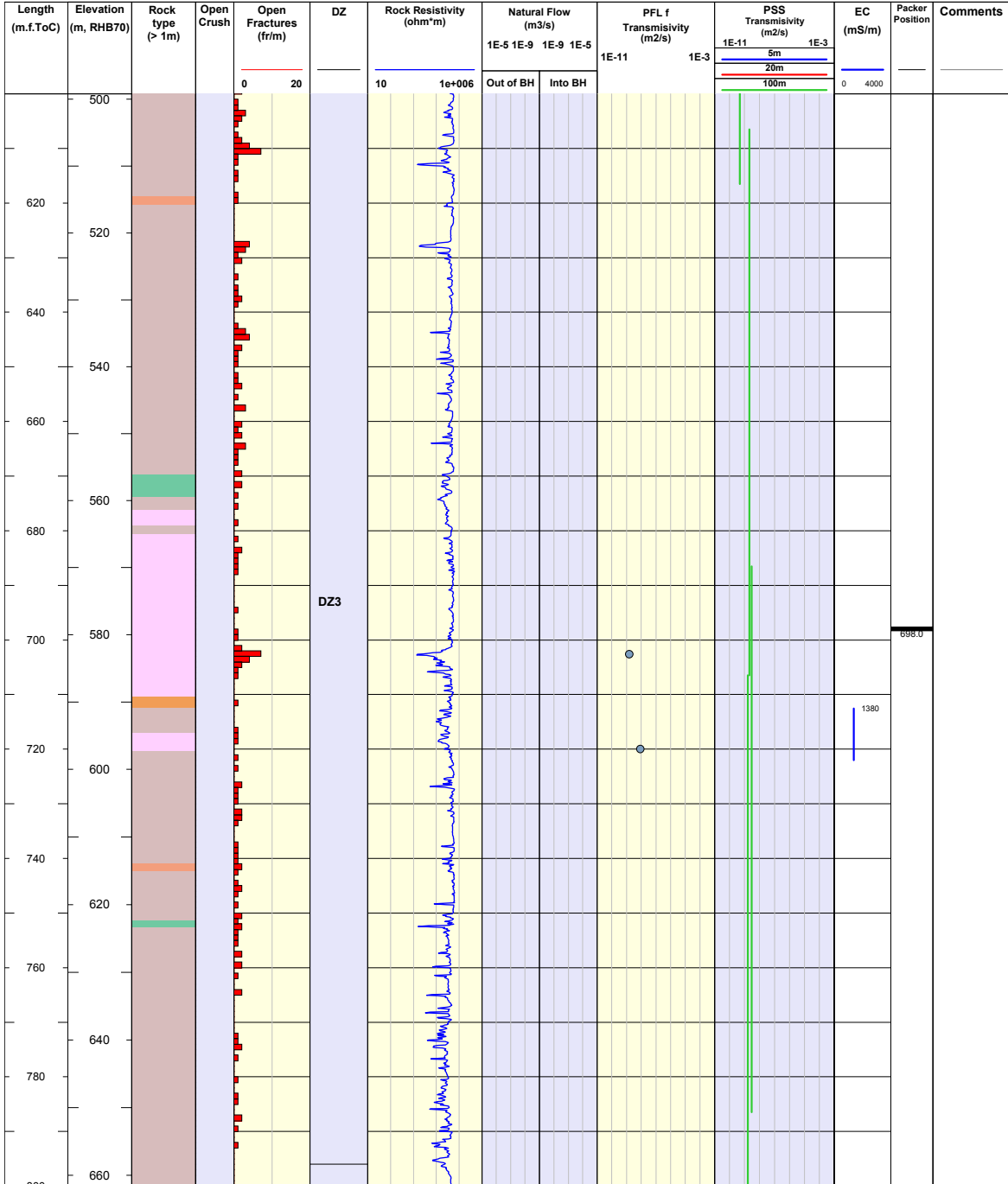
### 4.5.5 KFM05A, 600–800 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-23 14:30:00
Borehole	KFM05A	Northing [m]	6699344.85	Drilling Stop Date	2003-12-16 08:35:00
Diameter [mm]	77	Easting [m]	1631710.80	Packer Installation Date	
Length [m]	1002.710	Inclination [°]	-59.79	Plot Date	2006-08-08 21:18:51
Bearing [°]	80.90	Elevation [m.a.s.l.]	5.53		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic





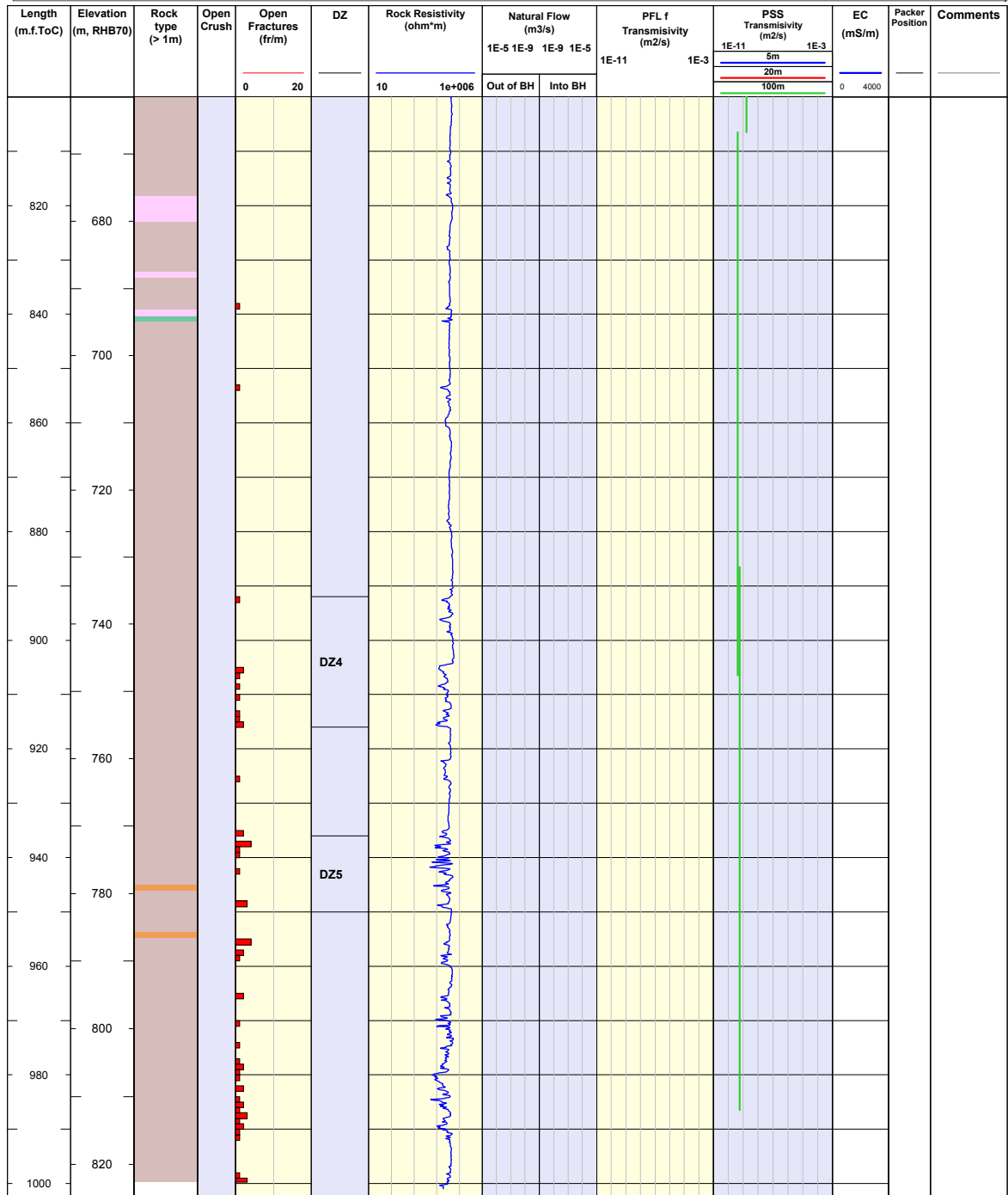
### 4.5.6 KFM05A, 800–1,002 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-23 14:30:00
Borehole	KFM05A	Northing [m]	6699344.85	Drilling Stop Date	2003-12-16 08:35:00
Diameter [mm]	77	Easting [m]	1631710.80	Packer Installation Date	
Length [m]	1002.710	Inclination [°]	-59.79	Plot Date	2006-08-08 21:18:51
Bearing [°]	80.90	Elevation [m.a.s.l.]	5.53		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic



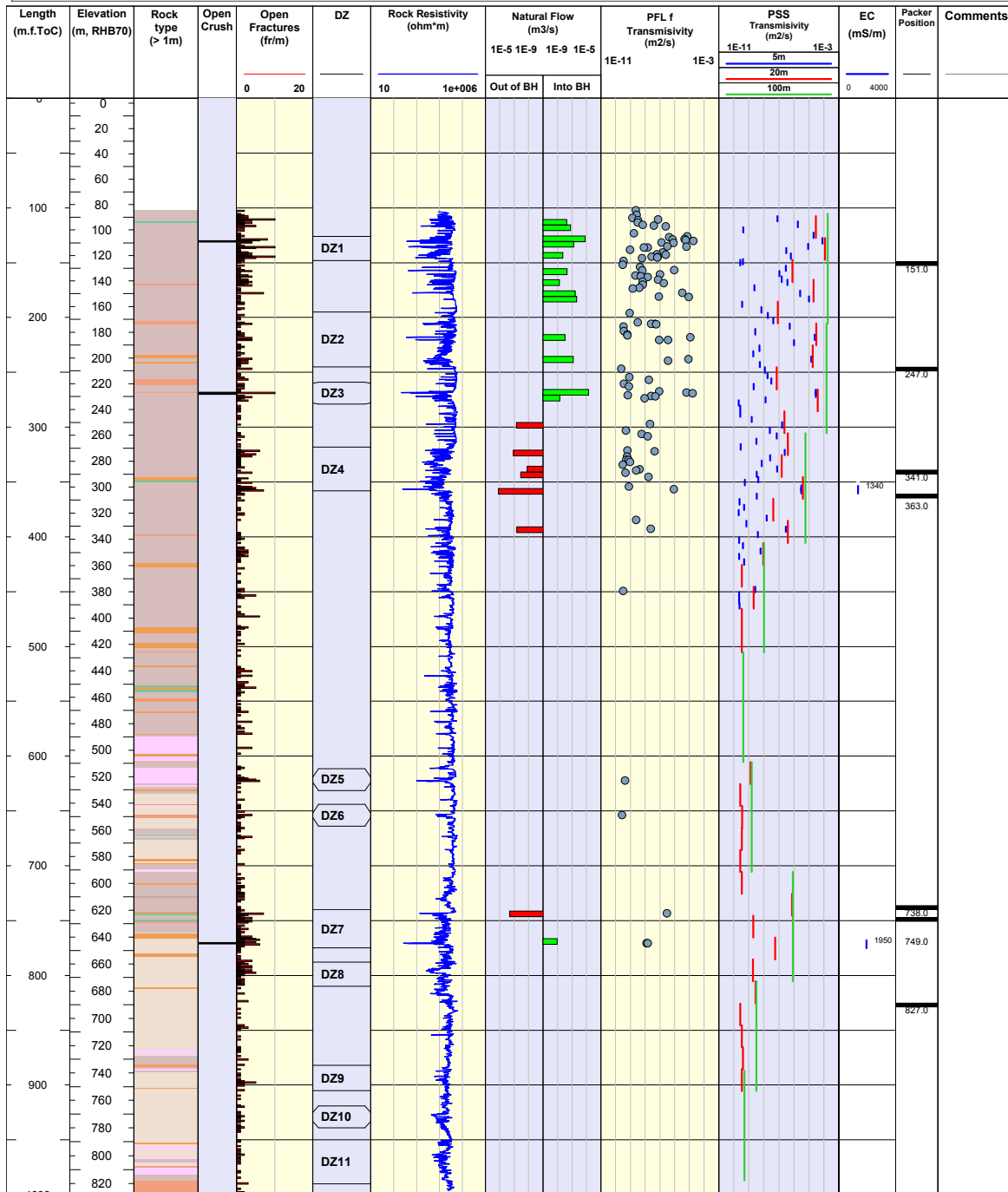
# 4.6 KFM06A

## 4.6.1 KFM06A, 0–1,000 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-11 16:25:00
	Borehole	KFM06A	Northing [m]	6699732.88	Drilling Stop Date	2003-11-21 09:55:00
	Diameter [mm]	77	Easting [m]	1632442.51	Packer Installation Date	
	Length [m]	1000.640	Inclination [°]	-60.24	Plot Date	2006-08-08 21:18:51
	Bearing [°]	300.92	Elevation [m.a.s.l.]	4.10		

### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite, metamorphic, aplitic
- Granite to granodiorite, metamorphic, medium-grained
- Granodiorite, metamorphic
- Amphibolite



### 4.6.2 KFM06A, 0–200 m



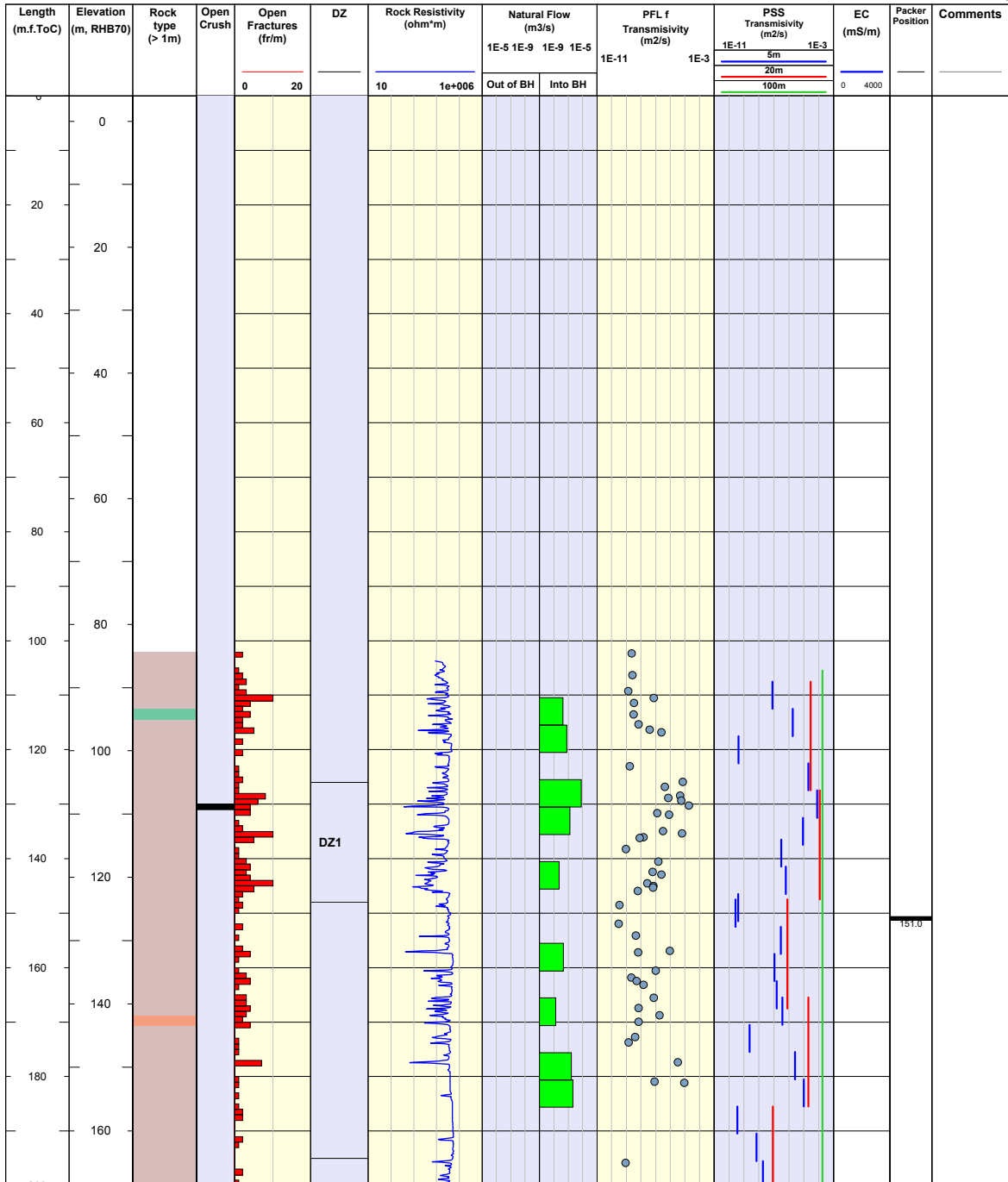
Site FORSMARK  
 Borehole KFM06A  
 Diameter [mm] 77  
 Length [m] 1000.640  
 Bearing [°] 300.92

Coordinate System RT90-RHB70  
 Northing [m] 6699732.88  
 Easting [m] 1632442.51  
 Inclination [°] -60.24  
 Elevation [m.a.s.l.] 4.10

Drilling Start Date 2003-11-11 16:25:00  
 Drilling Stop Date 2003-11-21 09:55:00  
 Packer Installation Date  
 Plot Date 2006-08-08 21:18:51

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained
- Granite, metamorphic, aplitic
- Granite to granodiorite, metamorphic, medium-grained
- Granodiorite, metamorphic
- Amphibolite



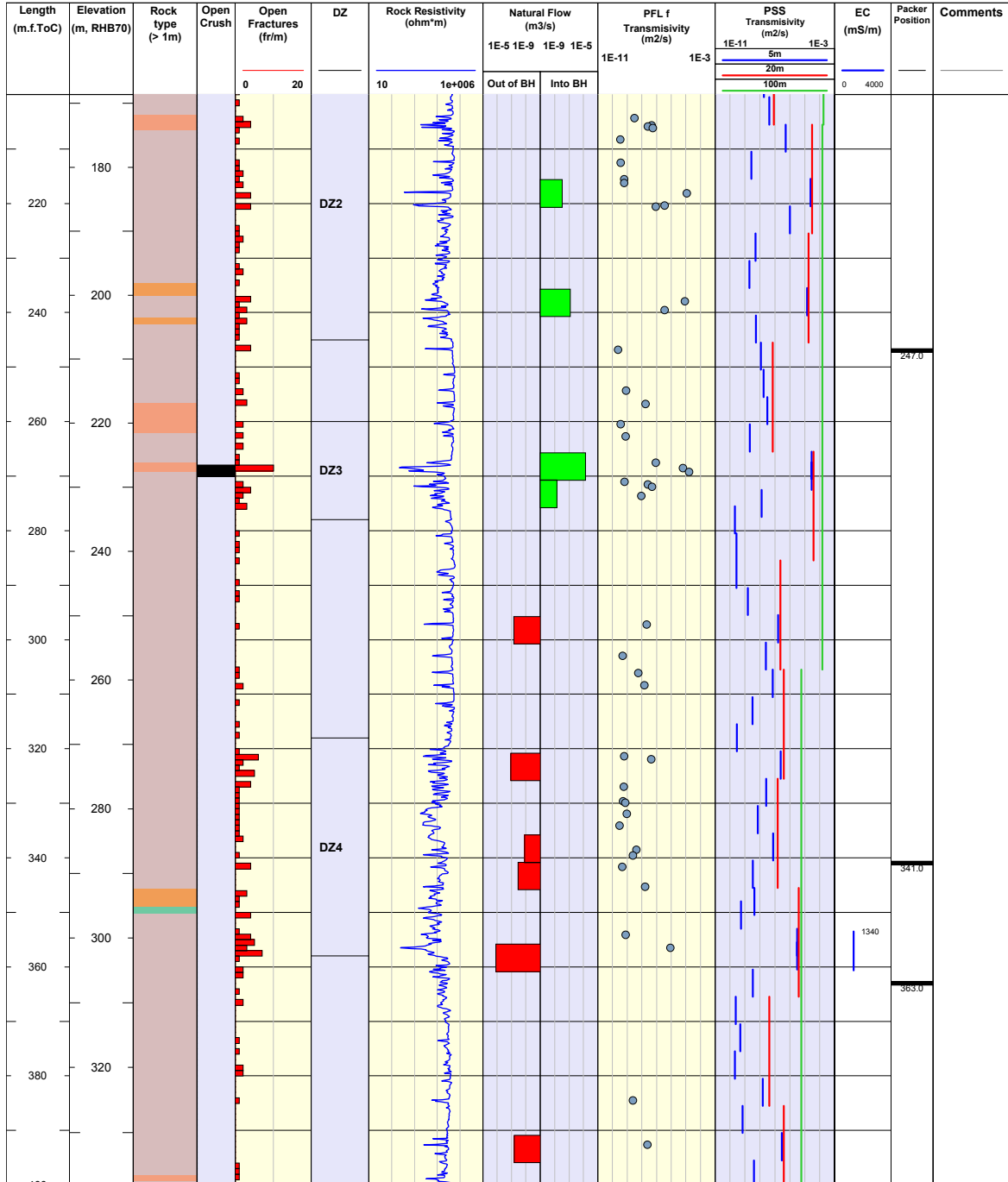
### 4.6.3 KFM06A, 200–400 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-11 16:25:00
Borehole	KFM06A	Northing [m]	6699732.88	Drilling Stop Date	2003-11-21 09:55:00
Diameter [mm]	77	Easting [m]	1632442.51	Packer Installation Date	
Length [m]	1000.640	Inclination [°]	-60.24	Plot Date	2006-08-08 21:18:51
Bearing [°]	300.92	Elevation [m.a.s.l.]	4.10		

#### ROCKTYPE

	Granite, fine- to medium-grained		Granite to granodiorite, metamorphic, medium-grained
	Pegmatite, pegmatitic granite		Granodiorite, metamorphic
	Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained		Amphibolite
	Granite, metamorphic, aplitic		



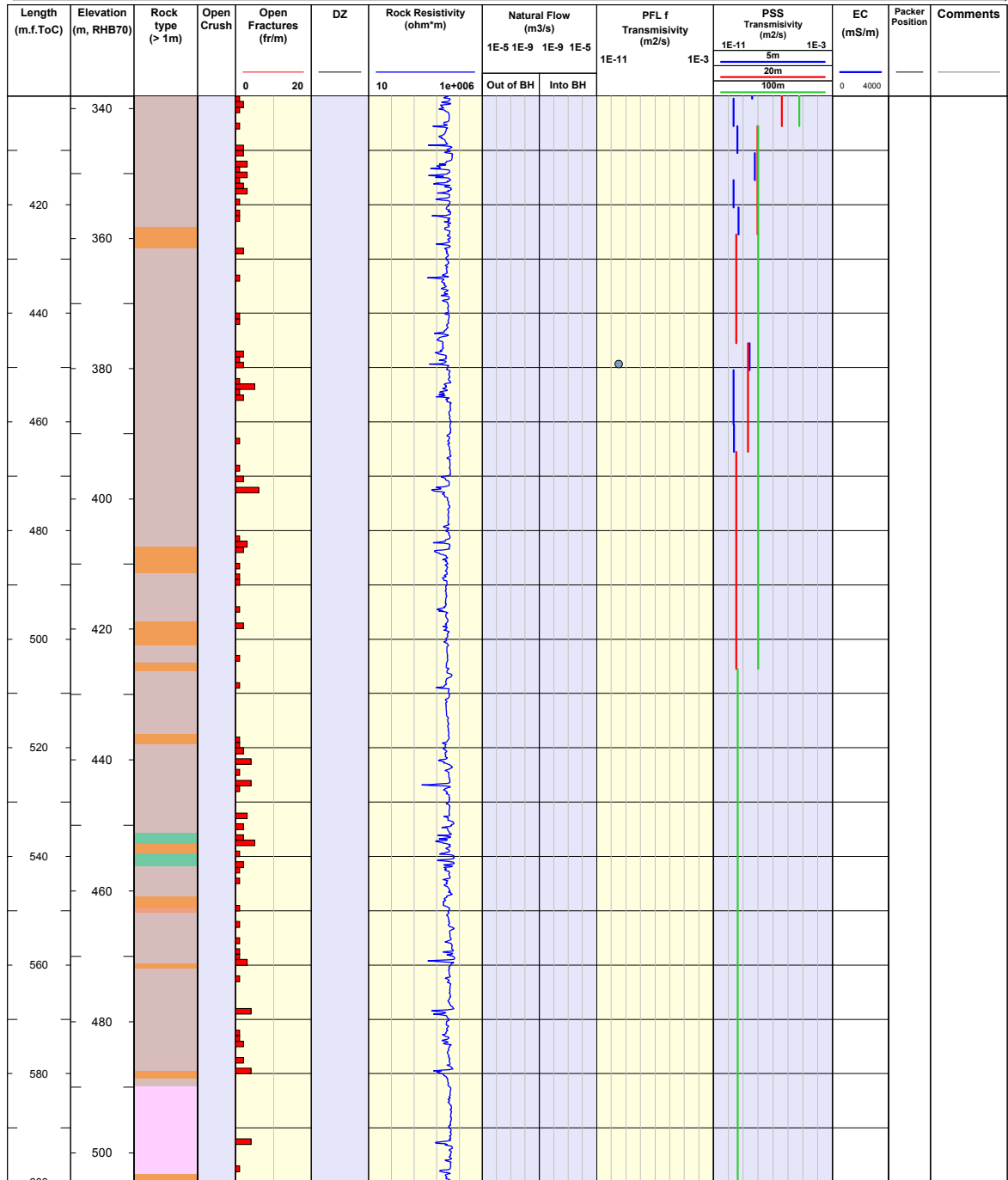
#### 4.6.4 KFM06A, 400–600 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-11 16:25:00
Borehole	KFM06A	Northing [m]	6699732.88	Drilling Stop Date	2003-11-21 09:55:00
Diameter [mm]	77	Easting [m]	1632442.51	Packer Installation Date	
Length [m]	1000.640	Inclination [°]	-60.24	Plot Date	2006-08-08 21:18:51
Bearing [°]	300.92	Elevation [m.a.s.l.]	4.10		

#### ROCKTYPE








Granite, fine- to medium-grained	Granite to granodiorite, metamorphic, medium-grained
Pegmatite, pegmatitic granite	Granodiorite, metamorphic
Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	Amphibolite
Granite, metamorphic, aplitic	

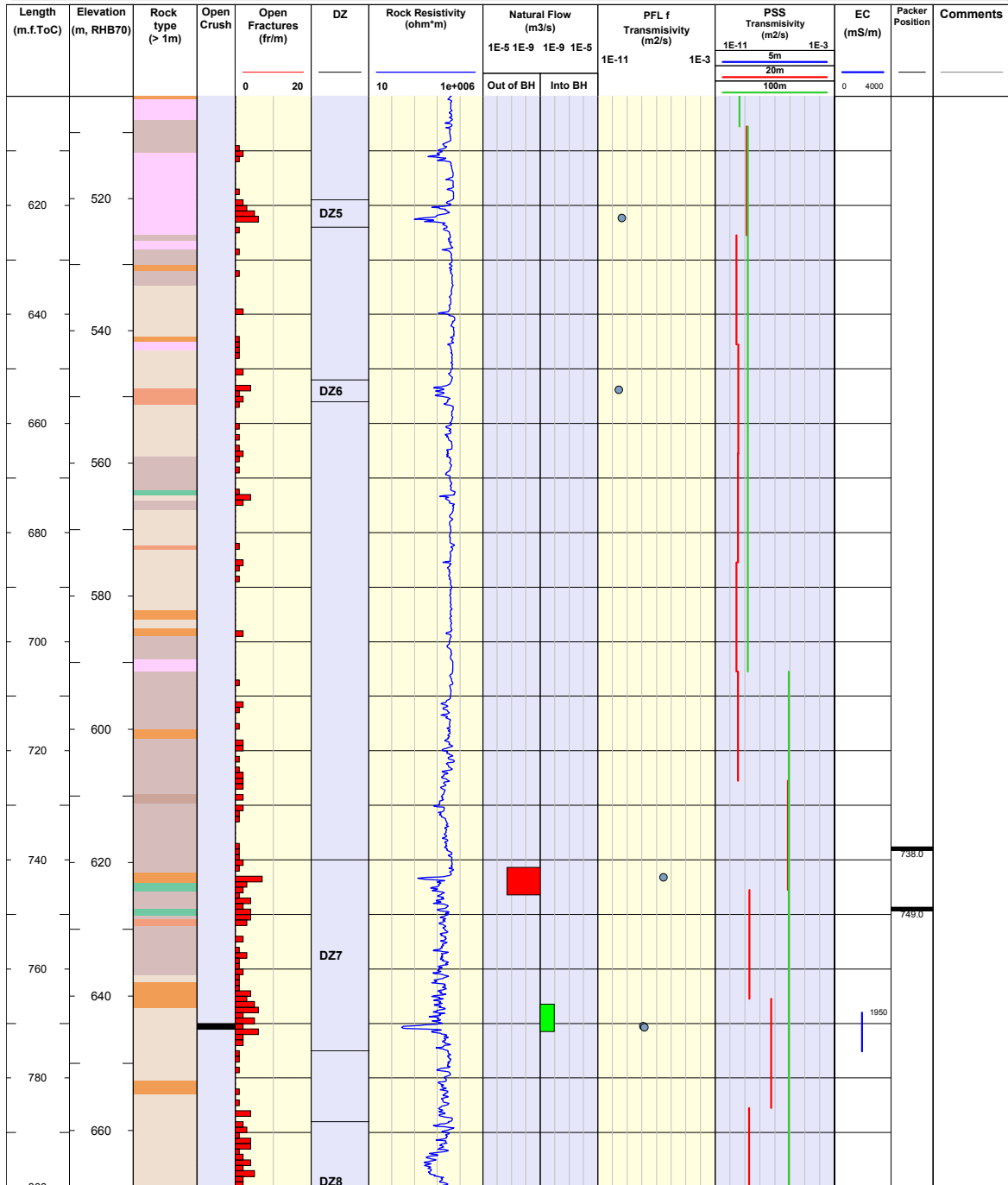


### 4.6.5 KFM06A, 600–800 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-11 16:25:00
	Borehole	KFM06A	Northing [m]	6699732.88	Drilling Stop Date	2003-11-21 09:55:00
	Diameter [mm]	77	Easting [m]	1632442.51	Packer Installation Date	
	Length [m]	1000.640	Inclination [°]	-60.24	Plot Date	2006-08-08 21:18:51
	Bearing [°]	300.92	Elevation [m.a.s.l.]	4.10		

#### ROCKTYPE








	Granite, fine- to medium-grained		Granite to granodiorite, metamorphic, medium-grained
	Pegmatite, pegmatitic granite		Granodiorite, metamorphic
	Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained		Amphibolite
	Granite, metamorphic, aplitic		

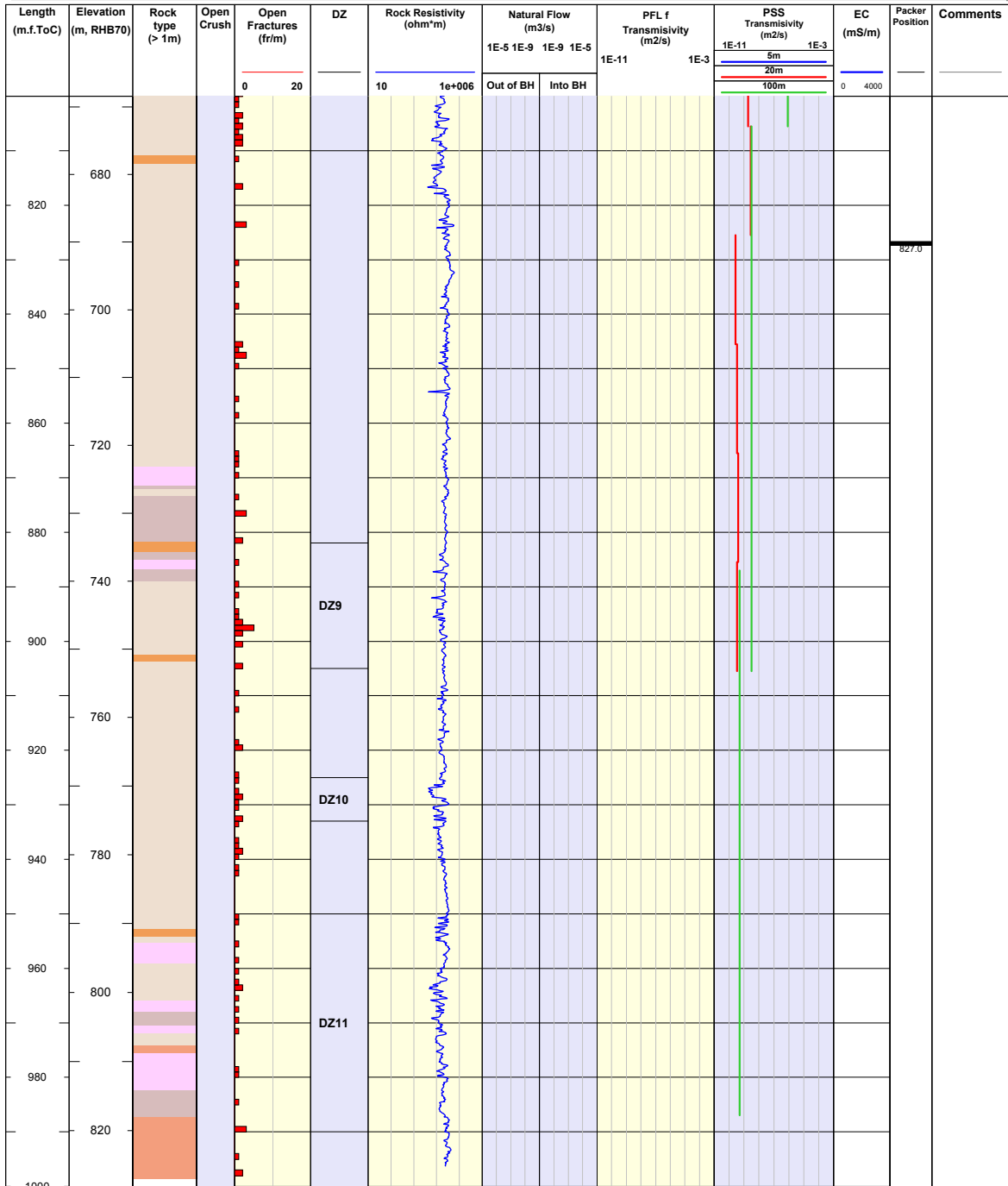


### 4.6.6 KFM06A, 800–1,000 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2003-11-11 16:25:00
	Borehole	KFM06A	Northing [m]	6699732.88	Drilling Stop Date	2003-11-21 09:55:00
	Diameter [mm]	77	Easting [m]	1632442.51	Packer Installation Date	
	Length [m]	1000.640	Inclination [°]	-60.24	Plot Date	2006-08-08 21:18:51
	Bearing [°]	300.92	Elevation [m.a.s.l.]	4.10		

#### ROCKTYPE

 Granite, fine- to medium-grained	 Granite to granodiorite, metamorphic, medium-grained
 Pegmatite, pegmatitic granite	 Granodiorite, metamorphic
 Granite, granodiorite and tonalite, metamorphic, fine- to medium-grained	 Amphibolite
 Granite, metamorphic, aplitic	



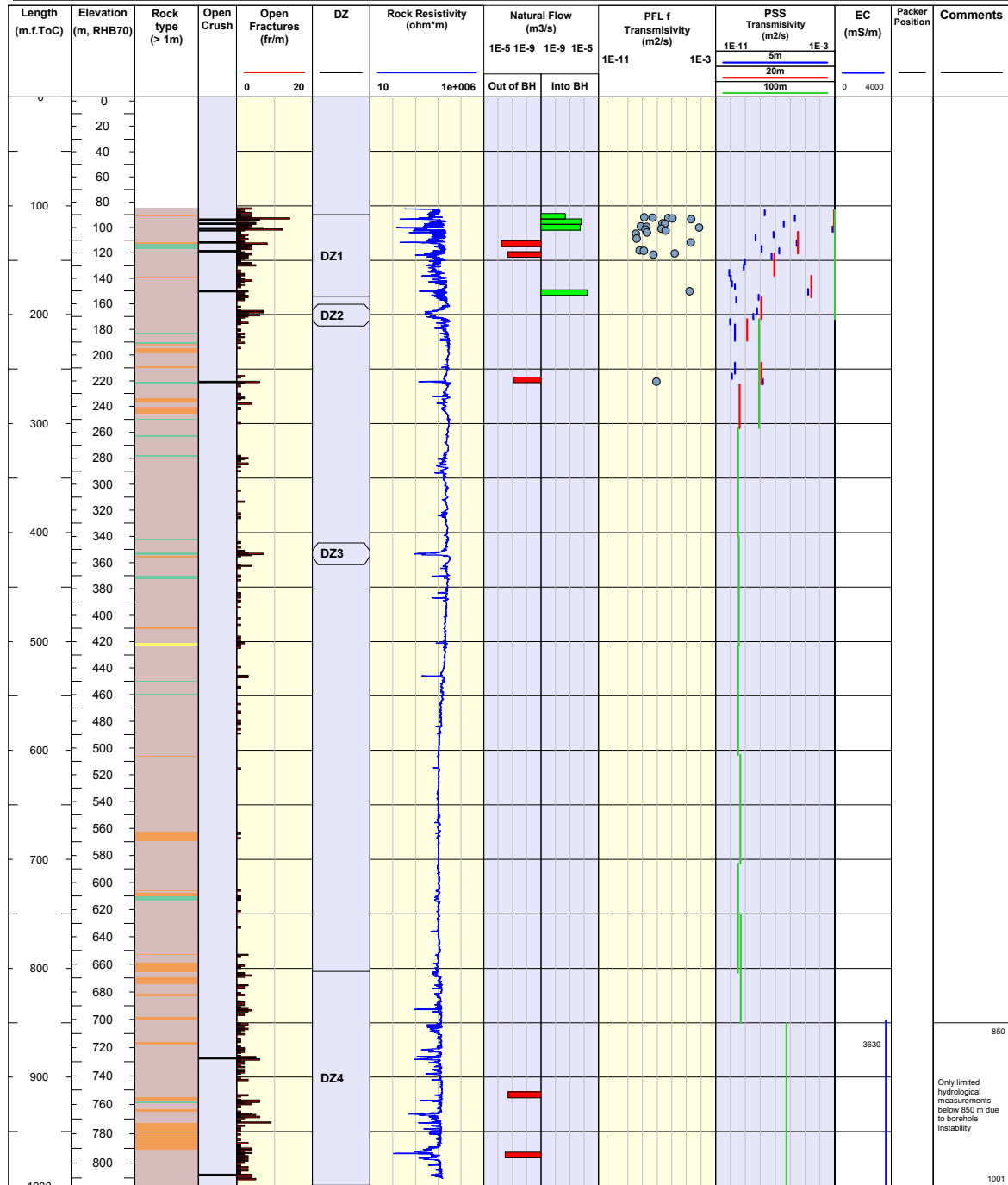
# 4.7 KFM07A

## 4.7.1 KFM07A, 0–1,001 m

	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2004-06-07 11:40:00
	Borehole	KFM07A	Northing [m]	6700127.08	Drilling Stop Date	2004-06-16 14:30:00
	Diameter [mm]	77	Easting [m]	1631031.57	Packer Installation Date	
	Length [m]	1001.550	Inclination [°]	-59.21	Plot Date	2006-08-08 21:18:51
	Bearing [°]	261.47	Elevation [m.a.s.l.]	3.33		

### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic





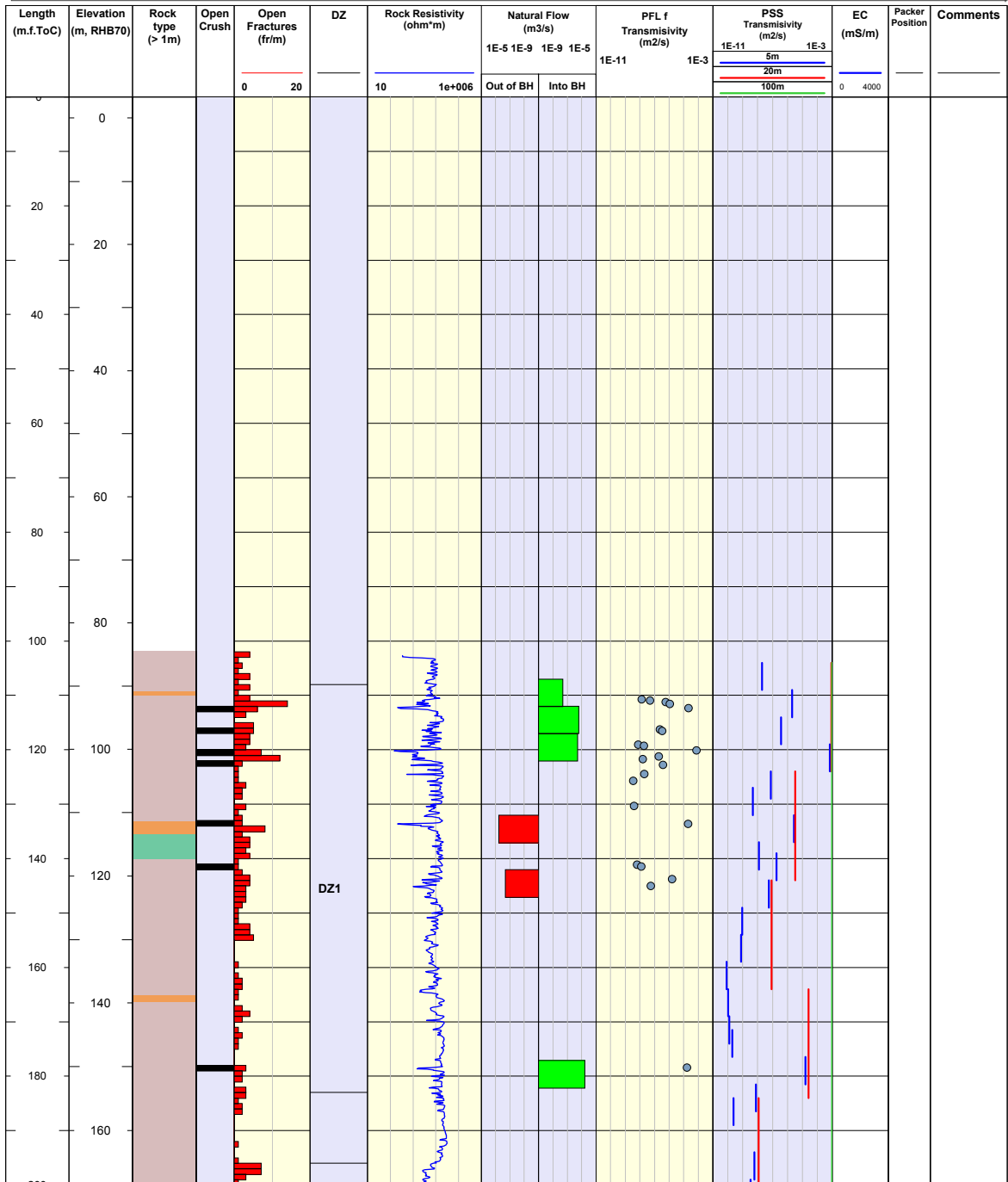
### 4.7.2 KFM07A, 0–200 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2004-06-07 11:40:00
Borehole	KFM07A	Northing [m]	6700127.08	Drilling Stop Date	2004-06-16 14:30:00
Diameter [mm]	77	Easting [m]	1631031.57	Packer Installation Date	
Length [m]	1001.550	Inclination [°]	-59.21	Plot Date	2006-08-08 21:18:51
Bearing [°]	261.47	Elevation [m.a.s.l.]	3.33		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic



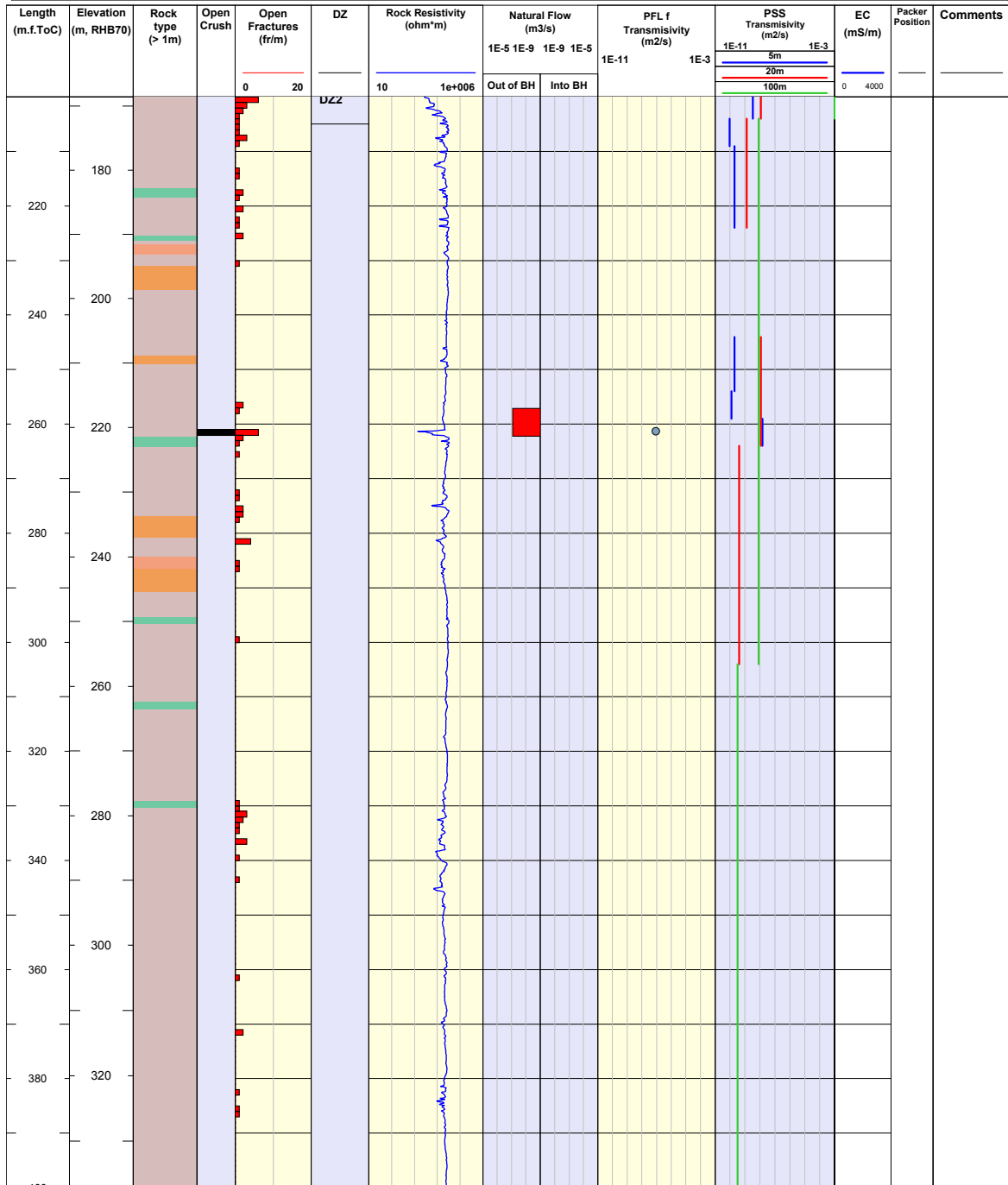
### 4.7.3 KFM07A, 200–400 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2004-06-07 11:40:00
Borehole	KFM07A	Northing [m]	6700127.08	Drilling Stop Date	2004-06-16 14:30:00
Diameter [mm]	77	Easting [m]	1631031.57	Packer Installation Date	
Length [m]	1001.550	Inclination [°]	-59.21	Plot Date	2006-08-08 21:18:51
Bearing [°]	261.47	Elevation [m.a.s.l.]	3.33		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic



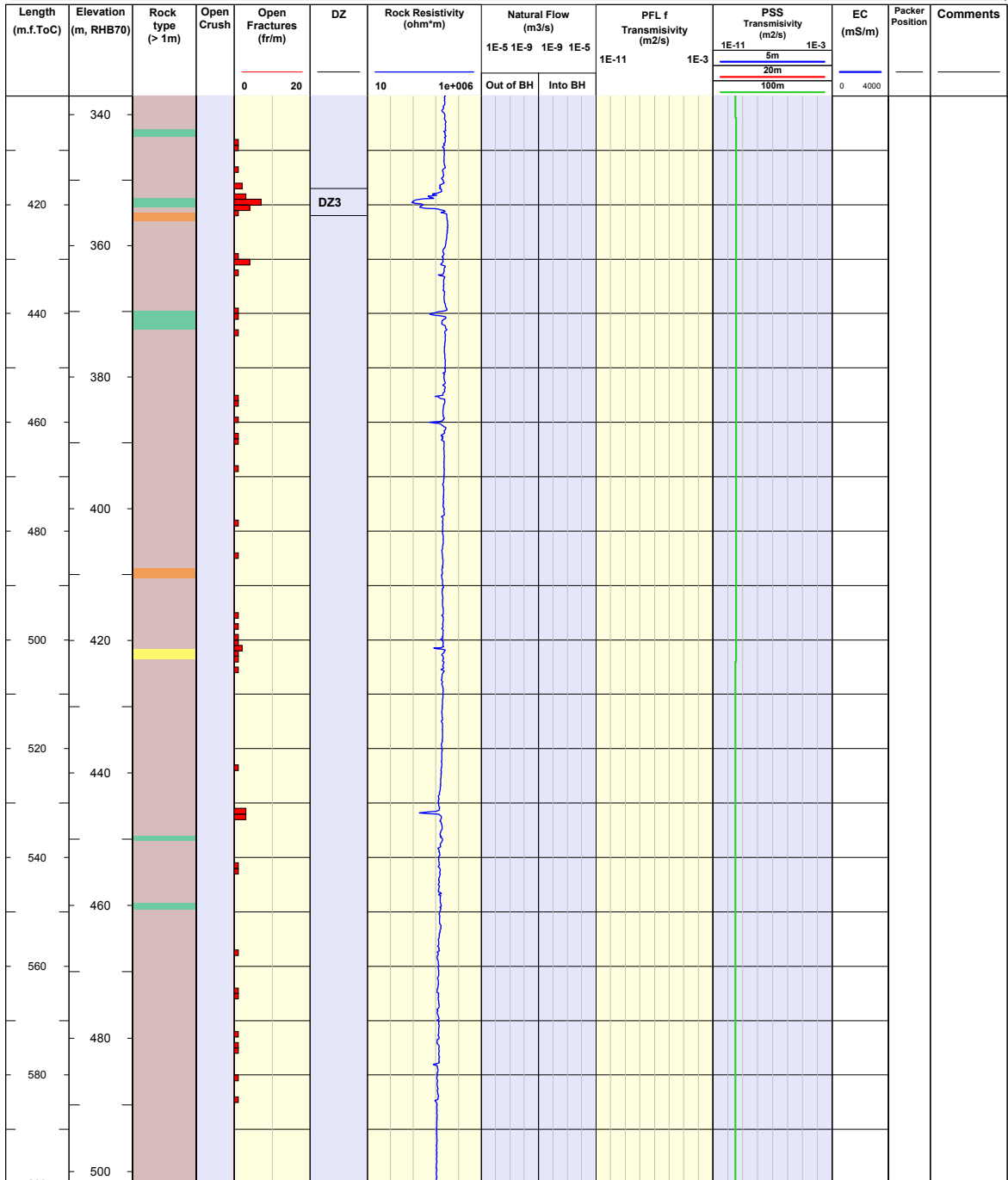
### 4.7.4 KFM07A, 400–600 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2004-06-07 11:40:00
Borehole	KFM07A	Northing [m]	6700127.08	Drilling Stop Date	2004-06-16 14:30:00
Diameter [mm]	77	Easting [m]	1631031.57	Packer Installation Date	
Length [m]	1001.550	Inclination [°]	-59.21	Plot Date	2006-08-08 21:18:51
Bearing [°]	261.47	Elevation [m.a.s.l.]	3.33		

#### ROCKTYPE

	Granite, fine- to medium-grained		Felsic to intermediate volcanic rock, metamorphic
	Pegmatite, pegmatitic granite		
	Granite to granodiorite, metamorphic, medium-grained		
	Amphibolite		



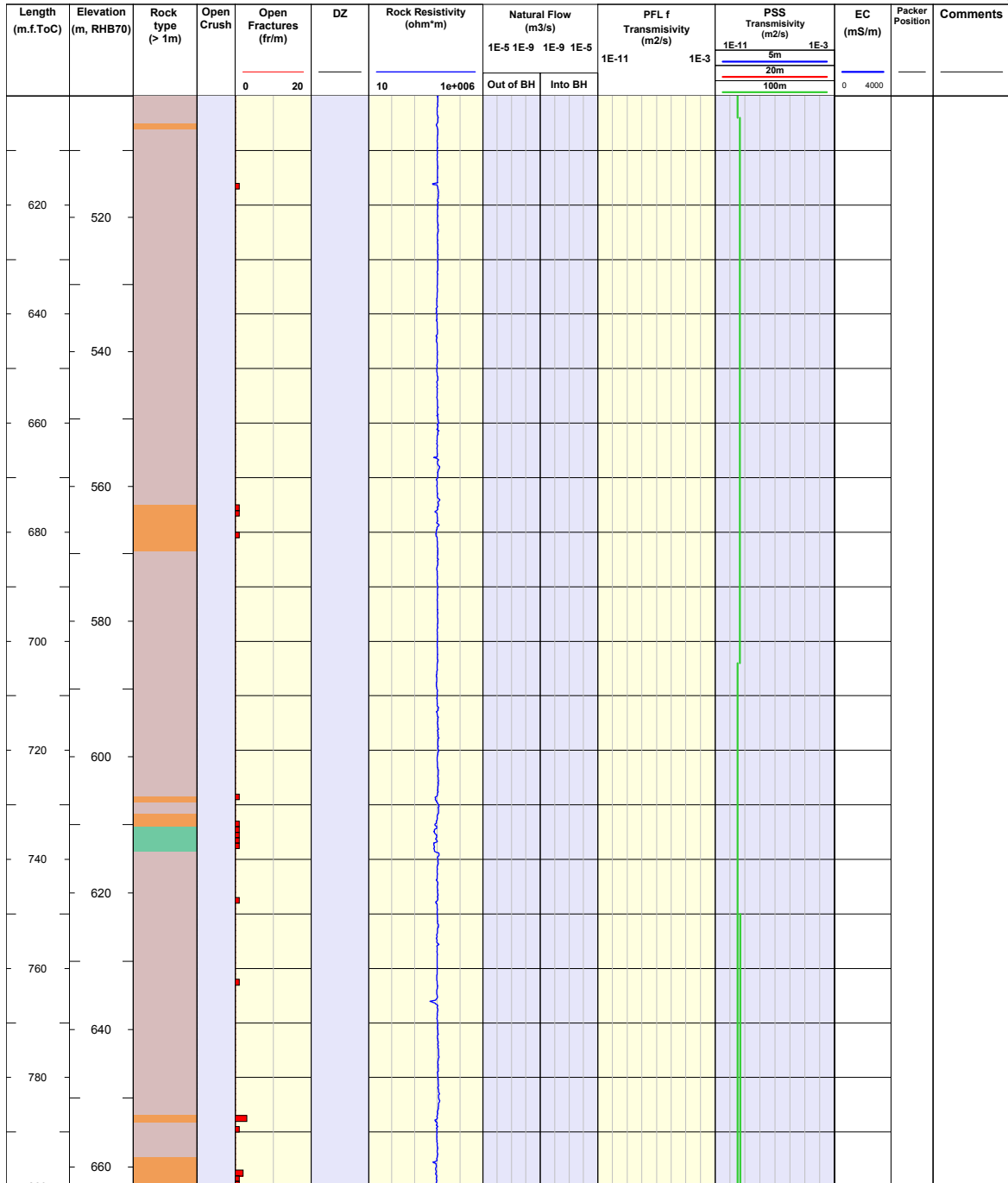
### 4.7.5 KFM07A, 600–800 m



Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2004-06-07 11:40:00
Borehole	KFM07A	Northing [m]	6700127.08	Drilling Stop Date	2004-06-16 14:30:00
Diameter [mm]	77	Easting [m]	1631031.57	Packer Installation Date	
Length [m]	1001.550	Inclination [°]	-59.21	Plot Date	2006-08-08 21:18:51
Bearing [°]	261.47	Elevation [m.a.s.l.]	3.33		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic



### 4.7.6 KFM07A, 800–1,001 m

<b>SKB</b>	Site	FORSMARK	Coordinate System	RT90-RHB70	Drilling Start Date	2004-06-07 11:40:00
	Borehole	KFM07A	Northing [m]	6700127.08	Drilling Stop Date	2004-06-16 14:30:00
	Diameter [mm]	77	Easting [m]	1631031.57	Packer Installation Date	
	Length [m]	1001.550	Inclination [°]	-59.21	Plot Date	2006-08-08 21:18:51
	Bearing [°]	261.47	Elevation [m.a.s.l.]	3.33		

#### ROCKTYPE

- Granite, fine- to medium-grained
- Pegmatite, pegmatitic granite
- Granite to granodiorite, metamorphic, medium-grained
- Amphibolite
- Felsic to intermediate volcanic rock, metamorphic

