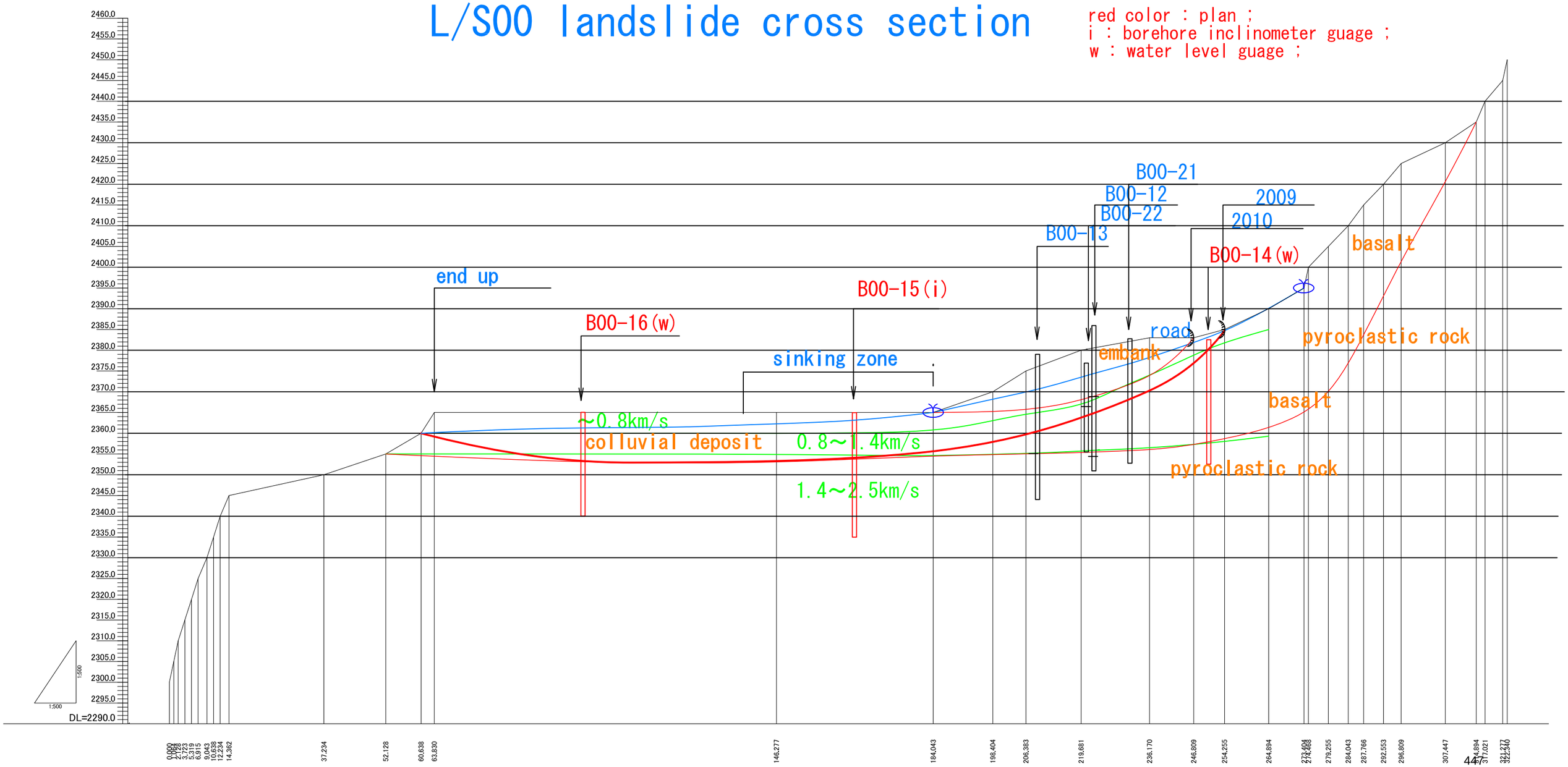
19. Landslide cross section

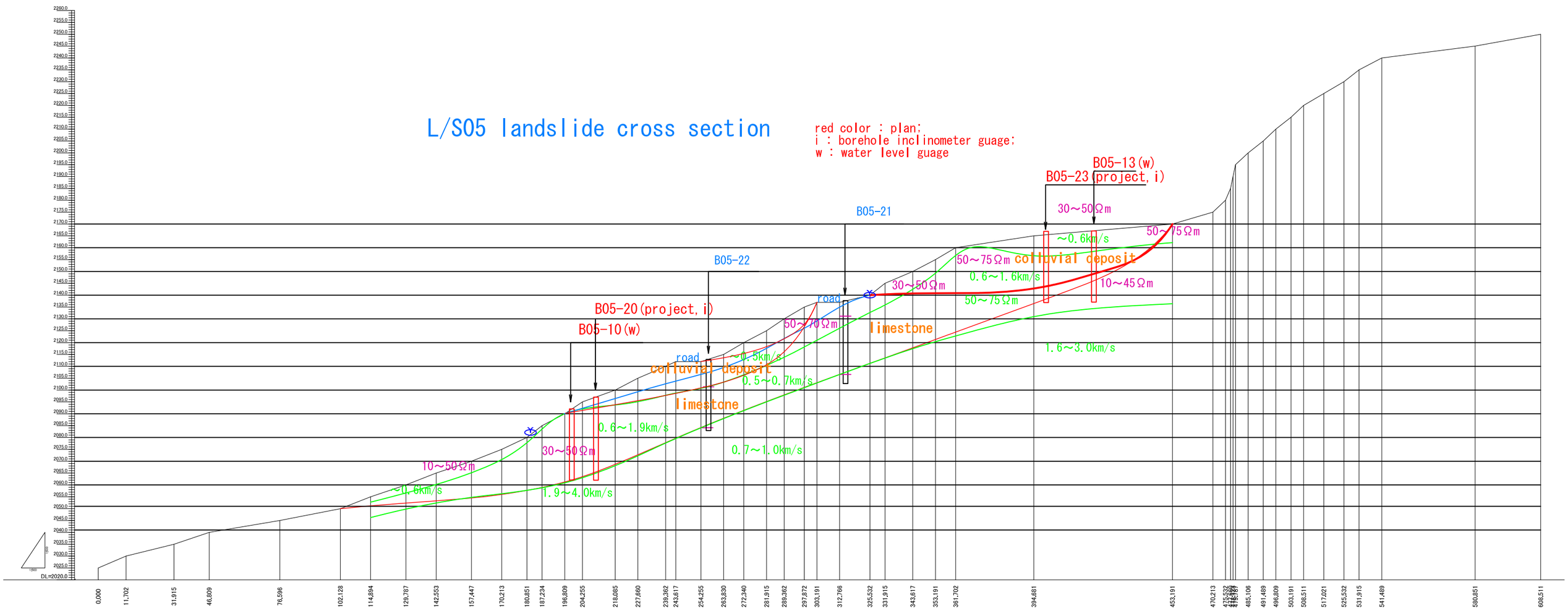
L/S00 landslide cross section

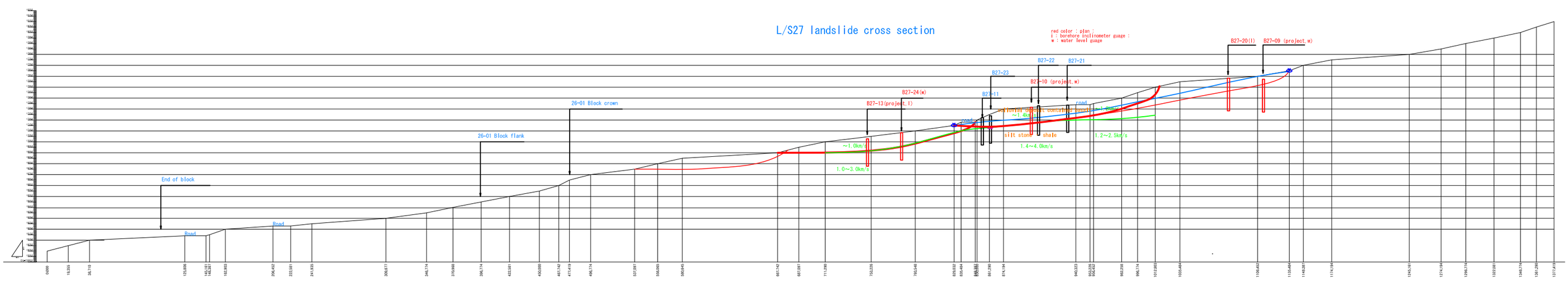
red color : plan ;
i : borehore inclinometer guage ;
w : water level guage ;



L/S05 landslide cross section

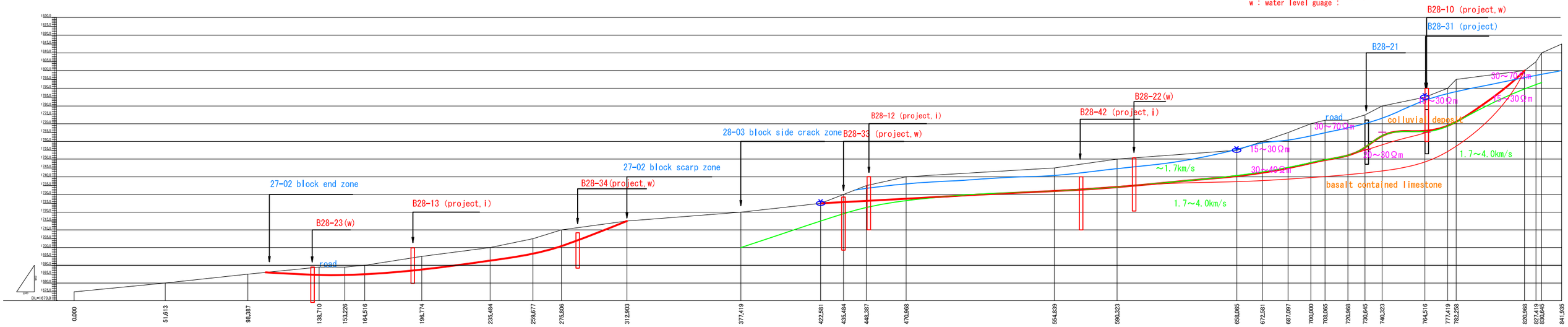
red color : plan;
i : borehole inclinometer guage;
w : water level guage



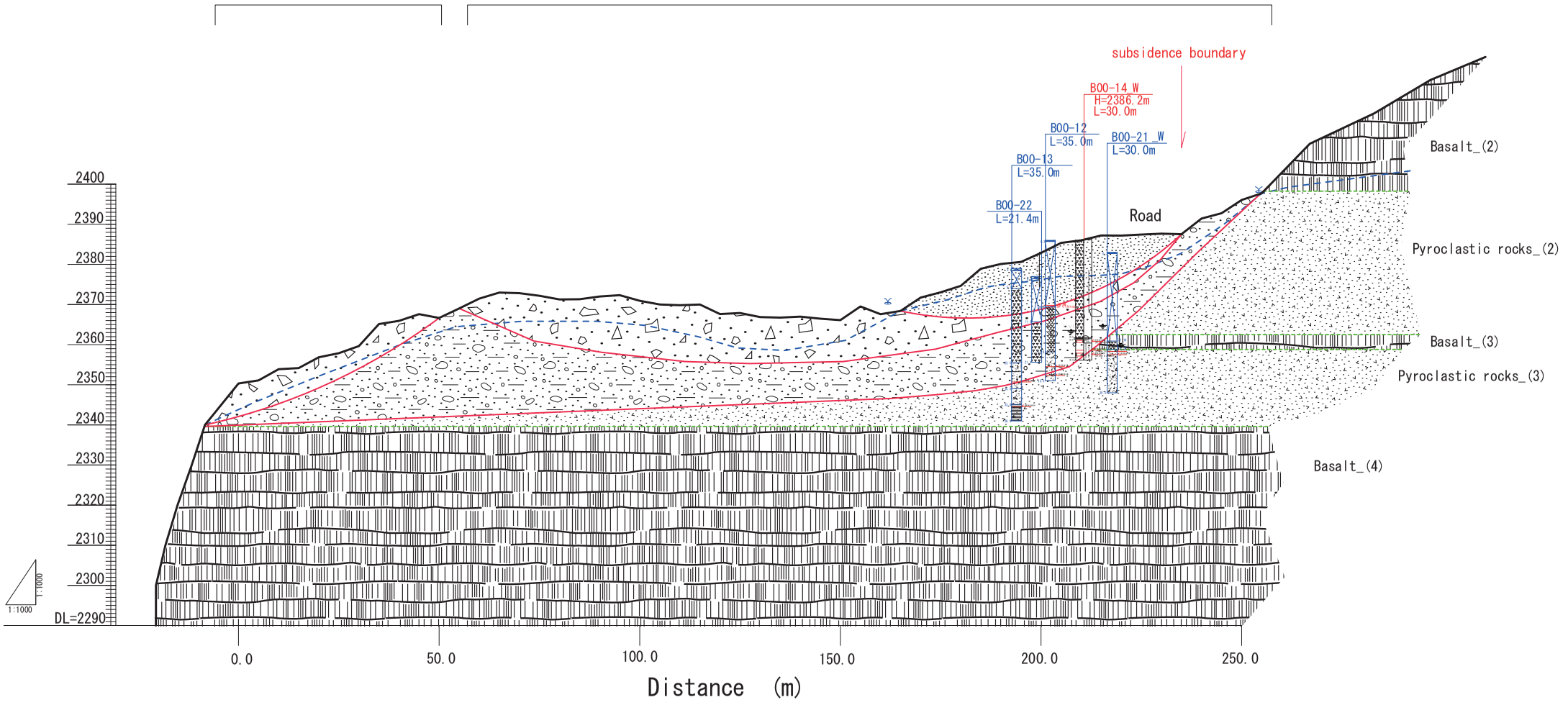

L/S27 landslide cross section
red color : plan ;
I : borehore inclinometer guage :
w : water level guage
B27-20(I)
B27-09 (project,w)
B27-22
B27-21
B27-23
B27-10 (project,w)
B27-24(w)
B27-13(project,I)
B27-11
26-01 Block crown
26-01 Block flank
End of block
road
Road
Road
~1.0km/s
1.0~3.0km/s
1.4~4.0km/s
1.2~2.5km/s
shale
silt stone
0.000
19.355
38.710
125.806
146.161
162.903
206.452
225.581
241.935
306.077
348.774
370.968
396.774
425.681
450.000
467.742
477.419
496.774
537.097
556.845
590.845
681.742
697.097
711.295
750.326
793.548
829.032
835.464
861.290
874.194
940.323
952.258
956.529
968.836
996.774
1012.903
1035.484
1106.452
1135.484
1148.307
1174.194
1245.161
1274.194
1296.774
1322.581
1340.774
1361.295
1377.419

L/S28 landslide cross section

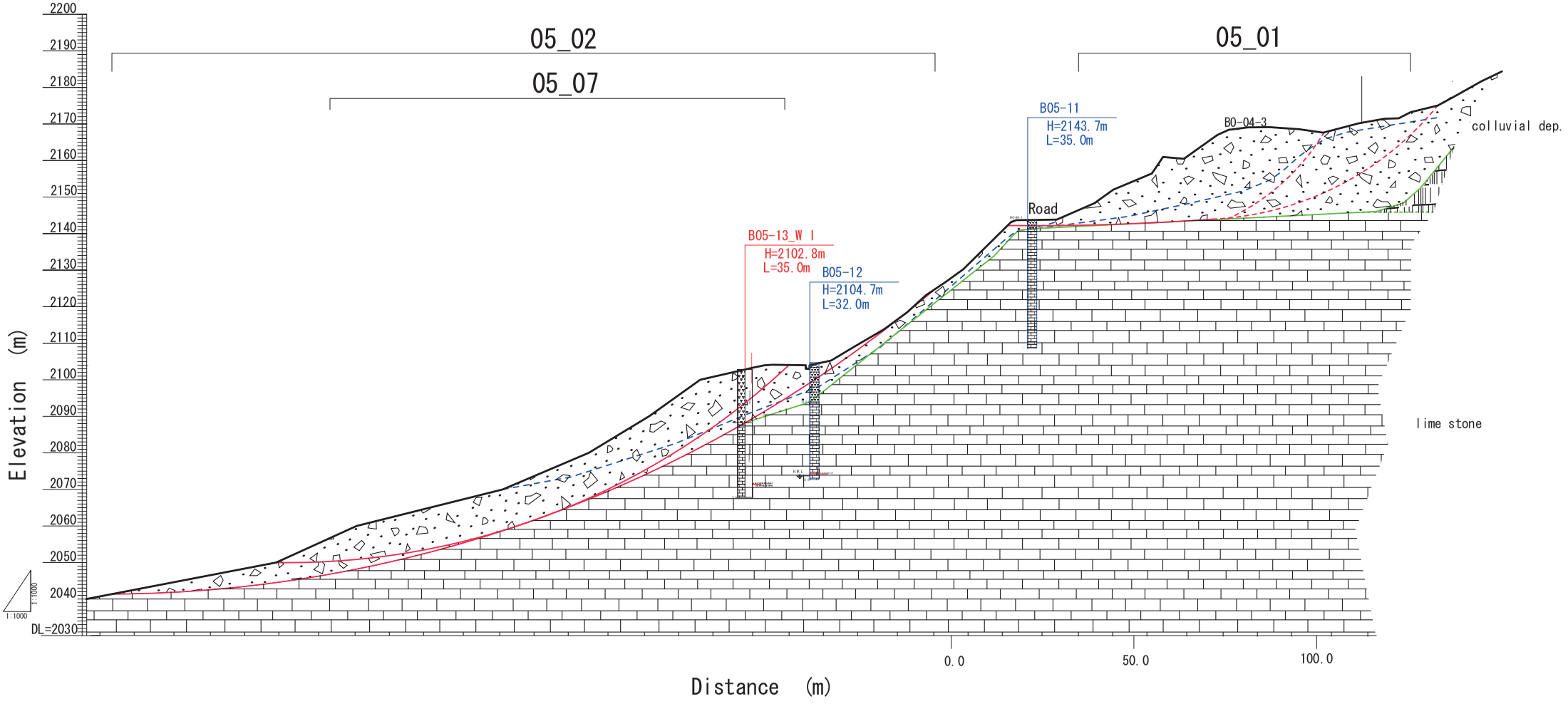
red color : plan :
i : borehole inclinometer guage :
w : water level guage :



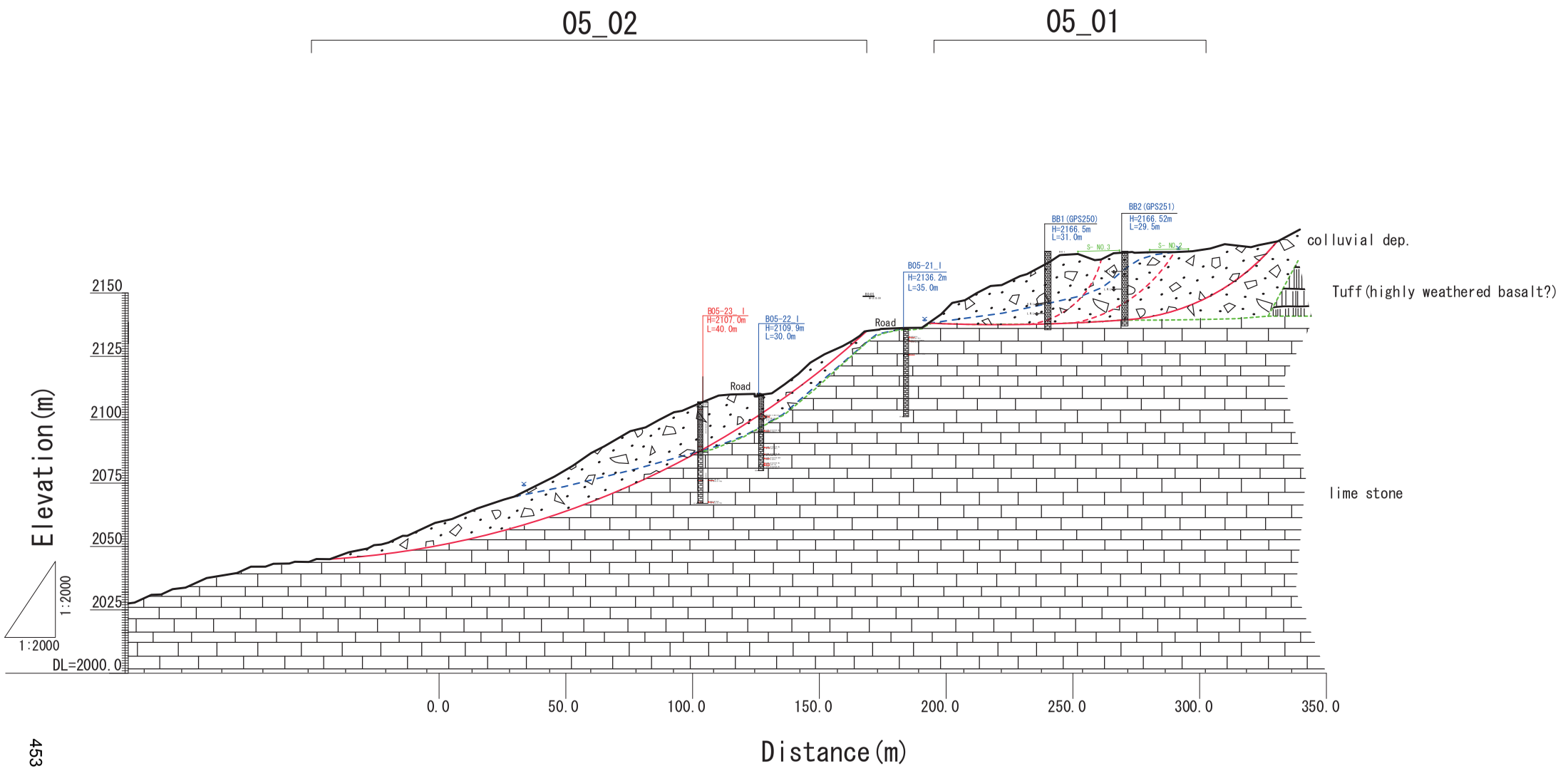
Travel-time curve and analytical diagram of velocity (Cross Section BO-12, L/SOO)



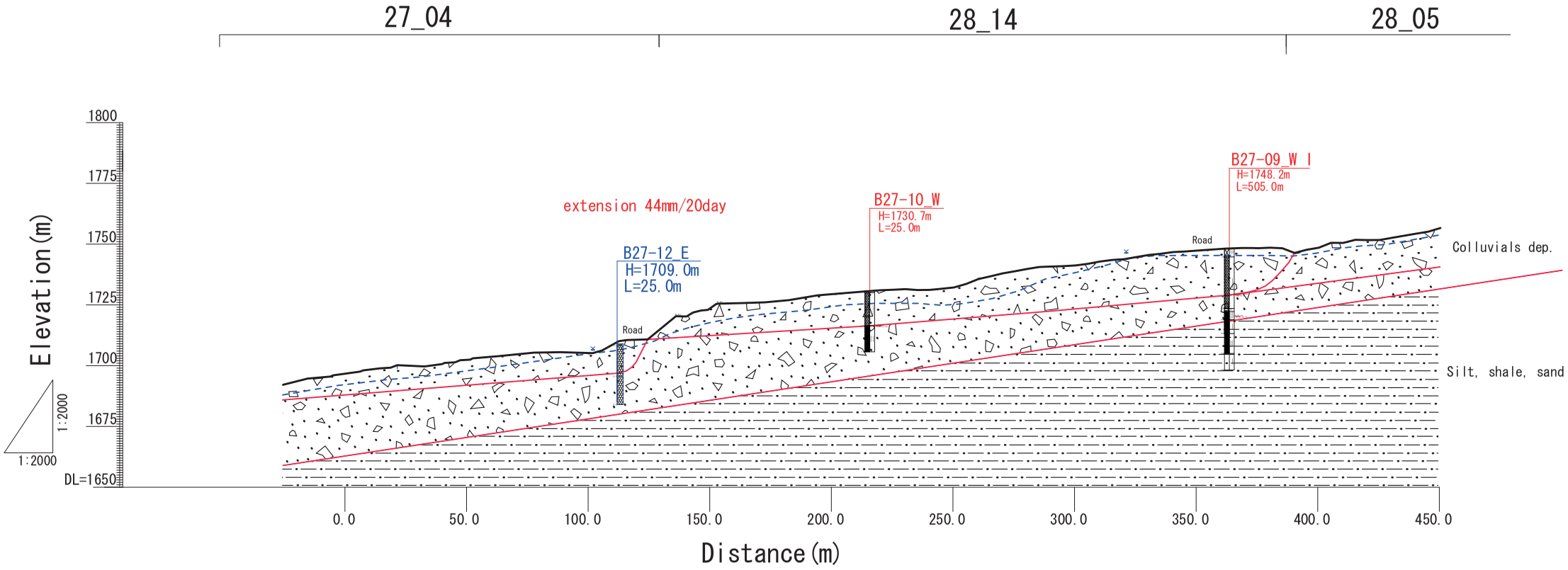
Travel-time curve and analytical diagram of velocity (Cross Section BO-04,L/S05)



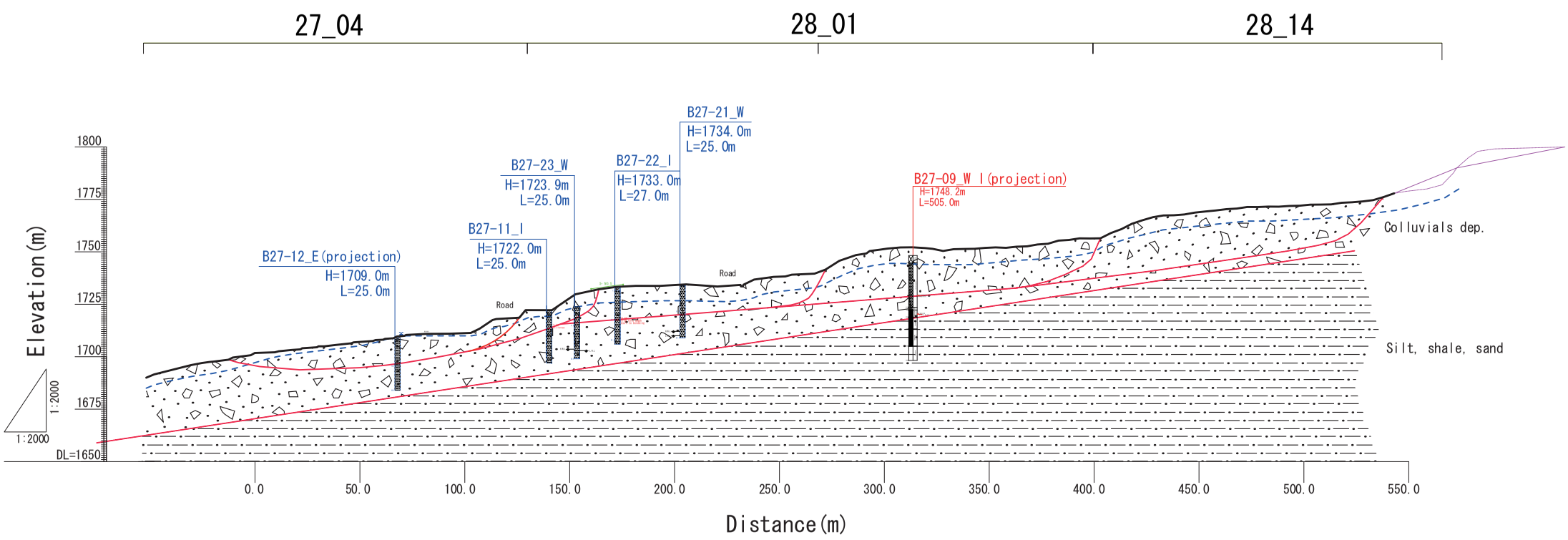
Travel-time curve and analytical diagram of velocity (Cross Section BO-05, L/S05)



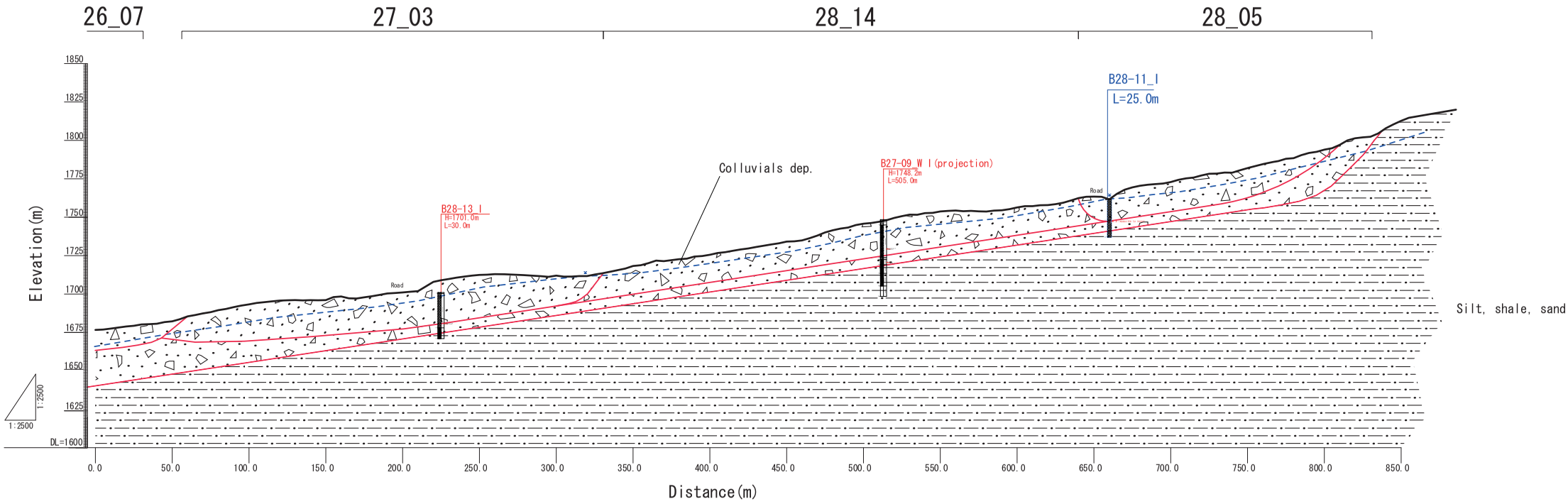
Travel-time curve and analytical diagram of velocity (Cross Section B0-08, L/S27)



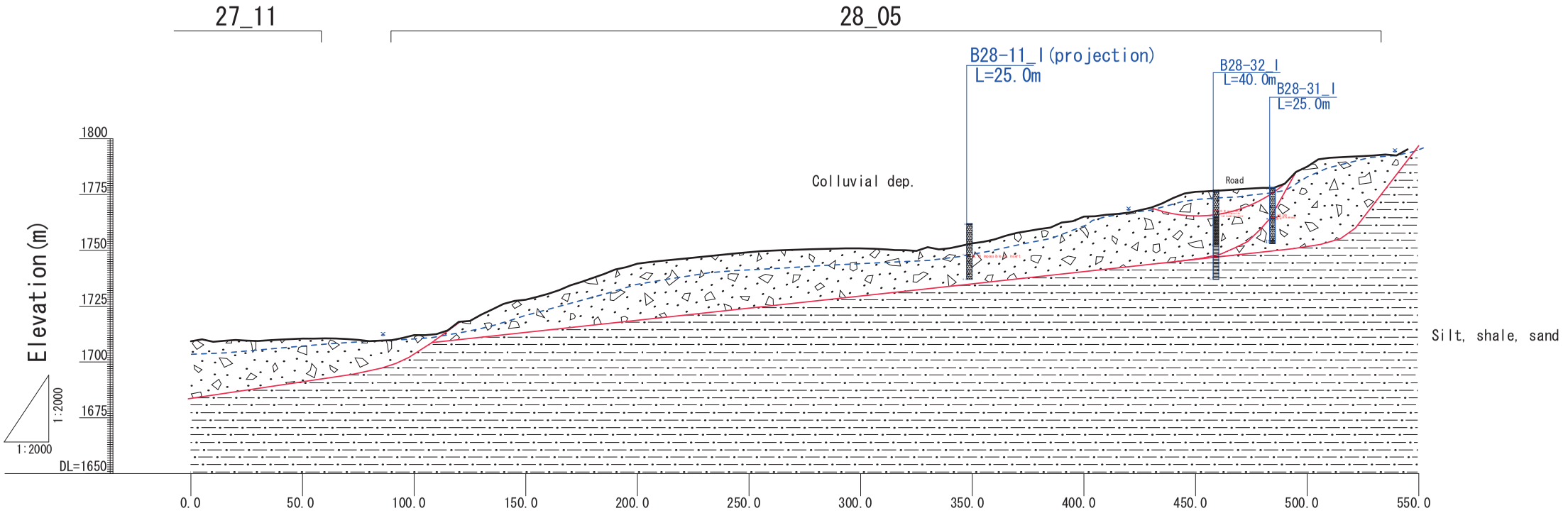
Travel-time curve and analytical diagram of velocity (Cross Section B0-09,L/S27)



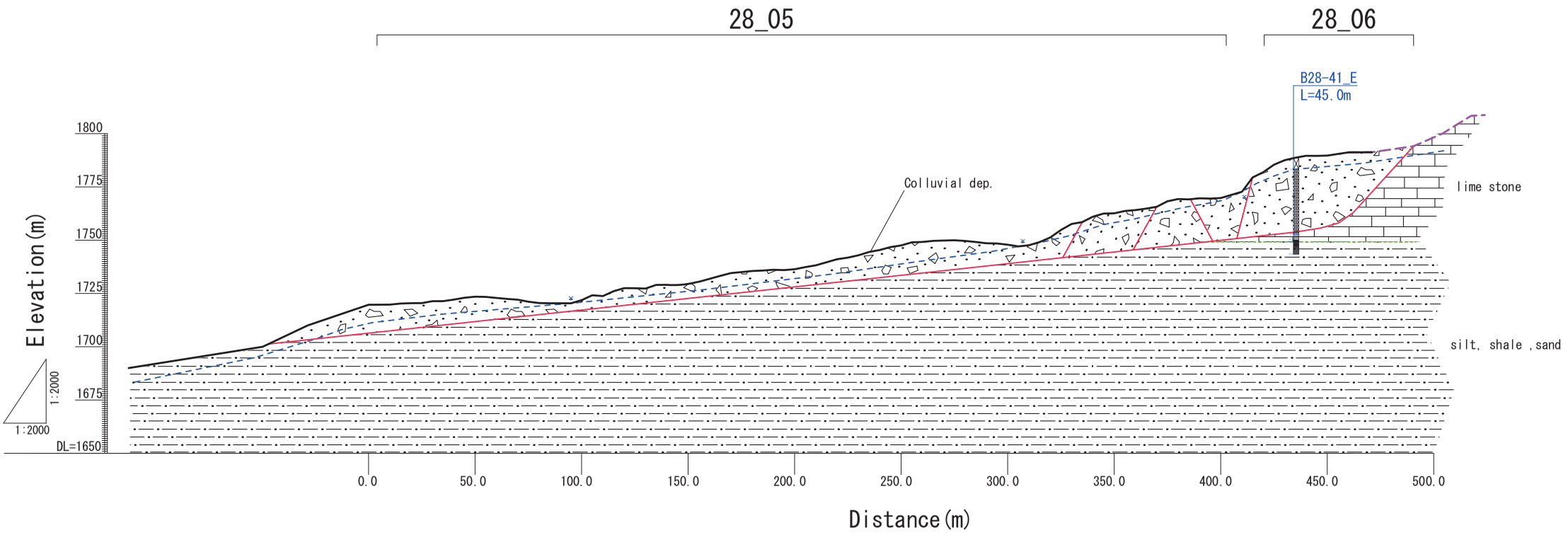
Travel-time curve and analytical diagram of velocity (Cross Section BO-14, L/S28)



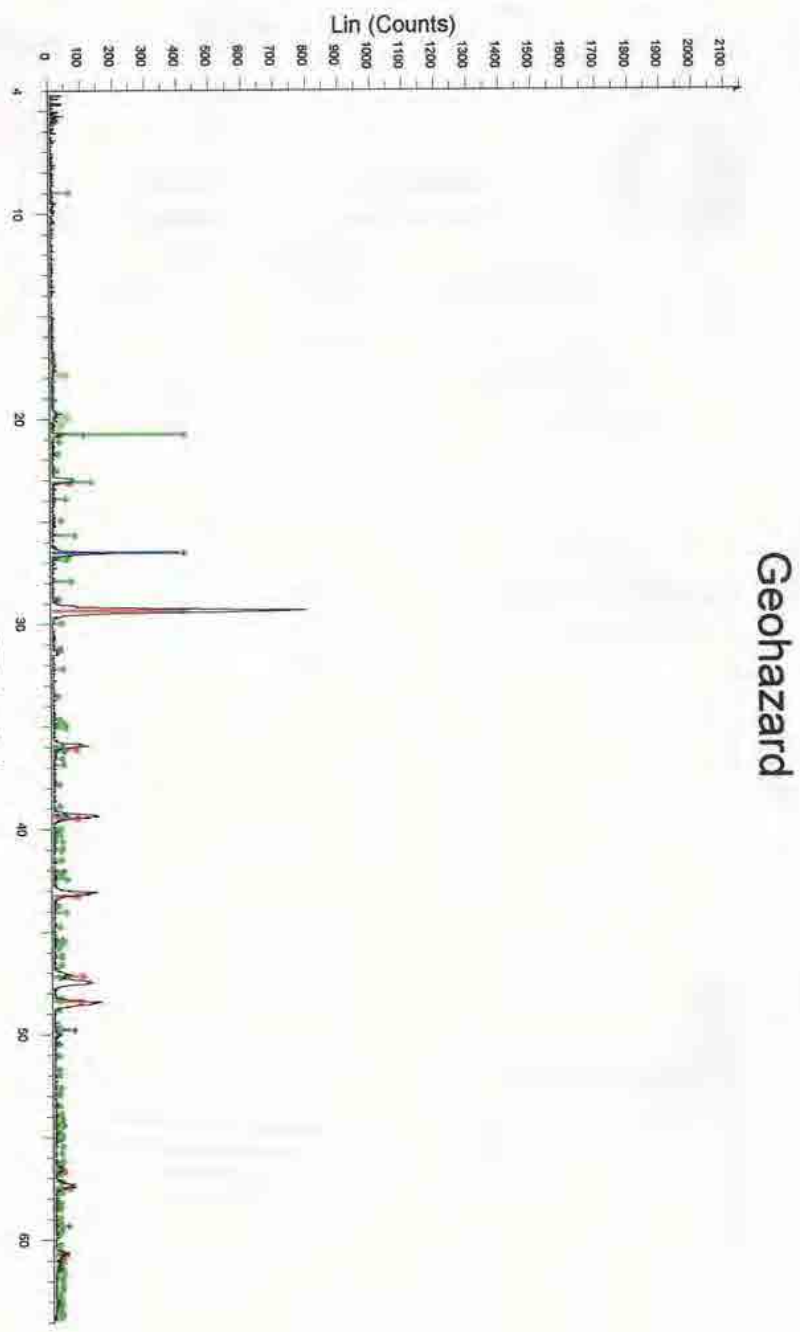
Travel-time curve and analytical diagram of velocity (Cross Section BO-15,L/S28)



Travel-time curve and analytical diagram of velocity (Cross Section BO-16,L/S28)



20. Laboratory test



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Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] Gold & Base metal [ ] Water [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section - Mineralogy [/] Physical [ ]

Client /Originator Name: - Geohazard(Leta Alemaychu)

Client Category: - Survey [/] Gov. [ ] Pvt. [ ]

File name:- 14908/2010 Area Ref-:- No of Samples :- 3 Sample No. B-05-22C

Sample Type:-Soil Lab No:- 14910/10 Geoh

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-16/09/2010

Identified Minerals

Mineral	(%)
Calcite	34.0
Quartz alpha	32.2
Muscovite	33.8

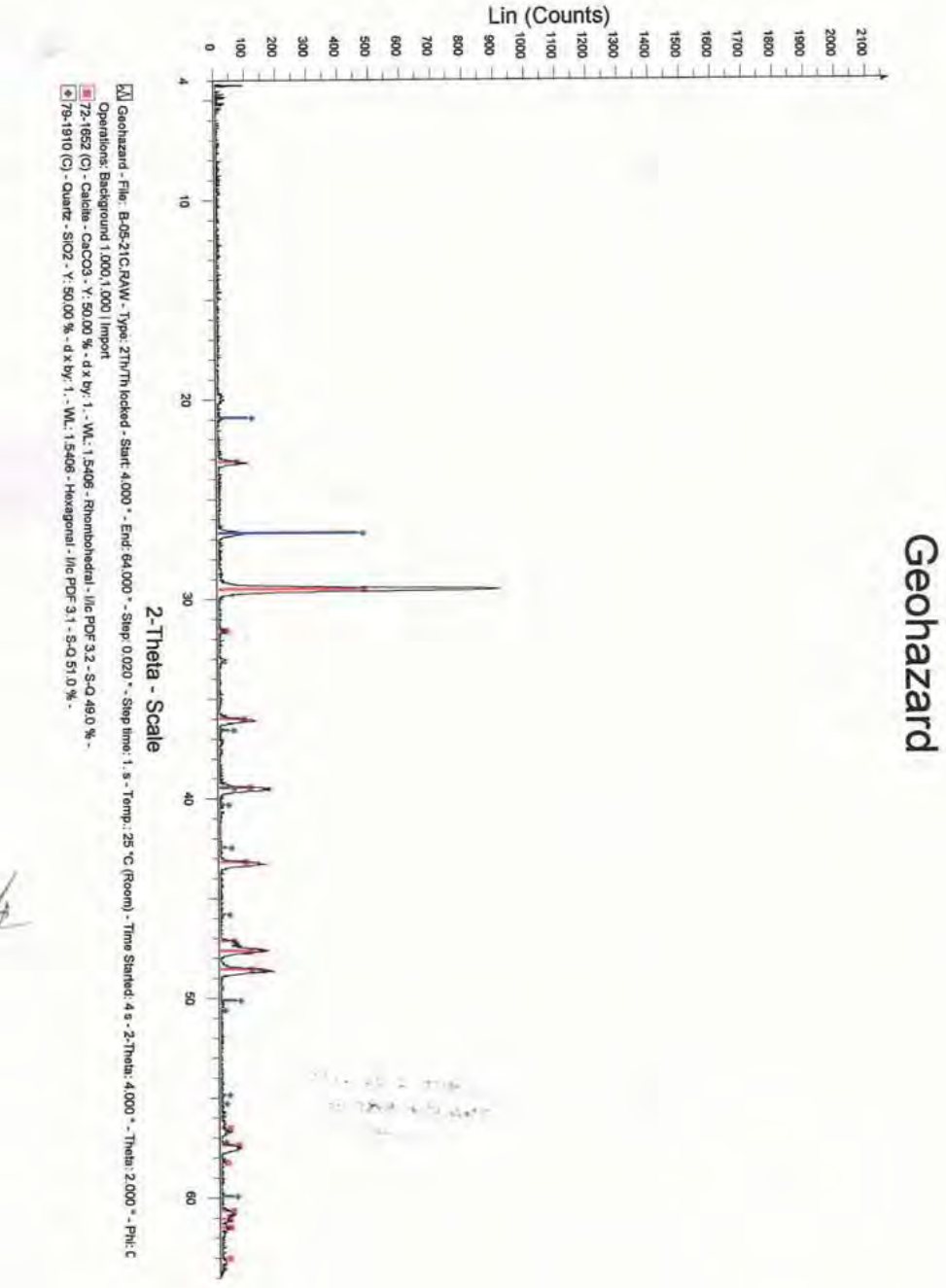
III) Remark note:-

Described By / Analysts

1. Workelul GIK
2. Adise Mekonnen

Checked by Workelul GIK **Date Completed** 30/09/2010

WORKELUL G/KRISTOS
Head, Mineralogy and Petrography Laboratory



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Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ✓ Physical ☐

Client /Originator Name: - Geohazard(Leta Alemayehu)

Client Category: - Survey ✓ Gov. ☐ Pvt. ☐

File name:- 14908/2010 Area Ref-:- No of Samples :- 3 Sample No. B-05-21C

Sample Type:-Soil Lab No:- 14909/10 Geoh.

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-16/09/2010

Identified Minerals

Mineral	(%)
Calcite	49.0
Quartz	51.0

III) Remark note:-

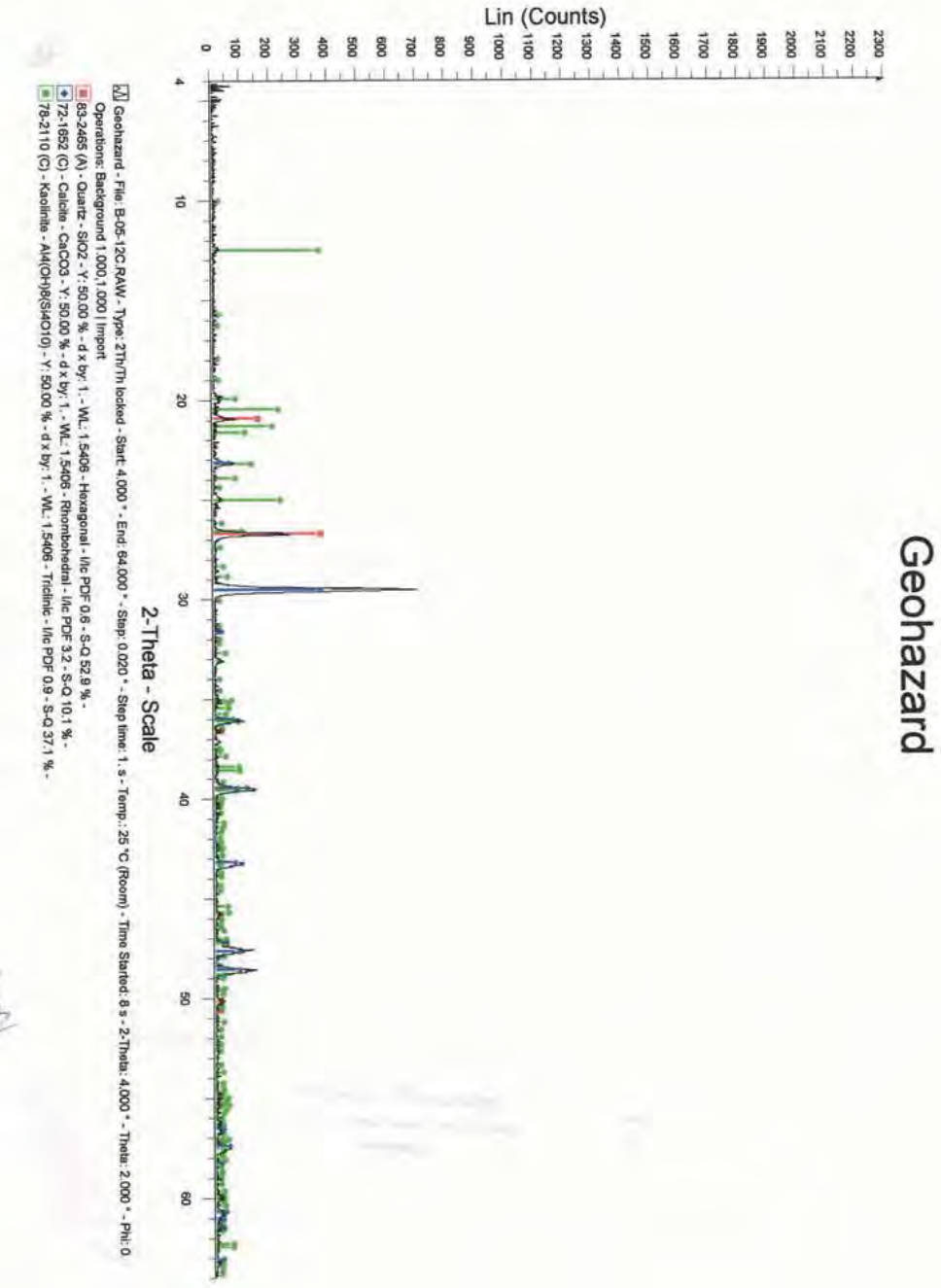
Described By / Analysts

1. Workelul GIK
2. Adise Mekonnen

Checked by Workelul GIK

WORKELUL G/KRISTOS
Head, Mineralogy and Petrography Laboratory

Date Completed 30/09/2010



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☑ Physical ☐

Client /Originator Name: - Geohazard(Leta Alemayehu)

Client Category: - Survey ☑ Gov. ☐ Pvt. ☐

File name:- 14908/2010 Area Ref-:- No of Samples :- 3 Sample No. B-05-12C

Sample Type:-Soil Lab No:- 14908/10 Geoh.

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-16/09/2010

Identified Minerals

Mineral	(%)
Quartz	52.9
Calcite	10.1
Kaolinite	37.1

iii) Remark note:-

Described By / Analysts

1. Workelul GIK
2. Adise Mekonnen

Checked by Workelul GIK **Date Completed** 30/09/2010

WORKELUL G/KRISTOS
Head, Mineralogy and Petrography Laboratory

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 14783/10 G0V Area Ref-:- No of Samples: - 17 Sample No.
Sample Type:-Rock Lab No: -
Type of Analysis:- Bulk Density and Water absorption Preparation required: - Date Submitted: - 12/09/10

Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
B-28-21-A	14797/10	95.09	98.29	59.52	3.37	8.25	2.45
		108.11	111.8	67.73	3.41	8.37	2.45
		Average			**3.39**	**8.31**	**2.45**
B-05-22-B	14790/10	71.23	73.4	44.78	3.04	7.58	2.49
		109.3	112.56	68.76	2.98	7.44	2.49
		Average			**3.01**	**7.51**	**2.49**
B-05-11-B	14784/10	80.84	84.46	50.6	4.48	10.69	2.39
		102.72	107.17	64.52	4.33	10.43	2.40
		Average			**4.41**	**10.56**	**2.40**

Described By / Analysts
1. Lakech Teferi 2.Meseret Desalegn

Checked by
Misrak Tefera

Date Completed :- 28/09/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: -14783/10 G0V Area Ref-:- No of Samples: - 17 Sample No.
Sample Type:-Rock Lab No: -
Type of Analysis:- Bulk Density and Water absorption Preparation required: - Date Submitted: - 12/09/10

Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
B-05-22-A	14789/10	55.53	57.01	34.69	2.67	6.63	2.49
		86.06	88.26	53.63	2.56	6.35	2.49
		Average			**2.62**	**6.49**	**2.49**
B-28-21-B	14798/10	91.7	92.09	60.3	0.43	1.22	2.88
		130.28	130.78	85.53	0.38	1.10	2.88
		Average			**0.41**	**1.16**	**2.88**
B-05-31 A	14791/10	86.15	87.36	53.72	1.40	3.59	2.56
		116.3	118.02	72.62	1.47	3.78	2.56
		Average			**1.44**	**3.69**	**2.56**

Described By / Analysts
1. Lakech Teferi 2. Meseret Desalegn

Checked by
Misrak Tefera

Date Completed :- 28/09/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical ☒
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey ☒ Gov. ☐ Pvt. ☐
File name: - 14783/10 G0V Area Ref-:- No of Samples: - 17 Sample No.
Sample Type:-Rock Lab No: -
Type of Analysis:-Bulk Density and Water absorption Preparation required: - Date Submitted: - 12/09/10

Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
B-22-11-A	14795/10	64.77	68.99	40.03	6.52	14.57	2.24
		113.91	120.7	69.94	5.96	13.38	2.24
		Average			**6.24**	**13.98**	**2.24**
B-05-32-A	14793/10	104.95	105.14	65.91	0.18	0.48	2.67
		124.43	124.77	78.16	0.27	0.72	2.67
		Average			**0.23**	**0.60**	**2.67**
B-28-31-A	14799/10	91.27	91.5	60.15	0.25	0.73	2.91
		123.49	123.83	81.34	0.28	0.80	2.90
		Average			0.27	0.77	2.91

Described By / Analysts
1. Lakech Teferi
2. Meseret Desalegn.

Checked by Misrak Tefera

Date Completed :- 28/09/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical ☒
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey ☒ Gov. ☐ Pvt. ☐
File name: - 14783/10 G0V Area Ref-:- No of Samples: - 17 Sample No.
Sample Type:-Rock Lab No: -
Type of Analysis :- Bulk Density and Water absorption Preparation required: - Date Submitted: - 12/09/10

Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
B-05-31-B	14792/10	66.04	66.83	41.44	1.19	3.11	2.60
		117.11	118.38	73.5	1.08	2.83	2.60
		Average			**1.14**	**2.97**	**2.60**
B-05-11-A	14783/10	86.89	88.21	54.69	1.52	3.94	2.59
		126.52	128.4	79.6	1.49	3.85	2.59
		Average			**1.51**	**3.90**	**2.59**
B-28-31-B	14800/10	97.97	99.24	61.15	1.30	3.33	2.57
		127.96	129.64	80.08	1.31	3.38	2.58
		Average			**1.31**	**3.36**	**2.58**

Described By / Analysts
1. Lakech Teferi 2.Meseret Desalegn

Checked by Misrak Tefera

Date Completed :- 28/09/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 15022/10 Geohazard (GSE) Area Ref: - No of Samples: 7 Sample No. B 27-11A – B28-11A
Sample Type:- Rock Lab No: - 15026/10 -15023/10
Type of Analysis :- Bulk Density Preparation required: - Date Submitted :- 12/10/10

Coll.No.	Lab.No.	Natural Sample Weight gm	Weight Covered with paraffin at air gm	Weight covered with paraffin under water gm	Bulk- Density g/cm³	Average
B 27-11A	15024/10	73.91	78.23	40.61	2.31	2.30
		94.1	99.55	51.26	2.29	
B 28-32A	15028/10	85.88	93.37	46.34	2.31	2.33
		108.69	121.75	58.46	2.35	
B28-11A	15022/10	105.83	115.2	68.12	3.05	3.03
		141.43	150.06	91.63	3.01	

Described By / Analysts
1.Meseret Desalegn

Checked by :- Misrak Tefera

Date Completed :- 18/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 15022/10 Grohazard(GSE) Area Ref: - No of Samples: 7 Sample No. B 27-21A - B28-11B
Sample Type:- Rock Lab No: - 15026/10 -15023/10
Type of Analysis :- Bulk Density Preparation required: - Date Submitted :- 12/10/10

Coll.No.	Lab.No.	Natural Sample Weight gm	Weight Covered with paraffin at air gm	Weight covered with paraffin under water gm	Bulk- Density g/cm³	Average
B27-21A	15026/10	66.8	76.08	32.79	2.15	2.16
		91.15	104.32	45.09	2.17	
B 27-22A	15027/10	73.16	84.13	36.69	2.22	2.22
		89.4	98.87	46.08	2.22	
B 27-12A	15025/10	54.16	66.95	24.8	2.14	2.20
		142.1	154.14	75.15	2.25	
B 28-11B	15023/10	69.6	81.71	36.09	2.34	2.32
		133.41	149.85	70.32	2.30	

Described By / Analysts
1.Lakech Teferi

Checked by :- Misrak Tefera

Date Completed :- 18/10/10

Melkamu Tegegne
02/12/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 14783/10 G0V Area Ref-:- No of Samples: - 17 Sample No.
Sample Type:-Rock Lab No: -
Type of Analysis :- Bulk Density and Water absorption Preparation required: - Date Submitted: - 12/09/10

Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
B-05-12-B	14786	86.63	90.27	54.16	4.20	10.08	2.40
		101.61	105.8	63.55	4.12	9.92	2.40
		Average			**4.16**	**10**	**2.40**
B-05-21-A	14787	101.42	106.52	62.94	5.03	11.70	2.32
		146.7	154.21	91.09	5.12	11.89	2.32
		Average			**5.08**	**11.80**	**2.32**

Described By / Analysts
1. Lakech Teferi
2. Meseret Desalegn

Checked by Misrak Tefera

Date Completed :- 28/09/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geo hazard Investigation Core Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 14783/10 G0V Area Ref-:- No of Samples: - 17 Sample No.
Sample Type:-Rock Lab No: -
Type of Analysis :- Bulk Density and Water absorption Preparation required: - Date Submitted: - 12/09/10

Coll.No.	Lab.No.	Weight of Dry sample gm	Weight of Wet sample gm	Suspended weight gm	Water absorption %	Porosity %	Bulk-Density gm/cm³
B-05-12-A	14785	99.93	101.11	62.3	1.18	3.04	2.57
		135.69	137.26	84.47	1.16	2.97	2.57
		Average			**1.17**	**3.01**	**2.57**
B-05-32-B	14794	54.26	55.63	34.17	2.52	6.38	2.53
		132.11	135.67	83.13	2.69	6.78	2.51
		Average			**2.61**	**6.58**	**2.52**
B-05-21-B	14788	73.57	74.51	46.27	1.28	3.33	2.60
		84.04	85.23	52.79	1.41	3.66	2.59
		Average			**1.35**	**3.50**	**2.60**

Described By / Analysts
1. Lakech Teferi 2.Meseret Desalegn

Checked by Misrak Tefera

Date Completed :- 28/09/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geohazard InvestigationCore Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 14825/10 GOV Area Ref :- No of Samples: - 3 Sample No. B-05-12-C
Sample Type :- Soil Lab No:- 14825/10
Type of Analysis:-Pipette analysis Preparation required: - Date Submitted:- 12/09/10

Project Locality
Total weight of sample in g Related sample weight(mo) in g 10

Coll.No.	Lab.No.	Settle way S cm	Settle velocity equivalent diameter ds cm	Weight of evaporating dish m1	Weight of evaporating dish with sample and peptisator m2 g	Weight of sample with peptisetor m3 m3=m2-m1 g	Weight of sample m=m3-m4 g	Weigh percent of grain size distribution mx100x100 = % mo
B-05-12-C	14825/10	15	0.004	28.0505	28.166	0.1155	0.0882	88.2
			0.002					
		10	0.0016	28.099	28.1868	0.0878	0.0605	60.5
		10	0.00063	30.0016	30.0613	0.0597	0.0324	32.4
		5	0.00025	27.7428	27.7883	0.0455	0.0182	18.2
			0.0002					
			0.0001					
		10	0.000063	27.7896	27.8134	0.0238	0.0118	11.8
			0.00002					

Described By / Analysts: 1.Lakech Teferi Checked by: Misrak Tefera Date Completed 12/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geohazard InvestigationCore Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 14825/10 GOV Area Ref :- No of Samples: - 3 Sample No. B-05-21-C
Sample Type :- Soil Lab No:- 14826/10
Type of Analysis:-Pipette analysis Preparation required: - Date Submitted:- 12/09/10

Project Locality
Total weight of sample in g Related sample weight(mo) in g 10

Coll.No.	Lab.No.	Settle way S cm	Settle velocity equivalent diameter ds cm	Weight of evaporating dish m1	Weight of evaporating dish with sample and peptisator m2 g	Weight of sample with peptisetor m3 m3=m2-m1 g	Weight of sample m=m3-m4 g	Weigh percent of grain size distribution mx100x100 = % mo
B-05-21-C	14826/10	15	0.004	26.3936	26.5098	0.1162	0.0889	88.9
			0.002					
		10	0.0016	26.7509	26.849	0.0981	0.0708	70.8
		10	0.00063	27.197	27.2739	0.0769	0.0496	49.6
		5	0.00025	30.5594	30.6138	0.0544	0.0271	27.1
			0.0002					
			0.0001					
		10	0.000063	34.7946	34.8171	0.0225	0.0105	10.5
			0.00002					

Described By / Analysts: 1.Lakech Teferi Checked by: Misrak Tefera Date Completed 12/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geohazard InvestigationCore Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 14825/10 GOV Area Ref :- No of Samples: - 3 Sample No. B-05-21-C
Sample Type :- Soil Lab No:- 14827/10
Type of Analysis:-Pipette analysis Preparation required: - Date Submitted:- 12/09/10

Project Locality

Total weight of sample in g — Related sample weight(mo) in g 10

Coll.No.	Lab.No.	Settle way S cm	Settle velocity equivalent diameter ds cm	Weight of evaporating dish m1	Weight of evaporating dish with sample and peptisator m2 g	Weight of sample with peptisetor m3 m3=m2-m1 g	Weight of sample m=m3-m4 g	Weigh percent of grain size distribution mx100x100 = % mo
B-05-22-C	14827/10	15	0.004	34.6579	34.7698	0.1119	0.0999	99.9
			0.002					
		10	0.0016	28.576	28.6655	0.0895	0.0775	77.5
		10	0.00063	28.18	28.254	0.074	0.062	62
		5	0.00025	34.3504	34.4086	0.0582	0.0462	46.2
			0.0002					
			0.0001					
		10	0.000063	35.8561	35.8832	0.0271	0.0151	15.1
			0.00002					

Described By / Analysts: 1.Lakech Teferi — Checked by: Misrak Tefera — Date Completed: 12/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geohazard InvestigationCore Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐

File name: - 14825/10 GOV Area Ref :- No of Samples: - 3 Sample No. B-05-12-C -B-05-22-C
Sample Type :- Soil Lab No:- 14825/10 -14827/10
Type of Analysis:-Pipette analysis Preparation required: - Date Submitted:- 12/09/10

Sample No& Lab.No — Data of pipette Analysis

Lab. No.	Coll.No		<0.00063 mm. 1. Weight in g. 2.Mass %	0.00063-0.002 mm 1. Weight in g. 2.Mass %	0.002-0.0063 mm 1. Weight in g. 2.Mass %	0.0063-0.016 mm 1. Weight in g. 2.Mass %	0.016-0.04 mm 1. Weight in g. 2.Mass %	0.04-0.063 mm 1. Weight in g. 2.Mass %	>0.063 mm 1. Weight in g. 2.Mass %
14825/10	B-05-12-C	1	5.42	2.94	6.53	12.91	12.73	5.42	154.04
		2	2.71	1.47	3.26	6.46	6.37	2.71	77.02
14826/10	B-05-21-C	1	1.53	2.43	3.29	3.09	2.65	1.62	185.38
		2	0.77	1.21	1.64	1.55	1.32	0.81	92.69
14827/10	B-05-22-C	1	28.91	59.55	30.25	29.68	42.89	0.19	8.52
		2	14.45	29.77	15.13	14.84	21.45	0.09	4.26

Described By / Analysts: 1.Lakech Teferi — Checked by: Misrak Tefera — Date Completed: 12/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical Lab section: - Mineralogy ☐ Physical ☒
Client /Originator Name:- Geohazard InvestigationCore Process

Client Category: - Survey ☒ Gov. ☐ Pvt. ☐
File name:- 14822/10 GOV Area Ref-: No of Samples: - 3 Sample No. B-05-12-C
Sample Type :- Soil Lab No:- 14822/10
Type of Analysis:-Grain size distribution Preparation required: - Date Submitted:-

Sieve Opening mm	Sample weight retained gm	Weight % Retained	Cumulative weight percent oversize	Cumulative weight percent undersize
>2.0	151.0389	75.5195	75.5195	100
2.0-1.18	1.3457	0.6729	76.1924	24.4805
1.18-0.6	0.4562	0.2281	76.4205	23.8076
0.6-0.3	0.3843	0.1921	76.6126	23.5795
0.3-0.16	0.2581	0.1290	76.7416	23.3874
0.16-0.063	0.5594	0.2797	77.0213	23.2584
<0.063	45.9574	22.9787	100	22.9787

Described By / Analysts
1.Lakech Teferi
2. Misrak Tefera

Checked by MisrakTefera

Date Completed 06/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical ☒
Client /Originator Name: - Geohazard InvestigationCore Process

Client Category: - Survey ☒ Gov. ☐ Pvt. ☐
File name: - 14822/10 GOV Area Ref :- No of Samples: - 3 Sample No. B-05-21-C
Sample Type :- Soil Lab No:- 14823/10
Type of Analysis:-Grain size distribution Preparation required: - Date Submitted:- 12/09/10

Sieve Opening mm	Sample weight retained gm	Weight % Retained	Cumulative weight percent oversize	Cumulative weight percent undersize
>2.0	182.0415	91.0208	91.0208	100
2.0-1.18	1.5890	0.7945	91.8153	8.9792
1.18-0.6	0.9185	0.4592	92.2745	8.1847
0.6-0.3	0.5070	0.2535	92.528	7.7255
0.3-0.16	0.1580	0.079	92.607	7.472
0.16-0.063	0.1676	0.0838	92.6908	7.393
<0.063	14.6184	7.3092	100	7.3092

Described By / Analysts
1.Lakech Teferi
2. Misrak Tefera

Checked by Misrak Tefera

Date Completed 06/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geohazard InvestigationCore Process

Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name:- 14822/10 GOV Area Ref:- No of Samples: - 3 Sample No. B-05-22-C
Sample Type :- Soil Lab No :- 14824/10
Type of Analysis:-Grain size distribution Preparation required: - Date Submitted :- 12/09/10

Sieve Opening mm	Sample weight retained gm	Weight % Retained	Cumulative weight percent oversize	Cumulative weight percent undersize
>2.0	1.1155	0.5577	0.5577	100
2.0-1.18	0.2523	0.1262	0.6839	99.4423
1.18-0.6	0.4236	0.2118	0.8957	99.3161
0.6-0.3	0.5451	0.2725	1.1682	99.1043
0.3-0.16	0.7967	0.3984	1.5666	98.8318
0.16-0.063	5.3912	2.6956	4.2622	98.4334
<0.063	191.4756	95.7378	100	95.7378

Described By / Analysts
1.Lakech Teferi
2. Misrak Tefera

Checked by
Misrak Tefera MT

Date Completed 06/10/10

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☐ Physical [x]
Client /Originator Name: - Geo hazard Investigation Core Process

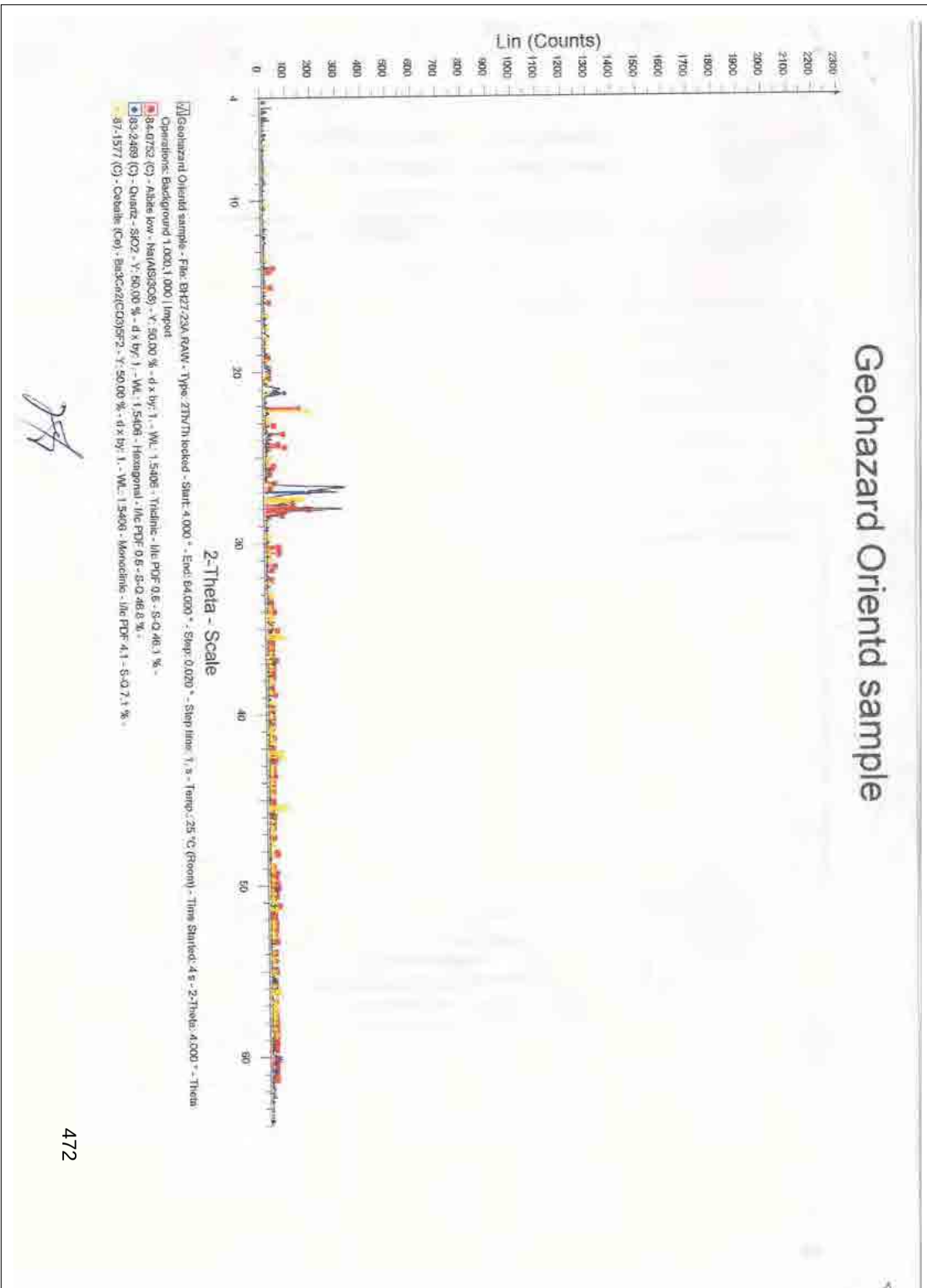
Client Category: - Survey [x] Gov. ☐ Pvt. ☐
File name: - 14822/10 GOV Area Ref: - No of Samples: 3 Sample No. B-05-21-C - B-05-22-C
Sample Type:- Soil Lab No: - 14822/10 -14824/10
Type of Analysis:- Specific gravity Preparation required: - Date Submitted: - 12/09/10

Coll.No.	Lab. No.	Pycnometer No.	m_2 Mass of picnometer in g	m_3 Mass of test solution in the picnometer without test sample in g	Q_2 Density of test solution in g/cm³	m_4 Mass of picnom.plus test sample in g	m_4-m_2 mass of test sample in g	m_5 mass of picnom. test sample and test solution in g	m_3+m_4 - m_5 volume of test sample in g/cm³	Specific Gravity in g/cm³	Average
B-05-12-C	14823/10	42/52	27.7095	77.5648	1 g/cm³	37.388	9.6785	83.3092	3.9341	2.46	2.46
		63/5	27.9092	77.8604	1 g/cm³	37.2205	9.3113	83.3908	3.7809	2.46	
B-05-21-C	14823/10	21/63	26.4816	76.3557	1 g/cm³	34.5056	8.024	81.1908	3.1889	2.51	2.49
		26/51	28.3248	78.2963	1 g/cm³	37.4939	9.1691	83.7322	3.7332	2.46	
B-05-22-C	14824/10	67/26	28.6866	78.4248	1 g/cm³	38.6291	9.9425	84.35	4.0173	2.47	2.46
		42/41	25.9851	75.8384	1 g/cm³	35.0605	9.0754	81.1934	3.7204	2.44	

Described By / Analysts
1.Lakech Teferi

Checked by :- Misrak Tefera MT

Date Completed :- 28 /09/2010



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☑ Physical ☐

Client /Originator Name: - Geohazard(Leta Alemaychu)

Client Category: - Survey ☑ Gov. ☐ Pvt. ☐

File name:- 15301/2010 Geoh. No of Samples: - 4 Sample No. BH -B27-23/A (Oriented)

Sample Type:-Core Lab No:- 15301/10 Area Ref Date Submitted:-21/10/2010

Type of Analysis:-XRD Preparation required: - Suspension in water & dry for 24h

Identified Minerals

Mineral	(%)
Albite low	46.1
Quartz	46.8
Cebalite	7.1

III) Remark note:-

Described By / Analysts

1. Workelul GIK
2. Girma Asemu

Checked by

Mineralogy & Physical Analysis
Case Team Coordinator

Date Completed 02/11/2010

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ☑ Physical ☐

Client /Originator Name: - Geohazard(Lcta Alemayehu)

Client Category: - Survey ☑ Gov. ☐ Pvt. ☐

File name:- 15301/2010 Geoh. Area Ref-:- No of Samples: - 4 Sample No. BH –B27-23/A

Sample Type:-Core Lab No:- 15301/10

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-21/10/2010

Identified Minerals

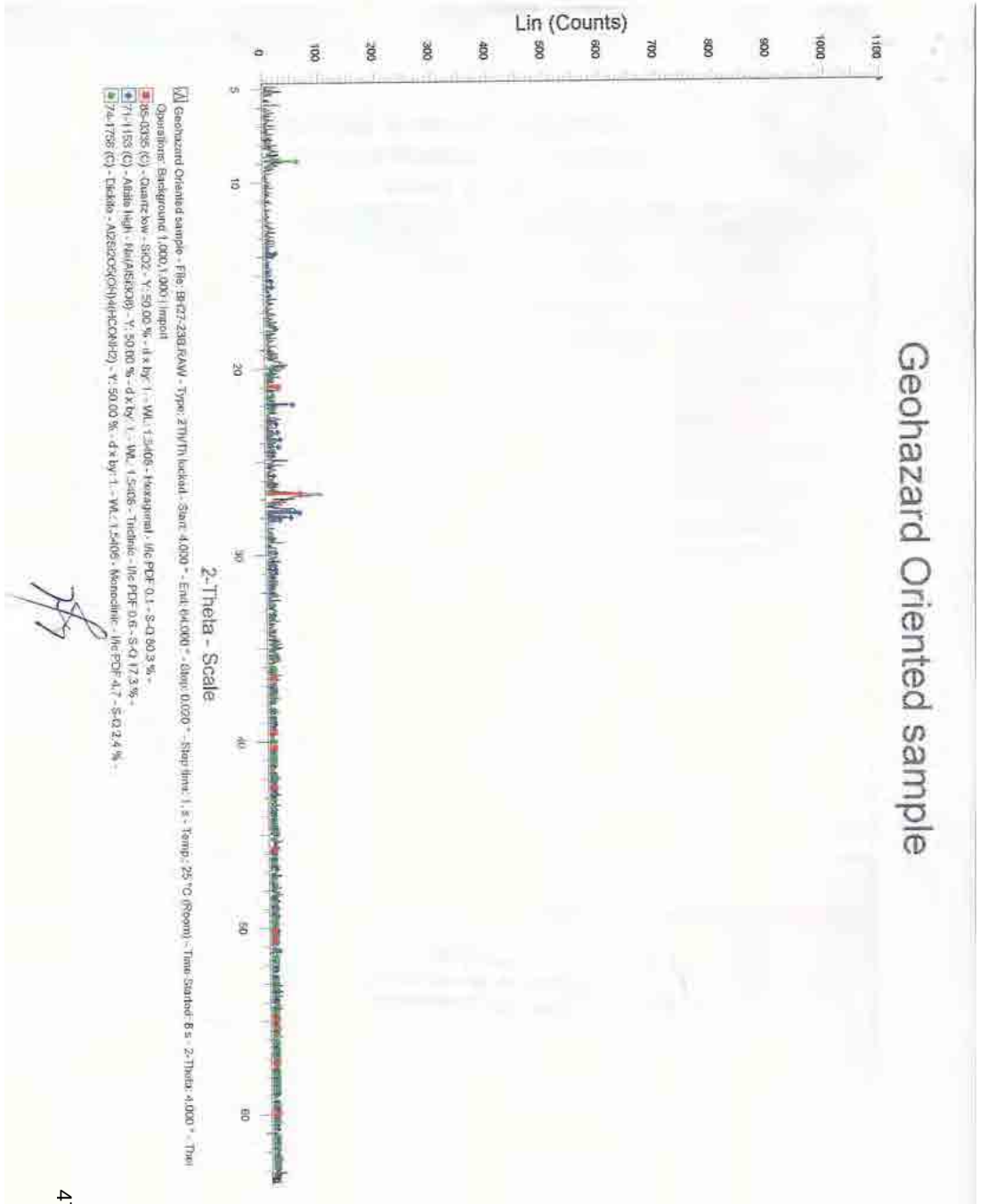
Mineral	(%)
Tridymite	18.2
Albite low	38.9
Muscovite	42.9

III) Remark note:-

Described By / Analysts **Checked by** **Date Completed** 02/11/2010

1. Workehul GIK
2. Girema Asenu

Wudinesh G. Kassie
Mineralogy & Physical Analysis
Lab Team Coordinator



Geohazard Oriented sample

474

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate ☐ Gold & Base metal ☐ Water ☐
Hydrocarbon ☐

Case Team: - Mineralogical: Lab section: - Mineralogy ✓ Physical ☐

Client /Originator Name: - Geohazard(Lcta Alemayehu)

Client Category: - Survey ✓ Gov. ☐ Pvt. ☐

File name:- 15301/2010 Geoh No of Samples: - 4 Sample No. BH -B27-23/B (Oriented)

Sample Type:-Core Lab No:- 15302/10 Area Ref Date Submitted:-21/10/2010

Type of Analysis:-XRD Preparation required: - Suspension in water & dry for 24h

Identified Minerals

Mineral	(%)
Quartz	8.30
Albite high	17.3
Dickite	2.4

III) Remark note:-

Described By / Analysis

1. Workeluf GIK
2. Girema Asemu

Checked by

Laboratory & Mineral Analysis
Laser Team Co-ordinator

Date Completed 02/11/2010

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] Gold & Base metal [ ] Water [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [/] Physical [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] Gov. [ ] Pvt. [ ]

File name:- 14632/11 Geohaz. Area Ref-:- Abay No of Samples :- 9 Sample No. B28-13a

Sample Type:-rock Lab No:- 14633/11

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011

I) Identified Minerals

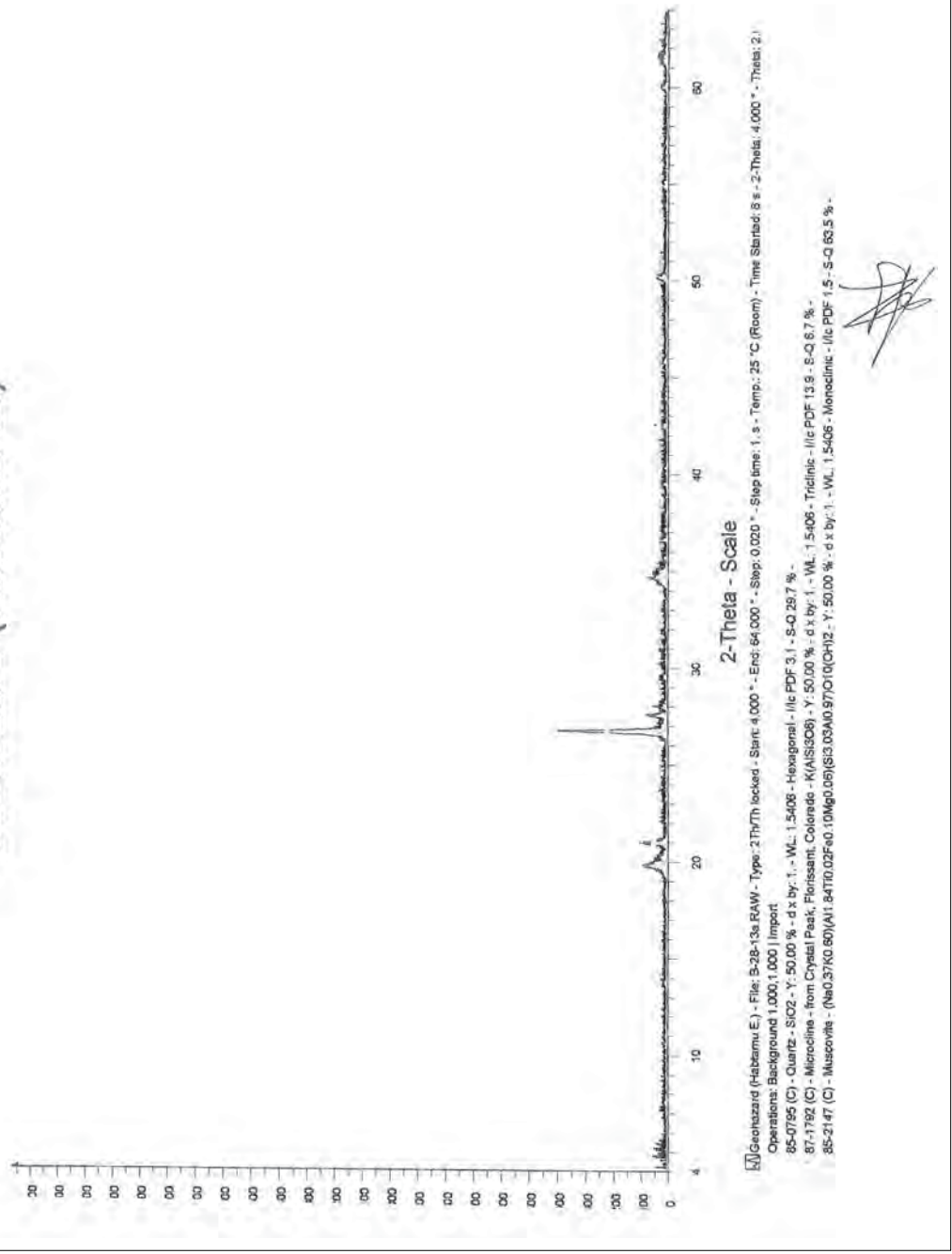
Mineral	(%)
Quartz	29.7
Microcline	6.7
Muscovite	63.5

II) Remark note:-

Described By / Analysts: Adise mekonnen

Checked by: Worku G/Kirstos, Mineralogy & Physical Analysis

Date Completed: 13/09/2010



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] **Gold & Base metal** [ ] **Water** [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [√] **Physical** [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] **Gov.** [ ] **Pvt.** [ ]

File name:- 14632/11 Geohaz. **Area Ref-:-** Abay **No of Samples :-** 9 **Sample No.** B28-10a

Sample Type:-rock **Lab No:-** 1463311

Type of Analysis:-XRD **Preparation required: -** powder <63mic. **Date Submitted:-**03/08/2011

II) Identified Minerals

Mineral	(%)
Quartz	75.9
Dolomite	4.2
Calcite	3.3
Albite	16.6

ii) Remark note:-

Described By / Analysts Adise mekonnen

Checked by

Date Completed 13/09/2010

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] **Gold & Base metal** [ ] **Water** [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [√] **Physical** [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] **Gov.** [ ] **Pvt.** [ ]

File name:- 14632/11 Geohaz. **Area Ref-:-** Abay **No of Samples: -** 9 **Sample No.** B27-09a

Sample Type:-rock **Lab No:-** 1463511

Type of Analysis:-XRD **Preparation required: -** powder <63mic. **Date Submitted:-**03/08/2011

I) Identified Minerals

Mineral	(%)
Quartz	80.2
Albite	17.6
Sepolite	2.2

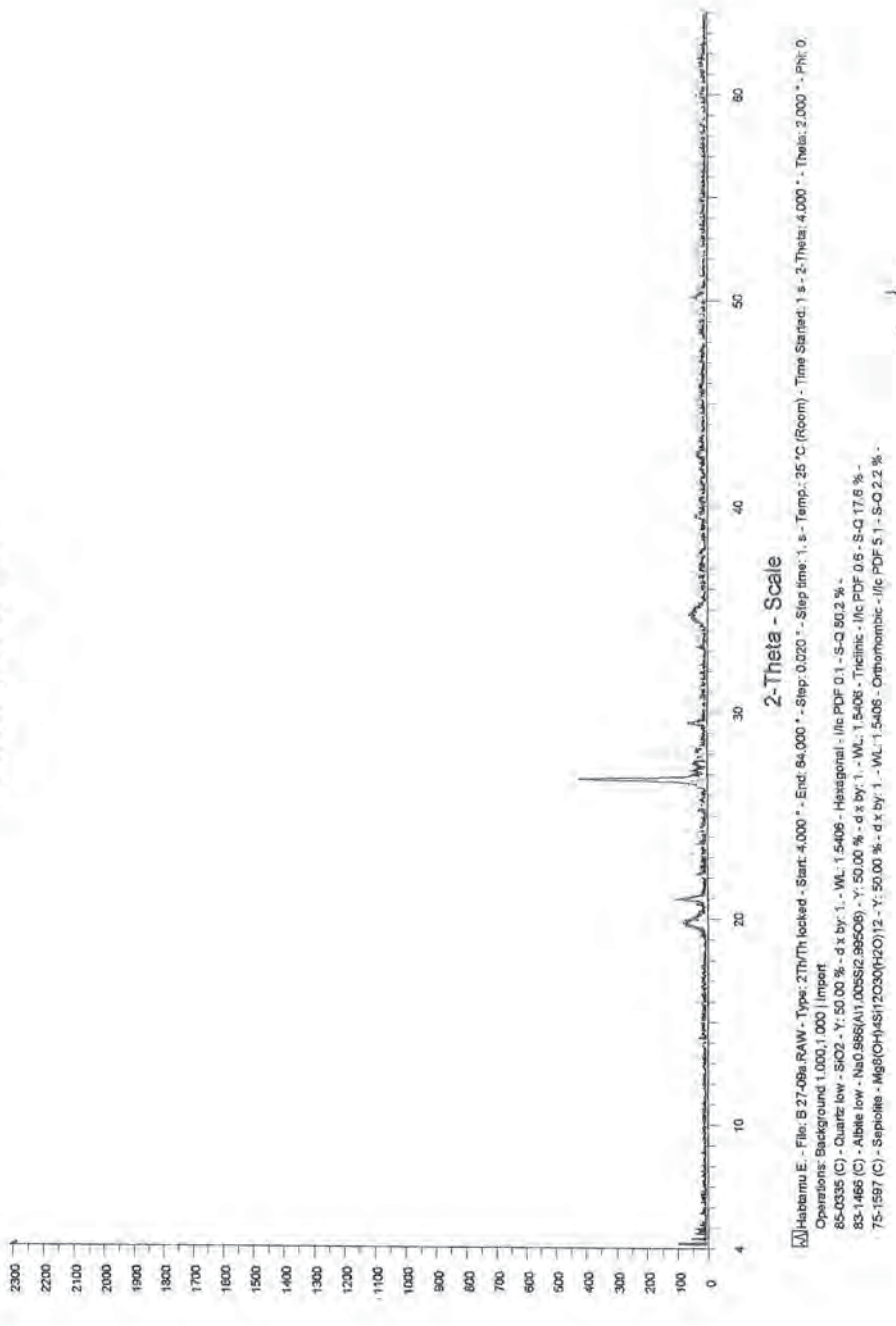
II) Remark note:-

Described By / Analysts Adise mekonnen

Checked by Mineralogy & Physical Analysis

Date Completed 13/09/2010

Habtamu E.



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] Gold & Base metal [ ] Water [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [/] Physical [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] Gov. [ ] Pvt. [ ]

File name:- 14632/11 Geohaz. Area Ref-:- Abay No of Samples: - 9 Sample No. B05-23

Sample Type:-rock Lab No:- 1463911

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011

I) Identified Minerals

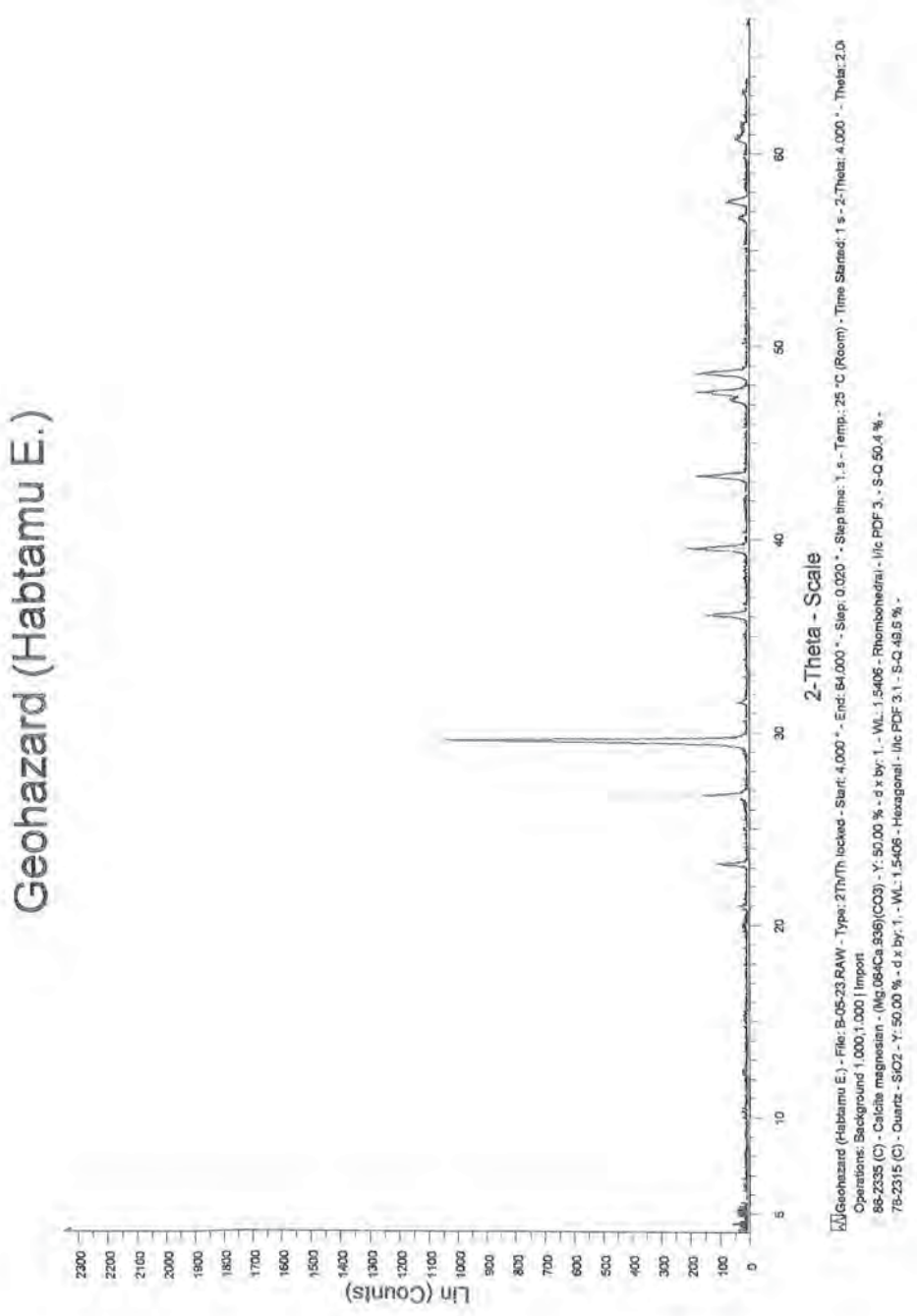
Mineral	(%)
Calcite magnesian	50.4
Quartz	49.6

II) Remark note:-

Described By / Analysts: Adise mekonnen

Checked by: Worasat G/Kirkos
Mineralogy & Physical Analysis
Case Team Co-ordinator

Date Completed: 13/09/2010



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] **Gold & Base metal** [ ] **Water** [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [/] **Physical** [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] **Gov.** [ ] **Pvt.** [ ]

File name:- 14632/11 Geohaz. **Area Ref-:-** Abay **No of Samples: -** 9 **Sample No.** B00-14a

Sample Type:-rock **Lab No:-** 1463811

Type of Analysis:-XRD **Preparation required: -** powder <63mic. **Date Submitted:-**03/08/2011

I) Identified Minerals

Vermiculite

II) Remark note:-

Described By / Analysts Adise mekonnen

Checked by

Date Completed 13/09/2010

Physical Analysis

Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] Gold & Base metal [ ] Water [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [/] Physical [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] Gov. [ ] Pvt. [ ]

File name:- 14632/11 Geohaz. Area Ref-:- Abay No of Samples: - 9 Sample No. B00-14C

Sample Type:-rock Lab No:- 14640/11

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011

I) Identified Minerals

Vermiculite

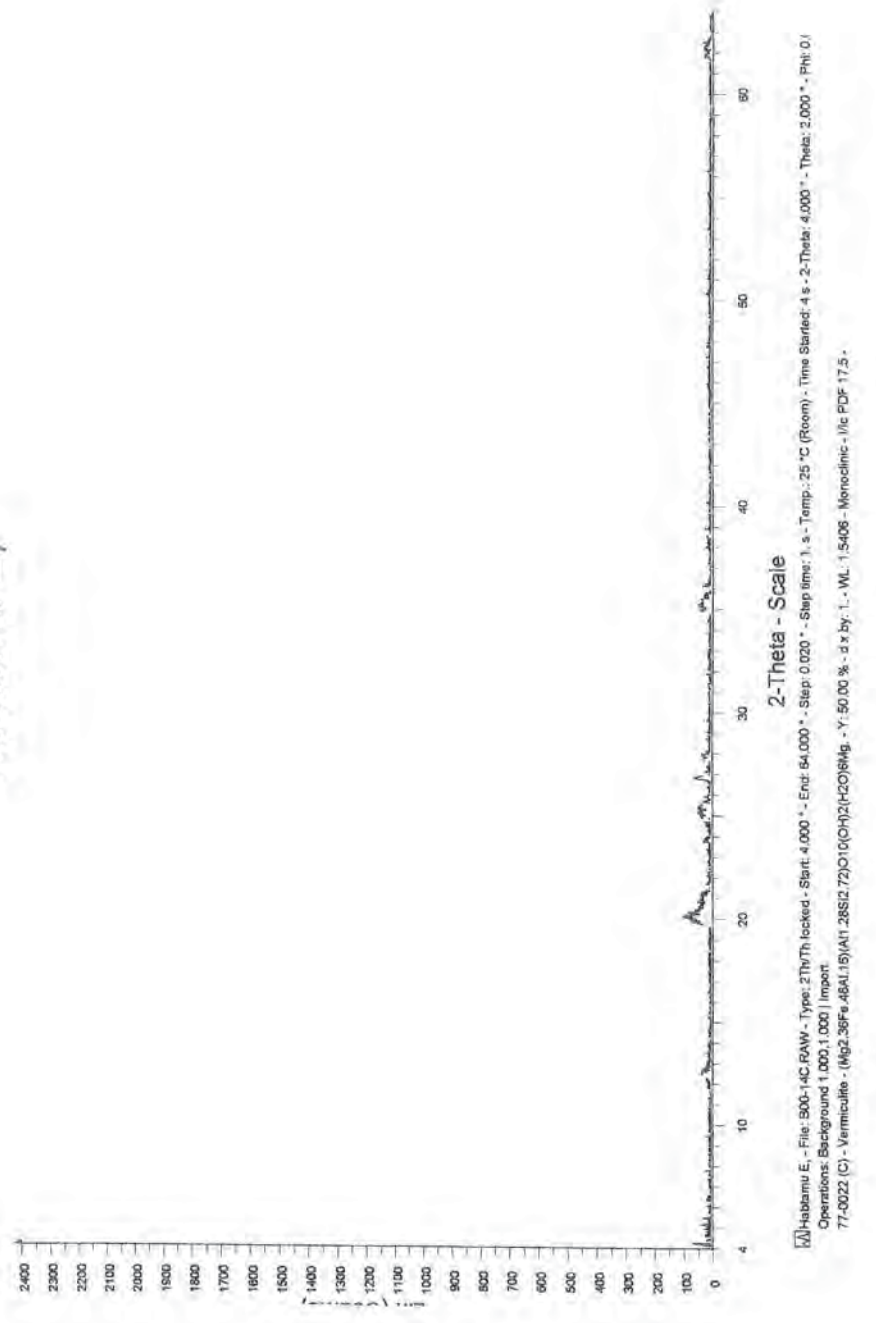
II) Remark note:-

Described By / Analysts: Adise mekonnen

Checked by: Worknesh G/Kiros

Date Completed: 13/09/2010

Habtamu E,



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] Gold & Base metal [ ] Water [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [/] Physical [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] Gov. [ ] Pvt. [ ]

File name:- 14632/11 Geohazard. Area Ref-:- Abay No of Samples: - 9 Sample No. B28-23b

Sample Type:-rock Lab No:- 14632/11

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011

I) Identified Minerals

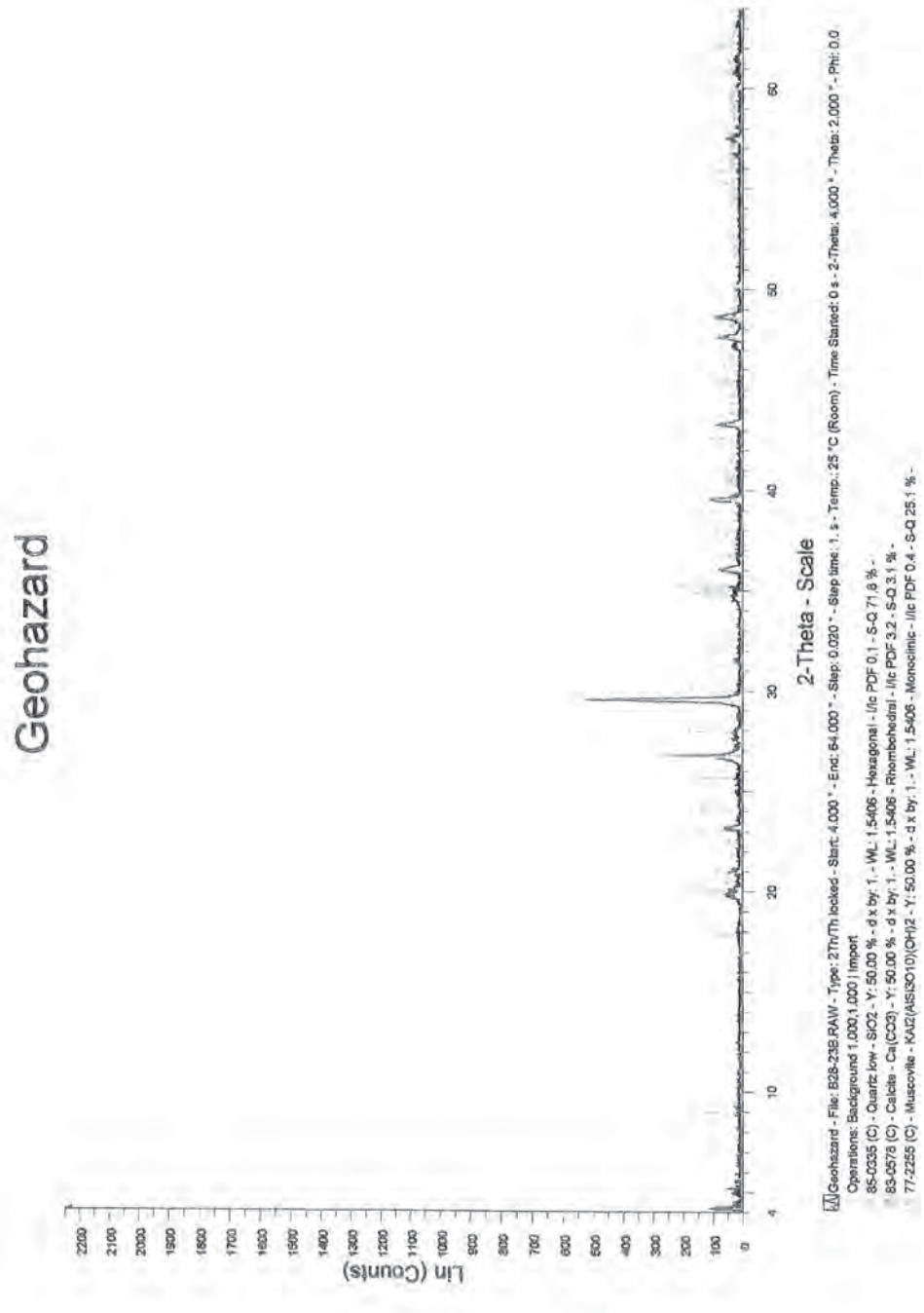
Mineral	(%)
Quartz	71.8
Calcite	3.1
Muscovite	25.1

II) Remark note:-

Described By / Analysts: Girma Asemu

Checked by: Worku Tsi G/Kiros, Mineralogy & Physical Analysis

Date Completed: 30/09/2011



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] Gold & Base metal [ ] Water [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [√] Physical [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] Gov. [ ] Pvt. [ ]

File name:- 14632/11 Geohazard. Area Ref-:- Abay No of Samples: - 9 Sample No. Boo-14b

Sample Type:-rock Lab No:- 14637/11

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011

I) **Identified Minerals**

II)

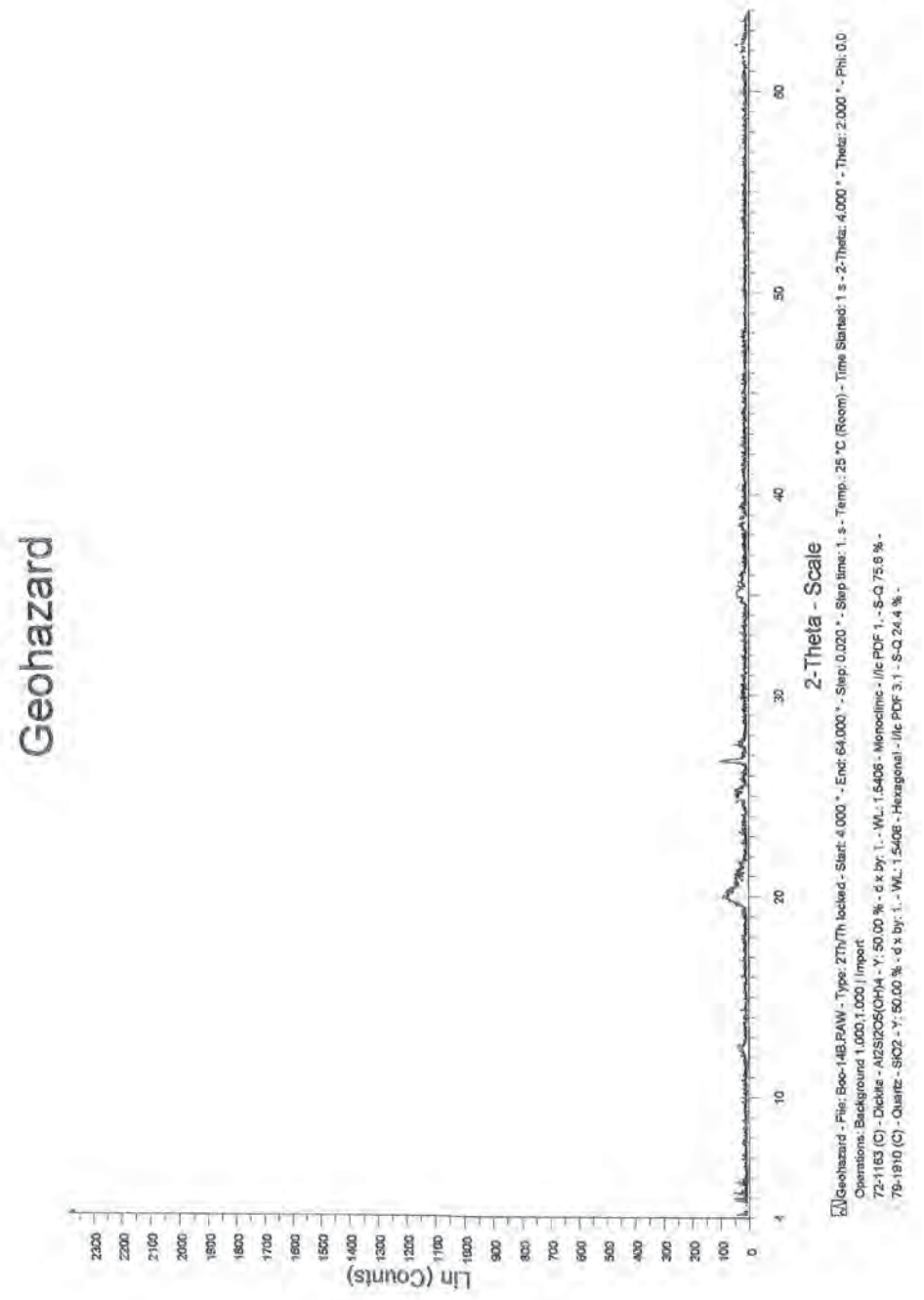
Mineral	(%)
Dickite	75.6
Quartz	24.4

II) Remark note:-

Described By / Analysts Checked by Date Completed 30/09/2011

Girma Asemu

Workneh G/Kirstos
Mineralogy & Physical Analysis
Case Team Coordinator



Geological Survey of Ethiopia
Geosciences Laboratory Center
Result Form

Case Team: - Chemical: Lab Section: - Silicate [ ] Gold & Base metal [ ] Water [ ]
Hydrocarbon [ ]

Case Team: - Mineralogical: Lab section: - Mineralogy [√] Physical [ ]

Client /Originator Name: - Geo hazard (Habtamu Eshetu)

Client Category: - Survey [X] Gov. [ ] Pvt. [ ]

File name:- 14632/11 Geohazard. Area Ref-:- Abay No of Samples: - 9 Sample No. B05-13

Sample Type:-rock Lab No:- 14640/11

Type of Analysis:-XRD Preparation required: - powder <63mic. Date Submitted:-03/08/2011

I) Identified Minerals

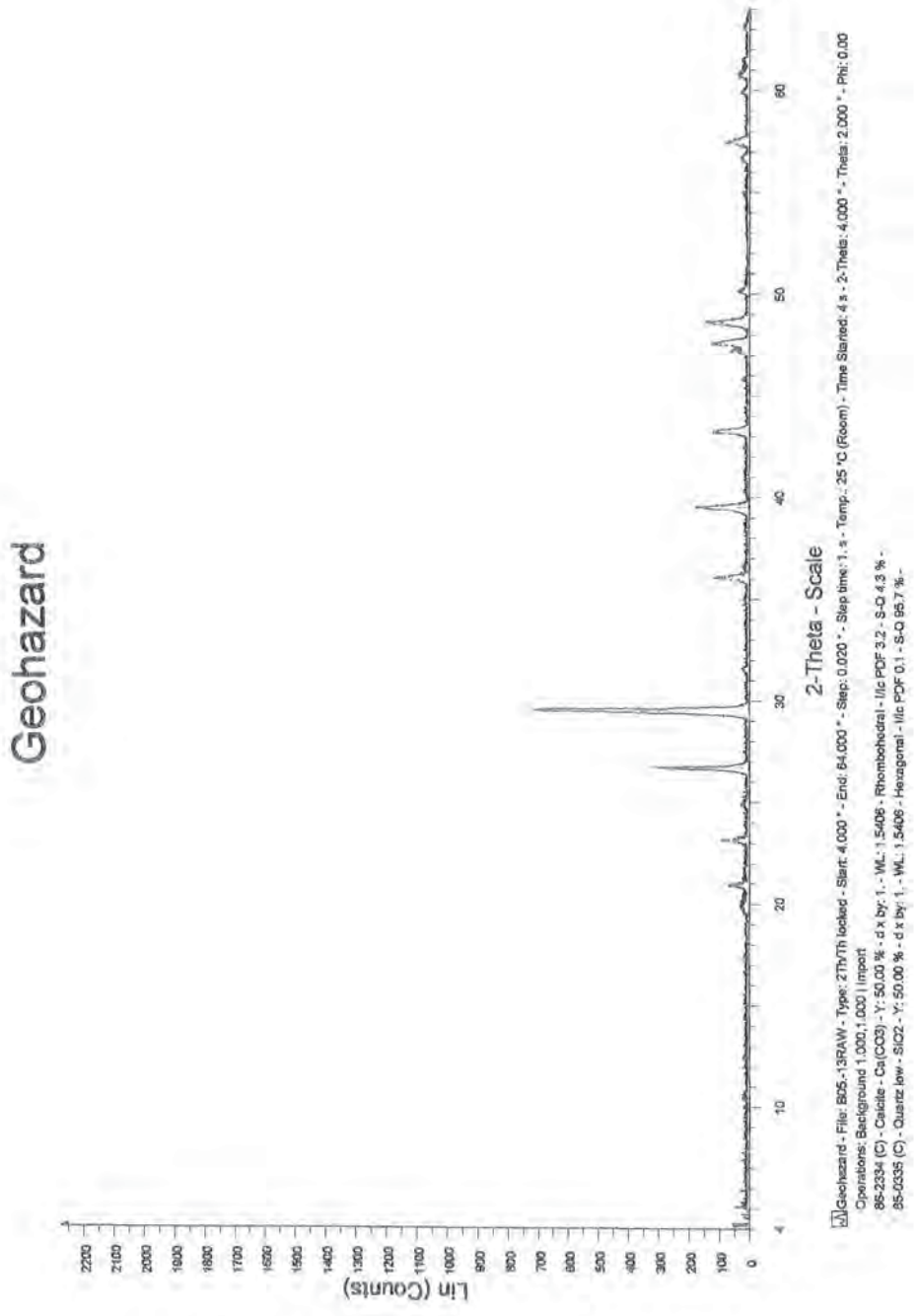
Mineral	(%)
Calcite	4.3
Quartz	95.7

II) Remark note:-

Described By / Analysts: Girma Asemu

Checked by: Workeid G/Kiros
Mineralogy & Physical Analysis
Case Team Coordinator

Date Completed: 30/09/2011



21. Questionnaire and its result of technical transfer workshop

Questionnaire of the workshop

Name: _____

Please choose on ONE option each question about this workshop.

Q1. Do you think that you are satisfied with this workshop?

☐ Extremely ☐ Think so ☐ I don't think so ☐ Not at all

Q2. Do you think that you understand contents of this workshop?

☐ Extremely ☐ Think so ☐ I don't think so ☐ Not at all

Q3. Do you think that this workshop is useful for your future work?

☐ Extremely ☐ Think so ☐ I don't think so ☐ Not at all

Q4. How was the time management of this workshop?

☐ Too long ☐ Good ☐ Too short

Q5. If you have any comments, please let us know.

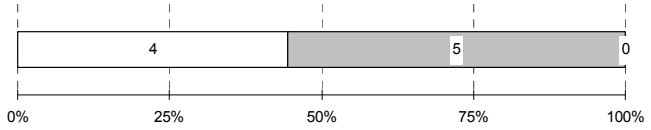
That's all for this questionnaire. Thank you for your cooperation!

Questionnaire summary of workshop for the landslide, debris flow and rock fall analysis

Date	25 February 2011 (after the workshop)
Place	Venue of the workshop (JICA project office in GSE)
Respondent	Participants of the GIS workshop: 9
Style	Distribution of the questionnaires sheets when the workshop finished. Answering each question (choice type x 4, free description type x 4) by writing down. Collection the questionnaires sheets on the venue.

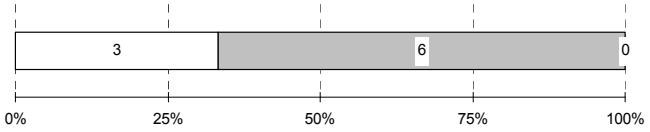
Q1. Do you think that you are satisfied with this workshop?

Option	Count	Ratio [%]
Extremely	4	44.4
Think so	5	55.6
I don't think so	0	0.0
Not at all	0	0.0



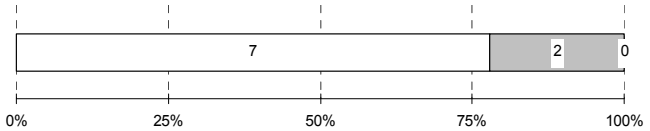
Q2. Do you think that you understand contents of this workshop?

Option	Count	Ratio [%]
Extremely	3	33.3
Think so	6	66.7
I don't think so	0	0.0
Not at all	0	0.0



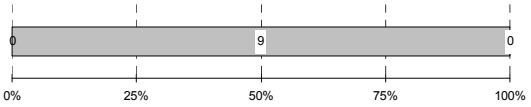
Q3. Do you think that this workshop is useful for your future work?

Option	Count	Ratio [%]
Extremely	7	77.8
Think so	2	22.2
I don't think so	0	0.0
Not at all	0	0.0



Q4. How was the time management of this workshop?

Option	Count	Ratio [%]
Suitable	0	0.0
Long	9	100.0
Short	0	0.0



Q5. If you have any comments, please let us know.

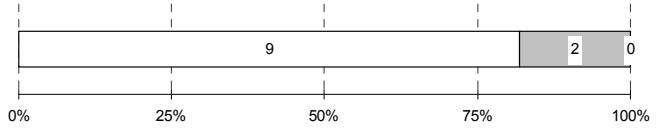
- This is a good demonstration/workshop I hope that the problem of the Abay landslide will be solved by you
- There is a lot of work to be done in these area, so please keep up
- Keep it up! I hope next time you will give us new ideas and more interesting applications!
- The time coverage for practical session is so short. Please give it more time
- Please give enough time for detail practical session so far so good with your work, I'm satisfied
- It is better to continue similar sessions in the future too
- Your effort is highly appreciated. But, I want to get involved more on practical work on the field.
- Everything was good and we still need more practical exercise. Thanks also.

Questionnaire summary of workshop for GIS

Date	18 March 2011 (after the workshop)
Place	Venue of the workshop (JICA project office in GSE)
Respondent	Participants of the GIS workshop: 9
Style	Distribution of the questionnaires sheets when the workshop finished. Answering each question (choice type x 4, free description type x 4) by writing down. Collection the questionnaires sheets on the venue.

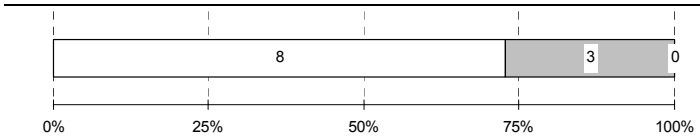
Q1. Do you think that you are satisfied with this workshop?

Option	**Count**	**Ratio [%]**
Extremely	9	81.8
Think so	2	18.2
I don't think so	0	0.0
Not at all	0	0.0



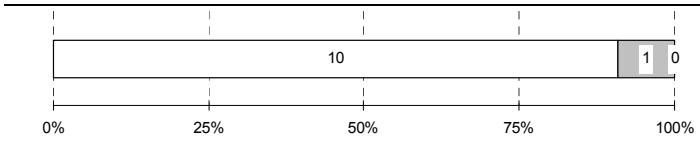
Q2. Do you think that you understand contents of this workshop?

Option	**Count**	**Ratio [%]**
Extremely	8	72.7
Think so	3	27.3
I don't think so	0	0.0
Not at all	0	0.0



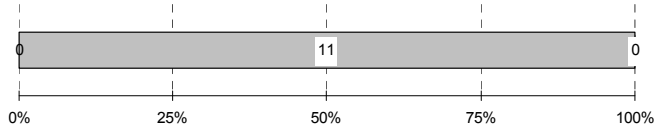
Q3. Do you think that this workshop is useful for your future work?

Option	**Count**	**Ratio [%]**
Extremely	10	90.9
Think so	1	9.1
I don't think so	0	0.0
Not at all	0	0.0



Q4. How was the time management of this workshop?

Option	**Count**	**Ratio [%]**
Suitable	0	0.0
Long	11	100.0
Short	0	0.0



Q5. If you have any comments, please let us know.

- I found the workshop one of the most useful training of my career. It was clear. I highly appreciate the trainer’s effort to clarify the contents of the workshop. Please keep it up thank you! Hope you prepare another training.
- Thanks for the trainer for his wonderful presentation.
- Thanks you very much, I am sorry for your country crisis, which occurred in Friday earthquake.
- The workshop was short and nice as wall as brief & thanks for all.
- This GIS workshop by Mr. Gonai is extremely good, in explaining the course matter, the course content, GIS in the beautiful manner, thank you so much.
- First of all I would like to thanks for the wonderful presentation regarding today’s program. It would be good for us if we took at least 2 days and practice it more keep it up!
- it is good that this type of workshop training could be continue thanks very much.
- I am very happy and satisfied for your workshop. So I don't have comments.
- Try to do the same thing at another time also.
- I need more exercise. I need to go over again. My GIS must be updated.
- More practices related to landslide analysis using GIS.

22. Capacity assessment questionnaire sheet

QUESTIONNAIRE A

Name: BIRUK ABEL **Speciality : ENGINEERING GEOLOGIST** **Age: 28** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐	☐	☐	☑ 3	☐		
	2 Geological Mapping	☐	☐	☐	☑ 3	☐		
	3 Drill Core Logging	☐	☐	☐	☑ 3	☐		
	4 Geophysical Sounding	☐	☑ 1	☐	☐	☐		
	5 Geomorphological Survey (Topo Survey)	☑ 0	☐	☐	☐	☐		
	6 Soil/Rock Test	☐	☑ 1	☐	☐	☐		
	7 Microscopic Observation (transparent, reflection)	☐	☑ 1	☐	☐	☐		
	8 Remote Sensing	☐	☑ 1	☐	☐	☐		
	9 Hydrological survey	☐	☑ 1	☐	☐	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐		
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐	☐	☑ 2	☐	☐		
	2 Topographic Observation (Landslide Topo Identification)	☐	☐	☑ 2	☐	☐		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.)	☐	☑ 1	☐	☐	☐		
	4 Sliding Plane Identification	☐	☑ 1	☐	☐	☐		
	5 Satelite Image Interpretation	☑ 0	☐	☐	☐	☐		
	6 Geological Survey (landlside, rock fall and debris flow)	☐	☐	☐	☑ 3	☐		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐	☑ 1	☐	☐	☐		
	8 Cross Sectional Interpretation of Landslide	☑ 0	☐	☐	☐	☐		
	9 Geophysical Interpretation on Landslide	☑ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐	☐	☑	☐	☐		
	2 Pipe strain gauge	☐	☑ 1	☐	☐	☐		
	3 Extensometer (Surface type)	☐	☐	☑ 2	☐	☐		
	4 Extensometer (Borehole type)	☐	☐	☑ 2	☐	☐		
	5 Groundwater measurement	☐	☐	☑ 2	☐	☐		
	6 Global Positioning System (GPS)	☐	☐	☑ 2	☐	☐		
	7 Nuk-ita (Wooden Extensometer)	☑ 0	☐	☐	☐	☐		
	8 Total station	☑ 0	☐	☐	☐	☐		
	9 Rain gauge	☐	☐	☑ 2	☐	☐		
	10 Other devices (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☐	☑ 1	☐	☐	☐		
	2 Compilation and graph out of extensometer data	☐	☑ 1	☐	☐	☐		
	3 Compilation and graph out of Inclinometer data	☐	☑ 1	☐	☐	☐		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☐	☑ 1	☐	☐	☐		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☐	☑ 1	☐	☐	☐		
	6 Slope Stability Analysis (Bishop Method)	☐	☑ 1	☐	☐	☐		
	7 Safety Factor Assumption	☐	☑ 1	☐	☐	☐		
	8 Rock fall Analysis	☐	☐	☑ 2	☐	☐		
	9 Debris flow Analysis	☐	☐	☑ 2	☐	☐		
	10 Other analysis methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐	☐	☐	☐	☐		
	2 Groundwater Lowering Method	☑ 0	☐	☐	☐	☐		
	3 Crest soil mobalization	☑ 0	☐	☐	☐	☐		
	4 Toe Embankment	☑ 0	☐	☐	☐	☐		
	5 Retaining Wall	☑ 0	☐	☐	☐	☐		
	6 Pile	☑ 0	☐	☐	☐	☐		
	7 Anchor	☑ 0	☐	☐	☐	☐		
	8 Horizontal Drilling	☑ 0	☐	☐	☐	☐		
	9 Geosynthetics	☑ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: BIRUK ABEL Speciality : Engineering Geologist Age: 28 Date: November 2011

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	NO		
	3 How do you plan data collection interval?			
	4 How often you make the maintenance of instruments?			
	5 Who will be responsible for the maintenance of operation?			
	6 What action will be made if instruments are not functioning?			
	7 Where the instruments will be maintenance?			
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	To predict the behaviour of landslide and forecasting landslide potential		
	2 Related to Q1, who will get the benefits of monitoring?	The community in general		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?	Based on the company's manual and contacting the expert on this		
	5 How do you assure the security of instruments?	proper installation and utilization of the instruments		
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?	To identify where landslide are more likely to occur		
	2 Do you have a system of risk assessment?	No		
	3 Do you inform the risk of landslide to the public?	NO		
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?			
	2 For effective emergency alert, what is the priority action?			
	3 What do you require for the emergency action?			
	4 Do you have the emergency action manuals for geohazard?			
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background	BSC Degree in Earth Sciences		
	2 Specialties	Geology		
	3 How many years belong to GSE?	Five years		
	4 What is your main role in GSE?	Making Geological and Engineering Geological Survey and preparing technical reports		
	5 What kind of training course did you participate?	GIS and Remote Sensing		
	6 What kind of skill and knowledge do you get?	Different landlside analysis and hazard mapping techniques		
	7 What do you expect for this project?	I will expect new skills and knowledge in landslide analysis survey		
	8 What do you think the future response of GSE for geohazards?	As an instituion GSE is responsible for different Geo-hazard prone areas in the country and m		
	7 What will be your role as a landslide expert for the future?	From now onwards I will use my new knowledge and skill obtained from the project in different		

QUESTIONNAIRE A

Name: HABTAMU ESHETU **Speciality : JUNIOR GEOLOGIST** **Age: 29** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐ 0	☐	☐	☑	☐		
	2 Geological Mapping	☐ 0	☐	☐	☑	☐		
	3 Drill Core Logging	☐ 0	☐	☐	☑	☐		
	4 Geophysical Sounding	☐ 0	☑	☐	☐	☐		
	5 Geomorphological Survey (Topo Survey)	☐ 0	☐	☑	☐	☐		
	6 Soil/Rock Test	☐ 0	☑	☐	☐	☐		
	7 Microscopic Observation (transparent, reflection)	☐ 0	☐	☑	☐	☐		
	8 Remote Sensing	☐ 0	☐	☑	☐	☐		
	9 Hydrological survey	☐ 0	☐	☑	☐	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐		
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐ 0	☑	☐	☐	☐		
	2 Topographic Observation (Landslide Topo Identification)	☐ 0	☐	☑	☐	☐		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc	☐ 0	☐	☑	☐	☐		
	4 Sliding Plane Identification	☐ 0	☐	☑	☐	☐		
	5 Satelite Image Interpretation	☐ 0	☑	☐	☐	☐		
	6 Geological Survey (landlside, rock fall and debris flow)	☐ 0	☐	☐	☑	☐		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐ 0	☐	☑	☐	☐		
	8 Cross Sectional Interpretation of Landslide	☑ 0	☐	☐	☐	☐		
	9 Geophysical Interpretation on Landslide	☑ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐ 0	☐	☐	☐	☑		
	2 Pipe strain gauge	☐ 0	☑	☐	☐	☐		
	3 Extensometer (Surface type)	☐ 0	☐	☐	☐	☑		
	4 Extensometer (Borehole type)	☐ 0	☐	☐	☐	☑		
	5 Groundwater measurement	☐ 0	☐	☐	☐	☑		
	6 Global Positioning System (GPS)	☐ 0	☐	☑	☐	☐		
	7 Nuk-ita (Wooden Extensometer)	☑ 0	☐	☐	☐	☐		
	8 Total station	☐ 0	☐	☐	☐	☑		
	9 Rain gauge	☑ 0	☐	☐	☐	☐		
	10 Other devices (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☐ 0	☐	☐	☑	☐		
	2 Compilation and graph out of extensometer data	☐ 0	☐	☐	☑	☐		
	3 Compilation and graph out of Inclinometer data	☐ 0	☐	☐	☑	☐		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☑ 0	☐	☐	☐	☐		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☐ 0	☑	☐	☐	☐		
	6 Slope Stability Analysis (Bishop Method)	☐ 0	☑	☐	☐	☐		
	7 Safety Factor Assumption	☐ 0	☑	☐	☐	☐		
	8 Rock fall Analysis	☐ 0	☑	☐	☐	☐		
	9 Debris flow Analysis	☐ 0	☑	☐	☐	☐		
	10 Other analysis methods (Pls. Specify)	☐ 0	☐	☐	☐	☐	0	
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐ 0	☑	☐	☐	☐		
	2 Groundwater Lowering Method	☐ 0	☑	☐	☐	☐		
	3 Crest soil mobalization	☑ 0	☐	☐	☐	☐		
	4 Toe Embankment	☐ 0	☑	☐	☐	☐		
	5 Retaining Wall	☐ 0	☑	☐	☐	☐		
	6 Pile	☑ 0	☐	☐	☐	☐		
	7 Anchor	☐ 0	☑	☐	☐	☐		
	8 Horizontal Drilling	☐ 0	☑	☐	☐	☐		
	9 Geosynthetics	☑ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: Speciality : Age: Date: November 2011

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	NO		
	3 How do you plan data collection interval?	Per two weeks		
	4 How often you make the maintenance of instruments?	Immediately (my opinion)		
	5 Who will be responsible for the maintenance of operation?	I don't know if it is present in Ethiopia		
	6 What action will be made if instruments are not functioning?	Maintenance otherwise installing another instrument		
	7 Where the instruments will be maintenance?	I'm not sure instrument maintenance in Ethiopia		
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	To understand the mechanism & landlside, depth, slip surface. To detect anount and depth of		
	2 Related to Q1, who will get the benefits of monitoring?	Government and public people are early warned		
	3 Do you have high intention to work on monitoring?	Yes I do have		
	4 If the instruments broken, how do you repair the instruments?	I try to read maintenanace manual and fix it		
	5 How do you assure the security of instruments?	by using properly and keeping them safely		
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?	Amount and hazard caused by landsliding		
	2 Do you have a system of risk assessment?	No		
	3 Do you inform the risk of landslide to the public?	I haven't told before		
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?	When high and long rainfall period occurs in landslide prone areas		
	2 For effective emergency alert, what is the priority action?	Monitoring of the hazards & informing the public rainsing awareness		
	3 What do you require for the emergency action?	Media , mobile phones, etc		
	4 Do you have the emergency action manuals for geohazard?	I don't have		
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background	BSC in Applied Geology		
	2 Specialties	Applied Geology		
	3 How many years belong to GSE?	1 year and 4 monthes		
	4 What is your main role in GSE?	Collecting field data		
	5 What kind of training course did you participate?	GIS, Slope Stability Analysis		
	6 What kind of skill and knowledge do you get?	I've learned/upgraded my knowldege ofGIS & able to know mechanism of slope stability analysis		
	7 What do you expect for this project?	nowledge and skill transfer to C/P		
	8 What do you think the future response of GSE for geohazards?	Hopefully GSE will be the main Geohazard investigation center in the country		
	7 What will be your role as a landslide expert for the future?	Evaluation, Monitoring& landlside, give/propose remedial measures, analyse slope stability		

QUESTIONNAIRE A

Name: LETA ALEMAYEHU **Speciality : ENGINEERING GEOLOGIST** **Age: 29** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐ 0	☐	☐	☑	☐		
	2 Geological Mapping	☐ 0	☐	☐	☑	☐		
	3 Drill Core Logging	☐ 0	☐	☐	☐	☑		
	4 Geophysical Sounding	☐ 0	☐	☑	☐	☐		
	5 Geomorphological Survey (Topo Survey)	☐ 0	☐	☐	☑	☐		
	6 Soil/Rock Test	☐ 0	☐	☑	☐	☐		
	7 Microscopic Observation (transparent, reflection)	☐ 0	☑	☐	☐	☐		
	8 Remote Sensing	☐ 0	☐	☐	☑	☐		
	9 Hydrological survey	☐ 0	☐	☑	☐	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐		
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐ 0	☐	☐	☑	☐		
	2 Topographic Observation (Landslide Topo Identification)	☐ 0	☐	☐	☑	☐		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc	☐ 0	☐	☐	☑	☐		
	4 Sliding Plane Identification	☐ 0	☐	☐	☑	☐		
	5 Satelite Image Interpretation	☐ 0	☐	☐	☑	☐		
	6 Geological Survey (landlside, rock fall and debris flow)	☐ 0	☐	☐	☑	☐		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐ 0	☐	☐	☑	☐		
	8 Cross Sectional Interpretation of Landslide	☐ 0	☐	☐	☑	☐		
	9 Geophysical Interpretation on Landslide	☐ 0	☐	☑	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐ 0	☐	☑	☑	☑		
	2 Pipe strain gauge	☐ 0	☑	☐	☐	☐		
	3 Extensometer (Surface type)	☐ 0	☐	☑	☑	☑		
	4 Extensometer (Borehole type)	☐ 0	☐	☑	☑	☑		
	5 Groundwater measurement	☐ 0	☐	☑	☑	☑		
	6 Global Positioning System (GPS)	☐ 0	☐	☑	☐	☑		
	7 Nuk-ita (Wooden Extensometer)	☐ 0	☑	☐	☐	☐		
	8 Total station	☑ 0	☐	☐	☐	☐		
	9 Rain gauge	☐ 0	☑	☑	☑	☑		
	10 Other devices (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☐ 0	☐	☐	☐	☑		
	2 Compilation and graph out of extensometer data	☐ 0	☐	☐	☐	☑		
	3 Compilation and graph out of Inclinometer data	☐ 0	☐	☐	☐	☑		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☐ 0	☐	☐	☑	☐		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☐ 0	☐	☐	☑	☐		
	6 Slope Stability Analysis (Bishop Method)	☐ 0	☐	☐	☑	☐		
	7 Safety Factor Assumption	☐ 0	☐	☐	☑	☐		
	8 Rock fall Analysis	☐ 0	☐	☑	☐	☐		
	9 Debris flow Analysis	☐ 0	☐	☑	☐	☐		
	10 Other analysis methods (Pls. Specify)	☐ 0	☐	☐	☐	☐	0	
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐ 0	☑	☐	☐	☐		
	2 Groundwater Lowering Method	☐ 0	☑	☐	☐	☐		
	3 Crest soil mobalization	☐ 0	☑	☐	☐	☐		
	4 Toe Embankment	☐ 0	☑	☐	☐	☐		
	5 Retaining Wall	☐ 0	☑	☐	☐	☐		
	6 Pile	☐ 0	☑	☐	☐	☐		
	7 Anchor	☐ 0	☑	☐	☐	☐		
	8 Horizontal Drilling	☐ 0	☑	☐	☐	☐		
	9 Geosynthetics	☐ 0	☑	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: LETA ALEMAYEHU Speciality : ENGINEERING GEOLOGIST Age:29 Date: November 2011

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	No except the one in the current project		
	3 How do you plan data collection interval?	Depending on dynamicity of target		
	4 How often you make the maintenance of instruments?	depending on wearing of equipment		
	5 Who will be responsible for the maintenance of operation?	myself		
	6 What action will be made if instruments are not functioning?	Diagnosis/trouble shoot by professional technician		
	7 Where the instruments will be maintenance?	At GSE IT department		
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	To understand mechanism, cause, and extend of landslide		
	2 Related to Q1, who will get the benefits of monitoring?	Geologist working in studying for counter measure of landlide		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?	Following the available manual or by consulting the manufacturer		
	5 How do you assure the security of instruments?	By hiring local guards for minimal wage		
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?	Based on elements at rist importance		
	2 Do you have a system of risk assessment?	Not systematic but sort of hazard type		
	3 Do you inform the risk of landslide to the public?	Only to professionals on technical meetings		
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?	In case of people casuality and extensive landslide occurance		
	2 For effective emergency alert, what is the priority action?	Monitoring and guidelines of work		
	3 What do you require for the emergency action?	guideline, policy, monitoring and dissiminating facility		
	4 Do you have the emergency action manuals for geohazard?	None so far		
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background	Masters Degree in Geo-Environmental Engineering, Masters degree in GIS & RS, BSC in Geo		
	2 Specialties	Geo-Environmental Engineering		
	3 How many years belong to GSE?	About 6 years		
	4 What is your main role in GSE?	Mapping, site investigation, co-ordinating activities		
	5 What kind of training course did you participate?	ground water management and exploration		
	6 What kind of skill and knowledge do you get?	geophysical methods		
	7 What do you expect for this project?	practical experience for standard hazard study, countermeasuree for Abay landslide		
	8 What do you think the future response of GSE for geohazards?	more emphasis and confidence		
	7 What will be your role as a landslide expert for the future?	coordinating and participating		

QUESTIONNAIRE A

Name: SISAY ALEMAYEHU **Speciality : ENGINEERING GEOLOGIST** **Age: 32** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐	☐	☐	☑ 3	☐		
	2 Geological Mapping	☐	☑ 1	☐	☐	☐		
	3 Drill Core Logging	☐	☑ 1	☐	☐	☐		
	4 Geophysical Sounding	☐	☐	☐	☐	☑ 4		
	5 Geomorphological Survey (Topo Survey)	☐	☑ 1	☐	☐	☐		
	6 Soil/Rock Test	☐	☑ 1	☐	☐	☐		
	7 Microscopic Observation (transparent, reflection)	☐	☐	☑ 2	☐	☐		
	8 Remote Sensing	☐	☐	☐	☑ 3	☐		
	9 Hydrological survey	☐	☐	☐	☑ 3	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐		
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐	☑ 1	☐	☐	☐		
	2 Topographic Observation (Landslide Topo Identification)	☐	☑ 1	☐	☐	☐		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.)	☐	☑ 1	☐	☐	☐		
	4 Sliding Plane Identification	☐	☐	☑ 2	☐	☐		
	5 Satelite Image Interpretation	☐	☑ 1	☐	☐	☐		
	6 Geological Survey (landlside, rock fall and debris flow)	☐	☐	☑ 2	☐	☐		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐	☑ 1	☐	☐	☐		
	8 Cross Sectional Interpretation of Landslide	☐	☑ 1	☐	☐	☐		
	9 Geophysical Interpretation on Landslide	☐	☐	☐	☑ 3	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐	☑ 1	☐	☐	☐		
	2 Pipe strain gauge	☐	☐	☐	☐	☐		
	3 Extensometer (Surface type)	☐	☐	☑ 2	☐	☐		
	4 Extensometer (Borehole type)	☐	☑ 1	☐	☐	☐		
	5 Groundwater measurement	☐	☐	☑ 2	☐	☐		
	6 Global Positioning System (GPS)	☐	☐	☐	☐	☑ 4		
	7 Nuk-ita (Wooden Extensometer)	☐	☑ 1	☐	☐	☐		
	8 Total station	☐	☐	☑ 2	☐	☐		
	9 Rain gauge	☐	☑ 1	☐	☐	☐		
	10 Other devices (Pls. Specify)	☐	☐	☐	☐	☐		
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☑ 0	☐	☐	☐	☐		
	2 Compilation and graph out of extensometer data	☑ 0	☐	☐	☐	☐		
	3 Compilation and graph out of Inclinometer data	☑ 0	☐	☐	☐	☐		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☐	☑ 1	☐	☐	☐		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☐	☑ 1	☐	☐	☐		
	6 Slope Stability Analysis (Bishop Method)	☐	☑ 1	☐	☐	☐		
	7 Safety Factor Assumption	☐	☑ 1	☐	☐	☐		
	8 Rock fall Analysis	☐	☑ 1	☐	☐	☐		
	9 Debris flow Analysis	☐	☑ 1	☐	☐	☐		
	10 Other analysis methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐	☐	☑ 2	☐	☐		
	2 Groundwater Lowering Method	☐	☑ 1	☐	☐	☐		
	3 Crest soil mobalization	☐	☑ 1	☐	☐	☐		
	4 Toe Embankment	☐	☑ 1	☐	☐	☐		
	5 Retaining Wall	☐	☑ 1	☐	☐	☐		
	6 Pile	☑ 0	☐	☐	☐	☐		
	7 Anchor	☐	☑ 1	☐	☐	☐		
	8 Horizontal Drilling	☐	☐	☑ 2	☐	☐		
	9 Geosynthetics	☐	☐	☑ 2	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: Speciality : Age: Date: November 2011+K28

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	Yes		
	3 How do you plan data collection interval?	I involved in seismogram at 5m interval		
	4 How often you make the maintenance of instruments?	So far it works well		
	5 Who will be responsible for the maintenance of operation?	Geological Survey of Ethiopia		
	6 What action will be made if instruments are not functioning?	Consult the experienced person		
	7 Where the instruments will be maintenance?	The company which produce the instrument		
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	To enable the evaluation of the amount of displacement of land		
	2 Related to Q1, who will get the benefits of monitoring?	The respected local people and the government as well		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?	It is difficult but I tried not to break		
	5 How do you assure the security of instruments?	By keeping it in a safe place while using it		
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?			
	2 Do you have a system of risk assessment?	Yes		
	3 Do you inform the risk of landslide to the public?	Yes		
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?			
	2 For effective emergency alert, what is the priority action?			
	3 What do you require for the emergency action?			
	4 Do you have the emergency action manuals for geohazard?	I don't think so		
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background	MSC in Computational Science		
	2 Specialties	Seismology		
	3 How many years belong to GSE?	Two years and seven months		
	4 What is your main role in GSE?	Engineering Geophysicts		
	5 What kind of training course did you participate?	GIS, Remote Sensing, and others		
	6 What kind of skill and knowledge do you get?	Landslide mechanisms and how to use monitor		
	7 What do you expect for this project?	To gain more knowledge so as to discharge into the project		
	8 What do you think the future response of GSE for geohazards?	To cover all the area in Ethiopia by studying landslide		
	7 What will be your role as a landslide expert for the future?	To contribute all my knowledge inorder to help my country		

QUESTIONNAIRE A

Name: TADESSE LEMMA **Speciality : ENGINEERING GEOPHYSICIST** **Age: 42** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐	☐	☐	☑	☐		
	2 Geological Mapping	☐	☐	☐	☑	☐		
	3 Drill Core Logging	☐	☑ 1	☐	☐	☐		
	4 Geophysical Sounding	☐	☐	☐	☐	☑ 4		
	5 Geomorphological Survey (Topo Survey)	☐	☐	☐	☑	☐		
	6 Soil/Rock Test	☐	☐	☐	☑	☐		
	7 Microscopic Observation (transparent, reflection)	☐	☑ 1	☐	☐	☐		
	8 Remote Sensing	☐	☑ 1	☐	☐	☐		
	9 Hydrological survey	☐	☐	☑ 2	☐	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐	1	
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐	☑ 1	☐	☐	☐		
	2 Topographic Observation (Landslide Topo Identification)	☐	☐	☐	☑ 3	☐		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.)	☐	☐	☑ 2	☐	☐		
	4 Sliding Plane Identification	☐	☐	☐	☑ 3	☐		
	5 Satelite Image Interpretation	☐	☑ 1	☐	☐	☐		
	6 Geological Survey (landlside, rock fall and debris flow)	☐	☐	☐	☑ 3	☐		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐	☐	☐	☑ 3	☐		
	8 Cross Sectional Interpretation of Landslide	☐	☐	☐	☑ 3	☐		
	9 Geophysical Interpretation on Landslide	☐	☐	☐	☐	☑ 4		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐	☑ 1	☐	☐	☐		
	2 Pipe strain gauge	☐	☑ 1	☐	☐	☐		
	3 Extensometer (Surface type)	☐	☑ 1	☐	☐	☐		
	4 Extensometer (Borehole type)	☐	☑ 1	☐	☐	☐		
	5 Groundwater measurement	☐	☐	☑ 2	☐	☐		
	6 Global Positioning System (GPS)	☐	☐	☐	☐	☑ 4		
	7 Nuk-ita (Wooden Extensometer)	☐	☐	☑ 2	☐	☐		
	8 Total station	☐	☑ 1	☐	☐	☐		
	9 Rain gauge	☐	☐	☑ 2	☐	☐		
	10 Other devices (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☐	☑ 1	☐	☐	☐		
	2 Compilation and graph out of extensometer data	☐	☑ 1	☐	☐	☐		
	3 Compilation and graph out of Inclinometer data	☐	☑ 1	☐	☐	☐		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☐	☑ 1	☐	☐	☐		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☐	☑ 1	☐	☐	☐		
	6 Slope Stability Analysis (Bishop Method)	☐	☑ 1	☐	☐	☐		
	7 Safety Factor Assumption	☐	☐	☑ 2	☐	☐		
	8 Rock fall Analysis	☐	☐	☑ 2	☐	☐		
	9 Debris flow Analysis	☐	☐	☑ 2	☐	☐		
	10 Other analysis methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐	☐	☐	☑ 3	☐		
	2 Groundwater Lowering Method	☐	☐	☐	☑ 3	☐		
	3 Crest soil mobalization	☐	☐	☐	☑ 3	☐		
	4 Toe Embankment	☐	☐	☐	☑ 3	☐		
	5 Retaining Wall	☐	☐	☐	☑ 3	☐		
	6 Pile	☐	☐	☐	☑ 3	☐		
	7 Anchor	☐	☐	☐	☑ 3	☐		
	8 Horizontal Drilling	☐	☐	☐	☑ 3	☐		
	9 Geosynthetics	☐	☐	☐	☑ 3	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: Speciality : Age: Date: November 2011+K28

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	No		
	3 How do you plan data collection interval?	According to the objective of the survey		
	4 How often you make the maintenance of instruments?	Whenever the need arise		
	5 Who will be responsible for the maintenance of operation?	I, myself		
	6 What action will be made if instruments are not functioning?	Try to maintain them		
	7 Where the instruments will be maintenance?			
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	Informing hazardous situation before hand		
	2 Related to Q1, who will get the benefits of monitoring?	The society		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?			
	5 How do you assure the security of instruments?			
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?			
	2 Do you have a system of risk assessment?			
	3 Do you inform the risk of landslide to the public?	Yes		
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?			
	2 For effective emergency alert, what is the priority action?	Evaluate people		
	3 What do you require for the emergency action?			
	4 Do you have the emergency action manuals for geohazard?			
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background	MSC in Engineering Geophysics		
	2 Specialties	Engineering Geophysicist		
	3 How many years belong to GSE?	10 years		
	4 What is your main role in GSE?	Group or team leader		
	5 What kind of training course did you participate?	Landslide and Countermeasures		
	6 What kind of skill and knowledge do you get?	Enormous (a lot)		
	7 What do you expect for this project?	High Success		
	8 What do you think the future response of GSE for geohazards?	High		
	7 What will be your role as a landslide expert for the future?			

QUESTIONNAIRE A

Name: TEKALIGNE TESFAYE **Speciality : GEOLOGIST** **Age: 52** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐	☐	☐	☑ 3	☐		
	2 Geological Mapping	☐	☐	☐	☑ 3	☐		
	3 Drill Core Logging	☐	☐	☐	☑ 3	☐		
	4 Geophysical Sounding	☐	☑ 1	☐	☐	☐		
	5 Geomorphological Survey (Topo Survey)	☐	☐	☐	☐	☐		
	6 Soil/Rock Test	☑ 0	☐	☐	☐	☐		
	7 Microscopic Observation (transparent, reflection)	☐	☐	☐	☑ 3	☐		
	8 Remote Sensing	☐	☑ 1	☐	☑ 3	☐		
	9 Hydrological survey	☐	☐	☐	☐	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐	☐	☐	☑ 3	☐		
	2 Topographic Observation (Landslide Topo Identification)	☐	☐	☑ 2	☐	☐		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc.)	☐	☐	☑ 2	☐	☐		
	4 Sliding Plane Identification	☐	☐	☑ 2	☐	☐		
	5 Satelite Image Interpretation	☐	☐	☑ 2	☐	☐		
	6 Geological Survey (landlside, rock fall and debris flow)	☐	☐	☑ 2	☐	☐		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐	☐	☐	☑ 3	☐		
	8 Cross Sectional Interpretation of Landslide	☐	☐	☐	☑ 3	☐		
	9 Geophysical Interpretation on Landslide	☐	☐	☑ 2	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐	☑ 1	☐	☐	☐		
	2 Pipe strain gauge	☐	☑ 1	☐	☐	☐		
	3 Extensometer (Surface type)	☐	☑ 1	☐	☐	☐		
	4 Extensometer (Borehole type)	☐	☑ 1	☐	☐	☐		
	5 Groundwater measurement	☐	☑ 1	☐	☐	☐		
	6 Global Positioning System (GPS)	☐	☐	☑ 2	☐	☐		
	7 Nuk-ita (Wooden Extensometer)	☐	☑ 1	☐	☐	☐		
	8 Total station	☐	☑ 1	☐	☐	☐		
	9 Rain gauge	☐	☑ 1	☐	☐	☐		
	10 Other devices (Pls. Specify)	☐	☐	☐	☐	☐	1	
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☐	☐	☐	☐	☐		
	2 Compilation and graph out of extensometer data	☐	☐	☐	☐	☐		
	3 Compilation and graph out of Inclinometer data	☐	☐	☐	☐	☐		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☐	☐	☐	☐	☐		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☐	☐	☐	☐	☐		
	6 Slope Stability Analysis (Bishop Method)	☐	☐	☐	☐	☐		
	7 Safety Factor Assumption	☐	☐	☐	☐	☐		
	8 Rock fall Analysis	☐	☐	☐	☐	☐		
	9 Debris flow Analysis	☐	☐	☐	☐	☐		
	10 Other analysis methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐	☑ 1	☐	☐	☐		
	2 Groundwater Lowering Method	☐	☑ 1	☐	☐	☐		
	3 Crest soil mobalization	☑ 0	☐	☐	☐	☐		
	4 Toe Embankment	☑ 0	☐	☐	☐	☐		
	5 Retaining Wall	☐	☑ 1	☐	☐	☐		
	6 Pile	☑ 0	☐	☐	☐	☐		
	7 Anchor	☐	☑ 1	☐	☐	☐		
	8 Horizontal Drilling	☐	☑ 1	☐	☐	☐		
	9 Geosynthetics	☑ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: Speciality : Age: Date: November 2011+K28

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	No		
	3 How do you plan data collection interval?	Every week		
	4 How often you make the maintenance of instruments?	Every year		
	5 Who will be responsible for the maintenance of operation?	The monitor		
	6 What action will be made if instruments are not functioning?	Quick Maintenance		
	7 Where the instruments will be maintenance?	At work place and abroad		
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	Predict harzard, warning, stop the slide		
	2 Related to Q1, who will get the benefits of monitoring?	People at vicinity, the communicty and the nation		
	3 Do you have high intention to work on monitoring?	No		
	4 If the instruments broken, how do you repair the instruments?	Use manual, ask specialists		
	5 How do you assure the security of instruments?	Proper placement, lubrication, careful fixing		
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?	High and if left as it is continious		
	2 Do you have a system of risk assessment?	No		
	3 Do you inform the risk of landslide to the public?	No		
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?	When the landslide condition is uncontrollable		
	2 For effective emergency alert, what is the priority action?			
	3 What do you require for the emergency action?	Preparedness to avoid life loss		
	4 Do you have the emergency action manuals for geohazard?	No		
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background	BA Degree in Geology		
	2 Specialties	Mineral Exploration		
	3 How many years belong to GSE?	30 years		
	4 What is your main role in GSE?	At present, Geo-hazard & Engineering geology work		
	5 What kind of training course did you participate?	Exploration, Remote Sensing		
	6 What kind of skill and knowledge do you get?	Mapping, Exploration		
	7 What do you expect for this project?	Successful implementation of countermeasures that would be applied at other place		
	8 What do you think the future response of GSE for geohazards?	GSE is becoming moresensitive for geo-hazard		
	7 What will be your role as a landslide expert for the future?	Formulate simple ways of landslide anti-mechanisms		

QUESTIONNAIRE A

Name: YEWUBNESH BEKELE **Speciality : Engineering Geologist** **Age: 26** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐ 0	☐	☐	☑	☐		
	2 Geological Mapping	☐	☐	☐	☑	☐		
	3 Drill Core Logging	☐	☐	☐	☑	☐		
	4 Geophysical Sounding	☑	☐	☐	☐	☐		
	5 Geomorphological Survey (Topo Survey)	☐ 0	☑	☐	☐	☐		
	6 Soil/Rock Test	☐ 0	☐	☐	☐	☐		
	7 Microscopic Observation (transparent, reflection)	☐ 0	☐	☐	☐	☐		
	8 Remote Sensing	☐ 0	☐	☐	☐	☐		
	9 Hydrological survey	☐ 0	☐	☐	☐	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐ 0	☐	☑	☐	☐		
	2 Topographic Observation (Landslide Topo Identification)	☐ 0	☐	☑	☐	☐		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc	☐ 0	☐	☑	☐	☐		
	4 Sliding Plane Identification	☐ 0	☐	☑	☐	☐		
	5 Satelite Image Interpretation	☐ 0	☐	☑	☐	☐		
	6 Geological Survey (landlside, rock fall and debris flow)	☐	☐	☐	☑	☐		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐ 0	☐	☑	☐	☐		
	8 Cross Sectional Interpretation of Landslide	☑ 0	☐	☐	☐	☐		
	9 Geophysical Interpretation on Landslide	☑ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐ 0	☑	☐	☐	☐		
	2 Pipe strain gauge	☐ 0	☑	☐	☐	☐		
	3 Extensometer (Surface type)	☐ 0	☑	☐	☐	☐		
	4 Extensometer (Borehole type)	☐ 0	☑	☐	☐	☐		
	5 Groundwater measurement	☐ 0	☑	☐	☐	☐		
	6 Global Positioning System (GPS)	☐	☑	☐	☐	☐		
	7 Nuk-ita (Wooden Extensometer)	☐ 0	☐	☐	☐	☐		
	8 Total station	☐ 0	☐	☐	☐	☐		
	9 Rain gauge	☐	☑	☐	☐	☐		
	10 Other devices (Pls. Specify)	☐	☐	☐	☐	☐	0	
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☑ 0	☐	☐	☐	☐		
	2 Compilation and graph out of extensometer data	☑ 0	☐	☐	☐	☐		
	3 Compilation and graph out of Inclinometer data	☑ 0	☐	☐	☐	☐		
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☑ 0	☐	☐	☐	☐		
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☑ 0	☐	☐	☐	☐		
	6 Slope Stability Analysis (Bishop Method)	☑ 0	☐	☐	☐	☐		
	7 Safety Factor Assumption	☐ 0	☑	☐	☐	☐		
	8 Rock fall Analysis	☑ 0	☐	☐	☐	☐		
	9 Debris flow Analysis	☑ 0	☐	☐	☐	☐		
	10 Other analysis methods (Pls. Specify)	☐ 0	☐	☐	☐	☐	0	
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐ 0	☑	☐	☐	☐		
	2 Groundwater Lowering Method	☐ 0	☑	☐	☐	☐		
	3 Crest soil mobalization	☑ 0	☐	☐	☐	☐		
	4 Toe Embankment	☐ 0	☑	☐	☐	☐		
	5 Retaining Wall	☐ 0	☑	☐	☐	☐		
	6 Pile	☐ 0	☑	☐	☐	☐		
	7 Anchor	☐ 0	☑	☐	☐	☐		
	8 Horizontal Drilling	☐ 0	☑	☐	☐	☐		
	9 Geosynthetics	☐ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: Speciality : Age: Date: November 2011+K28

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	No		
	3 How do you plan data collection interval?	According to the mainenance manual		
	4 How often you make the maintenance of instruments?	According to the maintenanace manual		
	5 Who will be responsible for the maintenance of operation?	Responsible and qualified personnel		
	6 What action will be made if instruments are not functioning?	Request to replace by functions according to the guarantee		
	7 Where the instruments will be maintenance?	In the manufacturer's shop		
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	To preclude the accident prehard		
	2 Related to Q1, who will get the benefits of monitoring?	All living things around the area, government, the wholesociety		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?	needs highly skilled specialists		
	5 How do you assure the security of instruments?	According to operational manual, using an indicator on the intrument		
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?	A wide variety of process of result in the downward movement of slope form		
	2 Do you have a system of risk assessment?	Yes		
	3 Do you inform the risk of landslide to the public?	Yes		
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?	From the survey result if there is predicor in the future		
	2 For effective emergency alert, what is the priority action?	To train those people around the area		
	3 What do you require for the emergency action?	Exclude these which generate he situation		
	4 Do you have the emergency action manuals for geohazard?	Recently not but very necessary		
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background	BA Degree in Geology		
	2 Specialties	Geology		
	3 How many years belong to GSE?	3 years		
	4 What is your main role in GSE?	as Assistant Geologist		
	5 What kind of training course did you participate?	GIS, Remote Sensing, Geomorphology		
	6 What kind of skill and knowledge do you get?	Utilitze different software, topography		
	7 What do you expect for this project?	Short-term trainings		
	8 What do you think the future response of GSE for geohazards?	It plays a great role in controlling hazards.		
	7 What will be your role as a landslide expert for the future?	Exploiting effort and take remedial actions to the problems occurred pre-hand		

QUESTIONNAIRE A

Name: ZULFA ABDURAHMAN **Speciality : ENGINEERING GEOLOGIST** **Age:** Date: November 2011

ITEM	SPECIFIC ITEMS	ANSWER(Please Check)						REMARKS
Basic Investigation	General Geological Experiences	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized	TOTAL	
	1 Geological Field Reconnaissance	☐	☐	☐	☑ 3	☐		
	2 Geological Mapping	☐	☐	☐	☑ 3	☐		
	3 Drill Core Logging	☐	☐	☑ 2	☐	☐		
	4 Geophysical Sounding	☐	☑ 1	☐	☐	☐		
	5 Geomorphological Survey (Topo Survey)	☐	☐	☐	☑ 3	☐		
	6 Soil/Rock Test	☐	☐	☐	☑ 3	☐		
	7 Microscopic Observation (transparent, reflection)	☐	☐	☐	☑ 3	☐		
	8 Remote Sensing	☐	☐	☑ 2	☐	☐		
	9 Hydrological survey	☐	☑ 1	☐	☐	☐		
	10 Other activitiy (Pls. Specify)	☐	☐	☐	☐	☐	21	
Landslide/rock fall/ debrisflow Identification	Landslide Related Activities	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Stereographic Observation (Arial Photo Interpretation)	☐	☐	☐	☐	☐		
	2 Topographic Observation (Landslide Topo Identification)	☑ 0	☐	☐	☐	☐ 0		
	3 Landslide Anomaly Survey (cracks, crests, toe accumulation, etc	☑ 0	☐	☐	☐	☐ 0		
	4 Sliding Plane Identification	☐	☑ 1	☐	☐	☐ 1		
	5 Satelite Image Interpretation	☐	☐	☑ 2	☐	☐ 2		
	6 Geological Survey (landlside, rock fall and debris flow)	☐	☐	☑ 2	☐	☐ 2		
	7 Hazard Mapping (landlside, rock fall and debris flow)	☐	☐	☑ 2	☐	☐ 2		
	8 Cross Sectional Interpretation of Landslide	☐	☑ 1	☐	☐	☐ 1		
	9 Geophysical Interpretation on Landslide	☑ 0	☐	☐	☐	☐ 0		
	10 Other methods (Pls. Specify)	☐ 0	☐ 2	☐ 6	☐	☐ 8	16	
Landslide Monitoring	Instruments	A=never seen	B=know mechanism	C=used	D=installed	E=data collected		
	1 Borehole Inclinometer	☐	☐	☐	☐	☑ 4		
	2 Pipe strain gauge	☐	☑ 1	☐	☐	☐		
	3 Extensometer (Surface type)	☐	☐	☐	☑ 3	☐		
	4 Extensometer (Borehole type)	☐	☐	☐	☐	☐		
	5 Groundwater measurement	☐	☐	☐	☐	☑ 4		
	6 Global Positioning System (GPS)	☐	☐	☑ 2	☐	☐		
	7 Nuk-ita (Wooden Extensometer)	☐	☐	☐	☐	☐		
	8 Total station	☐	☐	☐	☐	☐		
	9 Rain gauge	☐	☐	☐	☐	☑ 4		
	10 Other devices (Pls. Specify)	☐	☐ 1	☐ 2	☐ 3	☐ 12	18	
Landslide Data Collection Stability Analysis	Data compilation and Analysis	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Compilation and graph out of Inclinometer data	☑ 0	☐	☐	☐	☐		0
	2 Compilation and graph out of extensometer data	☑ 0	☐	☐	☐	☐		0
	3 Compilation and graph out of Inclinometer data	☑ 0	☐	☐	☐	☐		0
	4 Setting of soil parameter (ie., cohesion & internal friction angle)	☑ 0	☐	☐	☐	☐		0
	5 Slope Stability Analysis (Modifeid Fellenius Method)	☑ 0	☐	☐	☐	☐		0
	6 Slope Stability Analysis (Bishop Method)	☐	☑ 1	☐	☐	☐		1
	7 Safety Factor Assumption	☐	☑ 1	☐	☐	☐		1
	8 Rock fall Analysis	☑ 0	☐	☐	☐	☐		0
	9 Debris flow Analysis	☑ 0	☐	☐	☐	☐		0
	10 Other analysis methods (Pls. Specify)	☐ 0	☐	☐	☐	☐	0	0
Landslide Countermeasures	Countermeasures	A=no knowledge	B=know mechanism	C=partly involved	D=experienced	E=expertized		
	1 Surface Drainage	☐	☑ 1	☐	☐	☐		
	2 Groundwater Lowering Method	☑ 0	☐	☐	☐	☐		
	3 Crest soil mobalization	☑ 0	☐	☐	☐	☐		
	4 Toe Embankment	☐	☑ 1	☐	☐	☐		
	5 Retaining Wall	☐	☑ 1	☐	☐	☐		
	6 Pile	☐	☑ 1	☐	☐	☐		
	7 Anchor	☐	☑ 1	☐	☐	☐		
	8 Horizontal Drilling	☐	☑ 1	☐	☐	☐		
	9 Geosynthetics	☑ 0	☐	☐	☐	☐		
	10 Other methods (Pls. Specify)	☐	☐	☐	☐	☐	0	

QUESTIONNAIRE B

Name: Speciality : Age: Date: November 2011+K28

ITEMS	SPECIFIC INTERVIEW	ANSWER(Please Check)		REMARKS
Landslide Monitoring	1 Installation of Instruments	**Please fill in simple sentence (if you could answer)**		
	1 Have you formulated monitoring plan before?	NO		
	3 How do you plan data collection interval?			
	4 How often you make the maintenance of instruments?			
	5 Who will be responsible for the maintenance of operation?			
	6 What action will be made if instruments are not functioning?			
	7 Where the instruments will be maintenance?			
	2 General Question	**Please fill in simple sentence (if you could answer)**		
	1 What do you think the purpose of monitoring landslide?	To take some countermeasures		
	2 Related to Q1, who will get the benefits of monitoring?	GSE and EMA		
	3 Do you have high intention to work on monitoring?	Yes		
	4 If the instruments broken, how do you repair the instruments?			
	5 How do you assure the security of instruments?			
Landslide Countermeasures, Risk Assessment and Emergency Response	1 Risk Assessment	**Please fill in simple sentence (if you could answer)**		
	1 How do you define the risk on landslide?			
	2 Do you have a system of risk assessment?			
	3 Do you inform the risk of landslide to the public?			
	2 Emergency Response	**Please fill in simple sentence (if you could answer)**		
	1 When do you define as emergency situation?			
	2 For effective emergency alert, what is the priority action?			
	3 What do you require for the emergency action?			
	4 Do you have the emergency action manuals for geohazard?			
Personal records and General Questions		**Please fill in simple sentence**		
	1 Academic background			
	2 Specialties			
	3 How many years belong to GSE?	3 years		
	4 What is your main role in GSE?	Engineering Geologist		
	5 What kind of training course did you participate?	Engineering Geology		
	6 What kind of skill and knowledge do you get?	Engineering Geology		
	7 What do you expect for this project?	Knowledge and Experience		
	8 What do you think the future response of GSE for geohazards?	Better		
	7 What will be your role as a landslide expert for the future?			