ACWA POWER ELECTRICITY OPERATION AND MANAGEMENT INDUSTRY AND TRADE CO.



ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

ANNEX

APPENDIX-1 Official Letters
APPENDIX-2 Maps and Plans
APPENDIX-3 Air Quaility Model Outputs
APPENDIX-4 Meteorological Bulletin
APPENDIX-5 Geological and Geotechnical Survey Report
APPENDIX-6 Environmental Analysis Results
APPENDIX-7 Ecosystem Evaluation Report
APPENDIX-8 Acoustic Report

MGS PROJECT CONSULTANCY ENGINEERING TRADE CO.
ANKARA – June/2014

ANNEX 1
OFFICIAL LETTERS

SPECIAL PROVINCIAL ADMINISTRATION LETTER NO. 2939 DATED 28.06.2013

T.R.
KIRIKKALE PROVINCE SPECIAL PROVINCIAL ADMINISTRATION
Public Improvement and Urban Improving Directorate

Number: M.71.O.İÖİ.0.13.00.00-754/2939 28/06/2013
Subject: Landscaping Plan

MGS PROJECT CONSULTANCY ENGINEERING CO
Şehit Cevdet Özdemir Mah. Öveçler 4. Cad. 1350. Sok. No:1/7
Çankaya/Ankara

Ref: Your Letter dated 06.06.2013

It is understood from your Reference petition that the comment of our Administration is requested according to the provisions of 1/100,000 Landscaping Plan at the area where the Natural gas Combined Cycle Plant is set up on Kırıkkale Province, Yahşihan County, Kılıçlar Municipality.

Subjected area is foresty area according to Kırıkkale Landscape Plan and implementations have to be comply with Article 8.26 Energy Production Areas and Energy Transmission Lines.

Therefore, it is need to take permits mentioned at Landscape Plan and related laws and regulations.

I request that the necessary action be taken.

Signature
İsmail Köksal
Assistant of General Secretary

ANNEXES:
1 – Sample of Landscaping Plan
2 – Provisions of Plan

Article 8.26. Energy Production Areas and Energy Transmission Lines

8.26.1. Implementations of energy production areas (wind, solar, geothermal, hydro) will done after taking positive comment of the Ministry in the concept of taking permits from related authorities and institutions without change in 1/100,000 Landscape Plan. Landscape plan which is prepared through comments of related authorities and institutions will be sent to the Ministry in digital format.

STATE HYDRAULIC WORKS LETTER NO. 408609 DATED 10.07.2013

T.R.
MINISTRY OF ENVIRONMENT AND FORESTRY
General Directorate of State Hydraulic Works 5th Regional Directorate

Number: B.23.1.DSİ.1.05.10.00.754/408609
Subject: Landscape Works

KILIÇLAR MUNICIPALITY MAYORALTY YAHŞİHAN/KIRIKKALE

Ref: Your Letter dated 07.06.2013 and numbered B.23.1.DSİ.1.05.31.00.754/331966

In your reference correspondence, our view is requested concerning ACWA Power Kırıkkale Natural Gas Cycle Power Plant with an installed power to be installed by ACWA Power Electricity Operation and Management Inc. Co., on the land parcel no.1 and no.2, island no. 109, situated inside Kılıçlar Municipality, Yahşihan Town, Kırıkkale Province.

As a consequence of the in situ inspection by our Regional Directorate, it is determined that the said real property of which location has been marked on the enclosed 1 / 25000 scale map does not take part within the scope of the DSİ Projects and there is no ground water operations within the area. But, north part of the parcel no.1 of island no. 109 and north and south east part of the parcel no.2 of island no. 109 is in the region of Kızılırmak flood protection zone Also, Büyükkayalı creek which is a dry creek is pass over parcel no.2. This are classified as “Area Under the Flood Waters Law” according to 2008/13558 dated decision of council of ministers, 200 m distance to left and right from river axis, totally 400 m strip form area under flood.

As a result, there is no drawback in landscape preparation for natural gas combined cycle power plant unless below technical and legal information will be complied.

1) Parcel no.2, maintaining streambed of Büyükadalı Creek with 15 m length as given below hydraulic calculation (8 m streambed + 7 m one way service way)
2) There will be no permanent construction 200 m away from left axis of Kızılırmak River which is under the Flood Waters Law
3) Conservation of natural situation of other dry creeks, 2 m x 2 m openings for mandatory ways, culvert construction design for Q_{500} years repeating floods, rain water drainage system
4) Restriction of dumping excavation waste to steam beds and complying with Circular 2006/27 attached below

I kindly submit for your information.

Signature
Öznur TÖRKAKÇIOĞLU
Technician

9 September 2006 OFFICIAL GAZETTE Number: 26284

CIRCULAR

2006/27

Prime Ministry:
Subject: River Beds and Floods

Occurring in different parts of our country and cause the loss of life and property, as well as the daily life, adversely affecting all economic and commercial activity and the prevention of losses caused by floods following measures can be taken to remedy.

1 - Provincial, district and village settlements as large and medium-sized planned piecemeal settlements, according to the plans of the development plans for all kinds of small scale during the issuance of the General Directorate of State Hydraulic Works (DSI) shall comply with the measures and recommendations carefully.

2 - Various application areas in order to create the streams above, in cases deemed necessary operations after the approval of the General Directorate of State Hydraulic Works, except for strictly closed. Other than that, about all kinds of structures held stream beds or organizations shall be based on an approved project.

3 - For whatever reason, to do all the stream beds on structures such as bridges and culverts and creek beds or borders will be out of power transmission lines, roads, oil and natural gas pipelines, telephone lines, water and sewer lines, and the like, various organizations, the Regional Directorate of DSI purpose built buildings in different absolute opinion to be taken before, and the construction of facilities to be provided in accordance with this opinion. If no reply is received within 30 days of the applications by DSI shall be given to the appropriate view.

4 - Public institutions and organizations, giving rise to narrowing of the cross section of the water flow under the bridge and blocking the flow of water will be made structures. Made private and legal persons, and such structures are put in the required permits and licenses shall definitely. As a result of the audits conducted on water bodies which can cause narrowing of the flow cross-section of the construction, reconstruction under the responsibility of the administrative authorities under the legislation administered by the competent municipal or private will be removed immediately.

5 - The stream bed material, places to be, according to the bridge and in no way, preferably upstream of the bridge will be 750 m. nearer than not . Be material, will not alter the direction of the stream flow regime and flow. In the case of materials received by the downstream locations, the material from which the bridge, the bed topography, hydraulic, and the base material to be determined according to the conditions and in no time the distance is 1000 m. will not be closer than. Line registration will be provided to maintain the original river bed, sand-gravel companies to be audited in accordance with this principle, or behavior of those licenses will be canceled.

6 - River during the breeding work, the responsibility of public institutions and organizations structures (roads, bridges, and so on) will be taken to avoid damage by ensuring the coordination of related organizations.

7 - Areas under the responsibility of the General Directorate of Highways, roads and structures which will be held by the related institutions for projects to be taken and the aforementioned General Directorate of Highways Regional Directorates opinion shall be made in accordance with the standards.

8 - Lower elevations of the land during road works to ensure the flow of water, but also to allow the construction of infrastructure facilities related institutions, according to the opinions of DSI will be in sufficient quantities to make culverts.

9 - The stream bed , or in areas adjacent to the river bed of sand, gravel and quarry operating activities stabilized material , according to the comments made by DSI . Improper furnace applications, permits, licensing administrations will be canceled.

10 - Many in the region, excavation, road debris, and different types of waste in an irregular manner, discharged into basins and river beds. Filled with solid waste streams discharged from the extraordinary capacity of beds is reduced greatly increases the risk of flooding. All kinds of waste material loss in stream beds, civilian authorities and / or local authorities to be kept under constant control by means prevented by.

11 - Fluvial deposits formed in the cross-section of the stream bed and cause narrowing or blockage in existing structures that cause an increase in the size of floods and flood likely to be cleared by the administration on the trees.

12 - The main stream of the specified routes these measures shall be applied to the side streams.

13- 4373 dated “Protection against Flood Waters and Flood Act" may be deemed necessary measures will be taken in the prevention of and follow-up activities will be prohibited.

14 - During the cadastral works, stream beds and spontaneous course will allow the flow cross-section of the stream bed be excluded from registration, will be allocated to the flow of the stream, of course. Application in accordance with the determination of the width of the river bed will be the DSI’s knowledge and opinion. Individual work areas cadastral registration of which has been completed, the same principles and procedures apply to the applications.

I would kindly request that information, and the need.

Recep Tayyip Erdoğan

STATE HYDRAULIC WORKS LETTER NO. 483251 DATED 14.08.2013

T.C.
MINISTRY OF ENVIRONMENT AND FORESTRY
General Directorate of State Hydraulic Works 5th Regional Directorate

Number: 92711777-622-483251
Subject: Comments

ACWA Power Electricity Operation and Management Inc. Co.
Teşvikiye Cad. Teşvikiye Palas No:23/2 34356
Nişantaşı İstanbul

Ref: Your Letter dated 22.07.2013 and Numbered 2

In your reference correspondence, our view is requested concerning caisson wells which will be used for Natural gas Combined Cycle Plant is set up on Kırıkkale Province, Yahşihan County, Kılıçlar Municipality.

Well which are not deeper than 10 m are classified as “wells opened with hands” according to Ground Water Law numbered 167 Article 8.a. and for this kind of wells, permit is not requested. Because the well that you will use is not deeper than 10 m, there is no drawback for using groundwater for your useful needs.

I kindly submit for your information.

Signature
Bekir YAPAN
Deputy Region Director

GENERAL DIRECTORATE OF FORESTRY

T.C.

FORESTRY AND WATER WORKS MINISTRY

FORESTRY GENERAL DIRECTORATE

Number: 66995690-611.02[611.02]/575249

Topic: ACWA Power Kırıkkale Natural gas
Combined Cycle Power Plant Project
(611.02-2013-149)

MGS PROJECT ENGINEERING CONSULTANCY TRADING COMPANY

Şehit Cevdet Özer district Öveçler 4th main street 1351st street (203rd old) No:1/7

ÇANKAYA/ANKARA

Referance: a) 19.04.2013 dated and 48311039-220-6635 numbered writing

b) 26.09.2013 dated and 66995690-611.02(611.02)/260101-1821 numbered writing

c) 11.10.2013 dated and 48331039-220.01(01)-17051 numbered writing

d) 06.11.2013 dated and 66995690-611.02(611.02)/382723-2016 numbered writing

Related to "ACWA Power Kırıkkale Natural gas Combined Cycle Power Plant Project" construction planned by ACWA Power Electric Operation and Management Industry and Trade Limited Company within the boundaries of Kırıkkale provience, Yahşihan county and Kılıçlar town, your participation should be done to scope and special format determination meeting date 27.05.2013 at 14:00 or your writing report related to matter (a) has been required. Topics, which should be included the EIA, are sent.

Our recorded writing related to matter (b) asserts that planning combined cycle power plant project is in 26 Ha EIA field. 8.79 Ha of EIA field is in forest zone (afforestation zone) which is for public benefit. However, there are other areas which are alternative and suitable for usage. Therefore, EIA process is declined for this situation by general directorate declaration at final process.

It has been requested that participation to 2. Investigation and Assessment meeting on 30.10.2013 at 10:00am or sending written opinion related to matter (c). Final decision was not found suitable by our General Directorate related to matter (b).

MGS Project Engineering Consultancy Trading Company stated that the planned area was revised as exiting from forestry area and requested re-investigation of new area with the letter dated 21.01.2014 and numbered 222.

As a result of re-investigation, the area of planned ACWA Power Kırıkkale Natural gas Combined Cycle Power Plant Project by ACWA Power Electric Operation and Management Industry and Trade Limited Company is not included forestry area as new coordinates stated by MGS Project Engineering Consultancy Trading Company, so that our General Directorate stated that there is no obstacle for positive Final Decision of EIA.

Your information and necessity are required

Mehmet Zeki TEMUR

General Director a.

Deputy General Director

Distributor:

Necessity:

- To Environment And Urban Ministry
  (Environmental Impact asssestment,
  Permission and Control General Directorate
  (EIA))

Information:

To MGS Project Engineering Consultancy Trading Company

Şehit Cevdet Özer district Öveçler 4th main street 1351st street (203rd old) No:1/7

ÇANKAYA/ANKARA

ANNEX 2
MAPS AND PLANS

1/25,000 SCALE
TOPOGRAPHIC MAP

Bu harita ACWA POWER GROUP için hazırlanmıştır.
Haritanın tamamının veya bir bölümü çoğaltılamaz, kopyalanamaz, yayınlanamaz, üçüncü şahıslara verilemez.
Bunun aksi bir durumun yasal işlem uygulanır.

ESER NGCCPP PROJECT AREA

ACWA POWER NGCCPP PROJECT AREA

ACWA POWER ELECTRICITY OPERATION AND MANAGEMENT INDUSTRY AND TRADE COMPANY

ACWA POWER KIRIKKALE NGCCPP PROJECT
1/25.000 SCALE TOPOGRAPHIC MAP

PREPARED BY

MGS PROJECT CONSULTANCY ENGINEERING TRADE INC. CO.

Şehit Cevdet Özdemir Mahallesi, Öveçler 4. Cadde 1351. Sokak No : 1/7 06460 Çankaya/Ankara
Tel : +90 (312) 479 84 00 Fax : +90 (312) 479 84 99

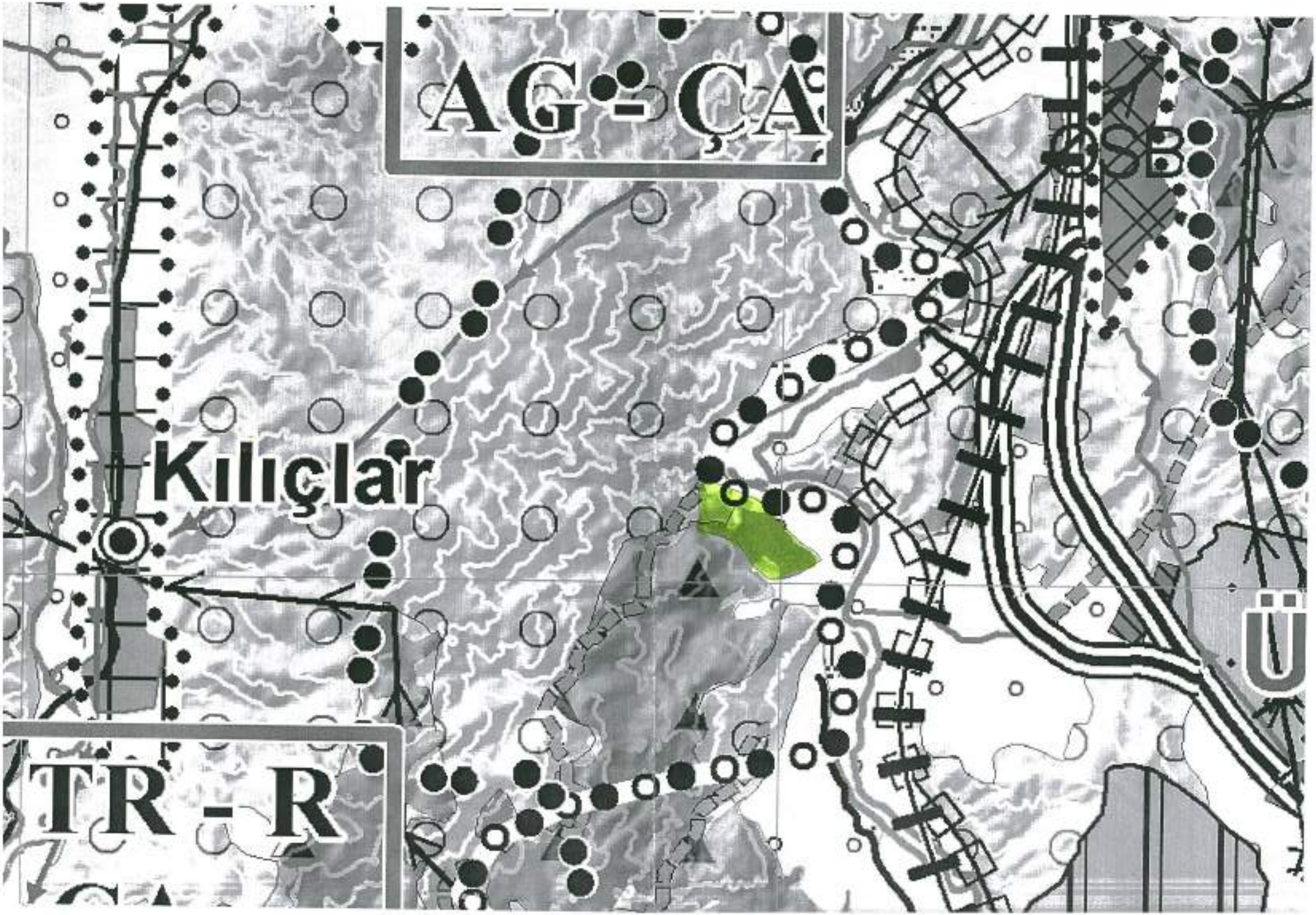
Prepared By	Environmental Engineer	Leyla BÜYÜKTANIR			SCALE	1 / 25 000
					DATE	15.01.2014
					PLAN NO	002
					STANDARD PLAN NO	30b2

LEGEND

ACWA POWER NGCCPP PROJECT AREA BOUNDARIES

ESER DGKÇS NGCCPP PROJECT AREA BOUNDARIES

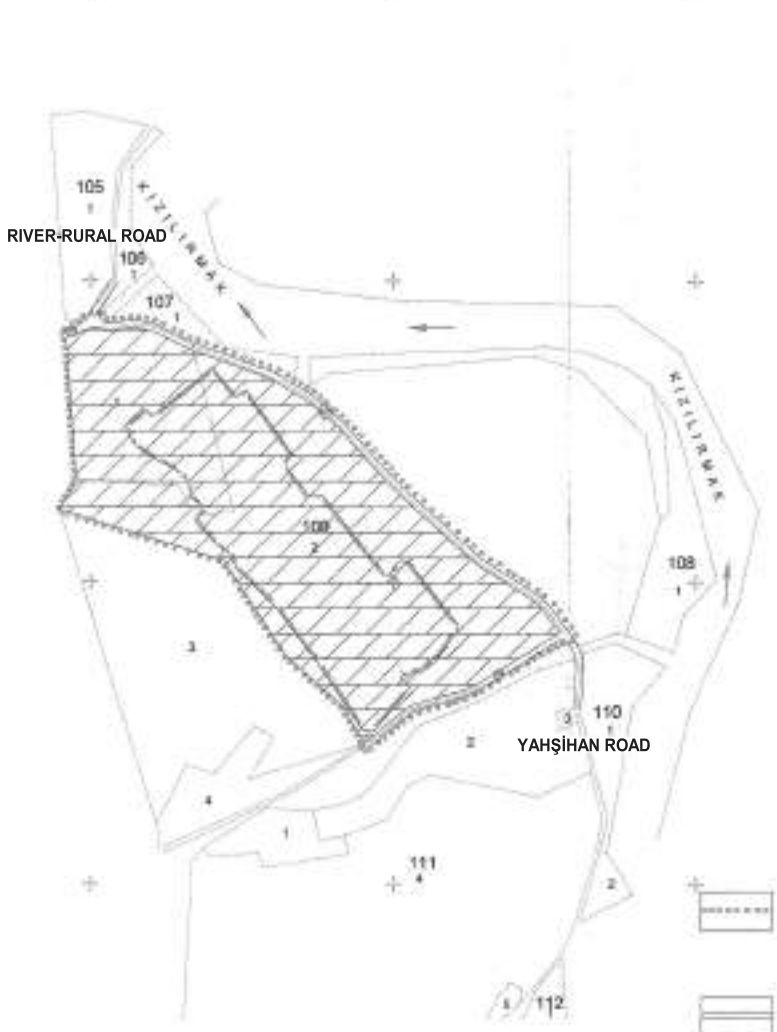
1/100,000 SCALE ENVIRONMENTAL PLAN


AG - ÇA
Kılıçlar
TR - R

1/5,000 SCALE
MASTER PLAN (DRAFT)

KIRIKKALE/YAHŞİHAN
KILIÇLAR
I30-b-1 4-a

ACWA POWER ELECTRICITY OPERATION AND MANAGEMENT INDUSTRY AND TRADE CO.
ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant Project
KILIÇLAR/YAHŞİHAN MASTER PLAN
BLOCK/PLOT NUMBER: 109/1 AND 2



1/5000

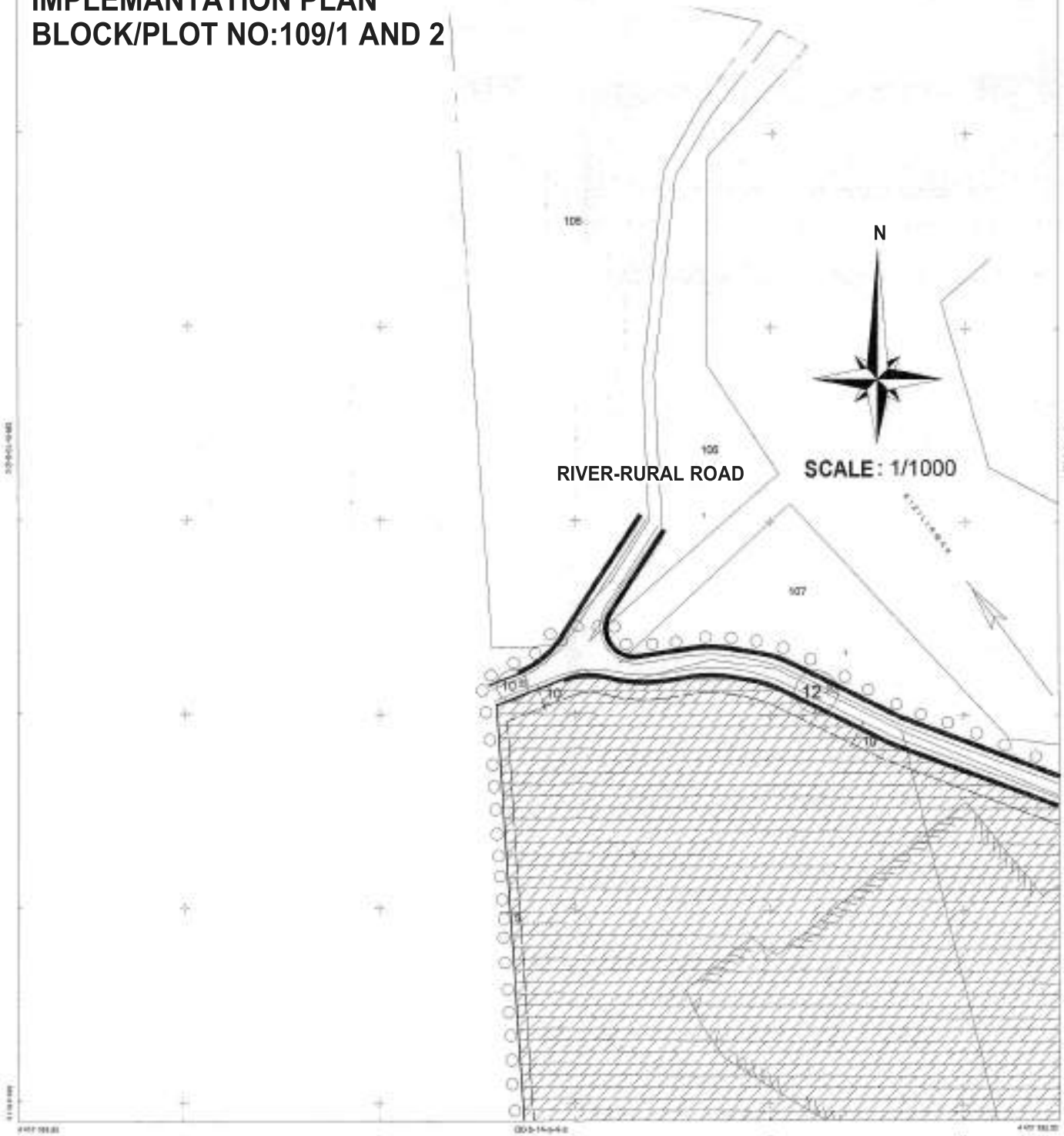
KIRIKKALE/YAHŞİHAN
KILIÇLAR
I30-b-1 4-a

1/1,000 SCALE APPLICATION CONSTRUCTION PLAN (DRAFT)

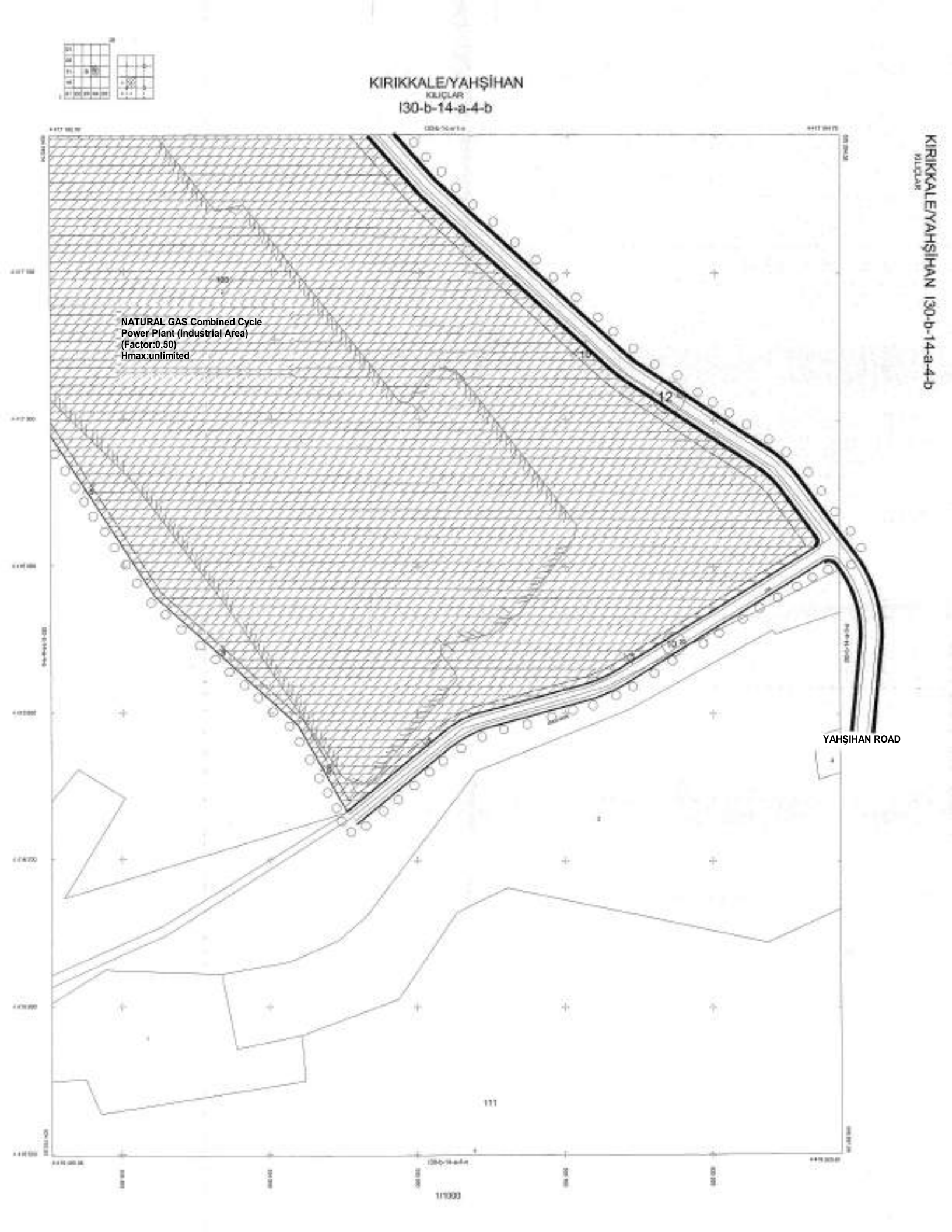
KIRIKKALE/YAHŞİHAN
KILIÇLAR
I30-b-14-a-1-d

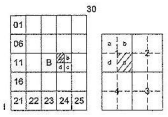
ACWA Power Electricity Operation and Management Industry and Trade Co.
ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant Project

KILIÇLAR/NYAHŞİHAN IMPLEMANTATION PLAN BLOCK/PLOT NO:109/1 AND 2



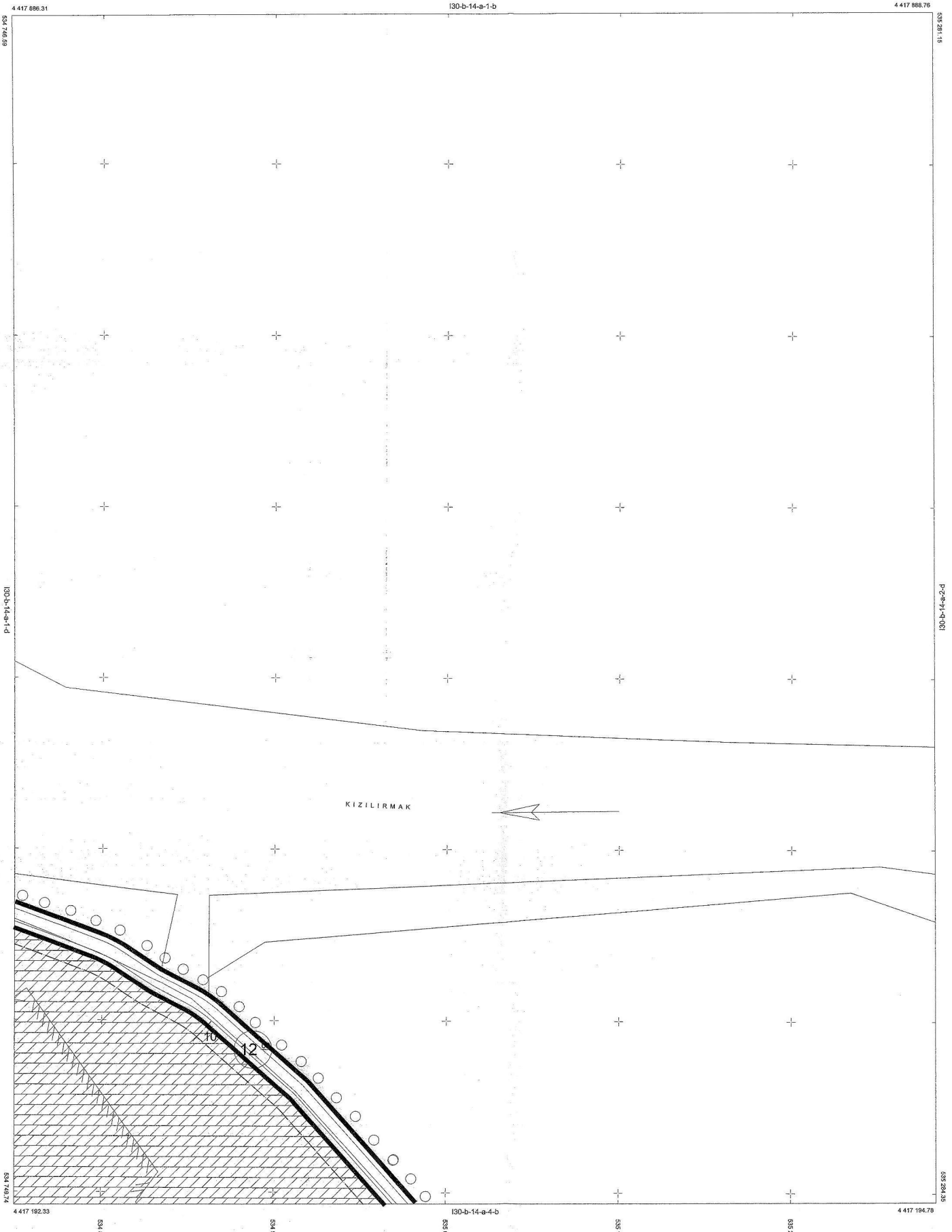
KIRIKKALE/YAHŞİHAN I30-b-14-a-1-d
KILIÇLAR


KIRIKKALE/YAHŞİHAN
KILIÇLAR
I30-b-14-a-4-b
NATURAL GAS Combined Cycle
Power Plant (Industrial Area)
(Factor:0.50)
Hmax:unlimited
YAHŞIHAN ROAD
111
KIRIKKALE/YAHŞİHAN I30-b-14-a-4-b
KILIÇLAR



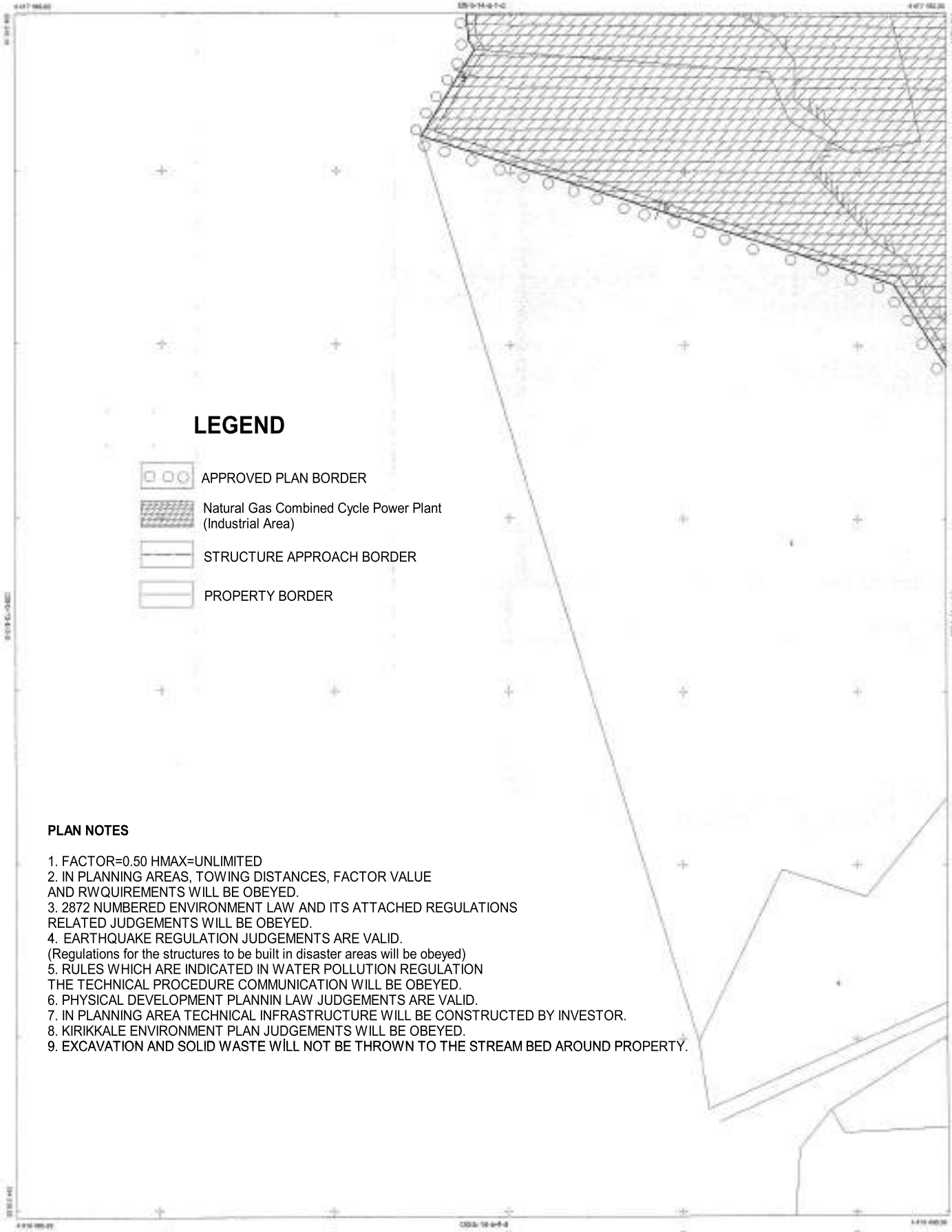
KIRIKKALE/YAHŞİHAN
KILIÇLAR
I30-b-14-a-1-c

KIRIKKALE/YAHŞİHAN I30-b-14-a-1-c
KILIÇLAR



1/1000

KIRIKKALE/YAHŞİHAN
KILIÇLAR
I30-b-14-a-4-a



LEGEND

- APPROVED PLAN BORDER
- Natural Gas Combined Cycle Power Plant (Industrial Area)
- STRUCTURE APPROACH BORDER
- PROPERTY BORDER

PLAN NOTES

1. FACTOR=0.50 HMAX=UNLIMITED
2. IN PLANNING AREAS, TOWING DISTANCES, FACTOR VALUE AND RWQUIREMENTS WILL BE OBEYED.
3. 2872 NUMBERED ENVIRONMENT LAW AND ITS ATTACHED REGULATIONS RELATED JUDGEMENTS WILL BE OBEYED.
4. EARTHQUAKE REGULATION JUDGEMENTS ARE VALID. (Regulations for the structures to be built in disaster areas will be obeyed)
5. RULES WHICH ARE INDICATED IN WATER POLLUTION REGULATION THE TECHNICAL PROCEDURE COMMUNICATION WILL BE OBEYED.
6. PHYSICAL DEVELOPMENT PLANNIN LAW JUDGEMENTS ARE VALID.
7. IN PLANNING AREA TECHNICAL INFRASTRUCTURE WILL BE CONSTRUCTED BY INVESTOR.
8. KIRIKKALE ENVIRONMENT PLAN JUDGEMENTS WILL BE OBEYED.
9. EXCAVATION AND SOLID WASTE WİLL NOT BE THROWN TO THE STREAM BED AROUND PROPERTY.

1/1000

KIRIKKALE/YAHŞİHAN I30-b-14-a-4-a
KILIÇLAR

GENERAL LAYOUT MAP

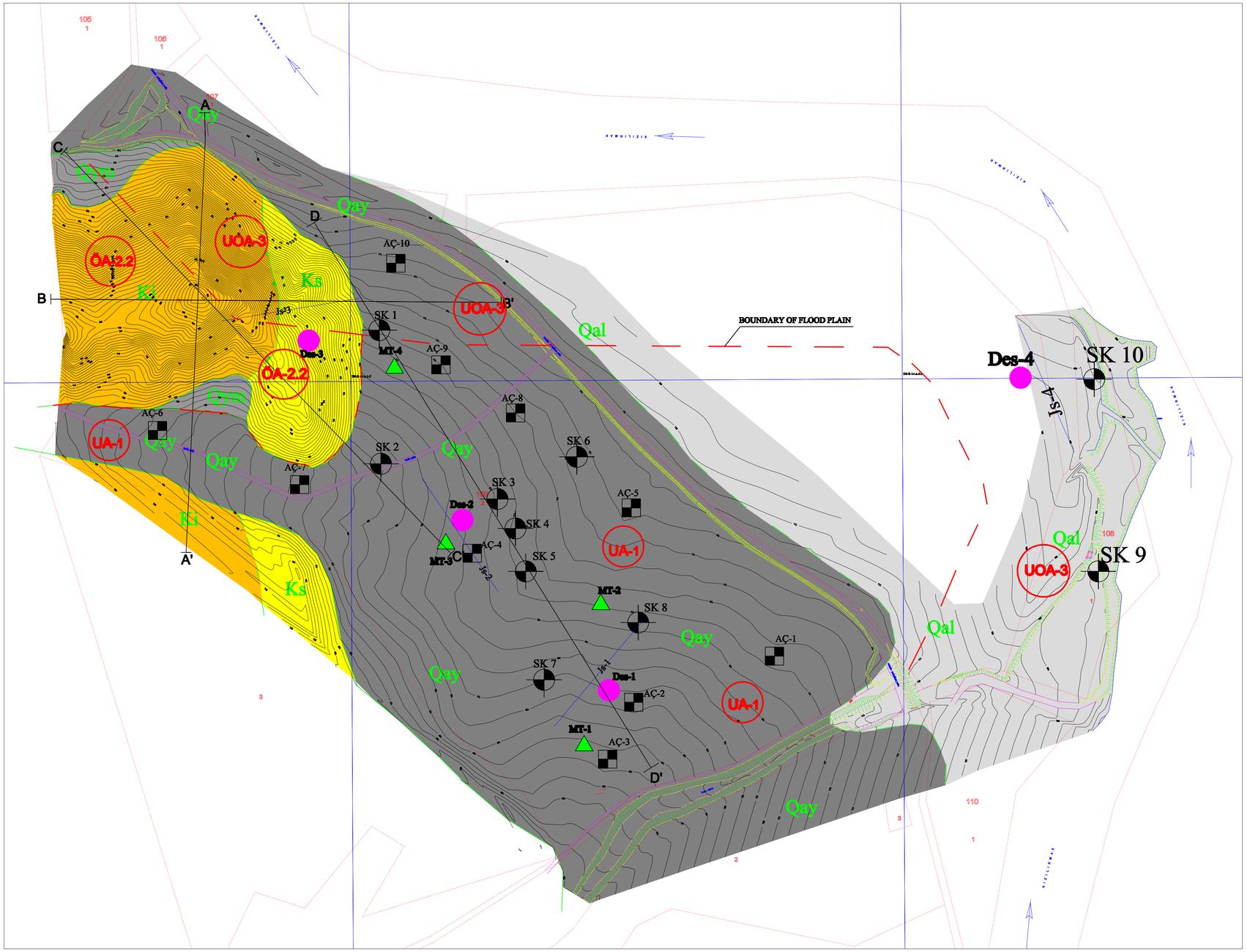
ACWA POWER ELECTRICITY OPERATION AND MANAGEMENT
INDUSTRY AND TRADE COMPANY

ACWA POWER KIRIKKALE NGCCPP PROJECT
LAYOUT PLAN



GEOLOGY MAP

APPENDIX-11



EXPLANATIONS

- Qal — Alluvion deposits
- Qym — Debris flow
- Qay — Alluvial fan deposits.
- Ks — Samanlık Formation : Alternation of gravelstone, sandstone, claystone.
- Ki — Ilıcaspınar Formation : Alternation of gravelstone, sandstone.
- Formation Boundary
- Tectonical Boundary
- Region Boundary
- A A' Cross Section Line

- SK 8 — Borehole Location
- AÇ-4 — Test Pit Location
- MT-3 — Mikrotremor Measurement Points
- Des-2 — Vertical Electrical Sounding
- Js-1 — Seismic Measurement Profile

UA-1 — Suitable lands slope rate is less than 10 %, Alluvial fan deposits. Ground water dept is between 12,00-13,00 meters.

OA-2.2 — Lands need precation for settlements slope rate is steeper than 10%. Alternation of gravelstone, sandstone, claystones. Samanlık and Ilıcaspınar Formations. No ground water level exists. Seepage water is possible. Precations should be taken against the possible slope stability problems.

UOA-3 — Unsuitable lands, under coverage of flood risk area which has been declerated as the council of ministry's desicion, memorandum number is 2008 / 13558 these land sections are not suitable for housing settlement.

Client :Acwa Power Electrcity Generation Ltd. Co.

KILIÇLAR, YAHŞİHAN, (KIRIKKALE)
DOĞALGAZ KOMBİNE ÇEVRİM ENERJİ SANTRALI
NATURAL GAS COMBINED CYCLE POWER PLANT

1 / 2000 SCALED GEOLOGICAL AND SETTLEMENT SUITABILITY MAP

	TITLE	NAME AND SURNAME	SIGNATURE	DATE
Prepared by	Geological Eng.	Demet ÇELİK		
Drawing by	Geological Eng.	Demet ÇELİK		
Checked by	Msc Geological Eng.	Ramen AREL		

SCALE : 1/2000 | MAP SECTION :

EFOL GEOTECHNICAL SERVICES Ltd. Co.

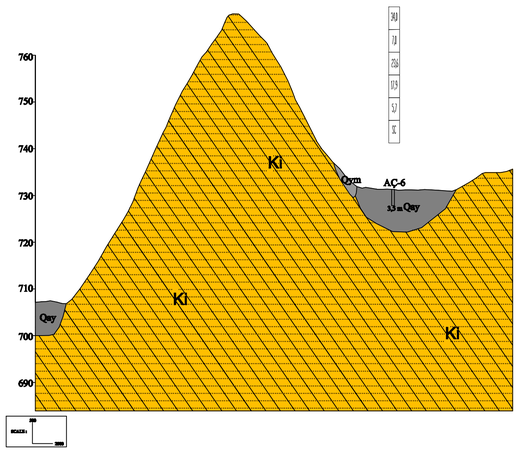
E & K Geology-Geotechnical Engineering Ltd. Co.

A

N

A'

S

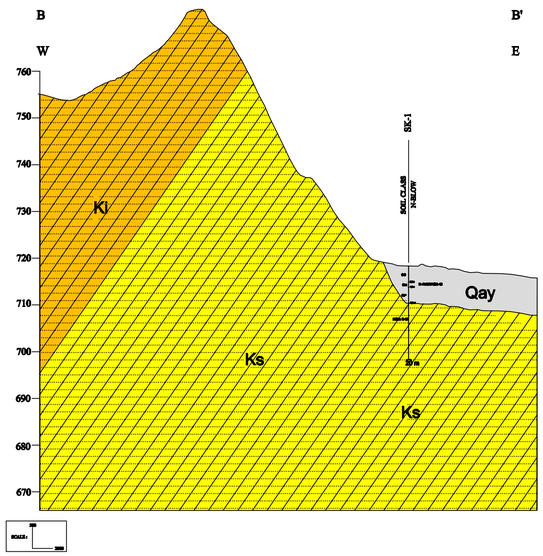


B

W

B'

E

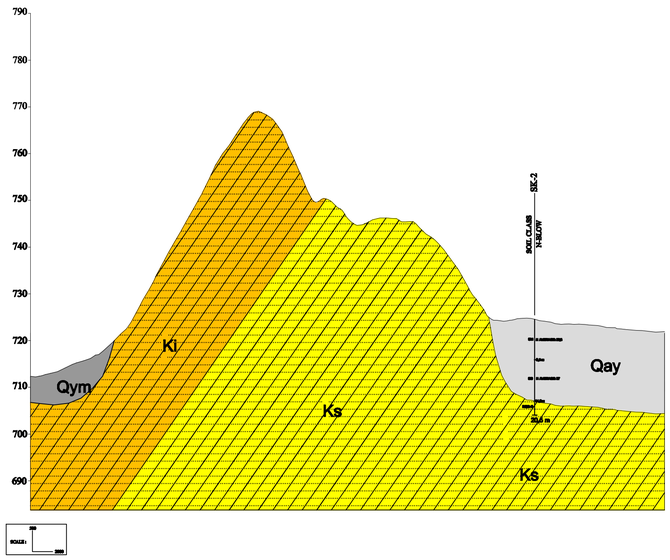


C

NW

C'

SE

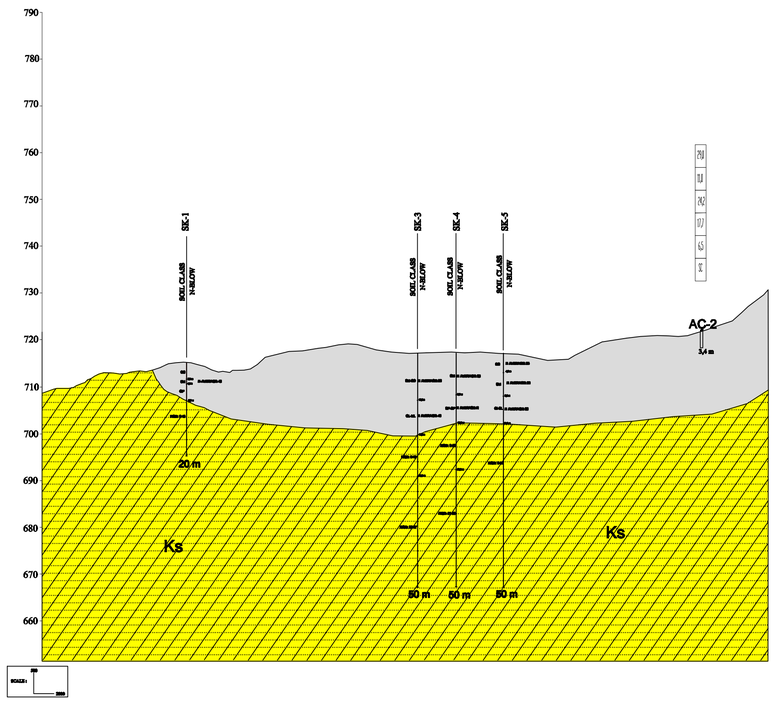


D

NW

D'

SE



Qym Debris flow

Qay Alluvial fan deposits.

Tks Samanlık Formation : Alternation of gravelstone, sandstone, claystone.

Tki Tıcapınar Formation : Alternation of gravelstone, sandstone.

- Retained percentage, No : 4
- Passing percentage, No :200
- Liquid limit %
- Plastic Limit %
- Plasticity Index %
- Soil Class

Client :Acwa Power Electricity Generation Ltd. Co.

KILIÇLAR, YAHŞİHAN, (KIRIKKALE)
DOĞALGAZ KOMBİNE ÇEVRİM ENERJİ SANTRALI
NATURAL GAS COMBINED CYCLE POWER PLANT

GEOLOGICAL CROSS SECTIONS

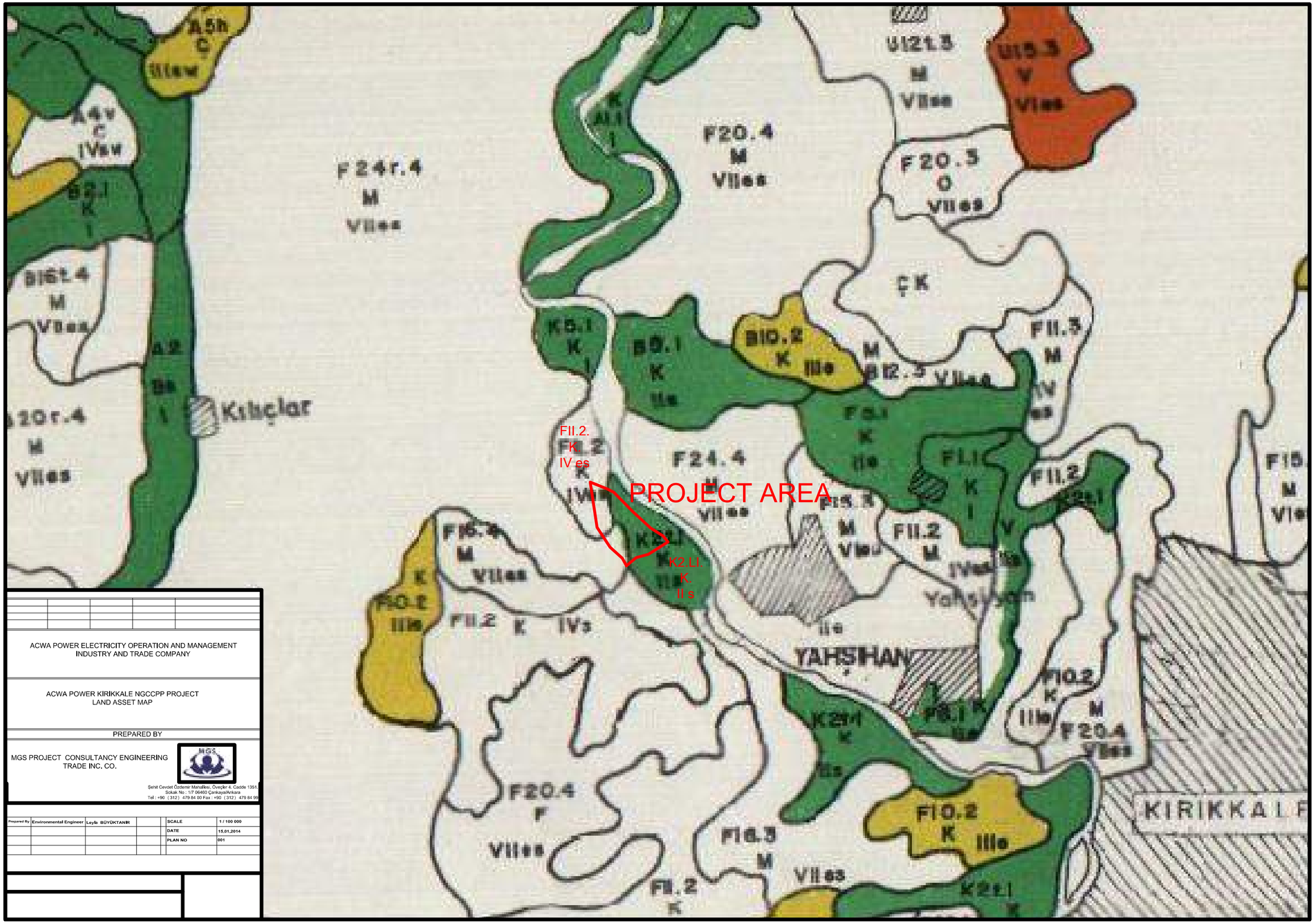
	TITLE	NAME AND SURNAME	SIGNATURE	DATE
Prepared by	Geological Eng.	Demet ÇELİK		
Drawing by	Geological Eng.	Demet ÇELİK		
Checked by	Msc Geological Eng.	Eymen AREL		

SCALE : NEXT TO THE CROSS SECTION | MAP SECTION :

EFOL GEOTECHNICAL SERVICES Ltd. Co.

E & K Geology-Geotechnical Engineering Ltd. Co.

LAND ASSET MAP



ACWA POWER ELECTRICITY OPERATION AND MANAGEMENT INDUSTRY AND TRADE COMPANY

ACWA POWER KIRIKKALE NGCCPP PROJECT
LAND ASSET MAP

PREPARED BY

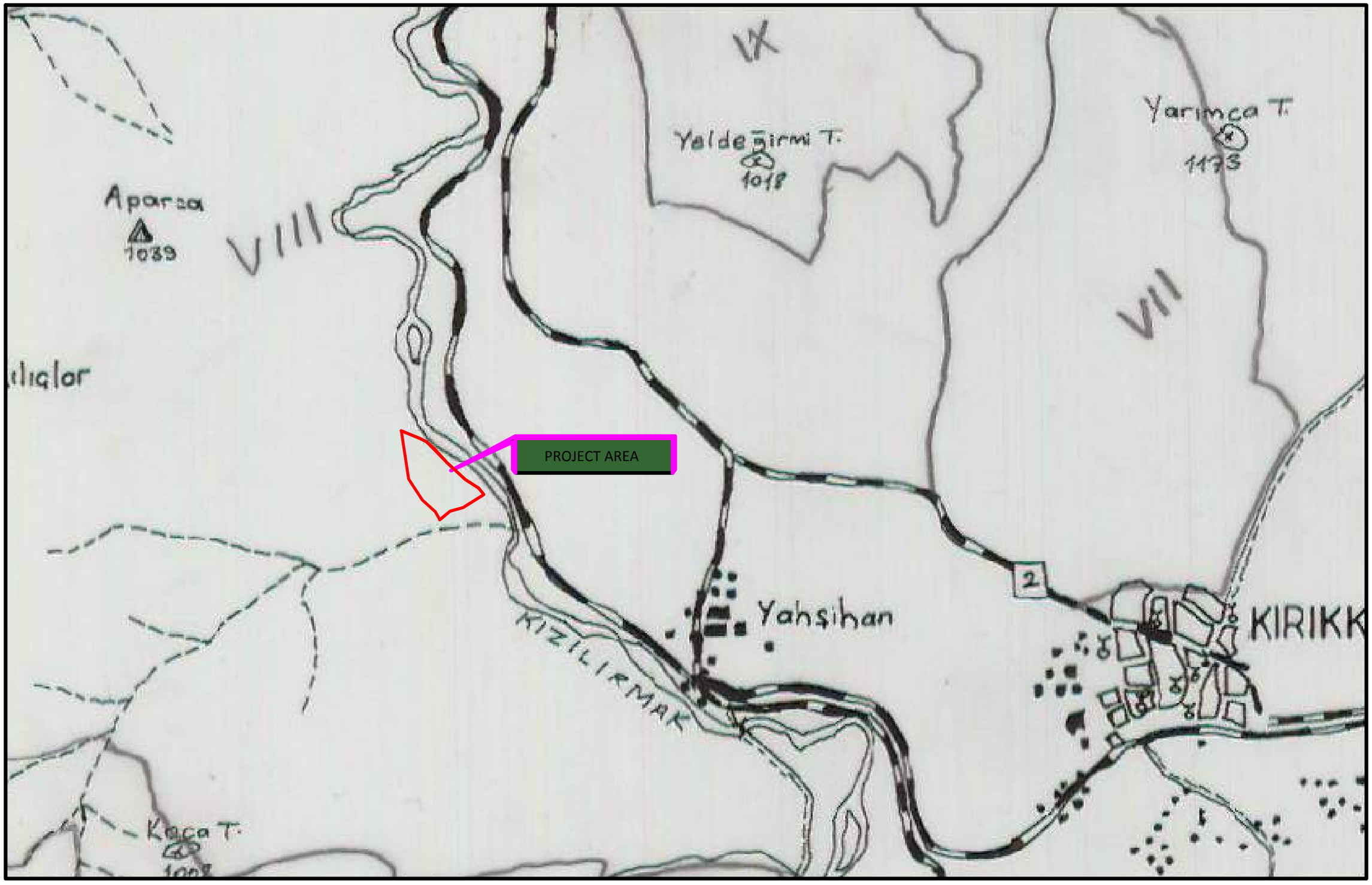
MGS PROJECT CONSULTANCY ENGINEERING TRADE INC. CO.

Şehit Cevdet Özdemir Mahallesi, Üveçler 4. Cadde 1351. Sokak No : 1/7 06460 Çankaya/Ankara
Tel : +90 (312) 479 84 00 Fax : +90 (312) 479 84 99

Prepared By	Environmental Engineer	Leyla BÜYÜKTANIR			SCALE	1 / 100 000
					DATE	15.01.2014
					PLAN NO	001

STAND MAP

Acwa Power Kırıkkale NGCCPP Project Stand Map



ANNEX 3
AIR QUALITY MODEL OUTPUTS

```
CO STARTING
CO TITLEONE  ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT
CO MODELOPT  DFAULT  CONC
CO RUNORNOT  RUN
CO AVERTIME  1  ANNUAL
CO POLLUTID  NOX
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  BACA1      POINT    534821 4415299   676.86
SO LOCATION  BACA2    POINT  534847 4415267   676.86
**SRCDESCR ACWA POWER NGCCPP
SO LOCATION  ESER1A    POINT     535249  4417479  680
SO LOCATION  ESER1B    POINT     535283  4417499  680
**SRCDESCR ESER NGCCPP
SO LOCATION  KKALE1    POINT     539763.0  4423247.0  940
SO LOCATION  KKALE2    POINT     539774.0  4423312.0  941
SO LOCATION  KKALE3    POINT     539783.0  4423378.0  940
**SRCDESCR KIRIKKALE NGCCPP
SO SRCPARAM  BACA1     28.13  75  360.15  31.2  5.5
SO SRCPARAM  BACA2     28.13  75  360.15  31.2  5.5
SO SRCPARAM  ESER1A    28.13  75  360.15  31.2  5.5
SO SRCPARAM  ESER1B    28.13  75  360.15  31.2  5.5
SO SRCPARAM  KKALE1    15.32  80  365.49  18.85  7
SO SRCPARAM  KKALE2    15.32  80  365.49  18.85  7
SO SRCPARAM  KKALE3    15.32  80  365.49  18.85  7
SO SRCGROUP TESIS BACA1 BACA2
SO SRCGROUP KUMULAT BACA1 BACA2  ESER1A ESER1B KKALE1 KKALE2 KKALE3
SO FINISHED
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RE STARTING

RE ELEVUNIT METERS

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RE DISCCART 526750 4422250 794.5 794.5

RE DISCCART 527250 4422250 808.4 808.4

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RE DISCCART 528250 4422250 808.5 808.5

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RE DISCCART 529750 4422750 856 856

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RE DISCCART 532750 4424250 977.2 977.2

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RE DISCCART 540750 4424250 831.5 831.5

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RE DISCCART 541750 4424250 906.9 906.9

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RE DISCCART 533750 4424750 912.7 912.7

RE DISCCART 534250 4424750 821.4 821.4

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RE DISCCART 535750 4424750 763.2 763.2

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RE DISCCART 536750 4424750 662.8 662.8

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RE DISCCART 529750 4425250 1062.3 1062.3

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RE DISCCART 530750 4425250 967.9 967.9

RE DISCCART 531250 4425250 1063.4 1063.4

RE DISCCART 531750 4425250 1115.4 1115.4

RE DISCCART 532250 4425250 1136.6 1136.6

RE DISCCART 532750 4425250 1117.2 1117.2

RE DISCCART 533250 4425250 1036.1 1036.1

RE DISCCART 533750 4425250 934.3 934.3

RE DISCCART 534250 4425250 857.1 857.1

RE DISCCART 534750 4425250 846.1 846.1

RE DISCCART 535250 4425250 806 806

RE DISCCART 535750 4425250 817.1 817.1

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RE DISCCART 536750 4425250 657.5 657.5

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RE DISCCART 537750 4425250 669.3 669.3

RE DISCCART 538250 4425250 708.8 708.8

RE DISCCART 538750 4425250 717.9 717.9

RE DISCCART 539250 4425250 727.5 727.5

RE DISCCART 539750 4425250 764.7 764.7

RE DISCCART 540250 4425250 825.7 825.7

RE DISCCART 540750 4425250 813.1 813.1

RE DISCCART 541250 4425250 843 843

RE DISCCART 541750 4425250 892.3 892.3

RE DISCCART 542250 4425250 955.9 955.9

RE DISCCART 542750 4425250 992 992

RE DISCCART 528142.3 4424000.1 1039.79 1426

** RCPDESCR KAYADIBI

RE DISCCART 528641.5 4421424.2 788.36 1426

** RCPDESCR KAYADIBI-1

RE DISCCART 530578.2 4414421.8 738.17 1037.6

** RCPDESCR KILIÇLAR

RE DISCCART 533199.9 4420647 701.35 1183.8

** RCPDESCR IRMAK

RE DISCCART 537336.4 4419481.4 694.83 843.1

** RCPDESCR HACIBALI

RE DISCCART 538624.8 4413866.5 766.42 1059.9

** RCPDESCR YENISEHIR MAH

RE DISCCART 538699 4411952.4 726.01 726.01

** RCPDESCR YAHSIHAN

RE DISCCART 539685.2 4412636.4 760.59 760.59

** RCPDESCR KIRIKKALE SANAYI

RE DISCCART 540884.8 4419539.6 843.38 1271.9

** RCPDESCR MAHMUTLAR

RE FINISHED

ME STARTING

ME SURFFILE KKALE1.SFC

ME PROFFILE KKALE1.PFL

ME SURFDATA 17135 2012 KIRIKKALE

ME UAIRDATA 17130 2012 ANKARA

ME PROFBASE 750

ME FINISHED

OU STARTING

OU RECTABLE 1 FIRST

OU PLOTFILE 1 TESIS FIRST TESIS1.plt

OU PLOTFILE ANNUAL TESIS TESISANNUAL.plt

OU PLOTFILE 1 KUMULAT FIRST KUMULAT1.plt

OU PLOTFILE ANNUAL KUMULAT KUMULATANNUAL.plt

OU FINISHED

****

*** SETUP Finishes Successfully ***

****

*** AERMOD - VERSION 12345 *** *** ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT *** 09/03/13

*** *** 09:42:07

PAGE 1

**MODELOPTs: RegDFAULT CONC ELEV

*** MODEL SETUP OPTIONS SUMMARY ***

**Model Is Setup For Calculation of Average CONCentration Values.

-- DEPOSITION LOGIC --

**NO GAS DEPOSITION Data Provided.

**NO PARTICLE DEPOSITION Data Provided.

**Model Uses NO DRY DEPLETION. DRYDPLT = F

**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:

1. Stack-tip Downwash.
2. Model Accounts for ELEVated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 1-HR
and Calculates ANNUAL Averages

**This Run Includes: 7 Source(s); 2 Source Group(s); and 1094 Receptor(s)

**The Model Assumes A Pollutant Type of: NOX

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:

Model Outputs Tables of ANNUAL Averages by Receptor

Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 750.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 3.7 MB of RAM.

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR VARY BY	EMIS RATE SCALAR
BACA1	0	0.28130E+02	534821.0	4415299.0	676.9	75.00	360.15	31.20	5.50	NO	NO	NO	
BACA2	0	0.28130E+02	534847.0	4415267.0	676.9	75.00	360.15	31.20	5.50	NO	NO	NO	
ESER1A	0	0.28130E+02	535249.0	4417479.0	680.0	75.00	360.15	31.20	5.50	NO	NO	NO	
ESER1B	0	0.28130E+02	535283.0	4417499.0	680.0	75.00	360.15	31.20	5.50	NO	NO	NO	
KKALE1	0	0.15320E+02	539763.0	4423247.0	940.0	80.00	365.49	18.85	7.00	NO	NO	NO	
KKALE2	0	0.15320E+02	539774.0	4423312.0	941.0	80.00	365.49	18.85	7.00	NO	NO	NO	
KKALE3	0	0.15320E+02	539783.0	4423378.0	940.0	80.00	365.49	18.85	7.00	NO	NO	NO	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID SOURCE IDs

TESIS BACA1 , BACA2 ,

KUMULAT BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(526750.0, 4409250.0, 798.3, 798.3, 0.0); (527250.0, 4409250.0, 815.8, 815.8, 0.0);

(527750.0, 4409250.0, 812.9, 812.9, 0.0); (528250.0, 4409250.0, 864.8, 864.8, 0.0);

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(529750.0, 4409250.0, 1041.7, 1041.7, 0.0); (530250.0, 4409250.0, 972.4, 972.4, 0.0);

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(531750.0, 4409250.0, 842.5, 842.5, 0.0); (532250.0, 4409250.0, 918.9, 918.9, 0.0);

(532750.0, 4409250.0, 949.0, 949.0, 0.0); (533250.0, 4409250.0, 976.2, 976.2, 0.0);

(533750.0, 4409250.0, 959.5, 959.5, 0.0); (534250.0, 4409250.0, 916.1, 916.1, 0.0);

(534750.0, 4409250.0, 872.4, 872.4, 0.0); (535250.0, 4409250.0, 832.5, 832.5, 0.0);

(535750.0, 4409250.0, 813.6, 813.6, 0.0); (536250.0, 4409250.0, 789.7, 789.7, 0.0);

(536750.0, 4409250.0, 793.4, 793.4, 0.0); (537250.0, 4409250.0, 789.2, 789.2, 0.0);

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(528750.0, 4410250.0, 824.5, 824.5, 0.0); (529250.0, 4410250.0, 914.7, 914.7, 0.0);

(529750.0, 4410250.0, 951.6, 951.6, 0.0); (530250.0, 4410250.0, 963.0, 963.0, 0.0);

(530750.0, 4410250.0, 930.2, 930.2, 0.0); (531250.0, 4410250.0, 933.3, 933.3, 0.0);

(531750.0, 4410250.0, 836.9, 836.9, 0.0); (532250.0, 4410250.0, 814.0, 814.0, 0.0);

(532750.0, 4410250.0, 872.1, 872.1, 0.0); (533250.0, 4410250.0, 846.9, 846.9, 0.0);

(533750.0, 4410250.0, 922.2, 922.2, 0.0); (534250.0, 4410250.0, 890.0, 890.0, 0.0);

(534750.0, 4410250.0, 808.3, 808.3, 0.0); (535250.0, 4410250.0, 793.0, 793.0, 0.0);

(535750.0, 4410250.0, 790.6, 790.6, 0.0); (536250.0, 4410250.0, 774.8, 774.8, 0.0);

(536750.0, 4410250.0, 742.2, 742.2, 0.0); (537250.0, 4410250.0, 700.1, 700.1, 0.0);

(537750.0, 4410250.0, 694.1, 694.1, 0.0); (538250.0, 4410250.0, 707.3, 707.3, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(538750.0, 4410250.0, 679.2, 679.2, 0.0); (539250.0, 4410250.0, 679.4, 679.4, 0.0);

(539750.0, 4410250.0, 680.4, 680.4, 0.0); (540250.0, 4410250.0, 685.8, 685.8, 0.0);

(540750.0, 4410250.0, 698.2, 698.2, 0.0); (541250.0, 4410250.0, 728.1, 728.1, 0.0);

(541750.0, 4410250.0, 756.2, 756.2, 0.0); (542250.0, 4410250.0, 753.0, 753.0, 0.0);

(542750.0, 4410250.0, 726.8, 726.8, 0.0); (526750.0, 4410750.0, 986.3, 986.3, 0.0);

(527250.0, 4410750.0, 1022.0, 1022.0, 0.0); (527750.0, 4410750.0, 830.2, 830.2, 0.0);

(528250.0, 4410750.0, 831.9, 831.9, 0.0); (528750.0, 4410750.0, 786.1, 786.1, 0.0);

(529250.0, 4410750.0, 906.3, 906.3, 0.0); (529750.0, 4410750.0, 861.0, 861.0, 0.0);

(530250.0, 4410750.0, 942.6, 942.6, 0.0); (530750.0, 4410750.0, 929.1, 929.1, 0.0);

(531250.0, 4410750.0, 908.1, 908.1, 0.0); (531750.0, 4410750.0, 889.7, 889.7, 0.0);

(532250.0, 4410750.0, 829.5, 829.5, 0.0); (532750.0, 4410750.0, 805.7, 805.7, 0.0);

(533250.0, 4410750.0, 799.6, 799.6, 0.0); (533750.0, 4410750.0, 833.4, 833.4, 0.0);

(534250.0, 4410750.0, 844.4, 844.4, 0.0); (534750.0, 4410750.0, 811.3, 811.3, 0.0);

(535250.0, 4410750.0, 780.1, 780.1, 0.0); (535750.0, 4410750.0, 751.9, 751.9, 0.0);

(536250.0, 4410750.0, 800.7, 800.7, 0.0); (536750.0, 4410750.0, 717.4, 717.4, 0.0);

(537250.0, 4410750.0, 675.7, 675.7, 0.0); (537750.0, 4410750.0, 675.1, 675.1, 0.0);

(538250.0, 4410750.0, 688.2, 688.2, 0.0); (538750.0, 4410750.0, 702.9, 702.9, 0.0);

(539250.0, 4410750.0, 698.7, 698.7, 0.0); (539750.0, 4410750.0, 730.3, 730.3, 0.0);

(540250.0, 4410750.0, 744.7, 744.7, 0.0); (540750.0, 4410750.0, 746.8, 746.8, 0.0);

(541250.0, 4410750.0, 722.6, 722.6, 0.0); (541750.0, 4410750.0, 762.6, 762.6, 0.0);

(542250.0, 4410750.0, 769.8, 769.8, 0.0); (542750.0, 4410750.0, 744.5, 744.5, 0.0);

(526750.0, 4411250.0, 1098.9, 1098.9, 0.0); (527250.0, 4411250.0, 1048.1, 1048.1, 0.0);

(527750.0, 4411250.0, 963.8, 963.8, 0.0); (528250.0, 4411250.0, 826.4, 826.4, 0.0);

(528750.0, 4411250.0, 757.4, 757.4, 0.0); (529250.0, 4411250.0, 804.1, 804.1, 0.0);

(529750.0, 4411250.0, 837.8, 837.8, 0.0); (530250.0, 4411250.0, 879.2, 879.2, 0.0);

(530750.0, 4411250.0, 961.8, 961.8, 0.0); (531250.0, 4411250.0, 948.5, 948.5, 0.0);

(531750.0, 4411250.0, 903.0, 903.0, 0.0); (532250.0, 4411250.0, 833.9, 833.9, 0.0);

(532750.0, 4411250.0, 799.5, 799.5, 0.0); (533250.0, 4411250.0, 766.5, 766.5, 0.0);

(533750.0, 4411250.0, 791.3, 791.3, 0.0); (534250.0, 4411250.0, 789.1, 789.1, 0.0);

(534750.0, 4411250.0, 792.5, 792.5, 0.0); (535250.0, 4411250.0, 741.1, 741.1, 0.0);

(535750.0, 4411250.0, 725.0, 725.0, 0.0); (536250.0, 4411250.0, 792.2, 792.2, 0.0);

(536750.0, 4411250.0, 672.5, 672.5, 0.0); (537250.0, 4411250.0, 674.0, 674.0, 0.0);

(537750.0, 4411250.0, 686.7, 686.7, 0.0); (538250.0, 4411250.0, 699.9, 699.9, 0.0);

(538750.0, 4411250.0, 705.3, 705.3, 0.0); (539250.0, 4411250.0, 729.0, 729.0, 0.0);

(539750.0, 4411250.0, 730.1, 730.1, 0.0); (540250.0, 4411250.0, 766.2, 766.2, 0.0);

(540750.0, 4411250.0, 795.8, 795.8, 0.0); (541250.0, 4411250.0, 741.8, 741.8, 0.0);

(541750.0, 4411250.0, 763.9, 763.9, 0.0); (542250.0, 4411250.0, 773.1, 773.1, 0.0);

(542750.0, 4411250.0, 766.3, 766.3, 0.0); (526750.0, 4411750.0, 997.0, 997.0, 0.0);

(527250.0, 4411750.0, 981.9, 981.9, 0.0); (527750.0, 4411750.0, 990.5, 990.5, 0.0);

(528250.0, 4411750.0, 839.3, 839.3, 0.0); (528750.0, 4411750.0, 828.0, 828.0, 0.0);

(529250.0, 4411750.0, 748.9, 748.9, 0.0); (529750.0, 4411750.0, 798.1, 798.1, 0.0);

(530250.0, 4411750.0, 894.6, 894.6, 0.0); (530750.0, 4411750.0, 960.8, 960.8, 0.0);

(531250.0, 4411750.0, 987.6, 987.6, 0.0); (531750.0, 4411750.0, 951.8, 951.8, 0.0);

(532250.0, 4411750.0, 871.3, 871.3, 0.0); (532750.0, 4411750.0, 824.5, 824.5, 0.0);

(533250.0, 4411750.0, 785.4, 785.4, 0.0); (533750.0, 4411750.0, 749.5, 749.5, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(534250.0,	4411750.0,	733.9,	733.9,	0.0);	(534750.0,	4411750.0,	728.8,	728.8,	0.0);
(535250.0,	4411750.0,	731.0,	731.0,	0.0);	(535750.0,	4411750.0,	735.9,	735.9,	0.0);
(536250.0,	4411750.0,	685.9,	685.9,	0.0);	(536750.0,	4411750.0,	676.6,	676.6,	0.0);
(537250.0,	4411750.0,	692.7,	692.7,	0.0);	(537750.0,	4411750.0,	702.8,	702.8,	0.0);
(538250.0,	4411750.0,	716.1,	716.1,	0.0);	(538750.0,	4411750.0,	719.7,	719.7,	0.0);
(539250.0,	4411750.0,	736.6,	736.6,	0.0);	(539750.0,	4411750.0,	727.2,	727.2,	0.0);
(540250.0,	4411750.0,	755.5,	755.5,	0.0);	(540750.0,	4411750.0,	788.9,	788.9,	0.0);
(541250.0,	4411750.0,	757.9,	757.9,	0.0);	(541750.0,	4411750.0,	764.7,	764.7,	0.0);
(542250.0,	4411750.0,	785.5,	785.5,	0.0);	(542750.0,	4411750.0,	774.3,	774.3,	0.0);
(526750.0,	4412250.0,	927.9,	927.9,	0.0);	(527250.0,	4412250.0,	943.8,	943.8,	0.0);
(527750.0,	4412250.0,	951.7,	951.7,	0.0);	(528250.0,	4412250.0,	895.3,	895.3,	0.0);
(528750.0,	4412250.0,	902.9,	902.9,	0.0);	(529250.0,	4412250.0,	757.1,	757.1,	0.0);
(529750.0,	4412250.0,	743.0,	743.0,	0.0);	(530250.0,	4412250.0,	829.7,	829.7,	0.0);
(530750.0,	4412250.0,	900.0,	900.0,	0.0);	(531250.0,	4412250.0,	984.4,	984.4,	0.0);
(531750.0,	4412250.0,	942.8,	942.8,	0.0);	(532250.0,	4412250.0,	866.0,	866.0,	0.0);
(532750.0,	4412250.0,	827.4,	827.4,	0.0);	(533250.0,	4412250.0,	798.2,	798.2,	0.0);
(533750.0,	4412250.0,	770.6,	770.6,	0.0);	(534250.0,	4412250.0,	763.2,	763.2,	0.0);
(534750.0,	4412250.0,	739.5,	739.5,	0.0);	(535250.0,	4412250.0,	717.4,	717.4,	0.0);
(535750.0,	4412250.0,	689.0,	689.0,	0.0);	(536250.0,	4412250.0,	676.7,	676.7,	0.0);
(536750.0,	4412250.0,	700.0,	700.0,	0.0);	(537250.0,	4412250.0,	730.7,	730.7,	0.0);
(537750.0,	4412250.0,	732.1,	732.1,	0.0);	(538250.0,	4412250.0,	771.0,	771.0,	0.0);
(538750.0,	4412250.0,	739.2,	739.2,	0.0);	(539250.0,	4412250.0,	750.2,	750.2,	0.0);
(539750.0,	4412250.0,	743.2,	743.2,	0.0);	(540250.0,	4412250.0,	762.3,	762.3,	0.0);
(540750.0,	4412250.0,	821.3,	821.3,	0.0);	(541250.0,	4412250.0,	771.0,	771.0,	0.0);

(541750.0, 4412250.0, 780.7, 780.7, 0.0); (542250.0, 4412250.0, 797.2, 797.2, 0.0);

(542750.0, 4412250.0, 797.4, 797.4, 0.0); (526750.0, 4412750.0, 891.5, 891.5, 0.0);

(527250.0, 4412750.0, 921.1, 921.1, 0.0); (527750.0, 4412750.0, 899.9, 899.9, 0.0);

(528250.0, 4412750.0, 921.3, 921.3, 0.0); (528750.0, 4412750.0, 921.3, 921.3, 0.0);

(529250.0, 4412750.0, 845.7, 845.7, 0.0); (529750.0, 4412750.0, 748.6, 748.6, 0.0);

(530250.0, 4412750.0, 769.0, 769.0, 0.0); (530750.0, 4412750.0, 877.4, 877.4, 0.0);

(531250.0, 4412750.0, 981.8, 981.8, 0.0); (531750.0, 4412750.0, 971.1, 971.1, 0.0);

(532250.0, 4412750.0, 901.8, 901.8, 0.0); (532750.0, 4412750.0, 871.8, 871.8, 0.0);

(533250.0, 4412750.0, 837.0, 837.0, 0.0); (533750.0, 4412750.0, 833.1, 833.1, 0.0);

(534250.0, 4412750.0, 763.2, 763.2, 0.0); (534750.0, 4412750.0, 739.8, 739.8, 0.0);

(535250.0, 4412750.0, 703.8, 703.8, 0.0); (535750.0, 4412750.0, 681.5, 681.5, 0.0);

(536250.0, 4412750.0, 672.6, 672.6, 0.0); (536750.0, 4412750.0, 732.9, 732.9, 0.0);

(537250.0, 4412750.0, 748.7, 748.7, 0.0); (537750.0, 4412750.0, 752.6, 752.6, 0.0);

(538250.0, 4412750.0, 791.2, 791.2, 0.0); (538750.0, 4412750.0, 763.7, 763.7, 0.0);

(539250.0, 4412750.0, 758.9, 758.9, 0.0); (539750.0, 4412750.0, 760.8, 760.8, 0.0);

(540250.0, 4412750.0, 762.8, 762.8, 0.0); (540750.0, 4412750.0, 789.5, 789.5, 0.0);

(541250.0, 4412750.0, 786.7, 786.7, 0.0); (541750.0, 4412750.0, 806.1, 806.1, 0.0);

(542250.0, 4412750.0, 819.7, 819.7, 0.0); (542750.0, 4412750.0, 823.1, 823.1, 0.0);

(526750.0, 4413250.0, 872.0, 872.0, 0.0); (527250.0, 4413250.0, 864.6, 864.6, 0.0);

(527750.0, 4413250.0, 896.3, 896.3, 0.0); (528250.0, 4413250.0, 921.2, 921.2, 0.0);

(528750.0, 4413250.0, 869.4, 869.4, 0.0); (529250.0, 4413250.0, 839.0, 839.0, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(529750.0, 4413250.0, 776.6, 776.6, 0.0); (530250.0, 4413250.0, 737.5, 737.5, 0.0);

(530750.0, 4413250.0, 820.8, 820.8, 0.0); (531250.0, 4413250.0, 900.6, 900.6, 0.0);

(531750.0, 4413250.0, 985.3, 985.3, 0.0); (532250.0, 4413250.0, 988.4, 988.4, 0.0);

(532750.0, 4413250.0, 975.5, 975.5, 0.0); (533250.0, 4413250.0, 878.9, 878.9, 0.0);

(533750.0, 4413250.0, 836.0, 836.0, 0.0); (534250.0, 4413250.0, 754.8, 754.8, 0.0);

(534750.0, 4413250.0, 736.9, 736.9, 0.0); (535250.0, 4413250.0, 693.1, 693.1, 0.0);

(535750.0, 4413250.0, 672.2, 672.2, 0.0); (536250.0, 4413250.0, 701.2, 701.2, 0.0);

(536750.0, 4413250.0, 738.7, 738.7, 0.0); (537250.0, 4413250.0, 785.3, 785.3, 0.0);

(537750.0, 4413250.0, 772.4, 772.4, 0.0); (538250.0, 4413250.0, 778.7, 778.7, 0.0);

(538750.0, 4413250.0, 767.8, 767.8, 0.0); (539250.0, 4413250.0, 775.1, 775.1, 0.0);

(539750.0, 4413250.0, 777.8, 777.8, 0.0); (540250.0, 4413250.0, 780.3, 780.3, 0.0);

(540750.0, 4413250.0, 802.8, 802.8, 0.0); (541250.0, 4413250.0, 810.6, 810.6, 0.0);

(541750.0, 4413250.0, 849.8, 849.8, 0.0); (542250.0, 4413250.0, 856.5, 856.5, 0.0);

(542750.0, 4413250.0, 860.6, 860.6, 0.0); (526750.0, 4413750.0, 890.8, 890.8, 0.0);

(527250.0, 4413750.0, 858.1, 858.1, 0.0); (527750.0, 4413750.0, 866.7, 866.7, 0.0);

(528250.0, 4413750.0, 926.6, 926.6, 0.0); (528750.0, 4413750.0, 926.8, 926.8, 0.0);

(529250.0, 4413750.0, 824.4, 824.4, 0.0); (529750.0, 4413750.0, 774.0, 774.0, 0.0);

(530250.0, 4413750.0, 730.0, 730.0, 0.0); (530750.0, 4413750.0, 787.4, 787.4, 0.0);

(531250.0, 4413750.0, 860.4, 860.4, 0.0); (531750.0, 4413750.0, 931.7, 931.7, 0.0);

(532250.0, 4413750.0, 1022.1, 1022.1, 0.0); (532750.0, 4413750.0, 947.3, 947.3, 0.0);

(533750.0, 4413750.0, 806.5, 806.5, 0.0); (534250.0, 4413750.0, 784.1, 784.1, 0.0);

(534750.0, 4413750.0, 710.5, 710.5, 0.0); (535250.0, 4413750.0, 678.9, 678.9, 0.0);

(535750.0, 4413750.0, 680.7, 680.7, 0.0); (536250.0, 4413750.0, 734.5, 734.5, 0.0);

(536750.0, 4413750.0, 746.3, 746.3, 0.0); (537250.0, 4413750.0, 795.2, 795.2, 0.0);

(537750.0, 4413750.0, 765.7, 765.7, 0.0); (538250.0, 4413750.0, 750.7, 750.7, 0.0);

(538750.0, 4413750.0, 766.7, 766.7, 0.0); (539250.0, 4413750.0, 789.9, 789.9, 0.0);

(539750.0, 4413750.0, 792.4, 792.4, 0.0); (540250.0, 4413750.0, 798.2, 798.2, 0.0);

(540750.0, 4413750.0, 829.2, 829.2, 0.0); (541250.0, 4413750.0, 840.7, 840.7, 0.0);

(541750.0, 4413750.0, 881.1, 881.1, 0.0); (542250.0, 4413750.0, 896.5, 896.5, 0.0);

(542750.0, 4413750.0, 887.5, 887.5, 0.0); (526750.0, 4414250.0, 917.1, 917.1, 0.0);

(527250.0, 4414250.0, 859.1, 859.1, 0.0); (527750.0, 4414250.0, 828.7, 828.7, 0.0);

(528250.0, 4414250.0, 858.7, 858.7, 0.0); (528750.0, 4414250.0, 891.1, 891.1, 0.0);

(529250.0, 4414250.0, 860.3, 860.3, 0.0); (529750.0, 4414250.0, 782.5, 782.5, 0.0);

(530250.0, 4414250.0, 726.9, 726.9, 0.0); (530750.0, 4414250.0, 768.6, 768.6, 0.0);

(531250.0, 4414250.0, 866.7, 866.7, 0.0); (531750.0, 4414250.0, 930.5, 930.5, 0.0);

(532250.0, 4414250.0, 968.8, 968.8, 0.0); (532750.0, 4414250.0, 902.5, 902.5, 0.0);

(533250.0, 4414250.0, 830.2, 830.2, 0.0); (533750.0, 4414250.0, 773.6, 773.6, 0.0);

(534250.0, 4414250.0, 756.8, 756.8, 0.0); (534750.0, 4414250.0, 759.2, 759.2, 0.0);

(535250.0, 4414250.0, 673.6, 673.6, 0.0); (535750.0, 4414250.0, 680.4, 680.4, 0.0);

(536250.0, 4414250.0, 697.8, 697.8, 0.0); (536750.0, 4414250.0, 712.3, 712.3, 0.0);

(537250.0, 4414250.0, 721.4, 721.4, 0.0); (537750.0, 4414250.0, 737.5, 737.5, 0.0);

(538250.0, 4414250.0, 762.5, 762.5, 0.0); (538750.0, 4414250.0, 798.5, 798.5, 0.0);

(539250.0, 4414250.0, 806.7, 806.7, 0.0); (539750.0, 4414250.0, 824.7, 824.7, 0.0);

(540250.0, 4414250.0, 825.7, 825.7, 0.0); (540750.0, 4414250.0, 821.5, 821.5, 0.0);

(541250.0, 4414250.0, 913.8, 913.8, 0.0); (541750.0, 4414250.0, 930.0, 930.0, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(542250.0, 4414250.0, 931.0, 931.0, 0.0); (542750.0, 4414250.0, 938.6, 938.6, 0.0);

(526750.0, 4414750.0, 877.6, 877.6, 0.0); (527250.0, 4414750.0, 847.6, 847.6, 0.0);

(527750.0, 4414750.0, 834.0, 834.0, 0.0); (528250.0, 4414750.0, 808.4, 808.4, 0.0);

(528750.0, 4414750.0, 817.1, 817.1, 0.0); (529250.0, 4414750.0, 793.7, 793.7, 0.0);

(529750.0, 4414750.0, 788.3, 788.3, 0.0); (530250.0, 4414750.0, 723.5, 723.5, 0.0);

(530750.0, 4414750.0, 757.9, 757.9, 0.0); (531250.0, 4414750.0, 846.0, 846.0, 0.0);

(531750.0, 4414750.0, 916.5, 916.5, 0.0); (532250.0, 4414750.0, 990.5, 990.5, 0.0);

(533250.0, 4414750.0, 849.9, 849.9, 0.0); (533750.0, 4414750.0, 778.1, 778.1, 0.0);

(534250.0, 4414750.0, 751.3, 751.3, 0.0); (534750.0, 4414750.0, 710.0, 710.0, 0.0);

(535250.0, 4414750.0, 679.9, 679.9, 0.0); (535750.0, 4414750.0, 678.0, 678.0, 0.0);

(536250.0, 4414750.0, 695.6, 695.6, 0.0); (536750.0, 4414750.0, 714.9, 714.9, 0.0);

(537250.0, 4414750.0, 741.3, 741.3, 0.0); (537750.0, 4414750.0, 752.8, 752.8, 0.0);

(538250.0, 4414750.0, 775.9, 775.9, 0.0); (538750.0, 4414750.0, 809.4, 809.4, 0.0);

(539250.0, 4414750.0, 883.9, 883.9, 0.0); (539750.0, 4414750.0, 854.5, 854.5, 0.0);

(540250.0, 4414750.0, 854.5, 854.5, 0.0); (540750.0, 4414750.0, 844.3, 844.3, 0.0);

(541250.0, 4414750.0, 862.7, 862.7, 0.0); (541750.0, 4414750.0, 922.4, 922.4, 0.0);

(542250.0, 4414750.0, 989.0, 989.0, 0.0); (542750.0, 4414750.0, 1008.1, 1008.1, 0.0);

(526750.0, 4415250.0, 842.8, 842.8, 0.0); (527250.0, 4415250.0, 815.1, 815.1, 0.0);

(527750.0, 4415250.0, 798.7, 798.7, 0.0); (528250.0, 4415250.0, 837.3, 837.3, 0.0);

(528750.0, 4415250.0, 798.1, 798.1, 0.0); (529250.0, 4415250.0, 774.1, 774.1, 0.0);

(529750.0, 4415250.0, 741.6, 741.6, 0.0); (530250.0, 4415250.0, 726.6, 726.6, 0.0);

(530750.0, 4415250.0, 763.7, 763.7, 0.0); (531250.0, 4415250.0, 850.4, 850.4, 0.0);

(531750.0, 4415250.0, 951.4, 951.4, 0.0); (532250.0, 4415250.0, 1013.0, 1013.0, 0.0);

(532750.0, 4415250.0, 872.5, 872.5, 0.0); (533250.0, 4415250.0, 888.2, 888.2, 0.0);

(533750.0, 4415250.0, 784.6, 784.6, 0.0); (534250.0, 4415250.0, 727.9, 727.9, 0.0);

(534750.0, 4415250.0, 684.6, 684.6, 0.0); (535250.0, 4415250.0, 670.8, 670.8, 0.0);

(535750.0, 4415250.0, 694.3, 694.3, 0.0); (536250.0, 4415250.0, 699.8, 699.8, 0.0);

(536750.0, 4415250.0, 743.8, 743.8, 0.0); (537250.0, 4415250.0, 762.8, 762.8, 0.0);

(537750.0, 4415250.0, 772.6, 772.6, 0.0); (538250.0, 4415250.0, 809.3, 809.3, 0.0);

(538750.0, 4415250.0, 892.0, 892.0, 0.0); (539250.0, 4415250.0, 885.7, 885.7, 0.0);

(539750.0, 4415250.0, 921.3, 921.3, 0.0); (540250.0, 4415250.0, 897.1, 897.1, 0.0);

(540750.0, 4415250.0, 886.2, 886.2, 0.0); (541250.0, 4415250.0, 861.3, 861.3, 0.0);

(541750.0, 4415250.0, 938.6, 938.6, 0.0); (542250.0, 4415250.0, 1033.7, 1033.7, 0.0);

(542750.0, 4415250.0, 1048.3, 1048.3, 0.0); (526750.0, 4415750.0, 807.4, 807.4, 0.0);

(527250.0, 4415750.0, 791.3, 791.3, 0.0); (527750.0, 4415750.0, 780.5, 780.5, 0.0);

(528250.0, 4415750.0, 784.7, 784.7, 0.0); (528750.0, 4415750.0, 799.7, 799.7, 0.0);

(529250.0, 4415750.0, 788.9, 788.9, 0.0); (529750.0, 4415750.0, 780.7, 780.7, 0.0);

(530250.0, 4415750.0, 719.3, 719.3, 0.0); (530750.0, 4415750.0, 748.4, 748.4, 0.0);

(531250.0, 4415750.0, 815.3, 815.3, 0.0); (531750.0, 4415750.0, 907.2, 907.2, 0.0);

(532250.0, 4415750.0, 994.2, 994.2, 0.0); (532750.0, 4415750.0, 866.0, 866.0, 0.0);

(533250.0, 4415750.0, 873.6, 873.6, 0.0); (533750.0, 4415750.0, 795.2, 795.2, 0.0);

(534250.0, 4415750.0, 720.1, 720.1, 0.0); (534750.0, 4415750.0, 664.0, 664.0, 0.0);

(535250.0, 4415750.0, 704.7, 704.7, 0.0); (535750.0, 4415750.0, 717.0, 717.0, 0.0);

(536250.0, 4415750.0, 729.1, 729.1, 0.0); (536750.0, 4415750.0, 741.1, 741.1, 0.0);

(537250.0, 4415750.0, 803.2, 803.2, 0.0); (537750.0, 4415750.0, 807.9, 807.9, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(538250.0, 4415750.0, 827.1, 827.1, 0.0); (538750.0, 4415750.0, 885.2, 885.2, 0.0);

(539250.0, 4415750.0, 949.0, 949.0, 0.0); (539750.0, 4415750.0, 952.3, 952.3, 0.0);

(540250.0, 4415750.0, 1008.7, 1008.7, 0.0); (540750.0, 4415750.0, 912.1, 912.1, 0.0);

(541250.0, 4415750.0, 907.8, 907.8, 0.0); (541750.0, 4415750.0, 885.0, 885.0, 0.0);

(542250.0, 4415750.0, 1001.9, 1001.9, 0.0); (542750.0, 4415750.0, 1084.9, 1084.9, 0.0);

(526750.0, 4416250.0, 805.7, 805.7, 0.0); (527250.0, 4416250.0, 783.4, 783.4, 0.0);

(527750.0, 4416250.0, 768.8, 768.8, 0.0); (528250.0, 4416250.0, 757.4, 757.4, 0.0);

(528750.0, 4416250.0, 754.5, 754.5, 0.0); (529250.0, 4416250.0, 755.1, 755.1, 0.0);

(529750.0, 4416250.0, 758.6, 758.6, 0.0); (530250.0, 4416250.0, 712.5, 712.5, 0.0);

(530750.0, 4416250.0, 749.0, 749.0, 0.0); (531250.0, 4416250.0, 828.1, 828.1, 0.0);

(531750.0, 4416250.0, 917.4, 917.4, 0.0); (532250.0, 4416250.0, 973.9, 973.9, 0.0);

(532750.0, 4416250.0, 1013.3, 1013.3, 0.0); (533250.0, 4416250.0, 983.8, 983.8, 0.0);

(533750.0, 4416250.0, 882.2, 882.2, 0.0); (534250.0, 4416250.0, 768.6, 768.6, 0.0);

(534750.0, 4416250.0, 686.1, 686.1, 0.0); (535250.0, 4416250.0, 666.5, 666.5, 0.0);

(535750.0, 4416250.0, 667.0, 667.0, 0.0); (536250.0, 4416250.0, 693.8, 693.8, 0.0);

(536750.0, 4416250.0, 723.7, 723.7, 0.0); (537250.0, 4416250.0, 797.8, 797.8, 0.0);

(537750.0, 4416250.0, 838.5, 838.5, 0.0); (538250.0, 4416250.0, 889.3, 889.3, 0.0);

(538750.0, 4416250.0, 918.8, 918.8, 0.0); (539250.0, 4416250.0, 995.0, 995.0, 0.0);

(539750.0, 4416250.0, 1008.9, 1008.9, 0.0); (540250.0, 4416250.0, 1039.1, 1039.1, 0.0);

(540750.0, 4416250.0, 944.4, 944.4, 0.0); (541250.0, 4416250.0, 962.1, 962.1, 0.0);

(541750.0, 4416250.0, 929.0, 929.0, 0.0); (542250.0, 4416250.0, 911.1, 911.1, 0.0);

(542750.0, 4416250.0, 1035.1, 1035.1, 0.0); (526750.0, 4416750.0, 805.9, 805.9, 0.0);

(527250.0, 4416750.0, 792.9, 792.9, 0.0); (527750.0, 4416750.0, 777.3, 777.3, 0.0);

(528250.0, 4416750.0, 759.0, 759.0, 0.0); (528750.0, 4416750.0, 741.0, 741.0, 0.0);

(529250.0, 4416750.0, 730.2, 730.2, 0.0); (529750.0, 4416750.0, 733.3, 733.3, 0.0);

(530250.0, 4416750.0, 711.1, 711.1, 0.0); (530750.0, 4416750.0, 758.4, 758.4, 0.0);

(531250.0, 4416750.0, 870.0, 870.0, 0.0); (531750.0, 4416750.0, 886.3, 886.3, 0.0);

(532250.0, 4416750.0, 922.7, 922.7, 0.0); (532750.0, 4416750.0, 994.4, 994.4, 0.0);

(533250.0, 4416750.0, 886.3, 886.3, 0.0); (534250.0, 4416750.0, 811.3, 811.3, 0.0);

(534750.0, 4416750.0, 750.6, 750.6, 0.0); (535250.0, 4416750.0, 709.4, 709.4, 0.0);

(535750.0, 4416750.0, 677.9, 677.9, 0.0); (536250.0, 4416750.0, 668.3, 668.3, 0.0);

(536750.0, 4416750.0, 717.5, 717.5, 0.0); (537250.0, 4416750.0, 776.1, 776.1, 0.0);

(537750.0, 4416750.0, 828.7, 828.7, 0.0); (538250.0, 4416750.0, 872.3, 872.3, 0.0);

(538750.0, 4416750.0, 892.5, 892.5, 0.0); (539250.0, 4416750.0, 881.0, 881.0, 0.0);

(539750.0, 4416750.0, 945.1, 945.1, 0.0); (540250.0, 4416750.0, 1030.7, 1030.7, 0.0);

(540750.0, 4416750.0, 1013.9, 1013.9, 0.0); (541250.0, 4416750.0, 1017.7, 1017.7, 0.0);

(541750.0, 4416750.0, 979.7, 979.7, 0.0); (542250.0, 4416750.0, 965.0, 965.0, 0.0);

(542750.0, 4416750.0, 943.4, 943.4, 0.0); (526750.0, 4417250.0, 819.4, 819.4, 0.0);

(527250.0, 4417250.0, 787.5, 787.5, 0.0); (527750.0, 4417250.0, 760.8, 760.8, 0.0);

(528250.0, 4417250.0, 746.7, 746.7, 0.0); (528750.0, 4417250.0, 731.5, 731.5, 0.0);

(529250.0, 4417250.0, 727.0, 727.0, 0.0); (529750.0, 4417250.0, 713.7, 713.7, 0.0);

(530250.0, 4417250.0, 705.5, 705.5, 0.0); (530750.0, 4417250.0, 726.7, 726.7, 0.0);

(531250.0, 4417250.0, 856.9, 856.9, 0.0); (531750.0, 4417250.0, 870.3, 870.3, 0.0);

(532250.0, 4417250.0, 916.2, 916.2, 0.0); (532750.0, 4417250.0, 959.6, 959.6, 0.0);

(533250.0, 4417250.0, 992.7, 992.7, 0.0); (533750.0, 4417250.0, 922.5, 922.5, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(	534250.0,	4417250.0,	834.9,	834.9,	0.0);	(534750.0,	4417250.0,	803.7,	803.7, 0.0);
(	535250.0,	4417250.0,	683.7,	683.7,	0.0);	(535750.0,	4417250.0,	666.9,	666.9, 0.0);
(	536250.0,	4417250.0,	696.2,	696.2,	0.0);	(536750.0,	4417250.0,	734.8,	734.8, 0.0);
(	537250.0,	4417250.0,	744.8,	744.8,	0.0);	(537750.0,	4417250.0,	815.1,	815.1, 0.0);
(	538250.0,	4417250.0,	795.2,	795.2,	0.0);	(538750.0,	4417250.0,	843.6,	843.6, 0.0);
(	539250.0,	4417250.0,	830.4,	830.4,	0.0);	(539750.0,	4417250.0,	866.6,	866.6, 0.0);
(	540250.0,	4417250.0,	920.3,	920.3,	0.0);	(540750.0,	4417250.0,	948.0,	948.0, 0.0);
(	541250.0,	4417250.0,	1015.0,	1015.0,	0.0);	(541750.0,	4417250.0,	1062.2,	1062.2, 0.0);
(	542250.0,	4417250.0,	987.0,	987.0,	0.0);	(542750.0,	4417250.0,	1046.7,	1046.7, 0.0);
(	526750.0,	4417750.0,	846.1,	846.1,	0.0);	(527250.0,	4417750.0,	801.3,	801.3, 0.0);
(	527750.0,	4417750.0,	774.2,	774.2,	0.0);	(528250.0,	4417750.0,	749.9,	749.9, 0.0);
(	528750.0,	4417750.0,	728.3,	728.3,	0.0);	(529250.0,	4417750.0,	716.6,	716.6, 0.0);
(	529750.0,	4417750.0,	707.1,	707.1,	0.0);	(530250.0,	4417750.0,	704.7,	704.7, 0.0);
(	530750.0,	4417750.0,	713.4,	713.4,	0.0);	(531250.0,	4417750.0,	758.1,	758.1, 0.0);
(	531750.0,	4417750.0,	835.0,	835.0,	0.0);	(532250.0,	4417750.0,	886.3,	886.3, 0.0);
(	532750.0,	4417750.0,	927.4,	927.4,	0.0);	(533250.0,	4417750.0,	965.0,	965.0, 0.0);
(	533750.0,	4417750.0,	843.9,	843.9,	0.0);	(534250.0,	4417750.0,	788.6,	788.6, 0.0);
(	534750.0,	4417750.0,	728.3,	728.3,	0.0);	(535250.0,	4417750.0,	666.6,	666.6, 0.0);
(	535750.0,	4417750.0,	679.8,	679.8,	0.0);	(536250.0,	4417750.0,	724.1,	724.1, 0.0);
(	536750.0,	4417750.0,	725.4,	725.4,	0.0);	(537250.0,	4417750.0,	725.2,	725.2, 0.0);
(	537750.0,	4417750.0,	828.8,	828.8,	0.0);	(538250.0,	4417750.0,	789.8,	789.8, 0.0);

(538750.0, 4417750.0, 781.6, 781.6, 0.0); (539250.0, 4417750.0, 804.2, 804.2, 0.0);

(539750.0, 4417750.0, 853.5, 853.5, 0.0); (540250.0, 4417750.0, 876.8, 876.8, 0.0);

(540750.0, 4417750.0, 903.5, 903.5, 0.0); (541250.0, 4417750.0, 978.7, 978.7, 0.0);

(541750.0, 4417750.0, 1073.5, 1073.5, 0.0); (542250.0, 4417750.0, 1012.4, 1012.4, 0.0);

(542750.0, 4417750.0, 1041.0, 1041.0, 0.0); (526750.0, 4418250.0, 911.1, 911.1, 0.0);

(527250.0, 4418250.0, 835.0, 835.0, 0.0); (527750.0, 4418250.0, 781.2, 781.2, 0.0);

(528250.0, 4418250.0, 757.2, 757.2, 0.0); (528750.0, 4418250.0, 734.1, 734.1, 0.0);

(529250.0, 4418250.0, 728.7, 728.7, 0.0); (529750.0, 4418250.0, 715.2, 715.2, 0.0);

(530250.0, 4418250.0, 708.0, 708.0, 0.0); (530750.0, 4418250.0, 702.1, 702.1, 0.0);

(531250.0, 4418250.0, 770.9, 770.9, 0.0); (531750.0, 4418250.0, 890.8, 890.8, 0.0);

(532250.0, 4418250.0, 824.0, 824.0, 0.0); (532750.0, 4418250.0, 839.4, 839.4, 0.0);

(533250.0, 4418250.0, 912.1, 912.1, 0.0); (534250.0, 4418250.0, 787.3, 787.3, 0.0);

(534750.0, 4418250.0, 749.4, 749.4, 0.0); (535250.0, 4418250.0, 708.6, 708.6, 0.0);

(535750.0, 4418250.0, 663.7, 663.7, 0.0); (536250.0, 4418250.0, 678.3, 678.3, 0.0);

(536750.0, 4418250.0, 687.2, 687.2, 0.0); (537250.0, 4418250.0, 731.7, 731.7, 0.0);

(537750.0, 4418250.0, 721.8, 721.8, 0.0); (538250.0, 4418250.0, 770.2, 770.2, 0.0);

(538750.0, 4418250.0, 766.5, 766.5, 0.0); (539250.0, 4418250.0, 806.1, 806.1, 0.0);

(539750.0, 4418250.0, 835.7, 835.7, 0.0); (540250.0, 4418250.0, 857.4, 857.4, 0.0);

(540750.0, 4418250.0, 881.1, 881.1, 0.0); (541250.0, 4418250.0, 938.0, 938.0, 0.0);

(541750.0, 4418250.0, 1052.1, 1052.1, 0.0); (542250.0, 4418250.0, 1084.5, 1084.5, 0.0);

(542750.0, 4418250.0, 1100.6, 1100.6, 0.0); (526750.0, 4418750.0, 892.2, 892.2, 0.0);

(527250.0, 4418750.0, 851.8, 851.8, 0.0); (527750.0, 4418750.0, 772.5, 772.5, 0.0);

(528250.0, 4418750.0, 743.1, 743.1, 0.0); (528750.0, 4418750.0, 727.4, 727.4, 0.0);

(529250.0, 4418750.0, 721.4, 721.4, 0.0); (529750.0, 4418750.0, 718.1, 718.1, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(530250.0, 4418750.0, 712.5, 712.5, 0.0); (530750.0, 4418750.0, 699.1, 699.1, 0.0);

(531250.0, 4418750.0, 705.0, 705.0, 0.0); (531750.0, 4418750.0, 793.0, 793.0, 0.0);

(532250.0, 4418750.0, 780.6, 780.6, 0.0); (532750.0, 4418750.0, 777.8, 777.8, 0.0);

(533250.0, 4418750.0, 877.2, 877.2, 0.0); (533750.0, 4418750.0, 796.7, 796.7, 0.0);

(534250.0, 4418750.0, 792.4, 792.4, 0.0); (534750.0, 4418750.0, 796.8, 796.8, 0.0);

(535250.0, 4418750.0, 737.4, 737.4, 0.0); (535750.0, 4418750.0, 717.8, 717.8, 0.0);

(536250.0, 4418750.0, 665.0, 665.0, 0.0); (536750.0, 4418750.0, 676.9, 676.9, 0.0);

(537250.0, 4418750.0, 700.3, 700.3, 0.0); (537750.0, 4418750.0, 755.1, 755.1, 0.0);

(538250.0, 4418750.0, 831.8, 831.8, 0.0); (538750.0, 4418750.0, 793.7, 793.7, 0.0);

(539250.0, 4418750.0, 804.9, 804.9, 0.0); (539750.0, 4418750.0, 831.3, 831.3, 0.0);

(540250.0, 4418750.0, 833.8, 833.8, 0.0); (540750.0, 4418750.0, 847.2, 847.2, 0.0);

(541250.0, 4418750.0, 892.4, 892.4, 0.0); (541750.0, 4418750.0, 954.0, 954.0, 0.0);

(542250.0, 4418750.0, 1100.0, 1100.0, 0.0); (542750.0, 4418750.0, 1007.3, 1007.3, 0.0);

(526750.0, 4419250.0, 892.1, 892.1, 0.0); (527250.0, 4419250.0, 836.6, 836.6, 0.0);

(527750.0, 4419250.0, 786.3, 786.3, 0.0); (528250.0, 4419250.0, 752.8, 752.8, 0.0);

(528750.0, 4419250.0, 729.0, 729.0, 0.0); (529250.0, 4419250.0, 726.2, 726.2, 0.0);

(529750.0, 4419250.0, 731.0, 731.0, 0.0); (530250.0, 4419250.0, 744.2, 744.2, 0.0);

(530750.0, 4419250.0, 713.0, 713.0, 0.0); (531250.0, 4419250.0, 697.5, 697.5, 0.0);

(531750.0, 4419250.0, 713.8, 713.8, 0.0); (532250.0, 4419250.0, 724.0, 724.0, 0.0);

(532750.0, 4419250.0, 761.4, 761.4, 0.0); (533250.0, 4419250.0, 785.3, 785.3, 0.0);

(533750.0, 4419250.0, 759.8, 759.8, 0.0); (534250.0, 4419250.0, 766.7, 766.7, 0.0);

(534750.0, 4419250.0, 815.9, 815.9, 0.0); (535250.0, 4419250.0, 816.3, 816.3, 0.0);

(535750.0, 4419250.0, 765.3, 765.3, 0.0); (536250.0, 4419250.0, 694.4, 694.4, 0.0);

(536750.0, 4419250.0, 671.2, 671.2, 0.0); (537250.0, 4419250.0, 695.1, 695.1, 0.0);

(537750.0, 4419250.0, 738.7, 738.7, 0.0); (538250.0, 4419250.0, 800.3, 800.3, 0.0);

(538750.0, 4419250.0, 776.6, 776.6, 0.0); (539250.0, 4419250.0, 805.1, 805.1, 0.0);

(539750.0, 4419250.0, 815.8, 815.8, 0.0); (540250.0, 4419250.0, 820.1, 820.1, 0.0);

(540750.0, 4419250.0, 842.9, 842.9, 0.0); (541250.0, 4419250.0, 923.4, 923.4, 0.0);

(541750.0, 4419250.0, 1005.7, 1005.7, 0.0); (542250.0, 4419250.0, 920.9, 920.9, 0.0);

(542750.0, 4419250.0, 973.8, 973.8, 0.0); (526750.0, 4419750.0, 923.4, 923.4, 0.0);

(527250.0, 4419750.0, 818.8, 818.8, 0.0); (527750.0, 4419750.0, 768.5, 768.5, 0.0);

(528250.0, 4419750.0, 741.9, 741.9, 0.0); (528750.0, 4419750.0, 735.6, 735.6, 0.0);

(529250.0, 4419750.0, 738.9, 738.9, 0.0); (529750.0, 4419750.0, 744.5, 744.5, 0.0);

(530250.0, 4419750.0, 764.8, 764.8, 0.0); (530750.0, 4419750.0, 739.6, 739.6, 0.0);

(531250.0, 4419750.0, 709.9, 709.9, 0.0); (531750.0, 4419750.0, 747.0, 747.0, 0.0);

(532250.0, 4419750.0, 726.0, 726.0, 0.0); (532750.0, 4419750.0, 690.7, 690.7, 0.0);

(533250.0, 4419750.0, 722.2, 722.2, 0.0); (533750.0, 4419750.0, 703.0, 703.0, 0.0);

(534250.0, 4419750.0, 741.6, 741.6, 0.0); (534750.0, 4419750.0, 828.6, 828.6, 0.0);

(535250.0, 4419750.0, 786.3, 786.3, 0.0); (535750.0, 4419750.0, 724.3, 724.3, 0.0);

(536250.0, 4419750.0, 672.5, 672.5, 0.0); (536750.0, 4419750.0, 668.7, 668.7, 0.0);

(537250.0, 4419750.0, 679.6, 679.6, 0.0); (537750.0, 4419750.0, 705.9, 705.9, 0.0);

(538250.0, 4419750.0, 746.7, 746.7, 0.0); (538750.0, 4419750.0, 750.7, 750.7, 0.0);

(539250.0, 4419750.0, 780.5, 780.5, 0.0); (539750.0, 4419750.0, 787.2, 787.2, 0.0);

(540250.0, 4419750.0, 801.7, 801.7, 0.0); (540750.0, 4419750.0, 837.7, 837.7, 0.0);

(541250.0, 4419750.0, 884.3, 884.3, 0.0); (541750.0, 4419750.0, 1042.6, 1042.6, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(542250.0, 4419750.0, 1033.1, 1033.1, 0.0); (542750.0, 4419750.0, 1062.5, 1062.5, 0.0);

(526750.0, 4420250.0, 863.5, 863.5, 0.0); (527250.0, 4420250.0, 803.9, 803.9, 0.0);

(527750.0, 4420250.0, 755.9, 755.9, 0.0); (528250.0, 4420250.0, 744.1, 744.1, 0.0);

(528750.0, 4420250.0, 743.4, 743.4, 0.0); (529250.0, 4420250.0, 747.6, 747.6, 0.0);

(529750.0, 4420250.0, 757.8, 757.8, 0.0); (530250.0, 4420250.0, 792.5, 792.5, 0.0);

(530750.0, 4420250.0, 776.2, 776.2, 0.0); (531250.0, 4420250.0, 730.1, 730.1, 0.0);

(531750.0, 4420250.0, 773.1, 773.1, 0.0); (532250.0, 4420250.0, 816.3, 816.3, 0.0);

(532750.0, 4420250.0, 760.3, 760.3, 0.0); (533250.0, 4420250.0, 683.2, 683.2, 0.0);

(533750.0, 4420250.0, 677.2, 677.2, 0.0); (534250.0, 4420250.0, 695.9, 695.9, 0.0);

(534750.0, 4420250.0, 807.3, 807.3, 0.0); (535250.0, 4420250.0, 713.8, 713.8, 0.0);

(535750.0, 4420250.0, 677.1, 677.1, 0.0); (536250.0, 4420250.0, 682.3, 682.3, 0.0);

(536750.0, 4420250.0, 688.6, 688.6, 0.0); (537250.0, 4420250.0, 688.9, 688.9, 0.0);

(537750.0, 4420250.0, 690.3, 690.3, 0.0); (538250.0, 4420250.0, 714.7, 714.7, 0.0);

(538750.0, 4420250.0, 746.1, 746.1, 0.0); (539250.0, 4420250.0, 766.0, 766.0, 0.0);

(539750.0, 4420250.0, 764.2, 764.2, 0.0); (540250.0, 4420250.0, 789.7, 789.7, 0.0);

(540750.0, 4420250.0, 815.2, 815.2, 0.0); (541250.0, 4420250.0, 872.7, 872.7, 0.0);

(541750.0, 4420250.0, 1005.7, 1005.7, 0.0); (542250.0, 4420250.0, 1110.6, 1110.6, 0.0);

(542750.0, 4420250.0, 1078.3, 1078.3, 0.0); (526750.0, 4420750.0, 855.1, 855.1, 0.0);

(527250.0, 4420750.0, 779.9, 779.9, 0.0); (527750.0, 4420750.0, 754.4, 754.4, 0.0);

(528250.0, 4420750.0, 752.5, 752.5, 0.0); (528750.0, 4420750.0, 757.7, 757.7, 0.0);

(529250.0, 4420750.0, 764.3, 764.3, 0.0); (529750.0, 4420750.0, 773.6, 773.6, 0.0);

(530250.0, 4420750.0, 813.1, 813.1, 0.0); (530750.0, 4420750.0, 787.2, 787.2, 0.0);

(531250.0, 4420750.0, 761.8, 761.8, 0.0); (531750.0, 4420750.0, 782.1, 782.1, 0.0);

(532250.0, 4420750.0, 809.6, 809.6, 0.0); (532750.0, 4420750.0, 734.5, 734.5, 0.0);

(533250.0, 4420750.0, 710.1, 710.1, 0.0); (533750.0, 4420750.0, 682.6, 682.6, 0.0);

(534250.0, 4420750.0, 670.7, 670.7, 0.0); (534750.0, 4420750.0, 779.4, 779.4, 0.0);

(535250.0, 4420750.0, 675.1, 675.1, 0.0); (535750.0, 4420750.0, 661.6, 661.6, 0.0);

(536250.0, 4420750.0, 690.3, 690.3, 0.0); (536750.0, 4420750.0, 713.1, 713.1, 0.0);

(537250.0, 4420750.0, 705.8, 705.8, 0.0); (537750.0, 4420750.0, 700.8, 700.8, 0.0);

(538250.0, 4420750.0, 719.7, 719.7, 0.0); (538750.0, 4420750.0, 789.5, 789.5, 0.0);

(539250.0, 4420750.0, 741.4, 741.4, 0.0); (539750.0, 4420750.0, 754.7, 754.7, 0.0);

(540250.0, 4420750.0, 769.5, 769.5, 0.0); (540750.0, 4420750.0, 801.0, 801.0, 0.0);

(541250.0, 4420750.0, 837.4, 837.4, 0.0); (541750.0, 4420750.0, 927.9, 927.9, 0.0);

(542250.0, 4420750.0, 1080.5, 1080.5, 0.0); (542750.0, 4420750.0, 1159.2, 1159.2, 0.0);

(526750.0, 4421250.0, 803.3, 803.3, 0.0); (527250.0, 4421250.0, 764.4, 764.4, 0.0);

(527750.0, 4421250.0, 761.2, 761.2, 0.0); (528250.0, 4421250.0, 768.9, 768.9, 0.0);

(528750.0, 4421250.0, 781.9, 781.9, 0.0); (529250.0, 4421250.0, 786.1, 786.1, 0.0);

(529750.0, 4421250.0, 792.4, 792.4, 0.0); (530250.0, 4421250.0, 822.4, 822.4, 0.0);

(530750.0, 4421250.0, 810.4, 810.4, 0.0); (531250.0, 4421250.0, 778.1, 778.1, 0.0);

(531750.0, 4421250.0, 787.5, 787.5, 0.0); (532250.0, 4421250.0, 863.6, 863.6, 0.0);

(532750.0, 4421250.0, 793.0, 793.0, 0.0); (533250.0, 4421250.0, 735.9, 735.9, 0.0);

(533750.0, 4421250.0, 706.8, 706.8, 0.0); (534250.0, 4421250.0, 685.3, 685.3, 0.0);

(534750.0, 4421250.0, 670.4, 670.4, 0.0); (535250.0, 4421250.0, 663.5, 663.5, 0.0);

(535750.0, 4421250.0, 679.3, 679.3, 0.0); (536250.0, 4421250.0, 748.2, 748.2, 0.0);

(536750.0, 4421250.0, 751.8, 751.8, 0.0); (537250.0, 4421250.0, 726.4, 726.4, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(537750.0, 4421250.0, 721.0, 721.0, 0.0); (538250.0, 4421250.0, 713.5, 713.5, 0.0);

(538750.0, 4421250.0, 716.4, 716.4, 0.0); (539250.0, 4421250.0, 730.5, 730.5, 0.0);

(539750.0, 4421250.0, 737.8, 737.8, 0.0); (540250.0, 4421250.0, 743.0, 743.0, 0.0);

(540750.0, 4421250.0, 769.5, 769.5, 0.0); (541250.0, 4421250.0, 799.4, 799.4, 0.0);

(541750.0, 4421250.0, 840.6, 840.6, 0.0); (542250.0, 4421250.0, 910.0, 910.0, 0.0);

(542750.0, 4421250.0, 997.9, 997.9, 0.0); (526750.0, 4421750.0, 798.8, 798.8, 0.0);

(527250.0, 4421750.0, 773.9, 773.9, 0.0); (527750.0, 4421750.0, 785.3, 785.3, 0.0);

(528250.0, 4421750.0, 790.6, 790.6, 0.0); (528750.0, 4421750.0, 806.0, 806.0, 0.0);

(529250.0, 4421750.0, 810.5, 810.5, 0.0); (529750.0, 4421750.0, 811.3, 811.3, 0.0);

(530250.0, 4421750.0, 845.8, 845.8, 0.0); (530750.0, 4421750.0, 861.1, 861.1, 0.0);

(531250.0, 4421750.0, 831.8, 831.8, 0.0); (531750.0, 4421750.0, 806.1, 806.1, 0.0);

(532250.0, 4421750.0, 846.7, 846.7, 0.0); (532750.0, 4421750.0, 827.9, 827.9, 0.0);

(533250.0, 4421750.0, 752.2, 752.2, 0.0); (533750.0, 4421750.0, 723.8, 723.8, 0.0);

(534250.0, 4421750.0, 715.1, 715.1, 0.0); (534750.0, 4421750.0, 697.9, 697.9, 0.0);

(535250.0, 4421750.0, 694.4, 694.4, 0.0); (535750.0, 4421750.0, 669.1, 669.1, 0.0);

(536250.0, 4421750.0, 756.2, 756.2, 0.0); (536750.0, 4421750.0, 788.7, 788.7, 0.0);

(537250.0, 4421750.0, 751.9, 751.9, 0.0); (537750.0, 4421750.0, 742.5, 742.5, 0.0);

(538250.0, 4421750.0, 741.8, 741.8, 0.0); (538750.0, 4421750.0, 740.9, 740.9, 0.0);

(539250.0, 4421750.0, 769.5, 769.5, 0.0); (539750.0, 4421750.0, 760.2, 760.2, 0.0);

(540250.0, 4421750.0, 764.1, 764.1, 0.0); (540750.0, 4421750.0, 769.2, 769.2, 0.0);

(541250.0, 4421750.0, 772.9, 772.9, 0.0); (541750.0, 4421750.0, 796.5, 796.5, 0.0);

(542250.0, 4421750.0, 849.1, 849.1, 0.0); (542750.0, 4421750.0, 925.7, 925.7, 0.0);

(526750.0, 4422250.0, 794.5, 794.5, 0.0); (527250.0, 4422250.0, 808.4, 808.4, 0.0);

(527750.0, 4422250.0, 807.3, 807.3, 0.0); (528250.0, 4422250.0, 808.5, 808.5, 0.0);

(528750.0, 4422250.0, 830.6, 830.6, 0.0); (529250.0, 4422250.0, 839.4, 839.4, 0.0);

(529750.0, 4422250.0, 826.9, 826.9, 0.0); (530250.0, 4422250.0, 863.2, 863.2, 0.0);

(530750.0, 4422250.0, 925.3, 925.3, 0.0); (531250.0, 4422250.0, 898.6, 898.6, 0.0);

(531750.0, 4422250.0, 836.0, 836.0, 0.0); (532250.0, 4422250.0, 842.5, 842.5, 0.0);

(532750.0, 4422250.0, 840.8, 840.8, 0.0); (533250.0, 4422250.0, 779.8, 779.8, 0.0);

(533750.0, 4422250.0, 749.0, 749.0, 0.0); (534250.0, 4422250.0, 759.1, 759.1, 0.0);

(534750.0, 4422250.0, 703.1, 703.1, 0.0); (535250.0, 4422250.0, 665.1, 665.1, 0.0);

(535750.0, 4422250.0, 658.2, 658.2, 0.0); (536250.0, 4422250.0, 676.3, 676.3, 0.0);

(536750.0, 4422250.0, 730.6, 730.6, 0.0); (537250.0, 4422250.0, 744.6, 744.6, 0.0);

(537750.0, 4422250.0, 763.7, 763.7, 0.0); (538250.0, 4422250.0, 784.4, 784.4, 0.0);

(538750.0, 4422250.0, 762.5, 762.5, 0.0); (539250.0, 4422250.0, 788.8, 788.8, 0.0);

(539750.0, 4422250.0, 787.2, 787.2, 0.0); (540250.0, 4422250.0, 779.9, 779.9, 0.0);

(540750.0, 4422250.0, 784.3, 784.3, 0.0); (541250.0, 4422250.0, 795.2, 795.2, 0.0);

(541750.0, 4422250.0, 789.3, 789.3, 0.0); (542250.0, 4422250.0, 813.0, 813.0, 0.0);

(542750.0, 4422250.0, 850.6, 850.6, 0.0); (526750.0, 4422750.0, 910.9, 910.9, 0.0);

(527250.0, 4422750.0, 880.6, 880.6, 0.0); (527750.0, 4422750.0, 852.6, 852.6, 0.0);

(528250.0, 4422750.0, 847.5, 847.5, 0.0); (528750.0, 4422750.0, 842.3, 842.3, 0.0);

(529250.0, 4422750.0, 870.1, 870.1, 0.0); (529750.0, 4422750.0, 856.0, 856.0, 0.0);

(530250.0, 4422750.0, 885.7, 885.7, 0.0); (530750.0, 4422750.0, 970.7, 970.7, 0.0);

(531250.0, 4422750.0, 915.6, 915.6, 0.0); (531750.0, 4422750.0, 895.1, 895.1, 0.0);

(532250.0, 4422750.0, 870.2, 870.2, 0.0); (532750.0, 4422750.0, 887.3, 887.3, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(533250.0, 4422750.0, 810.9, 810.9, 0.0); (533750.0, 4422750.0, 773.2, 773.2, 0.0);

(534250.0, 4422750.0, 763.3, 763.3, 0.0); (534750.0, 4422750.0, 712.2, 712.2, 0.0);

(535250.0, 4422750.0, 682.9, 682.9, 0.0); (535750.0, 4422750.0, 674.8, 674.8, 0.0);

(536250.0, 4422750.0, 656.3, 656.3, 0.0); (536750.0, 4422750.0, 677.6, 677.6, 0.0);

(537250.0, 4422750.0, 702.2, 702.2, 0.0); (537750.0, 4422750.0, 778.2, 778.2, 0.0);

(538250.0, 4422750.0, 825.9, 825.9, 0.0); (538750.0, 4422750.0, 798.3, 798.3, 0.0);

(539250.0, 4422750.0, 813.7, 813.7, 0.0); (539750.0, 4422750.0, 818.3, 818.3, 0.0);

(540250.0, 4422750.0, 814.4, 814.4, 0.0); (540750.0, 4422750.0, 803.0, 803.0, 0.0);

(541250.0, 4422750.0, 819.2, 819.2, 0.0); (541750.0, 4422750.0, 814.7, 814.7, 0.0);

(542250.0, 4422750.0, 806.6, 806.6, 0.0); (542750.0, 4422750.0, 831.8, 831.8, 0.0);

(526750.0, 4423250.0, 964.5, 964.5, 0.0); (527250.0, 4423250.0, 940.6, 940.6, 0.0);

(527750.0, 4423250.0, 888.7, 888.7, 0.0); (528250.0, 4423250.0, 928.9, 928.9, 0.0);

(528750.0, 4423250.0, 900.5, 900.5, 0.0); (529250.0, 4423250.0, 903.1, 903.1, 0.0);

(529750.0, 4423250.0, 874.9, 874.9, 0.0); (530250.0, 4423250.0, 891.0, 891.0, 0.0);

(530750.0, 4423250.0, 1000.4, 1000.4, 0.0); (531250.0, 4423250.0, 999.9, 999.9, 0.0);

(531750.0, 4423250.0, 973.6, 973.6, 0.0); (532250.0, 4423250.0, 899.3, 899.3, 0.0);

(532750.0, 4423250.0, 917.6, 917.6, 0.0); (533250.0, 4423250.0, 846.2, 846.2, 0.0);

(533750.0, 4423250.0, 780.3, 780.3, 0.0); (534250.0, 4423250.0, 754.9, 754.9, 0.0);

(534750.0, 4423250.0, 723.0, 723.0, 0.0); (535250.0, 4423250.0, 706.0, 706.0, 0.0);

(535750.0, 4423250.0, 759.8, 759.8, 0.0); (536250.0, 4423250.0, 682.5, 682.5, 0.0);

(536750.0, 4423250.0, 655.7, 655.7, 0.0); (537250.0, 4423250.0, 694.1, 694.1, 0.0);

(537750.0, 4423250.0, 775.2, 775.2, 0.0); (538250.0, 4423250.0, 882.6, 882.6, 0.0);

(538750.0, 4423250.0, 855.8, 855.8, 0.0); (539250.0, 4423250.0, 853.0, 853.0, 0.0);

(539750.0, 4423250.0, 836.5, 836.5, 0.0); (540250.0, 4423250.0, 882.8, 882.8, 0.0);

(540750.0, 4423250.0, 838.5, 838.5, 0.0); (541250.0, 4423250.0, 838.3, 838.3, 0.0);

(541750.0, 4423250.0, 840.9, 840.9, 0.0); (542250.0, 4423250.0, 833.6, 833.6, 0.0);

(542750.0, 4423250.0, 822.5, 822.5, 0.0); (526750.0, 4423750.0, 1019.8, 1019.8, 0.0);

(527250.0, 4423750.0, 866.0, 866.0, 0.0); (527750.0, 4423750.0, 948.8, 948.8, 0.0);

(528250.0, 4423750.0, 992.2, 992.2, 0.0); (528750.0, 4423750.0, 955.1, 955.1, 0.0);

(529250.0, 4423750.0, 938.8, 938.8, 0.0); (529750.0, 4423750.0, 891.7, 891.7, 0.0);

(530250.0, 4423750.0, 892.8, 892.8, 0.0); (530750.0, 4423750.0, 1004.5, 1004.5, 0.0);

(531250.0, 4423750.0, 1048.5, 1048.5, 0.0); (531750.0, 4423750.0, 1017.1, 1017.1, 0.0);

(532250.0, 4423750.0, 933.6, 933.6, 0.0); (532750.0, 4423750.0, 943.8, 943.8, 0.0);

(533250.0, 4423750.0, 897.4, 897.4, 0.0); (533750.0, 4423750.0, 821.5, 821.5, 0.0);

(534250.0, 4423750.0, 778.1, 778.1, 0.0); (534750.0, 4423750.0, 760.8, 760.8, 0.0);

(535250.0, 4423750.0, 734.5, 734.5, 0.0); (535750.0, 4423750.0, 748.8, 748.8, 0.0);

(536250.0, 4423750.0, 745.1, 745.1, 0.0); (536750.0, 4423750.0, 683.9, 683.9, 0.0);

(537250.0, 4423750.0, 660.2, 660.2, 0.0); (537750.0, 4423750.0, 752.8, 752.8, 0.0);

(538250.0, 4423750.0, 811.7, 811.7, 0.0); (538750.0, 4423750.0, 821.2, 821.2, 0.0);

(539250.0, 4423750.0, 796.9, 796.9, 0.0); (539750.0, 4423750.0, 799.5, 799.5, 0.0);

(540250.0, 4423750.0, 844.9, 844.9, 0.0); (540750.0, 4423750.0, 859.8, 859.8, 0.0);

(541250.0, 4423750.0, 890.3, 890.3, 0.0); (541750.0, 4423750.0, 867.5, 867.5, 0.0);

(542250.0, 4423750.0, 861.3, 861.3, 0.0); (542750.0, 4423750.0, 849.5, 849.5, 0.0);

(526750.0, 4424250.0, 995.8, 995.8, 0.0); (527250.0, 4424250.0, 1035.8, 1035.8, 0.0);

(527750.0, 4424250.0, 1026.6, 1026.6, 0.0); (528250.0, 4424250.0, 1068.6, 1068.6, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(528750.0, 4424250.0, 978.3, 978.3, 0.0); (529250.0, 4424250.0, 959.1, 959.1, 0.0);
(529750.0, 4424250.0, 929.9, 929.9, 0.0); (530250.0, 4424250.0, 915.9, 915.9, 0.0);
(530750.0, 4424250.0, 986.6, 986.6, 0.0); (531250.0, 4424250.0, 1066.0, 1066.0, 0.0);
(531750.0, 4424250.0, 1029.4, 1029.4, 0.0); (532250.0, 4424250.0, 977.1, 977.1, 0.0);
(532750.0, 4424250.0, 977.2, 977.2, 0.0); (533250.0, 4424250.0, 942.0, 942.0, 0.0);
(533750.0, 4424250.0, 840.8, 840.8, 0.0); (534250.0, 4424250.0, 797.3, 797.3, 0.0);
(534750.0, 4424250.0, 773.8, 773.8, 0.0); (535250.0, 4424250.0, 782.8, 782.8, 0.0);
(535750.0, 4424250.0, 759.1, 759.1, 0.0); (536250.0, 4424250.0, 697.7, 697.7, 0.0);
(536750.0, 4424250.0, 669.5, 669.5, 0.0); (537250.0, 4424250.0, 658.1, 658.1, 0.0);
(537750.0, 4424250.0, 793.5, 793.5, 0.0); (538250.0, 4424250.0, 796.2, 796.2, 0.0);
(538750.0, 4424250.0, 789.6, 789.6, 0.0); (539250.0, 4424250.0, 759.9, 759.9, 0.0);
(539750.0, 4424250.0, 779.9, 779.9, 0.0); (540250.0, 4424250.0, 800.5, 800.5, 0.0);
(540750.0, 4424250.0, 831.5, 831.5, 0.0); (541250.0, 4424250.0, 911.2, 911.2, 0.0);
(541750.0, 4424250.0, 906.9, 906.9, 0.0); (542250.0, 4424250.0, 904.2, 904.2, 0.0);
(542750.0, 4424250.0, 878.4, 878.4, 0.0); (526750.0, 4424750.0, 1069.4, 1069.4, 0.0);
(527250.0, 4424750.0, 1046.9, 1046.9, 0.0); (527750.0, 4424750.0, 1091.7, 1091.7, 0.0);
(528250.0, 4424750.0, 1096.5, 1096.5, 0.0); (528750.0, 4424750.0, 1017.5, 1017.5, 0.0);
(529250.0, 4424750.0, 1024.6, 1024.6, 0.0); (529750.0, 4424750.0, 970.8, 970.8, 0.0);
(530250.0, 4424750.0, 988.1, 988.1, 0.0); (530750.0, 4424750.0, 973.4, 973.4, 0.0);
(531250.0, 4424750.0, 1060.1, 1060.1, 0.0); (531750.0, 4424750.0, 1076.6, 1076.6, 0.0);
(532250.0, 4424750.0, 1085.3, 1085.3, 0.0); (532750.0, 4424750.0, 1043.0, 1043.0, 0.0);
(533250.0, 4424750.0, 969.1, 969.1, 0.0); (533750.0, 4424750.0, 912.7, 912.7, 0.0);
(534250.0, 4424750.0, 821.4, 821.4, 0.0); (534750.0, 4424750.0, 819.9, 819.9, 0.0);
(535250.0, 4424750.0, 788.1, 788.1, 0.0); (535750.0, 4424750.0, 763.2, 763.2, 0.0);
(536250.0, 4424750.0, 687.1, 687.1, 0.0); (536750.0, 4424750.0, 662.8, 662.8, 0.0);

(537250.0, 4424750.0, 749.5, 749.5, 0.0); (537750.0, 4424750.0, 772.9, 772.9, 0.0);

(538250.0, 4424750.0, 744.7, 744.7, 0.0); (538750.0, 4424750.0, 736.1, 736.1, 0.0);

(539250.0, 4424750.0, 741.6, 741.6, 0.0); (539750.0, 4424750.0, 760.7, 760.7, 0.0);

(540250.0, 4424750.0, 781.8, 781.8, 0.0); (540750.0, 4424750.0, 817.1, 817.1, 0.0);

(541250.0, 4424750.0, 865.6, 865.6, 0.0); (541750.0, 4424750.0, 940.4, 940.4, 0.0);

(542250.0, 4424750.0, 973.8, 973.8, 0.0); (542750.0, 4424750.0, 917.9, 917.9, 0.0);

(526750.0, 4425250.0, 1140.4, 1140.4, 0.0); (527250.0, 4425250.0, 1095.0, 1095.0, 0.0);

(527750.0, 4425250.0, 1167.6, 1167.6, 0.0); (528250.0, 4425250.0, 1118.0, 1118.0, 0.0);

(528750.0, 4425250.0, 1063.0, 1063.0, 0.0); (529250.0, 4425250.0, 1082.6, 1082.6, 0.0);

(529750.0, 4425250.0, 1062.3, 1062.3, 0.0); (530250.0, 4425250.0, 1014.1, 1014.1, 0.0);

(530750.0, 4425250.0, 967.9, 967.9, 0.0); (531250.0, 4425250.0, 1063.4, 1063.4, 0.0);

(531750.0, 4425250.0, 1115.4, 1115.4, 0.0); (532250.0, 4425250.0, 1136.6, 1136.6, 0.0);

(532750.0, 4425250.0, 1117.2, 1117.2, 0.0); (533250.0, 4425250.0, 1036.1, 1036.1, 0.0);

(533750.0, 4425250.0, 934.3, 934.3, 0.0); (534250.0, 4425250.0, 857.1, 857.1, 0.0);

(534750.0, 4425250.0, 846.1, 846.1, 0.0); (535250.0, 4425250.0, 806.0, 806.0, 0.0);

(535750.0, 4425250.0, 817.1, 817.1, 0.0); (536250.0, 4425250.0, 713.0, 713.0, 0.0);

(536750.0, 4425250.0, 657.5, 657.5, 0.0); (537250.0, 4425250.0, 667.4, 667.4, 0.0);

(537750.0, 4425250.0, 669.3, 669.3, 0.0); (538250.0, 4425250.0, 708.8, 708.8, 0.0);

(538750.0, 4425250.0, 717.9, 717.9, 0.0); (539250.0, 4425250.0, 727.5, 727.5, 0.0);

(539750.0, 4425250.0, 764.7, 764.7, 0.0); (540250.0, 4425250.0, 825.7, 825.7, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(540750.0, 4425250.0, 813.1, 813.1, 0.0); (541250.0, 4425250.0, 843.0, 843.0, 0.0);

(541750.0, 4425250.0, 892.3, 892.3, 0.0); (542250.0, 4425250.0, 955.9, 955.9, 0.0);

(542750.0, 4425250.0, 992.0, 992.0, 0.0); (528142.3, 4424000.1, 1039.8, 1426.0, 0.0);

(528641.5, 4421424.2, 788.4, 1426.0, 0.0); (530578.2, 4414421.8, 738.2, 1037.6, 0.0);

(533199.9, 4420647.0, 701.3, 1183.8, 0.0); (537336.4, 4419481.4, 694.8, 843.1, 0.0);

(538624.8, 4413866.5, 766.4, 1059.9, 0.0); (538699.0, 4411952.4, 726.0, 726.0, 0.0);

(539685.2, 4412636.4, 760.6, 760.6, 0.0); (540884.8, 4419539.6, 843.4, 1271.9, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

1 1 1

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: KKALE1.SFC Met Version: 12345

Profile file: KKALE1.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 17135 Upper air station no.: 17130

Name: KIRIKKALE Name: ANKARA

Year: 2012 Year: 2012

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
12	01	01	1	01	-1.0	0.043	-9.000	-9.000	-999.	21.	6.8	1.00	1.10	1.00	0.50	71.	10.0	272.5	2.0
12	01	01	1	02	-1.0	0.043	-9.000	-9.000	-999.	21.	6.8	1.00	1.10	1.00	0.50	198.	10.0	272.5	2.0
12	01	01	1	03	-1.0	0.043	-9.000	-9.000	-999.	21.	6.8	1.00	1.10	1.00	0.50	254.	10.0	272.5	2.0
12	01	01	1	04	-4.0	0.087	-9.000	-9.000	-999.	59.	13.6	1.00	1.10	1.00	1.00	203.	10.0	272.5	2.0
12	01	01	1	05	-1.0	0.043	-9.000	-9.000	-999.	21.	6.8	1.00	1.10	1.00	0.50	233.	10.0	272.5	2.0
12	01	01	1	06	-4.0	0.087	-9.000	-9.000	-999.	59.	13.6	1.00	1.10	1.00	1.00	232.	10.0	272.5	2.0
12	01	01	1	07	-1.0	0.043	-9.000	-9.000	-999.	21.	6.8	1.00	1.10	1.00	0.50	235.	10.0	273.1	2.0
12	01	01	1	08	-0.9	0.043	-9.000	-9.000	-999.	21.	7.3	1.00	1.10	0.47	0.50	93.	10.0	273.1	2.0
12	01	01	1	09	17.6	0.133	0.460	0.006	182.	112.	-11.1	1.00	1.10	0.20	0.50	247.	10.0	273.1	2.0

12 01 01 1 10 52.4 0.153 0.748 0.005 264. 138. -5.7 1.00 1.10 0.10 0.50 161. 10.0 273.8 2.0

12 01 01 1 11 76.6 0.248 0.962 0.005 383. 283. -16.3 1.00 1.10 0.06 1.00 234. 10.0 273.8 2.0

12 01 01 1 12 88.0 0.164 1.205 0.005 656. 155. -4.1 1.00 1.10 0.05 0.50 196. 10.0 273.8 2.0

12 01 01 1 13 85.7 0.251 1.227 0.005 711. 289. -15.2 1.00 1.10 0.05 1.00 203. 10.0 274.2 2.0

12 01 01 1 14 69.9 0.245 1.169 0.005 755. 279. -17.3 1.00 1.10 0.07 1.00 199. 10.0 274.2 2.0

12 01 01 1 15 41.6 0.231 0.995 0.005 781. 255. -24.5 1.00 1.10 0.12 1.00 202. 10.0 274.2 2.0

12 01 01 1 16 4.9 0.192 0.489 0.005 784. 193. -118.6 1.00 1.10 0.26 1.00 204. 10.0 274.2 2.0

12 01 01 1 17 -4.0 0.087 -9.000 -9.000 -999. 64. 13.7 1.00 1.10 1.00 1.00 201. 10.0 273.8 2.0

12 01 01 1 18 -4.0 0.087 -9.000 -9.000 -999. 59. 13.7 1.00 1.10 1.00 1.00 197. 10.0 273.8 2.0

12 01 01 1 19 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 204. 10.0 273.8 2.0

12 01 01 1 20 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 137. 10.0 274.2 2.0

12 01 01 1 21 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 90. 10.0 274.2 2.0

12 01 01 1 22 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 292. 10.0 274.9 2.0

12 01 01 1 23 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 50. 10.0 274.9 2.0

12 01 01 1 24 -8.9 0.130 -9.000 -9.000 -999. 108. 20.6 1.00 1.10 1.00 1.50 50. 10.0 275.9 2.0

First hour of profile data

YR MO DY HR HEIGHT F WDIR WSPD AMB_TMP sigmaA sigmaW sigmaV

12 01 01 01 10.0 1 71. 0.50 272.6 99.0 -99.00 -99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
526750.00	4409250.00	0.47623	527250.00	4409250.00	0.79123
527750.00	4409250.00	0.77198	528250.00	4409250.00	1.44860
528750.00	4409250.00	0.95937	529250.00	4409250.00	0.34096
529750.00	4409250.00	0.22533	530250.00	4409250.00	0.20259
530750.00	4409250.00	0.17595	531250.00	4409250.00	0.18240
531750.00	4409250.00	0.24580	532250.00	4409250.00	0.53369
532750.00	4409250.00	0.46060	533250.00	4409250.00	0.31380
533750.00	4409250.00	0.27043	534250.00	4409250.00	0.36316
534750.00	4409250.00	0.45819	535250.00	4409250.00	0.22778
535750.00	4409250.00	0.12896	536250.00	4409250.00	0.11704
536750.00	4409250.00	0.12181	537250.00	4409250.00	0.11039
537750.00	4409250.00	0.09503	538250.00	4409250.00	0.09067
538750.00	4409250.00	0.08524	539250.00	4409250.00	0.08379
539750.00	4409250.00	0.08455	540250.00	4409250.00	0.08387
540750.00	4409250.00	0.07688	541250.00	4409250.00	0.07065
541750.00	4409250.00	0.06877	542250.00	4409250.00	0.06842
542750.00	4409250.00	0.06753	526750.00	4409750.00	0.67859
527250.00	4409750.00	0.62090	527750.00	4409750.00	0.43951
528250.00	4409750.00	1.77422	528750.00	4409750.00	1.34527
529250.00	4409750.00	0.40111	529750.00	4409750.00	0.26857
530250.00	4409750.00	0.27372	530750.00	4409750.00	0.20695
531250.00	4409750.00	0.16865	531750.00	4409750.00	0.18637
532250.00	4409750.00	0.48381	532750.00	4409750.00	0.77040
533250.00	4409750.00	0.58053	533750.00	4409750.00	0.28657

534250.00	4409750.00	0.37890	534750.00	4409750.00	0.48814
535250.00	4409750.00	0.20885	535750.00	4409750.00	0.12811
536250.00	4409750.00	0.12203	536750.00	4409750.00	0.11469
537250.00	4409750.00	0.10690	537750.00	4409750.00	0.09813
538250.00	4409750.00	0.09262	538750.00	4409750.00	0.08943
539250.00	4409750.00	0.09005	539750.00	4409750.00	0.08974
540250.00	4409750.00	0.08652	540750.00	4409750.00	0.07964
541250.00	4409750.00	0.07312	541750.00	4409750.00	0.06987
542250.00	4409750.00	0.06979	542750.00	4409750.00	0.06835
526750.00	4410250.00	0.48054	527250.00	4410250.00	0.82782
527750.00	4410250.00	0.36904	528250.00	4410250.00	0.46523
528750.00	4410250.00	1.16674	529250.00	4410250.00	1.54011
529750.00	4410250.00	0.76533	530250.00	4410250.00	0.44283
530750.00	4410250.00	0.28210	531250.00	4410250.00	0.21765
531750.00	4410250.00	0.17437	532250.00	4410250.00	0.21696
532750.00	4410250.00	0.75900	533250.00	4410250.00	0.65016

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC

533750.00	4410250.00	0.34669	534250.00	4410250.00	0.39553
534750.00	4410250.00	0.24810	535250.00	4410250.00	0.17022
535750.00	4410250.00	0.13919	536250.00	4410250.00	0.13238
536750.00	4410250.00	0.12139	537250.00	4410250.00	0.11577
537750.00	4410250.00	0.10805	538250.00	4410250.00	0.09958
538750.00	4410250.00	0.09998	539250.00	4410250.00	0.09572
539750.00	4410250.00	0.09167	540250.00	4410250.00	0.08708
540750.00	4410250.00	0.08227	541250.00	4410250.00	0.07683
541750.00	4410250.00	0.07297	542250.00	4410250.00	0.07142
542750.00	4410250.00	0.07170	526750.00	4410750.00	0.40789
527250.00	4410750.00	0.38812	527750.00	4410750.00	0.50431
528250.00	4410750.00	0.83630	528750.00	4410750.00	0.47103
529250.00	4410750.00	1.93795	529750.00	4410750.00	2.05166
530250.00	4410750.00	0.92850	530750.00	4410750.00	0.53415
531250.00	4410750.00	0.28401	531750.00	4410750.00	0.21692
532250.00	4410750.00	0.21007	532750.00	4410750.00	0.27828
533250.00	4410750.00	0.32080	533750.00	4410750.00	0.33751
534250.00	4410750.00	0.31188	534750.00	4410750.00	0.28600
535250.00	4410750.00	0.17321	535750.00	4410750.00	0.14907
536250.00	4410750.00	0.16645	536750.00	4410750.00	0.13061
537250.00	4410750.00	0.12771	537750.00	4410750.00	0.11808
538250.00	4410750.00	0.10728	538750.00	4410750.00	0.09956
539250.00	4410750.00	0.09558	539750.00	4410750.00	0.08878
540250.00	4410750.00	0.08459	540750.00	4410750.00	0.08179
541250.00	4410750.00	0.08127	541750.00	4410750.00	0.07679
542250.00	4410750.00	0.07512	542750.00	4410750.00	0.07506
526750.00	4411250.00	0.29091	527250.00	4411250.00	0.37288
527750.00	4411250.00	0.48412	528250.00	4411250.00	0.42335
528750.00	4411250.00	0.32500	529250.00	4411250.00	0.67916
529750.00	4411250.00	1.77558	530250.00	4411250.00	2.48280

530750.00	4411250.00	0.87853	531250.00	4411250.00	0.52546
531750.00	4411250.00	0.29345	532250.00	4411250.00	0.21381
532750.00	4411250.00	0.23665	533250.00	4411250.00	0.23509
533750.00	4411250.00	0.26495	534250.00	4411250.00	0.21488
534750.00	4411250.00	0.24758	535250.00	4411250.00	0.18363
535750.00	4411250.00	0.16606	536250.00	4411250.00	0.16882
536750.00	4411250.00	0.14785	537250.00	4411250.00	0.13442
537750.00	4411250.00	0.12059	538250.00	4411250.00	0.11072
538750.00	4411250.00	0.10427	539250.00	4411250.00	0.09731
539750.00	4411250.00	0.09334	540250.00	4411250.00	0.08825

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
540750.00	4411250.00	0.08598	541250.00	4411250.00	0.08490
541750.00	4411250.00	0.08220	542250.00	4411250.00	0.08169
542750.00	4411250.00	0.08152	526750.00	4411750.00	0.66981
527250.00	4411750.00	0.75600	527750.00	4411750.00	0.58470
528250.00	4411750.00	0.60382	528750.00	4411750.00	0.42250

529250.00	4411750.00	0.33489	529750.00	4411750.00	0.58673
530250.00	4411750.00	2.49995	530750.00	4411750.00	1.31198
531250.00	4411750.00	0.79472	531750.00	4411750.00	0.55688
532250.00	4411750.00	0.29024	532750.00	4411750.00	0.25419
533250.00	4411750.00	0.28535	533750.00	4411750.00	0.25069
534250.00	4411750.00	0.23578	534750.00	4411750.00	0.22956
535250.00	4411750.00	0.20613	535750.00	4411750.00	0.18285
536250.00	4411750.00	0.17363	536750.00	4411750.00	0.15845
537250.00	4411750.00	0.13677	537750.00	4411750.00	0.12438
538250.00	4411750.00	0.11506	538750.00	4411750.00	0.10873
539250.00	4411750.00	0.10256	539750.00	4411750.00	0.09953
540250.00	4411750.00	0.09469	540750.00	4411750.00	0.09253
541250.00	4411750.00	0.09092	541750.00	4411750.00	0.09045
542250.00	4411750.00	0.09824	542750.00	4411750.00	0.09435
526750.00	4412250.00	2.68613	527250.00	4412250.00	2.02301
527750.00	4412250.00	1.60394	528250.00	4412250.00	2.63487
528750.00	4412250.00	1.58351	529250.00	4412250.00	0.32690
529750.00	4412250.00	0.35238	530250.00	4412250.00	0.94344
530750.00	4412250.00	2.53644	531250.00	4412250.00	1.13886
531750.00	4412250.00	1.40440	532250.00	4412250.00	0.59772
532750.00	4412250.00	0.29368	533250.00	4412250.00	0.31023
533750.00	4412250.00	0.31779	534250.00	4412250.00	0.27744
534750.00	4412250.00	0.26625	535250.00	4412250.00	0.23776
535750.00	4412250.00	0.21669	536250.00	4412250.00	0.19518
536750.00	4412250.00	0.16104	537250.00	4412250.00	0.14016
537750.00	4412250.00	0.12935	538250.00	4412250.00	0.11994
538750.00	4412250.00	0.11475	539250.00	4412250.00	0.10936
539750.00	4412250.00	0.10614	540250.00	4412250.00	0.10286
540750.00	4412250.00	0.13487	541250.00	4412250.00	0.10361
541750.00	4412250.00	0.11032	542250.00	4412250.00	0.13475
542750.00	4412250.00	0.13558	526750.00	4412750.00	3.53991

527250.00	4412750.00	3.05116	527750.00	4412750.00	4.29781
528250.00	4412750.00	3.51313	528750.00	4412750.00	3.31390
529250.00	4412750.00	2.91425	529750.00	4412750.00	0.35695
530250.00	4412750.00	0.38941	530750.00	4412750.00	1.15589

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
531250.00	4412750.00	1.14719	531750.00	4412750.00	1.57193
532250.00	4412750.00	2.60480	532750.00	4412750.00	0.61948
533250.00	4412750.00	0.36653	533750.00	4412750.00	0.92035
534250.00	4412750.00	0.34335	534750.00	4412750.00	0.31918
535250.00	4412750.00	0.28305	535750.00	4412750.00	0.25177
536250.00	4412750.00	0.21388	536750.00	4412750.00	0.16845
537250.00	4412750.00	0.15071	537750.00	4412750.00	0.13841
538250.00	4412750.00	0.13009	538750.00	4412750.00	0.12375
539250.00	4412750.00	0.11960	539750.00	4412750.00	0.11705
540250.00	4412750.00	0.11611	540750.00	4412750.00	0.13762
541250.00	4412750.00	0.13425	541750.00	4412750.00	0.17671

542250.00	4412750.00	0.21205	542750.00	4412750.00	0.20179
526750.00	4413250.00	2.05387	527250.00	4413250.00	2.66246
527750.00	4413250.00	3.33241	528250.00	4413250.00	3.18779
528750.00	4413250.00	5.39851	529250.00	4413250.00	4.47750
529750.00	4413250.00	0.63844	530250.00	4413250.00	0.38784
530750.00	4413250.00	1.30428	531250.00	4413250.00	1.28519
531750.00	4413250.00	1.19621	532250.00	4413250.00	1.53397
532750.00	4413250.00	1.53820	533250.00	4413250.00	0.66096
533750.00	4413250.00	0.64580	534250.00	4413250.00	0.44364
534750.00	4413250.00	0.40020	535250.00	4413250.00	0.34833
535750.00	4413250.00	0.29377	536250.00	4413250.00	0.22433
536750.00	4413250.00	0.18536	537250.00	4413250.00	0.16576
537750.00	4413250.00	0.15281	538250.00	4413250.00	0.14518
538750.00	4413250.00	0.14054	539250.00	4413250.00	0.14292
539750.00	4413250.00	0.14521	540250.00	4413250.00	0.14501
540750.00	4413250.00	0.18811	541250.00	4413250.00	0.19314
541750.00	4413250.00	0.27627	542250.00	4413250.00	0.23023
542750.00	4413250.00	0.18805	526750.00	4413750.00	0.70769
527250.00	4413750.00	0.84442	527750.00	4413750.00	1.27904
528250.00	4413750.00	1.44736	528750.00	4413750.00	1.99820
529250.00	4413750.00	2.12664	529750.00	4413750.00	0.56592
530250.00	4413750.00	0.38677	530750.00	4413750.00	1.09603
531250.00	4413750.00	7.12738	531750.00	4413750.00	2.58182
532250.00	4413750.00	1.23060	532750.00	4413750.00	2.87167
533750.00	4413750.00	0.65230	534250.00	4413750.00	0.71491
534750.00	4413750.00	0.54038	535250.00	4413750.00	0.45258
535750.00	4413750.00	0.33683	536250.00	4413750.00	0.24496
536750.00	4413750.00	0.21121	537250.00	4413750.00	0.19137
537750.00	4413750.00	0.17840	538250.00	4413750.00	0.16759

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
538750.00	4413750.00	0.16531	539250.00	4413750.00	0.19131
539750.00	4413750.00	0.17772	540250.00	4413750.00	0.16574
540750.00	4413750.00	0.19614	541250.00	4413750.00	0.17335
541750.00	4413750.00	0.17297	542250.00	4413750.00	0.15748
542750.00	4413750.00	0.14234	526750.00	4414250.00	0.81995
527250.00	4414250.00	0.73067	527750.00	4414250.00	0.47770
528250.00	4414250.00	0.67272	528750.00	4414250.00	0.85116
529250.00	4414250.00	0.94537	529750.00	4414250.00	0.40059
530250.00	4414250.00	0.35703	530750.00	4414250.00	0.48923
531250.00	4414250.00	7.28450	531750.00	4414250.00	6.10629
532250.00	4414250.00	3.38030	532750.00	4414250.00	5.58133
533250.00	4414250.00	2.73547	533750.00	4414250.00	1.43062
534250.00	4414250.00	0.94935	534750.00	4414250.00	0.83211
535250.00	4414250.00	0.58951	535750.00	4414250.00	0.39701
536250.00	4414250.00	0.31054	536750.00	4414250.00	0.26537
537250.00	4414250.00	0.23284	537750.00	4414250.00	0.20688
538250.00	4414250.00	0.19090	538750.00	4414250.00	0.20413
539250.00	4414250.00	0.18045	539750.00	4414250.00	0.17154

540250.00	4414250.00	0.15411	540750.00	4414250.00	0.14158
541250.00	4414250.00	0.20050	541750.00	4414250.00	0.19866
542250.00	4414250.00	0.19676	542750.00	4414250.00	0.19296
526750.00	4414750.00	2.59924	527250.00	4414750.00	2.10645
527750.00	4414750.00	1.66129	528250.00	4414750.00	0.84272
528750.00	4414750.00	1.06084	529250.00	4414750.00	0.53365
529750.00	4414750.00	0.46336	530250.00	4414750.00	0.32239
530750.00	4414750.00	0.36236	531250.00	4414750.00	1.30584
531750.00	4414750.00	1.92194	532250.00	4414750.00	1.65681
533250.00	4414750.00	18.14476	533750.00	4414750.00	1.89695
534250.00	4414750.00	2.24045	534750.00	4414750.00	1.25711
535250.00	4414750.00	0.74891	535750.00	4414750.00	0.54651
536250.00	4414750.00	0.41068	536750.00	4414750.00	0.32683
537250.00	4414750.00	0.26847	537750.00	4414750.00	0.22997
538250.00	4414750.00	0.20486	538750.00	4414750.00	0.21244
539250.00	4414750.00	0.38250	539750.00	4414750.00	0.32205
540250.00	4414750.00	0.32167	540750.00	4414750.00	0.28501
541250.00	4414750.00	0.33714	541750.00	4414750.00	0.34153
542250.00	4414750.00	0.22349	542750.00	4414750.00	0.19213
526750.00	4415250.00	2.79263	527250.00	4415250.00	1.51464
527750.00	4415250.00	0.90874	528250.00	4415250.00	3.07990
528750.00	4415250.00	0.98808	529250.00	4415250.00	0.45274

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
529750.00	4415250.00	0.29242	530250.00	4415250.00	0.29506
530750.00	4415250.00	0.41172	531250.00	4415250.00	7.03119
531750.00	4415250.00	3.96948	532250.00	4415250.00	1.80157
532750.00	4415250.00	14.26165	533250.00	4415250.00	17.83542
533750.00	4415250.00	2.05247	534250.00	4415250.00	1.62296
534750.00	4415250.00	0.13832	535250.00	4415250.00	1.00195
535750.00	4415250.00	0.78624	536250.00	4415250.00	0.53141
536750.00	4415250.00	0.39045	537250.00	4415250.00	0.32107
537750.00	4415250.00	0.28134	538250.00	4415250.00	0.39574
538750.00	4415250.00	0.94018	539250.00	4415250.00	0.84029
539750.00	4415250.00	0.64893	540250.00	4415250.00	0.67644
540750.00	4415250.00	0.63018	541250.00	4415250.00	0.52481
541750.00	4415250.00	0.40794	542250.00	4415250.00	0.19361
542750.00	4415250.00	0.16943	526750.00	4415750.00	0.90305
527250.00	4415750.00	0.54090	527750.00	4415750.00	0.39772
528250.00	4415750.00	0.45410	528750.00	4415750.00	0.73913
529250.00	4415750.00	0.51980	529750.00	4415750.00	0.41152
530250.00	4415750.00	0.26209	530750.00	4415750.00	0.28298
531250.00	4415750.00	0.92487	531750.00	4415750.00	2.07332
532250.00	4415750.00	1.41114	532750.00	4415750.00	1.71713
533250.00	4415750.00	4.61124	533750.00	4415750.00	1.02662
534250.00	4415750.00	0.66491	534750.00	4415750.00	0.90879
535250.00	4415750.00	1.42211	535750.00	4415750.00	0.94825
536250.00	4415750.00	0.62663	536750.00	4415750.00	0.45656

537250.00	4415750.00	0.41290	537750.00	4415750.00	0.33421
538250.00	4415750.00	0.34826	538750.00	4415750.00	0.51271
539250.00	4415750.00	0.43265	539750.00	4415750.00	0.39979
540250.00	4415750.00	0.30088	540750.00	4415750.00	0.44813
541250.00	4415750.00	0.44127	541750.00	4415750.00	0.45177
542250.00	4415750.00	0.22745	542750.00	4415750.00	0.15002
526750.00	4416250.00	0.42545	527250.00	4416250.00	0.26173
527750.00	4416250.00	0.22484	528250.00	4416250.00	0.21746
528750.00	4416250.00	0.22029	529250.00	4416250.00	0.22475
529750.00	4416250.00	0.23024	530250.00	4416250.00	0.23369
530750.00	4416250.00	0.24161	531250.00	4416250.00	0.84850
531750.00	4416250.00	2.42826	532250.00	4416250.00	1.62272
532750.00	4416250.00	1.14703	533250.00	4416250.00	1.01469
533750.00	4416250.00	1.21122	534250.00	4416250.00	0.46209
534750.00	4416250.00	0.72339	535250.00	4416250.00	1.04424
535750.00	4416250.00	0.84363	536250.00	4416250.00	0.64943

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC

536750.00	4416250.00	0.49468	537250.00	4416250.00	0.61423
537750.00	4416250.00	1.35941	538250.00	4416250.00	1.42853
538750.00	4416250.00	0.81869	539250.00	4416250.00	0.46974
539750.00	4416250.00	0.38932	540250.00	4416250.00	0.31708
540750.00	4416250.00	0.29545	541250.00	4416250.00	0.27280
541750.00	4416250.00	0.25083	542250.00	4416250.00	0.24288
542750.00	4416250.00	0.19272	526750.00	4416750.00	0.21130
527250.00	4416750.00	0.19670	527750.00	4416750.00	0.19292
528250.00	4416750.00	0.19481	528750.00	4416750.00	0.19854
529250.00	4416750.00	0.20250	529750.00	4416750.00	0.20655
530250.00	4416750.00	0.21074	530750.00	4416750.00	0.23096
531250.00	4416750.00	2.40191	531750.00	4416750.00	1.85520
532250.00	4416750.00	0.74602	532750.00	4416750.00	0.64372
533250.00	4416750.00	1.02095	534250.00	4416750.00	0.65952
534750.00	4416750.00	0.51873	535250.00	4416750.00	0.73282
535750.00	4416750.00	0.71031	536250.00	4416750.00	0.59343
536750.00	4416750.00	0.49249	537250.00	4416750.00	0.42477
537750.00	4416750.00	0.58901	538250.00	4416750.00	1.46131
538750.00	4416750.00	1.60782	539250.00	4416750.00	1.40081
539750.00	4416750.00	0.77260	540250.00	4416750.00	0.40601
540750.00	4416750.00	0.37105	541250.00	4416750.00	0.32045
541750.00	4416750.00	0.30091	542250.00	4416750.00	0.26662
542750.00	4416750.00	0.23336	526750.00	4417250.00	0.27441
527250.00	4417250.00	0.20533	527750.00	4417250.00	0.18244
528250.00	4417250.00	0.18223	528750.00	4417250.00	0.18371
529250.00	4417250.00	0.18622	529750.00	4417250.00	0.18848
530250.00	4417250.00	0.19173	530750.00	4417250.00	0.19354
531250.00	4417250.00	0.53489	531750.00	4417250.00	0.30578
532250.00	4417250.00	0.37759	532750.00	4417250.00	0.74478
533250.00	4417250.00	0.95087	533750.00	4417250.00	0.84293

534250.00	4417250.00	0.82115	534750.00	4417250.00	0.58367
535250.00	4417250.00	0.56245	535750.00	4417250.00	0.58440
536250.00	4417250.00	0.51701	536750.00	4417250.00	0.45287
537250.00	4417250.00	0.40991	537750.00	4417250.00	0.69686
538250.00	4417250.00	0.33534	538750.00	4417250.00	0.53862
539250.00	4417250.00	0.62333	539750.00	4417250.00	1.14200
540250.00	4417250.00	1.02472	540750.00	4417250.00	0.71310
541250.00	4417250.00	0.39809	541750.00	4417250.00	0.29424
542250.00	4417250.00	0.34903	542750.00	4417250.00	0.25304
526750.00	4417750.00	0.77172	527250.00	4417750.00	0.33336

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
527750.00	4417750.00	0.20240	528250.00	4417750.00	0.17152
528750.00	4417750.00	0.16913	529250.00	4417750.00	0.17108
529750.00	4417750.00	0.17332	530250.00	4417750.00	0.17588
530750.00	4417750.00	0.17851	531250.00	4417750.00	0.18153
531750.00	4417750.00	0.22322	532250.00	4417750.00	0.74820

532750.00	4417750.00	1.26176	533250.00	4417750.00	0.75338
533750.00	4417750.00	0.74591	534250.00	4417750.00	0.32120
534750.00	4417750.00	0.36074	535250.00	4417750.00	0.45185
535750.00	4417750.00	0.49388	536250.00	4417750.00	0.45419
536750.00	4417750.00	0.40902	537250.00	4417750.00	0.37713
537750.00	4417750.00	1.42579	538250.00	4417750.00	0.44305
538750.00	4417750.00	0.30710	539250.00	4417750.00	0.28210
539750.00	4417750.00	0.47489	540250.00	4417750.00	0.76545
540750.00	4417750.00	0.89932	541250.00	4417750.00	0.52530
541750.00	4417750.00	0.30378	542250.00	4417750.00	0.36969
542750.00	4417750.00	0.29675	526750.00	4418250.00	1.15232
527250.00	4418250.00	0.75851	527750.00	4418250.00	0.20203
528250.00	4418250.00	0.15951	528750.00	4418250.00	0.15537
529250.00	4418250.00	0.15707	529750.00	4418250.00	0.15995
530250.00	4418250.00	0.16355	530750.00	4418250.00	0.16889
531250.00	4418250.00	0.17282	531750.00	4418250.00	0.66499
532250.00	4418250.00	0.52613	532750.00	4418250.00	0.52934
533250.00	4418250.00	0.57853	534250.00	4418250.00	0.28233
534750.00	4418250.00	0.31770	535250.00	4418250.00	0.37598
535750.00	4418250.00	0.41685	536250.00	4418250.00	0.41639
536750.00	4418250.00	0.38167	537250.00	4418250.00	0.34581
537750.00	4418250.00	0.32725	538250.00	4418250.00	0.35664
538750.00	4418250.00	0.31763	539250.00	4418250.00	0.41594
539750.00	4418250.00	0.36627	540250.00	4418250.00	0.33180
540750.00	4418250.00	0.45493	541250.00	4418250.00	0.51554
541750.00	4418250.00	0.32802	542250.00	4418250.00	0.27081
542750.00	4418250.00	0.23500	526750.00	4418750.00	1.02619
527250.00	4418750.00	0.69298	527750.00	4418750.00	0.15128
528250.00	4418750.00	0.14155	528750.00	4418750.00	0.14421
529250.00	4418750.00	0.14703	529750.00	4418750.00	0.15028
530250.00	4418750.00	0.15479	530750.00	4418750.00	0.16200

531250.00	4418750.00	0.16869	531750.00	4418750.00	0.24030
532250.00	4418750.00	0.20765	532750.00	4418750.00	0.20154
533250.00	4418750.00	0.72505	533750.00	4418750.00	0.28591
534250.00	4418750.00	0.26241	534750.00	4418750.00	0.36046

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
535250.00	4418750.00	0.32554	535750.00	4418750.00	0.36129
536250.00	4418750.00	0.37006	536750.00	4418750.00	0.35612
537250.00	4418750.00	0.32555	537750.00	4418750.00	0.30310
538250.00	4418750.00	0.71751	538750.00	4418750.00	0.45805
539250.00	4418750.00	0.55614	539750.00	4418750.00	0.72366
540250.00	4418750.00	0.43274	540750.00	4418750.00	0.30269
541250.00	4418750.00	0.32660	541750.00	4418750.00	0.36280
542250.00	4418750.00	0.24147	542750.00	4418750.00	0.33876
526750.00	4419250.00	0.58484	527250.00	4419250.00	0.26784
527750.00	4419250.00	0.13375	528250.00	4419250.00	0.13080
528750.00	4419250.00	0.13534	529250.00	4419250.00	0.13880

529750.00	4419250.00	0.14254	530250.00	4419250.00	0.14731
530750.00	4419250.00	0.15569	531250.00	4419250.00	0.16504
531750.00	4419250.00	0.17185	532250.00	4419250.00	0.18009
532750.00	4419250.00	0.19054	533250.00	4419250.00	0.23048
533750.00	4419250.00	0.21687	534250.00	4419250.00	0.23471
534750.00	4419250.00	0.43701	535250.00	4419250.00	0.41079
535750.00	4419250.00	0.32678	536250.00	4419250.00	0.33579
536750.00	4419250.00	0.32873	537250.00	4419250.00	0.30701
537750.00	4419250.00	0.28409	538250.00	4419250.00	0.28940
538750.00	4419250.00	0.29599	539250.00	4419250.00	0.52973
539750.00	4419250.00	0.67438	540250.00	4419250.00	0.60153
540750.00	4419250.00	0.57336	541250.00	4419250.00	0.40999
541750.00	4419250.00	0.31498	542250.00	4419250.00	0.29730
542750.00	4419250.00	0.31229	526750.00	4419750.00	0.25429
527250.00	4419750.00	0.13193	527750.00	4419750.00	0.11952
528250.00	4419750.00	0.12432	528750.00	4419750.00	0.12830
529250.00	4419750.00	0.13223	529750.00	4419750.00	0.13728
530250.00	4419750.00	0.14664	530750.00	4419750.00	0.15165
531250.00	4419750.00	0.15993	531750.00	4419750.00	0.16681
532250.00	4419750.00	0.17462	532750.00	4419750.00	0.18628
533250.00	4419750.00	0.19258	533750.00	4419750.00	0.20551
534250.00	4419750.00	0.21899	534750.00	4419750.00	0.50084
535250.00	4419750.00	0.29079	535750.00	4419750.00	0.28981
536250.00	4419750.00	0.30838	536750.00	4419750.00	0.30563
537250.00	4419750.00	0.29366	537750.00	4419750.00	0.27235
538250.00	4419750.00	0.25565	538750.00	4419750.00	0.24852
539250.00	4419750.00	0.27993	539750.00	4419750.00	0.33761
540250.00	4419750.00	0.45079	540750.00	4419750.00	0.83268
541250.00	4419750.00	0.83022	541750.00	4419750.00	0.29808

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
542250.00	4419750.00	0.28207	542750.00	4419750.00	0.24717
526750.00	4420250.00	0.13708	527250.00	4420250.00	0.11181
527750.00	4420250.00	0.11423	528250.00	4420250.00	0.11870
528750.00	4420250.00	0.12303	529250.00	4420250.00	0.12803
529750.00	4420250.00	0.13539	530250.00	4420250.00	0.18333
530750.00	4420250.00	0.16351	531250.00	4420250.00	0.15520
531750.00	4420250.00	0.16403	532250.00	4420250.00	0.20366
532750.00	4420250.00	0.18018	533250.00	4420250.00	0.18915
533750.00	4420250.00	0.20114	534250.00	4420250.00	0.21002
534750.00	4420250.00	0.32369	535250.00	4420250.00	0.24564
535750.00	4420250.00	0.27104	536250.00	4420250.00	0.28380
536750.00	4420250.00	0.28599	537250.00	4420250.00	0.27699
537750.00	4420250.00	0.26206	538250.00	4420250.00	0.24541
538750.00	4420250.00	0.23331	539250.00	4420250.00	0.23077
539750.00	4420250.00	0.23750	540250.00	4420250.00	0.32466
540750.00	4420250.00	0.57166	541250.00	4420250.00	1.14426
541750.00	4420250.00	0.37148	542250.00	4420250.00	0.22190
542750.00	4420250.00	0.23386	526750.00	4420750.00	0.11643

527250.00	4420750.00	0.10555	527750.00	4420750.00	0.10991
528250.00	4420750.00	0.11414	528750.00	4420750.00	0.11915
529250.00	4420750.00	0.12724	529750.00	4420750.00	0.14241
530250.00	4420750.00	0.25844	530750.00	4420750.00	0.16624
531250.00	4420750.00	0.15179	531750.00	4420750.00	0.15905
532250.00	4420750.00	0.20986	532750.00	4420750.00	0.17058
533250.00	4420750.00	0.17828	533750.00	4420750.00	0.19020
534250.00	4420750.00	0.20181	534750.00	4420750.00	0.22995
535250.00	4420750.00	0.23354	535750.00	4420750.00	0.24689
536250.00	4420750.00	0.26180	536750.00	4420750.00	0.26695
537250.00	4420750.00	0.26241	537750.00	4420750.00	0.25042
538250.00	4420750.00	0.23513	538750.00	4420750.00	0.22099
539250.00	4420750.00	0.21500	539750.00	4420750.00	0.21255
540250.00	4420750.00	0.22609	540750.00	4420750.00	0.36978
541250.00	4420750.00	0.82460	541750.00	4420750.00	0.89953
542250.00	4420750.00	0.25230	542750.00	4420750.00	0.17565
526750.00	4421250.00	0.10012	527250.00	4421250.00	0.10241
527750.00	4421250.00	0.10644	528250.00	4421250.00	0.11186
528750.00	4421250.00	0.12593	529250.00	4421250.00	0.14665
529750.00	4421250.00	0.16862	530250.00	4421250.00	0.26826
530750.00	4421250.00	0.18417	531250.00	4421250.00	0.14706
531750.00	4421250.00	0.15724	532250.00	4421250.00	0.45803

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
532750.00	4421250.00	0.19628	533250.00	4421250.00	0.17007
533750.00	4421250.00	0.17868	534250.00	4421250.00	0.19085
534750.00	4421250.00	0.20381	535250.00	4421250.00	0.21611
535750.00	4421250.00	0.23279	536250.00	4421250.00	0.24282
536750.00	4421250.00	0.25669	537250.00	4421250.00	0.25007
537750.00	4421250.00	0.24019	538250.00	4421250.00	0.22742
538750.00	4421250.00	0.21529	539250.00	4421250.00	0.20531
539750.00	4421250.00	0.19941	540250.00	4421250.00	0.19741
540750.00	4421250.00	0.21165	541250.00	4421250.00	0.33289
541750.00	4421250.00	0.79903	542250.00	4421250.00	0.97723
542750.00	4421250.00	0.37007	526750.00	4421750.00	0.09730
527250.00	4421750.00	0.10007	527750.00	4421750.00	0.10810
528250.00	4421750.00	0.12530	528750.00	4421750.00	0.18131
529250.00	4421750.00	0.21631	529750.00	4421750.00	0.21052
530250.00	4421750.00	0.30750	530750.00	4421750.00	0.23635
531250.00	4421750.00	0.16819	531750.00	4421750.00	0.17708
532250.00	4421750.00	0.39410	532750.00	4421750.00	0.29540
533250.00	4421750.00	0.16317	533750.00	4421750.00	0.16975
534250.00	4421750.00	0.17870	534750.00	4421750.00	0.19055
535250.00	4421750.00	0.20288	535750.00	4421750.00	0.21685
536250.00	4421750.00	0.22658	536750.00	4421750.00	0.29167
537250.00	4421750.00	0.24412	537750.00	4421750.00	0.23316
538250.00	4421750.00	0.21976	538750.00	4421750.00	0.20670
539250.00	4421750.00	0.19471	539750.00	4421750.00	0.18810

540250.00	4421750.00	0.18476	540750.00	4421750.00	0.18833
541250.00	4421750.00	0.20253	541750.00	4421750.00	0.29514
542250.00	4421750.00	0.82734	542750.00	4421750.00	0.82825
526750.00	4422250.00	0.09663	527250.00	4422250.00	0.11447
527750.00	4422250.00	0.14038	528250.00	4422250.00	0.17723
528750.00	4422250.00	0.30235	529250.00	4422250.00	0.33871
529750.00	4422250.00	0.23410	530250.00	4422250.00	0.26143
530750.00	4422250.00	0.23801	531250.00	4422250.00	0.27151
531750.00	4422250.00	0.27624	532250.00	4422250.00	0.35876
532750.00	4422250.00	0.32325	533250.00	4422250.00	0.15875
533750.00	4422250.00	0.16139	534250.00	4422250.00	0.17067
534750.00	4422250.00	0.18040	535250.00	4422250.00	0.19230
535750.00	4422250.00	0.20189	536250.00	4422250.00	0.21594
536750.00	4422250.00	0.22144	537250.00	4422250.00	0.22881
537750.00	4422250.00	0.23533	538250.00	4422250.00	0.23611
538750.00	4422250.00	0.20111	539250.00	4422250.00	0.18882

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC

539750.00	4422250.00	0.17968	540250.00	4422250.00	0.17443
540750.00	4422250.00	0.17443	541250.00	4422250.00	0.19419
541750.00	4422250.00	0.21776	542250.00	4422250.00	0.37605
542750.00	4422250.00	0.77773	526750.00	4422750.00	0.20617
527250.00	4422750.00	0.30043	527750.00	4422750.00	0.34386
528250.00	4422750.00	0.37574	528750.00	4422750.00	0.33970
529250.00	4422750.00	0.40268	529750.00	4422750.00	0.26369
530250.00	4422750.00	0.21479	530750.00	4422750.00	0.24871
531250.00	4422750.00	0.32617	531750.00	4422750.00	0.47078
532250.00	4422750.00	0.45685	532750.00	4422750.00	0.42269
533250.00	4422750.00	0.16579	533750.00	4422750.00	0.15399
534250.00	4422750.00	0.16330	534750.00	4422750.00	0.17104
535250.00	4422750.00	0.18297	535750.00	4422750.00	0.19364
536250.00	4422750.00	0.19982	536750.00	4422750.00	0.21172
537250.00	4422750.00	0.21417	537750.00	4422750.00	0.24854
538250.00	4422750.00	0.41655	538750.00	4422750.00	0.22010
539250.00	4422750.00	0.19346	539750.00	4422750.00	0.17797
540250.00	4422750.00	0.16958	540750.00	4422750.00	0.16483
541250.00	4422750.00	0.17749	541750.00	4422750.00	0.21294
542250.00	4422750.00	0.25564	542750.00	4422750.00	0.48895
526750.00	4423250.00	0.23940	527250.00	4423250.00	0.34201
527750.00	4423250.00	0.48191	528250.00	4423250.00	0.42532
528750.00	4423250.00	0.42846	529250.00	4423250.00	0.33591
529750.00	4423250.00	0.21892	530250.00	4423250.00	0.18737
530750.00	4423250.00	0.24498	531250.00	4423250.00	0.28621
531750.00	4423250.00	0.36562	532250.00	4423250.00	0.46866
532750.00	4423250.00	0.36667	533250.00	4423250.00	0.18930
533750.00	4423250.00	0.14805	534250.00	4423250.00	0.15467
534750.00	4423250.00	0.16239	535250.00	4423250.00	0.17144
535750.00	4423250.00	0.17859	536250.00	4423250.00	0.19141

536750.00	4423250.00	0.19651	537250.00	4423250.00	0.20391
537750.00	4423250.00	0.23365	538250.00	4423250.00	0.85205
538750.00	4423250.00	0.44959	539250.00	4423250.00	0.25487
539750.00	4423250.00	0.18333	540250.00	4423250.00	0.18561
540750.00	4423250.00	0.16408	541250.00	4423250.00	0.16417
541750.00	4423250.00	0.18549	542250.00	4423250.00	0.24165
542750.00	4423250.00	0.30418	526750.00	4423750.00	0.20254
527250.00	4423750.00	0.40437	527750.00	4423750.00	0.35655
528250.00	4423750.00	0.26559	528750.00	4423750.00	0.28393
529250.00	4423750.00	0.24314	529750.00	4423750.00	0.18445

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
530250.00	4423750.00	0.19055	530750.00	4423750.00	0.24518
531250.00	4423750.00	0.23538	531750.00	4423750.00	0.29008
532250.00	4423750.00	0.39461	532750.00	4423750.00	0.30749
533250.00	4423750.00	0.22274	533750.00	4423750.00	0.16676
534250.00	4423750.00	0.15412	534750.00	4423750.00	0.15614

535250.00	4423750.00	0.16147	535750.00	4423750.00	0.16862
536250.00	4423750.00	0.17641	536750.00	4423750.00	0.18886
537250.00	4423750.00	0.19267	537750.00	4423750.00	0.20102
538250.00	4423750.00	0.35595	538750.00	4423750.00	0.33911
539250.00	4423750.00	0.19834	539750.00	4423750.00	0.17146
540250.00	4423750.00	0.17042	540750.00	4423750.00	0.16526
541250.00	4423750.00	0.16884	541750.00	4423750.00	0.16690
542250.00	4423750.00	0.19476	542750.00	4423750.00	0.26436
526750.00	4424250.00	0.24351	527250.00	4424250.00	0.20252
527750.00	4424250.00	0.21295	528250.00	4424250.00	0.17533
528750.00	4424250.00	0.22863	529250.00	4424250.00	0.20439
529750.00	4424250.00	0.18745	530250.00	4424250.00	0.22279
530750.00	4424250.00	0.26604	531250.00	4424250.00	0.21222
531750.00	4424250.00	0.25971	532250.00	4424250.00	0.30860
532750.00	4424250.00	0.27046	533250.00	4424250.00	0.23768
533750.00	4424250.00	0.19056	534250.00	4424250.00	0.16644
534750.00	4424250.00	0.15409	535250.00	4424250.00	0.16759
535750.00	4424250.00	0.16059	536250.00	4424250.00	0.17061
536750.00	4424250.00	0.17926	537250.00	4424250.00	0.18316
537750.00	4424250.00	0.25773	538250.00	4424250.00	0.27104
538750.00	4424250.00	0.22900	539250.00	4424250.00	0.17686
539750.00	4424250.00	0.16720	540250.00	4424250.00	0.15700
540750.00	4424250.00	0.15382	541250.00	4424250.00	0.16824
541750.00	4424250.00	0.16344	542250.00	4424250.00	0.16995
542750.00	4424250.00	0.19905	526750.00	4424750.00	0.16240
527250.00	4424750.00	0.18691	527750.00	4424750.00	0.14916
528250.00	4424750.00	0.14346	528750.00	4424750.00	0.18698
529250.00	4424750.00	0.18037	529750.00	4424750.00	0.19903
530250.00	4424750.00	0.22945	530750.00	4424750.00	0.28661
531250.00	4424750.00	0.21316	531750.00	4424750.00	0.20093
532250.00	4424750.00	0.19267	532750.00	4424750.00	0.22714

533250.00	4424750.00	0.24047	533750.00	4424750.00	0.27435
534250.00	4424750.00	0.21197	534750.00	4424750.00	0.23525
535250.00	4424750.00	0.16592	535750.00	4424750.00	0.15351
536250.00	4424750.00	0.16322	536750.00	4424750.00	0.16948

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
537250.00	4424750.00	0.17388	537750.00	4424750.00	0.19699
538250.00	4424750.00	0.18204	538750.00	4424750.00	0.17734
539250.00	4424750.00	0.17087	539750.00	4424750.00	0.16295
540250.00	4424750.00	0.15358	540750.00	4424750.00	0.14866
541250.00	4424750.00	0.15381	541750.00	4424750.00	0.16317
542250.00	4424750.00	0.16278	542750.00	4424750.00	0.16587
526750.00	4425250.00	0.10496	527250.00	4425250.00	0.13976
527750.00	4425250.00	0.09530	528250.00	4425250.00	0.12282
528750.00	4425250.00	0.15313	529250.00	4425250.00	0.14298
529750.00	4425250.00	0.16430	530250.00	4425250.00	0.21566
530750.00	4425250.00	0.29571	531250.00	4425250.00	0.20303

531750.00	4425250.00	0.15672	532250.00	4425250.00	0.14014
532750.00	4425250.00	0.15896	533250.00	4425250.00	0.22936
533750.00	4425250.00	0.27627	534250.00	4425250.00	0.31908
534750.00	4425250.00	0.33160	535250.00	4425250.00	0.19125
535750.00	4425250.00	0.20594	536250.00	4425250.00	0.15285
536750.00	4425250.00	0.16072	537250.00	4425250.00	0.16772
537750.00	4425250.00	0.17217	538250.00	4425250.00	0.17257
538750.00	4425250.00	0.17111	539250.00	4425250.00	0.16639
539750.00	4425250.00	0.16335	540250.00	4425250.00	0.18652
540750.00	4425250.00	0.14824	541250.00	4425250.00	0.14549
541750.00	4425250.00	0.15142	542250.00	4425250.00	0.15521
542750.00	4425250.00	0.15351	528142.30	4424000.10	0.28048
528641.50	4421424.20	0.13244	530578.20	4414421.80	0.36811
533199.90	4420647.00	0.17976	537336.40	4419481.40	0.29595
538624.80	4413866.50	0.17233	538699.00	4411952.40	0.11155
539685.20	4412636.40	0.11414	540884.80	4419539.60	0.75102

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
526750.00	4409250.00	0.87517	527250.00	4409250.00	1.17804
527750.00	4409250.00	1.04496	528250.00	4409250.00	1.69683
528750.00	4409250.00	1.17045	529250.00	4409250.00	0.53004
529750.00	4409250.00	0.39267	530250.00	4409250.00	0.38731
530750.00	4409250.00	0.39275	531250.00	4409250.00	0.51619
531750.00	4409250.00	0.61765	532250.00	4409250.00	1.04686
532750.00	4409250.00	0.84028	533250.00	4409250.00	0.59527
533750.00	4409250.00	0.52787	534250.00	4409250.00	0.65270
534750.00	4409250.00	0.84198	535250.00	4409250.00	0.50007
535750.00	4409250.00	0.32517	536250.00	4409250.00	0.26885
536750.00	4409250.00	0.26387	537250.00	4409250.00	0.25063
537750.00	4409250.00	0.23047	538250.00	4409250.00	0.22287
538750.00	4409250.00	0.21359	539250.00	4409250.00	0.21022
539750.00	4409250.00	0.21068	540250.00	4409250.00	0.20726
540750.00	4409250.00	0.19377	541250.00	4409250.00	0.18141
541750.00	4409250.00	0.17628	542250.00	4409250.00	0.17376
542750.00	4409250.00	0.17061	526750.00	4409750.00	1.56549
527250.00	4409750.00	1.12951	527750.00	4409750.00	0.74409
528250.00	4409750.00	2.15621	528750.00	4409750.00	1.61691
529250.00	4409750.00	0.60881	529750.00	4409750.00	0.44303
530250.00	4409750.00	0.46508	530750.00	4409750.00	0.41442
531250.00	4409750.00	0.43622	531750.00	4409750.00	0.50192
532250.00	4409750.00	1.04522	532750.00	4409750.00	1.34825
533250.00	4409750.00	0.97139	533750.00	4409750.00	0.54972
534250.00	4409750.00	0.65420	534750.00	4409750.00	0.87976
535250.00	4409750.00	0.46134	535750.00	4409750.00	0.29968
536250.00	4409750.00	0.27776	536750.00	4409750.00	0.26297
537250.00	4409750.00	0.24998	537750.00	4409750.00	0.23897
538250.00	4409750.00	0.22875	538750.00	4409750.00	0.22252

539250.00	4409750.00	0.22310	539750.00	4409750.00	0.22085
540250.00	4409750.00	0.21375	540750.00	4409750.00	0.20039
541250.00	4409750.00	0.18730	541750.00	4409750.00	0.18078
542250.00	4409750.00	0.17687	542750.00	4409750.00	0.17238
526750.00	4410250.00	1.56000	527250.00	4410250.00	2.16505
527750.00	4410250.00	0.73776	528250.00	4410250.00	0.78574
528750.00	4410250.00	1.47625	529250.00	4410250.00	1.81592
529750.00	4410250.00	0.99586	530250.00	4410250.00	0.65090
530750.00	4410250.00	0.48783	531250.00	4410250.00	0.45870
531750.00	4410250.00	0.45658	532250.00	4410250.00	0.50712
532750.00	4410250.00	1.39231	533250.00	4410250.00	1.05244

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
533750.00	4410250.00	0.63967	534250.00	4410250.00	0.68329
534750.00	4410250.00	0.47794	535250.00	4410250.00	0.37500
535750.00	4410250.00	0.32472	536250.00	4410250.00	0.29527

536750.00	4410250.00	0.27624	537250.00	4410250.00	0.26848
537750.00	4410250.00	0.25692	538250.00	4410250.00	0.24266
538750.00	4410250.00	0.24337	539250.00	4410250.00	0.23521
539750.00	4410250.00	0.22742	540250.00	4410250.00	0.21729
540750.00	4410250.00	0.20652	541250.00	4410250.00	0.19459
541750.00	4410250.00	0.18700	542250.00	4410250.00	0.18111
542750.00	4410250.00	0.17828	526750.00	4410750.00	1.09741
527250.00	4410750.00	0.93489	527750.00	4410750.00	1.48223
528250.00	4410750.00	1.65156	528750.00	4410750.00	0.80455
529250.00	4410750.00	2.35785	529750.00	4410750.00	2.30792
530250.00	4410750.00	1.16727	530750.00	4410750.00	0.75189
531250.00	4410750.00	0.50688	531750.00	4410750.00	0.53052
532250.00	4410750.00	0.55077	532750.00	4410750.00	0.57350
533250.00	4410750.00	0.57921	533750.00	4410750.00	0.58994
534250.00	4410750.00	0.55135	534750.00	4410750.00	0.53305
535250.00	4410750.00	0.37563	535750.00	4410750.00	0.33197
536250.00	4410750.00	0.34122	536750.00	4410750.00	0.29492
537250.00	4410750.00	0.29146	537750.00	4410750.00	0.27597
538250.00	4410750.00	0.25809	538750.00	4410750.00	0.24358
539250.00	4410750.00	0.23595	539750.00	4410750.00	0.22281
540250.00	4410750.00	0.21491	540750.00	4410750.00	0.20784
541250.00	4410750.00	0.20286	541750.00	4410750.00	0.19413
542250.00	4410750.00	0.18818	542750.00	4410750.00	0.18403
526750.00	4411250.00	0.95029	527250.00	4411250.00	0.91164
527750.00	4411250.00	1.39301	528250.00	4411250.00	1.41807
528750.00	4411250.00	0.68189	529250.00	4411250.00	1.08861
529750.00	4411250.00	2.12717	530250.00	4411250.00	2.75425
530750.00	4411250.00	1.12644	531250.00	4411250.00	0.76046
531750.00	4411250.00	0.55872	532250.00	4411250.00	0.53061
532750.00	4411250.00	0.51219	533250.00	4411250.00	0.45332
533750.00	4411250.00	0.48507	534250.00	4411250.00	0.41679

534750.00	4411250.00	0.47070	535250.00	4411250.00	0.38529
535750.00	4411250.00	0.35901	536250.00	4411250.00	0.35035
536750.00	4411250.00	0.32686	537250.00	4411250.00	0.30603
537750.00	4411250.00	0.28378	538250.00	4411250.00	0.26544
538750.00	4411250.00	0.25312	539250.00	4411250.00	0.24005
539750.00	4411250.00	0.23245	540250.00	4411250.00	0.22606

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
540750.00	4411250.00	0.23408	541250.00	4411250.00	0.20966
541750.00	4411250.00	0.20227	542250.00	4411250.00	0.19740
542750.00	4411250.00	0.19355	526750.00	4411750.00	1.23007
527250.00	4411750.00	1.45624	527750.00	4411750.00	1.30905
528250.00	4411750.00	1.97175	528750.00	4411750.00	1.53894
529250.00	4411750.00	0.70683	529750.00	4411750.00	0.99362
530250.00	4411750.00	2.93575	530750.00	4411750.00	1.61557
531250.00	4411750.00	1.05393	531750.00	4411750.00	0.81556

532250.00	4411750.00	0.63024	532750.00	4411750.00	0.63418
533250.00	4411750.00	0.54728	533750.00	4411750.00	0.46827
534250.00	4411750.00	0.44784	534750.00	4411750.00	0.44356
535250.00	4411750.00	0.41971	535750.00	4411750.00	0.38649
536250.00	4411750.00	0.37147	536750.00	4411750.00	0.34810
537250.00	4411750.00	0.31446	537750.00	4411750.00	0.29228
538250.00	4411750.00	0.27409	538750.00	4411750.00	0.26175
539250.00	4411750.00	0.25077	539750.00	4411750.00	0.24406
540250.00	4411750.00	0.23511	540750.00	4411750.00	0.23546
541250.00	4411750.00	0.21952	541750.00	4411750.00	0.21384
542250.00	4411750.00	0.21792	542750.00	4411750.00	0.21039
526750.00	4412250.00	3.26792	527250.00	4412250.00	2.73226
527750.00	4412250.00	2.46537	528250.00	4412250.00	4.29009
528750.00	4412250.00	3.43719	529250.00	4412250.00	0.75875
529750.00	4412250.00	0.74579	530250.00	4412250.00	1.57127
530750.00	4412250.00	2.98007	531250.00	4412250.00	1.45422
531750.00	4412250.00	1.68266	532250.00	4412250.00	0.87236
532750.00	4412250.00	0.64380	533250.00	4412250.00	0.62814
533750.00	4412250.00	0.56364	534250.00	4412250.00	0.50427
534750.00	4412250.00	0.49401	535250.00	4412250.00	0.46593
535750.00	4412250.00	0.43885	536250.00	4412250.00	0.40740
536750.00	4412250.00	0.35708	537250.00	4412250.00	0.32352
537750.00	4412250.00	0.30239	538250.00	4412250.00	0.28379
538750.00	4412250.00	0.27312	539250.00	4412250.00	0.26430
539750.00	4412250.00	0.25622	540250.00	4412250.00	0.24860
540750.00	4412250.00	0.29641	541250.00	4412250.00	0.23644
541750.00	4412250.00	0.23824	542250.00	4412250.00	0.25972
542750.00	4412250.00	0.25745	526750.00	4412750.00	4.12657
527250.00	4412750.00	3.62887	527750.00	4412750.00	5.04827
528250.00	4412750.00	4.54089	528750.00	4412750.00	4.73616
529250.00	4412750.00	4.63267	529750.00	4412750.00	0.80714

530250.00 4412750.00 0.84799 530750.00 4412750.00 2.13944

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
531250.00	4412750.00	1.57740	531750.00	4412750.00	1.90547
532250.00	4412750.00	2.89324	532750.00	4412750.00	1.01554
533250.00	4412750.00	0.94056	533750.00	4412750.00	1.53221
534250.00	4412750.00	0.59019	534750.00	4412750.00	0.56389
535250.00	4412750.00	0.52954	535750.00	4412750.00	0.49293
536250.00	4412750.00	0.43973	536750.00	4412750.00	0.37365
537250.00	4412750.00	0.34362	537750.00	4412750.00	0.31851
538250.00	4412750.00	0.30847	538750.00	4412750.00	0.29192
539250.00	4412750.00	0.28207	539750.00	4412750.00	0.27402
540250.00	4412750.00	0.26644	540750.00	4412750.00	0.28257
541250.00	4412750.00	0.27258	541750.00	4412750.00	0.31204
542250.00	4412750.00	0.34614	542750.00	4412750.00	0.33394
526750.00	4413250.00	3.30395	527250.00	4413250.00	3.45537

527750.00	4413250.00	3.97689	528250.00	4413250.00	3.86854
528750.00	4413250.00	6.38359	529250.00	4413250.00	5.69077
529750.00	4413250.00	1.18778	530250.00	4413250.00	0.86175
530750.00	4413250.00	2.40418	531250.00	4413250.00	2.33203
531750.00	4413250.00	1.64914	532250.00	4413250.00	1.88980
532750.00	4413250.00	1.89178	533250.00	4413250.00	1.35780
533750.00	4413250.00	1.38594	534250.00	4413250.00	0.71502
534750.00	4413250.00	0.66624	535250.00	4413250.00	0.61790
535750.00	4413250.00	0.55280	536250.00	4413250.00	0.46091
536750.00	4413250.00	0.40432	537250.00	4413250.00	0.37320
537750.00	4413250.00	0.34219	538250.00	4413250.00	0.33297
538750.00	4413250.00	0.31789	539250.00	4413250.00	0.31550
539750.00	4413250.00	0.30952	540250.00	4413250.00	0.30175
540750.00	4413250.00	0.34010	541250.00	4413250.00	0.34046
541750.00	4413250.00	0.43039	542250.00	4413250.00	0.38507
542750.00	4413250.00	0.34890	526750.00	4413750.00	3.50440
527250.00	4413750.00	2.82877	527750.00	4413750.00	2.69245
528250.00	4413750.00	2.31108	528750.00	4413750.00	2.71531
529250.00	4413750.00	2.72715	529750.00	4413750.00	1.07165
530250.00	4413750.00	0.88275	530750.00	4413750.00	1.80397
531250.00	4413750.00	9.42615	531750.00	4413750.00	3.55620
532250.00	4413750.00	1.68769	532750.00	4413750.00	3.25881
533750.00	4413750.00	1.10740	534250.00	4413750.00	1.04795
534750.00	4413750.00	0.83816	535250.00	4413750.00	0.75528
535750.00	4413750.00	0.62127	536250.00	4413750.00	0.49610
536750.00	4413750.00	0.44544	537250.00	4413750.00	0.41017
537750.00	4413750.00	0.37934	538250.00	4413750.00	0.35735

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
538750.00	4413750.00	0.34960	539250.00	4413750.00	0.37211
539750.00	4413750.00	0.34944	540250.00	4413750.00	0.33138
540750.00	4413750.00	0.36197	541250.00	4413750.00	0.33827
541750.00	4413750.00	0.35812	542250.00	4413750.00	0.36563
542750.00	4413750.00	0.38038	526750.00	4414250.00	3.98795
527250.00	4414250.00	4.35583	527750.00	4414250.00	2.48078
528250.00	4414250.00	3.12578	528750.00	4414250.00	2.59560
529250.00	4414250.00	1.88032	529750.00	4414250.00	0.87960
530250.00	4414250.00	0.85264	530750.00	4414250.00	1.06519
531250.00	4414250.00	10.44306	531750.00	4414250.00	8.19663
532250.00	4414250.00	4.25380	532750.00	4414250.00	6.06872
533250.00	4414250.00	3.09021	533750.00	4414250.00	1.78496
534250.00	4414250.00	1.29990	534750.00	4414250.00	1.16326
535250.00	4414250.00	0.92692	535750.00	4414250.00	0.71189
536250.00	4414250.00	0.59135	536750.00	4414250.00	0.51954
537250.00	4414250.00	0.46248	537750.00	4414250.00	0.41861
538250.00	4414250.00	0.39262	538750.00	4414250.00	0.40446
539250.00	4414250.00	0.37000	539750.00	4414250.00	0.35916
540250.00	4414250.00	0.33592	540750.00	4414250.00	0.31823

541250.00	4414250.00	0.43604	541750.00	4414250.00	0.46281
542250.00	4414250.00	0.48933	542750.00	4414250.00	0.49770
526750.00	4414750.00	6.35063	527250.00	4414750.00	5.55838
527750.00	4414750.00	4.63063	528250.00	4414750.00	2.37795
528750.00	4414750.00	2.89153	529250.00	4414750.00	1.33070
529750.00	4414750.00	1.06152	530250.00	4414750.00	0.81597
530750.00	4414750.00	0.89264	531250.00	4414750.00	2.99904
531750.00	4414750.00	4.91414	532250.00	4414750.00	2.93807
533250.00	4414750.00	18.60854	533750.00	4414750.00	2.29251
534250.00	4414750.00	2.64599	534750.00	4414750.00	1.64943
535250.00	4414750.00	1.13975	535750.00	4414750.00	0.90067
536250.00	4414750.00	0.72158	536750.00	4414750.00	0.59988
537250.00	4414750.00	0.51219	537750.00	4414750.00	0.45632
538250.00	4414750.00	0.41903	538750.00	4414750.00	0.42114
539250.00	4414750.00	0.61921	539750.00	4414750.00	0.54001
540250.00	4414750.00	0.55674	540750.00	4414750.00	0.55181
541250.00	4414750.00	0.70051	541750.00	4414750.00	0.72348
542250.00	4414750.00	0.51329	542750.00	4414750.00	0.45754
526750.00	4415250.00	4.60794	527250.00	4415250.00	2.78870
527750.00	4415250.00	1.87066	528250.00	4415250.00	6.17207
528750.00	4415250.00	2.18661	529250.00	4415250.00	1.12096

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 ,

KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
529750.00	4415250.00	0.79595	530250.00	4415250.00	0.80237
530750.00	4415250.00	0.96990	531250.00	4415250.00	8.12113
531750.00	4415250.00	5.32985	532250.00	4415250.00	3.08331
532750.00	4415250.00	18.88407	533250.00	4415250.00	19.32127
533750.00	4415250.00	2.54777	534250.00	4415250.00	2.10636
534750.00	4415250.00	0.63027	535250.00	4415250.00	1.46116
535750.00	4415250.00	1.18379	536250.00	4415250.00	0.87622
536750.00	4415250.00	0.68105	537250.00	4415250.00	0.58617
537750.00	4415250.00	0.52562	538250.00	4415250.00	0.63031
538750.00	4415250.00	1.21308	539250.00	4415250.00	1.13147
539750.00	4415250.00	1.01632	540250.00	4415250.00	1.15029
540750.00	4415250.00	1.16717	541250.00	4415250.00	1.03029
541750.00	4415250.00	0.80254	542250.00	4415250.00	0.45873
542750.00	4415250.00	0.41142	526750.00	4415750.00	1.38485
527250.00	4415750.00	1.00343	527750.00	4415750.00	0.86516
528250.00	4415750.00	1.01264	528750.00	4415750.00	1.64205
529250.00	4415750.00	1.34171	529750.00	4415750.00	1.18233
530250.00	4415750.00	0.77721	530750.00	4415750.00	0.85766
531250.00	4415750.00	3.26982	531750.00	4415750.00	5.34623
532250.00	4415750.00	2.72019	532750.00	4415750.00	5.21502
533250.00	4415750.00	10.82122	533750.00	4415750.00	1.86690
534250.00	4415750.00	1.29887	534750.00	4415750.00	1.53540
535250.00	4415750.00	1.97763	535750.00	4415750.00	1.41045
536250.00	4415750.00	1.00215	536750.00	4415750.00	0.77556

537250.00	4415750.00	0.71108	537750.00	4415750.00	0.60761
538250.00	4415750.00	0.62540	538750.00	4415750.00	0.97974
539250.00	4415750.00	0.91618	539750.00	4415750.00	0.88401
540250.00	4415750.00	0.67508	540750.00	4415750.00	0.94527
541250.00	4415750.00	0.85792	541750.00	4415750.00	0.79879
542250.00	4415750.00	0.48987	542750.00	4415750.00	0.38156
526750.00	4416250.00	0.83196	527250.00	4416250.00	0.63499
527750.00	4416250.00	0.60495	528250.00	4416250.00	0.61462
528750.00	4416250.00	0.64099	529250.00	4416250.00	0.67468
529750.00	4416250.00	0.71923	530250.00	4416250.00	0.73235
530750.00	4416250.00	0.79974	531250.00	4416250.00	4.84114
531750.00	4416250.00	9.93016	532250.00	4416250.00	4.53267
532750.00	4416250.00	2.82713	533250.00	4416250.00	2.97640
533750.00	4416250.00	9.91805	534250.00	4416250.00	1.48273
534750.00	4416250.00	1.61704	535250.00	4416250.00	1.79711
535750.00	4416250.00	1.42795	536250.00	4416250.00	1.08711

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
536750.00	4416250.00	0.86136	537250.00	4416250.00	0.94768
537750.00	4416250.00	1.84075	538250.00	4416250.00	2.33013
538750.00	4416250.00	1.57093	539250.00	4416250.00	0.92575
539750.00	4416250.00	0.78758	540250.00	4416250.00	0.65666
540750.00	4416250.00	0.62056	541250.00	4416250.00	0.56577
541750.00	4416250.00	0.51941	542250.00	4416250.00	0.49306
542750.00	4416250.00	0.42115	526750.00	4416750.00	0.87996
527250.00	4416750.00	0.70957	527750.00	4416750.00	0.61557
528250.00	4416750.00	0.58901	528750.00	4416750.00	0.59877
529250.00	4416750.00	0.62115	529750.00	4416750.00	0.64875
530250.00	4416750.00	0.68060	530750.00	4416750.00	0.74145
531250.00	4416750.00	4.06229	531750.00	4416750.00	4.77147
532250.00	4416750.00	5.08729	532750.00	4416750.00	3.01679
533250.00	4416750.00	18.33029	534250.00	4416750.00	4.45855
534750.00	4416750.00	2.04245	535250.00	4416750.00	1.83444
535750.00	4416750.00	1.44865	536250.00	4416750.00	1.13706
536750.00	4416750.00	0.94285	537250.00	4416750.00	0.84145
537750.00	4416750.00	1.22472	538250.00	4416750.00	2.04486
538750.00	4416750.00	2.04918	539250.00	4416750.00	1.77744
539750.00	4416750.00	1.16666	540250.00	4416750.00	0.74534
540750.00	4416750.00	0.69243	541250.00	4416750.00	0.61805
541750.00	4416750.00	0.61302	542250.00	4416750.00	0.58133
542750.00	4416750.00	0.56225	526750.00	4417250.00	1.76252
527250.00	4417250.00	0.82754	527750.00	4417250.00	0.59257
528250.00	4417250.00	0.57204	528750.00	4417250.00	0.57470
529250.00	4417250.00	0.59090	529750.00	4417250.00	0.60906
530250.00	4417250.00	0.63428	530750.00	4417250.00	0.66356
531250.00	4417250.00	5.68733	531750.00	4417250.00	6.36164
532250.00	4417250.00	5.65712	532750.00	4417250.00	3.80859

533250.00	4417250.00	3.40753	533750.00	4417250.00	5.67456
534250.00	4417250.00	10.09007	534750.00	4417250.00	9.43971
535250.00	4417250.00	1.41910	535750.00	4417250.00	1.52863
536250.00	4417250.00	1.26389	536750.00	4417250.00	1.01060
537250.00	4417250.00	0.87027	537750.00	4417250.00	1.20695
538250.00	4417250.00	0.73124	538750.00	4417250.00	1.18257
539250.00	4417250.00	1.13282	539750.00	4417250.00	1.86479
540250.00	4417250.00	1.71207	540750.00	4417250.00	1.25301
541250.00	4417250.00	0.74304	541750.00	4417250.00	0.57862
542250.00	4417250.00	0.70068	542750.00	4417250.00	0.50652
526750.00	4417750.00	3.39880	527250.00	4417750.00	1.23583

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
527750.00	4417750.00	0.68175	528250.00	4417750.00	0.56029
528750.00	4417750.00	0.54923	529250.00	4417750.00	0.55938
529750.00	4417750.00	0.57379	530250.00	4417750.00	0.59201

530750.00	4417750.00	0.61367	531250.00	4417750.00	0.68021
531750.00	4417750.00	3.77540	532250.00	4417750.00	7.21502
532750.00	4417750.00	5.88645	533250.00	4417750.00	3.68733
533750.00	4417750.00	3.16099	534250.00	4417750.00	1.38240
534750.00	4417750.00	1.42670	535250.00	4417750.00	1.34458
535750.00	4417750.00	1.95484	536250.00	4417750.00	1.43278
536750.00	4417750.00	1.08955	537250.00	4417750.00	0.91379
537750.00	4417750.00	2.10963	538250.00	4417750.00	0.87418
538750.00	4417750.00	0.68273	539250.00	4417750.00	0.69419
539750.00	4417750.00	1.20624	540250.00	4417750.00	1.55399
540750.00	4417750.00	1.62297	541250.00	4417750.00	0.95725
541750.00	4417750.00	0.60604	542250.00	4417750.00	0.69031
542750.00	4417750.00	0.56577	526750.00	4418250.00	3.12777
527250.00	4418250.00	2.08500	527750.00	4418250.00	0.63940
528250.00	4418250.00	0.53277	528750.00	4418250.00	0.52268
529250.00	4418250.00	0.53105	529750.00	4418250.00	0.54138
530250.00	4418250.00	0.55529	530750.00	4418250.00	0.57390
531250.00	4418250.00	0.60566	531750.00	4418250.00	1.89745
532250.00	4418250.00	1.42601	532750.00	4418250.00	2.60391
533250.00	4418250.00	5.16720	534250.00	4418250.00	0.92578
534750.00	4418250.00	1.05161	535250.00	4418250.00	1.46882
535750.00	4418250.00	1.71916	536250.00	4418250.00	1.43288
536750.00	4418250.00	1.14154	537250.00	4418250.00	0.94080
537750.00	4418250.00	0.82855	538250.00	4418250.00	0.80468
538750.00	4418250.00	0.70839	539250.00	4418250.00	0.80094
539750.00	4418250.00	0.76006	540250.00	4418250.00	0.73260
540750.00	4418250.00	0.87195	541250.00	4418250.00	0.92903
541750.00	4418250.00	0.65513	542250.00	4418250.00	0.55515
542750.00	4418250.00	0.49146	526750.00	4418750.00	1.86757
527250.00	4418750.00	1.32094	527750.00	4418750.00	0.49589
528250.00	4418750.00	0.48763	528750.00	4418750.00	0.49767

529250.00	4418750.00	0.50716	529750.00	4418750.00	0.51686
530250.00	4418750.00	0.52854	530750.00	4418750.00	0.54510
531250.00	4418750.00	0.56215	531750.00	4418750.00	0.83771
532250.00	4418750.00	0.71261	532750.00	4418750.00	0.68624
533250.00	4418750.00	1.46339	533750.00	4418750.00	0.82678
534250.00	4418750.00	0.94332	534750.00	4418750.00	1.12108

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
535250.00	4418750.00	1.15911	535750.00	4418750.00	1.39717
536250.00	4418750.00	1.26065	536750.00	4418750.00	1.11046
537250.00	4418750.00	0.95271	537750.00	4418750.00	0.84093
538250.00	4418750.00	1.84191	538750.00	4418750.00	1.00498
539250.00	4418750.00	1.12621	539750.00	4418750.00	1.45967
540250.00	4418750.00	1.01748	540750.00	4418750.00	0.81793
541250.00	4418750.00	0.81783	541750.00	4418750.00	0.76966
542250.00	4418750.00	0.54583	542750.00	4418750.00	0.66055

526750.00	4419250.00	1.09965	527250.00	4419250.00	0.69129
527750.00	4419250.00	0.47445	528250.00	4419250.00	0.46601
528750.00	4419250.00	0.47724	529250.00	4419250.00	0.48782
529750.00	4419250.00	0.49829	530250.00	4419250.00	0.51217
530750.00	4419250.00	0.52282	531250.00	4419250.00	0.54098
531750.00	4419250.00	0.55702	532250.00	4419250.00	0.58002
532750.00	4419250.00	0.61259	533250.00	4419250.00	0.69275
533750.00	4419250.00	0.71454	534250.00	4419250.00	0.77584
534750.00	4419250.00	1.26652	535250.00	4419250.00	1.46758
535750.00	4419250.00	1.20372	536250.00	4419250.00	1.15814
536750.00	4419250.00	1.04251	537250.00	4419250.00	0.93283
537750.00	4419250.00	0.84291	538250.00	4419250.00	0.83790
538750.00	4419250.00	0.76570	539250.00	4419250.00	1.09225
539750.00	4419250.00	1.35070	540250.00	4419250.00	1.28201
540750.00	4419250.00	1.45092	541250.00	4419250.00	1.30951
541750.00	4419250.00	0.80137	542250.00	4419250.00	0.88498
542750.00	4419250.00	0.72532	526750.00	4419750.00	1.02553
527250.00	4419750.00	0.64009	527750.00	4419750.00	0.44589
528250.00	4419750.00	0.44525	528750.00	4419750.00	0.45690
529250.00	4419750.00	0.46919	529750.00	4419750.00	0.48256
530250.00	4419750.00	0.51013	530750.00	4419750.00	0.50776
531250.00	4419750.00	0.52321	531750.00	4419750.00	0.53985
532250.00	4419750.00	0.56090	532750.00	4419750.00	0.59550
533250.00	4419750.00	0.62432	533750.00	4419750.00	0.67343
534250.00	4419750.00	0.72927	534750.00	4419750.00	1.25356
535250.00	4419750.00	1.00705	535750.00	4419750.00	1.05500
536250.00	4419750.00	1.08622	536750.00	4419750.00	1.00462
537250.00	4419750.00	0.91765	537750.00	4419750.00	0.83561
538250.00	4419750.00	0.78784	538750.00	4419750.00	0.74023
539250.00	4419750.00	0.73912	539750.00	4419750.00	0.77311
540250.00	4419750.00	0.91740	540750.00	4419750.00	1.63400

541250.00 4419750.00 2.01951 541750.00 4419750.00 0.78319

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
542250.00	4419750.00	0.74053	542750.00	4419750.00	0.65243
526750.00	4420250.00	1.24884	527250.00	4420250.00	0.57448
527750.00	4420250.00	0.41536	528250.00	4420250.00	0.42312
528750.00	4420250.00	0.43535	529250.00	4420250.00	0.44883
529750.00	4420250.00	0.46579	530250.00	4420250.00	0.53794
530750.00	4420250.00	0.51067	531250.00	4420250.00	0.50881
531750.00	4420250.00	0.53297	532250.00	4420250.00	0.64818
532750.00	4420250.00	0.58626	533250.00	4420250.00	0.61560
533750.00	4420250.00	0.65607	534250.00	4420250.00	0.69813
534750.00	4420250.00	0.90414	535250.00	4420250.00	0.86409
535750.00	4420250.00	0.98110	536250.00	4420250.00	1.03556
536750.00	4420250.00	1.00119	537250.00	4420250.00	0.91781
537750.00	4420250.00	0.83780	538250.00	4420250.00	0.78507

538750.00	4420250.00	0.75771	539250.00	4420250.00	0.73416
539750.00	4420250.00	0.69092	540250.00	4420250.00	0.74232
540750.00	4420250.00	1.00770	541250.00	4420250.00	1.92695
541750.00	4420250.00	0.91697	542250.00	4420250.00	0.79986
542750.00	4420250.00	0.65137	526750.00	4420750.00	1.17554
527250.00	4420750.00	0.41468	527750.00	4420750.00	0.39093
528250.00	4420750.00	0.40120	528750.00	4420750.00	0.41420
529250.00	4420750.00	0.43007	529750.00	4420750.00	0.45386
530250.00	4420750.00	0.58732	530750.00	4420750.00	0.50047
531250.00	4420750.00	0.49670	531750.00	4420750.00	0.52912
532250.00	4420750.00	0.72143	532750.00	4420750.00	0.56548
533250.00	4420750.00	0.59354	533750.00	4420750.00	0.63363
534250.00	4420750.00	0.67382	534750.00	4420750.00	0.75198
535250.00	4420750.00	0.81258	535750.00	4420750.00	0.89445
536250.00	4420750.00	0.97809	536750.00	4420750.00	1.00046
537250.00	4420750.00	0.95569	537750.00	4420750.00	0.87175
538250.00	4420750.00	0.80004	538750.00	4420750.00	0.88227
539250.00	4420750.00	0.74272	539750.00	4420750.00	0.71017
540250.00	4420750.00	0.67897	540750.00	4420750.00	0.78908
541250.00	4420750.00	1.24164	541750.00	4420750.00	1.44747
542250.00	4420750.00	0.70061	542750.00	4420750.00	0.52950
526750.00	4421250.00	0.46187	527250.00	4421250.00	0.36365
527750.00	4421250.00	0.37029	528250.00	4421250.00	0.38241
528750.00	4421250.00	0.40425	529250.00	4421250.00	0.43215
529750.00	4421250.00	0.46439	530250.00	4421250.00	0.58353
530750.00	4421250.00	0.51398	531250.00	4421250.00	0.48731
531750.00	4421250.00	0.54158	532250.00	4421250.00	1.47469

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
532750.00	4421250.00	0.60833	533250.00	4421250.00	0.57643
533750.00	4421250.00	0.60809	534250.00	4421250.00	0.65088
534750.00	4421250.00	0.69922	535250.00	4421250.00	0.75781
535750.00	4421250.00	0.84127	536250.00	4421250.00	0.92111
536750.00	4421250.00	0.99643	537250.00	4421250.00	1.00167
537750.00	4421250.00	0.95734	538250.00	4421250.00	0.86469
538750.00	4421250.00	0.80493	539250.00	4421250.00	0.77837
539750.00	4421250.00	0.73670	540250.00	4421250.00	0.67965
540750.00	4421250.00	0.65166	541250.00	4421250.00	0.74404
541750.00	4421250.00	1.20192	542250.00	4421250.00	1.42749
542750.00	4421250.00	0.81160	526750.00	4421750.00	0.37508
527250.00	4421750.00	0.34608	527750.00	4421750.00	0.35999
528250.00	4421750.00	0.38201	528750.00	4421750.00	0.44712
529250.00	4421750.00	0.49177	529750.00	4421750.00	0.49752
530250.00	4421750.00	0.64179	530750.00	4421750.00	0.74217
531250.00	4421750.00	0.73023	531750.00	4421750.00	0.61154
532250.00	4421750.00	1.01680	532750.00	4421750.00	0.71866
533250.00	4421750.00	0.55685	533750.00	4421750.00	0.58338
534250.00	4421750.00	0.61915	534750.00	4421750.00	0.66571

535250.00	4421750.00	0.72191	535750.00	4421750.00	0.78634
536250.00	4421750.00	0.86600	536750.00	4421750.00	1.08592
537250.00	4421750.00	1.01425	537750.00	4421750.00	1.04951
538250.00	4421750.00	1.01821	538750.00	4421750.00	0.90877
539250.00	4421750.00	0.86718	539750.00	4421750.00	0.80648
540250.00	4421750.00	0.73633	540750.00	4421750.00	0.66862
541250.00	4421750.00	0.62459	541750.00	4421750.00	0.70659
542250.00	4421750.00	1.28047	542750.00	4421750.00	1.26333
526750.00	4422250.00	0.33197	527250.00	4422250.00	0.35485
527750.00	4422250.00	0.38270	528250.00	4422250.00	0.42586
528750.00	4422250.00	0.56535	529250.00	4422250.00	0.61778
529750.00	4422250.00	0.53028	530250.00	4422250.00	0.73978
530750.00	4422250.00	1.03026	531250.00	4422250.00	1.25890
531750.00	4422250.00	0.81765	532250.00	4422250.00	0.80211
532750.00	4422250.00	0.76136	533250.00	4422250.00	0.55010
533750.00	4422250.00	0.55749	534250.00	4422250.00	0.59174
534750.00	4422250.00	0.62865	535250.00	4422250.00	0.67718
535750.00	4422250.00	0.73133	536250.00	4422250.00	0.80686
536750.00	4422250.00	0.88051	537250.00	4422250.00	0.96583
537750.00	4422250.00	1.07610	538250.00	4422250.00	1.20600
538750.00	4422250.00	1.18083	539250.00	4422250.00	1.04968

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 ,

KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
539750.00	4422250.00	0.94097	540250.00	4422250.00	0.80975
540750.00	4422250.00	0.73302	541250.00	4422250.00	0.75708
541750.00	4422250.00	0.68739	542250.00	4422250.00	0.87542
542750.00	4422250.00	1.29232	526750.00	4422750.00	0.47896
527250.00	4422750.00	0.55641	527750.00	4422750.00	0.59249
528250.00	4422750.00	0.63063	528750.00	4422750.00	0.60516
529250.00	4422750.00	0.73256	529750.00	4422750.00	0.69096
530250.00	4422750.00	0.96967	530750.00	4422750.00	0.89203
531250.00	4422750.00	1.11936	531750.00	4422750.00	1.06905
532250.00	4422750.00	0.88622	532750.00	4422750.00	1.05579
533250.00	4422750.00	0.61171	533750.00	4422750.00	0.53783
534250.00	4422750.00	0.56039	534750.00	4422750.00	0.58981
535250.00	4422750.00	0.63573	535750.00	4422750.00	0.68461
536250.00	4422750.00	0.73136	536750.00	4422750.00	0.80675
537250.00	4422750.00	0.87944	537750.00	4422750.00	1.05382
538250.00	4422750.00	1.43611	538750.00	4422750.00	1.47594
539250.00	4422750.00	1.56318	539750.00	4422750.00	1.11679
540250.00	4422750.00	0.92943	540750.00	4422750.00	0.85820
541250.00	4422750.00	1.01879	541750.00	4422750.00	0.94267
542250.00	4422750.00	0.82399	542750.00	4422750.00	1.13577
526750.00	4423250.00	0.50522	527250.00	4423250.00	0.61401
527750.00	4423250.00	0.74299	528250.00	4423250.00	0.72937
528750.00	4423250.00	0.77262	529250.00	4423250.00	0.82040
529750.00	4423250.00	0.87510	530250.00	4423250.00	1.01269

530750.00	4423250.00	0.77306	531250.00	4423250.00	0.79599
531750.00	4423250.00	0.85950	532250.00	4423250.00	0.95482
532750.00	4423250.00	1.09327	533250.00	4423250.00	0.79911
533750.00	4423250.00	0.51397	534250.00	4423250.00	0.52676
534750.00	4423250.00	0.55290	535250.00	4423250.00	0.58684
535750.00	4423250.00	0.63087	536250.00	4423250.00	0.67421
536750.00	4423250.00	0.71179	537250.00	4423250.00	0.77491
537750.00	4423250.00	0.90566	538250.00	4423250.00	1.97615
538750.00	4423250.00	1.47871	539250.00	4423250.00	1.52309
539750.00	4423250.00	0.46669	540250.00	4423250.00	1.15250
540750.00	4423250.00	1.05303	541250.00	4423250.00	1.14025
541750.00	4423250.00	1.25096	542250.00	4423250.00	1.16134
542750.00	4423250.00	0.99822	526750.00	4423750.00	0.48107
527250.00	4423750.00	0.64145	527750.00	4423750.00	0.65226
528250.00	4423750.00	0.60132	528750.00	4423750.00	0.70358
529250.00	4423750.00	0.81364	529750.00	4423750.00	0.94355

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
530250.00	4423750.00	0.93148	530750.00	4423750.00	0.72154
531250.00	4423750.00	0.79577	531750.00	4423750.00	0.76116
532250.00	4423750.00	0.94750	532750.00	4423750.00	1.00015
533250.00	4423750.00	0.98728	533750.00	4423750.00	0.56052
534250.00	4423750.00	0.50553	534750.00	4423750.00	0.52314
535250.00	4423750.00	0.54447	535750.00	4423750.00	0.57625
536250.00	4423750.00	0.60961	536750.00	4423750.00	0.64881
537250.00	4423750.00	0.67502	537750.00	4423750.00	0.73201
538250.00	4423750.00	1.02901	538750.00	4423750.00	0.98927
539250.00	4423750.00	0.87016	539750.00	4423750.00	1.01767
540250.00	4423750.00	1.24649	540750.00	4423750.00	1.06005
541250.00	4423750.00	1.13248	541750.00	4423750.00	1.27675
542250.00	4423750.00	1.38327	542750.00	4423750.00	1.31093
526750.00	4424250.00	0.50433	527250.00	4424250.00	0.51431
527750.00	4424250.00	0.53439	528250.00	4424250.00	0.69895
528750.00	4424250.00	0.67056	529250.00	4424250.00	0.74661
529750.00	4424250.00	0.82721	530250.00	4424250.00	0.82336
530750.00	4424250.00	0.70192	531250.00	4424250.00	0.73787
531750.00	4424250.00	0.69929	532250.00	4424250.00	0.83863
532750.00	4424250.00	0.86279	533250.00	4424250.00	0.87900
533750.00	4424250.00	0.58409	534250.00	4424250.00	0.49980
534750.00	4424250.00	0.49929	535250.00	4424250.00	0.53983
535750.00	4424250.00	0.53465	536250.00	4424250.00	0.56002
536750.00	4424250.00	0.58796	537250.00	4424250.00	0.60897
537750.00	4424250.00	0.79928	538250.00	4424250.00	0.81705
538750.00	4424250.00	0.74063	539250.00	4424250.00	0.70670
539750.00	4424250.00	0.87585	540250.00	4424250.00	1.03771
540750.00	4424250.00	0.91682	541250.00	4424250.00	0.94183
541750.00	4424250.00	1.00960	542250.00	4424250.00	1.20932

542750.00	4424250.00	1.37611	526750.00	4424750.00	0.52104
527250.00	4424750.00	0.49345	527750.00	4424750.00	0.63671
528250.00	4424750.00	0.65555	528750.00	4424750.00	0.57035
529250.00	4424750.00	0.57081	529750.00	4424750.00	0.66970
530250.00	4424750.00	0.64134	530750.00	4424750.00	0.67897
531250.00	4424750.00	0.59025	531750.00	4424750.00	0.59824
532250.00	4424750.00	0.61437	532750.00	4424750.00	0.68365
533250.00	4424750.00	0.77761	533750.00	4424750.00	0.72833
534250.00	4424750.00	0.54216	534750.00	4424750.00	0.62957
535250.00	4424750.00	0.51682	535750.00	4424750.00	0.49883
536250.00	4424750.00	0.52005	536750.00	4424750.00	0.53987

**MODELOPTs: RegDFAULT CONC ELEV

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
537250.00	4424750.00	0.57073	537750.00	4424750.00	0.63373
538250.00	4424750.00	0.61056	538750.00	4424750.00	0.61798
539250.00	4424750.00	0.64118	539750.00	4424750.00	0.73159

540250.00	4424750.00	0.84231	540750.00	4424750.00	0.81008
541250.00	4424750.00	0.78424	541750.00	4424750.00	0.82148
542250.00	4424750.00	0.80040	542750.00	4424750.00	1.07150
526750.00	4425250.00	0.50574	527250.00	4425250.00	0.45876
527750.00	4425250.00	0.48024	528250.00	4425250.00	0.47304
528750.00	4425250.00	0.48340	529250.00	4425250.00	0.47365
529750.00	4425250.00	0.49967	530250.00	4425250.00	0.57100
530750.00	4425250.00	0.65650	531250.00	4425250.00	0.56015
531750.00	4425250.00	0.64711	532250.00	4425250.00	0.81133
532750.00	4425250.00	0.90369	533250.00	4425250.00	0.67612
533750.00	4425250.00	0.70194	534250.00	4425250.00	0.68636
534750.00	4425250.00	0.80309	535250.00	4425250.00	0.55360
535750.00	4425250.00	0.61204	536250.00	4425250.00	0.48250
536750.00	4425250.00	0.50196	537250.00	4425250.00	0.52729
537750.00	4425250.00	0.54794	538250.00	4425250.00	0.56622
538750.00	4425250.00	0.58023	539250.00	4425250.00	0.60055
539750.00	4425250.00	0.66002	540250.00	4425250.00	0.77919
540750.00	4425250.00	0.73234	541250.00	4425250.00	0.69623
541750.00	4425250.00	0.70102	542250.00	4425250.00	0.72100
542750.00	4425250.00	0.70328	528142.30	4424000.10	0.71739
528641.50	4421424.20	0.40459	530578.20	4414421.80	0.88656
533199.90	4420647.00	0.59475	537336.40	4419481.40	0.90540
538624.80	4413866.50	0.36066	538699.00	4411952.40	0.26702
539685.20	4412636.40	0.27066	540884.80	4419539.60	1.71537

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
526750.00	4409250.00	17.09377 (12082802)	527250.00	4409250.00	31.70005 (12092618)
527750.00	4409250.00	31.46239 (12072702)	528250.00	4409250.00	76.59089 (12090619)
528750.00	4409250.00	69.77704 (12041603)	529250.00	4409250.00	68.84962 (12050905)
529750.00	4409250.00	38.13031 (12050905)	530250.00	4409250.00	36.77965 (12050905)
530750.00	4409250.00	28.60983 (12032822)	531250.00	4409250.00	29.90198 (12111317)
531750.00	4409250.00	60.93860 (12061422)	532250.00	4409250.00	82.71502 (12011103)
532750.00	4409250.00	88.89129 (12093004)	533250.00	4409250.00	100.02415 (12101722)
533750.00	4409250.00	76.48006 (12051522)	534250.00	4409250.00	86.78738 (12020803)
534750.00	4409250.00	108.46490 (12081123)	535250.00	4409250.00	70.16682 (12072024)
535750.00	4409250.00	6.75212 (12052324)	536250.00	4409250.00	9.24752 (12080322)
536750.00	4409250.00	12.88031 (12070424)	537250.00	4409250.00	6.65535 (12051520)
537750.00	4409250.00	5.26769 (12032308)	538250.00	4409250.00	5.84212 (12122111)
538750.00	4409250.00	6.18122 (12032308)	539250.00	4409250.00	9.09859 (12093007)
539750.00	4409250.00	14.97169 (12093007)	540250.00	4409250.00	16.26125 (12093007)
540750.00	4409250.00	12.07101 (12093007)	541250.00	4409250.00	7.29460 (12093007)
541750.00	4409250.00	6.13225 (12093007)	542250.00	4409250.00	6.09581 (12093007)
542750.00	4409250.00	5.32702 (12093007)	526750.00	4409750.00	42.13695 (12060521)
527250.00	4409750.00	26.95865 (12082802)	527750.00	4409750.00	10.97492 (12111408)
528250.00	4409750.00	76.81244 (12080121)	528750.00	4409750.00	68.18768 (12020406)
529250.00	4409750.00	63.94711 (12123005)	529750.00	4409750.00	38.38688 (12123005)
530250.00	4409750.00	57.98610 (12050905)	530750.00	4409750.00	30.12501 (12050905)

531250.00	4409750.00	12.12358 (12111317)	531750.00	4409750.00	24.30262 (12061422)
532250.00	4409750.00	110.63423 (12061422)	532750.00	4409750.00	111.52773 (12092623)
533250.00	4409750.00	109.32215 (12110319)	533750.00	4409750.00	58.59175 (12101722)
534250.00	4409750.00	114.26441 (12101719)	534750.00	4409750.00	121.46535 (12081123)
535250.00	4409750.00	51.29899 (12072024)	535750.00	4409750.00	6.90292 (12111810)
536250.00	4409750.00	6.50328 (12032622)	536750.00	4409750.00	5.95205 (12031518)
537250.00	4409750.00	5.30119 (12032308)	537750.00	4409750.00	6.05532 (12032308)
538250.00	4409750.00	6.55822 (12032308)	538750.00	4409750.00	6.76609 (12032308)
539250.00	4409750.00	11.00146 (12093007)	539750.00	4409750.00	13.23386 (12093007)
540250.00	4409750.00	14.05397 (12093007)	540750.00	4409750.00	10.42105 (12093007)
541250.00	4409750.00	5.86767 (12122110)	541750.00	4409750.00	5.43591 (12122110)
542250.00	4409750.00	5.20833 (12121109)	542750.00	4409750.00	5.43570 (12121109)
526750.00	4410250.00	49.10147 (12101923)	527250.00	4410250.00	64.35178 (12101721)
527750.00	4410250.00	10.73946 (12111408)	528250.00	4410250.00	11.35329 (12072404)
528750.00	4410250.00	48.75865 (12072702)	529250.00	4410250.00	76.03827 (12020406)
529750.00	4410250.00	81.74213 (12072505)	530250.00	4410250.00	77.89577 (12050905)
530750.00	4410250.00	45.12079 (12050905)	531250.00	4410250.00	26.82167 (12050905)
531750.00	4410250.00	7.25815 (12111809)	532250.00	4410250.00	29.72389 (12061422)
532750.00	4410250.00	121.26891 (12061424)	533250.00	4410250.00	93.99567 (12080701)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
533750.00	4410250.00	73.55723	(12101722)	534250.00	4410250.00	113.17136	(12101719)
534750.00	4410250.00	38.04150	(12080422)	535250.00	4410250.00	15.22911	(12052324)
535750.00	4410250.00	7.24299	(12111810)	536250.00	4410250.00	7.10770	(12032622)
536750.00	4410250.00	6.34330	(12031518)	537250.00	4410250.00	6.22308	(12032308)
537750.00	4410250.00	6.88313	(12032308)	538250.00	4410250.00	7.24864	(12032308)
538750.00	4410250.00	7.16369	(12032308)	539250.00	4410250.00	8.12164	(12093007)
539750.00	4410250.00	9.70605	(12093007)	540250.00	4410250.00	10.17115	(12093007)
540750.00	4410250.00	7.72701	(12093007)	541250.00	4410250.00	5.68215	(12122110)
541750.00	4410250.00	5.75017	(12121109)	542250.00	4410250.00	5.98531	(12121109)
542750.00	4410250.00	6.12548	(12121109)	526750.00	4410750.00	51.16032	(12101723)
527250.00	4410750.00	53.58849	(12120902)	527750.00	4410750.00	29.70829	(12090402)
528250.00	4410750.00	51.34783	(12060521)	528750.00	4410750.00	11.17265	(12072404)
529250.00	4410750.00	84.03962	(12112604)	529750.00	4410750.00	96.43874	(12090619)
530250.00	4410750.00	85.39098	(12072505)	530750.00	4410750.00	64.73337	(12050905)
531250.00	4410750.00	34.05103	(12050905)	531750.00	4410750.00	17.02426	(12032822)
532250.00	4410750.00	18.84730	(12061422)	532750.00	4410750.00	37.25937	(12082624)
533250.00	4410750.00	29.18959	(12100518)	533750.00	4410750.00	48.21716	(12050224)
534250.00	4410750.00	72.88632	(12101719)	534750.00	4410750.00	46.19663	(12080422)
535250.00	4410750.00	8.90306	(12100508)	535750.00	4410750.00	7.50889	(12111810)
536250.00	4410750.00	24.65058	(12070424)	536750.00	4410750.00	6.31722	(12031518)
537250.00	4410750.00	7.19599	(12032308)	537750.00	4410750.00	7.67936	(12032308)
538250.00	4410750.00	7.89019	(12032308)	538750.00	4410750.00	7.75178	(12032308)
539250.00	4410750.00	7.36917	(12122110)	539750.00	4410750.00	7.08433	(12122110)
540250.00	4410750.00	6.58242	(12122110)	540750.00	4410750.00	6.07710	(12121109)
541250.00	4410750.00	6.47318	(12121109)	541750.00	4410750.00	6.62835	(12121109)
542250.00	4410750.00	6.71350	(12121109)	542750.00	4410750.00	6.71830	(12121109)
526750.00	4411250.00	39.10500	(12010905)	527250.00	4411250.00	51.13206	(12010905)

527750.00	4411250.00	56.14324 (12101923)	528250.00	4411250.00	19.30448 (12090402)
528750.00	4411250.00	11.21447 (12111408)	529250.00	4411250.00	26.23280 (12070924)
529750.00	4411250.00	69.79728 (12092618)	530250.00	4411250.00	112.59651 (12090619)
530750.00	4411250.00	103.18835 (12072505)	531250.00	4411250.00	84.10124 (12050905)
531750.00	4411250.00	31.51979 (12050905)	532250.00	4411250.00	7.45698 (12111809)
532750.00	4411250.00	16.73945 (12061422)	533250.00	4411250.00	9.74056 (12061520)
533750.00	4411250.00	15.09796 (12050224)	534250.00	4411250.00	10.64914 (12100508)
534750.00	4411250.00	19.87072 (12080422)	535250.00	4411250.00	9.42285 (12080721)
535750.00	4411250.00	8.47525 (12061419)	536250.00	4411250.00	12.69470 (12010621)
536750.00	4411250.00	7.44902 (12032308)	537250.00	4411250.00	8.27110 (12032308)
537750.00	4411250.00	8.65168 (12032308)	538250.00	4411250.00	8.54807 (12032308)
538750.00	4411250.00	8.07029 (12032308)	539250.00	4411250.00	7.58715 (12122110)
539750.00	4411250.00	6.97630 (12122110)	540250.00	4411250.00	6.80252 (12121109)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
540750.00	4411250.00	7.09719 (12121109)	541250.00	4411250.00	7.40434 (12121109)
541750.00	4411250.00	7.40066 (12121109)	542250.00	4411250.00	7.30556 (12121109)

542750.00 4411250.00 7.14138 (12121109) 526750.00 4411750.00 72.54948 (12101723)

527250.00 4411750.00 77.61914 (12101723) 527750.00 4411750.00 75.92639 (12101723)

528250.00 4411750.00 19.31718 (12060221) 528750.00 4411750.00 10.55090 (12101721)

529250.00 4411750.00 10.90133 (12111408) 529750.00 4411750.00 22.03217 (12060521)

530250.00 4411750.00 110.36370 (12090604) 530750.00 4411750.00 114.16218 (12072505)

531250.00 4411750.00 118.42911 (12050905) 531750.00 4411750.00 93.82599 (12050905)

532250.00 4411750.00 15.57851 (12050905) 532750.00 4411750.00 12.47285 (12061422)

533250.00 4411750.00 14.29201 (12082624) 533750.00 4411750.00 10.75974 (12071819)

534250.00 4411750.00 11.09168 (12100508) 534750.00 4411750.00 11.21225 (12100508)

535250.00 4411750.00 10.49168 (12073119) 535750.00 4411750.00 10.40174 (12061419)

536250.00 4411750.00 8.55884 (12021721) 536750.00 4411750.00 8.83164 (12032308)

537250.00 4411750.00 9.55130 (12032308) 537750.00 4411750.00 9.52642 (12032308)

538250.00 4411750.00 8.99848 (12032308) 538750.00 4411750.00 8.15197 (12032308)

539250.00 4411750.00 7.43347 (12122110) 539750.00 4411750.00 7.77412 (12121109)

540250.00 4411750.00 8.11228 (12121109) 540750.00 4411750.00 8.13577 (12121109)

541250.00 4411750.00 8.15433 (12121109) 541750.00 4411750.00 7.94922 (12121109)

542250.00 4411750.00 7.64389 (12121109) 542750.00 4411750.00 7.32716 (12121109)

526750.00 4412250.00 59.73880 (12060520) 527250.00 4412250.00 71.15140 (12100419)

527750.00 4412250.00 77.31110 (12090502) 528250.00 4412250.00 87.15136 (12092806)

528750.00 4412250.00 64.86946 (12112804) 529250.00 4412250.00 11.80370 (12010511)

529750.00 4412250.00 11.46033 (12010411) 530250.00 4412250.00 61.19857 (12060521)

530750.00 4412250.00 119.51883 (12032502) 531250.00 4412250.00 127.10814 (12090503)

531750.00 4412250.00 121.00253 (12072505) 532250.00 4412250.00 37.09553 (12072504)

532750.00 4412250.00 8.58749 (12022410) 533250.00 4412250.00 18.30121 (12061422)

533750.00 4412250.00 12.64721 (12061520) 534250.00 4412250.00 11.29480 (12100508)

534750.00 4412250.00 12.45452 (12081920) 535250.00 4412250.00 11.47913 (12073119)

535750.00 4412250.00 11.84797 (12061419) 536250.00 4412250.00 9.09045 (12032308)

536750.00 4412250.00 10.46934 (12032308) 537250.00 4412250.00 10.71470 (12032308)

537750.00 4412250.00 10.11679 (12032308) 538250.00 4412250.00 9.07767 (12032308)

538750.00 4412250.00 8.50511 (12071607) 539250.00 4412250.00 8.74611 (12121109)

539750.00 4412250.00 9.14444 (12121109) 540250.00 4412250.00 9.13245 (12121109)

540750.00	4412250.00	22.35592 (12122118)	541250.00	4412250.00	8.57022 (12121109)
541750.00	4412250.00	8.13592 (12121109)	542250.00	4412250.00	15.19629 (12060423)
542750.00	4412250.00	15.45453 (12092122)	526750.00	4412750.00	78.86770 (12093023)
527250.00	4412750.00	67.11778 (12030705)	527750.00	4412750.00	83.73381 (12112717)
528250.00	4412750.00	76.01154 (12020107)	528750.00	4412750.00	80.74157 (12121607)
529250.00	4412750.00	80.20739 (12072701)	529750.00	4412750.00	12.77261 (12010411)
530250.00	4412750.00	13.03375 (12010411)	530750.00	4412750.00	83.44714 (12101721)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
531250.00	4412750.00	133.68229 (12101923)	531750.00	4412750.00	143.81857 (12090503)
532250.00	4412750.00	160.74718 (12041603)	532750.00	4412750.00	31.70755 (12050905)
533250.00	4412750.00	12.28224 (12111317)	533750.00	4412750.00	148.58558 (12082624)
534250.00	4412750.00	11.96423 (12071819)	534750.00	4412750.00	14.42514 (12032220)
535250.00	4412750.00	12.80546 (12061419)	535750.00	4412750.00	13.17799 (12072820)
536250.00	4412750.00	10.90855 (12032308)	536750.00	4412750.00	11.95722 (12032308)
537250.00	4412750.00	11.41425 (12032308)	537750.00	4412750.00	10.09914 (12032308)
538250.00	4412750.00	10.05365 (12071607)	538750.00	4412750.00	10.08094 (12071607)

539250.00 4412750.00 10.14927 (12121109) 539750.00 4412750.00 10.09334 (12121109)

540250.00 4412750.00 9.68923 (12121109) 540750.00 4412750.00 11.91492 (12060423)

541250.00 4412750.00 8.69299 (12092122) 541750.00 4412750.00 26.86598 (12092122)

542250.00 4412750.00 38.88981 (12081304) 542750.00 4412750.00 42.32006 (12081304)

526750.00 4413250.00 80.56734 (12072301) 527250.00 4413250.00 85.71672 (12072301)

527750.00 4413250.00 87.84822 (12101802) 528250.00 4413250.00 78.07776 (12020321)

528750.00 4413250.00 101.73948 (12081003) 529250.00 4413250.00 82.77531 (12072523)

529750.00 4413250.00 13.34726 (12010411) 530250.00 4413250.00 14.09372 (12010411)

530750.00 4413250.00 49.32108 (12061220) 531250.00 4413250.00 59.81803 (12060520)

531750.00 4413250.00 150.51386 (12101923) 532250.00 4413250.00 164.42614 (12090503)

532750.00 4413250.00 186.45189 (12072505) 533250.00 4413250.00 41.20936 (12050905)

533750.00 4413250.00 116.20554 (12061422) 534250.00 4413250.00 16.49876 (12063021)

534750.00 4413250.00 17.00737 (12032220) 535250.00 4413250.00 17.12464 (12061419)

535750.00 4413250.00 15.68321 (12072820) 536250.00 4413250.00 12.73976 (12032308)

536750.00 4413250.00 12.76839 (12032308) 537250.00 4413250.00 11.40698 (12071607)

537750.00 4413250.00 11.93884 (12071607) 538250.00 4413250.00 11.79108 (12071607)

538750.00 4413250.00 11.21792 (12071607) 539250.00 4413250.00 10.81746 (12121109)

539750.00 4413250.00 10.22167 (12121109) 540250.00 4413250.00 9.46475 (12121109)

540750.00 4413250.00 25.34630 (12081304) 541250.00 4413250.00 34.99828 (12081304)

541750.00 4413250.00 65.96805 (12081303) 542250.00 4413250.00 59.11359 (12081303)

542750.00 4413250.00 45.10946 (12081303) 526750.00 4413750.00 28.04521 (12080724)

527250.00 4413750.00 38.47314 (12072301) 527750.00 4413750.00 60.08967 (12072301)

528250.00 4413750.00 68.15131 (12081202) 528750.00 4413750.00 78.78497 (12012602)

529250.00 4413750.00 65.17863 (12072322) 529750.00 4413750.00 14.63879 (12122609)

530250.00 4413750.00 14.95751 (12122609) 530750.00 4413750.00 16.31508 (12072501)

531250.00 4413750.00 161.31549 (12060224) 531750.00 4413750.00 120.77923 (12060520)

532250.00 4413750.00 139.44152 (12120902) 532750.00 4413750.00 176.70599 (12101923)

533750.00 4413750.00 12.83045 (12022410) 534250.00 4413750.00 23.82376 (12063021)

534750.00 4413750.00 19.18713 (12032703) 535250.00 4413750.00 20.77327 (12021719)

535750.00 4413750.00 15.26793 (12021724) 536250.00 4413750.00 13.31921 (12032308)

536750.00 4413750.00 13.87864 (12071607) 537250.00 4413750.00 14.42323 (12071607)

537750.00 4413750.00 13.74464 (12071607) 538250.00 4413750.00 12.63792 (12071607)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
538750.00	4413750.00	11.52833	(12071607)	539250.00	4413750.00	15.03556	(12092122)
539750.00	4413750.00	17.43965	(12081304)	540250.00	4413750.00	23.43726	(12081303)
540750.00	4413750.00	54.70975	(12081303)	541250.00	4413750.00	41.49227	(12081303)
541750.00	4413750.00	27.01554	(12100805)	542250.00	4413750.00	24.74548	(12110223)
542750.00	4413750.00	17.66339	(12110223)	526750.00	4414250.00	53.57132	(12080724)
527250.00	4414250.00	36.17889	(12072603)	527750.00	4414250.00	15.55637	(12072603)
528250.00	4414250.00	24.39288	(12080724)	528750.00	4414250.00	45.12435	(12080724)
529250.00	4414250.00	37.92561	(12072301)	529750.00	4414250.00	14.00546	(12122609)
530250.00	4414250.00	14.91316	(12122609)	530750.00	4414250.00	15.33103	(12122609)
531250.00	4414250.00	165.88466	(12061124)	531750.00	4414250.00	144.08674	(12011520)
532250.00	4414250.00	193.07107	(12090502)	532750.00	4414250.00	193.78138	(12112804)
533250.00	4414250.00	162.20983	(12090402)	533750.00	4414250.00	26.12459	(12062319)
534250.00	4414250.00	25.18877	(12062719)	534750.00	4414250.00	26.65083	(12032703)
535250.00	4414250.00	24.54777	(12072820)	535750.00	4414250.00	14.11496	(12060618)

536250.00	4414250.00	16.70123 (12071607)	536750.00	4414250.00	16.99963 (12071607)
537250.00	4414250.00	15.63718 (12071607)	537750.00	4414250.00	13.91410 (12071607)
538250.00	4414250.00	12.26253 (12071607)	538750.00	4414250.00	26.97619 (12081303)
539250.00	4414250.00	22.94261 (12081303)	539750.00	4414250.00	19.49156 (12081303)
540250.00	4414250.00	8.20954 (12081303)	540750.00	4414250.00	8.77655 (12051320)
541250.00	4414250.00	37.19094 (12110206)	541750.00	4414250.00	46.60813 (12110206)
542250.00	4414250.00	46.52089 (12110206)	542750.00	4414250.00	49.83053 (12110206)
526750.00	4414750.00	86.98837 (12072603)	527250.00	4414750.00	69.39677 (12072603)
527750.00	4414750.00	62.01102 (12090621)	528250.00	4414750.00	33.93232 (12061122)
528750.00	4414750.00	46.52910 (12061122)	529250.00	4414750.00	16.69498 (12061122)
529750.00	4414750.00	13.75531 (12061506)	530250.00	4414750.00	13.26033 (12122810)
530750.00	4414750.00	13.96009 (12010610)	531250.00	4414750.00	52.05010 (12072603)
531750.00	4414750.00	110.31006 (12080724)	532250.00	4414750.00	185.63185 (12081202)
533250.00	4414750.00	287.24936 (12061121)	533750.00	4414750.00	30.75933 (12061919)
534250.00	4414750.00	37.68967 (12070120)	534750.00	4414750.00	28.29744 (12072110)
535250.00	4414750.00	24.17519 (12100412)	535750.00	4414750.00	15.93191 (12071607)
536250.00	4414750.00	18.39252 (12071607)	536750.00	4414750.00	16.54238 (12071607)
537250.00	4414750.00	14.17475 (12071607)	537750.00	4414750.00	12.05729 (12071607)
538250.00	4414750.00	10.92474 (12122813)	538750.00	4414750.00	25.31389 (12082719)
539250.00	4414750.00	121.41146 (12051320)	539750.00	4414750.00	90.68365 (12051320)
540250.00	4414750.00	87.65072 (12051320)	540750.00	4414750.00	70.35094 (12082719)
541250.00	4414750.00	87.90178 (12051724)	541750.00	4414750.00	76.07866 (12022523)
542250.00	4414750.00	80.97889 (12110206)	542750.00	4414750.00	75.12639 (12110206)
526750.00	4415250.00	60.73543 (12072605)	527250.00	4415250.00	40.42082 (12061120)
527750.00	4415250.00	22.87430 (12061120)	528250.00	4415250.00	70.60878 (12061120)
528750.00	4415250.00	24.61790 (12061120)	529250.00	4415250.00	15.14594 (12061506)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
529750.00	4415250.00	15.32512 (12061506)	530250.00	4415250.00	15.11106 (12061506)
530750.00	4415250.00	15.08720 (12122810)	531250.00	4415250.00	152.57463 (12062221)
531750.00	4415250.00	161.54460 (12110620)	532250.00	4415250.00	184.02068 (12020505)
532750.00	4415250.00	293.13142 (12072605)	533250.00	4415250.00	367.18545 (12092923)
533750.00	4415250.00	32.31989 (12072624)	534250.00	4415250.00	31.97135 (12082511)
534750.00	4415250.00	16.66081 (12101615)	535250.00	4415250.00	23.21023 (12082811)
535750.00	4415250.00	20.89925 (12082810)	536250.00	4415250.00	15.28818 (12122813)
536750.00	4415250.00	15.64073 (12122813)	537250.00	4415250.00	14.96878 (12122813)
537750.00	4415250.00	13.95908 (12122813)	538250.00	4415250.00	47.82470 (12092118)
538750.00	4415250.00	159.84933 (12053021)	539250.00	4415250.00	146.30692 (12053021)
539750.00	4415250.00	104.26263 (12030405)	540250.00	4415250.00	113.59071 (12041923)
540750.00	4415250.00	110.54225 (12053021)	541250.00	4415250.00	95.66191 (12092118)
541750.00	4415250.00	83.48236 (12080702)	542250.00	4415250.00	68.13917 (12011022)
542750.00	4415250.00	63.20803 (12011022)	526750.00	4415750.00	28.50687 (12081323)
527250.00	4415750.00	14.07104 (12081323)	527750.00	4415750.00	13.10414 (12061506)
528250.00	4415750.00	13.55645 (12061506)	528750.00	4415750.00	24.50930 (12071705)
529250.00	4415750.00	14.54468 (12071124)	529750.00	4415750.00	14.84160 (12061506)
530250.00	4415750.00	14.82469 (12122810)	530750.00	4415750.00	14.65765 (12122810)
531250.00	4415750.00	50.04659 (12100519)	531750.00	4415750.00	105.18808 (12020204)
532250.00	4415750.00	166.07993 (12050403)	532750.00	4415750.00	175.57262 (12062703)

533250.00	4415750.00	360.86659 (12032120)	533750.00	4415750.00	67.81144 (12071101)
534250.00	4415750.00	21.91554 (12041811)	534750.00	4415750.00	20.36417 (12041310)
535250.00	4415750.00	23.59583 (12033013)	535750.00	4415750.00	17.74958 (12021516)
536250.00	4415750.00	16.80529 (12010514)	536750.00	4415750.00	17.20366 (12010514)
537250.00	4415750.00	21.56878 (12110317)	537750.00	4415750.00	14.43249 (12010514)
538250.00	4415750.00	36.78401 (12092723)	538750.00	4415750.00	115.79930 (12092723)
539250.00	4415750.00	119.52977 (12101218)	539750.00	4415750.00	112.94489 (12101218)
540250.00	4415750.00	86.68093 (12101218)	540750.00	4415750.00	89.29357 (12110222)
541250.00	4415750.00	89.10743 (12110222)	541750.00	4415750.00	98.47652 (12092723)
542250.00	4415750.00	72.05733 (12101218)	542750.00	4415750.00	40.19924 (12011022)
526750.00	4416250.00	19.58707 (12071124)	527250.00	4416250.00	11.46120 (12061506)
527750.00	4416250.00	11.87517 (12061506)	528250.00	4416250.00	12.26285 (12061506)
528750.00	4416250.00	12.51266 (12061506)	529250.00	4416250.00	12.63187 (12122810)
529750.00	4416250.00	12.78746 (12122810)	530250.00	4416250.00	13.46313 (12122712)
530750.00	4416250.00	14.79090 (12122712)	531250.00	4416250.00	97.02614 (12070624)
531750.00	4416250.00	158.70693 (12030822)	532250.00	4416250.00	200.26014 (12080905)
532750.00	4416250.00	191.72890 (12060104)	533250.00	4416250.00	167.73342 (12050724)
533750.00	4416250.00	220.45869 (12071504)	534250.00	4416250.00	16.09087 (12020411)
534750.00	4416250.00	18.73574 (12041812)	535250.00	4416250.00	19.24195 (12120312)
535750.00	4416250.00	20.13874 (12041820)	536250.00	4416250.00	19.18478 (12122812)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
536750.00	4416250.00	17.20655	(12010514)	537250.00	4416250.00	38.50150	(12092002)
537750.00	4416250.00	139.11422	(12092018)	538250.00	4416250.00	178.83890	(12100223)
538750.00	4416250.00	120.14925	(12022722)	539250.00	4416250.00	117.35241	(12100402)
539750.00	4416250.00	96.99654	(12121122)	540250.00	4416250.00	73.15231	(12031402)
540750.00	4416250.00	71.10536	(12101218)	541250.00	4416250.00	74.88212	(12101218)
541750.00	4416250.00	62.40100	(12101218)	542250.00	4416250.00	49.78382	(12101218)
542750.00	4416250.00	40.30790	(12101218)	526750.00	4416750.00	9.50106	(12122810)
527250.00	4416750.00	9.73337	(12122810)	527750.00	4416750.00	9.95746	(12122810)
528250.00	4416750.00	10.57819	(12122712)	528750.00	4416750.00	11.59569	(12092907)
529250.00	4416750.00	11.95116	(12122712)	529750.00	4416750.00	12.74728	(12122712)
530250.00	4416750.00	13.44697	(12122712)	530750.00	4416750.00	14.37216	(12122712)
531250.00	4416750.00	165.80884	(12080802)	531750.00	4416750.00	188.46329	(12062704)
532250.00	4416750.00	84.26320	(12050724)	532750.00	4416750.00	91.60014	(12021403)
533250.00	4416750.00	193.29533	(12071504)	534250.00	4416750.00	125.60324	(12070523)
534750.00	4416750.00	16.00974	(12020611)	535250.00	4416750.00	19.21293	(12010513)
535750.00	4416750.00	16.59166	(12121610)	536250.00	4416750.00	18.03854	(12122812)
536750.00	4416750.00	18.14258	(12122812)	537250.00	4416750.00	15.77806	(12122812)
537750.00	4416750.00	72.54701	(12091319)	538250.00	4416750.00	171.14980	(12041619)
538750.00	4416750.00	150.32286	(12052222)	539250.00	4416750.00	142.22587	(12092006)
539750.00	4416750.00	90.12152	(12100402)	540250.00	4416750.00	90.26662	(12121122)
540750.00	4416750.00	91.05971	(12121122)	541250.00	4416750.00	81.37483	(12121122)
541750.00	4416750.00	77.78947	(12100402)	542250.00	4416750.00	65.64290	(12100402)
542750.00	4416750.00	49.95992	(12100402)	526750.00	4417250.00	24.65715	(12070624)
527250.00	4417250.00	9.84653	(12111409)	527750.00	4417250.00	11.10673	(12092907)
528250.00	4417250.00	11.81896	(12122809)	528750.00	4417250.00	12.30380	(12122809)
529250.00	4417250.00	12.01112	(12122809)	529750.00	4417250.00	11.98595	(12082707)

530250.00	4417250.00	12.27343 (12122712)	530750.00	4417250.00	12.50426 (12122712)
531250.00	4417250.00	69.98603 (12062704)	531750.00	4417250.00	16.93631 (12072506)
532250.00	4417250.00	67.11447 (12011118)	532750.00	4417250.00	166.95540 (12061005)
533250.00	4417250.00	195.55002 (12010323)	533750.00	4417250.00	132.12464 (12080605)
534250.00	4417250.00	167.73448 (12040624)	534750.00	4417250.00	51.79741 (12040706)
535250.00	4417250.00	19.08333 (12010513)	535750.00	4417250.00	18.20823 (12010513)
536250.00	4417250.00	15.72232 (12121610)	536750.00	4417250.00	16.72093 (12122812)
537250.00	4417250.00	16.20351 (12122812)	537750.00	4417250.00	66.47067 (12100721)
538250.00	4417250.00	12.98391 (12010514)	538750.00	4417250.00	72.51143 (12042219)
539250.00	4417250.00	84.70272 (12091319)	539750.00	4417250.00	113.52382 (12052222)
540250.00	4417250.00	92.61645 (12030902)	540750.00	4417250.00	78.76484 (12041620)
541250.00	4417250.00	81.76429 (12102304)	541750.00	4417250.00	67.57807 (12010103)
542250.00	4417250.00	80.44987 (12100402)	542750.00	4417250.00	63.07458 (12031402)
526750.00	4417750.00	62.06547 (12080723)	527250.00	4417750.00	22.63517 (12061323)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
527750.00	4417750.00	11.57790 (12122809)	528250.00	4417750.00	12.47422 (12122809)

528750.00 4417750.00 12.83190 (12122809)
529250.00 4417750.00 12.33304 (12082707)
529750.00 4417750.00 12.40266 (12082707)
530250.00 4417750.00 11.92505 (12082707)
530750.00 4417750.00 15.28258 (12072506)
531250.00 4417750.00 20.18097 (12072506)
531750.00 4417750.00 23.89474 (12072506)
532250.00 4417750.00 142.60630 (12071504)
532750.00 4417750.00 148.79905 (12020222)
533250.00 4417750.00 156.88635 (12101005)
533750.00 4417750.00 208.24804 (12071024)
534250.00 4417750.00 16.88023 (12040624)
534750.00 4417750.00 15.50131 (12020611)
535250.00 4417750.00 17.10373 (12010513)
535750.00 4417750.00 18.32542 (12010513)
536250.00 4417750.00 16.71563 (12121610)
536750.00 4417750.00 14.28018 (12080407)
537250.00 4417750.00 14.70807 (12122812)
537750.00 4417750.00 95.62018 (12110220)
538250.00 4417750.00 16.25104 (12100721)
538750.00 4417750.00 11.70760 (12122812)
539250.00 4417750.00 11.31499 (12010514)
539750.00 4417750.00 67.92407 (12042219)
540250.00 4417750.00 112.47205 (12081305)
540750.00 4417750.00 93.78402 (12041024)
541250.00 4417750.00 86.31808 (12052824)
541750.00 4417750.00 62.40814 (12012704)
542250.00 4417750.00 72.72827 (12102304)
542750.00 4417750.00 63.51747 (12011019)
526750.00 4418250.00 68.66352 (12030402)
527250.00 4418250.00 51.79801 (12062304)
527750.00 4418250.00 11.38433 (12122809)
528250.00 4418250.00 11.77500 (12122809)
528750.00 4418250.00 11.95910 (12122809)
529250.00 4418250.00 12.04093 (12082707)
529750.00 4418250.00 12.38756 (12072506)
530250.00 4418250.00 16.09346 (12072506)
530750.00 4418250.00 20.32664 (12072506)
531250.00 4418250.00 24.63860 (12072506)
531750.00 4418250.00 122.22372 (12071504)
532250.00 4418250.00 93.79581 (12082720)
532750.00 4418250.00 120.79901 (12062004)
533250.00 4418250.00 84.03883 (12080605)
534250.00 4418250.00 14.28897 (12011110)
534750.00 4418250.00 14.32801 (12072607)
535250.00 4418250.00 15.69527 (12010513)
535750.00 4418250.00 17.14795 (12010512)
536250.00 4418250.00 16.53548 (12010512)
536750.00 4418250.00 14.17463 (12121610)
537250.00 4418250.00 12.80030 (12080407)
537750.00 4418250.00 13.00061 (12122812)
538250.00 4418250.00 12.82752 (12122812)
538750.00 4418250.00 11.97701 (12122812)
539250.00 4418250.00 32.03181 (12100721)
539750.00 4418250.00 26.46766 (12051523)
540250.00 4418250.00 28.41013 (12081305)
540750.00 4418250.00 70.85765 (12081305)
541250.00 4418250.00 71.62495 (12052824)
541750.00 4418250.00 67.42495 (12011018)
542250.00 4418250.00 54.18162 (12012705)
542750.00 4418250.00 44.77231 (12011020)
526750.00 4418750.00 76.30083 (12092921)

527250.00 4418750.00 67.64340 (12070322) 527750.00 4418750.00 10.88598 (12082707)

528250.00 4418750.00 11.21854 (12082707) 528750.00 4418750.00 11.25035 (12082707)

529250.00 4418750.00 12.82019 (12072506) 529750.00 4418750.00 16.21384 (12072506)

530250.00 4418750.00 19.89958 (12072506) 530750.00 4418750.00 23.47892 (12072506)

531250.00 4418750.00 26.15801 (12072506) 531750.00 4418750.00 26.42233 (12072506)

532250.00 4418750.00 24.59672 (12072506) 532750.00 4418750.00 18.96428 (12072506)

533250.00 4418750.00 175.11502 (12082724) 533750.00 4418750.00 18.65492 (12072724)

534250.00 4418750.00 12.98218 (12011110) 534750.00 4418750.00 22.81766 (12040706)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M) Y-COORD (M) CONC (YYMMDDHH) X-COORD (M) Y-COORD (M) CONC (YYMMDDHH)

535250.00 4418750.00 14.02535 (12122711) 535750.00 4418750.00 16.68422 (12010512)

536250.00 4418750.00 16.22786 (12010512) 536750.00 4418750.00 14.27625 (12010512)

537250.00 4418750.00 11.98837 (12121610) 537750.00 4418750.00 11.53569 (12080407)

538250.00 4418750.00 61.33400 (12033001) 538750.00 4418750.00 18.05792 (12103019)

539250.00 4418750.00 28.02633 (12042019) 539750.00 4418750.00 67.64628 (12100721)

540250.00 4418750.00 42.18649 (12100721) 540750.00 4418750.00 20.54080 (12051523)

541250.00 4418750.00 30.45690 (12081305) 541750.00 4418750.00 66.12222 (12052824)

542250.00 4418750.00 45.42635 (12122823) 542750.00 4418750.00 70.10187 (12041224)

526750.00 4419250.00 69.16493 (12062704) 527250.00 4419250.00 30.64037 (12090523)

527750.00 4419250.00 10.19558 (12082707) 528250.00 4419250.00 10.28608 (12082707)

528750.00 4419250.00 12.77499 (12072506) 529250.00 4419250.00 15.77697 (12072506)

529750.00 4419250.00 18.95858 (12072506) 530250.00 4419250.00 21.95795 (12072506)

530750.00 4419250.00 24.44671 (12072506) 531250.00 4419250.00 25.29922 (12072506)

531750.00 4419250.00 23.93146 (12072506) 532250.00 4419250.00 19.98388 (12072506)

532750.00 4419250.00 14.16768 (12072506) 533250.00 4419250.00 13.35594 (12020410)

533750.00 4419250.00 12.51898 (12020410) 534250.00 4419250.00 12.99382 (12122711)

534750.00 4419250.00 50.58529 (12040706) 535250.00 4419250.00 56.74449 (12092104)

535750.00 4419250.00 15.29120 (12010512) 536250.00 4419250.00 15.89002 (12010512)

536750.00 4419250.00 14.35486 (12010512) 537250.00 4419250.00 12.15422 (12121610)

537750.00 4419250.00 10.17368 (12121610) 538250.00 4419250.00 10.50787 (12080407)

538750.00 4419250.00 11.68539 (12010516) 539250.00 4419250.00 27.51705 (12103019)

539750.00 4419250.00 38.53543 (12110220) 540250.00 4419250.00 44.99410 (12103020)

540750.00 4419250.00 58.85078 (12100721) 541250.00 4419250.00 54.51410 (12070921)

541750.00 4419250.00 50.21962 (12052603) 542250.00 4419250.00 39.02739 (12052824)

542750.00 4419250.00 61.76620 (12052824) 526750.00 4419750.00 27.67610 (12050724)

527250.00 4419750.00 9.88878 (12092707) 527750.00 4419750.00 10.10971 (12072506)

528250.00 4419750.00 12.55247 (12072506) 528750.00 4419750.00 15.18731 (12072506)

529250.00 4419750.00 17.90586 (12072506) 529750.00 4419750.00 20.46461 (12072506)

530250.00 4419750.00 22.34936 (12072506) 530750.00 4419750.00 23.46857 (12072506)

531250.00 4419750.00 22.85534 (12072506) 531750.00 4419750.00 20.15844 (12072506)

532250.00 4419750.00 15.68888 (12072506) 532750.00 4419750.00 12.01714 (12020410)

533250.00 4419750.00 12.18044 (12020410) 533750.00 4419750.00 11.44848 (12111410)

534250.00 4419750.00 13.28804 (12122711) 534750.00 4419750.00 66.78226 (12040706)

535250.00 4419750.00 15.20048 (12122711) 535750.00 4419750.00 13.98268 (12010512)

536250.00 4419750.00 14.71917 (12010512) 536750.00 4419750.00 13.96768 (12010512)

537250.00 4419750.00 12.35492 (12010512) 537750.00 4419750.00 10.52872 (12121610)

538250.00 4419750.00 9.25930 (12080407) 538750.00 4419750.00 10.36220 (12010516)

539250.00 4419750.00 11.46569 (12010516) 539750.00 4419750.00 11.77888 (12010516)

540250.00	4419750.00	22.24175 (12110220)	540750.00	4419750.00	57.63019 (12100123)
541250.00	4419750.00	87.04426 (12051523)	541750.00	4419750.00	60.82784 (12010107)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
542250.00	4419750.00	52.07688 (12010107)	542750.00	4419750.00	39.53865 (12122823)
526750.00	4420250.00	10.83030 (12092707)	527250.00	4420250.00	9.98983 (12072506)
527750.00	4420250.00	12.24698 (12072506)	528250.00	4420250.00	14.56903 (12072506)
528750.00	4420250.00	16.91470 (12072506)	529250.00	4420250.00	19.08768 (12072506)
529750.00	4420250.00	20.76295 (12072506)	530250.00	4420250.00	21.36057 (12072506)
530750.00	4420250.00	21.09911 (12072506)	531250.00	4420250.00	19.62450 (12072506)
531750.00	4420250.00	15.95379 (12072506)	532250.00	4420250.00	23.70367 (12071024)
532750.00	4420250.00	12.81732 (12010410)	533250.00	4420250.00	12.40511 (12091207)
533750.00	4420250.00	12.18623 (12091207)	534250.00	4420250.00	13.16987 (12122711)
534750.00	4420250.00	28.62252 (12040706)	535250.00	4420250.00	14.73845 (12122711)
535750.00	4420250.00	13.19454 (12122711)	536250.00	4420250.00	13.70428 (12010512)
536750.00	4420250.00	13.56100 (12010512)	537250.00	4420250.00	12.36781 (12010512)
537750.00	4420250.00	10.54021 (12010512)	538250.00	4420250.00	9.16431 (12121610)

538750.00	4420250.00	8.56874 (12080407)	539250.00	4420250.00	10.20899 (12010516)
539750.00	4420250.00	11.24519 (12010516)	540250.00	4420250.00	11.46456 (12010516)
540750.00	4420250.00	34.87576 (12110220)	541250.00	4420250.00	80.37483 (12092019)
541750.00	4420250.00	71.80471 (12052603)	542250.00	4420250.00	38.22025 (12020722)
542750.00	4420250.00	45.22819 (12020722)	526750.00	4420750.00	9.70324 (12072506)
527250.00	4420750.00	11.87344 (12072506)	527750.00	4420750.00	13.94721 (12072506)
528250.00	4420750.00	15.97779 (12072506)	528750.00	4420750.00	17.83428 (12072506)
529250.00	4420750.00	19.28433 (12072506)	529750.00	4420750.00	20.02637 (12072506)
530250.00	4420750.00	30.71959 (12082523)	530750.00	4420750.00	18.36855 (12072506)
531250.00	4420750.00	16.04625 (12072506)	531750.00	4420750.00	12.45314 (12072506)
532250.00	4420750.00	30.12837 (12071024)	532750.00	4420750.00	13.02538 (12010410)
533250.00	4420750.00	13.23053 (12091207)	533750.00	4420750.00	12.73004 (12091207)
534250.00	4420750.00	12.62874 (12122711)	534750.00	4420750.00	14.12753 (12122711)
535250.00	4420750.00	14.01756 (12122711)	535750.00	4420750.00	12.57737 (12122711)
536250.00	4420750.00	12.72805 (12010409)	536750.00	4420750.00	12.97574 (12010512)
537250.00	4420750.00	12.20094 (12010512)	537750.00	4420750.00	10.76679 (12010512)
538250.00	4420750.00	9.32218 (12121610)	538750.00	4420750.00	8.01216 (12121610)
539250.00	4420750.00	8.67387 (12010516)	539750.00	4420750.00	10.07934 (12010516)
540250.00	4420750.00	10.90334 (12010516)	540750.00	4420750.00	18.87281 (12050503)
541250.00	4420750.00	49.40105 (12110220)	541750.00	4420750.00	58.85730 (12020707)
542250.00	4420750.00	49.27699 (12010105)	542750.00	4420750.00	20.12225 (12020722)
526750.00	4421250.00	11.48745 (12072506)	527250.00	4421250.00	13.34639 (12072506)
527750.00	4421250.00	15.11747 (12072506)	528250.00	4421250.00	16.71762 (12072506)
528750.00	4421250.00	17.95539 (12072506)	529250.00	4421250.00	18.64267 (12072506)
529750.00	4421250.00	18.53403 (12072506)	530250.00	4421250.00	42.84885 (12082723)
530750.00	4421250.00	21.05114 (12062004)	531250.00	4421250.00	12.88006 (12072506)
531750.00	4421250.00	12.15079 (12010410)	532250.00	4421250.00	100.23938 (12082724)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
532750.00	4421250.00	14.73477 (12072724)	533250.00	4421250.00	13.56091 (12091207)
533750.00	4421250.00	12.74157 (12091207)	534250.00	4421250.00	12.27834 (12122711)
534750.00	4421250.00	13.20434 (12122711)	535250.00	4421250.00	13.13409 (12122711)
535750.00	4421250.00	12.46231 (12122711)	536250.00	4421250.00	13.23967 (12010409)
536750.00	4421250.00	13.29223 (12010409)	537250.00	4421250.00	12.29074 (12010409)
537750.00	4421250.00	11.51630 (12080406)	538250.00	4421250.00	10.50242 (12080406)
538750.00	4421250.00	8.47737 (12080406)	539250.00	4421250.00	7.60885 (12121909)
539750.00	4421250.00	8.66308 (12010516)	540250.00	4421250.00	9.88244 (12010516)
540750.00	4421250.00	10.55455 (12010516)	541250.00	4421250.00	16.70924 (12050503)
541750.00	4421250.00	50.05025 (12091420)	542250.00	4421250.00	63.19594 (12013121)
542750.00	4421250.00	63.52567 (12052603)	526750.00	4421750.00	12.73692 (12072506)
527250.00	4421750.00	14.32562 (12072506)	527750.00	4421750.00	15.71445 (12072506)
528250.00	4421750.00	16.80987 (12072506)	528750.00	4421750.00	24.41048 (12082720)
529250.00	4421750.00	29.70838 (12082720)	529750.00	4421750.00	24.41785 (12071302)
530250.00	4421750.00	65.99202 (12062004)	530750.00	4421750.00	53.09747 (12072005)
531250.00	4421750.00	13.91187 (12071024)	531750.00	4421750.00	21.88228 (12071024)
532250.00	4421750.00	70.11925 (12072724)	532750.00	4421750.00	46.11578 (12072724)
533250.00	4421750.00	13.47067 (12091207)	533750.00	4421750.00	12.47790 (12091207)
534250.00	4421750.00	11.75863 (12122711)	534750.00	4421750.00	12.75017 (12122711)

535250.00	4421750.00	12.83533 (12122711)	535750.00	4421750.00	11.83824 (12122711)
536250.00	4421750.00	12.64688 (12010409)	536750.00	4421750.00	12.10648 (12010409)
537250.00	4421750.00	12.48102 (12010409)	537750.00	4421750.00	11.24473 (12080406)
538250.00	4421750.00	10.81741 (12080406)	538750.00	4421750.00	9.22596 (12080406)
539250.00	4421750.00	7.36137 (12121610)	539750.00	4421750.00	7.61626 (12112909)
540250.00	4421750.00	8.47470 (12010516)	540750.00	4421750.00	9.54515 (12010516)
541250.00	4421750.00	10.19056 (12010516)	541750.00	4421750.00	13.95616 (12050503)
542250.00	4421750.00	56.04940 (12091420)	542750.00	4421750.00	51.87173 (12012701)
526750.00	4422250.00	13.59432 (12072506)	527250.00	4422250.00	14.80415 (12072506)
527750.00	4422250.00	15.77674 (12072506)	528250.00	4422250.00	24.13209 (12082720)
528750.00	4422250.00	44.64636 (12082720)	529250.00	4422250.00	50.06228 (12082523)
529750.00	4422250.00	42.34195 (12082723)	530250.00	4422250.00	65.55546 (12072005)
530750.00	4422250.00	37.69832 (12121401)	531250.00	4422250.00	44.75260 (12010401)
531750.00	4422250.00	61.31151 (12071024)	532250.00	4422250.00	74.66584 (12072724)
532750.00	4422250.00	56.69268 (12092724)	533250.00	4422250.00	12.34570 (12091207)
533750.00	4422250.00	11.92697 (12091207)	534250.00	4422250.00	11.25541 (12122711)
534750.00	4422250.00	12.12486 (12122711)	535250.00	4422250.00	11.92928 (12122711)
535750.00	4422250.00	11.19378 (12122711)	536250.00	4422250.00	13.51607 (12010409)
536750.00	4422250.00	14.04143 (12010409)	537250.00	4422250.00	13.08114 (12010409)
537750.00	4422250.00	10.91195 (12010409)	538250.00	4422250.00	9.58530 (12010512)
538750.00	4422250.00	9.35678 (12080406)	539250.00	4422250.00	7.52573 (12121610)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
539750.00	4422250.00	6.62519 (12020510)	540250.00	4422250.00	7.37505 (12112909)
540750.00	4422250.00	8.28595 (12010516)	541250.00	4422250.00	9.21976 (12010516)
541750.00	4422250.00	9.81157 (12010516)	542250.00	4422250.00	24.72130 (12050503)
542750.00	4422250.00	53.65910 (12091420)	526750.00	4422750.00	32.73479 (12011118)
527250.00	4422750.00	57.41837 (12071504)	527750.00	4422750.00	54.46238 (12062003)
528250.00	4422750.00	53.93496 (12082303)	528750.00	4422750.00	52.31469 (12082523)
529250.00	4422750.00	71.53450 (12082723)	529750.00	4422750.00	63.68932 (12072005)
530250.00	4422750.00	38.08340 (12072005)	530750.00	4422750.00	47.41672 (12080605)
531250.00	4422750.00	59.34640 (12013123)	531750.00	4422750.00	78.88511 (12050205)
532250.00	4422750.00	76.62411 (12100524)	532750.00	4422750.00	85.44965 (12080803)
533250.00	4422750.00	13.95620 (12040624)	533750.00	4422750.00	10.86642 (12091207)
534250.00	4422750.00	10.79808 (12122711)	534750.00	4422750.00	11.54698 (12122711)
535250.00	4422750.00	11.95587 (12021408)	535750.00	4422750.00	11.31563 (12021408)
536250.00	4422750.00	12.64160 (12010409)	536750.00	4422750.00	14.26852 (12010409)
537250.00	4422750.00	14.01560 (12010409)	537750.00	4422750.00	11.11223 (12010409)
538250.00	4422750.00	41.80502 (12110218)	538750.00	4422750.00	8.63855 (12102208)
539250.00	4422750.00	7.67337 (12102208)	539750.00	4422750.00	6.77982 (12121610)
540250.00	4422750.00	6.33278 (12112909)	540750.00	4422750.00	7.11106 (12112909)
541250.00	4422750.00	8.05732 (12010516)	541750.00	4422750.00	10.31782 (12051021)
542250.00	4422750.00	15.32893 (12100806)	542750.00	4422750.00	34.91753 (12050503)
526750.00	4423250.00	54.38247 (12061005)	527250.00	4423250.00	52.64590 (12061005)
527750.00	4423250.00	64.20588 (12080504)	528250.00	4423250.00	50.05351 (12020222)
528750.00	4423250.00	63.52071 (12060203)	529250.00	4423250.00	64.65826 (12032901)
529750.00	4423250.00	50.41115 (12072005)	530250.00	4423250.00	17.47900 (12121401)
530750.00	4423250.00	57.57849 (12011122)	531250.00	4423250.00	68.50255 (12091502)

531750.00	4423250.00	78.80711 (12080605)	532250.00	4423250.00	76.50458 (12092302)
532750.00	4423250.00	66.60525 (12013107)	533250.00	4423250.00	24.68211 (12080803)
533750.00	4423250.00	10.16009 (12091207)	534250.00	4423250.00	10.36789 (12122711)
534750.00	4423250.00	11.20171 (12020509)	535250.00	4423250.00	12.27050 (12021408)
535750.00	4423250.00	10.72303 (12122711)	536250.00	4423250.00	12.55056 (12010409)
536750.00	4423250.00	13.37231 (12010409)	537250.00	4423250.00	13.92776 (12010409)
537750.00	4423250.00	11.53860 (12010409)	538250.00	4423250.00	74.82837 (12051803)
538750.00	4423250.00	58.48043 (12080105)	539250.00	4423250.00	22.05752 (12080105)
539750.00	4423250.00	6.90235 (12102208)	540250.00	4423250.00	6.23360 (12020510)
540750.00	4423250.00	6.13987 (12112909)	541250.00	4423250.00	6.84396 (12010516)
541750.00	4423250.00	7.84852 (12010516)	542250.00	4423250.00	17.48006 (12103021)
542750.00	4423250.00	23.24475 (12033001)	526750.00	4423750.00	51.05022 (12010324)
527250.00	4423750.00	57.91322 (12080504)	527750.00	4423750.00	49.25925 (12061005)
528250.00	4423750.00	59.33007 (12122523)	528750.00	4423750.00	55.32701 (12101005)
529250.00	4423750.00	45.64039 (12101005)	529750.00	4423750.00	24.27631 (12072005)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)

530250.00 4423750.00 20.06399 (12080605)
530750.00 4423750.00 59.82605 (12011122)
531250.00 4423750.00 56.79456 (12122223)
531750.00 4423750.00 64.76530 (12121402)
532250.00 4423750.00 54.66290 (12051424)
532750.00 4423750.00 50.58875 (12051424)
533250.00 4423750.00 22.92056 (12080803)
533750.00 4423750.00 14.69031 (12041920)
534250.00 4423750.00 9.98132 (12122711)
534750.00 4423750.00 10.62298 (12122711)
535250.00 4423750.00 10.89807 (12021408)
535750.00 4423750.00 10.32551 (12122711)
536250.00 4423750.00 11.06708 (12010409)
536750.00 4423750.00 13.26713 (12010409)
537250.00 4423750.00 13.36198 (12010409)
537750.00 4423750.00 12.16066 (12010409)
538250.00 4423750.00 26.89438 (12101819)
538750.00 4423750.00 32.38934 (12110218)
539250.00 4423750.00 8.54595 (12080406)
539750.00 4423750.00 7.50199 (12080406)
540250.00 4423750.00 6.30286 (12020510)
540750.00 4423750.00 5.70201 (12020510)
541250.00 4423750.00 8.63916 (12101118)
541750.00 4423750.00 8.20593 (12101118)
542250.00 4423750.00 11.64615 (12103021)
542750.00 4423750.00 24.82626 (12103021)
526750.00 4424250.00 54.72430 (12091405)
527250.00 4424250.00 46.85929 (12112424)
527750.00 4424250.00 50.44396 (12112424)
528250.00 4424250.00 41.42013 (12031407)
528750.00 4424250.00 57.00183 (12101005)
529250.00 4424250.00 47.18272 (12121401)
529750.00 4424250.00 28.37462 (12121401)
530250.00 4424250.00 33.78845 (12080605)
530750.00 4424250.00 63.75361 (12080605)
531250.00 4424250.00 51.45341 (12122223)
531750.00 4424250.00 59.69116 (12013022)
532250.00 4424250.00 66.33025 (12051424)
532750.00 4424250.00 59.34837 (12053102)
533250.00 4424250.00 35.86182 (12053102)
533750.00 4424250.00 28.40571 (12041920)
534250.00 4424250.00 12.48647 (12033006)
534750.00 4424250.00 10.26067 (12020509)
535250.00 4424250.00 10.34337 (12122711)
535750.00 4424250.00 9.97139 (12122711)
536250.00 4424250.00 11.15207 (12010409)
536750.00 4424250.00 12.57470 (12010409)
537250.00 4424250.00 12.89504 (12010409)
537750.00 4424250.00 11.43972 (12010409)
538250.00 4424250.00 13.52431 (12101819)
538750.00 4424250.00 9.90651 (12110218)
539250.00 4424250.00 9.85658 (12080406)
539750.00 4424250.00 8.55524 (12080406)
540250.00 4424250.00 6.87115 (12080406)
540750.00 4424250.00 5.84170 (12102208)
541250.00 4424250.00 7.24765 (12101118)
541750.00 4424250.00 11.73052 (12101118)
542250.00 4424250.00 16.90201 (12101118)
542750.00 4424250.00 14.02525 (12101118)
526750.00 4424750.00 39.25852 (12121903)
527250.00 4424750.00 45.09123 (12112305)
527750.00 4424750.00 39.99506 (12031407)

528250.00	4424750.00	38.43574 (12031407)	528750.00	4424750.00	50.28653 (12121401)
529250.00	4424750.00	40.86396 (12121401)	529750.00	4424750.00	38.76086 (12011122)
530250.00	4424750.00	53.40407 (12080605)	530750.00	4424750.00	65.82141 (12080605)
531250.00	4424750.00	50.74045 (12122224)	531750.00	4424750.00	43.00474 (12012906)
532250.00	4424750.00	43.91904 (12121105)	532750.00	4424750.00	51.52522 (12112806)
533250.00	4424750.00	39.78656 (12053102)	533750.00	4424750.00	40.49417 (12052003)
534250.00	4424750.00	28.68831 (12033006)	534750.00	4424750.00	26.83214 (12031003)
535250.00	4424750.00	9.95397 (12122711)	535750.00	4424750.00	9.63359 (12122711)
536250.00	4424750.00	10.82484 (12021408)	536750.00	4424750.00	11.82857 (12010409)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
537250.00	4424750.00	12.07276 (12010409)	537750.00	4424750.00	11.72494 (12010409)
538250.00	4424750.00	11.42391 (12010409)	538750.00	4424750.00	10.25457 (12010409)
539250.00	4424750.00	10.26446 (12080406)	539750.00	4424750.00	9.36751 (12080406)
540250.00	4424750.00	7.90067 (12080406)	540750.00	4424750.00	6.23728 (12102208)
541250.00	4424750.00	5.37914 (12020510)	541750.00	4424750.00	10.10907 (12101118)
542250.00	4424750.00	16.92538 (12101118)	542750.00	4424750.00	19.92120 (12101118)

526750.00	4425250.00	30.12489 (12031407)	527250.00	4425250.00	37.87131 (12031407)
527750.00	4425250.00	26.26633 (12031407)	528250.00	4425250.00	32.13301 (12031407)
528750.00	4425250.00	30.79796 (12111604)	529250.00	4425250.00	24.29600 (12011122)
529750.00	4425250.00	38.33051 (12011122)	530250.00	4425250.00	53.68987 (12011122)
530750.00	4425250.00	64.36765 (12080605)	531250.00	4425250.00	47.23552 (12122224)
531750.00	4425250.00	28.63002 (12121105)	532250.00	4425250.00	23.26912 (12121105)
532750.00	4425250.00	26.79539 (12121105)	533250.00	4425250.00	40.17357 (12112223)
533750.00	4425250.00	42.26675 (12100723)	534250.00	4425250.00	57.53203 (12041920)
534750.00	4425250.00	50.06794 (12071503)	535250.00	4425250.00	13.72521 (12051022)
535750.00	4425250.00	28.19233 (12092104)	536250.00	4425250.00	10.07344 (12021408)
536750.00	4425250.00	11.14116 (12010409)	537250.00	4425250.00	12.06592 (12010409)
537750.00	4425250.00	12.23698 (12010409)	538250.00	4425250.00	11.72329 (12010409)
538750.00	4425250.00	10.62063 (12010409)	539250.00	4425250.00	10.30527 (12080406)
539750.00	4425250.00	9.35886 (12080406)	540250.00	4425250.00	10.88325 (12080105)
540750.00	4425250.00	6.55771 (12080406)	541250.00	4425250.00	5.62202 (12102208)
541750.00	4425250.00	4.99136 (12020510)	542250.00	4425250.00	11.20788 (12101118)
542750.00	4425250.00	15.48640 (12101118)	528142.30	4424000.10	83.70617 (12121903)
528641.50	4421424.20	17.65415 (12072506)	530578.20	4414421.80	14.77537 (12122609)
533199.90	4420647.00	13.06413 (12091207)	537336.40	4419481.40	11.82570 (12121610)
538624.80	4413866.50	11.76450 (12071607)	538699.00	4411952.40	8.18802 (12032308)
539685.20	4412636.40	9.94903 (12121109)	540884.80	4419539.60	119.24913 (12100122)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 ,

KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
526750.00	4409250.00	23.00708	(12010510)	527250.00	4409250.00	32.02870	(12092618)
527750.00	4409250.00	31.57342	(12072702)	528250.00	4409250.00	77.93050	(12090619)
528750.00	4409250.00	71.16313	(12041603)	529250.00	4409250.00	87.73920	(12050905)
529750.00	4409250.00	45.73870	(12050905)	530250.00	4409250.00	53.38759	(12032822)
530750.00	4409250.00	74.02968	(12032822)	531250.00	4409250.00	78.93659	(12123101)
531750.00	4409250.00	106.31694	(12061422)	532250.00	4409250.00	129.35365	(12011607)
532750.00	4409250.00	156.37920	(12093004)	533250.00	4409250.00	173.74438	(12101722)
533750.00	4409250.00	130.00281	(12051522)	534250.00	4409250.00	138.27450	(12020803)
534750.00	4409250.00	169.19802	(12080124)	535250.00	4409250.00	97.04376	(12072024)
535750.00	4409250.00	31.73210	(12072024)	536250.00	4409250.00	15.44506	(12040607)
536750.00	4409250.00	13.52742	(12070424)	537250.00	4409250.00	10.74099	(12111810)
537750.00	4409250.00	9.43727	(12111810)	538250.00	4409250.00	9.03009	(12032308)
538750.00	4409250.00	9.86820	(12032308)	539250.00	4409250.00	13.02327	(12093007)
539750.00	4409250.00	22.96464	(12093007)	540250.00	4409250.00	27.16965	(12093007)
540750.00	4409250.00	23.58378	(12093007)	541250.00	4409250.00	16.62554	(12093007)
541750.00	4409250.00	16.23998	(12093007)	542250.00	4409250.00	18.77081	(12093007)
542750.00	4409250.00	18.68890	(12093007)	526750.00	4409750.00	42.38612	(12060521)
527250.00	4409750.00	27.19252	(12082802)	527750.00	4409750.00	24.02070	(12010510)
528250.00	4409750.00	77.53314	(12080121)	528750.00	4409750.00	78.87942	(12072505)
529250.00	4409750.00	86.16785	(12050905)	529750.00	4409750.00	45.53219	(12123005)
530250.00	4409750.00	67.40797	(12050905)	530750.00	4409750.00	55.63331	(12032822)
531250.00	4409750.00	52.17845	(12061422)	531750.00	4409750.00	75.92791	(12061422)
532250.00	4409750.00	151.95278	(12061424)	532750.00	4409750.00	177.52716	(12091724)
533250.00	4409750.00	182.61701	(12110319)	533750.00	4409750.00	99.28333	(12101722)

534250.00	4409750.00	174.85342 (12101719)	534750.00	4409750.00	176.53155 (12080124)
535250.00	4409750.00	71.47924 (12072024)	535750.00	4409750.00	17.15487 (12040607)
536250.00	4409750.00	14.96719 (12040607)	536750.00	4409750.00	12.80110 (12040607)
537250.00	4409750.00	10.69522 (12111810)	537750.00	4409750.00	9.35722 (12111810)
538250.00	4409750.00	10.16142 (12032308)	538750.00	4409750.00	10.91384 (12032308)
539250.00	4409750.00	17.59011 (12093007)	539750.00	4409750.00	23.21613 (12093007)
540250.00	4409750.00	26.61987 (12093007)	540750.00	4409750.00	23.29345 (12093007)
541250.00	4409750.00	15.47142 (12093007)	541750.00	4409750.00	15.36646 (12093007)
542250.00	4409750.00	13.64743 (12093007)	542750.00	4409750.00	12.46689 (12093007)
526750.00	4410250.00	80.73290 (12101923)	527250.00	4410250.00	66.67876 (12090619)
527750.00	4410250.00	24.12129 (12010510)	528250.00	4410250.00	24.45240 (12010510)
528750.00	4410250.00	48.88374 (12072702)	529250.00	4410250.00	81.36971 (12072505)
529750.00	4410250.00	106.24261 (12050905)	530250.00	4410250.00	93.95054 (12050905)
530750.00	4410250.00	51.09262 (12050905)	531250.00	4410250.00	66.99893 (12032822)
531750.00	4410250.00	59.33947 (12061422)	532250.00	4410250.00	50.15855 (12082624)
532750.00	4410250.00	177.98036 (12092623)	533250.00	4410250.00	150.56506 (12080701)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
533750.00	4410250.00	123.16298	(12101722)	534250.00	4410250.00	169.00147	(12101719)
534750.00	4410250.00	52.34897	(12102021)	535250.00	4410250.00	18.73659	(12072024)
535750.00	4410250.00	16.13428	(12040607)	536250.00	4410250.00	13.96636	(12040607)
536750.00	4410250.00	12.20594	(12111810)	537250.00	4410250.00	10.58194	(12111810)
537750.00	4410250.00	10.42773	(12032308)	538250.00	4410250.00	11.37362	(12032308)
538750.00	4410250.00	11.83019	(12032308)	539250.00	4410250.00	17.02753	(12093007)
539750.00	4410250.00	21.56693	(12093007)	540250.00	4410250.00	23.69807	(12093007)
540750.00	4410250.00	20.98238	(12093007)	541250.00	4410250.00	13.69648	(12093007)
541750.00	4410250.00	13.57695	(12093007)	542250.00	4410250.00	12.05983	(12093007)
542750.00	4410250.00	10.04291	(12093007)	526750.00	4410750.00	101.99981	(12101923)
527250.00	4410750.00	94.87593	(12120902)	527750.00	4410750.00	38.99586	(12071623)
528250.00	4410750.00	51.39750	(12060521)	528750.00	4410750.00	24.78694	(12010510)
529250.00	4410750.00	84.49247	(12112604)	529750.00	4410750.00	97.17377	(12090619)
530250.00	4410750.00	105.70275	(12050905)	530750.00	4410750.00	75.75940	(12050905)
531250.00	4410750.00	37.67195	(12050905)	531750.00	4410750.00	59.35177	(12041405)
532250.00	4410750.00	66.69252	(12061422)	532750.00	4410750.00	46.41513	(12082624)
533250.00	4410750.00	44.13450	(12081322)	533750.00	4410750.00	69.61646	(12050224)
534250.00	4410750.00	103.60031	(12101719)	534750.00	4410750.00	62.51797	(12102021)
535250.00	4410750.00	18.29297	(12100508)	535750.00	4410750.00	16.14916	(12100508)
536250.00	4410750.00	24.80698	(12070424)	536750.00	4410750.00	12.25549	(12111810)
537250.00	4410750.00	10.60811	(12032308)	537750.00	4410750.00	11.76145	(12032308)
538250.00	4410750.00	12.59143	(12032308)	538750.00	4410750.00	12.98802	(12032308)
539250.00	4410750.00	13.45363	(12093007)	539750.00	4410750.00	12.75421	(12032308)
540250.00	4410750.00	13.21704	(12093007)	540750.00	4410750.00	13.13200	(12093007)
541250.00	4410750.00	12.27788	(12093007)	541750.00	4410750.00	11.67995	(12093007)
542250.00	4410750.00	10.32850	(12093007)	542750.00	4410750.00	10.26774	(12121109)
526750.00	4411250.00	59.86690	(12012205)	527250.00	4411250.00	83.76660	(12120607)
527750.00	4411250.00	105.71523	(12101923)	528250.00	4411250.00	38.80547	(12071623)
528750.00	4411250.00	25.13779	(12010510)	529250.00	4411250.00	26.24268	(12070924)

529750.00	4411250.00	69.83615 (12092618)	530250.00	4411250.00	113.21077 (12090619)
530750.00	4411250.00	128.02194 (12050905)	531250.00	4411250.00	95.87110 (12050905)
531750.00	4411250.00	43.50895 (12111317)	532250.00	4411250.00	60.67265 (12061422)
532750.00	4411250.00	27.85494 (12082624)	533250.00	4411250.00	20.68161 (12060906)
533750.00	4411250.00	22.07055 (12050224)	534250.00	4411250.00	20.03828 (12100508)
534750.00	4411250.00	25.36284 (12102021)	535250.00	4411250.00	19.14757 (12100508)
535750.00	4411250.00	16.60454 (12100508)	536250.00	4411250.00	14.38876 (12111810)
536750.00	4411250.00	11.86639 (12111810)	537250.00	4411250.00	12.19696 (12032308)
537750.00	4411250.00	13.32742 (12032308)	538250.00	4411250.00	13.88216 (12032308)
538750.00	4411250.00	13.93774 (12032308)	539250.00	4411250.00	13.67547 (12032308)
539750.00	4411250.00	13.14424 (12122110)	540250.00	4411250.00	12.83269 (12093007)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
540750.00	4411250.00	13.90250 (12093007)	541250.00	4411250.00	11.32402 (12122110)
541750.00	4411250.00	10.82033 (12121109)	542250.00	4411250.00	11.15680 (12121109)
542750.00	4411250.00	11.38740 (12121109)	526750.00	4411750.00	90.70333 (12101723)

527250.00 4411750.00 92.64575 (12101923)
527750.00 4411750.00 102.41361 (12101923)
528250.00 4411750.00 52.10613 (12091821)
528750.00 4411750.00 43.43849 (12082622)
529250.00 4411750.00 25.16003 (12010510)
529750.00 4411750.00 24.27545 (12010510)
530250.00 4411750.00 110.52536 (12090604)
530750.00 4411750.00 145.84714 (12072505)
531250.00 4411750.00 144.45059 (12050905)
531750.00 4411750.00 103.99078 (12050905)
532250.00 4411750.00 63.72864 (12061422)
532750.00 4411750.00 58.60997 (12082624)
533250.00 4411750.00 21.21360 (12111809)
533750.00 4411750.00 19.12993 (12111809)
534250.00 4411750.00 20.78329 (12100508)
534750.00 4411750.00 21.45727 (12100508)
535250.00 4411750.00 19.95931 (12100508)
535750.00 4411750.00 16.90440 (12100508)
536250.00 4411750.00 13.99775 (12111810)
536750.00 4411750.00 12.49192 (12032308)
537250.00 4411750.00 14.07926 (12032308)
537750.00 4411750.00 14.89517 (12032308)
538250.00 4411750.00 15.06727 (12032308)
538750.00 4411750.00 14.71951 (12032308)
539250.00 4411750.00 14.06093 (12032308)
539750.00 4411750.00 13.32774 (12122110)
540250.00 4411750.00 12.64148 (12122110)
540750.00 4411750.00 11.81061 (12122110)
541250.00 4411750.00 11.91294 (12121109)
541750.00 4411750.00 12.20576 (12121109)
542250.00 4411750.00 12.30318 (12121109)
542750.00 4411750.00 12.35089 (12121109)
526750.00 4412250.00 77.17727 (12060520)
527250.00 4412250.00 86.51323 (12101723)
527750.00 4412250.00 91.94310 (12101723)
528250.00 4412250.00 87.22242 (12092806)
528750.00 4412250.00 76.19797 (12120105)
529250.00 4412250.00 23.61097 (12111408)
529750.00 4412250.00 24.73412 (12111408)
530250.00 4412250.00 61.21695 (12060521)
530750.00 4412250.00 119.61191 (12032502)
531250.00 4412250.00 158.45918 (12050905)
531750.00 4412250.00 133.76168 (12072505)
532250.00 4412250.00 37.16891 (12072504)
532750.00 4412250.00 57.31795 (12061422)
533250.00 4412250.00 25.12801 (12082624)
533750.00 4412250.00 20.49220 (12111809)
534250.00 4412250.00 21.45134 (12100508)
534750.00 4412250.00 22.40612 (12100508)
535250.00 4412250.00 20.53173 (12100508)
535750.00 4412250.00 16.86959 (12100508)
536250.00 4412250.00 13.92166 (12111810)
536750.00 4412250.00 14.67393 (12032308)
537250.00 4412250.00 15.95780 (12032308)
537750.00 4412250.00 16.31905 (12032308)
538250.00 4412250.00 15.99963 (12032308)
538750.00 4412250.00 15.15677 (12032308)
539250.00 4412250.00 14.09928 (12032308)
539750.00 4412250.00 13.19258 (12122110)
540250.00 4412250.00 12.84627 (12071607)
540750.00 4412250.00 22.36472 (12122118)
541250.00 4412250.00 13.27399 (12121109)

541750.00	4412250.00	13.31190 (12121109)	542250.00	4412250.00	15.20108 (12060423)
542750.00	4412250.00	15.45974 (12092122)	526750.00	4412750.00	78.93986 (12093023)
527250.00	4412750.00	79.11589 (12060520)	527750.00	4412750.00	83.80760 (12112717)
528250.00	4412750.00	82.93205 (12060520)	528750.00	4412750.00	83.33717 (12060520)
529250.00	4412750.00	80.22889 (12072701)	529750.00	4412750.00	23.08873 (12111408)
530250.00	4412750.00	22.73639 (12010510)	530750.00	4412750.00	83.60006 (12101721)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
531250.00	4412750.00	153.14804 (12090503)	531750.00	4412750.00	173.80978 (12072505)
532250.00	4412750.00	160.83055 (12041603)	532750.00	4412750.00	71.69214 (12061422)
533250.00	4412750.00	82.08740 (12082624)	533750.00	4412750.00	157.24440 (12091323)
534250.00	4412750.00	21.42204 (12100508)	534750.00	4412750.00	22.83883 (12100508)
535250.00	4412750.00	20.54630 (12100508)	535750.00	4412750.00	17.18143 (12061419)
536250.00	4412750.00	14.69920 (12032308)	536750.00	4412750.00	16.88429 (12032308)
537250.00	4412750.00	17.60151 (12032308)	537750.00	4412750.00	17.29078 (12032308)
538250.00	4412750.00	16.35188 (12032308)	538750.00	4412750.00	15.09464 (12032308)

539250.00 4412750.00 14.07672 (12071607)
539750.00 4412750.00 14.27430 (12071607)
540250.00 4412750.00 14.28411 (12071607)
540750.00 4412750.00 14.25780 (12121109)
541250.00 4412750.00 14.26448 (12121109)
541750.00 4412750.00 26.87371 (12092122)
542250.00 4412750.00 38.90261 (12081304)
542750.00 4412750.00 42.33389 (12081304)
526750.00 4413250.00 80.64936 (12072301)
527250.00 4413250.00 85.78357 (12072301)
527750.00 4413250.00 87.91715 (12101802)
528250.00 4413250.00 82.01977 (12060520)
528750.00 4413250.00 101.80562 (12081003)
529250.00 4413250.00 82.81167 (12072523)
529750.00 4413250.00 22.59346 (12010411)
530250.00 4413250.00 22.51296 (12010411)
530750.00 4413250.00 49.33598 (12061220)
531250.00 4413250.00 77.53015 (12103101)
531750.00 4413250.00 164.12354 (12101923)
532250.00 4413250.00 182.63211 (12090503)
532750.00 4413250.00 200.62329 (12050905)
533250.00 4413250.00 136.63984 (12061422)
533750.00 4413250.00 132.72039 (12061422)
534250.00 4413250.00 23.84703 (12071819)
534750.00 4413250.00 23.82749 (12032220)
535250.00 4413250.00 19.85862 (12080820)
535750.00 4413250.00 18.27512 (12072820)
536250.00 4413250.00 17.15876 (12032308)
536750.00 4413250.00 18.71193 (12032308)
537250.00 4413250.00 18.48006 (12032308)
537750.00 4413250.00 17.48421 (12032308)
538250.00 4413250.00 16.03865 (12032308)
538750.00 4413250.00 15.86068 (12071607)
539250.00 4413250.00 15.90872 (12071607)
539750.00 4413250.00 15.75239 (12071607)
540250.00 4413250.00 15.44710 (12071607)
540750.00 4413250.00 25.35330 (12081304)
541250.00 4413250.00 35.00800 (12081304)
541750.00 4413250.00 65.98903 (12081303)
542250.00 4413250.00 59.13411 (12081303)
542750.00 4413250.00 45.12919 (12081303)
526750.00 4413750.00 73.71833 (12060221)
527250.00 4413750.00 60.41871 (12060221)
527750.00 4413750.00 60.18178 (12072301)
528250.00 4413750.00 77.19930 (12060520)
528750.00 4413750.00 80.75513 (12081202)
529250.00 4413750.00 65.19533 (12072322)
529750.00 4413750.00 23.99676 (12010411)
530250.00 4413750.00 24.47343 (12010411)
530750.00 4413750.00 24.74847 (12010411)
531250.00 4413750.00 161.36459 (12060224)
531750.00 4413750.00 121.67890 (12101723)
532250.00 4413750.00 152.79865 (12120902)
532750.00 4413750.00 186.27272 (12072505)
533750.00 4413750.00 38.48931 (12091323)
534250.00 4413750.00 31.87451 (12063021)
534750.00 4413750.00 27.29033 (12032703)
535250.00 4413750.00 23.45659 (12061419)
535750.00 4413750.00 17.35155 (12021724)
536250.00 4413750.00 18.58349 (12032308)
536750.00 4413750.00 19.14058 (12032308)
537250.00 4413750.00 18.14224 (12032308)

537750.00 4413750.00 17.76844 (12071607) 538250.00 4413750.00 17.77898 (12071607)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
538750.00	4413750.00	17.59132 (12071607)	539250.00	4413750.00	17.25797 (12071607)
539750.00	4413750.00	17.44366 (12081304)	540250.00	4413750.00	23.44284 (12081303)
540750.00	4413750.00	54.72722 (12081303)	541250.00	4413750.00	41.51280 (12081303)
541750.00	4413750.00	27.08137 (12100805)	542250.00	4413750.00	36.14456 (12051524)
542750.00	4413750.00	48.52321 (12053020)	526750.00	4414250.00	64.29868 (12020107)
527250.00	4414250.00	71.41249 (12072523)	527750.00	4414250.00	47.39015 (12072701)
528250.00	4414250.00	70.66570 (12060221)	528750.00	4414250.00	66.82126 (12093006)
529250.00	4414250.00	37.99686 (12072301)	529750.00	4414250.00	24.25917 (12010411)
530250.00	4414250.00	25.16081 (12010411)	530750.00	4414250.00	25.99313 (12010411)
531250.00	4414250.00	165.96254 (12061124)	531750.00	4414250.00	144.15024 (12011520)
532250.00	4414250.00	195.10131 (12090502)	532750.00	4414250.00	193.86848 (12112804)
533250.00	4414250.00	162.23150 (12090402)	533750.00	4414250.00	27.00404 (12062319)
534250.00	4414250.00	32.94670 (12062719)	534750.00	4414250.00	36.03677 (12032703)

535250.00	4414250.00	25.79732 (12072820)	535750.00	4414250.00	16.39640 (12101509)
536250.00	4414250.00	18.94171 (12071607)	536750.00	4414250.00	20.03064 (12071607)
537250.00	4414250.00	19.96498 (12071607)	537750.00	4414250.00	19.60947 (12071607)
538250.00	4414250.00	19.14901 (12071607)	538750.00	4414250.00	26.98199 (12081303)
539250.00	4414250.00	22.95137 (12081303)	539750.00	4414250.00	19.50825 (12081303)
540250.00	4414250.00	16.29872 (12071607)	540750.00	4414250.00	15.39137 (12071607)
541250.00	4414250.00	46.72702 (12051524)	541750.00	4414250.00	61.53089 (12051524)
542250.00	4414250.00	64.44954 (12051524)	542750.00	4414250.00	70.11307 (12051524)
526750.00	4414750.00	87.05877 (12072603)	527250.00	4414750.00	69.44757 (12072603)
527750.00	4414750.00	62.02947 (12090621)	528250.00	4414750.00	33.94169 (12061122)
528750.00	4414750.00	46.54206 (12061122)	529250.00	4414750.00	22.62970 (12122609)
529750.00	4414750.00	23.37936 (12010411)	530250.00	4414750.00	24.51875 (12010411)
530750.00	4414750.00	25.58971 (12010411)	531250.00	4414750.00	94.94828 (12060521)
531750.00	4414750.00	121.55245 (12120803)	532250.00	4414750.00	187.45244 (12081202)
533250.00	4414750.00	287.28143 (12061121)	533750.00	4414750.00	30.80397 (12061919)
534250.00	4414750.00	38.19570 (12070120)	534750.00	4414750.00	32.50264 (12072110)
535250.00	4414750.00	24.31983 (12100412)	535750.00	4414750.00	18.33561 (12071607)
536250.00	4414750.00	21.26608 (12071607)	536750.00	4414750.00	20.88380 (12071607)
537250.00	4414750.00	20.37705 (12071607)	537750.00	4414750.00	19.96159 (12071607)
538250.00	4414750.00	19.40236 (12071607)	538750.00	4414750.00	25.32624 (12082719)
539250.00	4414750.00	121.49407 (12051320)	539750.00	4414750.00	90.74017 (12051320)
540250.00	4414750.00	87.70579 (12051320)	540750.00	4414750.00	70.37292 (12082719)
541250.00	4414750.00	87.96504 (12051724)	541750.00	4414750.00	76.13713 (12022523)
542250.00	4414750.00	90.57904 (12051524)	542750.00	4414750.00	79.98993 (12110206)
526750.00	4415250.00	60.78163 (12072605)	527250.00	4415250.00	40.43287 (12061120)
527750.00	4415250.00	22.88060 (12061120)	528250.00	4415250.00	70.62887 (12061120)
528750.00	4415250.00	24.62403 (12061120)	529250.00	4415250.00	21.91091 (12122710)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
529750.00	4415250.00	21.99289	(12122609)	530250.00	4415250.00	22.81692	(12010411)
530750.00	4415250.00	23.88074	(12010411)	531250.00	4415250.00	152.62565	(12062221)
531750.00	4415250.00	162.78080	(12110620)	532250.00	4415250.00	185.63170	(12020505)
532750.00	4415250.00	293.23327	(12072605)	533250.00	4415250.00	367.29254	(12092923)
533750.00	4415250.00	32.32286	(12072624)	534250.00	4415250.00	32.06257	(12082511)
534750.00	4415250.00	18.26089	(12101615)	535250.00	4415250.00	23.37599	(12082811)
535750.00	4415250.00	21.01199	(12082810)	536250.00	4415250.00	21.84159	(12010515)
536750.00	4415250.00	20.42916	(12010515)	537250.00	4415250.00	18.66758	(12071607)
537750.00	4415250.00	19.10716	(12071607)	538250.00	4415250.00	47.83778	(12092118)
538750.00	4415250.00	159.93999	(12053021)	539250.00	4415250.00	146.39497	(12053021)
539750.00	4415250.00	104.33173	(12030405)	540250.00	4415250.00	113.66980	(12041923)
540750.00	4415250.00	110.62171	(12053021)	541250.00	4415250.00	95.70810	(12092118)
541750.00	4415250.00	85.77768	(12080702)	542250.00	4415250.00	74.24214	(12011022)
542750.00	4415250.00	70.55630	(12011022)	526750.00	4415750.00	28.51572	(12081323)
527250.00	4415750.00	20.23708	(12061506)	527750.00	4415750.00	20.79252	(12061506)
528250.00	4415750.00	21.07529	(12061506)	528750.00	4415750.00	24.51551	(12071705)
529250.00	4415750.00	21.33997	(12061506)	529750.00	4415750.00	21.45002	(12122810)
530250.00	4415750.00	21.22756	(12122810)	530750.00	4415750.00	21.53593	(12010411)

531250.00	4415750.00	59.03830 (12072701)	531750.00	4415750.00	117.55812 (12112804)
532250.00	4415750.00	167.85886 (12050403)	532750.00	4415750.00	185.07239 (12081204)
533250.00	4415750.00	360.93509 (12032120)	533750.00	4415750.00	67.81756 (12071101)
534250.00	4415750.00	22.01879 (12041811)	534750.00	4415750.00	20.62425 (12041310)
535250.00	4415750.00	23.73284 (12033013)	535750.00	4415750.00	23.31290 (12010515)
536250.00	4415750.00	23.66081 (12010515)	536750.00	4415750.00	21.89532 (12010515)
537250.00	4415750.00	21.57765 (12110317)	537750.00	4415750.00	18.70962 (12010515)
538250.00	4415750.00	36.81676 (12092723)	538750.00	4415750.00	115.89471 (12092723)
539250.00	4415750.00	120.64190 (12101218)	539750.00	4415750.00	114.15260 (12051524)
540250.00	4415750.00	105.31587 (12051524)	540750.00	4415750.00	100.64797 (12020219)
541250.00	4415750.00	92.47857 (12100805)	541750.00	4415750.00	98.55325 (12092723)
542250.00	4415750.00	78.32734 (12110223)	542750.00	4415750.00	56.40257 (12011022)
526750.00	4416250.00	20.51535 (12061506)	527250.00	4416250.00	21.25963 (12061506)
527750.00	4416250.00	21.87708 (12061506)	528250.00	4416250.00	22.43421 (12061506)
528750.00	4416250.00	22.76407 (12061506)	529250.00	4416250.00	22.64645 (12061506)
529750.00	4416250.00	22.46342 (12122810)	530250.00	4416250.00	22.15627 (12122810)
530750.00	4416250.00	21.48067 (12010610)	531250.00	4416250.00	97.04627 (12070624)
531750.00	4416250.00	158.78650 (12030822)	532250.00	4416250.00	202.21244 (12080905)
532750.00	4416250.00	193.66060 (12060104)	533250.00	4416250.00	207.84384 (12101923)
533750.00	4416250.00	313.43125 (12080604)	534250.00	4416250.00	20.74288 (12101509)
534750.00	4416250.00	25.13980 (12062719)	535250.00	4416250.00	23.12064 (12101509)
535750.00	4416250.00	23.26416 (12072820)	536250.00	4416250.00	22.60191 (12010515)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 ,

KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
536750.00	4416250.00	21.82266 (12010515)	537250.00	4416250.00	38.50814 (12092002)
537750.00	4416250.00	139.14349 (12092018)	538250.00	4416250.00	188.67553 (12032022)
538750.00	4416250.00	137.38820 (12120704)	539250.00	4416250.00	134.33529 (12110223)
539750.00	4416250.00	117.30184 (12110223)	540250.00	4416250.00	83.84377 (12110223)
540750.00	4416250.00	77.28811 (12101218)	541250.00	4416250.00	82.56501 (12101218)
541750.00	4416250.00	69.48297 (12101218)	542250.00	4416250.00	55.99332 (12101218)
542750.00	4416250.00	67.99770 (12110206)	526750.00	4416750.00	21.30027 (12061122)
527250.00	4416750.00	21.11416 (12061506)	527750.00	4416750.00	21.69309 (12061506)
528250.00	4416750.00	22.27306 (12061506)	528750.00	4416750.00	22.59501 (12061506)
529250.00	4416750.00	22.42991 (12061506)	529750.00	4416750.00	22.43585 (12122810)
530250.00	4416750.00	22.04751 (12122810)	530750.00	4416750.00	20.77586 (12122810)
531250.00	4416750.00	165.89789 (12080802)	531750.00	4416750.00	188.56248 (12062704)
532250.00	4416750.00	153.88428 (12123108)	532750.00	4416750.00	199.43279 (12081202)
533250.00	4416750.00	296.94193 (12072705)	534250.00	4416750.00	141.27953 (12072404)
534750.00	4416750.00	22.02876 (12101509)	535250.00	4416750.00	26.79251 (12080709)
535750.00	4416750.00	21.75937 (12101509)	536250.00	4416750.00	20.22662 (12010515)
536750.00	4416750.00	22.40470 (12010515)	537250.00	4416750.00	22.64273 (12010515)
537750.00	4416750.00	131.05347 (12081303)	538250.00	4416750.00	171.21415 (12041619)
538750.00	4416750.00	150.41967 (12052222)	539250.00	4416750.00	142.31923 (12092006)
539750.00	4416750.00	91.75972 (12100402)	540250.00	4416750.00	92.12882 (12121122)
540750.00	4416750.00	94.05845 (12110206)	541250.00	4416750.00	90.18212 (12110206)
541750.00	4416750.00	89.17539 (12110206)	542250.00	4416750.00	83.28984 (12080702)
542750.00	4416750.00	76.48857 (12080702)	526750.00	4417250.00	35.19889 (12072102)

527250.00	4417250.00	20.30634 (12061506)	527750.00	4417250.00	20.89260 (12061506)
528250.00	4417250.00	21.31967 (12061506)	528750.00	4417250.00	21.44133 (12061506)
529250.00	4417250.00	21.47025 (12122810)	529750.00	4417250.00	21.48680 (12122810)
530250.00	4417250.00	21.12106 (12122810)	530750.00	4417250.00	21.72299 (12122712)
531250.00	4417250.00	145.72344 (12072923)	531750.00	4417250.00	181.58675 (12072603)
532250.00	4417250.00	175.66253 (12020207)	532750.00	4417250.00	184.73014 (12110323)
533250.00	4417250.00	228.24222 (12110323)	533750.00	4417250.00	251.09772 (12080724)
534250.00	4417250.00	312.60798 (12072502)	534750.00	4417250.00	163.13243 (12061220)
535250.00	4417250.00	19.53435 (12010513)	535750.00	4417250.00	22.71230 (12060711)
536250.00	4417250.00	21.85256 (12010515)	536750.00	4417250.00	24.25909 (12010515)
537250.00	4417250.00	23.60015 (12010515)	537750.00	4417250.00	92.42426 (12082719)
538250.00	4417250.00	31.56142 (12082719)	538750.00	4417250.00	136.42521 (12082719)
539250.00	4417250.00	102.01424 (12082719)	539750.00	4417250.00	124.63480 (12100222)
540250.00	4417250.00	107.40891 (12121107)	540750.00	4417250.00	103.23186 (12080702)
541250.00	4417250.00	96.66228 (12101202)	541750.00	4417250.00	77.78829 (12011022)
542250.00	4417250.00	94.52634 (12080702)	542750.00	4417250.00	73.61763 (12011022)
526750.00	4417750.00	62.10483 (12080723)	527250.00	4417750.00	22.64230 (12061323)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
527750.00	4417750.00	19.00290	(12122810)	528250.00	4417750.00	19.37684	(12061506)
528750.00	4417750.00	19.59334	(12122810)	529250.00	4417750.00	19.71410	(12122810)
529750.00	4417750.00	20.49912	(12122712)	530250.00	4417750.00	21.27209	(12122712)
530750.00	4417750.00	21.95795	(12122712)	531250.00	4417750.00	22.38331	(12122712)
531750.00	4417750.00	118.79430	(12071705)	532250.00	4417750.00	209.96530	(12093002)
532750.00	4417750.00	184.63626	(12022207)	533250.00	4417750.00	226.75289	(12091401)
533750.00	4417750.00	208.32438	(12071024)	534250.00	4417750.00	28.82233	(12070624)
534750.00	4417750.00	27.97504	(12071610)	535250.00	4417750.00	17.79032	(12010513)
535750.00	4417750.00	24.94730	(12103013)	536250.00	4417750.00	23.81305	(12010515)
536750.00	4417750.00	24.45778	(12010515)	537250.00	4417750.00	23.22968	(12010515)
537750.00	4417750.00	95.64519	(12110220)	538250.00	4417750.00	22.70382	(12010514)
538750.00	4417750.00	22.49565	(12010514)	539250.00	4417750.00	31.14454	(12052020)
539750.00	4417750.00	109.56546	(12080423)	540250.00	4417750.00	131.41162	(12080423)
540750.00	4417750.00	110.97672	(12100224)	541250.00	4417750.00	100.90999	(12101218)
541750.00	4417750.00	67.90858	(12011019)	542250.00	4417750.00	82.47907	(12121122)
542750.00	4417750.00	72.59368	(12031402)	526750.00	4418250.00	70.91956	(12020404)
527250.00	4418250.00	51.81574	(12062304)	527750.00	4418250.00	17.80935	(12122712)
528250.00	4418250.00	18.45544	(12122712)	528750.00	4418250.00	19.08274	(12122712)
529250.00	4418250.00	19.72899	(12122712)	529750.00	4418250.00	20.30399	(12122712)
530250.00	4418250.00	20.83000	(12122712)	530750.00	4418250.00	21.96805	(12072506)
531250.00	4418250.00	26.56637	(12072506)	531750.00	4418250.00	122.32120	(12071504)
532250.00	4418250.00	93.81942	(12082720)	532750.00	4418250.00	170.35415	(12073023)
533250.00	4418250.00	244.04265	(12020620)	534250.00	4418250.00	21.70598	(12020411)
534750.00	4418250.00	20.14440	(12020411)	535250.00	4418250.00	23.81805	(12041812)
535750.00	4418250.00	24.96044	(12010513)	536250.00	4418250.00	26.84911	(12031209)
536750.00	4418250.00	28.41601	(12122812)	537250.00	4418250.00	26.47483	(12122812)
537750.00	4418250.00	23.95702	(12122812)	538250.00	4418250.00	23.48233	(12010514)
538750.00	4418250.00	23.26860	(12010514)	539250.00	4418250.00	32.04065	(12100721)

539750.00	4418250.00	26.50645	(12051523)	540250.00	4418250.00	35.32650	(12092723)
540750.00	4418250.00	70.94018	(12081305)	541250.00	4418250.00	80.43623	(12101218)
541750.00	4418250.00	75.43434	(12011020)	542250.00	4418250.00	62.44032	(12012704)
542750.00	4418250.00	53.64550	(12010103)	526750.00	4418750.00	76.37009	(12092921)
527250.00	4418750.00	67.68455	(12070322)	527750.00	4418750.00	18.08252	(12122809)
528250.00	4418750.00	19.38144	(12122809)	528750.00	4418750.00	19.37987	(12082707)
529250.00	4418750.00	19.77269	(12082707)	529750.00	4418750.00	19.67274	(12082707)
530250.00	4418750.00	22.18397	(12072506)	530750.00	4418750.00	26.37882	(12072506)
531250.00	4418750.00	30.04741	(12072506)	531750.00	4418750.00	32.13756	(12072506)
532250.00	4418750.00	32.92872	(12072506)	532750.00	4418750.00	31.25645	(12072506)
533250.00	4418750.00	175.23692	(12082724)	533750.00	4418750.00	27.58098	(12072506)
534250.00	4418750.00	26.57298	(12051220)	534750.00	4418750.00	50.73524	(12070523)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
535250.00	4418750.00	27.11439	(12020611)	535750.00	4418750.00	34.40858	(12010513)
536250.00	4418750.00	28.10241	(12121610)	536750.00	4418750.00	28.07672	(12122812)

537250.00 4418750.00 28.27470 (12122812)
537750.00 4418750.00 26.41278 (12122812)
538250.00 4418750.00 111.54678 (12091319)
538750.00 4418750.00 21.84429 (12010514)
539250.00 4418750.00 34.54374 (12092018)
539750.00 4418750.00 77.75916 (12051822)
540250.00 4418750.00 73.62566 (12051822)
540750.00 4418750.00 60.59927 (12051822)
541250.00 4418750.00 63.97402 (12051004)
541750.00 4418750.00 85.49084 (12052824)
542250.00 4418750.00 58.20068 (12010103)
542750.00 4418750.00 87.97257 (12121122)
526750.00 4419250.00 69.23503 (12062704)
527250.00 4419250.00 30.67194 (12090523)
527750.00 4419250.00 18.41513 (12082707)
528250.00 4419250.00 19.44201 (12082707)
528750.00 4419250.00 19.99265 (12082707)
529250.00 4419250.00 20.17545 (12082707)
529750.00 4419250.00 22.14243 (12072506)
530250.00 4419250.00 26.18890 (12072506)
530750.00 4419250.00 30.22792 (12072506)
531250.00 4419250.00 33.41558 (12072506)
531750.00 4419250.00 35.47002 (12072506)
532250.00 4419250.00 36.14662 (12072506)
532750.00 4419250.00 36.12425 (12072506)
533250.00 4419250.00 35.04456 (12072506)
533750.00 4419250.00 27.80027 (12072506)
534250.00 4419250.00 24.81782 (12011110)
534750.00 4419250.00 92.61265 (12040624)
535250.00 4419250.00 88.98461 (12031003)
535750.00 4419250.00 34.54728 (12010513)
536250.00 4419250.00 32.44883 (12010513)
536750.00 4419250.00 27.27832 (12121610)
537250.00 4419250.00 26.20886 (12122812)
537750.00 4419250.00 26.24556 (12122812)
538250.00 4419250.00 25.00839 (12122812)
538750.00 4419250.00 22.99801 (12122812)
539250.00 4419250.00 35.60484 (12091319)
539750.00 4419250.00 49.74789 (12092002)
540250.00 4419250.00 49.15251 (12052021)
540750.00 4419250.00 73.26864 (12092018)
541250.00 4419250.00 87.07181 (12041620)
541750.00 4419250.00 95.25288 (12100402)
542250.00 4419250.00 79.42548 (12041620)
542750.00 4419250.00 89.61245 (12052824)
526750.00 4419750.00 62.66207 (12071202)
527250.00 4419750.00 34.87298 (12070624)
527750.00 4419750.00 18.93425 (12082707)
528250.00 4419750.00 19.55732 (12082707)
528750.00 4419750.00 19.80762 (12082707)
529250.00 4419750.00 22.01390 (12072506)
529750.00 4419750.00 25.96681 (12072506)
530250.00 4419750.00 29.74300 (12072506)
530750.00 4419750.00 33.69303 (12072506)
531250.00 4419750.00 36.75874 (12072506)
531750.00 4419750.00 38.86860 (12072506)
532250.00 4419750.00 39.42007 (12072506)
532750.00 4419750.00 37.79268 (12072506)
533250.00 4419750.00 33.23009 (12072506)
533750.00 4419750.00 25.85766 (12020410)
534250.00 4419750.00 25.51060 (12011110)
534750.00 4419750.00 101.99051 (12040624)

535250.00	4419750.00	27.92063 (12072607)	535750.00	4419750.00	32.30201 (12010513)
536250.00	4419750.00	31.83521 (12010513)	536750.00	4419750.00	28.71402 (12121610)
537250.00	4419750.00	24.52117 (12121610)	537750.00	4419750.00	23.86443 (12122812)
538250.00	4419750.00	24.03368 (12122812)	538750.00	4419750.00	23.11066 (12122812)
539250.00	4419750.00	21.73976 (12122812)	539750.00	4419750.00	20.02620 (12122812)
540250.00	4419750.00	25.15493 (12091319)	540750.00	4419750.00	67.95761 (12041619)
541250.00	4419750.00	105.68596 (12052222)	541750.00	4419750.00	88.34666 (12012606)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
542250.00	4419750.00	88.39353 (12020220)	542750.00	4419750.00	78.01128 (12011020)
526750.00	4420250.00	69.25775 (12061021)	527250.00	4420250.00	21.31047 (12072101)
527750.00	4420250.00	18.69743 (12082707)	528250.00	4420250.00	18.94026 (12082707)
528750.00	4420250.00	21.77629 (12072506)	529250.00	4420250.00	25.51303 (12072506)
529750.00	4420250.00	29.28926 (12072506)	530250.00	4420250.00	32.45800 (12072506)
530750.00	4420250.00	36.06502 (12072506)	531250.00	4420250.00	39.16799 (12072506)
531750.00	4420250.00	40.29380 (12072506)	532250.00	4420250.00	38.60762 (12072506)

532750.00	4420250.00	36.57398 (12072506)	533250.00	4420250.00	28.80512 (12072506)
533750.00	4420250.00	25.28336 (12020410)	534250.00	4420250.00	24.52777 (12011110)
534750.00	4420250.00	28.94838 (12040706)	535250.00	4420250.00	26.44385 (12122711)
535750.00	4420250.00	28.97120 (12010512)	536250.00	4420250.00	31.97717 (12010512)
536750.00	4420250.00	29.85266 (12010512)	537250.00	4420250.00	25.63016 (12121610)
537750.00	4420250.00	21.40044 (12121610)	538250.00	4420250.00	21.81327 (12122812)
538750.00	4420250.00	22.05488 (12122812)	539250.00	4420250.00	21.51051 (12122812)
539750.00	4420250.00	20.40187 (12122812)	540250.00	4420250.00	19.10532 (12122812)
540750.00	4420250.00	34.88700 (12110220)	541250.00	4420250.00	97.31678 (12081305)
541750.00	4420250.00	96.73293 (12041224)	542250.00	4420250.00	67.29699 (12053003)
542750.00	4420250.00	72.92255 (12122823)	526750.00	4420750.00	63.24326 (12091521)
527250.00	4420750.00	17.62763 (12082707)	527750.00	4420750.00	18.17837 (12072506)
528250.00	4420750.00	21.44780 (12072506)	528750.00	4420750.00	24.92514 (12072506)
529250.00	4420750.00	28.49536 (12072506)	529750.00	4420750.00	31.92563 (12072506)
530250.00	4420750.00	34.34968 (12072506)	530750.00	4420750.00	37.37487 (12072506)
531250.00	4420750.00	39.45626 (12072506)	531750.00	4420750.00	38.96208 (12072506)
532250.00	4420750.00	47.54211 (12082720)	532750.00	4420750.00	31.58529 (12072506)
533250.00	4420750.00	23.93992 (12020410)	533750.00	4420750.00	24.01302 (12020410)
534250.00	4420750.00	22.45197 (12011110)	534750.00	4420750.00	26.39051 (12122711)
535250.00	4420750.00	27.98583 (12122711)	535750.00	4420750.00	26.36373 (12010512)
536250.00	4420750.00	30.55494 (12010512)	536750.00	4420750.00	29.97494 (12010512)
537250.00	4420750.00	26.23186 (12010512)	537750.00	4420750.00	22.44752 (12121610)
538250.00	4420750.00	19.87336 (12080407)	538750.00	4420750.00	20.34088 (12122812)
539250.00	4420750.00	20.93750 (12010516)	539750.00	4420750.00	21.04565 (12010516)
540250.00	4420750.00	20.17751 (12010516)	540750.00	4420750.00	18.87867 (12050503)
541250.00	4420750.00	49.42138 (12110220)	541750.00	4420750.00	84.09409 (12070921)
542250.00	4420750.00	69.76375 (12020722)	542750.00	4420750.00	37.80487 (12110518)
526750.00	4421250.00	17.81034 (12080122)	527250.00	4421250.00	18.01868 (12072506)
527750.00	4421250.00	21.07107 (12072506)	528250.00	4421250.00	24.28062 (12072506)
528750.00	4421250.00	27.52730 (12072506)	529250.00	4421250.00	30.73172 (12072506)
529750.00	4421250.00	33.57330 (12072506)	530250.00	4421250.00	42.87111 (12082723)

530750.00 4421250.00 36.83775 (12072506) 531250.00 4421250.00 37.58778 (12072506)

531750.00 4421250.00 35.61833 (12072506) 532250.00 4421250.00 124.32958 (12092020)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 ,

KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
532750.00	4421250.00	25.32334	(12072506)	533250.00	4421250.00	22.93963	(12020410)
533750.00	4421250.00	22.39065	(12020410)	534250.00	4421250.00	22.38000	(12122711)
534750.00	4421250.00	26.48209	(12122711)	535250.00	4421250.00	28.04951	(12122711)
535750.00	4421250.00	27.44314	(12122711)	536250.00	4421250.00	28.55651	(12010512)
536750.00	4421250.00	29.00712	(12010512)	537250.00	4421250.00	26.60836	(12010512)
537750.00	4421250.00	22.69166	(12121610)	538250.00	4421250.00	19.68504	(12121610)
538750.00	4421250.00	18.34925	(12080407)	539250.00	4421250.00	19.50932	(12010516)
539750.00	4421250.00	20.85581	(12010516)	540250.00	4421250.00	21.06828	(12010516)
540750.00	4421250.00	20.23960	(12010516)	541250.00	4421250.00	18.81453	(12010516)
541750.00	4421250.00	50.14594	(12091420)	542250.00	4421250.00	68.04033	(12070921)
542750.00	4421250.00	91.73607	(12052603)	526750.00	4421750.00	17.71125	(12072506)
527250.00	4421750.00	20.63401	(12072506)	527750.00	4421750.00	23.57724	(12072506)

528250.00	4421750.00	26.60215 (12072506)	528750.00	4421750.00	29.42683 (12072506)
529250.00	4421750.00	32.00628 (12072506)	529750.00	4421750.00	34.06428 (12072506)
530250.00	4421750.00	66.03050 (12062004)	530750.00	4421750.00	63.61320 (12071504)
531250.00	4421750.00	64.90253 (12082720)	531750.00	4421750.00	30.76107 (12072506)
532250.00	4421750.00	94.90779 (12062004)	532750.00	4421750.00	46.23513 (12072724)
533250.00	4421750.00	22.61053 (12010410)	533750.00	4421750.00	22.69382 (12091207)
534250.00	4421750.00	22.71800 (12122711)	534750.00	4421750.00	26.89297 (12122711)
535250.00	4421750.00	28.69491 (12122711)	535750.00	4421750.00	26.97195 (12122711)
536250.00	4421750.00	26.30037 (12010512)	536750.00	4421750.00	27.48567 (12010512)
537250.00	4421750.00	26.21786 (12010512)	537750.00	4421750.00	23.18063 (12010512)
538250.00	4421750.00	20.11902 (12121610)	538750.00	4421750.00	17.32146 (12121610)
539250.00	4421750.00	17.19270 (12080407)	539750.00	4421750.00	19.04550 (12010516)
540250.00	4421750.00	20.32708 (12010516)	540750.00	4421750.00	20.59972 (12010516)
541250.00	4421750.00	20.06138 (12010516)	541750.00	4421750.00	18.83788 (12010516)
542250.00	4421750.00	56.33355 (12091420)	542750.00	4421750.00	82.24039 (12070921)
526750.00	4422250.00	20.14159 (12072506)	527250.00	4422250.00	22.83038 (12072506)
527750.00	4422250.00	25.61850 (12072506)	528250.00	4422250.00	28.28993 (12072506)
528750.00	4422250.00	44.66481 (12082720)	529250.00	4422250.00	50.10260 (12082523)
529750.00	4422250.00	42.36891 (12082723)	530250.00	4422250.00	65.66983 (12072005)
530750.00	4422250.00	79.84651 (12010208)	531250.00	4422250.00	102.50750 (12073005)
531750.00	4422250.00	72.91587 (12082723)	532250.00	4422250.00	74.71529 (12072724)
532750.00	4422250.00	56.89153 (12092724)	533250.00	4422250.00	23.39924 (12091207)
533750.00	4422250.00	24.13993 (12091207)	534250.00	4422250.00	22.57553 (12122711)
534750.00	4422250.00	26.23260 (12122711)	535250.00	4422250.00	27.03698 (12122711)
535750.00	4422250.00	25.90309 (12122711)	536250.00	4422250.00	23.95951 (12010512)
536750.00	4422250.00	25.77571 (12010512)	537250.00	4422250.00	25.37180 (12010512)
537750.00	4422250.00	23.24200 (12010512)	538250.00	4422250.00	20.12175 (12121610)
538750.00	4422250.00	17.77605 (12121610)	539250.00	4422250.00	15.38135 (12080407)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
539750.00	4422250.00	16.45130	(12010516)	540250.00	4422250.00	18.63048	(12010516)
540750.00	4422250.00	19.80279	(12010516)	541250.00	4422250.00	20.08439	(12010516)
541750.00	4422250.00	19.69608	(12010516)	542250.00	4422250.00	27.28881	(12100721)
542750.00	4422250.00	54.34919	(12091420)	526750.00	4422750.00	37.42097	(12011118)
527250.00	4422750.00	57.48779	(12071504)	527750.00	4422750.00	54.51070	(12062003)
528250.00	4422750.00	53.97703	(12082303)	528750.00	4422750.00	52.36317	(12082523)
529250.00	4422750.00	71.58752	(12082723)	529750.00	4422750.00	63.78368	(12072005)
530250.00	4422750.00	93.94519	(12071504)	530750.00	4422750.00	107.32957	(12101005)
531250.00	4422750.00	85.09003	(12021823)	531750.00	4422750.00	95.78892	(12072005)
532250.00	4422750.00	76.75205	(12100524)	532750.00	4422750.00	104.60383	(12082724)
533250.00	4422750.00	33.67006	(12072724)	533750.00	4422750.00	24.27716	(12091207)
534250.00	4422750.00	22.15235	(12122711)	534750.00	4422750.00	25.29226	(12122711)
535250.00	4422750.00	26.54887	(12122711)	535750.00	4422750.00	25.63271	(12122711)
536250.00	4422750.00	23.00764	(12010409)	536750.00	4422750.00	26.75413	(12010409)
537250.00	4422750.00	25.85301	(12010409)	537750.00	4422750.00	22.92947	(12010512)
538250.00	4422750.00	48.06246	(12092219)	538750.00	4422750.00	17.83291	(12121610)
539250.00	4422750.00	16.10211	(12072509)	539750.00	4422750.00	17.43017	(12080709)

540250.00	4422750.00	16.38125 (12051021)	540750.00	4422750.00	18.16407 (12010516)
541250.00	4422750.00	34.43589 (12110517)	541750.00	4422750.00	27.33525 (12110220)
542250.00	4422750.00	20.88105 (12042019)	542750.00	4422750.00	42.97793 (12100721)
526750.00	4423250.00	62.13353 (12061005)	527250.00	4423250.00	64.23512 (12061005)
527750.00	4423250.00	64.33462 (12080504)	528250.00	4423250.00	70.00544 (12061005)
528750.00	4423250.00	63.60934 (12060203)	529250.00	4423250.00	64.76687 (12032901)
529750.00	4423250.00	84.31634 (12071504)	530250.00	4423250.00	88.72980 (12060220)
530750.00	4423250.00	109.17832 (12121401)	531250.00	4423250.00	104.75937 (12121401)
531750.00	4423250.00	118.13377 (12080605)	532250.00	4423250.00	77.21147 (12092302)
532750.00	4423250.00	97.49443 (12080605)	533250.00	4423250.00	91.35419 (12072724)
533750.00	4423250.00	23.66902 (12091207)	534250.00	4423250.00	21.56499 (12122711)
534750.00	4423250.00	24.28074 (12122711)	535250.00	4423250.00	25.45016 (12122711)
535750.00	4423250.00	24.98085 (12122711)	536250.00	4423250.00	24.23006 (12010409)
536750.00	4423250.00	25.93674 (12010409)	537250.00	4423250.00	27.13394 (12010409)
537750.00	4423250.00	22.35807 (12010512)	538250.00	4423250.00	141.51454 (12080105)
538750.00	4423250.00	67.87604 (12080105)	539250.00	4423250.00	22.45937 (12080105)
539750.00	4423250.00	13.70446 (12020510)	540250.00	4423250.00	24.41491 (12101118)
540750.00	4423250.00	31.31662 (12103021)	541250.00	4423250.00	45.56029 (12050503)
541750.00	4423250.00	48.42263 (12091420)	542250.00	4423250.00	42.24272 (12110220)
542750.00	4423250.00	31.57393 (12042019)	526750.00	4423750.00	68.55076 (12021403)
527250.00	4423750.00	58.06025 (12080504)	527750.00	4423750.00	81.21893 (12061005)
528250.00	4423750.00	94.83202 (12091405)	528750.00	4423750.00	91.06696 (12061005)
529250.00	4423750.00	79.17003 (12061005)	529750.00	4423750.00	80.75349 (12060220)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
530250.00	4423750.00	83.29957 (12052223)	530750.00	4423750.00	102.26738 (12121401)
531250.00	4423750.00	87.11216 (12011122)	531750.00	4423750.00	111.99761 (12011122)
532250.00	4423750.00	113.52662 (12080605)	532750.00	4423750.00	117.56374 (12080605)
533250.00	4423750.00	101.63313 (12100524)	533750.00	4423750.00	38.05030 (12040624)
534250.00	4423750.00	20.90062 (12122711)	534750.00	4423750.00	23.32925 (12122711)
535250.00	4423750.00	24.37757 (12122711)	535750.00	4423750.00	23.94144 (12122711)
536250.00	4423750.00	22.74252 (12010409)	536750.00	4423750.00	27.07671 (12010409)
537250.00	4423750.00	26.89171 (12010409)	537750.00	4423750.00	24.27110 (12010409)
538250.00	4423750.00	43.60522 (12110218)	538750.00	4423750.00	37.55299 (12092219)
539250.00	4423750.00	15.89833 (12102208)	539750.00	4423750.00	14.20830 (12121610)
540250.00	4423750.00	16.34008 (12041510)	540750.00	4423750.00	20.49601 (12031209)
541250.00	4423750.00	57.66282 (12103021)	541750.00	4423750.00	71.95271 (12103021)
542250.00	4423750.00	67.80529 (12092722)	542750.00	4423750.00	54.21100 (12091420)
526750.00	4424250.00	78.29492 (12091405)	527250.00	4424250.00	75.68542 (12021403)
527750.00	4424250.00	80.85407 (12021403)	528250.00	4424250.00	72.25069 (12030605)
528750.00	4424250.00	93.04372 (12061005)	529250.00	4424250.00	88.77227 (12101005)
529750.00	4424250.00	70.08488 (12101005)	530250.00	4424250.00	67.82108 (12112503)
530750.00	4424250.00	90.40844 (12121401)	531250.00	4424250.00	80.82803 (12011122)
531750.00	4424250.00	107.80727 (12011122)	532250.00	4424250.00	133.73639 (12080605)
532750.00	4424250.00	133.54717 (12051424)	533250.00	4424250.00	96.94268 (12051424)
533750.00	4424250.00	43.14467 (12062502)	534250.00	4424250.00	20.22081 (12122711)
534750.00	4424250.00	22.38912 (12122711)	535250.00	4424250.00	23.39543 (12122711)

535750.00	4424250.00	22.98662 (12122711)	536250.00	4424250.00	22.84816 (12010409)
536750.00	4424250.00	26.12571 (12010409)	537250.00	4424250.00	26.74765 (12010409)
537750.00	4424250.00	22.81049 (12010409)	538250.00	4424250.00	25.75940 (12101819)
538750.00	4424250.00	18.14611 (12010512)	539250.00	4424250.00	18.87200 (12080406)
539750.00	4424250.00	16.36596 (12031210)	540250.00	4424250.00	18.96795 (12031210)
540750.00	4424250.00	22.59263 (12031209)	541250.00	4424250.00	38.96776 (12101118)
541750.00	4424250.00	49.99545 (12120620)	542250.00	4424250.00	68.61366 (12120620)
542750.00	4424250.00	72.34293 (12092722)	526750.00	4424750.00	64.32990 (12030605)
527250.00	4424750.00	73.04448 (12010120)	527750.00	4424750.00	60.74963 (12030605)
528250.00	4424750.00	64.64270 (12031407)	528750.00	4424750.00	88.64937 (12122523)
529250.00	4424750.00	88.59798 (12121401)	529750.00	4424750.00	92.80884 (12101005)
530250.00	4424750.00	90.93158 (12121401)	530750.00	4424750.00	91.26341 (12080605)
531250.00	4424750.00	86.50025 (12011122)	531750.00	4424750.00	88.34897 (12122223)
532250.00	4424750.00	84.37671 (12122224)	532750.00	4424750.00	111.08729 (12012906)
533250.00	4424750.00	108.69828 (12053102)	533750.00	4424750.00	51.96812 (12100723)
534250.00	4424750.00	38.55471 (12041920)	534750.00	4424750.00	46.80848 (12040706)
535250.00	4424750.00	22.42628 (12122711)	535750.00	4424750.00	22.09634 (12122711)
536250.00	4424750.00	22.06860 (12010409)	536750.00	4424750.00	24.96085 (12010409)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
537250.00	4424750.00	25.48379	(12010409)	537750.00	4424750.00	24.00184	(12010409)
538250.00	4424750.00	23.05137	(12010409)	538750.00	4424750.00	21.52765	(12080406)
539250.00	4424750.00	20.63221	(12080406)	539750.00	4424750.00	19.78147	(12010513)
540250.00	4424750.00	22.67860	(12121610)	540750.00	4424750.00	21.58028	(12121610)
541250.00	4424750.00	23.33971	(12080407)	541750.00	4424750.00	50.60383	(12101118)
542250.00	4424750.00	66.85660	(12101118)	542750.00	4424750.00	59.98034	(12101118)
526750.00	4425250.00	39.05574	(12031407)	527250.00	4425250.00	57.28877	(12030605)
527750.00	4425250.00	43.48486	(12031407)	528250.00	4425250.00	63.67277	(12031407)
528750.00	4425250.00	71.02164	(12121903)	529250.00	4425250.00	66.64860	(12031407)
529750.00	4425250.00	62.14672	(12111604)	530250.00	4425250.00	79.02487	(12011122)
530750.00	4425250.00	98.04790	(12080605)	531250.00	4425250.00	87.18483	(12122223)
531750.00	4425250.00	62.00566	(12050506)	532250.00	4425250.00	61.31838	(12050506)
532750.00	4425250.00	61.33444	(12121105)	533250.00	4425250.00	103.66007	(12112806)
533750.00	4425250.00	70.12800	(12100723)	534250.00	4425250.00	90.11860	(12041920)
534750.00	4425250.00	82.30008	(12041920)	535250.00	4425250.00	27.36256	(12031003)
535750.00	4425250.00	55.10947	(12092104)	536250.00	4425250.00	21.52481	(12021408)
536750.00	4425250.00	23.74260	(12010409)	537250.00	4425250.00	25.91046	(12010409)
537750.00	4425250.00	26.02767	(12010409)	538250.00	4425250.00	24.40082	(12010409)
538750.00	4425250.00	21.75404	(12080406)	539250.00	4425250.00	21.48743	(12080406)
539750.00	4425250.00	21.17860	(12010513)	540250.00	4425250.00	23.89632	(12121610)
540750.00	4425250.00	23.89937	(12121610)	541250.00	4425250.00	20.84787	(12080407)
541750.00	4425250.00	22.35211	(12080407)	542250.00	4425250.00	52.34924	(12101118)
542750.00	4425250.00	64.08249	(12050324)	528142.30	4424000.10	135.46077	(12010120)
528641.50	4421424.20	27.60368	(12072506)	530578.20	4414421.80	25.74345	(12010411)
533199.90	4420647.00	25.23480	(12072506)	537336.40	4419481.40	25.08596	(12080407)
538624.80	4413866.50	17.98829	(12071607)	538699.00	4411952.40	15.01702	(12032308)
539685.20	4412636.40	13.87721	(12071607)	540884.80	4419539.60	119.31629	(12100122)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

NETWORK

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE	GRID-ID
TESIS	1ST HIGHEST VALUE IS	18.14476 AT (533250.00, 4414750.00, 849.90, 849.90, 0.00)	DC
	2ND HIGHEST VALUE IS	17.83542 AT (533250.00, 4415250.00, 888.20, 888.20, 0.00)	DC
	3RD HIGHEST VALUE IS	14.26165 AT (532750.00, 4415250.00, 872.50, 872.50, 0.00)	DC
	4TH HIGHEST VALUE IS	7.28450 AT (531250.00, 4414250.00, 866.70, 866.70, 0.00)	DC
	5TH HIGHEST VALUE IS	7.12738 AT (531250.00, 4413750.00, 860.40, 860.40, 0.00)	DC
	6TH HIGHEST VALUE IS	7.03119 AT (531250.00, 4415250.00, 850.40, 850.40, 0.00)	DC
	7TH HIGHEST VALUE IS	6.10629 AT (531750.00, 4414250.00, 930.50, 930.50, 0.00)	DC
	8TH HIGHEST VALUE IS	5.58133 AT (532750.00, 4414250.00, 902.50, 902.50, 0.00)	DC
	9TH HIGHEST VALUE IS	5.39851 AT (528750.00, 4413250.00, 869.40, 869.40, 0.00)	DC
	10TH HIGHEST VALUE IS	4.61124 AT (533250.00, 4415750.00, 873.60, 873.60, 0.00)	DC
KUMULAT	1ST HIGHEST VALUE IS	19.32127 AT (533250.00, 4415250.00, 888.20, 888.20, 0.00)	DC
	2ND HIGHEST VALUE IS	18.88407 AT (532750.00, 4415250.00, 872.50, 872.50, 0.00)	DC
	3RD HIGHEST VALUE IS	18.60854 AT (533250.00, 4414750.00, 849.90, 849.90, 0.00)	DC
	4TH HIGHEST VALUE IS	18.33029 AT (533250.00, 4416750.00, 886.30, 886.30, 0.00)	DC

5TH HIGHEST VALUE IS 10.82122 AT (533250.00, 4415750.00, 873.60, 873.60, 0.00) DC

6TH HIGHEST VALUE IS 10.44306 AT (531250.00, 4414250.00, 866.70, 866.70, 0.00) DC

7TH HIGHEST VALUE IS 10.09007 AT (534250.00, 4417250.00, 834.90, 834.90, 0.00) DC

8TH HIGHEST VALUE IS 9.93016 AT (531750.00, 4416250.00, 917.40, 917.40, 0.00) DC

9TH HIGHEST VALUE IS 9.91805 AT (533750.00, 4416250.00, 882.20, 882.20, 0.00) DC

10TH HIGHEST VALUE IS 9.43971 AT (534750.00, 4417250.00, 803.70, 803.70, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID
TESIS	HIGH 1ST HIGH VALUE IS	367.18545	ON 12092923: AT (533250.00, 4415250.00, 888.20, 888.20, 0.00) DC
KUMULAT	HIGH 1ST HIGH VALUE IS	367.29254	ON 12092923: AT (533250.00, 4415250.00, 888.20, 888.20, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)

A Total of 0 Warning Message(s)

A Total of 65 Informational Message(s)

A Total of 8784 Hours Were Processed

A Total of 2 Calm Hours Identified

A Total of 63 Missing Hours Identified (0.72 Percent)

******** FATAL ERROR MESSAGES ********

*** NONE ***

******** WARNING MESSAGES ********

*** NONE ***

****

*** AERMOD Finishes Successfully ***

****

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CO STARTING
CO TITLEONE  ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT
CO MODELOPT  DFAULT  CONC
CO RUNORNOT  RUN
CO AVERTIME  8
CO POLLUTID  CO
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  BACA1      POINT    534821 4415299   676.86
SO LOCATION  BACA2    POINT  534847 4415267   676.86
**SRCDESCR ACWA POWER NGCCPP
SO LOCATION  ESER1A    POINT     535249  4417479  680
SO LOCATION  ESER1B    POINT     535283  4417499  680
**SRCDESCR ESER NGCCPP
SO LOCATION  KKALE1    POINT     539763.0  4423247.0  940
SO LOCATION  KKALE2    POINT     539774.0  4423312.0  941
SO LOCATION  KKALE3    POINT     539783.0  4423378.0  940
**SRCDESCR KIRIKKALE NGCCPP
SO SRCPARAM  BACA1     56.25  75  360.15  31.2  5.5
SO SRCPARAM  BACA2     56.25  75  360.15  31.2  5.5
SO SRCPARAM  ESER1A    56.25  75  360.15  31.2  5.5
SO SRCPARAM  ESER1B    56.25  75  360.15  31.2  5.5
SO SRCPARAM  KKALE1    6.22  80  365.49  18.85  7
SO SRCPARAM  KKALE2    6.22  80  365.49  18.85  7
SO SRCPARAM  KKALE3    6.22  80  365.49  18.85  7
SO SRCGROUP TESIS BACA1 BACA2
SO SRCGROUP KUMULAT BACA1 BACA2  ESER1A ESER1B KKALE1 KKALE2 KKALE3
SO FINISHED
```

RE STARTING

RE ELEVUNIT METERS

RE DISCCART 526750 4409250 798.3 798.3

RE DISCCART 527250 4409250 815.8 815.8

RE DISCCART 527750 4409250 812.9 812.9

RE DISCCART 528250 4409250 864.8 864.8

RE DISCCART 528750 4409250 904.1 904.1

RE DISCCART 529250 4409250 996.3 996.3

RE DISCCART 529750 4409250 1041.7 1041.7

RE DISCCART 530250 4409250 972.4 972.4

RE DISCCART 530750 4409250 946.9 946.9

RE DISCCART 531250 4409250 905.2 905.2

RE DISCCART 531750 4409250 842.5 842.5

RE DISCCART 532250 4409250 918.9 918.9

RE DISCCART 532750 4409250 949 949

RE DISCCART 533250 4409250 976.2 976.2

RE DISCCART 533750 4409250 959.5 959.5

RE DISCCART 534250 4409250 916.1 916.1

RE DISCCART 534750 4409250 872.4 872.4

RE DISCCART 535250 4409250 832.5 832.5

RE DISCCART 535750 4409250 813.6 813.6

RE DISCCART 536250 4409250 789.7 789.7

RE DISCCART 536750 4409250 793.4 793.4

RE DISCCART 537250 4409250 789.2 789.2

RE DISCCART 537750 4409250 770.1 770.1

RE DISCCART 538250 4409250 721.1 721.1

RE DISCCART 538750 4409250 735.3 735.3

RE DISCCART 539250 4409250 710.2 710.2

RE DISCCART 539750 4409250 684.5 684.5

RE DISCCART 540250 4409250 676.7 676.7

RE DISCCART 540750 4409250 695.9 695.9

RE DISCCART 541250 4409250 734.5 734.5

RE DISCCART 541750 4409250 727.4 727.4

RE DISCCART 542250 4409250 709.1 709.1

RE DISCCART 542750 4409250 700.9 700.9

RE DISCCART 526750 4409750 833.8 833.8

RE DISCCART 527250 4409750 810.9 810.9

RE DISCCART 527750 4409750 786.4 786.4

RE DISCCART 528250 4409750 865 865

RE DISCCART 528750 4409750 917 917

RE DISCCART 529250 4409750 1030.5 1030.5

RE DISCCART 529750 4409750 1071.5 1071.5

RE DISCCART 530250 4409750 975.3 975.3

RE DISCCART 530750 4409750 940.4 940.4

RE DISCCART 531250 4409750 872.1 872.1

RE DISCCART 531750 4409750 835.7 835.7

RE DISCCART 532250 4409750 867.2 867.2

RE DISCCART 532750 4409750 890 890

RE DISCCART 533250 4409750 897 897

RE DISCCART 533750 4409750 917.6 917.6

RE DISCCART 534250 4409750 875.4 875.4

RE DISCCART 534750 4409750 867.4 867.4

RE DISCCART 535250 4409750 821.3 821.3

RE DISCCART 535750 4409750 780.3 780.3

RE DISCCART 536250 4409750 773.9 773.9

RE DISCCART 536750 4409750 736 736

RE DISCCART 537250 4409750 740.2 740.2

RE DISCCART 537750 4409750 767.6 767.6

RE DISCCART 538250 4409750 747.7 747.7

RE DISCCART 538750 4409750 724.8 724.8

RE DISCCART 539250 4409750 687.9 687.9

RE DISCCART 539750 4409750 676.8 676.8

RE DISCCART 540250 4409750 675.6 675.6

RE DISCCART 540750 4409750 694.8 694.8

RE DISCCART 541250 4409750 735.4 735.4

RE DISCCART 541750 4409750 752.6 752.6

RE DISCCART 542250 4409750 725.2 725.2

RE DISCCART 542750 4409750 723.2 723.2

RE DISCCART 526750 4410250 934.6 934.6

RE DISCCART 527250 4410250 869.8 869.8

RE DISCCART 527750 4410250 782.5 782.5

RE DISCCART 528250 4410250 787.3 787.3

RE DISCCART 528750 4410250 824.5 824.5

RE DISCCART 529250 4410250 914.7 914.7

RE DISCCART 529750 4410250 951.6 951.6

RE DISCCART 530250 4410250 963 963

RE DISCCART 530750 4410250 930.2 930.2

RE DISCCART 531250 4410250 933.3 933.3

RE DISCCART 531750 4410250 836.9 836.9

RE DISCCART 532250 4410250 814 814

RE DISCCART 532750 4410250 872.1 872.1

RE DISCCART 533250 4410250 846.9 846.9

RE DISCCART 533750 4410250 922.2 922.2

RE DISCCART 534250 4410250 890 890

RE DISCCART 534750 4410250 808.3 808.3

RE DISCCART 535250 4410250 793 793

RE DISCCART 535750 4410250 790.6 790.6

RE DISCCART 536250 4410250 774.8 774.8

RE DISCCART 536750 4410250 742.2 742.2

RE DISCCART 537250 4410250 700.1 700.1

RE DISCCART 537750 4410250 694.1 694.1

RE DISCCART 538250 4410250 707.3 707.3

RE DISCCART 538750 4410250 679.2 679.2

RE DISCCART 539250 4410250 679.4 679.4

RE DISCCART 539750 4410250 680.4 680.4

RE DISCCART 540250 4410250 685.8 685.8

RE DISCCART 540750 4410250 698.2 698.2

RE DISCCART 541250 4410250 728.1 728.1

RE DISCCART 541750 4410250 756.2 756.2

RE DISCCART 542250 4410250 753 753

RE DISCCART 542750 4410250 726.8 726.8

RE DISCCART 526750 4410750 986.3 986.3

RE DISCCART 527250 4410750 1022 1022

RE DISCCART 527750 4410750 830.2 830.2

RE DISCCART 528250 4410750 831.9 831.9

RE DISCCART 528750 4410750 786.1 786.1

RE DISCCART 529250 4410750 906.3 906.3

RE DISCCART 529750 4410750 861 861

RE DISCCART 530250 4410750 942.6 942.6

RE DISCCART 530750 4410750 929.1 929.1

RE DISCCART 531250 4410750 908.1 908.1

RE DISCCART 531750 4410750 889.7 889.7

RE DISCCART 532250 4410750 829.5 829.5

RE DISCCART 532750 4410750 805.7 805.7

RE DISCCART 533250 4410750 799.6 799.6

RE DISCCART 533750 4410750 833.4 833.4

RE DISCCART 534250 4410750 844.4 844.4

RE DISCCART 534750 4410750 811.3 811.3

RE DISCCART 535250 4410750 780.1 780.1

RE DISCCART 535750 4410750 751.9 751.9

RE DISCCART 536250 4410750 800.7 800.7

RE DISCCART 536750 4410750 717.4 717.4

RE DISCCART 537250 4410750 675.7 675.7

RE DISCCART 537750 4410750 675.1 675.1

RE DISCCART 538250 4410750 688.2 688.2

RE DISCCART 538750 4410750 702.9 702.9

RE DISCCART 539250 4410750 698.7 698.7

RE DISCCART 539750 4410750 730.3 730.3

RE DISCCART 540250 4410750 744.7 744.7

RE DISCCART 540750 4410750 746.8 746.8

RE DISCCART 541250 4410750 722.6 722.6

RE DISCCART 541750 4410750 762.6 762.6

RE DISCCART 542250 4410750 769.8 769.8

RE DISCCART 542750 4410750 744.5 744.5

RE DISCCART 526750 4411250 1098.9 1098.9

RE DISCCART 527250 4411250 1048.1 1048.1

RE DISCCART 527750 4411250 963.8 963.8

RE DISCCART 528250 4411250 826.4 826.4

RE DISCCART 528750 4411250 757.4 757.4

RE DISCCART 529250 4411250 804.1 804.1

RE DISCCART 529750 4411250 837.8 837.8

RE DISCCART 530250 4411250 879.2 879.2

RE DISCCART 530750 4411250 961.8 961.8

RE DISCCART 531250 4411250 948.5 948.5

RE DISCCART 531750 4411250 903 903

RE DISCCART 532250 4411250 833.9 833.9

RE DISCCART 532750 4411250 799.5 799.5

RE DISCCART 533250 4411250 766.5 766.5

RE DISCCART 533750 4411250 791.3 791.3

RE DISCCART 534250 4411250 789.1 789.1

RE DISCCART 534750 4411250 792.5 792.5

RE DISCCART 535250 4411250 741.1 741.1

RE DISCCART 535750 4411250 725 725

RE DISCCART 536250 4411250 792.2 792.2

RE DISCCART 536750 4411250 672.5 672.5

RE DISCCART 537250 4411250 674 674

RE DISCCART 537750 4411250 686.7 686.7

RE DISCCART 538250 4411250 699.9 699.9

RE DISCCART 538750 4411250 705.3 705.3

RE DISCCART 539250 4411250 729 729

RE DISCCART 539750 4411250 730.1 730.1

RE DISCCART 540250 4411250 766.2 766.2

RE DISCCART 540750 4411250 795.8 795.8

RE DISCCART 541250 4411250 741.8 741.8

RE DISCCART 541750 4411250 763.9 763.9

RE DISCCART 542250 4411250 773.1 773.1

RE DISCCART 542750 4411250 766.3 766.3

RE DISCCART 526750 4411750 997 997

RE DISCCART 527250 4411750 981.9 981.9

RE DISCCART 527750 4411750 990.5 990.5

RE DISCCART 528250 4411750 839.3 839.3

RE DISCCART 528750 4411750 828 828

RE DISCCART 529250 4411750 748.9 748.9

RE DISCCART 529750 4411750 798.1 798.1

RE DISCCART 530250 4411750 894.6 894.6

RE DISCCART 530750 4411750 960.8 960.8

RE DISCCART 531250 4411750 987.6 987.6

RE DISCCART 531750 4411750 951.8 951.8

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RE DISCCART 542250 4424750 973.8 973.8

RE DISCCART 542750 4424750 917.9 917.9

RE DISCCART 526750 4425250 1140.4 1140.4

RE DISCCART 527250 4425250 1095 1095

RE DISCCART 527750 4425250 1167.6 1167.6

RE DISCCART 528250 4425250 1118 1118

RE DISCCART 528750 4425250 1063 1063

RE DISCCART 529250 4425250 1082.6 1082.6

RE DISCCART 529750 4425250 1062.3 1062.3

RE DISCCART 530250 4425250 1014.1 1014.1

RE DISCCART 530750 4425250 967.9 967.9

RE DISCCART 531250 4425250 1063.4 1063.4

RE DISCCART 531750 4425250 1115.4 1115.4

RE DISCCART 532250 4425250 1136.6 1136.6

RE DISCCART 532750 4425250 1117.2 1117.2

RE DISCCART 533250 4425250 1036.1 1036.1

RE DISCCART 533750 4425250 934.3 934.3

RE DISCCART 534250 4425250 857.1 857.1

RE DISCCART 534750 4425250 846.1 846.1

RE DISCCART 535250 4425250 806 806

RE DISCCART 535750 4425250 817.1 817.1

RE DISCCART 536250 4425250 713 713

RE DISCCART 536750 4425250 657.5 657.5

RE DISCCART 537250 4425250 667.4 667.4

RE DISCCART 537750 4425250 669.3 669.3

RE DISCCART 538250 4425250 708.8 708.8

RE DISCCART 538750 4425250 717.9 717.9

RE DISCCART 539250 4425250 727.5 727.5

RE DISCCART 539750 4425250 764.7 764.7

RE DISCCART 540250 4425250 825.7 825.7

RE DISCCART 540750 4425250 813.1 813.1

RE DISCCART 541250 4425250 843 843

RE DISCCART 541750 4425250 892.3 892.3

RE DISCCART 542250 4425250 955.9 955.9

RE DISCCART 542750 4425250 992 992

RE DISCCART 528142.3 4424000.1 1039.79 1426

** RCPDESCR KAYADIBI

RE DISCCART 528641.5 4421424.2 788.36 1426

** RCPDESCR KAYADIBI-1

RE DISCCART 530578.2 4414421.8 738.17 1037.6

** RCPDESCR KILIÇLAR

RE DISCCART 533199.9 4420647 701.35 1183.8

** RCPDESCR IRMAK

RE DISCCART 537336.4 4419481.4 694.83 843.1

** RCPDESCR HACIBALI

RE DISCCART 538624.8 4413866.5 766.42 1059.9

** RCPDESCR YENISEHIR MAH

RE DISCCART 538699 4411952.4 726.01 726.01

** RCPDESCR YAHSIHAN

RE DISCCART 539685.2 4412636.4 760.59 760.59

** RCPDESCR KIRIKKALE SANAYI

RE DISCCART 540884.8 4419539.6 843.38 1271.9

** RCPDESCR MAHMUTLAR

RE FINISHED

ME STARTING

ME SURFFILE KKALE1.SFC

ME PROFFILE KKALE1.PFL

ME SURFDATA 17135 2012 KIRIKKALE

ME UAIRDATA 17130 2012 ANKARA

ME PROFBASE 750

ME FINISHED

OU STARTING

OU RECTABLE 8 FIRST

OU PLOTFILE 8 TESIS FIRST TESIS.plt

OU PLOTFILE 8 KUMULAT FIRST KUMULAT.plt

OU FINISHED

****

*** SETUP Finishes Successfully ***

****

*** AERMOD - VERSION 12345 *** *** ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT *** 09/03/13

*** *** 09:42:14

PAGE 1

**MODELOPTs: RegDFAULT CONC ELEV

*** MODEL SETUP OPTIONS SUMMARY ***

**Model Is Setup For Calculation of Average CONCentration Values.

-- DEPOSITION LOGIC --

**NO GAS DEPOSITION Data Provided.

**NO PARTICLE DEPOSITION Data Provided.

**Model Uses NO DRY DEPLETION. DRYDPLT = F

**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:

1. Stack-tip Downwash.

2. Model Accounts for ELEVated Terrain Effects.

3. Use Calms Processing Routine.

4. Use Missing Data Processing Routine.

5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 8-HR

**This Run Includes: 7 Source(s); 2 Source Group(s); and 1094 Receptor(s)

**The Model Assumes A Pollutant Type of: CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:

Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours

m for Missing Hours

b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 750.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0

Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07

Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 3.7 MB of RAM.

*** AERMOD - VERSION 12345 *** *** ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT *** 09/03/13

*** *** 09:42:14

**MODELOPTs: RegDFAULT CONC ELEV

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS VARY BY	URBAN SOURCE	HOR CAP/ SCALAR	EMIS RATE
BACA1	0	0.56250E+02	534821.0	4415299.0	676.9	75.00	360.15	31.20	5.50	NO	NO	NO	
BACA2	0	0.56250E+02	534847.0	4415267.0	676.9	75.00	360.15	31.20	5.50	NO	NO	NO	
ESER1A	0	0.56250E+02	535249.0	4417479.0	680.0	75.00	360.15	31.20	5.50	NO	NO	NO	
ESER1B	0	0.56250E+02	535283.0	4417499.0	680.0	75.00	360.15	31.20	5.50	NO	NO	NO	
KKALE1	0	0.62200E+01	539763.0	4423247.0	940.0	80.00	365.49	18.85	7.00	NO	NO	NO	
KKALE2	0	0.62200E+01	539774.0	4423312.0	941.0	80.00	365.49	18.85	7.00	NO	NO	NO	
KKALE3	0	0.62200E+01	539783.0	4423378.0	940.0	80.00	365.49	18.85	7.00	NO	NO	NO	

**MODELOPTs: RegDFAULT CONC ELEV

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs

TESIS BACA1 , BACA2 ,

KUMULAT BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(526750.0,	4409250.0,	798.3,	798.3,	0.0);	(527250.0,	4409250.0,	815.8,	815.8,	0.0);
(527750.0,	4409250.0,	812.9,	812.9,	0.0);	(528250.0,	4409250.0,	864.8,	864.8,	0.0);
(528750.0,	4409250.0,	904.1,	904.1,	0.0);	(529250.0,	4409250.0,	996.3,	996.3,	0.0);
(529750.0,	4409250.0,	1041.7,	1041.7,	0.0);	(530250.0,	4409250.0,	972.4,	972.4,	0.0);
(530750.0,	4409250.0,	946.9,	946.9,	0.0);	(531250.0,	4409250.0,	905.2,	905.2,	0.0);
(531750.0,	4409250.0,	842.5,	842.5,	0.0);	(532250.0,	4409250.0,	918.9,	918.9,	0.0);
(532750.0,	4409250.0,	949.0,	949.0,	0.0);	(533250.0,	4409250.0,	976.2,	976.2,	0.0);
(533750.0,	4409250.0,	959.5,	959.5,	0.0);	(534250.0,	4409250.0,	916.1,	916.1,	0.0);
(534750.0,	4409250.0,	872.4,	872.4,	0.0);	(535250.0,	4409250.0,	832.5,	832.5,	0.0);
(535750.0,	4409250.0,	813.6,	813.6,	0.0);	(536250.0,	4409250.0,	789.7,	789.7,	0.0);
(536750.0,	4409250.0,	793.4,	793.4,	0.0);	(537250.0,	4409250.0,	789.2,	789.2,	0.0);
(537750.0,	4409250.0,	770.1,	770.1,	0.0);	(538250.0,	4409250.0,	721.1,	721.1,	0.0);
(538750.0,	4409250.0,	735.3,	735.3,	0.0);	(539250.0,	4409250.0,	710.2,	710.2,	0.0);
(539750.0,	4409250.0,	684.5,	684.5,	0.0);	(540250.0,	4409250.0,	676.7,	676.7,	0.0);
(540750.0,	4409250.0,	695.9,	695.9,	0.0);	(541250.0,	4409250.0,	734.5,	734.5,	0.0);

(541750.0, 4409250.0, 727.4, 727.4, 0.0); (542250.0, 4409250.0, 709.1, 709.1, 0.0);

(542750.0, 4409250.0, 700.9, 700.9, 0.0); (526750.0, 4409750.0, 833.8, 833.8, 0.0);

(527250.0, 4409750.0, 810.9, 810.9, 0.0); (527750.0, 4409750.0, 786.4, 786.4, 0.0);

(528250.0, 4409750.0, 865.0, 865.0, 0.0); (528750.0, 4409750.0, 917.0, 917.0, 0.0);

(529250.0, 4409750.0, 1030.5, 1030.5, 0.0); (529750.0, 4409750.0, 1071.5, 1071.5, 0.0);

(530250.0, 4409750.0, 975.3, 975.3, 0.0); (530750.0, 4409750.0, 940.4, 940.4, 0.0);

(531250.0, 4409750.0, 872.1, 872.1, 0.0); (531750.0, 4409750.0, 835.7, 835.7, 0.0);

(532250.0, 4409750.0, 867.2, 867.2, 0.0); (532750.0, 4409750.0, 890.0, 890.0, 0.0);

(533250.0, 4409750.0, 897.0, 897.0, 0.0); (533750.0, 4409750.0, 917.6, 917.6, 0.0);

(534250.0, 4409750.0, 875.4, 875.4, 0.0); (534750.0, 4409750.0, 867.4, 867.4, 0.0);

(535250.0, 4409750.0, 821.3, 821.3, 0.0); (535750.0, 4409750.0, 780.3, 780.3, 0.0);

(536250.0, 4409750.0, 773.9, 773.9, 0.0); (536750.0, 4409750.0, 736.0, 736.0, 0.0);

(537250.0, 4409750.0, 740.2, 740.2, 0.0); (537750.0, 4409750.0, 767.6, 767.6, 0.0);

(538250.0, 4409750.0, 747.7, 747.7, 0.0); (538750.0, 4409750.0, 724.8, 724.8, 0.0);

(539250.0, 4409750.0, 687.9, 687.9, 0.0); (539750.0, 4409750.0, 676.8, 676.8, 0.0);

(540250.0, 4409750.0, 675.6, 675.6, 0.0); (540750.0, 4409750.0, 694.8, 694.8, 0.0);

(541250.0, 4409750.0, 735.4, 735.4, 0.0); (541750.0, 4409750.0, 752.6, 752.6, 0.0);

(542250.0, 4409750.0, 725.2, 725.2, 0.0); (542750.0, 4409750.0, 723.2, 723.2, 0.0);

(526750.0, 4410250.0, 934.6, 934.6, 0.0); (527250.0, 4410250.0, 869.8, 869.8, 0.0);

(527750.0, 4410250.0, 782.5, 782.5, 0.0); (528250.0, 4410250.0, 787.3, 787.3, 0.0);

(528750.0, 4410250.0, 824.5, 824.5, 0.0); (529250.0, 4410250.0, 914.7, 914.7, 0.0);

(529750.0, 4410250.0, 951.6, 951.6, 0.0); (530250.0, 4410250.0, 963.0, 963.0, 0.0);

(530750.0, 4410250.0, 930.2, 930.2, 0.0); (531250.0, 4410250.0, 933.3, 933.3, 0.0);

(531750.0, 4410250.0, 836.9, 836.9, 0.0); (532250.0, 4410250.0, 814.0, 814.0, 0.0);

(532750.0, 4410250.0, 872.1, 872.1, 0.0); (533250.0, 4410250.0, 846.9, 846.9, 0.0);

(533750.0, 4410250.0, 922.2, 922.2, 0.0); (534250.0, 4410250.0, 890.0, 890.0, 0.0);

(534750.0, 4410250.0, 808.3, 808.3, 0.0); (535250.0, 4410250.0, 793.0, 793.0, 0.0);

(535750.0, 4410250.0, 790.6, 790.6, 0.0); (536250.0, 4410250.0, 774.8, 774.8, 0.0);

(536750.0, 4410250.0, 742.2, 742.2, 0.0); (537250.0, 4410250.0, 700.1, 700.1, 0.0);

(537750.0, 4410250.0, 694.1, 694.1, 0.0); (538250.0, 4410250.0, 707.3, 707.3, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(	538750.0,	4410250.0,	679.2,	679.2,	0.0);	(539250.0,	4410250.0,	679.4,	679.4,	0.0);
(	539750.0,	4410250.0,	680.4,	680.4,	0.0);	(540250.0,	4410250.0,	685.8,	685.8,	0.0);
(	540750.0,	4410250.0,	698.2,	698.2,	0.0);	(541250.0,	4410250.0,	728.1,	728.1,	0.0);
(	541750.0,	4410250.0,	756.2,	756.2,	0.0);	(542250.0,	4410250.0,	753.0,	753.0,	0.0);
(	542750.0,	4410250.0,	726.8,	726.8,	0.0);	(526750.0,	4410750.0,	986.3,	986.3,	0.0);
(	527250.0,	4410750.0,	1022.0,	1022.0,	0.0);	(527750.0,	4410750.0,	830.2,	830.2,	0.0);
(	528250.0,	4410750.0,	831.9,	831.9,	0.0);	(528750.0,	4410750.0,	786.1,	786.1,	0.0);
(	529250.0,	4410750.0,	906.3,	906.3,	0.0);	(529750.0,	4410750.0,	861.0,	861.0,	0.0);
(	530250.0,	4410750.0,	942.6,	942.6,	0.0);	(530750.0,	4410750.0,	929.1,	929.1,	0.0);
(	531250.0,	4410750.0,	908.1,	908.1,	0.0);	(531750.0,	4410750.0,	889.7,	889.7,	0.0);
(	532250.0,	4410750.0,	829.5,	829.5,	0.0);	(532750.0,	4410750.0,	805.7,	805.7,	0.0);
(	533250.0,	4410750.0,	799.6,	799.6,	0.0);	(533750.0,	4410750.0,	833.4,	833.4,	0.0);
(	534250.0,	4410750.0,	844.4,	844.4,	0.0);	(534750.0,	4410750.0,	811.3,	811.3,	0.0);
(	535250.0,	4410750.0,	780.1,	780.1,	0.0);	(535750.0,	4410750.0,	751.9,	751.9,	0.0);
(	536250.0,	4410750.0,	800.7,	800.7,	0.0);	(536750.0,	4410750.0,	717.4,	717.4,	0.0);
(	537250.0,	4410750.0,	675.7,	675.7,	0.0);	(537750.0,	4410750.0,	675.1,	675.1,	0.0);
(	538250.0,	4410750.0,	688.2,	688.2,	0.0);	(538750.0,	4410750.0,	702.9,	702.9,	0.0);
(	539250.0,	4410750.0,	698.7,	698.7,	0.0);	(539750.0,	4410750.0,	730.3,	730.3,	0.0);
(	540250.0,	4410750.0,	744.7,	744.7,	0.0);	(540750.0,	4410750.0,	746.8,	746.8,	0.0);
(	541250.0,	4410750.0,	722.6,	722.6,	0.0);	(541750.0,	4410750.0,	762.6,	762.6,	0.0);
(	542250.0,	4410750.0,	769.8,	769.8,	0.0);	(542750.0,	4410750.0,	744.5,	744.5,	0.0);
(	526750.0,	4411250.0,	1098.9,	1098.9,	0.0);	(527250.0,	4411250.0,	1048.1,	1048.1,	0.0);

(527750.0, 4411250.0, 963.8, 963.8, 0.0); (528250.0, 4411250.0, 826.4, 826.4, 0.0);

(528750.0, 4411250.0, 757.4, 757.4, 0.0); (529250.0, 4411250.0, 804.1, 804.1, 0.0);

(529750.0, 4411250.0, 837.8, 837.8, 0.0); (530250.0, 4411250.0, 879.2, 879.2, 0.0);

(530750.0, 4411250.0, 961.8, 961.8, 0.0); (531250.0, 4411250.0, 948.5, 948.5, 0.0);

(531750.0, 4411250.0, 903.0, 903.0, 0.0); (532250.0, 4411250.0, 833.9, 833.9, 0.0);

(532750.0, 4411250.0, 799.5, 799.5, 0.0); (533250.0, 4411250.0, 766.5, 766.5, 0.0);

(533750.0, 4411250.0, 791.3, 791.3, 0.0); (534250.0, 4411250.0, 789.1, 789.1, 0.0);

(534750.0, 4411250.0, 792.5, 792.5, 0.0); (535250.0, 4411250.0, 741.1, 741.1, 0.0);

(535750.0, 4411250.0, 725.0, 725.0, 0.0); (536250.0, 4411250.0, 792.2, 792.2, 0.0);

(536750.0, 4411250.0, 672.5, 672.5, 0.0); (537250.0, 4411250.0, 674.0, 674.0, 0.0);

(537750.0, 4411250.0, 686.7, 686.7, 0.0); (538250.0, 4411250.0, 699.9, 699.9, 0.0);

(538750.0, 4411250.0, 705.3, 705.3, 0.0); (539250.0, 4411250.0, 729.0, 729.0, 0.0);

(539750.0, 4411250.0, 730.1, 730.1, 0.0); (540250.0, 4411250.0, 766.2, 766.2, 0.0);

(540750.0, 4411250.0, 795.8, 795.8, 0.0); (541250.0, 4411250.0, 741.8, 741.8, 0.0);

(541750.0, 4411250.0, 763.9, 763.9, 0.0); (542250.0, 4411250.0, 773.1, 773.1, 0.0);

(542750.0, 4411250.0, 766.3, 766.3, 0.0); (526750.0, 4411750.0, 997.0, 997.0, 0.0);

(527250.0, 4411750.0, 981.9, 981.9, 0.0); (527750.0, 4411750.0, 990.5, 990.5, 0.0);

(528250.0, 4411750.0, 839.3, 839.3, 0.0); (528750.0, 4411750.0, 828.0, 828.0, 0.0);

(529250.0, 4411750.0, 748.9, 748.9, 0.0); (529750.0, 4411750.0, 798.1, 798.1, 0.0);

(530250.0, 4411750.0, 894.6, 894.6, 0.0); (530750.0, 4411750.0, 960.8, 960.8, 0.0);

(531250.0, 4411750.0, 987.6, 987.6, 0.0); (531750.0, 4411750.0, 951.8, 951.8, 0.0);

(532250.0, 4411750.0, 871.3, 871.3, 0.0); (532750.0, 4411750.0, 824.5, 824.5, 0.0);

(533250.0, 4411750.0, 785.4, 785.4, 0.0); (533750.0, 4411750.0, 749.5, 749.5, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(534250.0, 4411750.0, 733.9, 733.9, 0.0); (534750.0, 4411750.0, 728.8, 728.8, 0.0);

(535250.0, 4411750.0, 731.0, 731.0, 0.0); (535750.0, 4411750.0, 735.9, 735.9, 0.0);

(536250.0, 4411750.0, 685.9, 685.9, 0.0); (536750.0, 4411750.0, 676.6, 676.6, 0.0);

(537250.0, 4411750.0, 692.7, 692.7, 0.0); (537750.0, 4411750.0, 702.8, 702.8, 0.0);

(538250.0, 4411750.0, 716.1, 716.1, 0.0); (538750.0, 4411750.0, 719.7, 719.7, 0.0);

(539250.0, 4411750.0, 736.6, 736.6, 0.0); (539750.0, 4411750.0, 727.2, 727.2, 0.0);

(540250.0, 4411750.0, 755.5, 755.5, 0.0); (540750.0, 4411750.0, 788.9, 788.9, 0.0);

(541250.0, 4411750.0, 757.9, 757.9, 0.0); (541750.0, 4411750.0, 764.7, 764.7, 0.0);

(542250.0, 4411750.0, 785.5, 785.5, 0.0); (542750.0, 4411750.0, 774.3, 774.3, 0.0);

(526750.0, 4412250.0, 927.9, 927.9, 0.0); (527250.0, 4412250.0, 943.8, 943.8, 0.0);

(527750.0, 4412250.0, 951.7, 951.7, 0.0); (528250.0, 4412250.0, 895.3, 895.3, 0.0);

(528750.0, 4412250.0, 902.9, 902.9, 0.0); (529250.0, 4412250.0, 757.1, 757.1, 0.0);

(529750.0, 4412250.0, 743.0, 743.0, 0.0); (530250.0, 4412250.0, 829.7, 829.7, 0.0);

(530750.0, 4412250.0, 900.0, 900.0, 0.0); (531250.0, 4412250.0, 984.4, 984.4, 0.0);

(531750.0, 4412250.0, 942.8, 942.8, 0.0); (532250.0, 4412250.0, 866.0, 866.0, 0.0);

(532750.0, 4412250.0, 827.4, 827.4, 0.0); (533250.0, 4412250.0, 798.2, 798.2, 0.0);

(533750.0, 4412250.0, 770.6, 770.6, 0.0); (534250.0, 4412250.0, 763.2, 763.2, 0.0);

(534750.0, 4412250.0, 739.5, 739.5, 0.0); (535250.0, 4412250.0, 717.4, 717.4, 0.0);

(535750.0, 4412250.0, 689.0, 689.0, 0.0); (536250.0, 4412250.0, 676.7, 676.7, 0.0);

(536750.0, 4412250.0, 700.0, 700.0, 0.0); (537250.0, 4412250.0, 730.7, 730.7, 0.0);

(537750.0, 4412250.0, 732.1, 732.1, 0.0); (538250.0, 4412250.0, 771.0, 771.0, 0.0);

(538750.0, 4412250.0, 739.2, 739.2, 0.0); (539250.0, 4412250.0, 750.2, 750.2, 0.0);

(539750.0, 4412250.0, 743.2, 743.2, 0.0); (540250.0, 4412250.0, 762.3, 762.3, 0.0);

(540750.0, 4412250.0, 821.3, 821.3, 0.0); (541250.0, 4412250.0, 771.0, 771.0, 0.0);

(541750.0, 4412250.0, 780.7, 780.7, 0.0); (542250.0, 4412250.0, 797.2, 797.2, 0.0);

(542750.0, 4412250.0, 797.4, 797.4, 0.0); (526750.0, 4412750.0, 891.5, 891.5, 0.0);

(527250.0, 4412750.0, 921.1, 921.1, 0.0); (527750.0, 4412750.0, 899.9, 899.9, 0.0);

(528250.0, 4412750.0, 921.3, 921.3, 0.0); (528750.0, 4412750.0, 921.3, 921.3, 0.0);

(529250.0, 4412750.0, 845.7, 845.7, 0.0); (529750.0, 4412750.0, 748.6, 748.6, 0.0);

(530250.0, 4412750.0, 769.0, 769.0, 0.0); (530750.0, 4412750.0, 877.4, 877.4, 0.0);

(531250.0, 4412750.0, 981.8, 981.8, 0.0); (531750.0, 4412750.0, 971.1, 971.1, 0.0);

(532250.0, 4412750.0, 901.8, 901.8, 0.0); (532750.0, 4412750.0, 871.8, 871.8, 0.0);

(533250.0, 4412750.0, 837.0, 837.0, 0.0); (533750.0, 4412750.0, 833.1, 833.1, 0.0);

(534250.0, 4412750.0, 763.2, 763.2, 0.0); (534750.0, 4412750.0, 739.8, 739.8, 0.0);

(535250.0, 4412750.0, 703.8, 703.8, 0.0); (535750.0, 4412750.0, 681.5, 681.5, 0.0);

(536250.0, 4412750.0, 672.6, 672.6, 0.0); (536750.0, 4412750.0, 732.9, 732.9, 0.0);

(537250.0, 4412750.0, 748.7, 748.7, 0.0); (537750.0, 4412750.0, 752.6, 752.6, 0.0);

(538250.0, 4412750.0, 791.2, 791.2, 0.0); (538750.0, 4412750.0, 763.7, 763.7, 0.0);

(539250.0, 4412750.0, 758.9, 758.9, 0.0); (539750.0, 4412750.0, 760.8, 760.8, 0.0);

(540250.0, 4412750.0, 762.8, 762.8, 0.0); (540750.0, 4412750.0, 789.5, 789.5, 0.0);

(541250.0, 4412750.0, 786.7, 786.7, 0.0); (541750.0, 4412750.0, 806.1, 806.1, 0.0);

(542250.0, 4412750.0, 819.7, 819.7, 0.0); (542750.0, 4412750.0, 823.1, 823.1, 0.0);

(526750.0, 4413250.0, 872.0, 872.0, 0.0); (527250.0, 4413250.0, 864.6, 864.6, 0.0);

(527750.0, 4413250.0, 896.3, 896.3, 0.0); (528250.0, 4413250.0, 921.2, 921.2, 0.0);

(528750.0, 4413250.0, 869.4, 869.4, 0.0); (529250.0, 4413250.0, 839.0, 839.0, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(529750.0, 4413250.0, 776.6, 776.6, 0.0); (530250.0, 4413250.0, 737.5, 737.5, 0.0);

(530750.0, 4413250.0, 820.8, 820.8, 0.0); (531250.0, 4413250.0, 900.6, 900.6, 0.0);

(531750.0, 4413250.0, 985.3, 985.3, 0.0); (532250.0, 4413250.0, 988.4, 988.4, 0.0);

(532750.0, 4413250.0, 975.5, 975.5, 0.0); (533250.0, 4413250.0, 878.9, 878.9, 0.0);

(533750.0, 4413250.0, 836.0, 836.0, 0.0); (534250.0, 4413250.0, 754.8, 754.8, 0.0);

(534750.0, 4413250.0, 736.9, 736.9, 0.0); (535250.0, 4413250.0, 693.1, 693.1, 0.0);

(535750.0, 4413250.0, 672.2, 672.2, 0.0); (536250.0, 4413250.0, 701.2, 701.2, 0.0);

(536750.0, 4413250.0, 738.7, 738.7, 0.0); (537250.0, 4413250.0, 785.3, 785.3, 0.0);

(537750.0, 4413250.0, 772.4, 772.4, 0.0); (538250.0, 4413250.0, 778.7, 778.7, 0.0);

(538750.0, 4413250.0, 767.8, 767.8, 0.0); (539250.0, 4413250.0, 775.1, 775.1, 0.0);

(539750.0, 4413250.0, 777.8, 777.8, 0.0); (540250.0, 4413250.0, 780.3, 780.3, 0.0);

(540750.0, 4413250.0, 802.8, 802.8, 0.0); (541250.0, 4413250.0, 810.6, 810.6, 0.0);

(541750.0, 4413250.0, 849.8, 849.8, 0.0); (542250.0, 4413250.0, 856.5, 856.5, 0.0);

(542750.0, 4413250.0, 860.6, 860.6, 0.0); (526750.0, 4413750.0, 890.8, 890.8, 0.0);

(527250.0, 4413750.0, 858.1, 858.1, 0.0); (527750.0, 4413750.0, 866.7, 866.7, 0.0);

(528250.0, 4413750.0, 926.6, 926.6, 0.0); (528750.0, 4413750.0, 926.8, 926.8, 0.0);

(529250.0, 4413750.0, 824.4, 824.4, 0.0); (529750.0, 4413750.0, 774.0, 774.0, 0.0);

(530250.0, 4413750.0, 730.0, 730.0, 0.0); (530750.0, 4413750.0, 787.4, 787.4, 0.0);

(531250.0, 4413750.0, 860.4, 860.4, 0.0); (531750.0, 4413750.0, 931.7, 931.7, 0.0);

(532250.0, 4413750.0, 1022.1, 1022.1, 0.0); (532750.0, 4413750.0, 947.3, 947.3, 0.0);

(533750.0, 4413750.0, 806.5, 806.5, 0.0); (534250.0, 4413750.0, 784.1, 784.1, 0.0);

(534750.0, 4413750.0, 710.5, 710.5, 0.0); (535250.0, 4413750.0, 678.9, 678.9, 0.0);

(535750.0, 4413750.0, 680.7, 680.7, 0.0); (536250.0, 4413750.0, 734.5, 734.5, 0.0);

(536750.0, 4413750.0, 746.3, 746.3, 0.0); (537250.0, 4413750.0, 795.2, 795.2, 0.0);

(537750.0, 4413750.0, 765.7, 765.7, 0.0); (538250.0, 4413750.0, 750.7, 750.7, 0.0);

(538750.0, 4413750.0, 766.7, 766.7, 0.0); (539250.0, 4413750.0, 789.9, 789.9, 0.0);

(539750.0, 4413750.0, 792.4, 792.4, 0.0); (540250.0, 4413750.0, 798.2, 798.2, 0.0);

(540750.0, 4413750.0, 829.2, 829.2, 0.0); (541250.0, 4413750.0, 840.7, 840.7, 0.0);

(541750.0, 4413750.0, 881.1, 881.1, 0.0); (542250.0, 4413750.0, 896.5, 896.5, 0.0);

(542750.0, 4413750.0, 887.5, 887.5, 0.0); (526750.0, 4414250.0, 917.1, 917.1, 0.0);

(527250.0, 4414250.0, 859.1, 859.1, 0.0); (527750.0, 4414250.0, 828.7, 828.7, 0.0);

(528250.0, 4414250.0, 858.7, 858.7, 0.0); (528750.0, 4414250.0, 891.1, 891.1, 0.0);

(529250.0, 4414250.0, 860.3, 860.3, 0.0); (529750.0, 4414250.0, 782.5, 782.5, 0.0);

(530250.0, 4414250.0, 726.9, 726.9, 0.0); (530750.0, 4414250.0, 768.6, 768.6, 0.0);

(531250.0, 4414250.0, 866.7, 866.7, 0.0); (531750.0, 4414250.0, 930.5, 930.5, 0.0);

(532250.0, 4414250.0, 968.8, 968.8, 0.0); (532750.0, 4414250.0, 902.5, 902.5, 0.0);

(533250.0, 4414250.0, 830.2, 830.2, 0.0); (533750.0, 4414250.0, 773.6, 773.6, 0.0);

(534250.0, 4414250.0, 756.8, 756.8, 0.0); (534750.0, 4414250.0, 759.2, 759.2, 0.0);

(535250.0, 4414250.0, 673.6, 673.6, 0.0); (535750.0, 4414250.0, 680.4, 680.4, 0.0);

(536250.0, 4414250.0, 697.8, 697.8, 0.0); (536750.0, 4414250.0, 712.3, 712.3, 0.0);

(537250.0, 4414250.0, 721.4, 721.4, 0.0); (537750.0, 4414250.0, 737.5, 737.5, 0.0);

(538250.0, 4414250.0, 762.5, 762.5, 0.0); (538750.0, 4414250.0, 798.5, 798.5, 0.0);

(539250.0, 4414250.0, 806.7, 806.7, 0.0); (539750.0, 4414250.0, 824.7, 824.7, 0.0);

(540250.0, 4414250.0, 825.7, 825.7, 0.0); (540750.0, 4414250.0, 821.5, 821.5, 0.0);

(541250.0, 4414250.0, 913.8, 913.8, 0.0); (541750.0, 4414250.0, 930.0, 930.0, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(542250.0, 4414250.0, 931.0, 931.0, 0.0); (542750.0, 4414250.0, 938.6, 938.6, 0.0);

(526750.0, 4414750.0, 877.6, 877.6, 0.0); (527250.0, 4414750.0, 847.6, 847.6, 0.0);

(527750.0, 4414750.0, 834.0, 834.0, 0.0); (528250.0, 4414750.0, 808.4, 808.4, 0.0);

(528750.0, 4414750.0, 817.1, 817.1, 0.0); (529250.0, 4414750.0, 793.7, 793.7, 0.0);

(529750.0, 4414750.0, 788.3, 788.3, 0.0); (530250.0, 4414750.0, 723.5, 723.5, 0.0);

(530750.0, 4414750.0, 757.9, 757.9, 0.0); (531250.0, 4414750.0, 846.0, 846.0, 0.0);

(531750.0, 4414750.0, 916.5, 916.5, 0.0); (532250.0, 4414750.0, 990.5, 990.5, 0.0);

(533250.0, 4414750.0, 849.9, 849.9, 0.0); (533750.0, 4414750.0, 778.1, 778.1, 0.0);

(534250.0, 4414750.0, 751.3, 751.3, 0.0); (534750.0, 4414750.0, 710.0, 710.0, 0.0);

(535250.0, 4414750.0, 679.9, 679.9, 0.0); (535750.0, 4414750.0, 678.0, 678.0, 0.0);

(536250.0, 4414750.0, 695.6, 695.6, 0.0); (536750.0, 4414750.0, 714.9, 714.9, 0.0);

(537250.0, 4414750.0, 741.3, 741.3, 0.0); (537750.0, 4414750.0, 752.8, 752.8, 0.0);

(538250.0, 4414750.0, 775.9, 775.9, 0.0); (538750.0, 4414750.0, 809.4, 809.4, 0.0);

(539250.0, 4414750.0, 883.9, 883.9, 0.0); (539750.0, 4414750.0, 854.5, 854.5, 0.0);

(540250.0, 4414750.0, 854.5, 854.5, 0.0); (540750.0, 4414750.0, 844.3, 844.3, 0.0);

(541250.0, 4414750.0, 862.7, 862.7, 0.0); (541750.0, 4414750.0, 922.4, 922.4, 0.0);

(542250.0, 4414750.0, 989.0, 989.0, 0.0); (542750.0, 4414750.0, 1008.1, 1008.1, 0.0);

(526750.0, 4415250.0, 842.8, 842.8, 0.0); (527250.0, 4415250.0, 815.1, 815.1, 0.0);

(527750.0, 4415250.0, 798.7, 798.7, 0.0); (528250.0, 4415250.0, 837.3, 837.3, 0.0);

(528750.0, 4415250.0, 798.1, 798.1, 0.0); (529250.0, 4415250.0, 774.1, 774.1, 0.0);

(529750.0, 4415250.0, 741.6, 741.6, 0.0); (530250.0, 4415250.0, 726.6, 726.6, 0.0);

(530750.0, 4415250.0, 763.7, 763.7, 0.0); (531250.0, 4415250.0, 850.4, 850.4, 0.0);

(531750.0, 4415250.0, 951.4, 951.4, 0.0); (532250.0, 4415250.0, 1013.0, 1013.0, 0.0);

(532750.0, 4415250.0, 872.5, 872.5, 0.0); (533250.0, 4415250.0, 888.2, 888.2, 0.0);

(533750.0, 4415250.0, 784.6, 784.6, 0.0); (534250.0, 4415250.0, 727.9, 727.9, 0.0);

(534750.0, 4415250.0, 684.6, 684.6, 0.0); (535250.0, 4415250.0, 670.8, 670.8, 0.0);

(535750.0, 4415250.0, 694.3, 694.3, 0.0); (536250.0, 4415250.0, 699.8, 699.8, 0.0);

(536750.0, 4415250.0, 743.8, 743.8, 0.0); (537250.0, 4415250.0, 762.8, 762.8, 0.0);

(537750.0, 4415250.0, 772.6, 772.6, 0.0); (538250.0, 4415250.0, 809.3, 809.3, 0.0);

(538750.0, 4415250.0, 892.0, 892.0, 0.0); (539250.0, 4415250.0, 885.7, 885.7, 0.0);

(539750.0, 4415250.0, 921.3, 921.3, 0.0); (540250.0, 4415250.0, 897.1, 897.1, 0.0);

(540750.0, 4415250.0, 886.2, 886.2, 0.0); (541250.0, 4415250.0, 861.3, 861.3, 0.0);

(541750.0, 4415250.0, 938.6, 938.6, 0.0); (542250.0, 4415250.0, 1033.7, 1033.7, 0.0);

(542750.0, 4415250.0, 1048.3, 1048.3, 0.0); (526750.0, 4415750.0, 807.4, 807.4, 0.0);

(527250.0, 4415750.0, 791.3, 791.3, 0.0); (527750.0, 4415750.0, 780.5, 780.5, 0.0);

(528250.0, 4415750.0, 784.7, 784.7, 0.0); (528750.0, 4415750.0, 799.7, 799.7, 0.0);

(529250.0, 4415750.0, 788.9, 788.9, 0.0); (529750.0, 4415750.0, 780.7, 780.7, 0.0);

(530250.0, 4415750.0, 719.3, 719.3, 0.0); (530750.0, 4415750.0, 748.4, 748.4, 0.0);

(531250.0, 4415750.0, 815.3, 815.3, 0.0); (531750.0, 4415750.0, 907.2, 907.2, 0.0);

(532250.0, 4415750.0, 994.2, 994.2, 0.0); (532750.0, 4415750.0, 866.0, 866.0, 0.0);

(533250.0, 4415750.0, 873.6, 873.6, 0.0); (533750.0, 4415750.0, 795.2, 795.2, 0.0);

(534250.0, 4415750.0, 720.1, 720.1, 0.0); (534750.0, 4415750.0, 664.0, 664.0, 0.0);

(535250.0, 4415750.0, 704.7, 704.7, 0.0); (535750.0, 4415750.0, 717.0, 717.0, 0.0);

(536250.0, 4415750.0, 729.1, 729.1, 0.0); (536750.0, 4415750.0, 741.1, 741.1, 0.0);

(537250.0, 4415750.0, 803.2, 803.2, 0.0); (537750.0, 4415750.0, 807.9, 807.9, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(538250.0, 4415750.0, 827.1, 827.1, 0.0); (538750.0, 4415750.0, 885.2, 885.2, 0.0);

(539250.0, 4415750.0, 949.0, 949.0, 0.0); (539750.0, 4415750.0, 952.3, 952.3, 0.0);

(540250.0, 4415750.0, 1008.7, 1008.7, 0.0); (540750.0, 4415750.0, 912.1, 912.1, 0.0);

(541250.0, 4415750.0, 907.8, 907.8, 0.0); (541750.0, 4415750.0, 885.0, 885.0, 0.0);

(542250.0, 4415750.0, 1001.9, 1001.9, 0.0); (542750.0, 4415750.0, 1084.9, 1084.9, 0.0);

(526750.0, 4416250.0, 805.7, 805.7, 0.0); (527250.0, 4416250.0, 783.4, 783.4, 0.0);

(527750.0, 4416250.0, 768.8, 768.8, 0.0); (528250.0, 4416250.0, 757.4, 757.4, 0.0);

(528750.0, 4416250.0, 754.5, 754.5, 0.0); (529250.0, 4416250.0, 755.1, 755.1, 0.0);

(529750.0, 4416250.0, 758.6, 758.6, 0.0); (530250.0, 4416250.0, 712.5, 712.5, 0.0);

(530750.0, 4416250.0, 749.0, 749.0, 0.0); (531250.0, 4416250.0, 828.1, 828.1, 0.0);

(531750.0, 4416250.0, 917.4, 917.4, 0.0); (532250.0, 4416250.0, 973.9, 973.9, 0.0);

(532750.0, 4416250.0, 1013.3, 1013.3, 0.0); (533250.0, 4416250.0, 983.8, 983.8, 0.0);

(533750.0, 4416250.0, 882.2, 882.2, 0.0); (534250.0, 4416250.0, 768.6, 768.6, 0.0);

(534750.0, 4416250.0, 686.1, 686.1, 0.0); (535250.0, 4416250.0, 666.5, 666.5, 0.0);

(535750.0, 4416250.0, 667.0, 667.0, 0.0); (536250.0, 4416250.0, 693.8, 693.8, 0.0);

(536750.0, 4416250.0, 723.7, 723.7, 0.0); (537250.0, 4416250.0, 797.8, 797.8, 0.0);

(537750.0, 4416250.0, 838.5, 838.5, 0.0); (538250.0, 4416250.0, 889.3, 889.3, 0.0);

(538750.0, 4416250.0, 918.8, 918.8, 0.0); (539250.0, 4416250.0, 995.0, 995.0, 0.0);

(539750.0, 4416250.0, 1008.9, 1008.9, 0.0); (540250.0, 4416250.0, 1039.1, 1039.1, 0.0);

(540750.0, 4416250.0, 944.4, 944.4, 0.0); (541250.0, 4416250.0, 962.1, 962.1, 0.0);

(541750.0, 4416250.0, 929.0, 929.0, 0.0); (542250.0, 4416250.0, 911.1, 911.1, 0.0);

(542750.0, 4416250.0, 1035.1, 1035.1, 0.0); (526750.0, 4416750.0, 805.9, 805.9, 0.0);

(527250.0, 4416750.0, 792.9, 792.9, 0.0); (527750.0, 4416750.0, 777.3, 777.3, 0.0);

(528250.0, 4416750.0, 759.0, 759.0, 0.0); (528750.0, 4416750.0, 741.0, 741.0, 0.0);

(529250.0, 4416750.0, 730.2, 730.2, 0.0); (529750.0, 4416750.0, 733.3, 733.3, 0.0);

(530250.0, 4416750.0, 711.1, 711.1, 0.0); (530750.0, 4416750.0, 758.4, 758.4, 0.0);

(531250.0, 4416750.0, 870.0, 870.0, 0.0); (531750.0, 4416750.0, 886.3, 886.3, 0.0);

(532250.0, 4416750.0, 922.7, 922.7, 0.0); (532750.0, 4416750.0, 994.4, 994.4, 0.0);

(533250.0, 4416750.0, 886.3, 886.3, 0.0); (534250.0, 4416750.0, 811.3, 811.3, 0.0);

(534750.0, 4416750.0, 750.6, 750.6, 0.0); (535250.0, 4416750.0, 709.4, 709.4, 0.0);

(535750.0, 4416750.0, 677.9, 677.9, 0.0); (536250.0, 4416750.0, 668.3, 668.3, 0.0);

(536750.0, 4416750.0, 717.5, 717.5, 0.0); (537250.0, 4416750.0, 776.1, 776.1, 0.0);

(537750.0, 4416750.0, 828.7, 828.7, 0.0); (538250.0, 4416750.0, 872.3, 872.3, 0.0);

(538750.0, 4416750.0, 892.5, 892.5, 0.0); (539250.0, 4416750.0, 881.0, 881.0, 0.0);

(539750.0, 4416750.0, 945.1, 945.1, 0.0); (540250.0, 4416750.0, 1030.7, 1030.7, 0.0);

(540750.0, 4416750.0, 1013.9, 1013.9, 0.0); (541250.0, 4416750.0, 1017.7, 1017.7, 0.0);

(541750.0, 4416750.0, 979.7, 979.7, 0.0); (542250.0, 4416750.0, 965.0, 965.0, 0.0);

(542750.0, 4416750.0, 943.4, 943.4, 0.0); (526750.0, 4417250.0, 819.4, 819.4, 0.0);

(527250.0, 4417250.0, 787.5, 787.5, 0.0); (527750.0, 4417250.0, 760.8, 760.8, 0.0);

(528250.0, 4417250.0, 746.7, 746.7, 0.0); (528750.0, 4417250.0, 731.5, 731.5, 0.0);

(529250.0, 4417250.0, 727.0, 727.0, 0.0); (529750.0, 4417250.0, 713.7, 713.7, 0.0);

(530250.0, 4417250.0, 705.5, 705.5, 0.0); (530750.0, 4417250.0, 726.7, 726.7, 0.0);

(531250.0, 4417250.0, 856.9, 856.9, 0.0); (531750.0, 4417250.0, 870.3, 870.3, 0.0);

(532250.0, 4417250.0, 916.2, 916.2, 0.0); (532750.0, 4417250.0, 959.6, 959.6, 0.0);

(533250.0, 4417250.0, 992.7, 992.7, 0.0); (533750.0, 4417250.0, 922.5, 922.5, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(534250.0, 4417250.0, 834.9, 834.9, 0.0); (534750.0, 4417250.0, 803.7, 803.7, 0.0);

(535250.0, 4417250.0, 683.7, 683.7, 0.0); (535750.0, 4417250.0, 666.9, 666.9, 0.0);

(536250.0, 4417250.0, 696.2, 696.2, 0.0); (536750.0, 4417250.0, 734.8, 734.8, 0.0);

(537250.0, 4417250.0, 744.8, 744.8, 0.0); (537750.0, 4417250.0, 815.1, 815.1, 0.0);

(538250.0, 4417250.0, 795.2, 795.2, 0.0); (538750.0, 4417250.0, 843.6, 843.6, 0.0);

(539250.0, 4417250.0, 830.4, 830.4, 0.0); (539750.0, 4417250.0, 866.6, 866.6, 0.0);

(540250.0, 4417250.0, 920.3, 920.3, 0.0); (540750.0, 4417250.0, 948.0, 948.0, 0.0);

(541250.0, 4417250.0, 1015.0, 1015.0, 0.0); (541750.0, 4417250.0, 1062.2, 1062.2, 0.0);

(542250.0, 4417250.0, 987.0, 987.0, 0.0); (542750.0, 4417250.0, 1046.7, 1046.7, 0.0);

(526750.0, 4417750.0, 846.1, 846.1, 0.0); (527250.0, 4417750.0, 801.3, 801.3, 0.0);

(527750.0, 4417750.0, 774.2, 774.2, 0.0); (528250.0, 4417750.0, 749.9, 749.9, 0.0);

(528750.0, 4417750.0, 728.3, 728.3, 0.0); (529250.0, 4417750.0, 716.6, 716.6, 0.0);

(529750.0, 4417750.0, 707.1, 707.1, 0.0); (530250.0, 4417750.0, 704.7, 704.7, 0.0);

(530750.0, 4417750.0, 713.4, 713.4, 0.0); (531250.0, 4417750.0, 758.1, 758.1, 0.0);

(531750.0, 4417750.0, 835.0, 835.0, 0.0); (532250.0, 4417750.0, 886.3, 886.3, 0.0);

(532750.0, 4417750.0, 927.4, 927.4, 0.0); (533250.0, 4417750.0, 965.0, 965.0, 0.0);

(533750.0, 4417750.0, 843.9, 843.9, 0.0); (534250.0, 4417750.0, 788.6, 788.6, 0.0);

(534750.0, 4417750.0, 728.3, 728.3, 0.0); (535250.0, 4417750.0, 666.6, 666.6, 0.0);

(535750.0, 4417750.0, 679.8, 679.8, 0.0); (536250.0, 4417750.0, 724.1, 724.1, 0.0);

(536750.0, 4417750.0, 725.4, 725.4, 0.0); (537250.0, 4417750.0, 725.2, 725.2, 0.0);

(537750.0, 4417750.0, 828.8, 828.8, 0.0); (538250.0, 4417750.0, 789.8, 789.8, 0.0);

(538750.0, 4417750.0, 781.6, 781.6, 0.0); (539250.0, 4417750.0, 804.2, 804.2, 0.0);

(539750.0, 4417750.0, 853.5, 853.5, 0.0); (540250.0, 4417750.0, 876.8, 876.8, 0.0);

(540750.0, 4417750.0, 903.5, 903.5, 0.0); (541250.0, 4417750.0, 978.7, 978.7, 0.0);

(541750.0, 4417750.0, 1073.5, 1073.5, 0.0); (542250.0, 4417750.0, 1012.4, 1012.4, 0.0);

(542750.0, 4417750.0, 1041.0, 1041.0, 0.0); (526750.0, 4418250.0, 911.1, 911.1, 0.0);

(527250.0, 4418250.0, 835.0, 835.0, 0.0); (527750.0, 4418250.0, 781.2, 781.2, 0.0);

(528250.0, 4418250.0, 757.2, 757.2, 0.0); (528750.0, 4418250.0, 734.1, 734.1, 0.0);

(529250.0, 4418250.0, 728.7, 728.7, 0.0); (529750.0, 4418250.0, 715.2, 715.2, 0.0);

(530250.0, 4418250.0, 708.0, 708.0, 0.0); (530750.0, 4418250.0, 702.1, 702.1, 0.0);

(531250.0, 4418250.0, 770.9, 770.9, 0.0); (531750.0, 4418250.0, 890.8, 890.8, 0.0);

(532250.0, 4418250.0, 824.0, 824.0, 0.0); (532750.0, 4418250.0, 839.4, 839.4, 0.0);

(533250.0, 4418250.0, 912.1, 912.1, 0.0); (534250.0, 4418250.0, 787.3, 787.3, 0.0);

(534750.0, 4418250.0, 749.4, 749.4, 0.0); (535250.0, 4418250.0, 708.6, 708.6, 0.0);

(535750.0, 4418250.0, 663.7, 663.7, 0.0); (536250.0, 4418250.0, 678.3, 678.3, 0.0);

(536750.0, 4418250.0, 687.2, 687.2, 0.0); (537250.0, 4418250.0, 731.7, 731.7, 0.0);

(537750.0, 4418250.0, 721.8, 721.8, 0.0); (538250.0, 4418250.0, 770.2, 770.2, 0.0);

(538750.0, 4418250.0, 766.5, 766.5, 0.0); (539250.0, 4418250.0, 806.1, 806.1, 0.0);

(539750.0, 4418250.0, 835.7, 835.7, 0.0); (540250.0, 4418250.0, 857.4, 857.4, 0.0);

(540750.0, 4418250.0, 881.1, 881.1, 0.0); (541250.0, 4418250.0, 938.0, 938.0, 0.0);

(541750.0, 4418250.0, 1052.1, 1052.1, 0.0); (542250.0, 4418250.0, 1084.5, 1084.5, 0.0);

(542750.0, 4418250.0, 1100.6, 1100.6, 0.0); (526750.0, 4418750.0, 892.2, 892.2, 0.0);

(527250.0, 4418750.0, 851.8, 851.8, 0.0); (527750.0, 4418750.0, 772.5, 772.5, 0.0);

(528250.0, 4418750.0, 743.1, 743.1, 0.0); (528750.0, 4418750.0, 727.4, 727.4, 0.0);

(529250.0, 4418750.0, 721.4, 721.4, 0.0); (529750.0, 4418750.0, 718.1, 718.1, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(530250.0, 4418750.0, 712.5, 712.5, 0.0); (530750.0, 4418750.0, 699.1, 699.1, 0.0);

(531250.0, 4418750.0, 705.0, 705.0, 0.0); (531750.0, 4418750.0, 793.0, 793.0, 0.0);

(532250.0, 4418750.0, 780.6, 780.6, 0.0); (532750.0, 4418750.0, 777.8, 777.8, 0.0);

(533250.0, 4418750.0, 877.2, 877.2, 0.0); (533750.0, 4418750.0, 796.7, 796.7, 0.0);

(534250.0, 4418750.0, 792.4, 792.4, 0.0); (534750.0, 4418750.0, 796.8, 796.8, 0.0);

(535250.0, 4418750.0, 737.4, 737.4, 0.0); (535750.0, 4418750.0, 717.8, 717.8, 0.0);

(536250.0, 4418750.0, 665.0, 665.0, 0.0); (536750.0, 4418750.0, 676.9, 676.9, 0.0);

(537250.0, 4418750.0, 700.3, 700.3, 0.0); (537750.0, 4418750.0, 755.1, 755.1, 0.0);

(538250.0, 4418750.0, 831.8, 831.8, 0.0); (538750.0, 4418750.0, 793.7, 793.7, 0.0);

(539250.0, 4418750.0, 804.9, 804.9, 0.0); (539750.0, 4418750.0, 831.3, 831.3, 0.0);

(540250.0, 4418750.0, 833.8, 833.8, 0.0); (540750.0, 4418750.0, 847.2, 847.2, 0.0);

(541250.0, 4418750.0, 892.4, 892.4, 0.0); (541750.0, 4418750.0, 954.0, 954.0, 0.0);

(542250.0, 4418750.0, 1100.0, 1100.0, 0.0); (542750.0, 4418750.0, 1007.3, 1007.3, 0.0);

(526750.0, 4419250.0, 892.1, 892.1, 0.0); (527250.0, 4419250.0, 836.6, 836.6, 0.0);

(527750.0, 4419250.0, 786.3, 786.3, 0.0); (528250.0, 4419250.0, 752.8, 752.8, 0.0);

(528750.0, 4419250.0, 729.0, 729.0, 0.0); (529250.0, 4419250.0, 726.2, 726.2, 0.0);

(529750.0, 4419250.0, 731.0, 731.0, 0.0); (530250.0, 4419250.0, 744.2, 744.2, 0.0);

(530750.0, 4419250.0, 713.0, 713.0, 0.0); (531250.0, 4419250.0, 697.5, 697.5, 0.0);

(531750.0, 4419250.0, 713.8, 713.8, 0.0); (532250.0, 4419250.0, 724.0, 724.0, 0.0);

(532750.0, 4419250.0, 761.4, 761.4, 0.0); (533250.0, 4419250.0, 785.3, 785.3, 0.0);

(533750.0, 4419250.0, 759.8, 759.8, 0.0); (534250.0, 4419250.0, 766.7, 766.7, 0.0);

(534750.0, 4419250.0, 815.9, 815.9, 0.0); (535250.0, 4419250.0, 816.3, 816.3, 0.0);

(535750.0, 4419250.0, 765.3, 765.3, 0.0); (536250.0, 4419250.0, 694.4, 694.4, 0.0);

(536750.0, 4419250.0, 671.2, 671.2, 0.0); (537250.0, 4419250.0, 695.1, 695.1, 0.0);

(537750.0, 4419250.0, 738.7, 738.7, 0.0); (538250.0, 4419250.0, 800.3, 800.3, 0.0);

(538750.0, 4419250.0, 776.6, 776.6, 0.0); (539250.0, 4419250.0, 805.1, 805.1, 0.0);

(539750.0, 4419250.0, 815.8, 815.8, 0.0); (540250.0, 4419250.0, 820.1, 820.1, 0.0);

(540750.0, 4419250.0, 842.9, 842.9, 0.0); (541250.0, 4419250.0, 923.4, 923.4, 0.0);

(541750.0, 4419250.0, 1005.7, 1005.7, 0.0); (542250.0, 4419250.0, 920.9, 920.9, 0.0);

(542750.0, 4419250.0, 973.8, 973.8, 0.0); (526750.0, 4419750.0, 923.4, 923.4, 0.0);

(527250.0, 4419750.0, 818.8, 818.8, 0.0); (527750.0, 4419750.0, 768.5, 768.5, 0.0);

(528250.0, 4419750.0, 741.9, 741.9, 0.0); (528750.0, 4419750.0, 735.6, 735.6, 0.0);

(529250.0, 4419750.0, 738.9, 738.9, 0.0); (529750.0, 4419750.0, 744.5, 744.5, 0.0);

(530250.0, 4419750.0, 764.8, 764.8, 0.0); (530750.0, 4419750.0, 739.6, 739.6, 0.0);

(531250.0, 4419750.0, 709.9, 709.9, 0.0); (531750.0, 4419750.0, 747.0, 747.0, 0.0);

(532250.0, 4419750.0, 726.0, 726.0, 0.0); (532750.0, 4419750.0, 690.7, 690.7, 0.0);

(533250.0, 4419750.0, 722.2, 722.2, 0.0); (533750.0, 4419750.0, 703.0, 703.0, 0.0);

(534250.0, 4419750.0, 741.6, 741.6, 0.0); (534750.0, 4419750.0, 828.6, 828.6, 0.0);

(535250.0, 4419750.0, 786.3, 786.3, 0.0); (535750.0, 4419750.0, 724.3, 724.3, 0.0);

(536250.0, 4419750.0, 672.5, 672.5, 0.0); (536750.0, 4419750.0, 668.7, 668.7, 0.0);

(537250.0, 4419750.0, 679.6, 679.6, 0.0); (537750.0, 4419750.0, 705.9, 705.9, 0.0);

(538250.0, 4419750.0, 746.7, 746.7, 0.0); (538750.0, 4419750.0, 750.7, 750.7, 0.0);

(539250.0, 4419750.0, 780.5, 780.5, 0.0); (539750.0, 4419750.0, 787.2, 787.2, 0.0);

(540250.0, 4419750.0, 801.7, 801.7, 0.0); (540750.0, 4419750.0, 837.7, 837.7, 0.0);

(541250.0, 4419750.0, 884.3, 884.3, 0.0); (541750.0, 4419750.0, 1042.6, 1042.6, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(542250.0, 4419750.0, 1033.1, 1033.1, 0.0); (542750.0, 4419750.0, 1062.5, 1062.5, 0.0);

(526750.0, 4420250.0, 863.5, 863.5, 0.0); (527250.0, 4420250.0, 803.9, 803.9, 0.0);

(527750.0, 4420250.0, 755.9, 755.9, 0.0); (528250.0, 4420250.0, 744.1, 744.1, 0.0);

(528750.0, 4420250.0, 743.4, 743.4, 0.0); (529250.0, 4420250.0, 747.6, 747.6, 0.0);

(529750.0, 4420250.0, 757.8, 757.8, 0.0); (530250.0, 4420250.0, 792.5, 792.5, 0.0);

(530750.0, 4420250.0, 776.2, 776.2, 0.0); (531250.0, 4420250.0, 730.1, 730.1, 0.0);

(531750.0, 4420250.0, 773.1, 773.1, 0.0); (532250.0, 4420250.0, 816.3, 816.3, 0.0);

(532750.0, 4420250.0, 760.3, 760.3, 0.0); (533250.0, 4420250.0, 683.2, 683.2, 0.0);

(533750.0, 4420250.0, 677.2, 677.2, 0.0); (534250.0, 4420250.0, 695.9, 695.9, 0.0);

(534750.0, 4420250.0, 807.3, 807.3, 0.0); (535250.0, 4420250.0, 713.8, 713.8, 0.0);

(535750.0, 4420250.0, 677.1, 677.1, 0.0); (536250.0, 4420250.0, 682.3, 682.3, 0.0);

(536750.0, 4420250.0, 688.6, 688.6, 0.0); (537250.0, 4420250.0, 688.9, 688.9, 0.0);

(537750.0, 4420250.0, 690.3, 690.3, 0.0); (538250.0, 4420250.0, 714.7, 714.7, 0.0);

(538750.0, 4420250.0, 746.1, 746.1, 0.0); (539250.0, 4420250.0, 766.0, 766.0, 0.0);

(539750.0, 4420250.0, 764.2, 764.2, 0.0); (540250.0, 4420250.0, 789.7, 789.7, 0.0);

(540750.0, 4420250.0, 815.2, 815.2, 0.0); (541250.0, 4420250.0, 872.7, 872.7, 0.0);

(541750.0, 4420250.0, 1005.7, 1005.7, 0.0); (542250.0, 4420250.0, 1110.6, 1110.6, 0.0);

(542750.0, 4420250.0, 1078.3, 1078.3, 0.0); (526750.0, 4420750.0, 855.1, 855.1, 0.0);

(527250.0, 4420750.0, 779.9, 779.9, 0.0); (527750.0, 4420750.0, 754.4, 754.4, 0.0);

(528250.0, 4420750.0, 752.5, 752.5, 0.0); (528750.0, 4420750.0, 757.7, 757.7, 0.0);

(529250.0, 4420750.0, 764.3, 764.3, 0.0); (529750.0, 4420750.0, 773.6, 773.6, 0.0);

(530250.0, 4420750.0, 813.1, 813.1, 0.0); (530750.0, 4420750.0, 787.2, 787.2, 0.0);

(531250.0, 4420750.0, 761.8, 761.8, 0.0); (531750.0, 4420750.0, 782.1, 782.1, 0.0);

(532250.0, 4420750.0, 809.6, 809.6, 0.0); (532750.0, 4420750.0, 734.5, 734.5, 0.0);

(533250.0, 4420750.0, 710.1, 710.1, 0.0); (533750.0, 4420750.0, 682.6, 682.6, 0.0);

(534250.0, 4420750.0, 670.7, 670.7, 0.0); (534750.0, 4420750.0, 779.4, 779.4, 0.0);

(535250.0, 4420750.0, 675.1, 675.1, 0.0); (535750.0, 4420750.0, 661.6, 661.6, 0.0);

(536250.0, 4420750.0, 690.3, 690.3, 0.0); (536750.0, 4420750.0, 713.1, 713.1, 0.0);

(537250.0, 4420750.0, 705.8, 705.8, 0.0); (537750.0, 4420750.0, 700.8, 700.8, 0.0);

(538250.0, 4420750.0, 719.7, 719.7, 0.0); (538750.0, 4420750.0, 789.5, 789.5, 0.0);

(539250.0, 4420750.0, 741.4, 741.4, 0.0); (539750.0, 4420750.0, 754.7, 754.7, 0.0);

(540250.0, 4420750.0, 769.5, 769.5, 0.0); (540750.0, 4420750.0, 801.0, 801.0, 0.0);

(541250.0, 4420750.0, 837.4, 837.4, 0.0); (541750.0, 4420750.0, 927.9, 927.9, 0.0);

(542250.0, 4420750.0, 1080.5, 1080.5, 0.0); (542750.0, 4420750.0, 1159.2, 1159.2, 0.0);

(526750.0, 4421250.0, 803.3, 803.3, 0.0); (527250.0, 4421250.0, 764.4, 764.4, 0.0);

(527750.0, 4421250.0, 761.2, 761.2, 0.0); (528250.0, 4421250.0, 768.9, 768.9, 0.0);

(528750.0, 4421250.0, 781.9, 781.9, 0.0); (529250.0, 4421250.0, 786.1, 786.1, 0.0);

(529750.0, 4421250.0, 792.4, 792.4, 0.0); (530250.0, 4421250.0, 822.4, 822.4, 0.0);

(530750.0, 4421250.0, 810.4, 810.4, 0.0); (531250.0, 4421250.0, 778.1, 778.1, 0.0);

(531750.0, 4421250.0, 787.5, 787.5, 0.0); (532250.0, 4421250.0, 863.6, 863.6, 0.0);

(532750.0, 4421250.0, 793.0, 793.0, 0.0); (533250.0, 4421250.0, 735.9, 735.9, 0.0);

(533750.0, 4421250.0, 706.8, 706.8, 0.0); (534250.0, 4421250.0, 685.3, 685.3, 0.0);

(534750.0, 4421250.0, 670.4, 670.4, 0.0); (535250.0, 4421250.0, 663.5, 663.5, 0.0);

(535750.0, 4421250.0, 679.3, 679.3, 0.0); (536250.0, 4421250.0, 748.2, 748.2, 0.0);

(536750.0, 4421250.0, 751.8, 751.8, 0.0); (537250.0, 4421250.0, 726.4, 726.4, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(537750.0, 4421250.0, 721.0, 721.0, 0.0); (538250.0, 4421250.0, 713.5, 713.5, 0.0);

(538750.0, 4421250.0, 716.4, 716.4, 0.0); (539250.0, 4421250.0, 730.5, 730.5, 0.0);

(539750.0, 4421250.0, 737.8, 737.8, 0.0); (540250.0, 4421250.0, 743.0, 743.0, 0.0);

(540750.0, 4421250.0, 769.5, 769.5, 0.0); (541250.0, 4421250.0, 799.4, 799.4, 0.0);

(541750.0, 4421250.0, 840.6, 840.6, 0.0); (542250.0, 4421250.0, 910.0, 910.0, 0.0);

(542750.0, 4421250.0, 997.9, 997.9, 0.0); (526750.0, 4421750.0, 798.8, 798.8, 0.0);

(527250.0, 4421750.0, 773.9, 773.9, 0.0); (527750.0, 4421750.0, 785.3, 785.3, 0.0);

(528250.0, 4421750.0, 790.6, 790.6, 0.0); (528750.0, 4421750.0, 806.0, 806.0, 0.0);

(529250.0, 4421750.0, 810.5, 810.5, 0.0); (529750.0, 4421750.0, 811.3, 811.3, 0.0);

(530250.0, 4421750.0, 845.8, 845.8, 0.0); (530750.0, 4421750.0, 861.1, 861.1, 0.0);

(531250.0, 4421750.0, 831.8, 831.8, 0.0); (531750.0, 4421750.0, 806.1, 806.1, 0.0);

(532250.0, 4421750.0, 846.7, 846.7, 0.0); (532750.0, 4421750.0, 827.9, 827.9, 0.0);

(533250.0, 4421750.0, 752.2, 752.2, 0.0); (533750.0, 4421750.0, 723.8, 723.8, 0.0);

(534250.0, 4421750.0, 715.1, 715.1, 0.0); (534750.0, 4421750.0, 697.9, 697.9, 0.0);

(535250.0, 4421750.0, 694.4, 694.4, 0.0); (535750.0, 4421750.0, 669.1, 669.1, 0.0);

(536250.0, 4421750.0, 756.2, 756.2, 0.0); (536750.0, 4421750.0, 788.7, 788.7, 0.0);

(537250.0, 4421750.0, 751.9, 751.9, 0.0); (537750.0, 4421750.0, 742.5, 742.5, 0.0);

(538250.0, 4421750.0, 741.8, 741.8, 0.0); (538750.0, 4421750.0, 740.9, 740.9, 0.0);

(539250.0, 4421750.0, 769.5, 769.5, 0.0); (539750.0, 4421750.0, 760.2, 760.2, 0.0);

(540250.0, 4421750.0, 764.1, 764.1, 0.0); (540750.0, 4421750.0, 769.2, 769.2, 0.0);

(541250.0, 4421750.0, 772.9, 772.9, 0.0); (541750.0, 4421750.0, 796.5, 796.5, 0.0);

(542250.0, 4421750.0, 849.1, 849.1, 0.0); (542750.0, 4421750.0, 925.7, 925.7, 0.0);

(526750.0, 4422250.0, 794.5, 794.5, 0.0); (527250.0, 4422250.0, 808.4, 808.4, 0.0);

(527750.0, 4422250.0, 807.3, 807.3, 0.0); (528250.0, 4422250.0, 808.5, 808.5, 0.0);

(528750.0, 4422250.0, 830.6, 830.6, 0.0); (529250.0, 4422250.0, 839.4, 839.4, 0.0);

(529750.0, 4422250.0, 826.9, 826.9, 0.0); (530250.0, 4422250.0, 863.2, 863.2, 0.0);

(530750.0, 4422250.0, 925.3, 925.3, 0.0); (531250.0, 4422250.0, 898.6, 898.6, 0.0);

(531750.0, 4422250.0, 836.0, 836.0, 0.0); (532250.0, 4422250.0, 842.5, 842.5, 0.0);

(532750.0, 4422250.0, 840.8, 840.8, 0.0); (533250.0, 4422250.0, 779.8, 779.8, 0.0);

(533750.0, 4422250.0, 749.0, 749.0, 0.0); (534250.0, 4422250.0, 759.1, 759.1, 0.0);

(534750.0, 4422250.0, 703.1, 703.1, 0.0); (535250.0, 4422250.0, 665.1, 665.1, 0.0);

(535750.0, 4422250.0, 658.2, 658.2, 0.0); (536250.0, 4422250.0, 676.3, 676.3, 0.0);

(536750.0, 4422250.0, 730.6, 730.6, 0.0); (537250.0, 4422250.0, 744.6, 744.6, 0.0);

(537750.0, 4422250.0, 763.7, 763.7, 0.0); (538250.0, 4422250.0, 784.4, 784.4, 0.0);

(538750.0, 4422250.0, 762.5, 762.5, 0.0); (539250.0, 4422250.0, 788.8, 788.8, 0.0);

(539750.0, 4422250.0, 787.2, 787.2, 0.0); (540250.0, 4422250.0, 779.9, 779.9, 0.0);

(540750.0, 4422250.0, 784.3, 784.3, 0.0); (541250.0, 4422250.0, 795.2, 795.2, 0.0);

(541750.0, 4422250.0, 789.3, 789.3, 0.0); (542250.0, 4422250.0, 813.0, 813.0, 0.0);

(542750.0, 4422250.0, 850.6, 850.6, 0.0); (526750.0, 4422750.0, 910.9, 910.9, 0.0);

(527250.0, 4422750.0, 880.6, 880.6, 0.0); (527750.0, 4422750.0, 852.6, 852.6, 0.0);

(528250.0, 4422750.0, 847.5, 847.5, 0.0); (528750.0, 4422750.0, 842.3, 842.3, 0.0);

(529250.0, 4422750.0, 870.1, 870.1, 0.0); (529750.0, 4422750.0, 856.0, 856.0, 0.0);

(530250.0, 4422750.0, 885.7, 885.7, 0.0); (530750.0, 4422750.0, 970.7, 970.7, 0.0);

(531250.0, 4422750.0, 915.6, 915.6, 0.0); (531750.0, 4422750.0, 895.1, 895.1, 0.0);

(532250.0, 4422750.0, 870.2, 870.2, 0.0); (532750.0, 4422750.0, 887.3, 887.3, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(533250.0, 4422750.0, 810.9, 810.9, 0.0); (533750.0, 4422750.0, 773.2, 773.2, 0.0);

(534250.0, 4422750.0, 763.3, 763.3, 0.0); (534750.0, 4422750.0, 712.2, 712.2, 0.0);

(535250.0, 4422750.0, 682.9, 682.9, 0.0); (535750.0, 4422750.0, 674.8, 674.8, 0.0);

(536250.0, 4422750.0, 656.3, 656.3, 0.0); (536750.0, 4422750.0, 677.6, 677.6, 0.0);

(537250.0, 4422750.0, 702.2, 702.2, 0.0); (537750.0, 4422750.0, 778.2, 778.2, 0.0);

(538250.0, 4422750.0, 825.9, 825.9, 0.0); (538750.0, 4422750.0, 798.3, 798.3, 0.0);

(539250.0, 4422750.0, 813.7, 813.7, 0.0); (539750.0, 4422750.0, 818.3, 818.3, 0.0);

(540250.0, 4422750.0, 814.4, 814.4, 0.0); (540750.0, 4422750.0, 803.0, 803.0, 0.0);

(541250.0, 4422750.0, 819.2, 819.2, 0.0); (541750.0, 4422750.0, 814.7, 814.7, 0.0);

(542250.0, 4422750.0, 806.6, 806.6, 0.0); (542750.0, 4422750.0, 831.8, 831.8, 0.0);

(526750.0, 4423250.0, 964.5, 964.5, 0.0); (527250.0, 4423250.0, 940.6, 940.6, 0.0);

(527750.0, 4423250.0, 888.7, 888.7, 0.0); (528250.0, 4423250.0, 928.9, 928.9, 0.0);

(528750.0, 4423250.0, 900.5, 900.5, 0.0); (529250.0, 4423250.0, 903.1, 903.1, 0.0);

(529750.0, 4423250.0, 874.9, 874.9, 0.0); (530250.0, 4423250.0, 891.0, 891.0, 0.0);

(530750.0, 4423250.0, 1000.4, 1000.4, 0.0); (531250.0, 4423250.0, 999.9, 999.9, 0.0);

(531750.0, 4423250.0, 973.6, 973.6, 0.0); (532250.0, 4423250.0, 899.3, 899.3, 0.0);

(532750.0, 4423250.0, 917.6, 917.6, 0.0); (533250.0, 4423250.0, 846.2, 846.2, 0.0);

(533750.0, 4423250.0, 780.3, 780.3, 0.0); (534250.0, 4423250.0, 754.9, 754.9, 0.0);

(534750.0, 4423250.0, 723.0, 723.0, 0.0); (535250.0, 4423250.0, 706.0, 706.0, 0.0);

(535750.0, 4423250.0, 759.8, 759.8, 0.0); (536250.0, 4423250.0, 682.5, 682.5, 0.0);

(536750.0, 4423250.0, 655.7, 655.7, 0.0); (537250.0, 4423250.0, 694.1, 694.1, 0.0);

(537750.0, 4423250.0, 775.2, 775.2, 0.0); (538250.0, 4423250.0, 882.6, 882.6, 0.0);

(538750.0, 4423250.0, 855.8, 855.8, 0.0); (539250.0, 4423250.0, 853.0, 853.0, 0.0);

(539750.0, 4423250.0, 836.5, 836.5, 0.0); (540250.0, 4423250.0, 882.8, 882.8, 0.0);

(540750.0, 4423250.0, 838.5, 838.5, 0.0); (541250.0, 4423250.0, 838.3, 838.3, 0.0);

(541750.0, 4423250.0, 840.9, 840.9, 0.0); (542250.0, 4423250.0, 833.6, 833.6, 0.0);

(542750.0, 4423250.0, 822.5, 822.5, 0.0); (526750.0, 4423750.0, 1019.8, 1019.8, 0.0);

(527250.0, 4423750.0, 866.0, 866.0, 0.0); (527750.0, 4423750.0, 948.8, 948.8, 0.0);

(528250.0, 4423750.0, 992.2, 992.2, 0.0); (528750.0, 4423750.0, 955.1, 955.1, 0.0);

(529250.0, 4423750.0, 938.8, 938.8, 0.0); (529750.0, 4423750.0, 891.7, 891.7, 0.0);

(530250.0, 4423750.0, 892.8, 892.8, 0.0); (530750.0, 4423750.0, 1004.5, 1004.5, 0.0);

(531250.0, 4423750.0, 1048.5, 1048.5, 0.0); (531750.0, 4423750.0, 1017.1, 1017.1, 0.0);

(532250.0, 4423750.0, 933.6, 933.6, 0.0); (532750.0, 4423750.0, 943.8, 943.8, 0.0);

(533250.0, 4423750.0, 897.4, 897.4, 0.0); (533750.0, 4423750.0, 821.5, 821.5, 0.0);

(534250.0, 4423750.0, 778.1, 778.1, 0.0); (534750.0, 4423750.0, 760.8, 760.8, 0.0);

(535250.0, 4423750.0, 734.5, 734.5, 0.0); (535750.0, 4423750.0, 748.8, 748.8, 0.0);

(536250.0, 4423750.0, 745.1, 745.1, 0.0); (536750.0, 4423750.0, 683.9, 683.9, 0.0);

(537250.0, 4423750.0, 660.2, 660.2, 0.0); (537750.0, 4423750.0, 752.8, 752.8, 0.0);

(538250.0, 4423750.0, 811.7, 811.7, 0.0); (538750.0, 4423750.0, 821.2, 821.2, 0.0);

(539250.0, 4423750.0, 796.9, 796.9, 0.0); (539750.0, 4423750.0, 799.5, 799.5, 0.0);

(540250.0, 4423750.0, 844.9, 844.9, 0.0); (540750.0, 4423750.0, 859.8, 859.8, 0.0);

(541250.0, 4423750.0, 890.3, 890.3, 0.0); (541750.0, 4423750.0, 867.5, 867.5, 0.0);

(542250.0, 4423750.0, 861.3, 861.3, 0.0); (542750.0, 4423750.0, 849.5, 849.5, 0.0);

(526750.0, 4424250.0, 995.8, 995.8, 0.0); (527250.0, 4424250.0, 1035.8, 1035.8, 0.0);

(527750.0, 4424250.0, 1026.6, 1026.6, 0.0); (528250.0, 4424250.0, 1068.6, 1068.6, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(528750.0, 4424250.0, 978.3, 978.3, 0.0); (529250.0, 4424250.0, 959.1, 959.1, 0.0);

(529750.0, 4424250.0, 929.9, 929.9, 0.0); (530250.0, 4424250.0, 915.9, 915.9, 0.0);

(530750.0, 4424250.0, 986.6, 986.6, 0.0); (531250.0, 4424250.0, 1066.0, 1066.0, 0.0);

(531750.0, 4424250.0, 1029.4, 1029.4, 0.0); (532250.0, 4424250.0, 977.1, 977.1, 0.0);

(532750.0, 4424250.0, 977.2, 977.2, 0.0); (533250.0, 4424250.0, 942.0, 942.0, 0.0);

(533750.0, 4424250.0, 840.8, 840.8, 0.0); (534250.0, 4424250.0, 797.3, 797.3, 0.0);

(534750.0, 4424250.0, 773.8, 773.8, 0.0); (535250.0, 4424250.0, 782.8, 782.8, 0.0);

(535750.0, 4424250.0, 759.1, 759.1, 0.0); (536250.0, 4424250.0, 697.7, 697.7, 0.0);

(536750.0, 4424250.0, 669.5, 669.5, 0.0); (537250.0, 4424250.0, 658.1, 658.1, 0.0);

(537750.0, 4424250.0, 793.5, 793.5, 0.0); (538250.0, 4424250.0, 796.2, 796.2, 0.0);

(538750.0, 4424250.0, 789.6, 789.6, 0.0); (539250.0, 4424250.0, 759.9, 759.9, 0.0);

(539750.0, 4424250.0, 779.9, 779.9, 0.0); (540250.0, 4424250.0, 800.5, 800.5, 0.0);

(540750.0, 4424250.0, 831.5, 831.5, 0.0); (541250.0, 4424250.0, 911.2, 911.2, 0.0);

(541750.0, 4424250.0, 906.9, 906.9, 0.0); (542250.0, 4424250.0, 904.2, 904.2, 0.0);

(542750.0, 4424250.0, 878.4, 878.4, 0.0); (526750.0, 4424750.0, 1069.4, 1069.4, 0.0);

(527250.0, 4424750.0, 1046.9, 1046.9, 0.0); (527750.0, 4424750.0, 1091.7, 1091.7, 0.0);

(528250.0, 4424750.0, 1096.5, 1096.5, 0.0); (528750.0, 4424750.0, 1017.5, 1017.5, 0.0);

(529250.0, 4424750.0, 1024.6, 1024.6, 0.0); (529750.0, 4424750.0, 970.8, 970.8, 0.0);

(530250.0, 4424750.0, 988.1, 988.1, 0.0); (530750.0, 4424750.0, 973.4, 973.4, 0.0);

(531250.0, 4424750.0, 1060.1, 1060.1, 0.0); (531750.0, 4424750.0, 1076.6, 1076.6, 0.0);

(532250.0, 4424750.0, 1085.3, 1085.3, 0.0); (532750.0, 4424750.0, 1043.0, 1043.0, 0.0);

(533250.0, 4424750.0, 969.1, 969.1, 0.0); (533750.0, 4424750.0, 912.7, 912.7, 0.0);

(534250.0, 4424750.0, 821.4, 821.4, 0.0); (534750.0, 4424750.0, 819.9, 819.9, 0.0);

(535250.0, 4424750.0, 788.1, 788.1, 0.0); (535750.0, 4424750.0, 763.2, 763.2, 0.0);

(536250.0, 4424750.0, 687.1, 687.1, 0.0); (536750.0, 4424750.0, 662.8, 662.8, 0.0);

(537250.0, 4424750.0, 749.5, 749.5, 0.0); (537750.0, 4424750.0, 772.9, 772.9, 0.0);

(538250.0, 4424750.0, 744.7, 744.7, 0.0); (538750.0, 4424750.0, 736.1, 736.1, 0.0);

(539250.0, 4424750.0, 741.6, 741.6, 0.0); (539750.0, 4424750.0, 760.7, 760.7, 0.0);

(540250.0, 4424750.0, 781.8, 781.8, 0.0); (540750.0, 4424750.0, 817.1, 817.1, 0.0);

(541250.0, 4424750.0, 865.6, 865.6, 0.0); (541750.0, 4424750.0, 940.4, 940.4, 0.0);

(542250.0, 4424750.0, 973.8, 973.8, 0.0); (542750.0, 4424750.0, 917.9, 917.9, 0.0);

(526750.0, 4425250.0, 1140.4, 1140.4, 0.0); (527250.0, 4425250.0, 1095.0, 1095.0, 0.0);

(527750.0, 4425250.0, 1167.6, 1167.6, 0.0); (528250.0, 4425250.0, 1118.0, 1118.0, 0.0);

(528750.0, 4425250.0, 1063.0, 1063.0, 0.0); (529250.0, 4425250.0, 1082.6, 1082.6, 0.0);

(529750.0, 4425250.0, 1062.3, 1062.3, 0.0); (530250.0, 4425250.0, 1014.1, 1014.1, 0.0);

(530750.0, 4425250.0, 967.9, 967.9, 0.0); (531250.0, 4425250.0, 1063.4, 1063.4, 0.0);

(531750.0, 4425250.0, 1115.4, 1115.4, 0.0); (532250.0, 4425250.0, 1136.6, 1136.6, 0.0);

(532750.0, 4425250.0, 1117.2, 1117.2, 0.0); (533250.0, 4425250.0, 1036.1, 1036.1, 0.0);

(533750.0, 4425250.0, 934.3, 934.3, 0.0); (534250.0, 4425250.0, 857.1, 857.1, 0.0);

(534750.0, 4425250.0, 846.1, 846.1, 0.0); (535250.0, 4425250.0, 806.0, 806.0, 0.0);

(535750.0, 4425250.0, 817.1, 817.1, 0.0); (536250.0, 4425250.0, 713.0, 713.0, 0.0);

(536750.0, 4425250.0, 657.5, 657.5, 0.0); (537250.0, 4425250.0, 667.4, 667.4, 0.0);

(537750.0, 4425250.0, 669.3, 669.3, 0.0); (538250.0, 4425250.0, 708.8, 708.8, 0.0);

(538750.0, 4425250.0, 717.9, 717.9, 0.0); (539250.0, 4425250.0, 727.5, 727.5, 0.0);

(539750.0, 4425250.0, 764.7, 764.7, 0.0); (540250.0, 4425250.0, 825.7, 825.7, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** DISCRETE CARTESIAN RECEPTORS ***

(X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)

(METERS)

(540750.0, 4425250.0, 813.1, 813.1, 0.0); (541250.0, 4425250.0, 843.0, 843.0, 0.0);

(541750.0, 4425250.0, 892.3, 892.3, 0.0); (542250.0, 4425250.0, 955.9, 955.9, 0.0);

(542750.0, 4425250.0, 992.0, 992.0, 0.0); (528142.3, 4424000.1, 1039.8, 1426.0, 0.0);

(528641.5, 4421424.2, 788.4, 1426.0, 0.0); (530578.2, 4414421.8, 738.2, 1037.6, 0.0);

(533199.9, 4420647.0, 701.3, 1183.8, 0.0); (537336.4, 4419481.4, 694.8, 843.1, 0.0);

(538624.8, 4413866.5, 766.4, 1059.9, 0.0); (538699.0, 4411952.4, 726.0, 726.0, 0.0);

(539685.2, 4412636.4, 760.6, 760.6, 0.0); (540884.8, 4419539.6, 843.4, 1271.9, 0.0);

**MODELOPTs: RegDFAULT CONC ELEV

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

1 1 1

**MODELOPTs: RegDFAULT CONC ELEV

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: KKALE1.SFC Met Version: 12345

Profile file: KKALE1.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 17135 Upper air station no.: 17130

Name: KIRIKKALE Name: ANKARA

Year: 2012 Year: 2012

First 24 hours of scalar data

YR MO DY JDY HR H0 U* W* DT/DZ ZICNV ZIMCH M-O LEN Z0 BOWEN ALBEDO REF WS WD HT REF TA HT

- -

12 01 01 1 01 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 71. 10.0 272.5 2.0

12 01 01 1 02 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 198. 10.0 272.5 2.0

12 01 01 1 03 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 254. 10.0 272.5 2.0

12 01 01 1 04 -4.0 0.087 -9.000 -9.000 -999. 59. 13.6 1.00 1.10 1.00 1.00 203. 10.0 272.5 2.0

12 01 01 1 05 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 233. 10.0 272.5 2.0

12 01 01 1 06 -4.0 0.087 -9.000 -9.000 -999. 59. 13.6 1.00 1.10 1.00 1.00 232. 10.0 272.5 2.0

12 01 01 1 07 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 235. 10.0 273.1 2.0

12 01 01 1 08 -0.9 0.043 -9.000 -9.000 -999. 21. 7.3 1.00 1.10 0.47 0.50 93. 10.0 273.1 2.0

12 01 01 1 09 17.6 0.133 0.460 0.006 182. 112. -11.1 1.00 1.10 0.20 0.50 247. 10.0 273.1 2.0

12 01 01 1 10 52.4 0.153 0.748 0.005 264. 138. -5.7 1.00 1.10 0.10 0.50 161. 10.0 273.8 2.0

12 01 01 1 11 76.6 0.248 0.962 0.005 383. 283. -16.3 1.00 1.10 0.06 1.00 234. 10.0 273.8 2.0

12 01 01 1 12 88.0 0.164 1.205 0.005 656. 155. -4.1 1.00 1.10 0.05 0.50 196. 10.0 273.8 2.0

12 01 01 1 13 85.7 0.251 1.227 0.005 711. 289. -15.2 1.00 1.10 0.05 1.00 203. 10.0 274.2 2.0

12 01 01 1 14 69.9 0.245 1.169 0.005 755. 279. -17.3 1.00 1.10 0.07 1.00 199. 10.0 274.2 2.0

12 01 01 1 15 41.6 0.231 0.995 0.005 781. 255. -24.5 1.00 1.10 0.12 1.00 202. 10.0 274.2 2.0

12 01 01 1 16 4.9 0.192 0.489 0.005 784. 193. -118.6 1.00 1.10 0.26 1.00 204. 10.0 274.2 2.0

12 01 01 1 17 -4.0 0.087 -9.000 -9.000 -999. 64. 13.7 1.00 1.10 1.00 1.00 201. 10.0 273.8 2.0

12 01 01 1 18 -4.0 0.087 -9.000 -9.000 -999. 59. 13.7 1.00 1.10 1.00 1.00 197. 10.0 273.8 2.0

12 01 01 1 19 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 204. 10.0 273.8 2.0

12 01 01 1 20 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 137. 10.0 274.2 2.0

12 01 01 1 21 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 90. 10.0 274.2 2.0

12 01 01 1 22 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 292. 10.0 274.9 2.0

12 01 01 1 23 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 50. 10.0 274.9 2.0

12 01 01 1 24 -8.9 0.130 -9.000 -9.000 -999. 108. 20.6 1.00 1.10 1.00 1.50 50. 10.0 275.9 2.0

First hour of profile data

YR MO DY HR HEIGHT F WDIR WSPD AMB_TMP sigmaA sigmaW sigmaV

12 01 01 01 10.0 1 71. 0.50 272.6 99.0 -99.00 -99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M) Y-COORD (M) CONC (YYMMDDHH) X-COORD (M) Y-COORD (M) CONC (YYMMDDHH)

526750.00 4409250.00 7.56888 (12071008) 527250.00 4409250.00 19.39449 (12091808)

527750.00 4409250.00 21.52604 (12110608) 528250.00 4409250.00 52.26286 (12110608)

528750.00 4409250.00 29.57037 (12112308) 529250.00 4409250.00 18.49655 (12050908)

529750.00 4409250.00 10.12764 (12050908) 530250.00 4409250.00 9.91634 (12050908)

530750.00 4409250.00 9.45101 (12101808) 531250.00 4409250.00 8.13224 (12101808)

531750.00 4409250.00 21.83802 (12061424) 532250.00 4409250.00 28.21482 (12091608)

532750.00 4409250.00 22.47419 (12093008) 533250.00 4409250.00 25.31858 (12101724)

533750.00 4409250.00 22.00230 (12033124) 534250.00 4409250.00 25.14018 (12101724)

534750.00 4409250.00 33.26057 (12081124) 535250.00 4409250.00 23.39527m (12072024)

535750.00 4409250.00 4.40331 (12022924) 536250.00 4409250.00 5.39896 (12021724)

536750.00 4409250.00 6.79582 (12021724) 537250.00 4409250.00 6.50623 (12021724)

537750.00 4409250.00 4.96623 (12021724) 538250.00 4409250.00 3.73951 (12122116)

538750.00 4409250.00 4.05110 (12122116) 539250.00 4409250.00 4.22206 (12122116)

539750.00 4409250.00 4.25758 (12122116) 540250.00 4409250.00 4.22642 (12122116)

540750.00 4409250.00 4.17069 (12122116) 541250.00 4409250.00 4.05061 (12122116)

541750.00 4409250.00 3.94456 (12122116) 542250.00 4409250.00 3.86976 (12122116)

542750.00 4409250.00 3.81148 (12122116) 526750.00 4409750.00 16.95295 (12043008)

527250.00 4409750.00 13.16821 (12052224) 527750.00 4409750.00 7.06497 (12110824)

528250.00 4409750.00 64.51140 (12110608) 528750.00 4409750.00 50.27331 (12110608)

529250.00 4409750.00 21.67799 (12100324) 529750.00 4409750.00 12.34396 (12120608)

530250.00 4409750.00 15.75149 (12050908) 530750.00 4409750.00 9.37139 (12101808)

531250.00 4409750.00 3.66034 (12101808) 531750.00 4409750.00 8.00386 (12061424)

532250.00 4409750.00 49.18444 (12061424) 532750.00 4409750.00 65.00856 (12091608)

533250.00 4409750.00 41.46879 (12091608) 533750.00 4409750.00 17.74832 (12101724)

534250.00 4409750.00 32.03598 (12101724) 534750.00 4409750.00 37.23403 (12081124)

535250.00 4409750.00 17.10747m (12072024) 535750.00 4409750.00 4.49139 (12022924)

536250.00 4409750.00 6.72718 (12021724) 536750.00 4409750.00 7.66026 (12021724)

537250.00 4409750.00 6.69107 (12021724) 537750.00 4409750.00 4.58640 (12021724)

538250.00 4409750.00 4.17604 (12122116) 538750.00 4409750.00 4.43400 (12122116)

539250.00 4409750.00 4.51616 (12122116) 539750.00 4409750.00 4.50120 (12122116)

540250.00	4409750.00	4.44103 (12122116)	540750.00	4409750.00	4.35251 (12122116)
541250.00	4409750.00	4.20845 (12122116)	541750.00	4409750.00	4.08498 (12122116)
542250.00	4409750.00	4.04171 (12122116)	542750.00	4409750.00	3.99171 (12122116)
526750.00	4410250.00	14.61423 (12100324)	527250.00	4410250.00	25.86949 (12081208)
527750.00	4410250.00	5.75507 (12082224)	528250.00	4410250.00	7.33292 (12110824)
528750.00	4410250.00	32.93491 (12110608)	529250.00	4410250.00	58.26951 (12110608)
529750.00	4410250.00	30.55912 (12100324)	530250.00	4410250.00	23.41555 (12050908)
530750.00	4410250.00	13.12325 (12050908)	531250.00	4410250.00	10.26516 (12101808)
531750.00	4410250.00	3.33149 (12112216)	532250.00	4410250.00	10.36745 (12061424)
532750.00	4410250.00	56.82545 (12091608)	533250.00	4410250.00	46.17123 (12111808)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
533750.00	4410250.00	20.08492 (12101724)	534250.00	4410250.00	34.23752 (12101724)
534750.00	4410250.00	12.40826 (12081124)	535250.00	4410250.00	9.03130 (12022924)
535750.00	4410250.00	5.20366 (12021724)	536250.00	4410250.00	8.34352 (12021724)
536750.00	4410250.00	8.68175 (12021724)	537250.00	4410250.00	6.56169 (12021724)
537750.00	4410250.00	4.27369 (12122116)	538250.00	4410250.00	4.63466 (12122116)

538750.00 4410250.00 4.77201 (12122116) 539250.00 4410250.00 4.80920 (12122116)

539750.00 4410250.00 4.76326 (12122116) 540250.00 4410250.00 4.67271 (12122116)

540750.00 4410250.00 4.55717 (12122116) 541250.00 4410250.00 4.41762 (12122116)

541750.00 4410250.00 4.29403 (12122116) 542250.00 4410250.00 4.23889 (12122116)

542750.00 4410250.00 4.24007 (12122116) 526750.00 4410750.00 14.37199 (12120908)

527250.00 4410750.00 18.62055 (12120608) 527750.00 4410750.00 10.53455 (12043008)

528250.00 4410750.00 21.15492 (12052224) 528750.00 4410750.00 7.49665 (12110824)

529250.00 4410750.00 62.74057 (12110608) 529750.00 4410750.00 75.08201 (12110608)

530250.00 4410750.00 33.81221 (12100324) 530750.00 4410750.00 24.16474 (12050908)

531250.00 4410750.00 10.39876 (12050908) 531750.00 4410750.00 6.44444 (12101808)

532250.00 4410750.00 6.21457 (12061424) 532750.00 4410750.00 12.13529 (12061424)

533250.00 4410750.00 9.40746 (12111808) 533750.00 4410750.00 16.26856 (12111808)

534250.00 4410750.00 20.45249 (12101724) 534750.00 4410750.00 15.30465 (12081124)

535250.00 4410750.00 9.63375 (12022924) 535750.00 4410750.00 7.14652 (12021724)

536250.00 4410750.00 10.24677 (12021724) 536750.00 4410750.00 9.26327 (12021724)

537250.00 4410750.00 6.17950 (12021724) 537750.00 4410750.00 4.78013 (12122116)

538250.00 4410750.00 5.07306 (12122116) 538750.00 4410750.00 5.16793 (12122116)

539250.00 4410750.00 5.12293 (12122116) 539750.00 4410750.00 4.99652 (12122116)

540250.00 4410750.00 4.85154 (12122116) 540750.00 4410750.00 4.73242 (12122116)

541250.00 4410750.00 4.68331 (12122116) 541750.00 4410750.00 4.54971 (12122116)

542250.00 4410750.00 4.48642 (12122116) 542750.00 4410750.00 4.47582 (12122116)

526750.00 4411250.00 9.91330 (12010908) 527250.00 4411250.00 12.97973 (12010908)

527750.00 4411250.00 16.34100 (12090508) 528250.00 4411250.00 6.25496 (12081208)

528750.00 4411250.00 6.29158 (12010516) 529250.00 4411250.00 12.91570 (12052224)

529750.00 4411250.00 52.88611 (12091808) 530250.00 4411250.00 94.73035 (12110608)

530750.00 4411250.00 38.94436 (12100324) 531250.00 4411250.00 26.24340 (12050908)

531750.00 4411250.00 9.40901 (12050908) 532250.00 4411250.00 3.82117 (12112216)

532750.00 4411250.00 6.05372 (12062724) 533250.00 4411250.00 8.25228 (12062724)

533750.00 4411250.00 7.00120 (12062724) 534250.00 4411250.00 7.23434 (12022924)

534750.00 4411250.00 13.46602 (12022924) 535250.00 4411250.00 10.21299 (12022924)

535750.00 4411250.00 9.66018 (12021724) 536250.00 4411250.00 12.33996 (12021724)

536750.00 4411250.00 9.04588 (12021724) 537250.00 4411250.00 5.51173 (12021724)

537750.00 4411250.00 5.35224 (12122116) 538250.00 4411250.00 5.53197 (12122116)

538750.00 4411250.00 5.52087 (12122116) 539250.00 4411250.00 5.39686 (12122116)

539750.00 4411250.00 5.26200 (12122116) 540250.00 4411250.00 5.08531 (12122116)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
540750.00	4411250.00	4.94249	(12122116)	541250.00	4411250.00	4.94584	(12122116)
541750.00	4411250.00	4.83256	(12122116)	542250.00	4411250.00	4.74110	(12122116)
542750.00	4411250.00	4.66026	(12122116)	526750.00	4411750.00	21.96692	(12050908)
527250.00	4411750.00	23.95586	(12032008)	527750.00	4411750.00	21.22405	(12050908)
528250.00	4411750.00	9.76087	(12093008)	528750.00	4411750.00	6.36498	(12111616)
529250.00	4411750.00	6.59697	(12111616)	529750.00	4411750.00	9.40585	(12052224)
530250.00	4411750.00	83.72907	(12091808)	530750.00	4411750.00	54.83529	(12100324)
531250.00	4411750.00	43.16677	(12100324)	531750.00	4411750.00	28.14845	(12050908)
532250.00	4411750.00	5.71453	(12101808)	532750.00	4411750.00	4.55154	(12062724)
533250.00	4411750.00	8.84528	(12062724)	533750.00	4411750.00	7.79472	(12062724)
534250.00	4411750.00	7.32045	(12022924)	534750.00	4411750.00	14.48204	(12022924)

535250.00	4411750.00	10.51270 (12022924)	535750.00	4411750.00	12.97589 (12021724)
536250.00	4411750.00	13.39313 (12021724)	536750.00	4411750.00	8.77165 (12021724)
537250.00	4411750.00	5.60517 (12122116)	537750.00	4411750.00	5.91452 (12122116)
538250.00	4411750.00	5.95661 (12122116)	538750.00	4411750.00	5.85988 (12122116)
539250.00	4411750.00	5.69538 (12122116)	539750.00	4411750.00	5.58078 (12122116)
540250.00	4411750.00	5.41455 (12122116)	540750.00	4411750.00	5.25697 (12122116)
541250.00	4411750.00	5.19464 (12122116)	541750.00	4411750.00	5.05705 (12122116)
542250.00	4411750.00	4.88590 (12122116)	542750.00	4411750.00	4.73601 (12122116)
526750.00	4412250.00	54.02807 (12102624)	527250.00	4412250.00	35.89837 (12102008)
527750.00	4412250.00	37.52871 (12012624)	528250.00	4412250.00	59.23809 (12111508)
528750.00	4412250.00	35.37210 (12111508)	529250.00	4412250.00	7.08419 (12122616)
529750.00	4412250.00	6.96154 (12122616)	530250.00	4412250.00	22.71958 (12043008)
530750.00	4412250.00	82.74532 (12091808)	531250.00	4412250.00	60.96436 (12100324)
531750.00	4412250.00	50.97337 (12100324)	532250.00	4412250.00	15.89728 (12072508)
532750.00	4412250.00	4.57180 (12111616)	533250.00	4412250.00	7.98713 (12062724)
533750.00	4412250.00	10.42214 (12062724)	534250.00	4412250.00	6.40213 (12063024)
534750.00	4412250.00	15.92323 (12022924)	535250.00	4412250.00	10.39932 (12022924)
535750.00	4412250.00	17.00984 (12021724)	536250.00	4412250.00	14.18344 (12021724)
536750.00	4412250.00	6.70331 (12021724)	537250.00	4412250.00	6.26907 (12122116)
537750.00	4412250.00	6.40803 (12122116)	538250.00	4412250.00	6.27299 (12122116)
538750.00	4412250.00	6.18748 (12122116)	539250.00	4412250.00	6.01080 (12122116)
539750.00	4412250.00	5.87947 (12122116)	540250.00	4412250.00	5.69227 (12122116)
540750.00	4412250.00	10.69716 (12122124)	541250.00	4412250.00	5.31937 (12122116)
541750.00	4412250.00	5.08797 (12122116)	542250.00	4412250.00	6.49993 (12111824)
542750.00	4412250.00	6.69669 (12021808)	526750.00	4412750.00	78.74698 (12101708)
527250.00	4412750.00	63.06294 (12101708)	527750.00	4412750.00	90.73327 (12102624)
528250.00	4412750.00	72.49261 (12102624)	528750.00	4412750.00	66.86557 (12111508)
529250.00	4412750.00	66.88845 (12101624)	529750.00	4412750.00	8.03363 (12122616)
530250.00	4412750.00	7.92493 (12122616)	530750.00	4412750.00	32.25056 (12102208)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
531250.00	4412750.00	58.37687	(12100324)	531750.00	4412750.00	72.03930	(12100324)
532250.00	4412750.00	82.38722	(12110608)	532750.00	4412750.00	15.83643	(12050908)
533250.00	4412750.00	6.59242	(12022916)	533750.00	4412750.00	58.58772	(12061424)
534250.00	4412750.00	8.69692	(12110916)	534750.00	4412750.00	17.11507	(12022924)
535250.00	4412750.00	13.07575	(12021724)	535750.00	4412750.00	21.58122	(12021724)
536250.00	4412750.00	13.08103	(12021724)	536750.00	4412750.00	6.53110	(12122116)
537250.00	4412750.00	6.84352	(12122116)	537750.00	4412750.00	6.81953	(12122116)
538250.00	4412750.00	6.59631	(12122116)	538750.00	4412750.00	6.48100	(12122116)
539250.00	4412750.00	6.29285	(12122116)	539750.00	4412750.00	6.06002	(12122116)
540250.00	4412750.00	5.79799	(12122116)	540750.00	4412750.00	5.47442	(12122116)
541250.00	4412750.00	5.17547	(12122116)	541750.00	4412750.00	11.06769	(12021808)
542250.00	4412750.00	16.55613	(12021808)	542750.00	4412750.00	19.40269	(12081308)
526750.00	4413250.00	57.13203	(12032324)	527250.00	4413250.00	64.97649	(12032324)
527750.00	4413250.00	87.15401	(12032324)	528250.00	4413250.00	74.97610	(12032324)
528750.00	4413250.00	95.07310	(12102624)	529250.00	4413250.00	76.39452	(12102624)
529750.00	4413250.00	8.87131	(12122616)	530250.00	4413250.00	9.07800	(12122616)
530750.00	4413250.00	25.54867	(12030824)	531250.00	4413250.00	28.52081	(12032208)

531750.00	4413250.00	60.38275 (12100324)	532250.00	4413250.00	81.39610 (12100324)
532750.00	4413250.00	78.44522 (12100324)	533250.00	4413250.00	15.75911 (12050908)
533750.00	4413250.00	41.87528 (12061424)	534250.00	4413250.00	12.93656 (12022916)
534750.00	4413250.00	17.42686 (12022924)	535250.00	4413250.00	20.55337 (12021724)
535750.00	4413250.00	24.14446 (12021724)	536250.00	4413250.00	7.43169 (12021724)
536750.00	4413250.00	7.25014 (12122116)	537250.00	4413250.00	7.25254 (12122116)
537750.00	4413250.00	7.14522 (12122116)	538250.00	4413250.00	6.90245 (12122116)
538750.00	4413250.00	6.64550 (12122116)	539250.00	4413250.00	6.29522 (12122116)
539750.00	4413250.00	5.90503 (12122116)	540250.00	4413250.00	5.50060 (12122116)
540750.00	4413250.00	10.48316 (12081308)	541250.00	4413250.00	16.70693 (12081308)
541750.00	4413250.00	30.62724 (12081308)	542250.00	4413250.00	23.86869 (12081308)
542750.00	4413250.00	16.53829 (12081308)	526750.00	4413750.00	16.91489 (12032324)
527250.00	4413750.00	20.26594 (12032324)	527750.00	4413750.00	35.14668 (12032324)
528250.00	4413750.00	47.56135 (12120908)	528750.00	4413750.00	62.80721 (12120908)
529250.00	4413750.00	43.51745 (12061408)	529750.00	4413750.00	9.22934 (12122616)
530250.00	4413750.00	9.72017 (12122616)	530750.00	4413750.00	13.29678 (12061308)
531250.00	4413750.00	158.20759 (12101624)	531750.00	4413750.00	67.31635 (12012624)
532250.00	4413750.00	53.99790 (12120608)	532750.00	4413750.00	84.20688 (12100324)
533750.00	4413750.00	10.46098 (12083016)	534250.00	4413750.00	21.32254 (12022916)
534750.00	4413750.00	15.19535 (12082916)	535250.00	4413750.00	32.05726 (12021724)
535750.00	4413750.00	19.04698 (12021724)	536250.00	4413750.00	7.20137 (12122116)
536750.00	4413750.00	7.77098 (12122116)	537250.00	4413750.00	7.53592 (12122116)
537750.00	4413750.00	7.26861 (12122116)	538250.00	4413750.00	6.84543 (12122116)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
538750.00	4413750.00	6.39296 (12121116)	539250.00	4413750.00	6.61525 (12081308)
539750.00	4413750.00	9.15210 (12081308)	540250.00	4413750.00	10.67179 (12081308)
540750.00	4413750.00	20.65639 (12081308)	541250.00	4413750.00	14.33729 (12081308)
541750.00	4413750.00	7.15502 (12012724)	542250.00	4413750.00	6.24502 (12110224)
542750.00	4413750.00	4.47714 (12110224)	526750.00	4414250.00	21.34786 (12112724)
527250.00	4414250.00	17.47867 (12112724)	527750.00	4414250.00	6.90835 (12112724)
528250.00	4414250.00	12.38852 (12112724)	528750.00	4414250.00	14.52529 (12120908)
529250.00	4414250.00	19.73742 (12032324)	529750.00	4414250.00	8.86283 (12122616)
530250.00	4414250.00	9.55168 (12122616)	530750.00	4414250.00	10.12741 (12122616)
531250.00	4414250.00	144.11262 (12032324)	531750.00	4414250.00	121.10886 (12120908)
532250.00	4414250.00	78.80076 (12120908)	532750.00	4414250.00	119.56798 (12111508)
533250.00	4414250.00	58.86916 (12052224)	533750.00	4414250.00	32.92059 (12062024)
534250.00	4414250.00	25.80302 (12022916)	534750.00	4414250.00	24.31597 (12082916)
535250.00	4414250.00	34.52931 (12021724)	535750.00	4414250.00	10.76140 (12081916)
536250.00	4414250.00	7.70500 (12021816)	536750.00	4414250.00	9.62320 (12021816)
537250.00	4414250.00	9.03509 (12021816)	537750.00	4414250.00	7.69997 (12021816)
538250.00	4414250.00	6.74172 (12121116)	538750.00	4414250.00	11.22634 (12081308)
539250.00	4414250.00	8.42043 (12081308)	539750.00	4414250.00	6.67492 (12081308)
540250.00	4414250.00	4.45906 (12121116)	540750.00	4414250.00	4.09323 (12121116)
541250.00	4414250.00	9.72115 (12110208)	541750.00	4414250.00	12.14772 (12110208)
542250.00	4414250.00	12.11218 (12110208)	542750.00	4414250.00	12.96216 (12110208)
526750.00	4414750.00	56.28742 (12041708)	527250.00	4414750.00	41.38460 (12041708)
527750.00	4414750.00	30.57653 (12061124)	528250.00	4414750.00	15.97451 (12082408)

528750.00	4414750.00	21.73007 (12082408)	529250.00	4414750.00	7.95977 (12082408)
529750.00	4414750.00	7.79095 (12122616)	530250.00	4414750.00	8.50462 (12122616)
530750.00	4414750.00	9.09096 (12122616)	531250.00	4414750.00	25.04331 (12112724)
531750.00	4414750.00	42.80528 (12120908)	532250.00	4414750.00	55.27074 (12120908)
533250.00	4414750.00	276.28853 (12102624)	533750.00	4414750.00	27.79760 (12100616)
534250.00	4414750.00	47.31707 (12062016)	534750.00	4414750.00	32.62064 (12090516)
535250.00	4414750.00	23.14540 (12081916)	535750.00	4414750.00	20.41804 (12021816)
536250.00	4414750.00	18.93128 (12021816)	536750.00	4414750.00	13.79319 (12021816)
537250.00	4414750.00	9.77308 (12021816)	537750.00	4414750.00	7.09719 (12021816)
538250.00	4414750.00	6.03546 (12010616)	538750.00	4414750.00	7.12227 (12082724)
539250.00	4414750.00	30.71530 (12051324)	539750.00	4414750.00	22.94995 (12051324)
540250.00	4414750.00	22.16850 (12051324)	540750.00	4414750.00	18.09903 (12082724)
541250.00	4414750.00	23.19198 (12011508)	541750.00	4414750.00	24.58457 (12011508)
542250.00	4414750.00	28.80255 (12011024)	542750.00	4414750.00	27.39101 (12011024)
526750.00	4415250.00	40.60244 (12082508)	527250.00	4415250.00	23.78271 (12081508)
527750.00	4415250.00	13.53264 (12081508)	528250.00	4415250.00	45.69530 (12081508)
528750.00	4415250.00	14.60610 (12081508)	529250.00	4415250.00	7.42543 (12122716)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
529750.00	4415250.00	7.69650	(12122716)	530250.00	4415250.00	7.92733	(12122716)
530750.00	4415250.00	8.05326	(12122716)	531250.00	4415250.00	100.92851	(12082508)
531750.00	4415250.00	100.74217	(12121408)	532250.00	4415250.00	119.10706	(12121408)
532750.00	4415250.00	229.39074	(12022308)	533250.00	4415250.00	324.47909	(12022308)
533750.00	4415250.00	27.57551	(12082516)	534250.00	4415250.00	48.94369	(12082516)
534750.00	4415250.00	11.61474	(12101616)	535250.00	4415250.00	30.06403	(12082816)
535750.00	4415250.00	35.08651	(12082816)	536250.00	4415250.00	21.61993	(12082816)
536750.00	4415250.00	13.78137	(12082816)	537250.00	4415250.00	9.42378	(12082816)
537750.00	4415250.00	6.85316	(12082816)	538250.00	4415250.00	19.65234	(12040924)
538750.00	4415250.00	63.14243	(12011508)	539250.00	4415250.00	52.84477	(12011508)
539750.00	4415250.00	54.74635	(12011508)	540250.00	4415250.00	47.45237	(12011508)
540750.00	4415250.00	39.69936	(12011508)	541250.00	4415250.00	34.92649	(12040924)
541750.00	4415250.00	39.42606	(12011024)	542250.00	4415250.00	30.30933	(12011024)
542750.00	4415250.00	26.16711	(12011024)	526750.00	4415750.00	16.93490	(12082608)
527250.00	4415750.00	8.93371	(12040408)	527750.00	4415750.00	6.72192	(12012116)
528250.00	4415750.00	7.12835	(12050208)	528750.00	4415750.00	13.19833	(12082608)
529250.00	4415750.00	7.89877	(12040408)	529750.00	4415750.00	7.79051	(12012116)
530250.00	4415750.00	8.19859	(12012116)	530750.00	4415750.00	8.28676	(12012116)
531250.00	4415750.00	18.09806	(12040324)	531750.00	4415750.00	55.95537	(12040808)
532250.00	4415750.00	90.10042	(12121408)	532750.00	4415750.00	66.22522	(12021324)
533250.00	4415750.00	156.02693	(12111224)	533750.00	4415750.00	17.89146	(12071108)
534250.00	4415750.00	14.11444	(12051816)	534750.00	4415750.00	17.32396	(12052416)
535250.00	4415750.00	31.73020	(12051916)	535750.00	4415750.00	28.76430	(12041916)
536250.00	4415750.00	19.65457	(12030416)	536750.00	4415750.00	12.05613	(12030416)
537250.00	4415750.00	8.03508	(12082816)	537750.00	4415750.00	7.16093	(12010516)
538250.00	4415750.00	9.44559	(12092224)	538750.00	4415750.00	29.01441	(12092724)
539250.00	4415750.00	41.03858	(12011024)	539750.00	4415750.00	38.48971	(12011024)
540250.00	4415750.00	42.30070	(12011024)	540750.00	4415750.00	22.64689	(12110224)
541250.00	4415750.00	22.88311	(12100224)	541750.00	4415750.00	25.80048	(12100224)

542250.00	4415750.00	31.46854 (12011024)	542750.00	4415750.00	18.07633 (12011024)
526750.00	4416250.00	7.39475 (12060208)	527250.00	4416250.00	6.53160 (12012116)
527750.00	4416250.00	6.76857 (12012116)	528250.00	4416250.00	7.00149 (12012116)
528750.00	4416250.00	7.21139 (12012116)	529250.00	4416250.00	7.38914 (12012116)
529750.00	4416250.00	7.60969 (12010416)	530250.00	4416250.00	8.12083 (12010416)
530750.00	4416250.00	8.50366 (12010416)	531250.00	4416250.00	40.32697 (12073024)
531750.00	4416250.00	87.07509 (12013008)	532250.00	4416250.00	80.94609 (12013008)
532750.00	4416250.00	83.73792 (12031908)	533250.00	4416250.00	64.44155 (12031908)
533750.00	4416250.00	61.22297 (12011824)	534250.00	4416250.00	10.81565 (12051816)
534750.00	4416250.00	17.72649 (12041316)	535250.00	4416250.00	28.85479 (12042016)
535750.00	4416250.00	17.33045 (12040816)	536250.00	4416250.00	15.31545 (12040916)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
536750.00	4416250.00	10.83958 (12030416)	537250.00	4416250.00	21.28044 (12022608)
537750.00	4416250.00	115.23720 (12022608)	538250.00	4416250.00	84.70574 (12022608)
538750.00	4416250.00	40.60519 (12011108)	539250.00	4416250.00	56.80901 (12011024)
539750.00	4416250.00	49.82085 (12011024)	540250.00	4416250.00	41.55149 (12011024)

540750.00 4416250.00 25.38634 (12011024) 541250.00 4416250.00 27.24400 (12011024)

541750.00 4416250.00 17.57297 (12011024) 542250.00 4416250.00 12.58020 (12011024)

542750.00 4416250.00 23.85311 (12011024) 526750.00 4416750.00 6.10151 (12012116)

527250.00 4416750.00 6.26177 (12012116) 527750.00 4416750.00 6.41275 (12012116)

528250.00 4416750.00 6.72432 (12010416) 528750.00 4416750.00 7.09125 (12010416)

529250.00 4416750.00 7.44509 (12010416) 529750.00 4416750.00 7.76602 (12010416)

530250.00 4416750.00 8.08223 (12010416) 530750.00 4416750.00 8.24471 (12010416)

531250.00 4416750.00 85.81182 (12022008) 531750.00 4416750.00 73.96779 (12022008)

532250.00 4416750.00 29.91172 (12013008) 532750.00 4416750.00 32.88537 (12010324)

533250.00 4416750.00 56.36890 (12011824) 534250.00 4416750.00 31.46631 (12070524)

534750.00 4416750.00 10.83963 (12020416) 535250.00 4416750.00 18.31303 (12042016)

535750.00 4416750.00 12.82061 (12042016) 536250.00 4416750.00 12.01798 (12031216)

536750.00 4416750.00 11.04541 (12010916) 537250.00 4416750.00 9.38536 (12010516)

537750.00 4416750.00 22.56588 (12041024) 538250.00 4416750.00 78.48576 (12041624)

538750.00 4416750.00 94.38823 (12022608) 539250.00 4416750.00 98.56998 (12022608)

539750.00 4416750.00 51.20878 (12011108) 540250.00 4416750.00 55.06333 (12011024)

540750.00 4416750.00 46.61456 (12011024) 541250.00 4416750.00 40.10919 (12011024)

541750.00 4416750.00 30.40555 (12011024) 542250.00 4416750.00 24.07492 (12011024)

542750.00 4416750.00 17.42370 (12011024) 526750.00 4417250.00 7.85707 (12073024)

527250.00 4417250.00 6.27114 (12010416) 527750.00 4417250.00 6.57415 (12010416)

528250.00 4417250.00 6.85708 (12010416) 528750.00 4417250.00 7.12082 (12010416)

529250.00 4417250.00 7.33541 (12010416) 529750.00 4417250.00 7.50443 (12010416)

530250.00 4417250.00 7.58965 (12010416) 530750.00 4417250.00 7.51896 (12010416)

531250.00 4417250.00 22.00846m (12090908) 531750.00 4417250.00 7.39813 (12122716)

532250.00 4417250.00 17.80552 (12010324) 532750.00 4417250.00 63.27739 (12010324)

533250.00 4417250.00 93.58140 (12010324) 533750.00 4417250.00 52.83165 (12011124)

534250.00 4417250.00 50.07963 (12011824) 534750.00 4417250.00 13.41873 (12040708)

535250.00 4417250.00 11.52635 (12040616) 535750.00 4417250.00 11.58138 (12012016)

536250.00 4417250.00 11.35338 (12031216) 536750.00 4417250.00 10.64096 (12031216)

537250.00 4417250.00 9.74842 (12010516) 537750.00 4417250.00 31.84432 (12041424)

538250.00 4417250.00 8.56186 (12020716) 538750.00 4417250.00 23.96985 (12041024)

539250.00	4417250.00	32.77644 (12040124)	539750.00	4417250.00	72.16754 (12022608)
540250.00	4417250.00	54.54174 (12010524)	540750.00	4417250.00	44.53533 (12011108)
541250.00	4417250.00	50.37586 (12011024)	541750.00	4417250.00	41.67173 (12011024)
542250.00	4417250.00	34.90641 (12011024)	542750.00	4417250.00	33.29799 (12011024)
526750.00	4417750.00	26.85409 (12073024)	527250.00	4417750.00	10.20758 (12073024)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
527750.00	4417750.00	6.50956 (12010416)	528250.00	4417750.00	6.69195 (12010416)
528750.00	4417750.00	6.82755 (12010416)	529250.00	4417750.00	6.88903 (12010416)
529750.00	4417750.00	6.87055 (12010416)	530250.00	4417750.00	6.75223 (12010416)
530750.00	4417750.00	6.52707 (12122716)	531250.00	4417750.00	6.75981 (12021316)
531750.00	4417750.00	7.85171 (12021316)	532250.00	4417750.00	44.13190 (12031424)
532750.00	4417750.00	87.78210 (12021408)	533250.00	4417750.00	56.71687 (12121408)
533750.00	4417750.00	52.10389 (12071024)	534250.00	4417750.00	12.67937 (12020416)
534750.00	4417750.00	10.71729 (12020416)	535250.00	4417750.00	11.26523 (12012516)
535750.00	4417750.00	11.86731 (12020516)	536250.00	4417750.00	11.53065 (12020516)
536750.00	4417750.00	10.31032 (12010516)	537250.00	4417750.00	9.76025 (12010516)

537750.00	4417750.00	63.43271 (12030508)	538250.00	4417750.00	10.68141 (12041424)
538750.00	4417750.00	8.87110 (12020716)	539250.00	4417750.00	8.30685 (12020716)
539750.00	4417750.00	21.71285 (12041024)	540250.00	4417750.00	39.20481 (12041624)
540750.00	4417750.00	46.90351 (12010524)	541250.00	4417750.00	44.41157 (12011024)
541750.00	4417750.00	44.60013 (12011024)	542250.00	4417750.00	45.76852 (12011024)
542750.00	4417750.00	41.92299 (12011024)	526750.00	4418250.00	38.95394 (12013008)
527250.00	4418250.00	20.81259 (12013108)	527750.00	4418250.00	6.20384 (12010416)
528250.00	4418250.00	6.25814 (12010416)	528750.00	4418250.00	6.25880 (12010416)
529250.00	4418250.00	6.16568 (12010416)	529750.00	4418250.00	6.01960 (12010416)
530250.00	4418250.00	5.87191 (12021316)	530750.00	4418250.00	6.64176 (12021316)
531250.00	4418250.00	7.46110 (12021316)	531750.00	4418250.00	37.82993 (12011824)
532250.00	4418250.00	31.08268 (12082724)	532750.00	4418250.00	34.46540m (12072008)
533250.00	4418250.00	35.56027 (12010408)	534250.00	4418250.00	11.56728 (12020416)
534750.00	4418250.00	9.96770 (12012516)	535250.00	4418250.00	11.74649 (12012516)
535750.00	4418250.00	11.77023 (12012516)	536250.00	4418250.00	11.65245 (12020516)
536750.00	4418250.00	10.34724 (12020516)	537250.00	4418250.00	9.44528 (12020316)
537750.00	4418250.00	8.95935 (12020316)	538250.00	4418250.00	9.05344 (12020716)
538750.00	4418250.00	9.10791 (12020716)	539250.00	4418250.00	15.11732 (12041424)
539750.00	4418250.00	10.04226 (12100724)	540250.00	4418250.00	9.96026 (12041624)
540750.00	4418250.00	19.54931 (12041624)	541250.00	4418250.00	23.71412 (12011024)
541750.00	4418250.00	44.77794 (12011024)	542250.00	4418250.00	37.85054 (12011024)
542750.00	4418250.00	31.85835 (12011024)	526750.00	4418750.00	42.98270 (12022008)
527250.00	4418750.00	26.67558 (12022008)	527750.00	4418750.00	5.71393 (12010416)
528250.00	4418750.00	5.66967 (12010416)	528750.00	4418750.00	5.56106 (12010416)
529250.00	4418750.00	5.38797 (12010416)	529750.00	4418750.00	5.72008 (12021316)
530250.00	4418750.00	6.44718 (12021316)	530750.00	4418750.00	7.17624 (12021316)
531250.00	4418750.00	7.84315 (12021316)	531750.00	4418750.00	8.50476 (12021316)
532250.00	4418750.00	8.64499 (12021316)	532750.00	4418750.00	9.51529 (12020416)
533250.00	4418750.00	44.31464 (12010408)	533750.00	4418750.00	10.97179 (12020416)
534250.00	4418750.00	10.45109 (12020416)	534750.00	4418750.00	10.03050 (12012516)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
535250.00	4418750.00	11.59913	(12012516)	535750.00	4418750.00	12.17851	(12012516)
536250.00	4418750.00	11.22805	(12012516)	536750.00	4418750.00	10.57822	(12020516)
537250.00	4418750.00	9.26824	(12020316)	537750.00	4418750.00	8.68704	(12020316)
538250.00	4418750.00	31.19415	(12121124)	538750.00	4418750.00	10.91571	(12011324)
539250.00	4418750.00	16.56270	(12030508)	539750.00	4418750.00	40.64000	(12041424)
540250.00	4418750.00	18.43987	(12041424)	540750.00	4418750.00	7.42968	(12041624)
541250.00	4418750.00	11.63414	(12041624)	541750.00	4418750.00	23.19692	(12121708)
542250.00	4418750.00	26.93616	(12011024)	542750.00	4418750.00	38.32974	(12011024)
526750.00	4419250.00	25.57286	(12020208)	527250.00	4419250.00	9.46183m	(12090908)
527750.00	4419250.00	5.08066	(12010416)	528250.00	4419250.00	4.97159	(12010416)
528750.00	4419250.00	4.91750	(12021316)	529250.00	4419250.00	5.54547	(12021316)
529750.00	4419250.00	6.22132	(12021316)	530250.00	4419250.00	6.91677	(12021316)
530750.00	4419250.00	7.52308	(12021316)	531250.00	4419250.00	7.95808	(12021316)
531750.00	4419250.00	8.20854	(12021316)	532250.00	4419250.00	8.12988	(12020416)
532750.00	4419250.00	9.21449	(12020416)	533250.00	4419250.00	9.91475	(12020416)
533750.00	4419250.00	9.97908	(12020416)	534250.00	4419250.00	9.43392	(12020416)

534750.00	4419250.00	13.84893 (12010224)	535250.00	4419250.00	14.56279 (12092108)
535750.00	4419250.00	11.86663 (12012516)	536250.00	4419250.00	11.44255 (12012516)
536750.00	4419250.00	10.39646 (12020516)	537250.00	4419250.00	9.41860 (12020516)
537750.00	4419250.00	8.42208 (12020316)	538250.00	4419250.00	7.94996 (12020316)
538750.00	4419250.00	7.92156 (12020716)	539250.00	4419250.00	16.47748 (12011324)
539750.00	4419250.00	26.68891 (12030508)	540250.00	4419250.00	29.42741 (12041424)
540750.00	4419250.00	30.93387 (12041424)	541250.00	4419250.00	15.13470 (12010108)
541750.00	4419250.00	24.20441 (12010108)	542250.00	4419250.00	12.28355 (12121708)
542750.00	4419250.00	24.42119 (12121708)	526750.00	4419750.00	9.81225 (12013008)
527250.00	4419750.00	4.56390 (12010416)	527750.00	4419750.00	4.46439 (12010416)
528250.00	4419750.00	4.74435 (12021316)	528750.00	4419750.00	5.33820 (12021316)
529250.00	4419750.00	5.96960 (12021316)	529750.00	4419750.00	6.60847 (12021316)
530250.00	4419750.00	7.22144 (12021316)	530750.00	4419750.00	7.66070 (12021316)
531250.00	4419750.00	7.86390 (12021316)	531750.00	4419750.00	7.90627 (12021316)
532250.00	4419750.00	8.00374 (12020416)	532750.00	4419750.00	8.55556 (12020416)
533250.00	4419750.00	9.09544 (12020416)	533750.00	4419750.00	8.99143 (12020416)
534250.00	4419750.00	8.54804 (12020416)	534750.00	4419750.00	21.17773 (12010224)
535250.00	4419750.00	10.59253 (12012516)	535750.00	4419750.00	11.24104 (12012516)
536250.00	4419750.00	10.88651 (12012516)	536750.00	4419750.00	10.17656 (12012516)
537250.00	4419750.00	9.44224 (12020516)	537750.00	4419750.00	8.29790 (12020516)
538250.00	4419750.00	7.75631 (12020316)	538750.00	4419750.00	7.45209 (12020316)
539250.00	4419750.00	7.53869 (12020716)	539750.00	4419750.00	7.86845 (12020716)
540250.00	4419750.00	14.55366 (12030508)	540750.00	4419750.00	39.59298 (12041424)
541250.00	4419750.00	45.55427m (12041124)	541750.00	4419750.00	30.09554 (12010108)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
542250.00	4419750.00	25.46111 (12010108)	542750.00	4419750.00	19.40255 (12010108)
526750.00	4420250.00	4.09491 (12010416)	527250.00	4420250.00	3.98632 (12010416)
527750.00	4420250.00	4.53001 (12021316)	528250.00	4420250.00	5.09682 (12021316)
528750.00	4420250.00	5.68454 (12021316)	529250.00	4420250.00	6.27600 (12021316)
529750.00	4420250.00	6.83725 (12021316)	530250.00	4420250.00	7.26621 (12021316)
530750.00	4420250.00	7.61252 (12021316)	531250.00	4420250.00	7.58199 (12021316)
531750.00	4420250.00	7.43172 (12021316)	532250.00	4420250.00	7.90519 (12020416)
532750.00	4420250.00	8.33322 (12020416)	533250.00	4420250.00	8.22952 (12020416)
533750.00	4420250.00	8.05211 (12020416)	534250.00	4420250.00	7.73174 (12020416)
534750.00	4420250.00	8.72029 (12012516)	535250.00	4420250.00	9.93910 (12012516)
535750.00	4420250.00	10.44337 (12012516)	536250.00	4420250.00	10.54917 (12012516)
536750.00	4420250.00	10.14759 (12012516)	537250.00	4420250.00	9.35993 (12020516)
537750.00	4420250.00	8.44658 (12020516)	538250.00	4420250.00	7.53733 (12020316)
538750.00	4420250.00	7.17391 (12020316)	539250.00	4420250.00	6.89137 (12020316)
539750.00	4420250.00	7.14553 (12020716)	540250.00	4420250.00	7.40622 (12020716)
540750.00	4420250.00	23.24957 (12030508)	541250.00	4420250.00	50.59225m (12041124)
541750.00	4420250.00	33.59866 (12010108)	542250.00	4420250.00	18.76492 (12010108)
542750.00	4420250.00	21.87598 (12010108)	526750.00	4420750.00	3.79035 (12021316)
527250.00	4420750.00	4.32060 (12021316)	527750.00	4420750.00	4.83916 (12021316)
528250.00	4420750.00	5.36910 (12021316)	528750.00	4420750.00	5.90220 (12021316)
529250.00	4420750.00	6.40937 (12021316)	529750.00	4420750.00	6.84164 (12021316)

530250.00	4420750.00	12.03027 (12082724)	530750.00	4420750.00	7.27903 (12021316)
531250.00	4420750.00	7.17967 (12021316)	531750.00	4420750.00	7.02235 (12020416)
532250.00	4420750.00	7.58993 (12020416)	532750.00	4420750.00	7.79772 (12020416)
533250.00	4420750.00	7.79796 (12020416)	533750.00	4420750.00	7.47128 (12020416)
534250.00	4420750.00	7.16249 (12012516)	534750.00	4420750.00	8.28278 (12012516)
535250.00	4420750.00	9.25133 (12012516)	535750.00	4420750.00	9.69292 (12012516)
536250.00	4420750.00	10.08662 (12012516)	536750.00	4420750.00	9.90991 (12012516)
537250.00	4420750.00	9.24168 (12012516)	537750.00	4420750.00	8.49970 (12020516)
538250.00	4420750.00	7.57894 (12020516)	538750.00	4420750.00	6.77838 (12020316)
539250.00	4420750.00	6.66138 (12020316)	539750.00	4420750.00	6.43223 (12020316)
540250.00	4420750.00	6.74878 (12020716)	540750.00	4420750.00	10.31901 (12011324)
541250.00	4420750.00	37.69386 (12030508)	541750.00	4420750.00	35.98343m (12041124)
542250.00	4420750.00	25.17209 (12010108)	542750.00	4420750.00	9.99625 (12010108)
526750.00	4421250.00	4.14113 (12021316)	527250.00	4421250.00	4.60659 (12021316)
527750.00	4421250.00	5.08187 (12021316)	528250.00	4421250.00	5.55853 (12021316)
528750.00	4421250.00	6.01434 (12021316)	529250.00	4421250.00	6.41432 (12021316)
529750.00	4421250.00	6.71267 (12021316)	530250.00	4421250.00	13.18074 (12082724)
530750.00	4421250.00	6.82621 (12021316)	531250.00	4421250.00	6.65093 (12021316)
531750.00	4421250.00	6.83299 (12020416)	532250.00	4421250.00	25.08689 (12082724)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
532750.00	4421250.00	7.41730 (12020416)	533250.00	4421250.00	7.30436 (12020416)
533750.00	4421250.00	7.00185 (12020416)	534250.00	4421250.00	6.81701 (12012516)
534750.00	4421250.00	7.80468 (12012516)	535250.00	4421250.00	8.57875 (12012516)
535750.00	4421250.00	9.25540 (12012516)	536250.00	4421250.00	9.67230 (12012516)
536750.00	4421250.00	9.57325 (12012516)	537250.00	4421250.00	9.06327 (12012516)
537750.00	4421250.00	8.46937 (12020516)	538250.00	4421250.00	7.68930 (12020516)
538750.00	4421250.00	6.77730 (12020516)	539250.00	4421250.00	6.41493 (12020316)
539750.00	4421250.00	6.20420 (12020316)	540250.00	4421250.00	6.03194 (12020716)
540750.00	4421250.00	6.37145 (12020716)	541250.00	4421250.00	8.99815 (12052508)
541750.00	4421250.00	36.36862 (12121624)	542250.00	4421250.00	39.15042 (12101124)
542750.00	4421250.00	29.68260 (12010108)	526750.00	4421750.00	4.39952 (12021316)
527250.00	4421750.00	4.82675 (12021316)	527750.00	4421750.00	5.26171 (12021316)
528250.00	4421750.00	5.67664 (12021316)	528750.00	4421750.00	9.30207 (12031424)
529250.00	4421750.00	9.67876 (12082724)	529750.00	4421750.00	8.59178 (12082724)
530250.00	4421750.00	20.54263m (12072008)	530750.00	4421750.00	17.73634m (12072008)
531250.00	4421750.00	6.22267 (12020416)	531750.00	4421750.00	6.61500 (12020416)
532250.00	4421750.00	18.17810 (12080808)	532750.00	4421750.00	14.87095 (12011824)
533250.00	4421750.00	6.81887 (12020416)	533750.00	4421750.00	6.51334 (12020416)
534250.00	4421750.00	6.40709 (12012516)	534750.00	4421750.00	7.35831 (12012516)
535250.00	4421750.00	8.15788 (12012516)	535750.00	4421750.00	8.60668 (12012516)
536250.00	4421750.00	9.14275 (12012516)	536750.00	4421750.00	9.14680 (12012516)
537250.00	4421750.00	8.82845 (12012516)	537750.00	4421750.00	8.35737 (12020516)
538250.00	4421750.00	7.74080 (12020516)	538750.00	4421750.00	6.95176 (12020516)
539250.00	4421750.00	6.07045 (12020316)	539750.00	4421750.00	5.90598 (12020316)
540250.00	4421750.00	5.75467 (12020316)	540750.00	4421750.00	5.70900 (12020716)
541250.00	4421750.00	6.02222 (12020716)	541750.00	4421750.00	7.56864 (12052508)
542250.00	4421750.00	40.44656 (12121624)	542750.00	4421750.00	35.47501 (12101124)

526750.00	4422250.00	4.60573 (12021316)	527250.00	4422250.00	5.00007 (12021316)
527750.00	4422250.00	6.36737 (12031424)	528250.00	4422250.00	9.71547 (12031424)
528750.00	4422250.00	16.46929 (12031424)	529250.00	4422250.00	17.16074 (12082724)
529750.00	4422250.00	11.22104 (12082724)	530250.00	4422250.00	21.88706m (12072008)
530750.00	4422250.00	14.45604 (12121408)	531250.00	4422250.00	17.16416 (12010408)
531750.00	4422250.00	15.33781 (12071024)	532250.00	4422250.00	18.67882 (12072724)
532750.00	4422250.00	17.66199 (12011824)	533250.00	4422250.00	6.37789 (12020416)
533750.00	4422250.00	6.07392 (12020416)	534250.00	4422250.00	6.04144 (12012516)
534750.00	4422250.00	6.90377 (12012516)	535250.00	4422250.00	7.53925 (12012516)
535750.00	4422250.00	7.99630 (12012516)	536250.00	4422250.00	8.39841 (12012516)
536750.00	4422250.00	8.65614 (12012516)	537250.00	4422250.00	8.49307 (12012516)
537750.00	4422250.00	8.17428 (12020516)	538250.00	4422250.00	7.70029 (12020516)
538750.00	4422250.00	7.04300 (12020516)	539250.00	4422250.00	6.26489 (12020516)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
539750.00	4422250.00	5.62092 (12020316)	540250.00	4422250.00	5.48718 (12020316)
540750.00	4422250.00	5.37505 (12020316)	541250.00	4422250.00	5.40938 (12020716)

541750.00 4422250.00 5.69836 (12020716) 542250.00 4422250.00 12.55776 (12121124)

542750.00 4422250.00 38.85037 (12121624) 526750.00 4422750.00 8.92239 (12010324)

527250.00 4422750.00 17.67476 (12031424) 527750.00 4422750.00 24.99699 (12031424)

528250.00 4422750.00 21.97182 (12031424) 528750.00 4422750.00 16.33835 (12082724)

529250.00 4422750.00 20.55121 (12101008) 529750.00 4422750.00 21.26338m (12072008)

530250.00 4422750.00 12.72628m (12072008) 530750.00 4422750.00 20.59247 (12121408)

531250.00 4422750.00 23.40320 (12010408) 531750.00 4422750.00 24.25963 (12010408)

532250.00 4422750.00 25.50444 (12011824) 532750.00 4422750.00 22.03765 (12080808)

533250.00 4422750.00 5.97223 (12020416) 533750.00 4422750.00 5.66897 (12020416)

534250.00 4422750.00 5.72864 (12012516) 534750.00 4422750.00 6.48950 (12012516)

535250.00 4422750.00 7.13871 (12012516) 535750.00 4422750.00 7.60224 (12012516)

536250.00 4422750.00 7.77589 (12012516) 536750.00 4422750.00 7.99419 (12012516)

537250.00 4422750.00 8.03144 (12012516) 537750.00 4422750.00 7.91326 (12020516)

538250.00 4422750.00 13.73980 (12041508) 538750.00 4422750.00 7.05365 (12020516)

539250.00 4422750.00 6.39196 (12020516) 539750.00 4422750.00 5.65426 (12020516)

540250.00 4422750.00 5.21378 (12020316) 540750.00 4422750.00 5.11886 (12020316)

541250.00 4422750.00 5.03252 (12020316) 541750.00 4422750.00 5.68865 (12051108)

542250.00 4422750.00 7.22101 (12051108) 542750.00 4422750.00 21.02495 (12121124)

526750.00 4423250.00 19.55548 (12010324) 527250.00 4423250.00 22.38541 (12021408)

527750.00 4423250.00 28.80073 (12021408) 528250.00 4423250.00 27.66639 (12021408)

528750.00 4423250.00 21.74246 (12101008) 529250.00 4423250.00 23.31300 (12101008)

529750.00 4423250.00 16.83697m (12072008) 530250.00 4423250.00 6.96806 (12121408)

530750.00 4423250.00 22.58750 (12011124) 531250.00 4423250.00 27.76210 (12011124)

531750.00 4423250.00 28.54101 (12011124) 532250.00 4423250.00 23.02412 (12011824)

532750.00 4423250.00 16.82445 (12021708) 533250.00 4423250.00 6.94937 (12062508)

533750.00 4423250.00 5.30125 (12020416) 534250.00 4423250.00 5.44774 (12012516)

534750.00 4423250.00 6.12959 (12012516) 535250.00 4423250.00 6.73019 (12012516)

535750.00 4423250.00 7.31520 (12012516) 536250.00 4423250.00 7.46985 (12012516)

536750.00 4423250.00 7.41599 (12012516) 537250.00 4423250.00 7.67276 (12020516)

537750.00 4423250.00 7.63697 (12020516) 538250.00 4423250.00 48.87307 (12031224)

538750.00 4423250.00 18.56348 (12031224) 539250.00 4423250.00 7.37893 (12020524)

539750.00	4423250.00	5.81019 (12020516)	540250.00	4423250.00	5.10827 (12020516)
540750.00	4423250.00	4.86259 (12020316)	541250.00	4423250.00	4.78742 (12020316)
541750.00	4423250.00	4.74224 (12020316)	542250.00	4423250.00	8.17565 (12121124)
542750.00	4423250.00	11.35316 (12121124)	526750.00	4423750.00	22.54511 (12010324)
527250.00	4423750.00	23.48171 (12031424)	527750.00	4423750.00	23.86486 (12021408)
528250.00	4423750.00	25.37873 (12010324)	528750.00	4423750.00	19.96052 (12101008)
529250.00	4423750.00	17.41931 (12101008)	529750.00	4423750.00	8.30489 (12101008)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
530250.00	4423750.00	8.77612 (12010408)	530750.00	4423750.00	23.79433 (12011124)
531250.00	4423750.00	28.23486 (12122224)	531750.00	4423750.00	29.50732 (12122224)
532250.00	4423750.00	15.80480 (12011124)	532750.00	4423750.00	12.95074 (12053108)
533250.00	4423750.00	5.82724 (12080808)	533750.00	4423750.00	4.97569 (12020416)
534250.00	4423750.00	5.17331 (12012516)	534750.00	4423750.00	5.81409 (12012516)
535250.00	4423750.00	6.38859 (12012516)	535750.00	4423750.00	6.89616 (12012516)
536250.00	4423750.00	7.25694 (12012516)	536750.00	4423750.00	7.24054 (12012516)
537250.00	4423750.00	7.17743 (12020516)	537750.00	4423750.00	7.35983 (12020516)

538250.00 4423750.00 12.08948 (12010824)
538750.00 4423750.00 10.59049 (12041508)
539250.00 4423750.00 6.46143 (12020516)
539750.00 4423750.00 5.91032 (12020516)
540250.00 4423750.00 5.29209 (12020516)
540750.00 4423750.00 4.65138 (12020316)
541250.00 4423750.00 4.53266 (12020316)
541750.00 4423750.00 4.50352 (12020316)
542250.00 4423750.00 4.98996 (12121124)
542750.00 4423750.00 11.51866 (12121124)
526750.00 4424250.00 25.07437 (12010324)
527250.00 4424250.00 22.21143 (12010324)
527750.00 4424250.00 22.23113 (12010324)
528250.00 4424250.00 13.32248 (12010324)
528750.00 4424250.00 17.66302 (12101008)
529250.00 4424250.00 15.32204 (12121408)
529750.00 4424250.00 11.64840 (12121408)
530250.00 4424250.00 14.27626 (12010408)
530750.00 4424250.00 24.99859 (12011124)
531250.00 4424250.00 25.96582 (12122224)
531750.00 4424250.00 27.29392 (12122224)
532250.00 4424250.00 18.82065 (12122224)
532750.00 4424250.00 15.27708 (12053108)
533250.00 4424250.00 10.51607 (12012508)
533750.00 4424250.00 7.14073 (12041924)
534250.00 4424250.00 4.91884 (12012516)
534750.00 4424250.00 5.51476 (12012516)
535250.00 4424250.00 6.06109 (12012516)
535750.00 4424250.00 6.52952 (12012516)
536250.00 4424250.00 6.75591 (12012516)
536750.00 4424250.00 6.79754 (12020516)
537250.00 4424250.00 6.85737 (12020516)
537750.00 4424250.00 7.13227 (12012516)
538250.00 4424250.00 6.98595 (12020516)
538750.00 4424250.00 6.77253 (12020516)
539250.00 4424250.00 6.41036 (12020516)
539750.00 4424250.00 5.95305 (12020516)
540250.00 4424250.00 5.41696 (12020516)
540750.00 4424250.00 4.83472 (12020516)
541250.00 4424250.00 4.33023 (12020316)
541750.00 4424250.00 4.27035 (12020316)
542250.00 4424250.00 4.63846 (12101124)
542750.00 4424250.00 6.00582 (12121124)
526750.00 4424750.00 15.36773 (12010324)
527250.00 4424750.00 18.73883 (12010324)
527750.00 4424750.00 10.56786 (12031408)
528250.00 4424750.00 10.17080 (12031408)
528750.00 4424750.00 15.41985 (12121408)
529250.00 4424750.00 14.88980 (12121408)
529750.00 4424750.00 16.26949 (12011124)
530250.00 4424750.00 21.73458 (12011124)
530750.00 4424750.00 24.40172 (12011124)
531250.00 4424750.00 25.53812 (12122224)
531750.00 4424750.00 21.25525 (12122224)
532250.00 4424750.00 16.05913 (12122224)
532750.00 4424750.00 15.46364 (12122224)
533250.00 4424750.00 14.72254 (12012508)
533750.00 4424750.00 13.95641 (12122824)
534250.00 4424750.00 7.19264 (12033008)
534750.00 4424750.00 8.12558 (12010224)
535250.00 4424750.00 5.74796 (12012516)
535750.00 4424750.00 6.18996 (12012516)

536250.00 4424750.00 6.35650 (12012516) 536750.00 4424750.00 6.42757 (12020516)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: TESIS ***

INCLUDING SOURCE(S): BACA1 , BACA2 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
537250.00	4424750.00	6.86469	(12012516)	537750.00	4424750.00	6.85962	(12012516)
538250.00	4424750.00	6.75802	(12020516)	538750.00	4424750.00	6.59997	(12020516)
539250.00	4424750.00	6.32314	(12020516)	539750.00	4424750.00	5.94808	(12020516)
540250.00	4424750.00	5.48921	(12020516)	540750.00	4424750.00	4.97169	(12020516)
541250.00	4424750.00	4.41972	(12020516)	541750.00	4424750.00	4.06602	(12020316)
542250.00	4424750.00	4.85452	(12052708)	542750.00	4424750.00	5.40807	(12101124)
526750.00	4425250.00	7.92422	(12031408)	527250.00	4425250.00	10.00803	(12031408)
527750.00	4425250.00	6.92104	(12031408)	528250.00	4425250.00	8.51156	(12031408)
528750.00	4425250.00	10.29169	(12121408)	529250.00	4425250.00	9.40270	(12122224)
529750.00	4425250.00	15.77893	(12122224)	530250.00	4425250.00	21.97472	(12122224)
530750.00	4425250.00	23.24091	(12011124)	531250.00	4425250.00	23.59697	(12122224)
531750.00	4425250.00	13.21196	(12122224)	532250.00	4425250.00	7.94301	(12122224)
532750.00	4425250.00	8.14082	(12122224)	533250.00	4425250.00	20.61308	(12012508)
533750.00	4425250.00	15.68361	(12012508)	534250.00	4425250.00	16.94747	(12010224)

534750.00 4425250.00 17.72476 (12010224) 535250.00 4425250.00 5.45652 (12012516)

535750.00 4425250.00 7.20615 (12092108) 536250.00 4425250.00 6.14209 (12012516)

536750.00 4425250.00 6.08754 (12020516) 537250.00 4425250.00 6.33132 (12020516)

537750.00 4425250.00 6.42509 (12020516) 538250.00 4425250.00 6.51267 (12020516)

538750.00 4425250.00 6.41208 (12020516) 539250.00 4425250.00 6.20585 (12020516)

539750.00 4425250.00 5.91349 (12020516) 540250.00 4425250.00 5.53341 (12020516)

540750.00 4425250.00 5.06797 (12020516) 541250.00 4425250.00 4.56874 (12020516)

541750.00 4425250.00 4.04994 (12020516) 542250.00 4425250.00 3.84062 (12020316)

542750.00 4425250.00 4.90759 (12052708) 528142.30 4424000.10 31.89930 (12010324)

528641.50 4421424.20 5.94717 (12021316) 530578.20 4414421.80 9.70583 (12122616)

533199.90 4420647.00 7.88587 (12020416) 537336.40 4419481.40 9.26341 (12020516)

538624.80 4413866.50 6.51394 (12121116) 538699.00 4411952.40 6.00926 (12122116)

539685.20 4412636.40 6.05958 (12122116) 540884.80 4419539.60 46.00623 (12100124)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M) Y-COORD (M) CONC (YYMMDDHH) X-COORD (M) Y-COORD (M) CONC (YYMMDDHH)

526750.00 4409250.00 11.52422 (12090608) 527250.00 4409250.00 22.18541 (12110608)

527750.00 4409250.00 24.14374 (12110608) 528250.00 4409250.00 54.56677 (12110608)

528750.00 4409250.00 32.71443 (12050908) 529250.00 4409250.00 23.73493 (12050908)

529750.00 4409250.00 13.50946 (12101808) 530250.00 4409250.00 19.49532 (12101808)

530750.00 4409250.00 21.25718 (12101808) 531250.00 4409250.00 22.48618 (12061424)

531750.00 4409250.00 45.34093 (12061424) 532250.00 4409250.00 61.44850 (12091608)

532750.00 4409250.00 39.57934 (12093008) 533250.00 4409250.00 44.01942 (12101724)

533750.00 4409250.00 36.73713 (12033124) 534250.00 4409250.00 42.46574 (12101724)

534750.00 4409250.00 51.66340 (12081124) 535250.00 4409250.00 32.36265m (12072024)

535750.00 4409250.00 10.59565m (12072024) 536250.00 4409250.00 6.81710 (12021724)

536750.00 4409250.00 9.20539 (12021724) 537250.00 4409250.00 9.93723 (12021724)

537750.00 4409250.00 9.04549 (12021724) 538250.00 4409250.00 7.28751 (12021724)

538750.00 4409250.00 6.29711 (12122116) 539250.00 4409250.00 6.83936 (12122116)

539750.00 4409250.00 7.17711 (12122116) 540250.00 4409250.00 7.35584 (12122116)

540750.00 4409250.00 7.48589 (12122116) 541250.00 4409250.00 7.48391 (12122116)

541750.00 4409250.00 7.41685 (12122116) 542250.00 4409250.00 7.32778 (12122116)

542750.00 4409250.00 7.22572 (12122116) 526750.00 4409750.00 29.83214 (12090608)

527250.00 4409750.00 18.87988 (12090608) 527750.00 4409750.00 12.11701 (12110824)

528250.00 4409750.00 69.43472 (12110608) 528750.00 4409750.00 52.61227 (12110608)

529250.00 4409750.00 24.70160 (12100324) 529750.00 4409750.00 13.99385 (12120608)

530250.00 4409750.00 21.57080 (12101808) 530750.00 4409750.00 19.25307 (12101808)

531250.00 4409750.00 19.09460 (12061424) 531750.00 4409750.00 30.24119 (12061424)

532250.00 4409750.00 73.46653 (12061424) 532750.00 4409750.00 110.98335 (12091608)

533250.00 4409750.00 59.15985 (12091608) 533750.00 4409750.00 29.89385 (12101724)

534250.00 4409750.00 49.93553 (12101724) 534750.00 4409750.00 56.17293 (12081124)

535250.00 4409750.00 23.84337m (12072024) 535750.00 4409750.00 10.53776 (12022924)

536250.00 4409750.00 8.47496 (12021724) 536750.00 4409750.00 10.64333 (12021724)

537250.00 4409750.00 10.67039 (12021724) 537750.00 4409750.00 9.18922 (12021724)

538250.00 4409750.00 7.08534 (12021724) 538750.00 4409750.00 6.98718 (12122116)

539250.00 4409750.00 7.44543 (12122116) 539750.00 4409750.00 7.69482 (12122116)

540250.00 4409750.00 7.82664 (12122116) 540750.00 4409750.00 7.90034 (12122116)

541250.00 4409750.00 7.83885 (12122116) 541750.00 4409750.00 7.71902 (12122116)

542250.00	4409750.00	7.63265 (12122116)	542750.00	4409750.00	7.51672 (12122116)
526750.00	4410250.00	42.52507 (12100324)	527250.00	4410250.00	51.52657 (12110608)
527750.00	4410250.00	11.95816 (12110824)	528250.00	4410250.00	12.73234 (12110824)
528750.00	4410250.00	35.92136 (12110608)	529250.00	4410250.00	60.51647 (12110608)
529750.00	4410250.00	36.31184 (12050908)	530250.00	4410250.00	28.01311 (12050908)
530750.00	4410250.00	18.58182 (12101808)	531250.00	4410250.00	21.70820 (12101808)
531750.00	4410250.00	22.16196 (12061424)	532250.00	4410250.00	19.89786 (12061424)
532750.00	4410250.00	107.47947 (12091608)	533250.00	4410250.00	71.72519 (12111808)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
533750.00	4410250.00	33.73130 (12101724)	534250.00	4410250.00	52.72115 (12101724)
534750.00	4410250.00	18.91728 (12081124)	535250.00	4410250.00	16.31722 (12022924)
535750.00	4410250.00	10.60380 (12022924)	536250.00	4410250.00	10.45315 (12021724)
536750.00	4410250.00	12.24845 (12021724)	537250.00	4410250.00	11.02236 (12021724)
537750.00	4410250.00	8.89768 (12021724)	538250.00	4410250.00	7.11023 (12122116)
538750.00	4410250.00	7.69073 (12122116)	539250.00	4410250.00	8.05850 (12122116)

539750.00 4410250.00 8.26315 (12122116)
540250.00 4410250.00 8.34844 (12122116)
540750.00 4410250.00 8.33730 (12122116)
541250.00 4410250.00 8.23223 (12122116)
541750.00 4410250.00 8.07245 (12122116)
542250.00 4410250.00 7.94543 (12122116)
542750.00 4410250.00 7.86987 (12122116)
526750.00 4410750.00 43.42493 (12100324)
527250.00 4410750.00 43.67688 (12100324)
527750.00 4410750.00 30.22893 (12110608)
528250.00 4410750.00 30.96824 (12090608)
528750.00 4410750.00 13.28319 (12110824)
529250.00 4410750.00 68.18857 (12110608)
529750.00 4410750.00 77.07744 (12110608)
530250.00 4410750.00 39.36150 (12050908)
530750.00 4410750.00 27.49747 (12050908)
531250.00 4410750.00 16.07832 (12101808)
531750.00 4410750.00 19.00762 (12061424)
532250.00 4410750.00 27.19461 (12061424)
532750.00 4410750.00 16.78216 (12102024)
533250.00 4410750.00 16.50722 (12111808)
533750.00 4410750.00 22.77968 (12111808)
534250.00 4410750.00 29.70548 (12101724)
534750.00 4410750.00 22.51660 (12081124)
535250.00 4410750.00 17.56181 (12022924)
535750.00 4410750.00 10.99074 (12022924)
536250.00 4410750.00 12.72706 (12021724)
536750.00 4410750.00 13.56115 (12021724)
537250.00 4410750.00 11.06595 (12021724)
537750.00 4410750.00 8.56230 (12021724)
538250.00 4410750.00 7.92323 (12122116)
538750.00 4410750.00 8.43322 (12122116)
539250.00 4410750.00 8.72424 (12122116)
539750.00 4410750.00 8.83958 (12122116)
540250.00 4410750.00 8.82775 (12122116)
540750.00 4410750.00 8.74875 (12122116)
541250.00 4410750.00 8.67159 (12122116)
541750.00 4410750.00 8.46143 (12122116)
542250.00 4410750.00 8.30120 (12122116)
542750.00 4410750.00 8.21095 (12122116)
526750.00 4411250.00 25.14761 (12120608)
527250.00 4411250.00 37.16771 (12120608)
527750.00 4411250.00 48.60810 (12100324)
528250.00 4411250.00 29.45537 (12110608)
528750.00 4411250.00 12.63685 (12110824)
529250.00 4411250.00 13.65105 (12110824)
529750.00 4411250.00 53.19942 (12091808)
530250.00 4411250.00 96.67307 (12110608)
530750.00 4411250.00 41.86337 (12100324)
531250.00 4411250.00 30.28785 (12101808)
531750.00 4411250.00 17.58686 (12101808)
532250.00 4411250.00 22.99624 (12061424)
532750.00 4411250.00 12.00185 (12062724)
533250.00 4411250.00 13.96180 (12062724)
533750.00 4411250.00 11.26420 (12062724)
534250.00 4411250.00 11.11316 (12022924)
534750.00 4411250.00 20.43206 (12022924)
535250.00 4411250.00 18.81252 (12022924)
535750.00 4411250.00 11.36479 (12021724)
536250.00 4411250.00 15.47541 (12021724)
536750.00 4411250.00 13.99243 (12021724)
537250.00 4411250.00 11.14256 (12021724)

537750.00 4411250.00 8.09285 (12021724) 538250.00 4411250.00 8.76793 (12122116)

538750.00 4411250.00 9.18331 (12122116) 539250.00 4411250.00 9.37134 (12122116)

539750.00 4411250.00 9.42234 (12122116) 540250.00 4411250.00 9.31864 (12122116)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
540750.00	4411250.00	9.15467	(12122116)	541250.00	4411250.00	9.09621	(12122116)
541750.00	4411250.00	8.87652	(12122116)	542250.00	4411250.00	8.67765	(12122116)
542750.00	4411250.00	8.51438	(12122116)	526750.00	4411750.00	34.43066	(12120908)
527250.00	4411750.00	37.59099	(12100324)	527750.00	4411750.00	42.37924	(12100324)
528250.00	4411750.00	38.61872	(12110608)	528750.00	4411750.00	33.28890	(12110608)
529250.00	4411750.00	12.75696	(12110824)	529750.00	4411750.00	13.83191	(12110824)
530250.00	4411750.00	84.10317	(12091808)	530750.00	4411750.00	60.96933	(12100324)
531250.00	4411750.00	46.13103	(12100324)	531750.00	4411750.00	36.49138	(12101808)
532250.00	4411750.00	23.57993	(12061424)	532750.00	4411750.00	24.09310	(12061424)
533250.00	4411750.00	15.38337	(12062724)	533750.00	4411750.00	12.64021	(12062724)
534250.00	4411750.00	11.50599	(12022924)	534750.00	4411750.00	22.06503	(12022924)

535250.00	4411750.00	19.94612 (12022924)	535750.00	4411750.00	14.99212 (12021724)
536250.00	4411750.00	17.80436 (12021724)	536750.00	4411750.00	14.73705 (12021724)
537250.00	4411750.00	10.70698 (12021724)	537750.00	4411750.00	9.05317 (12122116)
538250.00	4411750.00	9.63338 (12122116)	538750.00	4411750.00	9.94911 (12122116)
539250.00	4411750.00	10.04540 (12122116)	539750.00	4411750.00	10.04951 (12122116)
540250.00	4411750.00	9.88902 (12122116)	540750.00	4411750.00	9.65232 (12122116)
541250.00	4411750.00	9.49775 (12122116)	541750.00	4411750.00	9.24707 (12122116)
542250.00	4411750.00	8.96463 (12122116)	542750.00	4411750.00	8.75708 (12122116)
526750.00	4412250.00	54.12400 (12102624)	527250.00	4412250.00	41.82466 (12120908)
527750.00	4412250.00	40.62237 (12120908)	528250.00	4412250.00	70.57166 (12110424)
528750.00	4412250.00	55.70741 (12091808)	529250.00	4412250.00	12.62855 (12111616)
529750.00	4412250.00	12.71734 (12111616)	530250.00	4412250.00	24.78784 (12111208)
530750.00	4412250.00	83.10298 (12091808)	531250.00	4412250.00	67.60482 (12100324)
531750.00	4412250.00	53.13729 (12100324)	532250.00	4412250.00	16.64276 (12072508)
532750.00	4412250.00	21.93583 (12061424)	533250.00	4412250.00	15.19834 (12062724)
533750.00	4412250.00	16.40215 (12062724)	534250.00	4412250.00	9.84617 (12022924)
534750.00	4412250.00	23.92848 (12022924)	535250.00	4412250.00	20.78316 (12022924)
535750.00	4412250.00	20.00171 (12021724)	536250.00	4412250.00	19.68446 (12021724)
536750.00	4412250.00	14.27053 (12021724)	537250.00	4412250.00	9.80419 (12021724)
537750.00	4412250.00	10.01768 (12122116)	538250.00	4412250.00	10.42238 (12122116)
538750.00	4412250.00	10.72006 (12122116)	539250.00	4412250.00	10.72964 (12122116)
539750.00	4412250.00	10.64062 (12122116)	540250.00	4412250.00	10.39003 (12122116)
540750.00	4412250.00	10.70934 (12122124)	541250.00	4412250.00	9.78536 (12122116)
541750.00	4412250.00	9.44293 (12122116)	542250.00	4412250.00	9.10053 (12122116)
542750.00	4412250.00	8.81352 (12122116)	526750.00	4412750.00	80.55702 (12101708)
527250.00	4412750.00	64.20803 (12101708)	527750.00	4412750.00	90.86134 (12102624)
528250.00	4412750.00	72.57554 (12102624)	528750.00	4412750.00	68.40170 (12110424)
529250.00	4412750.00	66.95076 (12101624)	529750.00	4412750.00	13.22313 (12111616)
530250.00	4412750.00	13.29101 (12111616)	530750.00	4412750.00	41.32437 (12072508)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
531250.00	4412750.00	72.86470	(12100324)	531750.00	4412750.00	78.22440	(12100324)
532250.00	4412750.00	83.71026	(12110608)	532750.00	4412750.00	26.70870	(12061424)
533250.00	4412750.00	36.94830	(12061424)	533750.00	4412750.00	77.94348	(12091608)
534250.00	4412750.00	12.09085	(12110916)	534750.00	4412750.00	25.51450	(12022924)
535250.00	4412750.00	21.00106	(12022924)	535750.00	4412750.00	25.52646	(12021724)
536250.00	4412750.00	20.01247	(12021724)	536750.00	4412750.00	12.56226	(12021724)
537250.00	4412750.00	10.26304	(12122116)	537750.00	4412750.00	10.98010	(12122116)
538250.00	4412750.00	11.26934	(12122116)	538750.00	4412750.00	11.45457	(12122116)
539250.00	4412750.00	11.36131	(12122116)	539750.00	4412750.00	11.08767	(12122116)
540250.00	4412750.00	10.71617	(12122116)	540750.00	4412750.00	10.24318	(12122116)
541250.00	4412750.00	9.83413	(12122116)	541750.00	4412750.00	11.28677	(12021808)
542250.00	4412750.00	16.86842	(12021808)	542750.00	4412750.00	20.14980	(12081308)
526750.00	4413250.00	70.94772	(12032324)	527250.00	4413250.00	73.10475	(12032324)
527750.00	4413250.00	94.14492	(12032324)	528250.00	4413250.00	80.33803	(12032324)
528750.00	4413250.00	97.75262	(12100708)	529250.00	4413250.00	76.45657	(12102624)
529750.00	4413250.00	13.98386	(12122616)	530250.00	4413250.00	13.93990	(12122616)

530750.00	4413250.00	40.22601 (12061224)	531250.00	4413250.00	50.28685 (12050908)
531750.00	4413250.00	75.54629 (12100324)	532250.00	4413250.00	87.45072 (12100324)
532750.00	4413250.00	80.37335 (12100324)	533250.00	4413250.00	61.15013 (12061424)
533750.00	4413250.00	56.57091 (12061424)	534250.00	4413250.00	17.14930 (12110916)
534750.00	4413250.00	26.11525 (12022924)	535250.00	4413250.00	22.07400 (12021724)
535750.00	4413250.00	29.22857 (12021724)	536250.00	4413250.00	16.58547 (12021724)
536750.00	4413250.00	12.11854 (12021724)	537250.00	4413250.00	11.26253 (12122116)
537750.00	4413250.00	11.91556 (12122116)	538250.00	4413250.00	12.11844 (12122116)
538750.00	4413250.00	12.04527 (12122116)	539250.00	4413250.00	11.68250 (12122116)
539750.00	4413250.00	11.18173 (12122116)	540250.00	4413250.00	10.63895 (12122116)
540750.00	4413250.00	11.56399 (12081308)	541250.00	4413250.00	17.65802 (12081308)
541750.00	4413250.00	31.49531 (12081308)	542250.00	4413250.00	24.66311 (12081308)
542750.00	4413250.00	17.28051 (12081308)	526750.00	4413750.00	61.10005 (12101624)
527250.00	4413750.00	43.07312 (12101624)	527750.00	4413750.00	49.78210 (12032324)
528250.00	4413750.00	60.92881 (12120908)	528750.00	4413750.00	74.75127 (12120908)
529250.00	4413750.00	44.16320 (12061408)	529750.00	4413750.00	15.21693 (12122616)
530250.00	4413750.00	15.47311 (12122616)	530750.00	4413750.00	16.42586 (12061308)
531250.00	4413750.00	158.29709 (12101624)	531750.00	4413750.00	72.48123 (12050908)
532250.00	4413750.00	66.66062 (12120608)	532750.00	4413750.00	88.67490 (12100324)
533750.00	4413750.00	15.81680 (12022916)	534250.00	4413750.00	26.84268 (12062724)
534750.00	4413750.00	22.78462 (12022924)	535250.00	4413750.00	34.25350 (12021724)
535750.00	4413750.00	25.88832 (12021724)	536250.00	4413750.00	13.40600 (12021724)
536750.00	4413750.00	13.17361 (12021724)	537250.00	4413750.00	12.25267 (12122116)
537750.00	4413750.00	12.69469 (12122116)	538250.00	4413750.00	12.60127 (12122116)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
538750.00	4413750.00	12.09732	(12122116)	539250.00	4413750.00	11.43409	(12122116)
539750.00	4413750.00	10.77138	(12122116)	540250.00	4413750.00	11.80917	(12081308)
540750.00	4413750.00	21.66047	(12081308)	541250.00	4413750.00	15.23685	(12081308)
541750.00	4413750.00	8.59399	(12122116)	542250.00	4413750.00	9.74605	(12111824)
542750.00	4413750.00	18.22518	(12111824)	526750.00	4414250.00	66.52404	(12102624)
527250.00	4414250.00	75.99898	(12101624)	527750.00	4414250.00	41.00515	(12101624)
528250.00	4414250.00	53.73893	(12101624)	528750.00	4414250.00	41.80594	(12032208)
529250.00	4414250.00	28.63650	(12032324)	529750.00	4414250.00	15.83557	(12122616)
530250.00	4414250.00	16.36062	(12122616)	530750.00	4414250.00	16.58328	(12122616)
531250.00	4414250.00	169.60565	(12091808)	531750.00	4414250.00	131.99053	(12120908)
532250.00	4414250.00	100.14766	(12050908)	532750.00	4414250.00	119.69904	(12111508)
533250.00	4414250.00	59.36036	(12043008)	533750.00	4414250.00	33.27812	(12062024)
534250.00	4414250.00	33.03114	(12022916)	534750.00	4414250.00	27.57531	(12082916)
535250.00	4414250.00	37.19704	(12021724)	535750.00	4414250.00	13.66014	(12021724)
536250.00	4414250.00	15.87677	(12021724)	536750.00	4414250.00	13.73344	(12021724)
537250.00	4414250.00	12.95065	(12122116)	537750.00	4414250.00	12.69793	(12122116)
538250.00	4414250.00	12.06537	(12122116)	538750.00	4414250.00	12.82847	(12081308)
539250.00	4414250.00	10.58580	(12122116)	539750.00	4414250.00	9.92324	(12122116)
540250.00	4414250.00	9.38285	(12122116)	540750.00	4414250.00	8.92889	(12122116)
541250.00	4414250.00	14.40859	(12011024)	541750.00	4414250.00	19.05581	(12011024)

542250.00	4414250.00	19.37410	(12011024)	542750.00	4414250.00	20.95993	(12011024)
526750.00	4414750.00	90.65373	(12101708)	527250.00	4414750.00	59.39866	(12112724)
527750.00	4414750.00	53.81722	(12072608)	528250.00	4414750.00	25.55636	(12072608)
528750.00	4414750.00	35.48382	(12101624)	529250.00	4414750.00	15.17828	(12122616)
529750.00	4414750.00	15.76438	(12122616)	530250.00	4414750.00	16.45552	(12122616)
530750.00	4414750.00	16.81464	(12122616)	531250.00	4414750.00	42.94722	(12091808)
531750.00	4414750.00	95.51417	(12091808)	532250.00	4414750.00	77.54922	(12120908)
533250.00	4414750.00	276.39374	(12102624)	533750.00	4414750.00	28.01001	(12100616)
534250.00	4414750.00	47.67952	(12062016)	534750.00	4414750.00	37.10628	(12090516)
535250.00	4414750.00	25.87053	(12081916)	535750.00	4414750.00	20.57368	(12021816)
536250.00	4414750.00	20.01838	(12021724)	536750.00	4414750.00	13.92528	(12021816)
537250.00	4414750.00	11.75113	(12122116)	537750.00	4414750.00	11.39264	(12122116)
538250.00	4414750.00	10.76461	(12122116)	538750.00	4414750.00	10.08667	(12122116)
539250.00	4414750.00	30.99911	(12051324)	539750.00	4414750.00	23.16718	(12051324)
540250.00	4414750.00	22.37771	(12051324)	540750.00	4414750.00	25.19374	(12111824)
541250.00	4414750.00	46.28447	(12111824)	541750.00	4414750.00	32.33394	(12011508)
542250.00	4414750.00	43.23223	(12011024)	542750.00	4414750.00	41.04132	(12011024)
526750.00	4415250.00	56.89522	(12101308)	527250.00	4415250.00	28.06584	(12101308)
527750.00	4415250.00	16.16040	(12040408)	528250.00	4415250.00	62.09720	(12092524)
528750.00	4415250.00	20.38250m	(12090908)	529250.00	4415250.00	14.50827	(12122616)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
529750.00	4415250.00	15.20356	(12122616)	530250.00	4415250.00	15.83491	(12122616)
530750.00	4415250.00	16.18773	(12122616)	531250.00	4415250.00	102.34568	(12082508)
531750.00	4415250.00	102.28745	(12121408)	532250.00	4415250.00	121.07350	(12121408)
532750.00	4415250.00	229.54593	(12022308)	533250.00	4415250.00	324.66845	(12022308)
533750.00	4415250.00	27.89078	(12082516)	534250.00	4415250.00	49.16743	(12082516)
534750.00	4415250.00	14.36576	(12101616)	535250.00	4415250.00	30.37785	(12082816)
535750.00	4415250.00	35.36957	(12082816)	536250.00	4415250.00	22.76991	(12021724)
536750.00	4415250.00	13.96823	(12082816)	537250.00	4415250.00	10.22388	(12010616)
537750.00	4415250.00	10.00928	(12010616)	538250.00	4415250.00	19.69305	(12040924)
538750.00	4415250.00	63.19680	(12011508)	539250.00	4415250.00	52.98400	(12011508)
539750.00	4415250.00	60.47444	(12011024)	540250.00	4415250.00	60.34408	(12053024)
540750.00	4415250.00	55.45919	(12111824)	541250.00	4415250.00	46.11406	(12092124)
541750.00	4415250.00	48.01581	(12011508)	542250.00	4415250.00	43.12951	(12011024)
542750.00	4415250.00	36.83133	(12011024)	526750.00	4415750.00	19.37490	(12040408)
527250.00	4415750.00	12.37775	(12122716)	527750.00	4415750.00	12.94469	(12122716)
528250.00	4415750.00	13.42717	(12122716)	528750.00	4415750.00	17.74418	(12040408)
529250.00	4415750.00	14.34256	(12122716)	529750.00	4415750.00	14.71762	(12122716)
530250.00	4415750.00	15.02299	(12122716)	530750.00	4415750.00	15.19415	(12122616)
531250.00	4415750.00	43.02350	(12101624)	531750.00	4415750.00	91.11918	(12112708)
532250.00	4415750.00	92.57436	(12121408)	532750.00	4415750.00	97.94882	(12091808)
533250.00	4415750.00	209.02959	(12110608)	533750.00	4415750.00	18.72783	(12072108)
534250.00	4415750.00	16.33823	(12071616)	534750.00	4415750.00	18.78045	(12052416)
535250.00	4415750.00	32.56531	(12051916)	535750.00	4415750.00	29.05264	(12041916)
536250.00	4415750.00	19.79660	(12030416)	536750.00	4415750.00	12.16871	(12030416)
537250.00	4415750.00	10.28292	(12010516)	537750.00	4415750.00	9.93581	(12010616)

538250.00	4415750.00	9.72591 (12010616)	538750.00	4415750.00	42.43994 (12111824)
539250.00	4415750.00	58.14299 (12011024)	539750.00	4415750.00	53.85493 (12011024)
540250.00	4415750.00	62.11662 (12011024)	540750.00	4415750.00	35.76290 (12110224)
541250.00	4415750.00	33.95515 (12110224)	541750.00	4415750.00	30.62403 (12110224)
542250.00	4415750.00	41.85709 (12011024)	542750.00	4415750.00	26.28744 (12011024)
526750.00	4416250.00	11.78755 (12122716)	527250.00	4416250.00	12.39382 (12122716)
527750.00	4416250.00	12.99195 (12122716)	528250.00	4416250.00	13.57367 (12122716)
528750.00	4416250.00	14.07211 (12122716)	529250.00	4416250.00	14.51310 (12122716)
529750.00	4416250.00	14.90086 (12122716)	530250.00	4416250.00	15.36037 (12122716)
530750.00	4416250.00	15.50669 (12122716)	531250.00	4416250.00	76.72676 (12101524)
531750.00	4416250.00	162.88470 (12121508)	532250.00	4416250.00	107.39339 (12011524)
532750.00	4416250.00	85.58367 (12031908)	533250.00	4416250.00	80.17004 (12100324)
533750.00	4416250.00	259.41700 (12110608)	534250.00	4416250.00	17.12393 (12062024)
534750.00	4416250.00	27.49079 (12022916)	535250.00	4416250.00	29.72656 (12042016)
535750.00	4416250.00	34.10875 (12021724)	536250.00	4416250.00	16.86007 (12031216)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 ,

KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)

536750.00	4416250.00	13.62092 (12031216)	537250.00	4416250.00	21.30400 (12022608)
537750.00	4416250.00	115.30279 (12022608)	538250.00	4416250.00	84.80120 (12022608)
538750.00	4416250.00	67.32257 (12102308)	539250.00	4416250.00	79.12834 (12011024)
539750.00	4416250.00	69.65026 (12011024)	540250.00	4416250.00	59.23854 (12011024)
540750.00	4416250.00	35.09658 (12011024)	541250.00	4416250.00	38.60739 (12011024)
541750.00	4416250.00	25.06047 (12011024)	542250.00	4416250.00	18.23560 (12011024)
542750.00	4416250.00	38.01058 (12011024)	526750.00	4416750.00	11.67307 (12122716)
527250.00	4416750.00	12.20473 (12122716)	527750.00	4416750.00	12.78307 (12122716)
528250.00	4416750.00	13.38918 (12122716)	528750.00	4416750.00	13.91896 (12122716)
529250.00	4416750.00	14.41360 (12122716)	529750.00	4416750.00	14.84678 (12122716)
530250.00	4416750.00	15.35457 (12122716)	530750.00	4416750.00	15.60578 (12122716)
531250.00	4416750.00	86.20630 (12022008)	531750.00	4416750.00	99.51551 (12100424)
532250.00	4416750.00	126.61586 (12032324)	532750.00	4416750.00	83.19334 (12120908)
533250.00	4416750.00	336.28179 (12102624)	534250.00	4416750.00	65.50931 (12052224)
534750.00	4416750.00	29.49437 (12083016)	535250.00	4416750.00	36.05054 (12082916)
535750.00	4416750.00	21.24377 (12081916)	536250.00	4416750.00	17.33740 (12031216)
536750.00	4416750.00	15.13259 (12031216)	537250.00	4416750.00	14.20616 (12012716)
537750.00	4416750.00	77.65840 (12081308)	538250.00	4416750.00	79.80409 (12081308)
538750.00	4416750.00	94.48013 (12022608)	539250.00	4416750.00	98.66051 (12022608)
539750.00	4416750.00	56.89617 (12011024)	540250.00	4416750.00	80.95867 (12011024)
540750.00	4416750.00	72.38699 (12011024)	541250.00	4416750.00	65.28393 (12011024)
541750.00	4416750.00	53.72721 (12011024)	542250.00	4416750.00	45.91655 (12011024)
542750.00	4416750.00	36.84195 (12011024)	526750.00	4417250.00	21.02508 (12041708)
527250.00	4417250.00	12.01404 (12122716)	527750.00	4417250.00	12.59939 (12122716)
528250.00	4417250.00	13.11875 (12122716)	528750.00	4417250.00	13.62422 (12122716)
529250.00	4417250.00	14.10011 (12122716)	529750.00	4417250.00	14.61071 (12122716)
530250.00	4417250.00	15.10507 (12122716)	530750.00	4417250.00	15.43576 (12122716)
531250.00	4417250.00	94.61763 (12041708)	531750.00	4417250.00	117.37479 (12041708)
532250.00	4417250.00	118.19690 (12112724)	532750.00	4417250.00	106.71756 (12121408)
533250.00	4417250.00	164.02487 (12121408)	533750.00	4417250.00	121.55687 (12121408)

534250.00	4417250.00	185.45165 (12021224)	534750.00	4417250.00	97.44767 (12101624)
535250.00	4417250.00	21.82271 (12101616)	535750.00	4417250.00	24.87731 (12021816)
536250.00	4417250.00	27.08509 (12021816)	536750.00	4417250.00	16.67092 (12021816)
537250.00	4417250.00	15.39596 (12010516)	537750.00	4417250.00	31.88676 (12041424)
538250.00	4417250.00	13.17387 (12010516)	538750.00	4417250.00	35.88949 (12082724)
539250.00	4417250.00	33.03612 (12040124)	539750.00	4417250.00	72.25202 (12022608)
540250.00	4417250.00	68.82489 (12011024)	540750.00	4417250.00	80.32045 (12011024)
541250.00	4417250.00	90.18848 (12011024)	541750.00	4417250.00	69.52111 (12011024)
542250.00	4417250.00	72.07988 (12011024)	542750.00	4417250.00	60.74399 (12011024)
526750.00	4417750.00	54.87873 (12082608)	527250.00	4417750.00	15.77532 (12050208)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
527750.00	4417750.00	12.19067 (12122716)	528250.00	4417750.00	12.69935 (12122716)
528750.00	4417750.00	13.18080 (12122716)	529250.00	4417750.00	13.65391 (12122716)
529750.00	4417750.00	14.13280 (12122716)	530250.00	4417750.00	14.58702 (12122716)
530750.00	4417750.00	14.97647 (12122716)	531250.00	4417750.00	15.22213 (12122716)

531750.00 4417750.00 73.76251 (12082608) 532250.00 4417750.00 145.47589 (12040808)

532750.00 4417750.00 160.31288 (12021408) 533250.00 4417750.00 175.65506 (12121408)

533750.00 4417750.00 52.85853 (12071024) 534250.00 4417750.00 18.35416 (12090416)

534750.00 4417750.00 22.73913 (12082616) 535250.00 4417750.00 20.31555 (12101616)

535750.00 4417750.00 38.92284 (12033116) 536250.00 4417750.00 28.35825 (12030416)

536750.00 4417750.00 18.69310 (12010516) 537250.00 4417750.00 17.80820 (12010516)

537750.00 4417750.00 63.76004 (12110224) 538250.00 4417750.00 14.95450 (12010516)

538750.00 4417750.00 13.64963 (12010516) 539250.00 4417750.00 12.69077 (12012716)

539750.00 4417750.00 46.49046 (12041024) 540250.00 4417750.00 57.55184 (12102724)

540750.00 4417750.00 51.31145 (12100224) 541250.00 4417750.00 85.77353 (12011024)

541750.00 4417750.00 70.82417 (12011024) 542250.00 4417750.00 81.18156 (12011024)

542750.00 4417750.00 70.71222 (12011024) 526750.00 4418250.00 81.20550 (12013008)

527250.00 4418250.00 38.16544 (12082608) 527750.00 4418250.00 12.09405 (12010416)

528250.00 4418250.00 12.52230 (12010416) 528750.00 4418250.00 12.92786 (12010416)

529250.00 4418250.00 13.24062 (12010416) 529750.00 4418250.00 13.54612 (12010416)

530250.00 4418250.00 13.88278 (12122716) 530750.00 4418250.00 14.34115 (12122716)

531250.00 4418250.00 14.58352 (12122716) 531750.00 4418250.00 50.58102 (12011624)

532250.00 4418250.00 31.14999 (12082724) 532750.00 4418250.00 83.38326 (12073024)

533250.00 4418250.00 144.21945 (12013008) 534250.00 4418250.00 18.44289 (12020416)

534750.00 4418250.00 18.98734 (12020416) 535250.00 4418250.00 30.24987 (12041316)

535750.00 4418250.00 34.05323 (12042016) 536250.00 4418250.00 24.00732 (12040916)

536750.00 4418250.00 19.87450 (12031216) 537250.00 4418250.00 18.64411 (12010516)

537750.00 4418250.00 17.46168 (12010516) 538250.00 4418250.00 16.04688 (12010516)

538750.00 4418250.00 14.74517 (12010516) 539250.00 4418250.00 16.86151 (12041424)

539750.00 4418250.00 12.57566 (12012716) 540250.00 4418250.00 13.24757 (12041624)

540750.00 4418250.00 24.99852 (12041024) 541250.00 4418250.00 47.03271 (12011024)

541750.00 4418250.00 73.83366 (12011024) 542250.00 4418250.00 58.56723 (12011024)

542750.00 4418250.00 48.09013 (12011024) 526750.00 4418750.00 45.00889 (12022008)

527250.00 4418750.00 28.37998 (12022008) 527750.00 4418750.00 12.02895 (12010416)

528250.00 4418750.00 12.36476 (12010416) 528750.00 4418750.00 12.63873 (12010416)

529250.00 4418750.00 12.84850 (12010416) 529750.00 4418750.00 13.02731 (12010416)

530250.00	4418750.00	13.21079 (12010416)	530750.00	4418750.00	13.60098 (12122716)
531250.00	4418750.00	13.99320 (12122716)	531750.00	4418750.00	14.11679 (12122716)
532250.00	4418750.00	14.70832 (12021316)	532750.00	4418750.00	15.23126 (12021316)
533250.00	4418750.00	50.54956 (12010408)	533750.00	4418750.00	19.06697 (12020416)
534250.00	4418750.00	21.61801 (12020416)	534750.00	4418750.00	21.97942 (12020416)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC (YYMMDDHH)
535250.00	4418750.00	19.30347 (12012516)	535750.00	4418750.00	27.08764 (12042016)
536250.00	4418750.00	20.45532 (12031216)	536750.00	4418750.00	20.03357 (12010516)
537250.00	4418750.00	19.08726 (12010516)	537750.00	4418750.00	17.71268 (12010516)
538250.00	4418750.00	55.90222 (12040124)	538750.00	4418750.00	16.03427 (12011324)
539250.00	4418750.00	26.22489 (12011408)	539750.00	4418750.00	54.33034 (12041424)
540250.00	4418750.00	31.63343 (12041424)	540750.00	4418750.00	21.88259 (12022608)
541250.00	4418750.00	24.84077 (12052824)	541750.00	4418750.00	47.23114 (12011024)
542250.00	4418750.00	47.80006 (12011024)	542750.00	4418750.00	65.74984 (12011024)
526750.00	4419250.00	27.19861 (12020208)	527250.00	4419250.00	14.39751 (12062708)

527750.00	4419250.00	11.69503 (12010416)	528250.00	4419250.00	11.92847 (12010416)
528750.00	4419250.00	12.12483 (12010416)	529250.00	4419250.00	12.24018 (12010416)
529750.00	4419250.00	12.32465 (12010416)	530250.00	4419250.00	12.40199 (12010416)
530750.00	4419250.00	12.78474 (12122716)	531250.00	4419250.00	13.41147 (12021316)
531750.00	4419250.00	14.29214 (12021316)	532250.00	4419250.00	14.96508 (12021316)
532750.00	4419250.00	15.42062 (12021316)	533250.00	4419250.00	17.80089 (12020416)
533750.00	4419250.00	20.58360 (12020416)	534250.00	4419250.00	22.54705 (12020416)
534750.00	4419250.00	33.35689 (12011824)	535250.00	4419250.00	36.11039 (12010224)
535750.00	4419250.00	23.68048 (12012516)	536250.00	4419250.00	22.36127 (12012516)
536750.00	4419250.00	20.24726 (12010516)	537250.00	4419250.00	19.38179 (12010516)
537750.00	4419250.00	17.86604 (12010516)	538250.00	4419250.00	16.36589 (12010516)
538750.00	4419250.00	15.84154 (12020716)	539250.00	4419250.00	21.22154 (12030508)
539750.00	4419250.00	42.09630 (12030508)	540250.00	4419250.00	39.89677 (12011408)
540750.00	4419250.00	62.63459 (12022608)	541250.00	4419250.00	44.67331 (12011108)
541750.00	4419250.00	64.22251 (12011024)	542250.00	4419250.00	31.12066 (12052824)
542750.00	4419250.00	51.42098 (12011024)	526750.00	4419750.00	28.83432 (12021324)
527250.00	4419750.00	15.59552 (12073024)	527750.00	4419750.00	11.21934 (12010416)
528250.00	4419750.00	11.35009 (12010416)	528750.00	4419750.00	11.41355 (12010416)
529250.00	4419750.00	11.44002 (12010416)	529750.00	4419750.00	11.47314 (12010416)
530250.00	4419750.00	11.88164 (12021316)	530750.00	4419750.00	12.92030 (12021316)
531250.00	4419750.00	13.85893 (12021316)	531750.00	4419750.00	14.65657 (12021316)
532250.00	4419750.00	15.15290 (12021316)	532750.00	4419750.00	15.82279 (12020416)
533250.00	4419750.00	18.48202 (12020416)	533750.00	4419750.00	20.55296 (12020416)
534250.00	4419750.00	21.83335 (12020416)	534750.00	4419750.00	34.60742 (12040624)
535250.00	4419750.00	20.97799 (12012516)	535750.00	4419750.00	23.34407 (12012516)
536250.00	4419750.00	22.52579 (12012516)	536750.00	4419750.00	20.90628 (12020516)
537250.00	4419750.00	19.35369 (12010516)	537750.00	4419750.00	17.93490 (12010516)
538250.00	4419750.00	16.44312 (12010516)	538750.00	4419750.00	16.01747 (12020716)
539250.00	4419750.00	16.08562 (12020716)	539750.00	4419750.00	15.76187 (12020716)
540250.00	4419750.00	19.50576 (12030508)	540750.00	4419750.00	50.44006 (12030508)
541250.00	4419750.00	77.75655 (12100724)	541750.00	4419750.00	63.95695 (12011024)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
542250.00	4419750.00	63.46322	(12011024)	542750.00	4419750.00	58.85799	(12011024)
526750.00	4420250.00	29.45056	(12111224)	527250.00	4420250.00	10.45437	(12010416)
527750.00	4420250.00	10.55676	(12010416)	528250.00	4420250.00	10.57541	(12010416)
528750.00	4420250.00	10.55559	(12010416)	529250.00	4420250.00	10.53232	(12010416)
529750.00	4420250.00	11.43507	(12021316)	530250.00	4420250.00	12.42862	(12021316)
530750.00	4420250.00	13.46943	(12021316)	531250.00	4420250.00	14.24472	(12021316)
531750.00	4420250.00	14.94351	(12021316)	532250.00	4420250.00	15.45535	(12021316)
532750.00	4420250.00	16.57320	(12020416)	533250.00	4420250.00	18.08731	(12020416)
533750.00	4420250.00	19.35805	(12020416)	534250.00	4420250.00	20.21122	(12020416)
534750.00	4420250.00	19.30743	(12020416)	535250.00	4420250.00	20.40063	(12012516)
535750.00	4420250.00	22.42106	(12012516)	536250.00	4420250.00	22.81352	(12012516)
536750.00	4420250.00	21.53536	(12020516)	537250.00	4420250.00	19.24038	(12020516)
537750.00	4420250.00	17.60692	(12020316)	538250.00	4420250.00	16.53257	(12020316)
538750.00	4420250.00	15.29096	(12020316)	539250.00	4420250.00	15.77899	(12020716)

539750.00	4420250.00	15.83612 (12020716)	540250.00	4420250.00	15.49601 (12020716)
540750.00	4420250.00	26.42467 (12030508)	541250.00	4420250.00	66.21510m (12041124)
541750.00	4420250.00	52.32940 (12011024)	542250.00	4420250.00	37.37395 (12011024)
542750.00	4420250.00	50.39106 (12011024)	526750.00	4420750.00	25.06875 (12022008)
527250.00	4420750.00	9.74943 (12010416)	527750.00	4420750.00	9.74320 (12010416)
528250.00	4420750.00	9.67765 (12010416)	528750.00	4420750.00	9.96003 (12021316)
529250.00	4420750.00	10.93942 (12021316)	529750.00	4420750.00	11.94006 (12021316)
530250.00	4420750.00	12.85820 (12021316)	530750.00	4420750.00	13.81971 (12021316)
531250.00	4420750.00	14.50229 (12021316)	531750.00	4420750.00	14.97148 (12021316)
532250.00	4420750.00	18.73696 (12082724)	532750.00	4420750.00	16.52842 (12020416)
533250.00	4420750.00	17.94302 (12020416)	533750.00	4420750.00	18.47075 (12020416)
534250.00	4420750.00	18.21175 (12020416)	534750.00	4420750.00	17.68587 (12020416)
535250.00	4420750.00	19.71291 (12012516)	535750.00	4420750.00	21.36127 (12012516)
536250.00	4420750.00	22.52952 (12012516)	536750.00	4420750.00	21.75790 (12012516)
537250.00	4420750.00	19.69464 (12020516)	537750.00	4420750.00	17.15337 (12020516)
538250.00	4420750.00	16.18623 (12020316)	538750.00	4420750.00	15.08729 (12020316)
539250.00	4420750.00	14.81162 (12020716)	539750.00	4420750.00	15.26382 (12020716)
540250.00	4420750.00	15.30772 (12020716)	540750.00	4420750.00	14.91043 (12020716)
541250.00	4420750.00	39.45878 (12030508)	541750.00	4420750.00	45.06075m (12041124)
542250.00	4420750.00	40.69105 (12010108)	542750.00	4420750.00	17.52638 (12011024)
526750.00	4421250.00	8.98334 (12010416)	527250.00	4421250.00	8.95493 (12010416)
527750.00	4421250.00	8.85291 (12010416)	528250.00	4421250.00	9.52000 (12021316)
528750.00	4421250.00	10.42962 (12021316)	529250.00	4421250.00	11.39233 (12021316)
529750.00	4421250.00	12.33981 (12021316)	530250.00	4421250.00	13.26805 (12082724)
530750.00	4421250.00	13.94194 (12021316)	531250.00	4421250.00	14.47005 (12021316)
531750.00	4421250.00	14.64540 (12021316)	532250.00	4421250.00	64.61094 (12082724)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
532750.00	4421250.00	16.39019	(12020416)	533250.00	4421250.00	17.29780	(12020416)
533750.00	4421250.00	17.62748	(12020416)	534250.00	4421250.00	17.11588	(12020416)
534750.00	4421250.00	16.26046	(12012516)	535250.00	4421250.00	18.72892	(12012516)
535750.00	4421250.00	20.91023	(12012516)	536250.00	4421250.00	22.10166	(12012516)
536750.00	4421250.00	21.57972	(12012516)	537250.00	4421250.00	19.83987	(12012516)
537750.00	4421250.00	17.69070	(12020516)	538250.00	4421250.00	15.68261	(12020316)
538750.00	4421250.00	15.01978	(12020316)	539250.00	4421250.00	14.24901	(12020316)
539750.00	4421250.00	14.19731	(12020716)	540250.00	4421250.00	14.60147	(12020716)
540750.00	4421250.00	14.63949	(12020716)	541250.00	4421250.00	14.29168	(12020716)
541750.00	4421250.00	36.42515	(12121624)	542250.00	4421250.00	41.56944	(12101124)
542750.00	4421250.00	46.05050	(12010108)	526750.00	4421750.00	8.17144	(12010416)
527250.00	4421750.00	8.29594	(12021316)	527750.00	4421750.00	9.09932	(12021316)
528250.00	4421750.00	9.96273	(12021316)	528750.00	4421750.00	10.83609	(12021316)
529250.00	4421750.00	11.71795	(12021316)	529750.00	4421750.00	12.55329	(12021316)
530250.00	4421750.00	20.59693m	(12072008)	530750.00	4421750.00	25.15465	(12031424)
531250.00	4421750.00	28.55910	(12031424)	531750.00	4421750.00	14.07417	(12021316)
532250.00	4421750.00	37.32664	(12082724)	532750.00	4421750.00	15.92271	(12020416)
533250.00	4421750.00	16.44011	(12020416)	533750.00	4421750.00	16.49046	(12020416)
534250.00	4421750.00	15.99223	(12020416)	534750.00	4421750.00	15.74377	(12012516)

535250.00	4421750.00	18.17619 (12012516)	535750.00	4421750.00	19.63278 (12012516)
536250.00	4421750.00	21.09893 (12012516)	536750.00	4421750.00	20.98180 (12012516)
537250.00	4421750.00	19.73914 (12012516)	537750.00	4421750.00	17.86377 (12012516)
538250.00	4421750.00	15.81605 (12020516)	538750.00	4421750.00	14.36871 (12020316)
539250.00	4421750.00	13.69420 (12020316)	539750.00	4421750.00	13.16853 (12020316)
540250.00	4421750.00	13.48092 (12020716)	540750.00	4421750.00	13.85716 (12020716)
541250.00	4421750.00	13.90855 (12020716)	541750.00	4421750.00	13.64782 (12020716)
542250.00	4421750.00	40.57426 (12121624)	542750.00	4421750.00	36.90742 (12101124)
526750.00	4422250.00	7.97419 (12021316)	527250.00	4422250.00	8.72151 (12021316)
527750.00	4422250.00	9.52796 (12021316)	528250.00	4422250.00	10.35653 (12021316)
528750.00	4422250.00	16.50521 (12031424)	529250.00	4422250.00	17.21252 (12082724)
529750.00	4422250.00	12.60871 (12021316)	530250.00	4422250.00	27.32494 (12031424)
530750.00	4422250.00	41.47376 (12021408)	531250.00	4422250.00	49.31304 (12021408)
531750.00	4422250.00	33.65850 (12082724)	532250.00	4422250.00	18.75855 (12072724)
532750.00	4422250.00	18.28409 (12080808)	533250.00	4422250.00	15.54398 (12020416)
533750.00	4422250.00	15.39749 (12020416)	534250.00	4422250.00	14.83297 (12020416)
534750.00	4422250.00	15.02362 (12012516)	535250.00	4422250.00	16.93635 (12012516)
535750.00	4422250.00	18.34556 (12012516)	536250.00	4422250.00	19.46796 (12012516)
536750.00	4422250.00	19.97931 (12012516)	537250.00	4422250.00	19.25713 (12012516)
537750.00	4422250.00	17.85902 (12012516)	538250.00	4422250.00	16.09651 (12020516)
538750.00	4422250.00	14.11405 (12020516)	539250.00	4422250.00	13.10114 (12020316)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 ,

KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
539750.00	4422250.00	12.64972	(12020316)	540250.00	4422250.00	12.24876	(12020316)
540750.00	4422250.00	12.75406	(12020716)	541250.00	4422250.00	13.08126	(12020716)
541750.00	4422250.00	13.17000	(12020716)	542250.00	4422250.00	17.05995	(12033008)
542750.00	4422250.00	39.14420	(12121624)	526750.00	4422750.00	10.07273	(12061008)
527250.00	4422750.00	17.71375	(12031424)	527750.00	4422750.00	25.03493	(12031424)
528250.00	4422750.00	22.02511	(12031424)	528750.00	4422750.00	16.38980	(12082724)
529250.00	4422750.00	22.38933	(12031424)	529750.00	4422750.00	27.26802	(12031424)
530250.00	4422750.00	41.35978	(12031424)	530750.00	4422750.00	45.95790	(12010324)
531250.00	4422750.00	46.19962	(12010408)	531750.00	4422750.00	40.97776	(12011908)
532250.00	4422750.00	25.75118	(12011824)	532750.00	4422750.00	40.99008	(12080808)
533250.00	4422750.00	14.61976	(12020416)	533750.00	4422750.00	14.32660	(12020416)
534250.00	4422750.00	13.67936	(12020416)	534750.00	4422750.00	14.26628	(12012516)
535250.00	4422750.00	16.18613	(12012516)	535750.00	4422750.00	17.54088	(12012516)
536250.00	4422750.00	18.06255	(12012516)	536750.00	4422750.00	18.55076	(12012516)
537250.00	4422750.00	18.39420	(12012516)	537750.00	4422750.00	17.63120	(12012516)
538250.00	4422750.00	16.13198	(12041508)	538750.00	4422750.00	14.45546	(12020516)
539250.00	4422750.00	12.59208	(12020516)	539750.00	4422750.00	12.04502	(12020316)
540250.00	4422750.00	11.72088	(12020316)	540750.00	4422750.00	11.50080	(12020716)
541250.00	4422750.00	20.41331	(12011324)	541750.00	4422750.00	19.51219	(12030508)
542250.00	4422750.00	15.70251	(12011408)	542750.00	4422750.00	31.22967	(12033008)
526750.00	4423250.00	22.08645	(12010324)	527250.00	4423250.00	25.25899	(12021408)
527750.00	4423250.00	30.69349	(12021408)	528250.00	4423250.00	33.41476	(12021408)
528750.00	4423250.00	24.07594	(12101008)	529250.00	4423250.00	26.91339	(12101008)
529750.00	4423250.00	39.96897	(12031424)	530250.00	4423250.00	40.41827	(12021408)

530750.00	4423250.00	41.60785 (12010324)	531250.00	4423250.00	46.54379 (12121408)
531750.00	4423250.00	48.32085 (12011124)	532250.00	4423250.00	27.17117 (12010408)
532750.00	4423250.00	40.23713 (12010408)	533250.00	4423250.00	22.93243 (12011824)
533750.00	4423250.00	13.29237 (12020416)	534250.00	4423250.00	12.62336 (12020416)
534750.00	4423250.00	13.52892 (12012516)	535250.00	4423250.00	15.26163 (12012516)
535750.00	4423250.00	16.79119 (12012516)	536250.00	4423250.00	17.41615 (12012516)
536750.00	4423250.00	17.27215 (12012516)	537250.00	4423250.00	17.61243 (12012516)
537750.00	4423250.00	17.22572 (12012516)	538250.00	4423250.00	74.41818 (12031224)
538750.00	4423250.00	20.74130 (12020524)	539250.00	4423250.00	13.00093 (12020516)
539750.00	4423250.00	11.48573 (12020316)	540250.00	4423250.00	11.13028 (12020316)
540750.00	4423250.00	15.72096 (12121124)	541250.00	4423250.00	28.35388 (12121124)
541750.00	4423250.00	36.39663 (12121624)	542250.00	4423250.00	32.57148 (12030508)
542750.00	4423250.00	24.70596 (12011408)	526750.00	4423750.00	27.23498 (12010324)
527250.00	4423750.00	23.58633 (12031424)	527750.00	4423750.00	31.83530 (12010324)
528250.00	4423750.00	43.65362 (12010324)	528750.00	4423750.00	39.08505 (12010324)
529250.00	4423750.00	34.01765 (12010324)	529750.00	4423750.00	37.49645 (12021408)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
530250.00	4423750.00	30.15051	(12021408)	530750.00	4423750.00	41.60566	(12121408)
531250.00	4423750.00	38.24704	(12122224)	531750.00	4423750.00	49.22980	(12122224)
532250.00	4423750.00	39.29345	(12011124)	532750.00	4423750.00	40.28871	(12011124)
533250.00	4423750.00	30.54838	(12011824)	533750.00	4423750.00	12.38092	(12020416)
534250.00	4423750.00	11.70949	(12020416)	534750.00	4423750.00	12.81691	(12012516)
535250.00	4423750.00	14.40794	(12012516)	535750.00	4423750.00	15.78488	(12012516)
536250.00	4423750.00	16.75710	(12012516)	536750.00	4423750.00	16.82977	(12012516)
537250.00	4423750.00	16.34665	(12012516)	537750.00	4423750.00	16.66976	(12012516)
538250.00	4423750.00	17.94754	(12010824)	538750.00	4423750.00	14.62221	(12020516)
539250.00	4423750.00	13.28248	(12020516)	539750.00	4423750.00	12.12944	(12020516)
540250.00	4423750.00	11.34457	(12020316)	540750.00	4423750.00	11.00821	(12020316)
541250.00	4423750.00	27.63891	(12121124)	541750.00	4423750.00	41.61120	(12121124)
542250.00	4423750.00	49.14931	(12121624)	542750.00	4423750.00	40.07650	(12030508)
526750.00	4424250.00	33.06079	(12010324)	527250.00	4424250.00	32.79568	(12010324)
527750.00	4424250.00	38.24120	(12010324)	528250.00	4424250.00	28.57390	(12010324)
528750.00	4424250.00	44.17483	(12010324)	529250.00	4424250.00	38.33869	(12010324)
529750.00	4424250.00	32.04087	(12021408)	530250.00	4424250.00	31.07860	(12101008)
530750.00	4424250.00	40.90915	(12121408)	531250.00	4424250.00	39.01298	(12122224)
531750.00	4424250.00	51.35914	(12122224)	532250.00	4424250.00	49.03879	(12011124)
532750.00	4424250.00	44.18591	(12122224)	533250.00	4424250.00	26.49361	(12122224)
533750.00	4424250.00	12.85804	(12062508)	534250.00	4424250.00	10.89718	(12020416)
534750.00	4424250.00	12.14798	(12012516)	535250.00	4424250.00	13.59792	(12012516)
535750.00	4424250.00	14.88410	(12012516)	536250.00	4424250.00	15.61288	(12012516)
536750.00	4424250.00	15.71514	(12012516)	537250.00	4424250.00	15.58648	(12012516)
537750.00	4424250.00	16.18898	(12012516)	538250.00	4424250.00	15.43815	(12012516)
538750.00	4424250.00	14.49685	(12020516)	539250.00	4424250.00	13.39872	(12020516)
539750.00	4424250.00	12.52292	(12020516)	540250.00	4424250.00	11.65206	(12020516)
540750.00	4424250.00	11.14172	(12020316)	541250.00	4424250.00	13.01011	(12101124)
541750.00	4424250.00	24.18671	(12101124)	542250.00	4424250.00	40.15322	(12101124)

542750.00	4424250.00	53.75445	(12121624)	526750.00	4424750.00	22.98756	(12010324)
527250.00	4424750.00	32.16320	(12010324)	527750.00	4424750.00	20.18598	(12010324)
528250.00	4424750.00	19.33063	(12010324)	528750.00	4424750.00	41.13000	(12010324)
529250.00	4424750.00	36.33167	(12010324)	529750.00	4424750.00	32.18001	(12121408)
530250.00	4424750.00	37.39865	(12121408)	530750.00	4424750.00	38.35999	(12011124)
531250.00	4424750.00	42.53049	(12122224)	531750.00	4424750.00	44.99410	(12122224)
532250.00	4424750.00	43.71010	(12122224)	532750.00	4424750.00	48.65964	(12122224)
533250.00	4424750.00	31.70383	(12122224)	533750.00	4424750.00	17.01789	(12012508)
534250.00	4424750.00	10.19736	(12020416)	534750.00	4424750.00	14.01913	(12010224)
535250.00	4424750.00	12.85697	(12012516)	535750.00	4424750.00	14.04751	(12012516)
536250.00	4424750.00	14.64733	(12012516)	536750.00	4424750.00	14.79924	(12012516)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: KUMULAT ***

INCLUDING SOURCE(S): BACA1 , BACA2 , ESER1A , ESER1B , KKALE1 , KKALE2 , KKALE3 ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
537250.00	4424750.00	15.72521	(12012516)	537750.00	4424750.00	15.59422	(12012516)
538250.00	4424750.00	14.97627	(12012516)	538750.00	4424750.00	14.25635	(12020516)
539250.00	4424750.00	13.42827	(12020516)	539750.00	4424750.00	12.78745	(12020516)

540250.00	4424750.00	12.20754 (12020516)	540750.00	4424750.00	11.01520 (12020316)
541250.00	4424750.00	10.87983 (12020316)	541750.00	4424750.00	15.02288 (12101124)
542250.00	4424750.00	20.51657 (12101124)	542750.00	4424750.00	37.63256 (12101124)
526750.00	4425250.00	10.70926 (12031408)	527250.00	4425250.00	18.57526 (12010324)
527750.00	4425250.00	11.74026 (12031408)	528250.00	4425250.00	17.02996 (12031408)
528750.00	4425250.00	26.44118 (12010324)	529250.00	4425250.00	18.05184 (12031408)
529750.00	4425250.00	23.47502 (12121408)	530250.00	4425250.00	35.34526 (12121408)
530750.00	4425250.00	38.75868 (12011124)	531250.00	4425250.00	43.46658 (12122224)
531750.00	4425250.00	31.01293 (12122224)	532250.00	4425250.00	23.23996 (12122224)
532750.00	4425250.00	26.20510 (12122224)	533250.00	4425250.00	36.87085 (12122224)
533750.00	4425250.00	24.62228 (12012508)	534250.00	4425250.00	22.63620 (12041924)
534750.00	4425250.00	32.19428 (12010224)	535250.00	4425250.00	12.16050 (12012516)
535750.00	4425250.00	14.40387 (12012424)	536250.00	4425250.00	14.00822 (12012516)
536750.00	4425250.00	13.96577 (12012516)	537250.00	4425250.00	14.27774 (12012516)
537750.00	4425250.00	14.20237 (12012516)	538250.00	4425250.00	14.38426 (12012516)
538750.00	4425250.00	13.94110 (12020516)	539250.00	4425250.00	13.40260 (12020516)
539750.00	4425250.00	13.03423 (12020516)	540250.00	4425250.00	12.62668 (12020516)
540750.00	4425250.00	11.63445 (12020516)	541250.00	4425250.00	10.61663 (12020316)
541750.00	4425250.00	10.36701 (12020316)	542250.00	4425250.00	14.88753 (12101124)
542750.00	4425250.00	19.00268 (12052708)	528142.30	4424000.10	58.77413 (12010324)
528641.50	4421424.20	10.37827 (12021316)	530578.20	4414421.80	16.72099 (12122616)
533199.90	4420647.00	17.85758 (12020416)	537336.40	4419481.40	19.13259 (12010516)
538624.80	4413866.50	12.14479 (12122116)	538699.00	4411952.40	10.24404 (12122116)
539685.20	4412636.40	11.03555 (12122116)	540884.80	4419539.60	65.53268 (12022608)

**MODELOPTs: RegDFAULT CONC ELEV

*** THE SUMMARY OF HIGHEST 8-HR RESULTS ***

** CONC OF CO IN MICROGRAMS/M**3 **

DATE NETWORK

GROUP ID AVERAGE CONC (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

- -

TESIS HIGH 1ST HIGH VALUE IS 324.47909 ON 12022308: AT (533250.00, 4415250.00, 888.20, 888.20, 0.00) DC

KUMULAT HIGH 1ST HIGH VALUE IS 336.28179 ON 12102624: AT (533250.00, 4416750.00, 886.30, 886.30, 0.00) DC

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC ELEV

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)

A Total of 0 Warning Message(s)

A Total of 65 Informational Message(s)

A Total of 8784 Hours Were Processed

A Total of 2 Calm Hours Identified

A Total of 63 Missing Hours Identified (0.72 Percent)

******** FATAL ERROR MESSAGES ********

*** NONE ***

******** WARNING MESSAGES ********

*** NONE ***

****

*** AERMOD Finishes Successfully ***

****

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CO STARTING
CO TITLEONE  ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT
CO MODELOPT  DFAULT  CONC DDEP NODRYDPLT NOWETDPLT
CO RUNORNOT  RUN
CO AVERTIME  24  MONTH ANNUAL
CO POLLUTID  PM10
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  TESIS  AREAPOLY  534446.9  4415637.7  689.97
SO SRCPARAM  TESIS  0.0000355  35  17
SO AREAVERT  TESIS  534446.9 4415637.7  534492.0 4415660.2
SO AREAVERT  TESIS  534502.5 4415648.2  534559.6 4415661.8
SO AREAVERT  TESIS  534837.7 4415546.0  534979.0 4415403.2
SO AREAVERT  TESIS  535121.8 4415269.4  535260.1 4415168.7
SO AREAVERT  TESIS  535263.1 4415149.2  535096.3 4415054.5
SO AREAVERT  TESIS  535018.1 4415034.9  534944.5 4414968.8
SO AREAVERT  TESIS  534903.9 4415030.4  534806.2 4415113.1
SO AREAVERT  TESIS  534707.0 4415270.9  534436.4 4415355.1
SO AREAVERT  TESIS  534463.4 4415409.2
SO PARTDIAM TESIS 0.35 0.70 1.10 2.00 3.60 5.50 8.10 12.50 15.00
SO MASSFRAX TESIS 0.224 0.076 0.082 0.105 0.103 0.073 0.104 0.105 0.128
SO PARTDENS TESIS 1. 1. 1. 1. 1. 1. 1. 1. 1.
SO SRCGROUP  ALL
SO FINISHED

RE STARTING
RE ELEVUNIT  METERS
RE GRIDCART ETKI STA
```

RE GRIDCART ETKI XYINC 532350 21 250 4412800 21 250

RE GRIDCART ETKI ELEV 1 908.3 913.6 865.5 843.2 836.5 841.5 823.9 787.4

RE GRIDCART ETKI ELEV 1 754.7 746.5 743.1 706.1 704.0 682.8 679.9 675.4

RE GRIDCART ETKI ELEV 1 682.9 720.1 747.3 771.0 765.1

RE GRIDCART ETKI ELEV 2 946.5 942.5 915.1 872.3 847.7 856.0 838.0 773.6

RE GRIDCART ETKI ELEV 2 738.1 751.0 751.7 708.7 689.7 680.7 672.0 674.4

RE GRIDCART ETKI ELEV 2 697.6 723.8 761.2 779.9 784.5

RE GRIDCART ETKI ELEV 3 987.8 983.4 951.5 904.7 881.6 881.2 805.1 771.2

RE GRIDCART ETKI ELEV 3 737.3 719.0 718.1 699.4 686.9 672.4 675.3 687.8

RE GRIDCART ETKI ELEV 3 720.1 740.1 750.3 783.6 802.6

RE GRIDCART ETKI ELEV 4 1023.9 963.3 948.9 911.4 912.7 853.5 793.6

RE GRIDCART ETKI ELEV 4 760.4 757.2 727.9 702.7 697.7 678.0 672.7 683.7

RE GRIDCART ETKI ELEV 4 718.7 747.7 767.5 774.3 804.4 812.2

RE GRIDCART ETKI ELEV 5 1006.7 949.6 936.9 872.6 856.0 834.2 792.2

RE GRIDCART ETKI ELEV 5 788.0 787.9 743.5 701.9 685.0 670.9 670.8 699.1

RE GRIDCART ETKI ELEV 5 722.3 729.1 740.3 748.1 796.3 785.8

RE GRIDCART ETKI ELEV 6 976.2 943.0 884.8 861.5 815.3 793.2 785.8 767.7

RE GRIDCART ETKI ELEV 6 794.7 755.9 714.0 683.3 671.2 671.2 691.5 703.6

RE GRIDCART ETKI ELEV 6 710.9 716.8 731.0 737.0 751.0

RE GRIDCART ETKI ELEV 7 956.5 935.1 882.6 848.2 848.1 792.6 769.2 754.2

RE GRIDCART ETKI ELEV 7 748.6 776.9 736.6 689.1 671.0 673.2 684.2 692.0

RE GRIDCART ETKI ELEV 7 699.0 705.4 711.0 717.1 723.2

RE GRIDCART ETKI ELEV 8 988.0 936.6 912.2 896.3 862.1 804.7 766.8 745.5

RE GRIDCART ETKI ELEV 8 735.5 723.7 718.5 713.4 669.5 673.2 680.9 687.2

RE GRIDCART ETKI ELEV 8 693.8 700.9 713.7 724.0 732.9

RE GRIDCART ETKI ELEV 9 1003.5 981.8 926.2 872.1 829.4 795.0 778.4

RE GRIDCART ETKI ELEV 9 763.1 760.4 724.6 701.4 688.1 669.2 673.4 679.7

RE GRIDCART ETKI ELEV 9 688.0 700.6 713.6 717.1 729.2 744.6

RE GRIDCART ETKI ELEV 10 1016.9 990.5 950.3 933.7 864.4 813.5 761.0

RE GRIDCART ETKI ELEV 10 737.1 738.6 712.9 683.9 677.7 671.6 670.4

RE GRIDCART ETKI ELEV 10 682.1 690.8 701.3 726.7 746.5 739.5 762.6

RE GRIDCART ETKI ELEV 11 1024.3 989.3 956.2 918.2 858.3 808.1 762.1

RE GRIDCART ETKI ELEV 11 745.5 714.4 705.2 676.1 671.1 669.5 683.1

RE GRIDCART ETKI ELEV 11 708.0 721.8 703.1 723.1 755.0 754.6 785.6

RE GRIDCART ETKI ELEV 12 1021.2 985.4 923.1 877.1 825.9 809.1 786.3

RE GRIDCART ETKI ELEV 12 730.4 700.9 664.2 665.8 678.4 686.7 708.6

RE GRIDCART ETKI ELEV 12 730.5 747.5 710.3 720.8 748.8 787.7 788.5

RE GRIDCART ETKI ELEV 13 1003.8 1001.2 938.3 897.7 890.6 835.9 779.2

RE GRIDCART ETKI ELEV 13 744.6 702.3 668.2 666.0 680.9 711.9 696.4

RE GRIDCART ETKI ELEV 13 732.8 757.4 717.4 724.6 748.4 775.2 814.9

RE GRIDCART ETKI ELEV 14 993.7 1011.6 968.4 961.6 951.7 878.8 854.1

RE GRIDCART ETKI ELEV 14 779.3 743.1 698.9 667.9 664.7 673.7 678.5

RE GRIDCART ETKI ELEV 14 688.1 719.8 705.9 718.2 750.4 781.6 820.9

RE GRIDCART ETKI ELEV 15 986.2 1011.9 1016.4 1003.9 970.8 908.4 851.0

RE GRIDCART ETKI ELEV 15 790.8 752.8 712.7 681.8 670.1 665.0 665.0

RE GRIDCART ETKI ELEV 15 667.8 677.2 688.2 706.8 737.8 775.0 811.9

RE GRIDCART ETKI ELEV 16 959.7 990.1 1013.9 1011.0 966.7 932.9 860.0

RE GRIDCART ETKI ELEV 16 807.4 809.0 754.7 717.2 705.1 677.7 687.8

RE GRIDCART ETKI ELEV 16 669.5 666.0 689.5 707.1 736.7 770.3 796.7

RE GRIDCART ETKI ELEV 17 944.3 974.8 999.0 1013.1 995.1 932.1 876.1

RE GRIDCART ETKI ELEV 17 829.5 829.2 791.2 760.2 743.0 694.4 676.7

RE GRIDCART ETKI ELEV 17 671.0 666.3 686.4 698.1 726.9 757.9 787.9

RE GRIDCART ETKI ELEV 18 939.5 962.8 986.6 1013.7 972.2 923.1 890.5

RE GRIDCART ETKI ELEV 18 867.0 845.7 811.6 773.0 710.3 682.2 667.3

RE GRIDCART ETKI ELEV 18 666.0 670.8 706.9 738.2 714.2 737.3 768.9

RE GRIDCART ETKI ELEV 19 917.6 941.9 969.8 1016.2 961.3 909.0 915.5

RE GRIDCART ETKI ELEV 19 881.7 815.2 810.4 775.6 709.9 670.9 665.7

RE GRIDCART ETKI ELEV 19 676.9 721.0 705.7 751.5 723.9 730.8 751.9

RE GRIDCART ETKI ELEV 20 906.3 929.5 959.9 961.1 952.2 893.9 875.4

RE GRIDCART ETKI ELEV 20 844.8 786.4 745.4 741.5 696.7 664.4 665.9

RE GRIDCART ETKI ELEV 20 697.8 726.7 736.7 755.6 719.3 719.8 740.4

RE GRIDCART ETKI ELEV 21 887.4 907.8 924.6 939.8 947.7 882.9 822.4

RE GRIDCART ETKI ELEV 21 800.0 770.5 749.8 712.2 688.7 665.3 666.3

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RE GRIDCART ETKI HILL 21 1021.7 1021.7 1021.7 1021.7 734.5 760.1 1007.9

RE GRIDCART ETKI HILL 21 1059.9 1059.9

RE GRIDCART ETKI END

RE FINISHED

ME STARTING

ME SURFFILE KKALE1.SFC

ME PROFFILE KKALE1.PFL

ME SURFDATA 17135 2012 KIRIKKALE

ME UAIRDATA 17130 2012 ANKARA

ME PROFBASE 750

ME FINISHED

OU STARTING

OU RECTABLE ALLAVE FOURTH

OU PLOTFILE 24 ALL FOURTH 24.plt

OU PLOTFILE MONTH ALL FOURTH MONTH.plt

OU PLOTFILE ANNUAL ALL YIL.plt

OU FINISHED

****

*** SETUP Finishes Successfully ***

****

*** AERMOD - VERSION 12345 *** *** ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT *** 09/04/13

*** *** 08:57:26

PAGE 1

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** MODEL SETUP OPTIONS SUMMARY ***

**Model Is Setup For Calculation of Average CONCentration Values.

**Model Is Setup For Calculation of Dry DEPosition Values.

-- DEPOSITION LOGIC --

**NO GAS DEPOSITION Data Provided.

**PARTICLE DEPOSITION Data Provided.

**Model Uses NO DRY DEPLETION. DRYDPLT = F

**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses RURAL Dispersion Only.

**Model Uses Regulatory DEFAULT Options:

1. Stack-tip Downwash.
2. Model Accounts for ELEVated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.

5. No Exponential Decay.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 2 Short Term Average(s) of: 24-HR MONTH

and Calculates ANNUAL Averages

**This Run Includes: 1 Source(s); 1 Source Group(s); and 441 Receptor(s)

**The Model Assumes A Pollutant Type of: PM10

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:

Model Outputs Tables of ANNUAL Averages by Receptor

Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours

m for Missing Hours

b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 750.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0

Concentration: Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07

Output Units = MICROGRAMS/M**3

Deposition: Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 3600.0

Output Units = GRAMS/M**2

**Approximate Storage Requirements of Model = 3.7 MB of RAM.

*** AERMOD - VERSION 12345 *** *** ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT *** 09/04/13

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	X LOCATION OF AREA (METERS)	Y LOCATION OF AREA (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	SCALAR VARY BY
TESIS	9	0.35500E-04	534446.9	4415637.7	690.0	35.00	17	0.00	NO	

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	TESIS ,

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** SOURCE PARTICULATE/GAS DATA ***

*** SOURCE ID = TESIS ; SOURCE TYPE = AREAPOLY ***

MASS FRACTION =

0.22400, 0.07600, 0.08200, 0.10500, 0.10300, 0.07300, 0.10400, 0.10500, 0.12800,

PARTICLE DIAMETER (MICRONS) =

0.35000, 0.70000, 1.10000, 2.00000, 3.60000, 5.50000, 8.10000, 12.50000, 15.00000,

PARTICLE DENSITY (G/CM**3) =

1.00000, 1.00000, 1.00000, 1.00000, 1.00000, 1.00000, 1.00000, 1.00000, 1.00000,

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***

(METERS)

532350.0, 532600.0, 532850.0, 533100.0, 533350.0, 533600.0, 533850.0, 534100.0, 534350.0, 534600.0, 534850.0, 535100.0, 535350.0, 535600.0, 535850.0, 536100.0, 536350.0, 536600.0, 536850.0, 537100.0, 537350.0,

*** Y-COORDINATES OF GRID ***

(METERS)

4412800.0, 4413050.0, 4413300.0, 4413550.0, 4413800.0, 4414050.0, 4414300.0, 4414550.0, 4414800.0, 4415050.0, 4415300.0, 4415550.0, 4415800.0, 4416050.0, 4416300.0, 4416550.0, 4416800.0, 4417050.0, 4417300.0, 4417550.0, 4417800.0,

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)								
(METERS)	532350.00	532600.00	532850.00	533100.00	533350.00	533600.00	533850.00	534100.00	534350.00
4417800.00	887.40	907.80	924.60	939.80	947.70	882.90	822.40	800.00	770.50
4417550.00	906.30	929.50	959.90	961.10	952.20	893.90	875.40	844.80	786.40
4417300.00	917.60	941.90	969.80	1016.20	961.30	909.00	915.50	881.70	815.20
4417050.00	939.50	962.80	986.60	1013.70	972.20	923.10	890.50	867.00	845.70
4416800.00	944.30	974.80	999.00	1013.10	995.10	932.10	876.10	829.50	829.20

4416550.00	959.70	990.10	1013.90	1011.00	966.70	932.90	860.00	807.40	809.00
4416300.00	986.20	1011.90	1016.40	1003.90	970.80	908.40	851.00	790.80	752.80
4416050.00	993.70	1011.60	968.40	961.60	951.70	878.80	854.10	779.30	743.10
4415800.00	1003.80	1001.20	938.30	897.70	890.60	835.90	779.20	744.60	702.30
4415550.00	1021.20	985.40	923.10	877.10	825.90	809.10	786.30	730.40	700.90
4415300.00	1024.30	989.30	956.20	918.20	858.30	808.10	762.10	745.50	714.40
4415050.00	1016.90	990.50	950.30	933.70	864.40	813.50	761.00	737.10	738.60
4414800.00	1003.50	981.80	926.20	872.10	829.40	795.00	778.40	763.10	760.40
4414550.00	988.00	936.60	912.20	896.30	862.10	804.70	766.80	745.50	735.50
4414300.00	956.50	935.10	882.60	848.20	848.10	792.60	769.20	754.20	748.60
4414050.00	976.20	943.00	884.80	861.50	815.30	793.20	785.80	767.70	794.70
4413800.00	1006.70	949.60	936.90	872.60	856.00	834.20	792.20	788.00	787.90
4413550.00	1023.90	963.30	948.90	911.40	912.70	853.50	793.60	760.40	757.20
4413300.00	987.80	983.40	951.50	904.70	881.60	881.20	805.10	771.20	737.30
4413050.00	946.50	942.50	915.10	872.30	847.70	856.00	838.00	773.60	738.10
4412800.00	908.30	913.60	865.50	843.20	836.50	841.50	823.90	787.40	754.70

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)								
(METERS)	534600.00	534850.00	535100.00	535350.00	535600.00	535850.00	536100.00	536350.00	536600.00

4417800.00	749.80	712.20	688.70	665.30	666.30	689.60	704.80	728.80	725.60
4417550.00	745.40	741.50	696.70	664.40	665.90	697.80	726.70	736.70	755.60
4417300.00	810.40	775.60	709.90	670.90	665.70	676.90	721.00	705.70	751.50
4417050.00	811.60	773.00	710.30	682.20	667.30	666.00	670.80	706.90	738.20
4416800.00	791.20	760.20	743.00	694.40	676.70	671.00	666.30	686.40	698.10
4416550.00	754.70	717.20	705.10	677.70	687.80	669.50	666.00	689.50	707.10
4416300.00	712.70	681.80	670.10	665.00	665.00	667.80	677.20	688.20	706.80
4416050.00	698.90	667.90	664.70	673.70	678.50	688.10	719.80	705.90	718.20
4415800.00	668.20	666.00	680.90	711.90	696.40	732.80	757.40	717.40	724.60
4415550.00	664.20	665.80	678.40	686.70	708.60	730.50	747.50	710.30	720.80
4415300.00	705.20	676.10	671.10	669.50	683.10	708.00	721.80	703.10	723.10
4415050.00	712.90	683.90	677.70	671.60	670.40	682.10	690.80	701.30	726.70
4414800.00	724.60	701.40	688.10	669.20	673.40	679.70	688.00	700.60	713.60
4414550.00	723.70	718.50	713.40	669.50	673.20	680.90	687.20	693.80	700.90
4414300.00	776.90	736.60	689.10	671.00	673.20	684.20	692.00	699.00	705.40
4414050.00	755.90	714.00	683.30	671.20	671.20	691.50	703.60	710.90	716.80
4413800.00	743.50	701.90	685.00	670.90	670.80	699.10	722.30	729.10	740.30
4413550.00	727.90	702.70	697.70	678.00	672.70	683.70	718.70	747.70	767.50
4413300.00	719.00	718.10	699.40	686.90	672.40	675.30	687.80	720.10	740.10
4413050.00	751.00	751.70	708.70	689.70	680.70	672.00	674.40	697.60	723.80
4412800.00	746.50	743.10	706.10	704.00	682.80	679.90	675.40	682.90	720.10

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)		
(METERS)	536850.00	537100.00	537350.00
4417800.00	705.80	710.90	738.60
4417550.00	719.30	719.80	740.40
4417300.00	723.90	730.80	751.90
4417050.00	714.20	737.30	768.90
4416800.00	726.90	757.90	787.90
4416550.00	736.70	770.30	796.70
4416300.00	737.80	775.00	811.90
4416050.00	750.40	781.60	820.90
4415800.00	748.40	775.20	814.90
4415550.00	748.80	787.70	788.50
4415300.00	755.00	754.60	785.60
4415050.00	746.50	739.50	762.60
4414800.00	717.10	729.20	744.60
4414550.00	713.70	724.00	732.90
4414300.00	711.00	717.10	723.20
4414050.00	731.00	737.00	751.00
4413800.00	748.10	796.30	785.80
4413550.00	774.30	804.40	812.20
4413300.00	750.30	783.60	802.60
4413050.00	761.20	779.90	784.50
4412800.00	747.30	771.00	765.10

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)								
	532350.00	532600.00	532850.00	533100.00	533350.00	533600.00	533850.00	534100.00	534350.00
4417800.00	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70
4417550.00	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70
4417300.00	1021.70	1021.70	1021.70	1016.20	1021.70	1021.70	1021.70	1021.70	1021.70
4417050.00	1021.70	1021.70	1021.70	1013.70	1021.70	1021.70	1021.70	1021.70	1021.70
4416800.00	1020.70	1020.70	1020.70	1013.10	1014.90	1021.70	1021.70	1021.70	1021.70
4416550.00	1020.70	1018.10	1013.90	1020.30	1020.70	1021.70	1021.70	1027.60	1025.20
4416300.00	1020.00	1011.90	1016.40	1005.80	1020.50	1021.70	1027.60	1027.60	1027.60
4416050.00	1020.00	1019.80	1020.50	1020.50	1020.50	1027.60	1027.60	1027.60	1027.60
4415800.00	1003.80	1018.30	1027.60	1027.60	1027.60	1027.60	1027.60	1037.60	1037.60
4415550.00	1023.90	1027.60	1027.60	1027.60	1027.60	1027.60	1037.60	1037.60	1037.60
4415300.00	1024.30	1027.60	1027.60	1027.60	1027.60	1037.60	1037.60	1037.60	1037.60
4415050.00	1016.90	1027.20	1027.60	1027.60	1027.60	1037.60	1037.60	1037.60	1037.60
4414800.00	1006.30	1024.60	1027.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4414550.00	988.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4414300.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4414050.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4413800.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4413550.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4413300.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4413050.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60
4412800.00	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60	1037.60

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)								
	534600.00	534850.00	535100.00	535350.00	535600.00	535850.00	536100.00	536350.00	536600.00
4417800.00	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	1021.70	734.50	760.10
4417550.00	1021.70	1021.70	1021.70	1027.60	1021.70	1021.70	726.70	736.70	755.60
4417300.00	1021.70	1021.70	1021.70	1027.60	1021.70	1021.70	1017.20	1007.90	751.50
4417050.00	1021.70	1021.70	1027.60	1027.60	1027.60	1021.70	1021.70	1007.90	1007.90
4416800.00	1021.70	1021.70	1021.70	1027.60	1027.60	1021.70	1021.70	1058.00	1059.90
4416550.00	1027.60	1027.60	1027.60	1027.60	1027.60	1021.70	1021.70	1058.00	1059.90
4416300.00	1027.60	1027.60	1027.60	1027.60	1027.60	1027.60	1021.70	1058.00	1059.90
4416050.00	1037.60	1037.60	1037.60	1027.60	1027.60	1021.70	760.30	1007.90	1007.90
4415800.00	1037.60	1037.60	1027.60	1027.60	1027.60	1013.90	757.40	1007.90	1007.90
4415550.00	1037.60	1037.60	1037.60	1027.60	1027.60	758.00	755.40	1007.90	1007.90
4415300.00	1037.60	1037.60	1037.60	1037.60	1027.60	1020.30	758.00	1007.90	1007.90
4415050.00	1037.60	1037.60	1037.60	1037.60	1037.60	1027.60	758.00	1007.90	965.40
4414800.00	1037.60	1037.60	1037.60	1037.60	1037.60	1027.20	688.00	700.60	970.90
4414550.00	1037.60	1037.60	1037.60	1037.60	1037.60	986.00	687.20	814.50	970.90
4414300.00	1037.60	1037.60	1037.60	1037.60	1037.60	684.20	814.50	814.50	816.90
4414050.00	1037.60	1037.60	1037.60	1037.60	1037.60	691.50	814.50	814.50	816.90
4413800.00	1037.60	1037.60	1037.60	1037.60	1037.60	746.20	722.30	814.50	814.50
4413550.00	1037.60	1037.60	1037.60	1037.60	1037.60	814.50	771.70	771.70	767.50

4413300.00 | 1037.60 1037.60 1037.60 1037.60 1037.60 1037.60 814.50 814.50 814.50

4413050.00 | 1037.60 1037.60 1037.60 1037.60 1037.60 1037.60 816.90 814.70 814.50

4412800.00 | 1037.60 1037.60 1037.60 1037.60 1037.60 798.80 814.50 816.90 798.80

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)		
	536850.00	537100.00	537350.00
4417800.00	1007.90	1059.90	1059.90
4417550.00	1007.90	1059.90	1059.90
4417300.00	1007.90	1059.90	1059.90
4417050.00	1059.90	1059.90	1059.90
4416800.00	1059.90	1058.00	1007.90
4416550.00	1058.00	1007.90	1007.90
4416300.00	1058.00	1007.90	1007.90
4416050.00	1007.90	1007.90	1007.90
4415800.00	1007.90	1007.90	1007.90
4415550.00	1007.90	1007.90	1007.90
4415300.00	1007.90	1007.90	1007.90
4415050.00	1007.90	1059.90	1059.90
4414800.00	1007.90	1059.90	1059.90
4414550.00	1007.90	1048.80	1059.90

4414300.00 | 970.90 1007.90 1059.90

4414050.00 | 816.90 816.90 816.90

4413800.00 | 816.90 814.50 816.90

4413550.00 | 814.50 804.40 812.20

4413300.00 | 816.90 793.00 802.60

4413050.00 | 798.80 798.80 795.70

4412800.00 | 798.80 781.50 780.80

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***

(1=YES; 0=NO)

1 1 1

(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: KKALE1.SFC Met Version: 12345

Profile file: KKALE1.PFL

Surface format: FREE

Profile format: FREE

Surface station no.: 17135 Upper air station no.: 17130

Name: KIRIKKALE Name: ANKARA

Year: 2012 Year: 2012

First 24 hours of scalar data

YR MO DY HR H0 U* W* DT/DZ ZICNV ZIMCH M-O LEN Z0 BOWEN ALB REF WS WD HT REF TA HT IPCOD PRATE RH SFCP CCVR

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12 01 01 01 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 71. 10. 272.5 2. 0 -9.00 999. 925. 8

12 01 01 02 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 198. 10. 272.5 2. 0 -9.00 999. 925. 8

12 01 01 03 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 254. 10. 272.5 2. 0 -9.00 999. 924. 8

12 01 01 04 -4.0 0.087 -9.000 -9.000 -999. 59. 13.6 1.00 1.10 1.00 1.00 203. 10. 272.5 2. 0 -9.00 999. 924. 8

12 01 01 05 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 233. 10. 272.5 2. 0 -9.00 999. 924. 8

12 01 01 06 -4.0 0.087 -9.000 -9.000 -999. 59. 13.6 1.00 1.10 1.00 1.00 232. 10. 272.5 2. 0 -9.00 999. 924. 8

12 01 01 07 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 235. 10. 273.1 2. 0 -9.00 999. 925. 8

12 01 01 08 -0.9 0.043 -9.000 -9.000 -999. 21. 7.3 1.00 1.10 0.47 0.50 93. 10. 273.1 2. 0 -9.00 999. 925. 8

12 01 01 09 17.6 0.133 0.460 0.006 182. 112. -11.1 1.00 1.10 0.20 0.50 247. 10. 273.1 2. 0 -9.00 999. 926. 8

12 01 01 10 52.4 0.153 0.748 0.005 264. 138. -5.7 1.00 1.10 0.10 0.50 161. 10. 273.8 2. 0 -9.00 999. 925. 8

12 01 01 11 76.6 0.248 0.962 0.005 383. 283. -16.3 1.00 1.10 0.06 1.00 234. 10. 273.8 2. 0 -9.00 999. 925. 8

12 01 01 12 88.0 0.164 1.205 0.005 656. 155. -4.1 1.00 1.10 0.05 0.50 196. 10. 273.8 2. 0 -9.00 999. 925. 8

12 01 01 13 85.7 0.251 1.227 0.005 711. 289. -15.2 1.00 1.10 0.05 1.00 203. 10. 274.2 2. 0 -9.00 999. 925. 8

12 01 01 14 69.9 0.245 1.169 0.005 755. 279. -17.3 1.00 1.10 0.07 1.00 199. 10. 274.2 2. 0 -9.00 999. 926. 8

12 01 01 15 41.6 0.231 0.995 0.005 781. 255. -24.5 1.00 1.10 0.12 1.00 202. 10. 274.2 2. 0 -9.00 999. 926. 8

12 01 01 16 4.9 0.192 0.489 0.005 784. 193. -118.6 1.00 1.10 0.26 1.00 204. 10. 274.2 2. 0 -9.00 999. 926. 8

12 01 01 17 -4.0 0.087 -9.000 -9.000 -999. 64. 13.7 1.00 1.10 1.00 1.00 201. 10. 273.8 2. 0 -9.00 999. 927. 8

12 01 01 18 -4.0 0.087 -9.000 -9.000 -999. 59. 13.7 1.00 1.10 1.00 1.00 197. 10. 273.8 2. 0 -9.00 999. 928. 8

12 01 01 19 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 204. 10. 273.8 2. 0 -9.00 999. 928. 8

12 01 01 20 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 137. 10. 274.2 2. 0 -9.00 999. 929. 8

12 01 01 21 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 90. 10. 274.2 2. 0 -9.00 999. 929. 8

12 01 01 22 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 292. 10. 274.9 2. 0 -9.00 999. 930. 8

12 01 01 23 -1.0 0.043 -9.000 -9.000 -999. 21. 6.8 1.00 1.10 1.00 0.50 50. 10. 274.9 2. 0 -9.00 999. 930. 8

12 01 01 24 -8.9 0.130 -9.000 -9.000 -999. 108. 20.6 1.00 1.10 1.00 1.50 50. 10. 275.9 2. 0 -9.00 999. 931. 8

First hour of profile data

YR MO DY HR HEIGHT F WDIR WSPD AMB_TMP sigmaA sigmaW sigmaV

12 01 01 01 10.0 1 71. 0.50 272.6 99.0 -99.00 -99.00

F indicates top of profile (=1) or below (=0)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)								
	532350.00	532600.00	532850.00	533100.00	533350.00	533600.00	533850.00	534100.00	534350.00
4417800.00	0.08691	0.09348	0.10540	0.11645	0.12865	0.14384	0.16430	0.18202	0.19567
4417550.00	0.08008	0.09250	0.11016	0.12632	0.14126	0.15045	0.17181	0.19091	0.21507
4417300.00	0.08014	0.09284	0.11138	0.12368	0.15388	0.16410	0.18595	0.20930	0.23664
4417050.00	0.08546	0.09590	0.10874	0.12686	0.16207	0.18541	0.21070	0.24063	0.27191
4416800.00	0.09829	0.10365	0.11205	0.12985	0.16399	0.20510	0.23988	0.28904	0.33064
4416550.00	0.12082	0.12125	0.12653	0.14197	0.17664	0.21574	0.26905	0.34692	0.41831
4416300.00	0.14581	0.15230	0.16074	0.17541	0.20015	0.22457	0.29647	0.41986	0.58931
4416050.00	0.17413	0.19005	0.21980	0.24380	0.26728	0.29587	0.35439	0.54762	0.93991
4415800.00	0.21831	0.24205	0.28741	0.33115	0.38159	0.47564	0.63954	0.96726	1.98978
4415550.00	0.27299	0.31738	0.38973	0.47589	0.62140	0.79372	1.10967	16.77222	6.60246
4415300.00	0.30723	0.36226	0.45089	0.55724	0.75866	1.11593	2.02923	4.10193	16.44646
4415050.00	0.32483	0.39106	0.50591	0.63832	0.88528	1.28728	2.38587	7.36664	6.38117
4414800.00	0.37224	0.44332	0.57034	0.73703	0.98283	1.38739	1.86110	2.35063	2.60818
4414550.00	0.42055	0.49127	0.57180	0.67883	0.86437	1.15977	1.51158	1.94096	3.28602
4414300.00	0.40124	0.45050	0.55100	0.67816	0.73245	0.91156	1.03024	1.09388	0.93514
4414050.00	0.33786	0.39470	0.48230	0.55187	0.64725	0.67709	0.61937	0.57780	0.41425
4413800.00	0.29292	0.35825	0.39524	0.44776	0.43081	0.38715	0.37640	0.33575	0.32557
4413550.00	0.27828	0.32289	0.32957	0.31632	0.26054	0.23343	0.25932	0.32248	0.33303
4413300.00	0.26913	0.26765	0.25195	0.22004	0.17895	0.15315	0.19593	0.25289	0.68209
4413050.00	0.24416	0.21864	0.18620	0.15681	0.13690	0.13139	0.15038	0.21727	0.53946
4412800.00	0.20475	0.16418	0.14127	0.11921	0.11335	0.12193	0.14233	0.17255	0.20626

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)								
	534600.00	534850.00	535100.00	535350.00	535600.00	535850.00	536100.00	536350.00	536600.00
4417800.00	0.25779	1.52398	0.77119	0.84865	1.06567	1.34812	1.37531	0.83733	0.77326
4417550.00	0.33672	0.53649	0.86117	0.85628	1.00129	1.27399	1.68752	0.40869	0.29819
4417300.00	0.26072	0.30325	2.11001	0.84691	0.91947	0.83858	2.01844	0.91711	0.43997
4417050.00	0.31145	0.37118	2.49143	0.85546	0.86243	0.77629	0.78102	1.48041	1.34521
4416800.00	0.39032	0.48971	0.81781	0.97449	0.89614	0.87504	0.98669	1.30094	1.67444
4416550.00	0.54206	5.59856	1.42611	1.04147	1.10478	1.04780	1.10464	1.39043	2.11431
4416300.00	2.22412	1.28149	1.37322	1.35401	1.26293	1.17010	1.16837	1.27575	1.97979
4416050.00	1.67966	2.18838	2.18927	1.94309	1.60270	1.41526	6.32800	1.79516	3.28394
4415800.00	4.52453	4.80061	3.87786	3.95399	1.93495	3.73769	0.62451	3.28521	4.86394
4415550.00	9.77208	10.44367	6.81706	3.72687	2.47151	3.80279	0.61742	1.62265	2.92045
4415300.00	11.97919	11.48207	9.71030	4.17122	1.78496	1.25874	3.65025	0.72612	2.41574
4415050.00	10.71422	9.22196	4.51536	2.08245	1.18511	0.83425	0.66274	0.58919	1.62745
4414800.00	27.43368	3.21002	1.73630	0.82662	0.62141	0.55250	0.54076	0.61370	1.05438

4414550.00 |	9.88385	4.29440	1.24190	0.49857	0.36309	0.31258	0.32077	0.39224	0.53995
4414300.00 |	0.60912	0.97171	0.57401	0.36262	0.29603	0.25036	0.20258	0.18866	0.30552
4414050.00 |	0.50768	1.62594	0.41265	0.28297	0.25037	0.29436	0.32431	0.26141	0.17129
4413800.00 |	0.51053	0.53646	0.33738	0.24402	0.20772	0.31711	1.43996	0.89027	0.09003
4413550.00 |	2.33662	0.50765	0.32557	0.22996	0.19117	0.20889	1.15325	0.15104	0.05910
4413300.00 |	1.67969	1.36838	0.32169	0.23313	0.19470	0.17403	0.25740	1.28300	0.28699
4413050.00 |	0.22307	0.18706	0.53350	0.23923	0.20758	0.17455	0.17772	0.35312	1.43150
4412800.00 |	0.23737	0.26483	0.46453	0.30258	0.21535	0.19679	0.16196	0.21707	0.88681

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE ANNUAL AVERAGE CONCENTRATION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD |	X-COORD (METERS)		
(METERS) |	536850.00	537100.00	537350.00
4417800.00 |	0.71629	1.16943	1.07881
4417550.00 |	1.66881	2.34577	1.19483
4417300.00 |	2.93305	2.39945	0.57337
4417050.00 |	2.43309	1.47596	0.31819
4416800.00 |	3.56650	0.38957	0.25187

4416550.00	1.34615	0.30911	0.22710
4416300.00	1.10873	0.27934	0.20357
4416050.00	0.41889	0.24248	0.17713
4415800.00	0.39494	0.21291	0.15096
4415550.00	0.32126	0.17426	0.15025
4415300.00	0.23936	0.21451	0.14543
4415050.00	0.25372	0.35985	0.14577
4414800.00	0.93332	0.75259	0.19381
4414550.00	1.03477	1.86905	0.67932
4414300.00	0.56658	0.96051	1.68837
4414050.00	0.19758	0.16541	0.13549
4413800.00	0.05743	0.04753	0.05564
4413550.00	0.04358	0.03456	0.03338
4413300.00	0.08478	0.03660	0.02919
4413050.00	0.07109	0.04171	0.03210
4412800.00	0.16813	0.05361	0.04934

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE ANNUAL DRY DEPOSITION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2/YR **

Y-COORD | X-COORD (METERS)

(METERS)	532350.00	532600.00	532850.00	533100.00	533350.00	533600.00	533850.00	534100.00	534350.00
4417800.00	0.05317	0.05720	0.06259	0.06913	0.07721	0.08658	0.10098	0.11887	0.14575
4417550.00	0.05517	0.05997	0.06705	0.07468	0.08350	0.09290	0.10775	0.12809	0.16293
4417300.00	0.05906	0.06410	0.07116	0.07567	0.09111	0.10135	0.11828	0.14173	0.18354
4417050.00	0.06544	0.07037	0.07589	0.08247	0.09912	0.11335	0.13283	0.16344	0.21208
4416800.00	0.07556	0.07959	0.08398	0.09186	0.10748	0.12853	0.15311	0.19642	0.26266
4416550.00	0.09092	0.09346	0.09803	0.10743	0.12726	0.14795	0.18147	0.24323	0.34283
4416300.00	0.10943	0.11510	0.12377	0.13624	0.15656	0.18031	0.22628	0.31862	0.52122
4416050.00	0.13561	0.14687	0.16933	0.19019	0.21507	0.25616	0.31473	0.46551	0.84326
4415800.00	0.17643	0.19750	0.23511	0.27827	0.33178	0.43271	0.61712	0.96848	2.20169
4415550.00	0.23268	0.27622	0.34490	0.43883	0.59981	0.83460	1.31293	3.60709	10.65589
4415300.00	0.29469	0.36139	0.46237	0.61349	0.90406	1.47300	2.91879	6.42803	19.69121
4415050.00	0.36896	0.46457	0.61888	0.82917	1.25214	2.03286	3.98031	7.47997	10.67789
4414800.00	0.46599	0.58120	0.77577	1.07442	1.57020	2.43583	3.56782	4.85911	6.06317
4414550.00	0.54406	0.67755	0.85544	1.11120	1.52398	2.19654	2.97673	3.69631	4.13614
4414300.00	0.56929	0.69269	0.90990	1.19534	1.41500	1.84451	2.12820	2.26146	2.07980
4414050.00	0.55186	0.68452	0.88190	1.05686	1.27755	1.38479	1.34719	1.29244	1.02366
4413800.00	0.53744	0.66719	0.76198	0.87698	0.88553	0.85013	0.85395	0.77428	0.73812
4413550.00	0.53075	0.61487	0.64468	0.64265	0.56899	0.54516	0.58178	0.62729	0.62239
4413300.00	0.50966	0.52029	0.50419	0.46777	0.41165	0.36440	0.42257	0.47297	0.52631
4413050.00	0.45696	0.42817	0.38621	0.34963	0.31970	0.29775	0.31655	0.38309	0.41884
4412800.00	0.38545	0.33248	0.30487	0.27310	0.25572	0.25636	0.27782	0.30598	0.32066

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE ANNUAL DRY DEPOSITION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2/YR **

Y-COORD (METERS)	X-COORD (METERS)								
	534600.00	534850.00	535100.00	535350.00	535600.00	535850.00	536100.00	536350.00	536600.00
4417800.00	0.18434	0.35471	0.34413	0.37850	0.41360	0.44321	0.45405	0.31001	0.28914
4417550.00	0.21815	0.28130	0.41778	0.44426	0.47019	0.51677	0.40016	0.33400	0.30299
4417300.00	0.23981	0.32412	0.66065	0.53665	0.54805	0.52500	0.48068	0.46754	0.36097
4417050.00	0.29625	0.41941	0.86360	0.67391	0.66181	0.61541	0.56835	0.58596	0.45764
4416800.00	0.39418	0.58424	0.75131	0.88226	0.83918	0.76028	0.68484	0.64632	0.61243
4416550.00	0.58777	1.46748	1.22371	1.21006	1.11701	0.95121	0.81264	0.72769	0.71075
4416300.00	1.34635	1.71316	1.89085	1.75028	1.46476	1.17614	0.94982	0.78374	0.73161
4416050.00	2.23380	3.32896	3.27200	2.67896	1.98701	1.45746	1.27259	0.87686	0.69750
4415800.00	6.84083	8.05167	6.32594	4.01298	2.52154	1.50438	0.86054	0.88760	0.60252
4415550.00	14.07526	17.11665	12.39880	6.21727	2.88564	1.50182	0.83363	0.79271	0.56240
4415300.00	25.20152	19.15721	16.52505	7.71253	2.88681	1.38677	0.92097	0.60221	0.47079
4415050.00	18.71164	21.75272	9.80166	3.89088	1.85710	1.09251	0.72248	0.50785	0.37672
4414800.00	9.52961	8.54915	4.50764	1.65367	0.94910	0.68227	0.52504	0.41535	0.37848
4414550.00	4.11129	3.49950	2.00312	1.02638	0.56903	0.40666	0.33756	0.29255	0.27468
4414300.00	1.56160	1.57946	1.28803	0.74144	0.43297	0.28836	0.21993	0.18441	0.18937
4414050.00	1.11394	1.27639	0.86319	0.56289	0.35815	0.24281	0.17959	0.14168	0.11175
4413800.00	0.82323	0.80147	0.62699	0.44256	0.30298	0.21394	0.17707	0.11088	0.07508
4413550.00	0.67397	0.60736	0.47662	0.36021	0.26068	0.19148	0.17585	0.08538	0.06192
4413300.00	0.56465	0.49983	0.38464	0.30100	0.22726	0.17070	0.13791	0.13515	0.07123

4413050.00 | 0.36583 0.32567 0.34448 0.25508 0.20166 0.15552 0.12226 0.11813 0.10300

4412800.00 | 0.30414 0.27770 0.29117 0.23168 0.18014 0.14499 0.11411 0.09784 0.09517

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE ANNUAL DRY DEPOSITION VALUES AVERAGED OVER 1 YEARS FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2/YR **

Y-COORD (METERS)	X-COORD (METERS)		
(METERS)	536850.00	537100.00	537350.00
4417800.00	0.31817	0.33790	0.28882
4417550.00	0.38593	0.40711	0.31628
4417300.00	0.45994	0.40917	0.30116
4417050.00	0.54783	0.38949	0.28367
4416800.00	0.52549	0.33763	0.26405
4416550.00	0.45425	0.31830	0.25120
4416300.00	0.43539	0.30248	0.23483
4416050.00	0.38036	0.28046	0.21616
4415800.00	0.35408	0.26058	0.19819
4415550.00	0.32042	0.23179	0.19152
4415300.00	0.28404	0.23115	0.17814

4415050.00 | 0.25670 0.21862 0.16810

4414800.00 | 0.29052 0.21162 0.16165

4414550.00 | 0.27780 0.22364 0.17044

4414300.00 | 0.19798 0.19202 0.17646

4414050.00 | 0.10132 0.10205 0.09811

4413800.00 | 0.06655 0.05818 0.06119

4413550.00 | 0.05116 0.04436 0.04274

4413300.00 | 0.05145 0.04000 0.03552

4413050.00 | 0.04872 0.03819 0.03292

4412800.00 | 0.05290 0.03899 0.03326

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)				
	532350.00	532600.00	532850.00	533100.00	533350.00
4417800.0	0.95823 (12092424)	0.91174 (12020624)	0.98381 (12123124)	1.34271 (12020624)	1.40917 (12050324)
4417550.0	0.68557 (12020624)	0.96299 (12020624)	1.09570 (12123124)	1.16818 (12010324)	1.70979 (12020624)

4417300.0	0.63244 (12092724)	0.95890 (12020624)	1.22798 (12123124)	1.31738 (12123124)	1.71445 (12010324)
4417050.0	0.89800 (12021324)	0.86899 (12092724)	1.14964 (12020624)	1.51628 (12123124)	1.64484 (12110224)
4416800.0	0.71830 (12010424)	1.00675 (12050324)	1.17412 (12123124)	1.44089 (12020624)	1.94718 (12123124)
4416550.0	0.92121 (12032624)	0.89756 (12022524)	0.97798 (12123124)	1.67028 (12021324)	1.73403 (12020624)
4416300.0	1.06392 (12010424)	1.11031 (12022524)	1.24390 (12022524)	1.29420 (12022524)	1.77411 (12050324)
4416050.0	1.22865 (12040524)	1.31953 (12040524)	1.42312 (12040524)	1.62190 (12022524)	1.84928 (12022524)
4415800.0	1.42420 (12092824)	1.48809 (12031924)	1.78818 (12060324)	1.99275 (12122724)	2.33624 (12021224)
4415550.0	1.77549 (12040524)	2.03248 (12100124)	2.50143 (12040524)	3.09803 (12040524)	3.63271 (12092824)
4415300.0	1.64838 (12031924)	1.94779 (12031924)	2.29661 (12040524)	2.84190 (12040524)	3.62974 (12040524)
4415050.0	1.67354 (12112824)	2.02207 (12112824)	2.59689 (12092824)	2.78843 (12092824)	3.19025 (12092824)
4414800.0	1.49853 (12112124)	1.82255 (12061324)	2.30202 (12112124)	2.78883 (12061824)	3.60913 (12112124)
4414550.0	1.83631 (12061324)	2.21378 (12061324)	2.18550 (12112824)	2.49459 (12091124)	3.11346 (12122624)
4414300.0	1.81144 (12061324)	1.82138 (12112824)	2.03214 (12091124)	2.52392 (12110824)	3.14826 (12091124)
4414050.0	1.41833 (12112824)	1.50837 (12090324)	1.98422 (12090224)	2.60299 (12090224)	3.29765 (12090324)
4413800.0	1.27737 (12090324)	1.62573 (12082424)	1.95783 (12090224)	2.23982 (12090324)	2.02960 (12071924)
4413550.0	1.42308 (12110824)	1.66611 (12090324)	1.63397 (12090324)	1.44514 (12091124)	1.17823 (12062324)
4413300.0	1.40375 (12071924)	1.41164 (12090224)	1.22860m(12090824)	1.02979 (12090224)	0.77858m(12090824)
4413050.0	1.19201 (12090324)	1.04465 (12091124)	0.87171 (12090224)	0.70785 (12062024)	0.76393 (12022924)
4412800.0	0.98544 (12091124)	0.77070 (12090224)	0.64597 (12062024)	0.57923 (12070224)	0.78331 (12110924)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)				
	533600.00	533850.00	534100.00	534350.00	534600.00
4417800.0	1.18665 (12020424)	1.53286 (12103124)	1.72058 (12052724)	2.25965 (12121824)	1.80591 (12052424)
4417550.0	1.23680 (12020424)	1.49623 (12022324)	1.76531 (12103124)	2.48442 (12121524)	2.26626 (12052424)
4417300.0	1.56717 (12021324)	1.40625 (12021324)	1.79941 (12022324)	2.46489 (12012524)	2.14253 (12121824)
4417050.0	2.07961 (12021324)	1.67408 (12021324)	1.90713 (12022324)	2.54664 (12012524)	2.86385 (12121824)
4416800.0	2.13180 (12010324)	2.05380 (12021324)	2.24033 (12121524)	2.67809 (12012524)	3.41416 (12010324)
4416550.0	2.31792 (12020624)	2.41778 (12021324)	2.50896 (12102024)	2.87193 (12052724)	4.59168 (12121824)
4416300.0	2.29801 (12021324)	2.63079 (12021324)	3.39971 (12101324)	5.59992 (12050324)	12.89106 (12121824)
4416050.0	1.97055 (12050324)	2.88085 (12123124)	3.66123 (12092524)	6.46766 (12101324)	8.11820 (12052724)
4415800.0	3.14975 (12021224)	3.49607 (12032624)	5.41161 (12021224)	10.63350 (12092524)	15.96550 (12052424)
4415550.0	4.29706 (12092824)	5.42498 (12040524)	61.27997 (12020124)	20.47631 (12092724)	24.71089 (12012524)
4415300.0	4.44544 (12040524)	7.82282 (12021124)	13.72698 (12021124)	34.44249 (12021124)	27.89615 (12072324)

4415050.0 | 4.38491 (12111724) 8.79939 (12111724) 17.73509 (12111724) 17.55107 (12122724) 25.26308 (12062924)

4414800.0 | 5.00966 (12111724) 6.93258 (12111724) 8.85594 (12090324) 9.92011 (12071924) 204.15635 (12123024)

4414550.0 | 4.71233 (12090324) 6.80202 (12090324) 8.04934 (12090224) 11.06769 (12112224) 108.39828 (12033124)

4414300.0 | 4.50937 (12090224) 5.04699 (12071924) 4.96952 (12061624) 5.67918 (12111024) 4.66560 (12112224)

4414050.0 | 3.34425 (12071924) 2.91785 (12061624) 3.46274 (12110924) 3.03251 (12032724) 5.06172 (12070224)

4413800.0 | 1.79748 (12090224) 2.13017 (12111024) 2.41125 (12111024) 3.04010 (12032724) 4.53681 (12022724)

4413550.0 | 1.07539 (12070224) 1.73942 (12110924) 2.73558 (12022924) 3.31529 (12022924) 30.11485 (12011324)

4413300.0 | 0.94357 (12110924) 1.65932 (12032724) 2.33026 (12022924) 5.05813 (12112324) 22.90494 (12011324)

4413050.0 | 0.95155 (12110924) 1.37042 (12032724) 2.01019 (12022924) 3.79707 (12112324) 2.17773 (12070224)

4412800.0 | 1.08021 (12032724) 1.40098 (12022924) 1.82236 (12032724) 1.96434 (12022924) 2.08983 (12080924)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)				
	534850.00	535100.00	535350.00	535600.00	535850.00

4417800.0	15.94239 (12020524)	6.15462 (12012424)	5.71658 (12122224)	8.25549 (12122224)	11.12933 (12021424)
4417550.0	3.51901 (12021424)	6.02980 (12011224)	5.75824 (12012524)	7.25705 (12021424)	9.45384 (12021424)
4417300.0	1.87772 (12122324)	17.49261 (12031224)	5.95245 (12051124)	6.77104 (12121824)	5.96996 (12121824)
4417050.0	2.17959 (12122324)	21.81300 (12020524)	6.62800 (12122324)	6.20016 (12100424)	4.85779 (12012024)
4416800.0	2.64170 (12122324)	5.44989 (12100424)	7.26598 (12020724)	6.27958 (12100424)	5.59627 (12030324)
4416550.0	45.71070 (12031224)	8.29824 (12012524)	7.53386 (12100424)	7.31523 (12030224)	7.46532 (12012324)
4416300.0	6.90195 (12040824)	8.23416 (12020724)	7.92841 (12051124)	8.63596 (12012324)	9.34633 (12012324)
4416050.0	9.51122 (12051124)	10.65801 (12051124)	12.87272 (12040824)	11.35279 (12033124)	11.51733 (12120724)
4415800.0	16.17540 (12122324)	16.14836 (12033124)	16.21175 (12103024)	14.09175 (12033124)	21.63430 (12011424)
4415550.0	30.70994 (12052724)	19.87442 (12051924)	19.04186 (12030224)	13.54259 (12030224)	24.41467 (12022624)
4415300.0	23.25541 (12052724)	27.10585 (12012524)	19.28089 (12122124)	14.74728 (12122124)	10.09481 (12011524)
4415050.0	22.28875 (12093024)	17.59871 (12011524)	19.01550 (12082824)	14.43590 (12021824)	11.49672 (12021824)
4414800.0	15.63654 (12112224)	12.90032 (12031624)	6.69227 (12081324)	8.67327 (12053024)	9.20629 (12021824)
4414550.0	32.31719 (12110324)	8.40478 (12070424)	5.26490 (12052924)	4.33186 (12122124)	4.53725 (12053024)
4414300.0	6.97591 (12022724)	4.96645 (12032724)	4.11043 (12082924)	3.72484 (12010724)	3.18493 (12010724)
4414050.0	17.43627 (12020424)	3.61089 (12030124)	3.29527 (12021724)	3.01982 (12052924)	4.29901 (12081224)
4413800.0	4.77213 (12022924)	3.23579 (12022924)	2.52821 (12021724)	2.02012 (12052924)	4.93762 (12010724)
4413550.0	5.05494 (12031624)	3.22201 (12070424)	2.07482 (12022824)	2.37270 (12022824)	3.19101 (12052624)
4413300.0	20.36817 (12101824)	3.41214 (12081124)	2.75329 (12080324)	2.45931 (12102124)	2.19458 (12102124)
4413050.0	2.06241 (12080924)	7.51719 (12101824)	3.31152 (12111724)	2.78289 (12031624)	2.73401 (12022824)
4412800.0	2.91393 (12031624)	6.41594 (12101824)	3.10859 (12031624)	2.84966 (12111724)	3.14734 (12042524)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)				
	536100.00	536350.00	536600.00	536850.00	537100.00
4417800.0	13.39892 (12122024)	10.43409 (12122324)	11.53969 (12020524)	5.09568 (12011324)	9.24564 (12011324)
4417550.0	22.83588 (12012424)	2.52006 (12100424)	1.88723 (12120724)	18.13793 (12052724)	24.65409 (12052724)
4417300.0	32.67496 (12031324)	5.93418 (12011324)	3.21562 (12012324)	38.95504 (12010124)	23.36359 (12010124)
4417050.0	4.65543 (12011324)	10.46472 (12101124)	9.40059 (12121224)	17.18143 (12121124)	9.62867 (12030224)
4416800.0	6.24512 (12030324)	9.04100 (12121224)	11.92768 (12030224)	43.84153 (12011324)	3.34989 (12033124)
4416550.0	8.27010 (12012324)	9.75867 (12012324)	14.01948 (12020724)	8.42295 (12030224)	2.19791 (12030224)
4416300.0	9.45439 (12012324)	9.89909c(12012224)	12.37603 (12011424)	8.19399c(12012224)	1.89501 (12010124)
4416050.0	62.48271 (12020724)	11.68526 (12010524)	37.36820m(12012624)	2.87485 (12030324)	1.72620 (12090624)
4415800.0	4.23689 (12120424)	34.71309m(12012624)	63.02515 (12100424)	2.58002 (12021524)	1.37562 (12092924)

4415550.0	4.38332 (12011624)	9.96386 (12022624)	31.97934 (12011124)	2.26041 (12011624)	1.24488 (12091924)
4415300.0	61.53797 (12080724)	7.94965 (12122124)	60.86675 (12080724)	2.60146 (12091924)	2.37338 (12091924)
4415050.0	9.52536 (12082824)	7.83634 (12021824)	28.36884 (12080724)	3.90905 (12122124)	3.99995 (12092224)
4414800.0	11.22286 (12082824)	9.60574 (12111824)	13.48885 (12051524)	13.44189 (12122424)	12.69354 (12122424)
4414550.0	5.81081 (12053024)	8.19461 (12111824)	11.55637 (12111824)	13.69543 (12051524)	50.58581 (12051524)
4414300.0	2.59609 (12053024)	3.05518c(12012724)	5.29538 (12111824)	9.72936 (12111824)	18.70383 (12011024)
4414050.0	4.03137 (12122024)	5.15604 (12093024)	2.62247 (12122124)	4.53242 (12122124)	2.88984 (12021824)
4413800.0	27.90191 (12012524)	25.80518 (12012524)	1.23753 (12051424)	0.88338 (12072924)	0.69686 (12121124)
4413550.0	21.38428 (12011024)	2.15933 (12111924)	0.98515 (12072924)	0.81530 (12081324)	0.58640 (12051424)
4413300.0	4.07080 (12030124)	26.54548 (12011024)	5.07263 (12011624)	1.27950 (12010724)	0.65385 (12051424)
4413050.0	3.10031 (12052624)	6.01019 (12093024)	34.79460 (12011024)	0.90876 (12010724)	0.66015 (12081224)
4412800.0	2.81573 (12102124)	3.45135 (12030124)	22.45759 (12011024)	2.62676 (12011624)	0.79515 (12072924)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD | X-COORD (METERS)

(METERS) | 537350.00

- -

4417800.0 | 8.24545 (12011324)

4417550.0 | 8.72291 (12011324)

4417300.0 | 4.15511 (12121224)

4417050.0 | 2.57274 (12011424)

4416800.0 | 1.73536c(12012224)

4416550.0 | 1.43224 (12092924)

4416300.0 | 1.44249 (12092924)

4416050.0 | 1.24023c(12012224)

4415800.0 | 1.12044 (12092224)

4415550.0 | 1.13511 (12091924)

4415300.0 | 1.52011 (12091924)

4415050.0 | 2.16157 (12122124)

4414800.0 | 2.66387 (12021824)

4414550.0 | 8.51522 (12121324)

4414300.0 | 44.47520 (12010124)

4414050.0 | 2.80403 (12111824)

4413800.0 | 0.75053 (12121124)

4413550.0 | 0.55337 (12121124)

4413300.0 | 0.45380 (12051424)

4413050.0 | 0.57515 (12122124)

4412800.0 | 0.68595 (12081224)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)				
	532350.00	532600.00	532850.00	533100.00	533350.00
4417800.0	0.12542m(12093024)	0.12500 (12103124)	0.13674 (12103124)	0.14003m(12093024)	0.15910m(12093024)
4417550.0	0.10914m(12093024)	0.11771m(12093024)	0.13962 (12103124)	0.15592 (12053124)	0.16157 (12103124)
4417300.0	0.09712 (12053124)	0.12427 (12053124)	0.14157m(12093024)	0.15948 (12103124)	0.18372 (12103124)
4417050.0	0.09823 (12103124)	0.11268 (12103124)	0.13404 (12053124)	0.16572 (12053124)	0.19938 (12053124)
4416800.0	0.10342 (12123124)	0.11480 (12123124)	0.12835 (12103124)	0.15568 (12103124)	0.19963 (12053124)
4416550.0	0.11835 (12103124)	0.12015 (12123124)	0.13566 (12103124)	0.15980 (12103124)	0.20473 (12103124)
4416300.0	0.13797 (12113024)	0.14095 (12123124)	0.15672 (12123124)	0.18130 (12123124)	0.22396 (12103124)
4416050.0	0.18366 (12033124)	0.19618 (12113024)	0.21921 (12113024)	0.23249 (12123124)	0.26894 (12123124)
4415800.0	0.23555 (12022924)	0.26389 (12022924)	0.32045 (12113024)	0.34017 (12113024)	0.37776 (12123124)
4415550.0	0.28422 (12123124)	0.32815 (12123124)	0.43440 (12123124)	0.53152m(12073124)	0.68136 (12123124)
4415300.0	0.32756m(12093024)	0.38531m(12093024)	0.47522m(12093024)	0.60902 (12083124)	0.89162 (12083124)
4415050.0	0.34539 (12103124)	0.40390 (12103124)	0.54745 (12083124)	0.71136 (12083124)	1.08103 (12083124)
4414800.0	0.39229 (12083124)	0.48137 (12083124)	0.66235 (12083124)	0.90566 (12083124)	1.24077 (12113024)

4414550.0 | 0.47859 (12083124) 0.58275 (12083124) 0.70930 (12083124) 0.87108 (12113024) 1.10110 (12113024)

4414300.0 | 0.48193 (12083124) 0.56493 (12083124) 0.69582 (12113024) 0.86333 (12113024) 1.00681m(12093024)

4414050.0 | 0.42853 (12083124) 0.51187 (12113024) 0.64588m(12093024) 0.78854m(12093024) 0.97917m(12093024)

4413800.0 | 0.38862 (12113024) 0.48362m(12093024) 0.56401m(12093024) 0.66419m(12093024) 0.63528m(12093024)

4413550.0 | 0.38314m(12093024) 0.46528m(12093024) 0.48127m(12093024) 0.46025m(12093024) 0.37402 (12113024)

4413300.0 | 0.39195m(12093024) 0.39098m(12093024) 0.36164m(12093024) 0.31788 (12113024) 0.26347 (12083124)

4413050.0 | 0.35962m(12093024) 0.31587m(12093024) 0.27154 (12113024) 0.22783 (12083124) 0.19767 (12083124)

4412800.0 | 0.29709m(12093024) 0.23824 (12083124) 0.20332 (12083124) 0.16978 (12083124) 0.16009 (12083124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD | X-COORD (METERS)

(METERS) | 533600.00 533850.00 534100.00 534350.00 534600.00

4417800.0 | 0.19390b(12013124) 0.22270m(12093024) 0.26830 (12022924) 0.29420 (12022924) 0.40332 (12123124)

4417550.0 | 0.19999m(12093024) 0.24117m(12093024) 0.25546 (12053124) 0.32096 (12022924) 0.52045 (12123124)

4417300.0 | 0.19990b(12013124) 0.25042m(12093024) 0.28198m(12093024) 0.35052 (12053124) 0.41350b(12013124)

4417050.0 | 0.21380 (12053124) 0.27901b(12013124) 0.32467m(12093024) 0.38646 (12053124) 0.48489 (12022924)

4416800.0 | 0.24216 (12053124) 0.28677 (12053124) 0.38116m(12093024) 0.45171 (12053124) 0.57441b(12013124)

4416550.0 | 0.25576 (12053124) 0.33400 (12053124) 0.45036 (12103124) 0.58248b(12013124) 0.74311b(12013124)

4416300.0 | 0.25000 (12103124) 0.37073 (12053124) 0.57033m(12093024) 0.75394 (12103124) 3.09225 (12022924)

4416050.0 | 0.30285 (12033124) 0.38004 (12103124) 0.78471 (12053124) 1.27618 (12103124) 2.12028 (12103124)

4415800.0 | 0.47000m(12073124) 0.61637 (12033124) 1.02445 (12123124) 2.69898 (12103124) 6.05106 (12103124)

4415550.0 | 0.87718 (12063024) 1.22357 (12063024) 18.27903 (12103124) 7.45093 (12022924) 12.21607 (12022924)

4415300.0 | 1.32189 (12113024) 2.38970 (12113024) 4.78156 (12113024) 20.03256 (12083124) 14.45310 (12113024)

4415050.0 | 1.58478 (12113024) 2.90645 (12113024) 9.03485 (12083124) 8.10705 (12113024) 13.62352 (12113024)

4414800.0 | 1.73823 (12113024) 2.40403m(12093024) 3.09685m(12093024) 3.39637m(12093024) 31.38607m(12093024)

4414550.0 | 1.53631m(12093024) 2.16934m(12093024) 2.77669m(12093024) 4.40701 (12063024) 10.07739m(12093024)

4414300.0 | 1.36841m(12093024) 1.57038m(12093024) 1.58339 (12113024) 1.40447 (12113024) 0.88475 (12113024)

4414050.0 | 1.03857m(12093024) 0.89722m(12093024) 0.89511 (12113024) 0.65917 (12113024) 0.73851 (12113024)

4413800.0 | 0.55383 (12113024) 0.57440 (12083124) 0.52587 (12083124) 0.54172 (12113024) 0.64500 (12033124)

4413550.0 | 0.35039 (12083124) 0.38721 (12083124) 0.51335 (12083124) 0.55442 (12113024) 3.03215 (12022924)

4413300.0 | 0.22412 (12083124) 0.28960 (12083124) 0.40380 (12083124) 0.75622m(12093024) 2.00071b(12013124)

4413050.0 | 0.18913 (12083124) 0.22180 (12083124) 0.35224 (12083124) 0.57499m(12093024) 0.31707 (12113024)

4412800.0 | 0.17331 (12083124) 0.21028 (12083124) 0.28288 (12083124) 0.28721 (12063024) 0.31177m(12073124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS)				
	534850.00	535100.00	535350.00	535600.00	535850.00
4417800.0	1.29946 (12033124)	0.95191 (12053124)	0.95846 (12053124)	1.17702 (12033124)	1.55741 (12033124)
4417550.0	0.72777 (12053124)	1.02089 (12053124)	0.98402 (12053124)	1.13160 (12033124)	1.47870 (12033124)
4417300.0	0.45418 (12123124)	2.26028 (12033124)	0.99859 (12053124)	1.05574 (12033124)	1.02713 (12033124)
4417050.0	0.56237 (12123124)	2.71597 (12033124)	1.09676m(12043024)	1.11099m(12043024)	1.03185m(12043024)
4416800.0	0.74217 (12123124)	1.08117 (12053124)	1.35428m(12043024)	1.20125 (12022924)	1.23046m(12043024)
4416550.0	5.64356 (12033124)	1.88526m(12043024)	1.40928 (12022924)	1.61051 (12033124)	1.55309m(12043024)
4416300.0	1.85901 (12022924)	1.90316 (12123124)	1.82751 (12033124)	2.00904 (12123124)	1.82841m(12043024)
4416050.0	2.95467b(12013124)	3.08118 (12053124)	2.86671 (12123124)	2.48181 (12123124)	2.23099m(12043024)
4415800.0	6.17896 (12022924)	5.25580 (12033124)	6.05347m(12043024)	2.94428 (12123124)	5.52247m(12043024)
4415550.0	12.75903 (12022924)	8.51188 (12033124)	5.14506 (12053124)	3.77834m(12043024)	5.33519 (12123124)
4415300.0	12.43076m(12093024)	11.40620b(12013124)	5.52530 (12033124)	2.34165 (12033124)	1.60253m(12093024)

4415050.0 | 11.60312 (12113024) 5.23927m(12073124) 2.70354 (12083124) 1.52155 (12083124) 1.07411 (12053124)

4414800.0 | 3.99183 (12113024) 1.92007 (12063024) 0.90140m(12073124) 0.93962 (12123124) 0.85694 (12053124)

4414550.0 | 5.32968 (12033124) 1.53222m(12073124) 0.59553 (12053124) 0.39670 (12033124) 0.45260 (12123124)

4414300.0 | 1.38903 (12033124) 0.73597 (12022924) 0.45079 (12022924) 0.40798 (12033124) 0.31911b(12013124)

4414050.0 | 2.09965 (12033124) 0.55837 (12022924) 0.40415 (12022924) 0.35100m(12093024) 0.42189 (12083124)

4413800.0 | 0.78978m(12073124) 0.46524 (12022924) 0.36652m(12073124) 0.25512m(12073124) 0.47064 (12113024)

4413550.0 | 0.72895 (12033124) 0.47156m(12073124) 0.34260m(12073124) 0.24803m(12073124) 0.26165 (12113024)

4413300.0 | 1.63130 (12033124) 0.49809 (12022924) 0.34175m(12073124) 0.25735m(12073124) 0.19459 (12022924)

4413050.0 | 0.26133m(12073124) 0.76151 (12033124) 0.34420m(12073124) 0.27662m(12073124) 0.19749m(12073124)

4412800.0 | 0.37595 (12033124) 0.63154 (12033124) 0.45218 (12083124) 0.28885m(12073124) 0.23402 (12083124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD | X-COORD (METERS)

(METERS) | 536100.00 536350.00 536600.00 536850.00 537100.00

4417800.0 | 1.77666 (12033124) 1.22598 (12033124) 1.06751 (12022924) 1.05851 (12053124) 1.81123 (12053124)

4417550.0 | 2.44494 (12033124) 0.51170 (12022924) 0.40341m(12043024) 2.98747 (12033124) 4.19032 (12033124)

4417300.0 | 2.92052 (12022924) 1.25482 (12053124) 0.56671m(12043024) 5.04125 (12123124) 3.77274 (12053124)

4417050.0 | 1.00355m(12043024) 2.22550 (12053124) 1.78182 (12053124) 3.60453 (12053124) 1.93693 (12053124)

4416800.0 | 1.30681m(12043024) 1.66569m(12043024) 2.09550 (12053124) 5.81457 (12033124) 0.55380m(12043024)

4416550.0 | 1.57887m(12043024) 1.93049m(12043024) 2.93177 (12053124) 2.02937m(12043024) 0.43144m(12043024)

4416300.0 | 1.76658m(12043024) 1.96427m(12043024) 2.92878m(12043024) 1.64829 (12123124) 0.37887m(12043024)

4416050.0 | 8.26392 (12053124) 2.80469m(12043024) 4.44390m(12043024) 0.59520 (12123124) 0.32920m(12093024)

4415800.0 | 0.91373 (12123124) 4.42196m(12043024) 6.17043 (12022924) 0.54151 (12033124) 0.28104 (12033124)

4415550.0 | 0.87404m(12093024) 2.01359m(12043024) 3.01202 (12033124) 0.38577m(12043024) 0.20432m(12043024)

4415300.0 | 3.71672 (12113024) 0.92558 (12053124) 2.86335 (12113024) 0.26982 (12083124) 0.24690 (12083124)

4415050.0 | 0.77979m(12093024) 0.68214 (12053124) 2.49954 (12123124) 0.28965 (12053124) 0.43189m(12093024)

4414800.0 | 0.74905 (12053124) 0.78972 (12053124) 1.34773 (12053124) 1.11200 (12053124) 0.86677 (12053124)

4414550.0 | 0.53157 (12053124) 0.58149 (12083124) 0.68354 (12083124) 1.22152 (12113024) 2.57639 (12113024)

4414300.0 | 0.28527m(12093024) 0.30681b(12013124) 0.35749 (12083124) 0.65824 (12022924) 1.18810 (12022924)

4414050.0 | 0.41762 (12103124) 0.26711 (12113024) 0.15842 (12083124) 0.26295 (12022924) 0.20766 (12083124)

4413800.0 | 2.00223 (12033124) 1.24721 (12033124) 0.10293b(12013124) 0.08071 (12083124) 0.05443b(12013124)

4413550.0 | 1.31070 (12103124) 0.20509 (12053124) 0.06708 (12053124) 0.05891 (12123124) 0.04240m(12093024)

4413300.0 | 0.39105b(12013124) 1.57066 (12103124) 0.35782 (12123124) 0.09586 (12113024) 0.04903 (12123124)

4413050.0 | 0.22596b(12013124) 0.54000 (12113024) 1.84880 (12103124) 0.07689 (12053124) 0.04086 (12033124)

4412800.0 | 0.19931b(12013124) 0.33016 (12113024) 1.19474 (12033124) 0.24967m(12093024) 0.06148m(12073124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 537350.00
4417800.0	1.52609 (12053124)
4417550.0	1.57976 (12053124)
4417300.0	0.73307m(12043024)
4417050.0	0.43944m(12043024)
4416800.0	0.34509m(12043024)
4416550.0	0.29968m(12043024)
4416300.0	0.27341m(12093024)
4416050.0	0.24025 (12033124)
4415800.0	0.18676m(12043024)
4415550.0	0.16909m(12043024)
4415300.0	0.15071 (12083124)
4415050.0	0.15010 (12053124)
4414800.0	0.20796 (12083124)

4414550.0 | 0.80743 (12053124)

4414300.0 | 2.13355 (12022924)

4414050.0 | 0.19240 (12083124)

4413800.0 | 0.06236 (12083124)

4413550.0 | 0.03914 (12033124)

4413300.0 | 0.03653 (12083124)

4413050.0 | 0.04237 (12123124)

4412800.0 | 0.05509b(12013124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
	532350.00	532600.00	532850.00	533100.00	533350.00
4417800.0	0.00091 (12022224)	0.00098 (12123124)	0.00100 (12123124)	0.00112 (12020224)	0.00129 (12020224)
4417550.0	0.00091 (12061224)	0.00102 (12123124)	0.00108 (12123124)	0.00114 (12020224)	0.00134 (12020224)
4417300.0	0.00102 (12061224)	0.00104 (12123124)	0.00117 (12123124)	0.00119 (12020424)	0.00136 (12020224)
4417050.0	0.00122 (12011824)	0.00122 (12061224)	0.00120 (12123124)	0.00130 (12022224)	0.00153 (12061224)

4416800.0	0.00149 (12022224)	0.00155 (12022224)	0.00147 (12061224)	0.00147 (12040324)	0.00172 (12123124)
4416550.0	0.00162 (12022224)	0.00173 (12022224)	0.00184 (12021224)	0.00192 (12011824)	0.00198 (12022224)
4416300.0	0.00179 (12022224)	0.00197 (12101324)	0.00218 (12101324)	0.00239 (12101324)	0.00253 (12101324)
4416050.0	0.00207 (12040324)	0.00226 (12022224)	0.00253 (12022224)	0.00282 (12022224)	0.00316 (12022224)
4415800.0	0.00235 (12012124)	0.00264 (12011824)	0.00312 (12082524)	0.00367 (12082524)	0.00444 (12082624)
4415550.0	0.00310 (12071124)	0.00362 (12122724)	0.00460 (12071124)	0.00559 (12122724)	0.00738 (12021124)
4415300.0	0.00371 (12122724)	0.00427 (12072824)	0.00576 (12091024)	0.00798 (12071124)	0.01165 (12090424)
4415050.0	0.00454 (12071124)	0.00591 (12082524)	0.00798 (12061724)	0.01081 (12072824)	0.01780 (12061724)
4414800.0	0.00621 (12061924)	0.00837 (12061924)	0.01220 (12091124)	0.01753 (12091124)	0.02626 (12091124)
4414550.0	0.00856 (12061924)	0.01150 (12061924)	0.01461 (12091124)	0.01888 (12091124)	0.02639 (12061924)
4414300.0	0.00980 (12091124)	0.01185 (12091124)	0.01593 (12061924)	0.02167 (12062024)	0.02751 (12062824)
4414050.0	0.00945 (12061924)	0.01160 (12091024)	0.01673 (12110824)	0.02135 (12062824)	0.02581 (12062824)
4413800.0	0.00956 (12061824)	0.01329 (12062824)	0.01554 (12062824)	0.01798 (12062824)	0.01753 (12062824)
4413550.0	0.01073 (12062824)	0.01259 (12062824)	0.01309 (12062824)	0.01260 (12071924)	0.00989 (12061624)
4413300.0	0.01040 (12062824)	0.01045 (12062824)	0.00967 (12071924)	0.00822 (12061624)	0.00662 (12062824)
4413050.0	0.00916 (12062824)	0.00811 (12071924)	0.00679 (12061624)	0.00576 (12061624)	0.00563 (12070224)
4412800.0	0.00723 (12071924)	0.00586 (12061624)	0.00508 (12061624)	0.00454 (12110824)	0.00560 (12072424)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
	533600.00	533850.00	534100.00	534350.00	534600.00
4417800.0	0.00125 (12020224)	0.00139 (12112724)	0.00170 (12041324)	0.00186 (12052424)	0.00267 (12051824)
4417550.0	0.00135 (12020224)	0.00145 (12112724)	0.00179 (12041324)	0.00200 (12052424)	0.00334 (12052424)
4417300.0	0.00149 (12020624)	0.00172 (12020224)	0.00189 (12041324)	0.00215 (12041824)	0.00358 (12051824)
4417050.0	0.00172 (12051824)	0.00178 (12020224)	0.00204 (12041324)	0.00252 (12021324)	0.00470 (12051524)
4416800.0	0.00198 (12061224)	0.00214 (12092524)	0.00254 (12042424)	0.00320 (12042424)	0.00649 (12051524)
4416550.0	0.00227 (12020424)	0.00277 (12041824)	0.00342 (12042424)	0.00462 (12042424)	0.01001 (12051524)
4416300.0	0.00273 (12061224)	0.00327 (12092324)	0.00490 (12020424)	0.00720 (12041824)	0.01826 (12051524)
4416050.0	0.00384 (12021224)	0.00469 (12021324)	0.00669 (12021324)	0.01049 (12041324)	0.03778 (12051524)
4415800.0	0.00597 (12022224)	0.00823 (12090424)	0.01329 (12040324)	0.02874 (12072624)	0.09359 (12051824)
4415550.0	0.01021 (12081124)	0.01612 (12081124)	0.04161 (12071824)	0.11172 (12082524)	0.09787 (12051724)
4415300.0	0.01924 (12072824)	0.03829 (12072824)	0.08643 (12061924)	0.23199 (12062824)	0.20182 (12062824)
4415050.0	0.03067 (12091124)	0.06386 (12061924)	0.11546 (12091124)	0.14543 (12061824)	0.20909 (12091024)
4414800.0	0.04213 (12061924)	0.06165 (12062024)	0.07892 (12061824)	0.09470 (12061624)	0.12853 (12062824)

4414550.0 | 0.03946 (12110824) 0.05511 (12062824) 0.06576 (12110824) 0.06338 (12110824) 0.06576 (12080724)

4414300.0 | 0.03633 (12062824) 0.04028 (12062824) 0.03884 (12062824) 0.03675 (12062724) 0.03476 (12032724)

4414050.0 | 0.02686 (12062824) 0.02383 (12062824) 0.02274 (12062724) 0.02399 (12072424) 0.02817 (12080724)

4413800.0 | 0.01503 (12061624) 0.01498 (12070224) 0.01813 (12072424) 0.01857 (12072424) 0.02179 (12080724)

4413550.0 | 0.00896 (12061624) 0.01287 (12072424) 0.01618 (12072424) 0.01691 (12032724) 0.01767 (12070224)

4413300.0 | 0.00710 (12062724) 0.01079 (12072424) 0.01291 (12072424) 0.01459 (12062724) 0.01343 (12070224)

4413050.0 | 0.00713 (12072424) 0.00869 (12072424) 0.01058 (12072424) 0.01132 (12062724) 0.01079 (12080724)

4412800.0 | 0.00678 (12072424) 0.00793 (12072424) 0.00838 (12072424) 0.00858 (12062724) 0.00909 (12080724)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
	534850.00	535100.00	535350.00	535600.00	535850.00
4417800.0	0.00484 (12031224)	0.00503 (12051524)	0.00689 (12010724)	0.00773 (12010724)	0.00772 (12010724)

4417550.0	0.00417 (12052424)	0.00630 (12040824)	0.00847 (12010724)	0.00905 (12010724)	0.00900 (12010724)
4417300.0	0.00469 (12042024)	0.01022 (12031224)	0.01057 (12010724)	0.01052 (12010724)	0.00899 (12010724)
4417050.0	0.00640 (12042024)	0.01366 (12012024)	0.01337 (12010724)	0.01210 (12010724)	0.01082 (12041924)
4416800.0	0.00940 (12042024)	0.01485 (12040824)	0.01742 (12010724)	0.01594 (12033024)	0.01490 (12030324)
4416550.0	0.02580 (12122924)	0.02301 (12010724)	0.02241 (12033024)	0.02130 (12041924)	0.02011 (12041824)
4416300.0	0.02912 (12051524)	0.03168 (12033024)	0.03191 (12041924)	0.03037 (12041924)	0.02584 (12033124)
4416050.0	0.05382 (12051524)	0.05219 (12041924)	0.05449 (12041924)	0.04052 (12030324)	0.03287 (12030324)
4415800.0	0.11032 (12041324)	0.10782 (12040824)	0.06787 (12033124)	0.04646 (12030324)	0.03020 (12040924)
4415550.0	0.14816 (12052524)	0.15008 (12042124)	0.09786 (12040924)	0.05572 (12040924)	0.03372 (12033124)
4415300.0	0.11374 (12081324)	0.15391 (12042224)	0.11238 (12033124)	0.05561 (12120424)	0.02829 (12040224)
4415050.0	0.18640 (12061624)	0.12502 (12070424)	0.09888 (12040224)	0.05423c(12012724)	0.03927c(12012724)
4414800.0	0.14384 (12021724)	0.10925 (12031624)	0.03989 (12081924)	0.02591c(12012724)	0.02398 (12092224)
4414550.0	0.07149 (12070224)	0.05927 (12031624)	0.03060 (12032624)	0.01476 (12081224)	0.01205 (12122124)
4414300.0	0.04285 (12082924)	0.04361 (12032724)	0.02273 (12032624)	0.01369 (12032624)	0.00742 (12070424)
4414050.0	0.03116 (12032224)	0.03000 (12032724)	0.01805 (12032724)	0.01186 (12070424)	0.00723 (12032624)
4413800.0	0.02297 (12032224)	0.02211 (12031624)	0.01466 (12032724)	0.01022 (12032624)	0.00658 (12070424)
4413550.0	0.01766 (12032224)	0.01761 (12031624)	0.01213 (12032724)	0.00853 (12032624)	0.00620 (12070424)
4413300.0	0.01433 (12032224)	0.01383 (12082924)	0.01099 (12022924)	0.00709 (12032624)	0.00572 (12031624)
4413050.0	0.01116 (12081924)	0.01114 (12032724)	0.00985 (12022924)	0.00622 (12032724)	0.00516 (12032624)
4412800.0	0.00971 (12031624)	0.00937 (12032724)	0.00871 (12031624)	0.00574 (12022924)	0.00455 (12032624)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
	536100.00	536350.00	536600.00	536850.00	537100.00
4417800.0	0.00864 (12012524)	0.00505 (12012024)	0.00499 (12033024)	0.00545 (12040824)	0.00570 (12011424)
4417550.0	0.00714 (12010724)	0.00559 (12030324)	0.00557 (12040824)	0.00660 (12041824)	0.00717 (12011424)
4417300.0	0.00730 (12030324)	0.00891 (12033024)	0.00717 (12033124)	0.00826 (12011424)	0.00831 (12030224)
4417050.0	0.01160 (12030324)	0.01033 (12033124)	0.00866 (12041824)	0.01033 (12030224)	0.00842 (12030224)
4416800.0	0.01380 (12041824)	0.01229 (12011424)	0.01186 (12030224)	0.01035 (12030224)	0.00805 (12030324)
4416550.0	0.01726 (12041924)	0.01536 (12041924)	0.01364 (12041924)	0.01007 (12030324)	0.00627 (12051924)
4416300.0	0.02267 (12041924)	0.01862 (12030324)	0.01305 (12030324)	0.00862 (12051924)	0.00672 (12030424)
4416050.0	0.02121 (12030324)	0.01583 (12030424)	0.01370 (12030424)	0.00931 (12120424)	0.00655 (12033124)
4415800.0	0.02093 (12030424)	0.01681 (12033024)	0.01261 (12092224)	0.00876 (12041924)	0.00587 (12041924)
4415550.0	0.02062 (12030424)	0.01574 (12041924)	0.01128 (12030424)	0.00679 (12030424)	0.00484 (12040724)
4415300.0	0.01819 (12021824)	0.01364 (12021824)	0.00985 (12021824)	0.00726 (12021824)	0.00596 (12021824)

4415050.0 | (12021824)	0.02660 (12021824)	0.01850 (12021824)	0.01270 (12021824)	0.00908 (12021824)	0.00739
4414800.0 | (12021824)	0.02190 (12092224)	0.01779 (12092224)	0.01493 (12092224)	0.01250 (12021824)	0.00912
4414550.0 | (12122124)	0.01352 (12122124)	0.01392 (12122124)	0.01346 (12122124)	0.01199 (12122124)	0.00958
4414300.0 | (12082824)	0.00692 (12122124)	0.00739 (12053024)	0.00838 (12082824)	0.00887 (12082824)	0.00885
4414050.0 | (12082824)	0.00437 (12060624)	0.00367 (12122124)	0.00358 (12082824)	0.00417 (12082824)	0.00492
4413800.0 | (12082824)	0.00378 (12031624)	0.00283 (12060624)	0.00218 (12081324)	0.00197 (12081224)	0.00174
4413550.0 | (12081224)	0.00388 (12081224)	0.00266 (12022824)	0.00192 (12081324)	0.00150 (12081324)	0.00115
4413300.0 | (12081224)	0.00406 (12070424)	0.00321 (12031724)	0.00214 (12022824)	0.00151 (12022824)	0.00119
4413050.0 | (12122124)	0.00380 (12070424)	0.00288 (12032624)	0.00264 (12122024)	0.00161 (12021724)	0.00125
4412800.0 | (12081324)	0.00367 (12031624)	0.00270 (12070424)	0.00230 (12081224)	0.00175 (12022824)	0.00126

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST 24-HR DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD | X-COORD (METERS)

(METERS) | 537350.00

4417800.0 | 0.00557 (12011424)

4417550.0 | 0.00677 (12030224)

4417300.0 | 0.00674 (12030224)

4417050.0 | 0.00698 (12030324)

4416800.0 | 0.00486 (12051924)

4416550.0 | 0.00503 (12051924)

4416300.0 | 0.00530 (12033124)

4416050.0 | 0.00497 (12120424)

4415800.0 | 0.00423 (12033124)

4415550.0 | 0.00399 (12040724)

4415300.0 | 0.00467 (12021824)

4415050.0 | 0.00580 (12021824)

4414800.0 | 0.00660 (12021824)

4414550.0 | 0.00747 (12122124)

4414300.0 | 0.00839 (12082824)

4414050.0 | 0.00523 (12082824)

4413800.0 | 0.00233 (12082824)

4413550.0 | 0.00116 (12121124)

4413300.0 | 0.00091 (12081224)

4413050.0 | 0.00099 (12081224)

4412800.0 | 0.00114 (12122124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
	532350.00	532600.00	532850.00	533100.00	533350.00
4417800.0	0.00511 (12053124)	0.00545m(12093024)	0.00598m(12093024)	0.00653m(12093024)	0.00727m(12093024)
4417550.0	0.00510m(12093024)	0.00561m(12093024)	0.00624m(12093024)	0.00699m(12093024)	0.00787m(12093024)
4417300.0	0.00531 (12053124)	0.00586m(12093024)	0.00657m(12093024)	0.00695m(12093024)	0.00854m(12093024)
4417050.0	0.00556 (12053124)	0.00619m(12093024)	0.00692 (12053124)	0.00750m(12093024)	0.00931m(12093024)
4416800.0	0.00645m(12073124)	0.00676 (12053124)	0.00744 (12053124)	0.00825m(12093024)	0.01007m(12093024)
4416550.0	0.00851m(12073124)	0.00830m(12073124)	0.00848m(12093024)	0.00952m(12093024)	0.01161m(12093024)
4416300.0	0.00949 (12103124)	0.01045 (12103124)	0.01168 (12103124)	0.01232m(12073124)	0.01413m(12093024)
4416050.0	0.01197 (12063024)	0.01249m(12093024)	0.01499 (12103124)	0.01716 (12103124)	0.01993 (12103124)
4415800.0	0.01674 (12063024)	0.01909 (12063024)	0.02348 (12063024)	0.02763 (12063024)	0.03251 (12063024)
4415550.0	0.02159 (12022924)	0.02480 (12022924)	0.03071m(12093024)	0.04023m(12093024)	0.05714m(12093024)
4415300.0	0.02604m(12093024)	0.03306m(12093024)	0.04392m(12093024)	0.06107m(12093024)	0.09436m(12093024)
4415050.0	0.03718m(12093024)	0.04838m(12093024)	0.06633m(12093024)	0.09153m(12093024)	0.14227m(12093024)
4414800.0	0.05123m(12093024)	0.06501m(12093024)	0.08800m(12093024)	0.12548m(12093024)	0.19236m(12093024)
4414550.0	0.06080m(12093024)	0.07724m(12093024)	0.10053m(12093024)	0.13606m(12093024)	0.19527m(12093024)
4414300.0	0.06486m(12093024)	0.08206m(12093024)	0.11444m(12093024)	0.15834m(12093024)	0.19079m(12093024)

4414050.0 | 0.06629m(12093024) 0.08676m(12093024) 0.11836m(12093024) 0.14569m(12093024) 0.17973m(12093024)

4413800.0 | 0.06907m(12093024) 0.08978m(12093024) 0.10474m(12093024) 0.12226m(12093024) 0.12039m(12093024)

4413550.0 | 0.07215m(12093024) 0.08539m(12093024) 0.08938m(12093024) 0.08727m(12093024) 0.07224m(12093024)

4413300.0 | 0.07138m(12093024) 0.07260m(12093024) 0.06872m(12093024) 0.06094m(12093024) 0.04867m(12093024)

4413050.0 | 0.06467m(12093024) 0.05913m(12093024) 0.05106m(12093024) 0.04322m(12093024) 0.03506m(12093024)

4412800.0 | 0.05435m(12093024) 0.04470m(12093024) 0.03910m(12093024) 0.03171m(12093024) 0.02565m(12093024)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
(METERS)	533600.00	533850.00	534100.00	534350.00	534600.00
4417800.0	0.00830m(12093024)	0.00936m(12093024)	0.01150m(12043024)	0.01398 (12103124)	0.01732 (12103124)
4417550.0	0.00890m(12093024)	0.01018m(12093024)	0.01233m(12043024)	0.01583 (12103124)	0.02063 (12103124)
4417300.0	0.00976m(12093024)	0.01127m(12093024)	0.01359m(12043024)	0.01808 (12103124)	0.02322 (12103124)

4417050.0 | 0.01092m(12093024) 0.01275m(12093024) 0.01594m(12043024) 0.02094 (12103124) 0.02910 (12103124)

4416800.0 | 0.01230m(12093024) 0.01487m(12093024) 0.01974m(12043024) 0.02679 (12103124) 0.03930 (12022924)

4416550.0 | 0.01402m(12093024) 0.01751m(12093024) 0.02503m(12043024) 0.03564 (12103124) 0.05397 (12022924)

4416300.0 | 0.01688m(12093024) 0.02148m(12093024) 0.03293m(12043024) 0.05007 (12022924) 0.13597 (12123124)

4416050.0 | 0.02415 (12103124) 0.02952m(12093024) 0.04516m(12043024) 0.07903 (12022924) 0.19631 (12033124)

4415800.0 | 0.04261 (12063024) 0.06057 (12063024) 0.10227 (12022924) 0.21193m(12093024) 0.63551 (12033124)

4415550.0 | 0.08233m(12093024) 0.13458m(12093024) 0.37494m(12093024) 1.15737m(12093024) 1.28371m(12093024)

4415300.0 | 0.16206m(12093024) 0.33738m(12093024) 0.77113m(12093024) 2.27781m(12093024) 2.47899m(12093024)

4415050.0 | 0.24165m(12093024) 0.50079m(12093024) 0.94827m(12093024) 1.25749m(12093024) 1.99267m(12093024)

4414800.0 | 0.31427m(12093024) 0.46896m(12093024) 0.61959m(12093024) 0.71775m(12093024) 1.03662m(12093024)

4414550.0 | 0.29364m(12093024) 0.40151m(12093024) 0.47926m(12093024) 0.48687m(12093024) 0.38203m(12093024)

4414300.0 | 0.25547m(12093024) 0.28766m(12093024) 0.28114m(12093024) 0.21385m(12093024) 0.15409 (12033124)

4414050.0 | 0.19107m(12093024) 0.17215m(12093024) 0.14306m(12093024) 0.08488m(12093024) 0.13079 (12033124)

4413800.0 | 0.10877m(12093024) 0.09876m(12093024) 0.07300m(12093024) 0.06505 (12033124) 0.10712 (12033124)

4413550.0 | 0.06284m(12093024) 0.05946m(12093024) 0.05658 (12113024) 0.06387 (12033124) 0.08909 (12063024)

4413300.0 | 0.03651m(12093024) 0.03898 (12113024) 0.04480 (12113024) 0.05879 (12033124) 0.06791 (12063024)

4413050.0 | 0.02755m(12093024) 0.03157 (12113024) 0.03726 (12113024) 0.04994 (12033124) 0.04804 (12063024)

4412800.0 | 0.02557 (12113024) 0.02881 (12113024) 0.03007 (12113024) 0.04065 (12033124) 0.03888 (12063024)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
	534850.00	535100.00	535350.00	535600.00	535850.00
4417800.0	0.04007 (12053124)	0.03525 (12022924)	0.03703 (12033124)	0.04403 (12123124)	0.05171 (12123124)
4417550.0	0.02659 (12103124)	0.04192 (12022924)	0.04418 (12033124)	0.04924 (12033124)	0.05934 (12053124)
4417300.0	0.03144 (12103124)	0.07007 (12053124)	0.05443 (12033124)	0.05926 (12033124)	0.05776b(12013124)
4417050.0	0.04052 (12022924)	0.09164 (12053124)	0.07023 (12033124)	0.07027b(12013124)	0.06233b(12013124)
4416800.0	0.05409 (12033124)	0.07363 (12103124)	0.09220b(12013124)	0.08382b(12013124)	0.07310b(12013124)
4416550.0	0.16650 (12053124)	0.12311 (12033124)	0.11449b(12013124)	0.10665b(12013124)	0.08708b(12013124)
4416300.0	0.16490 (12033124)	0.18169 (12103124)	0.15828 (12103124)	0.12650b(12013124)	0.10194b(12013124)
4416050.0	0.33661 (12103124)	0.30465 (12103124)	0.22779 (12103124)	0.16281b(12013124)	0.12537b(12013124)
4415800.0	0.79903 (12103124)	0.55711 (12103124)	0.32721b(12013124)	0.19062b(12013124)	0.11921b(12013124)
4415550.0	1.74949 (12103124)	1.06594 (12103124)	0.45714 (12103124)	0.22813m(12093024)	0.13602m(12093024)
4415300.0	1.98302m(12073124)	1.52477 (12103124)	0.65432m(12093024)	0.28855m(12093024)	0.15921m(12093024)
4415050.0	1.99183m(12093024)	1.12491 (12033124)	0.41583 (12033124)	0.18457m(12093024)	0.11946m(12093024)
4414800.0	0.80978 (12033124)	0.50162 (12063024)	0.18126 (12053124)	0.09067 (12063024)	0.06727m(12043024)

4414550.0 | 0.42393 (12063024) 0.23555 (12022924) 0.12605 (12022924) 0.06365 (12053124) 0.03686 (12063024)

4414300.0 | 0.19622 (12063024) 0.14847 (12022924) 0.10489 (12022924) 0.05518 (12022924) 0.03105m(12073124)

4414050.0 | 0.13540 (12063024) 0.10145 (12022924) 0.08353 (12022924) 0.05011m(12073124) 0.02922m(12073124)

4413800.0 | 0.09467 (12063024) 0.07417 (12022924) 0.06560m(12073124) 0.04294m(12073124) 0.02628m(12073124)

4413550.0 | 0.06850 (12063024) 0.05876 (12022924) 0.05240m(12073124) 0.03675m(12073124) 0.02529m(12073124)

4413300.0 | 0.05128 (12022924) 0.04764 (12022924) 0.04292m(12073124) 0.03166m(12073124) 0.02296m(12073124)

4413050.0 | 0.03601 (12063024) 0.04276m(12073124) 0.03573m(12073124) 0.02760m(12073124) 0.02088m(12073124)

4412800.0 | 0.03013 (12063024) 0.03528m(12073124) 0.02907m(12073124) 0.02421m(12073124) 0.01912m(12073124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS)				
(METERS)	536100.00	536350.00	536600.00	536850.00	537100.00

4417800.0 | 0.05300 (12033124) 0.03191b(12013124) 0.02812 (12103124) 0.03292 (12123124) 0.04027 (12123124)

4417550.0 | 0.04504b(12013124) 0.03245 (12103124) 0.02855 (12022924) 0.04450 (12123124) 0.04925 (12053124)

4417300.0 | 0.05353b(12013124) 0.05014b(12013124) 0.03300 (12022924) 0.05514 (12123124) 0.04678 (12053124)

4417050.0 | 0.05564b(12013124) 0.06564b(12013124) 0.04572 (12123124) 0.06609 (12053124) 0.04136 (12123124)

4416800.0 | 0.06527b(12013124) 0.06567b(12013124) 0.06871b(12013124) 0.05938 (12123124) 0.02982 (12123124)

4416550.0 | 0.07512b(12013124) 0.07282b(12013124) 0.08933 (12053124) 0.04314b(12013124) 0.02666 (12123124)

4416300.0 | 0.08625b(12013124) 0.07644b(12013124) 0.08896 (12053124) 0.04086b(12013124) 0.02602m(12093024)

4416050.0 | 0.15118b(12013124) 0.10060b(12013124) 0.08354 (12053124) 0.03364m(12093024) 0.02663m(12093024)

4415800.0 | 0.06967m(12093024) 0.10682 (12053124) 0.06323b(12013124) 0.03736m(12093024) 0.02890m(12093024)

4415550.0 | 0.08752m(12093024) 0.08480b(12013124) 0.06040m(12093024) 0.03857 (12053124) 0.02773 (12053124)

4415300.0 | 0.10550 (12033124) 0.07005 (12033124) 0.05113 (12033124) 0.03095 (12033124) 0.02466 (12033124)

4415050.0 | 0.08442m(12093024) 0.05938m(12043024) 0.04235m(12043024) 0.02865 (12083124) 0.02429 (12053124)

4414800.0 | 0.05723 (12123124) 0.04906 (12123124) 0.04466 (12083124) 0.03366 (12053124) 0.02440 (12053124)

4414550.0 | 0.03443 (12123124) 0.03495 (12123124) 0.03488 (12053124) 0.03355 (12083124) 0.02647 (12053124)

4414300.0 | 0.01909 (12063024) 0.01744b(12013124) 0.02546 (12053124) 0.02607 (12083124) 0.02433 (12083124)

4414050.0 | 0.01625m(12073124) 0.01087 (12063024) 0.01132 (12033124) 0.00994b(12013124) 0.01222b(12013124)

4413800.0 | 0.01547 (12022924) 0.00978m(12073124) 0.00716m(12073124) 0.00661 (12123124) 0.00650 (12033124)

4413550.0 | 0.01822 (12022924) 0.00835 (12053124) 0.00654 (12053124) 0.00521m(12073124) 0.00442 (12123124)

4413300.0 | 0.01639m(12073124) 0.01361b(12013124) 0.00681m(12073124) 0.00519m(12073124) 0.00414m(12073124)

4413050.0 | 0.01546m(12073124) 0.01395 (12022924) 0.01027b(12013124) 0.00464 (12053124) 0.00382 (12053124)

4412800.0 | 0.01460m(12073124) 0.01106m(12073124) 0.00959 (12022924) 0.00516m(12073124) 0.00368 (12053124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV
NODRYDPLT NOWETDPLT

*** THE 4TH HIGHEST MONTH DRY DEPOSITION VALUES FOR SOURCE GROUP: ALL ***

INCLUDING SOURCE(S): TESIS ,

*** NETWORK ID: ETKI ; NETWORK TYPE: GRIDCART ***

** DEPO OF PM10 IN GRAMS/M**2 **

Y-COORD (METERS)	X-COORD (METERS) 537350.00
4417800.0	0.03255 (12053124)
4417550.0	0.03510 (12053124)
4417300.0	0.02958 (12123124)
4417050.0	0.02526 (12123124)
4416800.0	0.02205 (12123124)
4416550.0	0.02153m(12093024)
4416300.0	0.02159m(12093024)
4416050.0	0.02127m(12093024)
4415800.0	0.02227m(12093024)
4415550.0	0.02227 (12053124)
4415300.0	0.01868 (12123124)
4415050.0	0.01848 (12053124)
4414800.0	0.01914 (12123124)
4414550.0	0.01988 (12053124)
4414300.0	0.02182 (12053124)
4414050.0	0.01342 (12053124)

4413800.0 | 0.00637 (12033124)

4413550.0 | 0.00491 (12123124)

4413300.0 | 0.00359 (12123124)

4413050.0 | 0.00343m(12073124)

4412800.0 | 0.00324 (12053124)

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

NETWORK

GROUP ID AVERAGE CONC RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

- -

ALL 1ST HIGHEST VALUE IS 27.43368 AT (534600.00, 4414800.00, 724.60, 1037.60, 0.00) GC ETKI

2ND HIGHEST VALUE IS 16.77222 AT (534100.00, 4415550.00, 730.40, 1037.60, 0.00) GC ETKI

3RD HIGHEST VALUE IS 16.44646 AT (534350.00, 4415300.00, 714.40, 1037.60, 0.00) GC ETKI

4TH HIGHEST VALUE IS 11.97919 AT (534600.00, 4415300.00, 705.20, 1037.60, 0.00) GC ETKI

5TH HIGHEST VALUE IS 11.48207 AT (534850.00, 4415300.00, 676.10, 1037.60, 0.00) GC ETKI

6TH HIGHEST VALUE IS 10.71422 AT (534600.00, 4415050.00, 712.90, 1037.60, 0.00) GC ETKI

7TH HIGHEST VALUE IS 10.44367 AT (534850.00, 4415550.00, 665.80, 1037.60, 0.00) GC ETKI

8TH HIGHEST VALUE IS 9.88385 AT (534600.00, 4414550.00, 723.70, 1037.60, 0.00) GC ETKI

9TH HIGHEST VALUE IS 9.77208 AT (534600.00, 4415550.00, 664.20, 1037.60, 0.00) GC ETKI

10TH HIGHEST VALUE IS 9.71030 AT (535100.00, 4415300.00, 671.10, 1037.60, 0.00) GC ETKI

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID
ALL	HIGH 4TH HIGH VALUE IS	204.15635	ON 12123024: AT (534600.00, 4414800.00, 724.60, 1037.60, 0.00) GC ETKI

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT *** 09/04/13

*** *** 08:57:26

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST MONTH RESULTS ***

** CONC OF PM10 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 4TH HIGH VALUE IS	31.38607m	ON 12093024: AT (534600.00, 4414800.00, 724.60, 1037.60, 0.00)	GC	ETKI

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE SUMMARY OF MAXIMUM ANNUAL RESULTS AVERAGED OVER 1 YEARS ***

** DEPO OF PM10 IN GRAMS/M**2/YR **

NETWORK

GROUP ID DRY DEPO RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

- -

ALL 1ST HIGHEST VALUE IS 25.20152 AT (534600.00, 4415300.00, 705.20, 1037.60, 0.00) GC ETKI

2ND HIGHEST VALUE IS 21.75272 AT (534850.00, 4415050.00, 683.90, 1037.60, 0.00) GC ETKI

3RD HIGHEST VALUE IS 19.69121 AT (534350.00, 4415300.00, 714.40, 1037.60, 0.00) GC ETKI

4TH HIGHEST VALUE IS 19.15721 AT (534850.00, 4415300.00, 676.10, 1037.60, 0.00) GC ETKI

5TH HIGHEST VALUE IS 18.71164 AT (534600.00, 4415050.00, 712.90, 1037.60, 0.00) GC ETKI

6TH HIGHEST VALUE IS 17.11665 AT (534850.00, 4415550.00, 665.80, 1037.60, 0.00) GC ETKI

7TH HIGHEST VALUE IS 16.52505 AT (535100.00, 4415300.00, 671.10, 1037.60, 0.00) GC ETKI

8TH HIGHEST VALUE IS 14.07526 AT (534600.00, 4415550.00, 664.20, 1037.60, 0.00) GC ETKI

9TH HIGHEST VALUE IS 12.39880 AT (535100.00, 4415550.00, 678.40, 1037.60, 0.00) GC ETKI

10TH HIGHEST VALUE IS 10.67789 AT (534350.00, 4415050.00, 738.60, 1037.60, 0.00) GC ETKI

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** DEPO OF PM10 IN GRAMS/M**2 **

DATE NETWORK

GROUP ID DRY DEPO (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

- -

ALL HIGH 4TH HIGH VALUE IS 0.23199 ON 12062824: AT (534350.00, 4415300.00, 714.40, 1037.60, 0.00) GC ETKI

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** THE SUMMARY OF HIGHEST MONTH RESULTS ***

** DEPO OF PM10 IN GRAMS/M**2 **

DATE NETWORK

GROUP ID DRY DEPO (YYMMDDHH) RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE GRID-ID

- -

ALL HIGH 4TH HIGH VALUE IS 2.47899m ON 12093024: AT (534600.00, 4415300.00, 705.20, 1037.60, 0.00) GC ETKI

*** RECEPTOR TYPES: GC = GRIDCART

GP = GRIDPOLR

DC = DISCCART

DP = DISCPOLR

*** AERMOD - VERSION 12345 *** *** ACWA POWER NATURAL GAS COMBINED CYCLE POWER PLANT *** 09/04/13

*** *** 08:57:26

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**MODELOPTs: RegDFAULT CONC DDEP ELEV

NODRYDPLT NOWETDPLT

*** Message Summary : AERMOD Model Execution ***

--------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)

A Total of 0 Warning Message(s)

A Total of 65 Informational Message(s)

A Total of 8784 Hours Were Processed

A Total of 2 Calm Hours Identified

A Total of 63 Missing Hours Identified (0.72 Percent)

******** FATAL ERROR MESSAGES ********

*** NONE ***

******** WARNING MESSAGES ********

*** NONE ***

****

*** AERMOD Finishes Successfully ***

****

ANNEX 4
METEOROLOGICAL BULLETIN

LONG YEARS METEOROLOGICAL BULLETIN

T.R.
MINISTRY OF FORESTY AND WATER WORKS
GENERAL DIRECTORATE OF METEOROLOGY

Latitude	39												
Longitude	33												
Elevation	747				17135-KIRIKKALE					1960 - 2012			
Parameter	**Years**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Average Pressure (hPa)	47	932.0	930.3	928.8	927.4	928.2	927.5	926.4	927.2	930.0	932.4	933.3	932.6
Maximum Pressure (hPa)	47	950.7	947.3	949.0	944.4	941.7	938.3	937.8	937.9	941.2	944.1	947.7	949.2
Minimum Pressure (hPa)	47	898.7	909.8	907.9	912.5	917.1	915.3	915.4	917.6	917.9	919.8	914.9	912.2
Avg. Temperature at 7am (C)	53	-2.0	-1.1	2.4	7.8	13.0	17.4	20.1	19.0	14.0	8.6	3.3	0.3
Avg. Temperature at 2pm (C)	51	3.2	5.7	11.2	16.8	21.7	26.2	29.6	29.7	25.8	19.6	11.7	5.3
Avg. Temperature at 9pm (C)	51	0.1	2.0	6.8	11.9	16.3	20.7	24.3	23.9	19.2	13.1	6.5	2.3
Avg. Temperature (C)	51	0.4	2.1	6.8	12.2	16.9	21.2	24.6	24.1	19.5	13.6	6.9	2.5
Average Temperature > 5,0 C (day)	51	5.0	8.4	20.0	28.2	30.2	29.4	30.2	29.7	28.7	29.1	19.8	8.6
Average Temperature >= 10,0 C (day)	51	0.2	1.1	7.6	20.7	29.5	29.4	30.2	29.7	28.7	23.8	6.5	0.7
Average High Temperature	53	4.1	6.5	12.4	18.0	23.0	27.5	30.9	30.8	26.7	20.6	12.7	6.2
Average Low Temperature	51	-3.0	-2.0	1.4	6.1	10.1	13.8	16.6	16.3	12.1	7.4	2.2	-0.6
Maximum Temperature Day	53	29	28	24	22	23	27	26	1	10	2	2	1
Maximum Temperature Year	53	2005	2004	2008	2008	1995	1996	2012	2010	1963	1999	2004	1990
Maximum Temperature (C)	53	17.0	20.8	30.4	32.0	34.4	37.6	41.8	40.3	37.0	33.0	24.8	19.0
The highest Temperature >= 30,0 C (day)	53			0.0	0.2	1.8	8.7	19.0	18.4	6.8	0.7		
The highest Temperature >= 25,0 C (day)	53			0.2	2.6	10.7	22.4	29.5	28.7	19.8	7.0		
The highest Temperature >= 20,0 C (day)	53		0.0	2.7	10.5	22.8	29.1	30.8	30.4	27.6	16.4	1.8	
The highest Temperature <= -1,0 C (day)	53	6.3	3.2	0.4								0.1	2.2
Maximum Temperature Difference Druing Day	51	17.5	20.2	23.8	22.5	22.9	22.3	22.7	24.8	26.5	23.6	20.8	18.3

T.R.
MINISTRY OF FORESTY AND WATER WORKS
GENERAL DIRECTORATE OF METEOROLOGY

Latitude	39												
Longitude	33												
Elevation	747				17135-KIRIKKALE					1960 - 2012			
Parameter	**Years**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Minimum Temperature Day	51	16	6	3	4	6	5	5	31	29	30	26	31
Minimum Temperature Year	51	1980	1972	1985	1965	1990	1967	1985	1965	1974	1973	1995	1972
Minimum Temperature (C)	51	-22.4	-21.6	-19.8	-6.8	0.4	4.6	7.4	7.2	2.7	-5.0	-9.7	-18.0
Avg. Days With <=-0.1 and Lower Minimum Te	51	20.8	16.9	10.7	1.4						0.9	8.0	16.0
Avg. Days With <=-3 and Lower Minimum Temp	51	13.4	10.6	4.5	0.2						0.2	3.0	8.3
Avg. Days With <=-5 and Lower Minimum Temp	51	9.7	6.9	2.0	0.1						0.0	1.3	4.6
Avg. Days With <=-10 and Lower Minimum Tem	51	3.2	2.2	0.1									0.5
Avg. Days With <=-15 and Lower Minimum Tem	51	0.7	0.6	0.1									0.0
Avg. Days With <=-20 and Lower Minimum Tem	51	0.1	0.1										
Avg. Days With >=20 and Lower Minimum Temp	51						0.3	3.3	2.8	0.1			
Avg. Days With >=15 and Lower Minimum Temp	51				0.2	1.3	9.8	22.9	21.0	5.3	0.4		
Avg. Days With >=10 and Lower Minimum Temp	51		0.0	0.6	4.2	16.8	27.3	30.2	29.5	21.9	7.1	0.7	0.1
Avg. Days With >=5 and Lower Minimum Temp.	51	1.1	1.9	6.1	18.8	28.7	29.4	30.3	29.8	28.4	22.4	7.8	2.8
Average Minimum Temperature on Soil	40	-3.9	-3.1	-0.1	4.8	8.5	12.4	15.3	14.8	10.4	6.0	0.8	-1.7
Minimum Temperature on Soil	40	-24.0	-21.8	-19.9	-8.9	-1.0	2.9	7.0	5.5	1.0	-6.3	-10.8	-19.0
Minimum Temperature on Soil<=-0.1 and Lower	40	21.9	18.6	13.6	2.5	0.1					1.9	11.9	19.0
Minimum Temperature on Soil<=-3 and Lower	40	14.8	12.8	7.1	0.5						0.4	6.3	11.6
Minimum Temperature on Soil<=-5 and Lower	40	10.7	8.4	3.9	0.2						0.1	3.0	6.9
Minimum Temperature on Soil<=-10 and Lower	40	3.6	2.5	0.5								0.1	0.9
Average Pressure (hPa)	49	8.7	8.5	10.2	10.7	11.7	12.7	13.8	13.6	11.7	10.6	9.8	9.8
07 Local Average Realtive Humidity (%)	51	84.9	83.9	81.7	78.8	76.2	69.6	65.1	66.5	71.5	79.1	85.6	85.6
14 Local Average Realtive Humidity (%)	51	67.8	60.6	48.8	44.1	41.1	35.9	32.1	31.5	34.0	42.7	55.1	68.0
21 Local Average Realtive Humidity (%)	51	79.7	74.9	64.7	60.8	59.4	51.8	43.6	42.8	47.7	61.2	74.8	80.6

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MINISTRY OF FORESTY AND WATER WORKS
GENERAL DIRECTORATE OF METEOROLOGY

Latitude	39												
Longitude	33												
Elevation	747				17135-KIRIKKALE					1960 - 2012			
Parameter	**Years**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Average Humidity (%)	51	77.5	73.1	65.1	61.2	58.9	52.4	47.0	46.9	51.1	61.0	71.8	78.1
Minimum Humidity (%)	51	22	14	4	8	2	4	4	5	3	7	16	20
07 Local Average Cloudiness	45	7.5	6.9	5.7	5.3	4.1	2.6	1.7	1.6	2.3	4.0	5.6	7.2
14 Local Average Cloudiness	45	7.0	6.6	6.2	6.3	5.6	4.5	2.9	2.8	3.2	4.4	5.6	7.1
21 Local Average Cloudiness	45	6.2	5.4	4.5	4.6	4.0	3.1	1.6	1.4	1.7	3.0	4.3	6.1
Average Cloudiness	47	6.9	6.4	5.7	5.6	4.8	3.7	2.4	2.3	2.7	4.1	5.4	6.9
Average Open Day Number	47	2.6	2.6	4.8	4.1	5.1	9.2	16.6	16.8	14.4	10.0	5.8	2.8
Average Cloudiness Day Number	47	13.5	14.4	16.5	17.9	20.4	17.7	12.0	11.3	12.1	15.4	15.8	13.7
Average Closed Day Number	47	13.5	10.0	8.3	6.7	4.2	2.4	1.6	1.6	2.2	4.3	7.7	13.7
07 Total precipitation Average (mm)	45	15.3	10.6	13.2	15.8	14.0	6.9	4.5	3.0	4.3	9.0	12.2	15.0
14 Total precipitation Average (mm)	45	9.5	7.2	5.6	9.5	9.4	5.8	1.4	1.9	1.9	5.6	6.4	9.9
21 Total precipitation Average (mm)	45	9.7	7.9	9.1	14.7	19.9	16.1	3.5	3.1	4.1	7.2	8.2	10.8
Total precipitation Average (mm)	53	41.6	31.4	34.0	45.8	49.2	34.8	10.9	8.2	13.4	27.9	30.5	45.8
Daily Maximum Precipitation (mm)	53	36.5	36.0	30.2	33.0	35.8	100.6	52.7	26.1	29.4	39.2	40.0	34.6
Precipitation over 0.10 mm (avg.day)	53	11.1	10.2	9.9	11.4	11.0	7.7	3.1	2.4	3.5	6.5	8.2	10.7
Precipitation over 10 mm (avg.day)	53	1.2	0.6	0.9	1.5	1.4	0.9	0.3	0.2	0.3	0.8	0.8	1.2
Precipitation over 50 mm (avg.day)	53						0.0	0.0					
Avg. Number of snowy days	52	5.8	4.5	2.8	0.5							1.0	3.5
Number of Snow Covered Days	53	7.7	4.8	1.4	0.1							0.2	2.6
Maximum Thickness OF Snow (cm)	53	48	40	25	6							5	31
Number of Foggy Days	53	3.9	1.9	0.5	0.2					0.0	0.2	2.0	4.4
Number of Hailing Days	52	0.1	0.2	0.2	0.4	0.4	0.2	0.0		0.0	0.1	0.0	0.0
Average. number of Hoarfrost Days	53	6.6	5.9	3.8	0.5						0.8	6.9	7.1

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Latitude	39												
Longitude	33												
Elevation	747				17135-KIRIKKALE						1960 - 2012		
Parameter	**Years**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Average number of Thunder stormy Days	47	0.0	0.1	0.4	2.5	5.8	4.9	2.0	1.8	2.0	0.9	0.1	0.0
07 Local Average Wind Speed (m_sec)	53	1.3	1.3	1.3	1.3	1.0	1.0	1.4	1.2	1.0	0.9	1.1	1.3
14 Local Average Wind Speed (m_sec)	53	2.3	2.7	3.1	3.1	2.9	2.8	2.9	2.7	2.4	2.2	2.0	2.2
21 Local Average Wind Speed (m_sec)	53	1.5	1.6	1.8	1.9	1.9	2.4	3.5	3.1	2.1	1.5	1.2	1.4
Average Wind Speed (m_sec) (m_sec)	53	1.7	1.9	2.1	2.1	1.9	2.1	2.6	2.3	1.8	1.5	1.4	1.6
Maxmimum Wind Speen (m_sec) and Direction	53	22.6 SW	25.9 SSW	28.1 W	27.7 SSW	24.3 WSW	28.0 W	24.4 W	23.0 WNW	23.9 S	22.0 WSW	22.6 NNW	22.6 N
Stormy Days Average	53	0.4	0.8	0.9	1.1	0.7	0.9	0.8	0.5	0.5	0.2	0.3	0.3
Strong Winds Days Average	53	2.5	2.8	4.5	5.0	5.5	6.2	7.0	5.8	3.3	2.4	2.2	2.2
Total no. of N direction wind blowing	53	1148	1095	1399	989	1542	2073	2340	2243	1662	1413	1169	1189
Avg. N direction wind speed (m/s)	53	2.1	2.4	2.8	2.3	2.6	3.0	3.7	3.2	2.6	1.9	1.8	2.1
Total no. of NNE direction wind blowing	53	1049	932	1146	1166	1330	1944	2947	2487	1679	1513	1163	985
Avg. NNE direction wind speed (m/s)	53	2.1	2.3	2.5	2.3	2.3	2.8	3.2	3.2	2.5	2.1	1.9	1.9
Total no. of NE direction wind blowing	53	3636	3464	4467	3943	5096	6260	9170	8514	6459	5532	4146	3503
Avg. NE direction wind speed (m/s)	53	1.7	1.8	2.1	2.1	2.1	2.4	3.1	2.7	2.1	1.8	1.5	1.6
Total no. of ENE direction wind blowing	53	3435	3309	3691	3540	4658	4890	6170	6692	5541	5499	3952	3652
Avg. ENE direction wind speed (m/s)	53	1.6	1.8	2.0	1.9	2.0	2.2	2.7	2.7	2.0	1.7	1.5	1.5
Total no. of E direction wind blowing	53	3422	3497	3698	3309	3823	3739	4031	4424	4641	4220	4000	3285
Avg. E direction wind speed (m/s)	53	1.3	1.4	1.5	1.4	1.5	1.5	1.8	1.7	1.4	1.2	1.1	1.2
Total no. of ESEE direction wind blowing	53	895	835	752	753	809	923	839	881	988	757	796	798
Avg. ESE direction wind speed (m/s)	53	1.1	1.2	1.3	1.3	1.4	1.4	1.6	1.6	1.4	1.2	1.0	1.1
Total no. of SE direction wind blowing	53	1129	901	936	823	1073	896	762	750	1017	1191	1119	1262
Avg. SE direction wind speed (m/s)	53	1.0	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.2	1.0	1.0	1.0
Total no. of SSE direction wind blowing	53	741	582	445	524	506	359	269	260	437	420	495	682

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Latitude	39												
Longitude	33												
Elevation	747				17135-KIRIKKALE					1960 - 2012			
Parameter	**Years**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Avg. SSE direction wind speed (m/s)	53	1.0	1.2	1.3	1.4	1.3	1.3	1.5	1.4	1.3	1.1	1.0	1.1
Total no. of S direction wind blowing	53	2207	1845	1850	1699	1481	1106	697	564	953	1250	2095	2035
Avg. S direction wind speed (m/s)	53	1.5	1.8	1.9	2.0	1.7	1.6	1.4	1.5	1.5	1.5	1.5	1.4
Total no. of SSW direction wind blowing	53	3501	3258	2983	2897	2014	1019	626	600	1092	1811	2562	3450
Avg. SSW direction wind speed (m/s)	53	2.0	2.4	2.5	2.4	2.1	1.9	1.7	1.7	1.7	1.9	1.9	2.1
Total no. of SE direction wind blowing	53	5695	4798	5004	4829	3689	2263	1566	1337	1889	2545	3641	5589
Avg. SW direction wind speed (m/s)	53	1.9	2.0	2.1	2.1	1.9	1.9	1.8	1.6	1.6	1.6	1.6	1.8
Total no. of WSW direction wind blowing	53	1683	1721	2214	2422	1983	1520	739	819	1394	1693	1709	1865
Avg. WSW direction wind speed (m/s)	53	1.7	1.9	2.2	2.3	2.2	2.1	1.9	1.9	1.9	1.6	1.5	1.6
Total no. of W direction wind blowing	53	1871	1960	2272	2726	2533	2315	1538	1311	1592	1725	1709	1758
Avg. W direction wind speed (m/s)	53	1.7	1.9	2.2	2.3	2.4	2.4	2.2	2.1	2.0	1.7	1.6	1.6
Total no. of WNW direction wind blowing	53	498	513	796	837	928	1040	691	657	961	723	556	695
Avg. WNW direction wind speed (m/s)	53	1.6	1.9	2.2	2.3	2.4	2.4	2.5	2.3	2.1	1.8	1.5	1.5
Total no. of NW direction wind blowing	53	518	716	858	813	891	1200	1189	1029	830	627	531	714
Avg. NW direction wind speed (m/s)	53	1.6	1.7	1.8	1.9	2.0	2.2	2.5	2.2	1.8	1.4	1.7	1.5
Total no. of NNW direction wind blowing	53	414	528	631	518	623	970	859	700	621	415	548	506
Avg. NNW direction wind speed (m/s)	53	2.2	2.7	2.4	2.4	2.5	2.8	3.0	3.0	2.5	2.0	2.1	2.0
Average 5 cm. Soil Temperature (°C)	48	1.5	3.0	8.0	14.3	20.4	25.8	29.8	28.9	23.5	15.4	7.6	3.1
Minimum 5 cm. Soil Temperature (°C)	48	-8.6	-8.7	-9.6	0.9	3.9	10.2	15.0	14.4	8.0	1.0	-3.3	-6.6
Average 10 cm. Soil Temperature (°C)	48	1.7	2.9	7.8	14.0	20.0	25.2	28.8	28.4	23.3	15.7	7.8	3.3
Minimum 10 cm. Soil Temperature(°C)	48	-7.1	-6.7	-7.1	2.0	5.4	10.4	15.6	16.5	10.2	3.2	-1.0	-5.6
Average 20 cm. Soil Temperature (°C)	48	2.5	3.3	7.6	13.4	19.2	24.1	27.7	27.5	23.2	16.3	8.8	4.3
Minimum 20 cm. Soil Temperature°C)	48	-5.1	-4.3	-3.7	3.0	7.9	12.6	18.3	19.8	13.4	6.0	1.6	-1.6

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Latitude	39												
Longitude	33												
Elevation	747				17135-KIRIKKALE					1960 - 2012			
Parameter	**Years**	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Average 50 cm. Soil Temperature (°C)	31	4.6	4.6	7.7	12.7	17.5	22.0	25.7	26.7	23.9	18.5	11.6	6.7
Minimum 50 cm. Soil Temperature (°C)	31	1.2	1.1	0.2	6.9	10.2	14.4	21.4	22.3	18.4	11.2	5.2	2.4
Average 100 cm. Soil Temperature (°C)	31	7.1	6.3	7.9	11.6	15.6	19.5	23.1	24.7	23.5	19.8	14.5	9.8
Minimum 100 cm. Soil Temperature(°C)	31	0.3	3.2	3.6	8.1	11.1	14.6	19.8	21.7	19.6	13.1	9.0	6.4
Average Open Surface Evoparation (mm)	24				52.6	174.2	229.6	293.6	266.0	176.2	96.7	6.4	
Maxsimum Open Surface Evoparation (mm)	24				11.0	14.4	17.0	16.0	15.7	11.7	9.7	4.7	
Average Daily Total Insolation Duration (hr-min)	28	2.45	4.11	5.35	6.50	8.45	10.36	11.40	11.09	9.15	6.32	4.15	2.21
Average Global Insolation Intensity (cal÷cm²)	22	145.40	222.10	322.20	396.50	481.10	541.00	556.80	505.30	410.30	276.90	170.70	119.80
Maximum Dailiy Insolation Intensity (cal÷cm²)	22	1.05	1.23	1.55	1.56	1.65	1.62	1.58	1.51	1.55	1.26	1.80	0.97
Average Seawater Temperature (°C)													
Maximum Seawater Temperature (°C)													
Minimum Seawater Temperature (°C)													

THE HIGHEST PRECIPITATION VALUES OBSERVED AT STANDARD TIMES AND RECURRENCE GRAPHS

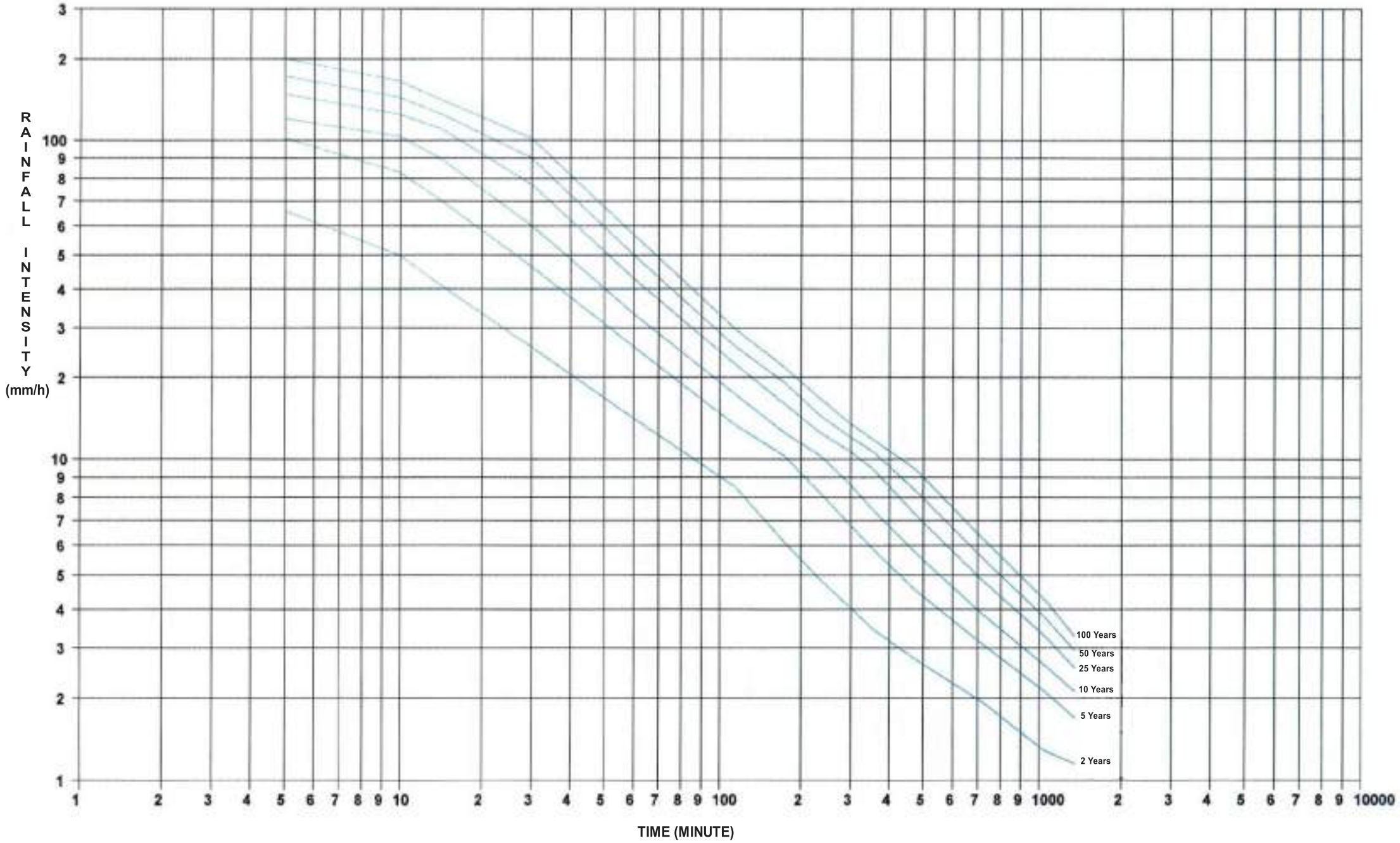
GENERAL DIRECTORATE OF METEOROLOGY
THE LARGEST VALUE OF RAINFALL OBSERVED IN STANDART TIMES IN THE KIRIKKALE METEOROLOGICAL STATION (mm)

YEAR	MINUTES				HOURS										
	5	10	15	30	1	2	3	4	5	6	8	12	18	24	24 +
2010	6,5	8,5	12,4	16,5	17,6	23,2	23,2	23,2	23,2	23,2	29,4	35,6	39,2	39,8	
2009	1,6	3,1	3,5	4,6	5,6	7,6	8,6	9,2	9,6	10,2	11,4	15,9	18,9	21,3	
2008	3,7	4,4	6,5	8,7	8,7	13,4	14,2	14,3	14,3	14,3	14,3	16,9	17,7	21,0	
2007	7,9	9,9	10,7	12,9	15,3	17,2	19,2	21,2	21,2	21,2	21,3	21,3	21,4	21,6	
2006	5,3	5,9	8,8	13,3	16,5	18,1	18,4	18,9	20,2	21,8	21,8	21,9	22,0	22,0	
2005	5,0	7,9	9,8	13,5	16,0	17,4	17,4	17,5	17,5	17,5	17,5	17,6	17,7	26,1	
2004	5,1	10,2	12,8	15,4	16,1	18,0	18,3	18,3	18,4	18,4	18,4	18,5	18,6	21,3	
2003	1,9	2,3	2,4	3,2	6,2	9,2	11,8	13,4	15,3	18,9	23,5	28,7	32,0	34,8	
2002	7,2	12,0	16,4	18,1	24,0	25,3	25,9	25,9	26,6	26,6	26,7	26,7	27,2	27,4	
2001	2,6	3,7	5,0	8,2	12,3	14,7	15,1	15,5	15,6	15,7	16,3	16,5	16,8	32,2	
2000	4,3	6,0	9,9	12,2	14,5	17,0	17,4	20,1	20,4	20,6	21,7	24,9	13,7	35,7	
1999	10,8	21,0	28,7	42,2	43,9	45,9	52,6	52,6	52,7	52,7	52,7	52,7	52,7	52,7	
1998	7,9	14,1	17,5	21,1	21,2	21,2	21,4	21,7	25,5	26,3	26,4	26,4	26,4	27,2	
1997	12,3	24,3	30,1	52,1	61,4	66,6	80,6	88,4	93,3	98,8	100,2	100,5	100,6	100,8	
1996	6,5	12,7	16,3	19,8	20,7	20,8	21,1	21,3	21,8	21,9	21,9	22,0	22,2	25,9	
1995	6,5	7,9	8,1	8,3	8,9	11,5	14,0	15,4	16,3	16,3	16,3	17,1	21,3	30,2	
1994	3,3	3,8	4,6	6,6	6,6	8,2	10,3	13,7	15,8	16,8	17,9	18,4	18,5	26,0	
1993	3,9	6,9	8,5	10,0	10,4	14,3	19,1	20,5	21,1	21,1	21,3	21,3	21,4	21,8	
1992	5,6	7,8	8,2	9,3	9,4	12,5	12,7	12,7	12,7	12,7	12,9	12,9	12,9	15,1	
1991	7,4	7,6	7,6	8,0	8,6	10,8	12,9	14,9	15,4	15,5	17,5	23,6	28,9	28,9	
1990	1,0	1,5	2,3	3,6	5,1	8,5	11,5	13,9	16,7	18,7	25,7	30,3	31,3	31,4	
1989	3,9	5,2	5,8	9,4	10,8	13,0	15,3	18,1	18,9	19,2	19,4	21,1	21,3	40,0	
1988	4,8	6,4	8,3	10,6	10,8	11,6	11,6	12,5	13,5	16,0	19,4	21,3	21,3	36,0	
1987	5,3	9,0	12,0	16,4	18,4	22,1	24,1	25,2	25,2	25,2	25,2	25,2	25,2	33,3	
1986	6,4	9,5	10,5	10,9	13,4	17,4	17,4	17,5	17,5	18,1	18,1	18,1	20,7	21,3	
1985	9,5	15,4	18,9	21,8	23,2	23,4	23,5	23,5	23,5	23,7	24,2	24,2	24,9	33,0	
1984	4,4	4,5	6,5	12,1	16,3	19,6	19,9	19,9	23,8	24,8	24,8	24,8	24,8	27,8	
1983	13,3	16,9	22,3	25,0	27,1	28,2	28,2	28,2	28,2	28,2	28,8	28,8	28,8	34,6	
1982	9,1	12,2	14,5	16,1	16,7	17,0	17,0	17,0	17,0	17,0	17,0	17,1	17,1	24,7	
1981	8,2	13,7	15,4	18,5	27,7	29,5	30,1	32,0	33,7	33,7	33,7	33,7	33,8	33,8	
1980	5,2	6,0	6,2	6,6	6,7	6,8	8,4	10,6	12,6	14,4	17,3	19,5	21,0	26,6	
1979	2,0	3,2	4,3	5,3	6,3	7,7	7,8	7,9	7,9	8,1	10,6	12,4	12,6	12,6	
1978	4,8	5,2	5,3	6,4	6,9	7,2	10,2	11,3	11,4	11,4	11,6	12,3	15,9	28,1	*
1977	12,4	18,6	23,7	29,4	29,4	29,4	29,4	29,4	29,4	29,4	29,4	29,4	38,6	39,8	
1976	8,8	15,2	20,2	28,4	30,2	30,3	30,3	30,3	30,3	30,6	31,8	32,3	32,9	35,9	
1975	4,3	5,5	6,5	8,2	8,7	8,7	11,1	13,0	14,8	16,3	16,8	18,6	18,7	20,5	
1974	10,0	20,0	29,6	37,0	42,6	44,1	44,3	44,3	44,3	44,3	44,3	44,3	44,3	50,1	
1973	2,8	4,4	5,0	7,1	9,4	16,7	21,4	26,2	28,2	29,8	32,0	33,7	33,7	33,7	
1972	5,5	5,5	5,5	5,5	12,7	12,8	13,3	13,6	13,6	13,6	13,9	15,5	18,6	19,1	
1971	10,0	17,0	20,0	21,3	21,3	21,7	21,7	21,7	22,3	22,8	23,9	23,9	24,4	30,2	
1970	2,0	3,5	6,0	7,4	7,7	9,0	11,2	13,5	15,4	17,1	17,7	20,2	20,3	24,7	
1969	3,2	4,0	3,7	6,3	8,5	13,1	13,5	13,7	14,4	16,9	27,9	30,2	31,5	37,5	
1968	5,8	9,7	9,7	13,2	14,2	16,7	22,5	26,0	26,1	26,1	26,1	26,1	26,1	26,1	
1967	5,3	7,6	8,7	10,2	11,2	11,4	11,4	11,4	11,4	11,4	12,4	16,0	29,0	29,6	
1966															
1965															
1964															
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1952															
1951															
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1949															
1948															
1947															
1946															
1945															
1944															
1943															
1942															
1941															
1940															
1939															
1938															
N	43	43	43	43	43	43	43	43	43	43	43	43	43	43	44
Y-ORT	6,0	9,2	11,5	14,8	16,8	18,9	20,4	21,6	22,5	23,2	24,4	25,7	26,7	31,0	30,9
Y-EB	13,3	24,3	30,1	52,1	61,4	66,6	80,6	88,4	93,3	98,8	100,2	100,5	100,6	100,8	100,8
Std.S	3,06	5,56	7,41	10,42	11,45	11,52	12,97	13,59	14,01	14,48	14,42	14,16	14,23	13,67	13,51
Car.K	0,59	0,91	1,09	1,80	2,00	2,23	2,91	3,28	3,48	3,75	3,78	3,81	3,60	3,33	3,37
UDF	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3	LP3
2 YEARS	5,6	7,9	9,5	11,8	13,5	15,8	16,8	17,8	18,6	19,2	20,4	21,6	22,8	27,7	27,8
5 YEARS	8,6	13,2	16,3	20,4	22,7	24,9	26,1	27,1	28,1	28,7	29,9	30,9	32,5	37,9	38,1
10 YEARS	10,4	17,0	21,5	27,6	30,4	32,3	34,2	35,3	36,4	37,1	38,4	39,3	41,0	45,8	46,1
25 YEARS	12,4	21,9	28,8	38,2	42,4	43,6	47,0	48,6	49,9	50,8	52,2	53,2	54,7	57,4	57,8
50 YEARS	13,7	25,7	34,7	47,4	53,0	53,5	58,7	61,0	62,3	63,6	65,1	66,3	67,1	67,3	67,6
100 YEARS	14,8	29,5	41,0	57,7	64,7	65,3	72,7	75,9	77,3	77,9	78,6	79,0	80,7	82,4	82,4
PLF	0,21	0,35	0,46	0,61	0,68	0,71	0,77	0,80	0,82	0,84	0,87	0,89	0,92	1,00	1,00
PLV	0,20	0,30	0,37	0,47	0,53	0,61	0,65	0,69	0,72	0,74	0,78	0,83	0,86	1,00	1,00

RECURRENCE GRAPHS

YEAR	DATE	PROVINCE	STATION	EVENT	NOTES
1977	08.09.1911	KIRIKKALE	KIRIKKALE	Rainfall and flood	Agricultural products, the environment and settlements are damaged due to the flood
1978	01.091.1978	KIRIKKALE	KIRIKKALE	Drought	Actual conditions needs rainfall
1979	03.04.1979	KIRIKKALE	KIRIKKALE	Storm	Agricultural products, the environment and settlements are damaged due to the storm
1980	04.12.1980	KIRIKKALE	KIRIKKALE	Storm	Agricultural products, the environment and settlements are damaged due to the storm
1981	04.04.1981	KIRIKKALE	KIRIKKALE	Snow Frost	Agricultural products, the environment and settlements are damaged due to the snow
1981	01.07.1981	KIRIKKALE	KIRIKKALE	Storm	Agricultural products, the environment and settlements are damaged due to the storm
1982	30.06.1982	KIRIKKALE	KIRIKKALE	Hail Storm	Agricultural products, the environment and settlements are damaged due to the hail storm
1983	18.02.1983	KIRIKKALE	KIRIKKALE	Snow	Traffic was disrupted due to snow
1983	22.05.1983	KIRIKKALE	ANKARA	Rainfall and flood	Agricultural products, the environment and settlements are damaged due to the flood
1986	03.06.1986	KIRIKKALE	KIRIKKALE	Hail	Agricultural products are damaged due to the hail
1987	22.05.1987	KIRIKKALE	KIRIKKALE	Storm	Agricultural products, the environment and settlements are damaged due to the hail storm
1999	18.07.1999	KIRIKKALE	KIRIKKALE	Rainfall and flood	Settlements are damaged due to the flood
2004	14.04.2004	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2007	11.11.2007	KIRIKKALE	KIRIKKALE	Storm	Settlements are damaged
2008	21.03.2008	KIRIKKALE	KIRIKKALE	Storm	Human, animal, transportation and settlements are damaged
2008	25.03.2008	KIRIKKALE	KIRIKKALE	Storm	Human, animal, transportation and settlements are damaged
2009	12.02.2009	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2009	14.02.2009	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2009	06.03.2009	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2009	19.03.2009	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2009	04.07.2009	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2009	08.09.2009	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2009	13.12.2009	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2010	02.01.2010	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2010	02.02.2010	KIRIKKALE	KIRIKKALE	Storm	Trees are damaged
2010	15.02.2010	KIRIKKALE	KIRIKKALE	Storm	Trees are damaged
2010	09.03.2010	KIRIKKALE	KIRIKKALE	Storm	Trees are damaged
2010	28.03.2010	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken

KIRIKKALE METEOROLOGICAL STATION RAINFALL INTENSITY-TIME-FREQUENCY CURVES



EXTREME EVENTS

YEAR	DATE	PROVINCE	STATION	EVENT	NOTES
2010	13.06.2010	KIRIKKALE	KIRIKKALE	Rainfall and flood	Human, animal, transportation and settlements are damaged
2010	20.06.2010	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2011	14.04.2011	KIRIKKALE	KIRIKKALE	Storm	Branches of trees are broken
2011	19.04.2011	KIRIKKALE	KIRIKKALE	Hail	Flowers of trees are damaged
2011	02.05.2011	KIRIKKALE	KIRIKKALE	Hail	Flowers of trees are damaged
2011	11.08.2011	KIRIKKALE	KIRIKKALE	Hail	Fruits of trees are damaged
2012	17.02.2012	KIRIKKALE	KIRIKKALE	Snow	Traffic is disrupted
2012	18.04.2012	KIRIKKALE	KIRIKKALE	Frost	Greenhouse agricultural products are damaged

ANNEX 5
GEOLOGICAL AND GEOTECHNICAL SURVEY REPORT

GEOLOGICAL – GEOTECHNICAL SURVEY REPORT BASED ON THE DEVELOPMENT PLAN OF THE AREA

AT KIRIKKALE PROVINCE – YAHŞIHAN DISTRICT – KILICLAR TOWN

Map Sections are;

No 108 Parcel 1 and No 109 Parcel 1 and 2

I30-b-14-a-1-c, I30-b-14-a-1-d, I30-b-14-a-2-d,

I30-b-14-a-3-a, I30-b-14-a-4-a, I30-b-14-a-4-b



Levent Gençman — ***Geophysical Engineer***

Eymen AREL — ***Geological Engineer (Msc)***

Adem ULUŞAHİN — ***Geological Engineer***

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July-2013
ANKARA

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1. AIM AND SCOPE

This study has been done to prepare the geological/geotechnical survey report based solely on development plan of Kırıkkale Province, Yahşihan District, and Kılıçlar Town, no 108 map section, no 1 parcel and no 109 map section belonging to no 1 and 2 parcels. Mentioned parcels are located in the following map sections, Kılıçlar/Yahşihan no130-b-14-a-1-ci, 130-b-14-a-1-d, 130-b-14-a-3-a, 130-b-14-a-4-a, 130-b-14-a-4b. Natural Gas Combined Cycle Power Plant is being planned on built in the area of work.

Research area is located in the borders of Kırıkkale Kılıçlar Town. The overall size of said parcels is approximately 30 hectares. The prepared report has been designed to open the said parcels, which a "Natural Gas Combined Cycle Power Plant" planned on built, to a development plan and a settlement suitability evaluation has been done to the research area (Photo 1.1).



Photo 1. 1: General view of the Research Area (View of SE from NE)

2. INTRODUCING THE RESEARCH AREA AND WORK METHODS

2.1 Spatial Information – Geographical Location

Research area is located west of Kızılırmak River, in the borders of Kırıkkale Province, Yahşihan District Kılıçlar Town (Figure 2.1).

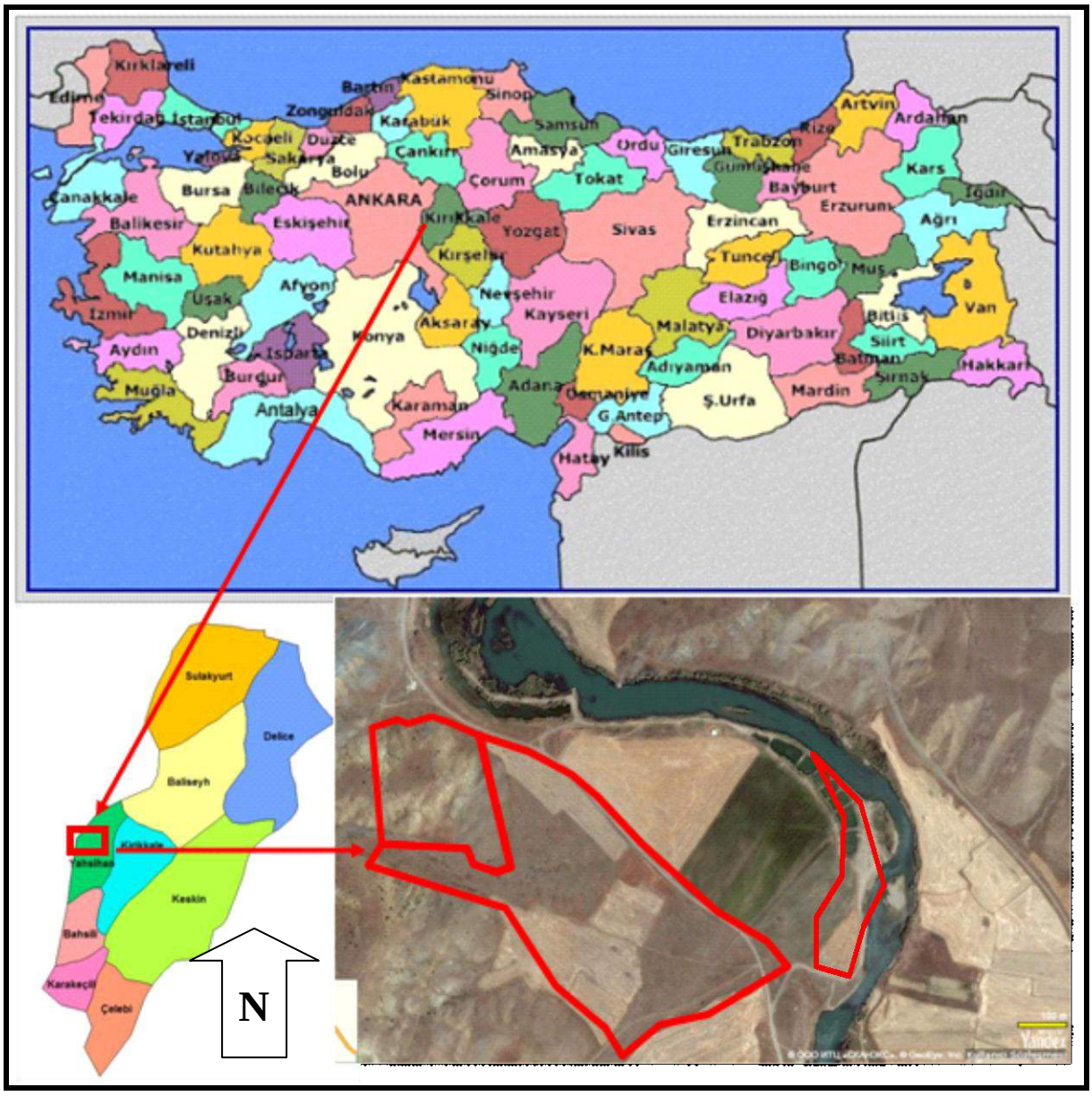


Figure 2. 1: Location Map of Research Area

Natural Gas Combined Cycle Power Plant is planned to construct in 109 map section, numbers 1 and 2 parcels.

The caisson wells necessary for providing the cooling down water for the Natural Gas Combined Cycle Power Plant will be located in 108 map section, numbers 1 parcel. The Coordinates of related map section and parcel numbers are listed below;

KIRIKKALE-YAHŞİHAN-KILIÇLAR District, Parcels: 109/1-2, 108/1 Sheet no:I 30 b ,

Property: Treasury,

Soil: type: Crudely

Map section: 109/1 = 60165 m^2

Map section: 109/2 = 154112 m^2

Map section: 108/1 = 23700 m^2

Coordinates of Map Section 109/ 1-2

ED50-3 DEGREE			UTM-6 DEGREE		
COORDINATES OF PROPERTY			COORDINATES OF PROPERTY		
Benchmark:	Y	X	Benchmark:	Y	X
1.	534459.468	4417405.212	1	534445.684	4415638.250
2.	534504.230	4417423.17	2	534490.428	4415656.250
3.	534523.049	4417416.174	3	534509.240	4415649.207
4.	534569.820	4417428.598	4	534555.992	4415661.626
5.	534602.524	4417424.213	5	534588.683	4415657.243
6.	534668.114	4417392.240	6	534654.247	4415625.283
7.	534735.533	4417118.417	7	534721.659	4415351.570
8.	534695.759	4417111.372	8	534681.881	4415344.527
9.	534660.010	4417129.628	9	534646.146	4415362.786
10.	534647.746	4417158.342	10	534633.887	4415391.479
11.	534478.599	4417170.240	11	534464.808	4415403.372
12.	534475.099	4417175.490	12	534461.309	4415408.620
13.	534448.193	4417120.147	13	534434.414	4415353.299
14.	534719.813	4417035.587	14	534705.925	4415268.773
15.	534821.305	4416878.885	15	534807.376	4415112.133

16.	534918.881	4416791.159	16	534904.913	4415024.442
17.	534952.008	4416732.472	17	534938.027	4414965.779
18.	535028.769	4416796.235	18	535114.757	4415029.546
19.	535124.870	4416822.757	19	535110.822	4415056.028
20.	535279.437	4416919.955	20	535264.325	4415153.187
21.	535241.069	4416997.640	21	5535226.973	4415200.853
22.	535141.131	4417031.403	22	535127.075	4415264.590
23.	535004.104	4417157.833	23	534990.102	4415390.970
24.	534912.753	4417258.512	24	534898.788	4415491.599
25.	534851.913	4417312.582	25	534837.972	4415546.657
26.	534834.373	4417321.900	26	534820.439	4415554.971
27.	534802.583	4417337.247	27	534788.662	4415570.312

Coordinates of Map Section 108/1

ED50-3 DEGREE

COORDINATES OF PROPERTY

Benchmark:	Y	X
1	535423,47	4417330,33
2	535450,01	4417246,03
3	535456,47	4417117,22
4	535440,56	4417101,31
5	535383,39	4416911,39
6	535462,78	4416884,45
7	535479,98	4416945,36
8	535533,59	4417004,77
9	535498,79	4417149,40
10	535466,68	4417264,92

UTM-6 DEGREE

COORDINATES OF PROPERTY

Benchmark:	Y	X
1	535409,30	4415563,40
2	535435,83	4415479,13
3	535442,29	4415350,37
4	535426,38	4415334,46
5	535362,24	4415144,62
6	535448,60	4415117,69
7	535465,69	4415178,58
8	535519,38	4415237,97
9	535484,59	4415382,54
10	535452,50	4415498,01

1/1000 scaled map canavas of working area is given in Figure 2.2 and Layout plan of the Natural Gas Combined Cycle Power Plant is given in Figure 2.3

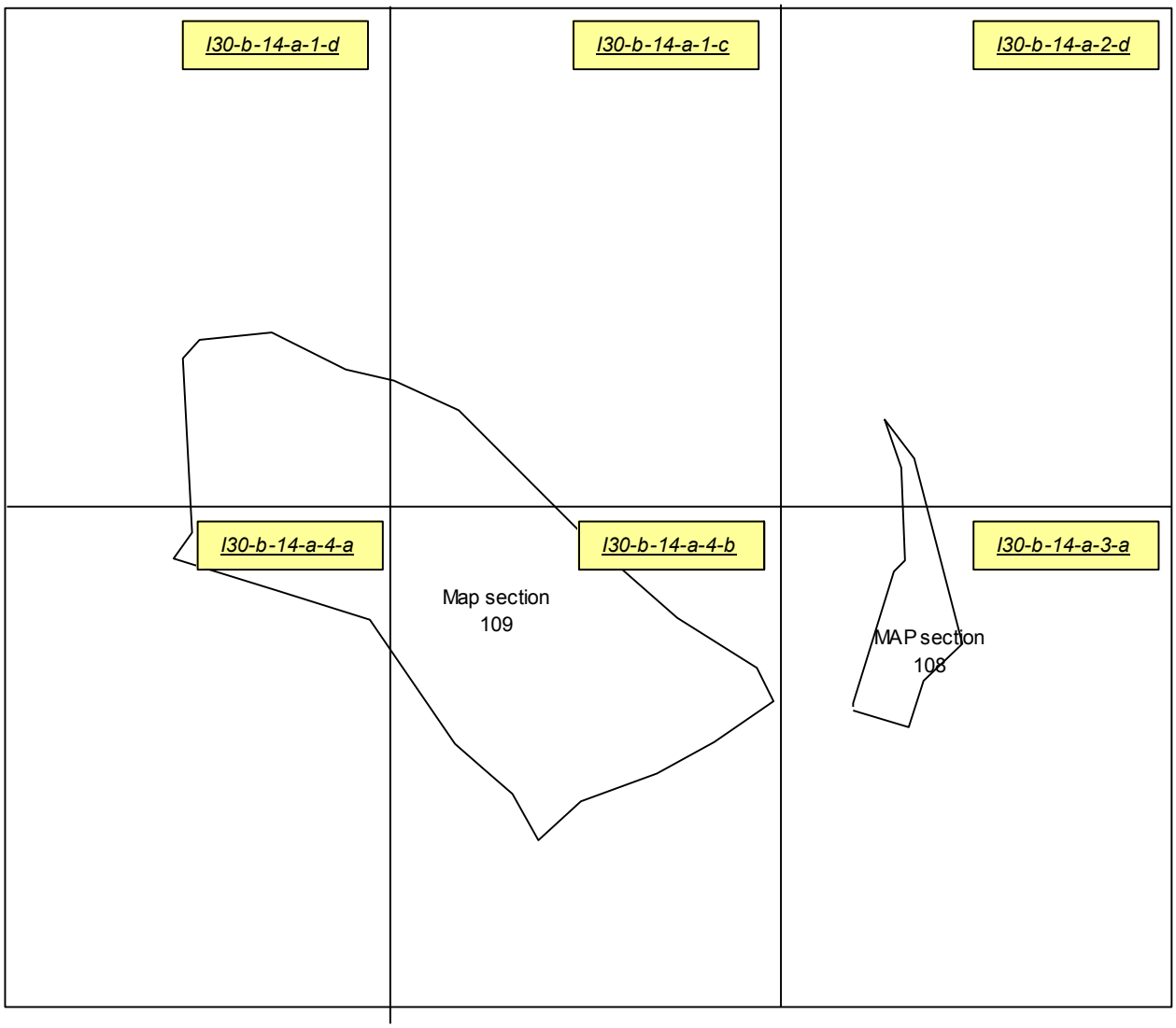


Figure 2. 2: 1/1000 scaled map canavas of working area

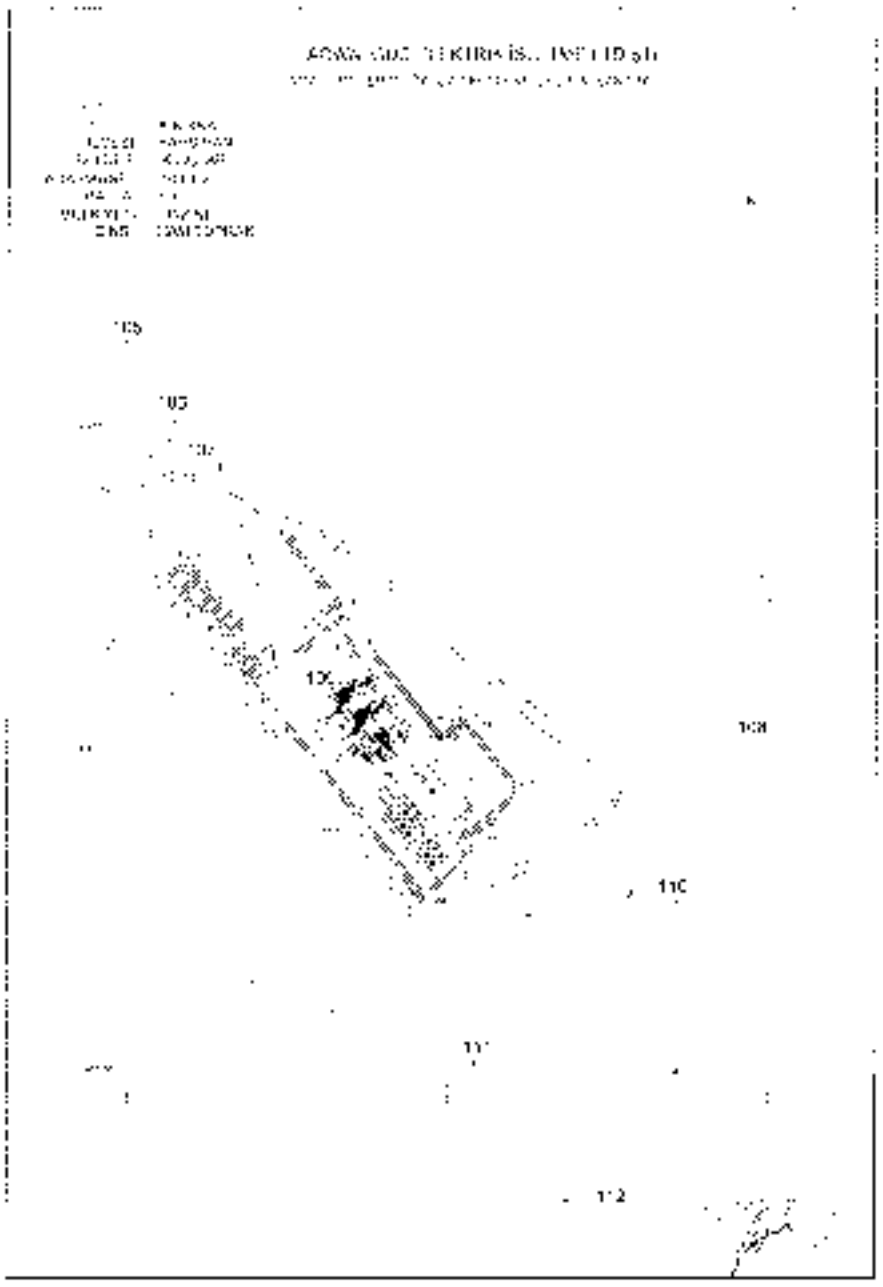


Figure 2. 3: Natural Gas Combined Cycle Power Plant Layout Plan

The working area of the Power Plant's construction is located in Kırıkkale Province Kılıçlar Town. Town is 25 kilometers away from Kırıkkale Province and 22 kilometers away from the center of Yahşihan District. Work area is located 4.18 kilometers (Air Distance) east from the Kılıçlar Town. It is possible to reach the work area from the town, with car on an 18 kilometers long route. (Figure 2.4)

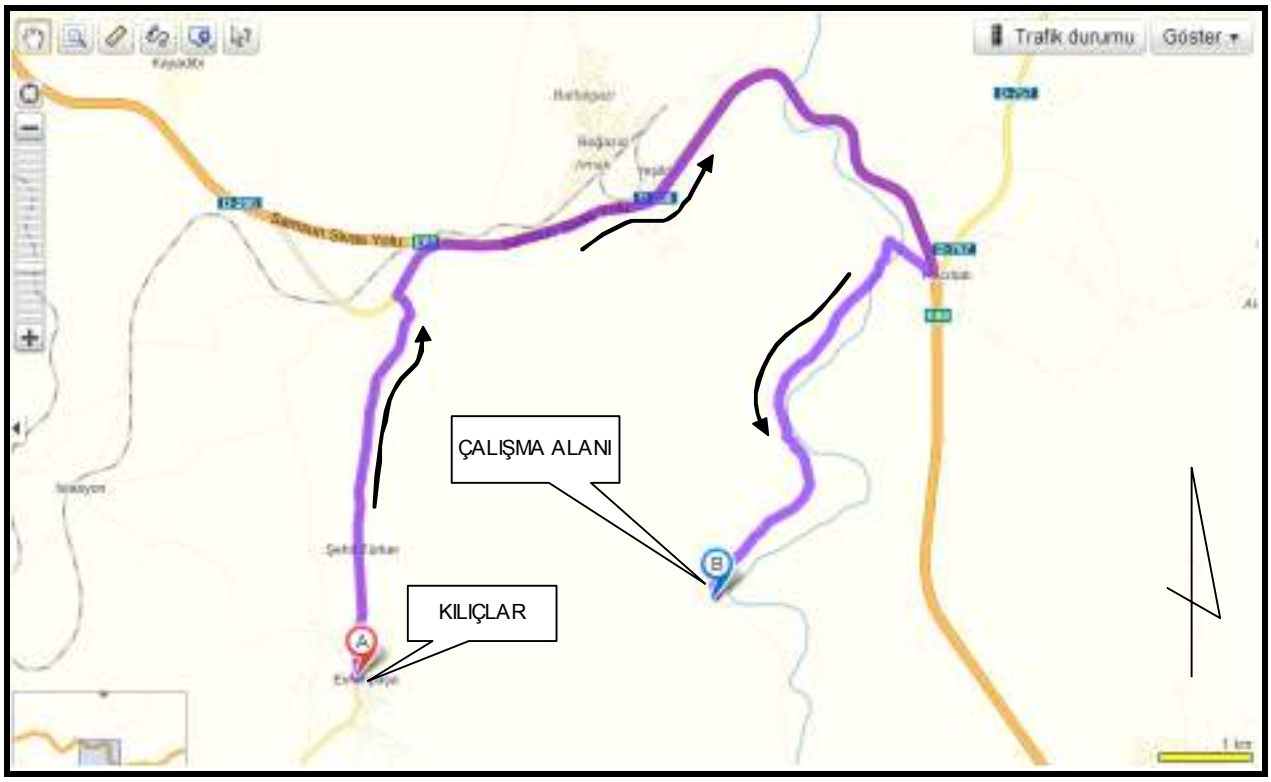


Figure 2. 4: Transportation route from Kılıçlar Town to working area

Yahşihan District has the altitude of 680 m and it has lands with a total area of 155 km2 including the Center Municipality 122 km2, Irmak Town municipality 15 km2 and Kılıçlar Town Municipality 155 km2. These lands are extremely fertile and surrounded with Demirlibel, Ardıçlı hills and, Kure and Delikli mountains. Yahşihan is located in the right (east) shore of Kızılırmak River, southern side of Kara Gunay Mountain's foots. Kızılırmak divides the land in the middle.

2.2 Climate and Vegetation

Research area; elevated 700 meters from sea level, is located in temperate climate. However, the result of the area being distant from the sea carries the property of harsh continental climate due to extreme temperature differences between daytime and nighttime caused by steppe climate. As a result, it is cold in winters, hot in summers. Temperature varies between +40,3°C and -22,4°C, and it's approximately 13°C on average. Yearly rainfall in total is 373,5 mms. 1960-2012 data logs of the General Directorate of Meteorology are summarized in Table 2.1.

KIRIKKALE	January	Februar	March	April	May	June	Julay	August	September	October	Nowember	December
	Avarage values for long years					(1960 - 2012)						
Avarage Temperature	0.4	2.1	6.8	12.2	16.9	21.2	24.6	24.1	19.5	13.6	6.9	2.5
Avarage Maximum Temperature	4.1	6.5	12.4	18.0	23.0	27.5	30.9	30.8	26.7	20.6	12.7	6.2
Avarage Minimum Temperature	-3.0	-2.0	1.4	6.1	10.1	13.8	16.6	16.1	12.1	7.4	2.2	-0.6
Avarage Sunny Time (Hour)	2.5	4.1	5.4	6.5	8.5	10.4	11.4	11.1	9.2	6.3	4.2	2.2
Avarage Ranny Days	11.1	10.2	9.9	11.4	11.0	7.7	3.1	2.4	3.5	6.5	8.2	10.7
Mountly Total precipitation	41.6	31.4	34.0	45.8	49.2	34.8	10.9	8.2	13.4	27.9	30.5	45.8
	Avarage values for long years						(1968 – 2012)*					
Maximum Temperature	17.0	20.8	30.4	32.0	34.4	37.6	41.8	40.1	37.0	31.0	24.8	19.0
Minimum Temperature	-22.4	-21.6	-19.8	-8.8	0.4	4.6	7.4	7.2	2.7	-5.0	-9.7	-18.0
Maximum precipitation	11.06.1997	100.6 kg/m²	Maximum wind speed			02.03.1988	101.2 km/sa	Maximum snow		05.01.2002	48.0 cm	

Table 2. 1: Meteorology Logs of Kırıkkale Province

Kırıkkale Province has a dominant vegetation of steppe. In higher altitudes, one can find forest lands consist of red oak and specifically juniper but these forestlands are not located in project area. Near areas of the project are agriculture sites.

2.3 Socio-Economical Status of the Area

Kırıkkale was under the dominance of respectively Hittites, Romans and Byzantines and after the Battle of Manzikert (Malazgirt) in 1071, the province was ruled by the Turkish settlement in Anatolia and became the scene of intensive settlement of the Turkish population. As a result; provinces, districts, towns and villages have witnessed the Turkish customs and traditions.

Kırıkkale University, which was founded in 1992, and its rapid development contributed to the province's economic, social and cultural life in a positive sense. In addition, Kırıkkale's republican identity and establishing MKEK had a significant impact on the social life.

Kırıkkale is one of the most strategically and economically important city of Turkey. MKEK Factories, TÜPRAŞ Center Anatolian Refinery, and The University of Kırıkkale play a great role on city's economical and commercial activities. In addition to that, on the industrial zone, which is built on approximately 150 hectare and is in the borders of Yahşihan borough, it is expected that 3000-5000 new employees will find an opportunity to earn their livings.

According to Address Based Population Registration System (ABPRS)'s records in 2011, the total population of the province of Kırıkkale is 274.992 people. 233.768 percent of the population lives in province and district centers and 41,224 percent live in towns and villages. 85 % of the population is in the cities and 15 % is in villages. The population growth rate is approximately 6 %. The total population of the County of Yahşihan is 16,618. 13.374 people of the total population are in the center of the county, 2132 is in counties and 1112 is villages.

Yahşihan County has reached good level of education. Enrollment rate in 2011-2012 academic year is 52 % in pre-school education, 100 % in primary education and 86 % in secondary education. According to the 2011 ABPRS: (6 + years) literacy status; illiterate: 11,899 people (4 %), literate: 239.084 people (94 %), unknown: 1,611 people (% 06) form.

88 % of the residents Yahşihan County are married, 8 % are single, % 4 are divorced and widowed. There are similarities in the results of the research conducted in 2006. In this case, there is a building in general demographic characteristic in Yahşihan County. The majority of the head of the households are elementary school graduates. Because Public Housing in the county and the majority of the residents are officers, teachers and scholars, the rate of college graduates has increased greatly in the past years.

2.4. Field, Laboratory and Office Work Methods

During field studies, 10 boreholes were drilled in Kırıkkale province Yahşihan District, Kılıçlar Town,109 Parcel No: 1 and 2, as well as 108 Parcel No: 1 in. During the drilling work, D-500 Rotary type drilling machine was used. Also in the study area, 10 test pits were opened and in 4 locations microtremor, resistivity and seismic refraction measurements were made. The site staff including a geological engineer and a geophysical engineer carried out the field works

During the drilling works, from different levels of soils, 74 disturbed (SPT) samples, 25 core samples (K) and 21 undisturbed samples (UD) from the fine-grained cohesive layers were collected. Also, during the drilling Works of (SK-9 and SK-10) in section108, parcel no: 1, permeability tests were carried out over a total of 6 units. In addition, 13 bulk samples

(sample bags) were collected from the 10 test pits. Boreholes, test pits and geophysical measurement locations are given in Table 2.2 with the location coordinates.

43 numbers of disturbed samples, 21 numbers of undisturbed (UD) samples, 25 numbers of core samples and 13 numbers of bulk soil samples were tested in the EFOL Geotechnical Services Company's Soil and Rock Mechanics Laboratory in Ankara. The tests applied on the samples are listed in Table 2.3 together with relevant test standards.

Survey Type	Survey No	Coordinates		Depth (m)
Borehole Drillings	SK-1	534753	4415444	20,00
	SK-2	534765	4415342	20,50
	SK-3	534870	4415309	50,00
	SK-4	534892	4415283	50,00
	SK-5	534909	4415240	50,50
	SK-6	534955	4415353	20,00
	SK-7	534922	4415142	50,00
	SK-8	535013	4415189	20,00
	SK-9	535471	4415244	21,00
	SK-10	535483	4415370	20,50
Testpits	AÇ-1	535200	4415150	3,50
	AÇ-2	535125	4415106	3,30
	AÇ-3	535071	4415055	3,40
	AÇ-4	534869	4415236	3,60
	AÇ-5	534936	4415282	3,40
	AÇ-6	534609	4415362	3,50
	AÇ-7	534732	4415316	3,20
	AÇ-8	534827	4415348	3,20
	AÇ-9	534872	4415473	3,50
	AÇ-10	534790	4415528	3,60
Microtremor	Mt-1	534976	4416840	-
	Mt-2	534992	4416976	-
	Mt-3	534842	4417035	-
	Mt-4	534792	4417205	-
Resistivity	Des-1	535000	4416893	70
	Des-2	534858	4417058	70
	Des-3	534709	4417232	70
	Des-4	535399	4417196	70
Seismic Refraction	Line No	Coordinates		
		Line start	Line end	
	Js-1	534947 - 4416858	535034 – 4416962	98,66
	Js-2	534893 – 4416988	534819 – 4417098	77,91
	Js-3	534645 - 4417292	534699 – 4417169	110,95
	Js-4	535451 - 4417124	535397 – 4417248	67,15

Table 2. 2: Location of boreholes, test pits and geophysical surveys

Rock and Soil Tests	Standard	Number of the Samples
Water content (soil)	TS 1900-1	77
Atterberg Limits (soil)	TS 1900-1	77
Sieve Analysis (soil)	ASTM D-422	77
Share Box (soil)	TS 1900-2	6
Tri axial compression test(soil)	TS 1900-2	12
Consolidation (soil)	TS 1900-2	10
Specific Gravity (soil-rock)	TS 1900-1	102
Compaction(Proctor) (soil)	TS 1900-1	13
CBR (soil)	TS-1900, ASTM D-1883	13
Unite weight (rock)	ISRM	19
Unconfined compression test (rock)	TS 2028	19
Elasticity Module (rock)	TS 2028, 2029, 2020	4
only north edge Poisson Rate (rock)	TS 2028, 2029, 2020	4
Point Load Test (rock)	TS 699- ASTM 5731	2

Table 2. 3: The list of the rock and soil samples which were tested in rock and soil mechanics laboratory and relevant test standards were used

During the office works, all the data obtained from the drilling works, test pit works, laboratory tests and geophysical surveys were evaluated together and they were used for the preparation of this report. On the other hand, all findings were mapped on the existing 1/1000 scaled topographical city maps which were already approved by the government authorities.

3. EXISTING PLAN STUDY, SETTLEMENT SITUATION AND PREVIOUS WORKS

3.1 Existing Plan and Settlement Situation

There is no any 1/5000 and 1/1000 scaled settlement plan and plan study in the section 109 parcel no.1 and 2 and section 108 and parcel no1. It could be only mentioned the existence of the abandoned Fish Farm's water ponds on the parcel no. 1 of 108 section.

The aim of this study is to get the settlement permission for Natural gas Combined Cycle Plant, which would be erected on the section 109 parcel no. 1 and 2. and on the section 108, parcel no.1. As the result, the study area has been evaluated in respect of settlement convenience. According to the project plan, the construction area of the power plant has been designed on the section 109 and parcel no. 1 and 2. Any premises on the section 108, Parcel no.1 is not plant on being constructed. Only the systems (10 meters deep cession wells) which are going to provide cooling water to the plant will be opened on the mention area.

3.2 Previous Geological Surveys, Inconvenient settlement and Disaster areas

There is no any pre-existing Geological and Geotechnical survey of Settlement Plan for the study area. On the other hand, based on the regulation number 7269; on the project site there is no any effected disaster area and restricted area for the settlement

3.3 Flooding Areas, Archeological Sites and Protected Regions

In the area comprises with section 109 parcel no. 1 and 2, section 108 parcel no.1 at Kılıçlar Town, Yahşihan County of Kırıkkale Province, archeological sites and protected regions do not exist. According to the Turkish General Directorate of State Hydraulic Works, only the restricted area is flood land which prolongs at 200 meters right and and 200 meters left side of the Kızılırmak River. This restricted land covers only north edge of the map section 109 and all the land belonging map section 108.

The official corresponding with the related Government Authorities are given in Appendix-1.

4. GEOMORPHOLOGY

The study area is located in the valley of the Kızılırmak River is the largest river in Turkey. Formation age of the area is estimated to be Late Pliocene. River is located in an 800-1000 m altitude plateau. There is ophiolitic mélange on the west coast of the river and flysh sequence on the east coast.

In Kızılırmak Valley, young deposits that give outcrops are geologically and geomorphologically divided into two subtexts: Holocene age deposits and Pleistocene age deposits. Holocene units are observed mostly in rivers beds, flood begs, flow deposits and fan deposits. Flood plain deposits are about 5-70 m wide along the riverbed, in the study area. Kızılırmak Valley's Pleistocene deposits are consisting of river terrace.

The Geomorphologic Map of the study is and its surroundings are given in Figure 4.1. The description of the mentioned map is also presented in Figure 4.2.

In respect of the land morphology, northwestern parts of the area are in elevations of 750 m consist of the Middle Miocene penaplane and Upper Miocene foot slope plains and advanced crestal flat surface. Southeastern parts consist of alluvial plains. Plains on the western side of the area are in the character of alluvial fan that deposited to the base. In eastern parts, the plains at the left coast of Kızılırmak River comprises of flood plain and terrace deposits material.

When the Slope Map of the study area that was presented in Appendix -10 is examined, it can be seen that in the northern west part of the area has soft and sharp slopes (between 10%-30% and sharper than 30%). Flat and soft slope areas (slopes that are lower than 10%) are located in South and Southeastern areas where alluvium plains can be found.

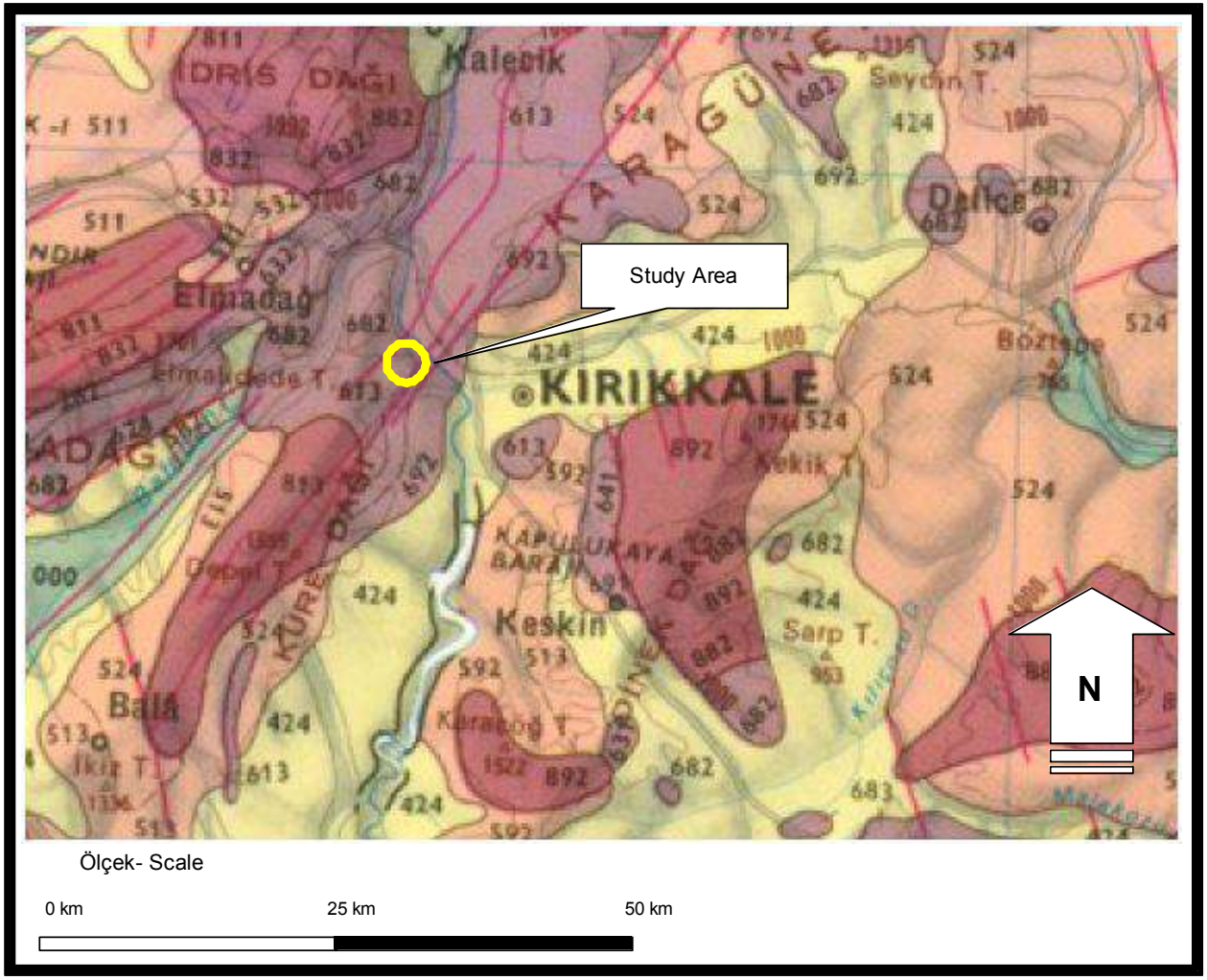


Figure 4. 1: Geomorphologic Map of the study area and its close vicinity (Erol, O. 1992; MTA)

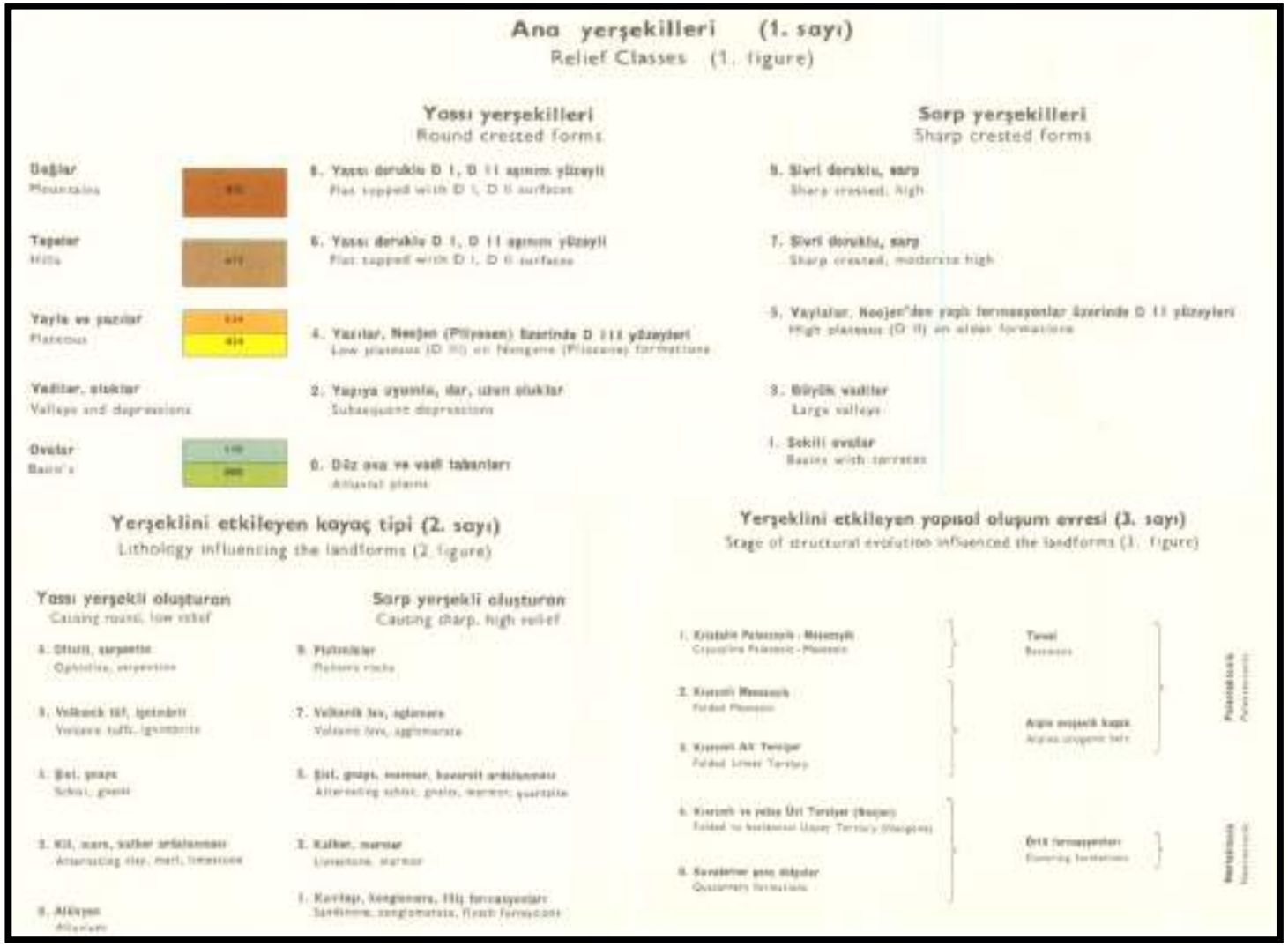


Figure 4. 2 :Explanations of the Map given in Figure 4.1

5. GEOLOGY

5.1. General Geology

1/100 000 scaled Geological Map of the region whit in Kırşehir I30 map section has been published by MTA (Mineral Investigation and Research General Directories). In this map section (Kırşehir İ30), Four different environment rocks type exist which are; rocks from Sakarya Block, rocks from İzmir-Ankara suture zone, rocks from Kırşehir Block and blanket deposits cover the base rocks. The Geological Map of the study area and its close vicinity is given Figure 5.1.

5.1.1. Stratigraphy

The stratigraphical column section of the geological units situated on the map section Kırşehir – İ30 are given in Figure 5.2. The oldest geological unites which are out cropped in the project area are; Upper Cretaceous aged Samanlık Formation (Ks) and Ilıca Formation (Ki). These unites are belong to İzmir –Ankara-Erzincan Suture Zone. Due to the effect of tectonically movements, the older geological unite, Ilıca Formation sits on the Samanlık Formations (Ks) which is younger than Ilıca Formation (Ki) in the project site.

As Quaternary aged deposits, Holocene aged alluvial fan deposits, debris flows, and flood plain deposits are observed.

Study area situates on the İzmir-Ankar-Erzincan Suture Zone. The relation between the geological unites which exist along this Suture Zone is tectono-stratigraphical. These rocks from oldest to youngest are; Late Cretaceous aged Artova Ophiyolitic mélanges, Kocatepe Formation, Karadağ Formation, Ilıcapınar Formation, Samanlık Formation, Haymana Formation, Paleocene-Eocene aged Dizilitaş Formation and Sakarya Formation.

All the deposit types which exist along the İzmir-Ankara-Erzincan Suture Zone represent the deposits settles in closing basin (converging basin edges) during Upper Cretaceous – Lower Eocene ages. Especially, the relation between turbiditic flyche deposits in the basin show the closing basin features like under trust movements.

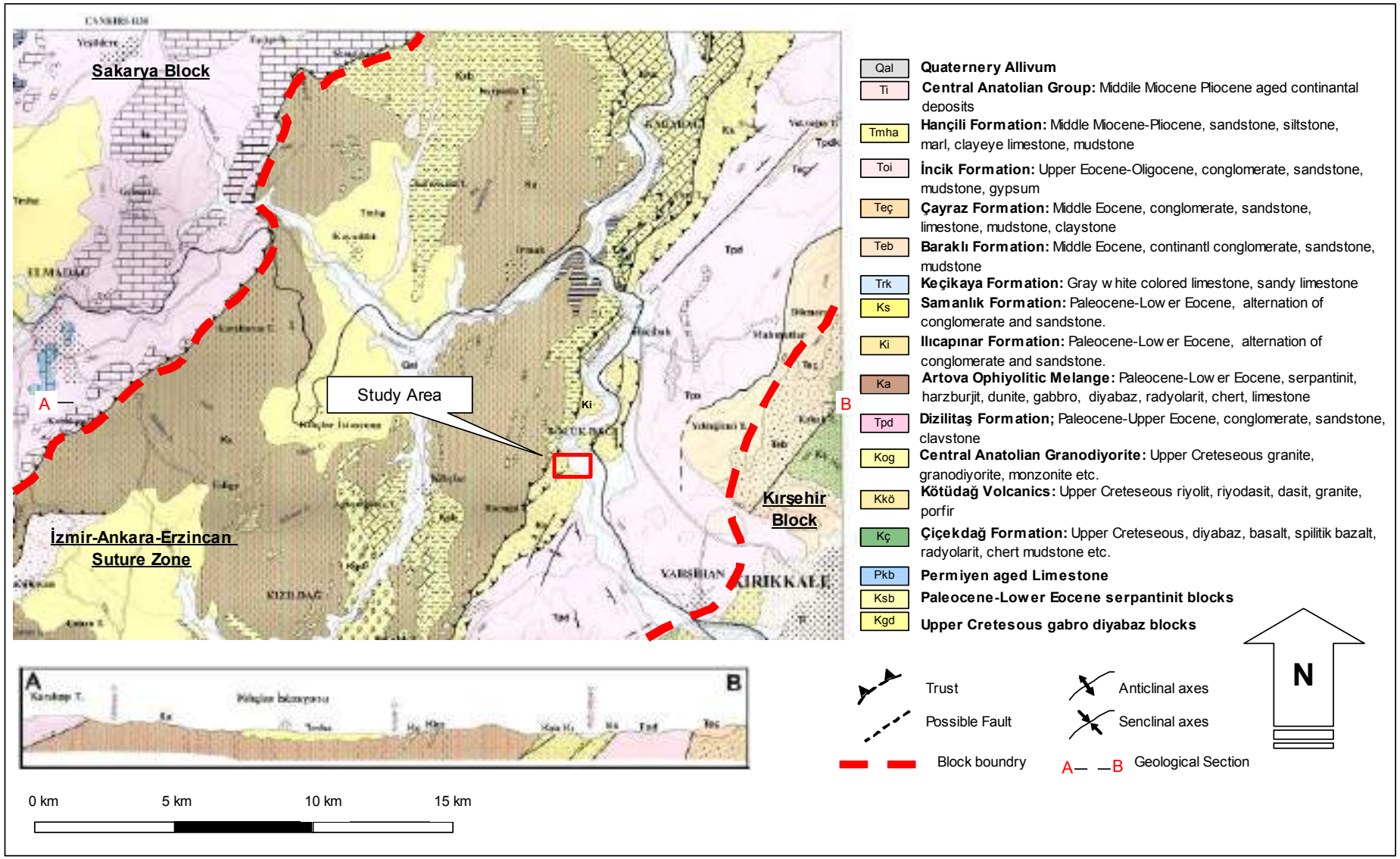


Figure 5. 1: Geological Map of the study are and its close vicinity (1/100 000 scaled geological map of Kırşehir I30 map section, MTA)

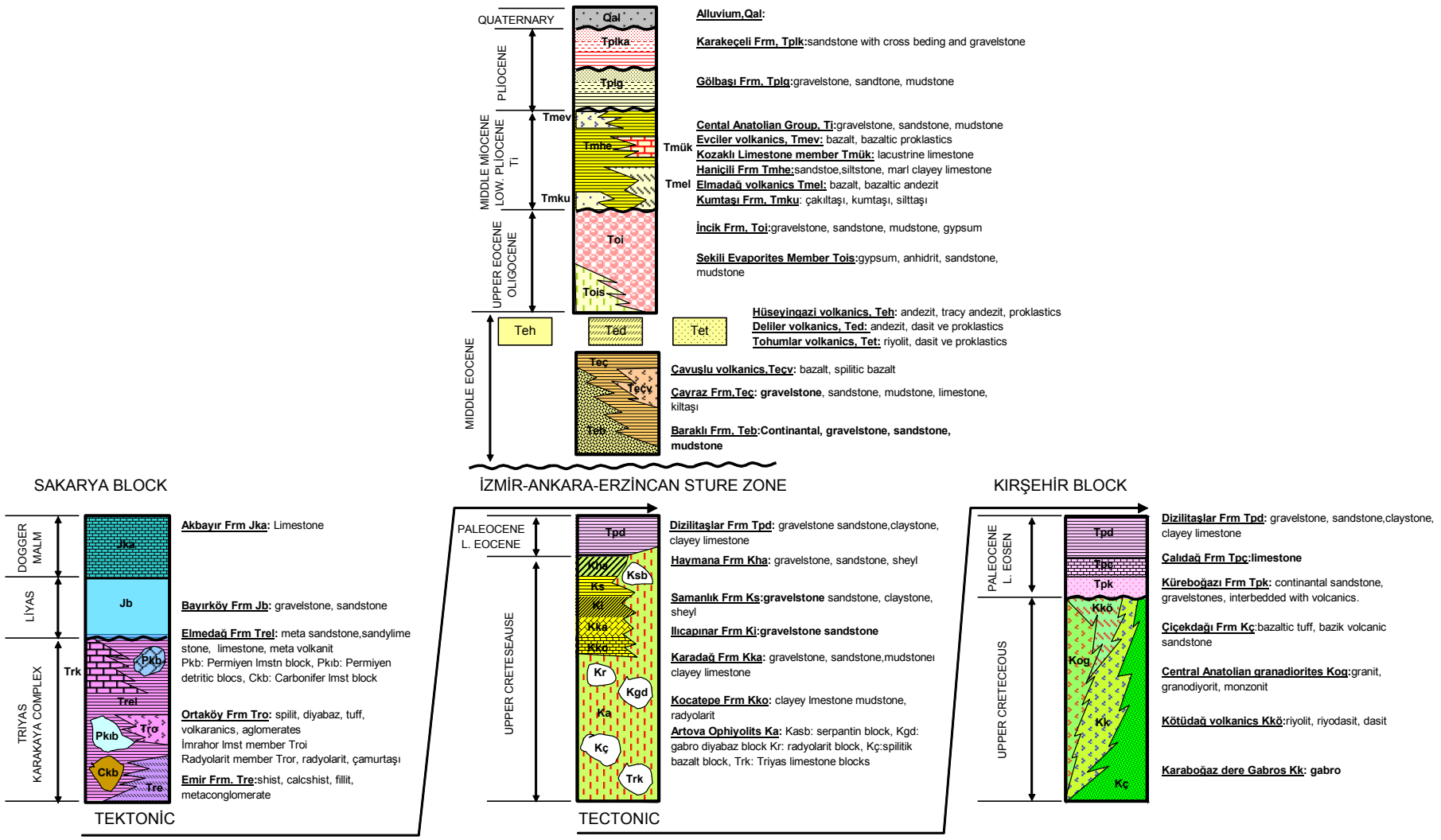


Figure 5. 2: Geological columnar section of the study area and close vicinity (Dönmez, M. 2008)

All geological deposits settled along the İzmir-Ankara-Erzincan Suture Zone are explained at the below from the oldest to youngest.

Artova Ophiolitic Mélange (Ka): Artova ophiolitic mélange (Özcan and others, 1980), in generally, this complex composes of basic-ultra basic, volcanic blocks, sedimentary rocks and ophiolitic fragments (Dönmez and others, 2008). This unites spreads expansively along the region between Bala and Çankırı and it outcrops at the northwest side of study area. Therefore, at the north of study area serpentines outcrops are seen. Artova ophiolites consist of pelagic clays, limestone, radyolarite, mudstone, gabbros, diabas, andezit, basalt, tuff, and agglomeratic blocks. The settlement age of the mélange is known as Late Cretaceous – Early Eocene. Karadağ Formation through lower angled Çankırı Fault over trusts this mélange (Artova Ophiolites).

Kocatepe Formation (Kko): It consists of pelagic clayey limestone, which has budinage structure, radiolarite-mudstone, and alternation of calsiturbidites. This sequence was named as Kocatepe Formation by Dönmez et.al, 2008. Limestones are red and grey colored and they have thin-middle thick bedding structures. Its fractured surfaces show seashell texture. Calsiturbidites contain shallow sea or reef limestone and few volcanic rock fragments. Radyolarite-mudstones are red colored and they have thin bedding surfaces (Akyürek and others, 1977).

Karadağ Formation (Kka): According to Akyürek and others 1997, Karadağ Formation generally contains volcanic gravels, sandstone, mudstone, pelagic clayey limestone and claystone (Dönmez and others, 2008). This formation's layers were reversed towards east and stratigraphicly, upper part of the formation composes of pelagic clayey limestone, sandstone, claystone layers. In the places where the formation is over lapped by serpentines levels, the sequence is 20-30 meters thick. Based on the paleontological data, the age of the formation is Cenomanien - Campanien (Akyürek and others 1997). The relation between Karadağ Formation and Ilıcıpınar Formation is transitive. Quaternary aged deposits covers the Karadağ Formation levels with an unconformity

Ilıca Formation (Kı): Ilıca Formation composes of green, brown and red colored turbiditic sequence, which is mainly gravelstone and sandstone alternation (Dönmez and et, al., 2008). Formation starts with a massif basaltic conglomerate at the bottom. This conglomerate composes of angular and semi-angular basalt, andesite, radiolorite, chert, limestone and serpentines gravels. At the top of basaltic conglomerate, 50 meter thick

sequence exists, which is alternation of sandstone and limestone. Limestones are gray and pink colored. At the upper part of this reversed sequence, thick-bedded sandstone and massif gravelstone layers are observed. Sandstone layers show poor gradation. Gravels are mainly originated from volcanic rocks and matrix composes of calcite, limonite, chlorite, and glauconite (Norman 1972). Total thickness of the formation is 1250 meters and depending on its stratigraphical position, the age of the formation is accepted as Maastrichtien. (Akyürek and others, 1979) (Dönmez et.al, 2008).

Samanlık Formation (Ks): The geological unite, which is yellow, green and brown, gray colored and alternation of gravelstone, sandstone and shale is named as Samanlık Formation (Akyürek and others, 1984). This formation occurred in flych environment and in the study area; Samanlık Formation spreads in parallel position with Ilıcapınar Formation's layers. Gravelstone layers of the formation are greenish, yellowish and brown colored and well cemented. Gravelstone layers gradually pass to sandstones. In the gravelstones, synchronously transported rudites and carol grains exist (Akyürek and others, 1984). Sandstones are green, yellow and brown colored and well cemented and fractured, the bedding thickness is fine and middle. Shales are dark gray colored and weakly cemented. Bedding thicknesses are fine and laminated (Akyürek and others, 1984). Considering the previous position, Formation is underlined by Ilıcapınar Formation and over lined by Dizilitaş Formation. However, due to tectonic movements, the sequence is observed in reverse position in the field.

Haymana Formation (Kha): Haymana Formation is represented by Turbiditic deposits, which consist of gravelstone, sandstone, and shale. Rigo and Cortesini (1959) named these turbidities as Haymana Formation. Gravelstones are greenish yellow and brown colored and well cemented with middle and thick bedding planes (Akyürek and others, 1997). In the unite, place to place, poorly sorted, coarse-grained gravelstone layers exist. In the gravelstones, synchronously transported rudites and carol fragments are observed. Sandstones are green, yellow and brown colored and well cemented. Bedding layers show thin and middle thicknesses. Shale layers are dark gray brownish cream colored and thin bedded. According to Akyürek and others, 1997, the age of Haymana Formation is Maastrichtien

Dizilitaşlar Formation (Tpd): The geological unites which composes of gravelstone, sandstone, claystone, with in gypsum and reef limestone blocks are named as Diziltaş Formation by Norman 1972. Unite has thin-middle-thick bedding layers. Apart from the

coarse gravels, roundness, sorting and grading are well developed. In the sections where fine-grained gravels exist, matrix is clay and these sections are good to well cemented. Sandstones are dark-light brown, gray and yellowish colored. It shows cross bedding structures. Matrix is clay and carbonates. In the sections where the carbonate is abundant as matrix, sandstones could be named as sandy carbonates. The characteristic features of the sandstones are; showing diamond macro texture. Claystones are light and dark green and dark gray colored. These claystone layers are slightly interbeded with sandstone and gravelstone layers. In some places, the claystones show massif appearance. Dizilitaş Formation is also includes olistostromes, which proves that formation deposited in deep-sea environment with turbididic flows (Bilgin and others 1986). According to Dönmez and others 2008, the age of the formation is Paleocene-Lower Eocene.

Alluvium (Qal, Qym, Qay): The youngest depositions in the region represent Quaternary aged geological unites which are Debris Flows (Qym), alluvial fans (Qay) and flood plain deposits (Qal).Flood plain deposits mostly spreads on the banks of Kızılırmak River. These deposits are reddish cream colored and composed of incremented clay, silt, sand, gravel and block mixtures.

5.1.2. Structural Geology

Study area situates at the Anatolian tectonic belt, which prolongs at the southern side of the North Anatolian Fault Zone (NAFZ). This belt gained its structural features during the Alpine Oregenesis. Study area sits on the İzmir-Ankara-Erzincan suture zone. This zone was occurred by the collision of Torit Anatolian belt and Sakarya Block, during the closing of Neothetis. As the result of this, suture zone consists of oceanic crust and deep-sea basin deposits. Depending on the closing movements of Thetis, over trust fault lines prolong from northeast to southwest were occurred. Among these faults, Çankırı Fault line passes close to the north-west boundary of the project area. At the northwest side of the project area (out side of the project area), Artova Ophiolits and serpentine blocks over trusted to younger deposits, which are Ilıca and Samanlık Formations, through Çankırı Fault Line. On the project site Ilıca formation is also over trusted to Samanlık Formation, which is younger than Ilıca Formation. Therefore bedding layers of Ilıca and Samanlık formations are observed as overturned bedding planes in the study area.

5.2. Geology of Study Area

Based on the data obtained from the field works and existing technical literature, it is determined that flat plain area spreads towards Kızılırmak River bed, at the southeast part of the study area is covered by Quaternary aged alluvial fan deposits (Qay) and flood plain deposits (Qal). During the drilling works, it was seen that the thickness of the alluvial fan deposits varies between 8,00 and 20,00 meters. The average thickness of the fan deposits is 15,00 meters. These blanket layers overlay the base rock, which is Upper Cretaceous aged Samanlık Formation (Ks). Mostly, sandstone and gravelstone layers of Samanlık Formation were drilled on the project site.

Alluvium fan deposits (Qal) and Flood plain deposits (Qal) are represented by medium dense to dense gravely silty sand and very stiff to hard gravely sandy silt layers. Samanlık Formation (Ks) composes of sandstone gravelstones in the study area.

On the other hand, at hilly side at northwest of the area where the altitude is about 750 meters yellowish brown colored sandstone and gravelstones of Ilıca Formation outcrops are observed. Older Ilıca Formation overturns to younger Samanlık Formation, because of tectonic movements.

6. GEOTECHNİCAL DRILLING AND TEST PIT WORKS AND IN-SITU TESTS

6.1. Drilling Works

10 numbers of boreholes, which the depths vary between 20 and 50 meters, were drilled, to investigate the thickness of the soil and rock layers, their lithological, structural and physical properties and the depth of ground water level. The total depth of boreholes completed is 320 meters. The data obtained from the boreholes is summarized in Table 6.1

During the drilling works, D-500 type rotary drilling machine, which is fixed on the truck, was used. Rotary techniques with circulation water and without circulation water are used in drilling works (Photo 6.1). At the different soil levels, Standard Penetration Tests (SPT) were carried out. In the rock sections, the progress of boreholes was fulfilled by core drill method. These works were completed between the dates of 04.06.2013 – 03.07.2013.

Borehole No	Coordinates		Depth (m)	Lithology	Formation
SK-1	534753	4415444	20,00	0,00 – 8,00 m: silty gravely sand with blocks (Qay) 8,00 – 20,00 m: alternation of sandstone, siltstone and conglomerate (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)
SK-2	534765	4415342	20,50	0,00-20,00 m: gravely clayey silt, silty sand, sand and clayey silt, clayey silt with few gravel, gravely sandy silt. (Qay) 20,00-20,50 m: sandstone (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)
SK-3	534870	4415309	50,00	0,00-17,50 m: gravely silty clayey sand, silty gravely sand, gravely fine sand-silt. (Qay) 17,50-50,00 m: alternation of sandstone claystone (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks))
SK-4	534892	4415283	50,00	0,00-15,00 m: gravelly silty clayey sand, silty gravely sand, gravely silty sand. (Qay) 15,00-50,00 m: alternation of claystone, siltstone, sandstone (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks))
SK-5	534909	4415240	50,50	0,00-15,00 m: gravely silty clayey sand, silty gravely clayey sand, clay with fine sand. (Qay) 15,00-50,50 m: alternation of marl siltstone sanstone, (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)
SK-6	534955	4415353	20,00	0,00-15,00 m: silty gravely sand, gravely silty sand (Qay) 15,00-20,00 m: alternation of sandstone siltstone (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)
SK-7	534922	4415142	50,00	0,00-16,00 m: gravely silty clay, sandy clay with few gravel, gravely silty sandy clay. (Qay) 16,00-50,00 m: alternation of siltstone marl (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)
SK-8	535013	4415189	20,00	0,00-13,00 m: silty fine sand with few gravel and few clay. (Qay) 13,00-20,00 m: alternation of conglomerate, sandstone and siltstone. (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)
SK-9	535471	4415244	21,00	0,00-15,00 m: gravely silty sand, fine sand with few gravel, silty sand with few clay. (Qal) 15,00-21,00 m: claystone inter bedded with sandstone. (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)
SK-10	535483	4415370	20,50	0,00-12,80 m: gravely silty sand, clayey silty sand with few gravel, sandy silty clay with few gravel.(Qal) 12,80-20,50 m: siltstone inter bedded with sandstone (Ks)	Alluvial Fan (Qay) Samanlık Formation (Ks)

Table 6. 1: The list of depths, lithology and formations determined from boreholes

Locations of boreholes are shown on the map given in Figure 6.1



Photo 6. 1: Drilling works

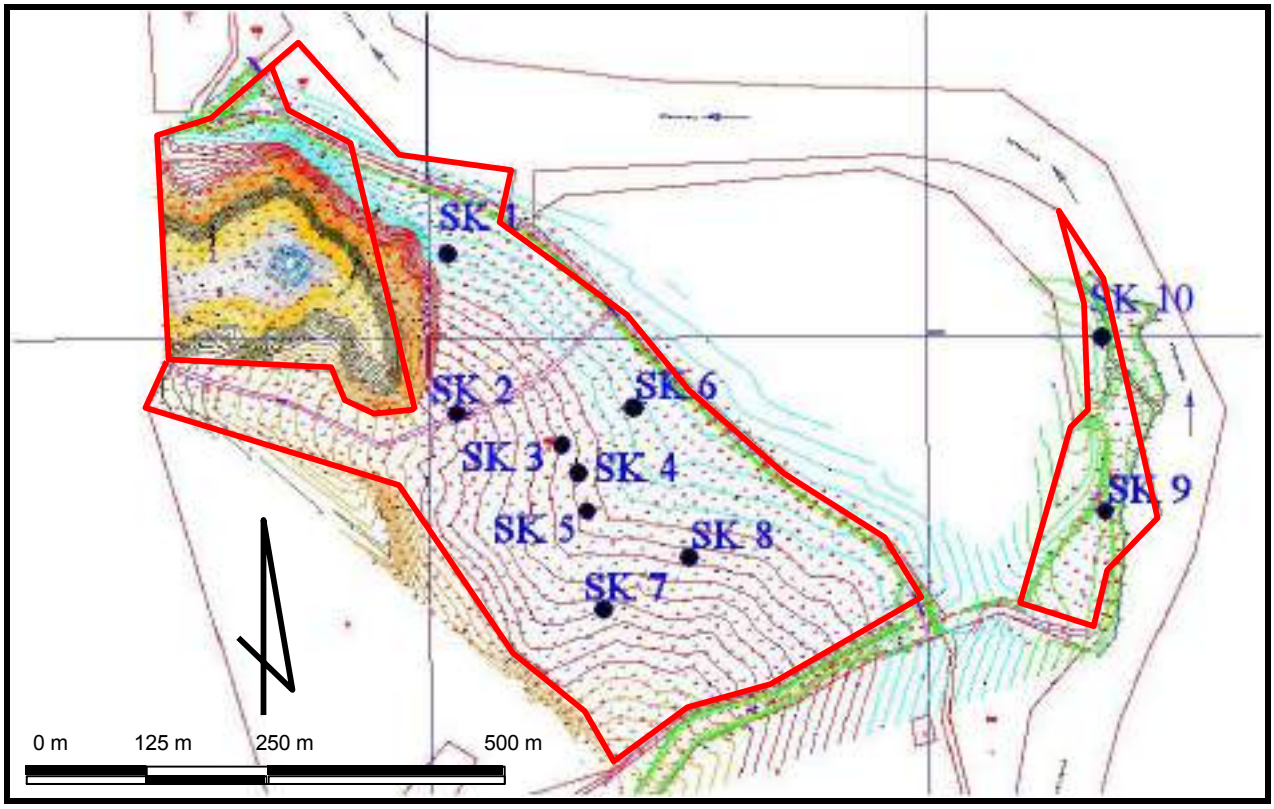


Figure 6. 1: The boundary of the parcels and borehole locations

The data obtained from boreholes is summarized at the below and borehole logs are given as Appendix 2.

SK-1; Drilling SK-1's total depth is 20, 00 meters. Deposits belonging to alluvial fan; infrequent blocked, silt and gravelly sand, have been cut in between 0,00 – 8,00 meters. Gravels, grit, magnetite pieces are half round and angular, coarse material rate is approximately 40%. Levels that have been cut are in dense to very dense structure. In between 8.00 and 20.00 meters, levels consisting of sandstone, siltstone, and conglomerate belonging to Samanlık Formation (Ks) have been cut. Mentioned levels are in less to moderately weathered conditions. The rock quality (RQD) is mostly poor and in small amounts is medium. Ground water was not encountered after drilling operations.

SK-2; Total depth of SK-2 is 20,50 meters. At the depths of 0,00 – 20,00 meters, alluvial fan deposits (Qay) have been cut; These deposits show loose, medium dense character and they are gravely clayey sand and gravely silty sand between the depths of 3,00 – 8,00 meters. At the depths, between 8,00 – 20,00 meters, these deposits are mainly very stiff and hard clayey silt, gravely silt and sandy silts. After the depth of 20,00 meters, the levels of Samanlık Formation (Ks) have been cut. These levels are sandstone beds and their weathering degree moderately and mostly weathered. RQD degree is very poor. Ground water level is at 14,00 meters.

SK-3; Total depth of SK-3 is 50,00 meters. The deposits which have been cut between the depths of 0,00 – 17,00 meters, belong to Alluval fan (Qal) deposits. Material class is mostly medium dense and dense gravely silty sand at the depths, between 0,00 – 17,00 meters. Between the depts. Of 17,00 – 50,00 meters, Samanlık Formation (Ks) levels exist. These levels are alternation of sandstone and claystone. Rock Quality (RQD) is very poor upper layers but at the deep it becomes medium and weathering degree is moderately to less weathered. The depth of Ground water level was measured as 14,30 meters.

SK-4; The depth of this borehole is 50,00 meters. Alluvial fan (Qay) deposits have been cut between 0,00 – 15,00 meters. The material from these levels are medium dense to dense gravely clayey silty sand and gravely sand. After the depth of 15,00 meters, the alternation of claystone, siltstone and sandstone levels have been cut. These levels belong to Sarımsaklı Formation (Ks). Weathering degree is moderately to less weathered between the depths of 15,00 – 33,00 meters and deeper than 33,00 meters it becomes

fresh and less weathered. Rock Quality is poor-medium to fine. After 43,00 meters very fine rock quality was encountered. Ground water depth is 13,50 meters.

SK-5; Total drilling depth is 50,50 meters. Alluvial fan (Qay) deposits have been cut between the depths of 0,00 – 15,00 meters. In this interval down to 6,50 meters, material is medium dense gravely clayey silty sand and silty gravely clayey sand. Deeper than 6,50 meters, material is clay with fine sand and few gravel. After 15,00 meters Sarımsaklı Formation's (Ks) levels have been cut in the drill hole. These levels are; alternation of marl, siltstone and sandstone at the depths, between 15,00 – 40,00 meters. The rock quality is poor to very poor and weathering degree is less-moderate and mostly weathered. Between 40,00 – 50,00 meters, the rock type is sandstone which is less and moderate weathered. The rock quality is medium to poor at these depths. The depth of Ground water level is 9,80 meters

SK-6; The depth of SK-6 is 20,00 meters. Alluvial fan deposits (Qay) which are medium dense and dense gravely sand, silty sand and clayey sand, have been cut at the depths of 0,00-15,00 meters. After 15,00 meters depth alternation of sandstone, claystone levels of Samanlık formation (Ks) have been cut. The rock qualities of these levels are very poor and poor. The weathering degree of these levels varies between less weathered and completely weathered. In this borehole ground water level was measured as 12,00 meters.

SK-7; Total drilling length is 50,00 meters. Between 0,00 – 16,00 meters, alluvial fan (Qay) deposits exist; material is stiff to very stiff sandy clay. After 16,00 meters depth, the alternation of sandstone, marl and siltstone levels have been cut which belong to Samanlık Formaration (Ks). The rock quality of these levels is very poor to poor but towards the end of borehole rock quality changes to fine. Weathering degree is fresh, less weathered at the deep, and moderately weathered through the surface. Ground water level is at the 12,00 meters.

SK-8; Depth of the borehole is 20,00 meters. Alluvial fan (Qay) deposits are at the depth of between 0,00-13,00 meters. These deposits are dense at the deep and medium dense towards the surface and they are gravely clayey and silty fine sand. Clay content increases towards the bottom of the borehole and soil type becomes low plastic very stiff clay at the bottom. At the depth of 13,00 meters, the level of Samanlık Formation (Ks) starts. These levels are alternation of conglomerate, claystone, sandstone and siltstones.

Rock quality of these levels is very poor at the surface and through the bottom of the borehole, it becomes fine. Weathering degree of the rocks is moderately and less weathered. Ground water level is at 12,50 meters.

SK-9; Total depth of SK-9 is 20,00 meters. Between the depths of 0,00 and 14,50 meters, flood plain deposits (Qal) have been cut. The soil type of these levels is very dense gravely sand and silty sand. After the depth of 14,50 meters, bed rock has been cut during the drilling operation. These rock levels belong to Sarımsaklı Formation (Ks) and composes of sandstones, which inter bedded with claystones. Rock quality (RQD) of these levels varies from very poor to medium. Weathering degree is moderate. The depth of the ground level was measured as 2,20 meters.

SK-10; Total depth of this borehole is 20,50 meters. Alluvial deposits (Qal) which were deposited at the flood plain surfaces of Kızılırmak River banks have been cut between the depths of 0,00 – 12,80 meters. These deposits are medium dense gravely silty sand down to 10,00 meters. After 10,00 meters deposits become very stiff silty clay. Between the depth of 12,80 and 20,50 meters levels belong to Samanlık Formation (Ks) have been cut. These level are sand stones which inter bedded with clay stones and siltstones. Rock quality is medium and weathering degree is less weathered. The depth of the ground water is 2,10 meters.

6.2 Test Pit Works

During the site works 10 numbers of test pits were excavated and their depths vary between the depth of 3,60 – 3,20 meters. Test pits were opened by using JSB model tractor excavator and test pit works were completed on the date of 02.07.2013. 13 no of bulk samples collected for laboratory works during this test pit works. The logs of test pits are shown at Appendix - 3. The data has collected from test pit works are summarized at below. The location maps of test pits are shown at Figure:6-2.

AC-1: Total depth of borehole is 3,50m. Vegetable soil are encountered between the depth of ,00-0,30m. and alluvial fan sediments(Qay) cut between the depth of 0,30-3,50m. These sediments are sands with rare clay, gravel and silt between the depth of 0,30-2,40m. Clay with silt which are classified as medium plasticity soil class are encountered between the depth of 2,40-3,50m.

AC-2: Total depth of borehole is 3,30m. Vegetable soil are encountered between the depth of 0,00-0,40 meters. And alluvial fan sediments (Qay) cut between the depth of 0,40-3,30m. The soil class are encountered between the depth of 0,40 -1,00m. is Sand with gravel.

Clayey sand encountered between the depth of 1,00 -3,00m. There is no discovering of ground water.

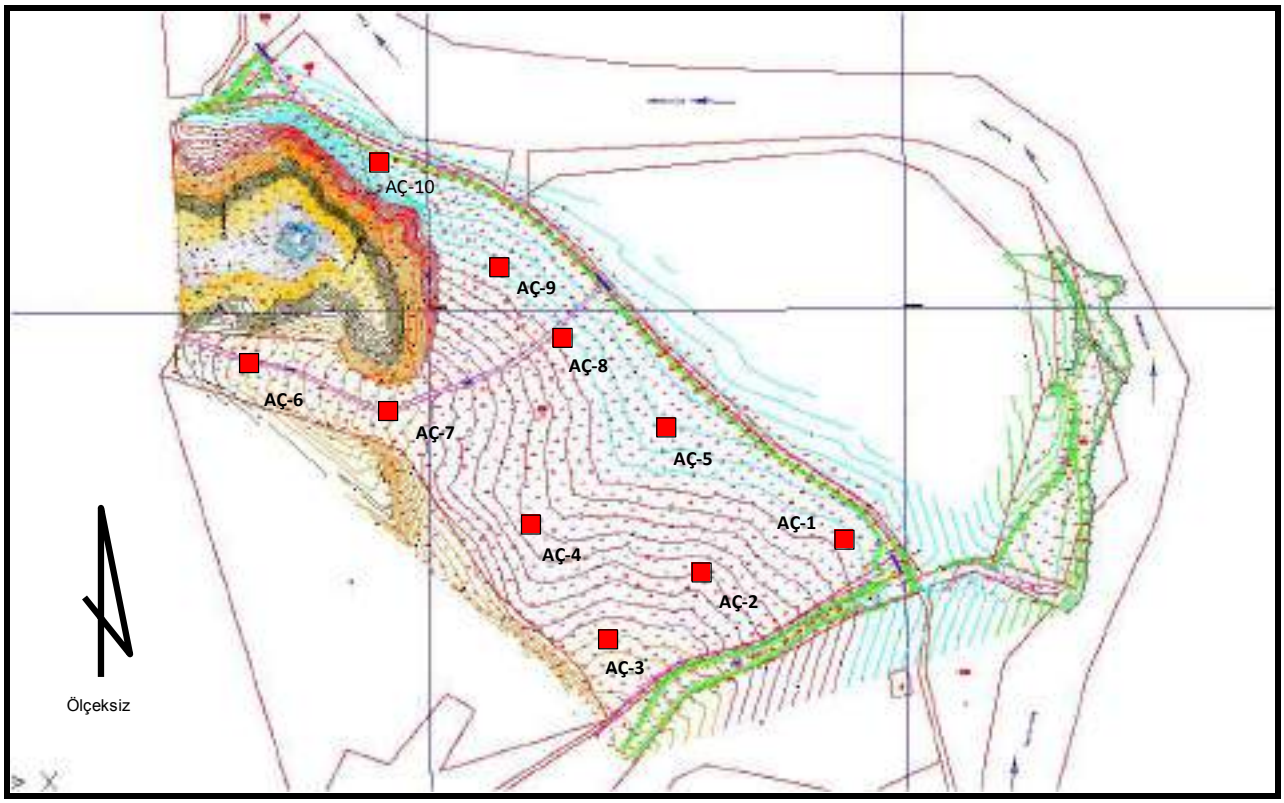


Figure 6. 2: Location map of test pits

AC-3: Total depth of borehole is 3,40 m. Top soil is encountered between the depth of 0,00-0,30 meters. and alluvial fan sediments (Qay) were cut between the depth of 0,30-3,40m. The soil class are encountered between the depth of 0,30 -1,80m. is sand with few gravel. Clay which is classified as low plasticity soil is encountered between the depth of 1,80 -3,40m. There is no ground water in this test pit.

AC-4: Total depth of borehole is 3,60 m. Vegetable soil are encountered between the depth of 0,00-0,30 meters. and alluvial fan sediments (Qay) were cut between the depth of 0,30-3,60m. The sediments was cut between the depth of 0,30 -1,50m. are represented with clayey sand with few gravels. Low plastic clay levels are encountered between the depth of 1,50-3,60m. The ground water level is not observed in this pit.

AC-5: Total depth of borehole is 3,40m. Top soil are encountered between the depth of 0,00-0,30 meters. and alluvial fan sediments(Qay) cut between the depth of 0,30-3,40m. The sediments are composed of silty clayey sands with few blocks and gravels. There is no any ground water level in this tes pit.

AC-6: Total depth of borehole is 3,50 m. Top soil are encountered between the depth of 0,00-0,30 meters. and alluvial fan sediments (Qay) were cut between the depth of 0,30-3,50m. The soil class is described as gravely clayey sands. There is no any observed ground water level in the pit.

AC-7: Total depth of borehole is 3,20 m. Top soil are encountered between the depth of 0,00-0,40 meters and alluvial fan sediments (Qay) were cut between the depth of 0,40-3,20 m. The sediments are sandy materials, which are rare complex. There is no discovering of ground water in this open pit. The sediments are gravely clayey sand with few blocks. There is no observed ground water in this pit.

AC-8: Total depth of borehole is 3,20 m. Top soil are encountered between the depth of 0,00-0,40 meters. Alluvial fan sediments (Qay) were cut between the depth of 0,40-3,20 m. The sediments are clayey sand with few gravels and they contain rarely blocks. The ground water level does not exist in the pit.

AC-9: Total depth of borehole is 3,50m. Top soil are encountered between the depth of 0,00-0,40 meters. Alluvial fan sediments (Qay) were cut between the depth of 0,40-3,50m. The soil class is described as gravely clayey sand with rare blocks. There is no ground water level in the test pit.

AC-10: Total depth of borehole is 3,60 m. Top soil are encountered between the depth of 0,00-0,30 meters. Alluvial fan deposits (Qay) were cut between the depth of 0,30-3,20 m. The soil class is described as gravely silty clayey sand with rare blocks. There is no ground water level in the pit.

6.3. Insitu Tests

Disturbed samples collected and Standard Penetration Tests (SPT) were conducted in every 1,5 meters, to determine the physical properties of the different soil layers encountered during drilling the boreholes.

While Standard Penetration Tests (SPT) were conducted the sampler spoon were plunged in to the soil layer by the help of 63,5 kg free fall hammer from 75 cm height. The necessary blows were counted for each 15 cm penetration of the spoon in to the soil layers. This operation were full filled total 45 cm penetration and the below counts for the last 30 cm penetration was recorded as SPT values and reported as N30. Blow counts of SPT N30 attained from Standard Penetration Tests (SPT) are shown on borehole logs (Appendix - 2). Standard Penetration Tests (SPT) results are also given in Table 6,2.

Borehole number	Number of sample	depth	SPT (N30)	Soil characterization
SK-1	SPT-1	1,50-1,75	>50 (refuse)	Very dense sand
	SPT-2	3,50-3,95	36	Dense sand
SK-2	SPT-1	1.50-1.95	17	Medium dense sand
	SPT-2	3,50-3,95	8	Loose sand
	SPT-3	4.50-4.95	30	Medium dense sand
	SPT-4	6.50-6.95	27	Medium dense sand
	SPT-5	7,50-7,95	31	Medium dense sand
	SPT-6	9,50-9,95	24	Medium dense sand
	SPT-7	10,50-10,95	29	Medium dense sand
	SPT-8	12,50-12,95	33	Dense sand
	SPT-9	13,50-13,95	40	Dense sand
	SPT-10	15,00-15,45	33	Dense sand
	SPT-11	16,50-16,60	>50 (refuse)	Very dense sand
	SPT-12	18,50-18,83	>50 (refuse)	Hard clay
SK-3	SPT-1	1,50-1,95	29	Medium dense sand
	SPT-2	3,50-3,95	19	Medium dense sand
	SPT-3	4,50-4,95	20	Medium dense sand
	SPT-4	6,50-6,95	31	Dense sand
	SPT-5	7,50-7,77	>50 (refuse)	Very dense sand
	SPT-6	9,50-9,95	36	Dense sand
	SPT-7	10,50-10,95	18	Very Stiff clay
	SPT-8	12,50-12,95	21	Medium dense sand
	SPT-9	13,50-13,55	>50 (refuse)	Very dense sand
	SPT-10	15,50-15,82	>50 (refuse)	Hard silt
	SPT-11	16,50-16,55	>50 (refuse)	Hard silt
	SPT-12	18,00-18,10	>50 (refuse)	weathered rock

Table 6. 2: SPT N number of blows and soil characterizations.

Table 6.2

Borehole number	Number of sample	depth	SPT (N30)	Soil characterization
SK-4	SPT-1	3,50-3,95	22	Medium dense sand
	SPT-2	4,50-4,95	23	Medium dense sand
	SPT-3	6,50-6,95	27	Medium dense sand
	SPT-4	7,50-7,75	>50 (refuse)	Very dense sand
	SPT-5	9,50-9,55	>50 (refuse)	Very dense sand
	SPT-6	10,50-10,78	>50 (refuse)	Very dense sand
	SPT-7	13,5013,71	>50 (refuse)	Very dense sand
	SPT-8	15,50-15,65	>50 (refuse)	Weathered rock
SK-5	SPT-1	1.50-1.95	24	Medium dense sand
	SPT-2	3,50-3,95	20	Medium dense sand
	SPT-3	4.50-4.95	23	Medium dense sand
	SPT-4	6.50-6.95	22	Medium dense sand
	SPT-5	7,50-7,95	25	Medium dense sand
	SPT-6	9,50-9,95	38	Hard clay
	SPT-7	10,50-10,95	35	Hard clay
SK-6	SPT-1	1,50-1,95	20	Medium dense sand
	SPT-2	3,50-3,95	20	Medium dense sand
	SPT-3	4,50-4,95	27	Very stiff clay
	SPT-4	6,50-6,95	30	Medium dense sand
	SPT-5	7,50-7,77	33	Dense sand
	SPT-6	9,50-9,95	36	Dense sand
	SPT-7	10,50-10,95	40	Dense sand
	SPT-8	12,50-12,80	>50 (refuse)	Very dense sand
SK-7	SPT-1	1,50-1,95	15	Medium dense sand
	SPT-2	3,50-3,95	29	Medium dense sand
	SPT-3	4,50-4,95	25	Very stiff clay
	SPT-4	6,00-6,45	32	Hard clay
	SPT-5	9,50-9,95	41	Hard clay
	SPT-6	10,50-10,95	37	Hard clay
	SPT-7	12,50-12,95	37	Hard clay

Table 6. 1 **SPT N number of blows and soil characterizations**

Table 6.2

Borehole number	Number of sample	depth	SPT (N30)	Soil characterization
SK-8	SPT-1	1,50-1,95	21	Medium dense sand
	SPT-2	3,50-3,95	38	Dense sand
	SPT-3	4,50-4,95	38	Dense sand
	SPT-4	6,50-6,95	43	Dense gravel
	SPT-5	7,50-7,80	>50 (refuse)	Very dense sand
	SPT-6	9,50-9,95	39	Dense sand
	SPT-7	10,50-10,95	40	Hard clay
	SPT-8	12,00-12,40	>50 (refuse)	Hard clay
SK-9	SPT-1	1.50-1.77	>50 (refuse)	Very dense sand
	SPT-2	3,00-3,10	>50 (refuse)	Very dense sand
	SPT-3	9.00-9.22	>50 (refuse)	Very dense sand
	SPT-4	12.00-12.45	64	Very dense sand
SK-10	SPT-1	1,50-1,95	25	Medium dense sand
	SPT-2	3,50-3,95	21	Medium dense sand
	SPT-3	4,50-4,95	28	Medium dense sand
	SPT-4	6,00-6,45	21	Medium dense sand
	SPT-5	7,50-7,95	22	Medium dense sand
	SPT-6	9,00-9,45	18	Medium dense sand
	SPT-7	12,00-12,45	28	Very stiff clay

Table 6. 2 **SPT N number of blows and soil characterizations**

The cooling water needed for Natural Gas Combined Cycle Power Plant, which is under planning to construct, will be provided by cession wells in parcel number 108. The permeability characterizations and coefficient of permeability K (cm/s) of alluvial sediments were determined by the non-pressure water tests. These tests were conducted in the boreholes SK-9 and SK-10 after the drilling operation. The data is obtained from water tests are summarized in Table 6.3. The related test forms are presented in Appendix – 4. Photo 6. 2 shows non-pressure water tests work (permeability tests).

Number of Borehole	Depth of Experiment	Coefficient of permeability K(cm/s)	Permeability
SK-9	1,50 m	$4,74 \times 10^{-2}$	Very permeable
	4,00 m	$3,71 \times 10^{-2}$	Very permeable
	6,00 m	$3,94 \times 10^{-2}$	Very permeable
	8,00 m	$3,77 \times 10^{-4}$	permeable
	12,00 m	$4,05 \times 10^{-5}$	half permeable
	13,50 m	$3,12 \times 10^{-4}$	permeable
SK-10	2,00 m	$2,90 \times 10^{-3}$	Very permeable
	3,50 m	$1,64 \times 10^{-3}$	Very permeable
	8,00 m	$2,78 \times 10^{-4}$	permeable
	12,00 m	$1,26 \times 10^{-4}$	permeable

Table 6. 3: Permeability characteristics of Alluvial (Qal) sediments.



Photo 6. 2: Permeability test works.

7. LABORATUARY TESTS FOR GEOTHECNICAL WORKS

Natural water content tests, Atterberg Limits, sieve analysis, hydrometer tests, direct shear box tests, three axial compression tests, CBR tests, Proctor tests, uniaxial compression tests and point load tests were carried out on the soil and rock samples covered during the drilling and test pit works. These tests were fulfilled in the soil and rock mechanics laboratory of EFOL Geotechnical Services Company. These tests were carried out according to the ASTM and TS-1900 standards and the test reports are given in Appendix - 5.

7.1. The Determination of Physical and index Properties of Soils.

The soils around the working area are represented by an average 15 m thick alluvial fan (Qay) and flood plain (Qay) deposits along the Kızılırmak River. These sediments are situated as a blanket layer above the base rocks. Sieve analysis, natural unite weight, natural water content, Atterberg Limits, soil classifications, strength parameters by direct shear box and triaxial compression tests, CBR values and compaction characteristics by proctor tests of the soils have been determined to understand the index and strength properties of the soil layers in the working area.

7.1.1 Soil Classification

Soil Classification has done according to USCS standards. 74 samples are classified. According to soil classification works, 71 % Percent of soils are originated from sands in working area. 43 % of these sands are classified as clayey sands of SC group, 52 % is silty sands of SM group, 3 % is silty and well graded sands of SM-SW group, 2 % is silty and poor graded sands of SM-SP group.

23 % of the soils in the working area are clays. 64 % of these clays are low plastic clays of CL group, 36 % of these clays are medium plastic clays of CL group.

Silts and gravels represent the rest of the 6 %. Silts with 3 % are in ML group, which shows low plasticity. Gravels are in 3% proportion and shows clayey gravel (GC) characters.

7.1.2. Natural Moisture Content (Wn)

Natural Moisture Content (Wn) is determined on the samples from 26 different groups. The below assessments could be done based on the results obtained from the natural water content determinations;

The natural moisture content values of the coarse-grained soils made of sand and gravel vary between maximum 13 % and minimum 4 %. Average value is % 8.65.

Moisture content values in fine-grained soils like clays and silts vary between maximum 22 % and minimum 9 %. Average value is % 15.16.

Fine grained-soils are generally having higher moisture content than coarse grained-soils due to the higher adsorption capacity. Accordingly, it can be said that fine grained soils have higher moisture contents comparing the coarse grained soils.

7.1.3. Atterberg Limits

Determination of Atterberg Limts is applied on 74 samples. According to the results, 24 numbers of the samples show non-plastic character (NP), 50 numbers of the samples show plastic character. Among the samples, which show plasticity, the highest liquid limit value (LL) is 39 % and the lowest liquid limits value is 20 %. The Average liquid limits value is 26,4 %.

The highest plastic limits value (PL) determined is 21%, the lowest value is 13 %. The average plastic limit value is 17 %.

Plastic index values (PI) (specified by the formula; "LL-PL= PI") are vary between 23 % and 2 %. The average value is 9,4 %.

It can be said that the most water sensitive soil class is medium plasticity clays of group CI in the study area. The plasticity index values (PI) of those clays are determined as 21%. The water sensitivity of the clays out of the group CI is low. 92 % of the soils are non-plastic (NP) or insensitive against water.

Another feature that noticed is that few natural moisture content values is over plastic limit when Atteberg limit values compared to the natural moisture content and moisture content values of most soils is under the plastic limit value so those soils are in solid phase.

7.2. The Determination of Mechanic Specification of the Soils and Rocks

Triaxial compression test and direct shear box test are applied to undisturbed (UD) samples from alluvial fan and alluvial deposits, which constitute the blanket layer in the investigation area. The results are summarized in the Table 7.1.

Borehole no Sample no	Test Type	Natural unit weight (kN/m3)	Dry unit volume weight (kN/m3)	cohesion (kg/cm2)	Angel of internal friction (degree)	Soil class
SK-1 UD-1	Triaxial	21,1	18,8	0,58	17	SC
SK-2 UD-3	Triaxial	21,2	19,1	0,79	22	SC
SK-3 UD-2	Share box	19,6	17,7	0,65	29	SC
SK-3 UD-3	Triaxial	20,3	18,0	0,64	18	SM
SK-5 UD-3	Triaxial	20,3	17,4	0,77	16	Cl
SK-6 UD-1	Share box	19,1	17,5	0,53	33	SC
SK-7 UD-1	Share box	19,9	18,2	0,65	32	SC
SK-7 UD-2	Triaxial	20,7	17,8	1,44	14	Cl
SK-7 UD-3	Triaxial	-	-	0,98	13	CL
SK-8 UD-2	Triaxial	21,3	19,3	0,77	24	GC
SK-8 UD-3	Triaxial	21,5	19,0	1,44	19	SC

Table 7. 1: Natural unite weight, cohesion and angle of internal friction values of fine grained soils.

The average of internal friction angle is 24.25 degree and average cohesion is 0.75 kg/cm^2 in the coarse grained soils according to the given values in Table 7.1. The average angle of internal friction is 14.33 degree and average cohesion is 1.06 kg/cm^2 in the fine grained soils.

Unconfined compression and point load tests were carried out on the core samples of sandstone, siltstone-clay stone alternation zones of Samanlik Formation(Ks) which constitute the base rock in the study area (at least 15 meter deep from the surface) and also young's modulus and Poisson's ratio values of some samples are determined. All of the results are summarized in the Table 7.2.

Borehole no Sample no	Natural unit volume weight (kN/m3)	Point load (kg/cm2)	unconfined compressive strength (kg/cm2)	Modulus of elasticity (kg/cm2)	Poisson's ratio
SK-1 K-1	26,4	-	315,2	-	-
SK-1 K-2	24,7	-	484,0	-	-
SK-3 K-1	24,6	-	240,8	-	-
SK-3 K-2	24,2	-	151,7	38544	0,23
SK-3 K-3	24,7	-	255,5	-	-
SK-3 K-4	23,3	-	901,5	-	-
SK-4 K-1	25,2	-	783,3	-	-
SK-4 K-2	24,6	-	50,5	40108?	0,21
SK-4 K-3	25,7	-	186,6	-	-
SK-5 K-1	23,5	-	133,8	-	-
SK-5 K-2	26,1	-	320,2	-	-
SK-5 K-3	-	14,4	-	-	-
SK-5 K-4	24,9	-	374,2	-	-
SK-6 K-1	23,3	-	121,1	-	-
SK-7 K-1	25,8	-	916,7	-	-
SK-7 K-2	25,6	-	891,3	-	-
SK-7 K-3	23,8	-	148,9	82271	0,22
SK-7 K-4	23,9	-	62,6	-	-
SK-8 K-1	24,5	-	298,5	-	-
SK-8 K-2	24,8	-	270,4	90512	0,22
SK-9 K-1	-	120,8	-	-	-
SK-9 K-2	25,9	-	831,9	-	-
SK-9 K-3	-	74,7	-	-	-
SK-10 K-1	26,4	-	1093,2	-	-
SK-10 K-2	26,7	-	725,4	-	-

Table 7. 2: Unit weight, unconfined compressive strength, Point load, Modulus of elasticity, Poisson's ratio results of rock samples.

The classification ratios given below could be done for the rocks in the investigation area based on to the results of unconfined compression test carried out on the core samples,

%36 very weak rocks	Uniaxial compression10-250 kg/cm2
%32 weak rocks	Uniaxial compression250-500 kg/cm2
%27 strong rocks	Uniaxial compression500-1000 kg/cm2
%5 very strong rocks	Uniaxial compression >1000 kg/cm2

Base on the Rocks Classification Criteria, Ulusay, R. (2002),

On the other hand, compaction (Proctor) and CBR tests were carried out on the bulk samples from test pits excavated in the alluvial fan deposits (Qay). The results are listed in the Table 7.3.

Test Pit and sample No	Maximum dry density(g/cm3)	Optimum water content (%)	Degree of Compaction (%)	Swelling rate (%)	Wet CBR value (%)
AÇ-1 T-1	2,054	10,36	96	0	24,7
AÇ-1 T-2	1,729	17,85	96	1,52	6,6
AÇ-2 T-1	2,087	9,78	96	0	30,4
AÇ-3 T-1	2,068	10,52	96	0,1	28,5
AÇ-3 T-2	1,861	13,40	96	0,4	11,6
AÇ-4 T-1	2,103	8,82	96	0	33,8
AÇ-4 T-2	1,867	12,15	96	0,59	12,9
AÇ-5 T-1	2,072	10,03	96	0,05	29,5
AÇ-6 T-1	2,061	10,24	96	0	26,8
AÇ-7 T-1	2,057	10,31	96	0,11	25,6
AÇ-8 T-1	2,116	8,65	96	0,12	34,8
AÇ-9 T-1	2,087	9,88	96	0,90	30,0
AÇ-10 T-1	2,084	9,92	96	0	27,8

Table 7. 3: Wet CBR and swelling rates of test pit samples.

Among the values given in Table 7.3, only one CBR result is lower than 10 %. Considering the CBR results, it could be said that alluvial fan sediments (Qay) might have sufficient bearing capacity when compacted with proper compaction energy and proper moisture content.

8. GEOPHYSICAL WORKS

In the study area, seismic measurements were applied to determine Vs shear wave velocity structure, dynamic elastic parameters (modulus of elasticity, shear modulus, bulk modulus etc.) and dominant ground acceleration coefficient (A_0); VES (Vertical Electrical Sounding) measurements were taken to determine the electrical variation of lithological medium, microtremor data collected to calculate the soil resonance period (T_0).

8.1 Seismic Studies

Seismic velocity measurements were taken to calculate the seismic parameters over the investigation area. During the measurements, the data were collected with the aim of surface wave analysis. In addition, gun shot were fired for refraction method by the help of the whole length system. (Photo 8.1, 8.2, 8.3). Thus, information could be taken deeper layers.



Photo 8. 1: Seismic studies; locating of gun power supply



Photo 8. 2: Locating of gun power supply



Photo 8. 3: Explosion of gun power supply

8.1.1 Introduction of the method

Surface wave method

This method takes advantages of dispersivity of surface waves, which is based on sorting and examining of refracted waves that comes from interfaces to surface during seismic measurements and carrying out the required evaluations. Briefly, it is based on obtaining of dispersion curve by helping of linearly charted of transformations of phase velocity dependent on frequency after making phase velocity-frequency transformation of field data and determining of max peaks. And also, it is based on determining of Vs wave velocity from calculated velocities.

The equipment; During the field study, 4.5 Hz vertical geophones were used in order to identify quite low frequencies. As it is known that high frequency waves involve information from ground surface and low frequency waves involve information more deeply, obtaining information by low frequency geophones from deeper would be more appropriate.

The data gather system used **active energy source,** 5,00 m group interval and 5,00 – 10,00 m offset distance were used. In this 24 channel-system, 115,00 m group interval and 135,00 m system length was used totally.

10-kg sledgehammer was used as an energy source and transmittal of the energy inside of the system to the last geophone was provided. Accordingly, for system at the shots with hummer, intermediate shots were done by 5,00 m offset distance and going between 6-7, 12-13, 18-19 numbered geophones. 5 shots were done as reverse shot by moving away 5,00 m from last geophone and behind the system. It is finished by gun shots as 10,00 m from in front of the system and 10,00 m from behind the system. Thus, in the places that energy cannot reach, it was raised 7 shots. In this case near offset becomes 5,00 m, far offset becomes 125 m. By this means, as well as in literature , at the determination of the depth, information was obtained up to 41,5 m (1/3 of system distance) with classical first arrivals, up to 125,0 m (conjecture that system distance represents the longest wavelength) in the surface wave analysis.

24-channel, Seismic Source brand, **DAQlink III** model, engineering purposes seismograph was used as a **seismic device**. The device which used in seismic study is professionally seismic device that through laptop connection both data storage provided and can be taken in appropriate format to use when it requires, and during the measurement appropriateness of the data can be confirmed by viewing the data on the screen. One

of the most important features of the device is being able to making unlimited listening as much as database authorities.

Other instruments of the system are 12 x 2 spread cable; 40 hz trigger geophone, trigger extension cable, internal GPS and 12 V dry batteries (accumulator).

The data were processed with **Surface Wave Analysis-Wave Eq** modules, which are under Seisimager program, and first arrival seismic waves were evaluated with **Surface Wave Analysis Plotrefa** modulus.

8.1.2. Field application of the method

In order to ensure that portrayed the whole of the field by studies for determinate field, appropriate number of measurement and measurement locations where on appropriate places were chosen (Figure 8.1).

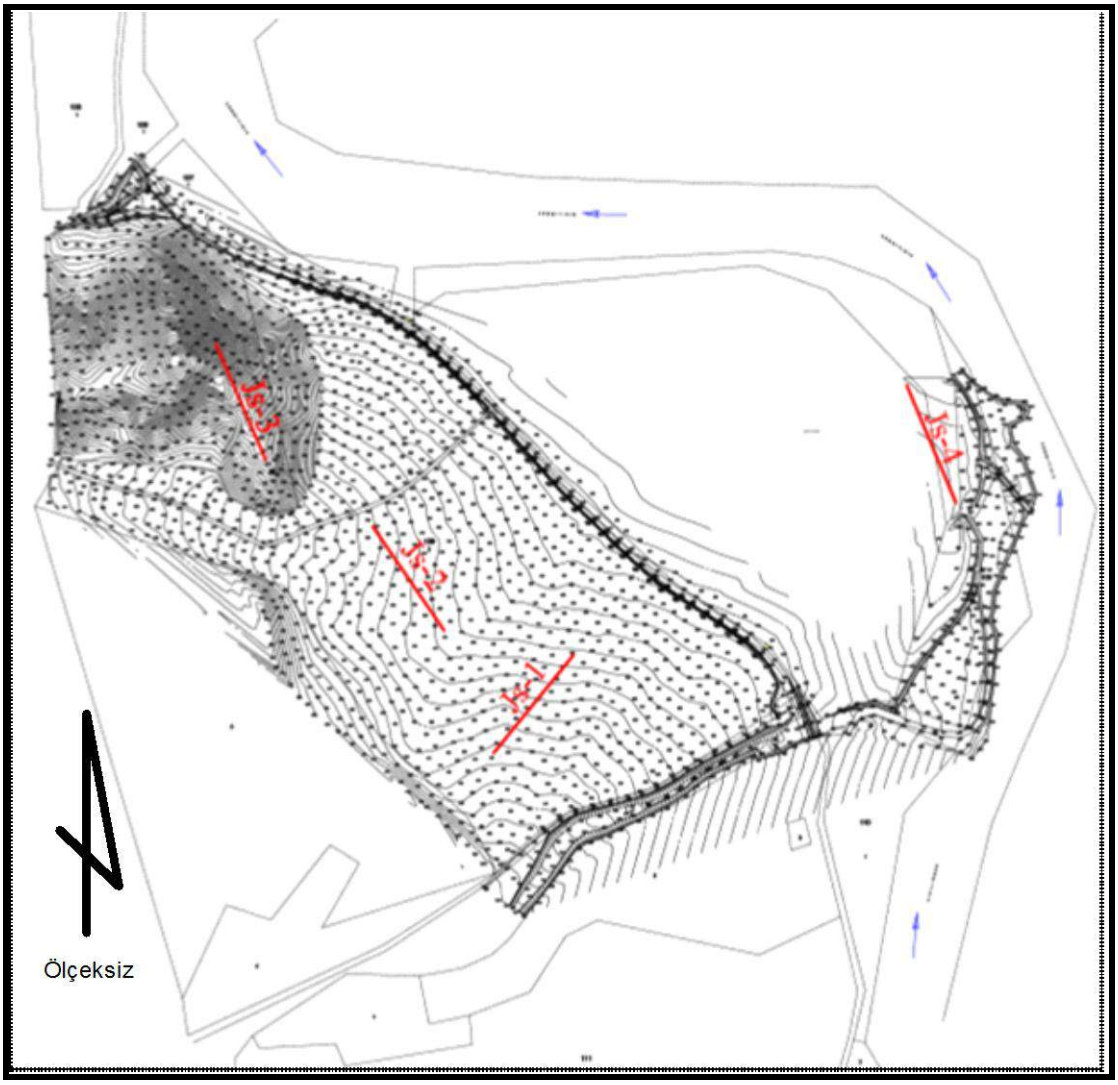


Figure 8. 1: Seismic measurement lines.

As it is seen in the figure 8.1, 4 spread measurements were planned for whole field. Three of the measurements (Js-1, Js-2, Js-3) were planned on the field where structures designed. Js-1 and Js-2 of these were chosen on the places where elevation difference is smaller rather than the rest of the field, as to Js-3 was chosen where high elevation, near to the river and considered place that alluvium is the thickest to be the selected area.

The start and end points coordinates of the seismic study is presented in Table 8.1.

Spread no	Coordinates	
	Start of line	End of line
Js-1	534947 - 4416858	535034 – 4416962
Js-2	534893 – 4416988	534819 – 4417098
Js-3	534645 - 4417292	534699 – 4417169
Js-4	535451 - 4417124	535397 – 4417248

Table 8. 1: Seismic measurement coordinates

8.1.3 Evaluation of collected data

Taken measures were saved as seg-2 format. Field data for Js-4 reverse shot is presented on the figure 8.2.

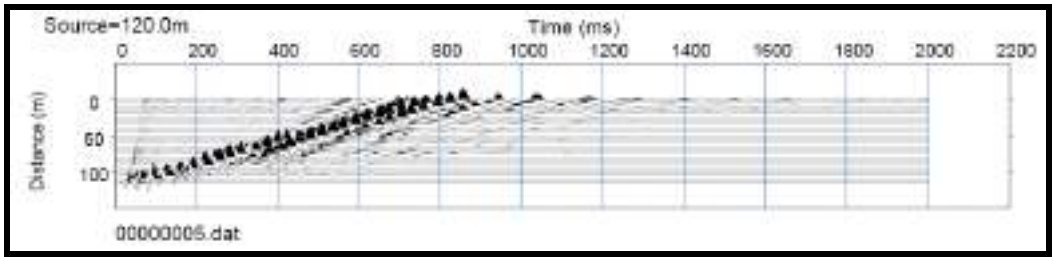


Figure 8. 2: Seismic measurement of the field data. (Js-4 reverse shot)

Dispersion curve was drawn on Seisimager program by making phase velocity-frequency transformation after maximum peaks were put.

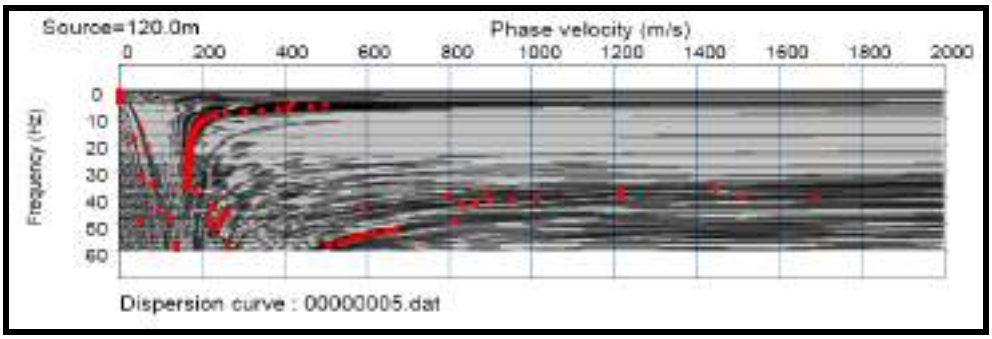


Figure 8. 3 : Phase velocity-frequency transformation and max peaks. (Js-4 reverse shot)



Figure 8. 4 : Dispersion curve of the field data (Js-4 reverse shot)

Obtained dispersion curve (raw curve) of the field data was subjected to inversion by creating initial model and the layered strata was modeled.



Figure 8. 5 : Estimated dispersion curve. (Js-4 reverse shot)

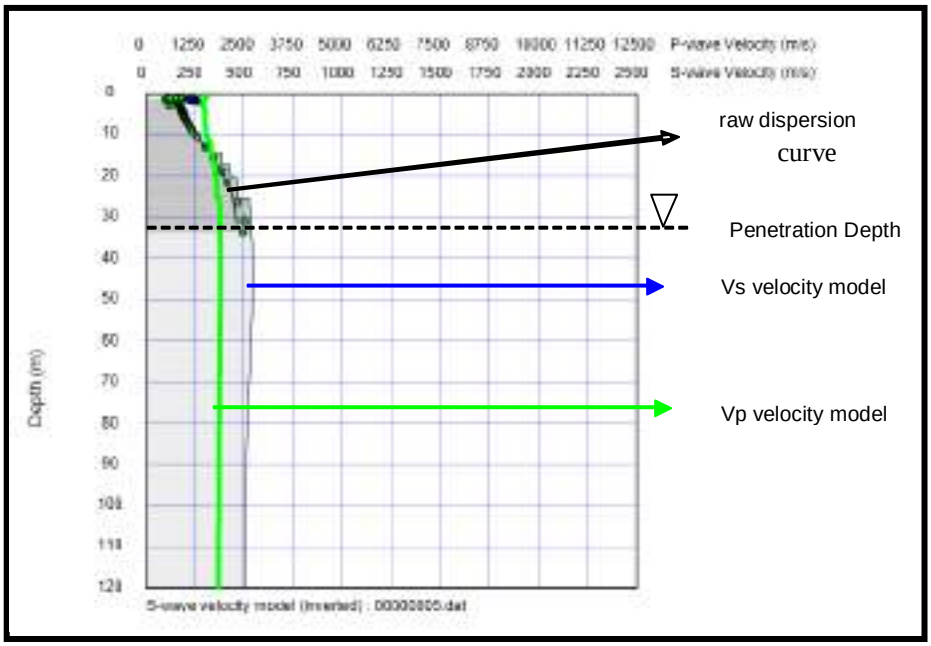


Figure 8. 6: Estimated underground model. (Js-4 reverse shot)

In order to check the coherence of inverted and existing layered model, it is made a point of error values (RMS) to be minimum.

Iteration=0 RMS=39.328381 m/s (19.288691%)
Iteration=1 RMS=36.549442 m/s (17.616827%)
Iteration=2 RMS=34.685504 m/s (16.397675%)
Iteration=3 RMS=33.240732 m/s (15.365648%)
Iteration=4 RMS=32.025933 m/s (14.441869%)

Table 8. 2 : Error rates of the dispersion curve (Js-4 reverse shot)

After the whole evaluation processes, the obtained underground model was tried to be interpreted.

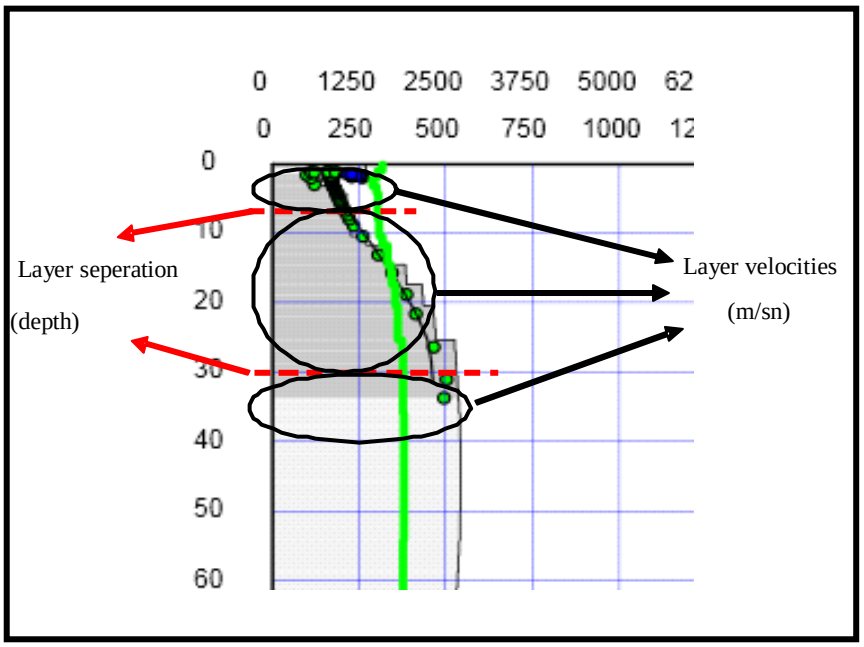


Figure 8. 7: Estimated underground model. (Js-4 reverse shot)

Obtained label depths-velocities and calculated density values from seismic velocities were taken -ASCII formatted, it was drawn by surfer drawing program as -sheet.

Depth (m)	S-wave velocity (m/s)	P-wave velocity (m/s)	Density (g/cc)	N
0.000000	267.468631	1586.890101	1.815513	25.285399
1.016949	199.890524	1511.878490	1.791612	10.001502
2.068966	140.161529	1445.579290	1.770243	3.229230

Table 8. 3: Density list of calculated underground model depth-velocity. (Js-4 reverse shot)

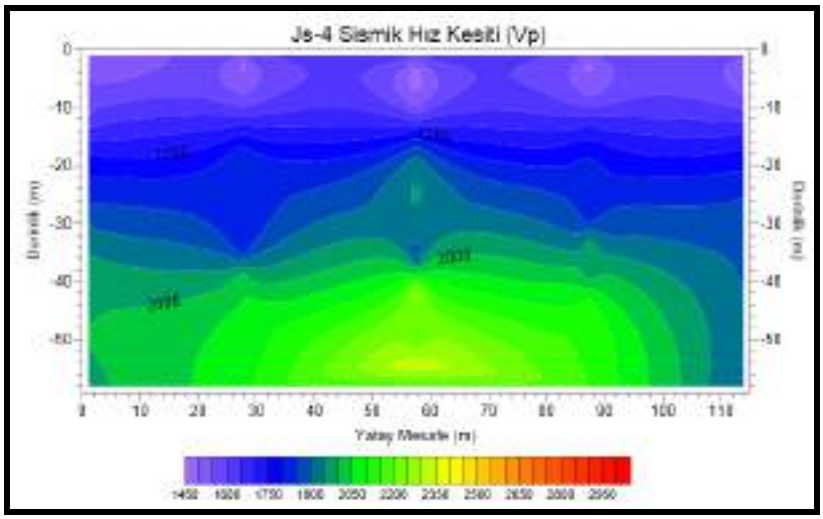


Figure 8. 8 :Depth-velocity section of estimated underground model. (Js-4)

Max frequency and H/V curves were calculated and drawn in seisimager program.

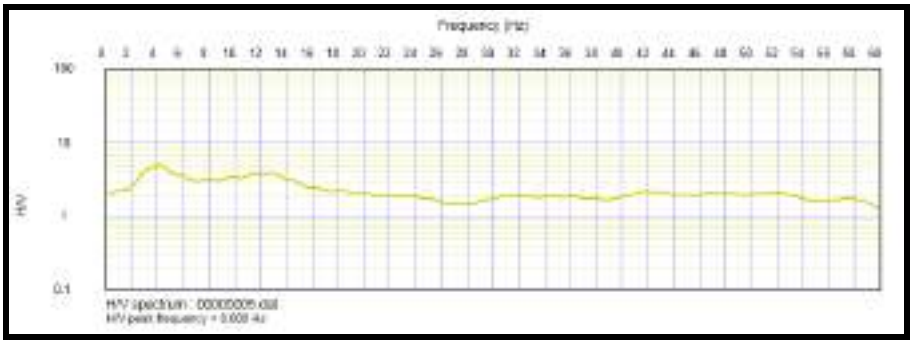


Figure 8. 9: Frequency-H/V curve. (Js-4)

Vp and Vs velocity values for the study area, dynamic elastic parameters, predominant period and frequency-dependent amplification value (H/V) were calculated based on obtained velocities and depths.

8.1.4. Dynamic-elastic parameters of the soil

Instructions about Seismic Properties of the Soil

They carry information about structural conditions of the medium. If longitudinal (P) waves have a resistance against compression and expansion strain of the material, geometric shapes of structures are found by helping of these wave velocities.

Transverse (S) waves occur if the material has a resistance against deformity and twisting. They carry information about physical conditions of environments. Areas where

liquefaction might occur can be determined directly by helping of this wave velocity because of S wave velocities has very low values in water-comprising environments. Liquefaction might occur in case of Vs < 200 m/sn.

Longitudinal (P) and transverse (S) wave velocities that measured in the field and the calculated soil elastic parameters with these waves' information are described below.

Poisson's Ratio (σ)

$$\upsilon = (Vp^2-2.Vs^2) / (2.Vp^2-2.Vs^2) \quad \text{unitless}$$

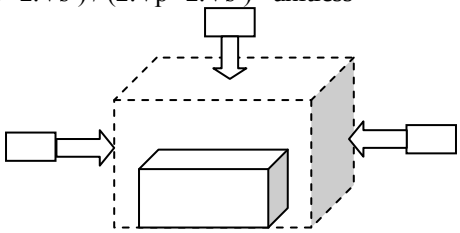


Figure 8. 10: The transverse deformation of the unit rate of longitudinal deformation of the unit.

A value changes according to velocities of P and S wave's velocities. It has no unit and takes value between 0-0.5. It takes maximum values in saturated (water saturated) zones, minimum values in unsaturated (unwatersaturated) zones

It checks the porosity and also check whether these pores are full of water or not and it control fractureness and anisotropy of the soil.

If poison ratio change between 0-0,025, it means non-porous media; If poisson ratio change between 0,25 and 0,35, it Means moderate porous media and if it is change between 0,35 and 0,50 that means the medium is fully porous.

Young's (Elasticity) Modulus (E):

$$\mathbf{E} = (d.Vs^2 / 100)\ (3.Vp^2-4.Vs^2) / (Vp^2.Vs^2) \quad kg/cm^2$$

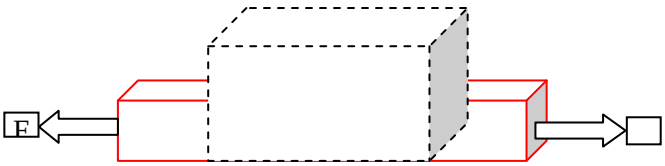


Figure 8. 11: Longitudinal deformation is the ratio of the longitudinal tension.

Elasticity modulus represents the hardness -in other words rigidity- and resistance of the soil, which is forced. It determines that how much settlement might occur in which type of soil. It depends on the porosity and texture of the rock

It shows that if modulus of elasticity; is 1.700 kg/cm^2 it is loose, is between 2.000- 10.000 kg/cm^2 it is tight (corrupted), is between 10.000-30.000 kg/cm^2 it is firm and is bigger than 30.000 kg/cm^2 it is very firm.

Shear Modulus (G)

$$\mathbf{G} = d.Vs^2/\ 100 \qquad (kg/cm^2)$$

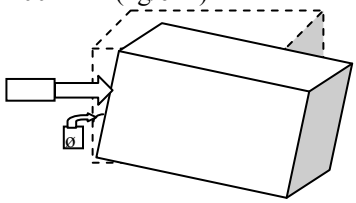


Figure 8. 12: It is stress to strain ratio.

It occurs under effect of lateral forces. It represents the skid strength and the resistance of the soil.

Dynamic shear modulus is calculated with the transverse wave velocity and it is a dimension of the earthquake damage. S waves can not propagate in liquids in case of Gd = 0 . The value of shear modulus decreases as long as soil gets wet. It shows that if shear modulus; is 600 kg/cm^2 it is loose, is between 600-3.000 kg/cm^2 it is moderate firm (corrupted), is between 3.000-10.000 kg/cm^2 it is firm, is bigger than 10.000 kg/cm^2 it is very firm.

Bulk Modulus (k):

$$\mathbf{K} = d.(Vp^2\text{-}4/3Vs^2) / 100 \quad kg/cm^2$$

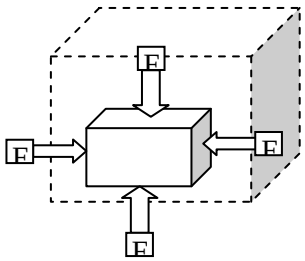


Figure 8. 13: The ratio of stress and volume deformation

It occurs when a force is applied to the object from all quarters. On this basis, Bulk modulus is the resistance against compression under a certain pressure. Compression values is low for soils, is big as for rocks.

Predominant Pulse Period of Soil (To):

As a result of the researches, there is a close relation between predominant pulse period of soil and damages on buildings that occur after earthquakes. Predominant pulse period of soil should not be equal or very close to own period of the building. Resonance occurs in case of being close and the building would be in danger during a probable earthquake.

$\mathbf{T_0} = 4.h_1 / Vs_1$ (sn), h= 50 m
$\mathbf{T_0} = 4.\ h_1 / Vs_1 + 4.\ (50-h_1) / Vs_2$ (sn)
$\mathbf{T_0} = 4.\ h_1 / Vs_1 + 4.\ (h_2-h_1) / Vs_2 + 4.(50-h_2) / Vs_3$

Predominant Pulse Period of Kanai:

$$T = \sum_{i=\int}^{n} \frac{4h_i}{V_i}$$

Kanai relation can be found by above-mentioned formula. Here, T is active pulse period; respectively h and V are thickness and velocities of the layer. Fourier and wavelet transformations of accelograms, which were measured in Bolu during Düzce earthquake on November 12, 1999 shows that amplitudes reached peak values when it is between 0.5-0.8 second. (Başokur et,al., 2003) However « Fourier Transform », as well as gives a view of the wave amplitudes, it is developed by the assumption that a certain frequency and amplitude be persistent on time. Therefore, it does not give information about time-dependent change of the amplitudes of a certain frequency band.

In order to understand the properties of an investigated time data, beside the knowledge that which frequencies of waves are the largest amplitude, it also needs to be aware of these changes in time (Başokur et. al., 2003). This information can be obtained by mapping the amplitudes in the time-frequency domain. Wavelet transforms can be used for this purpose. At a certain time, the amplitude is calculated in a specific period and this process was repeated for many time-period pair. This calculation provides a visualization of the amplitudes in time-period plane.

The calculated values and parameters are presented below.

Measure No	Soil Description	Depth (m)	Vp (m/s)	Vs (m/s)	Soil Group	Local Soil Class	Effective Ground Acceleration Coefficient (A_0)	Soil Resonant Period T_0 (sn)	Spectrum Periods T_A - T_B (sn)
Straight shot	1.seismic medium	6,62	1524	210	C	Z_2	0,30	0,31	0,15-0,40
	2.seismic medium	20,47	2149	774	B	Z_2	0,30	0,18	0,15-0,40
	3.seismic medium	70,45	2776	1339	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>70,45	3034	1531	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (6-7)	1.seismic medium	4,39	1681	352	C	Z_2	0,30	0,26	0,15-0,40
	2.seismic medium	23,82	2114	712	B	Z_2	0,30	0,21	0,15-0,40
	3.seismic medium	98,66	3162	1487	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>98,66	3444	1941	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (12-13)	1.seismic medium	5,92	1532	218	C	Z_2	0,30	0,40	0,15-0,40
	2.seismic medium	11,16	1616	294	C	Z_2	0,30	0,29	0,15-0,40
	3.seismic medium	25,16	1882	533	B	Z_2	0,30	0,22	0,15-0,40
	4.seismic medium	>25,16	2233	850	A	Z_1	0,30	0,11	0,10-0,30
Intermediate shot (18-19)	1.seismic medium	5,57	1522	209	C	Z_2	0,30	0,28	0,15-0,40
	2.seismic medium	33,57	2261	875	B	Z_2	0,30	0,17	0,15-0,40
	3.seismic medium	84,44	3033	1570	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>84,44	3256	1771	A	Z_1	0,30	0,10	0,10-0,30
Reverse shot	1.seismic medium	6,62	1550	235	C	Z_2	0,30	0,32	0,15-0,40
	2.seismic medium	23,67	2007	646	B	Z_2	0,30	0,21	0,15-0,40
	3.seismic medium	32,26	2267	881	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>32,26	2488	1079	A	Z_1	0,30	0,10	0,10-0,30

Table 8. 4: The earthquake parameters of the area (Js-1)

Measure No	Soil Description	Poisson ratio σ	Density d (gr/cm^3)	Shear Modulus G (kg/cm^2)	Elasticity Modulus E (kg/cm^2)	Bulk Modulus K (kg/cm^3)
Straight shot	1.seismic medium	0,49	1,93	871	2596	43847
	2.seismic medium	0,42	2,11	12897	36769	80615
	3.seismic medium	0,34	2,25	41150	110975	119610
	4.seismic medium	0,32	2,30	55006	146228	139881
Intermediate shot (6-7)	1.seismic medium	0,47	1,98	2508	7410	52811
	2.seismic medium	0,43	2,10	10869	31216	79731
	3.seismic medium	0,35	2,32	52429	142400	163886
	4.seismic medium	0,26	2,37	91259	231298	162384
Intermediate shot (12-13)	1.seismic medium	0,48	1,93	940	2800	44290
	2.seismic medium	0,48	1,96	1732	5139	49062
	3.seismic medium	0,45	2,04	5916	17233	64585
	4.seismic medium	0,41	2,13	15704	44452	85729
Intermediate shot (18-19)	1.seismic medium	0,49	1,93	862	2571	43725
	2.seismic medium	0,41	2,13	16693	47140	87457
	3.seismic medium	0,31	2,30	57840	152349	136020
	4.seismic medium	0,28	2,34	74915	193270	150328
Reverse shot	1.seismic medium	0,48	1,94	1095	3251	45299
	2.seismic medium	0,44	2,07	8832	25475	72033
	3.seismic medium	0,41	2,13	16934	47791	87796
	4.seismic medium	0,38	2,18	25999	71976	101540

Table 8. 5: Dynamic elacticity parameters of the area (Js-1 profile)

Measure No	Soil description	Depth (m)	Vp (m/s)	Vs (m/s)	Soil Group	Local Soil Class	Effective Ground Acceleration Coefficient (A_0)	Soil Predominant Vibration Period T_0 (sn)	Spectrum Periods T_A - T_B (sn)
Straight shot	1.seismic medium	7,85	1524	211	C	Z_2	0,30	0,37	0,15-0,40
	2.seismic medium	54,24	2216	834	B	Z_2	0,30	0,22	0,15-0,40
	3.seismic medium	77,91	2584	1167	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>77,91	2968	1512	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (6-7)	1.seismic medium	5,57	1520	207	C	Z_2	0,30	0,37	0,15-0,40
	2.seismic medium	25,72	2116	744	B	Z_2	0,30	0,22	0,15-0,40
	3.seismic medium	49,17	2335	941	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>49,17	2972	1516	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (12-13)	1.seismic medium	10,34	1546	231	C	Z_2	0,30	0,35	0,15-0,40
	2.seismic medium	25,55	2152	777	B	Z_2	0,30	0,17	0,15-0,40
	3.seismic medium	40,15	2241	857	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>40,15	2998	1539	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (18-19)	1.seismic medium	6,83	1538	224	C	Z_2	0,30	0,32	0,15-0,40
	2.seismic medium	54,06	2283	895	B	Z_2	0,30	0,20	0,15-0,40
	3.seismic medium	64,43	3012	1551	A	Z_1	0,30	0,10	0,10-0,30
	4.seismic medium	>64,43	3040	1585	A	Z_1	0,30	0,10	0,10-0,30
Reverse shot	1.seismic medium	9,11	1553	297	C	Z_2	0,30	0,31	0,15-0,40
	2.seismic medium	58,70	2290	901	B	Z_2	0,30	0,19	0,15-0,40
	3.seismic medium	>58,70	2928	1475	A	Z_1	0,30	0,10	0,10-0,30

Table 8. 6: The earthquake parameters of the area (Js-2)

Measure No	Soil Description	Poisson ratio σ	Density d (gr/cm^3)	Shear modulus G (kg/cm^2)	Elasticity modulus E (kg/cm^2)	Bulk modulus K (kg/cm^3)
Straight shot	1.seismic medium	0,49	1,93	879	2621	45836
	2.seismic medium	0,41	2,12	15089	42779	84721
	3.seismic medium	0,37	2,21	30702	84241	107443
	4.seismic medium	0,32	2,28	53355	141367	131814
Intermediate shot (6-7)	1.seismic medium	0,49	1,93	845	2521	43614
	2.seismic medium	0,42	2,10	11870	33938	78621
	3.seismic medium	0,40	2,15	19463	54615	92049
	4.seismic medium	0,32	2,28	53656	142098	132033
Intermediate shot (12-13)	1.seismic medium	0,48	1,94	1058	3149	45077
	2.seismic medium	0,42	2,11	13002	37057	80785
	3.seismic medium	0,41	2,13	15978	45198	86229
	4.seismic medium	0,32	2,29	55417	146423	133732
Intermediate shot (18-19)	1.seismic medium	0,48	1,94	993	2959	44622
	2.seismic medium	0,40	2,14	17507	49344	88800
	3.seismic medium	0,31	2,29	56530	148718	134685
	4.seismic medium	0,31	2,30	58984	154933	135625
Reverse shot	1.seismic medium	0,48	1,94	1750	5186	44646
	2.seismic medium	0,40	2,14	17757	50018	89246
	3.seismic medium	0,32	2,28	50604	134604	129350

Table 8. 7: Dynamic elacticity parameters of the area (Js-2 profile)

Measure No	Soil Description	Depth (m)	Vp (m/s)	Vs (m/s)	Soil Group	Local Soil Class	Effective Ground Acceleration Coefficient (A_0)	Soil Predominant Vibration Period T_0 (sn)	Spectrum Periods T_A - T_B (sn)
Straight shot	1.seismic medium	30,47	2553	1138	A	Z_1	0,30	0,16	0,10-0,30
	2 seismic medium	60,98	3068	1602	A	Z_1	0,30	0,10	0,10-0,30
	3.seismic medium	>60,98	3707	2178	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (6-7)	1.seismic medium	13,75	2236	852	B	Z_1	0,30	0,19	0,15-0,40
	2.seismic medium	67,15	2731	1298	A	Z_1	0,30	0,12	0,10-0,30
	3.seismic medium	>67,15	3322	1831	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (12-13)	1.seismic medium	21,29	2666	1240	A	Z_1	0,30	0,13	0,10-0,30
	2.seismic medium	>21,29	3076	1608	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (18-19)	1.seismic medium	15,40	2573	1156	A	Z_1	0,30	0,13	0,10-0,30
	2.seismic medium	39,97	2909	1459	A	Z_1	0,30	0,10	0,10-0,30
	3.seismic medium	>39,97	3693	2165	A	Z_1	0,30	0,10	0,10-0,30
Reverse shot	1.seismic medium	70,45	2953	1499	A	Z_1	0,30	0,17	0,10-0,30
	2.seismic medium	110,95	3366	1871	A	Z_1	0,30	0,10	0,10-0,30
	3.seismic medium	>110,95	3945	2401	A	Z_1	0,30	0,10	0,10-0,30

Table 8. 8: The earthquake parameters of the area (Js-3)

Measure No	Soil Description	Poisson ratio σ	Density d (gr/cm^3)	Shear modulus G (kg/cm^2)	Elasticity modulus E (kg/cm^2)	Bulk modulus K (kg/cm^3)
Straight shot	1.seismic medium	0,37	2,20	29107	80105	105574
	2.seismic medium	0,31	2,30	60394	158545	138215
	3.seismic medium	0,23	2,41	117039	289417	179408
Intermediate shot (6-7)	1.seismic medium	0,41	2,13	15783	44670	85947
	2.seismic medium	0,35	2,24	38511	104296	116800
	3.seismic medium	0,28	2,35	80480	206322	154520
Intermediate shot (12-13)	1.seismic medium	0,36	2,22	34935	95163	112656
	2.seismic medium	0,31	2,30	60887	159767	138847
Intermediate shot (18-19)	1.seismic medium	0,37	2,20	30904	82672	106828
	2.seismic medium	0,33	2,27	49432	131682	128040
	3.seismic medium	0,23	2,41	115537	286110	17554
Reverse shot	1.seismic medium	0,32	2,28	52375	138946	130810
	2.seismic medium	0,27	2,36	84311	215237	157316
	3.seismic medium	0,20	2,45	144463	348395	193514

Table 8. 9: Dynamic elacticity parameters of the area (Js-3 profile)

Measure No	Soil Description	Depth (m)	Vp (m/s)	Vs (m/s)	Soil Group	Local Soil Class	Effective Ground Acceleration Coefficient (A_0)	Soil Predominant Vibration Period T_0 (sn)	Spectrum Period T_A - T_B (sn)
Straight shot	1.seismic medium	10,41	1616	294	C	Z_2	0,30	0,46	0,15-0,40
	2.seismic medium	28,72	1817	474	B	Z_2	0,30	0,31	0,15-0,40
	3.seismic medium	63,29	1909	638	B	Z_1	0,30	0,16	0,15-0,40
	4.seismic medium	>63,29	2409	1008	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (6-7)	1.seismic medium	2,08	1615	293	C	Z_2	0,30	0,47	0,15-0,40
	2.seismic medium	37,79	1856	407	B	Z_2	0,30	0,44	0,15-0,40
	3.seismic medium	67,15	2086	717	B	Z_1	0,30	0,10	0,15-0,40
	4.seismic medium	>67,15	2422	1019	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (12-13)	1.seismic medium	8,78	1513	201	C	Z_2	0,30	0,42	0,15-0,40
	2.seismic medium	40,15	1959	603	B	Z_2	0,30	0,25	0,15-0,40
	3.seismic medium	54,41	2278	890	B	Z_1	0,30	0,10	0,15-0,40
	4.seismic medium	>54,41	2354	958	A	Z_1	0,30	0,10	0,10-0,30
Intermediate shot (18-19)	1.seismic medium	2,08	1600	279	C	Z_2	0,30	0,38	0,15-0,40
	2.seismic medium	31,56	1836	492	B	Z_2	0,30	0,35	0,15-0,40
	3.seismic medium	42,19	1969	611	B	Z_1	0,30	0,11	0,15-0,40
	4.seismic medium	>42,19	2136	762	A	Z_1	0,30	0,10	0,10-0,30
Reverse shot	1.seismic medium	7,85	1529	215	C	Z_2	0,30	0,47	0,15-0,40
	2.seismic medium	25,31	1810	468	B	Z_2	0,30	0,33	0,15-0,40
	3.seismic medium	>25,31	1884	535	B	Z_2	0,30	0,18	0,15-0,40

Table 8. 10: The earthquake parameters of the area (Js-4)

Measure No	Description of Soil	Poisson ratio σ	Density d (gr/cm^3)	Shear Modulus G (kg/cm^2)	Elasticity Modulus E (kg/cm^2)	Bulk modulus K (kg/cm^3)
Straight shot	1.seismic medium	0,48	1,96	1732	5139	49062
	2.seismic medium	0,46	2,02	4638	13575	60757
	3.seismic medium	0,43	2,04	8507	24452	63553
	4.seismic medium	0,39	2,17	22508	62747	96613
Intermediate shot (6-7)	1.seismic medium	0,48	1,96	1720	5103	49007
	2.seismic medium	0,47	2,03	3437	10140	65596
	3.seismic medium	0,43	2,09	10985	31485	76802
	4.seismic medium	0,39	2,17	23033	54145	97462
Intermediate shot (12-13)	1.seismic medium	0,49	1,93	796	2375	43217
	2.seismic medium	0,44	2,06	7649	22146	69149
	3.seismic medium	0,40	2,14	17303	48793	88517
	4.seismic medium	0,40	2,15	20213	56628	93230
Intermediate shot (18-19)	1.seismic medium	0,48	1,96	1556	4621	48156
	2.seismic medium	0,46	2,02	5010	14643	51853
	3.seismic medium	0,44	2,06	7863	22752	69780
	4.seismic medium	0,42	2,10	12481	35624	79837
Reverse shot	1.seismic medium	0,48	1,93	913	2723	44124
	2.seismic medium	0,46	2,02	4517	13228	60337
	3.seismic medium	0,45	2,04	5962	17364	64698

Table 8. 11: Dynamic elacticity parameters of the area (Js-4 profile)

The seismic traces and seismic sections are presented in APPENDIX-6. Keçeli (1990) and Kanai (1984) were used to calculate dynamic elastic parameters of the soil and Regulation of Buildings, which Consturacted in the Earthquake District (2007) were used to calculate earthquake parameters.

The layer discrimination was made depending on the velocities that obtained from the seismic measurements. Even though the distinctions are described as layers, the definition of the seismic medium would be more accurate. Therefore, both of seismic and geological strata depths should not be expected to match up each other.

If we summarize the results under the derived velocities and sections:

The velocities close to the surface were determined, as under effect of the alluvium media and Vs velocities are quite low.

Just below the alluvium, the geological settings could be described as dense fractured sandstone, siltstone and claystone that their velocity values are much higher than the alluvium and it is called Samanlık Formation. The difference between the velocity values that determined for the Samanlık Formation based on the saturated zones within the formation. The low velocities could be described as dense fractured levels of the soil or the vertical oriented splits.

The distributions of velocities (Vp) according to the lithology are presented in table 8.12.

Description of Soil	Seismic Velocity Vp (m/sec)
Alluvial Fan	1520 – 1681
???	2236
Sandstone, siltstone, claystone. frequent fractured	2114 – 2290
Sandstone, siltstone, claystone. rare fractured	2241 – 3162
Sandstone, siltstone, claystone. rare fractured	2731 – 3366
Sandstone, siltstone, claystone. rare fractured	2928 - 3707

Table 8. 12: : The distributions of the velocities (Vp) according to the lithology

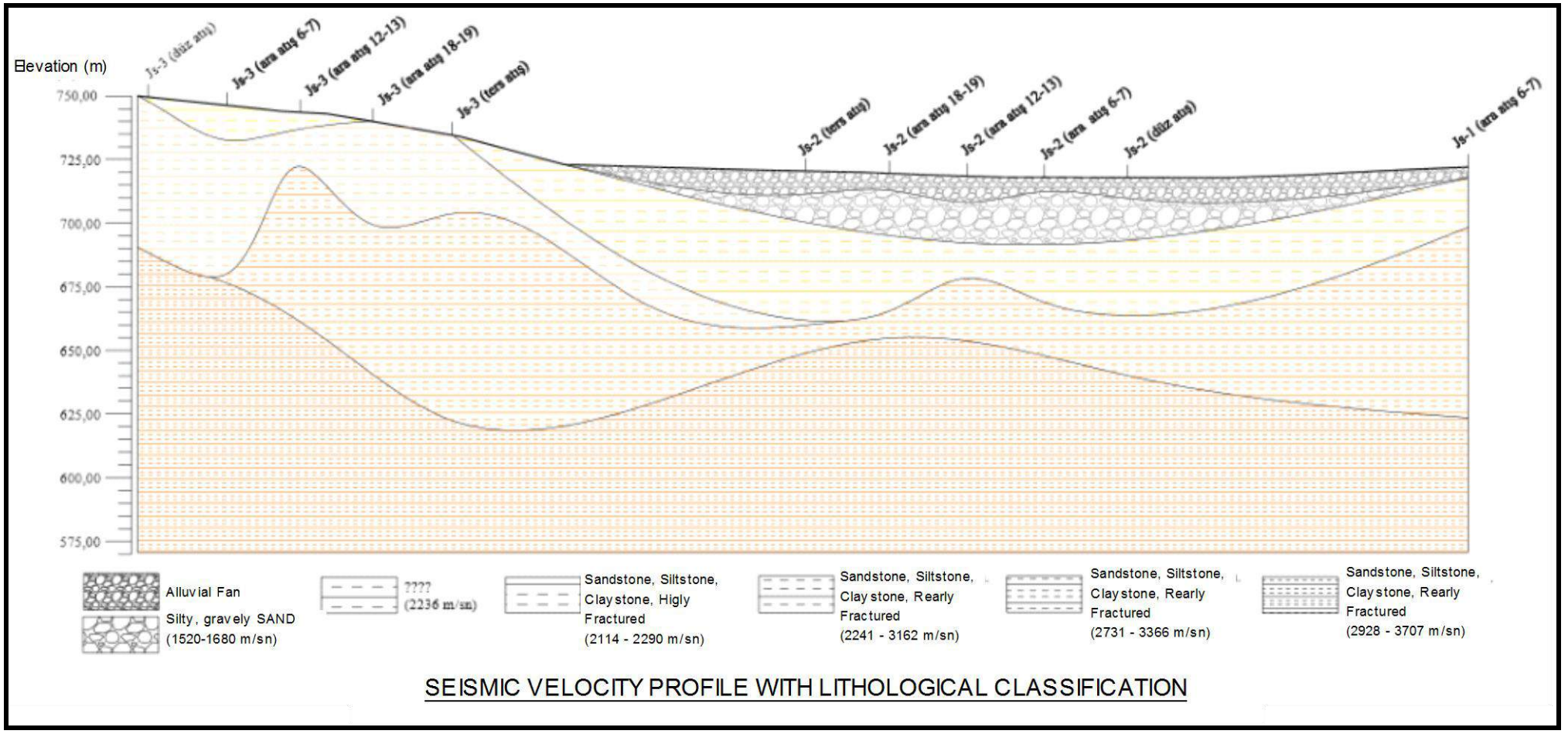


Figure 8. 14 : The evaluation of seismic velocity section as lithologic

Soil Group	Description of Soil Group	Stand. Penetr. (N/30)	Relative Tightness %	Unconfines Compression Resistance (kPa)	Shear Wave Velocity (m/sec)
(A)	1. Massive volcanic rocks and unweathered, rigid metamorphic rocks, rigid cement containing sediment rocks.	--	--	>100	>1000
	2. High level of firm sand, gravel ,	>50	85-100	--	>700
	3. Firm clay and clay with silt,	>32	--	>400	>700
(B)	1. Loose volcanic rocks as tuff and anglomera, cement containing weathered sediment rocks that have discontinuity level.	--	--	500-1000	700-1000
	2. Sıkı kum, çakıl,	30-50	65-85	--	400-700
	3. High level of firm clay and clay with silt.	*16-32*	--	*200-400*	*300-700*
(C)	*1.* so weathered methamorphic rocks that have soft discontinuity level and cement containing sediment rocks	--	--	*<500*	*400-700*
	2. Moderate firm sand, gravel.	'10-30	35-65	--	200-400
	3. Firm clay and clay with silt.	'8-16	--	100-200	200-300
(D)	1. Soft and thick alluvial strata that groundwater level is high.	--	--	--	*<200*
	2. Loose sand,	<10	<35	--	<200
	3. Soft clay, clay with silt,	<8	--	<100	<200

Table 8. 13 : Soil groups

Local Soil Class	Soil Group According to the Table above and The Thickness of Top Soil Layer (h_i)
Z_1	(A) Group soils $h_i \leq 15$m (B) group soils
Z_2	*$h_i > 15$m (B) group soils* *$h_i \leq 15$m (C) group soils*
Z_3	$15\text{m} < h_i \leq 50$m (C) group soils $h_i \leq 10$m (D) group soils
Z_4	$h_i > 50$m (C) group soils *$h_i > 10$m (D) group soils*

Table 8. 14 : Local soil classes

Local Soil Class According to Table 12.2	T_A (second)	T_B (second)
Z_1	0.10	0.30
Z_2	*0.15*	*0.40*
Z_3	0.15	0.60
Z_4	0.20	0.90

Table 8. 15 : Spectrum characteristic periods (T_A-T_B)

8.2. Microtremor Studies

Microtremor measurements were taken to determine soil resonant frequency of the investigated area.

8.2.1. Methodology

Microtremors are consistent vibrations with low amplitude in surface. Both of natural or artificial sources can generate these vibrations. The source can be as well as ocean waves, wind or tidal, also traffic caused by human activities, industrial machinery, industrial noise. The amplitudes of these vibrations change between 0.1 - 1 micron, as the periods change between 0.05 and 2 seconds intervals (Kanai and Tanaka 1954, 1961).

Whereas low-frequency content (<1Hz) atmospheric phenomena, the effect of tidal, geothermal activities, the ocean waves are natural events which generates the vibrations in surface; high frequency (> 1 Hz) content of the traffic, factories, machinery and similar vibrations are human-induced noises. The source of these movements is usually over the surface and indicates powerful changes in day/night, weekday/weekend periods. Natural origin ones from these noises are called microseism, human-induced high frequency ones are called microtremor.

Nowadays, in spite of the widespread usage of the method of microtremor, the content of micro-tremor wave is still unclear. Many observations and experiences on microtremor records show that microtremor consists of both body and surface waves, but there is no established theory concerning what kinds of wave motions the microtremor is made up from (Nakamura, 2000).

Nakamura (1989) asserted that microtremors consist of Rayleight waves. Nogoshi and Igarashi (1971) indicated the same idea. Some theoretical studies (Lachet and Bard, 1994; Konno and Ohmachi, 1998; Bard, 1998) asserted that the peak of H/V curves could be explained by the fundamental mode of Rayleigh waves.

Kanai and Tanaka (1961) indicated that microtemors appear because of multiple reflections of S wave of the ground. Kanai (1983), in their studies by adopting microtremors formed by vertically polarized S waves, they have determined some similarities with earthquake records. However, other researchers (Irikura and Kawanaka, 1980; Horike, 1985; Matsushima and Okada, 1990; Milana and others., 1996) have not accepted this approach. Aki (1957) has associated microtremors with surface waves.

The equipment used:

During the measurements, **PE-6** / B, 3-component geophone was used. There are two SM-6/U-B 4.5 Hz vertical geophone and two pieces of SM-6/H-B 4.5 Hz horizontal geophone are stated in this geophone.

24-channel, Seismic Source brand, **DAQlink III** model, engineering purposes seismograph was used as **data collector**. The device used in professionally seismic device through laptop connection both data storage provided and can be taken in appropriate format to use when it requires, and during the measurement appropriateness of the data can be confirmed by viewing the data on the screen. One of the most important features of the device is being able to making unlimited listening as much as database storage authorities.

For the solution phase, horizontal/vertical spectral ratios were calculated by using Geopsy program.

8.2.2. Field application of the method

Firstly, the acceptable amount of measure and measurement locations in the appropriate places was selected in order to ensure that the studies portrayed the whole of the field (Figure 8.15).

As seen in Figure 8.15, 4 points of measurement were planned for the whole of the field. All measurements were identified as areas of potential plant structures (Figure 8.15).

Coordinates of the measurement are given in Table 8.16.

Point No	Coordinates
Mt-1	534976 – 4416840
Mt-2	534992 – 4416976
Mt-3	534842 – 4417035
Mt-4	534792 – 4417205

Table 8. 16 : The coordinates of the measuring points

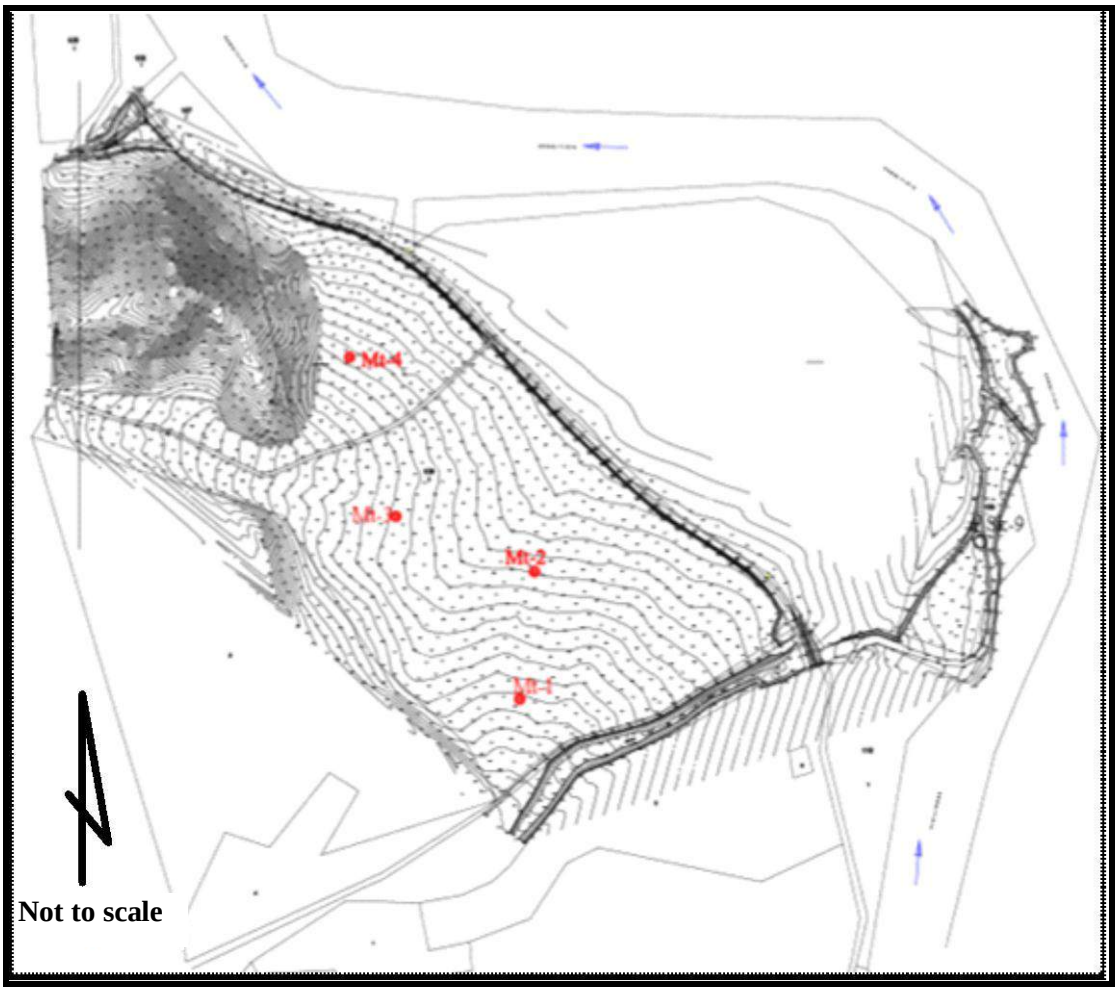


Figure 8. 15 : The distribution of microtremor measurement points of the study area

8.2.3 The evaluation of collected data

The microtremor data were evaluated with the Nakamura (1989) single station technique.

Nakamura Method:

Nakamura (1989) develops horizontal/vertical (H/V) spectral ratio method, which is used in order to determine the fundamental resonans frequency of a soil situated on the base rock by helping of microtremor data.

H / V spectral ratio method still has not a clear description though; it can be explained briefly by some certain assumptions. (Bour et.al., 1998; Delgado and others., 2000).

Transfer function of a sedimentary layer, which is located on the main rock, and the spectrum of the horizontal component that obtained on the sediment can be calculated by HS rates. The spectrum of the horizontal component, which is recorded on bedrock located nearby, can be calculated by HB rates.

$$S_1(f) = H_S(f)/H_B(f)$$

The transfer function S1 (f)can be determined by micro-tremor or earthquake records. When using a microtremor data, following assumptions are considered.

Microtremor data includes the wind, the ocean and the long-period noise which are created by sea waves as well as the city traffic and high-frequency noise from industry

Noise originated Rayleigh waves occur and spread in the sediment layer, which is located on the bedrock. Rayleigh waves are only observed by vertical component (VS) which is recorded on sediment, but they are not observed by vertical component (VB) which is on the bedrock.

$$S_{RW}(f) = V_S(f)/V_B(f)$$

It is assumed that the vertical component of microtremor data is not ampificated by the ground surface.

The spectral ratio of vertical and horizontal components is very close to 1 in a wide frequency range (0.1-10 Hz) on the bedrock.

$$HB(f)/VB(f) \approx 1$$

$S_1(f)/S_{RW}(f)$ ratio eliminates the effect of Rayleigh waves and the transfer function of the soil is determined in this way.

$$S_1(f)/S_{RW}(f) = H_S/V_S$$

The last expression above (1.4) shows that the transfer function of the soil (fundamental period of the soil) can be determined easily from spectral ratios of horizontal to vertical components by using 3-component single seismograph.

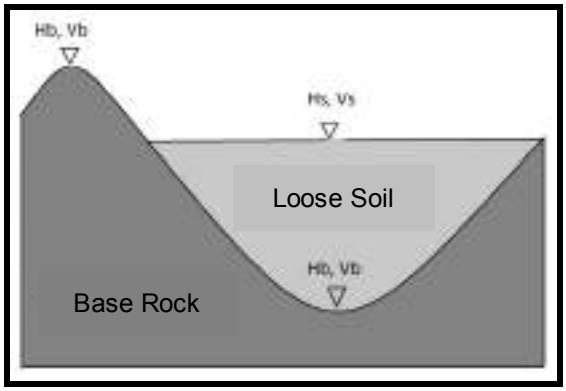


Figure 8. 16 : A simple earth model which represents H/V method that Nakamura (1989) recommended

8.2.4 The Measurement Results of Microtremor;

The Geopsy tool was used to Process the microtremor data with the use of H/V Horizontal to Vertical Spectral Ratios (Nakamura 1989). The obtained results and the number of selected windows, which used for the evaluation and window lenghts, are summarized in Table 8.17. The Figures and graphs related the evaluation is presented in APPENDIX-5.

Measure No	Record lenght (minute)	Window Lenght	Window Lenght	Soil Predominant Vibration Frequency f_0 (Hz)	Soil Predominant Vibration Period T_0 (sn)
01	18	15	50	5.53	0.18
02	20	19	50	4.97	0.20
03	15	10	50	5.24	0.19
04	20	18	50	5.84	0.17

Table 8. 17 : Microtremor evaluation report

8.3 Resistivity Measurements (DES)

In order to make lithologic distinction of underground for the study area, vertical electrical sounding (DES) measurements were made. Schlumberger array technique was used during the measurements.

8.3.1. Methodology

Direct Current Resistivity Method

Direct Current Electric Resistivity is based on measuring the response of the earth voltage by giving current from a particular source to the ground.

After this separation of the measured voltage,

$$\rho_{(a)} = K * (\Delta V / I)$$

It converted to apparent resistivity by using this correlation.

$\rho_{(a)}$: Apparent Resistivity (ohm.m)

K : Array coefficient

ΔV : the separation of the measured voltage (mV)

I : The current that given to the ground (mA)

"K" The array coefficient is calculated by following correlation.

$$K = \pi (a^2 - b^2) / 2b$$

a : Semi-current electrode spacing

b : Semi-potential electrode spacing

The Basis of the Opening Measurements

The ends of an array, which spread along a direction on Earth, are continued as spread outward by "da" interval according to mid point of the array. By this way, "L" array length would increase gradually it will grow up to the depth which the currents enter to the ground. The voltage measured on the surface change to reflect the change of resistivity with depth because of it would resist to current transition by a deep addition current participation for each expansion growth. "d" depth, which the current goes down, would also change when "L" array length change. Therefore, the extension measurements are used in order to examine the resistivity variation with depth. Due to the same reason, expansion measures are most used to find the location and the depth, the thicknesses and the resistivity of its environment of vertical and horizontal discontinuities. The observed values are drawn respectively the value of expansion and apparent resistivity by horizontal and vertical axises are logarithm to the base 10.

Schlumberger Array

In this array, current and voltage electrodes are arranged along the same direction. M and N electrodes are inside, A and B current electrodes are located outside. The distance between the voltage electrodes is called "b", the distance from the midpoint of the array of each current electrode is called "a". Schlumberger "b" distance is spread smaller than "a". **(b ≤ a/5)** (Figure 8.17)

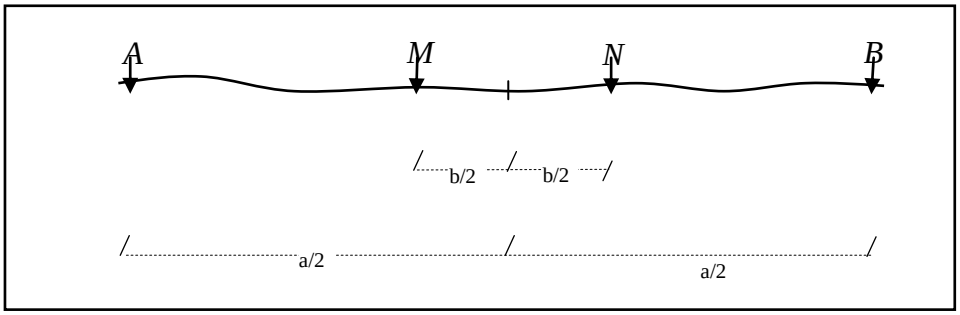


Figure 8. 17: Schlumber Array

The equipment used;

During the measurements, ABEM branded SAS 1000 model resistivity meter was used. 40 cm long, 12 mm in diameter, special copper alloy steel electrodes were used as the electrode.

45 amp 12 V dry-type batteries were used to operate the device and to apply the current to the surface, steel wire reinforced field type and isolated multiple wire 400 m long cables were used as the cable.

Free version Ip2Win inversion program was used to solve the collected data, Surfer program was used to draw the sections.

8.3.2. The field application of the method

Firstly, in order to ensure that the studies portrays the whole of the land for the determinated field, the appropriate number of measurement and measurement locations on the appropriate places were chosen. (Figure 8.18)

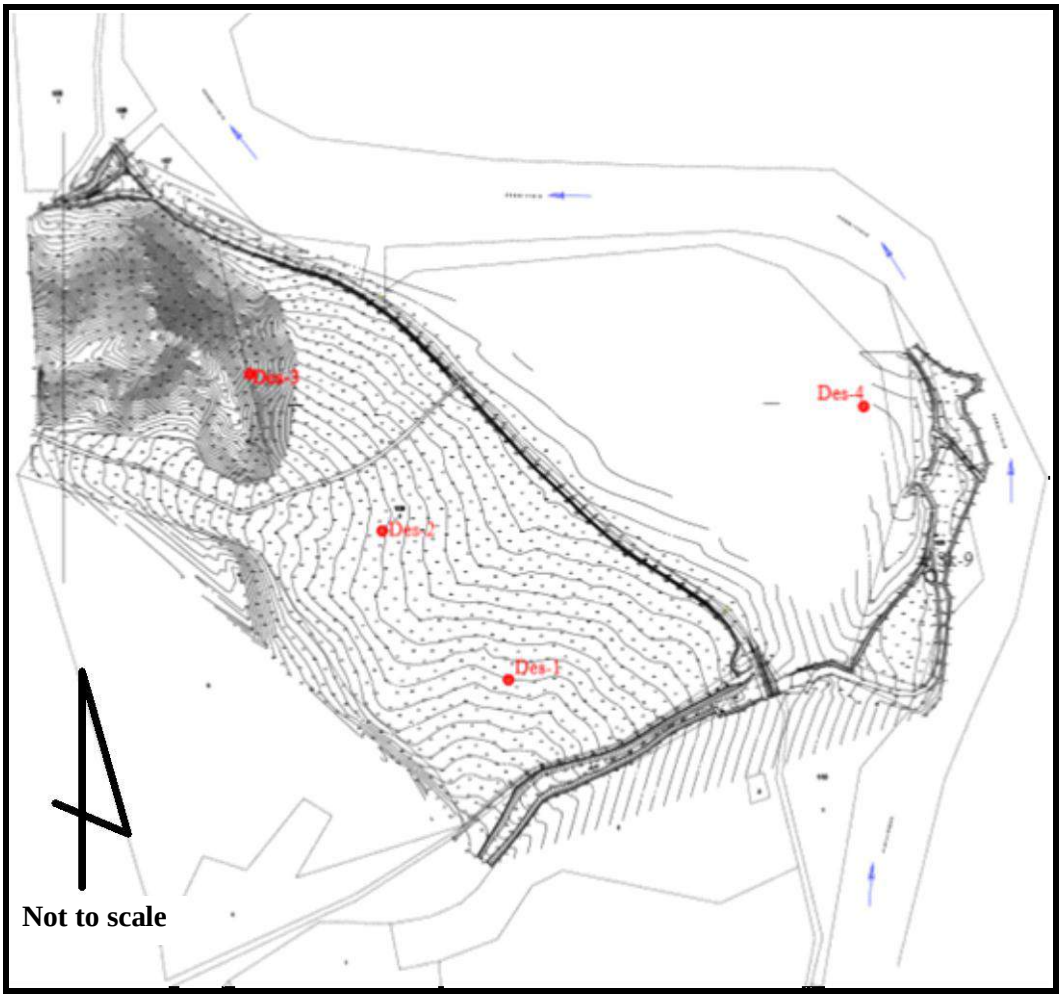


Figure 8. 18: The distribution of resistivity measurement points of the study area

As it is seen in the figure 8.18, 4-point measurements were planned for whole field. Three of the measurements (Des-1, Des-2, Des-3) were planned on the field where structures designed. Des-1 and Des-2 of these were chosen on the places where elevation difference is not much and where relatively represents whole of the field. As to Des-3 was chosen on the higher elevation, where represents the rock features of the environment. Des-4 was chosen at the bottom, near to the river. It is thought that alluvium is the thickest at this place

.

Coordinating of the measurements:

All measurement points were marked to the gps simultaneously during the measurements.

The coordinates of the measurement are given below Table 8.18.

Point No	Coordinates		Point No	Coordinates	
Des-1	535000	4416893	Des-3	534709	4417232
Des-2	534858	4417058	Des-4	535399	4417196

Table 8. 18: Coordinates of the measuring points (Des)

The geometry used during the measurement:

Schlumberger array technique was used and AB/2 length is maximum 100,00 m as the measurement geometry. According to maximum AB/2 length the investigation depth was 65,00-70,00 (Figure 8.19).

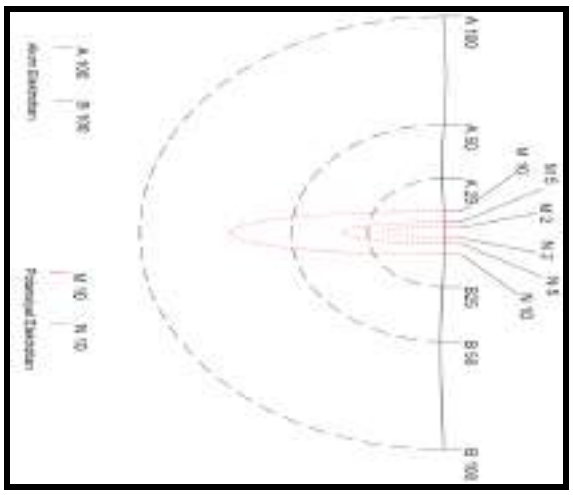


Figure 8. 19: The application scheme of the method

8.3.3. The evaluation of collected data;

The collected measures were recorded as Abem format (s4K and AMP format). The collected records were transformed to -txt format and it becomes useful as -sheet. (Table 8.19)

Filename:	C:\Users\Ugur\Desktop\EYMENK~1\r00005.s4k								
Instrument	ID:	SAS1000	2071936						
Date	&	Time:	25/06/2013	15:06:15					
Electrode	layout:	10	Schlumberger	XXX					
Protocol	#1:	SCHLMBGR.XYZ							
Protocol	#2:	-							
Client:									
Comment	#1:								
No.	Time	A(x)	B(x)	M(x)	N(x)	I(mA)	Voltage(V)	App.R.(ohmm)	Error(%)
1	1535	-2	2	-1	1	100	0.027	1.272326	0.103856
2	1547	-3	3	-1	1	100	0.026992	3.39195	0.189241
3	1560	-4	4	-1	1	100	0.027034	6.369651	0.345861

Table 8. 19: The view of Des measure field data

The calculated values prepared by us, the apparent resistivity tables and the logarithmic curves of each measure points were prepared by helping of the code program which calculates apparent resistivity (Figure 8.20).

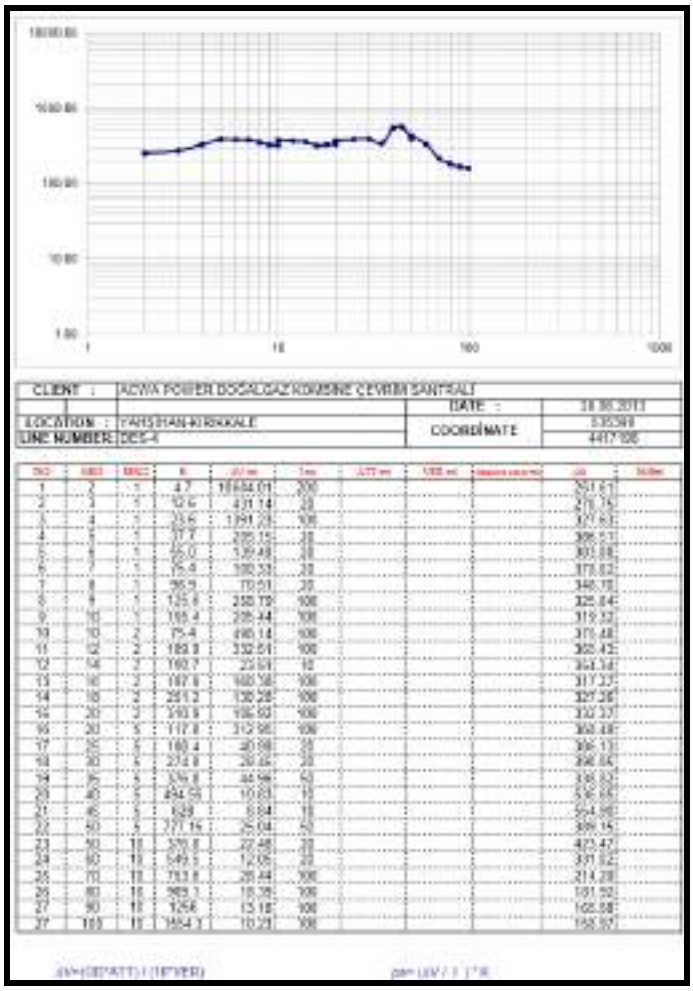


Figure 8. 20: Drawing the logarithmic of the measured values in the field and the calculated apparent resistivity

After then, the obtained apparent resistivity values were evaluated as real resistivity values in Ip2Win inversion program and then new calculated real resistivity Values-depth data were stored as –txt format.

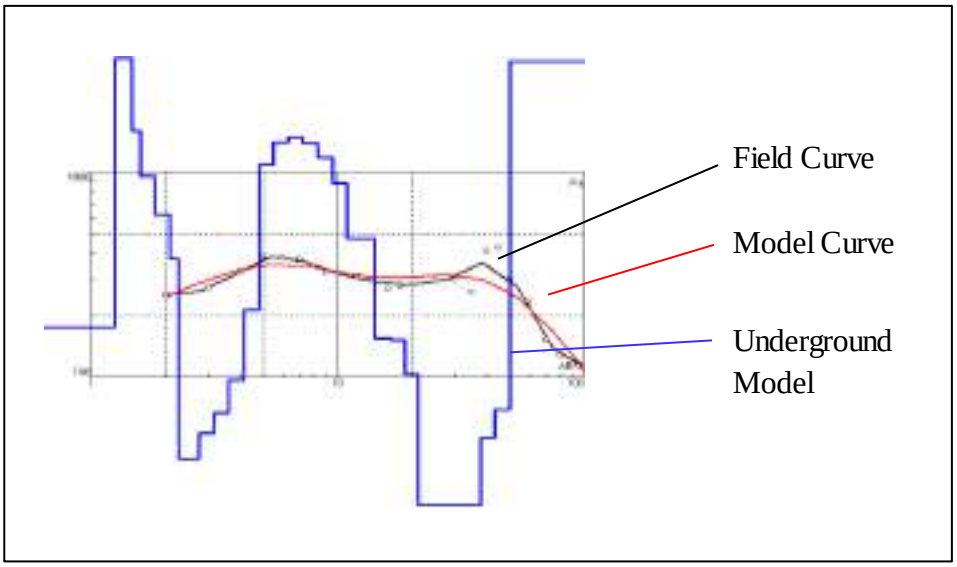


Figure 8. 21: The curve, which is dissolved and applied inversion on it and the groundwater model (Des-4)

	1													
das	4													
28	9.53	nLayers	Err_Rok	Err_Elak										
176	4510	1567	960	619	378	40.3	53.2	67.3	96.1	212	1086	1394	1479	
1.25	0.215	0.116	0.234	0.269	0.168	0.496	0.407	0.467	0.537	0.616	0.708	0.812	0.933	
1384	1171	886	475	155	152	104	7.22	6.95	11.6	19.4	50.6	69.5	3449	0001x Ro
1.07	1.23	1.41	3.14	2.48	2.14	2.53	3.84	3.71	4.26	4.89	5.62	6.45	0.00fix	h

Table 8. 20: Groundwater data, which is, applied inversion on it (Des-4)

The solutions were drawn and colored on Surfer drawing program. Natural neighbor method was used as the solution algorithm.

After the solutions, the obtained and solved depth-real resistivity value (ohmm) sections are given in the relevant part of the report.

8.3.4. Preparation of the sections;

Depth-resistivity variability values of the data which processed and evaluated real resistivity values converted in –sheet and the topography corrections were made for each point, the underground models were made two-dimensional by placed in the appropriate geometry and horizontal distance-depth changes were drawn. (Figure 8.22)

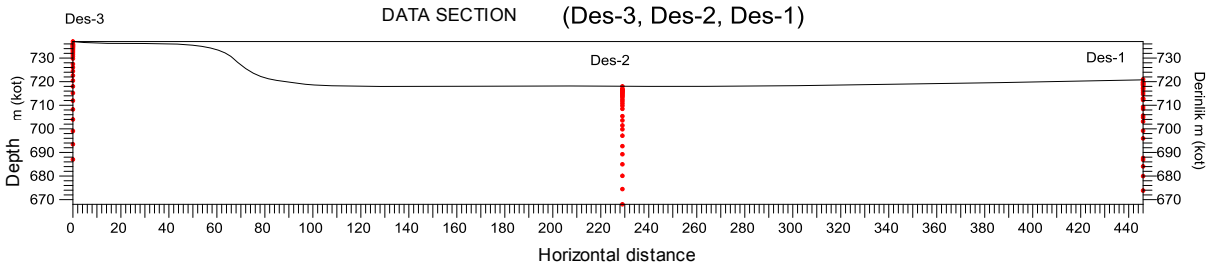


Figure 8. 22: The depth values of underground strata that calculated after vertical column process. The red colored circles shows the vertical data points.

Surfer drawing program was used during the drawings. The suitable color scale was determined and the section was colored according to this (Figure 8.23).

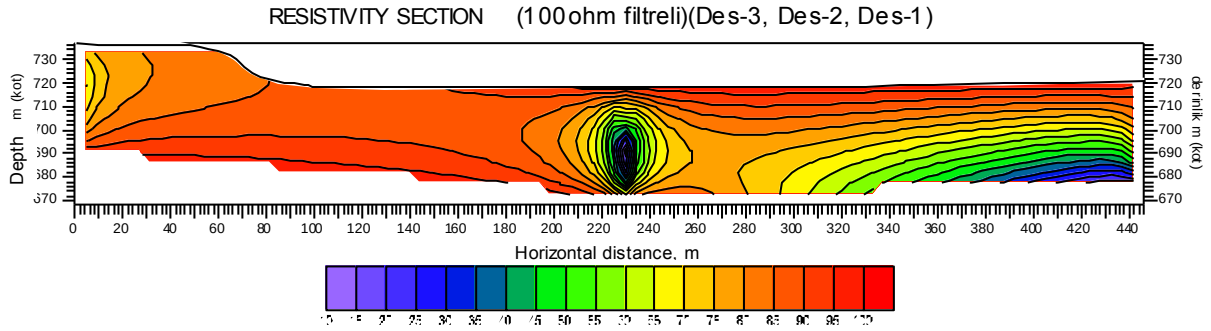


Figure 8. 23: It shows that determined the depths of underground environments after the vertical solution. The color scale shows color separations according to changes in resistivity.

For the resistivty sections after from all the processes;

On the top of the soil block-gravel-sand-silt and alluvium material that composed by clay, which change in between 4,00 m and 15,00 m are called as the old possible alluvial was determined. Below that, dense-rare fractured sandstone-siltstone-claystone was determined. And under these geological strata rare fractured sandstone-siltstone-claystone were determined. A unit that determinated in Des-3 point, located upper parts and behaves different than sandstone-siltstone-claystone which determinated comparatively lower part rather than the others was established (Table 8.21). This difference can be thought as lack of cover on it and being exposed to external factor directly.

Lithological Unite	Resistivity (ohm)
Aluvium	139 – 471
Sandstone-siltstone-claystone. Dense-rare cracked	38 – 206
Sandstone-Siltstone-Claystone. Rare cracked	123 - 242
Sandstone-Siltstone-Claystone. Rare cracked	2405

Table 8. 21: Resistivity values based on lithologies

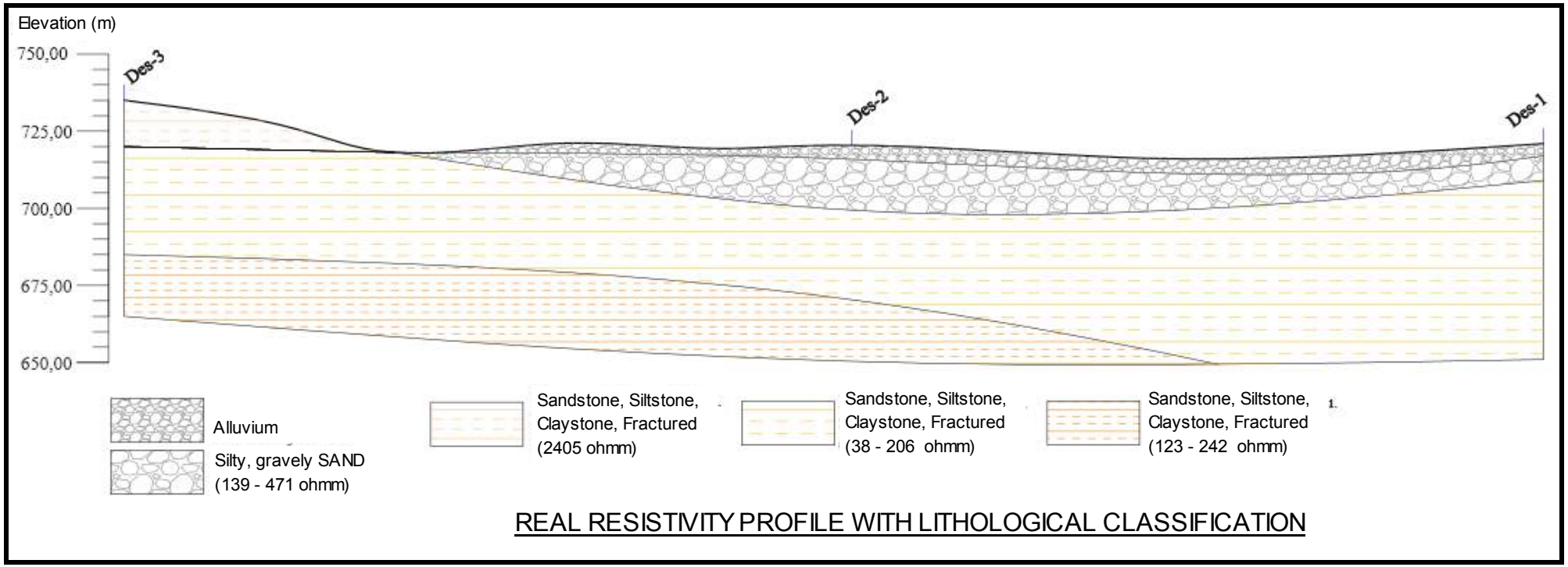


Figure 8. 24: Resistivity section allocated to lithologies

9. GEOTHECNICAL PROPERTIES OF ROCKS AND SOILS

9.1. Classification of Rocks and Soils

Considering the all findings provided by visual inspections, drilling works, test pit and geophysical works, it could be said that; the blanket layer in the working area composes of alluvial fan deposits (Qay), alluvial deposits (Qal) and debris flows (Qym) which are the youngest deposits in the area. The bedrock is mostly sandstone, siltstone and claystone alternation of Samanlik Formation (Ks) which outcrops on the hilly side of the area at the NW. Gravelstone and sandstone levels of Ilıcapınar Formation (Kı) is another rock type locates at the farest NW side of working area.

Soils; Alluvial fan sediments (Qay) are most common soil deposits in the investigation area. These deposits are locates on the map section 109/ 2 parcel. The thickness of these deposits, which covers the bedrock, varies between 8,00-20,00 m. The average thickness is 15 m. These soils are generally uncemented, medium dense and dense silty sands (SM), clayey sands (SC) and from medium to low plastic clays (CI and CL) which exist rarely. The consistencies of these clays are stiff to very stiff and hard. All these features could be seen in the borehole and test pit logs given in Section 6 and 7.

Alluvial deposits (Qal) of flood plain which cover all the area of the map section 108 parcel 1 where locates at the west side of Kızılırmak River is the other soil type in the area. The average thickness of these deposits is about 14 m. These deposits mainly consist of medium to dense, uncemented gravely silty sands (SM). They also contain very stiff and low practice clays in group CL

In addition to the soil types mentioned above, some debris flow deposits exist at slope foots of the hilly part locates at the North part of study area. These sediment made of gravely and blocky sands with a shallow thickness.

Rocks; Bedrock in the investigation area is represented by the alteration of sandstone-siltstone levels of Samanlık Formation (Ks) which also outcrops at the hilly part of the area at the NW. The RMR classification of rocks of Samanlık Formation (Ks) done by using the obtained data from borehole samples and laboratory works. RMR classification of the rocks was done according to the criteria's given Bieniawski 1989 (Table 9.1).

A. CLASSIFICATION PARAMETERS AND THEIR RATINGS									
Parameter			Range of values						
1	Strength of intact rock material	Point-load strength index	>10 MPa	4 - 10 MPa	2 - 4 MPa	1 - 2 MPa	For this low range - uniaxial compressive test is preferred		
		Uniaxial comp. strength	>250 MPa	100 - 250 MPa	50 - 100 MPa	25 - 50 MPa	5 - 25 MPa	1 - 5 MPa	< 1 MPa
	Rating		15	12	7	4	2	1	0
2	Drill core Quality RQD		90% - 100%	75% - 90%	50% - 75%	25% - 50%	< 25%		
	Rating		20	17	13	8	3		
3	Spacing of discontinuities		> 2 m	0.6 - 2 m	200 - 600 mm	60 - 200 mm	< 60 mm		
	Rating		20	15	10	8	5		
4	Condition of discontinuities (See E)		Very rough surfaces Not continuous No separation Unweathered wall rock	Slightly rough surfaces Separation < 1 mm Slightly weathered walls	Slightly rough surfaces Separation < 1 mm Highly weathered walls	Slickensided surfaces or Gouge < 5 mm thick or Separation 1-5 mm Continuous	Soft gouge >5 mm thick or Separation > 5 mm Continuous		
	Rating		30	25	20	10	0		
5	Ground water	Inflow per 10 m tunnel length (l/m)	None	< 10	10 - 25	25 - 125	> 125		
		(Joint water press)/ (Major principal σ)	0	< 0.1	0.1 - 0.2	0.2 - 0.5	> 0.5		
		General conditions	Completely dry	Damp	Wet	Dripping	Flowing		
	Rating		15	10	7	4	0		

B. RATING ADJUSTMENT FOR DISCONTINUITY ORIENTATIONS (See F)						
Strike and dip orientations		Very favourable	Favourable	Fair	Unfavourable	Very Unfavourable
Ratings	Tunnels & mines	0	-2	-5	-10	-12
	Foundations	0	-2	-7	-15	-25
	Slopes	0	-5	-25	-50	

C. ROCK MASS CLASSES DETERMINED FROM TOTAL RATINGS					
Rating	100 ← 81	80 ← 61	60 ← 41	40 ← 21	< 21
Class number	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock

D. MEANING OF ROCK CLASSES					
Class number	I	II	III	IV	V
Average stand-up time	20 yrs for 15 m span	1 year for 10 m span	1 week for 5 m span	10 hrs for 2.5 m span	30 min for 1 m span
Cohesion of rock mass (kPa)	> 400	300 - 400	200 - 300	100 - 200	< 100
Friction angle of rock mass (deg)	> 45	35 - 45	25 - 35	15 - 25	< 15

E. GUIDELINES FOR CLASSIFICATION OF DISCONTINUITY conditions					
Discontinuity length (persistence) Rating	< 1 m 6	1 - 3 m 4	3 - 10 m 2	10 - 20 m 1	> 20 m 0
Separation (aperture) Rating	None 6	< 0.1 mm 5	0.1 - 1.0 mm 4	1 - 5 mm 1	> 5 mm 0
Roughness Rating	Very rough 6	Rough 5	Slightly rough 3	Smooth 1	Slickensided 0
Infilling (gouge) Rating	None 6	Hard filling < 5 mm 4	Hard filling > 5 mm 2	Soft filling < 5 mm 2	Soft filling > 5 mm 0
Weathering Ratings	Unweathered 6	Slightly weathered 5	Moderately weathered 3	Highly weathered 1	Decomposed 0

F. EFFECT OF DISCONTINUITY STRIKE AND DIP ORIENTATION IN TUNNELLING**			
Strike perpendicular to tunnel axis		Strike parallel to tunnel axis	
Drive with dip - Dip 45 - 90°	Drive with dip - Dip 20 - 45°	Dip 45 - 90°	Dip 20 - 45°
Very favourable	Favourable	Very unfavourable	Fair
Drive against dip - Dip 45-90°	Drive against dip - Dip 20-45°	Dip 0-20 - irrespective of strike*	
Fair	Unfavourable	Fair	

* Some conditions are mutually exclusive . For example, if infilling is present, the roughness of the surface will be overshadowed by the influence of the gouge. In such cases use A.4 directly.
** Modified after Wickham et al (1972)

Table 9. 1: The Criteria's of RMR classification from, Bieniawski 1989

The results of RMR classification are summarized in Table 9.2 and the data used at the RMR classification study are given in Appendix-7.

Borehole no	Depth (m)	Lithology	RMR Points	Rock class
SK-1	8,00 – 20,00	The alternation of sandstone-siltstone	27	Poor
SK-2	20,00-20,50	The alternation of sandstone-siltstone	18	Very poor
SK-3	17,50-50,00	The alternation of sandstone-siltstone	34	Poor
SK-4	15,50-50,00	The alternation of sandstone-siltstone	27	Poor
SK-5	15,00-50,50	The alternation of sandstone-siltstone	19	Very poor
SK-6	15,00-20,00	The alternation of sandstone-siltstone	17	Very poor
SK-7	16,00-50,00	The alternation of sandstone-siltstone	37	Poor
SK-8	13,00-20,00	The alternation of sandstone-siltstone	42	Fair
SK-9	14,50-21,00	The alternation of sandstone-siltstone	37	Poor
SK-10	12,80-20,50	The alternation of sandstone-siltstone	45	Fair

Table 9. 2: The RMR Classification of Rocks in the Samanlık Formation (Ks)

The rock levels of Samanlık Formation (Ks) are generally in very poor to poor rock classes while some parts show fair rock quality. Fair and poor rocks are mostly found at the S or SE part of the area while the very poor rocks spread towards northern part of the area and they represent the upper 5-10 meters thick part of the Samanlık Formation under the alluvial blanket layer.

The other rock units in the area are gravelstone and claystone levels of Ilıca Formation (Ki). These rock outcrops are found in a restricted part of the NW side of the area. According to the visually inspection these outcrops are complately or highly weathered

9.2. Soil Profiles and Engineering Zones

Total 320 meters deep, 10 boreholes were drilled in the study area. The depths of these boreholes vary between 20,00 and 50,00 meters.

D - D' Profile line is the ideal one to represent the underground geological structure and the soil levels in the area. The geological cross section along the D – D' profile which covers SK-1, SK-3, SK-4, SK-5 boreholes and AÇ-2 test pit given in Figure 9.1.

As it is seen on the cross section, there is a blanket layer formed uncemented gravely sands which is mainly in SM and SC group, belongs to alluvial fan(Qay) deposits. This blanket layer is underlined by bedrock, which is Samanlık Formation (Ks). The thickness of blanket layer is between 15.00 to 17.00 along the cross section line but the thickness being decreased towards hilly area at the N. The thickness of the mentioned blanket deposits was measured as 8,00m in the borehole SK-1.

As it is mentioned in the above paragraph, sandstone, siltstone and claystone layers of Samanlık Formation underlays the blanket layer alluvial deposits as bedrock. Upper parts of the bedrock at the depth of 15.00 to 25.00 maters are intensively fractured and it shows weak-strength character. RQD values of base rock vary between 0 % - 54 %. These values are agreeable to the weak-strength of the rock. RQD values are getting higher up to 90 % after the depth of 25,00 meters. Consequently, it could be said that the layers of Samanlık formation change from very weak to weak or medium class rocks as getting deeper.

Groundwater level was not encountered at the borehole SK-1 on the profile (Figure 9.1) but in the boreholes SK-3, SK-4 and SK-5, the ground water levels were measured at the depth of 14.30, 13.50 and 9.80 m respectively. These measurements show that hydraulic gradient is towards Kızılırmak River at the NE and E and groundwater feeds the Kızılırmak River (Figure 9.1).

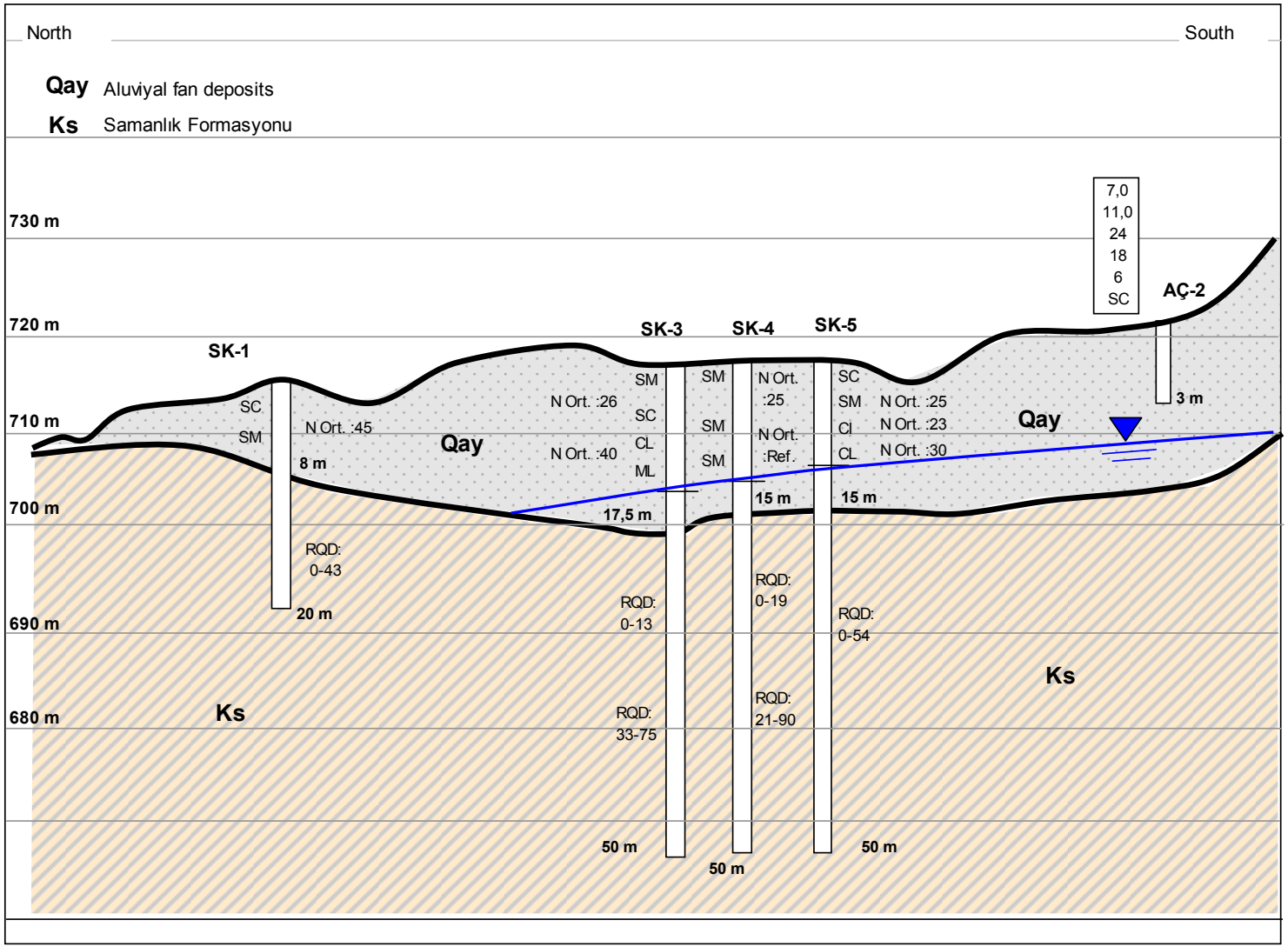


Figure 9. 1: Typical Geological Cross Section of Investigation Area (D-D' profile).

On the other hand, the soil groups, local soil classes and "Spectrum characteristic periods are detailed in Table 8.4, Table 8.6, Table 8.8 and Table 8.10 in the Chapter 8 (Seismic Works)

9.3 Evaluation of Swelling, Bearing Capacity, Liquefaction Analyses

9.3.1 Compactibility and Swelling Properties

According to data obtained so far, the spreading of the cohesive soils, which could have sweeling potential, is not so common in the study area. Especially, after the evaluation of the test results obtained from the undisturbed and disturbed samples taken from the boreholes, it is seen that the cohesive material in the area are mostly low plastic clays (CL) and few are medium plastic clays (CI). On the other hand these levels are mostly encountered deeper than 10,00 meters and they are rarely at the depth of 3,00 -5,00 meters. Consequently, the soil types in the area would not show any risk in respect of swelling and compression. CL and CI group cohesive soils are shown on the Van Der Merwe's Swelling Chart (Figure 9.2).

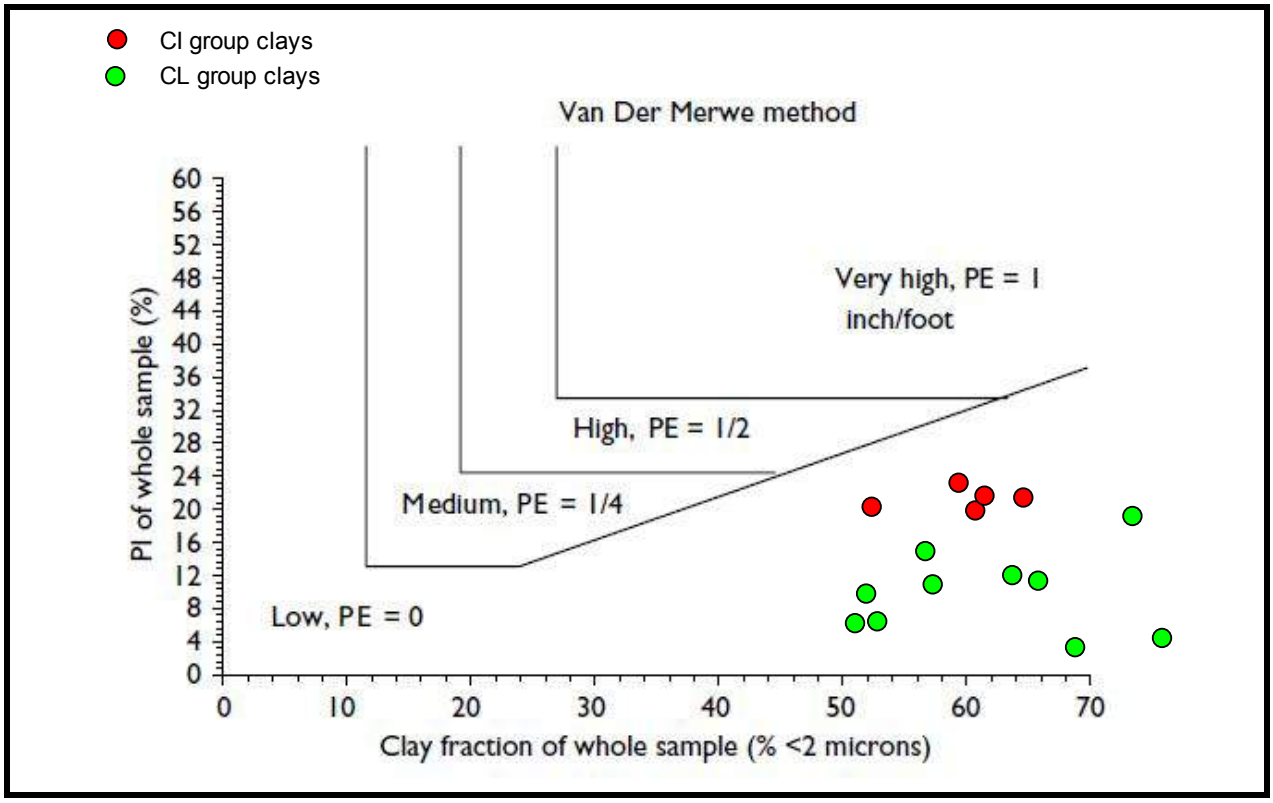


Figure 9. 2: Evaluation of the cohesive samples on Van Der Merwe Chart

As seen on Figure 9.2, all cohesive samples concentrate in the area, which has low swelling potential, depending on their low PI values.

In other respects, wet CBR tests were carried out on the bulk samples taken from the test pits. The compacted samples in the mold were kept in the water for 4 days period and after that, swelled rate of each sample were measured. All the measured data is summarized in Table 9.3 together with test pit numbers, sample numbers and soil groups. Swelling rates of all samples are less than 3 %. Considering the swelling data of the samples, the foundation bottoms of any structure would not show any swelling problem if they are compacted with proper energy and with proper moisture content.

Test Pit No	Sample No	Soil Group	Swelling Rate (%)
AÇ-1	T-1	SC	0,00
AÇ-1	T-2	Cl	1,52
AÇ-2	T-1	SC	0,00
AÇ-3	T-1	SC	0,10
AÇ-3	T-2	CL	0,40
AÇ-4	T-1	SC	0,00
AÇ-4	T-2	CL	0,59
AÇ-5	T-1	SC	0,05
AÇ-6	T-1	SC	0,00
AÇ-7	T-1	SC	0,11
AÇ-8	T-1	SC	0,12
AÇ-9	T-1	SC	0,09
AÇ-10	T-1	SC	0,00

Table 9. 3 : Swelling rates (%) of the samples from Test Pits

The compactibility of the cohesive samples was interpreted considering the criteria are given by Sower 1979.

Description	Compactibilty index (Cc)
Low compactibility	0.00-0.19
Medium compactibility	0.20-0.39
High compactibility	>0.40

Table 9. 4: Compactibility of soils (Sower 1979).

Compactibility Index (Cc) of the samples was calculated by using below equation:

$Cc = 0{,}009 \times (LL_{avrg} - 0.10)$

When the average values of Cl group soils are used, the compactibility Index is found as:

$Cc = 0.009 \times (37{,}26 - 0.10) \Rightarrow Cc = 0.33$

Calculated compactibility Index (Cc) for the CL group clays is also given below:

$Cc = 0.009 \times (25{,}30 - 0.10) \Rightarrow Cc = 0.23$

Calculated compactibility Index values were classified based on the criteria given in Table 9.4. The cohesive soils in the study area show medium compactibility character (Shower 1979, Table 9.4).

9.3.2. Settlement Properties

The Cl group clays belong to Alluvia fan deposits (Qay) look most susceptible material in respect of settlement in the study area. Approximately, 12,00 meters thick similar Cl layer were cut at the depths between 4,00 – 16,00 meters in SK-7 No borehole. Based on the data obtained from this borehole, a settlement calculation was carried out for 2,00 x 2,00 size model foundation foot. The formula given by Bowles 1996 was used in the calculations.

$\Delta s = Mv \times \Delta p \times F$

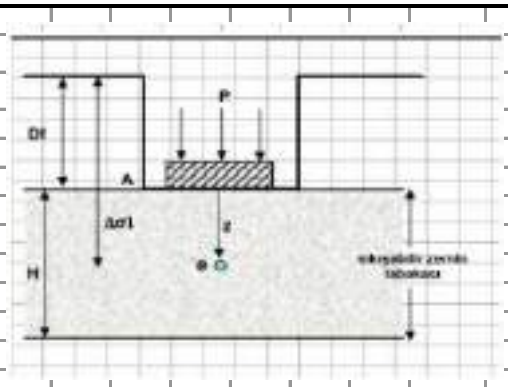
ΔS : Amount of settlement
Mv : Coefficient of volume compressibility
Δp : Pressure increments in the compressible layer.
F : Thickness of the compressible layer. (Under the foundation foot).

It was assumed that 2,00 kg/cm^2 load is applied to the foundation soil through the foot. Than amount of the settlement Δs, was calculated as;

$\Delta s = 0{,}68$ cm

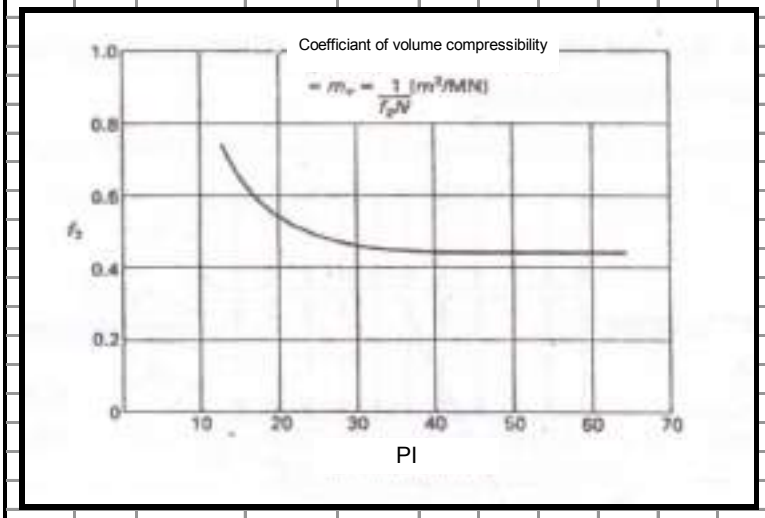
This settlement value is acceptable rate and it will not give any harm to the foundations. Detail Settlement calculations given in Figure 9.3.

SETTLEMENT CALCULATION



	H	12,00	m	The thckness of compressible layer						Over burden pressure at the point A					
	Df	1,00	m	Depth of the foundation hole								PA = Df x gn			
	Dw		m	Ground water level								PA=	20,7	kN/m2	
	gw	10,00	kN/m3	Unite weight of the water											
	gn	20,70	kN/m3	Natural unte weight of the soil											
	B	2,00	m	Foundation width											
	L	2,00	m	Foundation length						Total strees at the A point					
												P1 = (P - PA)			
	A	4,00	m2	Area of the foundation bottom								P1 =	179,30	kN/m2	
	Tb	4,00	m	upper level of the compressible layer											
	Ts	16,00	m	Bottom level of the compressible layer											
	z	9,00	m	sıkışabilir tabakanın orta noktası-temel mesafesi											
	P	2,00	kg/cm2	Structure Load											
*	Mv1	0,009615	cm2/kg	coefficiant of volume compressibility						Effective pressure increments in the layer H (Δ P1)					
	effective stress at e point									Δ P1 = (P1 x B x L)/((B + z) x (L + z))					
	Δσ1 = ((z + Df) x gn)									Δ P1 =	5,93	kN/m2=	0,05927	kg/cm2	
	Δσ1 =	207,00	kN/m2 =	2,07	kg/cm2										
	Total stress at e point									Settlement amount against the effective pressure increments (Δ P1)					
	Δσ = Δσ1 + P1									Δ s = H x Δ P1 x Mv1					
	Δσ =	386,30	kN/m2 =	3,863	kg/cm2					Δ s =	0,6839	cm			

* Coefficiant of volume compressibility (Mv1) was found on the below graph by using SPT belows and PI value



PI =	23		
N_{60} =	20	assumed	
f2 =	0,52		
Mv1 =	1/(f2 x N_{60})		m2/MN
Mv1 =	0,0961538	m2/MN	
Mv1 =	0,009615	cm2/kg	

Figure 9. 3: Settlement Calculations

9.3.3. Bearing Capacity Analysis

Terzaghi's ultimate bearing capacity formula was used, to understand the bearing capacity of the soils in the investigation area. Calculations were carried out on the model foundation by using the soil parameters obtained from each borehole.

$$qd = C \times N_c \times S_c + C_w \times (\gamma \times D_f \times N_q) + C'_w \times (0.5 \times \gamma \times B \times N_\gamma \times S_\gamma)$$

In the above equations;

- *C*: cohesion value
- *Cw and C'w*: Correction factors depending on the position of the ground water level
- γ: Natural unite weight of the soil
- *Sc, Sγ;* Coefficients depending on the foundation shape
- *Nc, Nq, Nγ*: Coefficients based on the internal friction angle of the soil.
- *Df*: Over burden thickness

It is assumed that model foundation depth is 1,00 meter *(Df)* , dimension of the foundation is 2,00 x 2,00 meters and the shape is square. Approaches to the ultimate bearing capacity of soils in the project area were done by using the obtained soil parameters in the above equation. The out comes of the calculations are given in Table 9.5 and the calculation sheets are attached to this report as Appendix-8.

The ultimate bearing capacity values given in Table 9.5 are only preliminary information and they should not be used for the real project applications. Additional geotechnical survey should be carried out for the definite bearing capacity figures after the project criteria are defined.

Borehole No	Foundation size (B x L)	Depth of Foundation (Df)	Ultimate Bearing Capacity (qd)
SK-1	2,00 x 2,00 meter	1,00 meter	5,0 kg/cm^2
SK-2	2,00 x 2,00 meter	1,00 meter	3,0 kg/cm^2
SK-3	2,00 x 2,00 meter	1,00 meter	5,0 kg/cm^2
SK-4	2,00 x 2,00 meter	1,00 meter	4,0 kg/cm^2
SK-5	2,00 x 2,00 meter	1,00 meter	3,0 kg/cm^2
SK-6	2,00 x 2,00 meter	1,00 meter	6,0 kg/cm^2
SK-7	2,00 x 2,00 meter	1,00 meter	6,0 kg/cm^2
SK-8	2,00 x 2,00 meter	1,00 meter	5,0 kg/cm^2

Table 9. 5: Ultimate bearing capacity figures for model foundation

10. HYDROGEOLOGICAL PROPERTIES

10.1. Groundwater

Apart from the one borehole, the groundwater is found at the different levels in 9 boreholes. The measured groundwater levels are listed below;

- SK-1: no groundwater
- SK-2: 14,00 m
- SK-3: 14,30 m
- SK-4: 13,50 m
- SK-5: 9,80 m
- SK-6: 12,00 m
- SK-7: 12,00 m
- SK-8: 12,50 m
- SK-9: 2,20 m
- SK-10: 2,10 m

While groundwater depths given above are examined together with the borehole locations, one could say that groundwater level shows shallow depth as the ground elevation decreases, (especially in the area close to Kızılırmak River bed).

10.2. Surface Water

The most important surface water around the investigation area is The Kızılırmak River, which flows at east side of field. There is no any other surface water or river in the working area. There is wadi along the south border of investigated area, which runs towards Kızılırmak River Bed.

10.3. Cooling and Potable Water

Potable water and especially cooling water could be supplied from the caisson wells, which could collect the water from the surface and ground water by infiltration or by underground drainage. Groundwater levels in the borehole SK-9 and SK-10 drilled inland section108 are measured as 2,00 m. The necessary cooling water for Natural Gas Combined Cycle Power Plant could be provided from caisson wells, which would be located in the map section 108. For this purpose, non - pressured water tests (permeability tests) were carried out in SK-9 and SK-10 boreholes, to determine the permeability coefficient and the "k" values of Alluvial (Qal) sediments. The results of permeability tests are given in Table 6.3 in Section 6.2. Detailed calculations are also given in Appendix-4

The number and the capacity of the caisson wells could be estimated by using the data available and Darcy's law.

$Q = k \times i \times A$

"Q" is flow rate, "k" is permeability coefficient, and "I" is hydraulic gradient in the equation above.
A caisson well with 5-meter diameter and 10 meter deep is schematically shown in the drawings given in Figure 10.1. In addition, the geological data obtained from SK-9 borehole is shown on the same drawing (Figure 10.1).

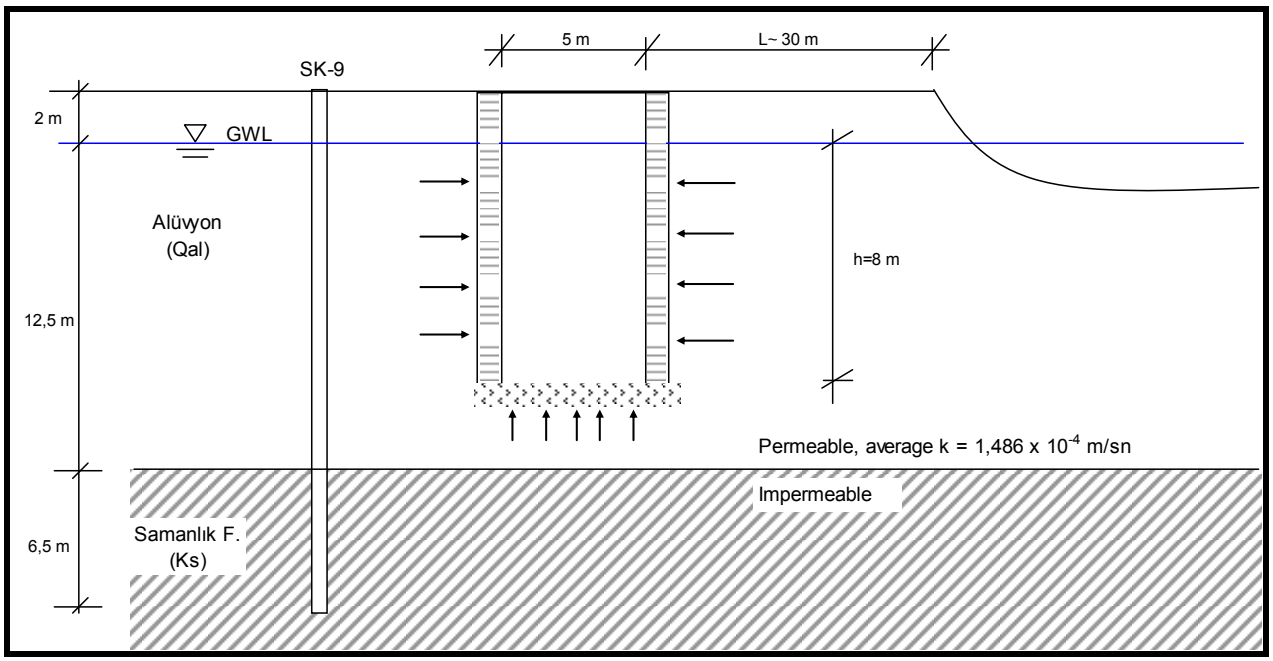


Figure 10. 1: Approximate dimensions and position of a well, which could be excavated near to borehole SK-9.

Darcy equation could be written as it shown blow.

- $i = h/L$
- $A = \pi r^2 + 2 \pi r h$

$\underline{Q = \pi r^2 + 2 \pi r h \times (L/h) \times k}$

$Q = 3,14 \times 6,25 + 2 \times 3,14 \times 2,5 \times 8 \times (8/30) \times 1,486 \times 10^{-4}$

$Q = 0,0976\ m^3/sn = 97,6\ lt/sn$

The flow rate capacity of the model-caisson well shown in the drawings (Figure 10.1) was calculated as i97,6 lt/sn. Four or five caisson wells, located with safe distance between each other will prevent the wells from influenced drawdown curves by others. In this case, total well efficiency could be 400 lt/sn. This much water will be sufficient for the power plant.

The water supply network is not available around the project area to provide potable water. The water from the cession wells should be analyzed to understand the quality if it could be drinkable or not.

11. THE EVALUATION OF NATURAL DISASTER HAZARDS

11.1. EARTHQUAKE POSSIBILITY

City of Kırıkkale generally takes place in first-degree seismic zone on "The Earthquake Map of Turkey" prepared by "Cancelled Ministry of Public Works and Settlement" and put in action by the number of 18.04.1996-96/8109 date value of council of ministers. Since the project area locates at the west side of Kırıkkale city, the study area locates at the second-degree seismic zone (Figure 11.1)

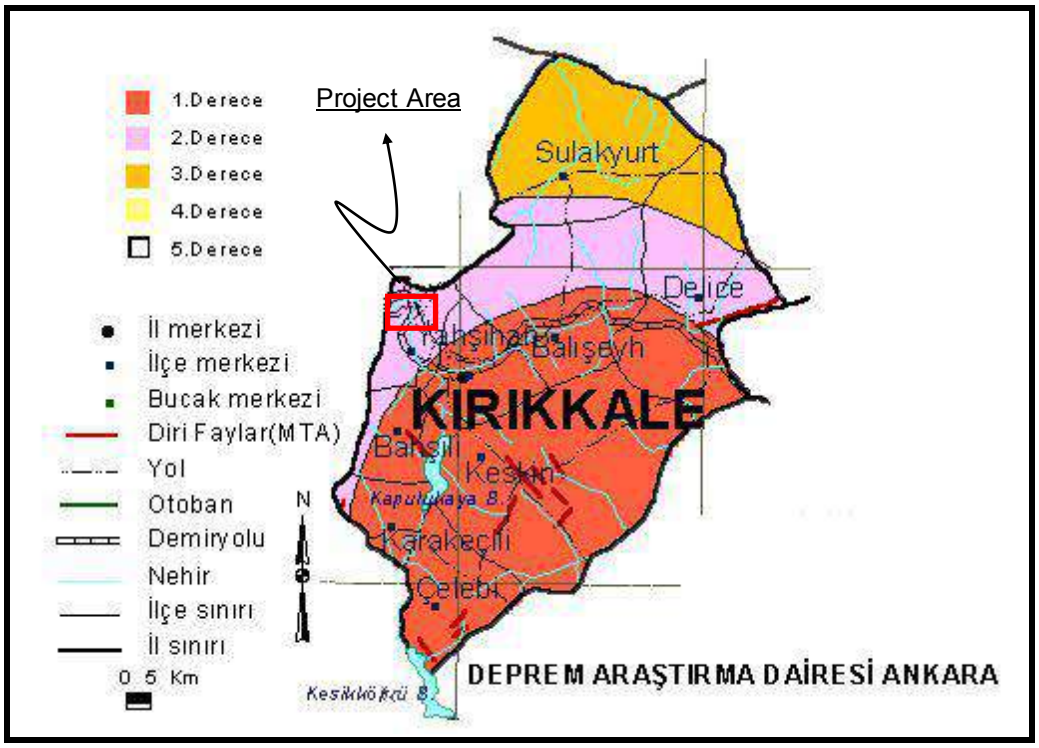


Figure 11. 1: Earthquake Map of Kırıkkale

As it is mentioned earlier, Investigation area takes place in second-degree seismic zone, therefore effective ground acceleration (Ao) could be accepted; Ao = 0,30 g. (Figure 11.1).

11.1.1. The Earthquake Risk of the Region

Kırıkkale never been in the center of major earthquakes but the Kırşehir Massive composed of magmatic and plutonic rocks takes place in the large arch of Kızılırmak river divided by

multiple blocks by faults. The basins among these blocks were filled with Neogene aged deposits. Apart from the North Anatolian Fault Zone (KAF), these basins are the other belts, which could cause earthquakes in Central Anatolia. The Kırsehir Earthquake on 1938 was occurred along the one of these belts. Based on the Neotectonical system of Turkey, the south block of North Anatolian Fault Zone (KAF) is forced to move towards west. However Kırıkkale Province locates on the south block of KAF, right hand side Sungurlu Strike Slip fault comes close to the southern part of Kırıkkale Province which release the pressure on the region (Figure 11.2)

The blue arrows on the map given in Figure 11.2 show the possible pressure directions. The middle arrow towards North East represents the pressure relases around Kırıkklae District. This modeling could be the reason why Kırıkkale Province did not have large magnitude earthquakes in the history.

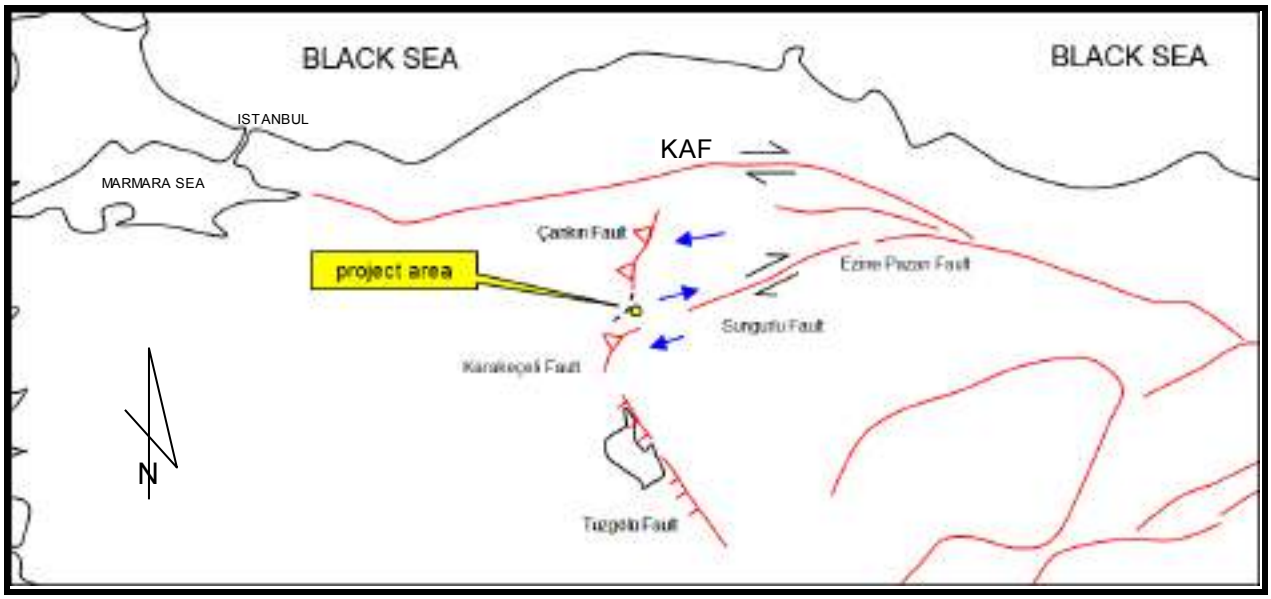


Figure 11. 2: Movement directions of the active faults around Kırıkkale

On the other hand, Earthquake risk assessment of the region was carried out to have better understanding of the earthquake risks in the area. This study is presented in this report (Chapter 11.1.2).

11.1.2. Earthquake Risk Assessment

In this study, Probabilistic earthquake risk assessment was carried out with the program working under Microsoft Excel software. Ferhat Özçep (PhD in Geophysical Engineering; İU Engineering Faculty, Geophysical Section) prepared this particular program.

As the data entrance, necessary documentation were obtained from "Kandilli Observatory and Earthquake Research Institute, National Earthquake Monitoring Centre". During the analysis, the numbers of the occurred earthquakes, (their magnitudes, and distance to study area et cetera) were used in the circular area, which the diameter is 100 km around the project site

This analysis was done for giving preliminary information, Prof. Osman Öncel (İU Engineering Faculty, Geophysical Section) has done the detailed analyze and it has presented in Appendix-12 as a separate report.

Analysis solution;
As the data, the earthquakes occurred at Ankara, Corum, Kırsehir, Cankırı and Yozgat in last 20 years were used for around Kırıkkale Province. Magnitudes of the used earthquakes are higher then 4,5 and their epicenter distance is 15 km and depth of focus is 8 km. Occurrence probability was accepted in 10 years and exceedance probability was accepted 5 %. Based on these assumptions, the results given in Table 11.1 and Table 11.2 were obtained.

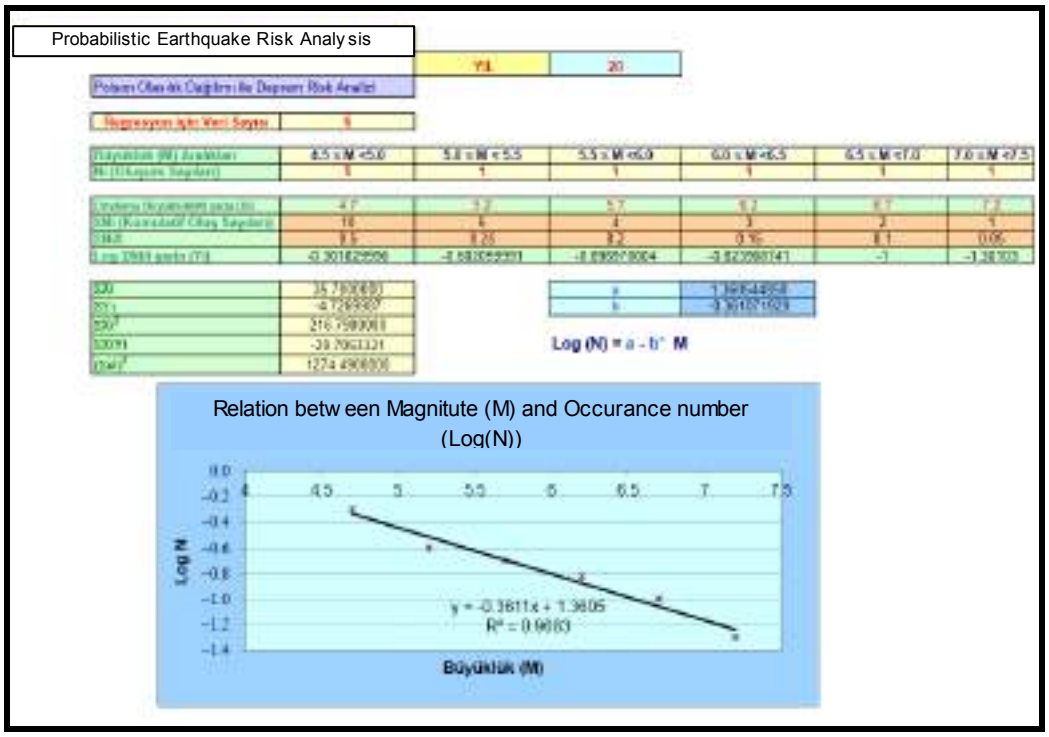


Table 11. 1: Probabilistic earthquake risk analysis



Table 11. 2: Poison Probability Disturbance

As it is seen in the above Tables, reoccurrence of the earthquake, which has 4,5 Magnitude is 2 years in 20 years period and reoccurrence of the 5 magnitude earthquake is 3 years in 20 years period. Reoccurrence of the earthquakes magnitude s larger than 5 is accepted 1 in 20 years period. Based on this information, earthquake occurrence probability is calculated for 10, 20, 50 and 100 years periods.

11.1.3. Active Tectonic

The active fault map of investigated area is given in the Figure 11.3. There are five active faults in the circle area, which the center is project site and the diameter is 150 km... Those faults are Quaternary aged, Çankırı, Karakeçeli, and Keskin Fault Zones and Holocene aged

Bala Fault and Akpınar Fault Zones. These active Faults are shown in Figure 11.3 (according to Active Fault Map of Turkey by MTA, 2012).

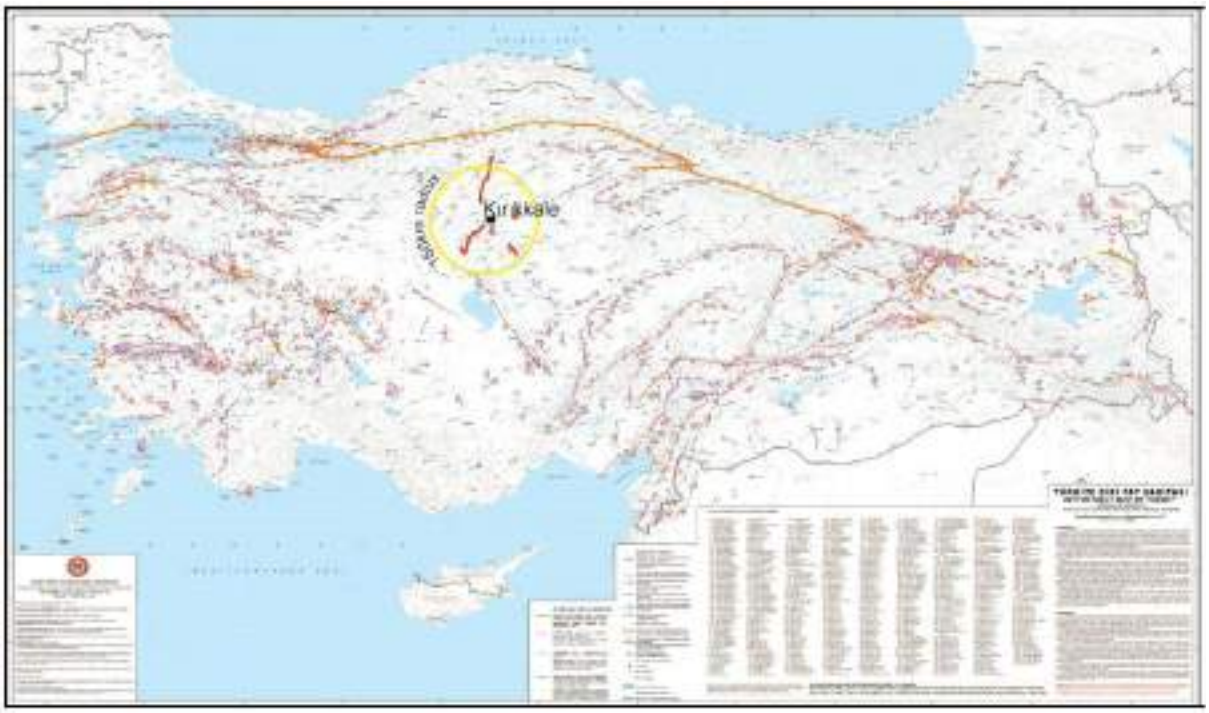


Figure 11. 3: Active Faults in the circular area with 150 km diameter, which the center is project site

Even there is no active fault via working area; the investigation area is under the effect of active faults around. Therefore, the building regulations in the earthquake areas should be followed during the construction of all kind structures.

11.1.4. Paleoseismic Works

The large magnetitu earthquakes have never affected the city Kırıkkale, as it is mentioned earlier. The magnitude of the largest earthquake, which was occurred between the years of 1900 and 2005, was M = 6,6 and its epicenter distance to the center of Kırıkkale Province was 48 km. This earthquake was occurred at East side of Kırıkkale. The earthquakes, occurred in the surrounding area of Kırıkkale, which has 31 400 km2 surface area, are listed in Table 11.3. These earthquakes arise between the years of 1900 and 2005 and their magnitude are larger then 4 (M>4).

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SN	Date	Time	latitude	longitud	Ref	depth (km)	Ms	Ref	Mb	Ref	Md	Ref	Ml	Ref	Mw	Ref	distance
1	6/0/1010	15:47:16.8	40,68	33,80	1	10	5	E	5	R	5	R	4.9	R	5.3	R	00
2	10/3/1928	00:57:07.7	40,47	33,42	1	70	5	E	5	R	5	R	4.9	R	5.3	R	71
3	10/4/1928	11:14:07.9	40,22	33,07	1	10	5.7	E	5.5	R	5.5	R	5.5	R	5.8	R	43
4	4/9/1930	05:07:46.0	39,70	34,00	9	30	5	E	5	R	5	R	4.9	R	5.3	R	42
5	4/10/1938	10:50:20.4	39,44	33,70	1	10	6.6	E	6.1	R	6.2	R	6.2	R	6.4	R	48
6	5/28/1938	00:05:00.4	39,40	33,81	1	30	4.9	E	4.9	R	4.9	R	4.9	R	5.2	R	53
7	7/21/1938	21:30:03.0	39,30	33,08	1	10	5	E	5	R	5	R	4.9	R	5.3	R	32
8	2/19/1973	18:10:01.5	40,28	33,86	4	22	4.7	E	4.7	4	4.7	R	4.7	R	5	R	57
9	7/4/1978	22:20:16.5	39,45	33,10	4	23	4.5	4	4.9	4	4.6	R	4.6	R	5	R	50
10	8/5/1990	18:31:49.6	40,23	33,88	4	17	4.7	R	4.8	4	5	R	4.8	R	4.9	R	53
11	7/30/2005	21:45:00.1	39,42	33,11	R	1	5.1	R	5.1	R	5	R	5.3	R	5.4	R	56

Table 11. 3: Earthquakes occurred around Kırıkkale Province (national Earthquake Monitoring Center)

11.1.5 Liquefaction Analysises and Assessments

In the drilling works, there is no evidence encountered for the existence of poorly graded and saturated loose sands, which could carry liquefaction risks in the area. Nevertheless poorly graded silty sands (SM; SPT:8) were cut at the depth of 3.5 meter in the borehole SK-2 Liquefaction Analysis was carried out on the mentioned sand layer to have a numerical approach to situation. The Analysis was done according to the method explained by Seed et.al, 1985.

The data obtained Borehole SK-2 was used In the model analysis, It is considered that the groundwater seasonally arises up to 1m to ground surface and the layer which could show liquefaction risk is between 3,00 – 7,50 meters depths. The out come of the analysis for this particular condition shows that Safety Factor of Liquefaction (FL) is "F = 1,5" for the earthquake magnitude is 7,5 (M = 7,5). This calculated Safety Factor, F = 1,5 provides the condition of FL> 1,2. Based on this result, one could say that there is no any liquefaction risk on the project site. The detail calculations of analysis and Liquefaction Charts used during the analysis are given in Appendix – 9.

11.1.6. Determination of the Predominant Period and Soil Amplification

In the surveys related with Micro-zoning and development plans, soil amplification and predominant periods of soils are two important parameters that should be considered. While the geometry of the structure is statically safe in normal conditions, its construction elements (steel, reinforced concrete etc.) are physically disturbed by dynamic loads and earthquake accelerations. In a similar manner, the soil amplification value for a particular region is quite important criteria that should be known in respect of determining the rate of the ground movements in the earthquakes (ISSMFE, 1993; Eckel, 1958; Özçep,2005).

The rate of the average wave velocity (Vs_{30}), down to 30 meters depth is the important parameter, which cause the soil amplification. The formulas used to determine the soil amplification value are given in Table 11.4.

Name of the Researcher		**Formulas**
Midorikawa (1987)		$A = 68\ Vs^{-0,6}$
Joyner and Fumal 1984)		$A = 23\ Vs^{-0,45}$
Borcherdt et.al. (1991)	Weak movement	AHSA = 700/ Vs
	Strong movement	AHSA = 600 / Vs
A = Relative growth, AHSA= Average Horizontal Spectral Amplification, Vs= Share wave velocity for 30 meters.		

Table 11. 4: Formulas, which used for determined amplification value

Calculated amplification value for the study area;

For $Vs_{(30)=}$ 363 m/sn

Name of the Researcher		**Amplification values**
Midorikawa (1987)		A = 1,98
Joyner and Fumal 1984)		A = 1,62
Borcherdt et. al. (1991)	Weak movement	AHSA = 1,93
	Strong movement	AHSA = 1,65
A = Relative growth, AHSA= Average Horizontal Spectral Amplification, Vs= Share wave velocity for 30 meters.		

Table 11. 5: Calculated amplification values

Spectral amplification values were calculated based on Midorikawa (1987) by using the average Vs_{30} values determined along the three profiles in the field. The results show that risk rate is in "group A" which means that Soil Amplification Risk is low in the study area (Table 11.6).

Spectral Amplification	Risk Rate
0.0 – 2.5	A (Low)
2.5 – 4.0	B (Medium)
4.0 – 6.5	C (High)

Table 11. 6: Micro-zoning rates based on spectral amplification (Ansal et.al., 2011)

The Geopsy tool was used to Process the microtremor data with the use of H/V Horizontal to Vertical Spectral Ratios (Nakamura 1989). The obtained results and the number of selected windows, which used for the evaluation and window lengths, are summarized in Table 11.7.

Measure No	Record length (minute)	Window numbers	Window Length	Soil Predominant Vibration Frequency f_0 (Hz)	Soil Predominant Vibration Period T_0 (sn)
01	18	15	50	5.53	0.18
02	20	19	50	4.97	0.20
03	15	10	50	5.24	0.19
04	20	18	50	5.84	0.17

Table 11. 7: Soil predominant vibration frequencies and soil predominant vibration periods

11.2. Mass Movements (Slope Stabilities)

In the study area, there are no any restricted lands under the coverage of the law 7269 due to not having previous affection of any hazards. On the other hand, any mass movements in the area (like land slides, rock falls etc.) were not observed during the site study. However, the artificial and natural slopes would be designed during the construction periods in the areas classified as ÖA – 2.2 (Land need precautions for settlement). Necessary precautions should be applied in these particular areas, like proper retaining walls against potential slope stability problems.

12. ASSESSMENT OF THE STUDY AREA WITH RESPECT OF THE HOUSING SETTLEMENT

While the data obtained from drilling works, geophysical works, geotechnical calculations, and our visual inspections are taken into account, the study are could be divided in 3 sections in respect of housing settlement;

a) Lands need precautions for settlement (ÖA-2.2)
b) Suitable lands for settlement (UA-1)
c) Unsuitable lands for settlement (UOA-3)

Distributions of these land sections are shown on the map given in Figure 12.1.

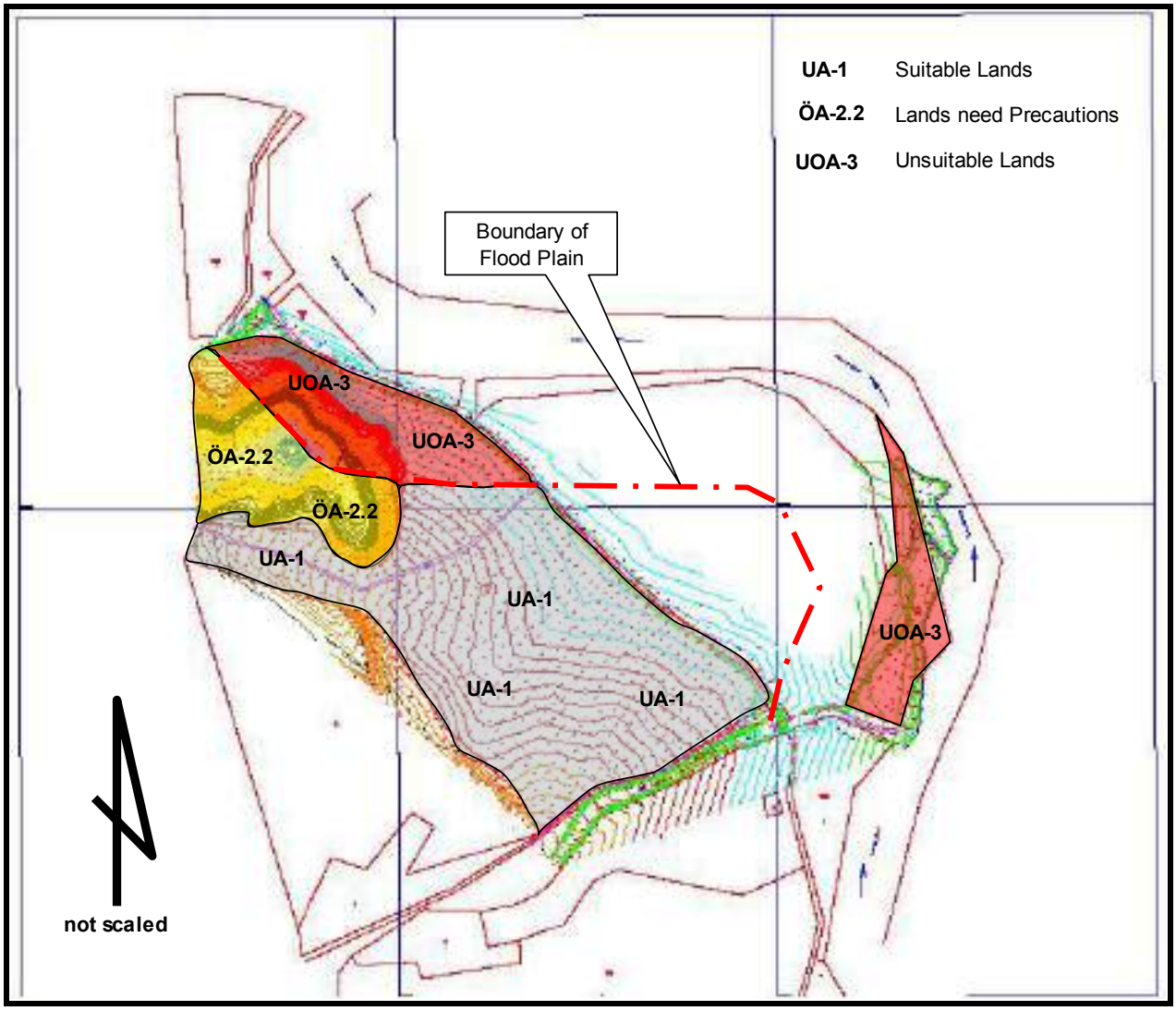


Figure 12. 1: Map of Land sections for Housing Settlements

12.1 Lands need Precautions for Settlement (ÖA – 2.2)

These land sections locate at the north west of the study area where the land elevation comes up to 770 meters. The rocks belong to Samanlık (Ks) and Ilıca (Ki) Formations outcrop in this hilly section of the project site. These rocks are mostly consists of gravelstone, sandstone and claystone alternations. No any problems like bearing capacity are expected in this area. The inclination of the slopes is steeper than 10 % and it reaches to 30 %. In this land, there is no static ground water level. Only the water could be the seepage water leaks from the surface, after the precipitation. Necessary precautions should be taken (like soil retaining structures) against the possible slope stability problems, which could be occurred on the artificial slopes, created with the excavation works in the construction period or on the natural slopes

12.2 Suitable Lands (UA – 1)

Suitable Lands locate mostly at the southern part of the study area. Soil type is composed of SM group silty sands. These sediments are generally very dense, course grained materials from alluvial fan (Qay) deposits, and some times, they contain few gravel and clay. Their thickness is about 15,00 meters and they carries ground water at the depth of 12,00- 13,00 meters. Land inclination is less than 10 %. In this section, no any soil problems like weak bearing capacity, high settlement, swelling etc. are expected. These land sections are suitable for housing settlements.

12.3 Unsuitable Lands (UOA – 3)

The area between the boundaries 200 meters at left side and 200 meters at the right side from the centerline of Kızılırmak River is **under the coverage of flood risk area**, which has been decelerated as the council of ministry's decision, and the memorandum number is 2008/13558. Therefore, these land sections are not suitable for housing settlement.

13. CONCLUSIONS AND RECOMMANDATIONS

1) This study has been done to prepare the geological/geotechnical study report based solely on development plan of Kırıkkale Province, Yahşihan District, Kılıçlar Town, no 108 map section, no 1 parcel and no 109 map section no 1 and 2 parcels where Natural Gas Combined Cycle Power Plant is planned to built on. The owner of the Power Plant Project is ACWA POWER ELECTICITY GENERATION CORPORATION Ltd Co.

These parcels are located in the following map sections Kılıçlar/Yahşihan no130-b-14-a-1-ci, 130-b-14-a-1-d, 130-b-14-a-3-a, 130-b-14-a-4-a, 130-b-14-a-4b and the overall size of the parcels is approximately 30 hectares.

2) It is planned that constructions complex of Power Plant will only be taken place in the parcels of map section 109. There is no any plant complex unite to be constructed in the map section 108. Only the cession wells will be located in 108 map section to provide the necessary utility and cooling water for the Natural Gas Combined Cycle Power Plant. It does not look that any problem would be occurred doe to excavation of the cession water wells in the map section 108, parcel 1.

3) The investigation area generally has shown gentle topography. The determined slope is inclination is less than 10 % at the southern part of the area. On the hilly section, which the altitude is, 780 meter, at the North, determined slope inclination varies between 10 % and 30 %.

4) 10 Investigation boreholes, which the depths vary between 20 and 50 meters, were drilled, to investigate the thickness of the soil and rock layers, their lithological, structural and physical properties and to determine the depth of ground water level. The total depth of boreholes is 320 meters.

5) There is a blanket layer consist of gravely sands in SM and SC group at the south and south west part of the study area, This blanket layers belongs to alluvial (Qal) and alluvial fan (Qay) deposits and it overlays the bedrock which belongs to Sarımsaklı Formation (Ks). The thickness of blanket layer is between 15.00 to 17.00 meters but its thickness being decreased towards the hilly area at the North and it is disappeared on hilly part of study area. At the south, sandstone, siltstone and claystone layers of Samanlık Formation under lays the blanket layer as bedrock. Upper part of this bedrock is highly fractured between the depths

of 15.00 and 25.00 meters and it shows very poor rock quality. RQD values of bedrock at these depths vary between 0 % - 54 %. Those vales are agreeable to its poor quality. RQD values are getting higher after the depth of 25.00 meters and it reaches up to 90 %. Consequently, it could be said that, the rock quality of Samanlık formation changes from very poor to poor and fair while getting deeper.

6) Apart from the SK-1, groundwater level is encountered in all boreholes. Groundwater level in the borehole SK-9 and SK-10 are measured about 2 meters. On the other hand, groundwater level varies from 10.00 to 14.00m in the boreholes SK-2, SK-3, SK-4, SK-5, SK-6, SK-7 and SK-8.

7) Based on the data obtained from seismic works, it could be said that, the local soil group, local soil class and spectrum characteristic periods of the geological units from surface down to the depths of 10,00 – 11,00 meters are C, Z_2 and T_A = 0.15 sn and T_B = 0.40 sn, in respectively. Between the 10,00 – 60,00 meters depths, local soil group becomes (B), local soil class is (Z_1 - Z_2) and spectrum characteristic periods become T_A = 0,15 sn and T_B = 0,40 sn. After the depth of 60 meters, local soil group, local soil class and spectrum characteristic periods become; (A), (Z1), T_A = 0,10 sn and T_B = 0,30 sn in respectively.

8) Project site takes place in second-degree seismic zone on "The Earthquake Map of Turkey" prepared by "Cancelled Ministry of Public Works and Settlement". Therefore, effective ground acceleration (Ao) should be accepted; Ao = 0,30 g

9) Even, there is no active fault via working area; the investigation area is under the effect of active faults around. Therefore, the building regulations in the earthquake areas, which were prepared by "Cancelled Ministry of Public Works and Settlement", should be followed during the construction of all kind structures.

10) There are no any restricted lands under the coverage of the law 7269 due to not having previous affection of any hazards. On the other hand, any mass movements in the area (like land slides, rock falls etc.) were not observed during the site study.

11) The study are could be divided in 3 sections in respect of housing settlement;

d) Lands need precautions for settlement (ÖA-2.2)
e) Suitable lands for settlement (UA-1)
f) Unsuitable lands for settlement (UOA-3)

Lands need Precautions for Settlement (ÖA – 2.2) These land sections locate at the north west of the study area where the land elevation comes up to 770 meters. The rocks belong to Samanlık (Ks) and Ilıca (Ki) Formations outcrop in this hilly section of the project site. These rocks are mostly consists of gravelstone, sandstone and claystone alternations. No any problems like bearing capacity are expected in this area. The inclination of the slopes is steeper than 10 % and it reaches to 30 %. In this land, there is no static ground water level. Only the water could be the seepage water leaks from the surface, after the precipitation. Necessary precautions should be taken (like soil retaining structures) against the possible slope stability problems, which could be occurred on the artificial slopes, created with the excavation works in the construction period or on the natural slopes

Suitable Lands (UA – 1) Suitable Lands locate mostly at the southern part of the study area. Soil type is composed of SM group silty sands. These sediments are generally very dense, course grained materials from alluvial fan (Qay) deposits, and some times, they contain few gravel and clay. Their thickness is about 15,00 meters and they carries ground water at the depth of 12,00- 13,00 meters. Land inclination is less than 10 %. In this section, no any soil problems like weak bearing capacity, high settlement, swelling etc. are expected. These land sections are suitable for housing settlements.

Unsuitable Lands (UOA – 3) The area between the boundaries 200 meters at left side and 200 meters at the right side from the centerline of Kızılırmak River is **under the coverage of flood risk area**, which has been decelerated as the council of ministry's decision, and the memorandum number is 2008/13558. Therefore, these land sections are not suitable for housing settlement.

12) Spectral amplification values were calculated based on Midorikawa (1987) by using the average Vs_{30} values determined along the three profiles in the field. The results show that risk rate is in "group A" which means that Soil Amplification Risk is low in the study area

13) As the data, the earthquakes occurred at Ankara, Corum, Kırsehir, Cankırı and Yozgat in last 20 years were used for around Kırıkkale Province. Magnitudes of the used earthquakes are higher then 4,5 and their epicenter distance is 15 km and depth of focus is 8 km. Occurrence probability was accepted in 10 years and exceedance probability was accepted 5 %. Based on these assumptions, reoccurrence of the earthquake, which has 4,5

Magnitude is 2 years in 20 years period and reoccurrence of the 5 magnitude earthquake is 3 years in 20 years period. Reoccurrence of the earthquakes magnitude s larger than 5 is accepted 1 in 20 years period. Based on this information, earthquake occurrence probability is calculated for 10, 20, 50 and 100 years periods.

14) This report has been prepared for only development settlement plan and **it must not be used as pre-geotechnical survey for any kind of construction in the area.** The ultimate bearing capacity values given in Table 9.5 in this report are only preliminary information and they should not be used for the real project applications. Additional geotechnical survey should be carried out for the definite bearing capacity figures after the project criteria are defined.

With our best regards,

Levent Gençman	**Eymen AREL**	**Adem ULUŞAHİN**
Geophysical Engineer	**Geological Engineer (Msc)**	**Geological Engineer**

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APP-1:

OFFICIAL CORRESPODINGS WITH GOVERMENT OFFICES

T.C.
ORMAN VE SU İŞLERİ BAKANLIĞI
Devlet Su İşleri Genel Müdürlüğü 5. Bölge Müdürlüğü

Sayı : B.23.1.DSİ.1.05.10.00-754-408609 10.07.2013
Konu : İmar İşleri

KILIÇLAR BELEDİYE BAŞKANLIĞINA YAHŞİHAN/KIRIKKALE

İlgi : 07.06.2013 tarihli ve B.23.1.DSİ.1.05.31.00-754/331966 sayılı yazınız.

İlgi yazınızla; Kırıkkale Yahşihan Kılıçlar Beldesi Belediye mücavir alanı hudutları dahilinde bulunan 109 ada 1 ve 2 sayılı parseller üzerine ACWA Güç Elektrik İşletme ve Yönetim Sanayi ve Tic.Ltd. Şti. tarafından kurulacak doğalgaz kombine çevrim santralının mevzi imar planının hazırlanması kapsamında ilgilisine verilecek cevaba esas, Bölge Müdürlüğümüz görüşünün bildirilmesi istenilmektedir.

Yapılan inceleme neticesinde; ekteki 1/25000 ölçekli haritada yeri işaretli olan, söz konusu taşınmazların DSİ projeleri kapsamında olmadığı ve içerisinde herhangi bir yeraltı suyu işletmesi bulunmadığı tespit edilmiştir. Ancak; 109 ada 1 sayılı parsel kuzey cephesinden ve 109 ada 2 sayılı parsel ise kuzey ve güneydoğu cephesinden kısmi olarak Kızılırmağın taşkın alanı içinde kalmakta olup, 109 ada 2 sayılı parselin içinden ise kuru dere vasıflı Büyükkayalı Deresi geçmekte ve ekteki 2008/13558 sayılı Bakanlar Kurulu Kararı gereğince Kızılırmağın mihverinden itibaren sağa ve sola 200m olmak üzere toplamda 400m genişliği haiz şeritvari saha suların taşmasıyla su altında kalan veya su baskınlarına uğrayabilecek **"Taşkın Sular Kanunu Kapsamındaki Alan"** içerisinde kalmaktadır.

Sonuç olarak; aşağıda verilen teknik ve yasal verilere uyulması kaydıyla mezkur taşınmazların doğolgaz kombine çevrim santralı inşa edilmesi amacıyla mevzi imar planının yapımında bir sakınca görülmemiştir:

1) 2 sayılı parsel içinden geçen Büyükkayalı Deresinin taşkın emniyetini teminen ekteki enkesite göre Dere yatağı güzergahı boyunca 15m (8m dere yatağı açıklığı+7m tek taraflı servis yolu olmak üzere) genişliğini haiz şeritvari sahanın Dere yatağı olarak muhafaza edilmesi,

2) Kızılırmağın mihverinden itibaren sol sahili boyunca şeritvari olarak bırakılması gereken 200 m'lik **"Taşkın Sular Kanunu Kapsamındaki Alan"** içinde kalan sahalara sabit tesis kurulmaması,

3)Cüzi derenaj sahası olan diğer kuru derelerin doğal halinin aynen muhafaza edilmesi ve zorunlu yol geçişlerine tercihen tek açıklıklı sanat yapısı veya (2mx2m) boyutundan küçük olmamak üzere Q_{500} yıllık yinelemeli taşkındebisini geçirecek kesitte kutu menfez inşa edilmesi ve yamaçlardan gelecek yüzeysel akışın altyapı hizmetleri kapsamında inşa edilecek olan yağmursuyu şebeke sistemi içinde toplanarak meskun mahalden uzaklaştırılması ,

4) Dere yataklarına hafriyat vb. malzeme atılmaması/stoklanmaması ve ekteki **"Dere Yatakları ve Taşkınlar"** konulu Başbakanlık Genelgesi hükümlerine uyulması gerekmektedir.

Bilgi ve gereğini rica ederim.

Bu belge, 5070 sayılı Elektronik İmza Kanununun 5. Maddesi gereğince güvenli elektronik imza ile imzalanmıştır.
Orijinal elektronik belge adresi: https://evrakdogrula.dsi.gov.tr Doğrulama Kodu: PUJW-IOM84-DW87-7212

Adres : DSİ 5. Bölge Müdürlüğü Eskişehir Yolu 8.km Çankaya 06520 ANKARA
Ayrıntılı Bilgi İçin : M. ŞULAN Mühendis Telefon : (0312) 2197700/4211 Faks: (0312) 2197800
e-posta : mehmetsulan@dsi.gov.tr Elektronik Ağ: www.dsi.gov.tr

Hacı HAKSAL
Bölge Müdürü

EK/EKLER :
1- 1/25000 ölçekli harita
2- Protokol metni
3- Taşkın debisi kesit tahkiki
4- Genelge

DAĞITIM :
Gereği:
Kılıçlar Belediye Başkanlığına
Yahşihan/kırıkkale

Bilgi:
DSİ 56. Şube Müdürlüğüne

(07.06.2013/331966 evrakınıza cevaben)

Bu belge, 5070 sayılı Elektronik İmza Kanununun 5. Maddesi gereğince güvenli elektronik imza ile imzalanmıştır.
Orijinal elektronik belge adresi: https://evrakdogrula.dsi.gov.tr Doğrulama Kodu: PUJM-QHE4-ON9T-3203

Adres : DSİ 5. Bölge Müdürlüğü Eskişehir Yolu 8.km Çankaya 06520 ANKARA
Ayrıntılı Bilgi İçin : M. ŞULAN Mühendis Telefon : (0312) 2197700/4211 Fax: (0312) 2197800
e-posta : mehmetsulan@dsi.gov.tr Elektronik Ağ: www.dsi.gov.tr

ACWA POWER

ACWA Güç Elektrik İşl. Ve Yön. San. Ve Tic. A.Ş.

Tarih: 22.07.2013

Konu: ACWA Power Kinikkale Doğalgaz Çevrim Santrali 108 ada 1 parsel köson kuyu hakkında görüş
Sayı: 0713-2

T.C.
ORMAN VE SU İŞLERİ BAKANLIĞI
Devlet Su İşleri Genel Müdürlüğü 5. Bölge Müdürlüğü

İlgi : a) B.23.1.DSI.1.05.10.00-754-408609 sayili 17.07.2013 tarihli yaziniz

Kırıkkale İli, Yahşihan İlçesi Kılıçlar Beldesinde kurmayı planladığımız 849,100 MWm / 834,090 Mwe kurulu gücündeki, doğalgaz yakıtlı, termik - kombine çevrim tipindeki üretim tesisi için lisans başvurusu yapılmıştır. Tesisin üzerine kurulması planlanan 109 ada 1 ve 109 ada 2 sayili parseller üzerine imar planlarının hazırlanması kapsamında kurumunuzun görüşü ilgi a) ile bildirilmiş ve şirketimiz ile 17.07.2013 tarihinde protokol imzalanmıştır.109 ada 1 ve 2 nolu parsellere bitişik olan 108 ada 1 parsel de tesisimiz için kullanılması planlanan suyun tedariği (su rezerv alanı) amacıyla açılması planlanan köson kuyular hakkında görüşünüzün bildirilmesini talep etmekteyiz.

Gereğini arz ederim.

Ekler:
1- 1/25000 ölçekli harita
2- 1/5000 ölçekli harita

ACWA Güç Elektrik İşletme ve Yön. San. ve Tic. A.Ş.
Abid Hussain Malik
ACWA Güç Elektrik İşl. Ve Yön. San ve Tic. A. Ş.
Genel Müdür

İletişim Adresi

Teşvikiye Caddesi, Teşvikiye Palas
No:21/2 34856 Nişantaşı – İstanbul
Tel: 0212 259 8996
Fax: 0212 259 5997

T.C.
ORMAN VE SU İŞLERİ BAKANLIĞI
Devlet Su İşleri Genel Müdürlüğü 5. Bölge Müdürlüğü

Sayı : 92711777-622-483251 14.08.2013
Konu : Görüşler

ACWA Güç Elektrik işl. ve Yön. San. ve Tic. A.Ş.
(Teşvikiye Caddesi, Teşvikiye Galas No:23/2 34356 Nişantaşı-İSTANBUL)

İlgi : 22.07.2013 tarihli ve 2 sayılı yazınız.

İlgi yazı ile Kırıkkale-Yahşihan Kılıçlar Beldesinde kurulması planlanan doğalgaz yakıtlı, termik-kombine çevrim tipindeki üretim tesisi için yazınız ekindeki haritada işaretlenen alanda açılacak keson kuyu ile ilgili görüş istenmektedir.

10 m'den sığ kuyular, 167 sayılı Yeraltısuları Hakkındaki Kanunun 8. madde (a) bendinde belirtilen "elle açılan kuyular" sayılmakta olup; bu tür kuyular için belge alma zorunluluğu bulunmamaktadır. Açılacak keson kuyunun derinliği 10 m'yi geçmeyeceğinden belgeye tabi olmayıp, kendi faydalı ihtiyacınızı karşılamak amacıyla kullanılmasında bir sakınca bulunmamaktadır.

Bilginizi rica ederim.

Bekir YAPAN
Bölge Müdür Yardımcısı

T.C.
Güvenli elektronik imzalı
SAĞLI İLE AYNIDIR
ANKARA
Onaylayan Memur
14 AĞU 2013

Bu belge, 5070 sayılı Elektronik İmza Kanununun 5. Maddesi gereğince güvenli elektronik imza ile imzalanmıştır.
Orijinal elektronik belge adresi: 'https://evrakdogrula.dsi.gov.tr' Doğrulama Kodu: TFXD-RP05-0LZ4-3888

Adres : DSİ 5. Bölge Müdürlüğü Eskişehir Yolu 8.km Çankaya 06520 ANKARA
Ayrıntılı Bilgi İçin : E. D. AKTAŞ Mühendis Telefon : 03122197700/4223 Faks:
e-posta : edaktas@dsi.gov.tr Elektronik Ağ: www.dsi.gov.tr

T.C
KIRIKKALE VALİLİĞİ
İl Gıda, Tarım ve Hayvancılık Müdürlüğü

Sayı : 79272455.230.04.02/ 154-2212 06./06/2013
Konu : Doğalgaz Kombine Çevrim Santralı İmar Planı

KILIÇLAR BELEDİYE BAŞKANLIĞINA

YAHŞİHAN/KIRIKKALE

İlgi: 04.06.2013 tarih ve 403 sayılı yazınız.

Belediyeniz mücavir alan sınırları içerisinde bulunan 109 ada 1-2 parsel üzerine ACWA ENERJİ ÜRETİM A.Ş. tarafından yapımı düşünülen Doğalgaz Kombine Çevrim Santralı ile ilgili yapılacak imar planı için belediyenizce 5403 sayılı kanun kapsamında Müdürlüğümüz görüşü sorulmuştur. Bu yatırımla ilgili ruhsat mercii EPDK olduğundan söz konusu kanun kapsamında izinlendirme talebinin bu kurum (EPDK) tarafından yapılması gerekmektedir.

Bilgilerinizi rica ederim.

Recep KIRBAŞ
Vali a.
İl Müdürü

İl Tarım Müdürlüğü
Tel:0318 2242938 Fax:224 2557
e-posta

Ayrıntılı bilgi için irt: Z.DURMAZ
Elektronik ağ:www.kirikkaletarim.gov.tr

T.C.
KIRIKKALE VALİLİĞİ
Çevre ve Şehircilik İl Müdürlüğü

02 Mayıs 2013

Sayı : 89168655-045 -1458

.... / .... /2013

Konu : İmar Planı

KILIÇLAR BELEDİYE BAŞKANLIĞINA

İlgi: 22.04.2013 tarihli ve 303 sayılı yazınız.

İlimiz Yahşihan İlçesi Kılıçlar Beldesi hudutları dahilinde bulunan 109 ada 1-2 parsel nolu taşınmazlar üzerine Doğalgaz Kombine Çevrim Santralı kurmak üzere uygulama imar planı hazırlanması ile ilgili Kurumumuz görüşünün bildirilmesi ilgi yazınız ile istenilmektedir.

Söz konusu taşınmaz üzerine Doğalgaz Kombine Çevrim Santralı kurmak üzere uygulama imar planı hazırlanmasında Kurumumuzca herhangi bir sakınca bulunmadığı hususunda;

Bilgilerinizi rica ederim.

Uğur ATAR
Çevre ve Şehircilik İl Müdür V.

2013/26C.
14.09.2013
R. Akman
DOSYA :
KILAK :
FENİŞL :
ZABITA :
Cevat Emrah ÖNDER

Çevre ve Şehircilik İl Müdürlüğü 71100 Merkez/KIRIKKALE
Telefon (0318) 224 25 47/1258 - 224 25 48/133 Faks: (0318) 224 25 50

Ayrıntılı bilgi için irtibat: A. DOĞAN
kirikkale@cob.gov.tr

BOTAŞ
BORU HATLARI İLE PETROL TAŞIMA A.Ş.
Arazi, İnşaat ve Kamulaştırma Daire Başkanlığı

Sayı : B.15.2.BOT.0.15.05.00-045.99-18787 13/06/2013
Konu : Diğer (Görüşler)

T.C.
KIRIKKALE İLİ
YAHŞİHAN İLÇESİ
KILIÇLAR BELEDİYE BAŞKANLIĞINA

İlgi : 04/06/2013 tarih ve 401 sayılı yazınız

Kırıkkale İli Yahşihan İlçesi Kılıçlar Belediyesi sınırları içerisinde yer alan 109 ada, 1-2 parselin üzerine ACWA Güç Elektrik İşletme ve Yönetim Sanayi ve Tic. Ltd. Şti. tarafından EPDK izniyle yapımı düşünülen Doğal Gaz Kombine Çevrim Santrali için hali hazır harita ve imar planı hazırlanmasına yönelik görüşümüzün talep edildiği ilgi yazınız ve ekindeki belgeler incelenmiştir.

Yazı ekinde sınırları belirtilen bahse konu alanda mevcut veya planlanan boru hattımız ve tesisimiz bulunmamaktadır.

Bilgilerinize arz ederiz.

Abdurrahman SARI
Daire Başkan Yardımcısı V.

Rıhi AKSOY
Daire Başkan V.

Adres : Bilkent Plaza A-2 Blok 06800 Bilkent/ANKARA
Telefon : (312) 297 2000 Faks : (312) 266 0733-34
İnternet Adresi : www.botas.gov.tr
Bilgi için : Temel KARAKARŞLAN
Mühendis
Telefon : (312) 297 29 46
e-posta : temel.karakarslan@botas.gov.tr

T.C.
ULAŞTIRMA DENİZCİLİK VE HABERLEŞME BAKANLIĞI
Karayolları Genel Müdürlüğü 4. Bölge Müdürlüğü

Sayı : 95386480- 755.01 / 90633
Konu : Doğalgaz Kombine Çevrim Santrali
İmar Planı Yapımı

19. Haziran .2013

KILIÇLAR BELEDİYE BAŞKANLIĞINA
Yahşihan/KIRIKKALE

İlgi: KILIÇLAR BELEDİYE BAŞKANLIĞI 'nin 04/06/2013tarihli ve 68517443 -407sayılı yazısı.

İlgi yazıda bahsi geçen kesim Ankara-Kırıkkale Devlet Yolu'na 2,5 Km. Kırıkkale-Delice Otoyoluna da yaklaşık 5 Km uzaklıkta olup karayolu güzergahlarımız dışındadır.

Gereğini bilgilerine rica ederim.

Mehmet TUTAŞ
Bölge Müdürü
Bölge Müdür Yardımcısı

Yeni Dikk Cad. No:29 DİSKAPİ
Telefon No 0312 203 4000 Faks 0312 084 3128
İnternet Adresi www.kgm.gov.tr
Bilgi İçin Fatma ÇELİK
Kalite Şef
Telefon
e-posta fatma@kgm.gov.tr

1/1

T.C.
KIRIKKALE VALİLİĞİ
İl Afet ve Acil Durum Müdürlüğü

Sayı : 30820934.5.71.00.00.155./ 501 19/09/2013
Konu : Afete Maruz Bölge

E-K JEOLOJİ JEOTEKNİK MÜHENDİSLİK LTD. ŞTİ.
ANKARA

İlgi : E-K Jeoloji Jeoteknik Müh.' in 19.09.2013 tarihli dilekçesi.

Kayıtlarımızda, Kırıkkale ili Yahşihan İlçesi Kılıçlar Beldesi 109 ada parsel 1 ve 2, 108 ada 1 nolu parsel in bulunduğu alanlar üzerinde Bakanlar Kurulu tarafından alınmış "Afete Maruz Bölge" kararı yoktur.

Ancak bölge Kızılırmak nehrine yakındır ve Kızılırmak nehrinden kaynaklanabilecek herhangi bir taşkın olayına açık olduğu için bölgenin sel olayına maruz kalıp kalmayacağı hakkında bölgeden sorumlu ilgili DSİ Müdürlüğü'nden görüş alınması uygundur.

Ayrıca 09.05.2008 tarih ve 26781 sayılı Resmi Gazetede yayınlanan 2008 / 13558 sayılı Bakanlar Kurulu kararınca: Kızılırmak Nehrinin mihverinden itibaren sağlı sollu 200' er metre olmak üzere toplam 400 metre genişliğindeki bir alanın sulanın taşmasıyla su altında kalabilecek bir alan olduğu tespit edilmiştir. Bu durum göz önünde bulundurulmalı, taşkın sahalarında herhangi bir sabit tesis kurulamayacağı göz önünde bulundurulmalıdır.

Bilgilerinize.

Sadet ÜNAY
Vali a.
İl Afet ve Acil Durum Müdürü

Osmanlı Mah. Üniversite Cad. Şehit Polis Hasan Aki Sok. No:8 71100 KIRIKKALE
Telefon: (0318) 224 27 21 - 244 26 20 Faks: (0318) 224 25 05
Ayrıntılı bilgi için irtibat: C. KAPLAN

APP-2:

BOREHOLE LOGS AND CORE PHOTOGRAPHS

Efol Jeoteknik Hizmetler Ticaret Ltd. Şti.
Ofis: 7.cad. 1326 sok. N0:4/4 A.Öveçler, ANKARA, Tel: (312)473 54 37 Faks: (312)473 54 38
Lab: Özanadolu San. Sit. 677. sok. No:36 Ostim, ANKARA
web: www.efoljeoteknik.com e-mail:info@efoljeoteknik.com

TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-1**
DERİNLİK (m) *Drill Hole Depth*	: 20.00 m	**BAŞL. TARİHİ** *Date of Start*	: 02.07.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: DÜŞEY	**BİTİŞ TARİHİ** *Date of Completion*	: 03.07.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 682 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 534753 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	05.07.2013	-
	Y : 4415444 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/17.00 m		

DÜŞÜNCELER / *Remarks*

KUYUDA YIKINTI OLMASI NEDENİYLE RASAT BORUSU KUYU TABANINA İNDİRİLEMEMİŞTİR.

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs* İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test* Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	GEÇİRİMLİLİK *Permeability* Su kayıpları (lt) *Water lost*	K (cm/s)	SPT *Standart Penetration Test* Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	NUMUNE(S:PT/UD/Boz.)K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties* Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
1			76 mm progress drill	90 mm	Brown colored % 40-50														12	-	-	-
2														24	50/10 cm				0	-	-	-
3																						
4																	UD-1	SC	29	-	-	-
														13	16	20	36	SM				
5																			31	-	-	-
6																						
7																			45	-	-	-
8																			32	-	-	-
9																			40	-	>50	W3
10			NQ Impregnated Diamond																22	-		
11																		K-1	50	41	10-50	W2-W3
12					Gray-brown colored % 50													K-2				
13																			54	30	>50	
14																			23	-		W3
15																						
16																			48	-		

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-8.00 m
Alluvial Fan Deposits (Qay)
Silty gravely **sand** with few blocks
Gravels are originated from sandstone and magnesite
Grains are angular and semi-angular, Coarse grain percentage is about 40 %.

8.00-20.00 m
Alternation of Sandstone-siltstone-conglomerate Samanlık Formation (Ks)
gray colored, highly fractured, joint spaces are between 5 - 20 mm, some joints filled with clay and some parts washed by FeO joint surfaces are smooth or slightly rough, less and moderately weathered rock quality is poor..

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: SK-1	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*		Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17			NQ Impregnated Diamond		-													34	4	>50	W2-W3		Description on the front page
18																		32	-				
19																							
20																		67	43	10-50			
21																							End of Borehole: 20.00 m
22																							
23																							
24																							
25																							
26																							
27																							
28																							
29																							
30																							
31																							
32																							
33																							
34																							
35																							
36																							

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-1

DEPTH: 0.00-17.50 m

TRUNK NO: 1/2



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-1

DEPTHS: 17.50-20.00 m

TRUNK NO: 2/2



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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-2**
DERİNLİK (m) *Drill Hole Depth*	: 20.50 m	**BAŞL. TARİHİ** *Date of Start*	: 08.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 09.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 690 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 534765 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	30.06.2013	14.00 m
	Y : 4415342 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/20.50 m		

DÜŞÜNCELER / *Remarks*

2.00-3.00 m ARASINDA TAKIM DÜŞMESİ GÖZLENDİ.

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	SPT Darbe Sayısı 1. 15 cm	SPT Darbe Sayısı 2. 15 cm	SPT Darbe Sayısı 3. 15 cm	Toplam Darbe Sayısı	Total rebound number	NUMUNE(S/P/T/U/D/I/Boz./K/Tor./Su) Sample(SPT / UD / D / C / Bulk / Water)	Karot yüzdesi (%) Percentage of core	RQD (%) Rock Quality Designation	Çatlak sıklığı (#/m) Discontinuity spacing	Ayrışma derecesi Degree of weathering
1																				33	-	-	-
2														6	8	9	17						
3																			SM-SW	-	-	-	-
4																		UD-1					
														4	5	3	8						
5														12	14	16	30		SM	-	-	-	-
6																							
																		UD-2	SC				
7														15	13	14	27			-	-	-	-
8														14	14	17	31		SM				
9																				21	-	-	-
																		UD-3	SC				
10														9	11	13	24			-	-	-	-
11														9	13	16	29						
12																				17	-	-	-
																empty			UD-4				
13														10	13	20	33			-	-	-	-
14														12	17	23	40		SC				
15																				-	-	-	-
16														11	16	17	33			-	-	-	-

NQ Impregnated Diamond

90 mm

Dark brown colored % 50

Light brown colored % 60

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-20.00 m
Alluvial Fan Deposits
(Qay)

0.00-3.00 m
Gravely clayey sand
Gravels are limestone, sandstone and angular

3.00-8.50 m

Gravely silty sand

8.50-10.00 m
Sand and clayey silt with few gravel

10.00-17.00 m

Brown colored silt with few gravel gravels are conglomerate and sand stone

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: **SK-2**	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*				Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*		Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17														50	10 cm								
18			NQ Impregnated Diamond		-														16	-	-	-	
19																empty		UD-5	-	-	-	-	**17.00-20.00 m** Gravely sandy silt
20														12	25	50/3 cm							
																			66	-	>50	W3-W4	**20.00-20.50 m Sandstone**
21																							**End of Borehole: 20.50 m**
22																							
23																							
24																							
25																							
26																							
27																							
28																							
29																							
30																							
31																							
32																							
33																							
34																							
35																							
36																							

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-2

DEPTH: 0.00-20.50 m

TRUNK NO: 1/1



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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-3**
DERİNLİK (m) *Drill Hole Depth*	: 50.00 m	**BAŞL. TARİHİ** *Date of Start*	: 09.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 12.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 685 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 534870 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	30.06.2013	14.30 m
	Y : 4415309 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/50.00 m		

DÜŞÜNCELER / *Remarks*

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	SPT Darbe Sayısı 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı	NUMUNE(S:PT/UD/Boz.İK/Tor/Su) *Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
1																			13	-	-	-
2														8	13	16	29	SM				
3																			17	-	-	-
4																empty		UD-1				
														7	10	9	19		-	-	-	-
5														6	12	8	20	SM				
6																			-	-	-	-
7																		UD-2				
														12	14	17	31	SM	10	-	-	-
8														21	50/12 cm							
9																			-	-	-	-
10																		UD-3				
														13	16	20	36	SM	12	-	-	-
11														7	9	9	18	CL				
12																			10	-	-	-
13																empty		UD-4				
														5	10	11	21	SC	13	-	-	-
14														40	50/5 cm							
15																			-	-	-	-
16																		UD-5				
														21	28	50/2 cm		ML	16	-	-	-

NQ Impregnated Diamond — 90 mm

Brown colored % 60

Light brown colored % 80

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-17.50 m
Alluvial Fan Deposits
(Qay)

0.00-2.50 m Gravely, silty clayey sand. Gravels are angular and originated sanstone, limestone.

2.50-6.00 m

Silty, gravely sand. Gravels are angular and originated sandstone limestone, magnesite

6.00-17.00 m

Fine sand - silt with few gravel

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: SK-3	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Keskici uç cinsi	Muhafaza borusu/Çimentolama	Sondaj suyu (renk ve %)	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su)	KAYAÇ ÖZELLİKLERİ *Rock properties*			
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	*Drillhole radius and Type of cuttings*	*Casing/Grouting*	*Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	*Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
17														50/5 cm					45	-	>50	W2-W3
18																						
19														50/10 cm					34	10		
20																			17	13	10-50	
21																			50	-	>50	
22																			35	4		
23																			42	-	10-50	
24																			50	4	>50	
25																						
26																			20	10	10-50	W2
27																			100	33		
28																						
29																				75	3-10	
30																				58	10-50	
31																						
32																				63		
33																				40		W2-W3
34																						
35																				55		W2
36																						

NQ Impregnated Diamond

90 mm

purple-brown

Gray-brown colored % 70

LEJAND *Legend*

T A N I M L A M A *Description*

17.00-17.50 m Clayey silt

17.50-50.00 m
Alternation of sandstone - claystone
Samanlık Formation
(Ks)

Gray colored, highly fractured, fractures generally oblique, in some places horizantal and also in soma places vertical. (33.20-33.50 m ve 40.55-40-67 m), joint spaces about 4 - 25 mm some filled with clay some filled with calcite, washed by FeO, joint surfaces are smoot and slightly rough, weathering degree is less-moderate, rock quality is medium.

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	KUYU NO *Borehole No*	: **SK-3**	SAYFA NO *Page No*	: 3

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su)	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	*Drillhole radius and Type of cuttings*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	*Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
37																		62				
38																						
39																		63				
40																						
41																						
42																						
43																		52				
44																						
45																		60				
46																						
47																		45				
48																						
49																		67				
50																						
			NQ Impregnated Diamond														100		10-50	W2		Description is on the front page
51																						
52																						
53																						
54																						
55																						
56																						**End of Borehole: 50.00 m**
			Gray colored % 70-80																			

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-3
DEPTH: 0.00-19.50 m
TRUNK NO: 1/7


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-3
DEPTH: 19.50-28.00 m
TRUNK NO: 2/7

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-3

DEPTH: 28.00-34.00 m

TRUNK NO: 3/7



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-3

DEPTH: 34.00-39.00 m

TRUNK NO: 4/7



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-3

DEPTH: 39.00-44.00 m

TRUNK NO: 5/7



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-3

DEPTH: 44.00-49.00 m

TRUNK NO: 6/7



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-3

DEPTH: 49.00-50.00 m

TRUNK NO: 7/7



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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-4**
DERİNLİK (m) *Drill Hole Depth*	: 50.00 m	**BAŞL. TARİHİ** *Date of Start*	: 14.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 18.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 683 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 534892 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: O. KARACA	30.06.2013	13.50 m
	Y : 4415283 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/50.00 m		

DÜŞÜNCELER / *Remarks*

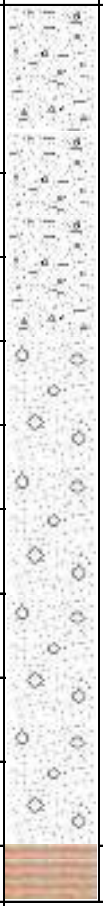
B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs* İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi	*Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test* Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	GEÇİRİMLİLİK *Permeability* Su kayıpları (lt) *Water lost*	K (cm/s)	SPT *Standart Penetration Test* Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	NUMUNE(S:PT/UD/Boz.lK/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties* Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*	LEJAND *Legend*	TANIMLAMA *Description*
1																									
2																									
3																									
4																			UD-1	SM					
															9	10	12	22			-	-	-	-	
5															8	12	11	23		SM	12	-	-	-	
6																			UD-2	SM-SW					
7															10	13	13	27			10	-	-	-	
8															24	50/10 cm				SM	-	-	-	-	
9																			BOŞ	UD-3					
10															50/5 cm						14	-	-	-	
11															26	50/13 cm					10	-	-	-	
12																			BOŞ	UD-4					
13																					-	-	-	-	
14															43	50/6 cm					5	-	-	-	
15																									
16															41	50/5 cm					71	-	>50	W2-W3	

Derinlik (m) *Depth*; GÜNLÜK İLERLEME *Daily Runs*: İlerleme (m) *Drill runs*; Su seviyesi ölçümü *Water level measurement*; Kuyu çapı ve Kesici uç cinsi: NQ Impregnated Diamond; *Drillhole radius and Type of cuttings*; Muhafaza borusu/Çimentolama *Casing/Grouting*: 90 mm; Sondaj suyu (renk ve %) *Drillhole water (colour and %)*: Brown colored % 60; Light brown colored % 80

LEJAND *Legend*



TANIMLAMA *Description*

0.00-15.00 m
Alluvial Fan Deposits
(Qay)

0.00-2.50 m

Gravely silty clayey sand

2.50-6.00 m

Silty, gravely sand.
Grains are angular and originated sandstone, limestone.

6.00-15.00 m

Gravely silty sand.

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: **SK-4**	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi	Muhafaza borusu/Çimentolama	Sondaj suyu (renk ve %)	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su)	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	*Drillhole radius and Type of cuttings*	*Casing/Grouting*	*Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	*Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17			NQ Impregnated Diamond		Purple brown colored % 60														91	19	>50	W2-W3		**15.00-50.00 m** **Alternation of claystone, siltstone and sandstone Samanlık Formation (Ks)** Gray colored highly fractured, in some places laminated, joint are oblique in some places horizontal, joint spaces 5-9 mm , washed by FeO, filled with calcite, some joints are closed some open, joint surfaces are smooth and slightly rough and wavy, fresh and less weathered, rock quality medium to fine
18																								
19																			70	-				
20																								
21																			58	10	10-50			
22																			23	-	>50			
23					Purple-brown colored % 80														47	-	10-50			
24																								
25																								
26																			86	42	3-10	W1-W2		
27																								
28																			100	47	10-50			
29																			50	22		W2-W3		
30																								
31																			66	57				
32																								
33																								
34																			100	70	3-10	W1-W2		
35																								
36																			100	30	10-50			

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	KUYU NO *Borehole No*	: **SK-4**	SAYFA NO *Page No*	: 3

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*: İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test*: Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	GEÇİRİMLİLİK *Permeability*: Su kayıpları (lt) *Water lost*	K (cm/s)	SPT *Standart Penetration Test*: Darbe Sayısı *Number of Blows*: 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*: Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*	LEJAND *Legend*	TANIMLAMA *Description*
37			NQ Impregnated Diamond		Purple-brown colored % 80														66	21				Description is on the front page
38																								
39																			86	42		W2		
40																								
41																			82	50				
42																								
43																								
44																			100	90	3-10	W1-W2		
45																								
46																				88				
47																								
48																								
49																				85				
50																								
51																								End of Borehole: 50.00 m
52																								
53																								
54																								
55																								
56																								

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-4

DEPTH: 0.00-18.00 m

TRUNK NO: 1/6



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-4

DEPTH: 18.00-27.00 m

TRUNK NO: 2/6

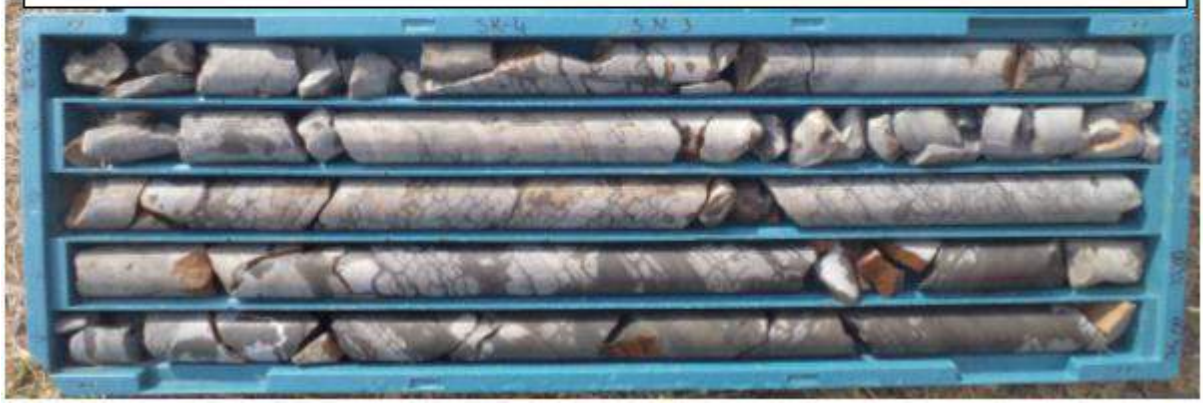


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-4

DEPTH: 27.00-34.00 m

TRUNK NO: 3/6



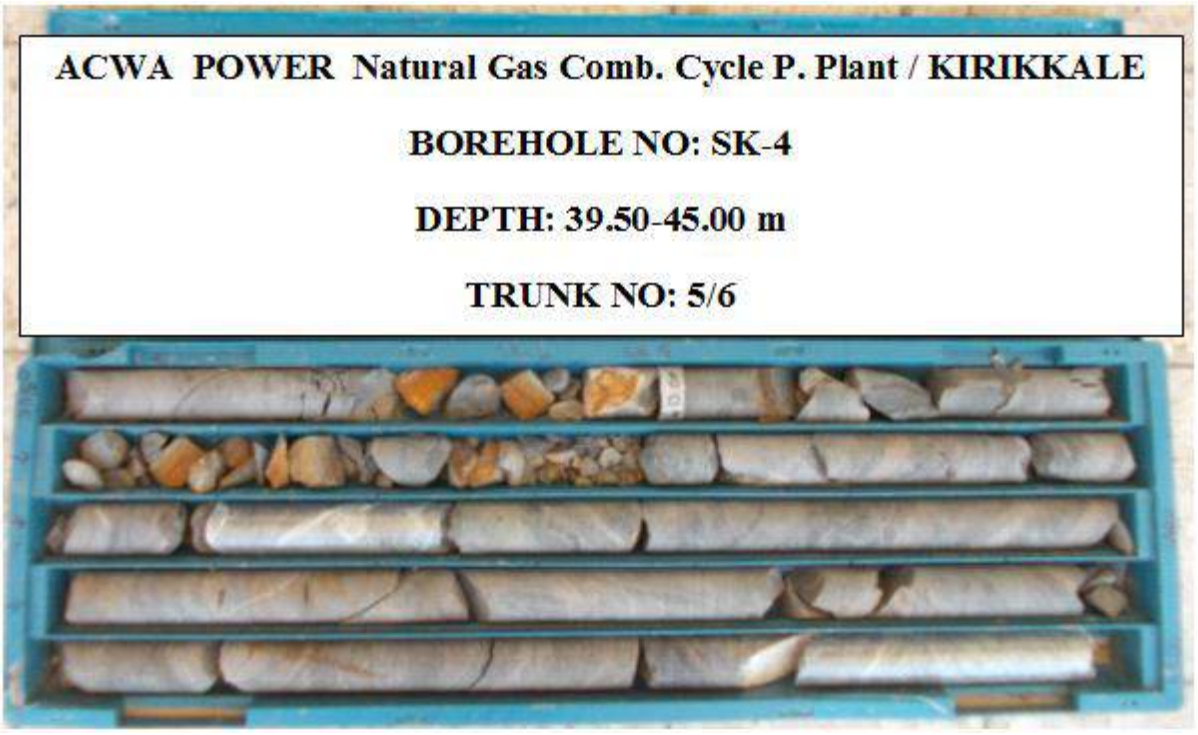
ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-4

DEPTH: 34.00-39.50 m

TRUNK NO: 4/6




ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-4
DEPTH: 39.50-45.00 m
TRUNK NO: 5/6


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-4
DEPTH: 45.00-50.00 m
TRUNK NO: 6/6

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-5**
DERİNLİK (m) *Drill Hole Depth*	: 50.50 m	**BAŞL. TARİHİ** *Date of Start*	: 23.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 26.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 683 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 534909 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	30.06.2013	9.80 m
	Y : 4415240 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/55.00 m		

DÜŞÜNCELER / *Remarks*

15.00-17.00 m ARASI TAKIM DÜŞMESİ GÖZLENMİŞ, 13.50-19.00 m ARASINDA NUMUNE ALINAMAMIŞTIR.

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs* İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi / *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama / *Casing/Grouting*	Sondaj suyu (renk ve %) / *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test* Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	GEÇİRİMLİLİK *Permeability* Su kayıpları (lt) *Water lost*	K (cm/s)	SPT *Standart Penetration Test* Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı	*Total rebound number*	NUMUNE(S:PT/UD/Boz.lK/Tor/Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties* Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
1			NQ Impregnated Diamond	90 mm	Brown colored % 60														3	-	-	-
2														8	11	13	24	SC				
3																			3	-	-	-
4																	UD-1	SM	-	-	-	-
														7	9	11	20					
5														6	9	14	23	SM	20	-	-	-
6																						
7																	UD-2	SM	5	-	-	-
														7	10	12	22					
8														8	11	14	25	SM	-	-	-	-
9																						
10																	UD-3	CI	20	-	-	-
														13	18	20	38					
11														14	16	19	35	CL	11	-	-	-
12																						
13					Light brown colored % 75														5	-	-	-
14																			-	-	-	-
15																						
16																			-	-	-	-

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-15.00 m
Alluvial Fan Deposits
(Qay)

0.00-2.50 m

Gravely clayey silty sand

2.50-6.00 m

Silty gravely clayey sand gravels are angular and orginated sandstone limestone.

6.50-15.00 m

sandy clay with few gravels. Sand fraction is fine

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: SK-5	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi	Muhafaza borusu/Çimentolama	Sondaj suyu (renk ve %)	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su)	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	*Drillhole radius and Type of cuttings*	*Casing/Grouting*	*Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	*Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17																			-	-	-	-		
18																			-	-	-	-		
19																								
20																			90	-	>50	W3-W4		
21																								
22																			46	12				
23																								
24																			50	-				
25																								
26					Purple-Brown colored % 50														45	14				
27																								
28																			84	34	10-50	W2-W3		
29																								
30																			15	-	>50			
31																								
32					Purple-brown colored % 60														40	-				
33																								
34																			100	23	10-50	W2		
35																			40	-	>50	W2-W3		
36																								

15.00-40.00 m
Alternation of Marl, siltstone and sandstone
Samanlık Formation
(Ks)
Gray colored highly fractured, joints are oblique in some place horizontal. Joint spaces are 1-5 cm, filled with calcite and clay, less and moderately weathered. rock quality is very poor

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Moderealty weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	KUYU NO *Borehole No*	: SK-5	SAYFA NO *Page No*	: 3

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi	Muhafaza borusu/Çimentolama	Sondaj suyu (renk ve %)	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su)	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	*Drillhole radius and Type of cuttings*	*Casing/Grouting*	*Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	*Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
37			NQ Impregnated Diamond		Purple-Brown colored % 80														87	-	>50	W2-W3		
38																								
39																			100	6				
40																								
41																			45	-				**40.00-50.50 m** **Sandstone** **Samanlık Formation** **(Ks)** Gray colored highly jointed and fractured, joints are oblique, joint spaces 0.5-2 cm, joints are filled with calcite and clay, some joints are open and without fill. Joint surfaces are smooth and slightly wavy and rough less-moderately weathered, rock quality is poor to medium
42																								
43																			55	14	10-50			
44																								
45																			50	5				
46																								
47																			100	35				
48																								
49																				54	>50	W2		
50																								
51																								**End of Borehole: 50.50 m**
52																								
53																								
54																								
55																								
56																								

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Moderealty weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-5

DEPTH: 0.00-23.00 m

TRUNK NO: 1/5



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

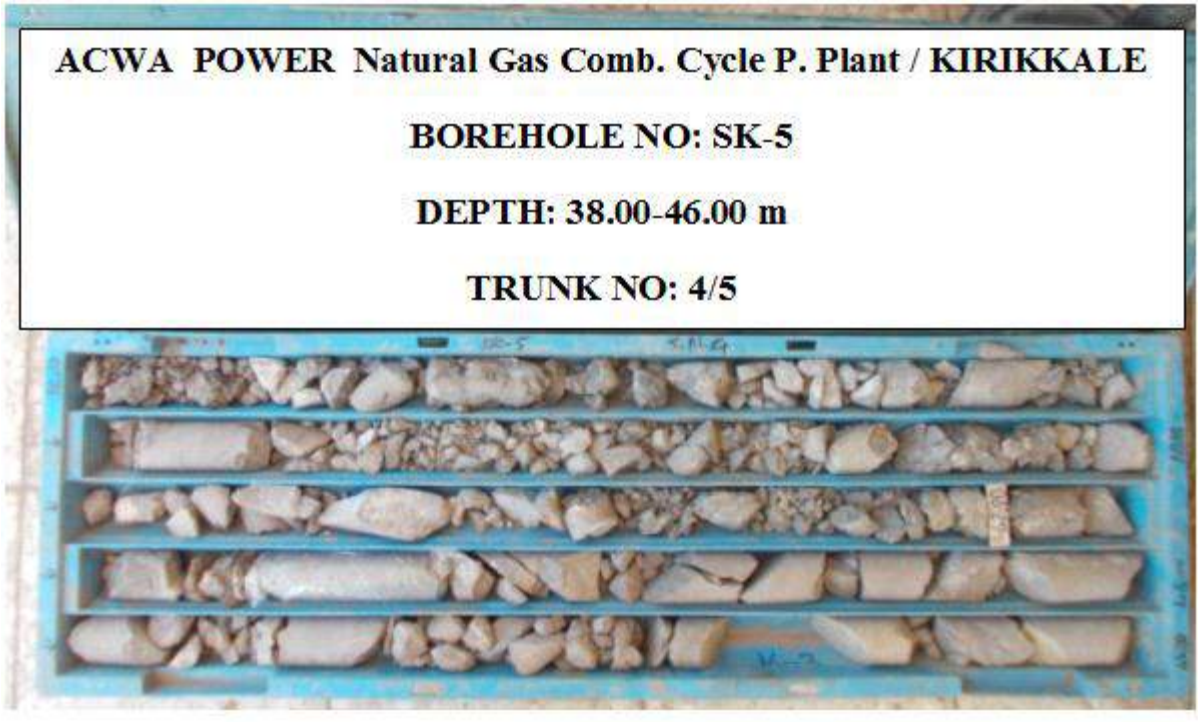
BOREHOLE NO: SK-5

DEPTH: 25.00-32.00 m

TRUNK NO: 2/5




ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-5
DEPTH: 32.00-38.00 m
TRUNK NO: 3/5


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-5
DEPTH: 38.00-46.00 m
TRUNK NO: 4/5

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-5

DEPTH: 46.00-50.50 m

TRUNK NO: 5/5



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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-6**
DERİNLİK (m) *Drill Hole Depth*	: 20.00 m	**BAŞL. TARİHİ** *Date of Start*	: 27.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 28.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 683 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 534955 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	30.06.2013	12.00 m
	Y : 4415353 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/20.00 m		

DÜŞÜNCELER / *Remarks*

UD-3 NOLU NUMUNE ZEMİN İÇİNE SURULEMEDİ..

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi	*Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	SPT Darbe Sayısı 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı	*Total rebound number*	NUMUNE(S:PT/UD/Boz.İK/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
1			NQ Impregnated Diamond		90 mm	Brown colored % 60															17	-	-	-
2															6	9	11	20		SM	-	-	-	-
3																								
4																			UD-1	SC	19	-	-	-
															9	10	10	20		SM				
5															10	12	15	27		CL	-	-	-	-
6																								
7																			UD-2	SC	-	-	-	-
															11	14	16	30		SM				
8															13	15	18	33		CL	10	-	-	-
9																								
10						Brown colored % 90										15	16	20	36		SM	10	-	-	-
11																								
															16	18	22	40		ML	20	-	-	-
12																								
13																			UD-3	SC	17	-	-	-
															20	24	10/0 cm							
14						Kahvemsi gri renkli % 50															20	-	-	-
15																								
16																					52	-	>50	W3-W4

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-15.00 m
Alluvial Fan Deposits
(Qay)

0.00-6.00 m

Silty, gravely sand.
İn some places interbedded with thin clay layers gravels are angular and originated from sandstone and limestone

6.00-15.00 m

Gravely silty sand

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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web: www.efoljeoteknik.com e-mail:info@efoljeoteknik.com

TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI / *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO / *Borehole No*	: **SK-6**	SAYFA NO / *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*: İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test*: Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	GEÇİRİMLİLİK *Permeability*: Su kayıpları (lt) *Water lost*	K (cm/s)	SPT *Standart Penetration Test*: Darbe Sayısı *Number of Blows*: 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*: Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*	LEJAND *Legend*	TANIMLAMA *Description*
17			NQ Impregnated Diamond		Gray colored % 60														80	-	>50	W2-W3		**15.00-20.00 m** **Alternation of sandstone and siltstone** **Samanlık Formation (Ks)** Gray colored fractured, joints filled with clay,washed by FeO close joints filled with calcite less-medium weathered rock quality is very poor
18																								
19																			100	22				
20																				20				
21																								**End of Borehole: 20,00 meters**
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
32																								
33																								
34																								
35																								
36																								

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Moderealty weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLENO: SK-6
DEPTH: 0.00-18.00 m
TRUNK NO: 1/2


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-6
DEPTH: 18.00-20.00 m
TRUNK NO: 2/2

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web: www.efoljeoteknik.com e-mail:info@efoljeoteknik.com

TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-7**
DERİNLİK (m) *Drill Hole Depth*	: 50.00 m	**BAŞL. TARİHİ** *Date of Start*	: 28.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 30.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 686 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 534922 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	04.07.2013	12.00 m
	Y : 4415142 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/49.00 m		

DÜŞÜNCELER / *Remarks*

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*
1			76 mm progress drill	90 mm	Açık kahve-San renkli % 40
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	SPT Darbe Sayısı 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı	Total rebound number	NUMUNE(S:PT/UD/Boz.lk/Tor/Su) *Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
														10	-	-	-
								7	6	9	15		SM	-	-	-	-
												UD-1	SC	-	-	-	-
								11	13	16	29						
								10	11	14	25		CL	-			
												UD-2	CI	4			
								7	14	18	32		CI				
														-	-	-	-
												UD-3	CL	-			
								16	20	21	41		CI				
														-			
								15	16	21	37			-	-	-	-
													UD-4				
								16	18	19	37		CI	2	-	-	-
														20	-	-	-

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-16.00 m
Alluvial Fan
(Qay)

0.00-4.00 m

Gravelly silty clayey sand.
Brown colored,
Gravels are mostly sandstone
Coarse grains are 25 - 30 %

4.00-13.50 m

Sandy clay with few gravels
Yellowish brown colored

13.50-16.00 m

Gravelly silty sand clay
gravels are angular and
semi angular, originated
conglomerate, sandstone
and granite, Coarse grain
percentage is 30 - 35 %

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: **SK-7**	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*				Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*		Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17																			31	-	>50	W2-W3		
18																								
19																			36	-	>50			
20																			100	30	10-50			
21																			74	10				
22																			82	22	>50	W2		
23																								
24																			66	21	10-50	W2-W3		
25																								
26																				20				
27																			100	38		W2		
28																			80	41				
29																								
30																			66	22				
31																								
32																			100	34				
33																								
34																				51				
35																			50	18				
36																								

NQ Impregnated Diamond

Gray-brown colored % 50-60

16.00-50.00 m
Alternation of Sandstone, siltstone and Marl
Samanlık Formation (Ks)

Pink - gray colored, highly fractured, joints are oblique and some places they are horizontal and vertical (33.30-33.67 m and 40.70-41.10 m), joint spaces are 4 - 7 mm, washed by FeO , filled with calcite, some is filled by clay and epidotic, joint surfaces are smooth and wavy, less weathered, rock quality is medium

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Moderealty weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI / *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	KUYU NO / *Borehole No*	: SK-7	SAYFA NO / *Page No*	: 3

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*	NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*	LEJAND *Legend*	TANIMLAMA *Description*
37			NQ Impregnated Diamond		Gray-brown colored % 60														66	50	10-50	W2-W3		Description are on the previos page
38																								
39																								
40																			100	83	3-10	W1-W2		
41																				60	10-50	W2		
42																								
43																								
44																				80	3-10			
45																								
46																				68		W1-W2		
47																								
48																				80		W2		
49																								
50																								
51																								End of Borehole: 50.00 m
52																								
53																								
54																								
55																								
56																								

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-7

DEPTH: 0.00-20.00 m

TRUNK NO: 1/6



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-7

DEPTH: 20.00-77.00 m

TRUNK NO: 2/6




ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-7
DEPTH: 27.00-33.00 m
TRUNK NO: 3/6


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-7
DEPTH: 33.00-40.00 m
TRUNK NO: 4/6


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-7
DEPTH:4 0.00-45.00 m
TRUNK NO: 5/6


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-7
DEPTH: 45.00-50.00 m
TRUNK NO: 6/6

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-8**
DERİNLİK (m) *Drill Hole Depth*	: 20.00 m	**BAŞL. TARİHİ** *Date of Start*	: 01.07.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 02.07.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 684 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 535013 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	05.07.2013	12.50 m
	Y : 4415189 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/20.00 m		

DÜŞÜNCELER / *Remarks*

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı 1. 15 cm	Darbe Sayısı 2. 15 cm	Darbe Sayısı 3. 15 cm	Toplam Darbe Sayısı	Total rebound number	NUMUNE(SPT/UD/Boz./KT/or/Su) *Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
1																				-	-	-	-
2														13	10	11	21		SC	-	-	-	-
3																							
4																		UD-1	SM	-	-	-	-
														14	18	20	38						
5														16	20	18	38		SM	-	-	-	-
6																							
7																		UD-2	GC	-	-	-	-
														13	19	24	43						
8														19	24	10/0			SM	-	-	-	-
9																							
10																		UD-3	SC	-	-	-	-
														13	19	20	39						
11														17	19	21	40		CL	-	-	-	-
12																							
13														19	28	50/10			CL	20	-	-	-
14																				40	5	>50	W2-W3
15																							
16																							

76 mm progress drill
NQ Impregnated Diamond
90 mm
Brown colored % 50

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-13.00 m
Alluvial Fan
(Qay)
Silty fine sands with few gravel and clay
Light brown colored, coarse grain percentage is 10 - 15 %
Clay content increases between the depths of 11,00 - 12,00 meters

13.00-15.00 m
Conglomerate Samanlık Formations (Ks)

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: **SK-8**	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*				Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*		Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17			NQ Impregnated Diamond		Gray colored % 40-50														100	72	10-50	W2		**15.00-20.00 m Alternation of claystone-siltstone-sandstone Samanlık Formation (Ks)** Gray colored, fractured, joints are oblique and horizontal and vertical in some places. (19.00-19.35 m), joint oppinings are 4-9 mm washed with FeO, filled with clay and calcite, joint surfaces wavy, less weathered and rocck quality is medium to fine
18																							
19																			76	3-10			
20																							
21																							**End of Borehole: 20.00 m**
22																							
23																							
24																							
25																							
26																							
27																							
28																							
29																							
30																							
31																							
32																							
33																							
34																							
35																							
36																							

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Moderealty weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-8

DEPTH: 0.00-18.00 m

TRUNK NO: 1/2



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-8

DEPTH: 18.00-20.00 m

TRUNK NO: 2/2



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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-9**
DERİNLİK (m) *Drill Hole Depth*	: 21.00 m	**BAŞL. TARİHİ** *Date of Start*	: 04.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 05.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 664 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 535471 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	05.06.2013	2.20 m
	Y : 4415244 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/21.00 m		

DÜŞÜNCELER / *Remarks*

6.00-12.00 m ARASINDA KUYUDA YIKILMA VE AKMA GÖZLENİYOR.

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	SPT Darbe Sayısı 1. 15 cm	SPT Darbe Sayısı 2. 15 cm	SPT Darbe Sayısı 3. 15 cm	Toplam Darbe Sayısı	Total rebound number	NUMUNE(SPT/UD/Boz.lk/Tor/Su) Sample(SPT / UD / D / C / Bulk / Water)	Karot yüzdesi (%) Percentage of core	RQD (%) Rock Quality Designation	Çatlak sıklığı (#/m) Discontinuity spacing	Ayrışma derecesi Degree of weathering	LEJAND *Legend*	TANIMLAMA *Description*
1			NQ Impregnated Diamond	90 mm								160	4,74 E_02							31	-	-	-		
												178													
2												185													
												170		9	50/12 cm					38	-	-	-		
3												250													
												225	3,71E_02												
4												300		50/10cm						23	-	-	-		
												325													
5												75								21	-	-	-		
												52													
6												40	3,94E_03												
												42													
7					Kahve % 40							7								18	-	-	-		
												8													
8												8	3,77E_04												
												7,5													
9																				-	-	-	-		
10					Gri % 50							3		21	50/12 cm				SM	24	-	-	-		
												2													
11												1	4,05E_05												
												1,5													
12																									
13			76 mm İlerleme Vidyesi									10		16	29	35	64		SM	26	-	-	-		
												11													
14												10	3,12E_04												
												9								24	-	-	-		
15																									
16																				100	19	>50	W2		

GÜNLÜK İLERLEME *Daily Runs* — **BASINÇLI SU DENEYİ** *Water Pressure Test* — **GEÇİRİMLİLİK** *Permeability* — **SPT** *Standart Penetration Test* — **KAYAÇ ÖZELLİKLERİ** *Rock properties*

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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web: www.efoljeoteknik.com e-mail:info@efoljeoteknik.com

TEMEL SONDAJ LOGU
Borehole Log

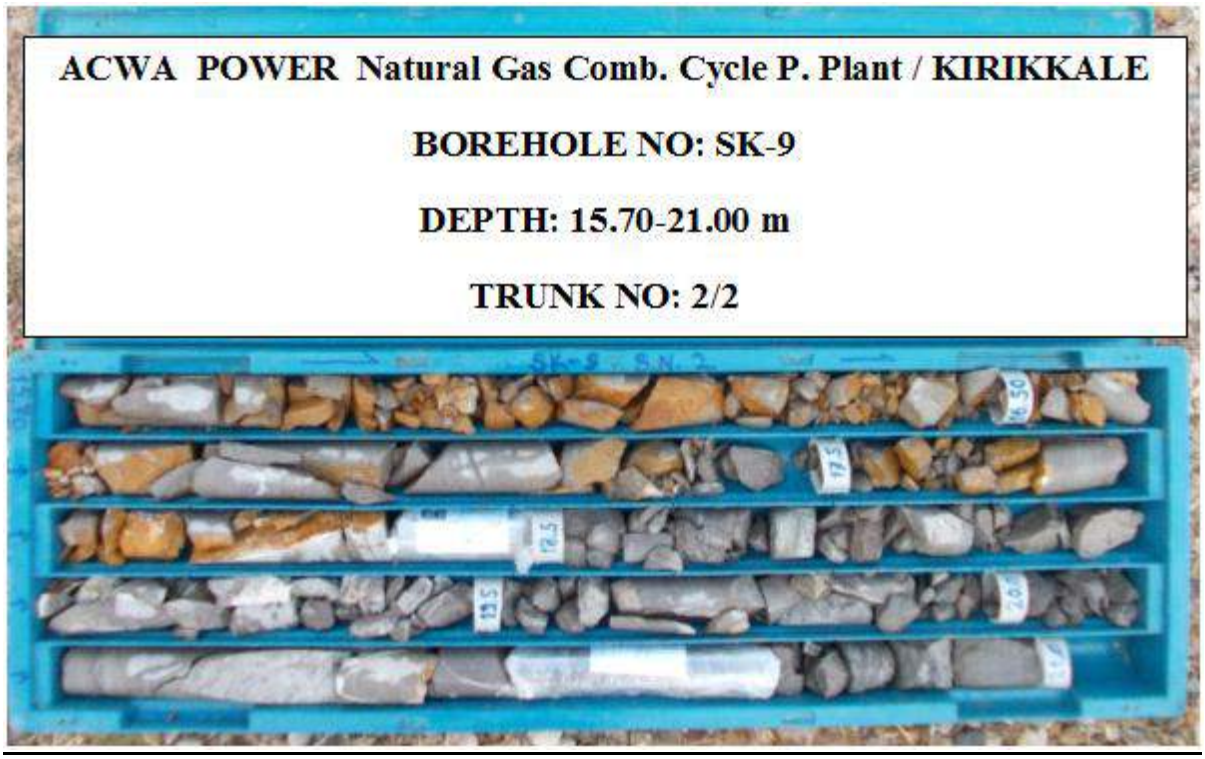
PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: **SK-9**	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Keskici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*				Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*		Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17																			83	31				
18																			70	15	10-50			
19			NQ Impregnated Diamond		Sarı-Gri % 80														96	-	>50	W3		**15.00-20.00 m** **Santstone, interbedded with claystone** **Samanlık Formation (Ks)** Gray colored highly fractured, joints are oblique, in some places vertical (13.70-14.00 m), joint spaces 5-9 mm, washed by FeO, filled with calcite dolgulu, joint surfaces are smooth and slightly rough and wavy,less weathered, rock quality is poor
20																			90	-				
21																			100	57	10-50			
22																								**End of Borehole: 21.00 m**
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
32																								
33																								
34																								
35																								
36																								

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-9
DEPTH: 0.00-15.70 m
TRUNK NO: 1/2


ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE
BOREHOLE NO: SK-9
DEPTH: 15.70-21.00 m
TRUNK NO: 2/2

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web: www.efoljeoteknik.com e-mail:info@efoljeoteknik.com

TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K.Ç.S.	**YERİ** *Location*	:	**KUYU NO** *Borehole No*	: **SK-10**
DERİNLİK (m) *Drill Hole Depth*	: 20.50 m	**BAŞL. TARİHİ** *Date of Start*	: 05.06.2013	**SAYFA NO** *Page No*	: 1
EĞİM / EĞİM YÖNÜ *Direction of Incliation*	: VERTICAL	**BİTİŞ TARİHİ** *Date of Completion*	: 06.06.2013	**YERALTISUYU GÖZLEMLERİ** *Groundwater Observations*	
KOT (m) *Ground Elevation*	: 666 m	**MAKİNA TİPİ** *Type of Drill Mach.*	: D-500	**Tarih** *Date*	**Derinlik (m)** *Depth*
KOORDİNAT Coordinate	X : 535483 D	**SONDÖR ADI SOYADI** *Driller Name and Surname*	: A. DEMİR	07.06.2013	2.10 m
	Y : 4415370 K	**RASAT BORU ÇAPI / BOYU** *Standpipe dia.(mm) / Lenght (m)*	: 40 mm/20.50 m		

DÜŞÜNCELER / *Remarks*

4.00-11.00 m ARASINDA KUYUDA YIKILMA VE AKMA GÖZLENİYOR.

B S T Ekipmanı / *Water Pressure Test Equipment*

Deneyde kullanılan tij cinsi *Rod Type*	:
Deneyde kullanılan pompa kapasitesi (lt/dak) / *Pomp Capacity0*	:
Deney cinsi / *Test Type*	:
Tıkaç lastiği boyu (cm) *Lenght of probe*	:

Derinlik (m) *Depth*	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*	Kuyu çapı ve Kesici uç cinsi	*Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	SPT Darbe Sayısı 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı	*Total rebound number*	NUMUNE(S:PT/UD/Boz.İK/Tor/Su) *Sample(SPT / UD / D / C / Bulk / Water)*	Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*
1						Brown colored % 80							20								22	-	-	-
													24	2,90E_03										
2													23											
													24		10	12	13	25		SM	-	-	-	-
3													8,5											
													8	1,64E_03										
4													8		8	10	11	21			-	-	-	-
													7											
5						Brown % 40																		
															9	13	15	28		SM-SP	7	-	-	-
6																								
7													6		7	10	11	21						
													8	2,78E_04										
8													7											
													7		8	11	11	22		SM				
9																								
10						Greenish-yellowish brown % 90							4,5		6	8	10	18			10	-	-	-
													6	1,26E_04										
11													7,5											
													7											
12																								
															14	12	16	28		CL	48	-	-	-
13																								
14						Grayish purple % 90																72	52	3-10	W2
15																								
16																					100	53		

NQ Impregnated Diamond — 90 mm

LEJAND *Legend*

T A N I M L A M A *Description*

0.00-12.80 m
Alluvium
(Qal)

0.00-7.00 m
Gravely silty sand
Grains are round and semi round and originated limestone, sandstone, granite and magnesite; coarse fraction is 20-30 %.

7.00-10.00 m
Clayey silty sand with few gravel

10.00-12.80 m
Yellowish brown colored sandy silty clay with few gravels

12.80-20.50 m
Sandstone interbedded with claystone siltstone
Samanlık Formation (Ks)
Gay colored, highly fractured, they are oblique in some places vertical (11.60-11.90 m), joint spaces 4-8 mm washed by FeO, filled with calcite, joint surfaces smooth and slightly rough , less weathered and rock quality is medium

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*

0 - 2	Çok yumuşak *Very soft*
3 - 4	Yumuşak *Soft*
5 - 8	Orta katı *Medium stiff*
9 - 15	Katı *Stiff*
16 - 30	Çok katı *Very stiff*
> 30	Sert *Hard*

İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*

0 - 4	Çok gevşek *Very loose*
5 - 10	Gevşek *Loose*
11 - 30	Orta sıkı *Medium dense*
31 - 50	Sıkı *Dense*
> 50	Çok sıkı *Very dense*

GEÇİRİMLİLİK (LUGEON) *Permeability*

< 1	Geçirimsiz *Impermeable*
1 - 5	Az Geçirimli *Less permeable*
5 - 25	Geçirimli *Permeable*
> 25	Çok Geçirimli *Very permeable*

RQD (%) *Rock Quality Designation*

0 - 25	Çok zayıf *Very poor*
25 - 50	Zayıf *Poor*
50 - 75	Orta *Medium*
75 - 90	İyi *Fine*
90 -100	Çok İyi *Very fine*

ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*

< 1	Masif *Massive*
1 - 3	Az Çatlaklı-Kırıklı *Less*
3 - 10	Kırıklı *Fractured*
10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*
> 50	Parçalanmış *Very fractured*

AYRIŞMA DERECESİ (W) *Degree of Weathering*

W1	Taze (Ayrışmamış) *Fresh*
W2	Az Ayrışmış *Less weathered*
W3	Orta Derecede Ayrışmış *Modereatly weatered*
W4	Çok Ayrışmış *Mostly weathered*
W5	Tamamen Ayrışmış *Completely weathered*

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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TEMEL SONDAJ LOGU
Borehole Log

PROJE ADI *Project Name*	: ACWA POWER D.GAZ K. Ç. S.	KUYU NO *Borehole No*	: **SK-10**	SAYFA NO *Page No*	: 2

Derinlik (m) *Depth*	GÜNLÜK İLERLEME *Daily Runs*		Kuyu çapı ve Kesici uç cinsi *Drillhole radius and Type of cuttings*	Muhafaza borusu/Çimentolama *Casing/Grouting*	Sondaj suyu (renk ve %) *Drillhole water (colour and %)*	BASINÇLI SU DENEYİ *Water Pressure Test*						GEÇİRİMLİLİK *Permeability*		SPT *Standart Penetration Test*				NUMUNE(SPT/UD/Boz./K/Tor./Su) *Sample(SPT / UD / D / C / Bulk / Water)*	KAYAÇ ÖZELLİKLERİ *Rock properties*				LEJAND *Legend*	TANIMLAMA *Description*
	İlerleme (m) *Drill runs*	Su seviyesi ölçümü *Water level measurement*				Basınç (kg/cm²) *Pressure*	Manometre Yük. (m) *Height of Manometer*	5 dak kayıp (lt) *5 min. Lost*	5 dak kayıp (lt) *5 min. Lost*	Toplam kayıp (lt) *Total lost*	Lugeon	Su kayıpları (lt) *Water lost*	K (cm/s)	Darbe Sayısı *Number of Blows* 1. 15 cm	2. 15 cm	3. 15 cm	Toplam Darbe Sayısı *Total rebound number*		Karot yüzdesi (%) *Percentage of core*	RQD (%) *Rock Quality Designation*	Çatlak sıklığı (#/m) *Discontinuity spacing*	Ayrışma derecesi *Degree of weathering*		
17			NQ Impregnated Diamond		Purple-gray % 90														100	70	10-50	W2		Description is on the previous page
18																								
19																				62				
20																								
21																								**End of Borehole: 20.50 m**
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
32																								
33																								
34																								
35																								
36																								

İNCE TANELİ ZEMİNLER (N) *Fine Grained Soils*		İRİ TANELİ ZEMİNLER (N) *Coarse GrainedSoils*		GEÇİRİMLİLİK (LUGEON) *Permeability*		RQD (%) *Rock Quality Designation*		ÇATLAK SIKLIĞI (# m) *Discontinuity Spacing*		AYRIŞMA DERECESİ (W) *Degree of Weathering*	
0 - 2	Çok yumuşak *Very soft*	0 - 4	Çok gevşek *Very loose*	< 1	Geçirimsiz *Impermeable*	0 - 25	Çok zayıf *Very poor*	< 1	Masif *Massive*	W1	Taze (Ayrışmamış) *Fresh*
3 - 4	Yumuşak *Soft*	5 - 10	Gevşek *Loose*	1 - 5	Az Geçirimli *Less permeable*	25 - 50	Zayıf *Poor*	1 - 3	Az Çatlaklı-Kırıklı *Less*	W2	Az Ayrışmış *Less weathered*
5 - 8	Orta katı *Medium stiff*	11 - 30	Orta sıkı *Medium dense*	5 - 25	Geçirimli *Permeable*	50 - 75	Orta *Medium*	3 - 10	Kırıklı *Fractured*	W3	Orta Derecede Ayrışmış *Modereatly weatered*
9 - 15	Katı *Stiff*	31 - 50	Sıkı *Dense*	> 25	Çok Geçirimli *Very permeable*	75 - 90	İyi *Fine*	10 - 50	Çok Çatlaklı-Kırıklı *Very jointed fractured*	W4	Çok Ayrışmış *Mostly weathered*
16 - 30	Çok katı *Very stiff*	> 50	Çok sıkı *Very dense*			90 -100	Çok İyi *Very fine*	> 50	Parçalanmış *Very fractured*	W5	Tamamen Ayrışmış *Completely weathered*
> 30	Sert *Hard*										

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-10

DEPTH: 0.00-15.50 m

TRUNK NO: 1/2



ACWA POWER Natural Gas Comb. Cycle P. Plant / KIRIKKALE

BOREHOLE NO: SK-10

DEPTH: 15.50-20.50 m

TRUNK NO: 2/2



APP-3:

TEST PIT LOGS AND PHOTOGRAPHS

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: **ACWA POWER**	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-1**
KOT *Ground Elevation*	: 681 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.50 m
KOORDİNATLAR *Coordinates*	X : 535 200 D Y 4415 150 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.50 m	JCB

Derinlik (m) *Depth*	LEJAND *Legend*	ZEMİN TANIMLAMASI *Strata Description*	YAS Seviyesi *GWL Level*	NUMUNE *Sample* Derinlik *Depth*	Tipi *Type*	No	MAK. KURU BİRİM AĞIRLIK gr/cm3 *Max.Dry Unit Weigth*	Optimum Su İçeriği (%) *Opt.Water Cont.*	Plastik Limit PL *Plastic Limit*	Plas. İndisi PI *Plastisite Index*	Likit Limit LL *Liquid Limit*	Su İçeriği w (%) *Water Content*	ELEK ANALİZİ *Sieve Analysis* + 4	ELEK ANALİZİ -200	ZEMİN SINIFI *Soil Classification*
0		**0.00-0.30 m** Top Soil													
1		**0.30-2.40 m** **Alluvial fan deposits** **(Qay)** Silty caly with few gravel Coarse fraction percentage is 20% , grains are angular and semi angular			T		2,054	10,36	17,6	7,3	24,9	5	28	10	SC
2															
3		**2.40-3.50 m** **Alluvial fan deposits** **(Qay)** sand silty clay with few gravels			T		1,729	17,85	18,1	18,7	36,8	17	4	56	CI
4		**End of Pit: 3.50 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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web: www.efoljeoteknik.com e-mail:info@efoljeoteknik.com

ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: **ACWA POWER**	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-2**
KOT *Ground Elevation*	: 684 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.30 m
KOORDİNATLAR *Coordinates*	X : 535 125 D Y 4415 106 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.30 m	JCB

Derinlik (m) *Depth*	LEJAND *Legend*	ZEMİN TANIMLAMASI *Strata Description*	YAS Seviyesi *GWL Level*	NUMUNE *Sample* Derinlik *Depth*	Tipi *Type*	No	MAK. KURU BİRİM AĞIRLIK gr/cm3 *Max.Dry Unit Weigth*	Optimum Su İçeriği (%) *Opt.Water Cont.*	Plastik Limit PL *Plastic Limit*	Plas. İndisi PI *Plastisite Index*	Likit Limit LL *Liquid Limit*	Su İçeriği w (%) *Water Content*	ELEK ANALİZİ *Sieve Analysis* + 4	ELEK ANALİZİ -200	ZEMİN SINIFI *Soil Classification*
1		**0.00-0.40 m** Top Soil													
		0.40-1.00 m **Alluvial fan deposits** **(Qay)** well graded gravely sand, grains are flaky													
2		**1.00-3.30 m** **Alluvial fan deposits** **(Qay)** Clayey sand with few gravel, dry, coarse grain percentage is 20 %, grains are angular and semi angular yarı yuvarlak ve köşeli.													
3					T		2,087	9,78	17,7	6,5	24,2	8	29	11	SC
4		**End of Pit: 3.30 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: ACWA POWER	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-3**
KOT *Ground Elevation*	: 689 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.40 m
KOORDİNATLAR *Coordinates*	X : 535 071 D Y 4415 055 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.40 m	JCB

Derinlik (m) *Depth*	**LEJAND** *Legend*	**ZEMİN TANIMLAMASI** *Strata Description*	**YAS Seviyesi** *GWL Level*	**NUMUNE** *Sample*			**MAK. KURU BİRİM AĞIRLIK** *Max.Dry Unit Weigth* gr/cm3	**Optimum Su İçeriği (%)** *Opt.Water Cont.*	**Plastik Limit PL** *Plastic Limit*	**Plas. İndisi PI** *Plastisite Index*	**Likit Limit LL** *Liquid Limit*	**Su İçeriği w (%)** *Water Content*	**ELEK ANALİZİ** *Sieve Analysis*		**ZEMİN SINIFI** *Soil Classification*
				Derinlik *Depth*	**Tipi** *Type*	**No**							**+ 4**	**-200**	
		0.00-0.30 m Top Soil													
1		**0.30-1.80 m** **Alluvial fan deposits** **(Qay)** Gravely clayey sand with few blocks, damp, coarse fraction is 15-20 %, grains are semi angular and angular			T		2,068	10,52	17,8	6,6	24,4	7	19	12	SC
2															
3		**1.80-3.40 m** **Alluvial fan deposits** **(Qay)** Silty clay with few gravels			T		1,861	13,97	18	7,1	25,1	10	3	53	CL
4		**End of Pit: 3.40 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: **ACWA POWER**	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-4**
KOT *Ground Elevation*	: 682 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.60 m
KOORDİNATLAR *Coordinates*	X : 534 869 D Y 4415 236 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.60 m	JCB

Derinlik (m) *Depth*	**LEJAND** *Legend*	**ZEMİN TANIMLAMASI** *Strata Description*	**YAS Seviyesi** *GWL Level*	**NUMUNE** *Sample*			**MAK. KURU BİRİM AĞIRLIK** *Max.Dry Unit Weigth* gr/cm3	**Optimum Su İçeriği (%)** *Opt.Water Cont.*	**Plastik Limit PL** *Plastic Limit*	**Plas. İndisi PI** *Plastisite Index*	**Likit Limit LL** *Liquid Limit*	**Su İçeriği w (%)** *Water Content*	**ELEK ANALİZİ** *Sieve Analysis*		**ZEMİN SINIFI** *Soil Classification*
				Derinlik *Depth*	**Tipi** *Type*	**No**							**+ 4**	**-200**	
		0.00-0.30 m Top Soil													
1		**0.30-1.50 m** **Alluvial fan deposits** **(Qay)** Clayey sand with few gravel and silt, dry, coarse fraction is 15-20 %, grains are semi angular.			T		2,103	8,82	17,9	6,3	24,2	8	24	13	SC
2															
3		**1.50-3.60 m** **Alluvial fan deposits** **(Qay)** Sandy caly with few gravels, yellowish brown colored			T		1,867	12,15	18,3	6,4	24,7	9	6	52	CL
4		**End of Pit: 3.60 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: **ACWA POWER**	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-5**
KOT *Ground Elevation*	: 680 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.40 m
KOORDİNATLAR *Coordinates*	X : 534 936 D Y 4415 282 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.40 m	JCB

Derinlik (m) *Depth*	LEJAND *Legend*	ZEMİN TANIMLAMASI *Strata Description*	YAS Seviyesi *GWL Level*	NUMUNE *Sample* Derinlik *Depth*	Tipi *Type*	No	MAK. KURU BİRİM AĞIRLIK gr/cm3 *Max.Dry Unit Weigth*	Optimum Su İçeriği (%) *Opt.Water Cont.*	Plastik Limit PL *Plastic Limit*	Plas. İndisi PI *Plastisite Index*	Likit Limit LL *Liquid Limit*	Su İçeriği w (%) *Water Content*	ELEK ANALİZİ *Sieve Analysis* + 4	ELEK ANALİZİ -200	ZEMİN SINIFI *Soil Classification*
1		**0.00-0.30 m** Top Soil													
2		**0.30-3.40 m** **Alluvial fan deposits (Qay)** Silty calyey with few gravel and blocks, dry, coarse grains are 20 % and originated sandstone.			T		2,072	10,03	17,8	7	24,8	7	25	11	SC
3															
4		**End of Pit: 3.40 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: **ACWA POWER**	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-6**
KOT *Ground Elevation*	: 695 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.50 m
KOORDİNATLAR *Coordinates*	X : 534 609 D Y 4415 362 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.50 m	JCB

Derinlik (m) *Depth*	**LEJAND** *Legend*	**ZEMİN TANIMLAMASI** *Strata Description*	**YAS Seviyesi** *GWL Level*	**NUMUNE** *Sample* Derinlik *Depth*	Tipi *Type*	No	**MAK. KURU BİRİM AĞIRLIK** gr/cm3 *Max.Dry Unit Weigth*	**Optimum Su İçeriği (%)** *Opt.Water Cont.*	**Plastik Limit PL** *Plastic Limit*	**Plas. İndisi PI** *Plastisite Index*	**Likit Limit LL** *Liquid Limit*	**Su İçeriği w (%)** *Water Content*	**ELEK ANALİZİ** Sieve Analysis + 4	-200	**ZEMİN SINIFI** *Soil Classification*
1		**0.00-0.30 m** Top Soil													
2		**0.30-3.50 m** **Alluvial fan deposits** **(Qay)** Gravely clayey sand, grains are angular and semi angular, damp, coarse fraction is 30-35 %			T		2,061	10,24	17,9	5,7	23,6	6	34	7	SC
3															
4		**End of Pit: 3.50 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: **ACWA POWER**	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-7**
KOT *Ground Elevation*	: 688 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.20 m
KOORDİNATLAR *Coordinates*	X : 534 732 D Y 4415 316 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

3.00 m'den itibaren bloklardan dolayı kazı zorluğu yaşandı.

KISALTMALAR *Abbreviations*

D : Örselenmiş numune *Disturbed Sample*
UD : Örselenmemiş Numune *Undisturbed Sample*
T : Torba Numune *Bulk Sample*
S : Su Numunesi *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	KAZI YÖNTEMİ *Excavation Method*
3.20 m	JCB

Derinlik (m) *Depth*	LEJAND *Legend*	ZEMİN TANIMLAMASI *Strata Description*	YAS Seviyesi *GWL Level*	NUMUNE *Sample* Derinlik *Depth*	Tipi *Type*	No	MAK. KURU BİRİM AĞIRLIK gr/cm3 *Max.Dry Unit Weigth*	Optimum Su İçeriği (%) *Opt.Water Cont.*	Plastik Limit PL *Plastic Limit*	Plas. İndisi PI *Plastisite Index*	Likit Limit LL *Liquid Limit*	Su İçeriği w (%) *Water Content*	ELEK ANALİZİ *Sieve Analysis* + 4	ELEK ANALİZİ -200	ZEMİN SINIFI *Soil Classification*
1		**0.00-0.40 m** Top Soil													
2		**0.40-3.20 m** **Alluvial fan deposits** **(Qay)** Gravely clayey sand with few blocks, gravels originated from sandstone and limestone, coarse grain percentages; 40%, block size is between 0,4-0,7 m			T		2,57	10,31	18,2	6,4	24,6	6	32	8	SC
3															
4		**End of Pit: 3.20 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: **ACWA POWER**	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-8**
KOT *Ground Elevation*	: 694 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.20 m
KOORDİNATLAR *Coordinates*	**X** : 534 827 D **Y** 4415 348 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

Bloklardan dolayı kazı zorluğu yaşandı.

KISALTMALAR *Abbreviations*

D : Örselenmiş numune *Disturbed Sample*
UD : Örselenmemiş Numune *Undisturbed Sample*
T : Torba Numune *Bulk Sample*
S : Su Numunesi *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.20 m	JCB

Derinlik (m) *Depth*	LEJAND *Legend*	ZEMİN TANIMLAMASI *Strata Description*	YAS Seviyesi *GWL Level*	NUMUNE *Sample* Derinlik *Depth*	Tipi *Type*	No	MAK. KURU BİRİM AĞIRLIK gr/cm3 *Max.Dry Unit Weigth*	Optimum Su İçeriği (%) *Opt.Water Cont.*	Plastik Limit PL *Plastic Limit*	Plas. İndisi PI *Plastisite Index*	Likit Limit LL *Liquid Limit*	Su İçeriği w (%) *Water Content*	ELEK ANALİZİ Sieve Analysis + 4	ELEK ANALİZİ Sieve Analysis -200	ZEMİN SINIFI *Soil Classification*
1		**0.00-0.40 m** Top Soil													
2		**0.40-3.20 m** **Alluvial fan deposits** **(Qay)** Gravely clayey sand with few blocks, dry, blocks are angular, coarse grain is 20 %			T		2,116	8,65	17,3	5,9	23,2	5	23	14	SC
3															
4		**End of Pit: 3.20 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: ACWA POWER	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-9**
KOT *Ground Elevation*	: 676 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.50 m
KOORDİNATLAR *Coordinates*	X : 534 872 D Y 4415 473 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	KAZI YÖNTEMİ *Excavation Method*
3.50 m	JCB

Derinlik (m) *Depth*	LEJAND *Legend*	ZEMİN TANIMLAMASI *Strata Description*	YAS Seviyesi *GWL Level*	NUMUNE *Sample* Derinlik *Depth*	Tipi *Type*	No	MAK. KURU BİRİM AĞIRLIK gr/cm3 *Max.Dry Unit Weigth*	Optimum Su İçeriği (%) *Opt.Water Cont.*	Plastik Limit PL *Plastic Limit*	Plas. İndisi PI *Plastisite Index*	Likit Limit LL *Liquid Limit*	Su İçeriği w (%) *Water Content*	ELEK ANALİZİ *Sieve Analysis* + 4	ELEK ANALİZİ *Sieve Analysis* -200	ZEMİN SINIFI *Soil Classification*
1		**0.00-0.40 m** Top Soil													
2		**0.40-3.50 m** **Alluvial fan deposits** **(Qay)** Gravely clayey sand with few blocks, grains angular and semi angular, gravels are originated from limestone sandstone and magnesite, the percentage of the coarse fraction is between 20 - 25 %			T		2,087	9,88	17,2	5,2	22,4	4	30	11	SC
3															
4		**End of Pit: 3.50 m**													
5															

LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			

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ARAŞTIRMA ÇUKURU LOGU
Trial Pit Log

PROJE ADI *Project Name*	: ACWA POWER	**TARİH** *Date*	: 02.07.2013	**UKUR NO** *Pit No*	: **AÇ-10**
KOT *Ground Elevation*	: 675 m	**KM** *Km*	:	**DERİNLİK (m)** *Pit Depth*	: 3.60 m
KOORDİNATLAR *Coordinates*	X : 534 790 D Y 4415 528 K	**HARİTA PAFTA NO** *Map Section No*	:	**YAS Seviyesi** *GW Level*	: -

DÜŞÜNCELER *Remarks*

KISALTMALAR *Abbreviations*

- **D : Örselenmiş numune** *Disturbed Sample*
- **UD : Örselenmemiş Numune** *Undisturbed Sample*
- **T : Torba Numune** *Bulk Sample*
- **S : Su Numunesi** *Water Sample*

KAZILABİLİRLİK *Ease of Excavation*

DERİNLİK *Depth*	**KAZI YÖNTEMİ** *Excavation Method*
3.60 m	JCB

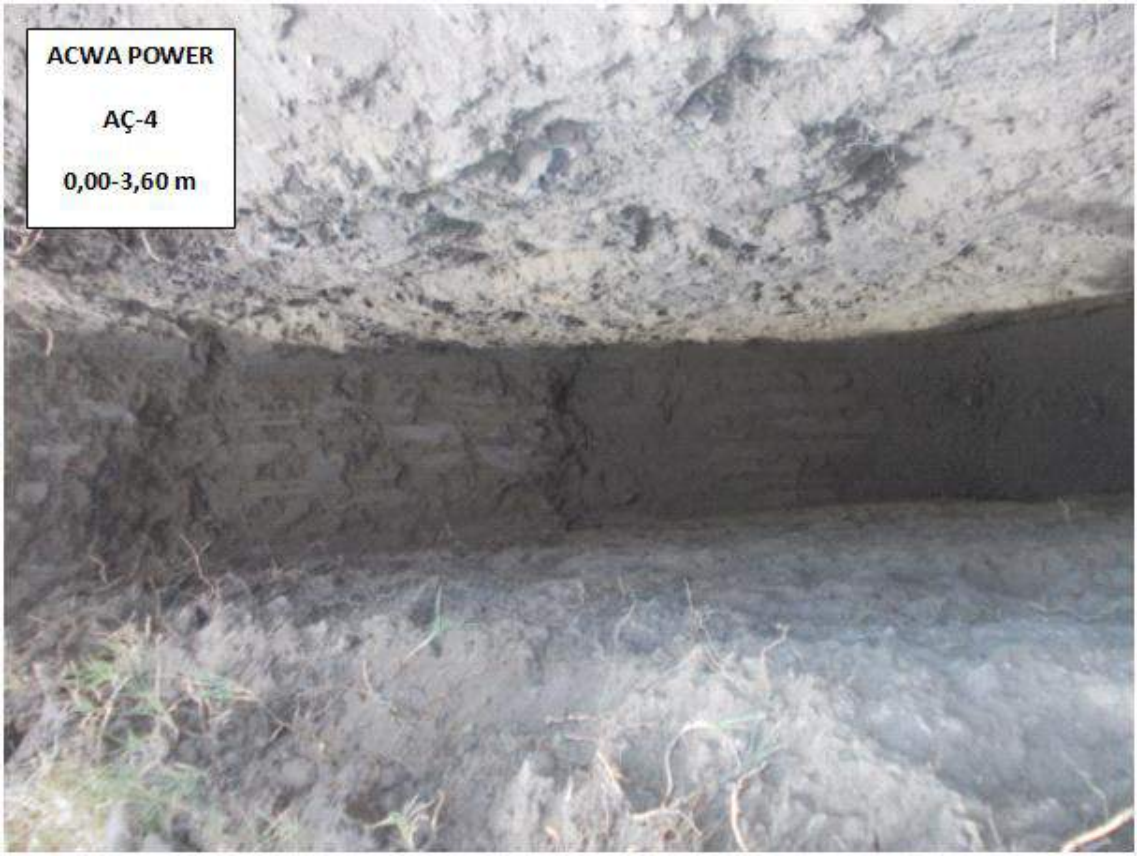
Derinlik (m) *Depth*	**LEJAND** *Legend*	**ZEMİN TANIMLAMASI** *Strata Description*	**YAS Seviyesi** *GWL Level*	**NUMUNE** *Sample* Derinlik *Depth*	Tipi *Type*	No	**MAK. KURU BİRİM AĞIRLIK** gr/cm3 *Max.Dry Unit Weigth*	**Optimum Su İçeriği (%)** *Opt.Water Cont.*	**Plastik Limit PL** *Plastic Limit*	**Plas. İndisi PI** *Plastisite Index*	**Likit Limit LL** *Liquid Limit*	**Su İçeriği w (%)** *Water Content*	**ELEK ANALİZİ** Sieve Analysis + 4	-200	**ZEMİN SINIFI** *Soil Classification*
1		**0.00-0.30 m** Top Soil													
2		**0.30-3.60 m Alluvial fan deposits (Qay)** . Gravely silty clayey sand with few blocks, blocks are originated sandstone limestone and magnesite, almost dry, coarse fraction is 25-30 %			T		2.084	9,92	18	5,9	23,9	6	30	10	SC
3															
4		**End of Pit: 3.60 m**													
5															

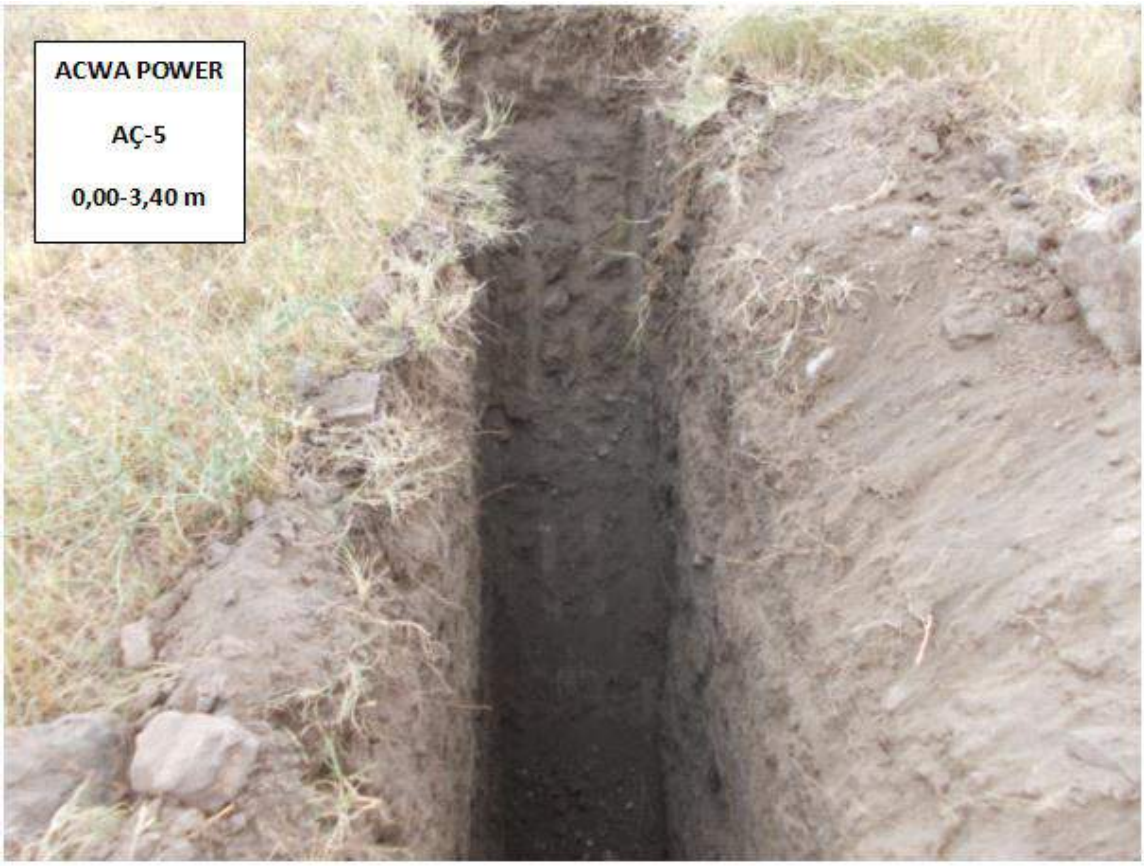
LOGU HAZIRLAYAN (Adı Soyadı, Ünvanı, İmzası) *Log Prepared By (Name Surname, Title, Signature)*			
KONTROL MÜHENDİSİ (Adı Soyadı, Ünvanı, İmzası) *Supervisor Engineer (Name Surname, Title, Signature)*			


ACWA POWER
AÇ-1
0,00-3,50 m


ACWA POWER
AÇ-2
0,00-3,30 m

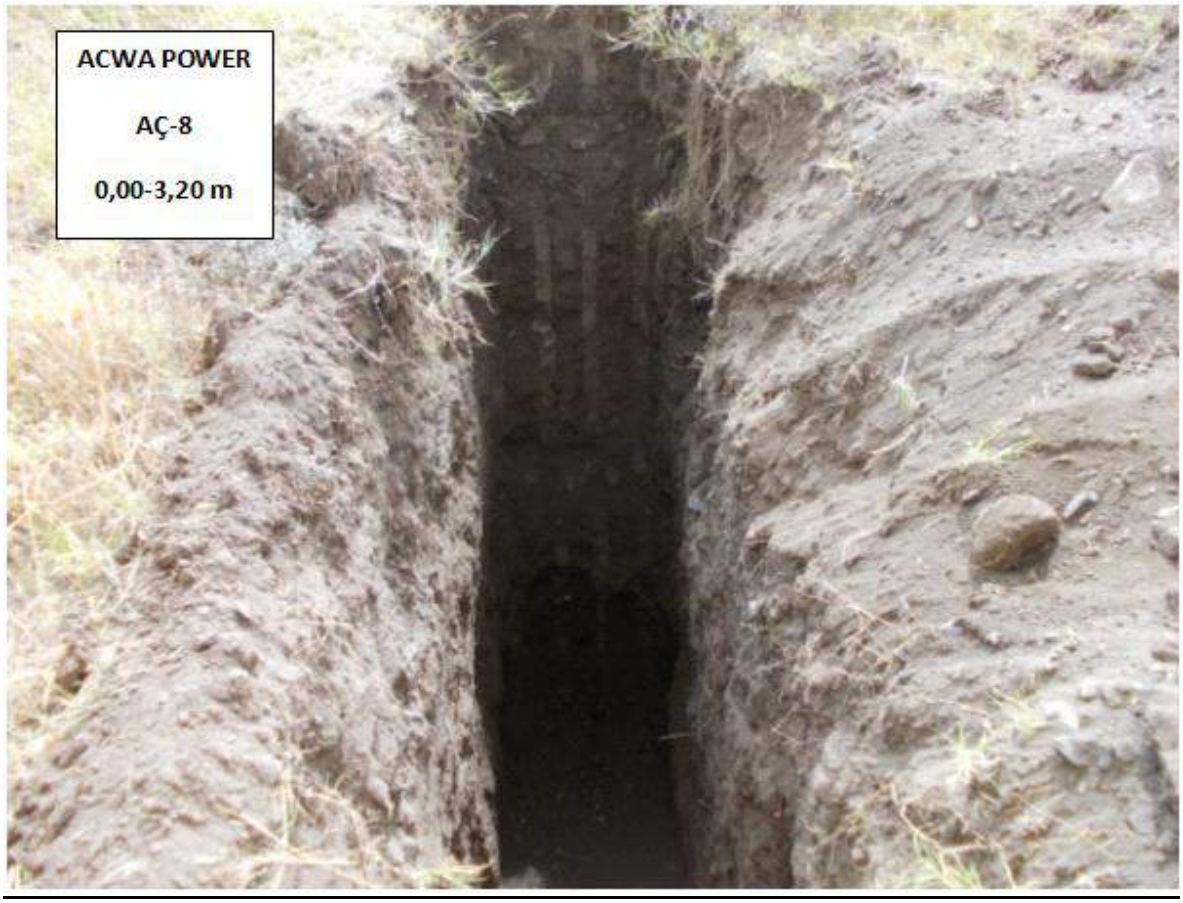

ACWA POWER
AÇ-3
0,00-3,40 m


ACWA POWER
AÇ-4
0,00-3,60 m


ACWA POWER
AÇ-5
0,00-3,40 m


ACWA POWER
AÇ-6
0,00-3,50 m


ACWA POWER
AÇ-7
0,00-3,20 m


ACWA POWER
AÇ-8
0,00-3,20 m


ACWA POWER
AÇ-9
0,00-3,50 m


ACWA POWER
AÇ-10
0,00-3,60 m

APP-4:

PERMEABILITY TEST RESULTS

Efol Jeoteknik Hizmetler Ticaret Ltd. Şti.
Ofis: 1324.cad. 1326 sok. N0:4/4 A.Öveçler, ANKARA,
Tel: (312)473 54 37 Faks: (312)473 54 38
Lab: Özanadolu San. Sit. 677. sok. No:36 Ostim, ANKARA

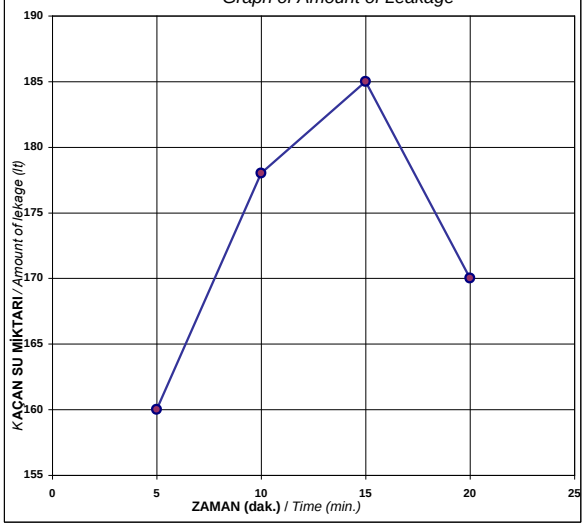
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-9**
DENEY YERİ *Test Location*	-	**KUYU KOTU (m)** *Borehole Elev*		664,00
TARİH *Date*	04.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	1,50
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,20
		DENEY ZONU BOYU (m) *Test Lenght (m)*		1,50

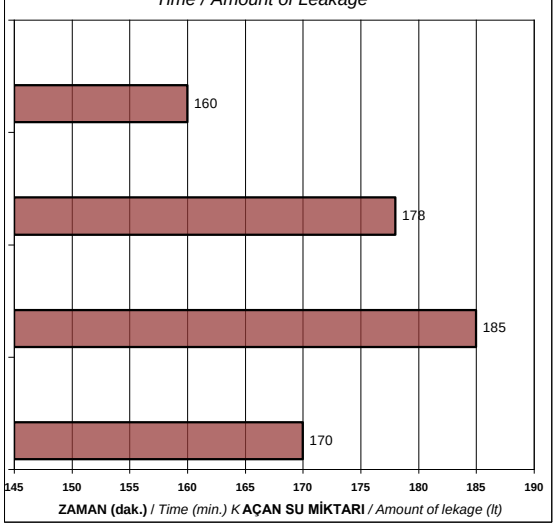
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	160,0	173,3
2. 5 dakika *2nd 5. min.*	178,0	
3. 5 dakika *3rd 5. min.*	185,0	
4. 5 dakika *4th 5. min.*	170,0	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	25,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,002

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



ZAMAN / KAÇAN SU MİKTARI
Time / Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000008
İLETKENLİK KATS. *Coefficient of Transmissibility*	**Cu**	95895,10

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	1,50
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	34,65

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**4,74E-02**

ÇOK GEÇİRİMLİ *HIGHLY PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

Efol Jeoteknik Hizmetler Ticaret Ltd. Şti.
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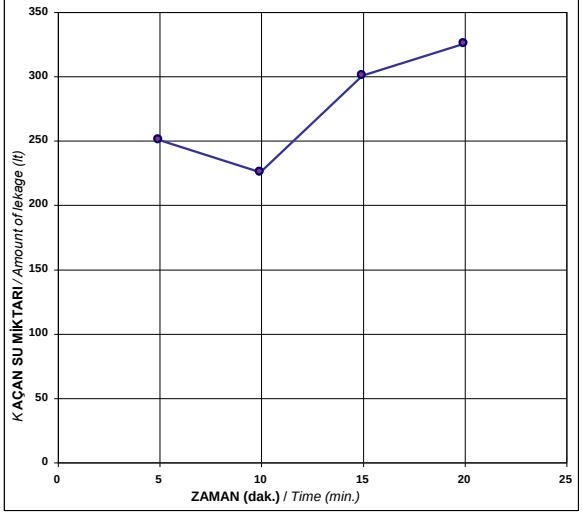
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-9**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		664,00
TARİH *Date*	04.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	4,00
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,20
		DENEY ZONU BOYU (m) *Test Lenght (m)*		2,50

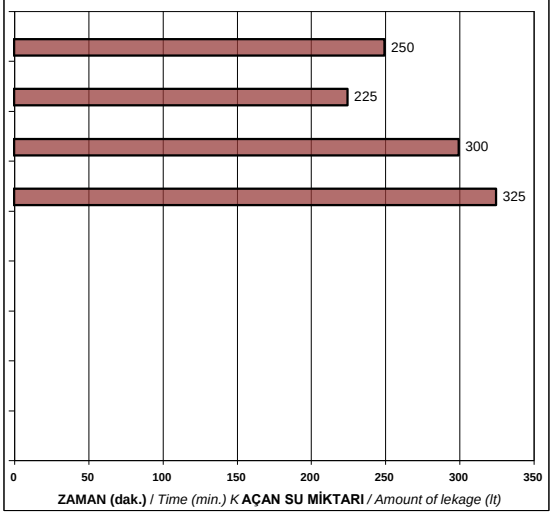
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	250,0	275,0
2. 5 dakika *2nd 5. min.*	225,0	
3. 5 dakika *3rd 5. min.*	300,0	
4. 5 dakika *4th 5. min.*	325,0	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	25,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,002

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



ZAMAN / KAÇAN SU MİKTARI
Time / Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000005
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	239407,53

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	1,80
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	55

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**3,71E-02**

ÇOK GEÇİRİMLİ *HIGHLY PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

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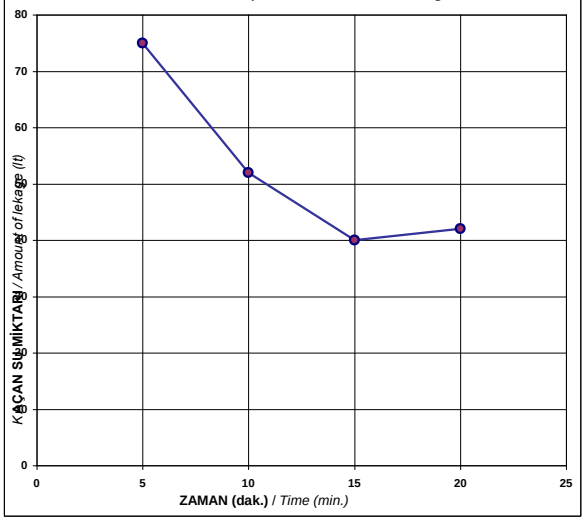
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-9**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		664,00
TARİH *Date*	04.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	6,00
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,20
		DENEY ZONU BOYU (m) *Test Lenght (m)*		2,00

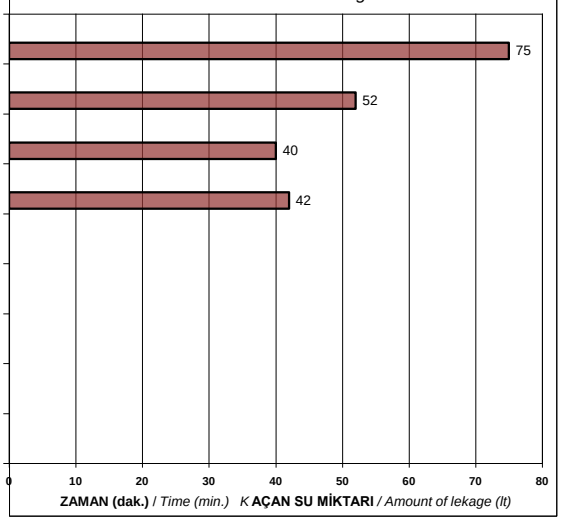
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	75,0	52,3
2. 5 dakika *2nd 5. min.*	52,0	
3. 5 dakika *3rd 5. min.*	40,0	
4. 5 dakika *4th 5. min.*	42,0	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	25,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,002

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



ZAMAN / KAÇAN SU MİKTARI
Time / Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000006
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	158615,27

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	3,80
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	10,45

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**3,94E-03**

ÇOK GEÇİRİMLİ *HIGHLY PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

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Lab: Özanadolu San. Sit. 677. sok. No:36 Ostim, ANKARA

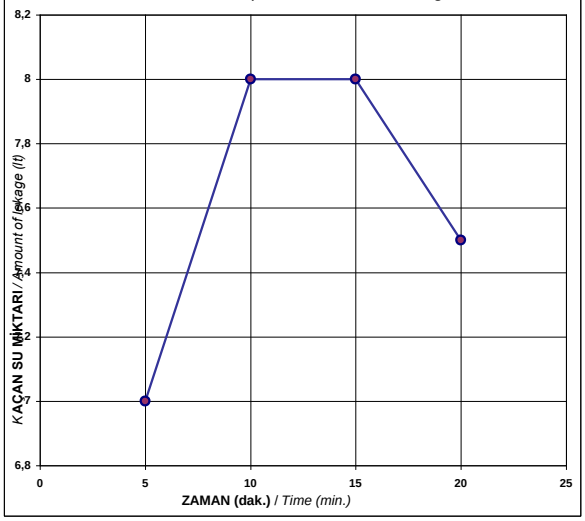
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-9**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		664,00
TARİH *Date*	04.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	8,00
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,20
		DENEY ZONU BOYU (m) *Test Lenght (m)*		2,00

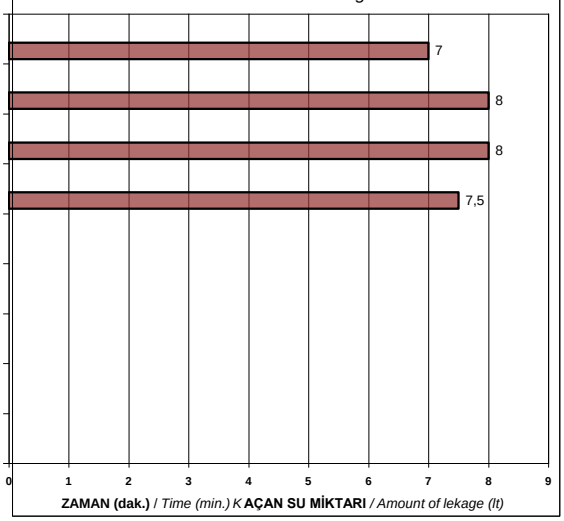
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	7,0	7,6
2. 5 dakika *2nd 5. min.*	8,0	
3. 5 dakika *3rd 5. min.*	8,0	
4. 5 dakika *4th 5. min.*	7,5	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	25,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,002

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



ZAMAN / KAÇAN SU MİKTARI
Time / Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000006
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	158615,27

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	5,80
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	1,525

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**3,77E-04**

GEÇİRİMLİ *PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

Efol Jeoteknik Hizmetler Ticaret Ltd. Şti.
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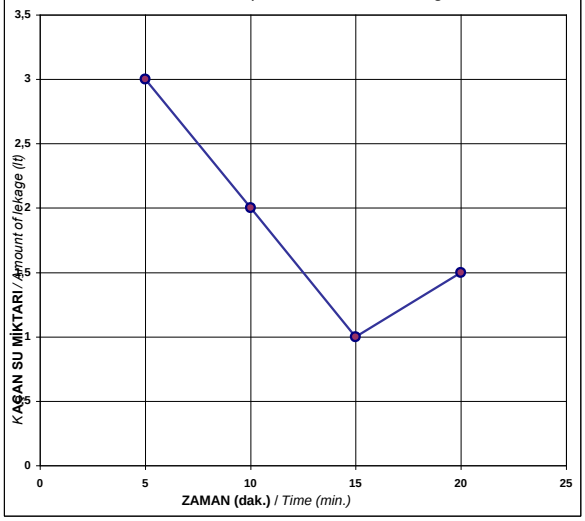
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-9**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		664,00
TARİH *Date*	04.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	12,00
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,20
		DENEY ZONU BOYU (m) *Test Lenght (m)*		3,00

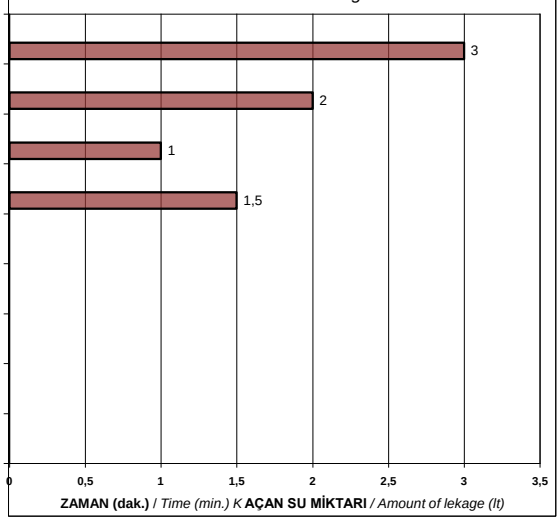
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	3,0	1,9
2. 5 dakika *2nd 5. min.*	2,0	
3. 5 dakika *3rd 5. min.*	1,0	
4. 5 dakika *4th 5. min.*	1,5	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	25,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,002

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



ZAMAN / KAÇAN SU MİKTARI
Time / Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000004
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	335426,06

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	9,80
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	0,375

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**4,05E-05**

YARI GEÇİRİMLİ *MODERATELY PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

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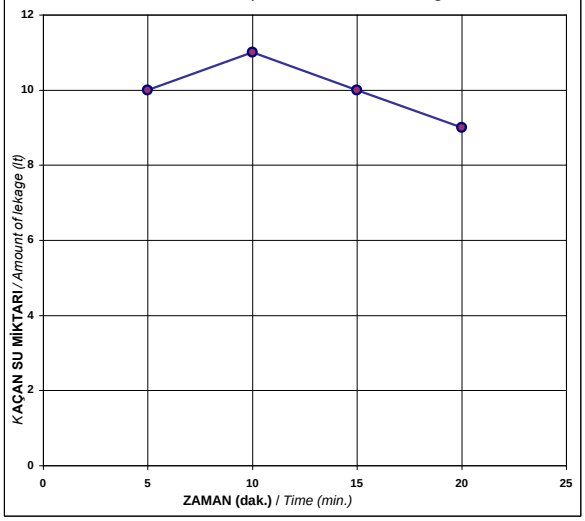
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-9**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		664,00
TARİH *Date*	04.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	13,50
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,20
		DENEY ZONU BOYU (m) *Test Lenght (m)*		1,50

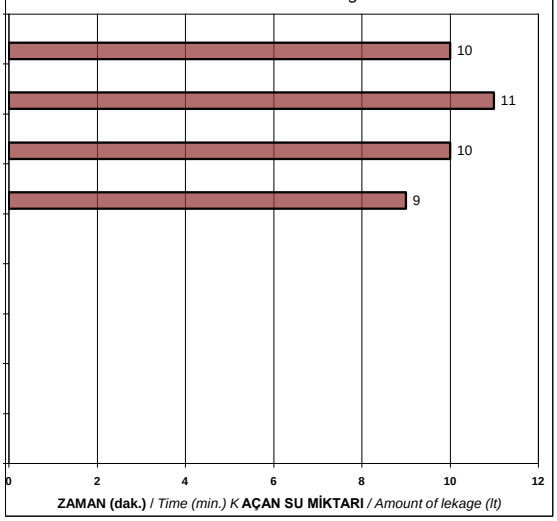
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	10,0	10,0
2. 5 dakika *2nd 5. min.*	11,0	
3. 5 dakika *3rd 5. min.*	10,0	
4. 5 dakika *4th 5. min.*	9,0	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	25,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,002

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



ZAMAN / KAÇAN SU MİKTARI
Time / Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000008
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	93463,37

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	11,30
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	2

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**3,12E-04**

GEÇİRİMLİ *PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

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web: www.efolieoteknik.com e-mail:info@efolieoteknik.com

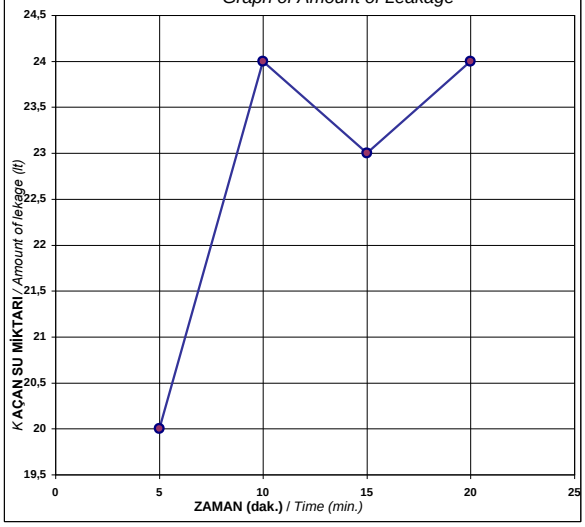
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-10**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		666,00
TARİH *Date*	05.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	2,00
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,10
		DENEY ZONU BOYU (m) *Test Lenght (m)*		2,00

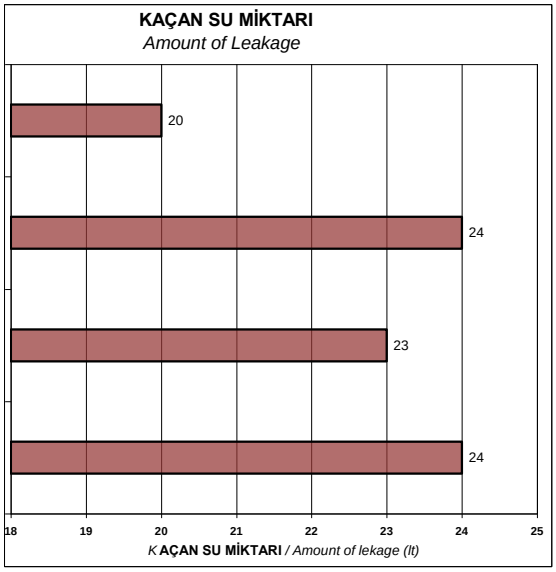
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	20,0	22,8
2. 5 dakika *2nd 5. min.*	24,0	
3. 5 dakika *3rd 5. min.*	23,0	
4. 5 dakika *4th 5. min.*	24,0	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	150,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,003

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



KAÇAN SU MİKTARI
Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000084
İLETKENLİK KATS. *Coefficient of Transmissibility*	**Cu**	15249,50

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	2,00
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	4,55

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**2,90E-03**

ÇOK GEÇİRİMLİ *HIGHLY PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

Efol Jeoteknik Hizmetler Ticaret Ltd. Şti.
Ofis: 1324.cad. 1326 sok. N0:4/4 A.Öveçler, ANKARA,
Tel: (312)473 54 37 Faks: (312)473 54 38
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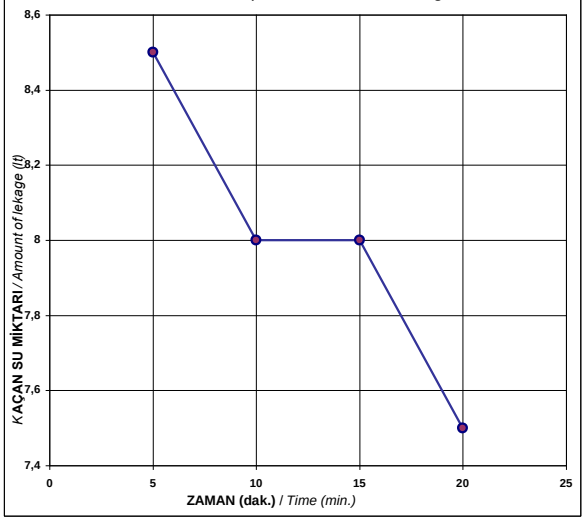
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-10**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		666,00
TARİH *Date*	05.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	3,50
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,10
		DENEY ZONU BOYU (m) *Test Lenght (m)*		1,50

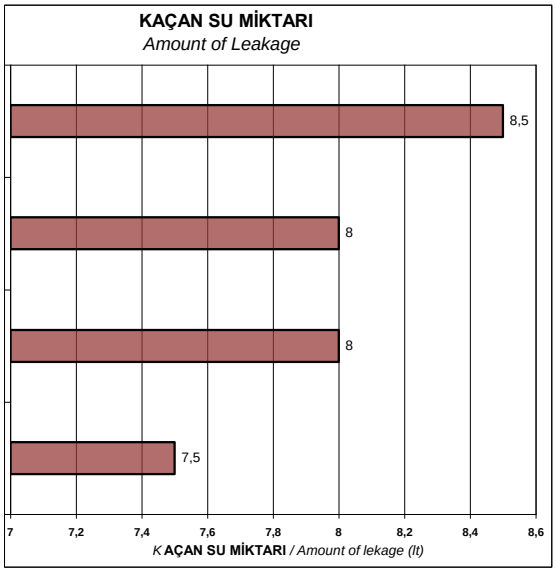
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	8,5	8,0
2. 5 dakika *2nd 5. min.*	8,0	
3. 5 dakika *3rd 5. min.*	8,0	
4. 5 dakika *4th 5. min.*	7,5	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	150,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,003

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



KAÇAN SU MİKTARI
Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000113
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	8820,34

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	1,40
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	1,6

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**1,64E-03**

ÇOK GEÇİRİMLİ *HIGHLY PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

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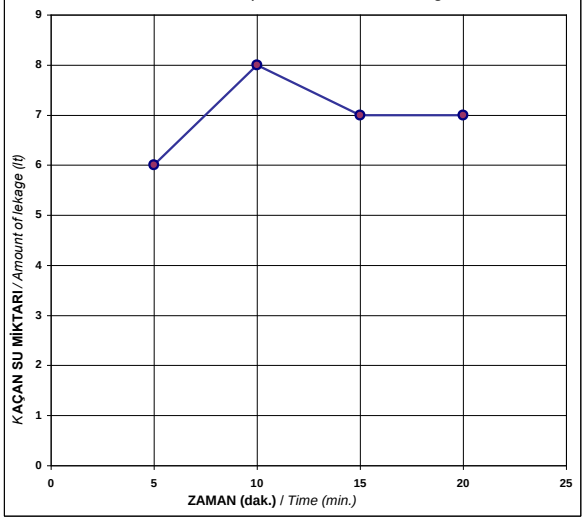
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-10**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		666,00
TARİH *Date*	05.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	8,00
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,10
		DENEY ZONU BOYU (m) *Test Lenght (m)*		2,00

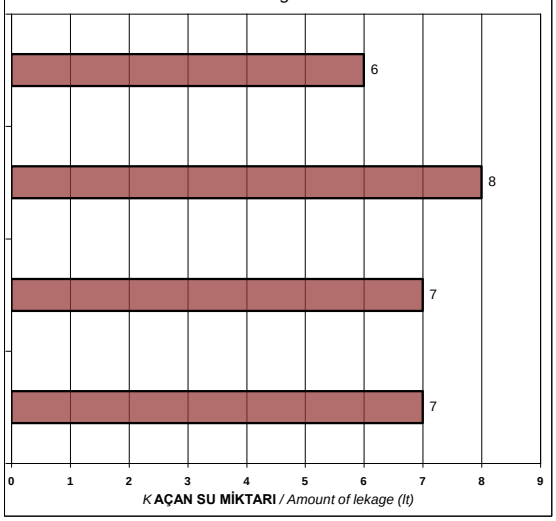
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	6,0	7,0
2. 5 dakika *2nd 5. min.*	8,0	
3. 5 dakika *3rd 5. min.*	7,0	
4. 5 dakika *4th 5. min.*	7,0	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	150,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,003

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



KAÇAN SU MİKTARI
Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000084
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	14784,97

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	5,90
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	1,4

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**2,78E-04**

GEÇİRİMLİ *PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

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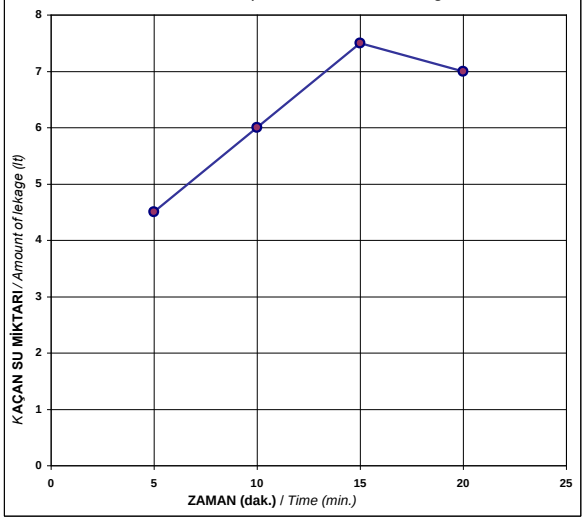
BASINÇSIZ SU DENEYİ
PermeabilityTest

PROJE ADI *Project Name*	ACWA POWER KIRIKKALE	**KUYU NO** *Borehole No*		**SK-10**
DENEY YERİ *Test Location*		**KUYU KOTU (m)** *Borehole Elev*		666,00
TARİH *Date*	05.06.2013	**KUYU DERİNLİĞİ (m)** *Depth of Borehole*	h_1	12,00
NOTLAR / *Remarks* -		**YAS Seviyesi (m)** *GWL (m)*	h_2	2,10
		DENEY ZONU BOYU (m) *Test Lenght (m)*		2,50

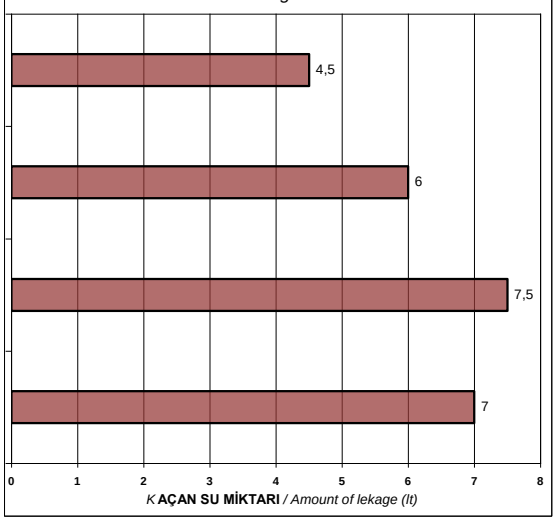
Süre (Dak.) *Duration (min.)*	KAÇAN SU MİKTARI (lt) *Amount of Leakage (lt)*	ORTALAMA *Mean Value*
I. 5 dakika *1st 5. min.*	4,5	6,3
2. 5 dakika *2nd 5. min.*	6,0	
3. 5 dakika *3rd 5. min.*	7,5	
4. 5 dakika *4th 5. min.*	7,0	

Deney Süresince Sabitlenen Su Seviyesi *Constant Water Level during test (m)*	0,00
Kuyu Yarıçapı (m) *Borehole Diameter*	0,03800
Delikli boru yarıçapı : *Diameter of Perfored Borehole (m)*	0,03800
Delik Adedi *Number of Holes (m)*	150,0
Delik Çapı (m) : *Diameter of Holes (m)*	0,003

KAÇAN SU GRAFİĞİ
Graph of Amount of Leakage



KAÇAN SU MİKTARI
Amount of Leakage



EFEKTİF KUYU YARIÇAPI *Effective Diameter of Borehole (m)*	**re**	0,000068
İLETKENLİK KATS. (Doygun) *Coefficient of Transmissibility*	**Cs**	22121,46

KUYUDAKİ SU YÜKSEKLİĞİ *Height of Water in Borehole (m)*	**H**	9,90
DEBİ (lt/dak.) *Flow Rate (lt/min.)*	**Q**	1,25

Geçirimlilik Katsayısı K (cm/s) *Coefficient of Permeability*	**1,26E-04**

GEÇİRİMLİ *PERMEABLE*

HAZIRLAYAN (Adı Soyadı, Ünvanı) *Prepared By (Name Surname, Title)*		

APP-5:

LABORATORY TEST RESULT

EFOL JEOTEKNİK HİZMETLER TİCARET LİMİTED ŞTİ.

DENEYİ YAPTIRAN KURULUŞ : E-K MÜHENDİSLİK	**YİBF NO:**	**RAPOR NO :**	**TARİH :**
Sayfa : 1/1 **Ek :** sayfa deney sonucu	**BAKANLIK RAPOR NO:**	NUMUNE GELİŞ TARİHİ:	DENEY TARİHİ:
Proje Adı:		**DENEY SONUÇLARI ÖZET TABLOSU**	

ACWA Güç Elektrik İşletme Ltd.Şti. Doğalgaz Kombine Çevrim Santrali Kılıçlar-Yahşiyan-Kırıkkale			Elek Analizi							Atterberg Limitleri				USCS	Su Oranı	Birim Ağırlık		Serbest Basınç		Kesme Kutusu		Üç eksenli			Şişme yüzdesi	Şişme Basıncı	Konsolidas.		Özgül Ağırlık	Hidrometre				Dispersibilite Deneyleri		PERMEABİLİTE	Proktor				
			Metot	-#4	-#10	-#40	-#200	Cu	Cr	Kurutma Yöntemi	LL	PL	PI	Birleştirilmiş Zemin Sınıfı		Doğal B.A.	Kuru B.A.	% Boy Kısalması	qu	kg/cm² c'	Derece Ø'	Deney Tipi	kg/cm² c	Derece Ø			Doğal Boş.Oranı	Sonraki Boş.Oranı		Metot	% Ağırlık kaybı	-0,076	-0,002	İğne Deliği Deneyi	Dağılma Deneyi		Metot	Maximum Kuru Bir.Ağ.	Optimum Su İçeriği	Nokta Yükleme (MPa)
Kuyu No	Örnek No	Derinlik		%	%	%	%				%	%	%	USCS	%	gr/cm³		%	kg/cm²	c'	Ø'		c	Ø	%	kg/cm²	e_n	e_f	gr/cm³			%	%			cm/sn(*10^{-8})		gr/cm³	%	$I_{(50)}$
SK-1	UD-1	3.00-3.50		90	82	63	32				24,2	16,5	7,7	SC	12	2,11	1,88					UU	0,58	17			0,43	0,30	2,67			32	18							
SK-1	SPT-2	3,50-3,95		77	72	57	31					NP		SM														2,72			31	9							
SK-2	SPT-1	1.50-1.95											0,0																											
SK-2	UD-1	3.00-3.50		72	49	21	10	40	2,8		21,3	19,0	2,3	SM-SW	11				Dağılgan olduğu için üç eksenli ve konsol deneyi yapılamadı.									2,72			10	4							
SK-2	SPT-3	4.50-4.95		66	52	27	14					NP		SM														2,70			14	6							
SK-2	UD-2	6.00-6.50		88	72	40	24				24,1	14,5	9,6	SC					Dağılgan olduğu için üç eksenli deneyi yapılamadı.									2,71			24	14							
SK-2	SPT-5	7.50-7.95		98	97	77	28					NP		SM														2,72			28	9							
SK-2	UD-3	9.00-9.25		95	85	52	32				25,3	13,3	12,0	SC	11	2,12	1,91					UU	0,79	22			0,41	0,33	2,71			32	17							
SK-2	SPT-9	13.50-13.95		88	81	65	43				35,9	17,5	18,4	SC														2,60			43	28							
SK-3	SPT-1	1.50-1.95		70	53	26	15					NP		SM														2,72			15	5							
SK-3	SPT-3	4.50-4.95		94	87	46	21					NP		SM														2,71			21	5							
SK-3	UD-2	6.00-6.50		77	70	45	22				23,9	16,4	7,5	SC	11	1,96	1,77			0,65	29,0								2,72			22	12							
SK-3	SPT-4	6.50-6.95		74	59	36	15				21,9	18,8	3,1	SM														2,69			15	5							
SK-3	UD-3	9.00-9.50		93	87	62	34				19,8	16,9	2,9	SM	13	2,03	1,80					UU	0,64	18			0,52	0,32	2,72			34	10							
SK-3	SPT-6	9.50-9.95		95	92	70	38					NP		SM														2,72			38	10							
SK-3	SPT-7	10.50-10.95		90	87	78	52				24,4	13,9	10,5	CL														2,64			52	36							
SK-3	SPT-8	12.50-12.95		94	91	76	49				26,2	15,2	11,0	SC														2,65			49	27							
SK-3	UD-5	15.00-15.30		98,1	97,4	96,2	72				24,3	20,9	3,4	ML	22	2,03	1,66			Dağılgan olduğu için üç eksenli deneyi yapılamadı.									2,67			72	20							
SK-4	SPT-1	1.50-1.95											0,0																											
SK-4	UD-1	3.00-3.50		91,3	80,8	55,1	40,8				19,8	17,1	2,7	SM														2,72			40,8	15							
SK-4	SPT-3	4.50-4.95		89,7	84,8	57	19,7					NP		SM						9 konsol olmalı								2,68			19,7	5							
SK-4	UD-2	6.00-6.50		98	83,6	24,6	6	9	1,2			NP		SM-SW							12 uu							2,70			6	2							
SK-4	SPT-5	7.50-7.95		60,3	51,8	33,3	17,7					NP		SM														2,70			17,7	7							

Laboratuvarımız Çevre ve Şehircilik Bakanlığı tarafından verilen 11 numaralı 'Laboratuvar İzin Belgesi'ne sahiptir.

Yapılan deneylerde TS 1900-1 ve TS 1900-2 standartları kullanılmıştır
Laboratuvarımız örnek alımı ve taşınmasından kaynaklanabilecek hatalardan sorumlu değildir.
Bu deney sonuçları yalnızca test edilen örnek için geçerlidir
Bu deney sonuç tablosu Laboratuvarın izni olmadan kısmen kopyalanamaz, değiştirilemez.

EFOL JEOTEKNİK HİZMETLER TİCARET LİMİTED ŞTİ.

DENEYİ YAPTIRAN KURULUŞ : E-K MÜHENDİSLİK	**YİBF NO:**	**RAPOR NO :**	**TARİH :**
Sayfa : 1/1 **Ek :** sayfa deney sonucu	**BAKANLIK RAPOR NO:**	NUMUNE GELİŞ TARİHİ:	DENEY TARİHİ:
Proje Adı:			

DENEY SONUÇLARI ÖZET TABLOSU

ACWA Güç Elektrik İşletme Ltd.Şti. Doğalgaz Kombine Çevrim Santrali Kılıçlar-Yahşiyan-Kırıkkale

Kuyu No	Örnek No	Derinlik	Elek Analizi: Metot	-#4	-#10	-#40	-#200	Cu	Cr	Atterberg Limitleri: Kurutma Yöntemi	LL	PL	PI	USCS: Birleştirilmiş Zemin Sınıfı	Su Oranı	Birim Ağırlık: Doğal B.A.	Kuru B.A.	Serbest Basınç: % Boy Kısalması	qu	Kesme Kutusu: kg/cm²	Derece	Üç eksenli: Deney Tipi	kg/cm²	Derece	Şişme yüzdesi	Şişme Basıncı	Konsolidas.: Doğal Boş.Oranı	Sonraki Boş.Oranı	Özgül Ağırlık	Hidrometre: Metot	% Ağırlık kaybı	-0,076	-0,002	Dispersibilite Deneyleri: İğne Deliği Deneyi	Dağılma Deneyi	PERMEABİLİTE	Proktor: Metot	Maximum Kuru Bir.Ağ.	Optimum Su İçeriği	Nokta Yükleme (MPa)
				%	%	%	%				%	%	%	USCS	%	gr/cm³		%	kg/cm²	c'	Ø'		c	Ø	%	kg/cm²	e_n	e_f	gr/cm³		%	%	%			cm/sn(*10^{-8})		gr/cm³	%	$I_{(50)}$
SK-5	SPT-1	1.50-1.95		91	86	61	26				31,2	15,8	15,4	SC															2,67			26	18							
SK-5	UD-1	3.00-3.50		93	86	60	23					NP		SM															2,75			23	8							
SK-5	SPT-3	4.50-4.95		96	90	47	15					NP		SM															2,68			15	5							
SK-5	UD-2	6.00-6.50		87	70	30	15				21,0	18,0	3,0	SM				Dağılgan olduğu için kesme kutusu, üç eksenli ve konsol deneyleri yapılamadı.											2,72			15	6							
SK-5	SPT-5	7.50-7.95		96	89	42	14					NP		SM															2,73			14	6							
SK-5	UD-3	9.00-9.50		100	96	90	65				37,8	16,7	21,1	CI	17	2,03	1,74					UU	0,77	16			0,51	0,41	2,62			65	45							
SK-5	SPT-7	10.50-10.95		100	100	94	87				26,6	15,9	10,7	CL															2,65			87	53							
SK-6	SPT-1	1.50-1.95		84	80	52	29					NP		SM															2,73			29	9							
SK-6	UD-1	3.00-3.50		94	86	57	31				26,2	17,8	8,4	SC	9	1,91	1,75			0,53	33								2,72			31	16							
SK-6	SPT-2	3.50-3.95		81	70	38	18					NP		SM															2,72			18	4							
SK-6	SPT-3	4.50-4.95		100	95	88	65				29,7	17,4	12,3	CL															2,68			65	41							
SK-6	UD-2	6.00-6.50		93	83	55	34				24,5	17,7	6,8	SC	11	1,93	1,74	5,13	0,63	Dağılgan olduğu için üç eksenli deneyi yapılamadı.							0,55	0,44	2,71			34	18							
SK-6	SPT-4	6.50-6.95		91	80	34	15					NP		SM															2,72			15	7							
SK-6	SPT-5	7.50-7.95		98	95	87	66				25,0	13,2	11,8	CL																		66	40							
SK-6	SPT-6	9.00-9.45		100	98	89	48					NP		SM															2,67			48	20							
SK-6	SPT-7	10.50-10.95		99	98	88	51				23,2	19,9	3,3	ML															2,68			51	13							
SK-6	UD-3	12.00-12.50		63,6	54,1	34,9	25,9				25,3	15,1	10,2	SC						Dağılgan olduğu için üç eksenli deneyi yapılamadı.									2,61			25,9	16							
SK-7	SPT-1	1.50-1.95		65,8	58,4	35,5	15,5					NP		SM															2,70			15,5	7							
SK-7	SPT-3	4.50-4.95		99,4	98,4	91	56,4				30,8	16,0	14,8	CL															2,68			56,4	31							
SK-7	UD-1	5,50-6,00		85,9	74,9	54,4	31,3				25,3	16,7	8,6	SC	9	1,99	1,82			0,65	32,0								2,70			31,3	18							
SK-7	SPT-4	6.50-6.95		91,6	87,6	77,1	61,4				35,9	15,4	20,5	CI															2,60			61,4	33							

Laboratuvarımız Çevre ve Şehircilik Bakanlığı tarafından verilen 11 numaralı 'Laboratuvar İzin Belgesi'ne sahiptir.

Yapılan deneylerde TS 1900-1 ve TS 1900-2 standartları kullanılmıştır
Laboratuvarımız örnek alımı ve taşınmasından kaynaklanabilecek hatalardan sorumlu değildir.
Bu deney sonuçları yalnızca test edilen örnek için geçerlidir
Bu deney sonuç tablosu Laboratuvarın izni olmadan kısmen kopyalanamaz, değiştirilemez.

EFOL JEOTEKNİK HİZMETLER TİCARET LİMİTED ŞTİ.

DENEYİ YAPTIRAN KURULUŞ : E-K MÜHENDİSLİK	**YİBF NO:**	**RAPOR NO :**	**TARİH :**
Sayfa : 1/1 **Ek :** sayfa deney sonucu	**BAKANLIK RAPOR NO:**	NUMUNE GELİŞ TARİHİ:	DENEY TARİHİ:
Proje Adı:	**DENEY SONUÇLARI ÖZET TABLOSU**		

ACWA Güç Elektrik İşletme Ltd.Şti. Doğalgaz Kombine Çevrim Santrali Kılıçlar-Yahşiyan-Kırıkkale			Elek Analizi						Atterberg Limitleri				USCS	Su Oranı	Birim Ağırlık		Serbest Basınç		Kesme Kutusu		Üç eksenli			Şişme yüzdesi	Şişme Basıncı	Konsolidas.		Özgül Ağırlık	Hidrometre				Dispersibilite Deneyleri		PERMEABİLİTE	Proktor				
			Metot	-#4	-#10	-#40	-#200	Cu	Cr	Kurutma Yöntemi	LL	PL	PI	Birleştirilmiş Zemin Sınıfı		Doğal B.A.	Kuru B.A.	% Boy Kısalması	qu	kg/cm²	Derece	Deney Tipi	kg/cm²	Derece			Doğal Boş.Oranı	Sonraki Boş.Oranı		Metot	% Ağırlık kaybı	-0,076	-0,002	İğne Deliği Deneyi	Dağılma Deneyi		Metot	Maximum Kuru Bir.Ağ.	Optimum Su İçeriği	Nokta Yükleme (MPa)
Kuyu No	Örnek No	Derinlik		%	%	%	%				%	%	%	USCS	%	gr/cm³		%	kg/cm²	c'	Ø'		c	Ø	%	kg/cm²	e_n	e_f	gr/cm³			%	%			cm/sn(*10^{-8})		gr/cm³	%	$I_{(50)}$
SK-7	UD-2	9,00-9,50		96	92	79	59				39,1	15,7	23,4	CI	16	2,07	1,78					UU	1,44	14			0,47	0,38	2,62			59	32							
SK-7	SPT-5	9.50-9.95		88	83	68	52				36,5	16,0	20,5	CI														2,61			52	33							
SK-7	UD-3	12,00-12,50		99	97	92	79				25,1	19,2	5,9	CL								UU	0,98	13			0,48	0,40	2,63			79	60							
SK-7	SPT-7	12,50-12,95		99	97	87	71				37,0	15,8	21,2	CI														2,60			71	45							
SK-8	SPT-1	1,50-1,95		91	84	60	39				25,5	17,8	7,7	SC														2,69			39	22							
SK-8	UD-1	3,00-3,50		77	60	30	15				22,3	20,1	2,2	SM														2,72			15	4							
SK-8	SPT-3	4,50-4,95		68	57	31	16					NP		SM														2,71			16	4							
SK-8	UD-2	6,00-6,50		67	59	46	36				27,5	16,3	11,2	GC	11	2,13	1,93					UU	0,77	24					2,70			36	21							
SK-8	SPT-5	7,50-7,95		86	72	38	21					NP		SM														2,72			21	7							
SK-8	UD-3	9,00-9,50		93	82	61	37				28,2	15,4	12,8	SC	13	2,15	1,90					UU	1,44	19			0,41	0,30	2,67			37	22							
SK-8	SPT-7	10,50-10,95		81	78	70	51				22,5	16,2	6,3	CL														2,69			51	29							
SK-8	SPT-8	12,00-12,45		95	89	75	52				24,6	18,2	6,4	CL														2,68			52	30							
SK-9	SPT-1	1,50-1,75		43	33	21	15				25,1	18,4	6,7	GC														2,67			15	8							
SK-9	SPT-2												0,0																										
SK-9	SPT-3	9,00-9,27		75,4	69,1	55,8	26					NP		SM														2,66			26	4							
SK-9	SPT-4	12,00-12,45		100	100	82,9	47,6					NP		SM														2,65			47,6	12							
SK-10	SPT-1	1,50-1,95		94,8	88,5	59,9	15,6					NP		SM														2,67			15,6	10							
SK-10	SPT-3	4,50-4,95		67,6	56,8	19,7	5	15	0,8			NP		SM-SP														2,68			5	2							
SK-10	SPT-5	7,50-7,95		94,4	87,1	53,9	42,5					NP		SM														2,71			42,5	13							
SK-10	SPT-7	12,00-12,45		99,2	98,3	96	56,7				25,5	14,6	10,9	CL														2,65			56,7	32							

Laboratuvarımız Çevre ve Şehircilik Bakanlığı tarafından verilen 11 numaralı 'Laboratuvar İzin Belgesi'ne sahiptir.

Yapılan deneylerde TS 1900-1 ve TS 1900-2 standartları kullanılmıştır

Laboratuvarımız örnek alımı ve taşınmasından kaynaklanabilecek hatalardan sorumlu değildir.

Bu deney sonuçları yalnızca test edilen örnek için geçerlidir

Bu deney sonuç tablosu Laboratuvarın izni olmadan kısmen kopyalanamaz, değiştirilemez.

EFOL JEOTEKNİK HİZMETLER TİCARET LİMİTED ŞTİ.

DENEYİ YAPTIRAN KURULUŞ : E-K MÜHENDİSLİK	**YİBF NO:**	**RAPOR NO :**	**TARİH :**
Sayfa : / **Ek :** sayfa deney sonucu	**BAKANLIK RAPOR NO:**	NUMUNE GELİŞ TARİHİ:	DENEY TARİHİ:
Proje Adı:	**DENEY SONUÇLARI ÖZET TABLOSU**		

ACWA Güç Elektrik İşletme Ltd.Şti. Doğalgaz Kombine Çevrim Santrali Kılıçlar-Yahşiyan-Kırıkkale			Elek Analizi							Atterberg Limitleri			USCS	Su Oranı	Birim Ağırlık		Özgül Ağırlık	Üç eksenli			Kesme Kutusu		Şişme yüzdesi	Şişme Basıncı	Hidrometri				Proktor			CBR				
			Metot	-#4	-#10	-#40	-#200	Cu	Cr	Kurutma Yöntemi	LL	PL	PI	Birleştirilmiş Zemin Sınıfı		Doğal B.A.	Kuru B.A.		Deney Tipi	kg/cm²	Derece	kg/cm²	Derece			Metot	% Ağırlık kaybı	-0,076	-0,002	Metot	Maximum Kuru Bir.Ağ.	Optimum Su İçeriği	Metot	Şişme Mik.	Suda Bekletme Süresi(Sa)	Den. Sonra Su İçeriği	CBR Oranı
Kuyu No	Örnek No	Derinlik		%	%	%	%				%	%	%	USCS	%	gr/cm³		gr/cm³		c	Ø	c'	Ø'	%	kg/cm²		%	%	%		gr/cm³	%		%		%	%
AÇ-1	1	0,30-2,40		72	59	26	10				24,9	17,6	7,3	SC	5			2,71										10	6		2,054	10,36		0	96	11,42	24,7
AÇ-1	2	2,40-3,50		96	92	74	56				36,8	18,1	18,7	CI	17			2,65										56	29		1,729	17,85		1,52	96	20,20	6,6
AÇ-2	1	0,40-3,40		71	51	22	11				24,2	17,7	6,5	SC	8			2,70										11	7		2,087	9,78		0	96	10,95	30,4
AÇ-3	1	0,30-1,80		81	63	26	12				24,4	17,8	6,6	SC	7			2,71										12	7		2,068	10,52		0,1	96	11,79	28,5
AÇ-3	2	1,80-3,40		97	95	80	53				25,1	18,0	7,1	CL	10			2,68										53	28		1,861	13,94		0,4	96	15,30	11,6
AÇ-4	1	0,30-2,50		76	58	23	13				24,2	17,9	6,3	SC	8			2,69										13	7		2,103	8,82		0	96	9,66	33,8
AÇ-4	2	1,50-3,60		94	90	74	52				24,7	18,3	6,4	CL	9			2,67										52	27		1,867	12,15		0,59	96	13,92	12,4
AÇ-5	1	0,40-3,40		75	57	23	11				24,8	17,8	7,0	SC	7			2,70										11	6		2,072	10,03		0,05	96	11,75	29,5
AÇ-6	1	0,30-3,50		66	51	17	7				23,6	17,9	5,7	SC	6			2,71										7	4		2,061	10,24		0	96	11,66	26,8
AÇ-7	1	0,40-3,20		68	50	20	8				24,6	18,2	6,4	SC	6			2,71										8	5		2,057	10,31		0,11	96	11,27	25,6
AÇ-8	1	0,40-3,20		77	61	31	14				23,2	17,3	5,9	SC	5			2,71										14	8		2,117	9,92		0,12	96	10,91	34,8
AÇ-9	1	0,40-3,50		70	59	28	11				22,4	17,2	5,2	SC	4			2,70										11	6		2,087	9,88		0,11	96	10,85	30,0
AÇ-10	1	0,30-3,60		70	48	17	10				23,9	18,0	5,9	SC	6			2,72										10	6		2,084	9,92		0	96	10,84	27,8

DİNAMİK KOMPAKSİYON

STANDART

Laboratuvarımız Çevre ve Şehircilik Bakanlığı tarafından verilen 11 numaralı 'Laboratuvar İzin Belgesi'ne sahiptir.

Yapılan deneylerde TS 1900-1 ve TS 1900-2 standartları kullanılmıştır
Laboratuvarımız örnek alımı ve taşınmasından kaynaklanabilecek hatalardan sorumlu değildir.
Bu deney sonuçları yalnızca test edilen örnek için geçerlidir
Bu deney sonuç tablosu Laboratuvarın izni olmadan kısmen kopyalanamaz, değiştirilemez.

EFOL JEOTEKNİK HİZMETLER TİCARET LİMİTED ŞTİ.

DENEYİ YAPTIRAN KURULUŞ : E-K MÜHENDİSLİK	**YİBF NO:**	**RAPOR NO :**	**TARİH :**
Sayfa : 1/1 **Ek :** sayfa deney sonucu	**BAKANLIK RAPOR NO:**	NUMUNE GELİŞ TARİHİ:	DENEY TARİHİ:

Proje Adı:

DENEY SONUÇLARI ÖZET TABLOSU

ACWA Güç Elektrik İşletme Ltd.Şti. Doğalgaz Kombine Çevrim Santrali Kılıçlar-Yahşiyan-Kırıkkale			Elek Analizi							Atterberg Limitleri				USCS	Su Oranı	Birim Ağırlık		Serbest Basınç		Elastisite Modülü	Poisson Oranı	Üç eksenli			Şişme yüzdesi	Şişme Basıncı	Konsolidas.		Özgül Ağırlık	Hidrometre				Dispersibilite Deneyleri		PERMEABİLİTE	Proktor				Nokta Yükleme (MPa)
			Metot	-#4	-#10	-#40	-#200	Cu	Cr	Kurutma Yöntemi	LL	PL	PI	Birleştirilmiş Zemin Sınıfı		Doğal B.A.	Kuru B.A.	% Boy Kısalması	qu	E	ν	Deney Tipi	kg/cm²	Derece			Doğal Boş.Oranı	Sonraki Boş.Oranı		Metot	% Ağırlık kaybı	-0,076	-0,002	İğne Deliği Deneyi	Dağılma Deneyi		Metot	Maximum Kuru Bir.Ağ.	Optimum Su İçeriği	
Kuyu No	Örnek No	Derinlik		%	%	%	%				%	%	%	USCS	%	gr/cm³		%	kg/cm²	Kg/cm²			c	Ø	%	kg/cm²	e_n	e_f	gr/cm³			%	%			cm/sn(*10^{-8})		gr/cm³	%	$I_{(50)}$
SK-1		10,60-10,75														2,64			315,2																				
SK-1		11,84-12,00														2,47			484,0																				
SK-3		27.60-27.80														2,46			240,8																				
SK-3		28.60-28.85														2,42			151,7	38544	0,23																		
SK-3		35.52-35.87														2,47			255,5																				
SK-3		44.80-45.00														2,33			901,5																				
SK-4		24.40-24.66														2,52			783,3																				
SK-4		28.50-28.80														2,46			50,5	40108	0,21	Mevcut kapalı çatlaktan kırıldı.																	
SK-4		46.15-46.34														2,57			186,6																				
SK-5		26.50-26.65														2,35			133,8																				
SK-5		35.60-35.74														2,61			320,2																				
SK-5		45.20-45.33																																					1,44
SK-5		47.50-47.62														2,49			374,2																				
SK-6		17.10-17.27														2,33			121,1																				
SK-7		24.70-24.85														2,58			916,7																				
SK-7		29.83-30.00														2,56			891,3																				
SK-7		38.00-38.27														2,38			148,9	82271	0,22																		
SK-7		42.75-42.87														2,39			62,6																				
SK-8		17.00-17.32														2,45			298,5																				
SK-8		18.00-18.35														2,48			270,4	90512	0,22																		

Laboratuvarımız Çevre ve Şehircilik Bakanlığı tarafından verilen 11 numaralı 'Laboratuvar İzin Belgesi'ne sahiptir.

Yapılan deneylerde TS 1900-1 ve TS 1900-2 standartları kullanılmıştır
Laboratuvarımız örnek alımı ve taşınmasından kaynaklanabilecek hatalardan sorumlu değildir.
Bu deney sonuçları yalnızca test edilen örnek için geçerlidir
Bu deney sonuç tablosu Laboratuvarın izni olmadan kısmen kopyalanamaz, değiştirilemez.

EFOL JEOTEKNİK HİZMETLER TİCARET LİMİTED ŞTİ.

DENEYİ YAPTIRAN KURULUŞ : E-K MÜHENDİSLİK	**YİBF NO:**	**RAPOR NO :**	**TARİH :**
Sayfa : 1/1 **Ek :** sayfa deney sonucu	**BAKANLIK RAPOR NO:**	NUMUNE GELİŞ TARİHİ:	DENEY TARİHİ:

Proje Adı:

DENEY SONUÇLARI ÖZET TABLOSU

ACWA Güç Elektrik İşletme Ltd.Şti. Doğalgaz Kombine Çevrim Santrali Kılıçlar-Yahşiyan-Kırıkkale			Elek Analizi							Atterberg Limitleri				USCS	Su Oranı	Birim Ağırlık		Serbest Basınç		Kesme Kutusu		Üç eksenli			Şişme yüzdesi	Şişme Basıncı	Konsolidas.		Özgül Ağırlık	Hidrometre				Dispersibilite Deneyleri		PERMEABİLİTE	Proktor				Nokta Yükleme (MPa)
			Metot	-#4	-#10	-#40	-#200	Cu	Cr	Kurutma Yöntemi	LL	PL	PI	Birleştirilmiş Zemin Sınıfı		Doğal B.A.	Kuru B.A.	% Boy Kısalması	qu	kg/cm^2	Derece	Deney Tipi	kg/cm^2	Derece			Doğal Boş.Oranı	Sonraki Boş.Oranı		Metot	% Ağırlık kaybı	-0,076	-0,002	İğne Deliği Deneyi	Dağılma Deneyi		Metot	Maximum Kuru Bir.Ağ.	Optimum Su İçeriği	
Kuyu No	Örnek No	Derinlik		%	%	%	%				%	%	%	USCS	%	gr/cm³		%	kg/cm^2	c'	Ø'		c	Ø	%	kg/cm^2	e_n	e_f	gr/cm³		%	%	%			cm/sn($*10^{-8}$)		gr/cm³	%	$I_{(50)}$
SK-9		15.06-15.17																																						12,08
SK-9		18.37-18.50														2,59			831,9																					
SK-9		20.51-20.73																																						7,47
SK-10		13,55-14,00														2,64			1093,2																					
SK-10		18,04-18,28														2,67			725,4																					

Laboratuvarımız Çevre ve Şehircilik Bakanlığı tarafından verilen 11 numaralı 'Laboratuvar İzin Belgesi'ne sahiptir.

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Bu deney sonuç tablosu Laboratuvarın izni olmadan kısmen kopyalanamaz, değiştirilemez.

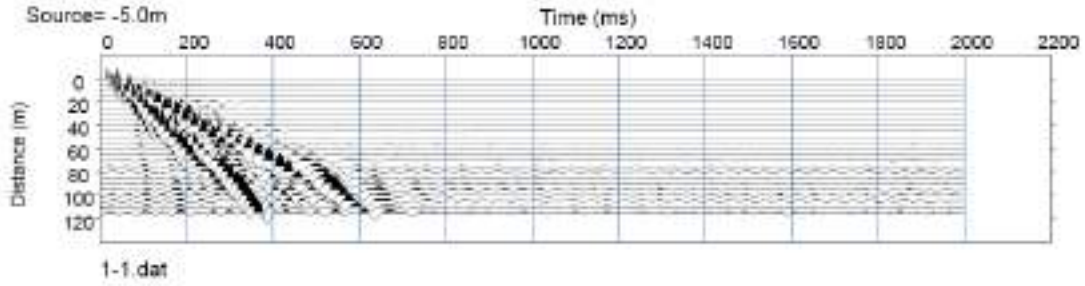
APP-6:

ENCLOSERS OF GEOPHISICAL SURVEY

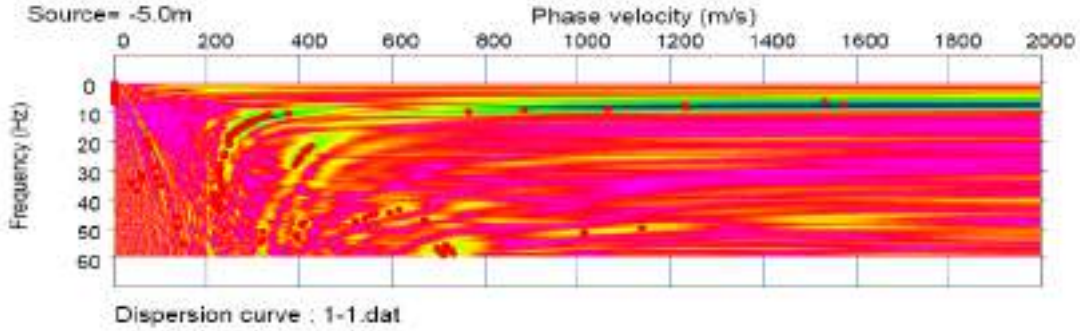
SEISMIC WORKS

JS-1 (NORMAL SHUT)

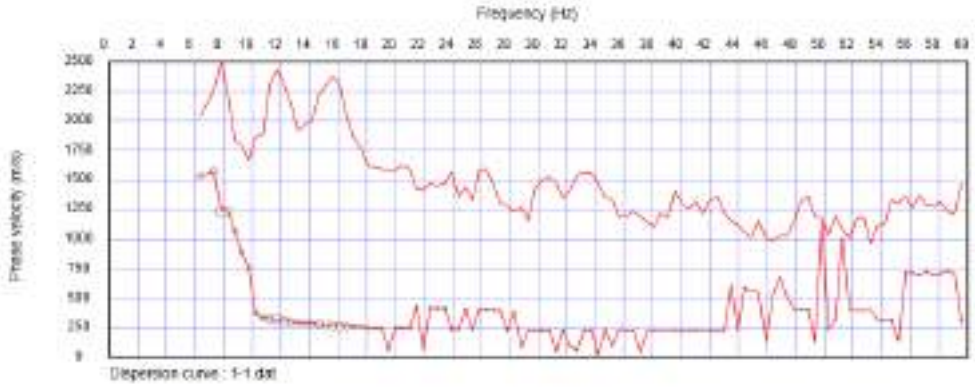
Field Data,



Phase volecity-frequancy reversal,



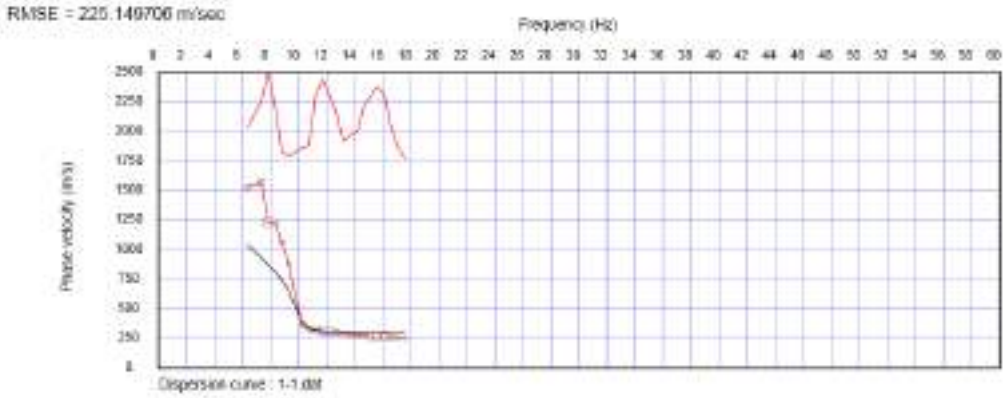
Dispersion Curve,



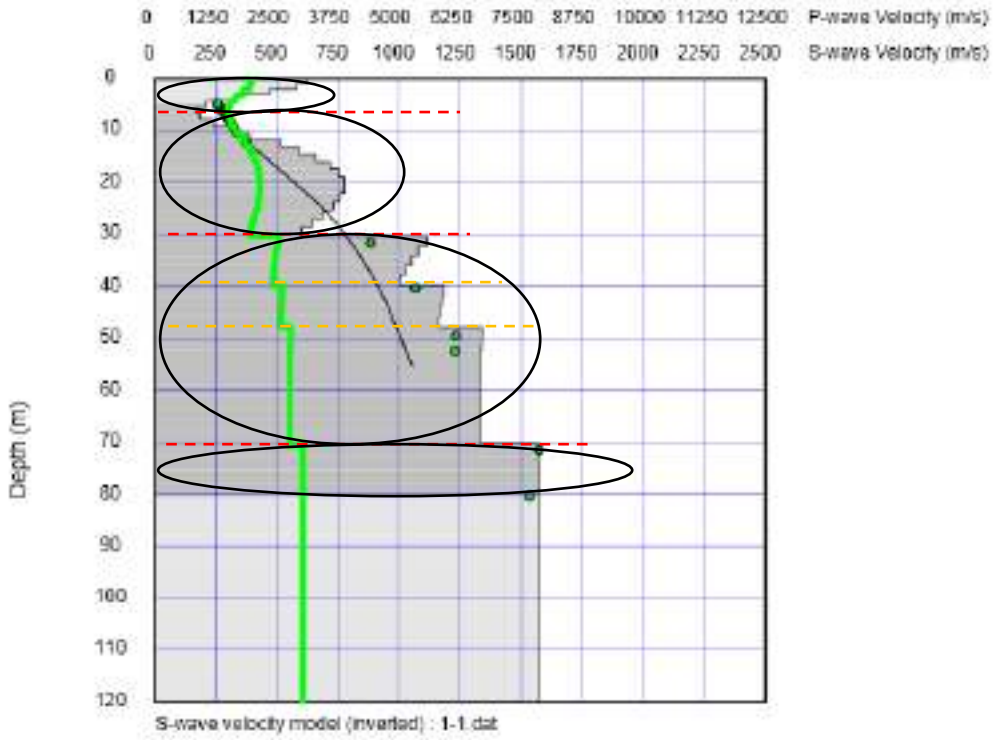
Eror rates of dispertion curve,

Iteration=0 RMS=444.201380 m/s (26.313360%)
Iteration=1 RMS=392.549574 m/s (22.211748%)
Iteration=2 RMS=345.610470 m/s (19.144999%)
Iteration=3 RMS=303.046793 m/s (16.908060%)
Iteration=4 RMS=260.929972 m/s (15.295564%)

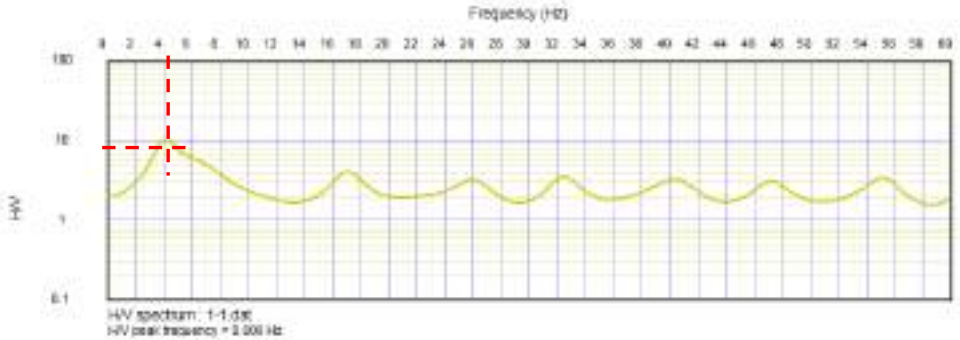
Calculatet dispertion curve,



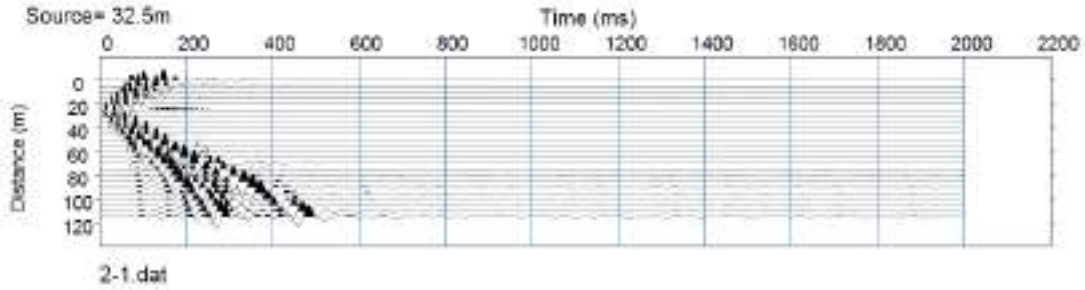
Calculated underground model,



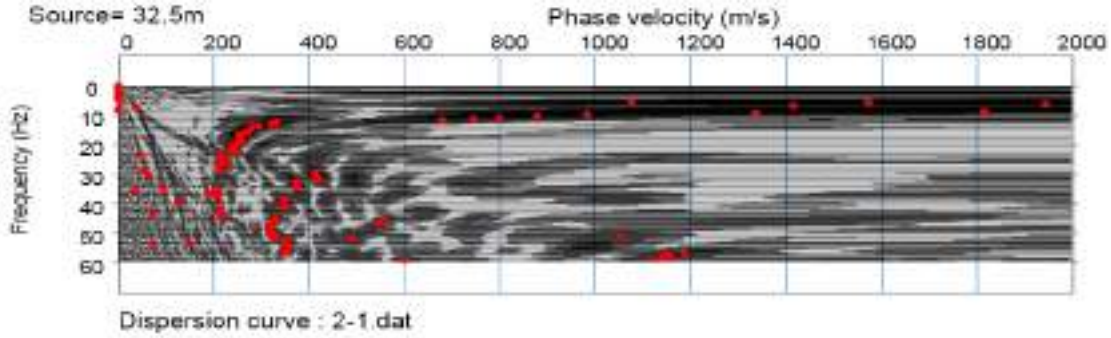
Calculated H/V curve



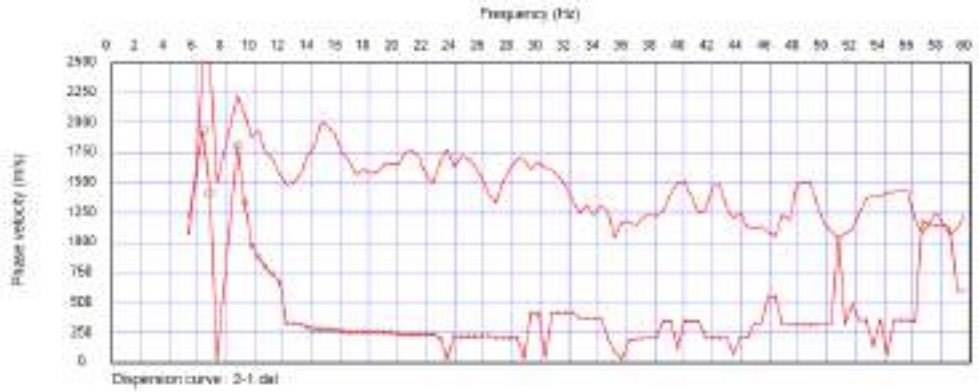
Field Data,



Phase volecity-frequancy reversal,



Dispersion Curve,



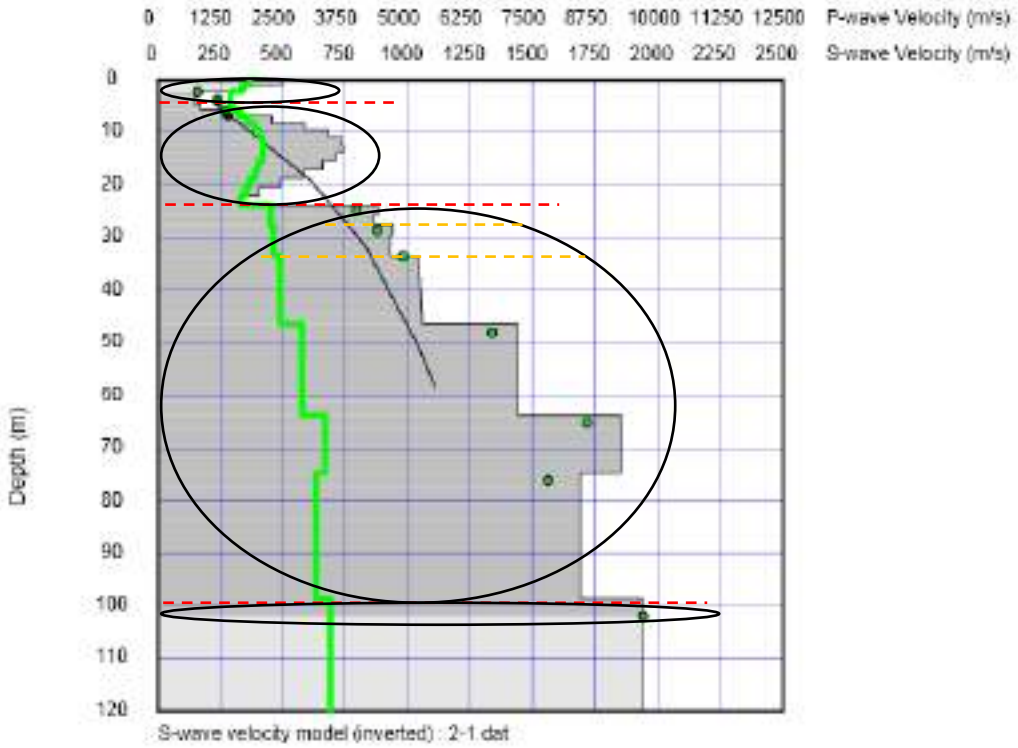
Eror rates of dispertion curve,

Iteration=0 RMS=760.243893 m/s (42.438290%)
Iteration=1 RMS=682.572424 m/s (37.964684%)
Iteration=2 RMS=603.567958 m/s (34.120770%)
Iteration=3 RMS=520.031214 m/s (29.299961%)
Iteration=4 RMS=457.221657 m/s (26.005920%)

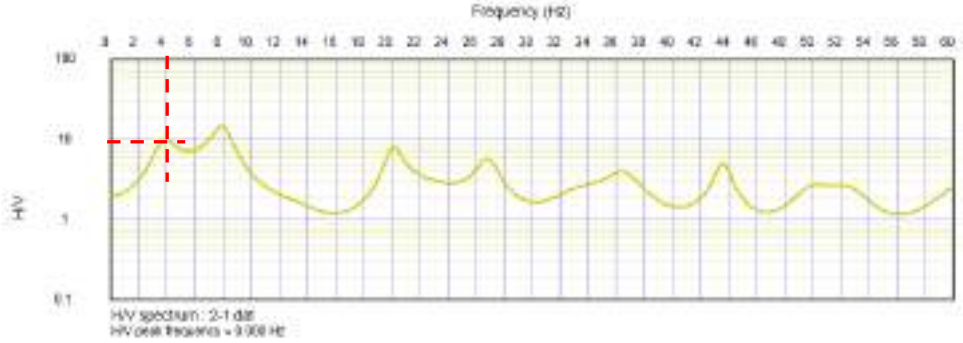
Calculated dispertion curve,



Calculated underground model,

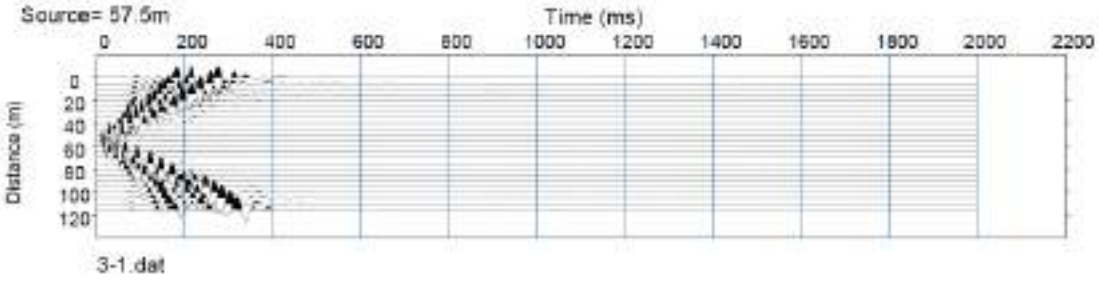


Calculated H/V curve,

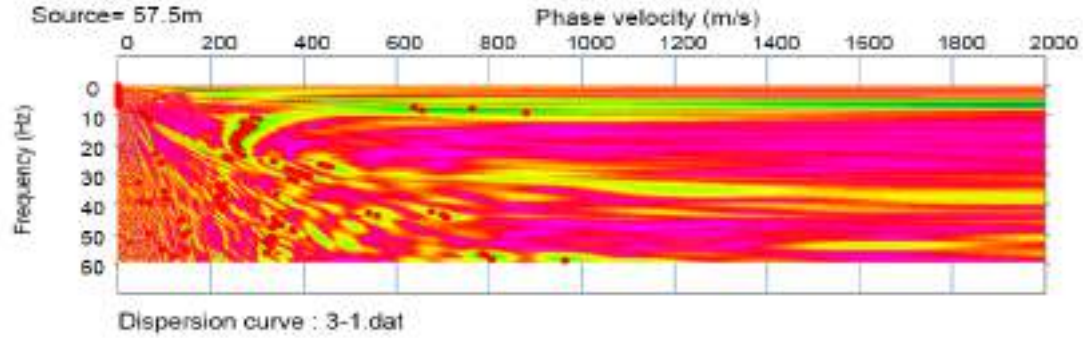


JS-1 (INTERIM SHOT 12-13)

Field Data,



Phase volecity-frequancy reversal,



Dispersion Curve,



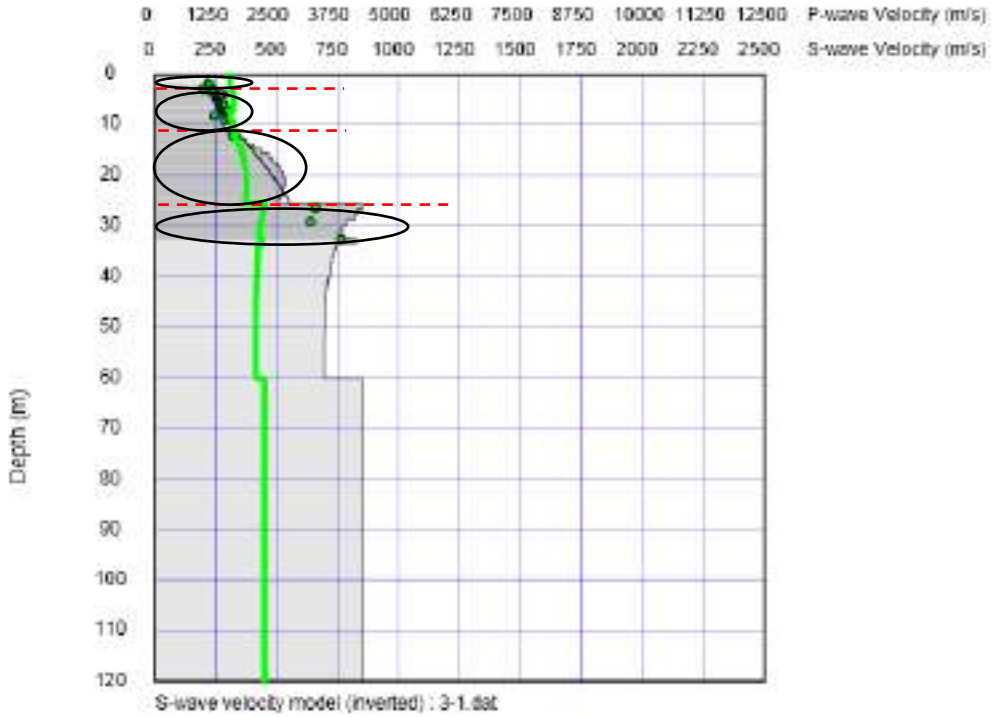
Eror rate of dispertion curv,

Iteration=0 RMS=107.991114 m/s (9.819229%)
Iteration=1 RMS=96.525192 m/s (9.258666%)
Iteration=2 RMS=87.022625 m/s (8.821866%)
Iteration=3 RMS=79.221100 m/s (8.493012%)
Iteration=4 RMS=72.722703 m/s (8.237505%)

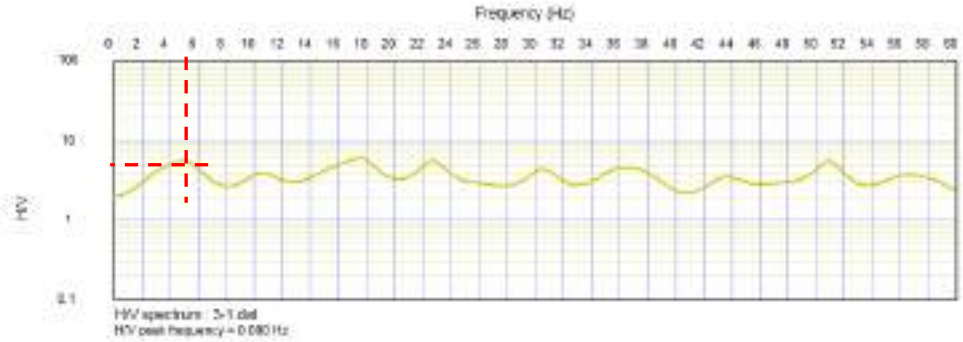
Calculated dispertion curve,



Calculated underground model,

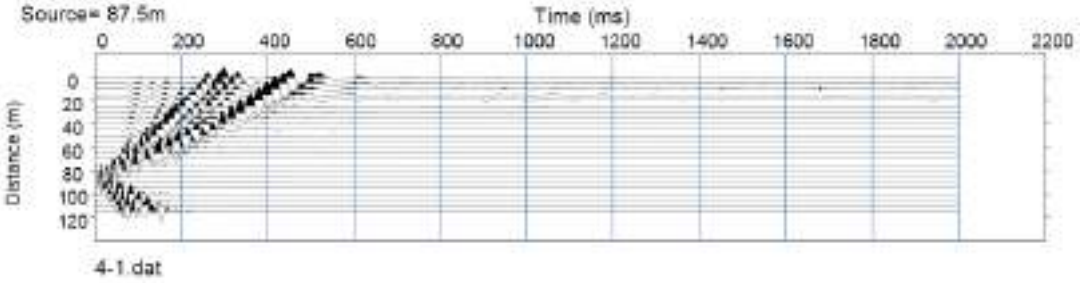


Calculated H/V curve,



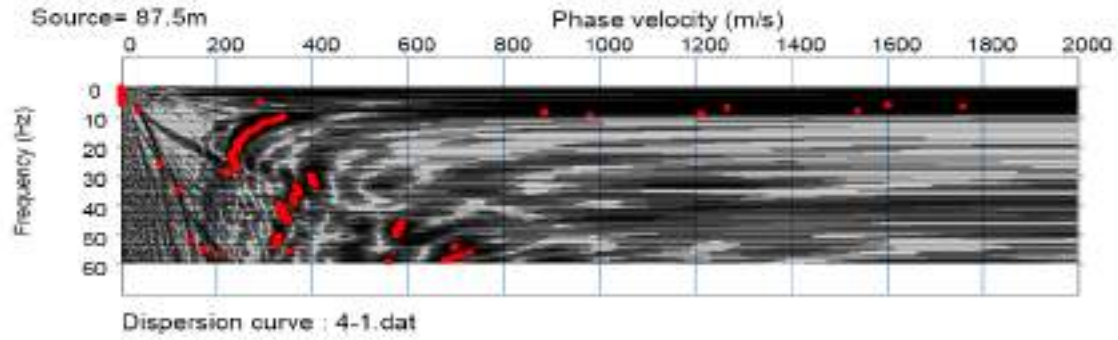
JS-1 (INTERIM SHUT 18-19)

Field data,

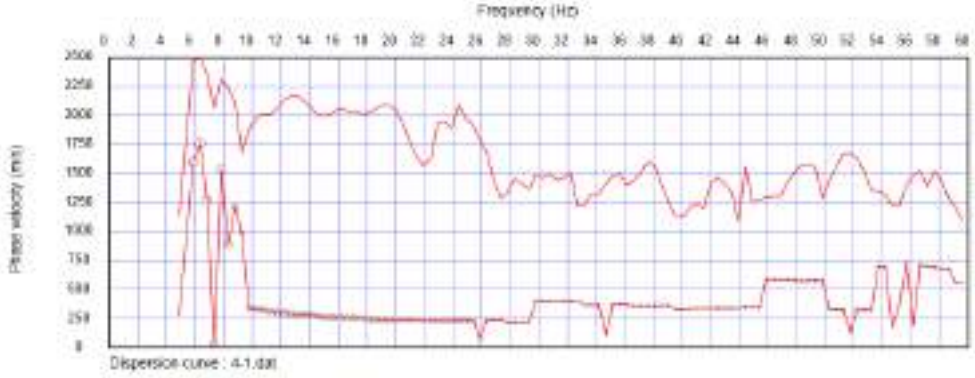


Phase volecity-frequancy reversal,

,



Dispertion curve,



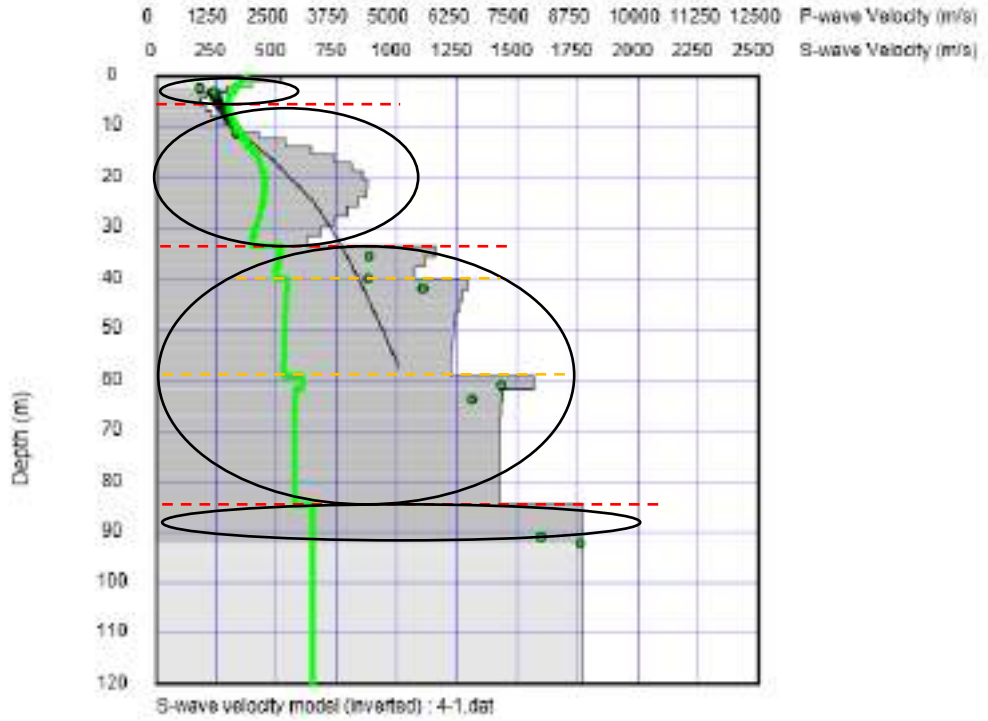
Eror rate of dispertion,

Iteration=0 RMS=413.165182 m/s (18.829723%)
Iteration=1 RMS=353.141278 m/s (15.966675%)
Iteration=2 RMS=318.171233 m/s (14.342482%)
Iteration=3 RMS=291.876227 m/s (14.120112%)
Iteration=4 RMS=262.594312 m/s (14.226366%)

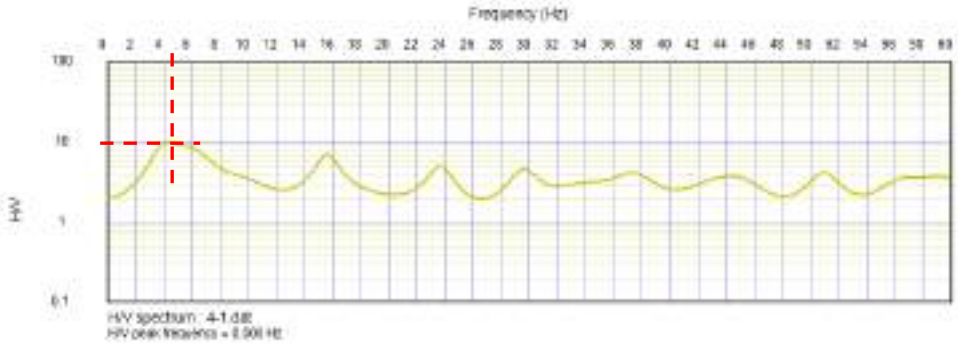
Calculated dispertion curve,



Calculated underground model,

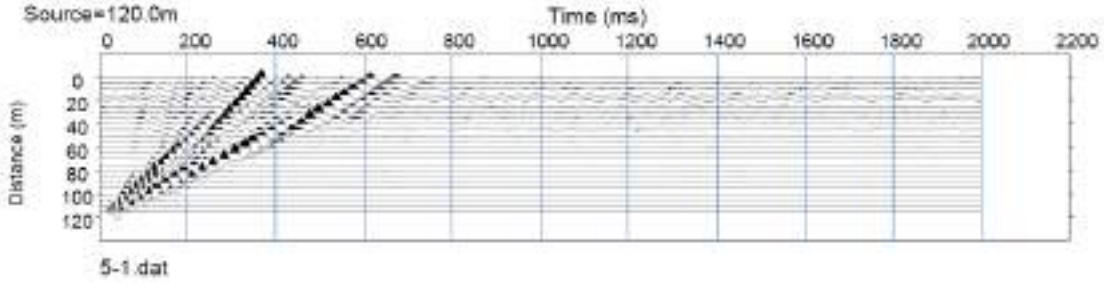


Calculated H/V curve,



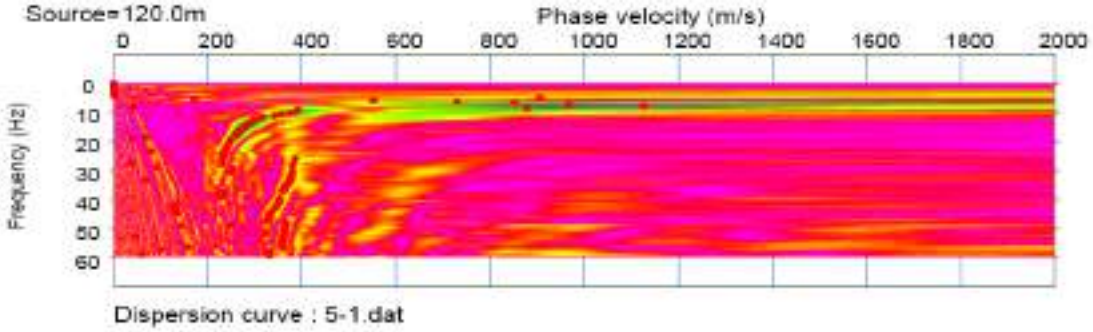
JS-1 (REVERSE SHUT)

Field date,



Phase volecity-frequancy reversal,

,



Dispersion curve,



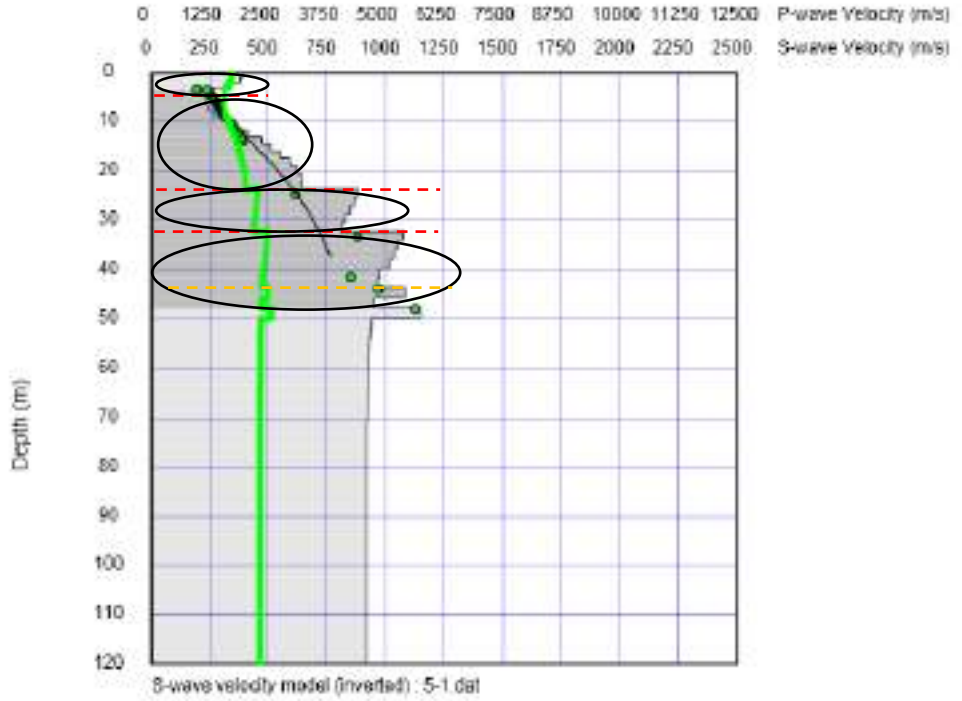
Eror rate of dispersion curve,

Iteration=0 RMS=157.952264 m/s (18.363703%)
Iteration=1 RMS=144.751489 m/s (15.947981%)
Iteration=2 RMS=135.519639 m/s (14.372688%)
Iteration=3 RMS=127.472743 m/s (13.512671%)
Iteration=4 RMS=119.322382 m/s (12.685468%)

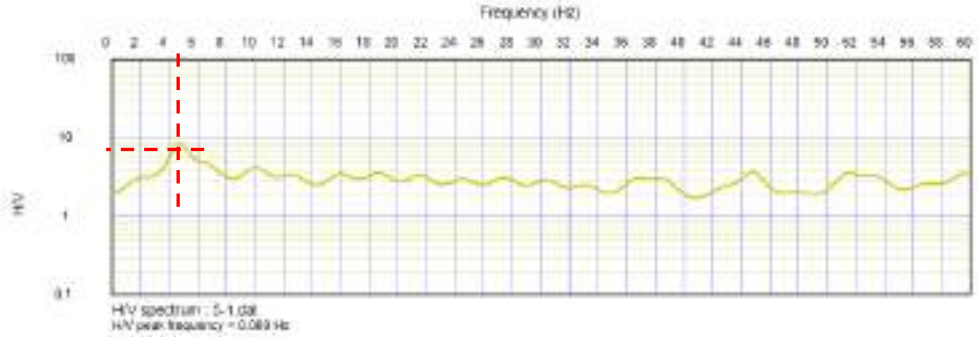
Calculated dispersion curve,



Calculated underground model,

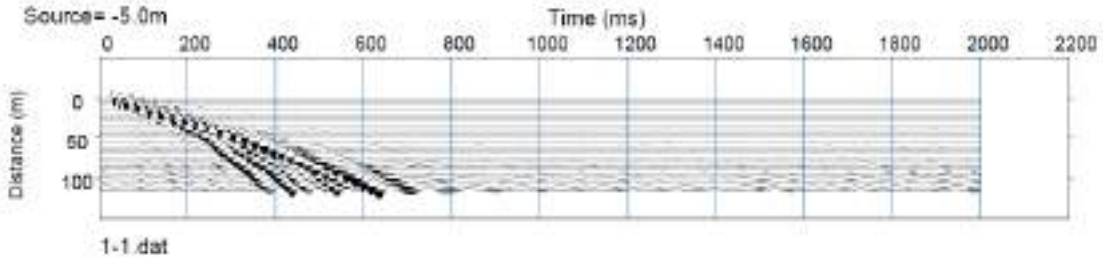


Calculated H/V curve,



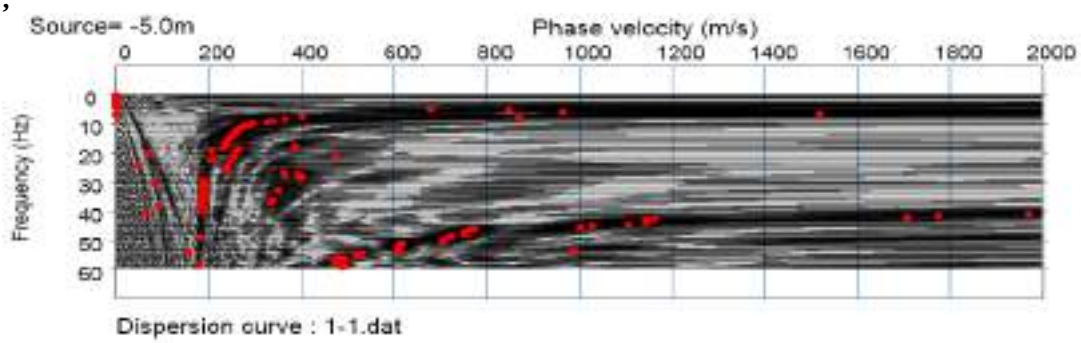
JS-2 (NORMAL SHUT)

Field data,

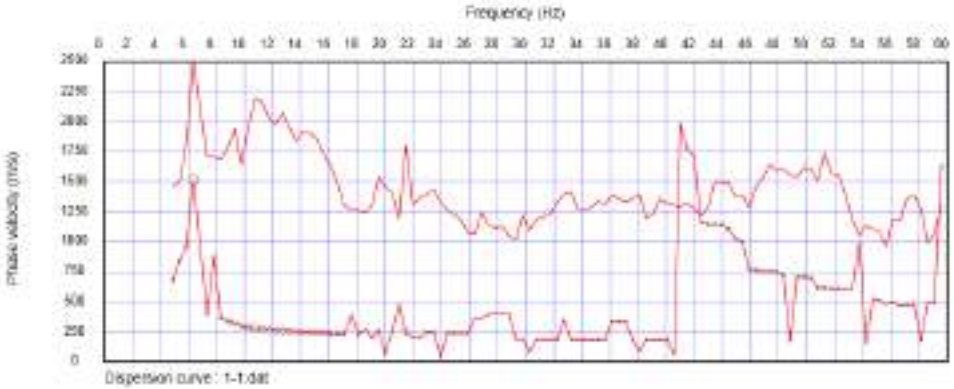


Phase volecity-frequancy reversal,

,



Dispersion curve,



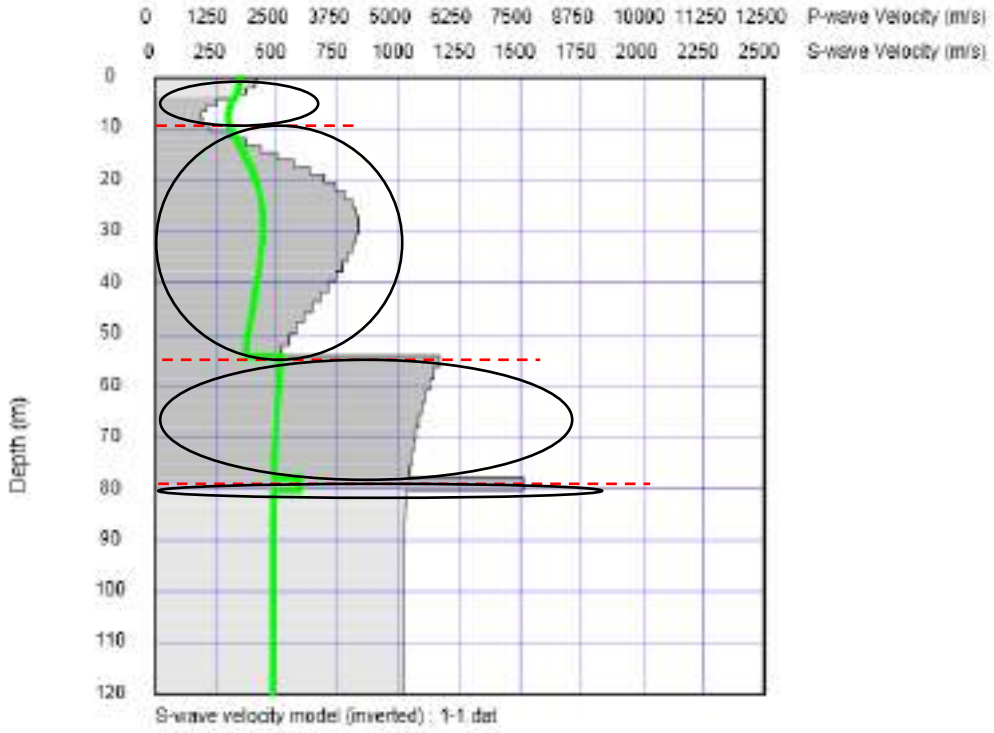
Eror rates of dispersion curve,

Iteration=0 RMS=334.506750 m/s (19.692287%)
Iteration=1 RMS=297.495782 m/s (15.494492%)
Iteration=2 RMS=263.518423 m/s (12.696773%)
Iteration=3 RMS=234.658003 m/s (10.368382%)
Iteration=4 RMS=222.961724 m/s (8.755817%)

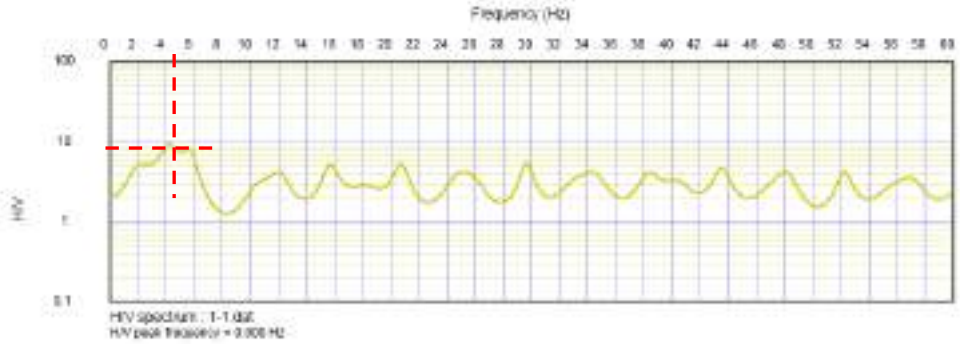
Calculated dispersion curve,



Calculated underground model,

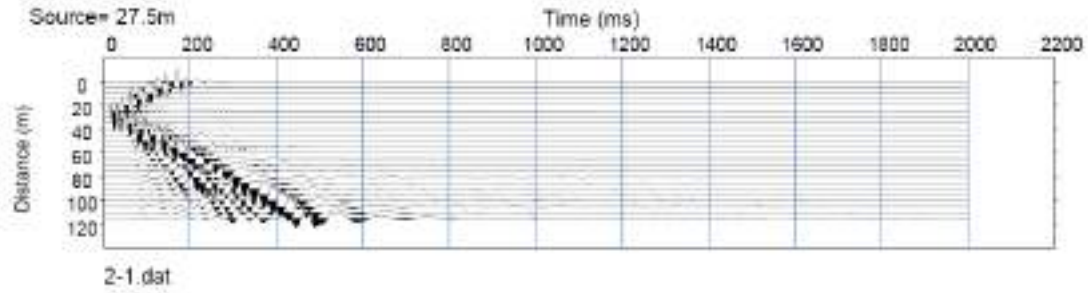


Calcuted H/V curve,



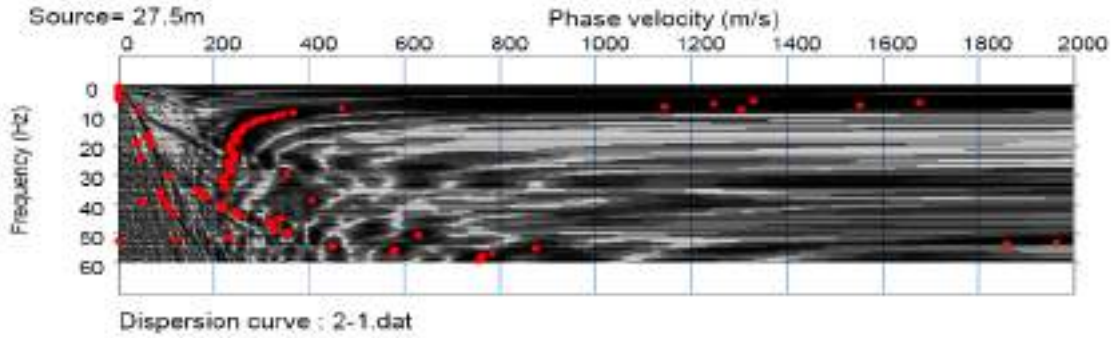
JS-2 (INTERIM SHUT 6-7)

Field data,

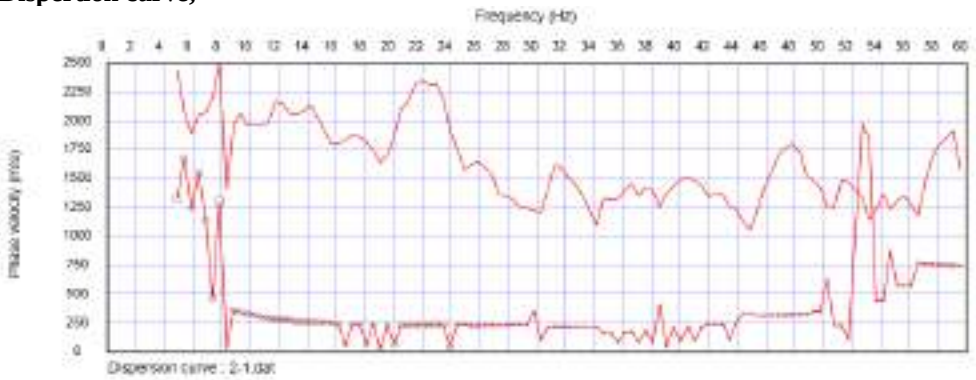


Phase volecity-frequancy reversal,

,



Dispertion curve,



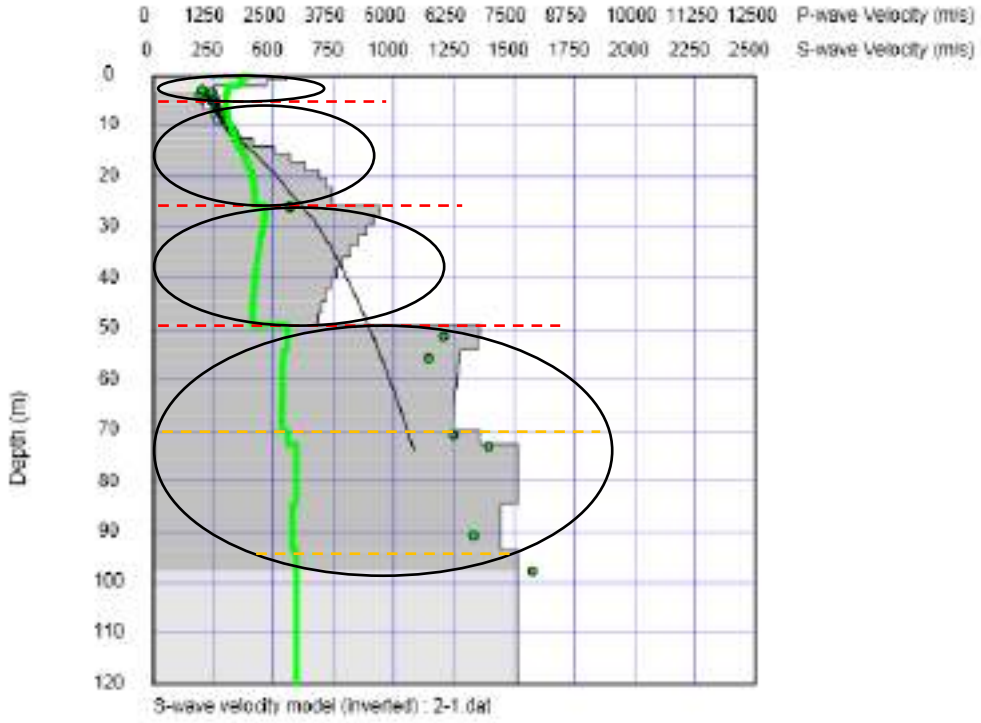
Eror rates of dispersion curve,

Iteration=0 RMS=320.886135 m/s (19.827652%)
Iteration=1 RMS=287.487209 m/s (17.162846%)
Iteration=2 RMS=262.902379 m/s (15.794311%)
Iteration=3 RMS=238.051474 m/s (15.207967%)
Iteration=4 RMS=214.399755 m/s (14.809231%)

Calculated dispertion curve,



Calculated underground model,

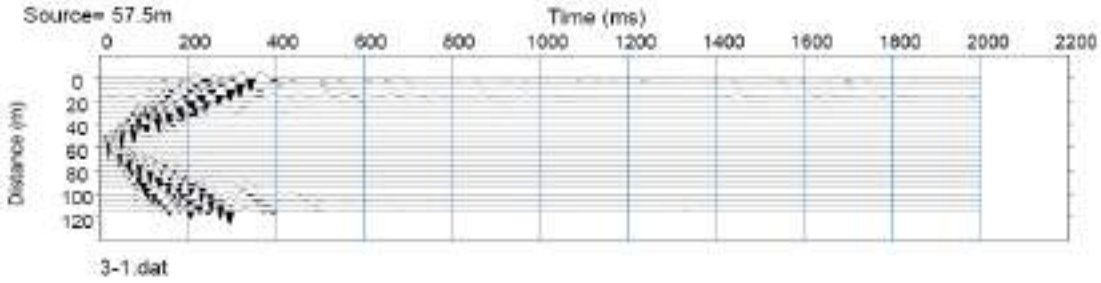


Calculated H/V curve,

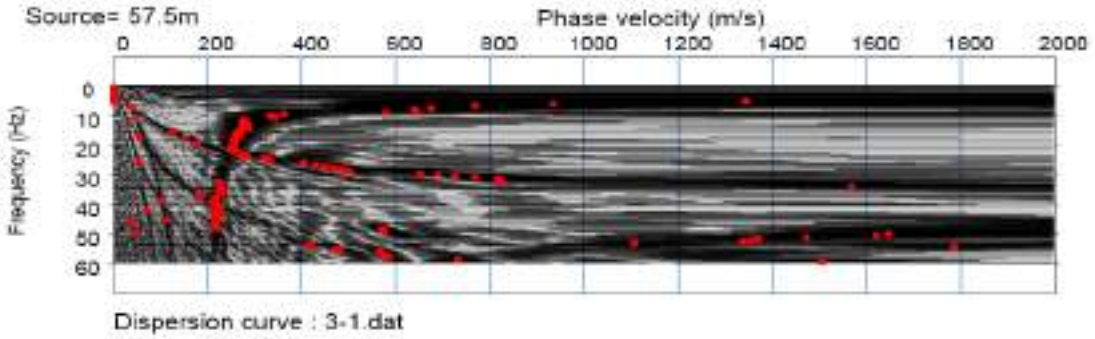


JS-2 (INTERIM SHUT 12-13)

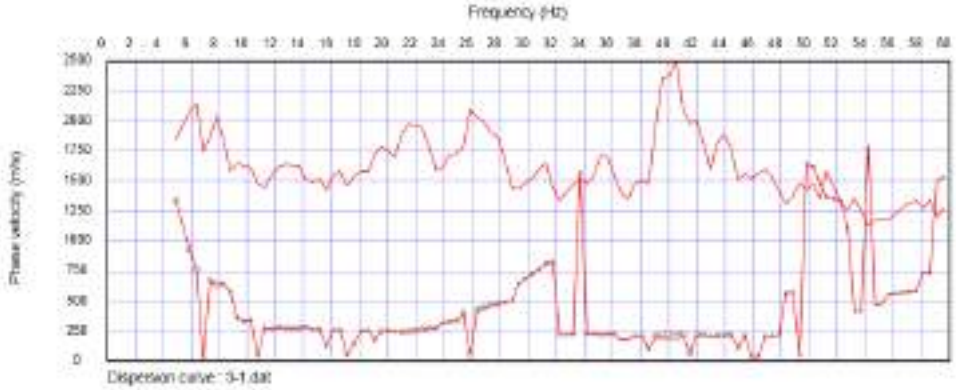
Field data,



Phase volecity-frequancy reversal,



Dispersion curve,



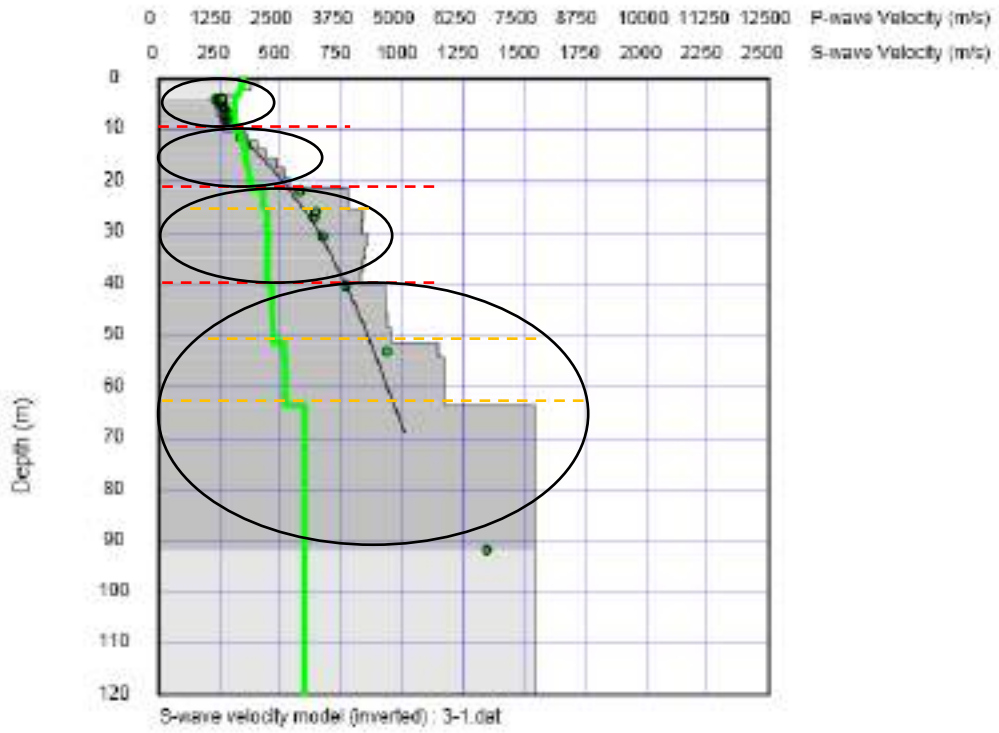
Eor rates of dispertion curve,

Iteration=0 RMS=117.880858 m/s (14.840195%)
Iteration=1 RMS=107.389398 m/s (13.355364%)
Iteration=2 RMS=97.696215 m/s (11.936505%)
Iteration=3 RMS=89.235939 m/s (10.596416%)
Iteration=4 RMS=81.829354 m/s (9.447013%)

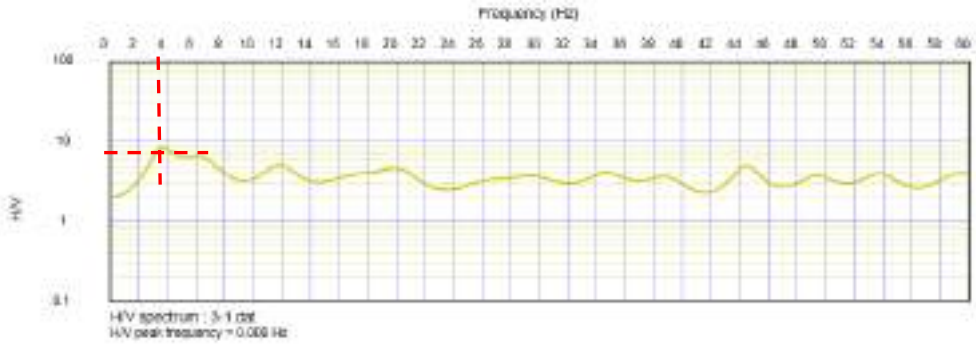
Calculated dispersion curve,



Calculated underground model,

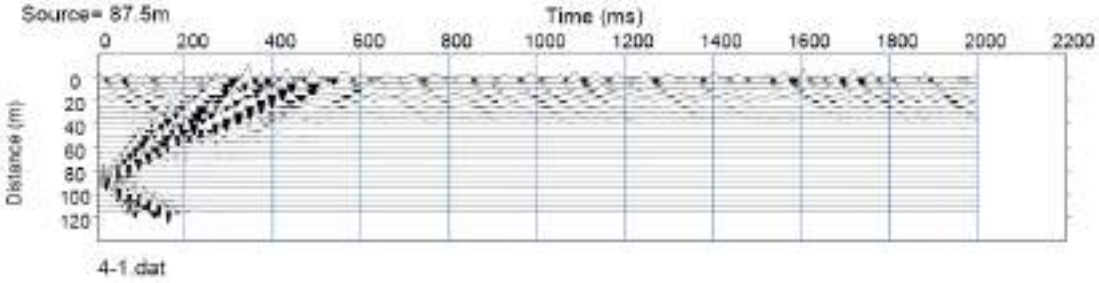


Calculated H/V curve



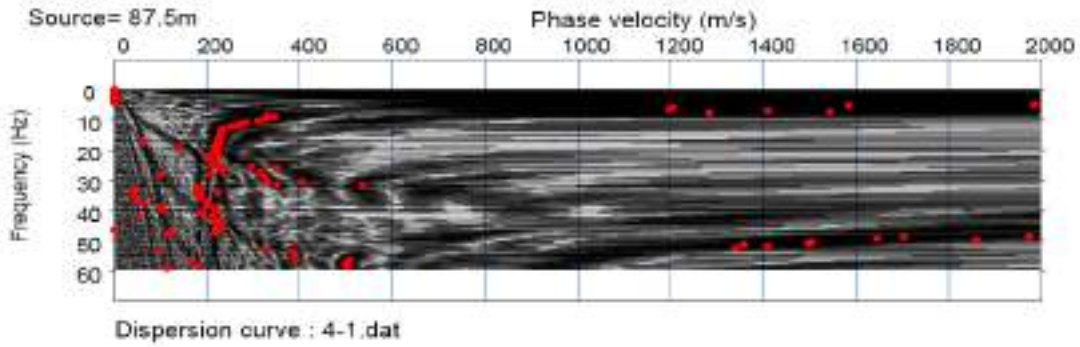
JS-2 (INTERIM SHUT 18-19)

Field data,

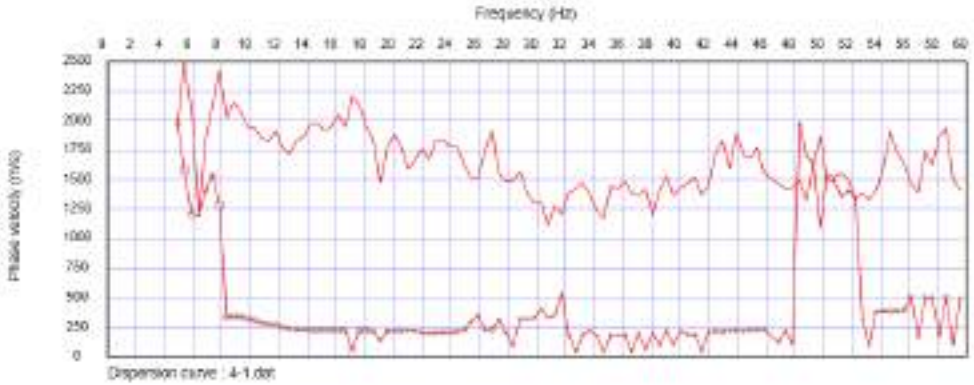


Phase volecity-frequancy reversal,

,



Dispertion curve,



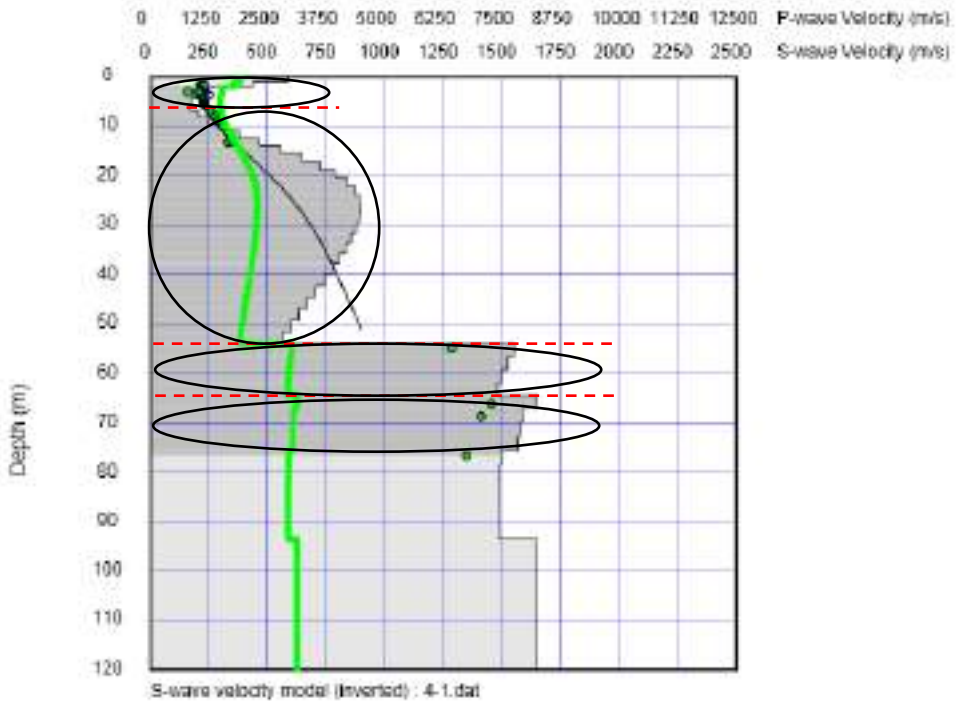
Eror rates of dispersion curve,

Iteration=0 RMS=344.718993 m/s (18.607220%)
Iteration=1 RMS=301.885873 m/s (15.329616%)
Iteration=2 RMS=276.744843 m/s (13.732890%)
Iteration=3 RMS=261.723638 m/s (15.092813%)
Iteration=4 RMS=237.462834 m/s (17.332903%)

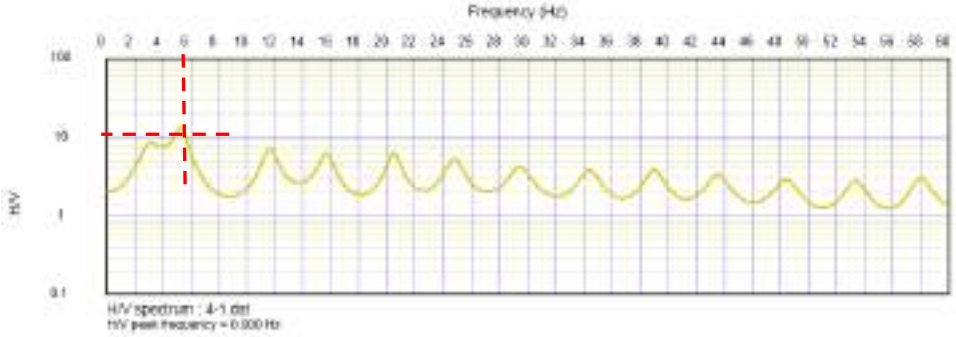
Calculated dispertion curve,



Calculated underground model,

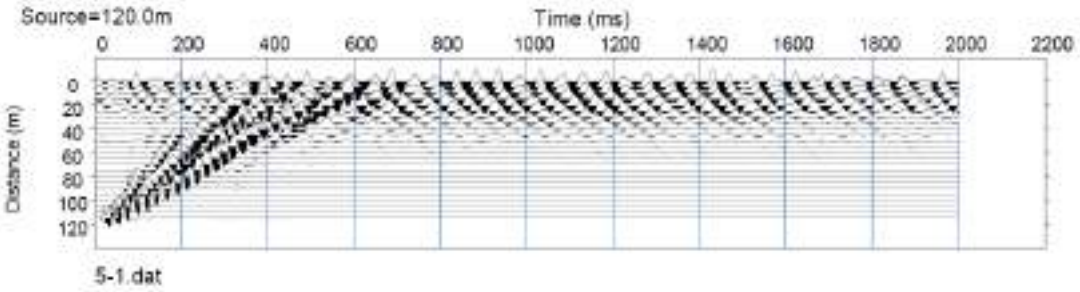


Calculated H/V curve,



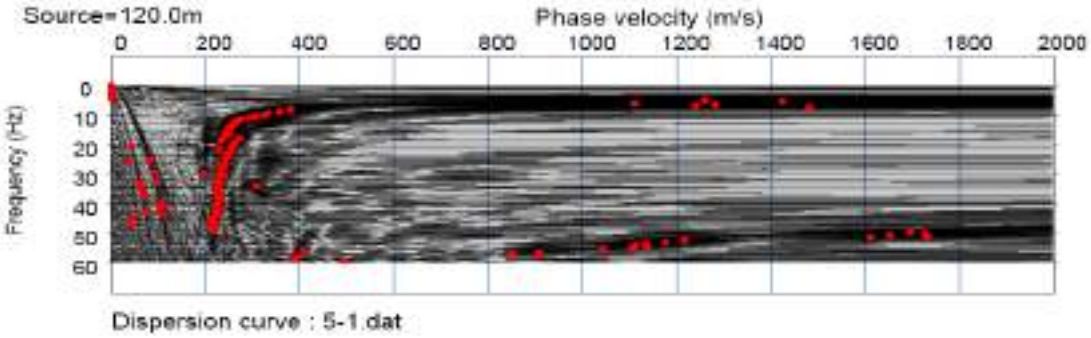
JS-2 (REVERSE SHUT)

Field data,



Phase volecity-frequancy reversal,

,



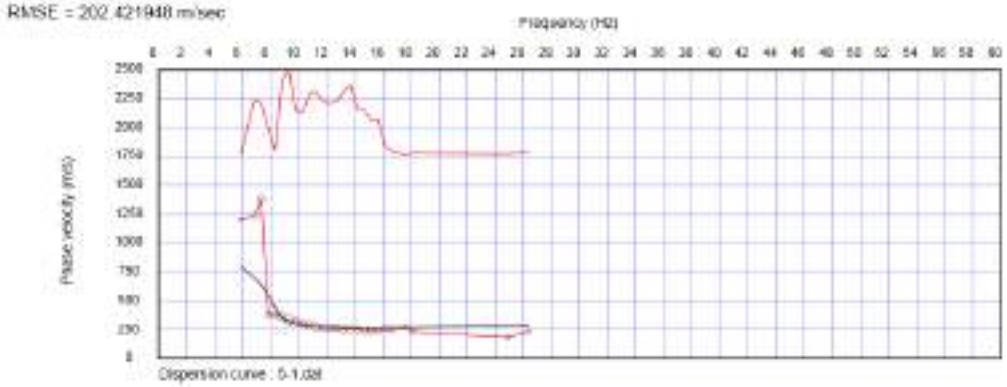
Dispersion curve,



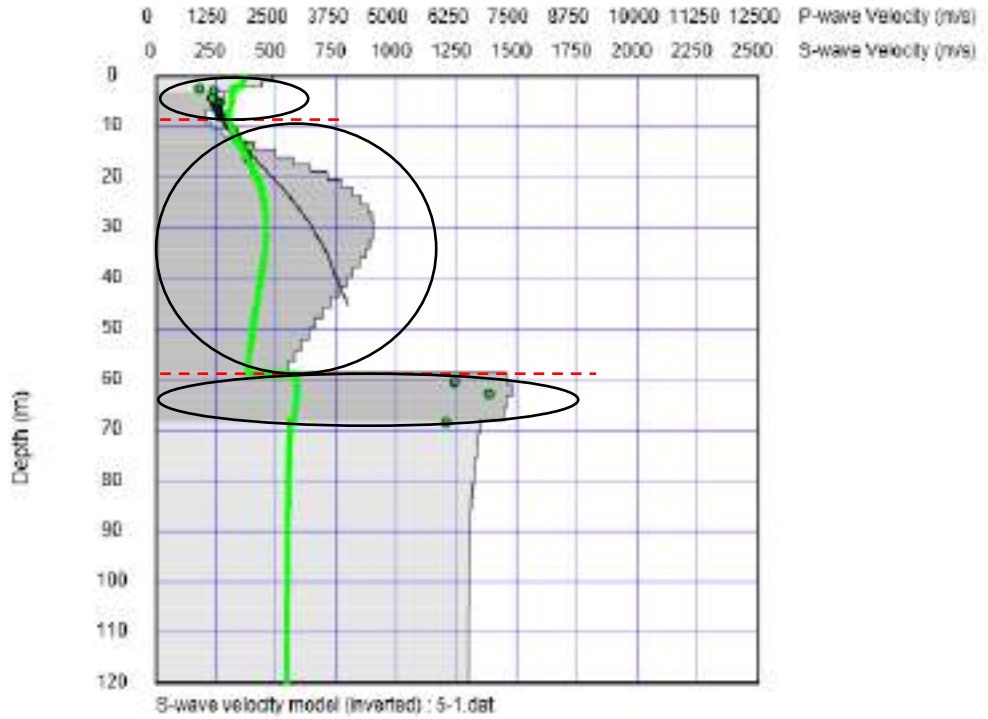
Eror rate of dispersion curve,

Iteration=0 RMS=310.065001 m/s (18.297991%)
Iteration=1 RMS=277.034491 m/s (15.311034%)
Iteration=2 RMS=248.973489 m/s (13.397528%)
Iteration=3 RMS=237.849519 m/s (12.397819%)
Iteration=4 RMS=221.773177 m/s (13.817579%)

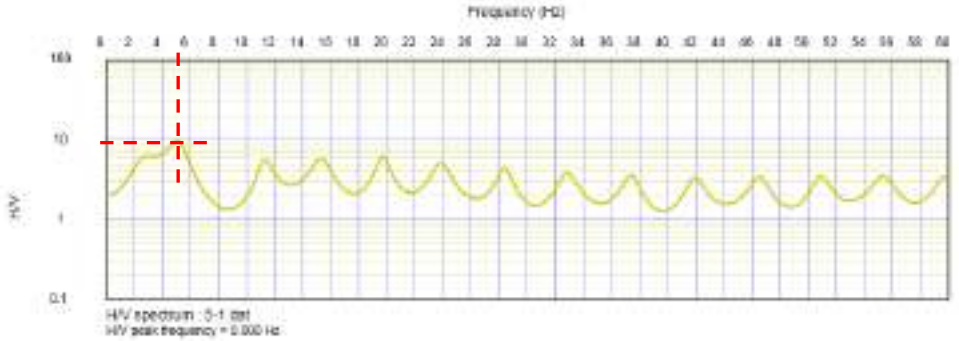
Calculated dispersion curve,



Calculated underground model,

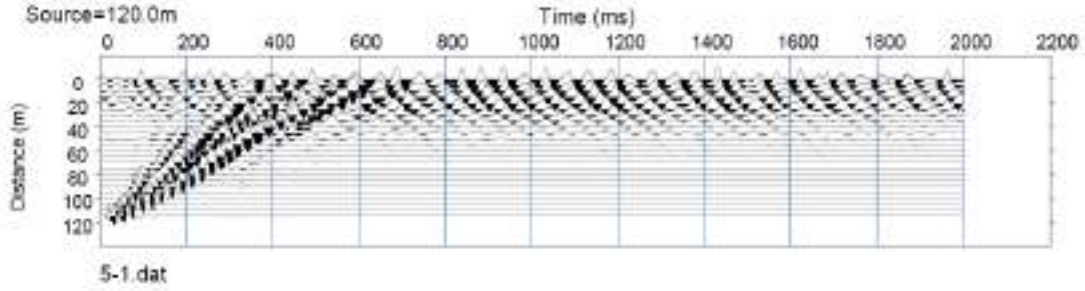


Calculated H/V curve,



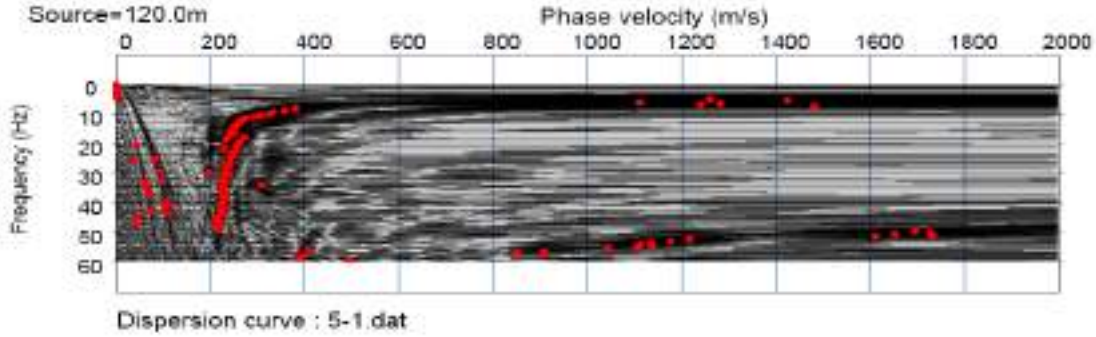
JS-3 (NORMAL SHUT)

Field data,

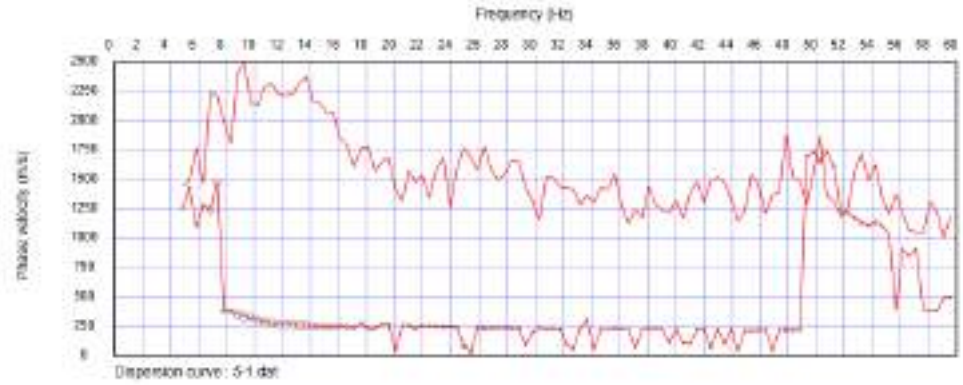


Phase volecity-frequancy reversal,

,



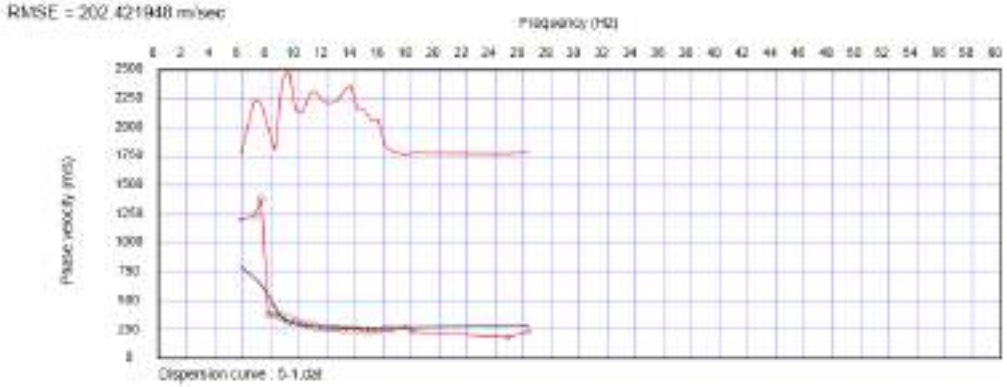
Dispersion curve,



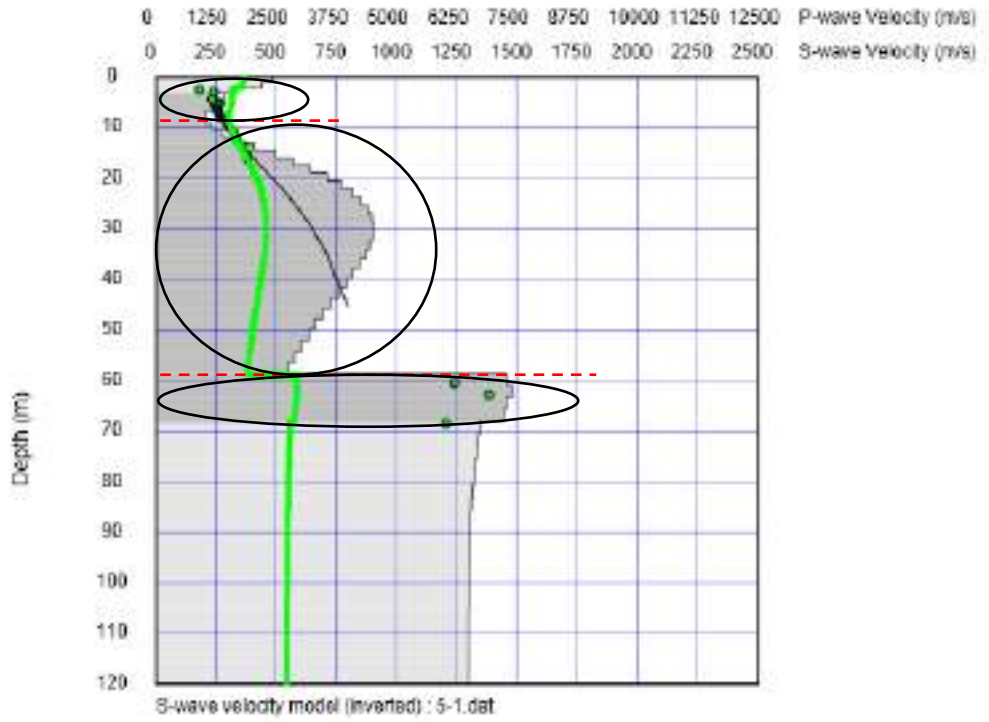
Eror rates of dispertion curve,

Iteration=0 RMS=310.065001 m/s (18.297991%)
Iteration=1 RMS=277.034491 m/s (15.311034%)
Iteration=2 RMS=248.973489 m/s (13.397528%)
Iteration=3 RMS=237.849519 m/s (12.397819%)
Iteration=4 RMS=221.773177 m/s (13.817579%)

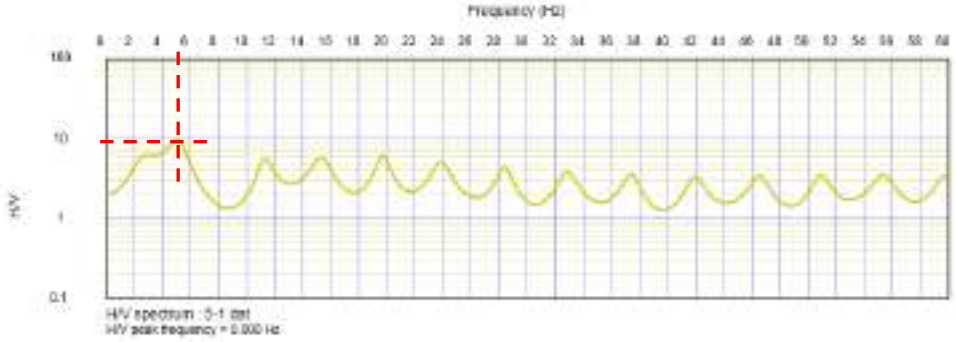
Calculated dispertion curve,



Calculated underground model,

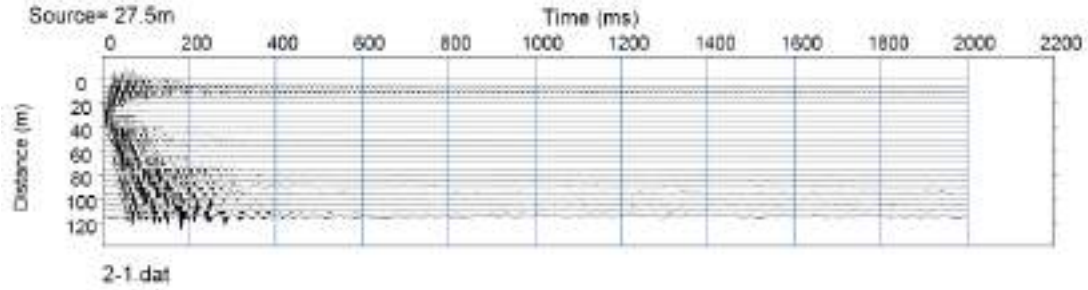


Calculated H/Vcurve,



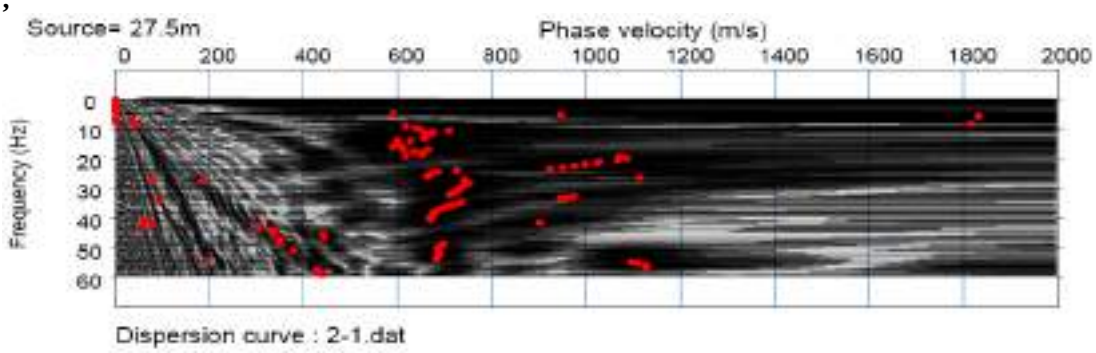
JS-3 (INTERIM SHUT 6-7)

Field data,

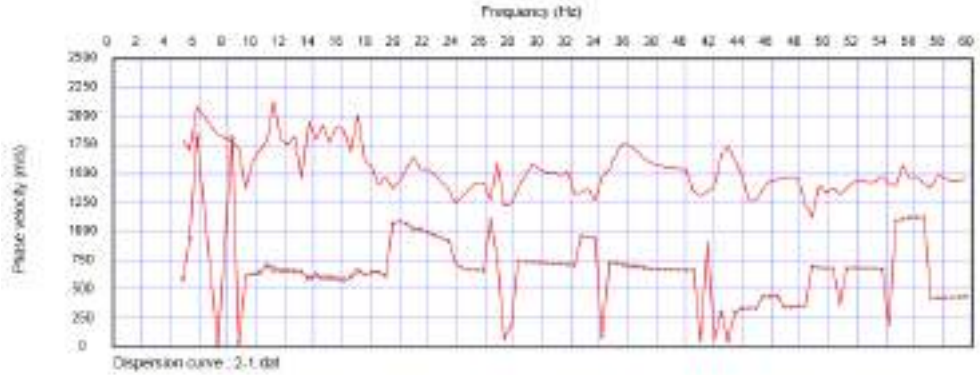


Phase volecity-frequancy reversal,

,



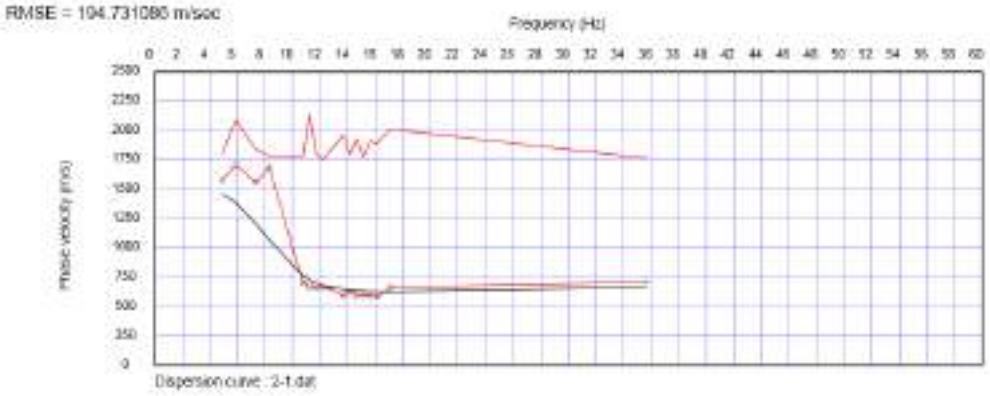
Depresion curve,



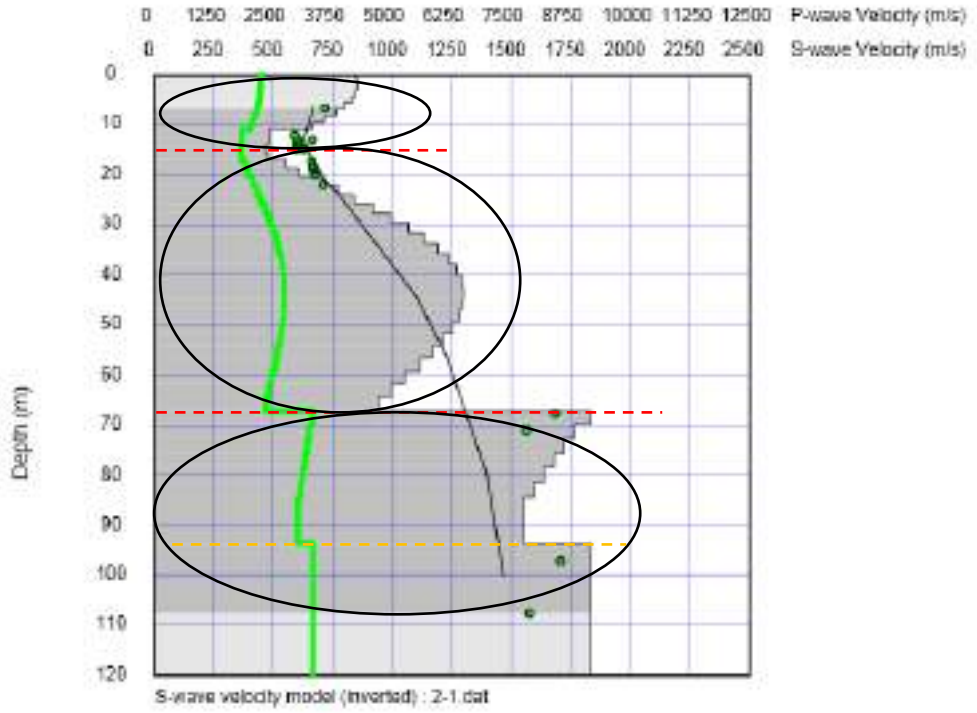
Eror rates of dispersion curve,

Iteration=0 RMS=374.337226 m/s (17.991060%)
Iteration=1 RMS=340.315104 m/s (16.192755%)
Iteration=2 RMS=301.127046 m/s (14.408669%)
Iteration=3 RMS=263.218522 m/s (12.682615%)
Iteration=4 RMS=226.503089 m/s (10.998343%)

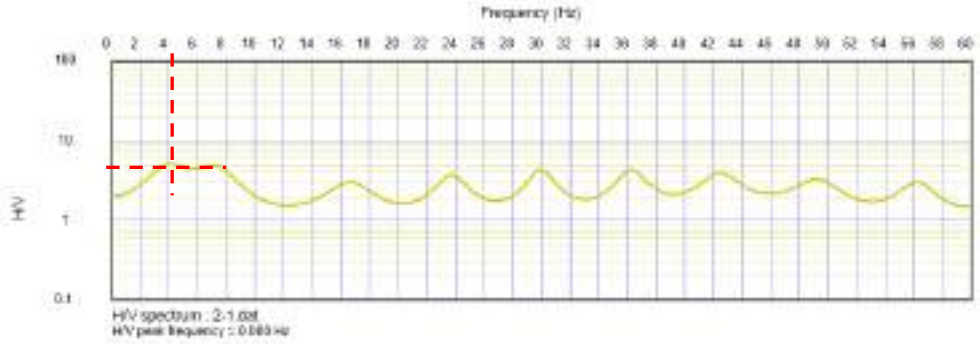
Calculated dispertion curve,



Calculated underground model,

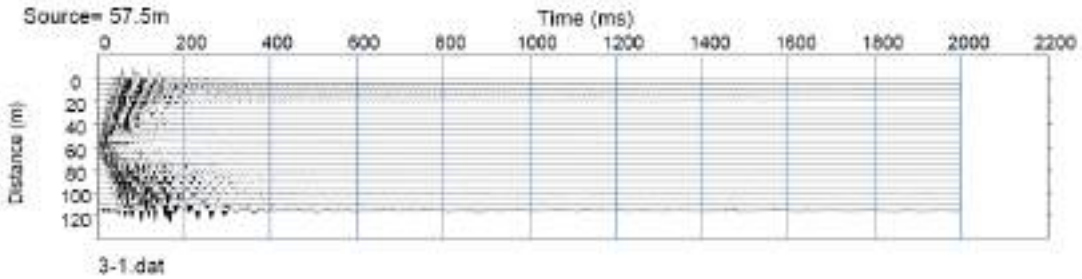


Calculated H/V curve,



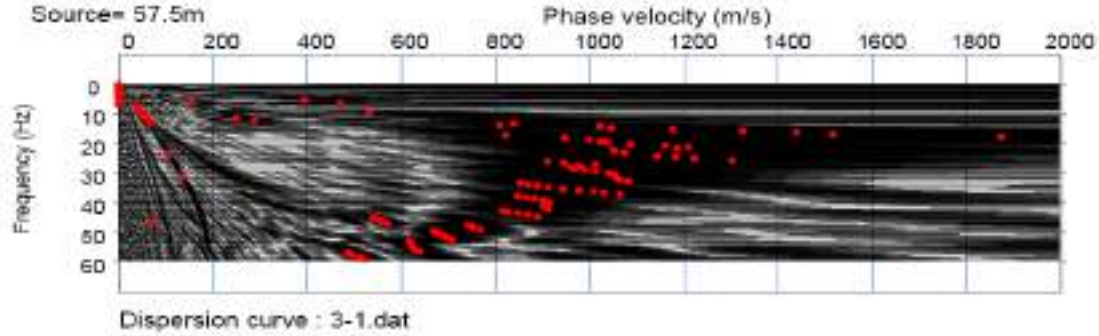
JS-3 (INTERIM SHUT 12-13)

Field data,

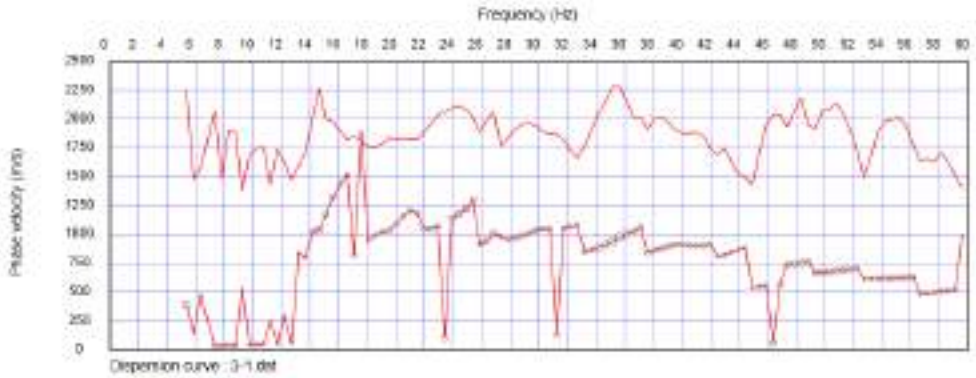


Phase volecity-frequancy reversal,

,



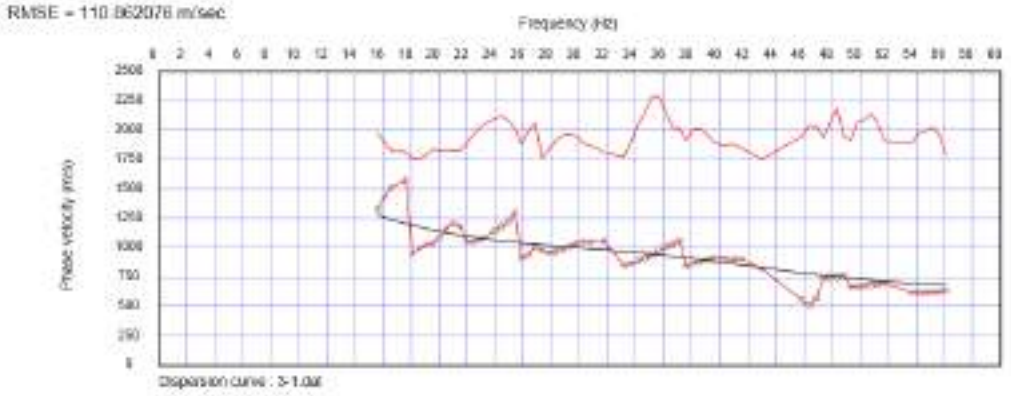
Dispersion curve,



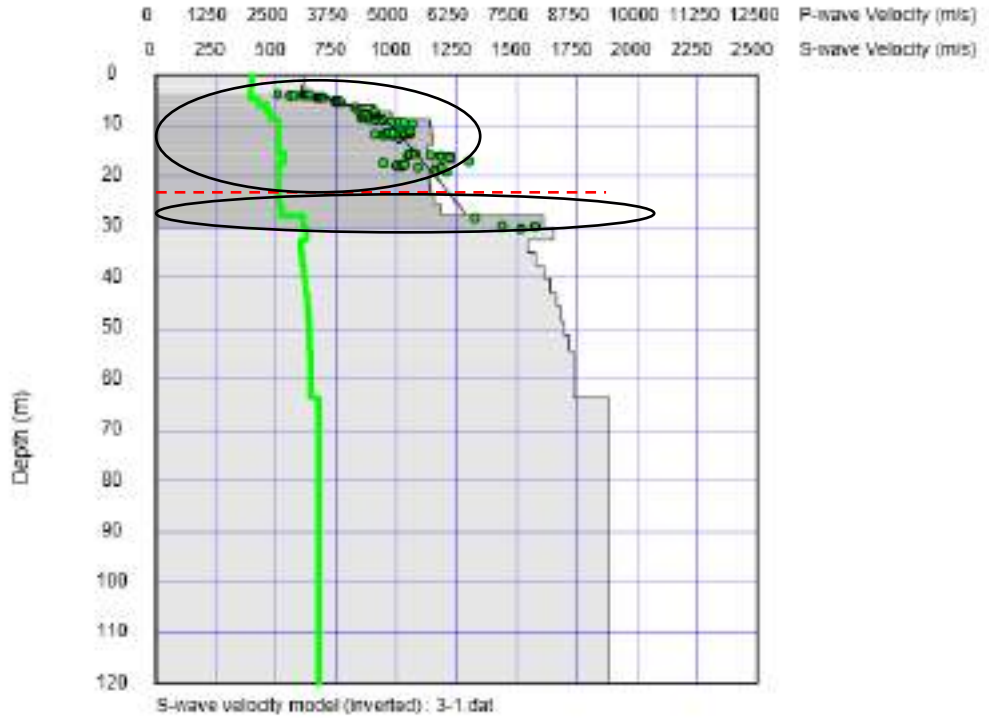
Eror rates of dispertion curve,

Iteration=0 RMS=137.086645 m/s (12.519108%)
Iteration=1 RMS=128.932610 m/s (11.573972%)
Iteration=2 RMS=122.416928 m/s (10.746737%)
Iteration=3 RMS=117.647134 m/s (10.065173%)
Iteration=4 RMS=113.643713 m/s (9.496336%)

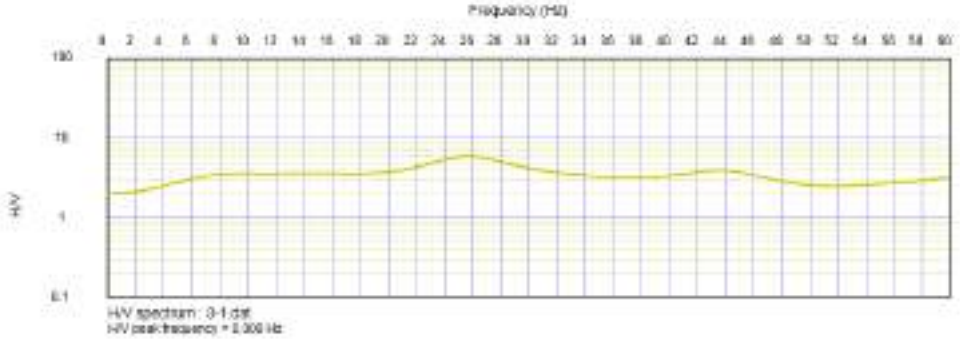
Calculated dispersion curve,



Calculted underground model

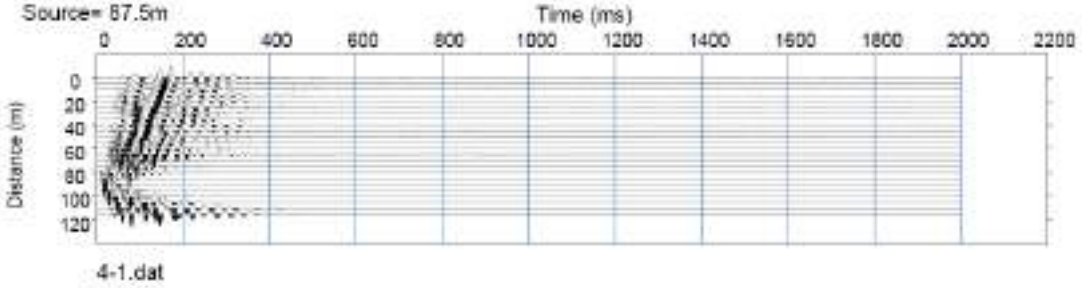


Calculated H/V curve,



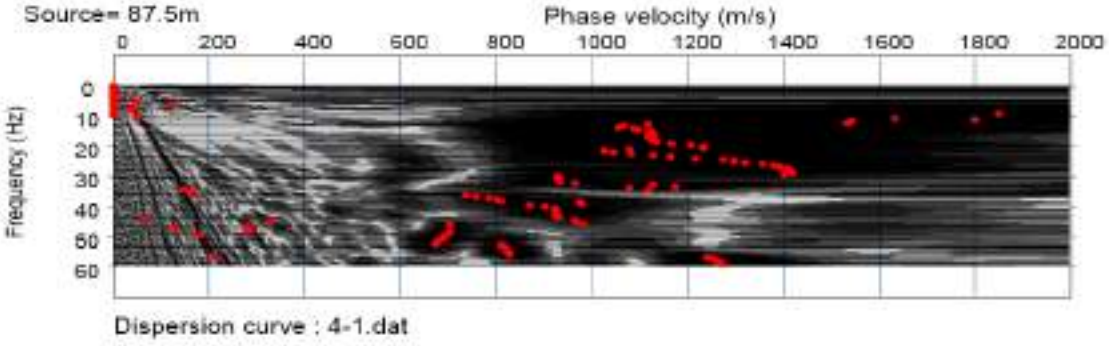
JS-3 (INTERIM SHUT 18-19)

Field data,

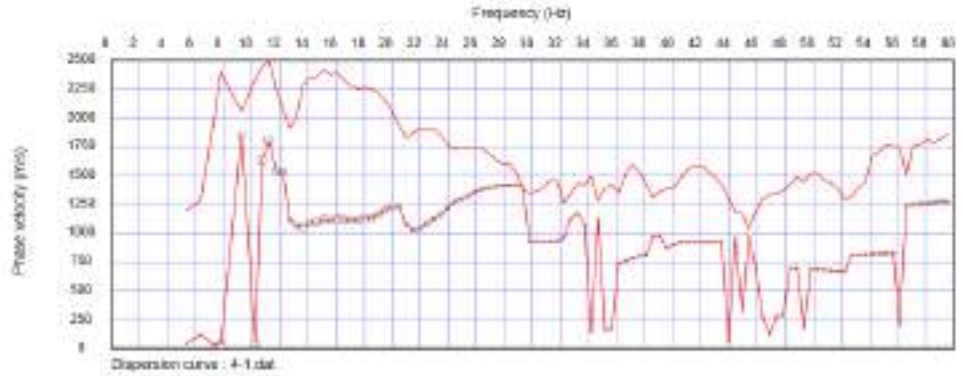


Phase volecity-frequancy reversal,

,



Dispersion curvw,



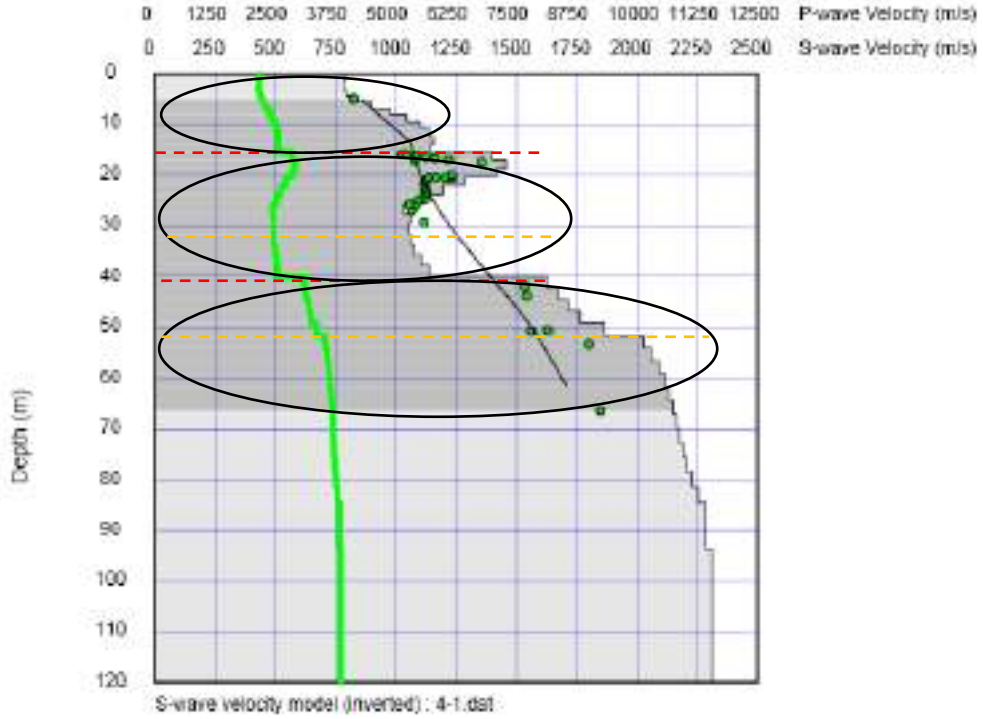
Eror rates of dispersion curve,

Iteration=0 RMS=167.136267 m/s (9.854506%)
Iteration=1 RMS=155.419618 m/s (9.124795%)
Iteration=2 RMS=146.238565 m/s (8.533204%)
Iteration=3 RMS=138.584659 m/s (8.044716%)
Iteration=4 RMS=132.370472 m/s (7.633720%)

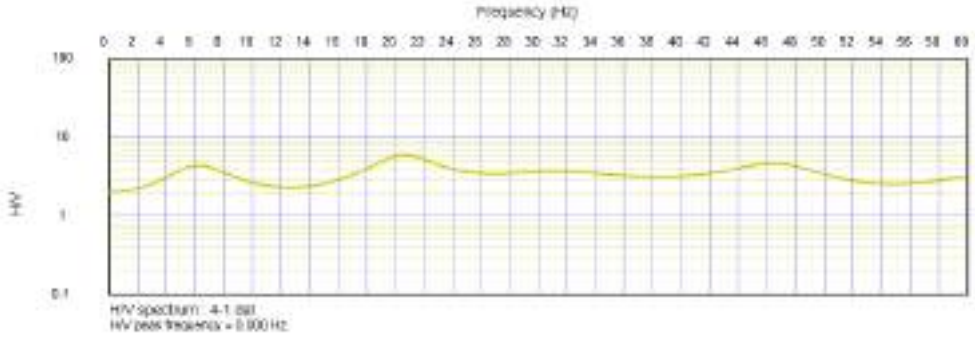
Calculated dispersion curve,



Calculated under ground model,

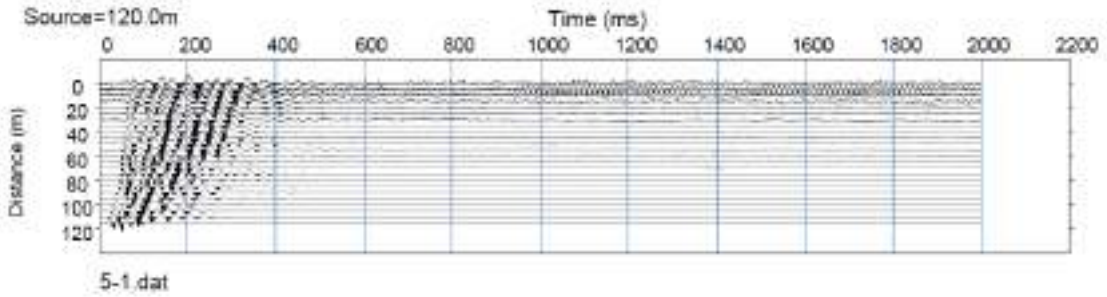


Calculated H/V curve,



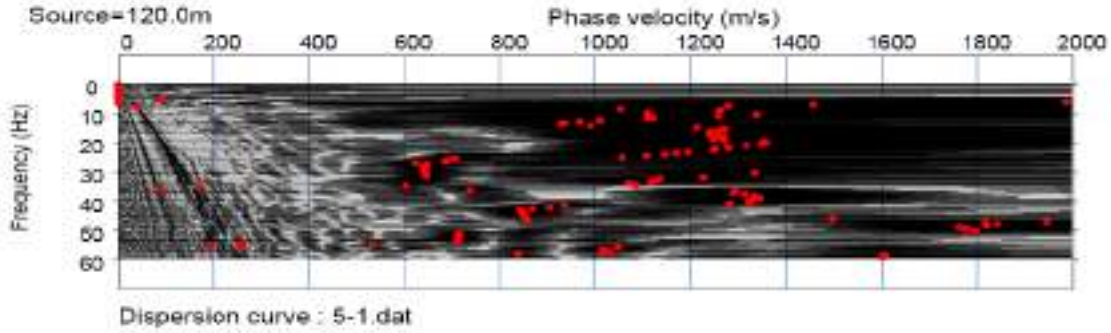
JS-3 (REVERSE SHUT)

Field data,

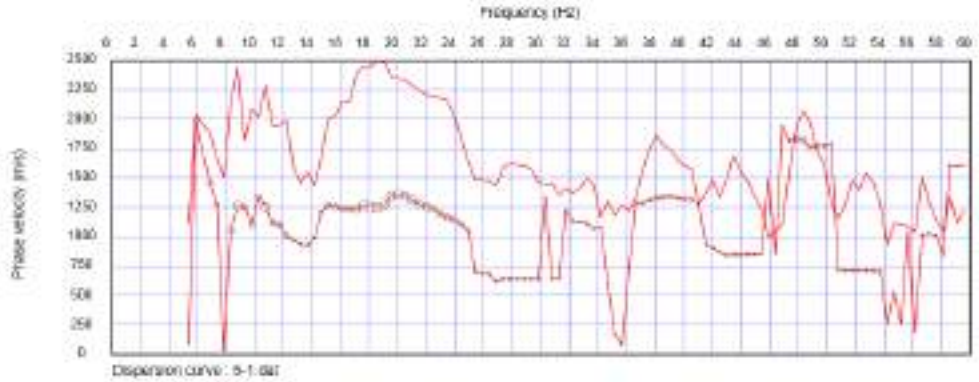


Phase volecity-frequancy reversal,

,



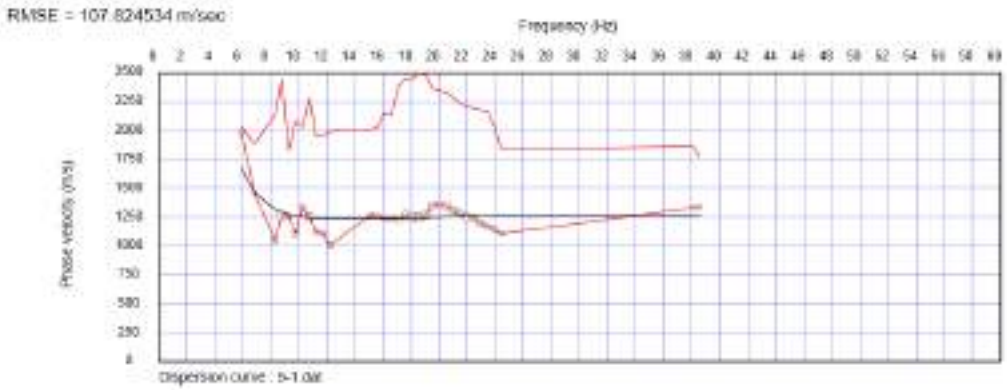
Dispersion curve,



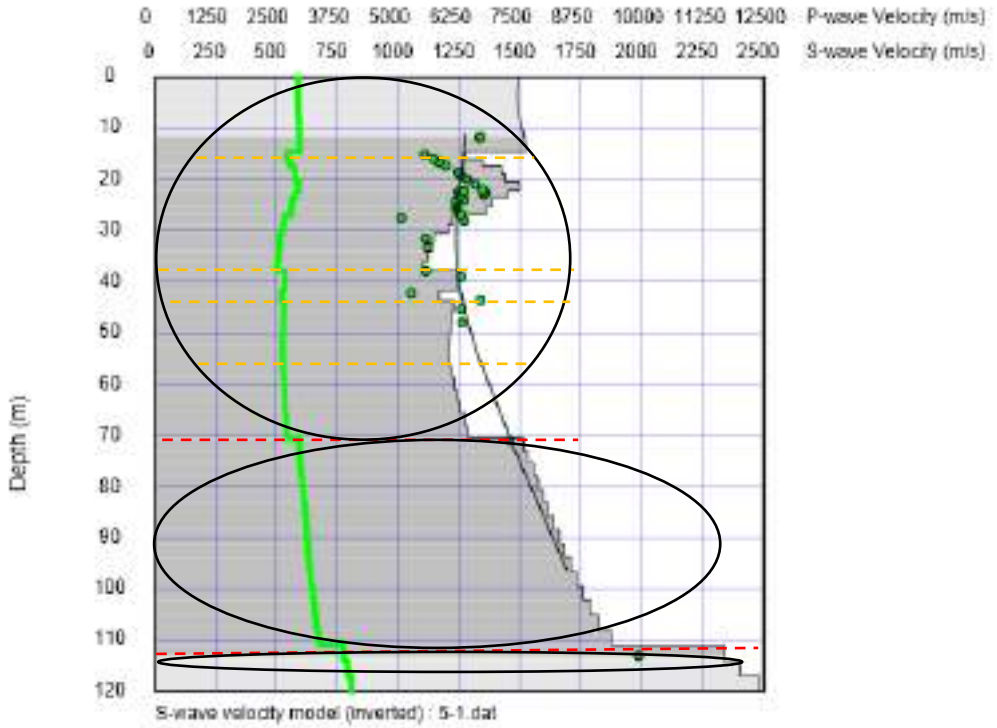
Eror rate of dispersion curve,

Iteration=0 RMS=133.035973 m/s (6.942957%)
Iteration=1 RMS=126.171544 m/s (6.629482%)
Iteration=2 RMS=120.134525 m/s (6.386551%)
Iteration=3 RMS=114.789009 m/s (6.187171%)
Iteration=4 RMS=110.879675 m/s (6.101636%)

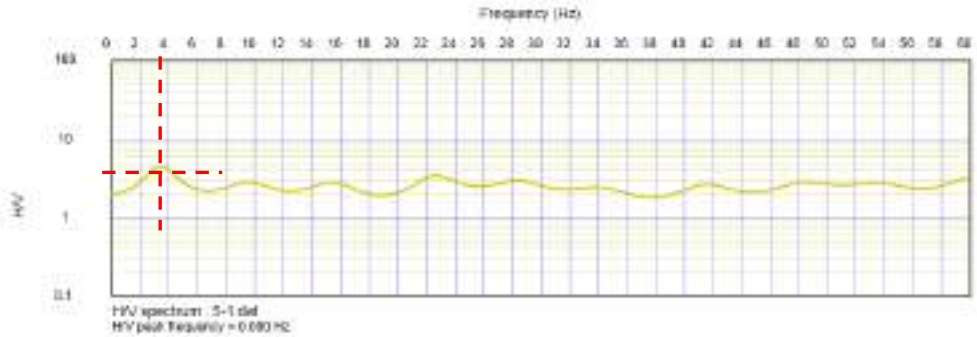
Calculated dispersion curve,



Calculated under ground model,

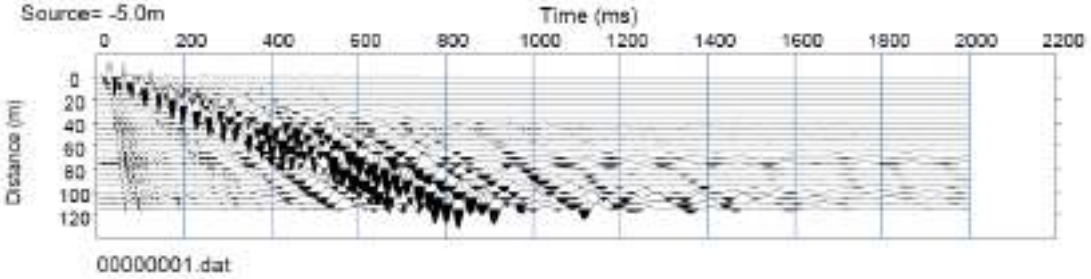


Calculated H/V curve,



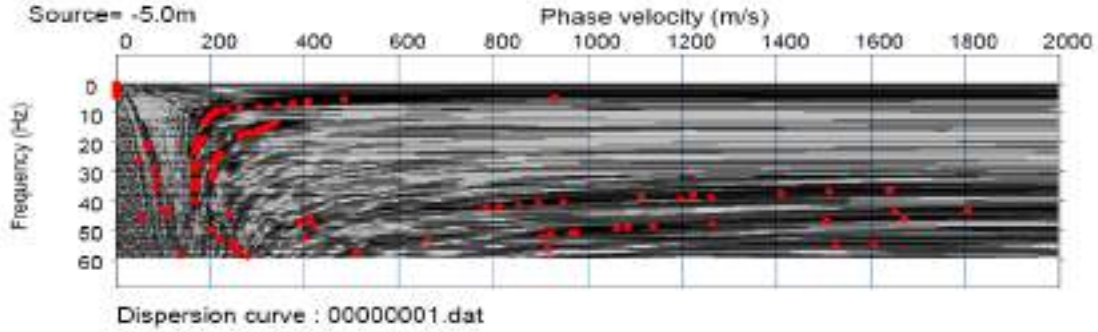
JS-4 (NORMAL SHUT)

Field data,



Phase volecity-frequancy reversal,

,



Dispersion curve,



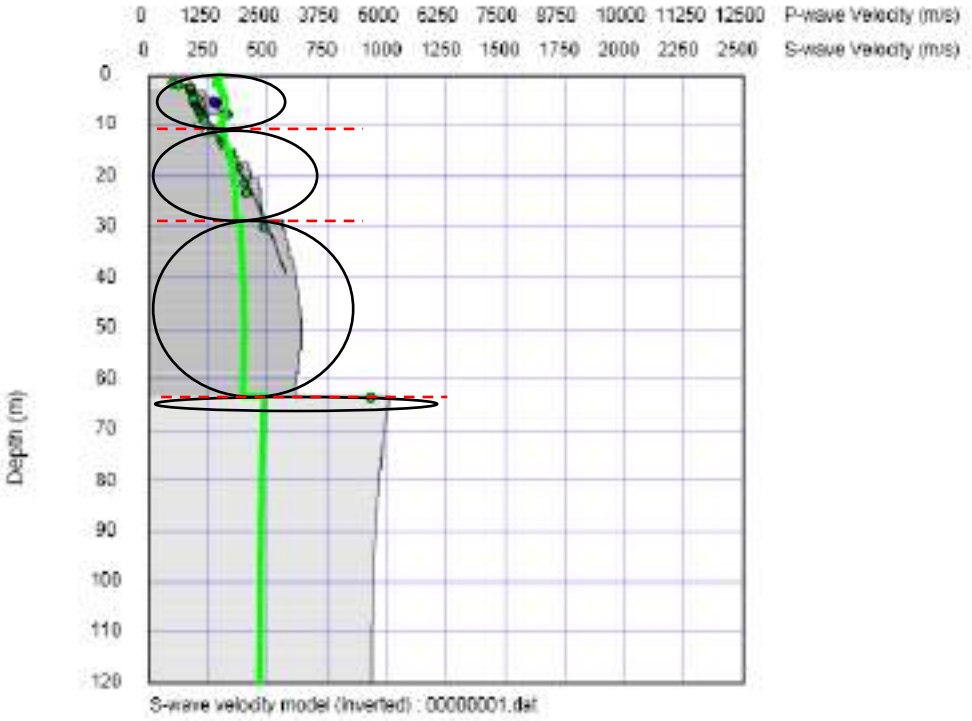
Eror rate of dispertion curve,

Iteration=0 RMS=98.399706 m/s (21.153713%)
Iteration=1 RMS=90.594962 m/s (19.634260%)
Iteration=2 RMS=84.353134 m/s (18.650301%)
Iteration=3 RMS=81.738926 m/s (18.123384%)
Iteration=4 RMS=79.824977 m/s (18.005836%)

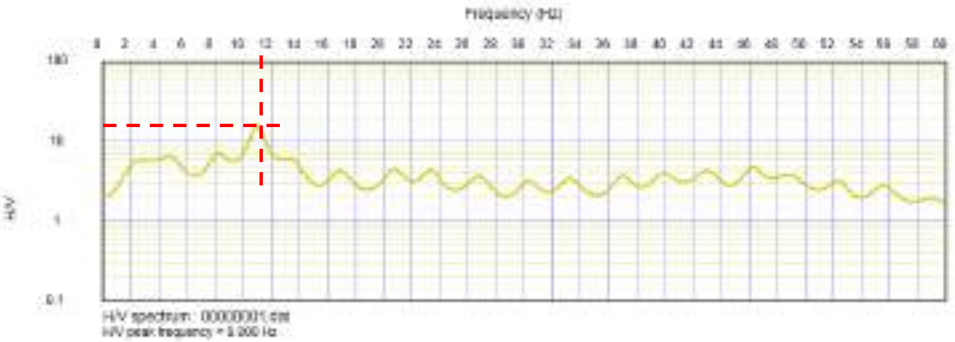
Calculated dispersion curve,



Calculated under ground model,

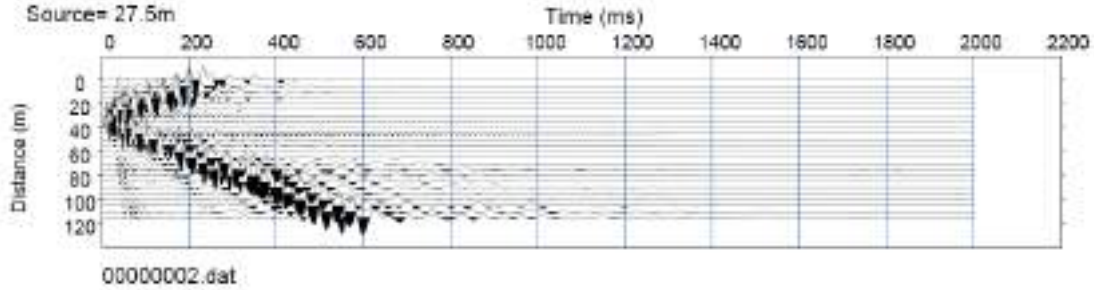


Calculated H/V curve,

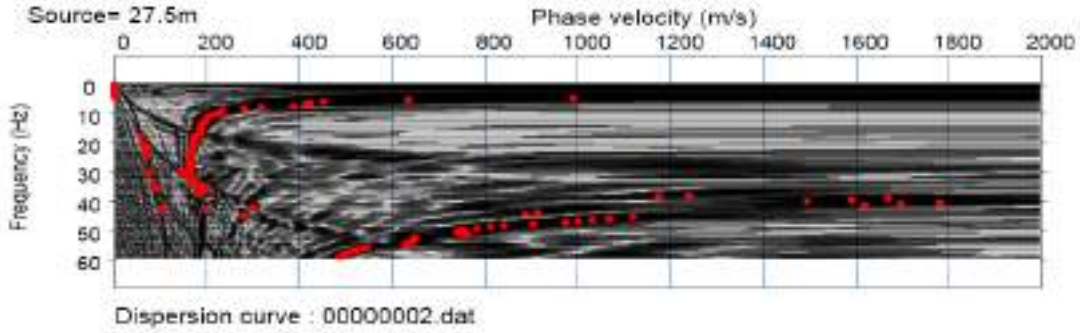


JS-4 (INTERIM SHUT 6-7)

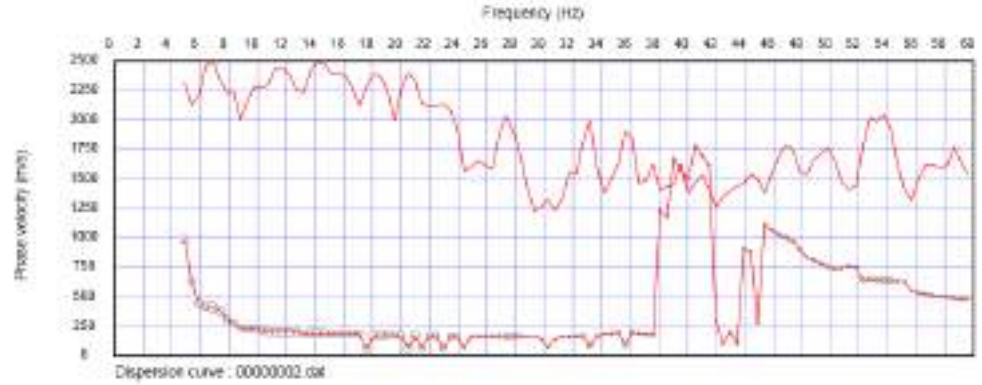
Field data,



Phase volecity-frequancy reversal,



Dispersion curve,



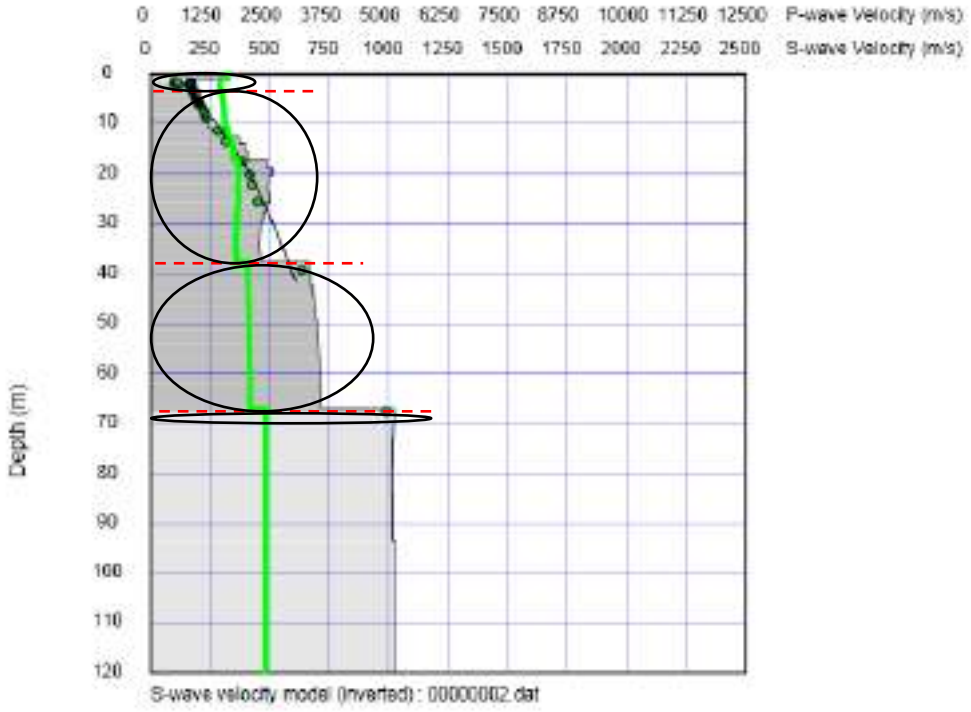
Eror rates of dispersion curve,

Iteration=0 RMS=72.088085 m/s (15.964890%)
Iteration=1 RMS=70.308000 m/s (14.746908%)
Iteration=2 RMS=68.809658 m/s (14.012303%)
Iteration=3 RMS=67.656249 m/s (13.488770%)
Iteration=4 RMS=65.904126 m/s (12.706629%)

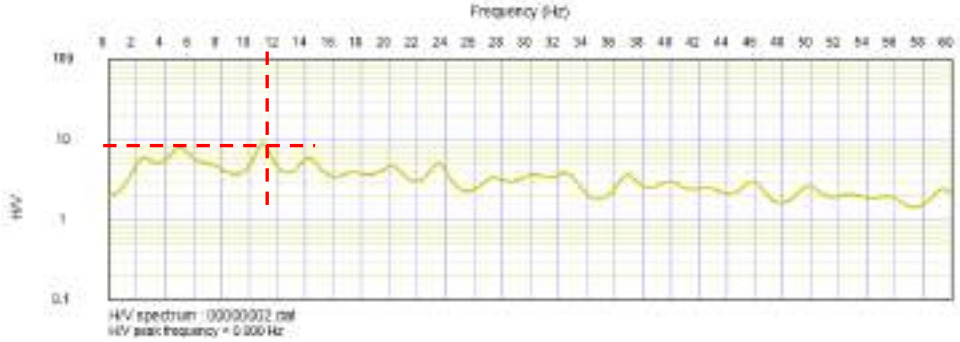
Calculated dispersion curve,



Calculated under ground model,

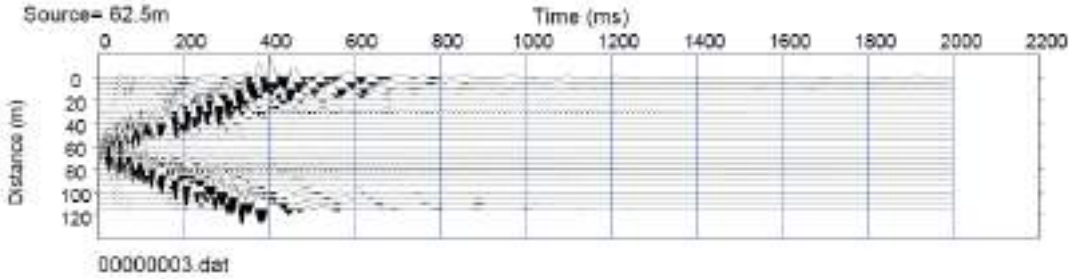


Calculated H/V curve,

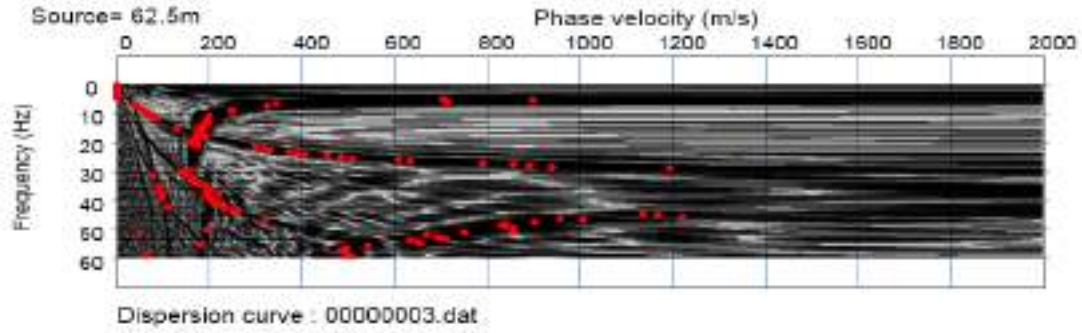


JS-4 (INTERIM SHUT 13-14)

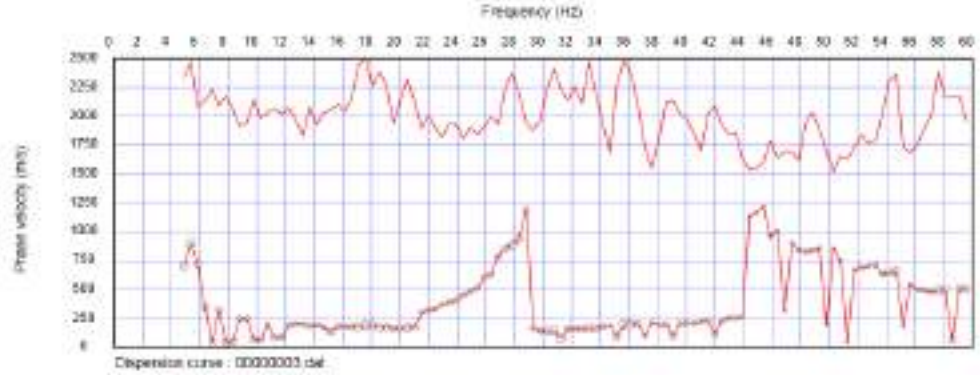
Field data,



Phase volecity-frequancy reversal,



Dispersion curve,



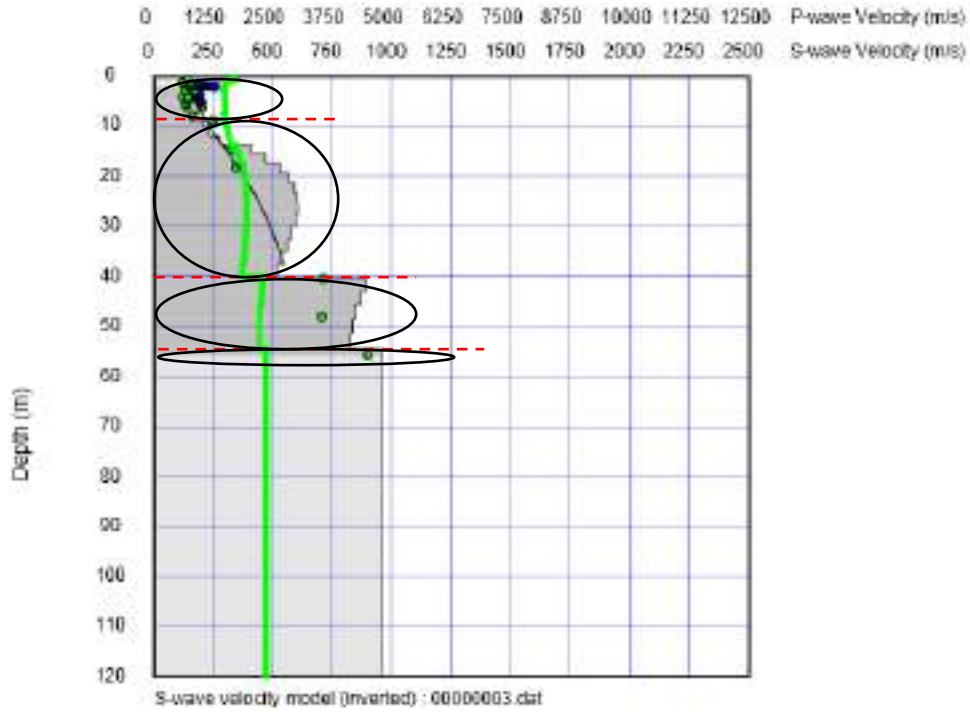
Eror rates of dispersion curve,

Iteration=0 RMS=102.782816 m/s (22.017870%)
Iteration=1 RMS=93.719013 m/s (20.656267%)
Iteration=2 RMS=88.195316 m/s (19.716745%)
Iteration=3 RMS=84.893554 m/s (19.299564%)
Iteration=4 RMS=81.671551 m/s (19.499454%)

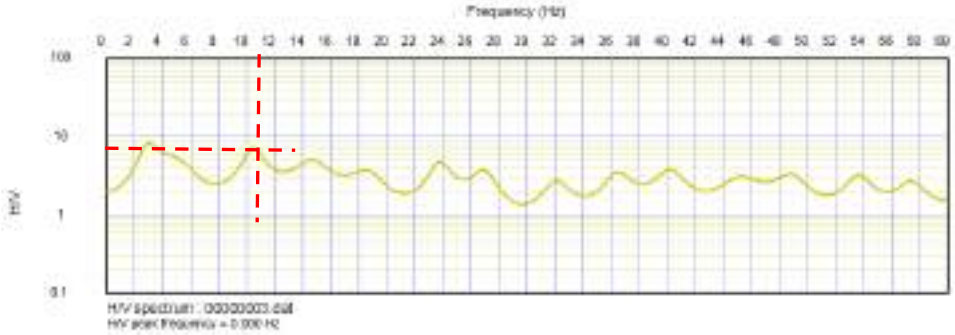
Calculated dispesion curve,



Calculated under ground model,

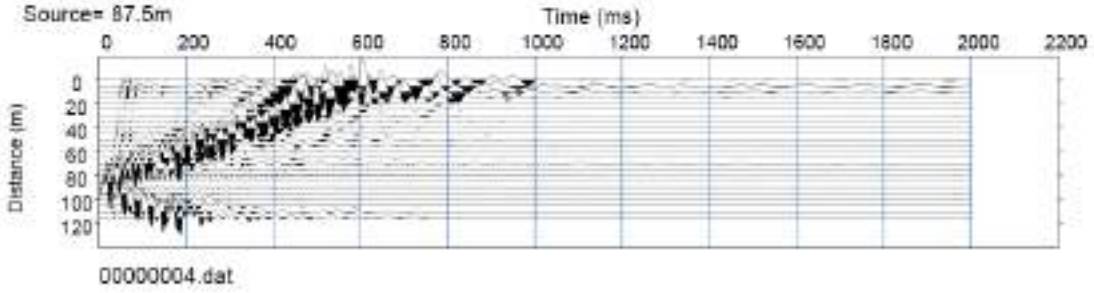


Calculated H/V curve,



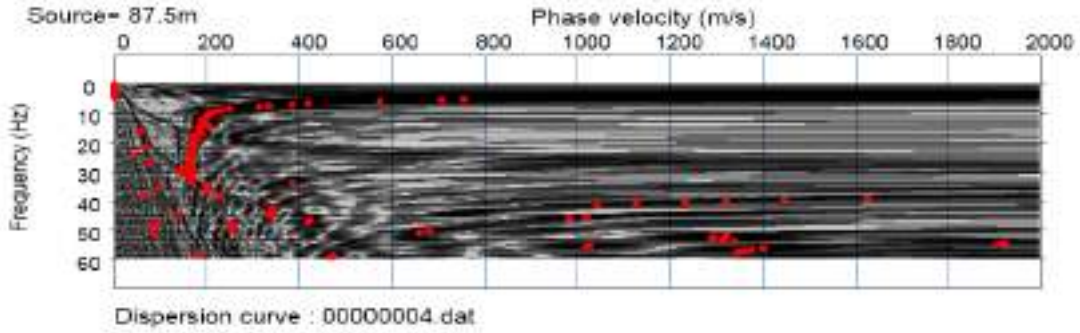
JS-4 (INTERIM SHUT 18-19)

Field data,

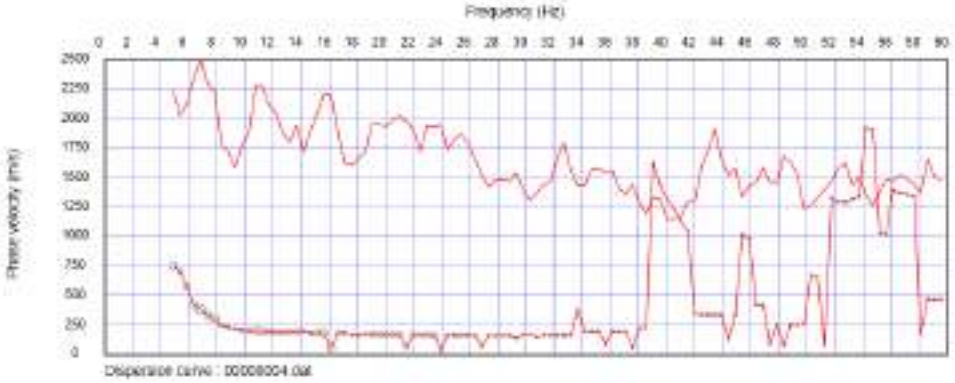


Phase volecity-frequancy reversal,

,



Dispersion curve,



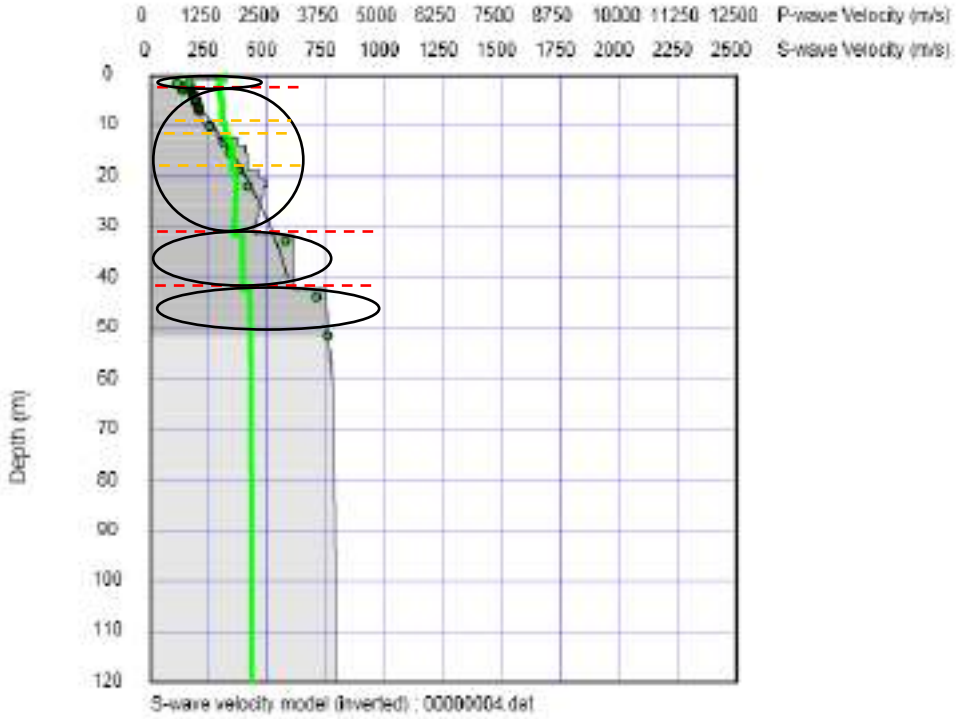
Eror rates of dispersion curve,

Iteration=0 RMS=57.133865 m/s (11.531487%)
Iteration=1 RMS=54.772649 m/s (10.859711%)
Iteration=2 RMS=52.812789 m/s (10.642978%)
Iteration=3 RMS=50.931446 m/s (10.479811%)
Iteration=4 RMS=49.064342 m/s (10.301082%)

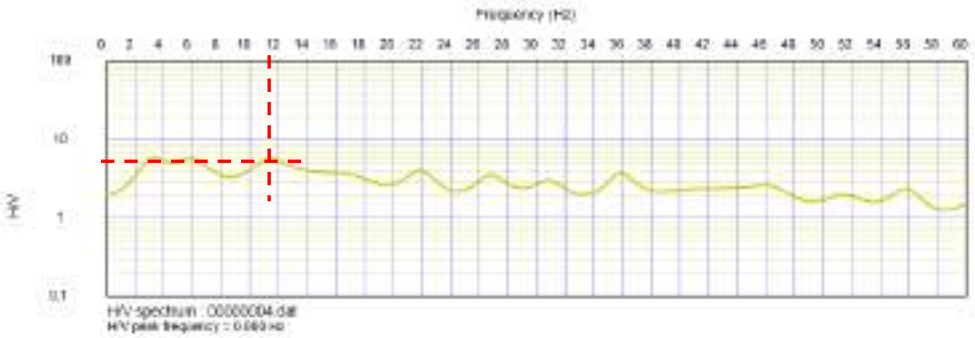
Calculated dispersion curve,



Calculated underground model,

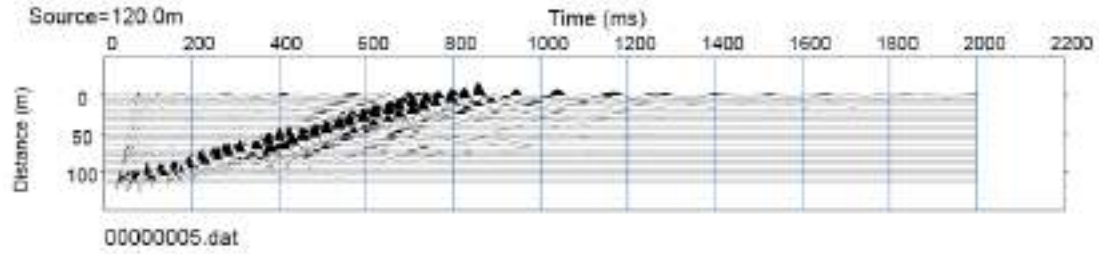


Calculated H/V curve,



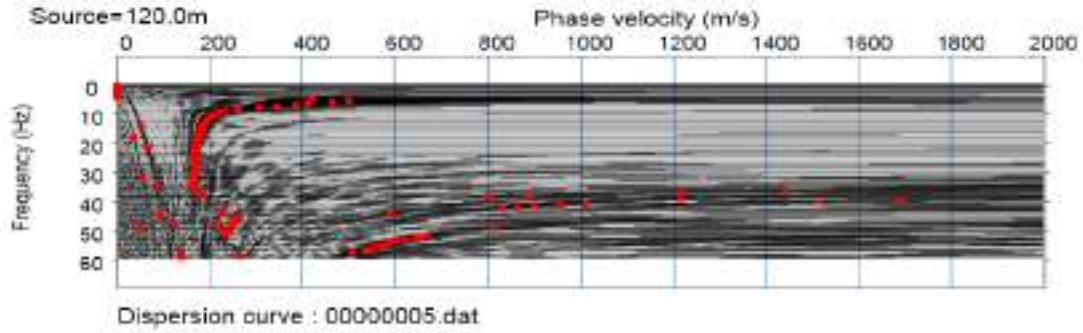
JS-4 (REVERSE SHUT)

Field data,

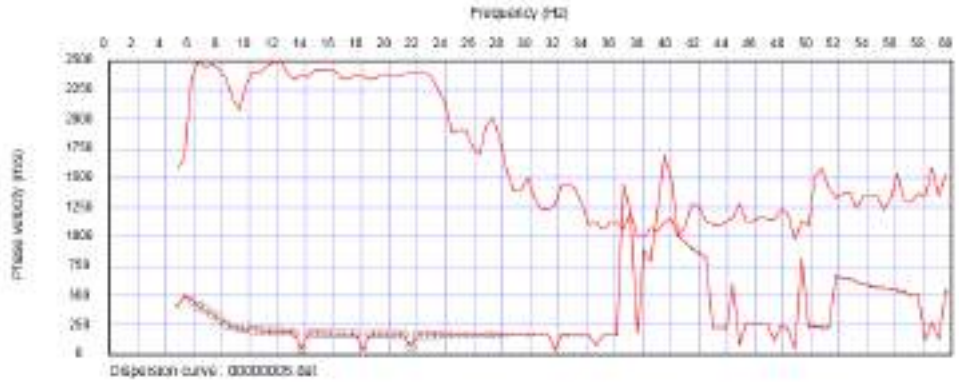


Phase volecity-frequancy reversal,

,



Dispersion curve,



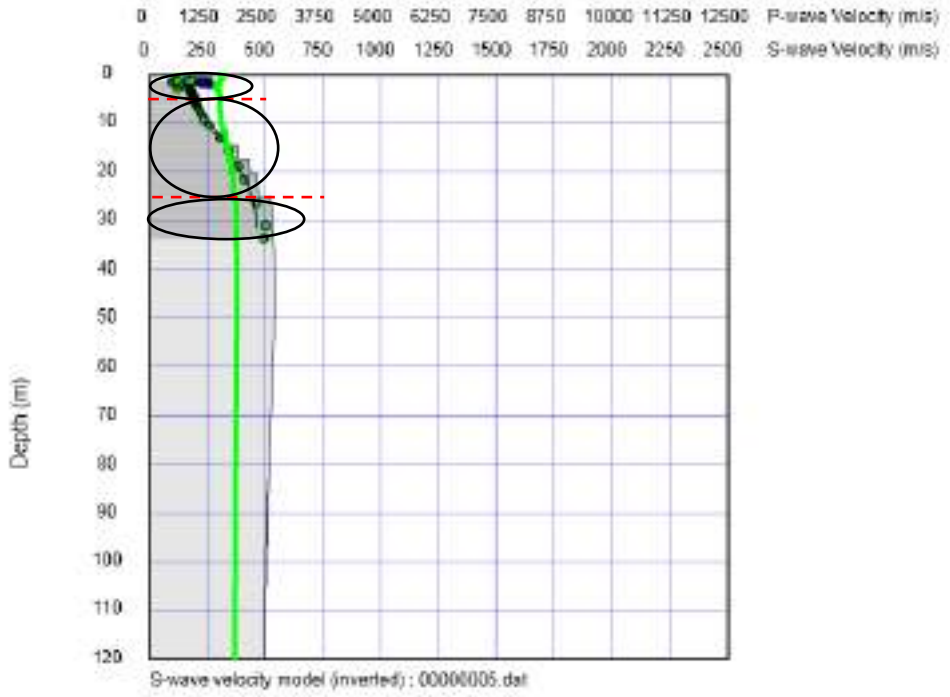
Eror rates of dispersion curve,

Iteration=0 RMS=39.328381 m/s (19.288691%)
Iteration=1 RMS=36.549442 m/s (17.616827%)
Iteration=2 RMS=34.685504 m/s (16.397675%)
Iteration=3 RMS=33.240732 m/s (15.365648%)
Iteration=4 RMS=32.025933 m/s (14.441869%)

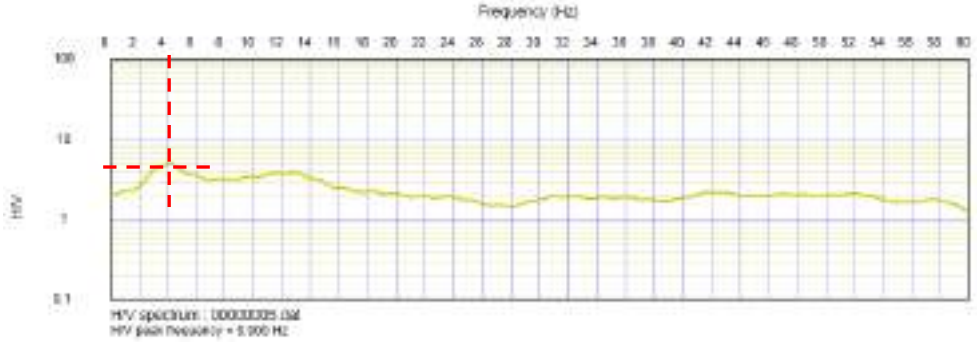
Calculated dispersion curve,

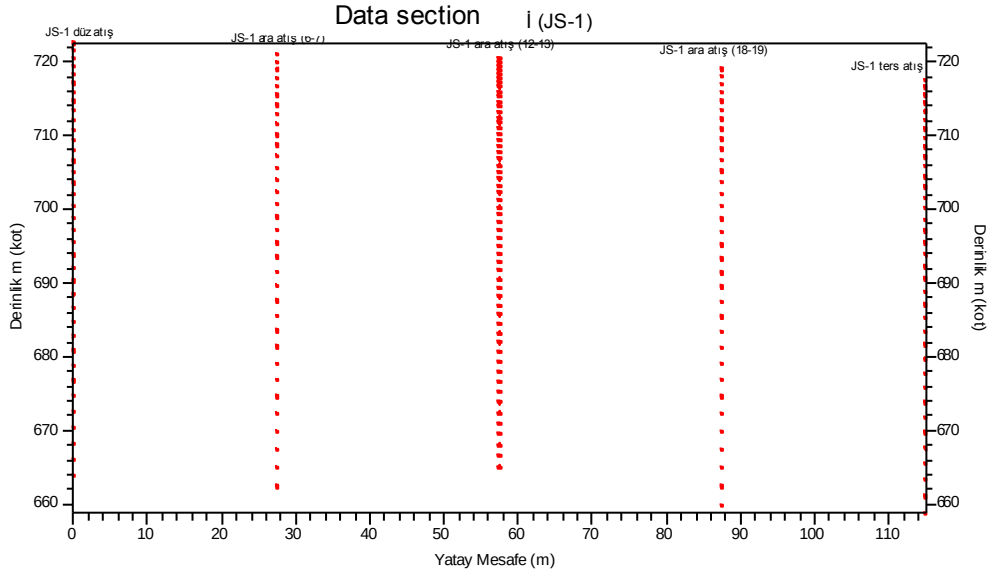


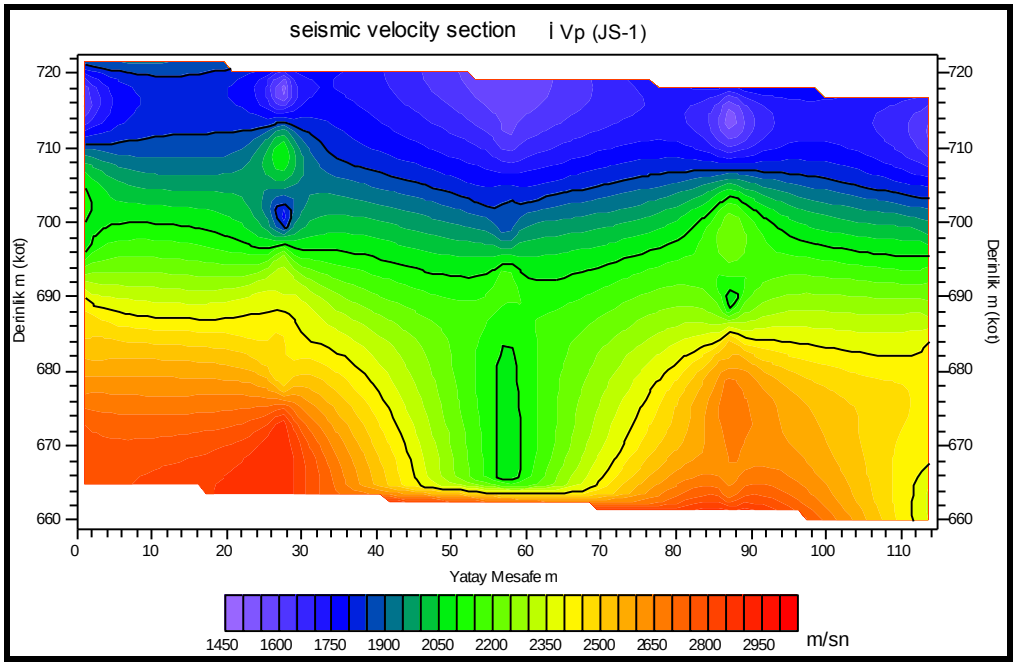
Calculated under ground model,

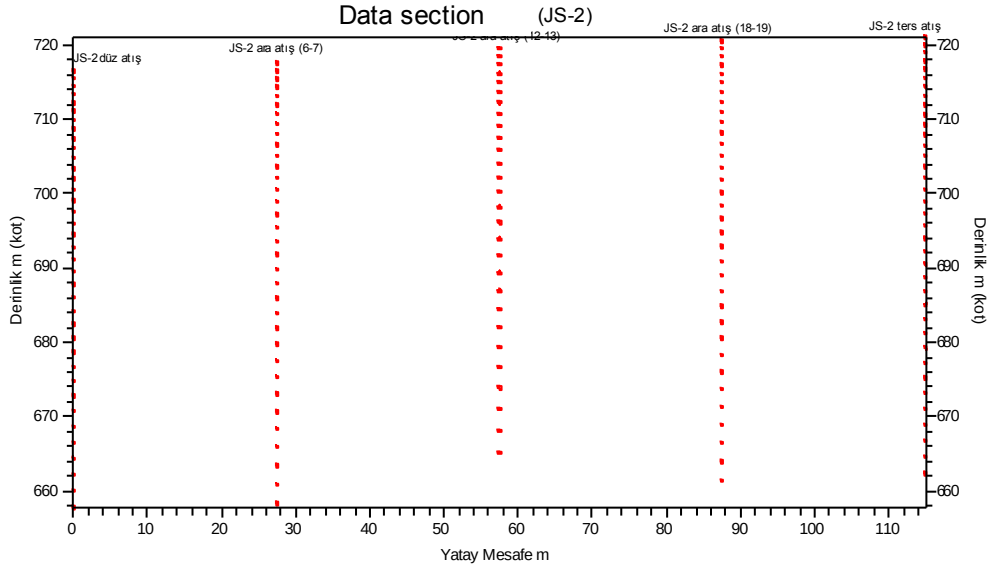


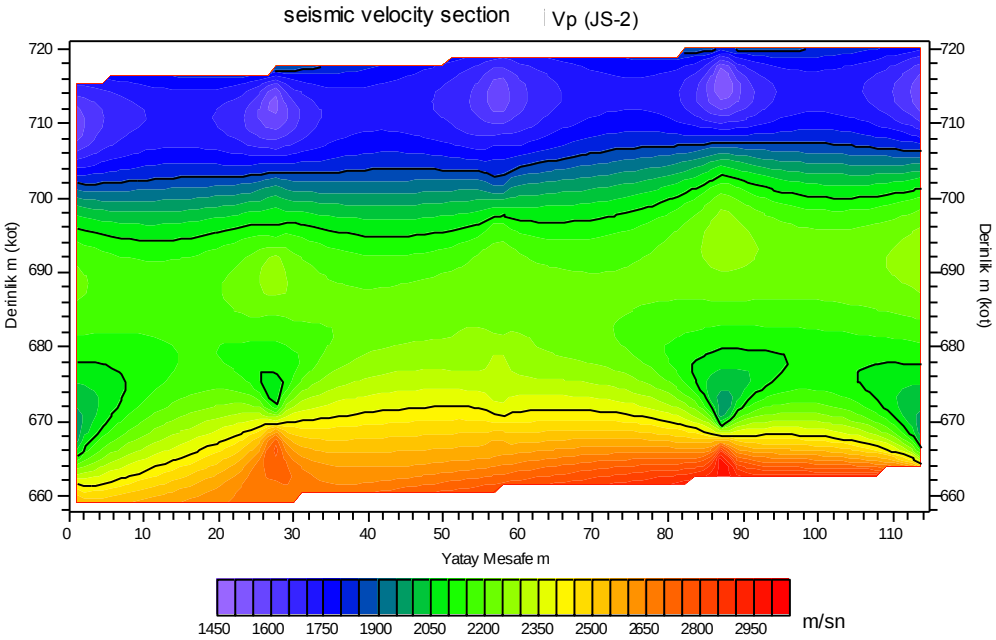
Calculated H/V curve,

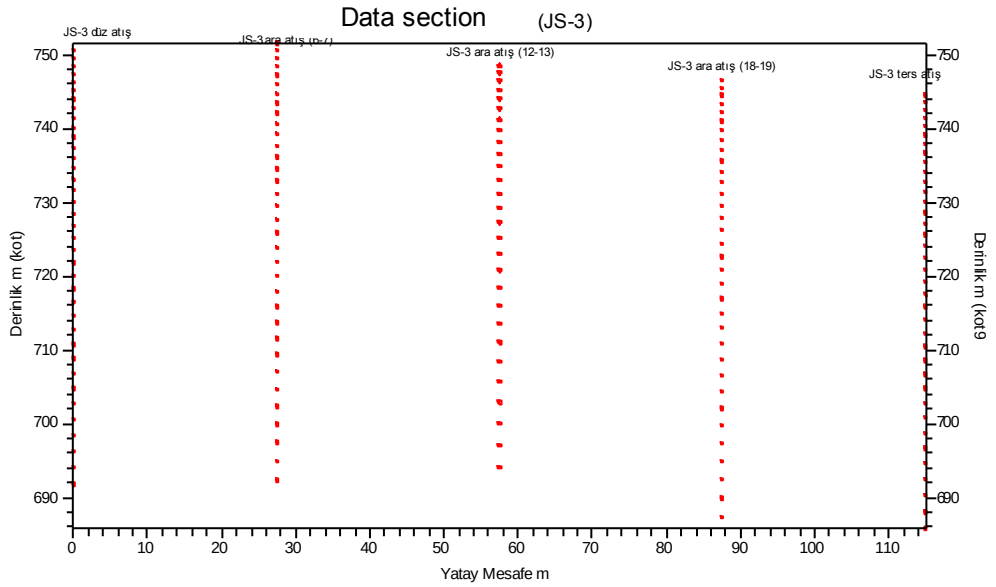


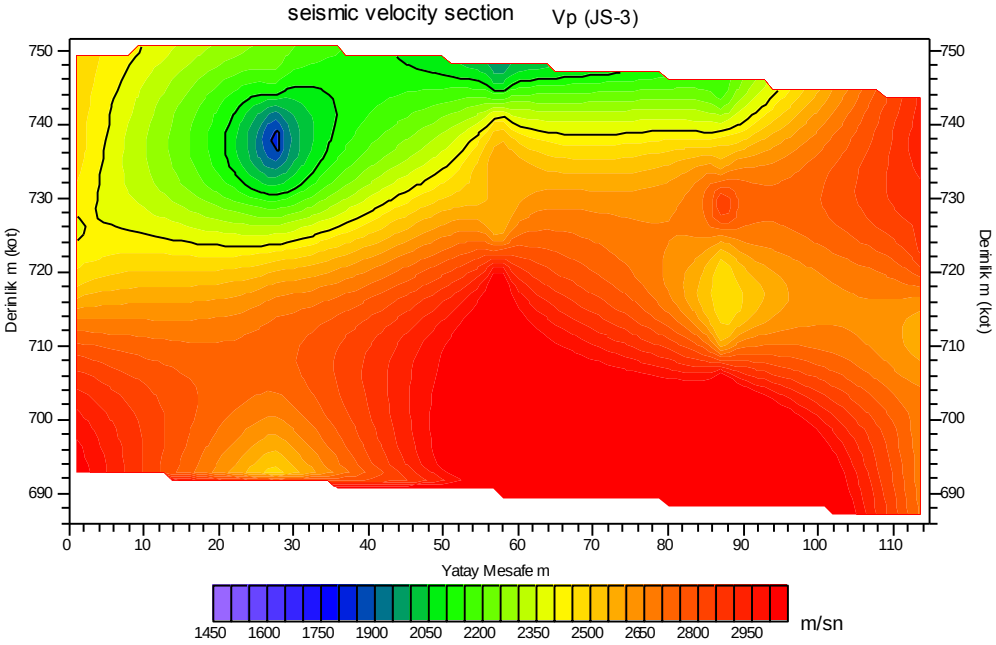

Data section İ (JS-1)
JS-1 düz atış
JS-1 ara atış (12-13)
JS-1 ara atış (18-19)
JS-1 ters atış
Derinlik m (kot)
Yatay Mesafe (m)

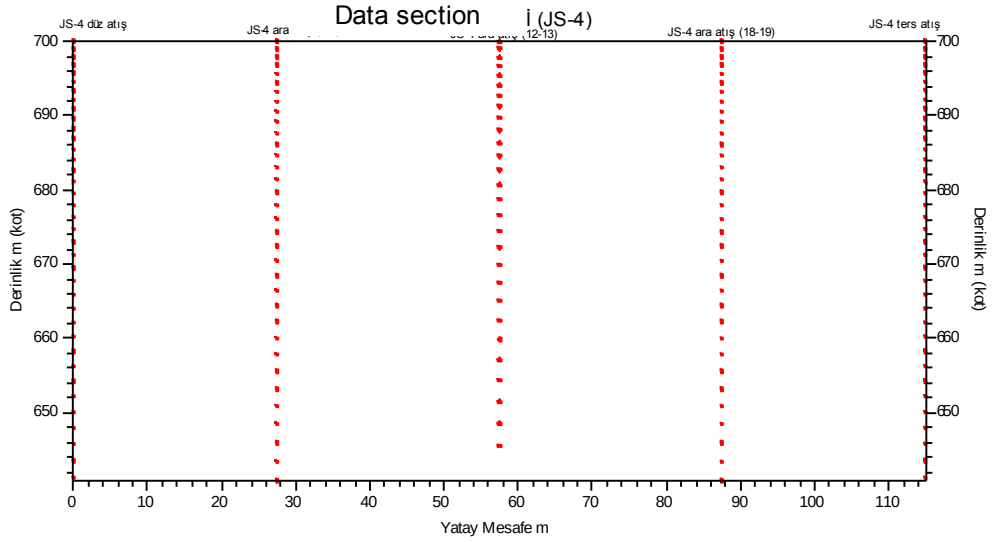

seismic velocity section İ Vp (JS-1)
Derinlik m (kot)
Yatay Mesafe m
1450 1600 1750 1900 2050 2200 2350 2500 2650 2800 2950
m/sn

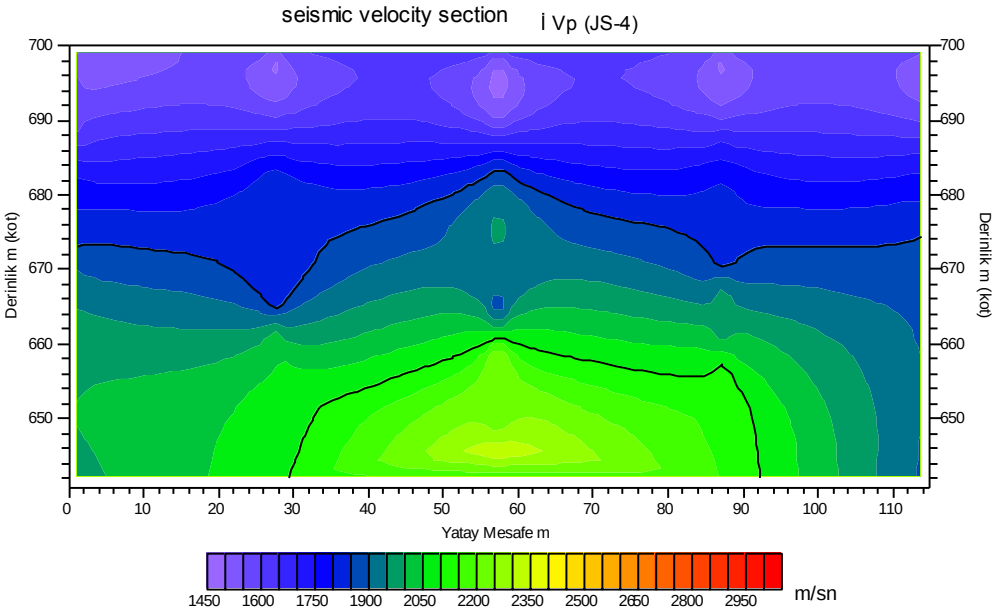

Data section (JS-2)
JS-2 düz atış
JS-2 ara atış (6-7)
JS-2 ara atış (18-19)
JS-2 ters atış
Derinlik m (kot)
Yatay Mesafe m

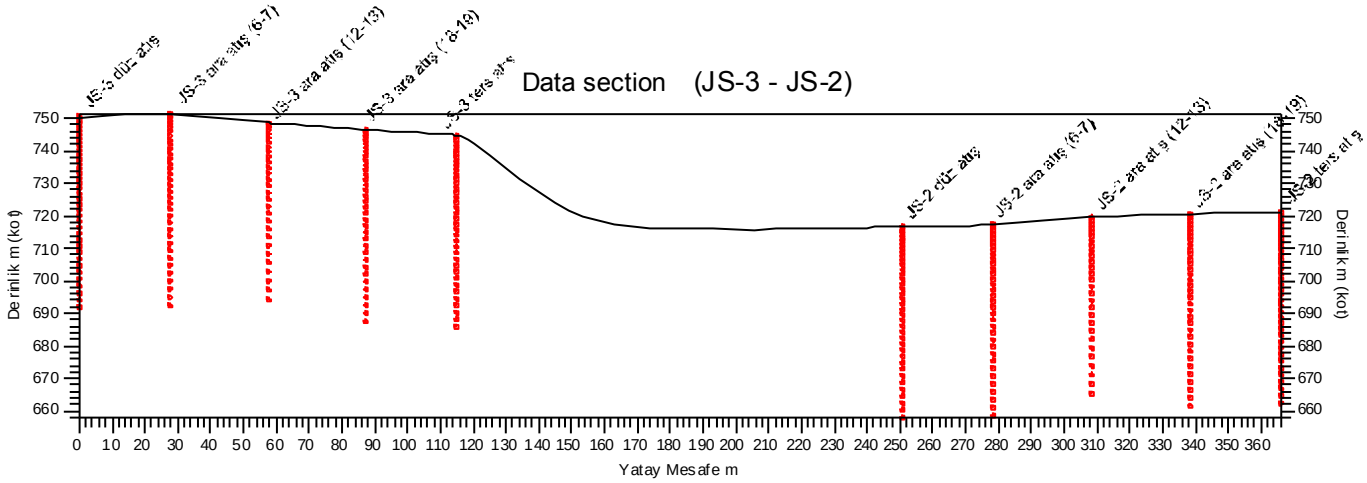

seismic velocity section Vp (JS-2)
Derinlik m (kot)
Yatay Mesafe m
1450 1600 1750 1900 2050 2200 2350 2500 2650 2800 2950
m/sn

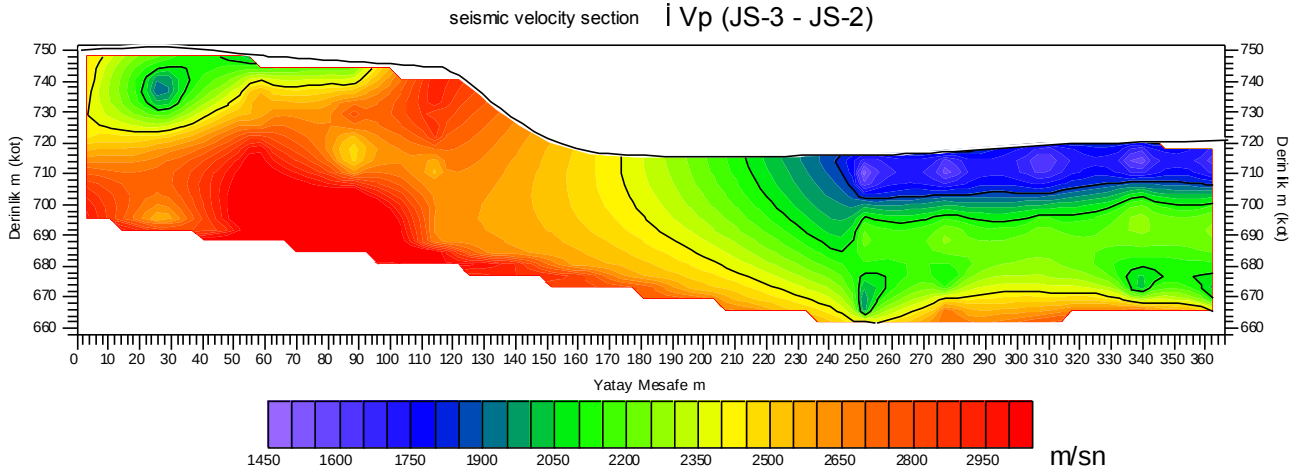

Data section (JS-3)
JS-3 diz atış
JS-3 ara atış (12-13)
JS-3 ara atış (18-19)
JS-3 ters atış
Derinlik m (kot)
Yatay Mesafe m


seismic velocity section Vp (JS-3)
Derinlik m (kot)
Yatay Mesafe m
1450 1600 1750 1900 2050 2200 2350 2500 2650 2800 2950
m/sn


Data section
İ (JS-4)
JS-4 düz atış
JS-4 ara
JS-4 ara atış (18-19)
JS-4 ters atış
Derinlik m (kot)
Yatay Mesafe m

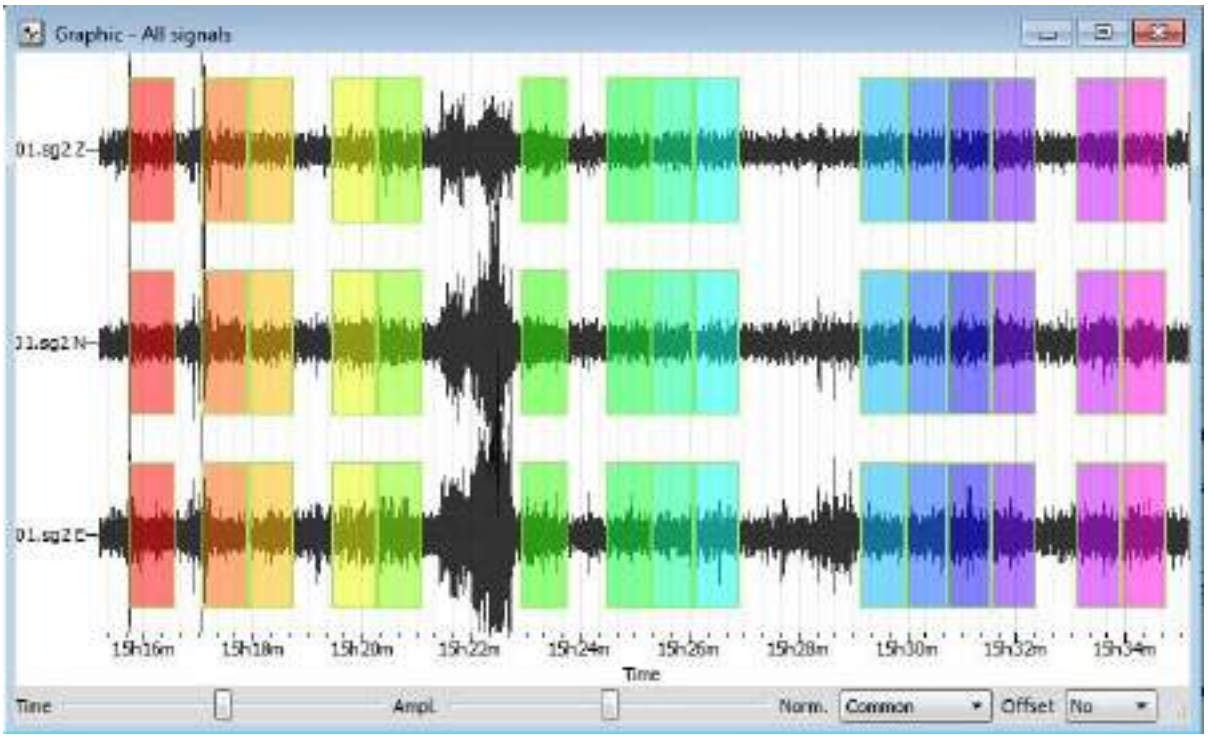

seismic velocity section
İ Vp (JS-4)
Derinlik m (kot)
Yatay Mesafe m
1450 1600 1750 1900 2050 2200 2350 2500 2650 2800 2950
m/sn


Data section (JS-3 - JS-2)
JS-3 düz atış
JS-3 ara atış (6-7)
JS-3 ara atış (12-13)
JS-3 ara atış (18-19)
JS-3 ters atış
JS-2 düz atış
JS-2 ara atış (6-7)
JS-2 ara atış (12-13)
JS-2 ara atış (18-19)
JS-2 ters atış
Derinlik m (kot)
Yatay Mesafe m

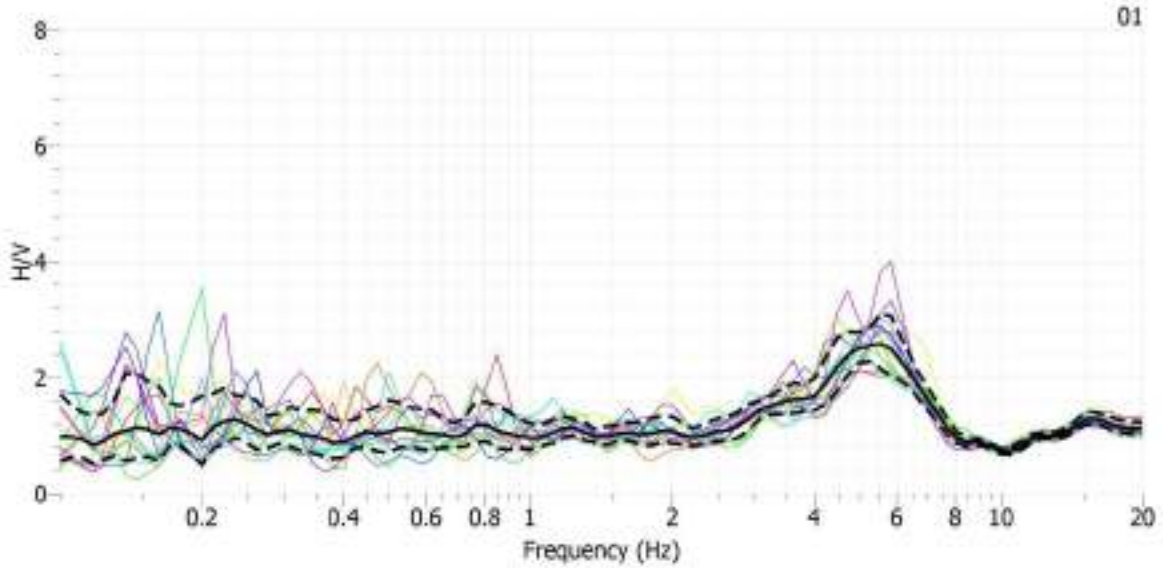

seismic velocity section İ Vp (JS-3 - JS-2)
Derinlik m (kot)
Yatay Mesafe m
1450 1600 1750 1900 2050 2200 2350 2500 2650 2800 2950
m/sn

MICROTROMER WORKS

01 LOCATION

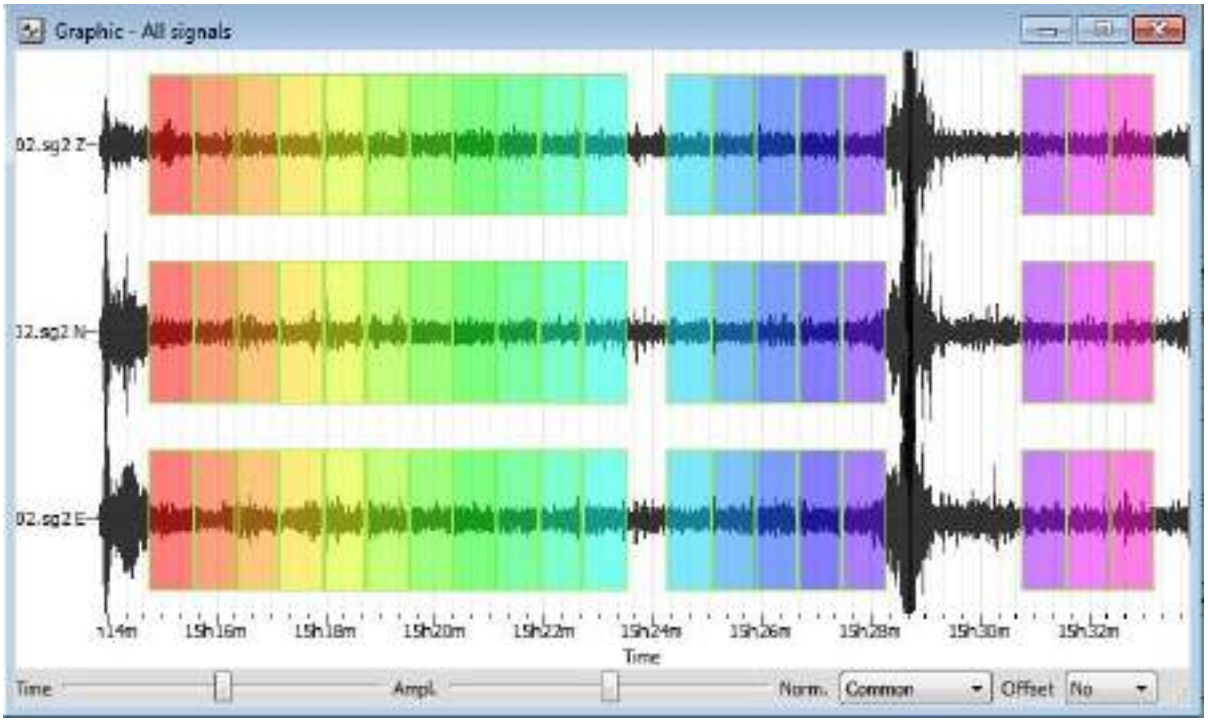


Record for location 01 and selected windows 01

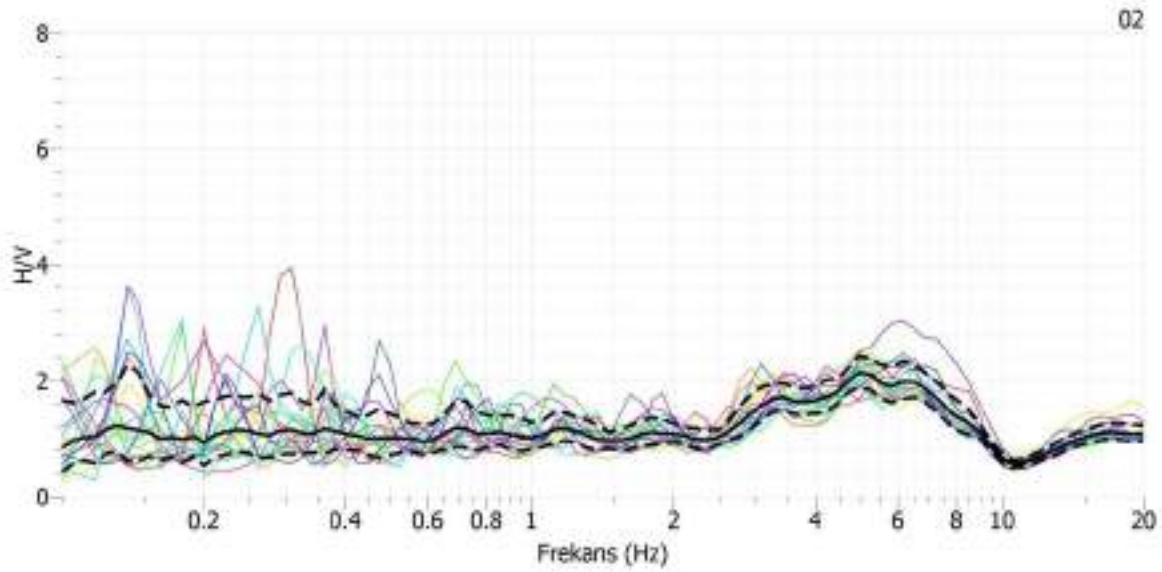


Calculated H/V curve for 01 location

02 Location

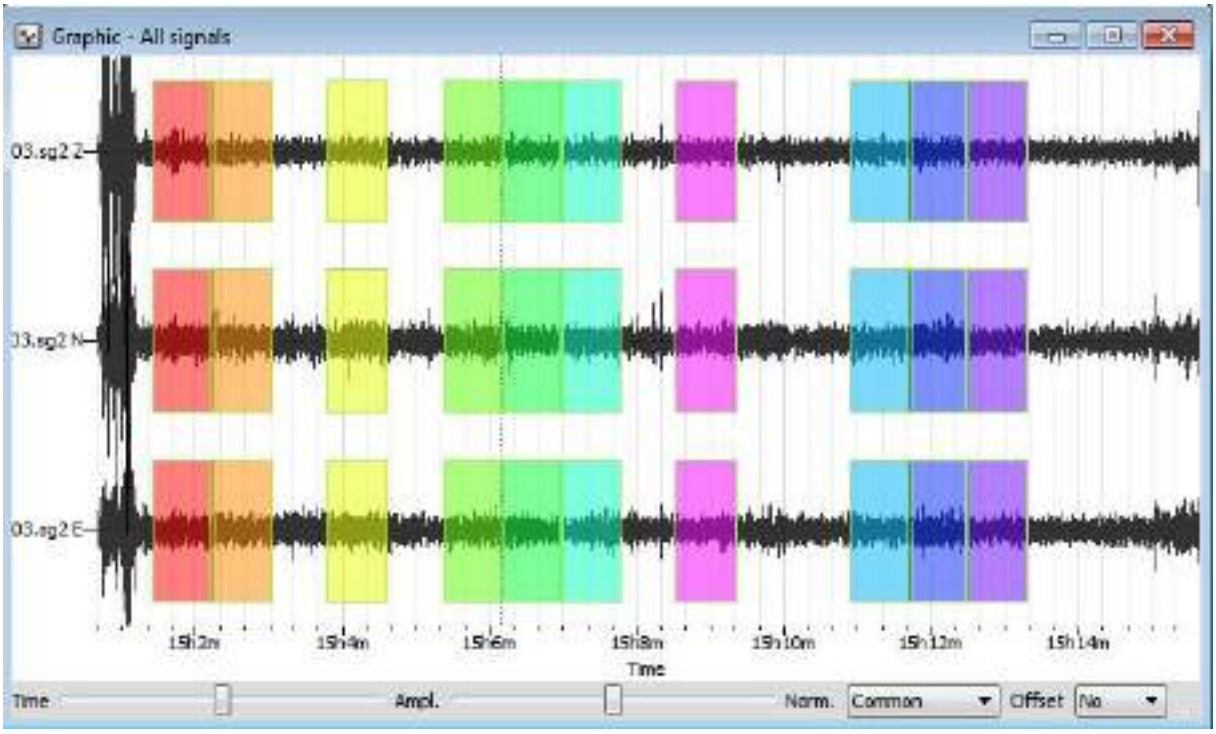


Records for 02 location and selected windows

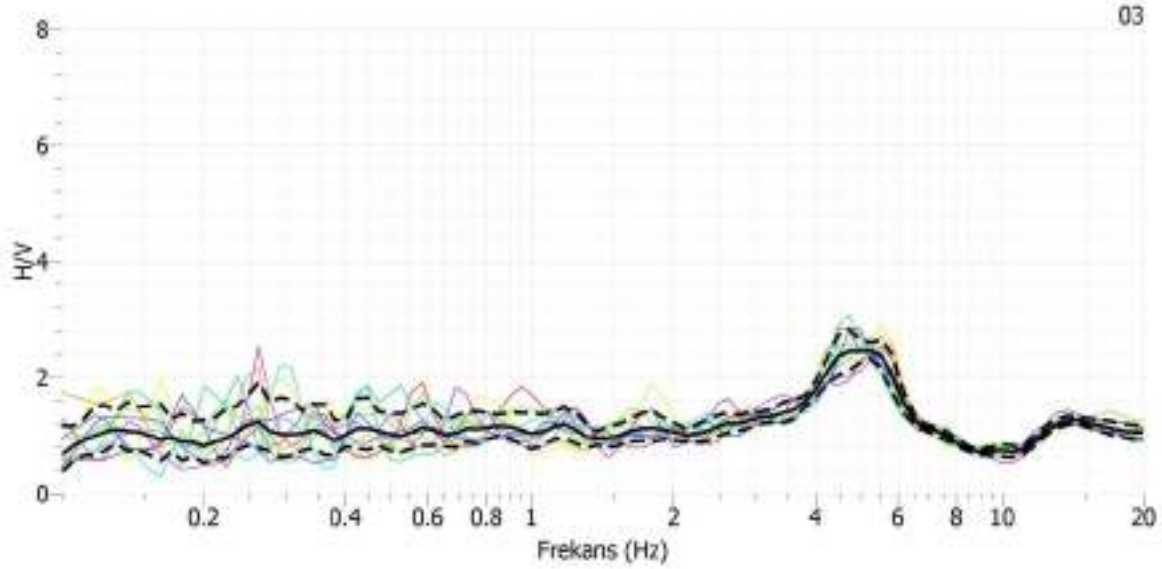


Calculated H/V curves for 02 location

03 LOCATION

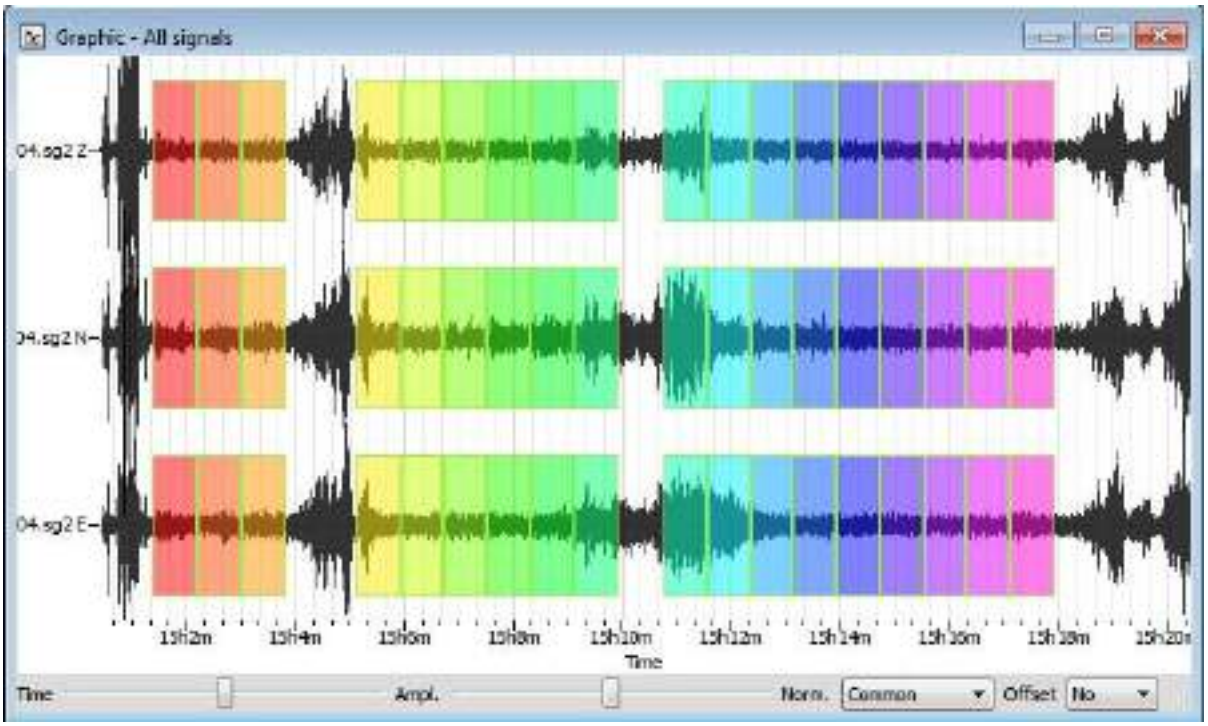


Records for location 03 and selected windows

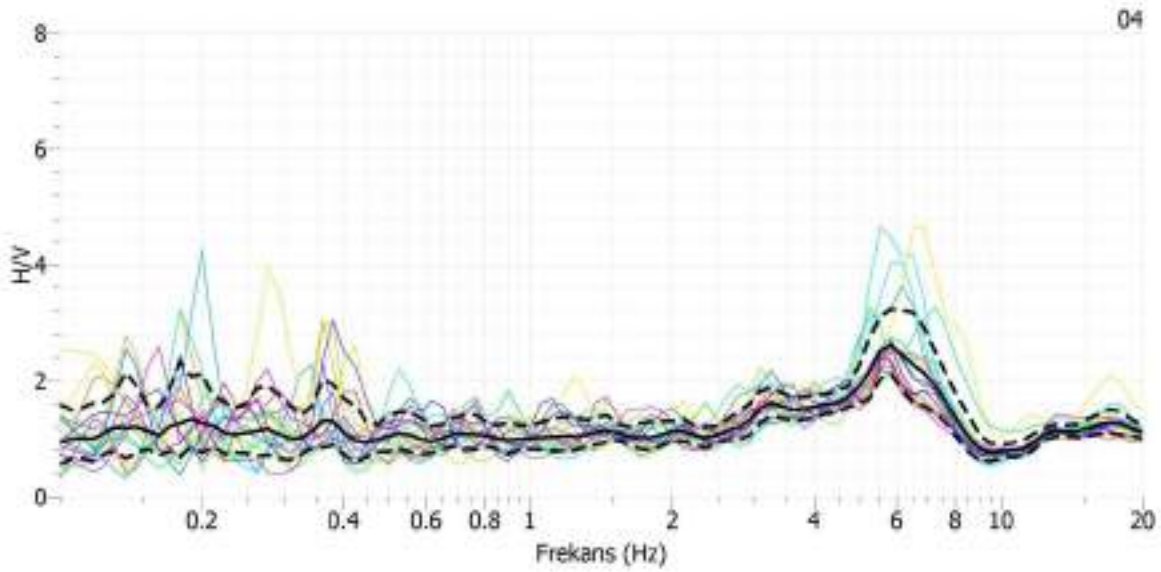


Calculated H/V curves for 03 location

04 LOCATION



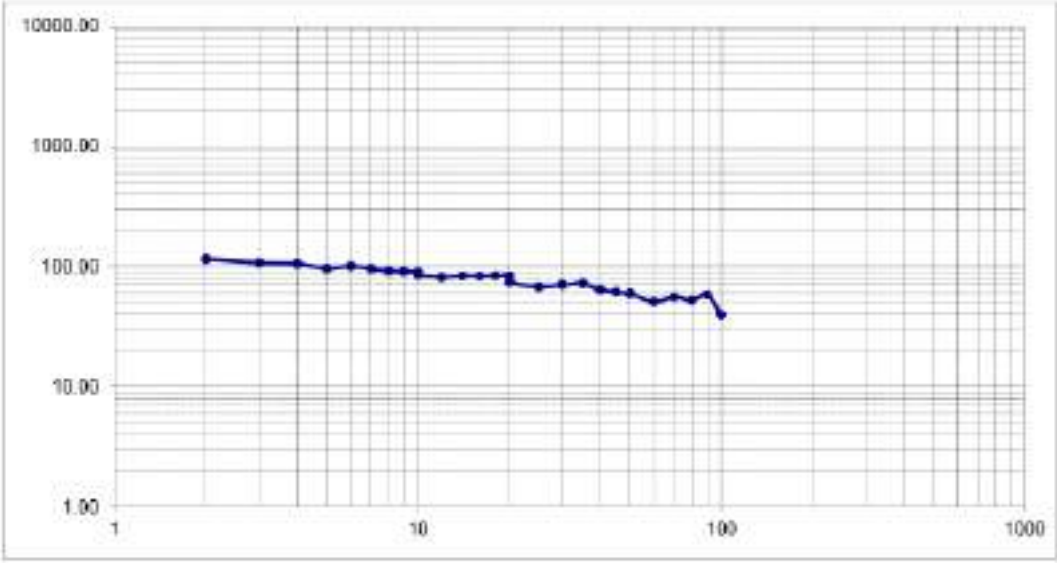
Records for 04 location and selected windows



Calculated H/V curve for 04 location

RESISTIVITY WORKS

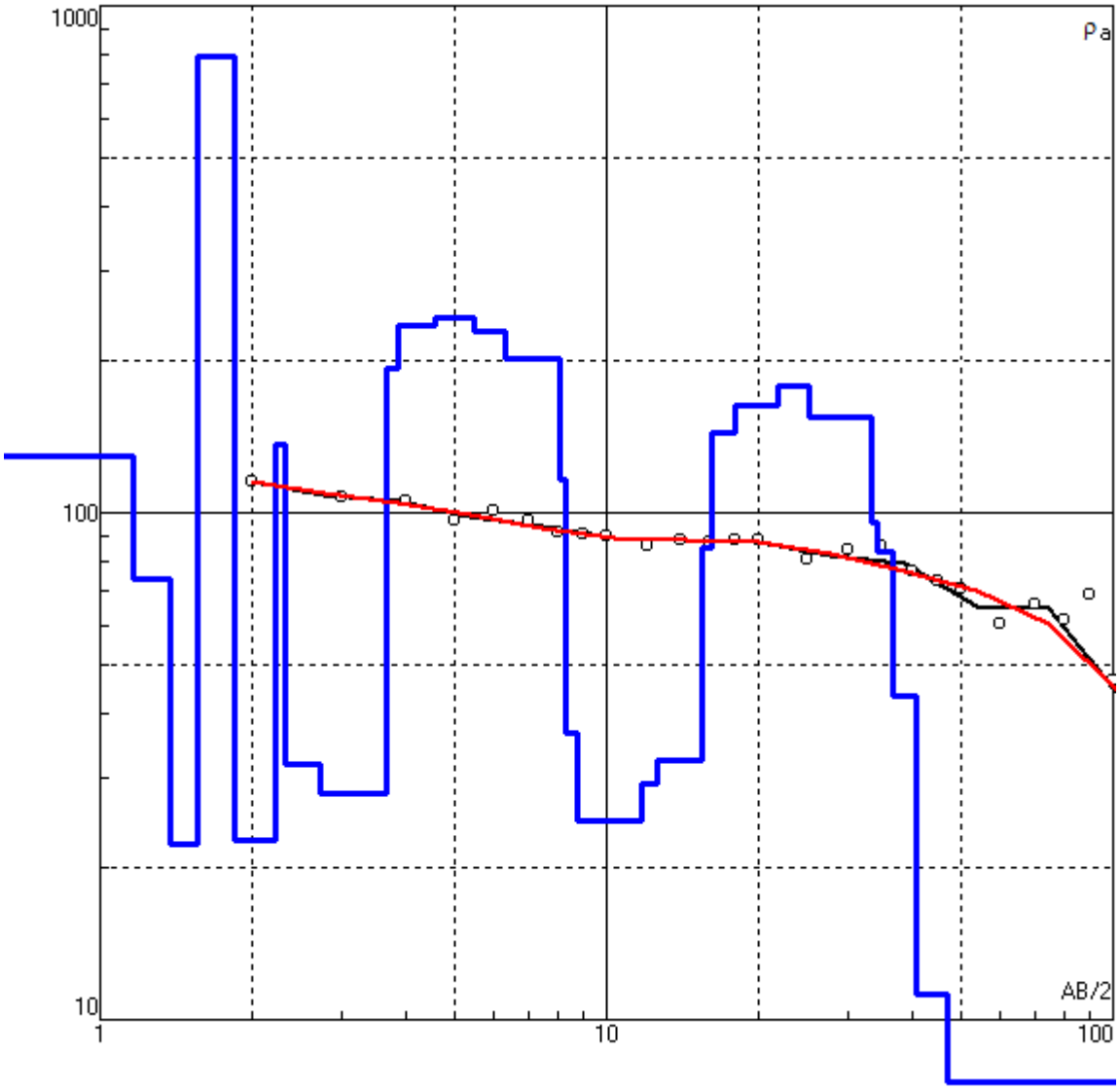
Des-1



CLIENT :	ACWA POWER DOĞALGAZ KOMBİNE ÇEVRİM SANTRALİ		
		DATE :	26.06.2013
LOCATION :	YAHŞİHAN-KIRIKKALE	COORDİNATE	535000
LINE NUMBER:	DES-1		4416893

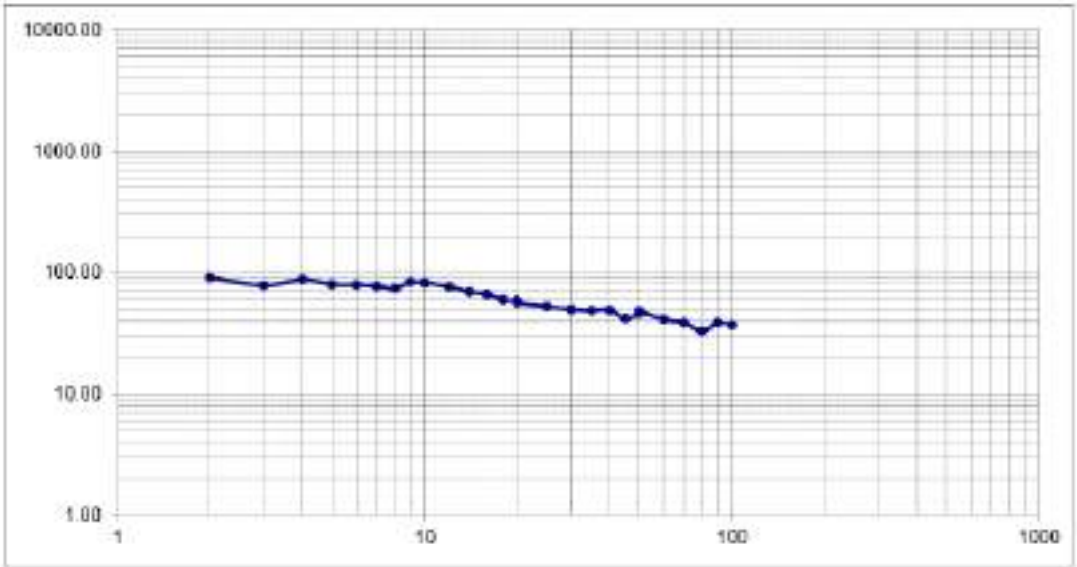
NO	AB/2	MN/2	K	ΔV mV	I mA	ATT mV	YER mV	measure error mV	ρa	Notes
1	2	1	4.7						115.36	
2	3	1	12.6						107.44	
3	4	1	23.6						105.36	
4	5	1	37.7						96.68	
5	6	1	55.0						100.51	
6	7	1	75.4						96.20	
7	8	1	98.9						91.82	
8	9	1	125.6						91.11	
9	10	1	155.4						89.69	
10	10	2	75.4						84.83	
11	12	2	109.9						81.61	
12	14	2	150.7						83.73	
13	16	2	197.8						83.17	
14	18	2	251.2						83.76	
15	20	2	310.9						83.67	
16	20	5	117.8						74.24	
17	25	5	188.4						67.99	
18	30	5	274.8						70.64	
19	36	5	376.8						71.96	
20	40	5	494.55						64.12	
21	45	5	628						61.44	
22	50	5	777.15						59.18	
23	50	10	376.8						59.60	
24	60	10	549.5						50.84	
25	70	10	753.6						55.88	
26	80	10	989.1						52.14	
27	90	10	1256						58.22	
27	100	10	1554.3						39.50	

ΔV=(ÖD*ATT) / (10*VER) ρa= (ΔV / I) * K



1										
des	1									
28	2.93	nLayers	Err_Rok	Err_Etak						
129	73.8	22.2	795	22.6	136	32	28	192	235	242
1.16	0.212	0.182	0.296	0.372	0.0937	0.402	0.944	0.209	0.723	0.891
228	201	116	36.9	24.6	29.1	32.6	85.3	144	163	178
0.812	1.8	0.172	0.493	2.92	0.88	2.85	0.737	1.75	3.93	3.23
155	95.3	83.5	43.4	11.2	0.2	0000fix	Ro			
8.3	0.749	2.8	4.13	6.14	0000fix	h				

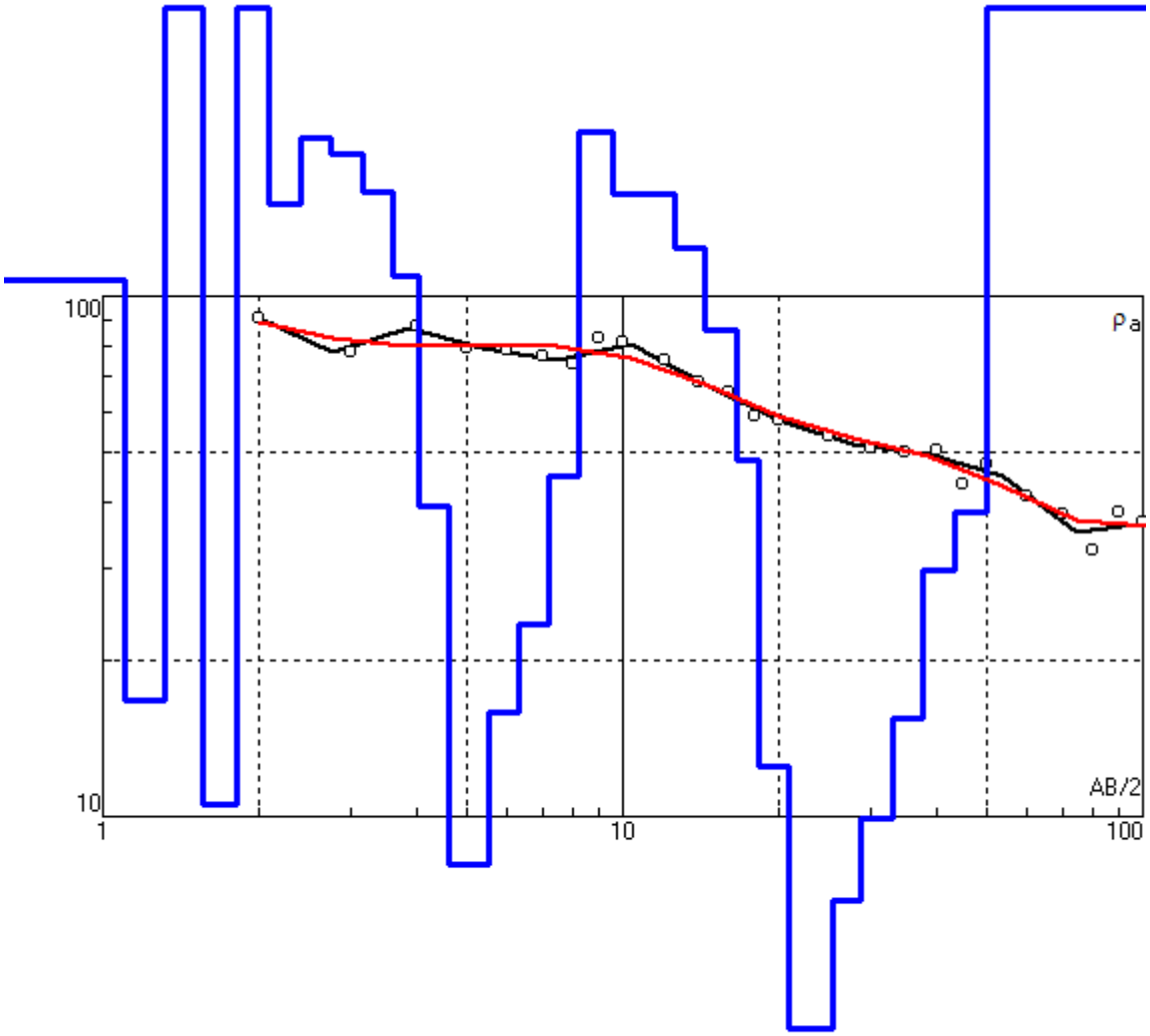
Des-2



CLIENT :	ACWA POWER DOĞALGAZ KOMBİNE ÇEVRİM SANTRALİ		
		DATE :	26.06.2013
LOCATION :	YAHŞİHAN-KIRIKKALE	COORDİNATE	534658
LINE NUMBER:	DES-2		4417058

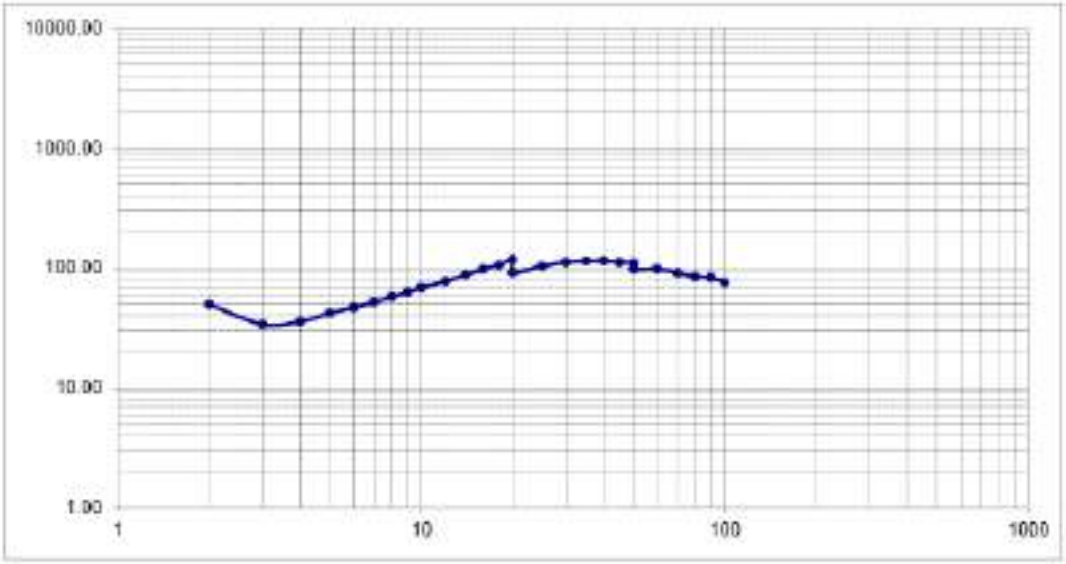
NO	AB/2	MNO	K	ΔV mv	I mA	ATT mV	VER mV	Measure value mV	ρa	Notes
1	2	1	4.7	3867.12	200				91.07	
2	3	1	12.6	1242.97	200				78.06	
3	4	1	23.6	743.67	200				87.57	
4	5	1	37.7	422.05	200				79.51	
5	6	1	55.0	287.15	200				78.90	
6	7	1	75.4	203.89	200				76.83	
7	8	1	98.9	149.16	200				73.76	
8	9	1	125.6	132.25	200				83.05	
9	10	1	155.4	105.03	200				81.63	
10	10	2	75.4	218.62	200				82.37	
11	12	2	109.9	138.30	200				76.00	
12	14	2	150.7	91.58	200				69.01	
13	16	2	197.8	66.61	200				65.88	
14	18	2	251.2	47.34	200				59.46	
15	20	2	310.9	37.65	200				58.52	
16	20	5	117.8	95.44	200				56.19	
17	25	5	188.4	55.32	200				52.11	
18	30	5	274.8	36.07	200				49.55	
19	35	5	376.8	25.83	200				48.67	
20	40	5	494.55	19.75	200				48.84	
21	45	5	628	13.39	200				42.03	
22	50	5	777.15	11.86	200				46.07	
23	50	10	376.8	25.40	200				47.85	
24	60	10	549.5	15.04	200				41.33	
25	70	10	753.6	10.19	200				38.40	
26	80	10	989.1	6.60	200				32.63	
27	90	10	1256	6.14	200				38.55	
27	100	10	1654.3	4.74	200				36.85	

ΔV=(OD*ATT) / (10*VER) ρa= (ΔV / I) * K



1										
des	2									
28	4.37	nLayers	Err_Rok	Err_Etak						
107	16.7	438	10.5	471	150	201	188	158	109	39.3
1.1	0.211	0.246	0.261	0.264	0.312	0.355	0.407	0.467	0.439	0.553
8.11	15.8	23.3	45.2	206	157	124	86	48.5	12.5	3.91
0.916	0.764	0.933	0.97	1.33	3.1	1.8	2.14	1.63	2.72	4.42
6.91	9.95	15.4	29.6	38.4	3641	0000fix	Ro			
3.43	4.26	4.89	5.62	6.45	0000fix	h				

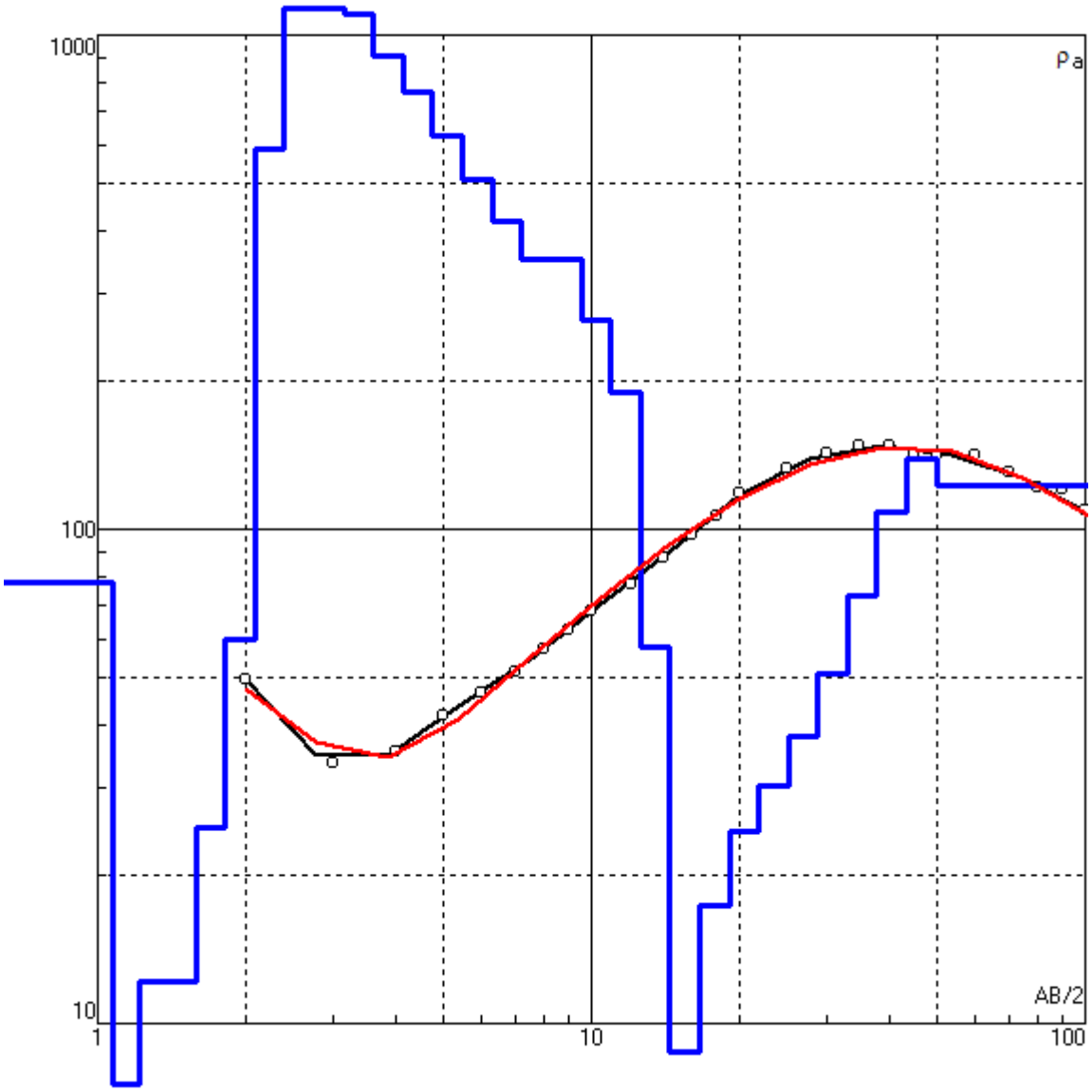
Des-3



CLIENT :	ACWA POWER DOĞALGAZ KOMBİNE ÇEVRİM SANTRALİ		
		DATE :	26.06.2013
LOCATION :	YAHŞİHAN-KIRIKKALE	COORDINATE	534709
LINE NUMBER:	DES-3		4417232

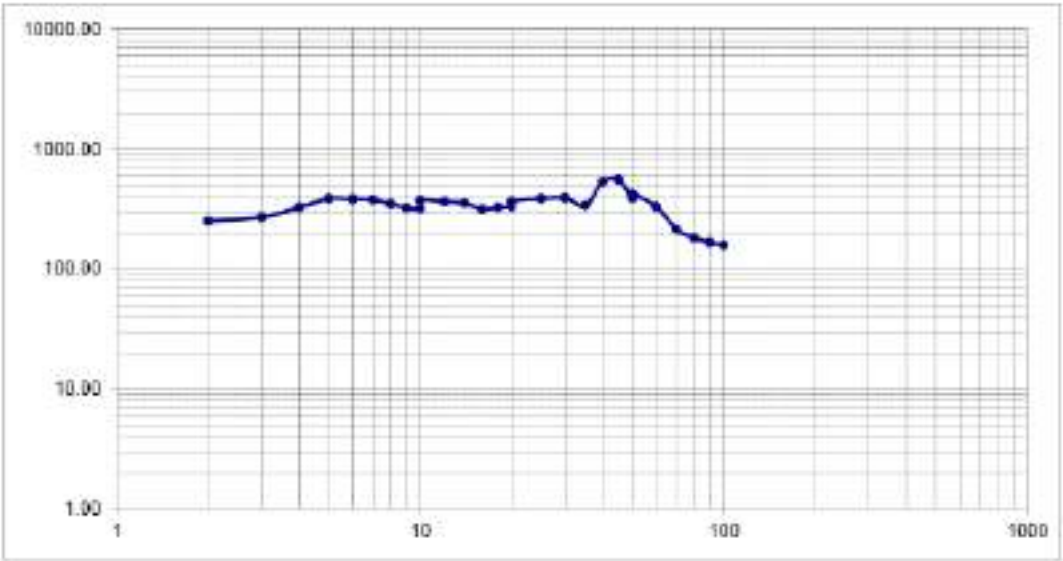
NO	AB/2	MN/2	K	ΔV mV	I mA	ATT mV	VER mV	Measure value mV	ρa	Notes
1	2	1	4.7	2106.09	200				49.60	
2	3	1	12.6	534.66	200				33.58	
3	4	1	23.6	301.92	200				35.55	
4	5	1	37.7	222.65	200				41.96	
5	6	1	55.0	169.97	200				46.70	
6	7	1	75.4	137.00	200				51.62	
7	8	1	98.9	116.07	200				57.40	
8	9	1	125.6	99.63	200				62.50	
9	10	1	155.4	88.02	200				68.40	
10	10	2	75.4	180.61	200				68.06	
11	12	2	109.9	140.51	200				77.21	
12	14	2	150.7	115.74	200				87.22	
13	16	2	197.8	98.41	200				97.33	
14	18	2	251.2	83.85	200				105.31	
15	20	2	310.9	75.26	200				116.97	
16	20	5	117.8	155.24	200				91.40	
17	25	5	188.4	109.59	200				103.23	
18	30	5	274.8	81.14	200				111.47	
19	35	5	376.8	60.66	200				114.09	
20	40	5	494.55	46.25	200				114.37	
21	45	5	628	35.47	200				111.36	
22	50	5	777.15	28.19	200				109.54	
23	50	10	376.8	51.73	200				97.45	
24	60	10	549.5	35.69	200				97.78	
25	70	10	753.6	24.06	200				90.66	
26	80	10	989.1	17.09	200				84.50	
27	90	10	1256	13.23	200				83.08	
27	100	10	1554.3	9.69	200				75.29	

ΔV=(OD*ATT) / (10*VER) ρa= (ΔV / I) * K



1										
des	3									
28	3.09	nLayers	Err_Rok	Err_Etak						
77.9	2.17	12.1	25	60	590	2405	1735	1100	905	764
1.07	0.148	0.36	0.234	0.269	0.309	0.355	0.407	0.467	0.537	0.616
624	510	418	352	266	190	57.5	8.72	17.3	24.4	30.3
0.708	0.812	0.933	2.3	1.41	1.62	1.86	2.14	2.45	2.82	3.23
38.1	51	73.2	108	139	123	0000fix	Ro			
3.71	4.26	4.89	5.62	6.45	0000fix	h				

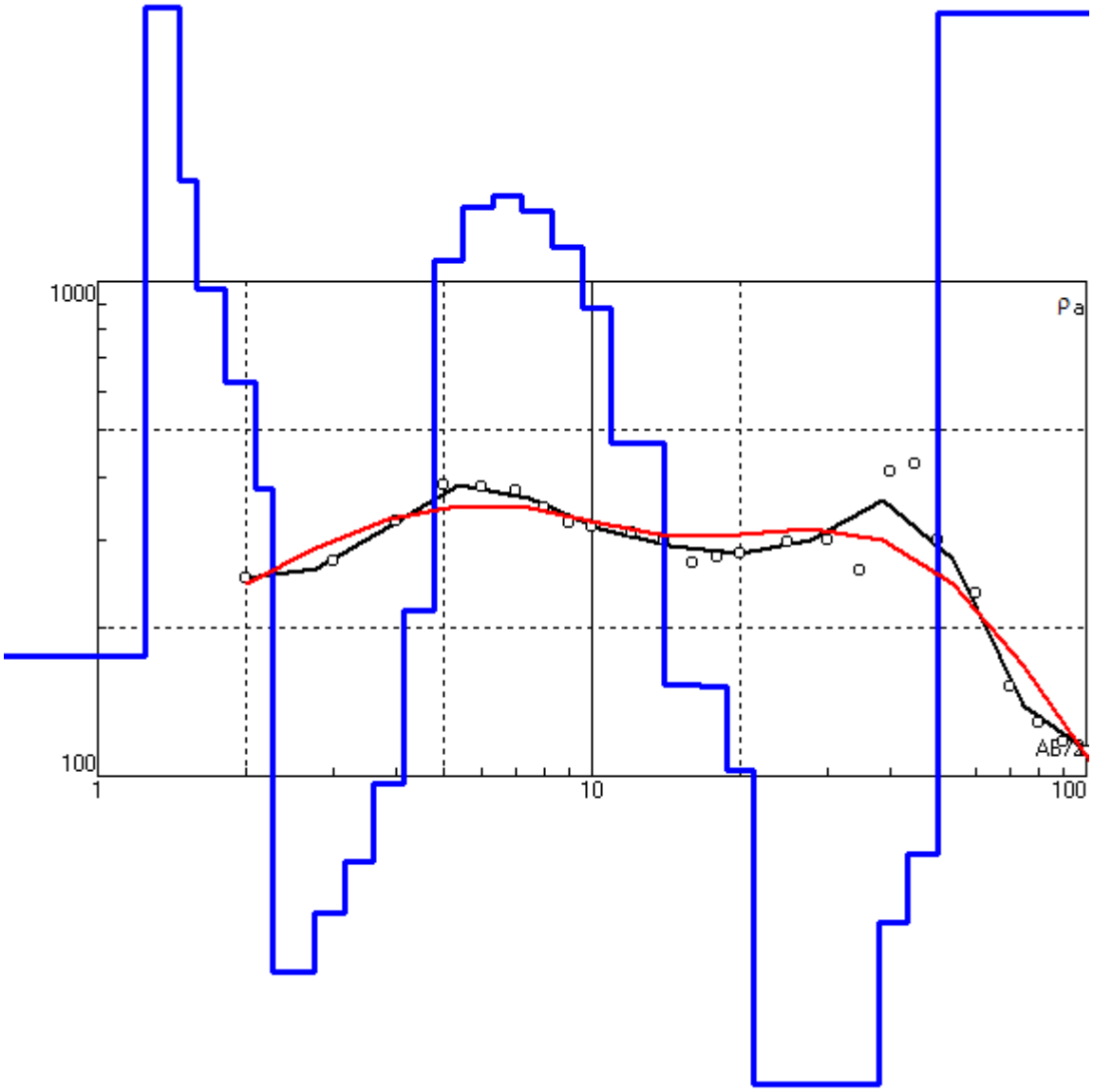
Des-4



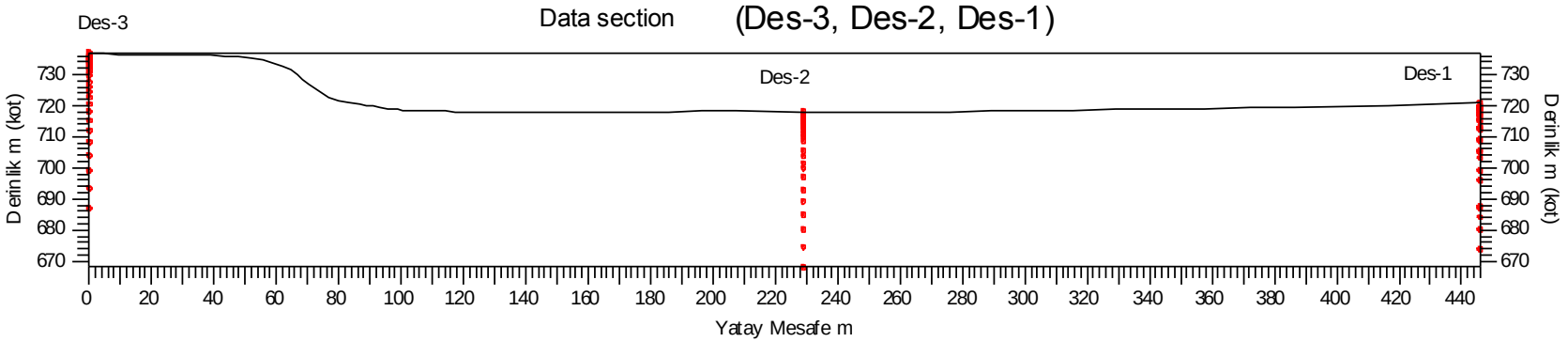
CLIENT :	ACWA POWER DOĞALGAZ KOMBİNE ÇEVRİM SANTRALİ		
		DATE :	26.06.2013
LOCATION :	YAHŞİHAN-KIRIKKALE	COORDİNATE	535399
LINE NUMBER:	DES-4		4417196

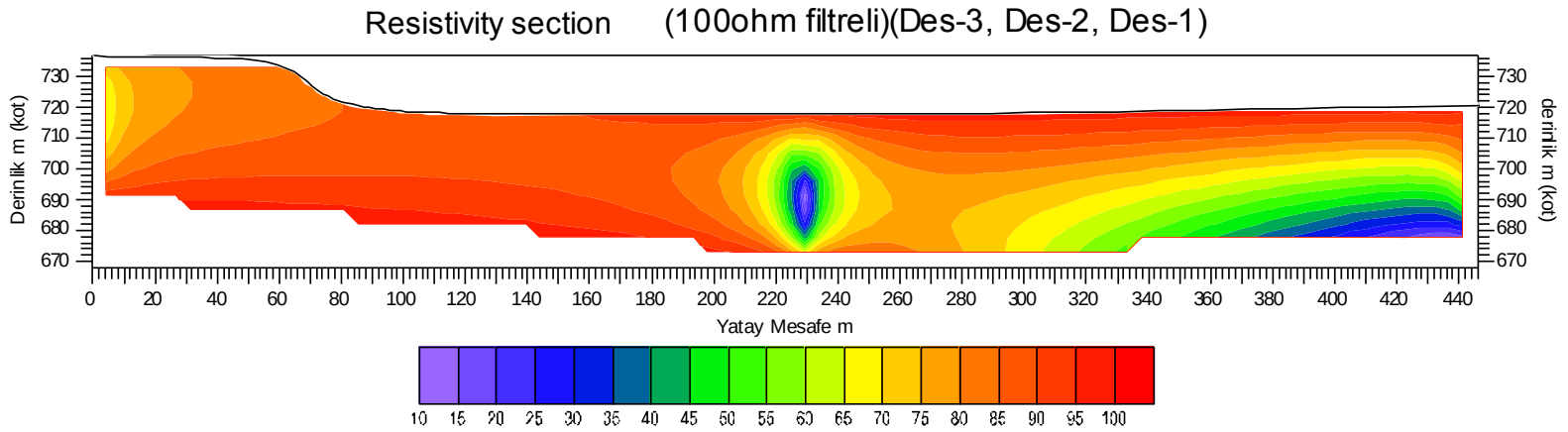
NO	AB/2	MN/2	K	ΔV mV	I mA	ATT mV	VER mV	Measure value mV	ρa	Notes
1	2	1	4.7	10684.01	200				251.61	
2	3	1	12.6	431.14	20				270.75	
3	4	1	23.6	1391.23	100				327.63	
4	5	1	37.7	205.15	20				386.51	
5	6	1	55.0	139.40	20				383.00	
6	7	1	76.4	100.33	20				378.02	
7	8	1	98.9	70.51	20				348.70	
8	9	1	125.6	258.79	100				325.04	
9	10	1	155.4	205.44	100				319.32	
10	10	2	75.4	498.14	100				375.40	
11	12	2	109.9	332.51	100				365.43	
12	14	2	150.7	23.51	10				354.34	
13	16	2	197.8	160.38	100				317.27	
14	18	2	251.2	130.28	100				327.26	
15	20	2	310.9	106.92	100				332.37	
16	20	5	117.8	312.95	100				368.49	
17	25	5	188.4	40.99	20				386.13	
18	30	5	274.8	28.45	20				390.85	
19	35	5	376.8	44.96	50				338.82	
20	40	5	494.55	10.83	10				535.66	
21	45	5	628	8.84	10				554.90	
22	50	5	777.15	25.04	50				389.15	
23	50	10	376.8	22.48	20				423.47	
24	60	10	549.5	12.05	20				331.02	
25	70	10	753.6	28.44	100				214.29	
26	80	10	989.1	18.39	100				181.92	
27	90	10	1256	13.18	100				165.58	
27	100	10	1554.3	10.23	100				158.97	

ΔV=(OD*ATT) / (10*VER) ρa= (ΔV / I) * K



1										
des	4									
28	9.53	nLayers	Err_Rok	Err_Etak						
175	4510	1587	960	619	378	40.3	53.2	67.3	96.1	212
1.25	0.215	0.116	0.234	0.269	0.168	0.495	0.407	0.467	0.537	0.616
1086	1394	1479	1384	1171	886	475	155	152	104	7.22
0.708	0.812	0.933	1.07	1.23	1.41	3.14	2.48	2.14	2.53	3.84
6.95	11.6	19.4	50.6	69.5	3449	0000fix	Ro			
3.71	4.26	4.89	5.62	6.45	0000fix	h				


Data section (Des-3, Des-2, Des-1)
Des-3
Des-2
Des-1
Derinlik m (kot)
Yatay Mesafe m
730
720
710
700
690
680
670
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440


Resistivity section (100ohm filtreli)(Des-3, Des-2, Des-1)
Derinlik m (kot)
derinlik m (kot)
Yatay Mesafe m
730
720
710
700
690
680
670
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440
10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

APP-7:

RMR CLASSIFICATION DATA

SK-1 8,00-20,00 m										Average	Unite	Point
Uniaxial strength test	315,2	484								39,19	MPa	4
Point load												
RQD	0	0	41	30	0	0	4	0	43	13,11	%	3
Joint space	60	30	60									
	1,667	3,333	1,667							2,22	cm	5
Condition of joints	>5									>5	mm	0
Groundwater	dry									dry		15
											Toplam	27
											poor rock	

SK-2 20,00 20,50										Average	Unite	Point
Uniaxial strength test	50									4,90	MPa	3
Point load												
RQD	0									0,00	%	3
Joint space	60											
	1,667									1,67	cm	5
Condition of joints	>5									>5	mm	0
Groundwater	wet									wet		7
											Toplam	18
											very poor rock	

SK-3 17,50-50,0	metre									Average	Unite	Point
Uniaxial strength test	240,8	151,7	255,5	901,5						37,99	MPa	4
Point load												
RQD	37,58									37,58	%	8
Joint space	60	30	60	30	5	30	30					
	1,667	3,333	1,667	3,333	20	3,333	3,333			5,24	cm	5
Condition of joints	1-5									1-5	mm	10
Groundwater	Islak									Islak		7
											Toplam	34
											poor rock	

									Average	Unite	Point
SK-4 15,5-50	metre										
Uniaxial strength test	783,3	50,5	186,6						33,36	MPa	4
Point load											
RQD	37,39								37,39	%	8
Joint space	60	60	30	5	30	5	30	5			
	1,667	1,667	3,333	20	3,333	20	3,333	20	9,17	cm	8
Condition of joints	>5								>5	mm	0
Groundwater	Islak								Islak		7
									Toplam		**27**

poor rock

									Average	Unite	Point
SK-5 15-50,50	metre										
Uniaxial strength test	133,8	320,2	186,6	374,2					24,88	MPa	
Point load	1,44								1,44	MPa	4
RQD	10,94								10,94	%	3
Joint space	60	30	60	30	60	60	30	60			
	1,667	3,333	1,667	3,333	1,667	1,667	3,333	1,667	2,29	cm	5
Condition of joints	>5								>5	mm	0
Groundwater	Islak								Islak		7
									Toplam		**19**

very poor rock

									Average	Unite	Point
SK-6 15-20	metre										
Uniaxial strength test	121,1								11,88	MPa	2
Point load									0	MPa	
RQD	0	0	22	20					10,50	%	3
Joint space	30										
	3,333								3,33	cm	5
Condition of joints	>5								>5	mm	0
Groundwater	Islak								Islak		7
									Toplam		**17**

very poor rock

										Average	Unite	Point
SK-7 16-50	metre											
Uniaxial strength test	916,7	891,3	148,9	62,6						49,51	MPa	4
Point load										0	MPa	
RQD	38,32									38,32	%	8
Joint space	60	60	30	60	30	30	5	30	5			
	1,667	1,667	3,333	1,667	3,333	3,333	20	3,333	20	6,48	cm	8
Condition of joints	1-5									1-5	mm	10
Groundwater	Islak									Islak		7
										Toplam		**37**
										poor rock		

					Average	Unite	Point
SK-8 13-20	metre						
Uniaxial strength test	298,5	270,4			27,90	MPa	4
Point load					0	MPa	
RQD	5	72	76		51,00	%	13
Joint space	30	30	5				
	3,333	3,333	20		8,89	cm	8
Condition of joints	1-5				1-5	mm	10
Groundwater	Islak				Islak		7
					Toplam		**42**
					Fair rock		

					Average	Unite	Point
SK-9 14,50-21,00	metre						
Uniaxial strength test	831,9				81,58	MPa	
Point load	12,08	7,47			9,78	MPa	12
RQD	5	72	76		51,00	%	13
Joint space	30	60	60	30			
	3,333	1,667	1,667	3,333	2,50	cm	5
Condition of joints	>5				>5	mm	0
Groundwater	Islak				Islak		7
					Toplam		**37**
					Poor rock		

							Average	Unite	Point
SK-10	12,80-20,50	metre							
Uniaxial strength test		1093	725,4				89,17	MPa	7
Point load		0					0,00	MPa	
RQD		52	53	70	62		59,25	%	13
Joint space		5	30						
		20	3,333				11,67	cm	8
Condition of joints		1-5					1-5	mm	10
Groundwater		Islak					Islak		7
								Toplam	**45**
								Fair rock	

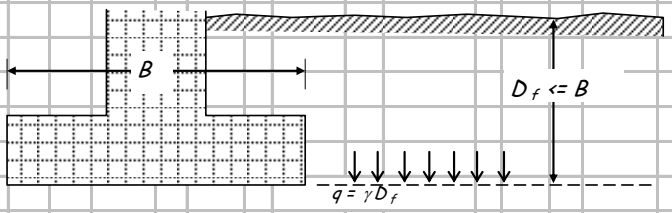
APP-8:

BEARING CAPACITY CALCULATION SHEETS

BEARING CAPACITY CALCULATION SHEET

Date 25.07.2013

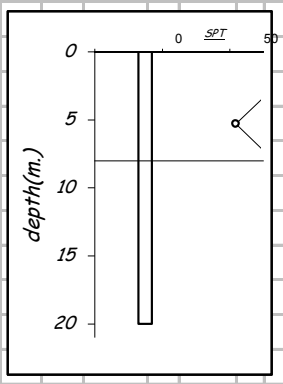
BOREHOLE No SK-1



BOREHOLE No SK-1

Found. Type; square

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM,SC
2. Tbk	8	m	Rock
3. Tbk		m	
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values

	der. (m	SPT
1-	2,0	Ref
2-	4,0	36
3-	6,0	Ref
4-	7,5	Ref
5-	9,0	Ref
6-	10,5	Ref
7-	12,0	Ref
8-	13,5	Ref
9-	15,0	Ref
10-		

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	21,1	kN/m^3
c_1	=	58,0	kPa
ϕ_1	=	17,0	degree
N_c	=	11,0	
N_q	=	3,9	
N_γ	=	1,2	
Gs	=	3,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=		m
H	=	1,4	m
C_w	=	1,0	water
C'_w	=	1,0	correction

$H = 0.5 x B x \tan(45+\phi/2)$

H = 0,5 x 2 x tan 54 = 1,4 m

(H<Tbk1; use the top layer's parametrs)

Calculation of avrg soil parameters

ϕ_1 =	17,0	c_1 =	58,0	ϕ_{ort} =	$(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$
ϕ_2 =	20	c_2 =	0	c_{ort} =	$(d_1 x c_1 + (H-d_1) x c_2)/H$
γ_2 =	16			ϕ_{ort} =	0
γ_{ort} =	0			c_{ort} =	0

Ultumate Bearing Capasty Formula

$qd = cxN_c xS_c + C_w x(\gamma x D_f xN_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 58,0 x 11,0 x 1,0 + 1,0 x 21,1 x 1,0 x 3,9 + 1,0 x 0,5 x 21 x 2,0 x 1,2 x 1,0

qd = 744 kPa

qem = 744 / 3,0 = 248,0 kPa

Settlement calculation

Settlement was ignored due to soil is being in SM and SC group

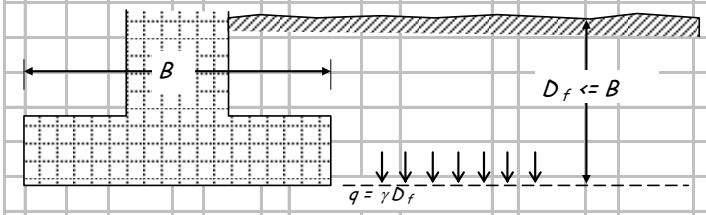
RECOMENDATIONS

Suggested allowable bearing capacity is 250 kPa

BEARING CAPACITY CALCULATION SHEET

Date 25.07.2013

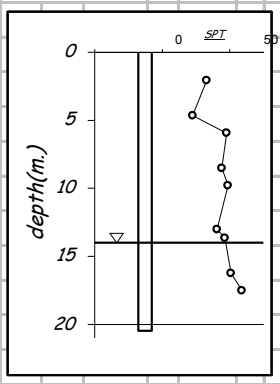
BOREHOLE No SK-2



BOREHOLE No SK-2

Found. Type; square

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM,SC
2. Tbk	20	m	rock
3. Tbk		m	
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values

	der. (m	SPT
1-	1,5	17
2-	3,5	8
3-	4,5	30
4-	6,5	27
5-	7,5	31
6-	10,0	24
7-	10,5	29
8-	12,5	33
9-	13,5	40
10-	15,0	33

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	20,0	kN/m^3
c_1	=	10,0	kPa
ϕ_1	=	20,0	degree
N_c	=	14,8	
N_q	=	6,4	
N_γ	=	2,9	
Gs	=	2,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=	14,0	m
H	=	1,4	m
C_w	=	1,0	correction
C'_w	=	1,0	for water

H = 0.5xBxtan(45+ϕ/2)

H = 0,5 x 2 x tan 55 = 1,4 m

(H<Tbk1; use the top layer's parametrs)

Calculation of avrg soil parameters

ϕ_1 =	20,0	c_1 =	10,0	ϕ_{ort} =	$(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$
ϕ_2 =		c_2 =		c_{ort} =	$(d_1 x c_1 + (H-d_1) x c_2)/H$
γ_2 =	0			ϕ_{ort} =	0
γ_{ort} =	0			c_{ort} =	0

Ultumate Bearing Capasty Formula

qd= $cxN_c xS_c + C_w x(\gamma x D_f x N_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 10,0 x 14,8 x 1,0 + 1,0 x 20,0 x 1,0 x 6,4 + 1,0 x 0,5 x 20 x 2,0 x 2,9 x 1,0

qd = 334 kPa

qem = 334 / 2,0 = 167,2 kPa

Settlement calculation

settlement was ignored due to vsoil is in SM and SC group

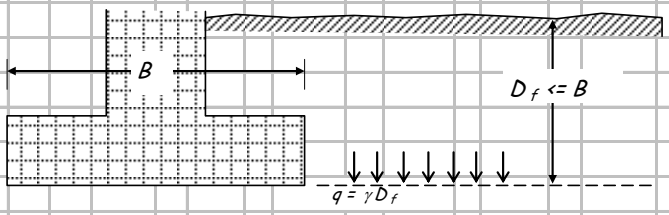
RECOMMENDATIONS

suggested allowable bearing capacity is 150 kPa

BEARING CAPACITY CALCULATION SHEET

Date 25.07.2013

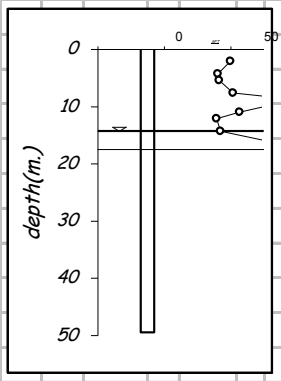
BOREHOLE No SK-3



BOREHOLE No SK-3

Found. Type; square

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM,SC
2. Tbk	17,5	m	rock
3. Tbk		m	
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values

	der. (m	SPT
1-	1,5	29
2-	3,5	19
3-	4,5	20
4-	6,5	31
5-	7,5	R
6-	9,5	36
7-	10,5	18
8-	12,5	21
9-	15,0	R
10-		

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	20,0	kN/m^3
c_1	=	40,0	kPa
ϕ_1	=	15,0	degree
N_c	=	11,0	
N_q	=	3,9	
N_γ	=	1,2	
Gs	=	2,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=	14,3	m
H	=	1,3	m
C_w	=	1,0	correction
C'_w	=	1,0	for water

H = 0.5xBxtan(45+ ϕ/2)

H = 0,5 x 2 x tan 53 = 1,3 m

(H< Tbk1; use the top layer's parametrs)

Calculation of avrg soil parameters

ϕ_1 = 15,0 c_1 = 40,0 ϕ_{ort} = $(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$

ϕ_2 = c_2 = 0 c_{ort} = $(d_1 x c_1 + (H-d_1) x c_2)/H$

γ_2 = ϕ_{ort} = 0

γ_{ort} = 0 c_{ort} = 0

Ultumate Bearing Capasty Formula

$qd = cxN_c xS_c + C_w x(\gamma x D_f xN_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 40,0 x 11,0 x 1,0 + 1,0 x 20,0 x 1,0 x 3,9 + 1,0 x 0,5 x 20 x 2,0 x 1,2 x 1,0

qd = 541 kPa

qem = 541 / 2,0 = 270,4 kPa

Settlement calculation

Settlement was ignored due to soil is sand (SM, SC)

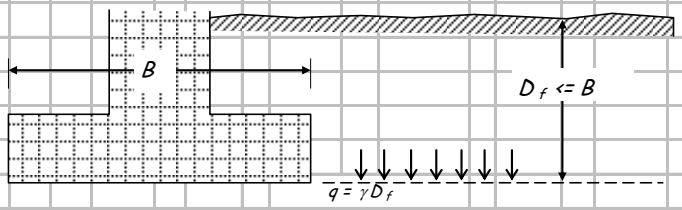
RECOMMENDATIONS

Suggested allowable bearing capacity is 250 kPa

BEARING CAPACITY CALCULATION SHEET

Date 25.07.2013

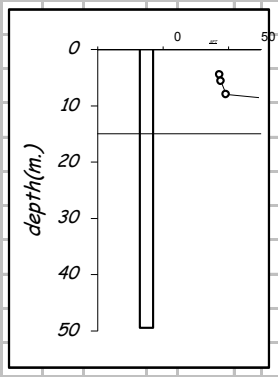
BOREHOLE No SK-4



BOREHOLE No SK-4

Found. Type; square

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM
2. Tbk	15	m	rock
3. Tbk		m	
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values

	der. (m	SPT
1-	3,5	22
2-	4,5	23
3-	6,5	27
4-	7,5	R
5-	9,5	
6-	10,5	
7-	12,0	
8-	13,5	
9-	15,0	
10-		

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	17,0	kN/m^3
c_1	=	15,0	kPa
ϕ_1	=	20,0	degree
N_c	=	14,8	
N_q	=	6,4	
N_γ	=	2,9	
Gs	=	2,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=		m
H	=	1,4	m
C_w	=	1,0	correction
C'_w	=	0,6	for water

H = 0.5xBxtan(45+ϕ/2)

H = 0,5 x 2 x tan 55 = 1,4 m

(H<Tbk1; use the top layer's parametrs)

Calculation of avrg soil parameters

ϕ_1 = 20,0 c_1 = 15,0 ϕ_{ort} = $(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$

ϕ_2 = 0 c_2 = 0 c_{ort} = $(d_1 x c_1 + (H-d_1) x c_2)/H$

γ_2 = 0 ϕ_{ort} = 0

γ_{ort} = 0 c_{ort} = 0

Ultumate Bearing Capasty Formula

$qd = cxN_c xS_c + C_w x(\gamma xD_f xN_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 15,0 x 14,8 x 1,0 + 1,0 x 17,0 x 1,0 x 6,4 + 0,6 x 0,5 x 17 x 2,0 x 2,9 x 1,0

qd = 361 kPa

qem = 361 / 2,0 = 180,4 kPa

Settlement calculation

Zemin kumdn (SM grubu) oluşması nedeni ile oturma ihmal edilmiştir

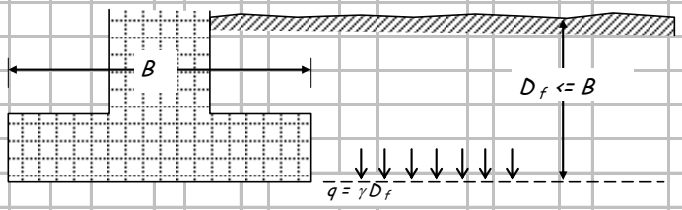
RECOMMENDATIONS

Suggested allowable bearing capacity is 200 kPa

BEARING CAPACITY CALCULATION SHEET

Date 25.07.2013

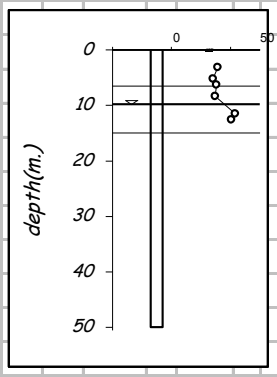
BOREHOLE No SK-5



BOREHOLE No SK-5

Found. Type; square

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM
2. Tbk	6,5	m	CI
3. Tbk	15	m	Rock
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values

	der. (m	SPT
1-	1,5	24
2-	3,5	20
3-	4,5	23
4-	6,5	22
5-	9,5	38
6-	10,5	35
7-		
8-		
9-		
10-		

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	20,0	kN/m^3
c_1	=	15,0	kPa
ϕ_1	=	15,0	degree
N_c	=	11,0	
N_q	=	3,9	
N_γ	=	1,2	
Gs	=	2,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=	9,8	m
H	=	1,3	m
C_w	=	1,0	correction
C'_w	=	0,6	for water

H = 0.5xBxtan(45+ϕ/2)

H = 0,5 x 2 x tan 53 = 1,3 m

(H<Tbk1; use the top layer's parametrs)

Calculation of avrg soil parameters

ϕ_1 =	15,0	c_1 =	15,0	ϕ_{ort} =	$(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$
ϕ_2 =	20	c_2 =	0	c_{ort} =	$(d_1 x c_1 + (H-d_1) x c_2)/H$
γ_2 =	16			ϕ_{ort} =	0
γ_{ort} =	0			c_{ort} =	0

Ultumate Bearing Capasty Formula

qd= $cxN_c xS_c + C_w x(\gamma xD_f xN_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 15,0 x 11,0 x 1,0 + 1,0 x 20,0 x 1,0 x 3,9 + 0,6 x 0,5 x 20 x 2,0 x 1,2 x 1,0

qd = 257 kPa

qem = 257 / 2,0 = 128,5 kPa

Settlement calculatio carried out for the clay layer between 6,5-15,0 meters

q	=	qem - D_f x γ_1	=	128,5	-	1,0	x	20,0	=	108,5					z/B	=	5,375	z: layer depth	
Δp	=	q x (Δp/q)	=	108,5	x	0,0	=	3,3							$\Delta p/q$	=	0,03	from chart	
S	=	Δp x mv x h	=	3,3	x	1,2E-04	x	8,5	=	0,003	m				γ_1	=	20	kN/m^3	
Ignorable amount settlement										0,3319	cm				mv	=	0,00012	kPa^{-1}	
															h	=	8,5	h:layer thickness	

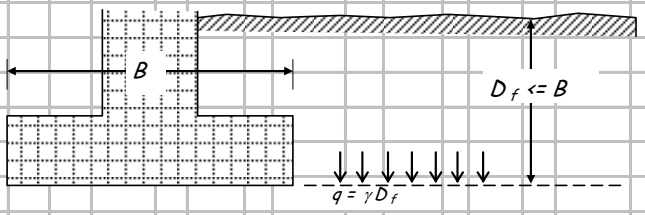
RECOMMENDATIONS

Suggested allowable bearing capacity is 150 kPa

BEARING CAPACITY CALCULATION SHEET

Date 25.07.2013

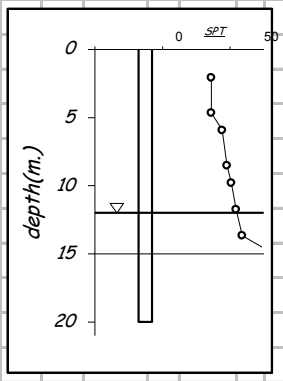
BOREHOLE No SK-6



BOREHOLE No SK-6

Found. Type; square

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM,SC
2. Tbk	15	m	Rock
3. Tbk		m	
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values

	der. (m	SPT
1-	1,5	20
2-	3,5	20
3-	4,5	27
4-	6,5	30
5-	7,5	33
6-	9,0	36
7-	10,5	40
8-	12,5	R
9-	15,0	
10-		

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	19,1	kN/m^3
c_1	=	53,0	kPa
ϕ_1	=	33,0	degree
N_c	=	30,1	
N_q	=	18,4	
N_γ	=	15,1	
Gs	=	2,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=	12,0	m
H	=	1,8	m
C_w	=	1,0	correction
C'_w	=	1,0	for water

H = 0.5xBxtan(45+ ϕ/2)

H = 0,5 x 2 x tan 62 = 1,8 m

(H< Tbk1; use the top layer's parametrs)

Calculation of avrg soil parameters

ϕ_1 =	33,0	c_1 =	53,0	ϕ_{ort} =	$(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$
ϕ_2 =	20	c_2 =	0	c_{ort} =	$(d_1 x c_1 + (H-d_1) x c_2)/H$
γ_2 =	16			ϕ_{ort} =	0
γ_{ort} =	0			c_{ort} =	0

Ultumate Bearing Capasty Formula

$qd = cxN_c xS_c + C_w x(\gamma xD_f xN_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 53,0 x 30,1 x 1,0 + 1,0 x 19,1 x 1,0 x 18,4 + 1,0 x 0,5 x 19 x 2,0 x 15,1 x 1,0

qd = 2237 kPa

qem = 2237 / 2,0 = 1118,4 kPa

Settlement calculation

Zeminin kum olması sonucu oturma ihmal edilmiştir

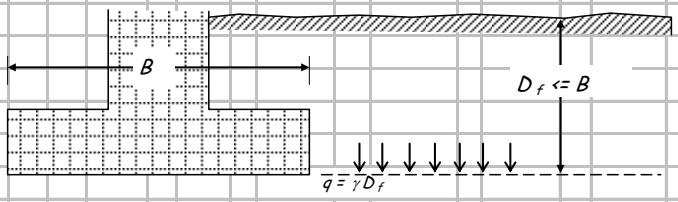
RECOMMENDATIONS

Suggested allowable bearing capacity is 300 kPa

BEARING CAPACITY CALCULATION SHEET

Date 25.07.2013

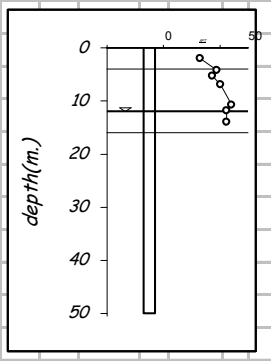
BOREHOLE No SK-7



BOREHOLE No SK-7

Found. Type; square

Borehole profile



Layer depth and soil classes			
1. Tbk	0	m	SM,SC
2. Tbk	4	m	CL,CI
3. Tbk	16	m	Rock
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values		
	der. (m	SPT
1-	1,5	15
2-	3,5	29
3-	4,5	25
4-	6,0	32
5-	9,5	41
6-	10,5	37
7-	12,5	37
8-		
9-		
10-		

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	19,9	kN/m^3
c_1	=	65,0	kPa
ϕ_1	=	32,0	degree
N_c	=	20,7	
N_q	=	10,7	
N_γ	=	6,8	
Gs	=	2,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=	12,0	m
H	=	1,8	m
C_w	=	1,0	correction
C'_w	=	1,0	for water

H = 0.5xBxtan(45+ϕ/2)

H = 0,5 x 2 x tan 61 = 1,8 m

(H<Tbk1; use the top layer's parametrs)

Ultumate Bearing Capasty Formula

$qd = cxN_c xS_c + C_w x(\gamma xD_f xN_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 65,0 x 20,7 x 1,0 + 1,0 x 19,9 x 1,0 x 10,7 + 1,0 x 0,5 x 20 x 2,0 x 6,8 x 1,0

qd = 1694 kPa

qem = 1694 / 2,0 = 847,2 kPa

Calculation of avrg soil parameters

ϕ_1 =	32,0	c_1 =	65,0	ϕ_{ort} =	$(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$
ϕ_2 =	20	c_2 =	0	c_{ort} =	$(d_1 xc_1 + (H-d_1) xc_2)/H$
γ_2 =	16			ϕ_{ort} =	0
γ_{ort} =	0			c_{ort} =	0

Settlement calculation was carried out for CI, CL clay layers between the depths 4,00 - 16,00 meters

q	=	qem - D_f x γ_1	=	847,2	-	1,0	x	19,0	=	828,2		z/B	=	5	z: layer depth
Δp	=	q x ($\Delta p/q$)	=	828,2	x	0,0	=	24,8				$\Delta p/q$	=	0,03	from chart
S	=	Δp x mv x h	=	24,8	x	7,0E-05	x	12,0	=	0,021	m	γ_1	=	19	kN/m^3
										2,09	cm	mv	=	0,00007	kPa^{-1}
												h	=	12	h:layer thickness

Ignorable amount settlement

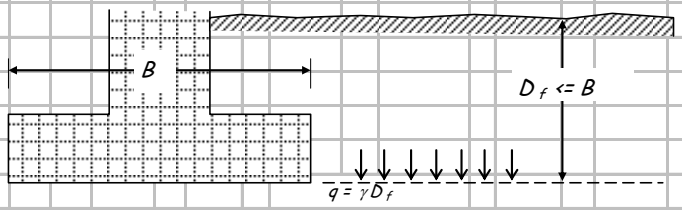
RECOMMENDATIONS

Suggested allowable bearing capacity is 300 kPa

TAŞIMA GÜCÜ HESAP FÖYÜ

Date 25.07.2013

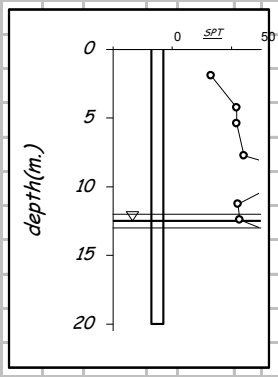
BOREHOLE No SK-8



BOREHOLE No SK-8

Found. Type; square

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM,SC
2. Tbk	12	m	CL
3. Tbk	13	m	Rock
4. Tbk		m	
5. Tbk		m	
6. Tbk		m	
7. Tbk		m	

SPT values

	der. (m	SPT
1-	1,5	21
2-	3,5	38
3-	4,5	38
4-	6,5	43
5-	7,5	R
6-	9,5	39
7-	10,5	40
8-	12,0	R
9-		
10-		

D_f	=	1,0	m
B	=	2,0	m
γ_1	=	21,5	kN/m^3
c_1	=	144,0	kPa
ϕ_1	=	19,0	degree
N_c	=	8,3	
N_q	=	2,5	
N_γ	=	0,4	
Gs	=	2,0	
S_c	=	1,0	
S_γ	=	1,0	
GW	=	12,5	m
H	=	1,4	m
C_w	=	1,0	correction
C'_w	=	1,0	for water

H = 0.5xBxtan(45+ϕ/2)

H = 0,5 x 2 x tan 55 = 1,4 m

(H<Tbk1; use the top layer's parametrs)

Calculation of avrg soil parameters

ϕ_1 =	19,0	c_1 =	144,0	ϕ_{ort} =	$(d_1 x \phi_1 + (H-d_1) x \phi_2)/H$
ϕ_2 =	20	c_2 =	0	c_{ort} =	$(d_1 x c_1 + (H-d_1) x c_2)/H$
γ_2 =	16			ϕ_{ort} =	0
γ_{ort} =	0			c_{ort} =	0

Ultumate Bearing Capasty Formula

qd= $cxN_c xS_c + C_w x(\gamma xD_f xN_q) + C'_w x(0.5x\gamma xBxN_\gamma xS_\gamma)$

Allowable Bearing Capacity Formula

qem = qd / Gs

qd = 144,0 x 8,3 x 1,0 + 1,0 x 21,5 x 1,0 x 2,5 + 1,0 x 0,5 x 22 x 2,0 x 0,4 x 1,0

qd = 1263 kPa

qem = 1263 / 2,0 = 631,7 kPa

Settlement calculation was carried out for the clay layer between 11,0-12,0 meters

q	=	qem - D_f x γ_1	=	631,7	-	1,0	x	21,5	=	610,2			z/B	=	5,75	z: layer depth
Δp	=	q x ($\Delta p/q$)	=	610,2	x	0,0	=	12,2					$\Delta p/q$	=	0,02	from chart
S	=	Δp x mv x h	=	12,2	x	9,0E-05	x	1,0	=	0,0011	m		γ_1	=	21,5	kN/m^3
										0,1098	cm		mv	=	0,00009	kPa^{-1}
													h	=	1	h:layer thickness

Ignorable amount settlement

RECOMMENDATIONS

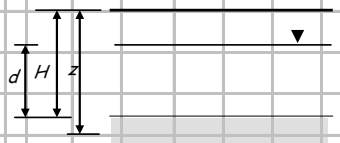
Suggested allowable bearing capacity is 250 kPa

APP-9:

LIQUEFACTION ANALAYSIS AND CHARTS

LIQUEFACTION (Seed et. al, 1985)

Date: 25.07.2013



Ground surface

GWL

Layer carries liquefaction risk

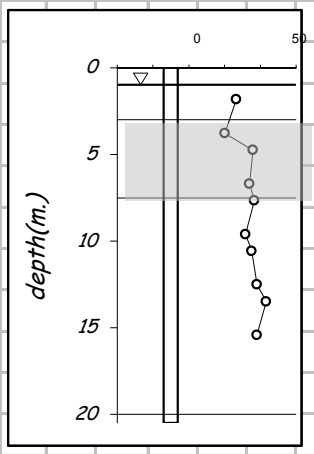
MAP section

Map section: 109

Parcel No: 2

Borehole no: SK-2

Borehole profile



Layer depth and soil classes

1. Tbk	0	m	SM	
2. Tbk	3	m	SM	
3. Tbk	7,5	m	SC	
4. Tbk	20	m	kaya	
5. Tbk		m		
6. Tbk		m		
7. Tbk		m		

SPT values

	der. (m)	SPT
1-	1,5	17
2-	3,5	8
3-	4,5	30
4-	6,5	27
5-	7,5	31
6-	9,5	24
7-	10,5	29
8-	12,5	33
9-	13,5	40
10-	15,5	33

SPT	=	8	
H	=	3	m
z	=	5,25	m
d	=	2	m
g	=	9,81	m/sn^2
γ'_{ort}	=	10,9	kN/m^3
γ_{ort}	=	19	kN/m^3
a_0	=	0,3	
a_{max}	=	2,943	m/sn^2
Dr	=	60	%
GW	=	1	m

Periodic stress ratio $\tau_{av} / \sigma'_0 = 0.65 \times (a_{max} / g) \times (\sigma_0 / \sigma'_0) \times r_d$

Stiffness reduction Factor; $r_d = (1-0.015 \times z)$ = 0,92

Effective overburden pressure; $\sigma_0 = \gamma'_{ort} \times H$ = 11 x 3 = 32,7 kPa = 3,27 t/m^2 = 0,327 kg/cm^2

Total overburden pressure; $\sigma'_0 = \gamma_{ort} \times H$ = 19 x 3 = 57 kPa = 5,7 t/m^2 = 0,57 kg/cm^2

since τ_{av} / σ'_0 = 0,65 x 2,9 / 9,81 x 3,3 / 5,7 x 0,92 = <u>0,103</u>

Cyclic soil strength; $N_1 = C_n \times (ER_m/60) \times N_m$ =

SPT value; N_m, = 8

Correction coeff. for overborden pressure; C_n = 1,6 (Find in the chart given Figure-c)

Actual enrgy delivered to drill; (%) ER_m = 60 (From Table-a)

Since; N_1 = 1,6 x 60 / 60 x 8 = 12

cyclic stress ratio depends N1 for a magnitude 7,5 earthquake ; $(\tau_{av} / \sigma'_0)_{M=7.5}$

(It is found by using N1 value on the charts given in Figure a or Figure b)

(for different magnitude use the appropraite coefficient from Table-b)

Since; N1 = <u>0,15</u> for 7,5 magnitude

The factor of safety for liquefaction; $F_L = (\tau_{av} / \sigma'_0)_{M=M} / (\tau_{av} / \sigma'_0)$ = <u>1,5</u>

<u>FL > 1,2, no liquefation risk</u>

Table-a

Summary of energy ratios for SPT procedures. (Seed et al., 1985, and Skempton, 1986)

Country	Hammer type	Hammer release	Estimated rod energy ER_r (%)	Correction factor for 60% rod energy
Japan[a]	Donut	Tombi	78	1.30
	Donut[b]	Rope and pulley with special throw release	67	1.12 Average 1.2
U.S.A.	Safety[b]	Rope and pulley	60	1.00
	Donut	Rope and pulley	45	0.75
Argentina	Donut[b]	Rope and pulley	45	0.75
China	Donut[b]	Free-fall[c]	60	1.00
	Donut	Rope and pulley	50	0.85
U.K.	Pilcon	Trip	60	1.00
	Old standard	Rope and pulley	60	1.00

a Japanese SPT results have additional corrections for borehole diameter and frequency effects

b Prevalent method in each country today

c Pilcon type hammers develop an energy ratio of about 60%

Table-b

Correction factors for the influence of earthquake magnitude on liquefaction resistance (Seed et al., 1985)

Earthquake magnitude, M	Number of representative cycles at $0.65\tau_{max}$	$\left(\frac{\tau_{av}}{\sigma'_0}\right)_M$ for $M = M$ / $\left(\frac{\tau_{av}}{\sigma'_0}\right)_M$ for $M = 7.5$
8.5	26	0.89
7.5	15	1.0
6.75	10	1.13
6	5~6	1.32
5.25	2~3	1.5

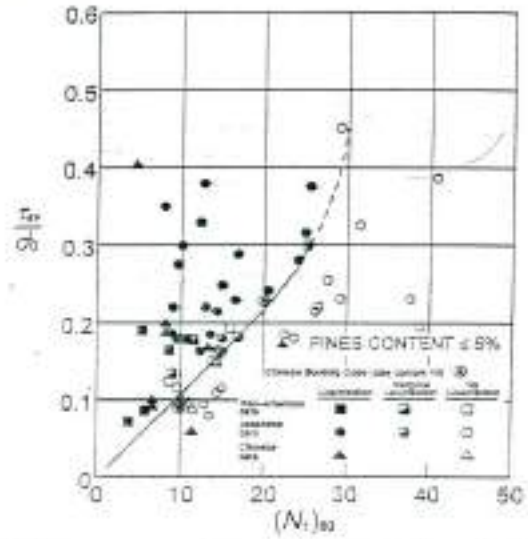


Figure-a

Relationship between stress ratios causing liquefaction and $(N_1)_{60}$ value for clean sands for M=7.5 earthquakes (Seed et al., 1985).

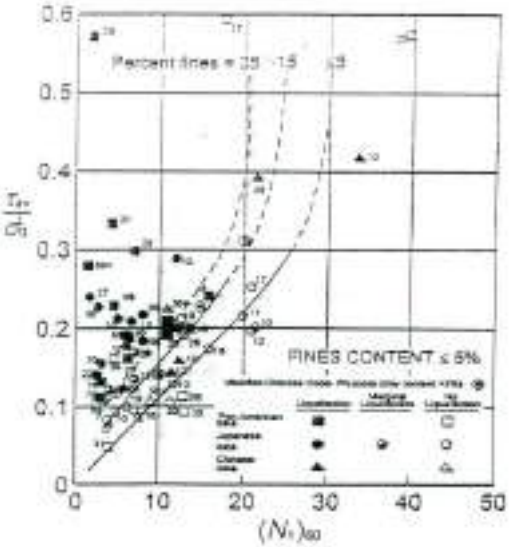


Figure-b

Relationship between stress ratios causing liquefaction and $(N_1)_{60}$ value for silty sands for M=7.5 earthquakes (Seed et al., 1985)

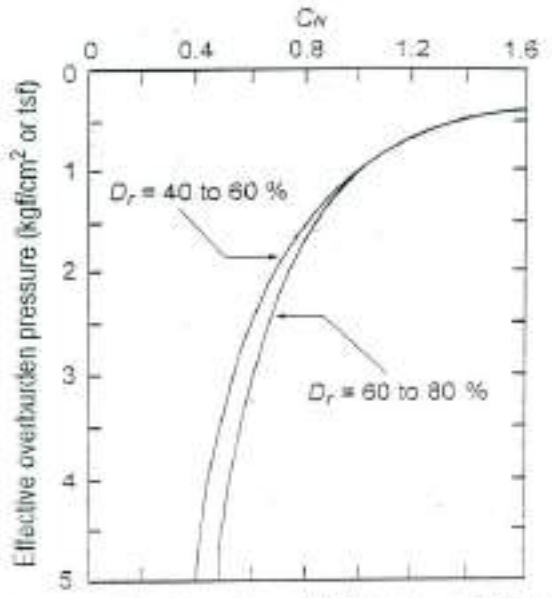


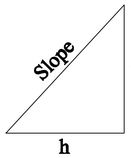
Chart for values of C_N (Seed et al., 1983).

Figure-c

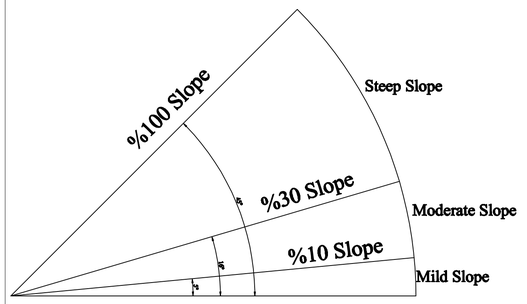
APP-10:

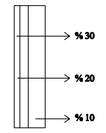
1/1000 SCALED SLOPE MAP

APPENDIX-10



$$\% \text{ Slope} = \frac{v}{h} * 100$$





SPACES BETWEEN COUNTER LINES FOR DIFFERENT SLOPE PERCENTAGES.

d	Slopes steeper than 30 %
c	Slopes between 20-30 %
b	Slopes between 10-20%
a	Slopes less steep than 10%

Client :Acwa Power Electricity Generation Ltd. Co.

KILIÇLAR, YAHŞİHAN, (KIRIKKALE)
DOĞALGAZ KOMBİNE ÇEVRİM ENERJİ SANTRALI
NATURAL GAS COMBINED CYCLE POWER PLANT

1 / 2000 SCALED SLOPE MAP

	TITLE	NAME AND SURNAME	SIGNATURE	DATE
Prepared by	Geological Eng.	Demet ÇELİK		
Drawing by	Geological Eng.	Demet ÇELİK		
Checked by	Msc Geological Eng.	Eyman AREL		

SCALE : 1/2000 | MAP SECTION :

EFOL GEOTECHNICAL SERVICES Ltd. Co.

E & K Geology-Geotechnical Engineering Ltd. Co.

APP-11:

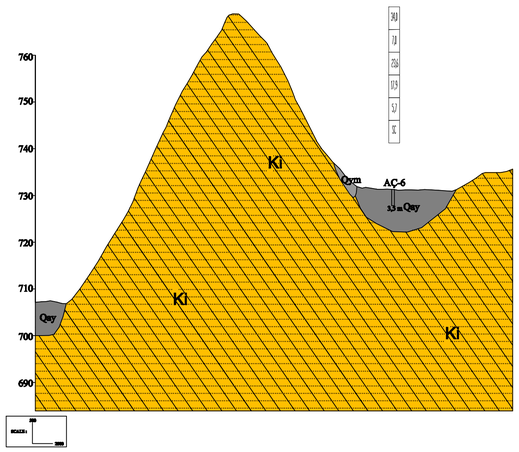
1/1000 and 1/2000 SCALED GEOLOGICAL and SETTLEMENT SUITABILITY MAPS

A

N

A'

S

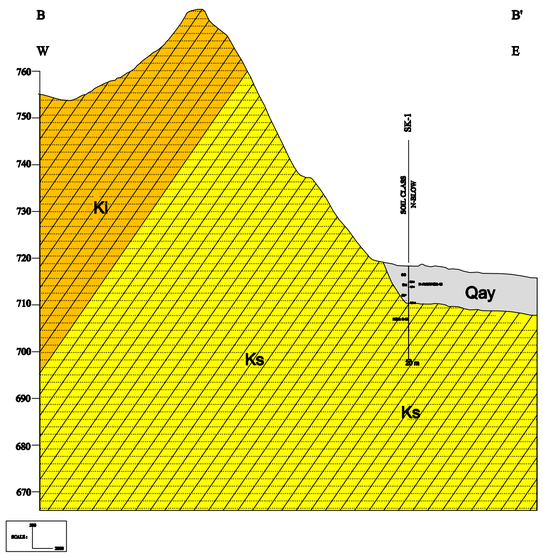


B

W

B'

E

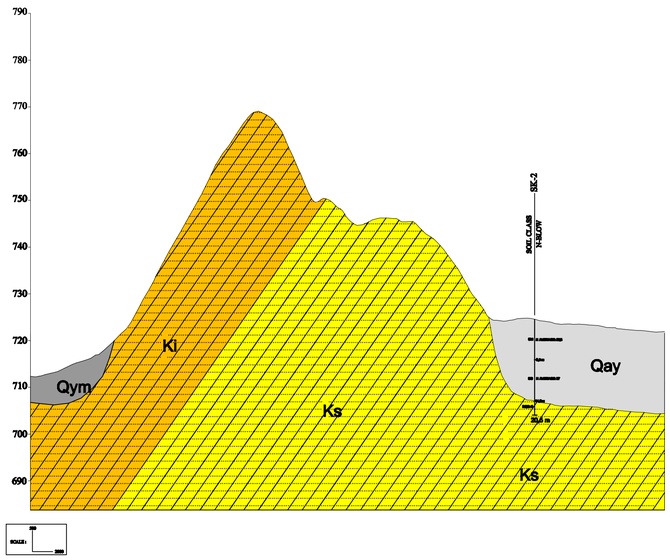


C

NW

C'

SE

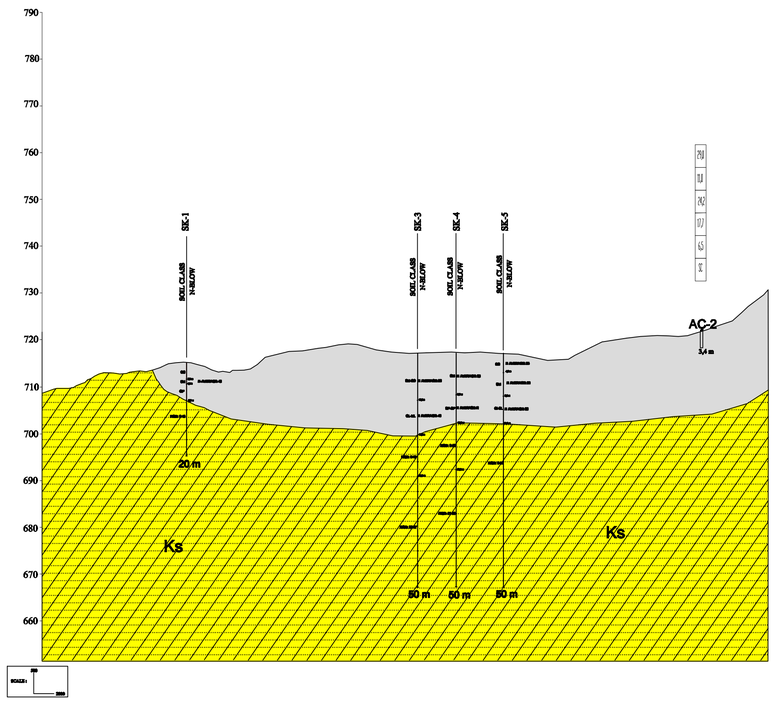


D

NW

D'

SE



Qym Debris flow

Qay Alluvial fan deposits.

Tks Samanlık Formation : Alternation of gravelstone, sandstone, claystone.

Tki Tıcapınar Formation : Alternation of gravelstone, sandstone.

- Retained percentage, No : 4
- Passing percentage, No :200
- Liquid limit %
- Plastic Limit %
- Plasticity Index %
- Soil Class

Client :Acwa Power Electricity Generation Ltd. Co.

KILIÇLAR, YAHŞİHAN, (KIRIKKALE)
DOĞALGAZ KOMBİNE ÇEVRİM ENERJİ SANTRALI
NATURAL GAS COMBINED CYCLE POWER PLANT

GEOLOGICAL CROSS SECTIONS

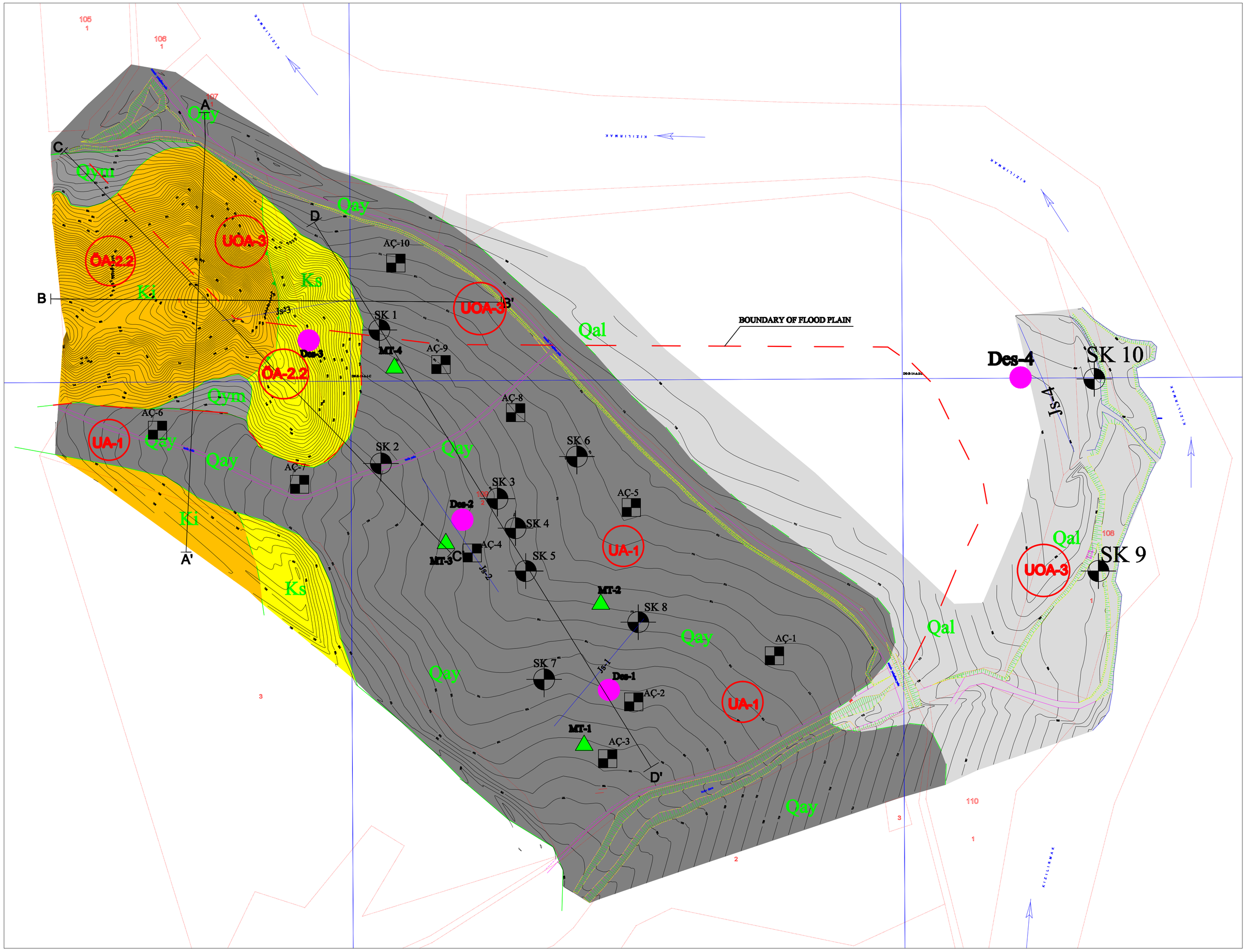
	TITLE	NAME AND SURNAME	SIGNATURE	DATE
Prepared by	Geological Eng.	Demet ÇELİK		
Drawing by	Geological Eng.	Demet ÇELİK		
Checked by	Msc Geological Eng.	Eymen AREL		

SCALE : NEXT TO THE CROSS SECTION | MAP SECTION :

EFOL GEOTECHNICAL SERVICES Ltd. Co.

E & K Geology-Geotechnical Engineering Ltd. Co.

APPENDIX-11



EXPLANATIONS

- Qal — Alluvion deposits
- Qym — Debris flow
- Qay — Alluvial fan deposits.
- Ks — Samanlık Formation : Alternation of gravelstone, sandstone, claystone.
- Ki — Ilıcapınar Formation : Alternation of gravelstone, sandstone.
- Formation Boundary
- Tectonical Boundary
- Region Boundary
- A A' Cross Section Line

- SK 8 — Borehole Location
- AÇ-4 — Test Pit Location
- MT-3 — Mikrotremor Measurement Points
- Des-2 — Vertical Electrical Sounding
- Js-1 — Seismic Measurement Profile

UA-1 — Suitable lands slope rate is less than 10 %, Alluvial fan deposits. Ground water dept is between 12,00-13,00 meters.

OA-2.2 — Lands need precation for settlements slope rate is steeper than 10%. Alternation of gravelstone, sandstone, claystones. Samanlık and Ilıcapınar Formations. No ground water level exists. Seepage water is possible. Precations should be taken against the possible slope stability problems.

UOA-3 — Unsuitable lands, under coverage of flood risk area which has been declarated as the council of ministry's desicion, memorandum number is 2008 / 13558 these land sections are not suitable for housing settlement.

Client :Acwa Power Electricity Generation Ltd. Co.

KILIÇLAR, YAHŞİHAN, (KIRIKKALE)
DOĞALGAZ KOMBİNE ÇEVRİM ENERJİ SANTRALI
NATURAL GAS COMBINED CYCLE POWER PLANT

1 / 2000 SCALED GEOLOGICAL AND SETTLEMENT SUITABILITY MAP

	TITLE	NAME AND SURNAME	SIGNATURE	DATE
Prepared by	Geological Eng.	Demet ÇELİK		
Drawing by	Geological Eng.	Demet ÇELİK		
Checked by	Msc Geological Eng.	Ramen AREL		

SCALE : 1/2000 | MAP SECTION :

EFOL GEOTECHNICAL SERVICES Ltd. Co.

E & K Geology-Geotechnical Engineering Ltd. Co.

APP-12:
EARTHQUAKE RISK ASSESMENT REPORT

EARTHQUAKE HAZARD ANALYSİS REPORT

KIRIKKALE PROVINCE – YAHŞİHAN COUNTY – KILIÇLAR DISTRICT

Prof. Dr. Ali Osman ÖNCEL

24.08.2013

CONTEXT

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CHAPTER 1 - INTRODUCTION

INTRODUCTION

Earthquake Risk Analysis (ERA) is used for the study of behavioral ground characteristics due to an earthquake prior to construction. ERA is a necessary examination which should be conducted based on the regulations of the International Building Code (UBC) in order to increase the safety of the structure. ERA can be made on the basis of both the deterministic and the probobalistic. Deterministic Seismic Hazard Analysis (DSHA) determines danger risk over a structure which will be caused for each source.

Probabilistic Seismic Hazard Analysis (PSHA) shows the risk variation of different durations and possible effetcs over a structure considering available entire sources based on an integrated approach. PSHA is an important standard for engineering application since it shows the variability for different possibilities depending on the time. PSHA applications are made in different ways. In particular region studied could be classified in different seismic regions. In this case, possibe effects of a source region is determined on the project site. Seismic zones can be represented in different ways due to effect of the human factor through the process of the seismic zoning. PSHA studies begun recently without zoning, and each source has been considered to contribute to earthquake hazard. Kırıkkale Province - Yahşihan District – Kılıçlar Village (KJC), North Anatolian Fault (NAF) in the northern site of Turkey, Kırıkkale-Erbaa Fault Zone (KEFZ) and Salt Lake Fault Zone (TGFZ) are just found to be located in an area closer to the important fault zones. One of the most basic and common characteristics for fault zones is being controlled with dextral strike slip feature or horizontal stress.

PSHA - in order to determine earthquake risk which is the one part forming the study of the geological and geotechnical surveys around KYK Zoning Plan Report - is important for calculating the parameters for performance-based design of engineering structures.

According to the Seismic Zoning Map of Turkey, Kırıkkale until 2006 as shown in the third grade of seismic zone can be reached through the media, but after 2006, according to the information has been declared as the first grade of seismic zone. Therefore, the regulation for buildings to the effective peak ground acceleration (PGA) corresponding to an earthquake recurrence period of 475 years is defined as 0.4g. Regulation, both the application and legally only applies to the type of building structures.

Turkey Regulations of Earthquake Design allows being calculation of acceleration spectrum if it is needed taking into account the effect of seismicity and site-specific determination of the local field conditions. In this study, site-specific design features of KYK region will be determined as permitted by regulation evaluated.

In order to determine risk characteristics and design earthquake for KYK site investigation, Probabilistic Seismic Hazard Analysis (PSHA: Probabilistic Seismic Hazard Analysis) were made using the entire earthquakes within a region based on the central area (33.88 N - 33.41 D) in a radius of 150 km. The study are are shown separately in Geological and Earthquake maps (Figure 1).

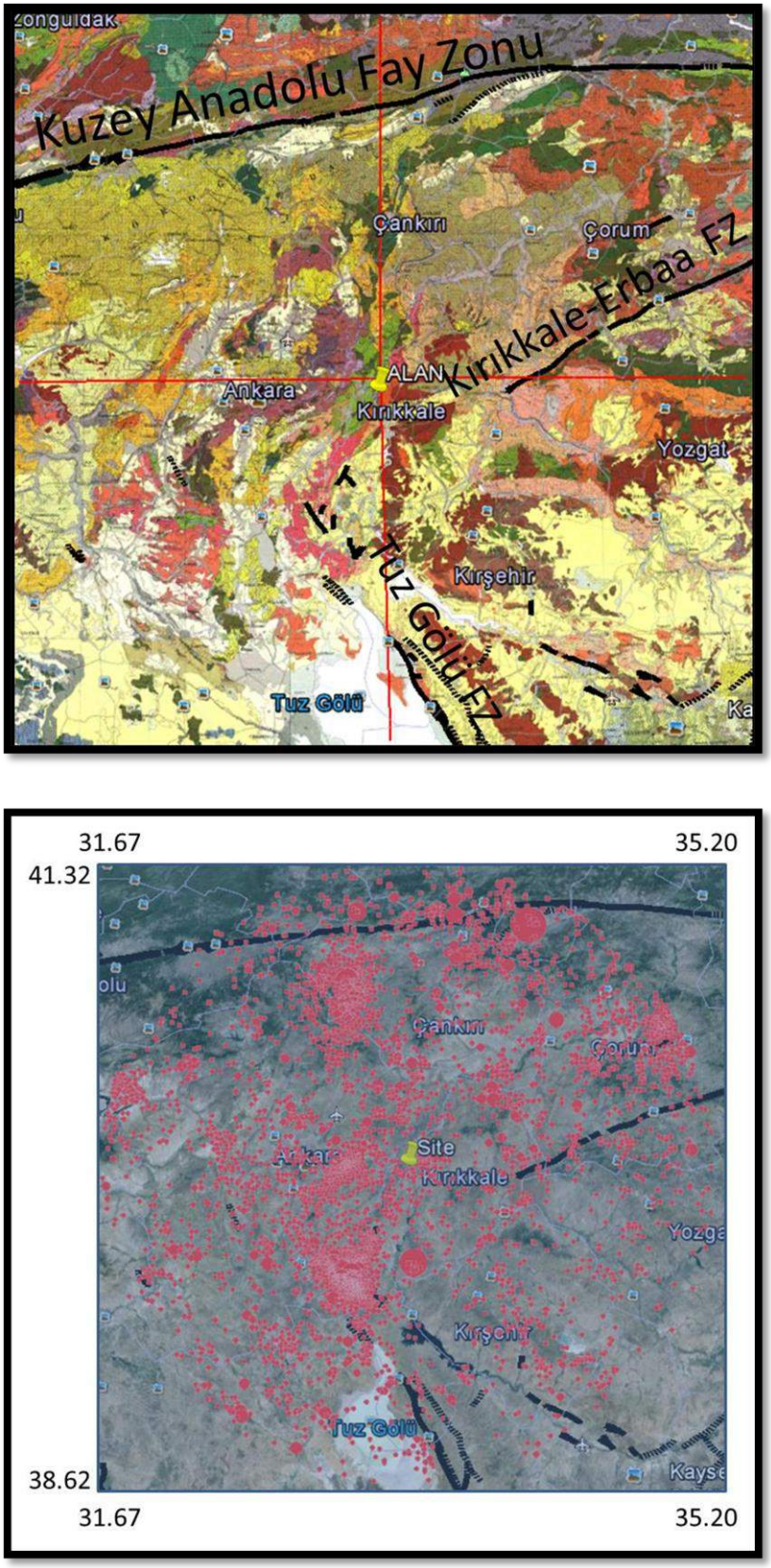


Figure 1: KYK site and location. Ttwo major fault system appears to be close to the KYK field. Geological units prepared by the MTA shows the change of different units over which the map scale are prepared in 1500.000.

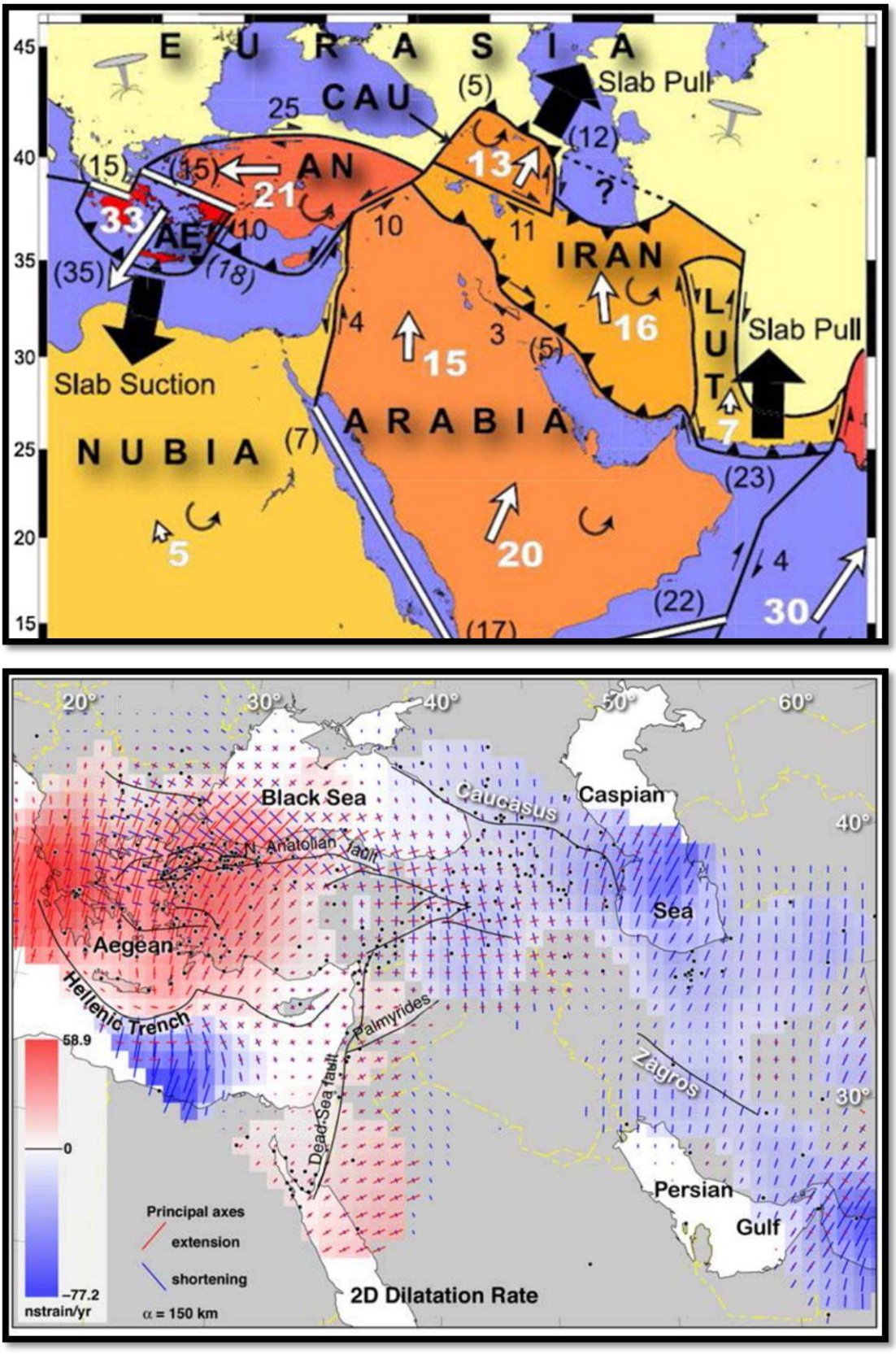


Figure 2: Plate movements in and around Turkey. Upper Figure. The directions and rates of GSP are given (Reilinger et al., 2006), LOWER Figure. The nature of deformations are shown (Allmendiger et al. 2007). Compression type (blue color) and opening type (red color) show the changes in the mechanisim of stress system.

ACTIVE TECTONIC STRUCTURE

The seismic hazard of Turkey is due to being deformed as a result of the large plates motions. NE Arabia plate moves with a certain speed (15 mm / year) in the NE direction. Tectonic regime in eastern Turkey occurs in the form of compressive stress. Depending on NS continuous stretch the Anatolian plate is broken. Broken plates in Turkey form a great strike-slip fault systems. One of these is the the North Anatolian Fault (NAF) - separating Black Sea and Anatolian - rapidly deforming with a plate velocity of the 25 mm / yr. The other is the East Anatolian Fault (EAFZ) which is being rapidly deformed of 10 mm / year in the NE direction. Anatolian plate moves to the west at a specific rate (21 mm / year) through two major fault zones (Reilinger et al., 2006).

In particular, the western part of the Anatolian plate shows a very different behavior as a result of the NS extensional tectonic opening. Namely, the deformation in the Northern West Anatolian plate rate (15 mm / year) is significantly lower than the South West Anatolian plate rate (33 mm /year) since the pulling-back effect of subducting african plate. Because, Anatolian plate is being slowed in the west due to existence of Aegean plate boundary. The deformation over the plate of Western Anatolia undergoes faster under the NS effect of extensional tectonically opening (Allmendiger et al., 2007).

The fault zones which are available close to the project area are the largest North Anatolian Fault (NAF), Kırıkkale-Erbaa Fault Zone (KEFZ) and Salt Lake Fault Zone (TGFZ). The large earthquakes have occurred in the NAFZ which is the major strike fault zone in Turkey.

KEFZ that intersect with Resadiye in the east NAFZ is NE-SW dextral strike slip fault. It lies from Resadiye to Kırıkkale, which has about the length of 250 km from the measurements over Tırkish Active Fault Map.

TFZ, extending from north of Salt Lake to South of Nigde in the NW-SE direction, is 190 km in length measured from the Map of Turkish Active Fault. The eastern site of TFZ which has a strike of NW-SE trending fault passing (Şerefli Koç Hisarsar-Aksaray) has been stated to have a component strike-slip fault (Aydemir and Ates, 2006). In general, the earliar studies show that the existing nature of tectonic faults is mainly ralated to the right-lateral strike-slip faults.

CHAPTER II: METHOD AND APPLICATIONS

METHOD

That the change in the properties of the occurrence and clustering of tectonic earthquakes occur due to fault heterogenities associated with the different stress magnitudes. Tectonic stress on active fault zones may occur in different ways depending on continuous deformation as a result of plate motions. The changes in seismicity clustering prior to larger earthquakes (before, during, and after) may be related to changes in the local tectonic stres.

However, the fault segments are broken under different stress loads due to changing resistance of crustal structure. The changes of tectonic stress in time and space are better understood based on a five-dimensional study of earthquake occurrences (Oncel and Wilson, 2007).

The relation between earthquake frequency and the earthquake magnitude is known as a the Gutenberg-Richter Law, which were determined on 1954. The regression parameters (a and b) that determines the relation between Earthquake Magnitude (M) and Frequency of Earthquake Occurrence are called as the seismicity parameters. The Gutenberg-Richter (1954) Law is given in the following way:

$$\log N = a - bM \quad (1)$$

Relation (1), fault length and seismic moment, energy dissipation and the frequency of occurrence of earthquakes in relation to a power law, the scaling property of seismicity is widely used in the explanation. N is the the number of large earthquakes with a magnitude larger than M in an area within a study time- range. N increases depending on the changes in the size of the area in question or observation time; therefore, it should be normalized in order to find the average number for per year or per km^2. The determination of the spatial variation of seismic b value along fault zones, earthquake fault zones are used to exemine both the physical properties of earthquke occurrence and characteristics of earthquake recurrence based on the crustal irregularities.

In particular seismic b parameter varies between 0.5 and 1.5, the average global value of 1, respectively. Seismic b value (<1) is lower in areas that average size of earthquake magnitudes are relatively higher than the areas in which the size of earthquakes are observed relatively smaller. The main factors that affect the robust determination of earthquake parameters are the length of the observation time and the homogeneity of earthquake magnitude. In this respect, the analysis of seismic hazard can be achieved by the addition of historical data in order to extend the length of the observation period than the length of recurrence period for a expected magnitude of regional earthquake.

EARTHQUAKE DATA

The moment-magnitude (Mw) catalog for the region under investigation was compiled for years between 1600 and 2006 from the European Integrated Earthquake Catalogs (ABDK: SHARE and SHEEC). The data set was compiled for the square area from the center of project area to the outer distance of 150 km. The Earthquake data for near-term (2006-2013) was compiled from the Data Center of European-Mediterranean (EMSC). Conversion equations based on the earthquake types (Mb or MD) are used to convert them to moment magnitude, and they were attached to the ABDK catalog in Turkey.

Seismicity data includes blasting, fore-shock and aftershock earthquakes, such as known the secondary events. If cleaning of secondary events is ignored, the earthquake risk analyzes are falsified data in different ranges of earthquake magnitude. The occurrence of an earthquake is random and independent. In order to create mainshock catalogue, the secondary events which is the main-shock earthquake-related foreshocks and aftershocks should be eliminated. The main shock earthquake in the project catalog was created as a result of filtering (declustering) aftershocks which does not show poisson behavior (being independent of each other).

EARTHQUAKE RECURRENCE RELATIONS

Earthquake statistic analysis of about 400 years (1600-2013) was conducted as a result of the seismicity data compilation based on the changes in data completeness for different part of observation period. Seismic hazard parameters (a = activity rate and b = tectonic stress) of the statistical relationship between the frequency of earthquakes (log N) and sizes of earthquake magnitude (Mw) are estimated based on the Maximum Likelihood Method (MLM) that the equation is shown below (see Oncel and Wyss, 2001) .

$$\mathbf{b = \log_{10} e/(\overline{m} - m_0 + 0.05)} \qquad (2)$$

where $\overline{m}$ is the average magnitude of all the earthquakes and m_0 is the completeness of earthquake catalog. Adjustments associated to the magnitude errors must be made. For example, the magnitude of the error correction error half the value for magnitude error of 0.1 is 0.05. In this study, 0.2 and 0.5 are considered as the magnitude errors. The standard error of δb that is calculated from a specified number (n) of seismicity data is calculated for a confidence interval 95% by Aki's (1965) formula.

$$\delta b = 1.96 b \ / \sqrt{n} \qquad (3)$$

The relation found based on the MLM for the study area is given in the following:

$$\text{LogN} = 5.01 - 0.649\ (\pm 0.04)\ M_w \qquad (4)$$

Determining the relationship given above was used for the long-term seismic data (400 years). Frequency and probability of earthquakes in the region can easily be determined using this correlation by conventional methods. One of the most important problems in the determination of seismic hazard and risk is to determine the maximum possible earthquake.

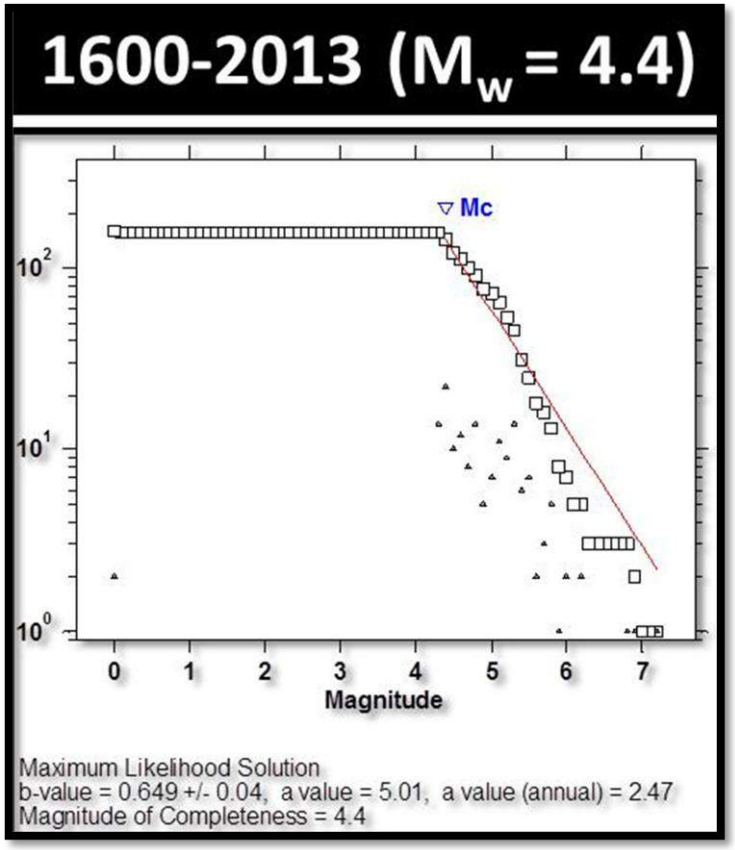


Figure 3: *Earthquake statistic for the study area and vicinity. The center of the region assumed the project area, and extended a radius distance of 150 km for compiling the earthquake data, which might endanger the risk in the region, is based on the completeness analysis of seismicity data.*

Table 1. Earthquake Data

Earthquake Data	Date	Threshold Magnitude	Magnitude Error
Historical	1600-1917	5.4	0.5
Instrumental 1	1918-1965	5.3	0.3
Instrumental 2	1965-1999	4.3	0.3
Instrumental 3	1999-2013	4.2	0.2

A different approach for the study are was used to find the maximum expected earthquake (see. Kijko ve Oncel, 2001). Seismic data prepared in this study for the determination of the expected maximum earthquake has been divided into two separate groups as the historical (1600-1917) and instrumental (1918-2013) (see Table 1). Information in the region we have studied on the historical data reported in the area of damage is measured as the intensity values (I) which shows the changes in the size of felt damage. These values of intensity were translated into earthquake

magnitude Mw. Instrumental data is categorized as due to changes of data completeness and magnitude accuracy depending in the stational development of seismic monitoring network. In this study, the magnitude completeness of instrumental period (1918-2013) - determined based on the change in the number of time-occurrence data - was divided into 3 different sizes. The magnitude errors were taken from The European Earthquake Catalogue (EEC). The magnitude error for earthquakes of historical period and instrumental period is 0.5 and 0.2 respectively.

Table 2. Corrected Earthquake Hazard Parameters		
Seismic b value	0.69	±0.03
Mmax	7.2	±0.3
LAMBDA	2.233 +- 0.335 (for Mmin = 4.00)	

An integrated analysis of seismic hazard parameters of the earthquake catalog was created in order to increase while the greatest earthquake in the region was not accepted to be the largest magnitude of expected earthquake. The method in this study was used to determine uncertainity range of the expected large earthquake magnitude. Therefore, the expected largest of regional earthquake was estimated to be of M_{max} = 7.3 (± 0.3) (Kijko and Oncel, 2001). So far, information was given some technical details as for the expected seismic hazard parameters and the calculation of the largest regional earthquake. These parameters are used to estimate earthquake recurrence times in the area for various range of earthquake magnitude on different periods (1, 75.475, and 2475) and different exceedance probabilities of 50 years (2%, 10% and 50%) .

PROBABLISTIC SEISMIC HAZARD ANALYSIS

There are many methods in relation to the determination for the probability of earthquake occurrences. The most important factor determining the probability of occurrence of earthquakes is the uncertainity of Recurrence Periods. The uncertainty of the recurrence period decreases in which the the observation time of catalog is longer than the period of expected largest earthquake (approximately 300 years) especially in the study area

$$Tr = \frac{\Delta T}{10^{(a-bM)}} \tag{5}$$

Where ΔT is the observation time of earthquake catalogue.

Another way to determine occurrence probability of an earthquake recurrence within one year (annual probability of exceedance) is to be given as Poisson Probability. The uncertainity of Recurrence Time RT can be determined based on the standard errors of the seismicity parameters (a and b). First, the earthquakes recurrence in this study was found and the uncertainties in the periods were shown.

The example of the principles and applications of the method used in this study can be found in the work of Kijko and Oncel (2001). The recurrence periods in year of 72, 425 and 2475 for engineering calculations corresponds to calculated probabilities in 50 years of life for a structure exceeding 50% (72 years), 10% (475yıl) and 2% (2475) were (Figure 4).

ATTENUATION RELATION

Attenuation relationships depend on the distance from the earthquake station (r), ground strength and fracture mechanics, and the earthquake magnitude (M). Attenuation relations especially examine the strength properties in two main categories of soil and rock (e.g., Sadigh et al., 1997). Attenuation relations are used in the calculation of acceleration values and a large number of available decay relations is available.

The most widely used attenuation relations are Abrahamson ve Silva (1997), Boore vd. (1997), Sadigh vd. (1997) and Ambraseys vd. (1996). In this study the attenuation relationship of Sadigh et al. (1997) that based on data obtained from earthquakes in California for the open space strong motion data of shallow crust (20-25 km) which may be up to 30 km thick has occurred is usually used.

The data used up to 200 km away from the fracture surface of the M4 and M8 is based on the data. Attenuation relations for small earthquakes (Mw <4.0) and long distances (r> 100 km) suggested not to use it. Attenuation relationships acceleration (PGA and SA) is based on the geometric average of the two horizontal components. Soil classification as a rock (Vs ≈ 620 m / s) and deep soil (Vs ≈ 310 m / s) in relation to two different categories have been developed. Studies of the behavior of the horizontal spectral acceleration (5% damping) for the ground conditions are given by the two separate formulas.

$$\ln Y = b_1 + b_2(M_w - 6) + b_3(M_w - 6)^2 + b_5 \ln r + b_v \ln(V_S / V_A) \quad (6)$$

$$r = \sqrt{r_{jb}^{\,2} + h^2} \quad (7)$$

$$b_1 = \begin{cases} b_{1SS} & \text{Strike - slip} \\ b_{1RS} & \text{Reverse} \\ b_{1ALL} & \text{Unknown mechanism} \end{cases} \quad (8)$$

Y: The ground motion parameters (PGA, SA) in g, Mw: Moment magnitude, r_{jb}: the closest distance to the vertical projection of fracture (in km), Vs: 30 m is the mean shear (shear) wave velocity (in m /s). The earthquakes in Turkey, the relation of Sadigh et al. 1997 compared with observed the PGA data in particular for the earthquakes of medium-sized (5.5 <MW <6.5) and larger size (6.5 <MW <7.5) and appeated to exhibit good agreement with the ground group A-B (Çeken, 2007). Çeken (2007) indicated a similarity or for observations and theoretical data for comparison with the curves obtained as for the C-D ground group, but showed the serious differences on estimated values for the same distance. He claimed that the reason might be related to study seperataely for soft ground and softer ground (C-D group) instead of studying them together. Taking into account for the reported comparisons on the proposed attenuation relationships, the attenuation curve for the A-B ground has been used.

CHAPTER III: RESULTS

DETERMINATION OF PROBOBALISTIC SEISMIC HAZARD MAPS

The details of the method used in the study is based on Kijko and Oncel (2001) which shows a case work on Japanese Islands. The method used in the study area is a new approach that leaving no need of seismic zoning. The characteristics parameters of each earthquake (location, size and depth) form the source area under risk. The historical and instrumental data for the determination of the magnitude of the impending earthquake were used together, and different historical intervals were taken into account for the uncertainty. If an example needs to explain, the earthquake magnitudes of 0.5 has been considered as an error for 1600-1917 (see Table 1). Taking into account the parameters of seismic hazard factors enhanced the accuracy of the calculated parameters of the relation of earthquake-frequency (log N = a - b M) (see Table 2).

Seismic hazard/risk mapping which shows the expected danger in which an earthquake happens will be completed as a result of the changes for different periods of time (0.2 sec and 1 sec) of the peak ground acceleration (PGA), spectral acceleration (SA) or Acceleration Response Spectrum (ARS). Especially the acceleration of low-building construction (SA = 0.2 sec) and high-building construction (T = 1 sec) to account for the pre-construction planning for the acceleration of construction used in the design of safety is of utmost importance.



Reports of field seismological studies along the different profiles (Js-1, Js-2,Js-3,Js-4) where different shots (Straight - Mid-Reverse) were conducted showed the ground within the A-C range based on calculated seismic velocities.

The ground class examined based upon the provided statistical data, and A-class (49%) were found to be mainly available. The ground in B-class (28%) and C-class (23%) was respectively found. Ground condition in project site is represented substantially (70%) with a group of A-B ground. The equation of Sadigh et al. (1997) – considering A-B soil classification – was used in the the project area, and the values of PGA and SA acceleration which might be caused by a large earthquake in a large area were calculated.

Probabilistic method of seismic hazard map was calculated for a ground of rock-hard (A and B ground class). The greatest value of ground acceleration (PGA) appears to be of about 0.15 g in the center of the project area (Fig. 5), and PGA closer to Çankırı and the North Anatolian Fault increases a value of 0.3g. Spectral acceleration (SA) which is calculated for T = 0.2 sec increased up 0.5 g and 1 g in the center when the size changes of SA in size are examined (Fig. 5). Spectral Acceleration T = 1 sec rises 0.4 g in a small area for SW direction.

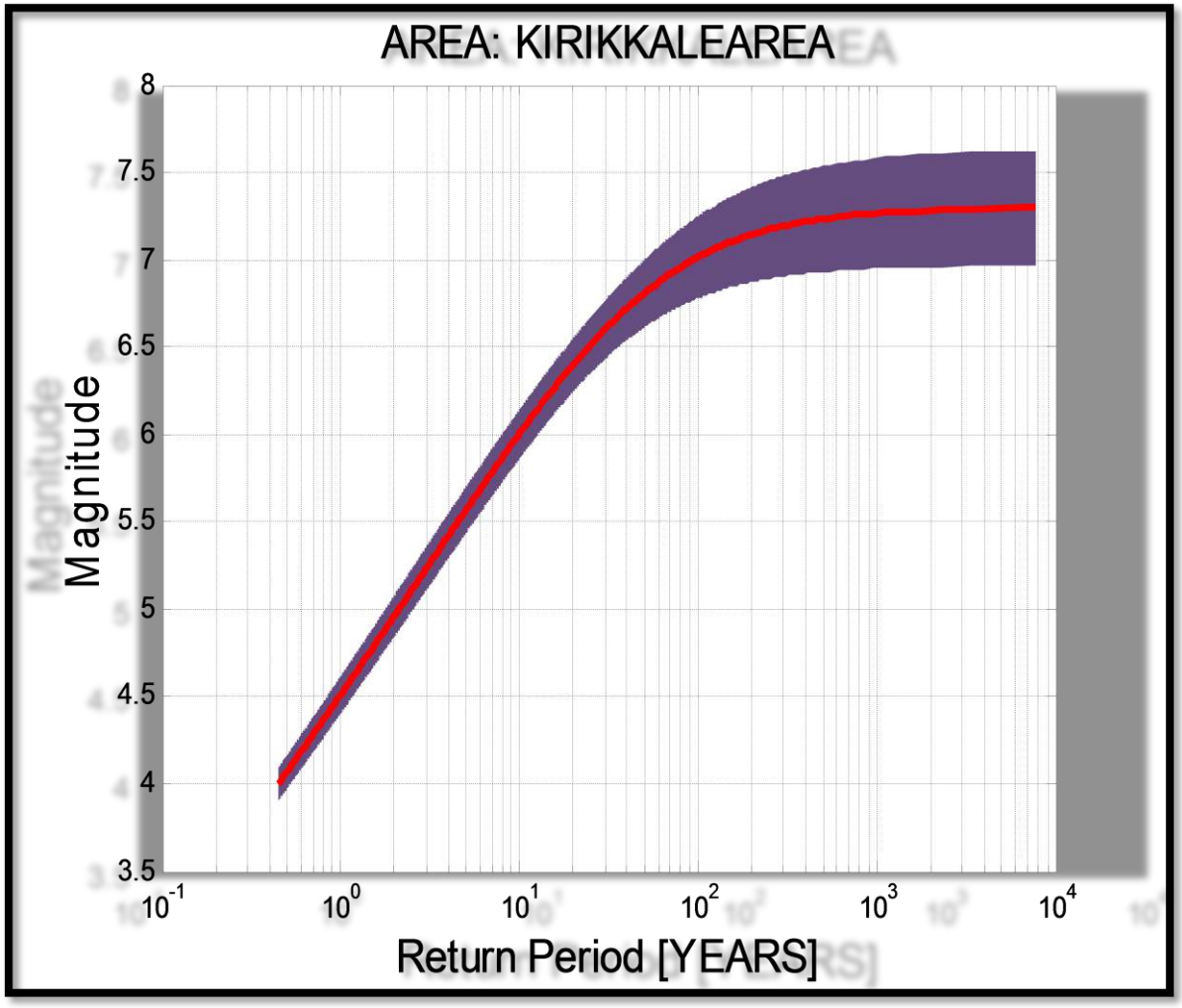


Figure 4A: Probabilities of occurrences of earthquakes and recurrence times for different durations Calculated on an annual exceedance probabilities of earthquakes was calculated for different size Increases in size of uncertainties with increasing earthquake magnitude. Especially, the uncertainity for earthquake M>7.0 is larger due to uncertainity of historical data.

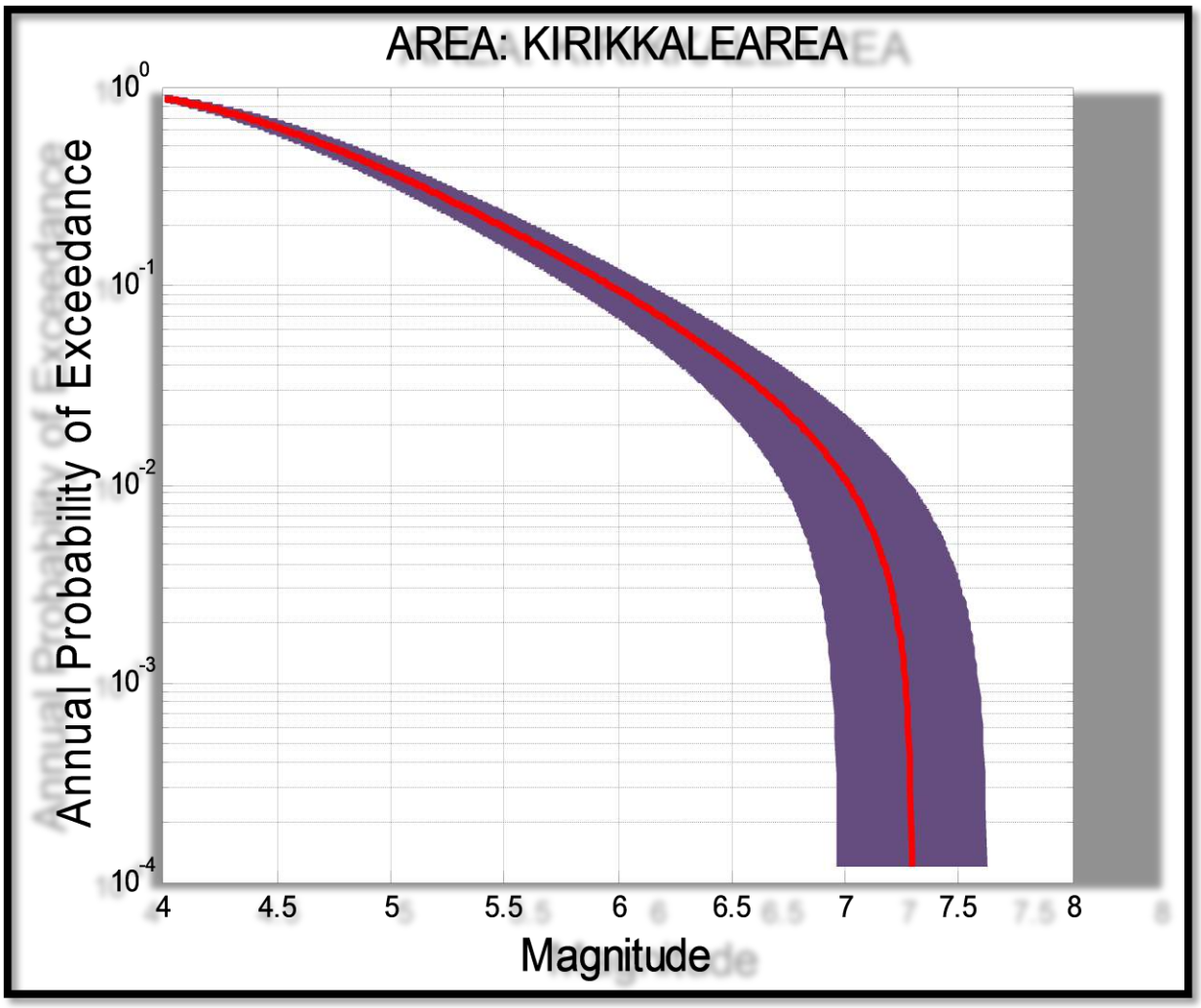


Figure 4B. Annual exceedance probabilities of earthquakes was calculated for different size. Increases in size of uncertainties with increasing earthquake magnitude.

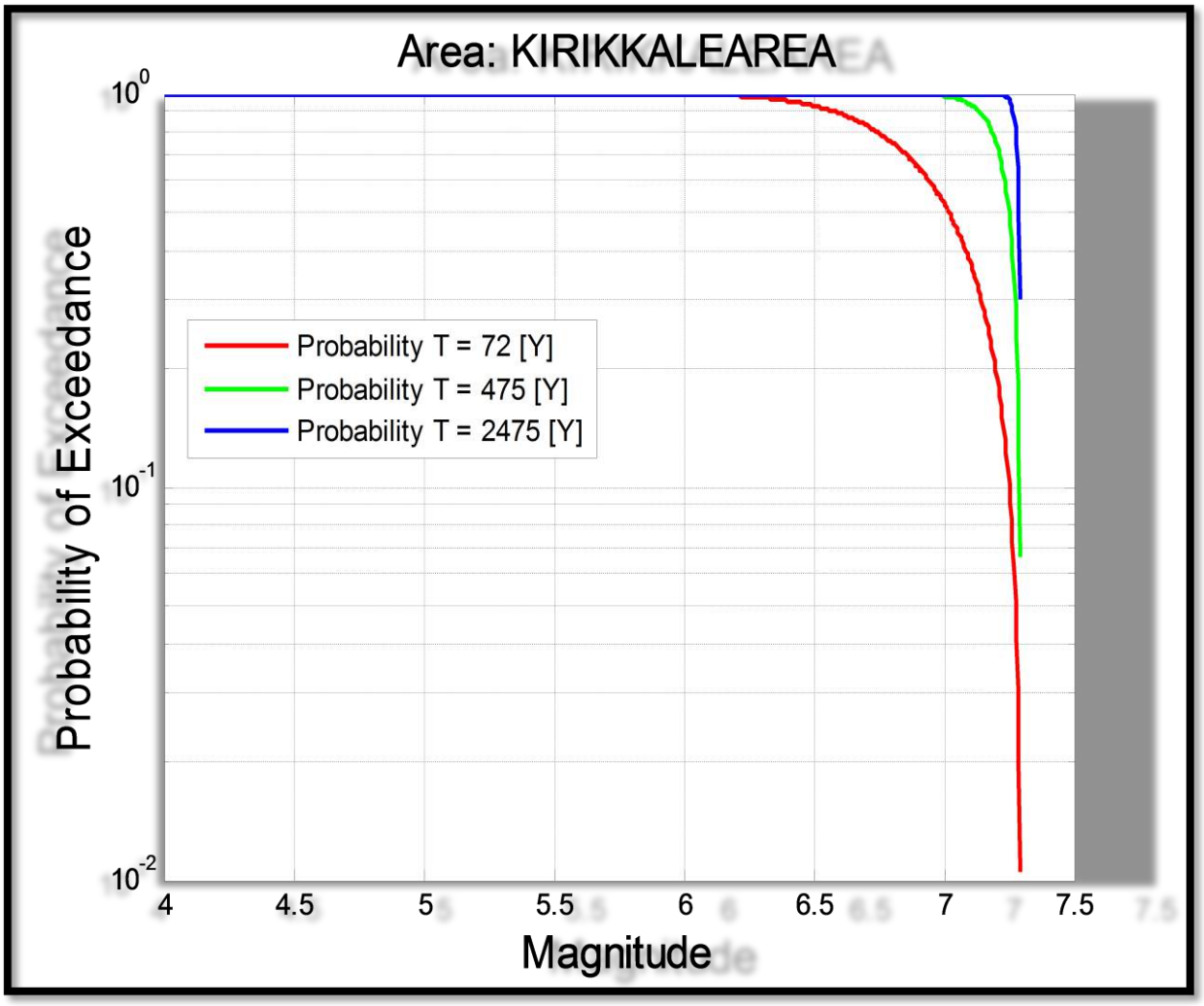


Figure 4C. Probabilities of occurrences of earthquakes and recurrence times for different durations. Probability of excedance is for different magnitude (M) of earthquakes was calculated for recurrence times which are important for various building structures.

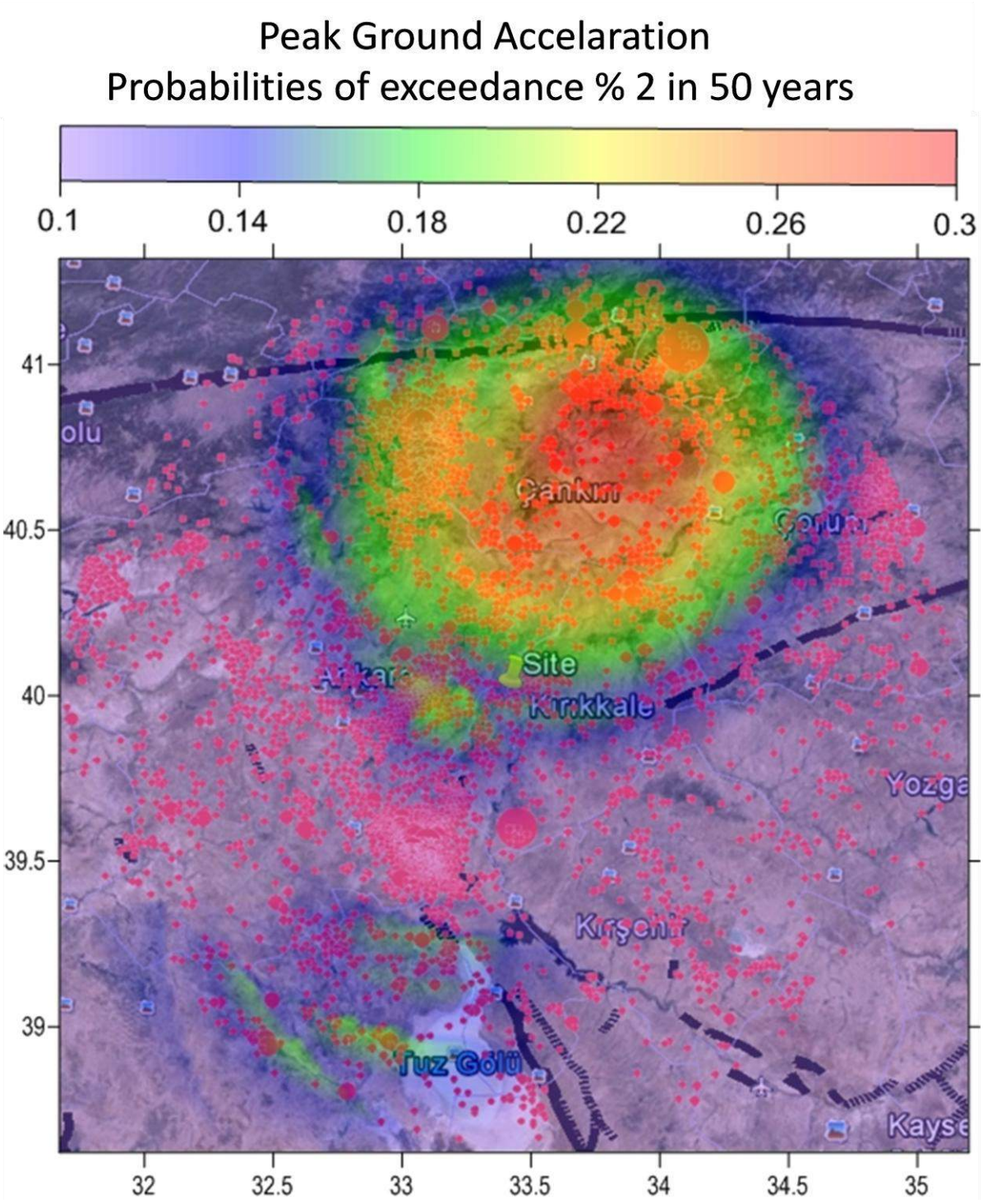


Figure 5A: *Earthquake Hazard Map (PGA).*

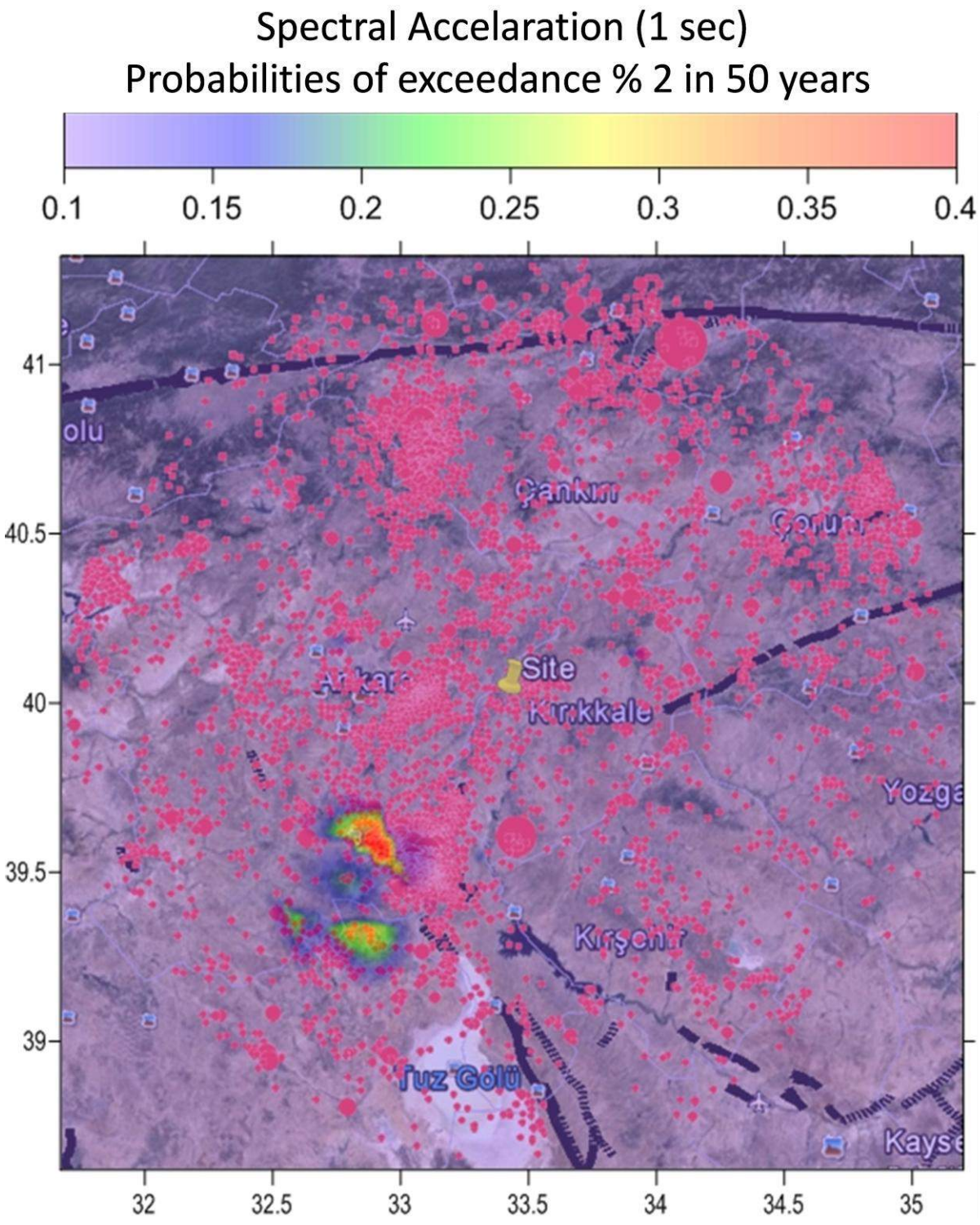


Figure 5C: *Earthquake Hazard Maps (SA=1sn)*

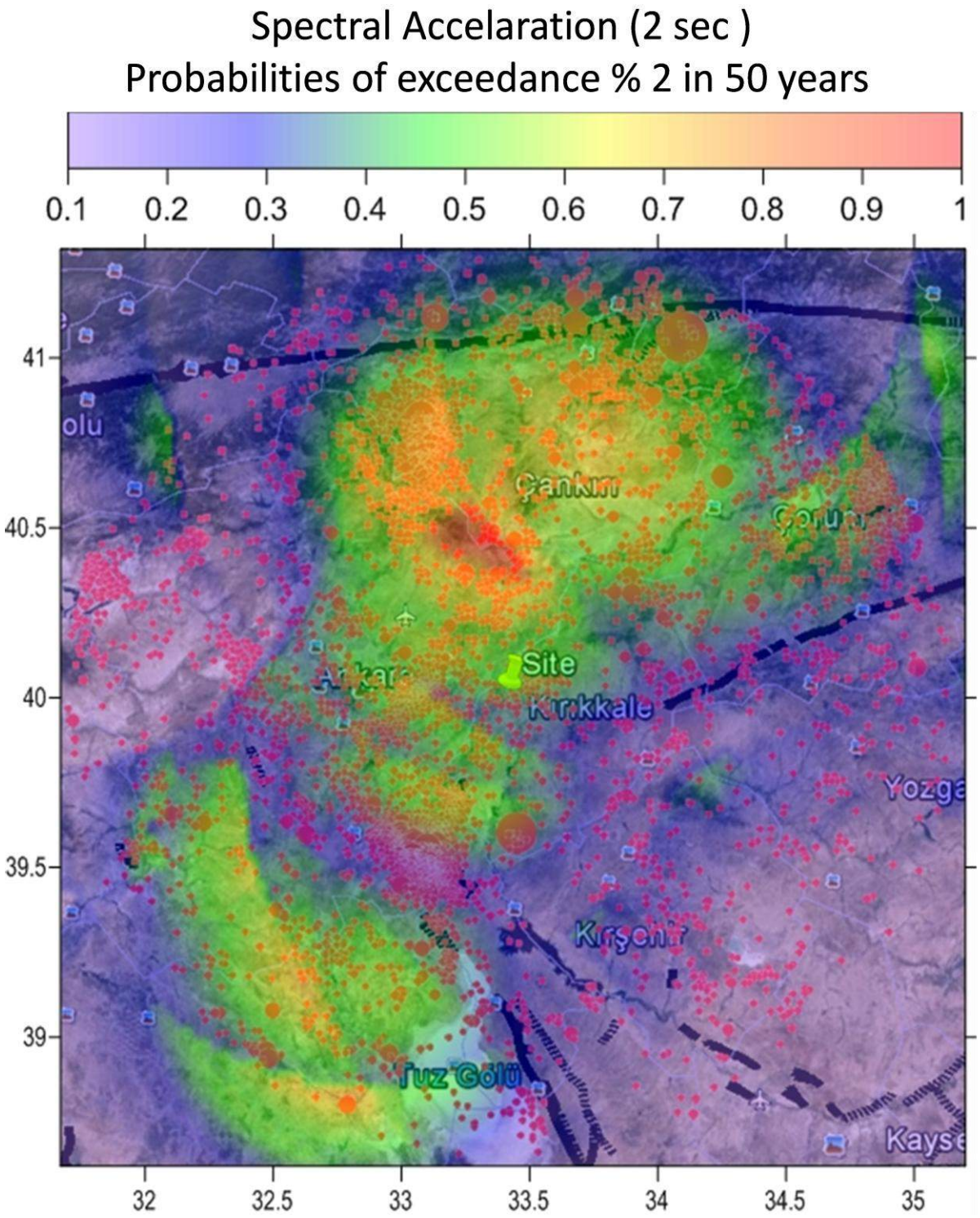


Figure 5B: *Earthquake Hazard Map (SA=2 sn).*

IV. CONCLUSION AND SUGGESTIONS

This study is of the Kırıkkale Province, Yahsihan County, Kılıçdere District I30-b-14-A-1-c, I30-B-14-a-1-D, I30-b-14-A-2-d, I30-b-14-a-3-a, I30-B-14-a-4-a, I30-b-14-A-4-b in the drawing sheets, Ada Parcel Number 108: 1, Islands 109 Parcel Number 1 and 2 sites Main Geological-Geotechnical Investigation Report zoning Plan was prepared to form a base for the preparation of Earthquake Hazard Analysis Report.

Seismic studies in the project area provided the ground state mainly in relation to a ground of the A-B class while a very small part of the area were found to be associated with a ground of C class. One of the ground acceleration attenuation relationships which found to be compatible with the comparison after the earthquakes between measured and estimated values. The regional expected largest earthquake - based on long-term historical and instrumental data - is calculated Mw = 7.2 ± 0.3 in the region which determined in a distance 150 km from the center of the project area.

The maximum expected earthquake Mw = 7.3 for earthquake hazard calculations was taken as an earthquake focal depth 10 km and the maximum diatance of 150 km. Peak Ground Acceleration (PGA) and Spectral Acceleration (T = 0.2 and T = 1.0 periods in seconds) were prepared 50% in 50 years, corresponding to the exceedance probability of 10% and 2%, respectively, for recurrence periods in years of 72, 475, and 2475. As performance-based recommendations for the design of earthquake resistant, 50-year life of the structure and the expected acceleration values corresponding to the 2% probability of exceedance should be based on the largest earthquake.

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SADIGH, K., CHANG, C.-Y., ABRAHAMSON, N. A., CHIOU, S. J. and POWER, M. S. 1993. Specification of long-period ground motions: Updated attenuation relationships for rock site conditions and adjustment factors for near-fault effects. Pages 59-70 of: Proceedings of ATC-17-1 Seminar on Seismic Isolation, Passive Energy Dissipation, and Active Control.

ANNEX 6
ENVIRONMENTAL ANALYSIS RESULTS

GROUNDWATER ANAYLSIS REPORT

SEGAL

SEGAL ÇEVRE ÖLÇÜM ve ANALİZ LABORATUARI

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web: www.segalanaliz.com

www.segal.com.tr

TÜRKAK

Report No
R-6228/13

Report Date
13.06.2013

Customer Name / Address	ACWA Power Electricity Operation and Management Inc. Co. Kılıçlar Beldesi Yahşiyan / KIRIKKALE
Sampler Institution / Company	SEGAL Çevre Ölçüm ve Analiz Laboratuarı (Furkan S. ÇELİK)
Name and Sampling Date of the Sample	Groundwater (N-6159/13) – 07.06.2013
Receipt of the Sample Shape	Instant
Deliverer of the Sample	Furkan S. ÇELİK (SEGAL personel)
Name and Number of the Project	P-3470/13
Date of Sample Acceptance	07.06.2013
Delivery Conditions of the Sample	Based on TS EN ISO 5667-3:2007 standard plastic and glass container in cool medium with chemical protective and sealed container was used.
Remarks	Analysis of samples according to Management of Surface Water Quality Regulation Table 5 for "ACWA Power Kırıkkale Natural Gas Combined Cycle" project
Date of the Test	07.06.2013 – 12.06.2013
Number of the Pages of the Report	3 pages

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirm by
Emine Aslı AYAN	Fevzi KARAKAYA
Chemist Ms.	Laboratory Manager

Sample Name and Number: Groundwater – N-6160/13

Parameter-Unit		**Test Result**	**Management of Surface Water Quality Regulation Table 5**			
			Water Quality Classes			
			I	**II**	**III**	**IV**
Temperature (°C)		16,1	≤25	≤ 25	≤ 30	> 30
pH		7,85	6,5-8,5	6,5-8,5	6,0-9,0	6,0-9,0 dışında
Conductivity (µS/cm)		592	< 400	400-1000	1001-3000	> 3000
Color (RES)	RES 436 nm	<0,5	1,5	3	4,3	5
	RES 525 nm	<0,5	1,2	2,4	3,7	4,2
	RES 620 nm	<0,5	0,8	1,7	2,5	2,8

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Dissolved Oxygen (mg/L)	8,6	> 8	6-8	3-6	< 3
Oxygen Saturation (%)[a]	98,7	90	70-90	40-70	< 40
Chemical Oxygen Demand (mg/L)	<10	< 25	25-50	50-70	> 70
Biological Oxygen Demand (mg/L)	<4	< 4	4-8	8-20	> 20
Amonium Nitrogen (mg/L)	<0,1	< 0,2[b]	0,2-1[b]	1-2[b]	> 2
Nitrite Nitrogen (mg/L)	0,005	< 0,002	0,002-0,01	0,01-0,05	> 0,05
Nitrate Nitrogen (mg/L)	2,8	< 5	5-10	10-20	> 20
Total Kjeldahl Nitrogen (mg/L)	0,35	0.5	1.5	5	> 5
Total Phosphorus (mg/L)	<0,01	< 0,03	0,03-0,16	0,16-0,65	> 0,65
Mercury (µg/L)	<0,5	< 0,1	0,1-0,5	0,5-2	> 2
***Cadmium (µg/L)	<1	≤ 2	2-5	5-7	> 7
***Lead (µg/L)	5,4	≤10	10-20	20-50	> 50
***Cupper (µg/L)	<2	≤20	20-50	50-200	> 200
***Nickel (µg/L)	<5	≤20	20-50	50-200	> 200
***Zinc (µg/L)	<1	≤200	200-500	500-2000	> 2000
Fecal Coliform (KOB/100mL)	120	≤10	10-200	200-2000	> 2000
Total Coliform (KOB/100 mL)	2500	≤100	100-20000	20000-100000	> 100000

(a) Ensuring only one of the parameters of concentration or saturation percent is sufficient.

(b) Depending on pH value of free ammonia nitrogen concentration 0.02 mg NH_3^-N/L value should not exceed. Parameters marked with *** are within the scope of Ministry of Environment and Urbanization but not authority of accreditation institution.

Parameter-Unit	Uncertainties	Test Method
Temperature (^oC)	± 0,3	SM 2550 B
pH	% ± 1,10	TS 3263 ISO 10523
Conductivity (µS/cm)	% ± 2,77	TS 9748 EN 27888
Color (RES)	% ± 8,30	TS 6392 EN ISO 7887
Dissolved Oxygen (mg/L)	% ± 0,80	TS 5677 EN 25814
Oxygen Saturation (%)[a]	% ± 0,80	TS 5677 EN 25814
Chemical Oxygen Demand (mg/L)	% ± 3,10	SM 5220 B
Biological Oxygen Demand (mg/L)	% ± 3,34	SM 5210 B
Amonium Nitrogen (mg/L)	% ± 5,38	SM 4500 NH_3 B-C

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Nitrite Nitrogen (mg/L)	% ± 6,00	SM 4500 NO_2 B
Nitrate Nitrogen (mg/L)	% ± 6,16	EPA METHOD 352-1
Total Kjeldahl Nitrogen (mg/L)	% ± 3,40	SM 4500 N_{org} B
Total Phosphorus (mg/L)	% ± 6,62	SM 4500 P B E
Mercury (µg/L)	% ± 6,84	SM 3112 B
***Cadmium (µg/L)	% ± 2,35	EPA 200.7
***Lead (µg/L)	% ± 2,85	EPA 200.7
***Cupper (µg/L)	% ± 4,75	EPA 200.7
***Nickel (µg/L)	% ± 1,87	EPA 200.7
***Zinc (µg/L)	% ± 3,41	EPA 200.7
Fecal Coliform (KOB/100mL)	% ± 13,50	TS EN ISO 9308-1
Total Coliform (KOB/100 mL)	% ± 9,48	TS EN ISO 9308-1

"Samples are preserved based on *TS EN ISO 5667-3:2007* – Water Quality – Sampling – Section 3: Samples are preserved under the rules of Sample Preserving and Carrying Rules. During this period, samples which are hazardous or chemically, microbiolgically or physically decaying are disposed without waiting proposed waiting duration."

Environment Conditions:

Wheather		***Open***	***Rain***		***Yes***	***Temperature ºC***	***Coordinates***	***E***	534801
		Close			***No***			***N***	4415463

Opinions and Comments:

Seal

Signature

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TÜRKAK

Report No
R-6227/13

Report Date
13.06.2013

Customer Name / Address	ACWA Power Electricity Operation and Management Inc. Co. Kılıçlar Beldesi Yahşiyan / KIRIKKALE
Sampler Institution / Company	SEGAL Çevre Ölçüm ve Analiz Laboratuarı (Furkan S. ÇELİK)
Name and Sampling Date of the Sample	Groundwater (N-6159/13) – 07.06.2013
Receipt of the Sample Shape	Instant
Deliverer of the Sample	Furkan S. ÇELİK (SEGAL personel)
Name and Number of the Project	P-3470/13
Date of Sample Acceptance	07.06.2013
Delivery Conditions of the Sample	Based on TS EN ISO 5667-3:2007 standard plastic and glass container in cool medium with chemical protective and sealed container was used.
Remarks	Analysis of samples according to Management of Surface Water Quality Regulation Table 5 for "ACWA Power Kırıkkale Natural Gas Combined Cycle" project
Date of the Test	07.06.2013 – 12.06.2013
Number of the Pages of the Report	3 pages

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirm by
Emine Aslı AYAN	Fevzi KARAKAYA
Chemist Ms.	Laboratory Manager

Sample Name and Number: Groundwater – N-6159/13

Parameter-Unit		**Test Result**	**Management of Surface Water Quality Regulation Table 5**			
			Water Quality Classes			
			I	**II**	**III**	**IV**
Temperature (^{o}C)		15	≤25	≤ 25	≤ 30	> 30
pH		8,45	6,5-8,5	6,5-8,5	6,0-9,0	6,0-9,0 dışında
Conductivity (µS/cm)		314	< 400	400-1000	1001-3000	> 3000
Color (RES)	RES 436 nm	<0,5	1,5	3	4,3	5
	RES 525 nm	<0,5	1,2	2,4	3,7	4,2
	RES 620 nm	<0,5	0,8	1,7	2,5	2,8

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Dissolved Oxygen (mg/L)	8,5	> 8	6-8	3-6	< 3
Oxygen Saturation (%)[a]	97,6	90	70-90	40-70	< 40
Chemical Oxygen Demand (mg/L)	<10	< 25	25-50	50-70	> 70
Biological Oxygen Demand (mg/L)	<4	< 4	4-8	8-20	> 20
Amonium Nitrogen (mg/L)	<0,1	< 0,2[b]	0,2-1[b]	1-2[b]	> 2
Nitrite Nitrogen (mg/L)	0,003	< 0,002	0,002-0,01	0,01-0,05	> 0,05
Nitrate Nitrogen (mg/L)	2,3	< 5	5-10	10-20	> 20
Total Kjeldahl Nitrogen (mg/L)	0,31	0.5	1.5	5	> 5
Total Phosphorus (mg/L)	<0,01	< 0,03	0,03-0,16	0,16-0,65	> 0,65
Mercury (µg/L)	<0,5	< 0,1	0,1-0,5	0,5-2	> 2
***Cadmium (µg/L)	<1	≤ 2	2-5	5-7	> 7
***Lead (µg/L)	5,8	≤10	10-20	20-50	> 50
***Cupper (µg/L)	<2	≤20	20-50	50-200	> 200
***Nickel (µg/L)	<5	≤20	20-50	50-200	> 200
***Zinc (µg/L)	<1	≤200	200-500	500-2000	> 2000
Fecal Coliform (KOB/100mL)	100	≤10	10-200	200-2000	> 2000
Total Coliform (KOB/100 mL)	2000	≤100	100-20000	20000-100000	> 100000

(a) Ensuring only one of the parameters of concentration or saturation percent is sufficient.

(b) Depending on pH value of free ammonia nitrogen concentration 0.02 mg NH_3^-N/L value should not exceed. Parameters marked with *** are within the scope of Ministry of Environment and Urbanization but not authority of accreditation institution.

Parameter-Unit	Uncertainties	Test Method
Temperature (^oC)	± 0,3	SM 2550 B
pH	% ± 1,10	TS 3263 ISO 10523
Conductivity (µS/cm)	% ± 2,77	TS 9748 EN 27888
Color (RES)	% ± 8,30	TS 6392 EN ISO 7887
Dissolved Oxygen (mg/L)	% ± 0,80	TS 5677 EN 25814
Oxygen Saturation (%)[a]	% ± 0,80	TS 5677 EN 25814
Chemical Oxygen Demand (mg/L)	% ± 3,10	SM 5220 B
Biological Oxygen Demand (mg/L)	% ± 3,34	SM 5210 B
Amonium Nitrogen (mg/L)	% ± 5,38	SM 4500 NH_3 B-C
Nitrite Nitrogen (mg/L)	% ± 6,00	SM 4500 NO_2 B
Nitrate Nitrogen (mg/L)	% ± 6,16	EPA METHOD 352-1
Total Kjeldahl Nitrogen (mg/L)	% ± 3,40	SM 4500 N_{org} B

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Total Phosphorus (mg/L)	% ± 6,62	SM 4500 P B E
Mercury (µg/L)	% ± 6,84	SM 3112 B
***Cadmium (µg/L)	% ± 2,35	EPA 200.7
***Lead (µg/L)	% ± 2,85	EPA 200.7
***Cupper (µg/L)	% ± 4,75	EPA 200.7
***Nickel (µg/L)	% ± 1,87	EPA 200.7
***Zinc (µg/L)	% ± 3,41	EPA 200.7
Fecal Coliform (KOB/100mL)	% ± 13,50	TS EN ISO 9308-1
Total Coliform (KOB/100 mL)	% ± 9,48	TS EN ISO 9308-1

"Samples are preserved based on *TS EN ISO 5667-3:2007* – Water Quality – Sampling – Section 3: Samples are preserved under the rules of Sample Preserving and Carrying Rules. During this period, samples which are hazardous or chemically, microbiolgically or physically decaying are disposed without waiting proposed waiting duration."

Environment Conditions:

Wheather		***Open***	***Rain***		***Yes***	***Temperature ºC***	***Coordinates***	***E***	535420
		Close			***No***			***N***	4414012

Opinions and Comments:

Seal

Signature

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SURFACE WATER ANALYSIS REPORT

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TÜRKAK Test TS EN ISO/IEC 17025 AD-0429-T

Report No
R-5953/13

Report Date
21.05.2013

Customer Name / Address	ACWA Power Electricity Operation and Management Inc. Co. Kılıçlar Beldesi Yahşiyan / KIRIKKALE
Sampler Institution / Company	SEGAL Çevre Ölçüm ve Analiz Laboratuarı (Furkan S. ÇELİK)
Name and Sampling Date of the Sample	Surface Water (N-5825/13) – 14.05.2013
Receipt of the Sample Shape	Instant
Deliverer of the Sample	Furkan S. ÇELİK (SEGAL personel)
Name and Number of the Project	P-3307/13
Date of Sample Acceptance	14.05.2013
Delivery Conditions of the Sample	Based on TS EN ISO 5667-3:2007 standard plastic and glass container in cool medium with chemical protective and sealed container was used.
Remarks	Analysis of samples according to Management of Surface Water Quality Regulation Table 5 for "ACWA Power Kırıkkale Natural Gas Combined Cycle" project
Date of the Test	14.05.2013 – 20.05.2013
Number of the Pages of the Report	3 pages

"This report cannot be used for environmental legislation works"

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirm by
Emine Aslı AYAN	Fevzi KARAKAYA
Chemist Ms.	Laboratory Manager

Sample Name and Number: Surface Water – N-5825/13

Parameter-Unit		**Test Result**	**Management of Surface Water Quality Regulation Table 5**			
			Water Quality Classes			
			I	**II**	**III**	**IV**
Temperature (^{o}C)		20,1	≤25	≤ 25	≤ 30	> 30
pH		7,24	6,5-8,5	6,5-8,5	6,0-9,0	6,0-9,0 dışında
Conductivity (µS/cm)		1505	< 400	400-1000	1001-3000	> 3000
Color (RES)	RES 436 nm	3,4	1,5	3	4,3	5
	RES 525 nm	<0,5	1,2	2,4	3,7	4,2

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	RES 620 nm	<0,5	0,8	1,7	2,5	2,8
Dissolved Oxygen (mg/L)		7,36	> 8	6-8	3-6	< 3
Oxygen Saturation (%)[a]		85,1	90	70-90	40-70	< 40
Chemical Oxygen Demand (mg/L)		<10	< 25	25-50	50-70	> 70
Biological Oxygen Demand (mg/L)		<4	< 4	4-8	8-20	> 20
Amonium Nitrogen (mg/L)		<0,1	< 0,2[b]	0,2-1[b]	1-2[b]	> 2
Nitrite Nitrogen (mg/L)		0,043	< 0,002	0,002-0,01	0,01-0,05	> 0,05
Nitrate Nitrogen (mg/L)		1,0	< 5	5-10	10-20	> 20
Total Kjeldahl Nitrogen (mg/L)		0,88	0.5	1.5	5	> 5
Total Phosphorus (mg/L)		0,046	< 0,03	0,03-0,16	0,16-0,65	> 0,65
Mercury (µg/L)		<0,5	< 0,1	0,1-0,5	0,5-2	> 2
***Cadmium (µg/L)		<1	≤ 2	2-5	5-7	> 7
***Lead (µg/L)		<5	≤10	10-20	20-50	> 50
***Cupper (µg/L)		3	≤20	20-50	50-200	> 200
***Nickel (µg/L)		<5	≤20	20-50	50-200	> 200
***Zinc (µg/L)		<1	≤200	200-500	500-2000	> 2000
Fecal Coliform (KOB/100mL)		120	≤10	10-200	200-2000	> 2000
Total Coliform (KOB/100 mL)		2500	≤100	100-20000	20000-100000	> 100000

(a) Ensuring only one of the parameters of concentration or saturation percent is sufficient.
(b) Depending on pH value of free ammonia nitrogen concentration 0.02 mg NH_3^-N/L value should not exceed. Parameters marked with *** are within the scope of Ministry of Environment and Urbanization but not authority of accreditation institution.

Parameter-Unit	Uncertainties	Test Method
Temperature (^oC)	± 0,3	SM 2550 B
pH	% ± 1,10	TS 3263 ISO 10523
Conductivity (µS/cm)	% ± 2,77	TS 9748 EN 27888
Color (RES)	% ± 8,30	TS 6392 EN ISO 7887
Dissolved Oxygen (mg/L)	% ± 0,80	TS 5677 EN 25814
Oxygen Saturation (%)[a]	% ± 0,80	TS 5677 EN 25814
Chemical Oxygen Demand (mg/L)	% ± 3,10	SM 5220 B
Biological Oxygen Demand (mg/L)	% ± 3,34	SM 5210 B
Amonium Nitrogen (mg/L)	% ± 5,38	SM 4500 NH_3 B-C
Nitrite Nitrogen (mg/L)	% ± 6,00	SM 4500 NO_2 B
Nitrate Nitrogen (mg/L)	% ± 6,16	EPA METHOD 352-1

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Total Kjeldahl Nitrogen (mg/L)	% ± 3,40	SM 4500 N_{org} B
Total Phosphorus (mg/L)	% ± 6,62	SM 4500 P B E
Mercury (µg/L)	% ± 6,84	SM 3112 B
***Cadmium (µg/L)	% ± 2,35	EPA 200.7
***Lead (µg/L)	% ± 2,85	EPA 200.7
***Cupper (µg/L)	% ± 4,75	EPA 200.7
***Nickel (µg/L)	% ± 1,87	EPA 200.7
***Zinc (µg/L)	% ± 3,41	EPA 200.7
Fecal Coliform (KOB/100mL)	% ± 13,50	TS EN ISO 9308-1
Total Coliform (KOB/100 mL)	% ± 9,48	TS EN ISO 9308-1

"Samples are preserved based on *TS EN ISO 5667-3:2007* – Water Quality – Sampling – Section 3: Samples are preserved under the rules of Sample Preserving and Carrying Rules. During this period, samples which are hazardous or chemically, microbiolgically or physically decaying are disposed without waiting proposed waiting duration."

Environment Conditions:

Wheather		***Open***	***Rain***		***Yes***	***Temperature ºC***	***Coordinates***	***E***	535420
		Close			***No***			***N***	4414012

Opinions and Comments:

Seal

Signature

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TÜRKAK Test TS EN ISO/IEC 17025 AD-0429-T

Report No
R-5954/13

Report Date
21.05.2013

Customer Name / Address	ACWA Power Electricity Operation and Management Inc. Co. Kılıçlar Beldesi Yahşiyan / KIRIKKALE
Sampler Institution / Company	SEGAL Çevre Ölçüm ve Analiz Laboratuarı (Furkan S. ÇELİK)
Name and Sampling Date of the Sample	Surface Water (N-5825/13) – 14.05.2013
Receipt of the Sample Shape	Instant
Deliverer of the Sample	Furkan S. ÇELİK (SEGAL personel)
Name and Number of the Project	P-3307/13
Date of Sample Acceptance	14.05.2013
Delivery Conditions of the Sample	Based on TS EN ISO 5667-3:2007 standard plastic and glass container in cool medium with chemical protective and sealed container was used.
Remarks	Analysis of samples according to Management of Surface Water Quality Regulation Table 5 for "ACWA Power Kırıkkale Natural Gas Combined Cycle" project
Date of the Test	14.05.2013 – 20.05.2013
Number of the Pages of the Report	3 pages

"This report can not be used for environmental legislation works"

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirm by
Emine Aslı AYAN	Fevzi KARAKAYA
Chemist Ms.	Laboratory Manager

Sample Name and Number: Surface Water – N-5824/13

Parameter-Unit		**Test Result**	**Management of Surface Water Quality Regulation Table 5**			
			Water Quality Classes			
			I			**I**
Temperature (^{o}C)		20,5	≤25	≤ 25	≤ 30	> 30
pH		7,17	6,5-8,5	6,5-8,5	6,0-9,0	6,0-9,0 dışında
Conductivity (µS/cm)		1499	< 400	400-1000	1001-3000	> 3000
Color (RES)	RES 436 nm	3,3	1,5	3	4,3	5
	RES 525 nm	<0,5	1,2	2,4	3,7	4,2

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	RES 620 nm	<0,5	0,8	1,7	2,5	2,8
Dissolved Oxygen (mg/L)		7,49	> 8	6-8	3-6	< 3
Oxygen Saturation (%)[a]		86	90	70-90	40-70	< 40
Chemical Oxygen Demand (mg/L)		<10	< 25	25-50	50-70	> 70
Biological Oxygen Demand (mg/L)		<4	< 4	4-8	8-20	> 20
Amonium Nitrogen (mg/L)		<0,1	< 0,2[b]	0,2-1[b]	1-2[b]	> 2
Nitrite Nitrogen (mg/L)		0,076	< 0,002	0,002-0,01	0,01-0,05	> 0,05
Nitrate Nitrogen (mg/L)		0,91	< 5	5-10	10-20	> 20
Total Kjeldahl Nitrogen (mg/L)		0,72	0.5	1.5	5	> 5
Total Phosphorus (mg/L)		0,042	< 0,03	0,03-0,16	0,16-0,65	> 0,65
Mercury (µg/L)		<0,5	< 0,1	0,1-0,5	0,5-2	> 2
***Cadmium (µg/L)		<1	≤ 2	2-5	5-7	> 7
***Lead (µg/L)		<5	≤10	10-20	20-50	> 50
***Cupper (µg/L)		2,9	≤20	20-50	50-200	> 200
***Nickel (µg/L)		<5	≤20	20-50	50-200	> 200
***Zinc (µg/L)		1,1	≤200	200-500	500-2000	> 2000
Fecal Coliform (KOB/100mL)		150	≤10	10-200	200-2000	> 2000
Total Coliform (KOB/100 mL)		2400	≤100	100-20000	20000-100000	> 100000

(a) Ensuring only one of the parameters of concentration or saturation percent is sufficient.
(b) Depending on pH value of free ammonia nitrogen concentration 0.02 mg NH_3^-N/L value should not exceed. Parameters marked with *** are within the scope of Ministry of Environment and Urbanization but not authority of accreditation institution.

Parameter-Unit	Uncertainties	Test Method
Temperature (^oC)	± 0,3	SM 2550 B
pH	% ± 1,10	TS 3263 ISO 10523
Conductivity (µS/cm)	% ± 2,77	TS 9748 EN 27888
Color (RES)	% ± 8,30	TS 6392 EN ISO 7887
Dissolved Oxygen (mg/L)	% ± 0,80	TS 5677 EN 25814
Oxygen Saturation (%)[a]	% ± 0,80	TS 5677 EN 25814
Chemical Oxygen Demand (mg/L)	% ± 3,10	SM 5220 B
Biological Oxygen Demand (mg/L)	% ± 3,34	SM 5210 B
Amonium Nitrogen (mg/L)	% ± 5,38	SM 4500 NH_3 B-C
Nitrite Nitrogen (mg/L)	% ± 6,00	SM 4500 NO_2 B
Nitrate Nitrogen (mg/L)	% ± 6,16	EPA METHOD 352-1

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TÜRKAK

Report No
R-5954/13

Report Date
21.05.2013

Total Kjeldahl Nitrogen (mg/L)	% ± 3,40	SM 4500 N_{org} B
Total Phosphorus (mg/L)	% ± 6,62	SM 4500 P B E
Mercury (µg/L)	% ± 6,84	SM 3112 B
***Cadmium (µg/L)	% ± 2,35	EPA 200.7
***Lead (µg/L)	% ± 2,85	EPA 200.7
***Cupper (µg/L)	% ± 4,75	EPA 200.7
***Nickel (µg/L)	% ± 1,87	EPA 200.7
***Zinc (µg/L)	% ± 3,41	EPA 200.7
Fecal Coliform (KOB/100mL)	% ± 13,50	TS EN ISO 9308-1
Total Coliform (KOB/100 mL)	% ± 9,48	TS EN ISO 9308-1

"Samples are preserved based on *TS EN ISO 5667-3:2007* – Water Quality – Sampling – Section 3: Samples are preserved under the rules of Sample Preserving and Carrying Rules. During this period, samples which are hazardous or chemically, microbiolgically or physically decaying are disposed without waiting proposed waiting duration."

Environment Conditions:

Wheather		***Open***	***Rain***		***Yes***	***Temperature ºC***	***Coordinates***	***E***	534801
		Close			***No***			***N***	4415463

Opinions and Comments:

Seal

Signature

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SOİL SAMPLE ANALYSIS REPORT

BA-SER
SU VE TARIMSAL ANALİZ LABORATUVARI
Erciyes İşyerleri Sitesi 198. Cad. No: 20 Macunköy
Yenimahalle/ANKARA

SOIL ANALYSIS REPORT

Customer Name: ACWA Power Electricity Operation and Management Inc. Co.
Address: Kılıçlar Beldesi Yahşiyan / KIRIKKALE

Laboratory No: 3147-3148-3149

Report No: 45-45-46

Sample Arrival Date: 16.05.2013

Sample Report Date: 21.05.2013

Page Number: 4

Explanation of Methods:

1- TS 8333 Soil- Determination of Water Saturation (İşba%)
2- TS 8334 Soil- Determination of Total Salt (Salt%)
3- TS 8336 Soil - Determination of Organic Content
4- TS 8340 Soil – Determination of Phosphorus (Olsen and Ark Method)
5- TS 8341 Soil- Determination of Potassium (Ammonium Acetate Method)
6- TS 8332 ISO 10390 Soil Quaility- Determination of pH
7- TS 8335 ISO 10693 Soil Quality- Determination of Carbonate Content- Volumetric (lime%)

Calibration Instruments

Name	Brand	Model	Serial No
ICP	Perkinermer	Optimo 7000 DV	800908140
pH meter	Jenway	3510	5782
EC meter	Jenway	4510	3582
Calsimeter		Scheibler	
Spectrophotometer	Visible	T60	5-1610-01-0219
Mixing Instrument	N. Bioter	NB-101-BC	9101MC102
Sensitive Scales	Presica	XB	2801989
Rough Scales	Presica	BJ 1000 C	1650405

Seal Date Laboratory Manager

BA-SER
Su ve Tarımsal Analiz Laboratuvarı

Date: 21.05.2013

Report No:44

Lab No: 3147

Soil Analysis Report

Sampling Location		Results		Evaluation
Province	Kırıkkale	İsba%	48	Tın
District	Yahşihan	pH	8.10	Low alkali
Village	Kılıçlar	Lime %	10.35	Medium lime
Location		Salt %	0.010	Salt free
Depth	0-30	Phosphate (per kg)	2.63	Slight
Coordinates	E: 534548 N:4414590	Organic Matter %	0.70	Slight
Plant		Potassium	69.82	Sufficient
		Area		
Customer	ACWA Power	Parcel No	Sample no 1	

Sample was taken by us.

Our laboratory was authorized by governorship approval from Food Agriculture Livestock Province Directorate in order to make soil analysis.

Date: 21.05.2013

Report No:45

Lab No: 3148

Soil Analysis Report

Sampling Location		Results		Evaluation
Province	Kırıkkale	İsba%	48	Tın
District	Yahşihan	pH	8.02	Low alkali
Village	Kılıçlar	Lime %	5.96	Medium lime
Location		Salt %	0.009	Salt free
Depth	0-30	Phosphate (per kg)	2.86	Slight
Coordinates	E: 535213 N:4415266	Organic Matter %	0.54	Slight
Plant		Potassium	90.54	Sufficient
		Area		
Customer	ACWA Power	Parcel No	Sample no 2	

Sample was taken by us.

Our laboratory was authorized by governorship approval from Food Agriculture Livestock Province Directorate in order to make soil analysis.

BA-SER
Su ve Tarımsal Analiz Laboratuvarı

Date: 21.05.2013

Report No:46

Lab No: 3149

Soil Analysis Report

Sampling Location		Results		Evaluation
Province	Kırıkkale	İsba%	47	Tın
District	Yahşihan	pH	7.96	Low alkali
Village	Kılıçlar	Lime %	15.89	High lime
Location		Salt %	0.014	Salt free
Depth	0-30	Phosphate (per kg)	3.32	Low
Coordinates	E: 534548 N:4414590	Organic Matter %	0.60	Slight
Plant		Potassium	46.37	Sufficient
		Area		
Customer	ACWA Power	Parcel No	Sample no 3	

Sample was taken by us.

Our laboratory was authorized by governorship approval from Food Agriculture Livestock Province Directorate in order to make soil analysis.

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0429-T

Report No
R-5975/13

Report Date
23.05.2013

Customer Name / Address	ACWA Power Electricity Operation and Management Inc. Co. Kılıçlar Beldesi Yahşiyan / KIRIKKALE
Sampler Institution / Company	SEGAL Çevre Ölçüm ve Analiz Laboratuarı (Furkan S. ÇELİK)
Name and Sampling Date of the Sample	Soil (N-5827/13) – 14.05.2013
Receipt of the Sample Shape	Instant
Deliverer of the Sample	Furkan S. ÇELİK (SEGAL personel)
Name and Number of the Project	P-3307/13
Date of Sample Acceptance	14.05.2013
Delivery Conditions of the Sample	Sealed plastic container
Remarks	Analysis of soil for"ACWA Power Kırıkkale Natural Gas Combined Cycle" project
Date of the Test	14.05.2013 – 20.05.2013
Number of the Pages of the Report	6 pages (2 pages of EKOSISTEM Çevre Laboratuarı report, 2 pages ESÇEM Çevre Laboratuarı report)

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by

Emine Aslı AYAN
Chemist Ms.

Prepared by

Emine Aslı AYAN
Chemist Ms.

Sample Name and Number: Soil – N-5827/13

Parameter-Unit	Test Result	Test Method
***Antimon (mg/kg)	<1,25	EPA 3051 A, EPA 200.7
***Arsenic (mg/kg)	27	EPA 3051 A, EPA 200.7
***Copper (mg/kg)	40	EPA 3051 A, EPA 200.7
***Barium (mg/kg)	145	EPA 3051 A, EPA 200.7
***Bor (mg/kg)	78,5	EPA 3051 A, EPA 200.7
Mercury (mg/kg)	6,5	EPA 3051 A, SM 3112 B
***Zinc (mg/kg)	73	EPA 3051 A, EPA 200.7
***Kadmium (mg/kg)	2,1	EPA 3051 A, EPA 200.7
***Krom (mg/kg)	75	EPA 3051 A, EPA 200.7
***Lead (mg/kg)	30	EPA 3051 A, EPA 200.7

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***Molibden (mg/kg)	<2,5	EPA 3051 A, EPA 200.7
***Selenium (mg/kg)	<1,25	EPA 3051 A, EPA 200.7
***[1] Total Petroleum Hydrocarbons (mg/kg)	3,8	TS EN 14039
* TOX (mg/kg)	127,38	EPA 9023

*** signed parameters are within the scope of Ministry of Environment and Urbanization but not authority of accreditation institution.
***[1] sgined parameters are out of acrediation scope so that these analysis were performed by “Ekosistem Çevre Laboratuarı”
* signed parameter was performed by “Esçem Çevre Laboratuarı” in the scope of authorization of the Ministry.

Environment Conditions:

Wheather		***Open***	***Rain***		***Yes***	***Temperature ºC***	***Coordinates***	***E***	535061
		Close			***No***			***N***	4415385

Opinions and Comments:

Seal

Signature

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TÜRKAK Test TS EN ISO/IEC 17025 AB-0423-T

Report No R-5974/13

Report Date 23.05.2013

Customer Name / Address	ACWA Power Electricity Operation and Management Inc. Co. Kılıçlar Beldesi Yahşiyan / KIRIKKALE
Sampler Institution / Company	SEGAL Çevre Ölçüm ve Analiz Laboratuarı (Furkan S. ÇELİK)
Name and Sampling Date of the Sample	Soil (N-5826/13) – 14.05.2013
Receipt of the Sample Shape	Instant
Deliverer of the Sample	Furkan S. ÇELİK (SEGAL personel)
Name and Number of the Project	P-3307/13
Date of Sample Acceptance	14.05.2013
Delivery Conditions of the Sample	Sealed plastic container
Remarks	Analysis of soil for"ACWA Power Kırıkkale Natural Gas Combined Cycle" project
Date of the Test	14.05.2013 – 20.05.2013
Number of the Pages of the Report	6 pages (2 pages of EKOSISTEM Çevre Laboratuarı report, 2 pages ESÇEM Çevre Laboratuarı report)

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirmed by
Emine Aslı AYAN Chemist Ms.	Fevzi KARAKAYA Laboratory Manager

Sample Name and Number: Soil – N-5826/13

Parameter-Unit	Test Result	Test Method
***Antimon (mg/kg)	<1,25	EPA 3051 A, EPA 200.7
***Arsenic (mg/kg)	19,5	EPA 3051 A, EPA 200.7
***Copper (mg/kg)	32,5	EPA 3051 A, EPA 200.7
***Barium (mg/kg)	155	EPA 3051 A, EPA 200.7
***Bor (mg/kg)	49,5	EPA 3051 A, EPA 200.7
Mercury (mg/kg)	6,0	EPA 3051 A, SM 3112 B
***Zinc (mg/kg)	52,5	EPA 3051 A, EPA 200.7
***Kadmium (mg/kg)	2,05	EPA 3051 A, EPA 200.7
***Krom (mg/kg)	91,5	EPA 3051 A, EPA 200.7

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***Lead (mg/kg)	22,5	EPA 3051 A, EPA 200.7
***Molibden (mg/kg)	<2,5	EPA 3051 A, EPA 200.7
***Selenium (mg/kg)	<1,25	EPA 3051 A, EPA 200.7
***[1] Total Petroleum Hydrocarbons (mg/kg)	2,08	TS EN 14039
* TOX (mg/kg)	280,1	EPA 9023

*** signed parameters are within the scope of Ministry of Environment and Urbanization but not authority of accreditation institution.
***[1] sgined parameters are out of acrediation scope so that these analysis were performed by “Ekosistem Çevre Laboratuarı”
* signed parameter was performed by “Esçem Çevre Laboratuarı” in the scope of authorization of the Ministry.

Environment Conditions:

Wheather		***Open***	***Rain***		***Yes***	***Temperature ºC***	***Coordinates***	***E***	534780
		Close			***No***			***N***	4415150

Opinions and Comments:

Seal

Signature

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NOISE MESAUREMENT RESULTS

SEGAL ÇEVRE ÖLÇÜM ve ANALİZ LABORATUARI
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Report No
R-6176/13

Report Date
06.06.2013

Customer Name / Address	ACWA Power Electricity Operation and Management Inc. Co. Teşvikiye Cad. Teşvikiye Palas No:23-2 Nişantaşı / İstanbul
Measurement Date	14.05.2013 – 15.05.2013
Name and Number of the Project	Background (Existing) Noise Measurement – P-3307/13
Remarks	Measurements done for EIA Report planned Natural Gas Combined Cycle Power Plant of ACWA Power Electricity Operation and Management Inc. Co.
Number of the Pages of the Report	10 pages

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirm by
Furkan S. ÇELİK Chemist Ms.	Fevzi KARAKAYA Laboratory Manager

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GENERAL INFORMATION

1- TRADE NAME

ACWA Power Electricity Operation and Management Inc. Co.

2- OPERATION ACTIVITY

ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant will be operated at Kırıkkale province Yahşihan district, Kılıçlar destination.

3- OPERATION DURATION

The power plant is at installation phase and the operation is not started yet. The background noise measurements were done at plant site and plant domain.

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INFORMATION ABOUT BACKGROUND NOISE LEVEL

1. Measurement and evaluation of noise level at the closest noise-sensitive building to plant site plant based on TS 9315 and TS 9798 (If there is no any noise-sensitive building closer than 500 m to the plant, then noise measurement will be optional, not mandatory.)

The plant will be installed at Kırıkkale province, Kılıçlar district. The closest noise-sensitive building is at Kılıçlar district and not closer than 500 m. Therefore, background noise level measurements were done at plant site and plant domain.

1.1.Determination of measurement points for background noise level (considering potential noise level calculations during plant operation or around plant site at least two points)

Measurement Points	Coordinates	
	X	Y
1	537168	4414910
2	536631	4415424
3	536733	4416293
4	535215	4413636
5	534809	4416411
6	533682	4415306
7	533682	4415306
8	531035	4414926

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Measurement Results of Background Noise Level-Daytime

Measurement Points	Structure Type	Time (Daytime)	Background Noise Level (dBA)
1	Plant site and plant domain	10.05	52,4
2		10.36	53,0
3		11.00	50,4
4		11.30	45,0
5		12.15	44,6
6		13.30	47,5
7		14.20	46,2
8		15.04	49,3

Measurement Results of Background Noise Level-Evening

Measurement Points	Structure Type	Time (Evening)	Background Noise Level (dBA)
1	Plant site and plant domain	19.04	47,8
2		19.25	47,0
3		19.46	46,6
4		20.10	41,3
5		20.30	41,6
6		21.15	44,9
7		21.32	41,2
8		21.53	46,3

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Measurement Results of Background Noise Level-Night

Measurement Points	Structure Type	Time (Night)	Background Noise Level (dBA)
1	Plant site and plant domain	23.02	45,3
2		23.21	44,9
3		23.40	43,6
4		23.58	36,9
5		00.16	37,5
6		00.56	39,0
7		01.10	38,6
8		01.28	41,0

1.2. The distance of measurement points to plant site

The closest noise-sensitive structure is at Kılıçlar district and not closer than 500 m.

1.3. The distance between measurement points

The distances between measurement points are changing 300 m to 600 m and 100 m as closest.

1.4. Measurement period (depending on noise type variying between 5-15 minutes), date, parameters and results (records if exist)

Measurements have been performed between 14.05.2013 and 15.05.2013. Measurement instrument was controlled between 94-114 dBA by "SV 30A SN: 22502 Acoustic Calibrator". Measurement were done on fast mode during 8 minutes.

Measurement results are presented at 1.1.

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Report No
R-6176/13

Report Date
06.06.2013

1.5. Measurement height

Measurements were done at open area and 3.5 m away from reflecting surface at 1.5 m height.

1.6. Measurement Methodology

Measurements were done based on TS ISO 1996-2: 2009 and TS 9315 ISO 1996-1: 2005 standards and Environmental Noise Evaluation and Management Regulation.

1.7. Information about measurement instrument (serial no, type, model and producer)

SVANTEK (Type 1), SVAN 957 Model SN: 21412.

Technical information;

Instrument records results automatically in its memory. At dark environment, its own light is used. Instrument can calculate equivalent noise level (L_{eq}), average, minimum and maximum noise levels. Uncertainty is ± 0,51%.

1.8. Calibration method, calibration levels and calibration certificate

Measurement instrument was calibrated between 94-114 dBA by “SV 30A SN: 22502 Acoustic Calibrator”. Calibration certificate is presented at Annex 4-5.

1.9. Laboratory Name (name and license)

The person that done measurement and wrote the report is Furkan S. ÇELİK.). The report was approved by Fevzi KARAKAYA. Certificates are presented at Annex 1 and Annex 2.

Laboratory license is presented at Annex 6.

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1.10. Evaluation based on 27. and 28. articles of the national regulation.

Article 27;

Measurement Points	Structure Type	Time (Daytime)	Background Noise Level (dBA)	Category
1	Plant site and plant domain	10.05	52,4	A
2		10.36	53,0	A
3		11.00	50,4	A
4		11.30	45,0	A
5		12.15	44,6	A
6		13.30	47,5	A
7		14.20	46,2	A
8		15.04	49,3	A

Measurement Points	Structure Type	Time (Evening)	Background Noise Level (dBA)	Category
1	Plant site and plant domain	19.04	47,8	A
2		19.25	47,0	A
3		19.46	46,6	A
4		20.10	41,3	A
5		20.30	41,6	A
6		21.15	44,9	A
7		21.32	41,2	A
8		21.53	46,3	A

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Measurement Points	Structure Type	Time (Night)	Background Noise Level (dBA)	Category
1	Plant site and plant domain	23.02	45,3	A
2		23.21	44,9	A
3		23.40	43,6	A
4		23.58	36,9	A
5		00.16	37,5	A
6		00.56	39,0	A
7		01.10	38,6	A
8		01.28	41,0	A

Category A (Ldaytime <55 dBA) Area

Category B (Ldaytime 55- 64 dBA) Area

Category C (Ldaytime 65-74 dBA) Area

Category D (Ldaytime >74 dBA) Area

Article 28;

Annex-VII. Table-9 : Limit Values of Inner Environment

Household Areas		Closed Window Leq (dBA)*	Open Window Leq (dBA)*
	Bedrooms	35	45
	Sitting Rooms	45	55

*During there is no activity at the usage area.

Annex-VII. Table-5: Limit Values for Construction Site

Activity Type (construction, demolition and maintenance)	$L_{daytime}$ (dBA)
Building	***70***
Way	75
Other Sources	70

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ANNEX

ANNEX 1- Certificate of Person Who Do the Measurements and Write the Report

ANNEX 2- Certificate of Person Who Approved the Report

ANNEX 3 – Measurement Photographs

ANNEX 4 – Calibration Certificate

ANNEX 5 – Calibrator Documents

ANNEX 6 – Authorization and License of the Laboratory by the Ministry and Turkish Acrediation Institution

ANNEX 7 – Temperature and Humidity Analyzer Calibration Certificates

ANNEX 8 – Emission Information System Record Document

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NO, NO_2 AND NO_X MEASUREMENT RESULTS

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TÜRKAK
Test TS EN ISO/IEC 17025 AD-0423-T

Report No
R-6564/13

Report Date
23.07.2013

Customer Name / Address	ACWA GÜÇ ELEKTRİK İŞLETME VE YÖNETİM SANAYİ VE TİCARET LTD. ŞTİ. Teşvikiye Cad. Teşvikiye Palas No:23/2 Nişantaşı/ İSTANBUL
Name and Sampling Date of the Sample	Pasive Sampling – 03.06.2013
Name and Number of the Project	Pasive Sampling — P-3307/13
Date of Sample Acceptance	04.06.2013 - 24.06.2013
Remarks	Measurements done for EIA Report planned Natural Gas Combined Cycle Power Plant of ACWA Power Electricity Operation and Management Inc. Co.
Date of the Test	14.05.2013 – 23.06.2013
Number of the Pages of the Report	3 pages

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirm by
Satılmış DOĞAN Kimyager	Fevzi KARAKAYA Laboratuar Müdürü

A.INTRODUCTION

Passive sampling of ambient air was done for EIA Report planned Natural Gas Combined Cycle Power Plant of ACWA Power Electricity Operation and Management Inc. Co.

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B.SAMPLING LOCATION, PARAMETERS, METHODOLOGY, SAMPLING DEVICE AND RESULTS

Coordinates of sampling points are represented at Table 1.

Table-1: Sampling Point Coordinates

Sampling Points	Sampling Coordinates	
	E	N
HK-1	534906	4415219
HK-2	535961	4416601
HK-3	536495	4413087
HK-4	537128	4414760
HK-5	534769	4416586
HK-6	531034	4414442
HK-7	533997	4412360
HK-8	533676	4415645

Measuring methodology is given according to parameters at table-2.

Table – 2: According to the measurement parameter measurement methods and sampling

Sampling Parameter	Measurement Method	Sampling
***NO_2, ***NO_x and NO	Pasive sampling method (TS EN 13528-1, TS EN 13528-2)	Pasive sampling tubes

***Signed parameters are out of accreditation so that done by Gradko İnternational Inc.

C.SAMPLING RESULTS

Table – 3: **SAMPLING**

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Sampling Point	Sampling Date	Sampling Duration (hour)	NO_2 (ppb)	NO_x (ppb)	NO (ppb)	NO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO ($\mu g/m^3$)	Total µG NO_2	Total µG NO_x
HK-1	14.05.2013 – 03.06.2013	480	3,09	7,81	4,72	5,93	14,99	9,06	0,21	0,52
HK-2			3,40	5,78	2,38	6,54	11,10	4,56	0,23	0,39
HK-3			3,45	7,13	3,68	6,62	13,68	7,06	0,23	0,48
HK-4			4,99	7,55	2,56	9,58	14,49	4,91	0,33	0,51
HK-5			4,47	7,54	3,08	8,58	14,48	5,91	0,30	0,51
HK-6			4,72	7,12	2,40	9,06	13,66	4,60	0,32	0,48
HK-7			3,75	5,31	1,56	7,21	10,20	2,99	0,25	0,36
HK-8			5,47	7,09	1,61	10,51	13,61	3,10	0,37	0,47

Sampling Point	Sampling Date	Sampling Duration (hour)	NO_2 (ppb)	NO_x (ppb)	NO (ppb)	NO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO ($\mu g/m^3$)	Total µG NO_2	Total µG NO_x
HK-1	03.06.2013 – 23.06.2013	480	2,43	4,30	1,87	4,66	8,23	3,57	0,16	0,29
HK-2			2,71	7,75	5,04	5,19	14,85	9,65	0,18	0,52
HK-3			2,30	5,30	3,00	4,41	10,16	5,74	0,15	0,35
HK-4			3,04	6,98	3,95	5,82	13,38	7,56	0,20	0,47
HK-5			0,25	4,49	4,25	0,47	8,61	8,14	0,02	0,30
HK-6			2,90	6,40	3,50	5,56	12,27	6,70	0,19	0,43
HK-7			1,84	5,71	3,87	3,53	10,94	7,41	0,12	0,38
HK-8			3,24	5,72	2,48	6,20	10,95	4,75	0,22	0,38

D.APPENDIXES

App 1. Gradko International Inc. report

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TÜRKAK
Test
TS EN ISO/IEC 17025
AD-0423-T

Report No
R-6671/13

Report Date
30.07.2013

Customer Name / Address	ACWA GÜÇ ELEKTRİK İŞLETME VE YÖNETİM SANAYİ VE TİCARET LTD. ŞTİ. Teşvikiye Cad. Teşvikiye Palas No:23/2 Nişantaşı/ İSTANBUL
Name and Sampling Date of the Sample	Pasive Sampling – 23.06.2013
Name and Number of the Project	Pasive Sampling — P-3307/13
Date of Sample Acceptance	14.07.2013
Remarks	Measurements done for EIA Report planned Natural Gas Combined Cycle Power Plant of ACWA Power Electricity Operation and Management Inc. Co.
Date of the Test	23.06.2013 – 13.07.2013
Number of the Pages of the Report	3 pages

The test and /or measurements results, the uncertainties with confidence probability and test methods are given on the following pages which are part of this report.

Prepared by	Confirmed by
Furkan S. ÇELİK Chemist Ms.	Fevzi KARAKAYA Laboratory Manager

A.INTRODUCTION

Passive sampling of ambient air was done for EIA Report planned Natural Gas Combined Cycle Power Plant of ACWA Power Electricity Operation and Management Inc. Co.

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B.SAMPLING LOCATION, PARAMETERS, METHODOLOGY, SAMPLING DEVICE AND RESULTS

Proje kapsamında ölçüm yapılan noktalara ait koordinatlar tablo-1 de verilmiştir.

Tablo – 1: Ölçüm noktası koordinatları

Sampling Points	Sampling Coordinates	
	E	N
HK-1	534906	4415219
HK-2	535961	4416601
HK-3	536495	4413087
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HK-6	531034	4414442
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C.SAMPLING RESULTS

Table – 3: **SAMPLING**

Sampling Point	Sampling Date	Sampling Duration (hour)	NO_2 (ppb)	NO_x (ppb)	NO (ppb)	NO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO ($\mu g/m^3$)	Total µG NO_2	Total µG NO_x
HK-1	23.06.2013 – 13.07.2013	480	2,15	5,42	3,26	4,13	10,38	6,25	0,14	0,36
HK-2			2,30	2,78	0,48	4,41	5,33	0,92	0,15	0,19
HK-3			1,50	4,55	3,05	2,87	8,71	5,85	0,10	0,30
HK-4			2,30	4,20	1,90	4,41	8,05	3,64	0,15	0,28
HK-5			2,29	5,22	2,93	4,39	10,00	5,62	0,15	0,35
HK-6			3,04	5,49	2,45	5,82	10,52	4,70	0,20	0,37
HK-7			1,83	3,29	1,47	3,50	6,31	2,81	0,12	0,22
HK-8			3,25	6,90	3,65	6,22	13,21	6,99	0,22	0,46

D.EKLER

Ek 1. Gradko İnternational Ltd. analiz raporu

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ANNEX 7
ECOSYSTEM EVALUATION REPORT

ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Yahşihan District, Kılıçlar Town

ECOSYSTEM ASSESSMENT REPORT



Yahşihan, Kırıkkale

September,2013

ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Yahşihan District, Kılıçlar Town

ECOSYSTEM ASSESSMENT REPORT

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ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Town of Yahşiyan, Borough of Kılıçlar

CHAPTER 1

Phyto-Ecological Assessment

Impacts of Planned Project on the Species of Plants Whose Generations are Endangered and the Aquatic and Terrestrial Flora and the Measures Required To Be Taken



Prepared by: Prof.Dr. Murat EKICI

Gazi University, Science Faculty
Biology Department
Botanic Specialty Branch
Academician

PHYTO-ECOLOGICAL ASSESSMENT

1.1 INTRODUCTION

Activity constituting the topic of Project; is a Natural Gas Combined Cycle Power Plant (NGCCP) Project planned by ACWA Power Electricity Operation and Management Industry and Trade Co. in the installed power of 834,09 MVVe / 849,1 MVVm / 1.528,5 MVVt within the boundaries of Kirikkale Province, Town of Yahsiyan, Borough of Kiliclar. It is situated over a 261.142,58 m² - surface area at the plot numbered 130—b2 with scale of 1/25,000 in Kirsehir and the possession of activity belongs to the treasury.

1.2 PURPOSE OF THE STUDY

1) Identification of existing biological diversity belonging to the Project site of Power plant and its surroundings,
2) Identification of the habitat types in the region,
3) Introduction of impacts of the construction operations to be carried out over the zonal flora,
4) Identification of the impact mitigating measures related to on the species which are endemic, rare and whose generations are endangered, which might be affected from the activities within the region.

1.3 METHOD

1.3.1. Floristic List Presentation

Floristic list shall respectively include the following information.

Floristic list; shall be enumerated according to the degree of kindship like the ferns (Pteridophyta), gymnosperms (Gymnospermae) and angiosperms (Angiospermae). The species will be offered together with their type names and if any, respectively their local names in Turkish, phyto-geographical regions, whether or not endemic and the hazard categories of endemic taxa (Table – 1. 2).

The plants collected from the study area will be identified using the relevant floras, firstly the work called Flora of Turkey and the East Aegean Islands (Davis, 1965-1988). To determine whether or not the species are endemic and their category of the species endangered although they are not endemic, Turkiye Plants Red Book prepared by Ekim et al., (Ekim et all., 2000) shall be taken as a reference. For Turkish names of these plants, the work called List or Turkiye Plants shall be utilized (Guner, 2012).

1.3.2. Data Analysis

The list of full habitant – based – flora pertaining to the area where the Power plant shall be built has been generated in consequence of the study. The ones among identified species which are endemic, rare or in the international protection statue have been determined. Protection measures have been suggested for the high – hazard sensitive areas.

1.2 ECOLOGIC STRUCTURE

Due to awareness of topographic and climatic characteristics, our Country is under the impact of 3 floristic regions. These are; the Regions of Mediterranean, Irano-Turanian and Euro-Siberian. The region where the project area is situated is contained within the boundaries of Irano – Turanian Phyto-geographic region (Figure – 1.1).

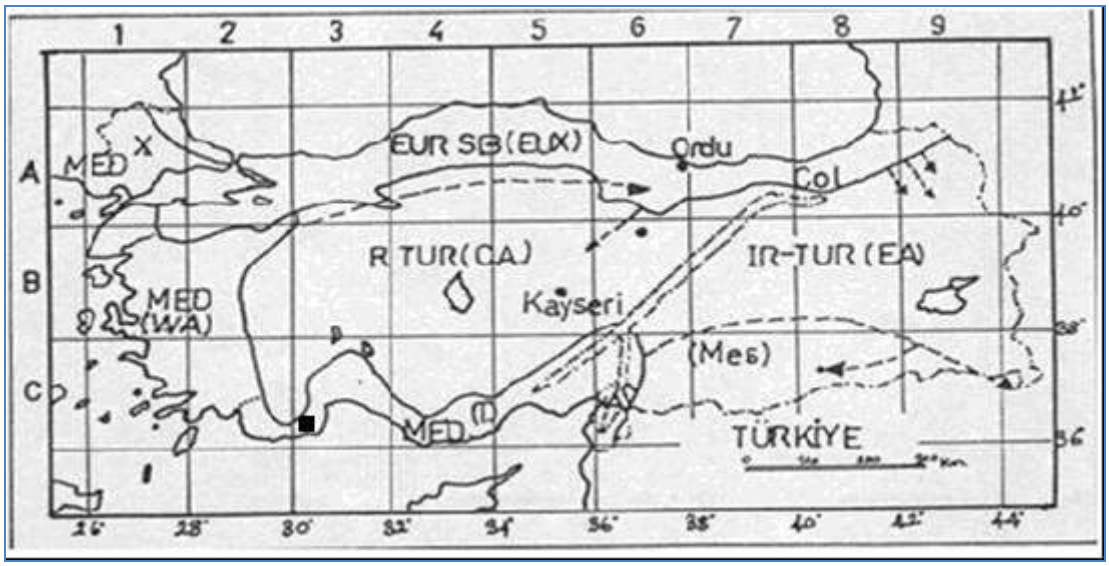


Figure – 1.1 Phyto-geographic Regions of Turkiye

1.3 PRIMARY ECOSYSTEMS WITHIN AND AROUND HEP PROJECT AREA

1.5.1. Vegetation

Within the project area and its surroundings, primarily riparian and steppe vegetation have been identified. Some of the characteristic species of riparian vegetation are;

Tamarix smyrnensis, Plantago lanceolata, Populus alba, Thypha shuttlewortii, Lythrum salicaria and *Salix alba.*



Photograph – 1.1 Views from Project Site

As for the steppe vegetation, the *Arthemisia absinthium, Eryngium campestre* variety are being represented with *virens*, *Centaurea virgata, Medicago sativa, Teucrium polium, Hordeum bulbosum, Bromus sterilis, Poa bulbosa, Aegilops umbellulata* subsp. *umbellulata*, *Stipa holosericea, Koelaria cristata* and the taxa like *Peganum harmala.*



Photographs – 1.2 Views from Project Site

Dominant plant types along the coastline of creek are *Populus alba, Tamarix smyrnensis and Salix alba.*

Particularly *the taxa like Lythrum salicaria, Salix alba and Thypha schutlteworth* are water – dependent yet, due to possessing wide – spread species, any danger related to the future of taxa is not in question. Furthermore, when it is considered that the project area is at a 200 – meter distance from the Kizilirmak River, there exists no danger in terms of specifically for the water – dependent plant types.



Photograph – 1.3 *Thypha schutlteworth*



Photograph – 1.4 *Salix* ve *Populus sp.*

1.4 FLORISTCAL STRUCTURE

In consequence of the site surveys we have conducted, **133** species and subspecies of taxa belonging to **32** families have been identified from the site. At the project site, there are **25** taxa belonging to Irano-Turanian phytogeographical region, **16** taxa pertaining to Euro-Siberian phytogeographical region and **7** taxa pertaining to Mediterranean phytogeographical region. Great majority of the species identified are of quite widespread and cosmopolitan (**85**) (Figure – 1.2). 5 of the species identified from the region are endemic for our country.

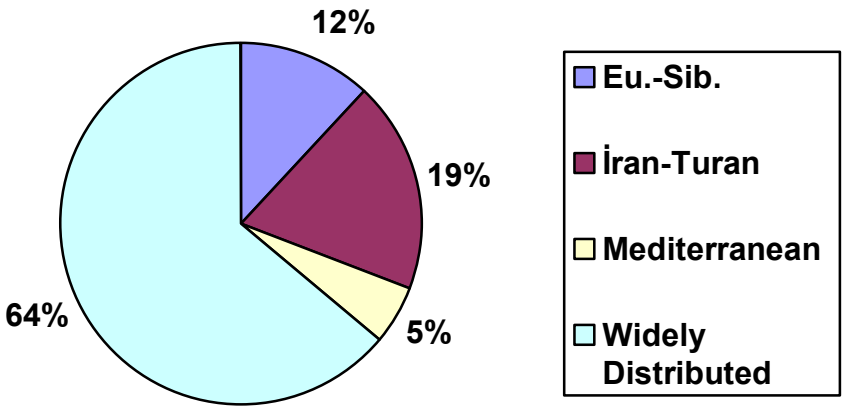


Figure – 1.2 Phytogeographical Regions – Based Taxa Distribution

1.6.1. State of Plants from the Aspect of Hazard Class and Endemism at the Site

5 of **133** taxa identified from the site are contained within the endemic and **LC** (The **l**east **c**oncerned) hazard category (Table – 1.1). For this reason, although a loss of some of these widespread endemic species shall be experienced individually as a result of the activity within the site, these species are at the recoverable level in time.

Table – 1.1. Endemic Taxa and Hazard Categories

Endemic Taxa	IUCN Categories
Alyssum pateri Nyar subsp. *pateri*	**LC**
Astragalus lycius Boiss.	**LC**
Phlomis pungens Willd. var. *pungens*	**LC**
Scutellaria orientalis L. subsp. *pectinata* (Bentham) Edmondson	**LC**
Wiedemannia orientalis Fisch. & Mey.	**LC**

LC: The least concerned

Table – 1.2 Plant Species Identified within the Activity Area and Surrounding

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC REGION	ENDEMISM		IUCN
					R	W	
ACANTHACEAE	1	Acanthus hirsutus Boiss.	Ayı pençesi "Bear Claw"	Widespread			
APIACEAE	2	Bifora radians M.Bieb.	Küçük kişniş otu, yabani kişniş	Euro-Siberian			
	3	Eryngium campestre L. var. virens Link	Şeker dikeni	Widespread			
	4	Falcaria vulgaris Bernh.	Kaz ayağı	Widespread			
	5	Ferula szowitsiana DC.	Baldıran	Irano-Turanian			
	6	Torilis arvensis (Huds.) Link subsp. arvensis	Derecikotu	Widespread			
ASTERACEAE	7	Achillea wilhemsii C. Koch	Civanperçemi, yavşan	Widespread			
	8	Anthemis tinctoria L. var. tinctoria	Sarı papatya	Widespread			
	9	Artemisia absinthium L.	Pelin	Widespread			
	10	Carduus nutans L. subsp. leiophyllus (Petr.) Stoj. & Stef.	Deve dikeni	Irano-Turanian			
	11	Carduus pycnocephalus L. subsp. albidus (Bieb.) Kazmi	Eşşek dikeni	Widespread			
	12	Carthamus lanatus L.	Yünlü aspir	Euro-Siberian			
	13	Carlina vulgaris L.	Domuzdikeni	Irano-Turanian			
	14	Centaurea carduuiformis DC. subsp. carduuiformis var. carduuiformis	Peygamber çiçeği	Widespread			
	15	Centaurea depressa Bieb.	Acımık	Widespread			

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC REGION	ENDEMISM R	ENDEMISM W	IUCN
	16	Centaurea solstitialis L. subsp. solstitialis	Zerdali dikeni	Widespread			
	17	Centaurea virgata Lam.	Çubuklu peygamber çiçeği	Euro-Siberian			
	18	Chardinia orientalis (L.) O. Kuntze	*	Widespread			
	19	Cirsium lappaceum (Bieb.) Fischer subsp. lappaceum		Widespread			
	20	Cnicus benedictus L. var. benedictus	Şevketibostan	Widespread			
	21	Crepis alpina L.	*	Euro-Siberian			
	22	Crepis foetida L. subsp. rhoedifolia (Bieb.) Celak	Kohum	Irano-Turanian			
	23	Crepis sancta (L.) Babcock	*	Irano-Turanian			
	24	Crupina crupinastrum (Moris) Vis.	*	Widespread			
	25	Echinops viscosus DC. var. bithynicus (Boiss.) Rech. fil	Sakız dikeni	Widespread			
	26	Lactuca serriola L.		Widespread			
	27	Onopordum acanthium L.	Galagan, kenger	Widespread			
	28	Onopordum bracteatum Boiss. et Heldr var. bracteatum	Kaluğan, kangal, kangal dikeni	Widespread			
	29	Pilosella piloselloides (Vill.) Sojak subsp. megalomastix (NP)Sell & West	*	Widespread			
	30	Senecio vernalis Waldst. & Kit.	Ekin otu	Widespread			
	31	Tragopogon longirostris Bisch. ex Schultz Bip. var. longirostris	*	Widespread			

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC REGION	ENDEMISM R	ENDEMISM W	IUCN
	32	Xeranthemum annum L.	Dağ karanfili	Mediterranean			
BORAGINACEAE	33	Anchusa azurea Miller var. azurea	Sığır dili, güriz	Widespread			
	34	Cerinthe minor L. subsp. auriculata (Ten.) Domac	Mum çiçeği	Widespread			
	35	Echium angustifolium Miller	Sığırdili	Mediterranean			
	36	Echium italicum L.	Kurt kuyruğu	Euro-Siberian			
	37	Moltkia coerulea (Willd.) Lehm.	Anadolu taşkesenotu	Euro-Siberian			
	38	Onosma tauricum Pallas ex Willd. var. tauricum	Emzik otu	Euro-Siberian			
BRASSICACEAE	39	Alyssum pateri Nyar subsp. pateri	*	Widespread		X	LC
	40	Cardaria draba (L.) Desv. subsp. chalepensis (L.) O.E. Schulz	Kedi otu	Mediterranean			
	41	Crambe orientalis L. var.orientalis	*	Euro-Siberian			
	42	Descurainia sophia (L.)Webb ex Prantl	Süpürge otu	Euro-Siberian			
	43	Erysimum crassipes Fisch. & Mey.	*	Widespread			
	44	Hirschfeldia incana (L.) Lag.-Foss.	*	Widespread			
	45	Malcolmia africana (L.) R.Br.	*	Widespread			
CARYOPHYLLACEAE	46	Agrostemma githago L.	Buğday çiçeği, buğday karamuğu, ekin ebesi	Widespread			
	47	Gysophila libanotica Boiss.	*	Widespread			

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC	ENDEMISM		IUCN
				REGION	R	W	
	48	Silene conoidea L.	İtalyan yapışkan otu	Widespread			
	49	Silene dichotoma Ehrh. subsp. dichotoma	*	Widespread			
	50	Silene spergulifolia (Desf.) Bieb.	*	Widespread			
CHENOPODIACEAE	51	Beta lomatogona Fisch. & Mey.	Ala pancar, dağ pancarı	Euro-Siberian			
CISTACEAE	52	Helianthemum ledifolium (L.) Miller var. microcarpum Willk.	*	Widespread			
CONVOLVULACEAE	53	Convolvulus arvensis L.	Tarla sarmaşığı	Widespread			
ELAEAGNACEAE	54	Elaeagnus angustifolia L.	Kuş iğdesi, yabani iğde	Widespread			
EUPHORBIACEAE	55	Euphorbia macroclada Boiss.	Sütleğen	Widespread			
FABACEAE	56	Astragalus brachypterus Fisch.	*	Widespread			
	57	Astragalus lycius Boiss.	*	Euro-Siberian		X	LC
	58	Astragalus microcephalus Willd.	Boz geven, kara geven	Euro-Siberian			
	59	Coronilla varia L. subsp. varia	Renkli burçak, Körigen	Euro-Siberian			
	60	Genista sessilifolia DC.	Borcak çalısı	Widespread			
	61	Lathyrus digitatus (Bieb.) Fiori	*	Widespread			
	62	Medicago lupulina L.	Şerbetçiotu yoncası	Widespread			
	63	Medicago radiata L.	*	Irano-Turanian			
	64	Medicago sativa L.	Çevrince	Widespread			

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC REGION	ENDEMISM R	ENDEMISM W	IUCN
	65	Melilotus officinalis (L.) Desr.	Eşek yoncası, sarı yonca	Widespread			
	66	Onobrychis altissima Grossh.	*	Widespread			
	67	Onobrychis armena Boiss. & Huet.	*	Widespread			
	68	Trifolium hirtum All.	*	Mediterranean			
	69	Trigonella brachycarpa (Fisch.) Morris	Topbaş çemen	Irano-Turanian			
	70	Trigonella courelescens (Bieb.) Hal.	Devre otu	Irano-Turanian			
	71	Trigonella fischeriana Ser.	*	Irano-Turanian			
	72	Trigonella monantha C.A. Meyer subsp. monantha	*	Irano-Turanian			
	73	Trigonella monspeliaca L.	Akdeniz çemeni	Mediterranean			
	74	Trigonella velutina Boiss.	*	Irano-Turanian			
GERANIACEAE	75	Erodium ciconium (L.) L'Herit	*	Widespread			
GLOBULARIACEAE	76	Globularia orientalis L.	Doğu demir omcası	Irano-Turanian			
HYPERICACEAE	77	Hypericum scabrum L.	Kepir otu, mayasıl otu	Irano-Turanian			
LABIATAE	78	Acinos rotundifolius Pers	*	Widespread			
	79	Ajuga chamaepytis (L.) Schreber subsp. chia (Schreber) Arcangeli var. ciliata Briq.	Yer çamı	Widespread			
	80	Marrubium parviflorum Fisch. & Mey. subsp. parviflorum	*	Widespread			
	81	Phlomis pungens Willd. var. pungens	*	Widespread		X	LC

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC REGION	ENDEMISM R	ENDEMISM W	IUCN
	82	Salvia ceratophylla L.	*	Irano-Turanian			
	83	Salvia viridis L.	Ada çayı	Mediterranean			
	84	Scutellaria orientalis L. subsp. pectinata (Bentham) Edmondson	Kaside otu	Irano-Turanian		X	LC
	85	Stachys cretica L. subsp. anatolica Rech. Fil.	*	Widespread			
	86	Teucrium polium L.	Acı yavşan	Widespread			
	87	Thymus sipyleus Boiss. subsp. sipyleus var. sipyleus	Dağ çayı	Widespread			
	88	Wiedemannia orientalis Fisch. & Mey.	Ballıbaba, Sormuk otu	Irano-Turanian		X	LC
	89	Ziziphora capitata L.	Dağ reyhanı	Irano-Turanian			
	90	Ziziphora clinopodioides Lam.	Keklik otu, kır nanesi	Widespread			
	91	Ziziphora tenuior L.	Nane ruhu	Irano-Turanian			
LILIACEAE	92	Allium scorodoprasum L. subsp. rotundum (L.) Stearn	Taş sarımsağı, köpek sarımsağı	Euro-Siberian			
LYTHRACEAE	93	Lythrum salicaria L.		Widespread			
MALVACEAE	94	Alcea biennis Waldts. & Kit.	Gülfatma, Hatmi çiçeği	Widespread			
PAPAVERACEAE	95	Papaver rhoeas L.	Gelincik	Widespread			
PLANTAGINACEAE	96	Plantago lanceolata L.	Yılandili, yılan otu	Widespread			
PLUMBAGINACEAE	97	Limonium bellidifolium (Gouan)Dumort.	*	Euro-Siberian			

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC REGION	ENDEMISM R	ENDEMISM W	IUCN
	98	Plumbago europea L.	Diş otu, Döven otu, Keler otu	Euro-Siberian			
POACEAE	99	Aegilops umbellulata Zhukovsky subsp. umbellulata	*	Widespread			
	100	Aegilops squarrosa L.	*	Widespread			
	101	Aegilops triuncialis L. subsp. triuncialis	Çayır otu	Widespread			
	102	Avena sativa L.	Yulaf	Widespread			
	103	Briza humilis Bieb.	Başlıklı zembilotu	Widespread			
	104	Bromus japonicus Thunb. subsp. japonicus	*	Widespread			
	105	Bromus sterilis L.	Kıraç çayırı	Widespread			
	106	Bromus tomentellus Boiss.	*	Irano-Turanian			
	107	Chrysopogon gryllus (L.) Trin. subsp. gryllus	*	Widespread			
	108	Cynodon dactylon (L.)Pers var. villosus Regel	Ayrık otu	Widespread			
	109	Echinaria capitata (L.) Desf.	Kirpi otu	Widespread			
	110	Festuca sclerophylla Boiss. ex Bischaff	*	Irano-Turanian			
	111	Hordeum murinum L. ssp. leparinum (Link) Arc. var. Simulens Bowden	Pisipisi otu	Irano-Turanian			
	112	Hordeum bulbosum L.	Yumrulu arpa	Widespread			
	113	Koeleria cristata (L.) Pers.	Sorguçlu gümüşotu	Widespread			
	114	Poa bulbosa L.	Yumrulu salkım otu	Widespread			

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC	ENDEMISM		IUCN
				REGION	R	W	
	115	Secale cereale L. var. cereale	Çavdar	Widespread			
	116	Stipa holosericea Trin.	*	Irano-Turanian			
	117	Stipa lessingiana Trin. & Rupr.	*	Widespread			
	118	Taeniatherum caput-medusae (L.) Nevski subsp. crinitus (Schreber) Melderis	*	Widespread			
POLYGALACEAE	119	Polygala vulgaris L.	Süt otu	Widespread			
RESEDACEAE	120	Reseda lutea L. var. lutea	Gerdanlık	Widespread			
ROSACEAE	121	Potentilla recta L.	Dikparmak otu	Widespread			
	122	Sanguisorba minor Scop. subsp. Minor	Kelek otu	Widespread			
RUBIACEAE	123	Cruciata articulata (L.) Ehrend.	*	Irano-Turanian			
	124	Galium incanum Sm. subsp. elatius (Boiss.) Ehrend.	*	Widespread			
	125	Rubia tinctorum L.	Kök boya	Irano-Turanian			
SALICACEAE	126	Populus alba L.	Kavak	Widespread			
	127	Salix alba L.	Söğüt	Widespread			
SCROPHULARIACEAE	128	Linaria chalepensis (L.)Miller var.chalepensis	*	Mediterranean			
	129	Verbascum cherianthifolium Boiss. var. cherianthifolium	Sığır kuyruğu	Widespread			
	130	Veronica multifida L.	*	Irano-Turanian			
TAMARICACEAE	131	Tamarix smyrnensis Bunge.	Ilgın	Widespread			

FAMILY	NO	NANE OF SPECIES	TURKISH NAME	PHYTOGEOGRAPHIC REGION	ENDEMISM		IUCN
					R	W	
THYPHACEAE	132	Thypha schutlteworthii W. D. J. Koch & Sond.	Kamış	Widespread			
ZYGOPHYLLACEAE	133	Peganum harmala L.	Üzerlik	Widespread			

R: Rare Species, **W:** Widespread

1.6.2. Assessment of Site from the Aspect of Landscape

Project site is situated within the Irano-Turanian geographical vegetation region, therefore Irano-Turanian – originated plants have higher populations. The areas disrupted can be rehabilitated by the plants contained within the natural flora of region. For this reason, when the landscape – purpose plants are being selected, preference of natural plants of the region is extremely crucial in terms of ecosystem balance.

1.5 OVERALL ASSESSMENT

Should we consider that 34% of Turkiye Flora is endemic, it is seen that the flora of study area is extremely poor from the aspect of endemism. Similarly, the endemic species obtained from the site also occupy a large area and it cannot be mentioned that the future generations would enter into danger either. In consequence of the activities required to be performed, the flora elements will be partly affected. Also due to the fact that a great majority of both species identified from the site is cosmopolitan and also the endemics are widespread, it is obvious that the activity to be accomplished would not create any risk in terms of future of the flora species. Being contained inside the activity area, partly destructed habitats and the species of populations will renew themselves within a short slice of time.

Together with project, during preparation of the land, at the construction phase; probable environmental effect resulting from digging and excavation – induced dust formation, emissions formed due to use of fuel in the heavy equipments, development of noise, workers – originated waste water and solid waste development are required to be monitored both in construction phase and also in the operation phase.

Moreover, during construction period, if the roads, particularly the ones used are frequently sprinkled with water, generation of dust shall be prevented. Thus, natural environment shall have not been affected by the activities much.

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ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Town of Yahşiyan, Borough of Kılıçlar

Ecosystem Assessment Report

CHAPTER 2

Faunistic Assessment

ECOLOGICAL STRUCTURE, AMPHIBIANS, REPTILES, BIRDS AAND MAMMALS
(Terrestrial species, species of animals which are endemic, rare and ones whose generation are endangered)



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FAUNISTIC ASSESSMENT

2.1. INTRODUCTİON

The terrestrial fauna species and their impact on the fauna have been identified based on the surveys accomplished and the literature. As a result of the identifications, a conclusion was achieved and suggestions have been presented.

In a general sense, project areas consist of agricultural, steppe lands and wetlands. The site constitutes a natural habitat for a great deal of species pertaining to Amphibians, Reptilia, Aves and Mammalia classes of the vertebrate animals.

Terrestrial fauna species existing at the project site and in its immediate vicinity have been researched and detailed in this chapter.





Photograph: Wetlands (above) and Steppe Lands (below) at the Project Site and in its Immediate Surroundings

2.2. THE METHODOLOGY FOLLOWED UP

In preparation of the report, the information obtained from the land surveys conducted in previous years and some days – carried out land surveys and literature data have been utilized. Fauna elements identification – oriented works have been performed by my party during land survey. In addition, also the droppings, footprints, remains of eaten food and also recorded owl pellets have been recorded.

Biotope types have been determined and visualized optically, by performing land survey within the study area.

2.3. FAUNISTIC FEATURES OF PROJECT AREA

Class percentages of vertebrate animal species identified in the study area have been given in **Figure – 2.3.** As it would be seen here, the highest rate of species with 71% belongs to the birds and this is followed by the reptiles' rate of 13% and mammals' rate of 12%. As for the amphibian species are represented by 3 species in the area which points out a 4% - percentage.

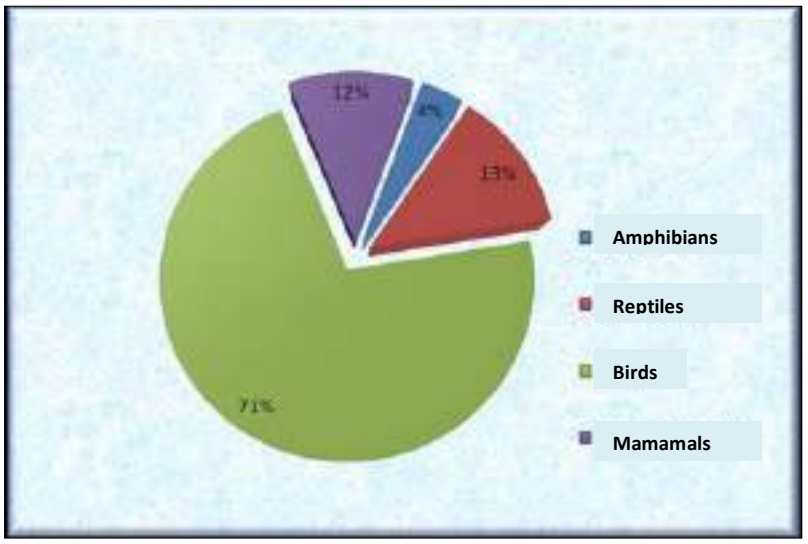


Figure – 2.3 The Rates of Terrestrial Fauna Elements Identified In the Region versus Each Other in Terms of Number of Species

2.3.1. Amphibians

The amphibians are comprised within Caudata and Anura groups. Caudata group is the group covering the tailed amphibians (salamanders). Among the salamanders, there are terrestrial and aquatic species. As the species of this class are cold-blooded, they generally show activity starting from the spring months and remain inactive under the bottom mud of water or soil in cold season. Anura group covers the tailless amphibians (frogs) and the frogs are found in two groups like land and water frogs in our country. Land and water frogs exist at the project site and in its immediate surroundings.

These species being quite common also across Türkiye have been given together with their Preservation statues in **Table – 2.1.** The amphibian species likely to be present at the project site and in its immediate surroundings have been probed and these organisms are represented by 3 types in the area. All amphibians identified at the study area have been determined by IUCN as LC Common-The Least Concern. The species of amphibian have not been come across at the project area.

Table – 2.1 Amphibian Species Spread at the Terrestrial and Aquatic Biotopes at the Project Site and its Immediate Surrounding

Group / Family	Species and Turkish name	Habitat	Preservation Statue	
			Bern	IUCN
Anura/ Bufonidae	*Bufo bufo* Siğilli Kurbağa	In the regions with little vegetation and moist rocky zones or wooded sections (up to 3000 m)	Annex - III	LC
Anura/ Bufonidae	*Bufo viridis* *(Pseudepidalea viridis)* Gece Kurbağası	By the stream edge – intensive moist soils	Annex - II	LC
Anura/ Ranidae	*Rana ridibunda* *(Pelophylax ridibundus)* Su Kurbağası	In the pools, lakes and with abundant vegetation and slow – flowing waters and mostly in the waters across the very low ones in the waters of plains (up to 2500 m)	Annex - III	LC

They are the species being dominant and common in Turkiye. In addition, also according to the Decision of Hunting Period Central Hunting Commission published every year, all of the species scrutinized have been taken under Preservation by the Ministry pursuant to Article – 5 (Law no. 4915, Clause – 4, Subparagraph – 1).

Endemic amphibian species have not been come across at the project site. The representative photos of amphibian species which are likely to be found at the project site and its immediate surroundings have been shown in **Figure – 2.4**.



Figure – 2.4 From the Amphibian Species from the Region; Night Frog**,** *Bufo viridis* (LH) and Plain Frog, *Rana ridibunda* (RH), and Warty Frog, *Bufo bufo* (Bottom)
(Reference: http://en.wikipedia.org/wiki/Bufo)

2.3.2. Reptiles

Reptile species, Testudines and Squamata are the species belonging to 2 groups of Reptillia class. Testudines from these groups comprise the species of turtle; also the turtles are divided into two groups, the terrestrial and aquatic species. Similarly, there are species which have adapted to the fresh water biotopes also in the aquatic species. As for Squamata, it covers the species of lizards and snakes. Observation of the species given in **Table -2.2** has high probability at the project site and its immediate surroundings from time to time.

Table – 2.2 Reptile Species Spread at the Terrestrial and Aquatic Biotopes at the Project Site and its Immediate Surrounding

Group / Family	Species and Turkish name	Habitat	Preservation Status	
			Bern	IUCN
Testudınata/ Testudınıdae	*Testudo graeca* Yaygın Tosbağa	Dry, stony and sandy terrains, among vineyards, orchards	Annex- II	VU
Squamata/ Gekkonidae	*Cyrtopodion kotschyi* İnce parmaklı keler	Lives in rocky areas and building walls	Annex- II	LC
Squamata/Scıncıdae	*Ablepharus kitaibellii* İnce kertenkele	Lives in short – planted outdoors, and in the sections with lemurs and sparse trees. It hides under stones and leaves.	Annex- II	LC
Squamata/ Lacertidae	*Ophisops elegans* Tarla kertenkelesi	Lives in the areas with less vegetation and rocky and ground floor.	Annex- II	-
Squamata/ Anguidae	*Ophisaurus apodus* Oluklu Kertenkele	Lives in the shrubbery, stony slopes with abundant vegetation	Annex- II	-
Squamata/ Colubridae	*Coluber nummifer (Hemorrhois nummifer)* Sikkeli Yılan	Lives in stony zones with little vegetation	Annex- III	LC
	Coluber rubriceps (Platyceps collaris) Toros Yılanı	Lives in dry stony and bushy environments	Annex - III	LC
	Eirenis modestus Uysal yılan	Stony zones with less vegetation	Annex - III	LC
	Elaphe quatuorlineata Sarı yılan	Lives in sparsely wooded scrub and rocky locations	Annex - III	NT
	Natrix natrix Yarısucul yılan	Meadows nearby water	Annex – III	LC

Almost all of the species of reptile likely to be available at the project site and in its immediate surroundings are in LC Common – Least Concern category and from the species being dominant and widespread in Turkiye. also according to the Decision of Hunting Period Central Hunting Commission published every year, all of the species scrutinized have been taken under Preservation by the Ministry pursuant to Article – 5 (Law no. 4915, Clause – 4, Subparagraph – 1). Hunting of hunt animals taken under Preservation, keeping them alive or dead and transport are prohibited.

The species of endemic reptile have not been come across at the project site.

2.3.3. Birds

According to the immigration status of the terrestrial and aquatic biotopes identified at the project site and its immediate surroundings and around along Kizilirmak River and the area where the power plant shall be built, it is possible to seasonally come across following bird species;

1) Local,
2) Summer migrants,
3) Winter migrants

The reproduction of local birds and summer migrant birds in these groups takes place in the vicinity of the line. In general, the field birds, songbirds, and terrestrial forms are dominantly found in the area. Furthermore, the presence of daytime predators and the water edge – hunted and lived birds are in question as well.

Besides nestling local reproduction birds in great numbers within this region, rather scant workspace will reduce the influence of project operations to the migratory birds to minimum level. The species of birds determined in the area, their immigration status and Preservation statues have been given in **Table – 2.3**.

Table – 2.3 Bird Species and Preservation Statues Spread at the Terrestrial and Aquatic Biotopes at the Project Site and its Immediate Surroundings

No	Scientific Name Group/Family/Species	Turkish Name	Preservation Statue		Immigration State
			Bern Annex	IUCN	
	Ciconiiformes/Ciconiidae				
1	*Ciconia ciconia*	Leylek	II	LC	Reproductio n in Summer
Falconiformes/Accipitridae					
2	*Buteo rufinus*	Kızıl şahin	II	LC	Winter migrants
3	*Buteo buteo*	Şahin	II	LC	Local
4	*Accipiter nisus*	Atmaca	II	LC	Local
5	*Accipiter brevipes*	Yoz Atmaca	II	LC	Summer Migrants
6	*Falco tinnunculus*	Kerkenez	II	LC	Local
7	*Falco naumanni*	Küçük Kerkenez	II	VU	Reproduction in Summer
8	*Falco columbarius*	Boz doğan	II	LC	Winter migrants
Columbiiformes/Columbidae					
9	*Columba livia*	Kaya güvercini	III	LC	Local
Strigiformes/ Tytonidae					
10	*Tyto alba*	Peçeli Baykuş	II	LC	Local
Strigiformes/Strigidae					

No	Scientific Name Group/Family/Species	Turkish Name	Preservation Statue		Immigration State
			Bern Annex	IUCN	
11	*Athene noctua*	Kukumav	II	LC	Local
Apodiformes/Apodidae					
12	*Apus apus*	Ebabil	III	LC	Reproduction in Summer
Coraciiformes/Coraciidae					
13	*Coracias garrulus*	Gökkuzgun	II	NT	Reproduction in Summer
Passeriformes/Alaudidae					
14	*Alauda arvensis*	Tarlakuşu	III	LC	Local
15	*Galerida cristata*	Tepeli toygar	III	LC	Local
Passeriformes/Hirundinidae					
16	*Hirundo rustica*	Kır kırlangıcı	II	LC	Reproduction in summer
17	*Delichon urbicum*	Ev Kırlangıcı	II	LC	Reproduction in summer
Passeriformes/Motacillidae					
18	*Anthus trivialis*	Ağaç İncirkuşu	II	LC	Summer Migrants
19	*Anthus cervinus*	Kızıl Gerdanlı İncirkuşu	II	LC	Summer Migrants
20	*Motacilla flava*	Sarı kuyruksallayan	II	LC	Summer Migrants
21	*Motacilla alba*	Ak kuyruksallayan	II	LC	Summer Migrants
22	*Motacilla cinerea*	Dağ Kuyruksallayanı	II	LC	Summer Migrants
Passeriformes/Prunellidae					
23	*Prunella ocularis*	Sürmeli Dağbülbülü	II	LC	Summer Migrants
Passeriformes/Turdidae					
24	*Luscinia megarhynchos*	Bülbül	II	LC	Reproduction in summer
25	*Phoenicurus ochruros*	Kara kızılkuyruk	II	LC	Local
26	*Phoenicurus phoenicurus*	Kızılkuyruk	II	LC	Reproduction in summer
27	*Oenanthe oenanthe*	Kuyrukkakan	II	LC	Reproduction in summer
28	*Oenanthe isabellina*	Boz kuyrukkakan	II	LC	Reproduction in summer

No	Scientific Name Group/Family/Species	Turkish Name	Preservation Statue		Immigration State
			Bern Annex	IUCN	
29	*Oenanthe hispanica*	Kara Kulaklı Kuyrukkakan	II	LC	Reproduction in summer
30	*Saxicola rubetra*	Çayır taşkuşu	II	LC	Summer Migrants
31	*Saxicola torquata*	Taşkuşu	II	LC	Reproduction in summer
32	*Monticola saxatilis*	Taşkızılı	II	LC	Summer Migrant
Passeriformes/Sylviidae					
33	*Hippolais pallida*	Ak Mukallit	II	LC	Summer Migrant
34	*Sylvia nisoria*	Çizgili Ötleğen	II	LC	Summer Migrant
35	*Sylvia communis*	Ak Gerdanlı Ötleğen	II	LC	Reproduction in summer
36	*Phylloscopus collybita*	Çıvgın	II	LC	Reproduction in summer
Passeriformes/Muscicapidae					
37	*Ficedula semitorquata*	Alaca Sinekkapan	II	NT	Summer migrants
38	*Ficedula hypoleuca*	Kara Sinekkapan	II	LC	Transit visitor
Passeriformes/Paridae					
39	*Parus caeruleus*	Mavi Baştankara	II	LC	Local
Passeriformes/Sittidae					
40	*Sitta europaea*	Sıvacıkuşu	II	LC	Local
Passeriformes/Laniidae					
41	*Lanius isabellinus*	Kızıl Kuyruklu Örümcekkuşu	II	LC	Random
42	*Lanius excubitor*	Büyük Örümcekkuşu	II	LC	Winter migrants
Passeriformes/Corvidae					
43	*Pica pica*	Saksağan	-	LC	Local
44	*Garrulus glandarius*	Alakarga	-	LC	Local
45	*Corvus monedula*	Küçük karga	-	LC	Local
46	*Corvus corone cornix*	Leş kargası	-	LC	Local
Passeriformes/Sturnidae					
47	*Sturnus vulgaris*	Sığırcık	-	LC	Local
Passeriformes/Passeridae					

No	Scientific Name Group/Family/Species	Turkish Name	Preservation Statue		Immigration State
			Bern Annex	IUCN	
48	*Passer domesticus*	Serçe	-	LC	Local
49	*Passer montanus*	Ağaç serçesi	III	LC	Local
Passeriformes/Fringillidae					
50	*Fringilla coelebs*	İspinoz	III	LC	Local
51	*Carduelis cannabina*	Ketenkuşu	II	LC	Local
52	*Carduelis carduelis*	Saka	II	LC	Local
53	*Carduelis spinus*	Karabaşlı İskete	II	LC	Winter Migrants
54	*Loxia curvirostra*	Çaprazgaga	II	LC	Local
Passeriformes/Emberizidae					
55	*Emberiza hortulana*	Kirazkuşu	III	LC	Reproduction in summer

2.3.4. Mammals

As a result of the works executed around the project area, it may be said that structures looking like cages and the like for nesting by the bats are not available and those ones observed or potential species in the locality are the ones coming from the settlements or remote rocky areas for feeding. The species of mammals having potential of existing in the area have been provided in **Table – 2.4** together with Preservation Statues.

Accordingly, it has been seen that almost all of the species identified from the area are in **"LC"** namely "Common Species" category according to IUCN Red List. Other than the species enumerated herein, other mammal species might be randomly seen in the field.

Table – 2.4 Mammal Species and Preservation Statues Spread at the Terrestrial and Aquatic Biotopes at the Project Site and its Immediate Surroundings

Group / Family	Species and Turkish name	Habitat	Preservation Statue	
			Bern	IUCN
Insectıvora / Erinaceidae	*Erinaceus concolor* Kirpi	Vineyards, orchards, culture land and forest	-	LC
Chiroptera/ Vespertilionidae	*Pipistrellus pipistrellus* Cüce yarasa	Nests into wall wedges of the houses in the vicinity of the line.	Annex - III	LC
Lagomorpha/ Leporidae	*Lepus europaeus* Yabani tavşan	Found in the forest or openings.	Annex - III	LC
Rodentia/ Muridae	*Microtus lydius* Batı Anadolu Tarla Faresi	Lives in all types of cultural land and steppe and orchards.	-	-
	Cricetulus migratorius Cüce avurtlak	Lives in the plateaus, meadows, forest land and cultural land.	-	LC
	Apodemus mystacinus Kayalık Orman Faresi	Lives in the forest and rocks in the openings.	-	LC
	Mus macedonicus Tarla Sarı Ev Faresi	Lives in the open terrain.	-	LC
	Rattus rattus Ev Sıçanı	Lives in built-up areas and grassy, bushy creekline.	-	LC
Carnivora/ Canidae	*Vulpes vulpes* Tilki	Lives in the forest and around the settlement, all sorts of habitats.	-	LC

The mammals that are potentially available at the project area and its immediate surroundings have been studied and almost all of these organisms have been identified to be LC and Common – Least Concern according to IUCN.

The species of *Vulpes vulpes* (Kızıl Tilki) is included in the hunt animals category allowed to be hunted by Article – 6 of Central Hunting Commission decision during hunting is free during 2013 – 2014 hunting period from the hunt animals by the Ministry pursuant to law no. 4915, Clause 4, Subparagraph – 1. The species of endemic animals have not been come across at the project site.

2.4. ECOSYSTEM DESTRUCTION AND FAUNA

2.4.1. Its Potential Effect on Biotopes and Fauna:

Natural Gas Combined Cycle Power Plant shall be set up over a specific/limited area and the outputs of system would likely to affect the fauna species more. Throughout construction phase, it is envisaged that a short – term loss of ecosystem and abandonment of area and deformation of natural structure maybe experienced. It might be said that some of the overall population would be affected from the environmental effects which might be caused by the Power Plant area designated within the integrity of the habitat.

The works from the storage sites to be used within the scope of Project should carried out in accordance with the current regulations of the Environmental Legislations with the Environmental Impact Assessments and the bed of any creeks found in its vicinity should not be deformed. Excavation material must not be dumped into creek beds.

It is possible for the living groups existing at the site to be affected from the activities as they would be materialized in the open area throughout the activity. Due to the works to be carried out at this phase, replacement of habitats by the elements of fauna shall be in question. Since the species found in the area are of the elements of fauna having a wide spread across the entire country and availability of alternate habitat areas in the immediate surroundings, it is not anticipated that there would happen a large-scaled area reduction in the living and reproduction areas of these organisms.

2.6. INTERNATIONAL AND DOMESTIC PRESERVATİON STATUES OF THE FAUNA SPECIES

2.6.1. BERN Convention

European Preservation Convention of Wildlife and Natural Habitats have been accepted for the first time in Bern in 1979. By signing this convention in 1984, the Republic of Turkiye has become a party hereof. The objective of this convention: is to ensure preservation of wild flora and fauna and living environments thereof, particularly giving priority to those species which are migratory, whose generation has endangered or maybe vulnerable and develop the collaboration of more than one countries regarding this matter.

According to Bern Convention, the species of fauna taken under Preservation have been divided into two categories.

Annex – II	Species precisely taken under Preservation
Annex – III	Conserved species

Provisions of Article – 6 of Bern Convention:

Every Contracting Party shall take appropriate and necessary legal and administrative measures which will secure that the wild fauna species specified in the list of Annex – II are specially protected. For these species, particularly following matters will be prohibited:

a) All forms of deliberate capture and keeping and deliberate killing,

b) Deliberate damage to the reproduction or resting places or destruction of these place,
c) Disturbance of wild fauna, especially in the reproduction, development and the deliberate disturbance during hibernation in a way to be contrary to the purpose of this Convention,
d) To collect eggs from the wild environment or their deliberate destruction or keep these eggs even if empty,
e) In cases where it would make contribution to the effectiveness of these provisions, including animals that have been embalmed and readily recognizable part obtained from the any material on which this was used, keeping these animals in states of alive or dead and domestic trading hereof.

Annex – II: The list including the species which are explicitly required to be taken under preservation is contained within Annex – II. The contracting parties of the Convention will take necessary legal and administrative measures to ensure that the wild fauna species specified in Annex – II are specifically taken under preservation. Concerning these species, following situations will be particularly prohibited:

Annex – III: Comprises the list of the fauna species taken under preservation. Every party concluding the Convention will take necessary legal and administrative measures to ensure that the wild fauna species specified in Annex – III are taken under preservation.
The exploitation issue of the wild fauna species stated in Annex – II shall be regulated in consideration of the conditions put forth in Article – 2 to keep the populations away from risk. The measures oriented towards this will comprise the following:

Annex – IV Prohibited Hunting Method and Tools and Other Prohibited Operation Forms

Provisions of Article – 7 of Bern Convention:

1 - Every Contracting Party shall take appropriate and necessary legal and administrative measures which will secure protection of wild fauna species specified in list no. III attached hereto.
2 – All sorts of operations of the wild fauna specified in list no.III shall have been regulated in a way not to endanger presence of populations considering the context of article – 2 conditions.
f) – Measures to be taken;
g) Other principles regulating the closed hunting seasons and / or the operation,
h) In order to raise the wild fauna up to adequate population levels, when deemed necessary, temporary or regional prohibition of the operation,
i) Development of the regulation on the sale of wild animals either being alive or death, keeping the same for the purpose of selling, and transport or putting on sale properly.

Which ones of the vertebrate animal species identified in the area are contained in what annexes according to Bern is also visible in the following diagram.

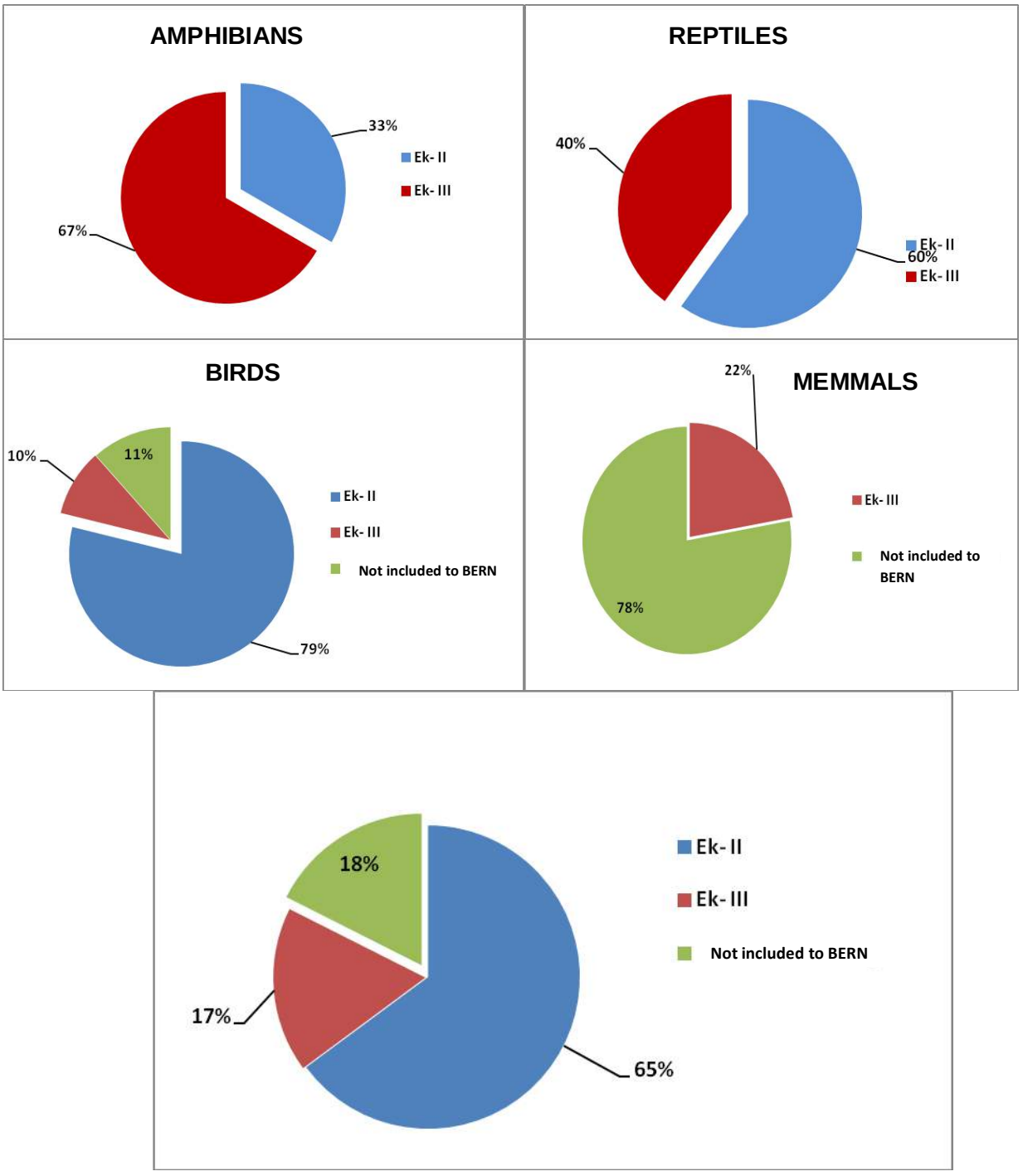


Figure – 2.5 The distribution of terrestrial vertebrate species by BERN

2.6.2. IUCN (International Union for Preservation of Nature and Natural Resources)

IUCN (International Union for Preservation of Nature and Natural Resources) Hazard Categories (Red Data Book) and their meanings are given below.

EX (Extinct)	Extinct taxon (Extinct)
EW (Extinct in the Wild)	Taxon extinct in nature (Extinct in Nature)
CR (Critically Endangered)	Taxon critically endangered (Critical)
EN (Endangered)	Taxon endangered (Endangered)
VU (Vulnerable)	Taxon extinction of whose generation is high in nature (Sensitive-Delicate-Vulnerable)
NT (Near Threatened)	It might be endangered (Near Threatened)
LC (Least Concern)	Taxon which has a wide-spread high population (Low Risky)
DD (Data Deficient)	Due to absence of adequate information, the taxon for which risk of extinction – related assessment is impossible by examining its state of distribution and/or population (Data Deficient)
NE (Not Evaluated)	Not Evaluated Taxon (Not Evaluated)

From the graphics below, we can see which of the species identified are comprised in what preservation category by IUCN. Accordingly, most of the species are comprised in LC common category.

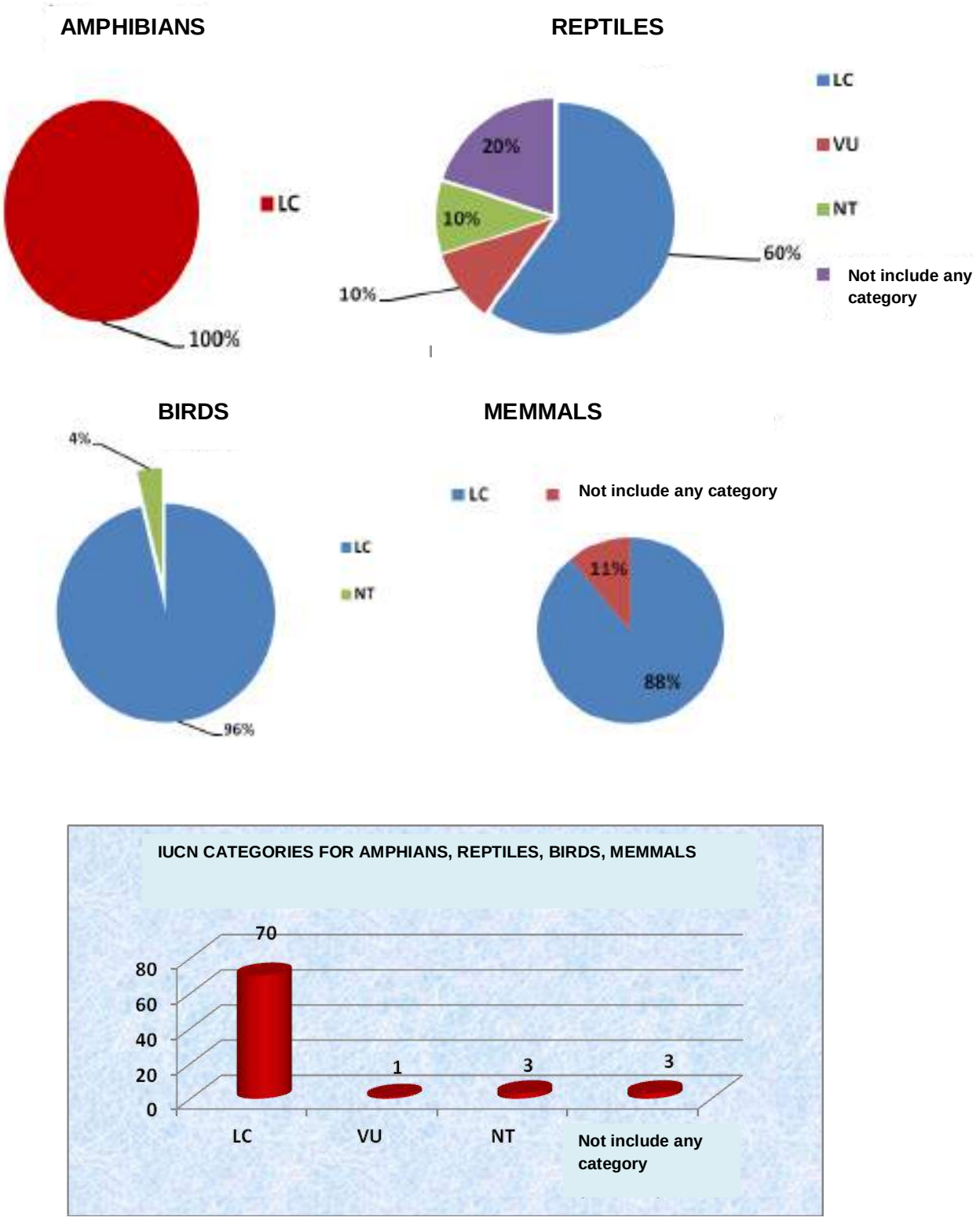


Figure – 2.6. Distribution Graphics for the Terrestrial Fauna Species Identified in the Area by IUCN Categories

2.6.3. Central Hunting Commission (CHC)

According to the decision of General Directorate of Nature Preservation and National Parks, Central Hunting Commission taking effect annually upon having been published in the Official Gazette, the species in the area have been classified according to the categories given in Annex Lists as well. According to the decisions of CHC;

Annex List - I	Fauna Taken under Preservation by the Ministry of Environment and Forestry
Annex List - II	Hunt Animals Taken under Preservation by the Central Hunting Commission
Annex List - III	Hunt Animals Which Are Permitted To Be Hunted by the Central Hunting Commission During Specified Periods.

Accordingly;

From the Amphibians; None of the species identified in the area is contained in any annex according to CHC Decisions. Almost the entire amphibian species found in Turkiye is not under preservation according to CHC Decisions.

From the Reptiles; According to CHC Decisions, all of the species identified are contained in Annex – 1. Namely, all of these species are fauna taken under preservation by the Ministry of Environment and Forestry.

Of the Birds; Almost all of them are contained in a list according to CHC Decisions.

From the Mammals; Almost all of them are contained in a list according to CHC Decisions.

It is required to act according to the preservation measures for the species specified in the Preservation Lists pertaining to the Hunting Periods drawn up annually in line with the Decisions of Nature Preservation and National Parks General Directorate, Central Hunting Commission.

2.7. CONCLUSIONs AND RECOMMENDATIONS

Species Percentage of Category – Based Vertebra Animals identified in the survey area have been provided in **Figure – 2.3.** As it would be seen here, the highest number of species in the area belongs to the birds with a 71% rate, which is followed by the reptiles with a rate of 13% and the mammals with a rate of 12%. As for the amphibian species are represented with 3 species corresponding to 4% in the area.

Most of the species identified are in LC common category and their population status in Turkiye is sufficient. Any species whose generation is endangered and required to be protected has not been come across within the project site. Nevertheless, in addition to the measures oriented preservation of fauna species and biodiversity specified in Phyto-ecology section, the measures specified from the aspect of fauna should also be obeyed.

Since the terrestrial fauna species have mobility, they would head towards similar habitats nearby. The fauna species will not be endangered due to the activities to be effectuated. However, attention should be paid to the following points when working in the site.

- Dumping any type of excavation materials into water resources found in the immediate surroundings should not happen and material depot for the topsoil should be built at the storage sites pointed out in the Project Presentation File,
- Due attention should be paid to the preservation of the stream bed,
- When working, endeavors should be carried out in conformity with the regulations published pursuant to the Environmental legislations,
- Care should be taken in performing the construction works at the construction phase. It is suggested that high care is paid during construction phase during reproduction period of fauna between March and June and the noise is reduced down to minimum level during execution of construction works.

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ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Town of Yahşiyan, Borough of Kılıçlar

Ecosystem Assessment Report

CHAPTER – 3

Hydrological Assessment



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HYROBIOLOGICAL ASSESSMENT

3.1. INTRODUCTION

ACWA Power Kırıkkale Natural gas Combined Cycle Power Plant is situated within the boundaries of Borough of Kiliclar at the Town of Yahsiyan in Kirikkale Province in The Central Anatolia Region. Kizilirmak River staying inside the boundaries of the recommended Project is the longest running water which emerges from the territory of Turkiye and flows into the sea again from the territory of Turkiye. Its length is 1,355 km. Its major tributaries are Delice Brook, Devrez and Gokirmak. Kizilirmak River springs from the southern slopes of Kizildag in the Town of Imranli of Sivas Province in the easternmost Central Anatolia Region, firstly flows towards west then towards northwest passing by Salt Lake in the Northeast. Later on it heads towards North and northeast. Here, it unites with the Brook of Delice and after uniting with Devrez Brook in the west also, empties into Black sea from pours into Bafra Cape.

In order to identify and reveal preservation and endemism states of the aquatic fauna found in the Borough of Kiliclar and its immediate surroundings within the scope of the Project proposed, in September 2013, a land survey has been actualized in the Kizilirmak River and its surroundings situated inside the project area and the effect of the project over the aquatic ecosystem has been evaluated. Also the area – related literature has been scrutinized together with the outcomes acquired from the land study materialized by our party have been scrutinized within the extent of the assessment report.

3.2. METHODOLOGY

In order to identify existing aquatic fauna and reveal their preservation and endemism statues within scope of the Project proposed, in September 2013, a land survey has been actualized in the Kizilirmak River situated in the area. Project area has been given in Figure – 3.1.

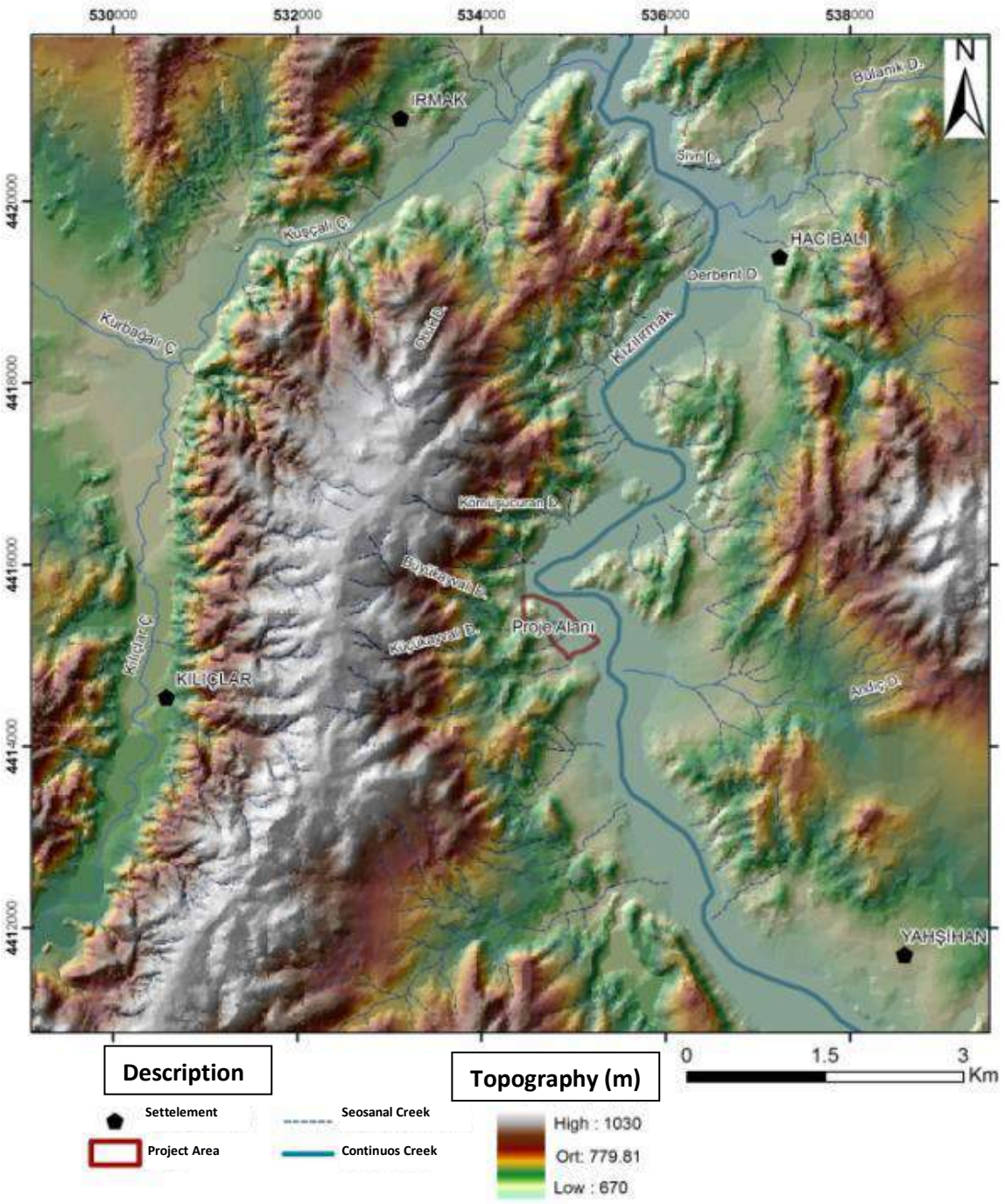


Figure – 3.1 Topographic Map of Study Area

The aquatic ecosystems consist of ***phytoplanktonic organisms*** contained at breeding step (algeas living free or bonded) and the so-called primary and secondary consumers fed by them ***zooplankton and benthic organisms*** and ***the fish*** fed by either ***phytoplanktonic, zooplankton and benthic organisms*** called to be the tertiary consumers, small fish depending on feeding preferences. When addressed to within this extent, the basic rings of the food chain in the ecosystem are the algeas (bonded forms and free forms – phytoplanktonic organisms), zooplankton organisms, benthic organisms and the fish. The

changes happening in the aquatic systems might be leading to alterations on these organisms as well.

Within the scope of this study, due to being the group which is ranked at the top step of the aquatic systems and might be affected most during the operation to be performed, the fish have been taken into account. From the most important indicators of the aquatic vertebra animals, the fish samples called Samus 725 MP has been caught with Samus 725 MP Electro – shocker (Photo – 3.1). The fish obtained have been fixed with both 4% formaldehyde, and also 96% alcohol and brought to the labratory and identified.



Photo – 3.1 Collecting the Fish Species

3.3. AQUATIC VERTEBRA FAUNA

The fish are the key biological component ranked in the top ring of food chain in the aquatic systems. Ecologically, the fish which are fed with alga, zooplankton or benthic organisms are ranked at the top ring of the food chain within the water. Some of their species do not only ecologically gain value but economically as well.

During land survey realized at the project site in September 2013, 8 species from Cyprinidae (Carps) family, 2 species from Balitoridae (Stone Eater Fish-Scavengers) family, and 1 species from Siluridae (Catfish) family, totally 11 species have been identified. The preservation status and population densities of these species identified have been given in Table – 3.1 according to IUCN Red List (2010), Bern Co0nvention (2002) and CITES (2004). Nevertheless, the overall bio-ecologic properties of the species identified have been provided below. The categories and abbreviations given in Table – 3.1 have been explained below:

IUCN: (International Union for Conservation of Nature and Natural Resources) Version 2010

EX: (Extinct): The species indisputably proven to be extinct.

CR: (Critically endangered): The species that are in the extreme level of becoming extinct in wildlife.

EN: (Endangered): The species, generation of which is in tremendous risk of becoming extinct in the wildlife.

VU: (Sensitive): The species, generation of which is in tremendous risk of becoming extinct in the wildlife.

LC: (Least concern): Common species.

Bern (BERN CONVENTION)

ANNEX – II: SPFS Animal Species Definitely Required To Be Preserved
ANNEX – III: PFS Animal Species Required To Be Preserved

***Alburnoides bipunctatus* (Bloch, 1782) - Chub**

Ody is slightly flattened on the sides and covered with cycloid scales. Color is darker on the dorsal side and laterals and abdominal region is silvery white. Particulary during reproduction term, a dark line appears on both sides. The adults can reach at a 10 – 12 cm length, maximum 16 cm (Photo – 3.2). It is usually fed with the benthic insect larvae and surface – drifted organisms. Its reproduction period happens in May and June.

The European population of this species whose population density was determined to be quite high is contained in the preserved species statue withn the scope of Annex – III of Bern Convention however, no preservation statue related to its population has been set down in Turkiye.



Photo – 3.2 Alburnoides bipunctatus

***Alburnus escherischii* STEINDACHNER 1897 – Bleak**

The body has generally lengthened and slightly flattened on the sides. The body is covered with easy – to fall cycloid scales. The body is generally light – colored and bright – looking (Photo – 3.3).

Being an endemic species in the in the river systems of Sakarya and Kizilirmak Rivers, *Alburnus escherischii* lives in droves particularly at the sections of lakes and running waters.

The mouth is in semi-ventral position and they are generally fed by benthic invertebrates, zooplankton and larvae of flies. During study, it has been determined that the population density of the species whose reproduction period is between the months of April – June was "High".



Photo – 3.3 Alburnus escherischii

***Barbus tauricus* KESSLER, 1877- Whiskered Fish**

This species preferring clean, oxygen-rich, deep structure gravelly, stony or sandy habitats of the high-flowing running water systems can adapt itself to the stagnant water systems as well. According to IUCN (2010), European population of this species evaluated to be sensitive (VU) category has been identified at all stations of the study area (**Photo – 3.**4).

Although the species whose population density of its adults was reported to be at "Medium" level enjoy a life of solitary, the younger individuals live in small groups. While the younger individuals are fed by b benthic organisms, the food prefence of the adults is compopsed of small fishj and vegetal materials. This species whose reproduction period i.s between the months of April – June as with other Cyprinidae species migrates to the uppefr section s of the running waters for reproduction. It prefers the stony and sandy coastal zones of the running waters as the spawning area and m akes a reproduction behavior whjen the water temperature reached at 12-18 °C.



Photo – 3.4 Barbus tauricus

***Capoeta banarescui* TURAN, KOTTELAT, EKMEKCI & IMAMOGLU, 2006 – Khramulya**

The species preferring the stony and gravelly habitats of the rivers in the central zones where flow rate is not high is a kind of species gets adapted good to stagnant waters as well. Due to presence of two pairs of barbels on the mouth side, it is easily distinguished from the species of *Capoeta capoeta* and *Capoeta sieboldi*. Mouth is in ventral position (Photo – 3.5). In

general, it is fed by zooplankton and phytoplankton in the juvenile period and invertebrates, algae and aquatic plants in the adulthood period. Reproduction period is between the months of April – June.
This species identified that its population density is at “High” level is not included in any hazard risk categories according to IUCN (2010), Bern Convention (2002) and CITES (2004).



Photo – 3.5 Capoeta banarescui

***Capoeta sieboldi* (STEINDACHNER, 1864) – Khramulya – Yellow Fish – Brook Fish**

This species called as Khramulya – Yellow Fish – Brook Fish by local people is benthopelagic and a quite high – ecologic tolerance species (Photo – 3.6). This species which keeps on its life in the lakes and at the bottoms of slightly gravelly, sandy and clay areas in the slow-flowing running waters exhibits a distribution in the Kizilirmak River system and easily gets adapted to the stagnant water in our counter. Its primary foods are composed of Zooplankton organisms and aquatic invertebrates in younger ages and algae, plant articles and detritus in adulthood ages. The reproduction period of this species identified that its population density at all points of the study is at “High” level is between the months of April – July.

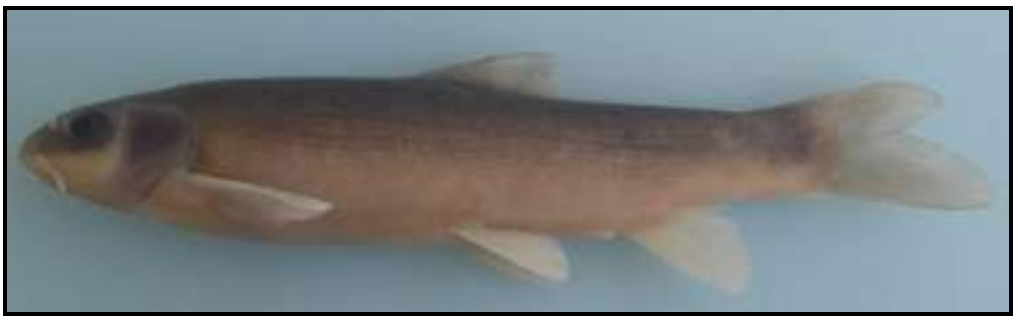


Photo – 3.6 Capoeta sieboldi – Khramulya – Yellow Fish
***Chondrostoma regium* (HECKEL, 1843) –** Structural nose

This species so-called Structural nose by the local people prefers the habitats at the “Abramis Zone” where the flow rate of the river is not high and its floor is stony or gravel however, can survive in the lakes as well (Photo – 3.7). In general, the algae and aquatic invertebrates create its nutrients. Reproduction period is in April and May. This species identified that its population density is at “Medium” level is not included among the species

that are endangered or required to be preserved within the scope of IUCN (2010) Red List , Bern Convention (2002).





Photo – 3.7 Chondrostoma regium

***Cyprinus carpio* (LINNAEUS, 1758) – Carp**

As with many countries, the natural population of this species which has not been almost come across in our country at all has an economic importance and its culture is being made. The species whose ecologic tolerance is remarkably high maintains its life in deeper sections and the vegetation – rich areas of the lakes /ponds, brackish waters, rivers (Photo – 3.8).

According to IUCN Red List (2010), the subpopulations in Danube River where the natural forms are available are being evaluated in the scope of the species endangered. No preservation status has been set down for the waters of the Republic of Turkiye. The reproduction period bearing the Omnivorous feeding feature is between the months of April – June.



Photo – 3.8 Cyprinus carpio

***Squalius cephalus* (LINNAEUS, 1758)-Tatlısu Kefali-Chub"**

Typically being known as a running water fish and called by local people as 'Chub m-Common Carp", *Squalius cephalus*, adapts itself to the lakes and Brackishwaters very well (Photo – 3.9). The reproduction period of this species which has a wide dispersion in Kura – Aras, Kizilirmak, and Yesilirmak river systems is between the months of April – June. Mostly, it is fed by the aquatic invertebrates, insect larvae, plant particles and small fish. Adults reaches sexual maturity when they are 3-4 years old.



Photo – 3.9 Squalius cephalus

***Oxynemacheilus (Nemacheilus) angorae* (STEINDACHNER, 1897) – sabanejewia aurata**

Body is cylindrical and cross – sections are always circular. Body is covered with the cycloid scales. Its lateral line is complete. Free edges of the dorsal and anal fins are flat. Their mouths are ventral (lower) positioned and are generally fed by benthic invertebrates and zooplankton organisms (Photo – 3.10). *Oxynemacheilus angorae* generally prefers flowing, gravelly and stony bottom parts of the running waters. Although it would rather like clean waters most, it is quite resistive against pollution and can live even in the environments deprived from adequate oxygen. This species observed to reproduce in the months of April – July and identified to have a "High – level" population density has been caught from the slow-flowing and stony sections of Kizilirmak and Yesilirmak River systems close to coast.

There is not any preservation statues according to IUCN Red List (2010), Bern Convention (2002) and CITES (2004).



Photo – 3.10 Oxynemacheius angorae - Sabanejewia aurata

***Oxynemacheilus banarescui* (DELMASTRO, 1982) - Sabanejewia aurata**

Bodies are in structure of a thin, long and cylindrical shape. Body is covered with the cycloid scales. Head and dorso have been ventrally flattened and in normal width. Eyes are quite small and positioned upwardly. Mouth is small and ventrally positioned and has three pairs of whiskers around it. Lateral line is incomplete. Body has dark brown stains irregularly lined up on a yellowish or gray-white background, mostly on the lateral lines (Photo – 3.11). Although this species being nocturnal maintain its life in the areas with gravelly bottom structure and sandy areas, they can be available in the marshes as well. Its reproduction period is between the months of April – July and mostly fed by b benthic organisms and zooplanktons.

The population density of the species identified in the sections of Kizilirmak River close to the coast is at "High" level and is not included among the species that are endangered or required to be preserved within the scope of IUCN (2010) Red List, Bern Convention (2002).



Photo – 3.11 Oxynemacheius banarescui- Sabanejewia aurata

***Silurus glanis* Linneaus, 1758 - Catfish**

Its body is long and head is top – flattened and remarkably strong. Mouth is ventrally positioned and has three pairs of whiskers around it. Its anal fins are quite long and bear approximately 90 soft rays. Body color is usually blackish-gray or ash-gray on the dorsal, and ventral portion hereof is off-white or yellowish (Photo – 3.12).

The catfish generally live in the lakes, ponds and large river systems with a bottom structure being clay, soft – floored. Primary foods of this species that owns carnivore type of feeding are composed of the organisms like freshwater lobsters, birds, small snakes.
The reproduction period of this species that possesses economical importance and is nocturnal (night-active) is between the months of May – July.

The population density of the species assessed within the scope of Annex - III preserved species of Bern Convention is at "Medium" level at the study area.



Photo – 3.12 Silurus glanis

Table – 3.1 The fish species obtained in consequence of the sampling carried out at the project site according to reproduction and life habitats, threat categories, population densities and the station where they were sampled

FAMILY	NO	SPECIES	TURKISH NAME	IUCN	BERN	Endemism	Life habitat	POPULATION DENSITY
Cyprinidae	1	*Alburnoides bipunctatus* (Bloch, 1782)	Bleak	-	Annex-III	-	Running water River Lake	High
	2	*Alburnus escherischi* (Steindachner, 1897)	İnci balığı	-	-	Endemic	Running water River Lake	High
	3	*Barbus tauricus* Kessler, 1877	Bıyıklı Balık, Caner	VU	-	-	Running water River Lake	Medium
	4	*Capoeta banarescui* Turan, Kottelat, Ekmekçi & Imamoglu, 2006	Siraz (İn) balık	-	-	Endemic	Running water River Lake	High
	5	*Capoeta sieboldi* (Steindachner, 1864)	Sarı Balık	-	-	-	Running water River Lake	High
	6	*Chondrostoma regium* (Heckel, 1849)	Kababurun	-	-	-	Running water River Lake	Medium
	7	*Cyprinus carpio* (Linnaeus, 1758)	Sazan	-	Annex-III (Tuna populations)	-	River Lake	High

FAMILY	NO	SPECIES	TURKISH NAME	IUCN	BERN	Endemism	Life habitat	POPULATION DENSITY
	8	*Squalius cephalus* (Linnaes, 1758)	Tatlısu kefali	LC	-	Running water River Lake	Running water River Lake	High
Balitoridae	9	*Oxynemacheilus angorae* (Steindachner, 1897)	Çöpçü Balığı	-	-	Endemic	Running water River Lake	High
	10	*Oxynemacheilus banarescui* (Delmastro, 1982)	Çöpçü Balığı	-	-	Endemic	Running water River Lake	High
Siluridae	11	*Silurus glanis* (Linnaes, 1758)	Yayın	-	Annex - III	-	River Lake	Medium

In addition to these natural species existing within the study area, *Pseudorasbora parva* (Stone moroko) from the family of Cyprinidae entered and showing distribution in the running waters within the basins of Kizilirmak and Sakarya River systems is an invasive species. Nevertheless, it is known from the previous studies that *Esox lucius* (Turna-Northern pike), *Sander lucioperca* (Sudak-Pike-perch) and *Atherina boyer* (Gümüş Balığı – Big head sand-smelt) from Percidae family and particularly *Gambusia holbrooki* from Poecilidae family which were instilled in fish at particularly Dam lakes in order to fight against mosquitoes and obtain economic importance spread into our big river systems by escaping from these lakes and damaging the natural species. However, during the study, these species have not been come across.

3.3. MEASURES REQUIRED TO BE TAKEN FOR ELIMINATION OF ADVERSE EFFECTS WHICH WOULD EMERGE DURING THE ACTIVITIES TO BE PERFORMED WIHIN THE SCOPE OF THE WORKS

The natural gas to b e used at ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant shall be obtained from Botas natural gas pipeline. The cooling system to be employed at the Natural Gas Combined Cycle Power Plant shall operate in closed – loop and thus, water shall be required once for the system start up only. During operation phase, the water required shall be met by the evaporated and blowdown water losses. The cooling water required for the system from the Caisson wells planned to be drilled. Since the cooling system is of the closed – loop type, the cooling system discharge shall not happen to Kizilirmak River.

Due to having been designed within the scope of project as the Closed – Looped Open Type forced draft cooling tower (Wet -Type Fan System), approximately a 40,000 m^3 circulation water is required to be constantly existing in the cooling system. This amount of water shall be obtained step by step for the first time from the Caisson wells.

Waste water emanating from the employees who will work shall happen during construction and operation phase of the project. Household wastewaters shall be discharged into Kıizilirmak River only after having been purified from the wastewater treatment plant to be built within scope of the project. The wastewaters that will be discharged into the receiving environment must be discharged in accordance with Water Pollution Control Regulation, Circular on Technical Methods of Wastewater Treatment Plants and Water Products Regulation.

Maintaining the human – induced effects on the fish and their living habitats identified at the project site at a minimum level, their preservation bears significance in terms of their transfer to future generations. In this context, it is recommended that the application is carried out by paying attention to the following matters.

- Mixing of any chemical substance with the river beds and aquatic ecosystems should be prevented during operation.
- Household wastes which would arise during construction and operation period shall be left to the receiving environment according to the regulations.
- No intervention should happen on the river bed during reproduction period (April – July) of the fish available from the area.

- In certain periods, some of the physical and chemical properties of the river water (particularly, salinity, water temperature, electrical conductivity, dissolved oxygen etc.) must be measured and in occurrence of any adverse situation, necessary measures must be taken.

The impact of some physical and chemical parameters of the water on the aquatic organisms has been explained below:

- Temperature is one of the most important factors affecting the life of organisms in the aquatic ecosystems. Depending on the temperature rise, metabolism of the fish accelerates and reaching at sexual maturity age is reduced.
- ***In addition to this, temperature affects distribution, feeding, spawning and also the behavior of the fish species. Most of the species belonging to Cyprinidae (Carp) family stops their feeding activity whenever water temperature drops below 8-10ºC and begin reproduction whenever the water temperature rises above 15 ºC (Nikolskii, 1963).***
- PH being one of the water quality parameters recommended to be monitored periodically is an indicator of the water's acidic and basic features and very crucial in terms of fish life and yield. ***Freshwater fish generally prefer pH between 6.5 – 8.5.***
- Being one of the most important factors for the aquatic organisms and recommended to be periodically monitored both during construction and operation phases as well, dissolved oxygen (DO_2) amount carries great importance for the organisms whose lives are subject to aerobic metabolism and considerably significant in terms of lives and developments of the aquatic organisms. The more the temperature and amount of organic substance, the less the dissolved oxygen, and the higher the air pressure, the more the amount of dissolved oxygen (Yaramaz, 1992). However, the factors like salinity and flow rate also affect the amount of dissolved oxygen (Wetzel, 1983). ***Bremond and Vuichard (1973) have stated that the amount of oxygen for Cyprinids to be able to survive should be at least 5 mg/l.***
- Being the transmission power of the ions of electrical current in water, the electrical conductivity (EC) value varies depending on concentration of all salts dissolved in the water. Any increase in rate of electrical conductivity representing one of the parameters required to be periodically followed up from the aspect of its level in the water depends on a rise in salinity ratio in the water (Wetzel (1989). ***Nevertheless, Bremond and Vuichard (1973) have stated that the electrical conductivity is an indicator of the amount of dissolved substance and varies between 150-750 µS/cm inland waters appropriate for the fish and if reached at 3000 µS/cm, it would cause an ecologic unbalancing in the water.***

In terms of preservation of existing aquatic fauna at the project site, when necessary measures and pre cautions are taken In light of the above – given information, impact of said project would be reduced down to minimum and the continuity of the species available in the aquatic ecosystem would be likely to be achieved.

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ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Town of Yahşiyan, Borough of Kılıçlar

Ecosystem Assessment Report

SECTION 4

Geological and Hydrogeological Assessment



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GEOLOGICAL AND HYDROGEOLOGICAL ASSESSMENT

4.1. INTRODUCTION, PROJECT SITE AND TOPOGRAPHY

The planned ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant is located at the west of Kızılırmak River and within the borders of Kırıkkale Province, Yahşihan Town, Kılıçlar Municipality. The Plant site is situated in Kırıkkale Province, Kılıçlar Municipality. The municipality is approximaltely 25 km away from the city center and 22 km from the Yahşihan town center (Figure 1, Picture 1). The study field is located 4,18 km (air distance) east of Municipality center. The track lenght is 18 km and it is possible to travel from the Municipality to working field by car (Figure 1). The activity area was choosen as the island 108 parcel no.1, island 109, parcel no. 1 and 2, which is located on I30-b-14-a-1-c, I30-b-14-a-1-d, I30-b-14-a-2-d, I30-b-14-a-3-a, I30-b-14-a-4-a, I30-b-14-a-4-b map sections of Kılıçlar Municipality with the larger scale of 1/25000. The main dwelling units around the working site are Yahşihan Town, Hacıbalı, Irmak and Kılıçlar Villages. The area has moderate rugged terrain and a limited woodland (Picture 2). Kızılırmak River runs in the Northwest-Southeast direction within the borders of the site. Kuşçalı, Derbent and Andıç Streams are important streams intersecting with the area, flowing into the Kızılırmak River.

Kırıkkale Province, embracing the Natural Gas Thermal Power Plant, is located in Middle Kızılırmak region of Cenral Anatolia, and surrounded by Çorum and Yozgat in the east, Kırşehir in the South, Ankara in the west and Çankırı in the north. The average altitude is 700m and the highest point is Denek Mountain – Namıkkaya Hill with the height of 1.744 m. The main fertile lands of the Province are the plains of Keskin-Maşat, Bahşılı, Kızılırmak and Kılıçözü. Kızılırmak River, crossing the border of the Province from Çelebi Town in the South, runs to the North setting the provincial border of Kırıkkale-Çankırı in the North. Kızılırmak River, running at the eastern part of the city center, has the lenght of 94 km within the provincial border, and Kapulukaya Dam and hydroelectric plant were constructed on the river. Other important streams of the province are Delice River, Kılıçgözü and Balaban Creek, Acıözü and Çoruhözü Streams. There are plateaus ranging from 1200m – 1600m within the borders of Kırıkkale province. Hodar, Bedesten, Kamışlı and Sarıkaya on Küre Mountain; Koçu on Koçu Mountain; Azgın, Gümüşpınar, Pehlivanlı, Suludere and Yeşilkaya on Denek Mountain are the most important plateaus in the region. There are only a few plains within the province border. The most important plain is Kırıkkale Plain reaching to Çamlıca and Karakaya Hills in the North, to the west part of Denek Mountain in the South. The northern downhills meet on the plain, forming the core of the settlement in Kırıkkale province. The site where Machinery and Chemical Industry Corporation facilities are reaching over the Denek Mountain. It broadens toward Kızılırmak River and the broadest part is inbetween the Çoruhözü River and Kızılırmak River, with the height of approximately 750m. Although there are certain plains along the river in addition to Kırıkkale plain, these are not so important in terms of geoformations resulting due the fact that there is a big difference in terms of rise between river basins and hills. The mountains has became round hills or at some places sharp hills either eroded all along by deep valleys or shattering. It is observed that the number of these kinds of hills are increasing when getting closer to the mountains. There are plateaus ranging from 1200m – 1600m heigth within the borders of Kırıkkale province. Hodar, Bedesten, Kamışlı, Sarıkaya plateaus on Küre Mountain; Koçu plateau on Koçu Mountain; Gümüşpınar, Pehlivanlı, Suludere, Yelişkaya and Azgın plateaus on Denek Mountains are the most important plateaus of the region. The approximate elevation of

provincial land from sea level is 700m. Koçu Mountain, located in the direction of northwest-southeast has the width of 4km and height of 700m. The peak point of the mountain is Yığıltepe (1278m). Denek Mountain order in the east and southeast is located between Keskin Village and İzzettin Village that are in the south part of Çoruhözü Valley. The highest points are Gavur Hill (1742m) and Bozkaya Hill (1577m), forming the longest, widest and highest mass of the region with 44 km lenght and 30km width. Küre Hill (1450 m) is the peak of Küre Mountain lying in the northeast-southwest direction.

Kızılırmak River: Kızılırmak is the most important river in the region. Kızılırmak, rising from the mountains in the eastern part of Zara Town of Sivas Province, enters into the Kırıkkale border from Çelebi Town in the South and flows through the northern part heading to north-west in the central town. Leaving the provincial borders, it forms the Çankırı-Kırıkkale provincial border in the north. Kapulukaya Dam is located on Kızılırmak River within the borders of Hasandede-Hacılar terrain.

Delice Creek: It is one of the important arms of Kızılırmak River. It flows along Yozgat provincial border and approaches to Delice Town center. It leaves the area from south-east part of the region alongside the provincial borders of these two cities. Delice Creek is 50 km long within the provincial borders.

Çoruhözü Creek: It directly empties into Kızılırmak River and rises from upper parts of İzzettin Village. It flows in parallel with the railways between İzzettin – Balışeyh regions, crosses the central town and flows into the Kızılırmak River. It provides a huge contribution to agricultural areas within the boundaries of its course. There are motor-pumps on the creek for irrigation purposes. Its lenght is 48 km.

Okun Stream: Balaban and Sarılıöz Creeks generated by the waters flowing from southern parts of Elmadağ region, merges around Kılıçlar Town and forms Okun Creek. 13 km-long stream flows into the Kızılırmak River near Irmak Town.

In addition to these streams and creeks, there are other seasonal creeks and streams drying during summer time.

Lakes: There is no natural lake within the borders or Kırıkkale province. Kapulukaya Dam Lake on Kızılırmak River is the only artificial lake in the region. Kapulukaya Dam Lake covers 20.7 km^2 area. It was constructed for energy supply and drinking and industrial water supply, and has the volume of 282 hm^3. Additionally, Çipi Lake in Ahili Town was constructed for irrigation purposes and it contributes to an area of 46 ha with its 304.000 m^3 water volume (http://www2.cedgm.gov.tr/icd_raporlari/kirikkale06.pdf).

The mean topographical height of the said Project site is 779.31m while the maximum height is 1030m and minimum height is 670m with no major difference in topographical structure (Figure 4.1.).

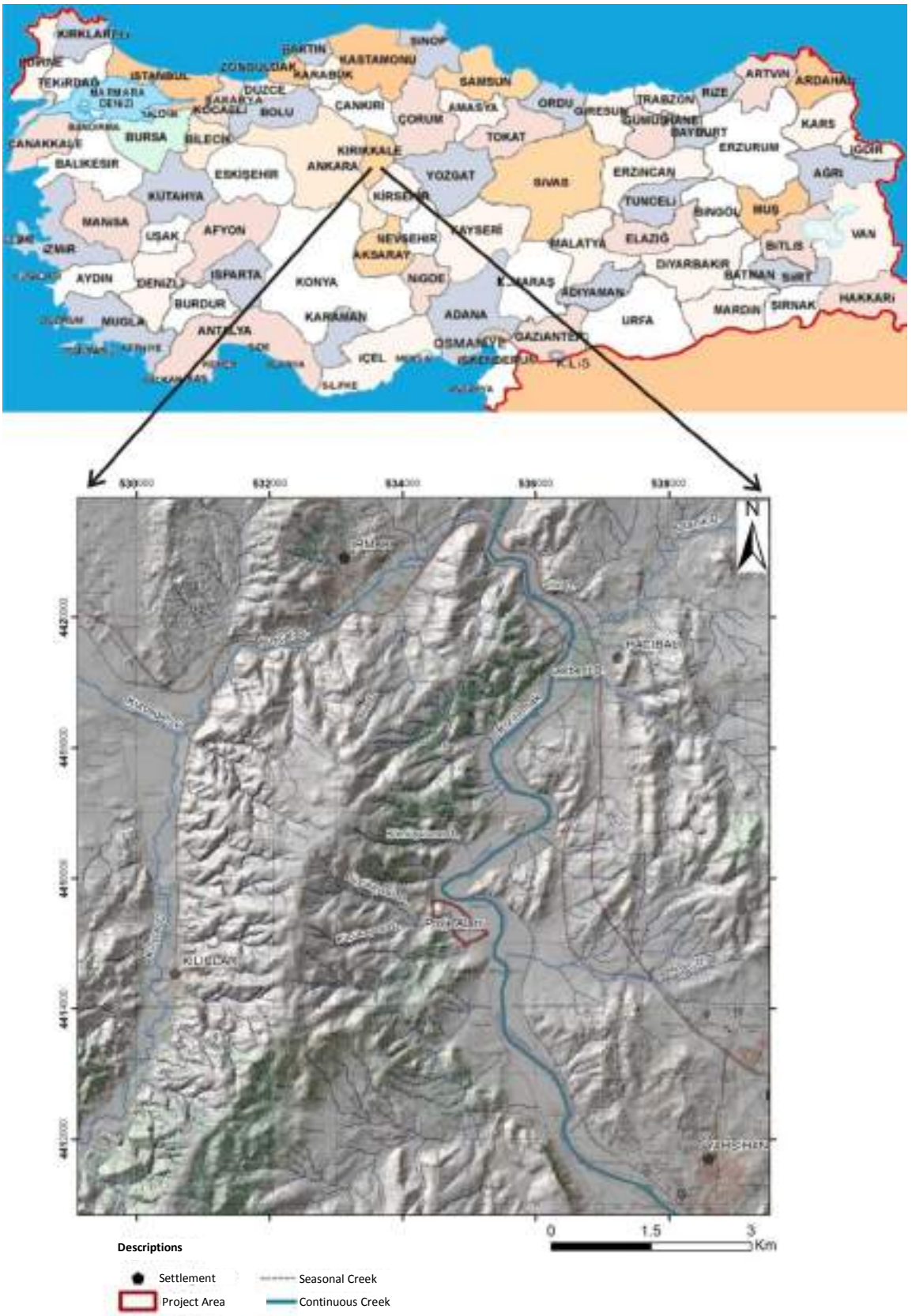


Figure 4.1. Site Location Map of Project Site



Picture 4.1. Pictures of Project Site



Picture 4.2. Wooden land throughout the Project site

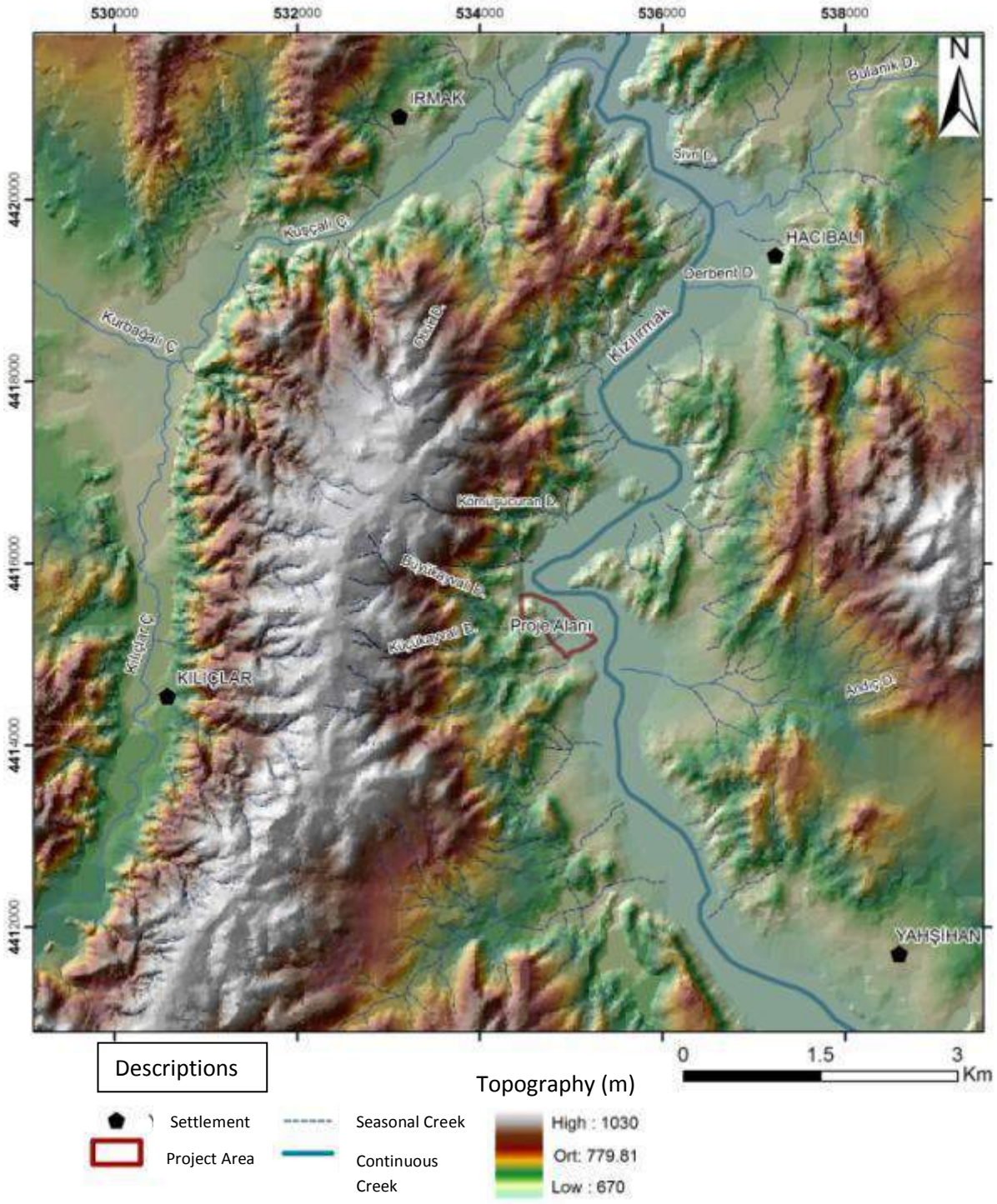


Figure 4.2. Topographic Map of Project Site

4.2. CLIMATE

Kırıkkale province is located 747 m altitute from sea level and in the mild temperature zone. However, continental climate is prevailing in the region due to the fact that the area is away from the sea level and daily temperature difference is changing due to the steppe terrain. Depending on the semi-arid climate, it is dry and hot in summers and cold in winters.

During the Assessment process of climate conditions prevailing in the Project site and around, precipitation and temperature data measured at the Kırıkkale (Center) Meteorology Station were evaluated.

According to the data monitored in Kırıkkale Meteorology Station during the Assessment process, annual mean temperature is recorded as 12.97°C, the highest mean temperature according to the long term monthly mean temperatures is recorded as 25.33°C in July and the lowest temperature is 0.76°C in January. According to the long term monthly temperature data, the lowest monthly temperature is recorded as -4.9°C in January, 2002; the highest monthly temperature is recorded as 28.7°C in August, 2006 (Tablo 4.1, Figure 4.3).

Tablo 4.1. Long-term Monthly Total Precipitation Values of Temperature Parameter measured at Meteorology Stations located at and near the Project Site.

Year/Month	January	February	March	April	May	June	July	August	September	October	November	December
1992	-2	-1.9	4.8	12.4	16.6	20	21.9	24.2	17.6	16.4	5.9	0.1
1993	-4.3	0	6.4	11.6	15.7	20.6	23.6	24	19.9	14.8	4	3.9
1994	3.5	2.4	7.4	15.2	17.7	21.8	25.2	24.5	23.4	16	6	0.7
1995	3.3	5.7	7.7	10.8	18.6	22.9	22.3	24.8	20.2	11.7	4.1	3.3
1996	1.8	5.3	4.9	10.2	19.2	21	26	-	-	-	-	-
1997	2.4	1.3	4.1	8.5	18.4	20.9	24.1	22.3	16.4	13.6	7.1	3.9
1998	2.6	3.7	5.2	14.3	16.7	21.1	25.8	26	20.2	15	9	4.8
1999	3.5	4.5	7.5	13	17.6	21.5	25.6	24.4	19.5	14.3	7.1	4.4
2000	-3.6	-0.9	5.2	13.8	16.2	20.4	27.6	23.7	19.8	12.5	8.4	2.4
2001	3.2	4.8	12.1	13.5	15.7	23.3	27.6	26.1	21.8	13.9	7.7	3.6
2002	-4.9	3.9	9.6	11.3	17.5	21.8	26.1	23.9	19.8	14.4	7.9	-1.2
2003	5.7	0.6	3.7	11.7	20	23.4	25.1	25.3	19	15.6	7.8	1.8
2004	0.4	3.6	7.7	12.1	16.8	20.7	24	24.2	19.9	14.8	7	1.7
2005	3.9	3.1	7.1	12.3	17.4	21	26.5	26.5	19.5	11.8	6.2	2.9
2006	-2.1	-0.1	8.4	14.1	17.3	22.8	23.8	28.7	19.4	14.4	5.7	0.5
2007	2.2	1.5	7.6	9.9	21.2	23.5	27.2	27.3	21.7	-	-	-
2008	-4.9	-1.5	11	15	17	23	25.9	27.1	20.6	13.8	8.9	0.7
2009	2.1	4.7	6.2	11.5	16.3	22.8	24.6	23.7	19	16.8	7	5.3
2010	3.2	7	8.7	12.1	18	22.1	26.4	28.3	22.5	12.2	9.7	4.7
2011	1.8	2.6	5.5	10.9	15.4	20	26.2	24.1	20.1	11	2.5	2.9
2012	-1.8	-4.1	3.3	14.7	17.3	23.5	26.5	24.4	21.5	16	8.5	3.3
Average	0.76	2.20	6.86	12.33	17.46	21.81	25.33	25.18	20.09	14.16	6.87	2.62
Maksimum	5.70	7.00	12.10	15.20	21.20	23.50	27.60	28.70	23.40	16.80	9.70	5.30
Minimum	-4.90	-4.10	3.30	8.50	15.40	20.00	21.90	22.30	16.40	11.00	2.50	-1.20

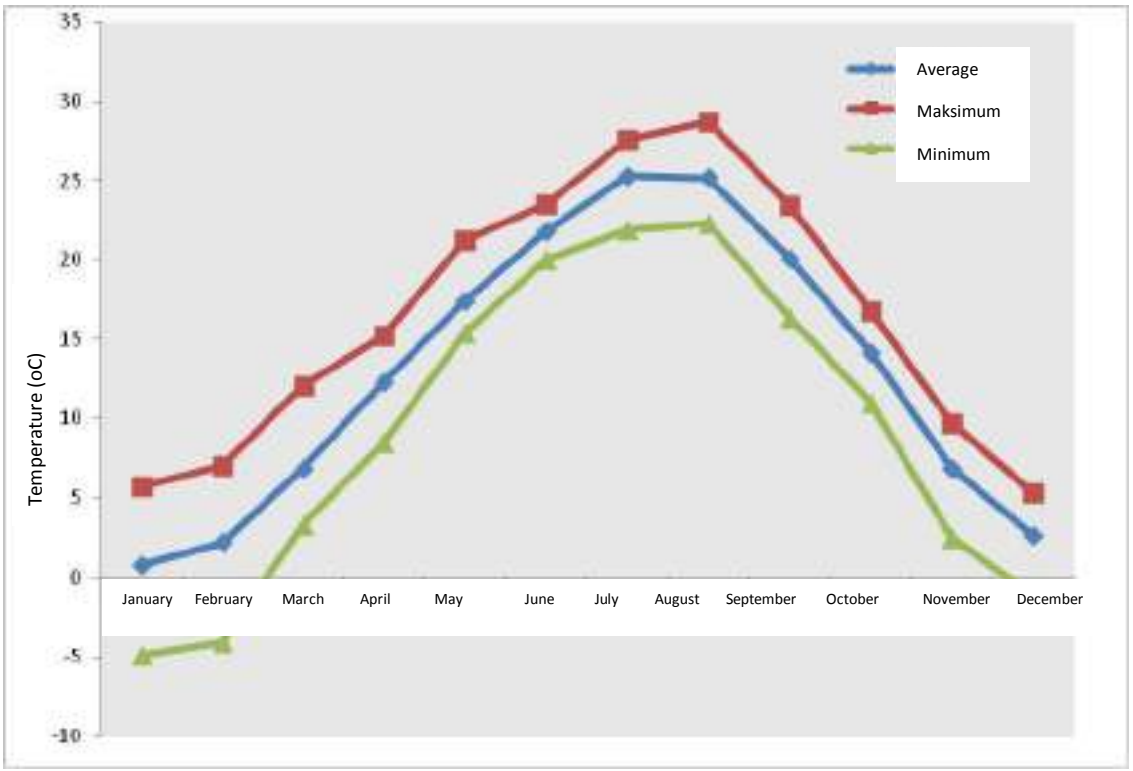


Figure 4.3. Time-based Changes on Monthly Mean Temperature Parameter

Please see Figure 4.4. for 21-year total precipitation values measured between 1992-2012 by the Kırıkkale Meteorology Station. 21-year mean precipitation value of Kırıkkale Meteorology Station is 365.31 mm. Maximum annual precipitation was recorded as 610.10 mm in 1997 and minimum annual total precipitation was recorded as 138.20 mm in 2007.

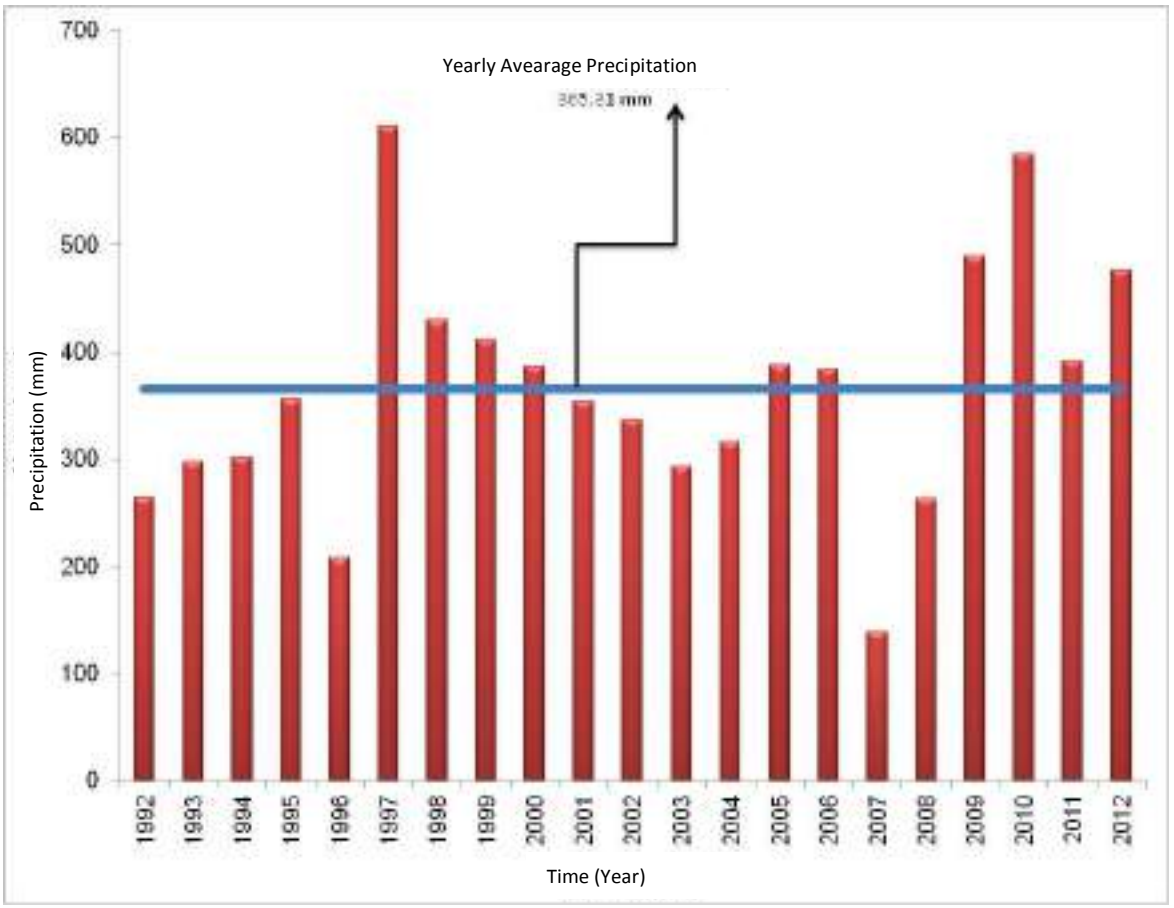


Figure 4.4. Kırıkkale YGI Annual Total Precipitation Diagram

Taking into account the 21-year precipitation data recorded by Kırıkkale Meteorology Station between 1992-2012 (Tablo 4.1.), the annual mean precipitation value is 365.31 mm and the monthly mean precipitation value is 31.63 mm. Throughout Kırıkkale province, summers receive the lowest level of precipitation while the most rainy seasons are autumn, winter and spring respectively. As is shown in Figure 4.4., precipitation starts as of September and increasingly continue in winter and reaching the peak season in April. April is the most rainy season in terms of long-term monthly precipitation and it is recorded 45.83 mm while July as the lowest rainy season has 10.89 mm precipitation.

Tablo 4.2. Kırıkkale Meteorology Observation Station - Monthly Mean Precipitation Values (mm)

Year/Month	January	February	March	April	May	June	July	August	September	October	November	December	Total
1992	0.8	5.3	55.8	22.3	6.8	55.4	8	12.2	3.8	11.6	31.1	50.6	263.7
1993	37.7	36.2	15.4	25.4	92.4	23.3	-	3.9	0.6	1.8	26	34	296.7
1994	52.2	21.8	34.7	33.8	38.3	0.2	1.8	8.8	1.8	30.6	52.8	24.6	301.4
1995	26.6	12.6	80.2	73.6	25	21.2	18.4	2.9	17.4	27.4	38.7	11.2	355.2
1996	23.8	27	74.5	32.5	34.4	8	7.1	-	-	-	-	-	207.3
1997	45.7	23.3	15.2	79.8	84.5	138.2	11.4	33.9	1.2	51.2	36.8	88.9	610.1
1998	9.4	28.6	46.2	51.9	123.9	69.6	2.8	-	2.6	12.9	32	49.3	429.2
1999	34	58.4	58.8	17.2	7.1	36.4	59.9	58	8	56.2	12.7	4.2	410.9
2000	75.7	30	18.8	80	26.4	59	-	19.2	4.3	25.9	7.2	39.2	385.7
2001	2.5	17.3	22.1	18.2	96.7	0.6	3.9	1	12.2	1.7	61.2	116.6	354
2002	40.7	13.1	34.1	108.8	34.1	9.3	5.4	2.8	25.1	21.2	31.9	9.3	335.8
2003	41.1	42.2	2.9	49.2	14.7	0.1	1.5	1.2	38.7	13.5	6.9	81.1	293.1
2004	88.6	11.6	8	30.9	30.9	51.1	17.8	17.8	0.2	3.8	44.8	10.3	315.8
2005	17.6	14.6	73	70.3	19.1	31	18.5	18.4	33.8	20.8	57.5	12.1	386.7
2006	53.3	65.2	35.6	14.1	56	27.9	4.6	-	52.2	61.2	12	1.8	383.9
2007	15.4	13.8	22	29.6	8.7	47.6	0.6	0.4	0.1	-	-	-	138.2
2008	12.4	11.7	17.4	19.7	21	7.4	1	0.4	68.9	22.3	32.5	48	262.7
2009	37.6	91.5	51.8	98.5	45.8	23	11.7	0.1	4.7	10	52.5	62.2	489.4
2010	82.1	40.6	28	36.8	47.3	108.8	14.6	0.4	1.2	121.8	22.1	80.3	584
2011	40.6	30.1	60	33	50	39.8	17.1	15.2	0.9	55.8	12.5	36.8	391.8
2012	115.8	43	46.8	36.8	68.1	1.3	0.9	4.1	-	46.3	34.7	78.1	475.9
Average	40.65	30.38	38.16	45.83	44.34	36.15	10.89	11.15	14.62	31.37	31.89	44.14	365.31
Maksimum	115.80	91.50	80.20	108.80	123.90	138.20	59.90	58.00	68.90	121.80	61.20	116.60	-
Minimum	0.80	5.30	2.90	14.10	6.80	0.10	0.60	0.10	0.10	1.70	6.90	1.80	-

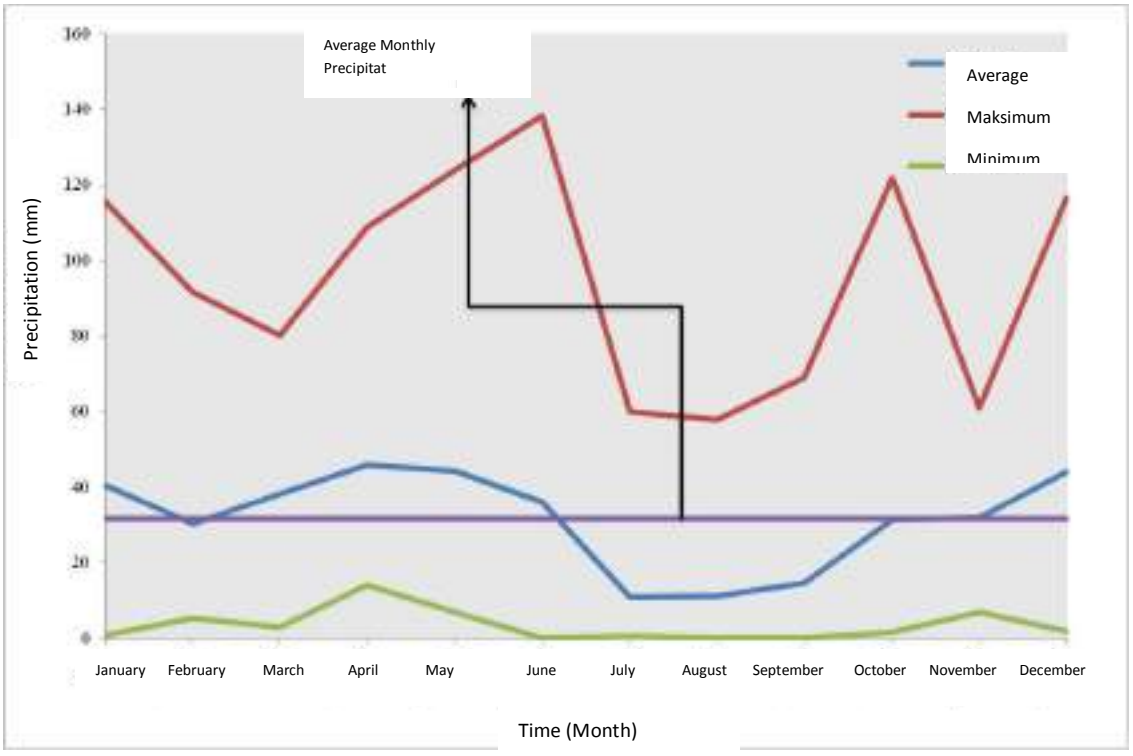


Figure 4.5. Time-based Changes of Monthly Mean Precipitation

Please see Figure 4.6 for the distribution of precipitation in the spring, summer, autumn and winter seasons masured by the meteorology station. According to the precipitation values recorded at the station, approximately 33.81 % of the efficient rainfall is observed in spring while 30.34% of the rest falls in winter, 20.52% in autumn and 15.33% in summer.

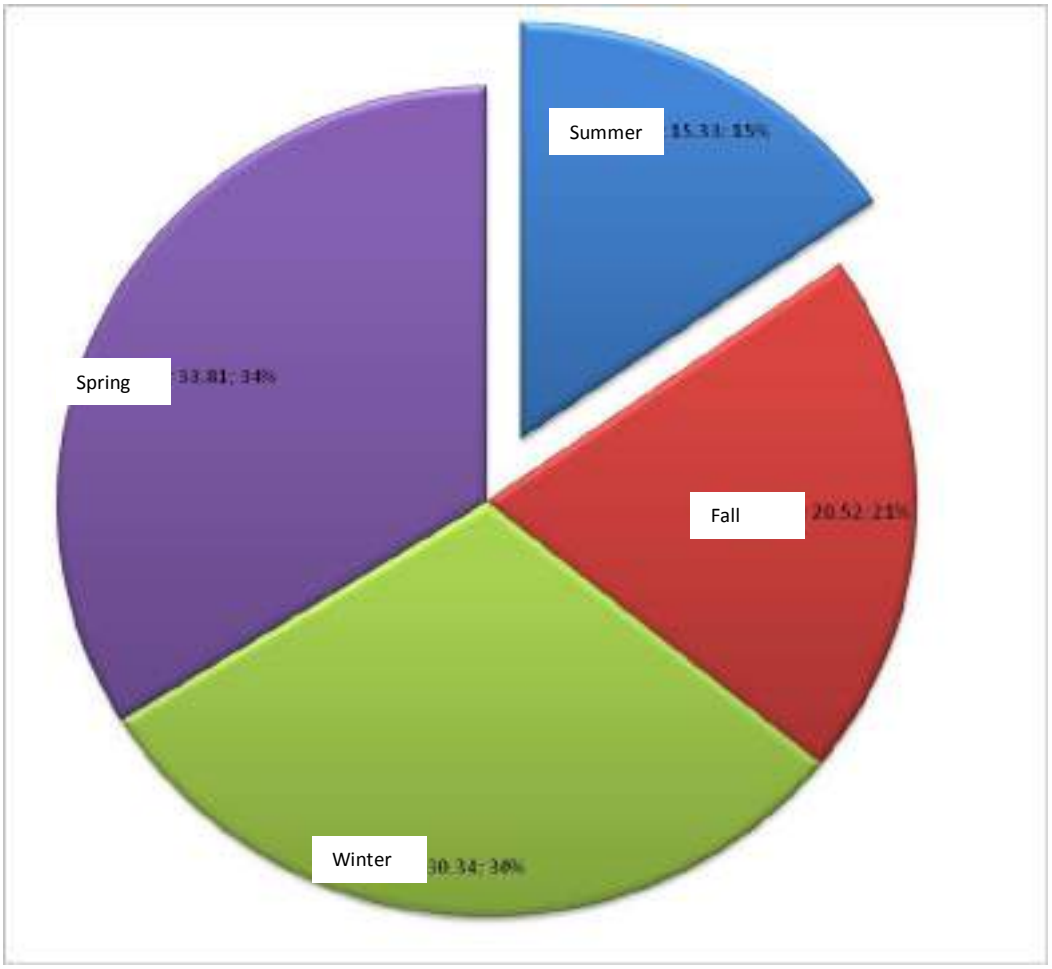


Figure 4.6. Seasonal Distribution of Precipitation Measured by Kırıkkale Meteorology Station

4.3. HYDROLOGY

4.3.1. Rivers

The biggest river in the whole Assessment area is Kızılırmak River flowing from 1.8 km south-west of power plant to the direction of southeast-northwest (Picture 3). Kızılırmak is the longest river rising and flowing into the sea within the borders of Turkey. It is named after the clay-sand red-colored residues settled in the middle of third period. Kızılırmak rises from the 38.8° east and 39.8° north of southern slopes of Kızıldağ in Sivas Province. It starts to flow to west and southwest and 38.7° north and 34.8° east, then swings like a bow. It continues firstly to west, crossing the Salt Lake in northeast and heads to the northwest. The river course heads to north and northeast. It merges with the Delice River at the point of 40.47° east and 34.14° west and traverses toward northwest. It flows together with Devrez River at 41.10° east and 34.42° west parts and heads to the northeast. Kızılırmak River flows into the Black Sea in Bafra Town of Samsun Province. While crossing Sivas, Kayseri, Nevşehir, Kırşehir, Kırıkkale, Ankara, Çankırı, Çorum and Samsun provinces relatively, it collects the water of many streams and creeks and pours into the Black Sea at Bafra Cape region.



Picture 4.3. Kızılırmak River flowing toward North-South at the Assessment Site

Kızılırmak is one of the most important rivers in Turkey, consisting of a variety of large and small scale streams. The data acquired from the debris-flow observation station located on Yahşihan Village Arch that is 6 km away from Kırıkkale province were used during the Assessment process of flow characteristics of Kızılırmak.

At the flow observation station of Yahşihan Village Arch, maximum surface flow of Kızılırmak River is observed between May and September as a result of superficial feeding with the start of effective rainfall and snowmelting in the higher parts of the mountains (Figure 4.7). At the flow observation station of Yahşihan Village Arch, the maximum flow is observed in July as 87.91 m^3/sec and minimum flow in April as 18.253 m^3/sec according to the long term (2002-2011) monthly debris value (Tablo 4.3). According to the results of the measurment carried out on a monthly basis between 2002-2011, long-term monthly mean flow value is measured as 45.521 m^3/sec. The period of change of flow in the river has a cycle consisting of 2 different periods; 1-dry period and 1-rainy period. In this case, the period of May-September when the flow is close to or higher than long-term monthly mean flow value represents the rainy period while the period of October-April when the flow is lower than the mean flow value represents the dry period. According to the long-term monthly mean debris-flow, the maximum debris was measured in August (116 m^3/sec) and the minimum flow was observed in March (1.96 m^3/sec). These results reveals that the difference between the higher and lower flow period is aproximately 59.18 times more. As is shown in Figure 4.8, the maximum flow between 2002-2011 is 80.95 m^3/sec while the minimum flow is measured in 2008 as 23.673 m^3/sec. The flow was higher than the mean flow value between 2003-2004, 2006 and 2010-2011 while it was lower than the mean value during the rest of time and the minimum flows was generated between these times.

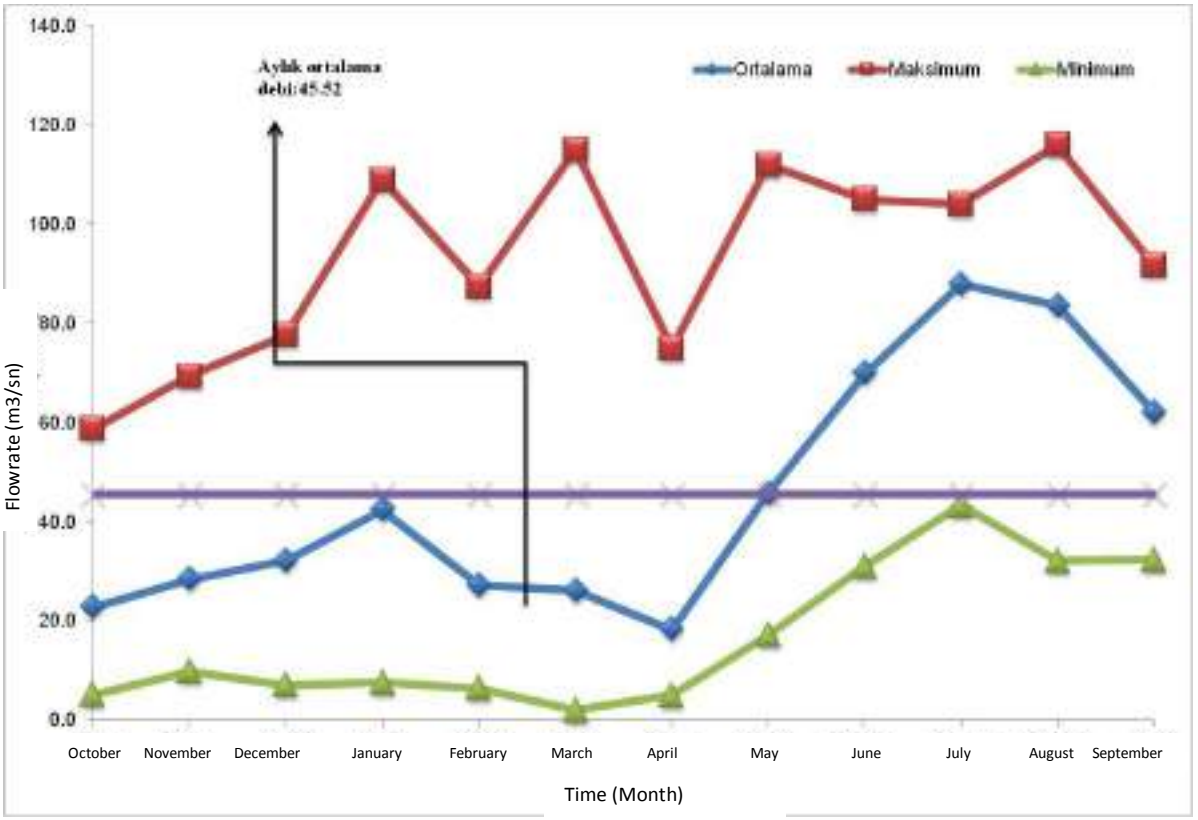


Figure 4.7. Changes of Monthly Flow Value Measured Between 2002-2011 at the Yahşihan Village Arch Flow Observation Station

Tablo 4.3. Monthly Flow Value in the Kırıkkale Province, Yahşihan Village Arch Flow Observation Station (m^3/sec)

Year/Month	October	November	December	January	February	March	April	May	June	July	August	September	Average
2002	22.2	14	16	13.8	14.6	13.9	9.97	17.2	38.5	67	32.1	32.3	24.298
2003	43.7	43.9	76.1	43.8	44.7	34.8	11.5	39.8	63.7	99.2	104	72.5	56.475
2004	58.7	59.8	77.7	71	9.5	20.6	12.8	53.3	81.8	104	116	70.5	61.308
2005	12.8	10.5	9.15	7.62	15.2	8.02	7.51	33.3	63.4	95.4	68.1	61.7	32.725
2006	12.5	14.1	15.1	49.7	34.8	13.1	6.66	50.3	76.1	104	101	84.9	46.855
2007	17.5	17.4	30.9	49.4	25.4	12.1	25.5	33.5	67.6	84.9	72.5	80.8	43.125
2008	5.63	9.84	7.16	37.8	16.1	1.96	4.98	36.8	31.1	43.3	56	33.4	23.673
2009	17.6	26.6	14.2	24.7	6.37	4.05	5.01	25.2	70.7	83.8	69.9	56.9	33.753
2010	5.07	17.6	7.01	16.4	18.1	37.8	75	112	101	93.5	105	36	52.040
2011	31.6	69.4	68.2	109	87.5	115	23.6	55.4	105	104	111	91.7	80.950
Average	22.730	28.314	32.152	42.322	27.227	26.133	18.253	45.680	69.890	87.910	83.560	62.070	45.520
Maksimum	58.700	69.400	77.700	109.000	87.500	115.000	75.000	112.000	105.000	104.000	116.000	91.700	-
Minimum	5.070	9.840	7.010	7.620	6.370	1.960	4.980	17.200	31.100	43.300	32.100	32.300	-

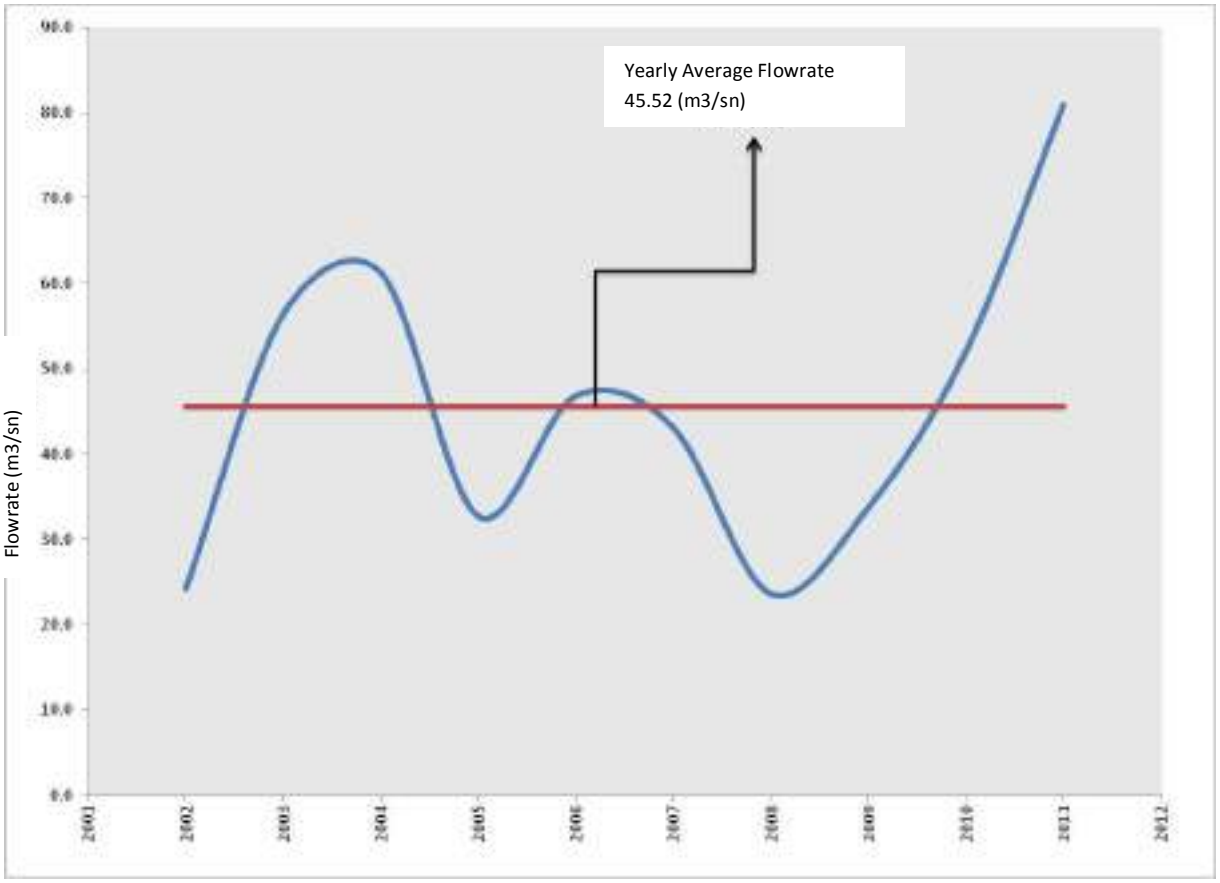


Figure 4.8. The Diagram of the Long Term Annual Mean Flow Value Measured at Yahşihan Village Arch Flow Observation Station

The Diagram shown in Figure 4.9. displays the percentage distribution of monthly mean values acquired from daily flow values. The Figure 4.10 reveals the percentage distribution of the flow according to the seasonal data acquired daily flow values. The month of October

when the monthly mean flows are at the lowest level constitutes 4.16% of the year-round flows while the month of July when the monthly mean flows are at the highest level constirutes 16.0% of the year-round flows. Between 2002-2011, according to the annual total flow value, the flow amounts of Kızılırmak River are 44.19% in summer, 20.71% in Autumn, 18.62% in winter and 16.49% in spring. According to these data, 64.89% of the total flow in the river basin occurs during summer and autumn months. In winter and spring, the minimum flow percentage is observed.

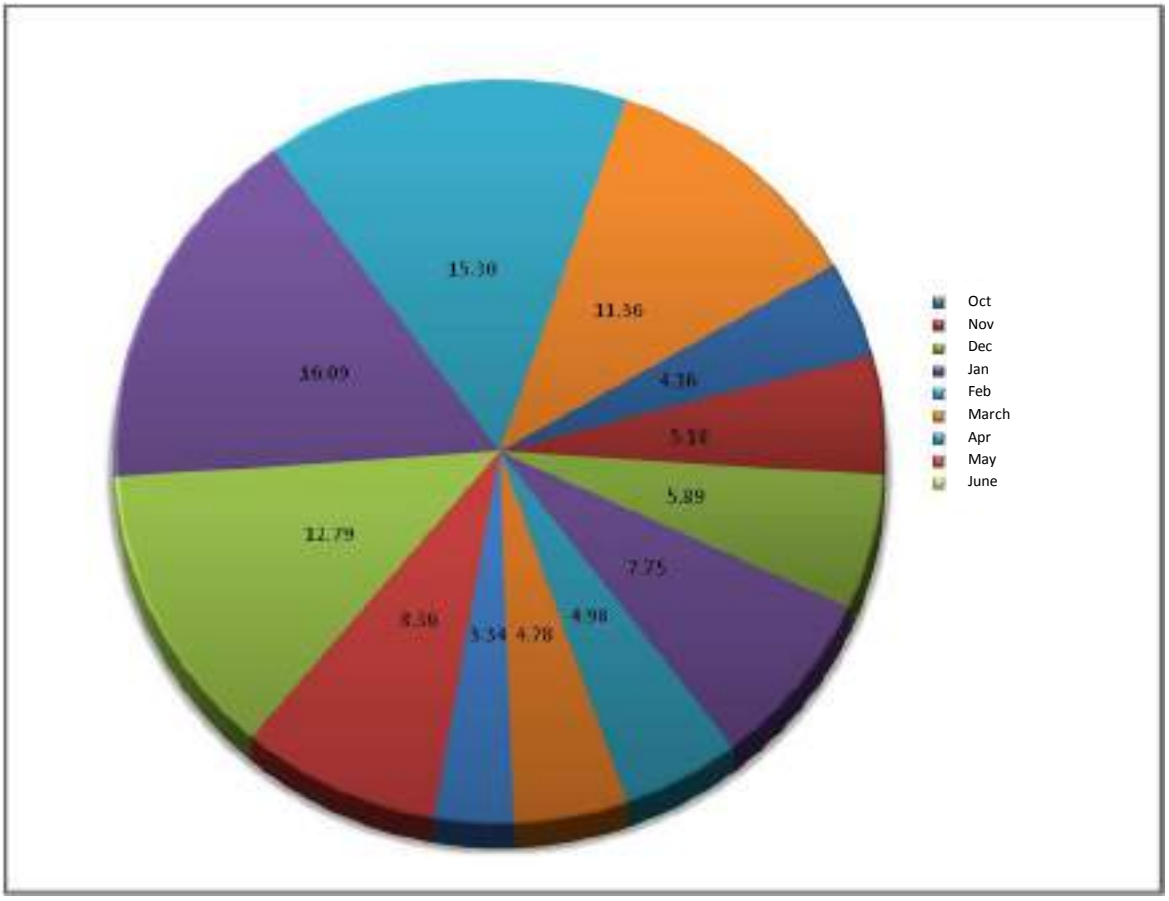


Figure 4.9. Montlhy Flow Diagram of Yahşihan Village Arch Flow Observation Station (%)

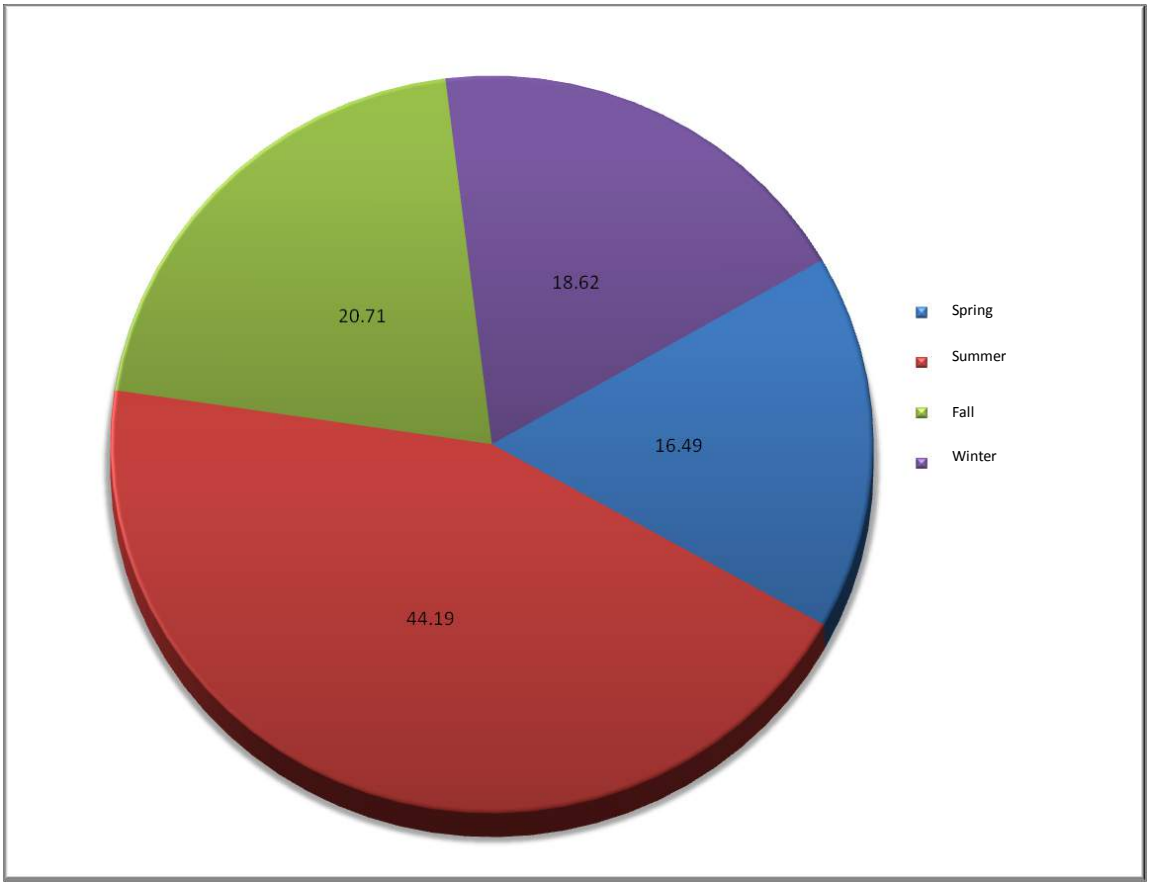


Figure 4.10. Seasonal Flow Diagram of Yahşihan Village Arch Flow Observation Station (%)

4.4. GENERAL GEOLOGY

Stratigraphy

The surface of the Project site is covered with sediment units formed at different periods from Upper Cretacaous to Quaternary. The basement of the site is formed by an upper cretaceous aged Irmak formation and Yahşihan formation having a typical melange characteristics. While Irmak formation forms the basement of the units in the western part of Assessment site, Yahşihan formation forms the basement of the eastern units. It is observed that Yahşihan formation is intruded by Karacaali pluton in the eastern part. Upper-D Cretaceous aged Ilıcapınar formation and Bölükdağ formation exposing more generally in the center and eastern parts of the Assessment site is tectonically covered by Irmak formation. Subsequently, paleocene aged Dizilitaşlar formation covers these unit with transitional contacts. Paleocene aged Dizilitaşlar formation is also covered by eocene-aged Bulanıkdere formation, Karagüney, Mahmutlar and Bahsili formations, respectively. All these units are covered by Oligo-Miocene aged units with angular unconformity. The top is placed with unconformity Quaternary-aged young clastic units (Akıncı, 2008) (Figure 4.11 and Figure 4.12).

Irmak Formation (Krüir)

Irmak formation was addressed by Norman (1972) for the first time. The formation is named after Irmak Town where it is the most convenient site to examine (Arni 1947; Baykal, 1943). It is known in the literature as “Mesozoic Ophiolitic Flysh” (Mof), “ophiolitic serie” or “ophiolitic part of Ankara melange” (Norman 1972). Having a wide surfacing in the west and northwest part of the site, the unit has a broad expansion.

The unit forming the basis of the units in Assessment site: It consists of radiolarial chert blocks floating in the green tuff and mudstone matrix, limestone, turbiditical sandstone, agglomerate, basaltic pillow lava, serpentinie breccia, gabbro and diabase. This unit including the olistostrome series, settlement structures, sliding structures and turbidites has the thickness of 1500 m and constitutes the basement.

Serpentinites, cherts and various ophiolitic (radiolarite, spilite basalt, diabase) rocks are observed in in the vicinity of Irmak town, the eastern part of Kızılırmak. Brown sandstones, laminated grey mudstones in some parts and turbidites are observed in the upper parts. They are covered with pelagic limestones including high amount of micro fossils. There is an intensive deformation on the rocks in this region. Matrix-assisted debris-flow sediments including pelagic limestones or gravel mudstones (debris flow) and chaotic sediments are frequently observed within the units. Globotruncana sp. fossils prevails in pelagic limestones. The units are generally medium-thin laminated. According to the studies carried out by Norman (1972), the total thickness of stacking in the region is about 500m.

In and around the Assessment site, Globotrucana fossils are found in the limestones in the units. In addition to this finding, certain fossils are encountered during the thin-slice analysis, however the data is insufficient for age and environment definiton. In the stratified limestones of the region between Irmak Town and Kızılırmak Arch, Arni (1942) , Baykal (1943) , Erol (1954, 1955) and Boccaletti et. Al. (1966) determined

Calpionella alpina
Calpionella elliptica CADISH
Orbitoides trochus (FRITCH) SILVESTRI
Orbitolina conoidea grubu
Praeglobotruncana stephani GONDOLFI
Globotruncana sigali REICHEL
Globoruncana lapparenti grubu
Heterohelix sp.
Globogerinella sp. and Nowack (1928), Erol (1955) Aptikus fauna at various levels, aging them at different levels from Upper Jura to Turonian(Norman,1972). The ages of the youngest limestones in Irmak formation are generally defined as Upper Cretaceous, especially Turonian-Campanian. However, ıt is only posible to find only the upper parts of the formation in this region while the lower parts and Jura aged limestones are observed it the west towards Idris Mountain (Erol,1954).

The unit mainly consisting of dark and hard ophiolitic rocks generally forms the higher and steep hills on the site. The units where the fine-grained clastic forms are prevailing generally establish valleys and lower parts.

It is though that Irmak formation is an accretionary complex formed as a result of a subduction in the continental margin. Some authors (Baykal, 1943; Bailey and Mc Callien, 1950) suggest that this complex was formed due to severe tectonic faults. However, Norman (1972) suggests that the reactions expected due to such a severe tectonics are not visible (Egeran and Lahn, 1951) and adding that there is no cleavage observed except from serpentinites and the formation of the unit can be explained by underwater landslides, olistostromes and turbid flow activities (Akıncı 2008).

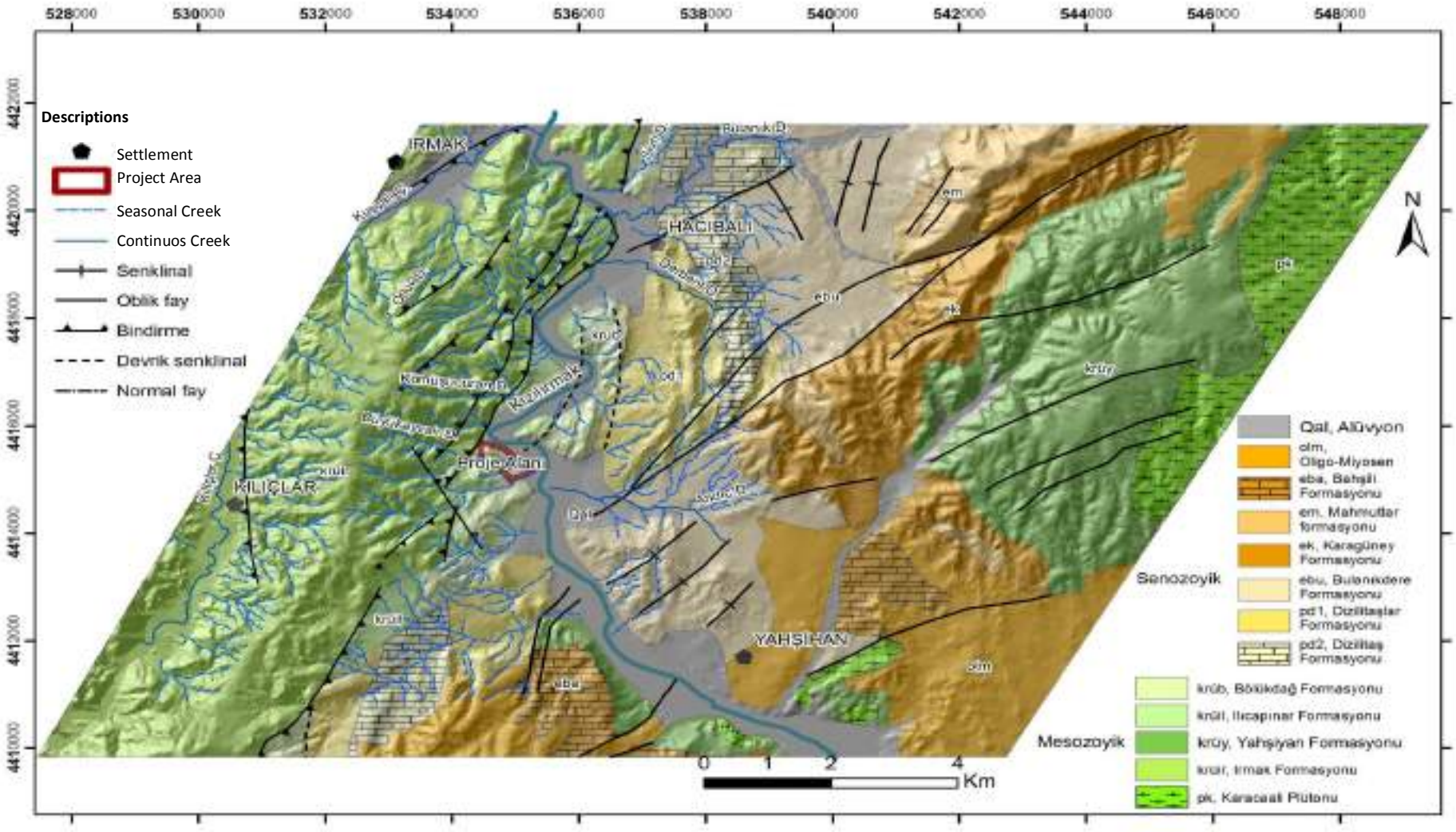


Figure 4.11. Geology Map of the Project Site and its Periphery (Akıncı, 2008)

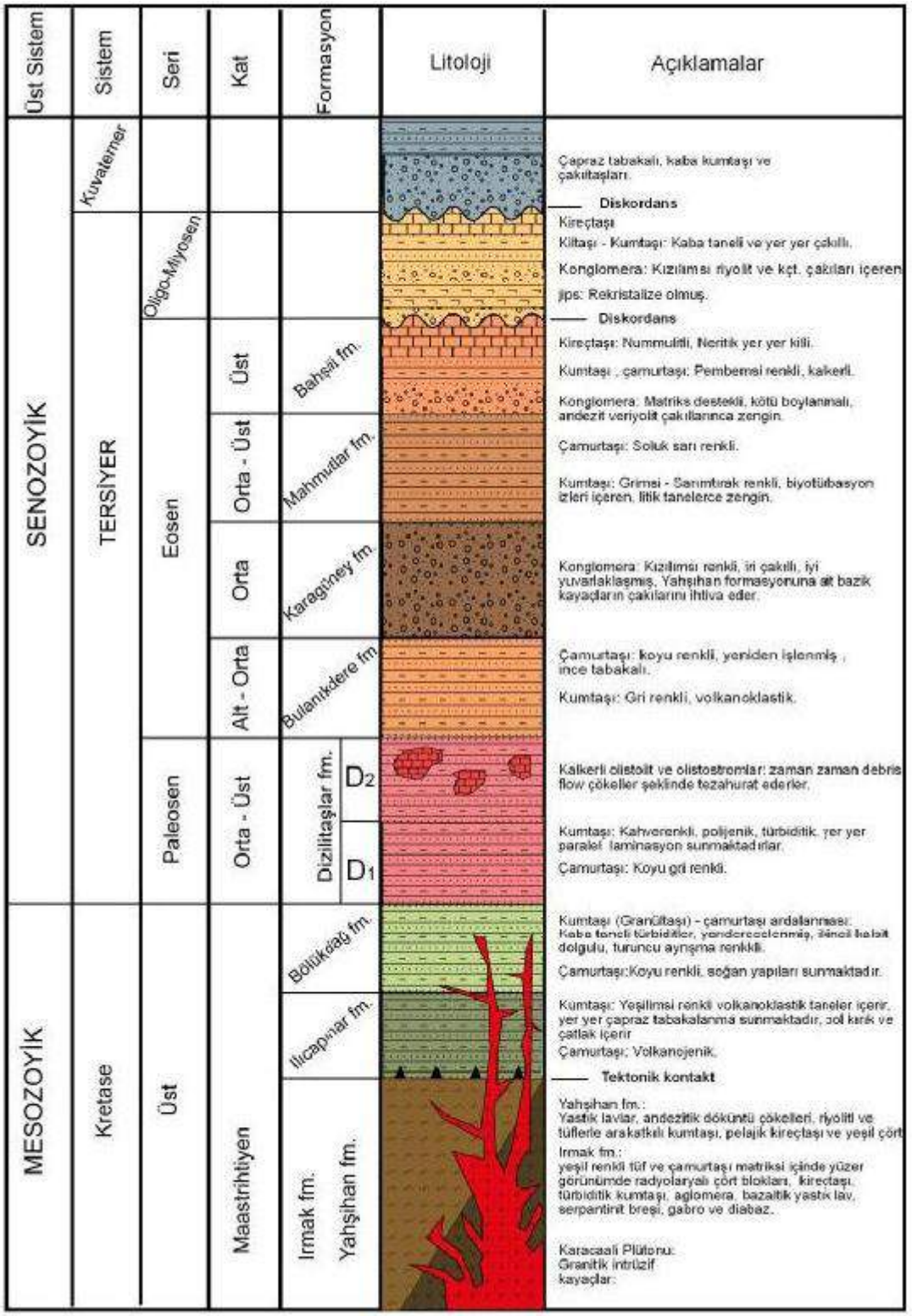


Figure 4.12. Stratigraphical Section of Yahşihan Region and its Periphery (no scale) (Akıncı, 2008)

Yahşihan Formation (krüy)

The unit is located in Yahşihan town and named by Norman (1972) after the typical crops in the region. The broadest surfacing of the unit is formed in western and northwestern parts of Karacaali Village within the Project site. In addition to these locations, the unit crops out in the South Bahşili and Southwest Yahşihan. Yahşihan formation consists of pillow lava, andesitic debris sediments, rhyolit and tuff subleveled sandstones, pelagic limestones and green cherts. It was formed with the sediments of eroded ocean bottom eroded by rising from sea level.

Despite the fact that Norman et al. (1980) thought that Irmak formation is equivalent of Yahşihan formation, Kaymakcı (2000) mapped the unit as a part of North Anatolia Ankara Melange. However, this is deprived of imbricate and internal fracturing structures that are protected in Ankara melange located at the west part of the working site. Considering its general apperance, Yahşihan formation seems to have the traces of ocenic bottom units. Considerably decomposed rhyolits are observed during the analysis carried out at the North Kızıldere. In the eastern parts, these units are covered with neogene aged layers. The South part of Kızıldere region is covered with broken grey diabases that are not in the shape of a layer while the upper parts are covered with tuffs, agglomerate and pillow lava (Norman 1972). In the west side of Kızıldere near Yahşihan town, anesitic-dacitic lava flow, radiolaritine and cherts are observed.

The units were probably exposed to severe hydrothermal decomposition due to the intrusion of Karacaali pluton and metasomatized in certain parts. Therefore, it was diffiult to collect fresh samples. Durign the study carried out by Norman (1972) at the region, only the limestones were observed and a piece of rudist in calcarenite found in the east of Kızıldere (N. Karacabey) was referred to Radiolidae family. In the other sections, *Globotruncana tricarinata* (QUE.), *Globotruncana* sp. (stuarti grubundan), *Siderolitidae, Miliolidae and* Radiolaria fossils were detected by Ercüment Sirel and they were aged as Campanian-Maastrihtian.

Yahşihan formation is intruded by riolitic dykes forming a part of Kırşehir massif and Karacaali granite pluton (Sulakyurt granites, Kaymakçı 2000). The contact point of the intrusion was metamorphized. Norman et al. (1980) thought that the intrusion started during Early Paleocene period. The thickness of Yahşihan formations differs depending on the protection level from erosion and the amoun of intrusion of the pluton, it is observed that the formation has at least 1000m of tickness in the west Karacaali (Norman 1972). It is asumed that volcanics of Yahşihan formation mainly settled in the submarine medium (Fiske and Matsuda, 1964).

Karacaali Pluton (pk)

It was firstly named by Norman (1972) after the Karacaali village located in North Kırıkkale. It mainly crops out in Karacaali village and in the northern parts. The pluton can also be examined in the south and northeast of Bahşili town. The formation mainly consists of granitic intrusive rocks. During the field studies carried around Karacaali Village, granite and granodiorite-type rocks are observed. These granites are sometimes observed as dykes

inside the basic dark volcanic rocks of Yahşihan formation. The rocks were exposed to a severe hydrothermal decomposition.

It is seen that magmatic rocks are holocristalline in the relatively inner parts. On the other hand, it is observed that magmatic rocks are fine grained rhyolite and even frit felsite on the dykes and sills intersecting with Yahşihan formation and near formation border (Norman 1972).

The border of Karacaali pluton with Yahşihan formation is metasomatized. Its contact point with younger formations is discordant. Rhyolites, dykes and sills intruded into the Upper Cretaceous older Yahşihan formation and metasomatism data shows that the pluton is younger than Upper Cretaceous (probably Maastriihtian) and older than Ypresian (Karagüney formation) (Norman, 1972).

It is estimated that Karacaali pluton fell into the exact place during Paleocene period and parts cutting the Yahşihan formation has reached to the surface. At the same time, the area where the pluto located was ascended creating steep slopes, which caused to turbid flows, floods and submarine landslides and provided a settlement of various marine sedimantary rocks (Norman, 1972).

Ilıcapınar Formation (krüil)

The formation was firstly named by Norman (1972) after Iıcapınar Village (region) located in the Southwest of the project field. At and around the study site, there is Ilıcapınar region, Bedesten town (C9), Bölükbağ in the west and Irmak town in the northwest. The unit is represented with volcanoclastic sandstones, mudstones, conglomerate and muddy pebble stones (debris flow). During the studies carried out 3km southeastern part of Irmak Village, the southeast of Kızılırmak near the railways, muddy pebble Stones (debris flow), volcanoclastic greenish sandstones and conglomerate intercalation are observed. Sandstones partly create cross stratification. Medium-thin stratified sandstone-muddlestone intercalation is observed in the upper parts. Sandstones includes a high amount of multi-fracture and cleavage units. These units are meters-long thick and extend along the railway cutting in an intercalation manner. The stratification in the west part of the site is mainly destroyed and inverted. The traces of deformation decrease through the southwest.

In Ilıcapınar region, grey-greenish volcanoclastic coarse-grained sandstones are surfaced along with volcanogenic mudstones as intercalation. Surface thickness differ in places. Muddy pebble Stones are frequently observed in the stacking as channel fill.

On the other hand, Irmak formation that is located unde Ilıcapınar formation has a faulted contact. However no fault line traces was observed in Ilıcapınar region. On the contrary, it was observed that the border is concordant in the region. The border of the unit with Bölükbağ formation is also concordant in all parts. Ilıcapınar formation consists of spilite pieces with high tuff content, volcanic glass, sanidine, pyroxene and biotite. Chloritization gives greenish colour to the formation. According to the thin-slice analysis of the sample of sandstone rock from Ilıcapınar region, a high amount of middle lenght volcanic rock pieces were detected. Most of the crystals are made of plagioclase minerals. Plagioclase minerals are generally detected as faulted and fragmented while some of them have zoned earth

structure. On the other hand, amphiboles are the second prevailing minerals after plagioclasts. Rock crystals are defined as lytic tuffs (Prof. Dr. Fikret İŞLER).

The biggest thickness process of Ilıcapınar formation happens in the southwest part of the region. The measured thickness is 1250 m and it only stands fort he visible part. It is reported that it is likely to have a few hundred-meter thickness lyes under Irmak formation (Norman, 1972). Since the sediments of Ilıcapınar formation have relatively low resistance level against erosion, they mainly compose middle height broad hills and valleys. Although the fossils of Ilıcapınar formation are not useful for a precise age definition, the age of the formation is estimaed as Lower Maasrihtian due to its position inbetween the lower Irmak formation (Senonian) and upper Bölükbag formation (Maastrihtian) (Norman, 1972). It is understood that Ilıcapınar formation was settled in a deep basin during the early Maastrihtian period and the sediments were frequently carried to the region by turbulent flows and sometimes olistostromes (Norman, 1972).

Bölükdağ Formation (krüb)

It was named by Norman (1972) after the Bölükdağı Maountain located in the southwest of Hacıbalı Village where the unit can efficintly be studied. The formation has certain surfaces along the extend of Ilıcapınar formation in the northeast of Irmak town, near Bedesten town and in the east of Ilıcapınar region. The dominant lithology of the unit is mudstone intercalation. The type section of the formation has the thickness of 560 m and consists of thin-stratified altered sandstone and mudstone. The microconglomerates containing massif granüle stone, sandstone and andesite, consists of the channel fills of approximately 10 m-thickness. These channel fills generally creates eroded surfaces. The coarse-grained turbidites contains half-round calsite that is half-graded abd cemented with secondary calsite fill, fine-grained volcanic pieces, quartz and opaque oxide minerals.

Flute structures in the inverted layers are partly visible, showing that the former flow was in direction of southeast. Durgin the field studies carried out in Bölükdag and Ilıcapınar regions, medium-thick turbidite sandstone in the orange decomposition colour and dark mudstones intercalate in the region. There are interesting big bulb structures in mudstones. The unit is mainly brown-green due to the alterations. Bölükdağ formation includes huge amount of base structures (groove and flute structures).

Green-tuffed thin-layered sandstone covering the green-tuffed sandstones of 12 m in Bölükbaşı region represents the top of Ilıcapınar formation. It is generally observed that sandstones contain graded stratification, sedimented base structures and various inner structures (Norman, 1972).

There is no fossil content detected in Bölükdağ formation. According to the study carried out by N. Karacabey (MTA) on the fossils compiled from the field work by Norman (1972), *Lapeirousia jouanneti* (DES. MOUL.) BAYLE fossil is defined and aged as Maastrihtian. As microfossils, the fossils detected in sandstones by B. Sözeri (MTA) are defined as *Orbitoides Media* D'ARCH and aged as Maastrihtian(M.T.A. Rap. No. BS/68/35). It is estimated that the formation was generated by the settlement of the sandstones and the coarse-grained sediments carried by the turbulent flows into a relatively deep marine environment where the mudstones settle. It is a point of curiosity that there is less conglomerate and caotic

sediments in Bölükbag formation than Ilıca formation, which may be regarded as an indication of the transition to a calmer environment.

Dizilitaşlar Formation (pd)

During the field study, Dizilitaslar formation was examined by Norman (1972) in 5 different units while it is deemed suitable to divide the field in 2 different units in this study. Dizilitaslar formation, extending from northeast to southwest within the boundaries of the study field, consists of andstone, mudstones, turbidites and calcareous olistolites embedded in the material. Since the limestone olistostrome and olistolites in these units stand for a different sediment mechanism, it forms a different unit. Additionaly, D3 member out of 5 different member defined by Norman (1972), is equal to this unit. Therefore, Dizilitas formation is examined under 2 different member units in this study.

D1 Member (pd1)

The unit located 3 km east of Bedesten town consists of brown sandstone, greyish mudstone ans turbidites. Sandstones basements have sedimentary characteristics and gradation. While most of the basement structures are the bioturbation marks, it is also possible to see cavern and groove patterns. It rarely include round, middle-fine grained conglomerate levels.

During the field study in the east part of Bölükdag region, poligenic turbid sandstones an dark mudstones are observed. The gradation is uncertain at the lower level, while it is observed in the upper levels. It is detected that sandstone fractures are partly filled with secondary calcite cement. Basement structures are frequently seen in sandstones, some of which display parallel lamination.

Paleocene turbids have concordant borders with Bölükdag formation beneath and eocene aged units on the top. Within and around the study field, it is frequently covered with neogene aged parallel sediments. The fossil content detected during our study is insufficient to designate the precise age and environment of the units. During his studies in the region, Norman (1972) detected
Laffittenia sp
Globorotalia sp.
Miscellania sp.
Marssonalla sp.
Globigerina sp.
Rotalia sp.
Planorbulina
Nodosaria sp.
Textularia sp.
Rotaliidae
Miliolidae
Lithothamnium sp. and Bryozoa fossils in the calcarenites and aged the unit as Paleocene. In addition to the above mentioned forms, the below-mentioned fauna was also detected in the samples of conglomerate clasts having calceraous clast and calcite green mudstone matrix;

Miscellaniea miscella, D'ARC.
Alveolina sp.
Keramosparea sp.
Rotalia sp.
Peneroplidae
Parachetetes sp. (alg).

Considering the lithology of the unit, it is likely to estimate that mudstones are the prevailing lithology in the region and sandstones and coarse-grained sediments were carried by the turbid flows. According to these data, it is understood that Dizilitaslar formation (pd1) is settled in a usually stable and deep marine medium.

D2 Member (pd2)

Calceraous olistolites and olistostromes are distinguished in the paleocene aged turbidites of Dizilitaşlar formation, indicating an intense gravitational mass slide facies. They extend in the direction of northeast-southwest in parallel with the Dizilitas formation turbidites in and around the study field.

During the field studies, floating massive limestone olistolites are observed in sandstone-mudstone intercalation units. Debris flows and packstones including huge amount of carbonate are also frequently observed. There is sandstone-mudstone intercalation extendind along the roadcut at the southwest of Hacılı district. Large-scale channel fills are also frequently observed within these units. There are mainly the flow of carbonated volcanoclastic pebbled conglomerates, marls and calciturbids within the channel fills. During the field studies, miliolid fossilsare also partly detected in the limesotnes.

The unit obsrved in the Dizlitaşlar formation and containing olistolites, olisotromes and abundant channel fill is an indication of higher power level in the region. In this respect, it is highly likely that the rocks of previously settled units were carried into the turbid sediments settling in deep marine medium by means of mass flows due to high tectonic activities, and they settled there.

Bulanıkdere Formation (ebu)

The turbids are named after the Bulanıkdere formation since they have many common features according to the study carried out by Norman (1972). This units constitutes the main parts of eocene aged units in the study field, surfacing in South and east of Kecili Village, in North and west of Güzeren Village, around Mahmutlar Village and in the northern parts of Yahşihan Village within the boundaries of the site. The unit mainly consists of dark mudstones, grey volcanoclastic sandstones, massif pebble stones and granitic, calceraous and riolitic pebbled conglomerates of debris flows and partial channel fills.

Bulanıkdere formation, an eocene aged deep marine facies of Kırıkkale basin, has the thickness of 2 km and is less deformated compared to the old sediments in the west part of the basin.

Bulanıkdere formation consists of turbids and the thin-layered dark mudstones that were re-shaped by erosional channels and debris flows. The transferred materials are generally derived from Ankara melange and consist of andesite, limestone and green cherts. Norman (1972) studies Bulanıkdere formation as 3 different formation, namely Bulanıkdere, Hacıbalı and Keçili. Hacıbalı and Keçili formations consist of materials that were eroded and re-transfered. In the field studies carried out in the North-west of Güzeren village, it is observed that the unit emerges as highly thick mudstones and extends with the volcano-clastic sandstone intercalations. In the upper parts, pebbeld units containing big granitic rock pieces in the shape of channel fills are observed. There is a unit of dark muddy siltstones in the North-west of Mahmutlar village and they are intercalated by sandstones in the upper parts. Mudstones are surfacing as the main rock unit, over which there is conglomerate with highly round pieces of limestones settled in neritic environment and riolitic pebbels, and conglomerate levels in the pattern of debris settlement. The samples compiled from the unit have insufficient fossil data for an exact definition of age and environment. In one of the studies in the region, Norman (1972) detected
Nummulites sp.
Globorotalia sp.
Gastropod fossils in the sample of sandstone taken from the units showiing the similar lithology in the east of Bahşili region, and aged the unit as Eocene. This unit is generally concordant or transitive due to the underlying turbids of Dizilitaşlar formation and covering Eocene aged conglomerate. However, there is a faulty border in the northern part of Yahşihan. Considering the lithological features, the unit gives the impression of a relatively deep and calm environment due to the sandstones. It is likely that turbulent flows occasionaly carry sandy and coarse-grained sediments to the region while bigger grain-sized materials such as pebbles fill the channels and erosion holes.

Karagüney Formation (ek)

It was examined firstly by Norman (1972) and named referring to the Karagüney Mountain surfacing the unit. Karagüney formation also gives its name to the unit having rock-such lithology. The formation is surfacing within and around the study field, in the South of Güzeren Village, in the west and southwest of Mahmutlar Village. the red conglomerates are the dominant lithology of the unit. Highly round and coarse-pebbled volcanoclastic red conglomerates, sandstones and soft mudstones are observed in the unit samples from southwest of Güzeren village. Sandstones are generally thick layered. There is no sufficient fossil data for the thin-layer analysis of the samples collected from the Karagüney formation rock compilations. Referring to the study carried out by Norman (1972),
Disticoplax biserialis DIETRICH
Rotalia sp.
Miliolidae fossils were detected by B. Sözeri (M.T.A. Rap. No.S.69/19) in the well-rounded calcareous pebbles in the green conglomerates taken form the eastern foothills of Karagüney Mountain and the unit is aged as Paleocene. The other pebbles of the same erritory studied by Norman (1972) was detected by N. Karacabey (M.T.A. Rap. No. 1969/249) to include *Lapeirousia jouanneti* (DES. MOUL.) BAYLE, *Sabinia* sp. and it is aged as Maastrihtian. Norman (1972) stated in his study that the formation is mainly of the Ypresian age. The lower border of Karagüney formation is disconcordant with Yahşihan formation while the upper border is transitive with Mahmutlar formation. The thickest parts of the formation are the North Karagüney and Yahşihan with around 250-300 m thickness (Norman, 1972). It is likely

that Karagüney formation was settled where it is close to the land, at the front parts of the mouth of a flood-carrying streams, and in litoral regions. It generally displays a characteristics of transgressive bottom conglomerate (Norman, 1972).

Mahmutlar Formation (em)

Mahmutlar formation was firstly examined by Norman (1972) and named referring to Mahmutlar Village where is the type section. The name of the “Mahmutlar” formation is also given to the yellowish sandstone and mudstone units surfacing the study field due to the lithologically common features. The layers of Mahmutlar formation are observed in the east of Mahmutlar village and in the South of Güzeren village. During the studies carried out in the South-west of Güzeren village, mudstone layers intercalating with sandstones are observed. Bioturbation marks representing the possible delta environment are observed. On the other hand, sandstone-mudstone intercalation prevails in the upper parts. The layers generally extend to the North-west direction with a 30 degree angle. Sandstones have huge amount of lytic materials consisting polycrystal quartz of Karacaali pluton granites.

In the north-east of Mahmutlar village, sanstone-mudstone intercalation and conglomerates in the shape of channel fills are observed. It mainly consists of chert, basalt ans rhyolite structures. Partial rippl marks and cross stratification are monitored in the sandstones. According to the cross stratification data, flow direction is estimated heading from northeast to northwest. The sandstones in brown decomposition colour generally stratifies in middle-thickness.

There is no sufficient fossil content in the samples taken from Mahmutlar formation in order to define the exact age and environment. Baykal (1943) detected *Alvelina* sp. around Mahmutlar village and defined the age as Eocene period (Norman, 1972). E. Sirel and B. Sözeri (MTA) analysed the yellowish sandy limestone samples collected by Norman (1972) from northern parts of Yahşihan, and they detected

Nummulite cf. Globulus LEYM.
Discocyclina sp.
Robulus sp.
Globigerina sp.
Operculina sp.
Rotalidae
Miliolidae
Bryozoa fossils, defining the age of the unit as Upper Paleocene – Ypresian – Lower Lutetian.

The lower border of Mahmutlar formation has a gradual transition to Karagüney formation. The contact with the Eocene aged neolitic limestones and conglomerates covering the unit is not observed in the study field.

Mahmutlar formation developed in an neritic environment where marine flows are occasionaly effective. Sandy limestones were generated by the reef tendencies in the some areas of slightly upgraded parts of the submarine, hosting a lot of organisms. No indication

related to turbid flows in the formation layers reveals that rocks are more settled and tectonically developed in a calmer environment (Norman, 1972).

Bahşili Formation (eba)

Norman (1972) analysed Bahşili formation. It is revelaed that the rocks of this unit has the broadest surfacing in the South part of the field, between Bahşili town and Hodar. Additionally, it is observed in the South-west and North-east of Yahşihan town. The formation, with a form of a regressive strutucture, consists of the congomerates supported by the matrix containing cornered volcanic pieces, pebbled red sandstones, calcareaous sandstones, slightly sanded mudstone, sandy limestones and numulitic limestones. During the field studies carried out in the northeast of Yahşihan region, it is observed that the formation emerges as volcanic pebbled limestones and extends as the conglomerates containing huge round andesites and rhyolite pebbles. The conglomerates are poorly sorted and the lenght of a pebble reaches to 20 cm in diameter. They are covered with neritic limestones containing bivalvia and nummulites fossils and sandy-silty limestones. In the upper parts, the conglomerates in the shape of erosion surface fillings in the calcarenites and sandstones.

In the anaysis around Bahşili town, sandstones and nummulited neritic limestone layers are observed. These are covered witg massif looking orange sandstone and volcanogenic pebble stones. The approximate grain size of the pebble stones is 2 cm and they are in round shape. The upper parts of the unit is covered with reddish mudstones. The pebble stones having the feature of erosional basin filling are frequently observed.

The thin-layer analysis of middle-grained sandstone sample taken from the southwest of Yahşihan town reveals that most of the pieces are limestones. Limestones include plenty of fossil shells. More in particular, the algaes prevail. It is highly likely that they are reef limestone pieces. The field studies carried out by Proff. Dr. Niyazi AVŞAR reveals that the fossiliferous limestone sample taken from northeast of Yahşıhan town contains *Nummulites* sp., *Assilina* sp., *Discocyclina* sp. and coral fossils and the unit is aged as Eocene-Lutetian.

The lowest border of the formation is not accesible within the study field. On the other hand, the upper border has faulted contact of Neogene aged rocks near Bahşili region while having a discondant contact in other parts.

Considering the lithological features of the formation, it is estimated that the unit was settled in shallow marine environment conditions. The conglomerates containing round and semi-round giant pebbles and clayed limestones can be regarded as a indicator. There is a shift to terrestrial environment towards the upper parts.

Oligo – Miocene (olm)

The prevailing lithology of the formation contains Oligocene-Miocene gypsums, soft and coarse-grained sandstones, highly round asidic-basic igneous rock, limestone, tuffs and sandstone pebbled conglomerates. Paleocene and Eocene aged sediments are covered incongruously covered along a broad line between Hodar town and Yahşihan town within the boundaries of study field. The structure of the conglomerates are different in Kırıkkale region

since there is an apparent grain orientation towards the south. Therefore, Ankara melange is the source rock and it is defined in the studies by Norman (1972) as Oligo-Miocene that is older than theunit mapped as Eocene aged.

The formation is generally in the shape of horizontal or almost horizontal layers filling the erosion gaps occured after Alpine orogenesis or covering erosion plains. It is in the form of river storagefilling the basin deepening towards Kırıkkale (Norman,1972).

Alluvials (Qal)

Allivuals are usually the cross-layered coarse sandstones and pebble stones composed along Kızılırmak and its arm. They occupy a broad field in the south f Kırıkkale.

Regional Tectonic

The Neotectonic structure of Turkey is mainly developed depending on the openning of Atlantic Ocean and the counter-clockwise (to the north) movement of Arab-African plate compared to the Eurasian plate. The northern movement of Arabian plate results that Anatolian plate is moving towards the west and North-East Anatolian plate is heading to the east, as a result of which a pressure is observed in the Eastern Anatolia (Dewey and Şengör, 1979).

Turkey, located in Alpine zone, is geologically divided into varios units by various researhers. The trials to divide into tectonic units started many years ago. Firstly, Argan (1924) divided Turkey into 3 units from North to South as of Pontides, Intermediate Massifs and Taurids, comparing the orogenic belts of Anatolia with Alpines. Afterwards, Arni (1939), Blumenthal (1946) and Egeran (1947) analysed Turkey in more than three units. On the other hand, Ketin (1961- 1983) determined the number of tectonic units as four. This four-unit structure, depending on the orogenic developments of mountain belts, is the territory of Pontides, Anatolides, Taurids and edge folds. Neotectonic structure of Turkey, located on several plates due to its geological location, was shaped as a result of the pressure of African and Arabian plates on Anatolian plate and the collision of Arabian and Anatolian plates.

Northern movement of Arabian plate leaded Anatolian plate to move to the West and Nortern Anatolian plate to East, as a result of which there was a pressure in East Anatolia(McKenzie, 1972). Western movement of Anatolian plate compared to Blacksea plate resultes in the pressure owards the east-west direction and expansion in the north-south direction (Alptekin, 1973; McKenzie, 1978; Dewey and Şengör, 1979). As a result of this, the most important seismotectonics structures with seismicity characteristics are listed as West Anatolia graben region, North Anatolia fault, North-East Anatolian fault, East Anatolian fault and Southeast Anatolia overthrust (Bitlis Overthrust Belt) (Figure 4.13).

Figure 4.13. The Main Tectonic Agents in and around Turkey (McKenzie, 1972)

Neotectonic activities in and around Turkey and the current seismicity of Anatolia was formed as a result of the relative activities among Arabian, African and Eurasian plates (McKenzie, 1972). Aegan plate is limited by the west extension of North Anatolian Fault, and this border is known as Anatolian graben or dykes (McKenzie, 1972). As a result of the collision between

Arabian plate and Anatolian plate, right-trending movement along the North Anatolian Fault and left-trending movement along the East Anatolian Fault move the Anatolian plate towards the west (Dewey, 1976 (Figure 4.14).

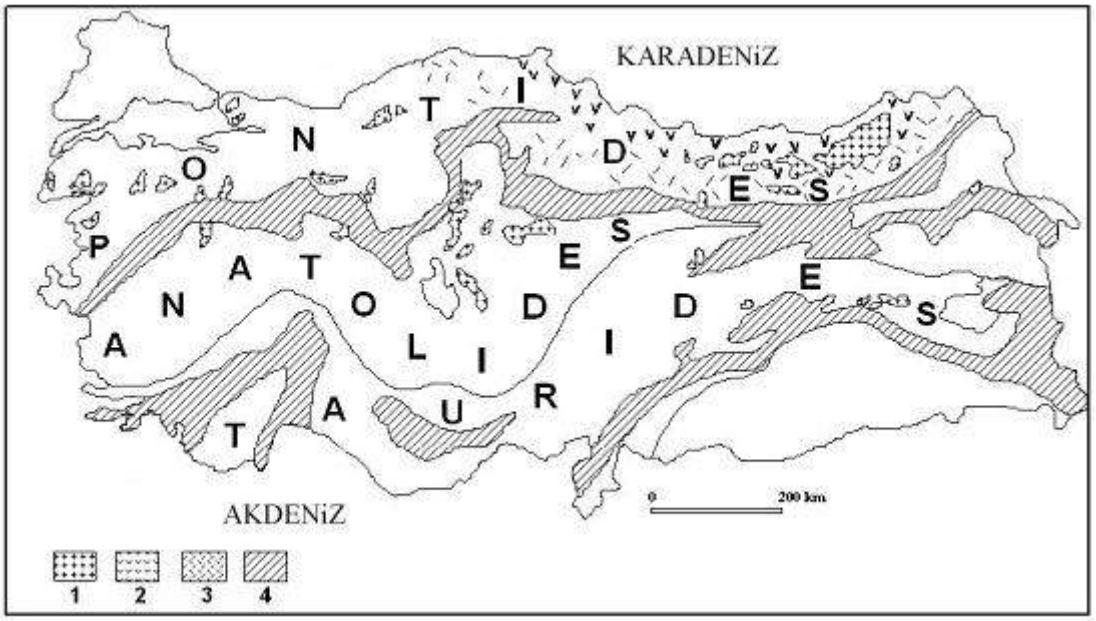


Figure 4.14. Neotectonic Units of Turkey 1. Granitic rocks, 2. Late Cretaceous TH-CA volcanism, 3. Late Cretaceous CA-A (Shoshonitic) volcanism, 4. Ophiolitic suture zones (Şengör vd., 1985; Barka, 1992)

The North Anatolia Fault Zone forms the borders of Eurasia plate and Anatolian platelet or block with the lenght of 1150 km. This fault zone has the form of a fishbone together with Kırıkkale-Erbaa Faukt Zone, Almus Fault Zone and Taşova- Tekke splay faults extending in the Anatolian platelet (Şengör vd. 1985). Certain important deformation structures are observed in the wedge-shaped zone between North Anatolia Fault Zone and Kırıkkale-Erbaa Fault Zon, in the areas near Kırıkkale-Erbaa Fault and in the rock-stratigtaphy units aged between Eocene and Late Pliocene. These are Eocene aged old sandstones, limestones and its congomerates, Oligocene-Late Pliocene aged sandstones, steep sloped plates in conglomerate and evaporitic rocks, reversed layers and overthrusts between Late Pliocene and Eocene. These pressure-based structures extend very close to and in parallel with Kırıkkale-Erbaa Fault Zone and towards northeast southwest part. Compression structures with various tendencies in the northern and middle parts of the wedge-shaped region (Çankırı-Çorum tectonic wedge) tend to extend in parallel with this fault line and has advanced deformations, which explains that these structures are related to a clockwise circulation in the tectonic wedge (Gökten and Meydan, 2006).

Deformation speed difference between North Anatolia Fault Zone and Kırıkkale-Erbaa Fault Zone, stopping the westering movement of tectonic wedge at the overthrust zone and south-westering movement of North Anatolia Fault Zone following the Havza region are the results of this circulation while the northwest-southeast compression effect created on Kırıkkale-Erbaa Fault is the results of severe deformations near the fault (Gökten and Meydan, 2006) (Figure 4.15 ve Figure 4.16).

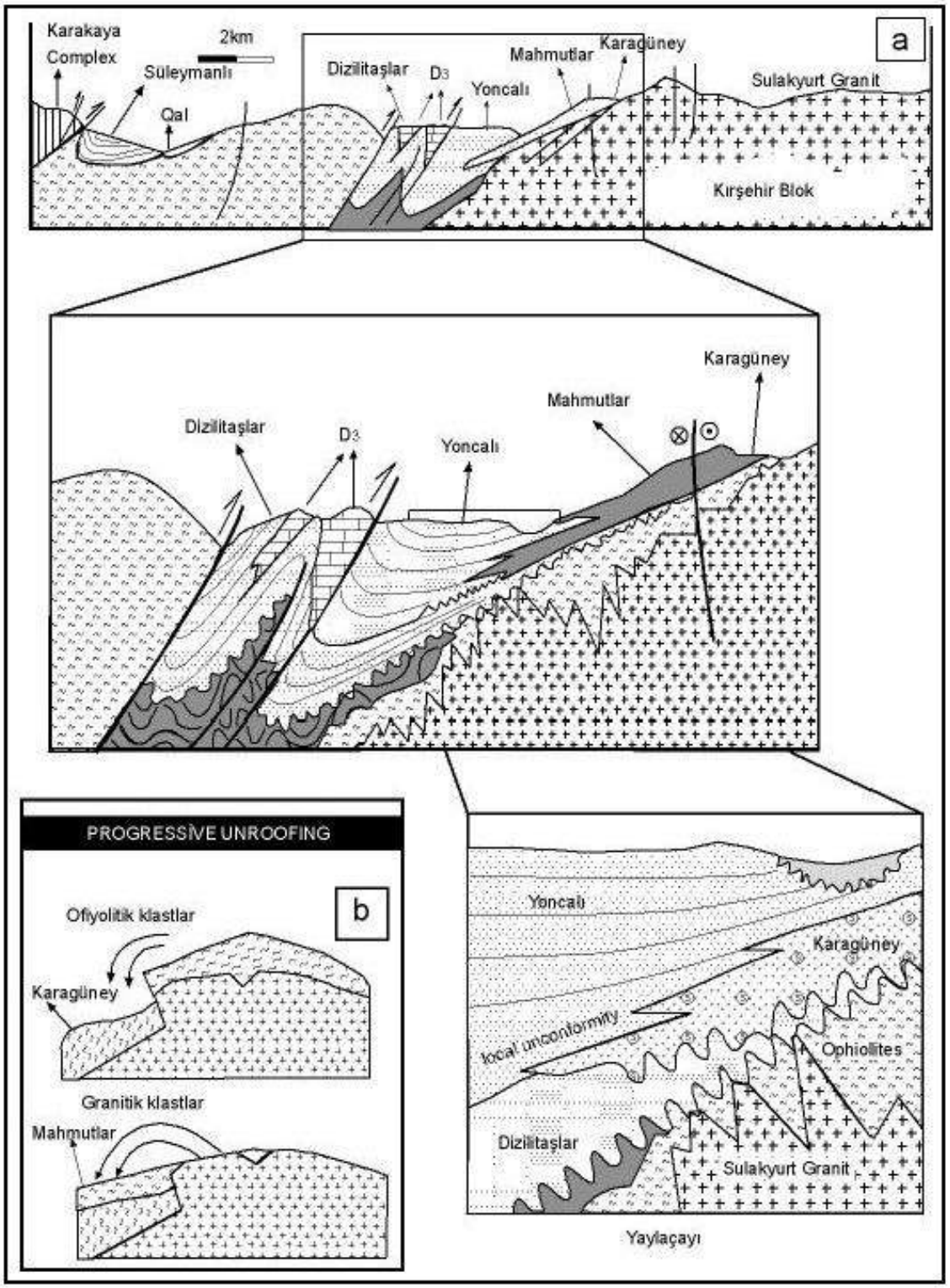


Figure 4.15. Cross Sections Showing Structural Elements in Kırıkkale Basin and Stratigraphic Relations (Kaymakcı, 2000)

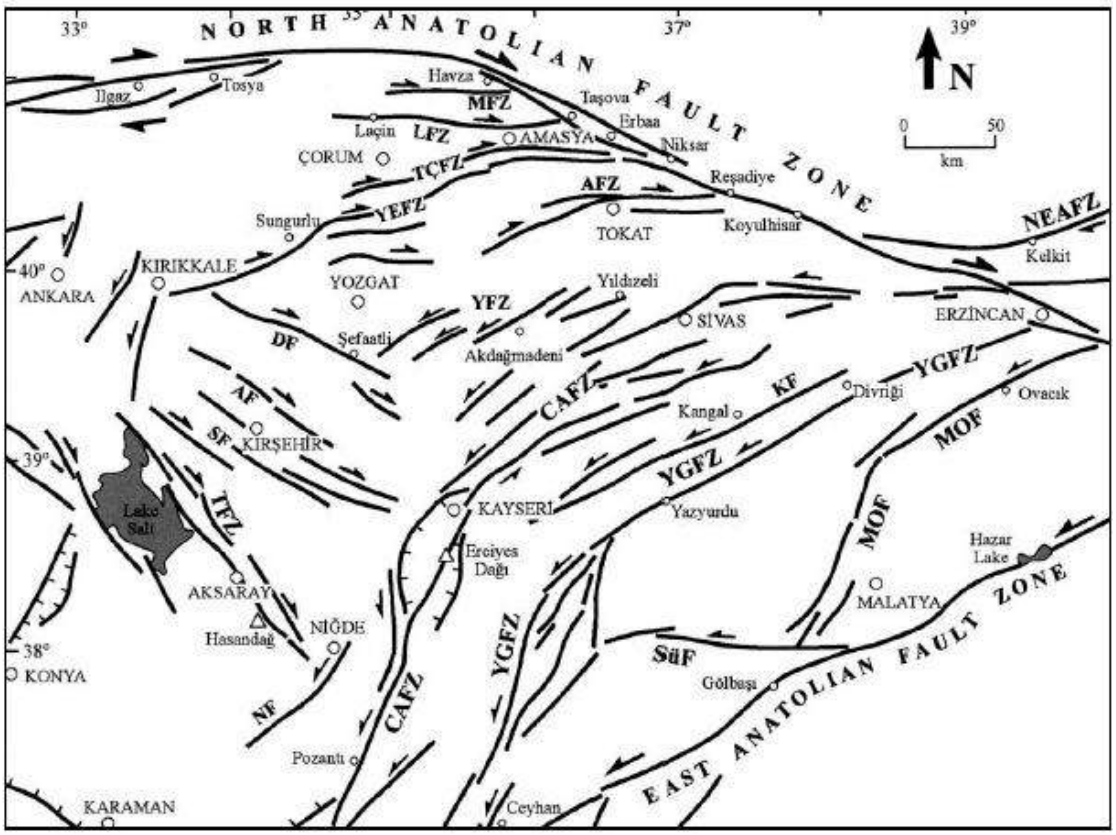


Figure 4.16. Structural Map Showing the Regional Tectonic Elements in the Study Field (Şaroğlu et al. 1987)

The analysis of the structural units of the study field reveals that the northeast-southwestering curves are generally the first productions of the tectonic movements. Overthrusting faults forming in the highly compressed zones are either derived from the curves or cut them. Oblique faults and strike-slip faults cutting these structures follow the above-mentioned faults (Norman, 1972). In short, it is observed that Kırıkkale massif is divided into three units by right-trending strike-slip faults after the first east-westering compressions. While the compression is ongoing, the curves transform into overthrusts or cut by them. Sediments in the edges regarded as “outcrops” of Kırıkkale massif collapse on one another towards west to east while there are relatively more open structures in “coves” (Norman, 1972).

It is later observed that compression couplehas the direction of northwest-soutneast due to a clockwise movement. The formation of cross folds and overthrust of Bedesten-Yahşihan fault probably generated durign this period. In addition to the compression couple, right-trending iterated large and small faults show that there is still a positive block punch couple. It is understood that this block punch couple is affected by the alteration in the direction of clockwise movement (positive) since east-westerin strike-slip faults cut the northeast-southwestering faults. Eventually, it is observed that compression couple has the north-south direction (Norman, 1972).

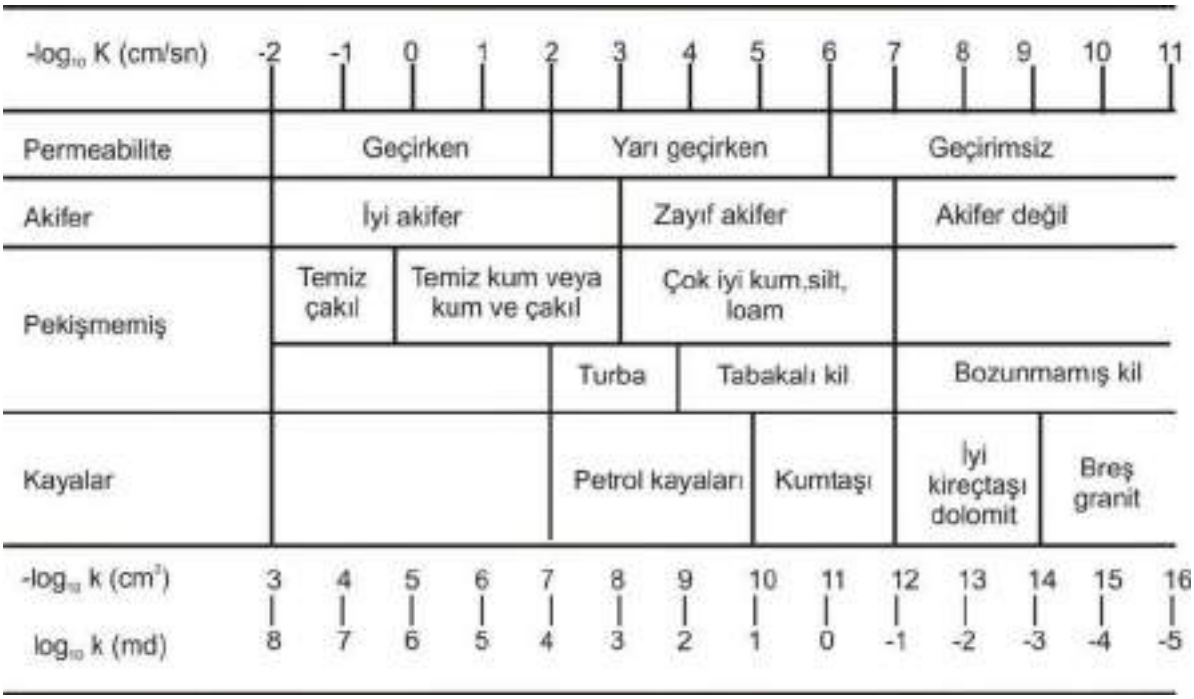
4.4.1. Hydrogeology

There are four water-carrying unit within the project site according to their carrying and transferring features. These are:

a. Impervious Units,
b. Low Permeable Units,
c. Permeable Units and
d. High Permeable Units.

The above-mentioned order is designated considering the hydraulic conductivity value intervals of the various hydrological units shown in the Figure 4.4 below prepared by Bear, Zaslavsky and Irmay (1968). These value intervals show that there is three classification as good, weak and aquifer in the soft and hard units (rocks). According this data, the hydrogeological features of outcrops in many parts of the study field is explained below (Figure 4.17).

Figure 4.4. Value Intervals of Hydraulic Conductivity and Permeability Coefficients in Various Units



Irmak Formation (Krüir)

Irmak formation was addressed by Norman (1972) for the first time. The formation is named after Irmak Town (C3) where it is the most convenient site to examine (Arni 1947; Baykal, 1943). It is known in the literature as “Mesozoic Ophiolitic Flysh” (Mof), “ophiolitic serie” or “ophiolitic part of Ankara melange” (Norman 1972). Having a wide surfacing in the west and northwest part of the site, the unit has a broad expansion. The unit forming the basis of the units in Assessment site: It consists of radiolarial chert blocks floating in the green tuff and mudstone matrix, limestone, turbiditical sandstone, agglomerate, basaltic pillow lava, serpentinie breccia, gabbro and diabase.

Considering the hydrological features of the units consisting of agglomerate, tuff, basaltic pillow lava, serpentinite breccia, gabbro and diabase outcropping in the Irmak formation, it is revealed that these units have low or very low hydraulic conductivity. Additionally, chert blocks, limesotnes and turbidit sandstone levels display an aquifer characteristics depending on the horizontal and vertical distributions. Low conductivity units prevail in the Irmak formation and the formation has a low conductivity characteristics.

Yahşihan Formation (krüy)

The unit is located in Yahşihan town and named by Norman (1972) after the typical outcrops in Yahşihan town of Kırıkkale province. The broadest surfacing of the unit is formed in western and northwestern parts of Karacaali Village within the Project site In addition to these locations, the unit crops out in the South Bahşili and Southwest Yahşihan. Yahşihan formation consists of pillow lava, andesitic debris sediments, rhyolit and tuff subleveled sandstones, pelagic limestones and green cherts. It was formed with the sediments of eroded ocean bottom eroded by rising from sea level.

Considering the hydrological features of the units consisting of pillow lava, andesitic debris sediments, rhyolites and tuff outcropping in Yahşihan formation, it is revealed that these units have low and/or very low hydraulic conductivity. Therefore, these levels are defined as impermeable. Additionally, sandstone, pelagic limestones ans green chert levels display an aquifer characteristics depending on the horizontal and vertical distributions. Since the low permeable units prevail in Yahşihan formation, it mainly displays an impermeable characteristics.

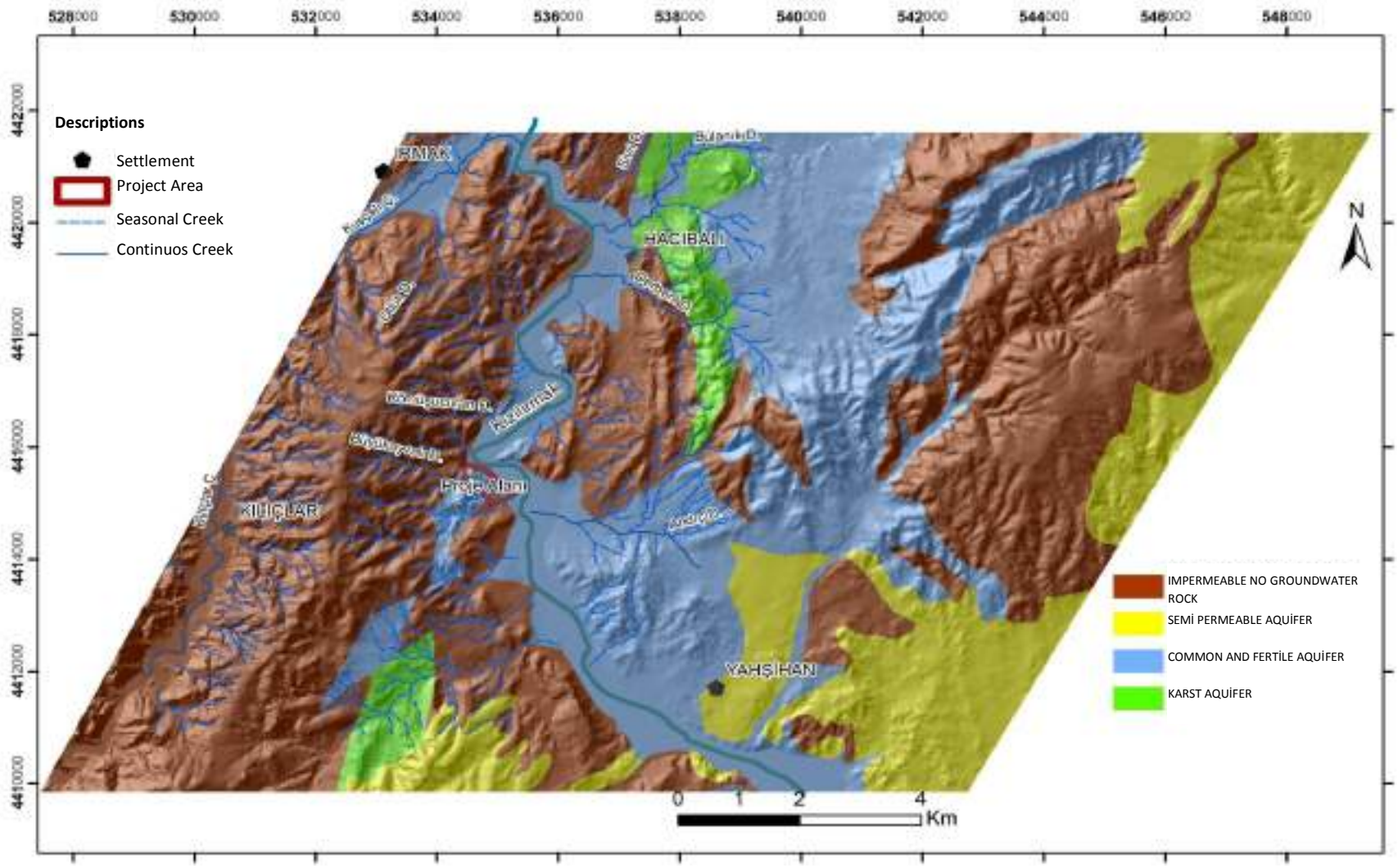


Figure 4.17. Hydrological Map of the Project Field and the Surroundings

ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Yahşihan District, Kılıçlar Town

Landscape Repair Plan



Yahşihan, KIRIKKALE
September 2013

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ABBREVIATIONS

APS : European Landscape Convention
ÇED : Environmental Impact Assessment
PKT : Landscape Character Type

Karacaali Pluton (pk)

It was firstly named by Norman (1972) after the Karacaali village located in North Kırıkkale. It mainly crops out in Karacaali village and in the northern parts. The pluton can also be analysed in the south and northeast of Bahşili town. The formation mainly consists of granitic intrusive rocks.

During the field studies carried around Karacaali Village, granite and granodiorite-type rocks are observed. These granites are sometimes observed as dykes inside the basic dark volcanic rocks of Yahşihan formation The rocks were exposed to a severe hydrothermal decomposition. Additionally, fracture systems are partly developed within the unit depending on the tectonism that they are exposed to. Therefore, it displays a semi-pervious characteristics in many parts of the project field.

Ilıcapınar Formation (krüil)

The formation was firstly named by Norman (1972) after Ilıcapınar Village (region) located in the Southwest of the project field. At and around the study site, there is Ilıcapınar region, Bedesten town (C9), Bölükbağ in the west and Irmak town in the northwest The unit is represented with volcanoclastic sandstones, mudstones, conglomerate and muddy pebble stones (debris flow). Sandstones partly create cross stratification. Medium-thin stratified sandstone-muddlestone intercalation is observed in the upper parts. Sandstones includes a high amount of multi-fracture and cleavage units. Considering the hydrogeological features, mudstone levels outcropping in the formation display low and/or very low hyraulic conductivity. Therefore, these levels are defined as impermeable units. Additionally, conglomerate and muddy pebblestone levels display an aquifer characteristics depending on the horizontal and vertical distributions. Since the high permeable units prevail within the formation, it mainly displays an aquifer characteristics.

Bölükdağ Formasyonu (krüb)

It was named by Norman (1972) after the Bölükdağı Maountain located in the southwest of Hacıbalı Village where the unit can efficintly be studied. The formation has certain surfaces along the extend of Ilıcapınar formation in the northeast of Irmak town, near Bedesten town and in the east of Ilıcapınar region. The dominant lithology of the unit is sandstone-mudstone intercalation. The type section of the formation has the thickness of 560 m and consists of thin-stratified altered sandstone and mudstone The microconglomerates containing massif granüle stone, sandstone and andesite, consists of the channel fills of approximately 10 m- thickness. These channel fills generally creates eroded surfaces. The coarse-grained turbidites contains half-round calsite that is half-graded abd cemented with secondary calsite fill, fine-grained volcanic pieces, quartz and opaque oxide minerals. Sandstone layers are permeable within the study field while the mudstone layers are impermeable. The formation is defined as impermeable in many parts of the study field.

Dizilitaşlar Formasyonu (pd)

Dizilitaşlar formation was analysed in 5 different units by Norman (1972) while it is currently analysed in 2 different unit. Dizilitaslar formation, extending from northeast to southwest within the boundaries of study field, consists of andstone, mudstones, turbidites and calcareous olistolites embedded in the material. Since limestone olistostrome and olistolites in these units stand for a different sediment mechanism, it forms a different uni. Additionaly, D3 member out of 5 different member defined by Norman (1972), is equal to this unit. Therefore, Dizilitas formation is examined under 2 different member units in this study.

D1 Üyesi (pd1)

The unit located 3 km east of Bedesten town consists of brown sandstone, greyish mudstone ans turbidites. Sandstones basements have sedimentary characteristics and gradation. While most of the basement structures are the bioturbation marks, it is also possible to see cavern and groove patterns It rarely include round, middle-fine grained conglomerate levels. Since low permeable units prevail in most parts of the D1 project field, the unit displays an impermeable characteristics.

D2 Üyesi (pd2)

Calceraous olistolites and olistostromes are distinguished in the paleocene aged turbidites of Dizilitaşlar formation, indicating an intense gravitational mass slide facies. They extend in the direction of northeast-southwest in parallel with the Dizilitas formation turbidites in and around the study field.

During the field studies, floating massive limestone olistolites are observed in sandstone-mudstone intercalation units in the southwest of Keçili region. Debris flows and packstones including huge amount of carbonate are also frequently observed. There is sandstone-mudstone intercalation extendind along the roadcut at the southwest of Hacıbalı district. The limestone and sandstone layers have auifer characteristics in D2 field while the mudstone layers are impermeable within the site. Additionally, limestone layers are dominant in the unit and it is defined as carstic aquifer unit.

Bulanıkdere Formasyonu (ebu)

The turbids are named after the Bulanıkdere formation since they have many common features according to the study carried out by Norman (1972). This units constitutes the main parts of eocene aged units in the study field, surfacing in South and east of Kecili Village, in North and west of Güzeren Village, around Mahmutlar Village and in the northern parts of Yahşihan Village within the boundaries of the site. The unit mainly consists of dark mudstones, grey volcanoclastic sandstones, massif pebble stones and granitic, calceraous and riolitic pebbled conglomerates of debris flows and partial channel fills. Since the high permeable units are dominant in the region, the formation is defined as permeable aquifer unit.

Karagüney Formasyonu (ek)

It was examined firstly by Norman (1972) and named referring to the Karagüney Mountain surfacing the unit. Karagüney formation also gives its name to the unit having rock-such lithology. The formation is surfacing within and around the study field, in the South of Güzeren Village, in the west and southwest of Mahmutlar Village. The red conglomerates are the dominant lithology of the unit. Highly round and coarse-pebbled volcanoclastic red conglomerates, sandstones and soft mudstones are observed in the unit samples from southwest of Güzeren village Sandstones are generally thick layered. Since the high permeable units are dominant in the region, the formation is defined as permeable aquifer unit.

Mahmutlar Formasyonu (em)

Mahmutlar formation was firstly examined by Norman (1972) and named referring to Mahmutlar Village where is the type section The name of the “Mahmutlar” formation is also given to the yellowish sandstone and mudstone units surfacing the study field due to the lithologically common features. The layers of Mahmutlar formation are observed in the east of Mahmutlar village and in the South of Güzeren village. The studies carried out in the South-west of Güzeren village revelaed that there are mudstone layers intercalating with sandstones. Bioturbation marks representing the possible delta environment are observed. On the other hand, sandstone-mudstone intercalation prevails in the upper parts. The layers generally extend to the North-west direction with a 30 degree angle. Sandstones have huge amount of lytic materials consisting polycrystal quartz of Karacaali pluton granites.

Considering the hydrogeological features of mudstone layers coutcropping in the formation, the units display a low and/or very low hydraulic conductivity features. Therefore, these units are defined as impermeable. Additionally, sandstone levels display an aquifer characteristics depending on the horizontal and vertical distributions. Since the low permeable units are dominant in the region, the formation is defined as impermeable unit.

Bahşili Formasyonu (eba)

Bahşili formation was analysed by Norman (1972). It is revelaed that the rocks of this unit has the broadest surfacing in the South part of the field, between Bahşili town and Hodar. Additionally, it is observed in the South-west and North-east of Yahşihan town. The formation, with a form of a regressive strutucture, consists of the congomerates supported by the matrix containing cornered volcanic pieces, pebbled red sandstones, calcareaous sandstones, slightly sanded mudstone, sandy limestones and numulitic limestones.

Considering the hydrogeological features of mudstone layers coutcropping in the formation, the units display a low and/or very low hydraulic conductivity features. Therefore, these units are defined as impermeable. Additionally, matrix-supported conglomerate levels containing sandstone, limestone and numulitic limestone display an aquifer characteristics depending on the horizontal and vertical distributions. Since the high permeable units are dominant in the region, the formation is defined as impermeable unit.

Oligo – Miocene

The prevailing lithology of the formation contains Oligocene-Miocene gypsums, soft and coarse-grained sandstones, highly round asidic-basic igneous rock, limestone, tuffs and sandstone pebbled conglomerates. The conglomerates containing gypsum, soft and coarse-grained sandstones and limestones and sandstone pebbles display an aquifer characteristics while the tuffed layers are impermeable. The study field has a semi-permeable feature.

Alluvials (Qa)

Allivuals are usually the cross-layered coarse sandstones and pebble stones composed along Kızılırmak and its arm. Sandy and pebbled levels in alluvial sediments display an aquifer characteristics depending on the horizontal and vertical distributions.

Boreholes

In the different locations of the project site, there are ten (10) boreholes of different depths of 20.00-50.00 m containing underground water, except the SK-1. Please see below the Figure 5 showing the measured underground water depths (Geological-Geotechnical Investigation Report, 2013). The ground water levels in the site change between 676m – 661.8m (See Figure 4.5).

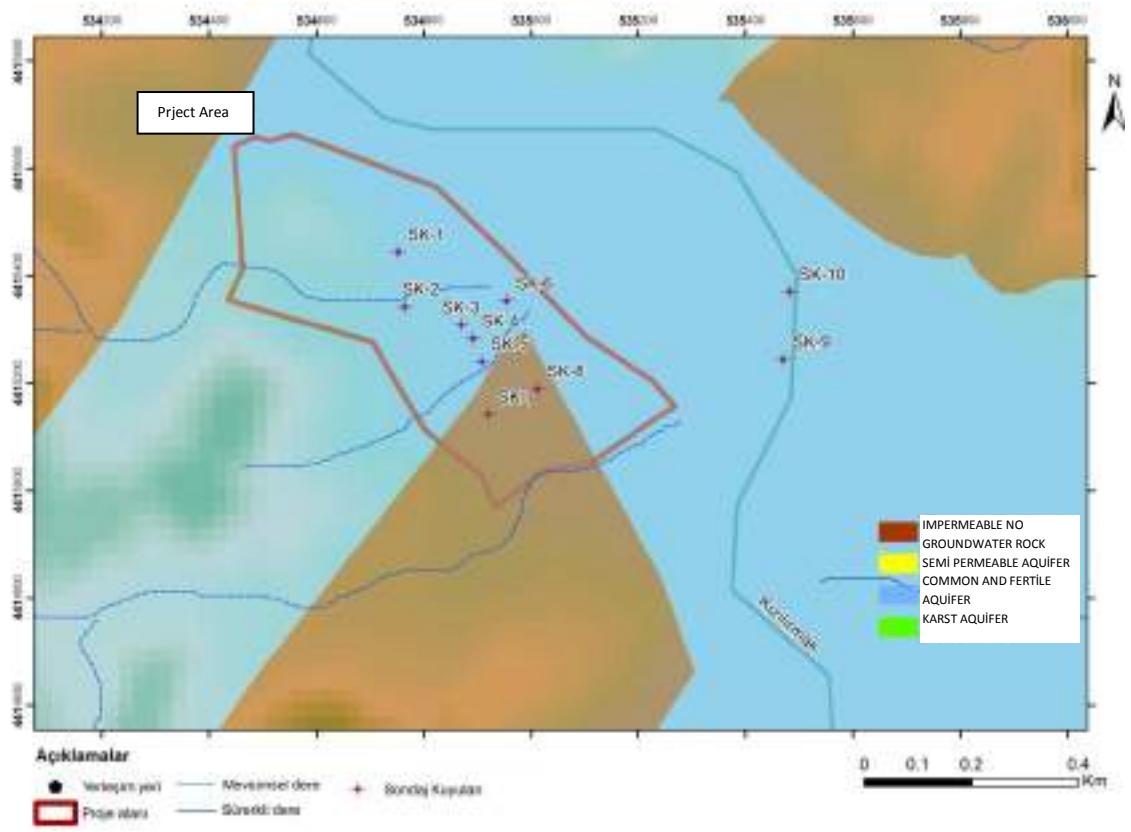


Figure 4.18. The Boreholes Drilled within the Project Site

Figure 4.5. The Borehole Values Drilled in the Project Site

Coordinates (UTM)		Basic Reseach Drill	Depth (m)	Groundwater Depth (m)	Topo (m)	Groundwater (m)
x	y	-				
534753	4415444	SK-1	20	-	-	
534765	4415342	SK-2	20.5	14	690	676
534870	4415309	SK-3	50	14.3	685	670.7
534892	4415283	SK-4	50	13.5	683	669.5
534909	4415240	SK-5	50.5	9.8	683	673.2
534955	4415353	SK-6	20	12	683	671
534922	4415142	SK-7	50	12	686	674
535013	4415189	SK-8	20	12.5	684	671.5
535471	4415244	SK-9	21	2.2	664	661.8
535483	4415370	SK-10	20.5	2.1	666	663.9

Analysing the distribution of the above-mentioned ground water depths in the site, it is interpreted that the water table is surfacing towards the Kızılırmak River basin and where the ground level is decreasing. In this case, ground water direction heads towards the Kızılırmak River.

Surface Waters

Kızılırmak River is the most important surface water running in and around the project site. On the other hand, there is no other conctant surface water within the boundaries of the project site but a few seasonal creeks (See Figure 4.18).

Surface Water-Ground Water Correlation

The groung water exploration drills ranging between 20.00-50.00m (320 m in total) were launched in 10 different locations within the project fields so as to specify the thickness levels of ground and rock units, their lithological, structural and physical characteristics and the ground water conditions. Plese see Figure 6 for the lithology data summary acquired during the drilling (Geological-Geotechnical Investigation Report, 2013).

The first 15 m of the boreholes no. SK-9 and 10 located in the west of Kızılırmak River contains pebbled-silted sand, low pebbled fine sand and low clayed and silted sand units (Figure 4.6), following a 20m silt stone intermediary-level sandstone units (Krüb). In this case, the aquifer system displays a free characteristics. Additionally, the first 20m of the other boreholes drilled in the other locations contains pebbled silted clayed sand, silted pebbled sand and pebbled silted sand units. These units also display an aquifer and a free characteristics. Considering these findings, it is observed that there is hydrogeological

interaction between the ground water and Kızılırmak as a surface water source within the territory. This interaction occurs as a result the feeding of ground water by the surface water.

Figure 4.6. Log Data on the Boreholes Drilled in and around the Project Site

Sondaj No	Koordinatlar		Derinlik (m)	Litoloji
SK-1	534753	4415444	20	0.00 – 8.00 m: bloklu siltli çakıllı kum (Qay) 8.00 – 20.00 m: kumtaşı silttaşı konglomera ardalanması (Krüil)
SK-2	534765	4415342	20.5	0.00-20.00 m: çakıllı killi kum. siltli kum. kum ve killi silt. az çakıllı killi silt. çakıllı kumlu silt (Qal) 20.00-20.50 m: kumtaşı (Krüil)
SK-3	534870	4415309	50	0.00-17.50 m: çakıllı siltli killi kum. siltli çakıllı kum. çakıllı ince kum-silt (Qal) 17.50-50.00 m: kumtaşı kiltaşı ardalanması (Ks)
SK-4	534892	4415283	50	0.00-15.00 m: çakıllı siltli killi kum. siltli çakıllı kum. çakıllı siltli kum (Qal) 15.00-50.00 m: kiltaşı silttaşı kumtaşı ardalanması (Krüil)
SK-5	534909	4415240	50.5	0.00-15.00 m: çakıllı siltli killi kum. siltli çakıllı killi kum. ince kumlu kil (Qal) 15.00-50.50 m: marn silttaşı kumtaşı ardalanması. kumtaşı (Krüil)
SK-6	534955	4415353	20	0.00-15.00 m: siltli çakıllı kum. çakıllı siltli kum 15.00-20.00 m: kumtaşı silttaşı ardalanması (Krüil)
SK-7	534922	4415142	50	0.00-16.00 m: çakıllı siltli kil. az çakıllı kumlu kil. çakıllı siltli kumlu kil (Qay) 16.00-50.00 m: kumtaşı silttaşı marn ardalanması (Krüb)
SK-8	535013	4415189	20	0.00-13.00 m: az çakıl ve az killi siltli ince kum (Qay) 13.00-20.00 m: konglomera. kumtaşı silttaşı ardalanması (Krüb)
SK-9	535471	4415244	21	0.00-15.00 m: çakıllı siltli kum. az çakıllı ince kum. az killi ve siltli kum (Qal) 15.00-21.00 m: kiltaşı ara seviyeli kumtaşı (Krüb)
SK-10	535483	4415370	20.5	0.00-12.80 m: çakıllı siltli kum. az çakıllı killi siltli kum. az çakıl ve kumlu siltli kil(Qal) 12.80-20.50 m: silttaşı ara seviyeli kumtaşı (Krüb)

4.5. RESULTS

The planned Acwa Power Natural Gas Combined Cycle Plant is located at the west of Kızılırmak River and within the borders of Kırıkkale Province, Yahşihan Town, Kılıçlar Municipality. The Plant site is situated in Kırıkkale Province, Kılıçlar Municipality. The municipality is approximaltely 25 km away from the city center and 22 km from the Yahşihan town center (Figure 1, Picture 1). The study field is located 4,18 km (air distance) east of Municipality center. The track lenght is 18 km and it is possible to travel from the Municipality to working field by car (Figure 1). The activity area was choosen as the island 108 parcel no.1, island 109, parcel no. 1 and 2, which is located on I30-b-14-a-1-c, I30-b-14-a-1-d, I30-b-14-a-2-d, I30-b-14-a-3-a, I30-b-14-a-4-a, I30-b-14-a-4-b map sections of Kılıçlar Municipality with the larger scale of 1/25000. The main dwelling units around the working site are Yahşihan Town, Hacıbalı, Irmak and Kılıçlar Villages. The area has moderate rugged terrain and a limited woodland (Picture 2). Kızılırmak River runs in the Northwest-Southeast direction within the borders of the site. Kuşçalı, Derbent and Andıç Streams are important streams intersecting with the area, flowing into the Kızılırmak River.

Kırıkkale Province, embracing the Natural Gas Thermal Power Plant, is located in Middle Kızılırmak region of Cenral Anatolia, and surrounded by Çorum and Yozgat in the east, Kırşehir in the South, Ankara in the west and Çankırı in the north. The average altitude is 700m and the highest point is Denek Mountain – Namıkkaya Hill with the height of 1.744 m. The main fertile lands of the Province are the plains of Keskin-Maşat, Bahşılı, Kızılırmak and Kılıçözü. Kızılırmak River, crossing the border of the Province from Çelebi Town in the South, runs to the North setting the provincial border of Kırıkkale-Çankırı in the North. Kızılırmak River, running at the eastern part of the city center, has the lenght of 94 km within the provincial border, and Kapulukaya Dam and hydroelectric plant were constructed on the river. Other important streams of the province are Delice River, Kılıçgözü and Balaban Creek, Acıözü and Çoruhözü Streams. There are plateaus ranging from 1200m – 1600m within the borders of Kırıkkale province. Hodar, Bedesten, Kamışlı and Sarıkaya on Küre Mountain; Koçu on Koçu Mountain; Azgın, Gümüşpınar, Pehlivanlı, Suludere and Yeşilkaya on Denek Mountain are the most important plateaus in the region. There are only a few plains within the province border. The most important plain is Kırıkkale Plain reaching to Çamlıca and Karakaya Hills in the North, to the west part of Denek Mountain in the South. The northern downhills meet on the plain, forming the core of the settlement in Kırıkkale province. The site where Machinery and Chemical Industry Corporation facilities are reaching over the Denek Mountain. It broadens toward Kızılırmak River and the broadest part is inbetween the Çoruhözü River and Kızılırmak River, with the height of approximately 750m. Although there are certain plains along the river in addition to Kırıkkale plain, these are not so important in terms of geoformations resulting due the fact that there is a big difference in terms of rise between river basins and hills. The mountains has became round hills or at some places sharp hills either eroded all along by deep valleys or shattering. It is observed that the number of these kinds of hills are increasing when getting closer to the mountains. There are plateaus ranging from 1200m – 1600m heigth within the borders of Kırıkkale province. Hodar, Bedesten, Kamışlı, Sarıkaya plateaus on Küre Mountain; Koçu plateau on Koçu Mountain; Gümüşpınar, Pehlivanlı, Suludere, Yelişkaya and Azgın plateaus on Denek Mountains are the most important plateaus of the region. The approximate elevation of

provincial land from sea level is 700m. Koçu Mountain, located in the direction of northwest-southeast has the width of 4km and height of 700m. The peak point of the mountain is Yığıltepe (1278m). Denek Mountain order in the east and southeast is located between Keskin Village and İzzettin Village that are in the south part of Çoruhözü Valley. The highest points are Gavur Hill (1742m) and Bozkaya Hill (1577m), forming the longest, widest and highest mass of the region with 44 km lenght and 30km width. Küre Hill (1450 m) is the peak of Küre Mountain lying in the northeast-southwest direction. There is no big topological alteration within and around the project site and the approximate topological height is 779.31 while the maximum height is 1030m and the minimum height is 670m.

It is planned that the Natural Gas Combined Cycle Plant is constructed on the island no.109 and the required waters are provided from the caisson pits to be drilled in the island no.8. As a result, the ground water level in the boreholes drilled by the related private company within and aroud the project site is approximately between 2.1m -14.3m. The first 15 m of the boreholes no. SK-9 and 10 located in the west of Kızılırmak River contains pebbled-silted sand, low pebbled fine sand and low clayed and silted sand units, following a 20m silt stone intermediary-level sandstone units (Krüb). In this case, the aquifer system displays a free characteristics. Additionally, the first 20m of the other boreholes drilled in the other locations contains pebbled silted clayed sand, silted pebbled sand and pebbled silted sand units. These units also display an aquifer and a free characteristics. Considering these findings, it is observed that there is hydrogeological interaction between the ground water and Kızılırmak as a surface water source within the territory. This interaction occurs as a result the feeding of ground water by the surface water.

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ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Yahşiyan District, Kılıçlar Town

Ecosystem Assessment Report

CHAPTER 5

Assessment in Agricultural Terms



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ASSESSMENT IN AGRICULTURAL TERMS

5.1. INTRODUCTION

Assessments performed for soil conditions (1st and 4th conditions) specified in the Annex-5 CWA in Ecosystem Assessment Report prepared by ACWA Power Electricity Operation and Management Industry and Trade Co. within the Natural Gas Combined Cycle Power Plant (NGCCP) Project within borders of Kırıkkale Province, Yahşihan District, Kılıçlar Town included in 1/25,000 scaled Kırşehir I30-b2 sheet, which is planned to be located at a total area of 261,142.58 m^2, and has an established power of 834.09 MWe / 849.1 MWm / 1,528.5 MWt, are provided below in detail.

Condition no: 1. Monitoring program shall be conducted in agricultural and forest soils located in the vicinity of the power plant activity area, materials to be analyzed shall be specified (amount of total of heavy metals in available materials lead, cadmium, nickel, chrome, zinc, copper, sulfur as sulfate in soil, pH will be specified every 3 years, and aggregate stability will be specified every 5 years in order to monitor the change in soil structure).

Large soil groups map of the project area and its vicinity is given in Figure 5.1, and majority of the area is classified as 'Colluvial Soils', while 'Reddish Brown Soil' are found in northwest of the project area even if little. Characteristics of the regional soils mentioned according to Large Soil Groups (LSG) are evaluated as follows according to 'Soil and Land Classification Standards Technical Direction and Legislation Concerned' published in 2008.

Colluvial Soils covering a very space at the project area are young soil, which have accumulated by being carried from short distances through gravity, landslides, surface flow or tributary rivers, and formed on the material called colluvium. Having good drainages due to dense, rough and massive material they contain, these soils have good yield potential if irrigated. Plant growth is largely dependent on climate.

Reddish Brown Soils found partially in northwest of the area exist densely in arid and semi-arid climates. Natural plant covers on them are usually composed of short pastures and bushes. Containing high rates of calcium in their profiles, these soils have quite good yield potential and are rich with vegetable nutrients. Having good natural drainages, these soils have middle level organic matter content (1-2%). These soils, which have low biological efficiency, generally have natural yields.

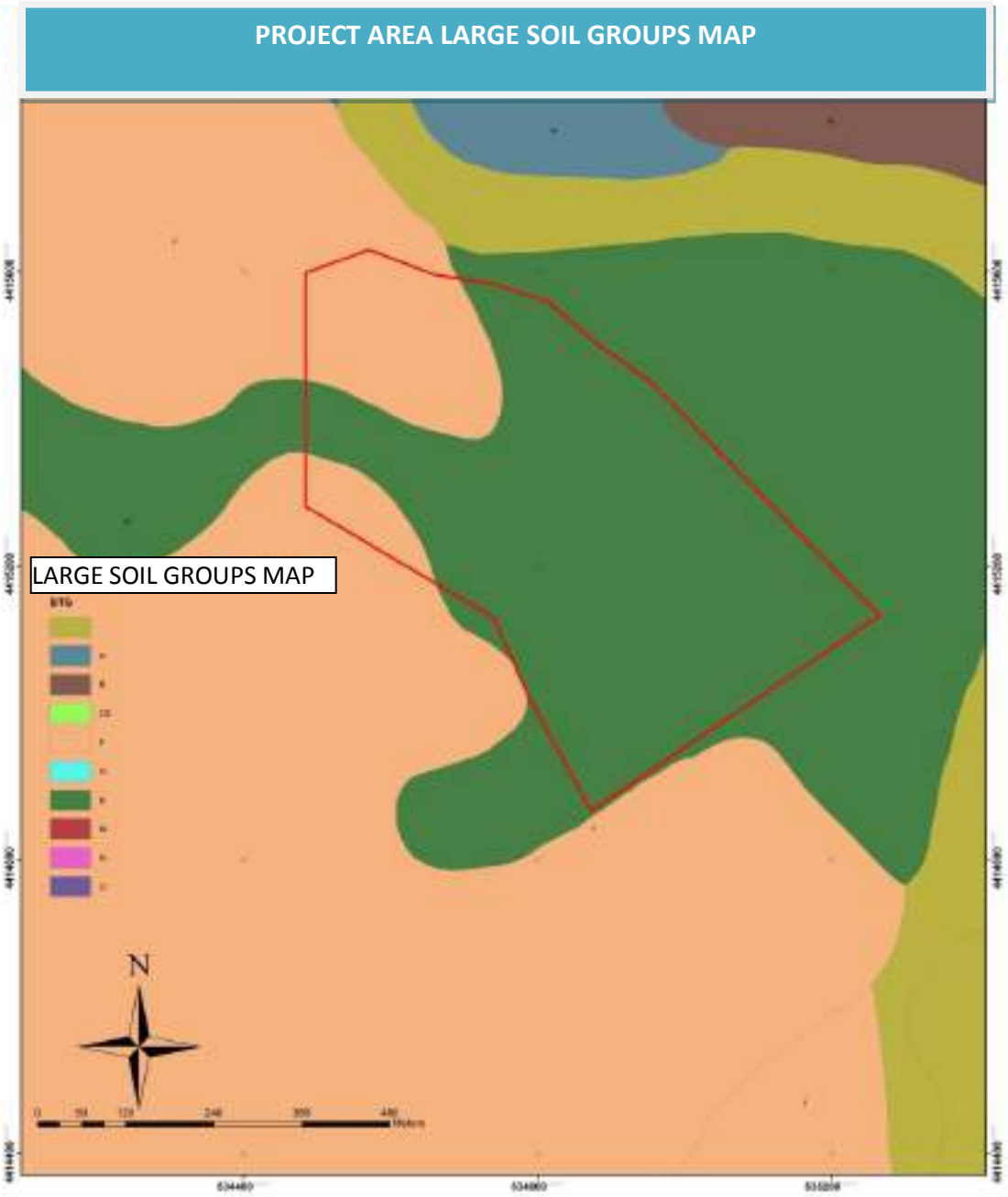


Figure 5.1 LARGE Soil Groups (LSG) of the Project Area[1]

5 different slope classes are defined within the project area and given in Figure 5.2. Slope perpendicularity is more than 30% on average in northwest of the area and less than 20% in north and southeast. High slope perpendicularities have caused Colluvial soils to be dominant in that part of the area. In an Assessment to be performed as areal average, 2/3 part of the project

area has a slope perpendicularity of less than 10%. Distribution of slope classes within the project area is given in Table 5.1 in detail.

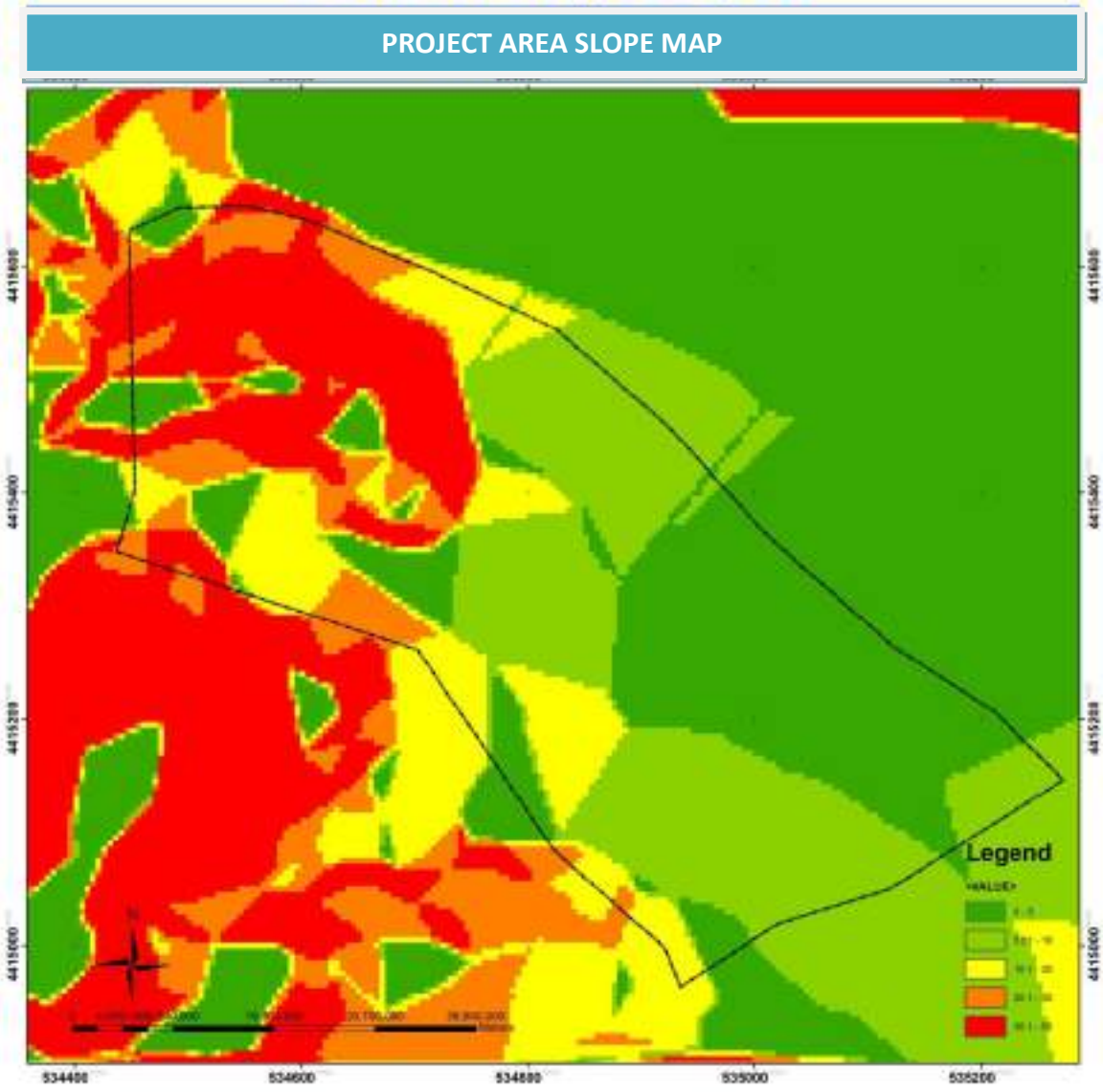


Figure 5.2 Slope Map of the Project area[1]

Table 5.1. Areal Distribution of Slop Classes within Project Site

Slope class (°)	Area (m^2)	Area (da)
0-2	18,582	18.582
2-5	52,268	52.268
5-8	77,707	77.707
8-12	29,910	29.910
12-20	17,787	17.787
20-30	17,390	17.390
30-45	32,792	32.792
45-82	14,707	14,707
Total	**261,142**	**261.142**

Water basin, in which the project area is located, is given in Figure 5.3 together with drainage pattern and height area. In addition, areal distribution of topographic heights within the project site is given in Table 5.2 in detail. Height within the area varies between 670 and 730 m, and is found between 680-710 m in a part of 2/3 of the project area.

Table 5.2. Areal Distribution of Topographical Heights within Project Site

Height (m)	Area (m^2)	Area (da)
670-680	93,171	18.582
680-690	88,249	52.268
690-700	37,860	77.707
700-710	22,522	29.910
710-720	13,772	17.787
720-730	5,568	17,390
Total	**261,142**	**261.142**

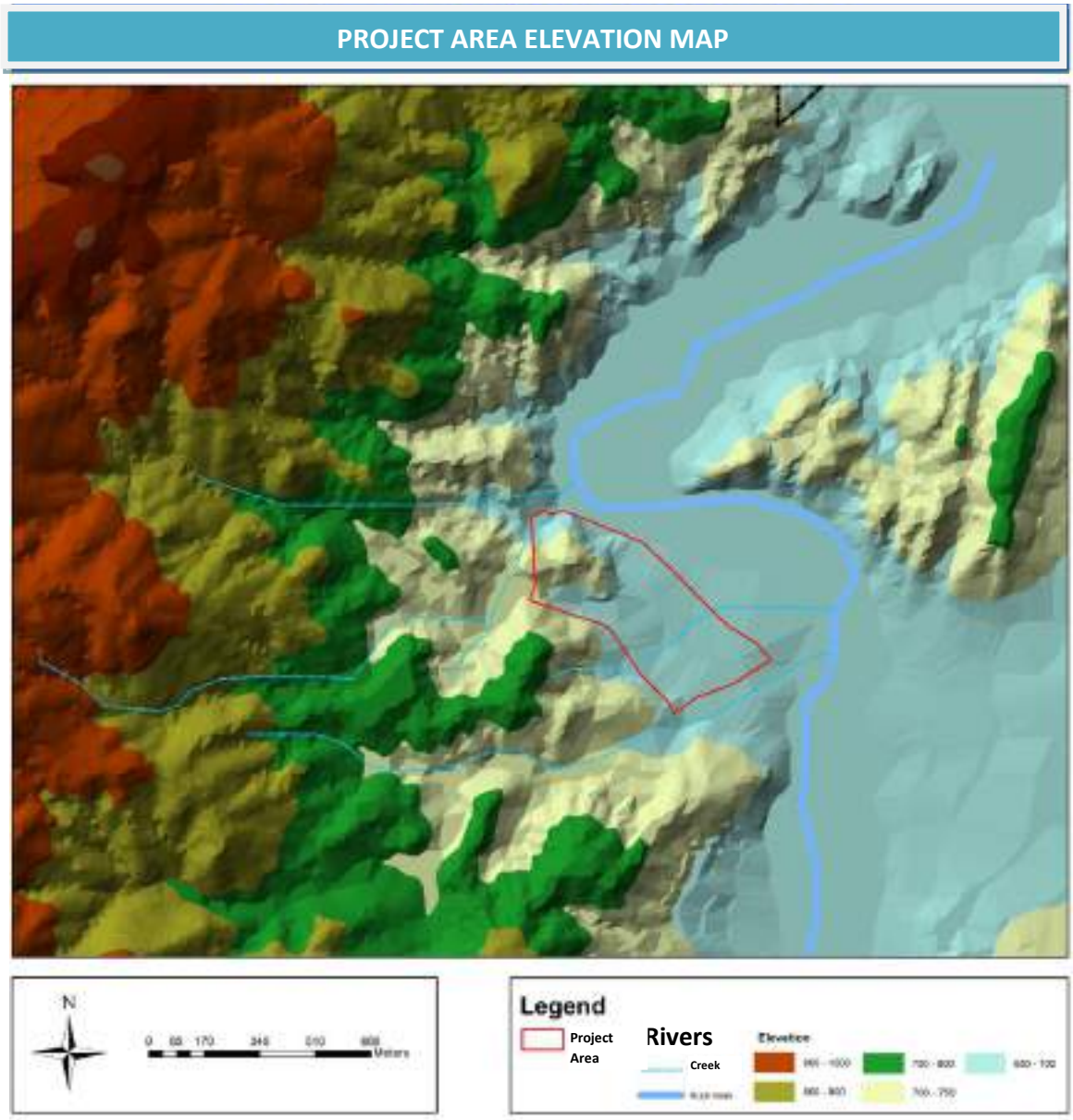


Figure 5.3. Project Area Water Basin, Drainage Pattern and Height Map

When project water basin and drainage pattern are considered, it is observed that two dry streams flow through the power plant activity area and are connected to Kızılırmak (Figure 5.3). First one of these is located in northwest of the site and the second one almost passes through the middle of the site; it passes close to northeast section of the project area. Attention must be paid not to deform dry stream bed in terms of ecosystem integrity to the extent not required. On the other hand, if the dry stream beds will be deformed as a result of construction activities during planning of related activities within the scope of Natural Gas Combined Cycle Power Plant (NGCCP), beds need to be turned at upper water basin in a secure way and connected to the closes natural waterway. In other words, it must be ensured with turning structures that these

natural waterways do not pass over or through the project site. For that purpose, there are suitable natural waterways both in the northwest and south of the site (Figure 5.3). Prevention of contamination of the river with project sourced construction materials has crucial importance when it is considered that dry streams are directly connected to the main river according to nature of land degradations at site. Speed of water flowing downwards by condensing after each rainfall must be cut. Hence, reaching of sediments, which may occur due to project sourced land degradations, to Kızılırmak, will be prevented on a large scale.

A monitoring program was developed in land use types (agriculture and meadow) soils in the vicinity of the power plant activity area according to soil, topography (curve) and water basin (drainage pattern) characteristics of Kırıkkale Natural Gas Combined Cycle Power Plant (NGCCP), and its details are provided in Table 5.3 and Figure 5.4.

Table 5.3. Soil Sampling Points in Agricultural and Meadow Areas in the Vicinity of the Power Plant Activity Area

Sample no	Sample place	Distance between samples (m)	Land use type	Location indicators	
				x	y
1	Out of area	25	Agriculture	534919	4415496
2	Out of area	25	Meadow	535182	4415061
3	Out of area	25	Meadow	534425	4415643
4	Out of area	25	Agriculture	534696	4415232
5	Out of area	75	Agriculture	534955	4415536
6	Out of area	75	Meadow	535230	4415025
7	Out of area	75	Meadow	534379	4415673
8	Out of area	75	Agriculture	534662	4415186
9	Out of area	125	Agriculture	534983	4415574
10	Out of area	125	Meadow	535271	4414993
11	Out of area	125	Meadow	534340	4415701
12	Out of area	125	Agriculture	534628	4415146
13	Out of area	175	Agriculture	535012	4415610
14	Out of area	175	Meadow	535307	4414962
15	Out of area	175	Meadow	534305	4415732
16	Out of area	175	Agriculture	534596	4415107
17	Project area	-	-	534645	4415472
18	Project area	-	-	534859	4415427
19	Project area	-	-	534761	4415306
20	Project area	-	-	534918	4415263
21	Project area	-	-	535049	4415163

As seen in Figure 5.4, two section directions, in northwest – southeast and northeast – southwest, in order to perform monitoring in agricultural and meadow lands located within Kırıkkale Natural Gas Combined Cycle Power Plant (NGCCP) Project activity site. It is suggested to take a sample every 50 m on these sections by starting 25 m outside of the project area. Location indicators (coordinates) of these sampling points are given in Table 5.3.

moreover, it is planned to take 5 soil samples within the project area on directions of the same section.

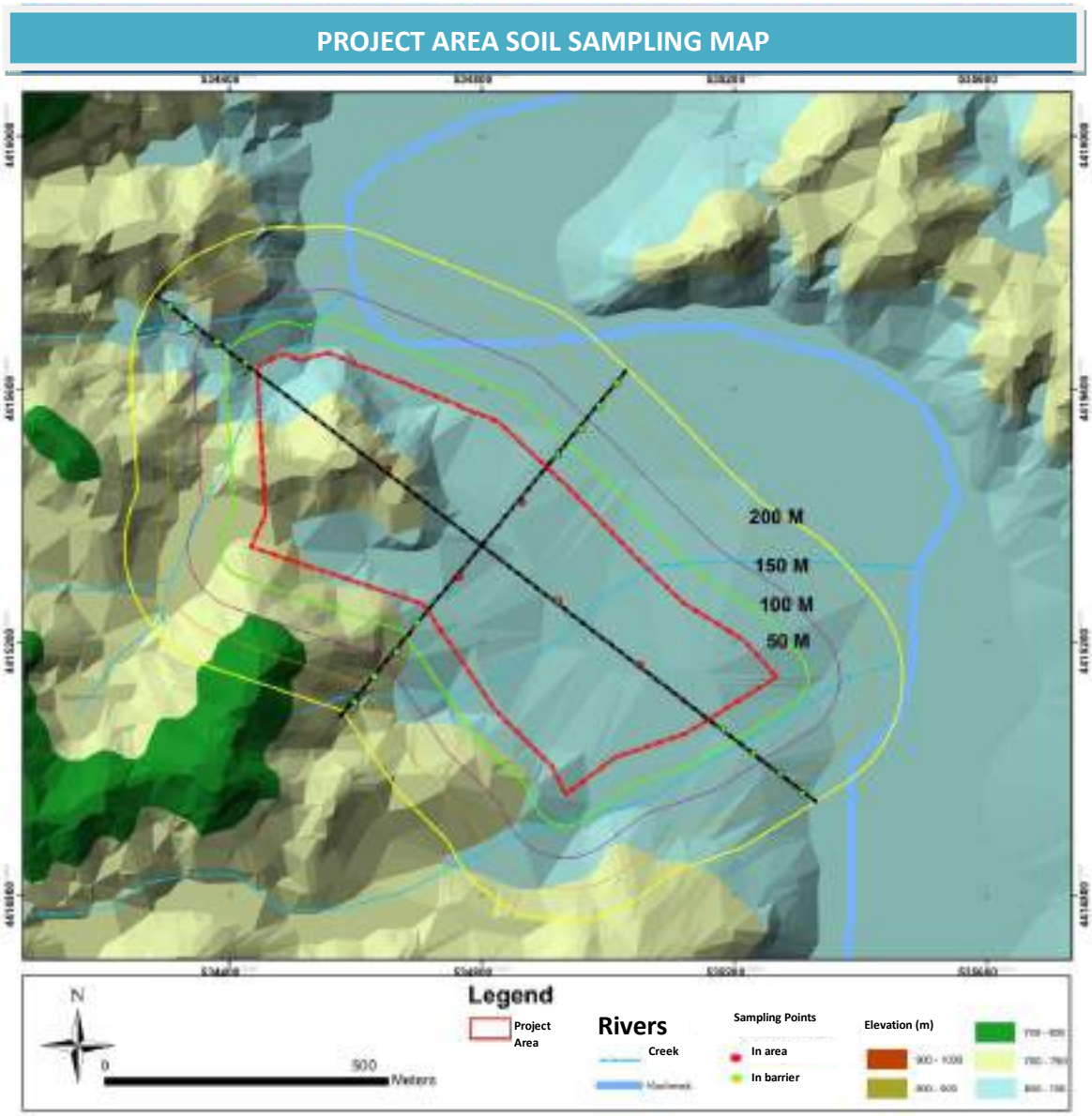


Figure 5.4. Location Indicators of Soil Sampling Points Suggested in order to Perform Monitoring in Agricultural and Meadow Lands within Power Plant Activity Area

Soil samplings will be performed from points that are shown in positional manner in Table 5.3 and Figure 5.4, and available metals lead, cadmium, nickel, chrome, zinc, copper, sulfur and chlorine, sulfur as sulfate in soil, pH and fluoride analyses will be performed each year. In addition to the analyses performed on annually taken samples, total amount of heavy metals will be analyzed once in 3 years, and aggregate stability analysis will be performed once every 5 years in order to monitor the change in soil structure.

Condition no: 4. Before starting activity, it will be declared that available metals lead, cadmium, nickel, chrome, zinc, copper, sulfur and chlorine, sulfur as sulfate in soil, pH, fluoride and aggregate stability analyses are performed for control purposes.

It is possible that agricultural and meadow areas in the vicinity and Kızılırmak river bed located very close to the project area will be contaminated by heavy metals through processes of possible water (surface, tunnel and gully erosion) and wind erosion (dust flying) as a result of construction activities (land degradations) to be carried out Kırıkkale Natural Gas Combined Cycle Power Plant (NGCCP). Therefore, formation of all erosion processes at site must be prevented by using water and soil protection methods. Moreover, there will be dense vehicle traffic areas in NGCCP. Therefore sediment carrying may occur through ways such as dust flying, smearing of mud to tires. Irrigation or application of other dust palliatives may be required in order to reduce or eliminate dust sources negatives (wind erosion). Works such as road sweeping, washing of vehicle tires and stabilizing of construction site enters and exits and access roads must be performed in order to prevent vehicle traffic sourced sediment transportation. Again the top soil vegetable soil) must be stripped by respiration depth (A and B horizons) and stored and preserved in another area to be used later in landscape and regaining to environment works. Cleaning of plant cover must be performed within planning (timing). Untimely cutting and cleaning processes will increase erosion and sedimentation risk. Consequently, an efficient monitoring and Assessment activity will be performed at site in order to prevent soil and water contaminations.

According to the contaminator indicator parameters unique to the aforesaid activity for Power plants published within the scope ‘Regulation concerning control of soil contamination and point sourced contaminated sites’ were performed by SEGAL Environmental Measurement and Analysis Laboratory’ to ‘Ecosystem Environmental Laboratory’ and ‘Eşçem Environmental Laboratory’. Analysis results of soil samples taken from 2 different points are given in Table 5.4. These analysis results will found the basis comparatively for monitoring and Assessments to be performed annually, for 3 years and 5 years, for soil characteristics in terms of ecosystem integrity.

Table 5.4. Analysis Results of Soil Samples

Sample	Parameter-Unit (mg/kg)													
	Antimony	Arsenic	Copper	Barium	Boron	Mercury	Zinc	Cadmium	Chrome	Lead	Molybdenum	Selenium	Total Oil Hydrocarbons	TOX
1*	<1,25	20	32,5	155	49,5	6	52,5	2,05	91,5	22,5	<2,5	<1,25	2,08	280,1
2*	<1,25	27	40	145	78,5	6,5	73	2,1	75	30	<2,5	<1,25	3,8	127,38

*Coordinates according to sampling points are E-534780 - N-4415150 and E-535061 - N-4415385, respectively.

As a result of the Assessment performed according to heavy metal limit values in soil specified in the Annex-IA[1,] in 'Soil Contamination Control Regulation' published in the Official Gazette number 25381 on 31.05.2005, Mercury contents of soils are quite over 1,5 mg/kg furnace dry soil values allowed as seen in Table 5.5, while Lead, Cadmium, Chrome, Copper and Zinc evaluated within the scope of the regulation are below limit values.

Table 5.5. Heavy Metal Limit Values in Soil (Source: Soil Contamination Control Regulation)

Heavy metal limit values in soil		
Heavy metal (Total)	**If soil pH is around 5-6**	**If soil pH is 6**
	mg/kg furnace dry soil	**mg/kg furnace dry soil**
Lead	50	300
Cadmium	1	3
Chrome	100	100
Copper	50	140
Nickel	30	75
Zinc	150	300
Mercury	1	1,5

Note: If pH value is above 7, Ministry can increase limit values up to 50% in cases where it is not hazardous for environmental and human health, underground water in particular. Exceeding these limit values may be allowed in cases where it is not hazardous for environmental and human health in areas where feed crops are raised.

'Regulation concerning control of soil contamination and point sourced contaminated sites'[1], in which soil contamination levels that can affect human health are given under Generic

Contaminator Limit Values published in the official gazette number 27605 in 2010, explains both the indicators required to be evaluated according to above specified fields of activity as stated above, and limit concentration values of these indicators to humans and environment comprehensively.

Limit values determined for impacts of indicators evaluated within the scope of the related activity (power plant) on humans and environment in certain ways are given in Table 5.6.

Total Oil Hydrocarbon (TOH) values measured for both samples evaluated do not contain contamination risk on human and environmental health at important level. While no limit value is directly specified for this parameter in this list, Total Organic Halogen (TOX) values of which are also given, they are seen that they do not have the concentrations, which will create contamination in the event that they flow into underground waters and are not drunk, when evaluated over total values calculated for different organic halogens found in the list (Table 5.6).

For example, since Antimony covers of examples are below the given limit value, there is no contamination risk in current situation.

In the event that concentration of Arsenic, which is an element, even little concentrations of which can have serious impact on human health, measured in samples, have the potential to threat human and environmental health if the below specified conditions occur. According to the regulation published in 2005, while the allowed Arsenic concentration as a result of treatment of a contaminated soil is maximum 20 mg/kg, Arsenic contents of soil samples evaluated are above this value.

In the Assessment performed in terms of limit values given within the scope of both regulations, it is seen that Copper contents of samples do not have the level to create contamination.

Barium concentrations of samples do not contain risk factor according to the schedule given in Table 5.6. It has the potential to create risk factor in the event that it flows into underground water and this water is drunk.

While there is no limit value in regulations for boron content, in soils, which have more than 5 kg/mg boron content, plant growth significantly reduces; this value is approximately 1 mg/kg and values over it cause toxic effect (Wolf, 1971).

Mercury contents are above allowable values according to the regulation published in 2005 as specified above, and have the potential to create risk factor at significant levels in the event that they enter the body through respiration or water flowing into underground water is drunk, in the Assessment performed according to Table 5.3.

When it is considered that pH contents of regional soils have higher values than 6 according to a general Assessment to be performed by taking climate and main material characteristics in

Central Anatolian conditions into consideration, they do not have contamination risk factor at important levels within the scope of both regulations in terms of Zinc, Cadmium, Chrome and Lead contents. pH analyses are not performed and not suggested to be performed in soil samples. pH analyses will be performed before start of the project either according to the soil samples used in Figure 5.4 or in soil samples used in Table 5.4. In addition to this initial value, pH analyses will be repeated each year.

It is seen that Molybdenum and Selenium contents of soil samples do not have important levels of contamination factor since they are under the limit values given for human and environmental health according to Table 5.6.

In a similar way, aggregate stability analyses in soil samples have not been performed and are guaranteed to be performed. Aggregate stability tests will be performed before start of the project either according to the sampling plan given in Figure 5.4 or in soil samples used in Table 5.4. In addition to this initial aggregate stability value, aggregate stability will be determined once in every 5 years within the scope of ecosystem Assessment report in order to monitor the changes at project site and its vicinity.

Table 5.6. Genetic Contaminator Limit Value List of Indicators Evaluated for Power Plants (Reference: Regulation Concerning Control of Soil Contamination and Point Source Contaminated Sites)

Contaminator	CAS No	Absorption through swallowing and of soil and skin contact (mg/kg furnace dry soil)		Respiration of volatile materials in outer environment (mg/kg furnace dry soil)		Respiration of fugitive dusts in outer environment (mg/kg furnace dry soil)		Transportation of contaminators in underground water and drinking of underground water[1] (mg/kg furnace dry soil) SF = 10		SF = 1	
ORGANİCS											
Chloromethane	74-87-3	49	c,e	2	e	-		0.01	e.g	0.001	e,g
Methylene chloride	75-09-2	85	c,e	12	e	-		0.05	h	0.005	h
Chloroform	67-66-3	105	c,e	0,3	e	-		0.8	h	0.08	h
Carbon tetrachloride	56-23-5	5	c,e	0,3	e	-		0.02	h	0.002	h
Methyl bromide	74-83-9	110	b,c	8	b	-		0.1	b.g	0.01	b,g
Bromoform	75-25-2	61	e	-	i	-		0.3	h	0.03	h
Chloromethane	74-87-3	49	c,e	2	e	-		0.01	e.g	0.001	e,g
1,2-Dichloroethane	107-06-2	7	c,e	0,5	e	-		0.002	e.g	0.0002	e,g
Vinyl chloride (chloroethylene)	75-01-4	0,4	c,e,k	0,6	e,l	-		0.0002	e.g.k	0.00002	e,g, k
Total Oil Hydrocarbons (Aliphatic) (EC5 - EC8) [4]	0-01-0	4693	b,c	-	i	-		4	b.g	0.4	b,g
Total Oil Hydrocarbons (Aliphatic) (EC8> - EC16) [4]	0-01-1	7821	b,c	-	i	-		7	b.g	0.7	b,g
Total Oil Hydrocarbons (Aliphatic) (EC16> - EC35) [4]	0-00-9	156429	b,c	-	f	-		146	b.g	15	b,g
Total Oil Hydrocarbons (Aromatic)	0-01-3	15643	b,c	-	i	-		15	b.g	1	b,g

Contaminator	CAS No	Absorption through swallowing and of soil and skin contact (mg/kg furnace dry soil)		Respiration of volatile materials in outer environment (mg/kg furnace dry soil)		Respiration of fugitive dusts in outer environment (mg/kg furnace dry soil)		Transportation of contaminators in underground water and drinking of underground water[1] (mg/kg furnace dry soil) SF = 10		SF = 1	
(EC5 - EC9) [4]											
Total Oil Hydrocarbons (Aromatic) (EC9> - EC16) [4]	0-01-4	1564	b,c	-	i	-		1	b,g	0.1	b,g
Total Oil Hydrocarbons (Aromatic) (EC16> - EC35) [4]	0-01-2	2346	b,c	-	f	-		2	b,g	0.2	b,g
INORGANİKLER											
Antimony	7440-36-0	31	b,c	-		-	f	2	ı	0.2	ı
Arsenic	7440-38-2	0,4	e	-		471	e	3	ı	0.3	ı
Copper	7440-50-8	3129	b,c	-		-	f	514	b,g	51	b,g
Barium	7440-39-3	15643	b,c	-		433702	b	288	h	29	h
Mercury	7439-97-6	23	b,c	3	d	-		3	d	0.6	b,g
Zinc	7440-66-6	23464	b,c	-		-	f	6811	b,g	681	b,g
Cadmium	7440-43-9	70	b,m	-		1124	e	27	b,g	3	b,g
Chrome (total) [5]	7440-47-3	235	b,c	-		24	e	900000	ı	1	ı
Lead	7439-92-1	400	n	-		-	f	135	b,g	14	b,g
Molybdenum	7439-98-7	391	b,c	-		-	f	14	h	1	h
Selenium	7782-49-2	391	b,c	-		-	f	0,5	ı	0.05	ı

[1] Dilution factor must be accepted as SF ‘1’ in the event that distance to aquifers is less than 3 m, aquifer is cracked or carstic, or contamination source area is equal to or greater than 10 hectares; and as SF ‘10’ n other cases.

[2] Must be taken into consideration for all mixtures excluding Aroklor 1016.
[3] Only to be taken into consideration for Aroklor 1016 mixtures.
[4] EC: Equivalent carbon amount. For detailed information see ABD EPA, 2002. (Provisional Peer Reviewed Toxicity Values for Total Petroleum Hydrocarbons. Superfund Health Risk Technical Support Center National Center for Environmental Assessment, Office of Research and Development, Cincinnati, OH 45268).
[5] Limit values calculated for chrome (VI) are used.
[a] Risks on human health are taken into considered in calculation of Generic Contaminator Limit Value.
[b] Hazard index is accepted as '1' in calculation of this value.
[c] Only the exposure way of swallowing of soil is considered since there is no skin absorption factor for this contaminator.
[d] Soil saturation concentration (C_{sat}).
[e] Cancer risk is accepted as "10^{-6}" in calculation of this value.
[f] There are no toxicological values for this exposure way.
[g] HBL value is used in calculation of this value.
[h] Drinking water determined by the World Health Organization is used in calculation of this value.
[ı] Limit value given for drinking and utility water at TS-266 Water Intended for Human Consumption standard is used in calculation of this value.
[i] No limit value could be calculated for this exposure way since there are no D_i, and D_w values for this contaminator.
[j] Whatever the contaminator concentration in soil may be, this exposure way is not required to be taken into consideration due to chemical specific characteristics.
[k] This limit value is calculated by assuming that vinyl chloride is exposed to lifelong.
[l] This limit value is calculated by assuming that vinyl chloride is constantly exposed to during adulthood period.
[m] RfD_o value determined for taking of Cadmium into body through nutrition is used in calculation of this limit value.
[n] This value is taken from ABD EPA, 1994 (ABD EPA, 1994. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, EPA/540/F-94/043, Office of Solid Waste and Emergency Response, Washington, D.C. Directive 9355.4-12.).
[o] This value is calculated by using the RfD_o value determined for mercury chloride (CAS No. 7847-94-7).
[ö] This value is calculated by using the RfD_o value determined for thallium sulfate (CAS No. 7446-18-6).

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ACWA POWER KIRIKKALE NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT

Kırıkkale Province, Yahşihan District, Kılıçlar Town

LANDSCAPE REPAIR PLAN



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LANDSCAPE REPAIR PLAN

6.1. INTRODUCTION

6.1.1. Justification

According to the European Landscape Convention, landscape is an area, characteristics of which form in the way perceived by humans as a result of interaction and actions of human and/or natural factors. In terms of landscape ecology, landscape can be defined as use of areas that are repeated with similar forms in areas vast for miles and miles, or mosaic, which is a mixture of local ecosystems. In general sense, landscape can be defined as the view (panorama) of the entire environment. It is possible to handle in two main branches as natural landscape and cultural landscape (Yavuzşefik and Uzun 2005).

1- Natural landscape is a landscape, in which completely natural elements are dominant out of cities, are little or not affected by human, and which protect its own natural balance and order. For example Mountains, Hills, Tundras, Forests, Rivers and Lakes etc. Are natural elements. Moreover tundra, desert, steps, macquis and forest, which are national vegetation types, are natural landscapes,

2- Cultural landscape is the form of landscape appearing as a result of the use of nature by humans for various purposes. While it is hard to make definite limitations and classifications, they are separated into two main classes as Urban and Rural landscape. Urban landscape is living environment such as structures forming cities, city blocks, traffic system, social facilities and commercial and industrial areas that have appeared as a result of people's desire to live together. Rural landscape is the view of the environment created by humans as a result of their efforts outside cities. These activities may be in the form of agriculture, forestry, recreation and environmental protection. As a result of those, a balanced or unbalanced rural landscape view appears. Rural landscape creates a barrier between urban landscape and natural landscape. However today, human has also wide scale impact also on natural landscape. Humans have lived in close relationship with nature since ancient times. As known, first humans protected the nature and did not engage in activities changing the environment; on the contrary, they accepted the nature as a part of the place they lived at and adopted all its rules. In this period, mankind tried to benefit from the existing materials in nature and almost did not affect the nature. In other words, he tried to continue his living through hunting without affecting the nature. Hence, in this period humans harmed animal specimens a little and caused almost no harm to plants. His impact on plants starts with shift to agricultural production. Therefore, works in rural landscape area mostly covers natural landscape also. Activities not complying with ecological principles have inflicted deep wounds on natural and rural landscapes which are very hard to heal, e.g. mines sand and rock mines, oil-natural gas pipelines, transportation axes, agricultural areas etc. We can summarize negative impacts of humans on the nature as follows (Yavuzşefik and Uzun 2005):

- Destruction of vegetation covers and forests,
- Contamination of soil, streams, lakes and seas,

- Increase of erosion, avalanches and floods (agricultural areas and meadows have become unproductive).
- Narrowing of agricultural areas, tendency of humans perform agriculture in unsuitable places (because the best agricultural places have been and are residential areas),
- Air pollution has negatively affected urban life,
- Ozone layer depletion and its effects continue.

Mining works performed with open quarry method in particular causes serious damage to the current ecosystem if not performed under suitable conditions. Topography of land is being changed, natural plant and animal communities are disappearing, and significant changes in hydrologic cycle occurs since artificial hills and pits form and geological material becomes upside down (Özbey 2005).

Above specified events and developments put forward the need to plan and repair the nature and generate work area (Yavuzşefik and Uzun 2005).

6.1.2. Aim

Aim and task of landscape repair technique is stabilization of damaged areas, improvement of ecological conditions of these areas and transformation of any area into usable form. In other words, it is about bringing the nature to the most suitable status in ecological terms and improving it by healing the opened wounds and removing the damage done. For example protection of sloped areas against landslides and erosion, vegetation of coal and mine quarries and waste areas and stabilizing them is of aims and tasks of landscape repair (Yavuzşefik and Uzun 2005).

In ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant Project, it is also aimed in the same way to remove the natural damage that will arise during project construction and rehabilitation of the area. Designing of land morphology compatible with the environment, which is destructed and damaged during project works, and stage of vegetation of damaged surfaces (Biorestoration) covers this process. It is sometimes necessary to take structural and technical measures during vegetation works.

6.1.3. Scope

Landscape repair works are carried out in three stages as pre-construction, during construction and post-construction period. Within this scope working subjects of project area borders and land works, natural landscape inventories (flora, fauna, geomorphology, topography and geology, hydrogeology, soil, climate, erosion and sediment status), cultural landscape inventories (property status, land use status, socio-economic structure, areas having archeological and historical importance and cultural heritage), visual landscape inventory, landscape analysis (landscape water function analysis, landscape erosion function analysis, landscape habitat function analysis, landscape character function analysis, landscape visual function analysis), determination of landscape repair targets, biological and technical repair, application, management, supervision and monitoring are evaluated as titles.

In order for landscape repair works to be carried out successfully, it is required to determine aims, take inventory of factor causing damage or pre-activity area and its immediate vicinity, determine the impacts of activity, which causes damage, on environment, decide which repair processes to be performed during and after activity and carry out repair works in this direction (vegetation etc.), create an environment equal to the ecological and socio-economic values under conditions before damage and carry out monitoring-maintenance works with which the continuity of this system will be ensured (Akpınar 2002).

I- PRE-CONSTRUCTION

6.2. MATERIAL AND MANAGEMENT

6.2.1. Project Area and Borders

Activity subject of the project is the Natural Gas Combined Cycle Power Plant (NGCCP) Project at an established power of 834,09 MWe / 849,1 MWm / 1.528.5 MWt planned by ACWA Power Electricity Operation and Management Industry and Trade Co. within borders of Kırıkkale Province, Yahşihan District, Kılıçlar Town. Activity area is located on a total area of 261.142,58 m2 in 1/25000 scale Kırşehir I30-b2 sheet, and activity area property is public domain. NGCCP is located 4,5 km northwest of Yahşihan District, 3,7 km east of Kılıçlar Town and 4 km northwest of Yenişehir Town (Anonymous 2013). Locations of work area and satellite view of work area are given in Figure 6.1, Figure 6.2 and Figure 6.3, respectively.

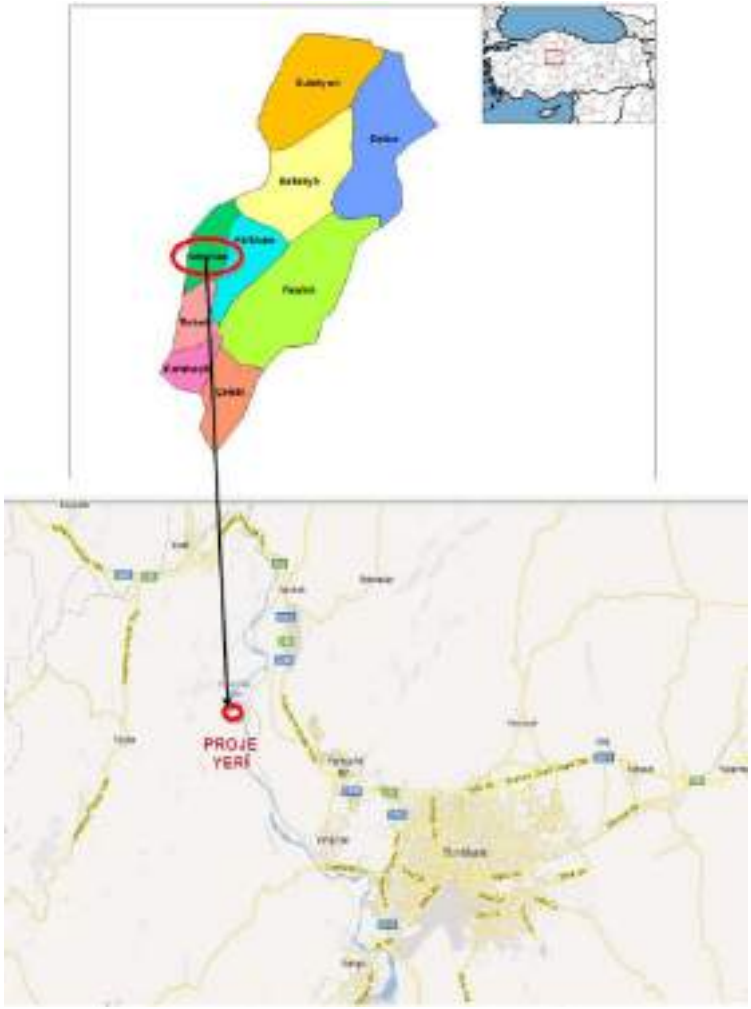


Figure 6.1. Location of Work Area (Anonymous 2013)



Figure 6.2. Satellite View of the Project Location

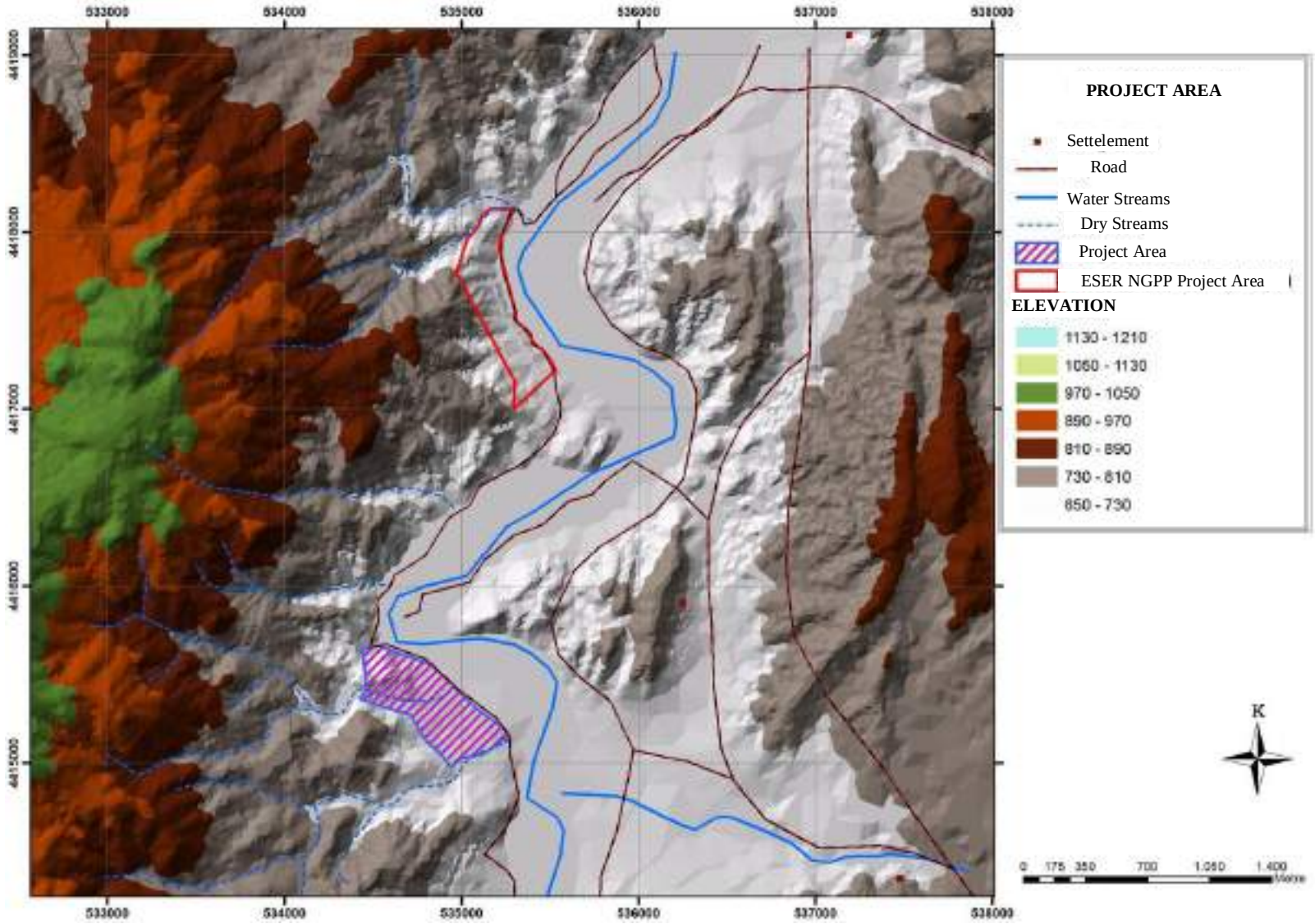


Figure 6.3. Project Area

Coordinates regarding the project are as Table 6.1:

Table 6.1. Work Area Conditions

	PROJECT AREA COORDINATES					
	Koor. Sırası	:	Sağa,Yukarı	Koor. Sırası	:	Enlem,Boylam
	Datum	:	ED-50	Datum	:	WGS-84
	Türü	:	UTM	Türü	:	COĞRAFİK
	D.O.M.	:	33	D.O.M.	:	–
	Zon	:	36	Zon	:	–
	Ölçek Fak.	:	6 derecelik	Ölçek Fak.	:	–
	PROJECT AREA					
1	534461.31		4415408.62	39.886383		33.402714
2	534461.31		4415408.62	39.886383		33.402714
3	534434.41		4415353.30	39.885885		33.402396
4	534705.92		4415268.77	39.885113		33.405567
5	534807.38		4415112.13	39.883697		33.406745
6	534904.81		4415024.44	39.882903		33.407881
7	534938.03		4414965.78	39.882373		33.408265
8	535014.76		4415029.55	39.882945		33.409166
9	535110.82		4415056.03	39.883179		33.410291
10	535265.33		4415153.19	39.884048		33.412103
11	535226.97		4415200.85	39.884479		33.411657
12	535127.08		4415264.59	39.885058		33.410492
13	534990.10		4415390.97	39.886202		33.408897
14	534898.79		4415491.60	39.887112		33.407835
15	534837.97		4415545.66	39.887602		33.407126
16	534820.44		4415554.97	39.887686		33.406922
17	534654.25		4415625.28	39.886327		33.404982
18	534558.68		4415657.24	39.888619		33.403866
19	534555.99		4415661.63	39.888658		33.403834
20	534509.24		4415649.21	39.886548		33.403287
21	534490.43		4415656.15	39.888612		33.403067
22	534445.68		4415638.25	39.888452		33.402543

6.2.2. Land Works

Works performed within the scope of Landscape Repair Plan were realized step by step such as gathering of natural and cultural data belonging to the land, obtaining of photos of work area and Office works. Written, numerical and visual data was evaluated, digitization in computer environment was performed, and maps, which will lead detection and interpretation of sensitive areas such as height groups and educational analysis. Photos of the project area and google earth pictures were used within the scope of works.

6.3. STUDY INVENTORY AND ANALYSIS

6.3.1. Natural Landscape Inventory

6.3.1.1. Flora

Our country is under the effect of 3 floristic regions due to differences of topographic structure and climate characteristics. These are Mediterranean, Persia-Turan and Europe-Siberia regions. Region, which is located within the project site, is within borders of Persia-Turan Phytogeographical region.

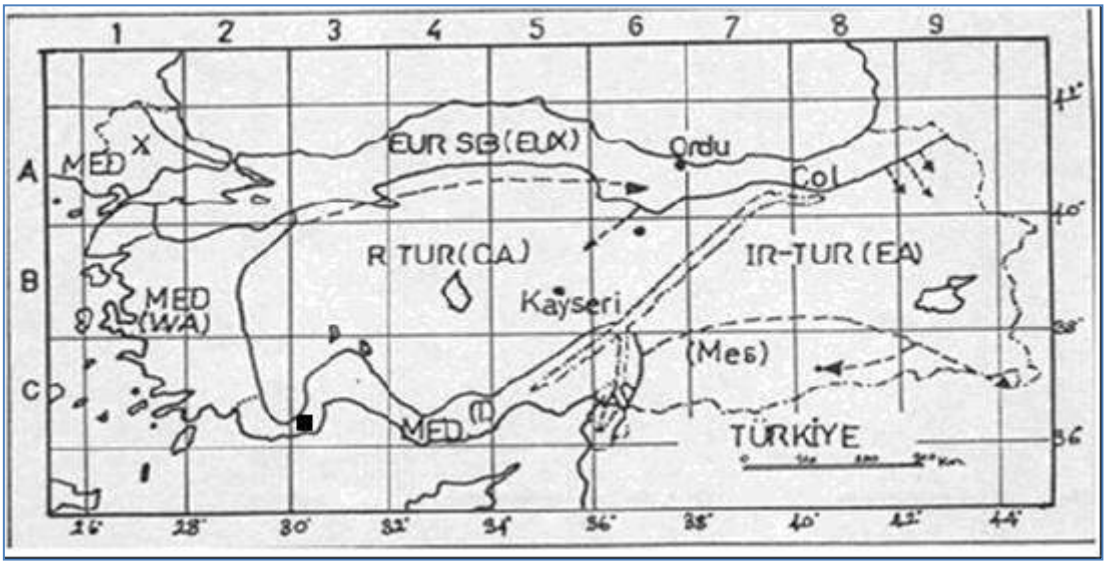


Figure 6.4. Phytogeographical Regions of Turkey

Major riparian and step vegetation within and around the project site is detected. Some of the characteristic types of riparian vegetation are;

Tamarix smyrnensis, Plantago lanceolata, Populus alba, Thypha shuttlewortii, Lythrum salicaria and *Salix alba*.

Step vegetation is represented by taxons such as *Arthemisia absinthium, Eryngium campestre* var. *virens*, *Centaurea virgata, Medicago sativa, Teucrium polium, Hordeum bulbosum, Bromus sterilis, Poa bulbosa, Aegilops umbellulata* subsp. *umbellulata*, *Stipa holosericea, Koelaria cristata* and *Peganum harmala*.

Dominant plant types along the watercourse coastline are the types *Populus alba, Tamarix smyrnensis* and *Salix alba.*

Taxons such as *Lythrum salicaria, Salix alba* and *Thypha schutlteworthii* in particular are water dependent, however there is no danger concerning the future of taxons since they are types having wide distribution. Moreover, there is no danger for water dependent plant types when we consider the fact that the project site is 200 m away from Kızılırmak river.

Project area is located within Persia-Turan phytogeography, therefore Persian-Turan originated plants are more. Deformed areas can be easily rehabilitated through plants found in the natural flora of the area. Therefore, preferring natural plants of the region while selecting landscape purposed plants is quite important in terms of ecosystem balance.

6.3.1.2. Fauna

Terrestrial fauna types and its effects on fauna were detected based on examinations performed and literature information. A result was reached and suggestions were presented as a result of detections.

Project areas are generally composed of agricultural step lands and wetlands. Site forms a natural habitat for various types belonging to Amphibia, Reptilia, Aves and Mammalia classes of vertebrates.

Information obtained from land works performed in previous years in the area and in preparation of the report. During land work, works towards detection of fauna elements were carried out by me. Moreover feces, footsteps, eaten food residues and owl pellets in the land were also recorded.

The most crowded species of vertebrate encountered in the work area is birds with 71%, and this is followed by reptiles with 13% and mammals with 12%. Amphibious species are represented by 3 types in the area and correspond to a rate of 4%.

No endemic amphibious reptile, bird or mammal species were encountered in project area.

6.3.1.3. Geomorphology

Investigation area is located at the valley of Kızılırmak, the biggest river of our country. Formation age of the area is estimated as Late Pliocene. River is located in a 800-1000 m high plateau. Ophiolitic mélange is observed at west coast of the river, while flysh sequences are observed at the east coast. Kızılırmak valley exposed rocks are separated in 2 sub-groups as Holosen and Pleistocene as geologic and geomorphologic. Holosen units are majorly observed in river beds, flood plains, flood agglomerates and fans. Northwest sections of the area are 700 m high and composed of flat top hill formed with Middle Miocene peneplain and Upper Miocene peneplain boom plains. Southeast sections are composed of alluvium plains. Plains at west of the area have alluvion range precipitated at valley bottom. East sections, i.e. plains at left shore of Kızılırmak consist of flood plain and terrace material sediments (Gençman et al. 2013).

6.3.1.4. Topography and Geology

It is seen at work area that middle and vertical slopes (between 10%-30% and more vertical than 30%) are located at flat top hill found at northwest. Straight and smooth sloped areas (slopes less than 10%) are located at south and southeastern sections where alluvion plain is located at (Gençman et al. 2013). Topography area of the project area is given at Figure 6.5.

Geology

1/100 000 scaled geology map of the region was published by General Directorate of MTA within the scope of Kırşehir I30 sheet. In Kırşehir I30 sheet, there are Sakarya Block, İzmir-Ankara-Erzincan Suture Zone, Kırşehir Block and rock types belonging to four different environments which cover this piling with inconsistency (Gençman et al. 2013).

Kılıçlar Group

In this group olistolites and olistostromes derived from older rocks are found widely. The group that is observed widely within the region is separated in Hisarköy and Karadağ formations. Hisarköy formation is divided in Cengizpınar volcanite member, Kocatepe limestone member and Radiolaritine member, while Karadağ formation is divided in Kurşunludüz limestone member. All these units are observed in the vicinity of Kılıçlar village (Anonymous 2013).

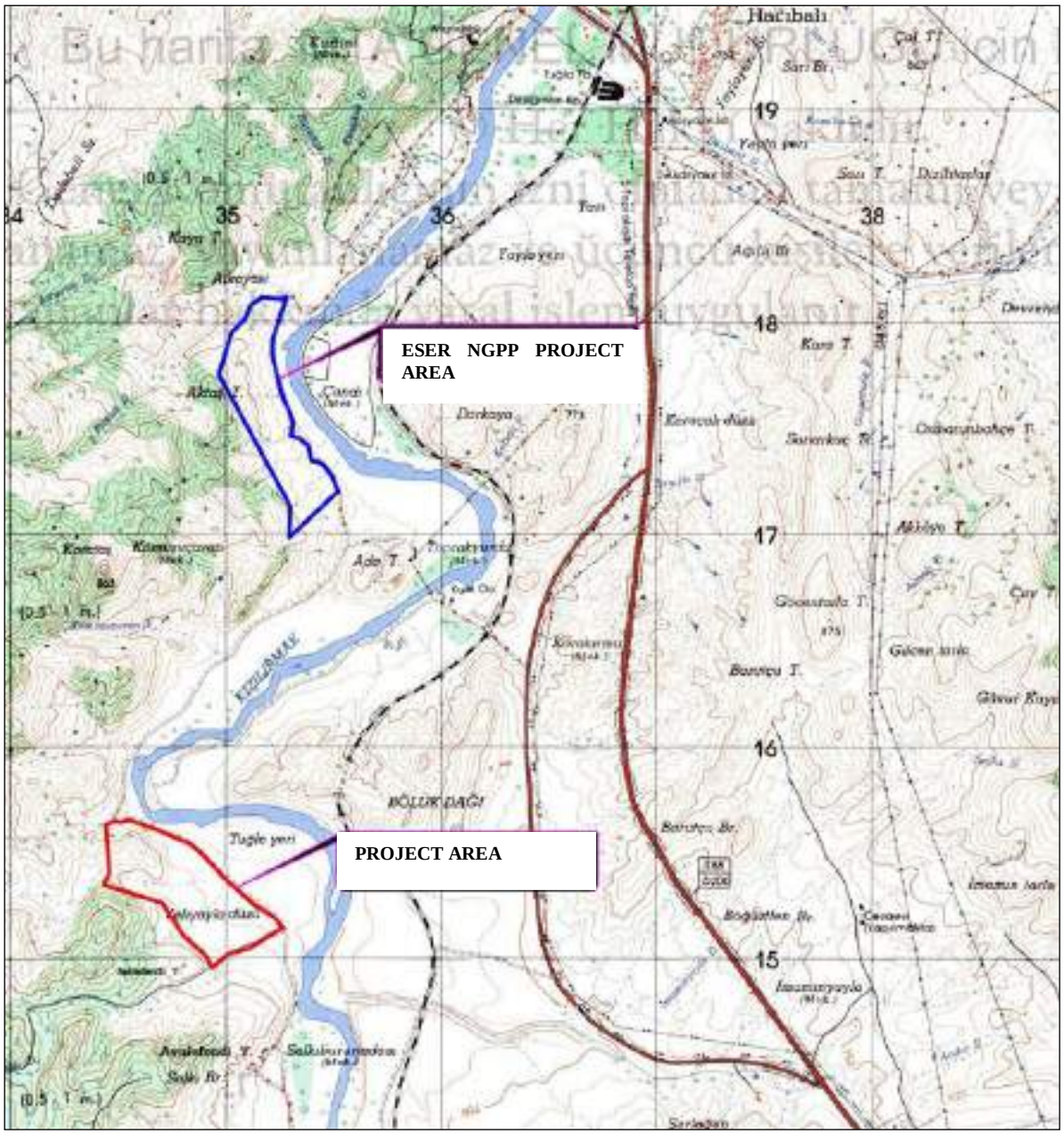


Figure 6.5. Topography Map of the Project Area

Hisarköy Formation (Kkh)

Unit generally displays extent in northeast-southwest direction. It is composed of rock types formed by particles varying from large pebble to thin sand size. Sediment rocks of the unit are partly composed of bad gradation volcanic particle pebble, sand stone, mudstone alternation and limestones observed locally. Pebbles and sandstones have mostly gray, brown and red, loosely fixed and have unclear bedding. Gradation and sorting are roughly observed throughout the unit. Olistolite and olistostromes deriving from Eldivan ofiolite community are widely observed within Hisarköy formation (Anonymous 2013).

Cengizpınar Volcanite Member (Kkhc)

Unit is divided according to the rock type characteristic within Hisarköy formation. Cengizpınar volcanite member is composed of spilite (basaltic), diabase, which has formed in various stages within Hisarköy formation and has partially preserved its pillow lava characteristics, and dykes and silica connected to them. Soilites are dark colored, purplish and grey, while diabases are grey and green colored. It is observed that spilites have primary relationship with volcanic material sandstones marn and sandy-layed limestones (Anonymous 2013).

Kocatepe Limestone Member (Kkhk)

It is divided according to rock type characteristics within Hisarköy formation. Kocatepe limestone is composed of pelagic clayed limestone, radiolaritine-mudstone and calciturbidite alternation, which can be observed in long distances despite having gained divided sausage structure. Pelagic clayed limestone is red and grey colored, has thin-middle bedding and clamshell break surface (Anonymous 2013).

Radiolarite Member (Kkhr)

It is divided according to rock type characteristics within Hisarköy formation. Unit is composed of radiolarite and mudstone alternation. Radiolarites are red, green and have thin layer. Serpentinite olistolites are observed locally within radiolarites. Unit is found within Hisarköy formation in forms of vertical and lateral direction with the formation, and lenses (Anonymous 2013).

Karadağ Formation

Karadağ formation starts below with volcanic particle sandstone and pebble alteration, and continues upwards as sandstone-mudstone alteration. Pebble and sandstone is green, brown, red colored, tightly fixed and have thin-middle bedding. Sandstones have gradation, parallel lamination, flow cross lamination and convolite bedding. Mudstone is grey, brown and gray, tightly fixed, has thin layer and is needle-like fault. Mudstones are on sandstone layers as transitional (Anonymous 2013).

Kurşunludüz Limestone Member (Kkkk)

It is divided within Karadağ formation in accordance with the map scale according to rock type characteristics. Member is composed of yellow-like white, grey, red colored, clamshell break surfaced, silica band and nodular, thin-middle layer and sometimes laminated clayed limestone. Kurşunludüz limestone member is transitional with Karadağ formation from below and above (Anonymous 2013).

Olistolites and Olistostromes within Kılıçlar Group

Olistolites and olistostromes, which have derived from Eldivan ofiolite community and are represented with the symbol ‘Keo’, are sections, in which mixture and/or one of serpentinite,

gabbro, diabase and volcanic rocks is of majority. Eldivan ofiolite community formed as a result of its flowing into Cenomanian- Campanian old units after their settlement in the region within Albian-Apsian time period, and participation into precipitation by arriving at different times as attraction dislocation (Anonymous 2013).

Ilıcapınar Formation (Kı)

Unit is composed of irregular alternation of conglomerate and sandstone. Conglomerates are brown, gray, red colored, are middle fixed and have thick-very thick layer. Layer bottoms are corroded. Gradation is middle. Sandstones are green and brown colored, middle fixed and have middle-thick bedding. Gradual bedding, parallel lamination and small scale flow cross lamination are observed in sandstones (Anonymous 2013).

Dizilitaşlar Formation (Td)

Dizilitaşlar formation is composed of conglomerate, sandstone, shale, clayed limestone and classic limestone. Moreover, it also contains numerous single and hundreds of meters long contemporaneous olistolites, which have derived from Çaldağ formation and have reef limestone characteristics. Conglomerates are yellow, brown colored, loosely fixed and have middle-thick layer. There are two types of pebble: Rough mastric supported, very poorly sorted conglomerate and small pebble, particle supported middle sorted pebbles (Anonymous 2013).

Mahmutlar Formation (Tmk)

It is usually observed widely at north sections. Unit is divided into Karagedik member composed of shale, sandstone, marn and conglomerate, Taşlıdere member composed of sandstone, mudstone, tuff sandstone and tuffite, and Kabaktepe member composed of pebble, less sandstone, shale and tuff. Sections, which cannot be divided into members, are shown as Mahmutlar formation. Conglomerate, sandstone marn and tuffs form the common rock type in Mahmutlar formation (Anonymous 2013).

Karagedik Member (Tmka)

It is divided at southeast section of the region by protecting rock type characteristics and precipitation environment. Member is composed of shale, sandstone marn and conglomerate. Dominant rock type is shale. Pebbles are found as inter levels with lenticular geometry. Shales are green and black colored, middle fixed and have middle-thick layer. Parallel lamination is observed locally. Sandstones are green, brown, poorly fixed and have thin-thick layer (Anonymous 2013).

Taşlıdere Member (Tmt)

It is divided in the east part of the region according to rock type and precipitation environment characteristics. Taşlıdere member is composed of sandstone, mudstone, tuff sandstone and tuffite (Anonymous 2013).

Old Alluvion (Terrace Material) and Alluvion (Qe, Qa)

Old alluviums, which are protected at various heights according to river beds in the region are observed. They are composed of unfixed or very poorly fixed sand, mile and pebbles. Alluvion is today's precipitates composed of Kızılırmak river and sand, mile and pebble throughout the arms of this river (Anonymous 2013).

Geology map of the work area is seen in Figure 6.6.

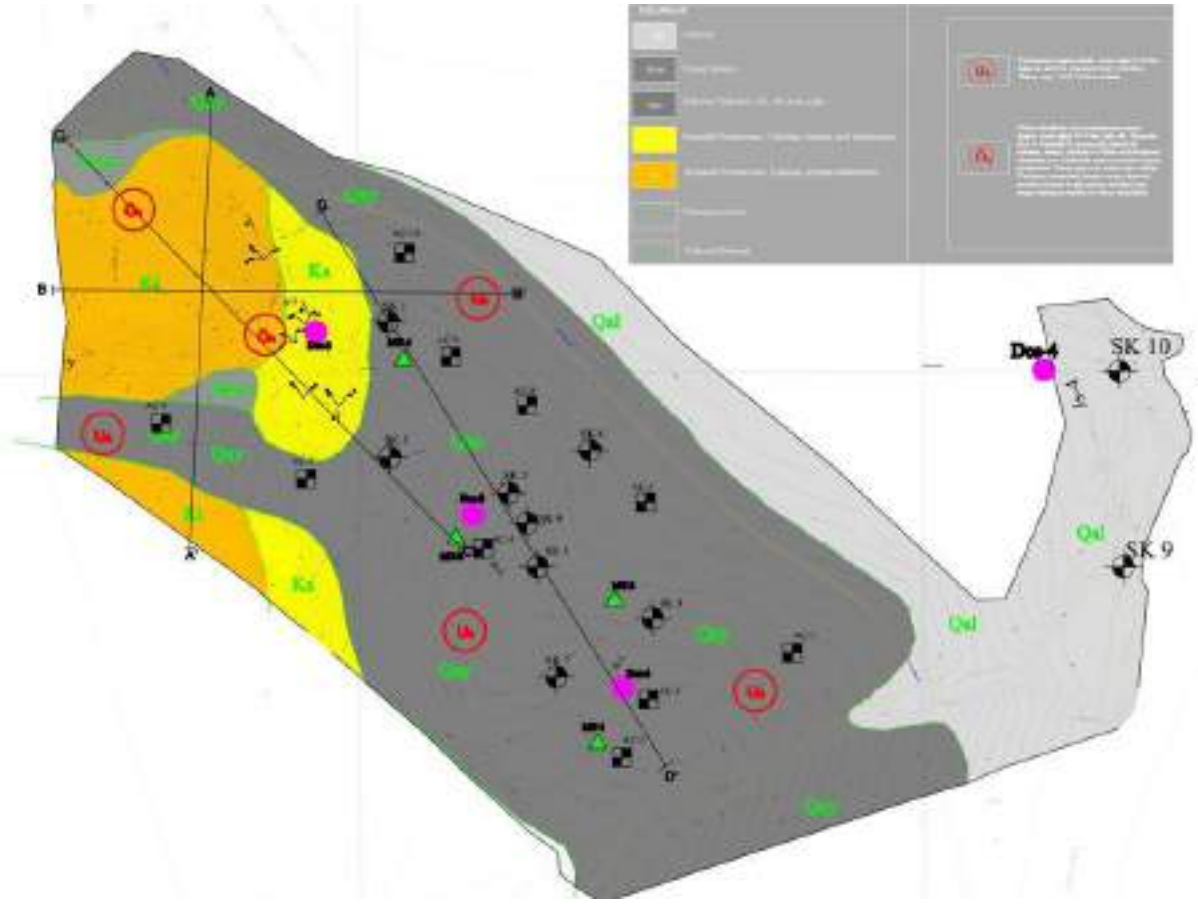


Figure 6.6. Work Area and Its Vicinity Geology Map (Anonymous 2013)

6.3.1.5. Hydrogeology

Total water potential of Kırıkkale is 3.257,5 hm3/year with 3.250 hm3/year ground water 7,5 hm3/year underground water. Closest surface water source to the project area is Kızılırmak River, which is approximately 200 m away. There is no surface water source within the Project site (Anonymous 2013).

6.3.1.6. Soil

Soil of Kırıkkale province is usually composed of brown soil. These soils, which are brown or grey-like on the surface, are small grained and can easily decompose. Lime rate is quite high. Main rock has volcanic characteristics. These soils have accumulated in alveolar parts

located in very rugged areas. Bare volcanic rock surfaces are seen on their surface. They are productive since they are rich with minerals. Moreover, there alluvion soils at water course sides in the south. These create thick covers. They have very little slope. They are suitable for field agriculture and irrigated farming. Low rainfall rate and drought is an important factor in soil formation (Anonymous 2011).
In large soil group map, soil in the area, in which the plant is to be established, is reddish brown soils (Anonymous 2013). Map showing the soil characteristics of the project area and its vicinity is given in Figure 6.7.

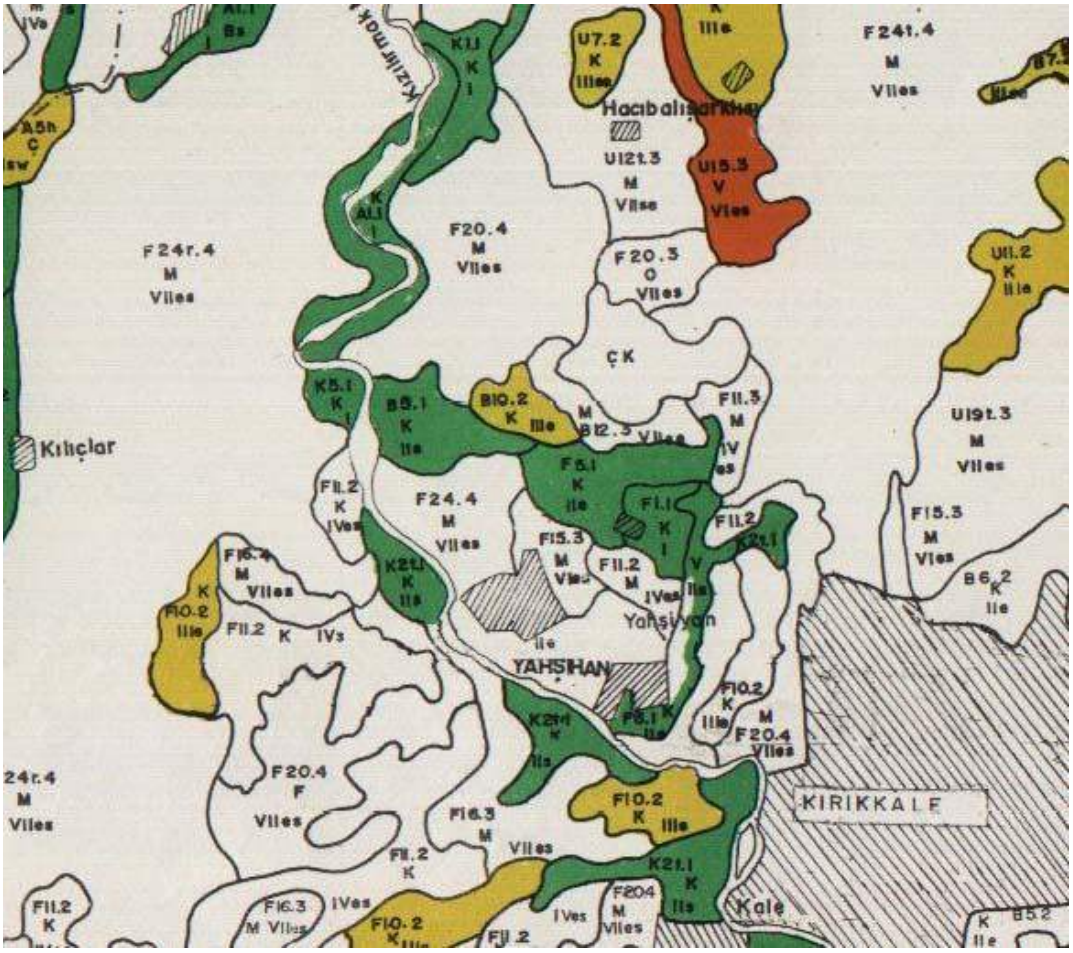


Figure 6.7. Soil Characteristics Map of Project Area and Its Vicinity

6.3.1.7. Climate

Continental climate is dominant in the region. Altitude above sea level is between 1280 – 1580 m. and winter is harsh also with the effect of altitude. Autumn and spring are less experienced and mostly six months of winter and six months of summer are felt (Anonymous 2013).

Temperature

According to Kırıkkale Meteorology Station observation records, average temperature of the region is detected as 12,5°C, annual average highest temperature as 18,1°C, and average

lowest temperature as 6,7°C. Monthly temperature values are given in Table 6.2 (Anonymous 2013).

Table 6.2. Temperature Values Belonging to Kırıkkale Meteorology Station (Anonymous 2013)

METEOROLOGY	Jan	/ Feb	/ March	/ Apr	/ May	/ Jun	/ Jul	/ Aug	/ Sep	/ Now	/ Oct	/ Dec	/ Yearly
Avg. Temp.	0,6	2,3	6,6	12,2	16,8	21,1	24,5	24,0	19,5	13,5	6,7	2,3	12,5
Avg.High Temp.	4,2	6,8	12,2	18,0	22,9	27,2	30,7	30,5	26,8	20,5	12,0	5,8	18,1
Avg.Low Temp.	-2,6	-1,8	1,2	6,2	10,2	13,7	16,7	16,3	12,1	7,4	2,2	-0,8	6,7
Max.High Temp.	17.0	20,8	27,9	30,4	34,4	39,6	41,6	39,0	36,9	33,0	24,8	19,0	41,6
Max.Low Temp.	-22,4	-21,3	-19,8	-5,8	0,4	5,4	7,4	8,0	2,8	-2,60	-9,7	-17	-22,4

Rainfall

According to Kırıkkale Meteorology Station observation records, average total amount of rainfall is 378,3 mm, and the highest monthly average amount of rainfall occurred on June with 100,6 mm. Monthly rainfall values are given in Table 6.3 (Anonymous 2013).

Table 6.3. Rainfall Values Belonging to Kırıkkale Meteorology Station (Anonymous 20132013)

METEOROLOGY	Jan	/ Feb	/ March	/ Apr	/ May	/ Jun	/ Jul	/ Aug	/ Sep	/ Now	/ Oct	/ Dec	/ Yearly
Avg. Total Precipitation mm	41,4	26,7	33,0	51,5	51,2	33,6	12,0	9,0	12,5	28,6	34,1	44,7	378,3
Daily Max. Precipitation mm	28,1	36,0	30,2	33,0	30,0	100,6	52,7	19,6	29,4	33,0	40,0	34,6	100,6

Humidity

According to Kırıkkale Meteorology Station observation records, annual average relative humidity of the region is 63%i and the lowest relative humidity occurred on July with 8%. Relative humidity values are given in Table 6.4 (Anonymous 2013).

Table 6.4. Humidity Values Belonging to Kırıkkale Meteorology Station (Anonymous 2013)

METEOROLOGY	Jan	/ Feb	/ March	/ Apr	/ May	/ Jun	/ Jul	/ Aug	/ Sep	/ Now	/ Oct	/ Dec	/ Yearly
Avg. Relative Humudity %	75	72	65	63	61	555	50	51	54	63	72	78	63
Lowest Avg. Rel. Hum. %	22	22	11	14	12	10	8	9	10	14	16	20	8

6.3.1.8. Erosion and Sediment State

In Kırıkkale, there are aridity, stoniness and water erosion issues apart from wind erosion. Provincial soils are located within Kızılırmak water basin. Water basin is covered with gypsum bearing series in respect of its geology. Therefore, bottom land has aridity issue. Aridity is observed in forms of brackish and salty, brackish alkali and salty alkali. Moreover, erosion and soil loss occur since a 42.525.0 hectare of provincial land size is not used and 103.578 hectares are non-irrigated fallow and settling land (Anonymous 2011).

6.3.2. Cultural Landscape Inventory

6.3.2.1. Property Status

Entire area, in which the plant is to be established, is public property. Lands on which ACWA Power Kırıkkale NGPP is to be built, which are under the property of the Treasury, will be leased for 49 years (Anonymous 2013).

6.3.2.2. Land Use Status

Land use status of Kırıkkale Province is given in Table 6.5. There is no land use in the area in which the plant is to be established, and is currently empty land (Anonymous 2013). Land size of the province by use status is given in Table 6.6.

Table 6.5. Kırıkkale Province Land Use Status (Anonymous 2011)

Kullanım Tipi	Alan (km2)	Yüzde %
Yerleşim Alanları	108,3	2,31
Orman Alanları	505,3	10,76
Hazine Alanları	845,4	18,01
Şahıs Arazileri	2925,5	62,31
Mera Alanları	11,9	0,25
Akarsular ve Göller	24,2	0,52
Tesisil Harici Alanlar	274,2	5,84
TOPLAM	**4694,8**	100,00

Table 6.6. Land Size by Use Status (Anonymous 2011)

ALAN (HA)	ARAZİ CİNSİ	% ORANI
234871	Tarıma elverişli arazi	50
142338	Çayır-Mera	30
46199	Orman-Fundalık	9,7
49805	Kullanılmayan Arazi (Taşlık-Bataklık Yollar vs.)	10,3
473213	TOPLAM	100

6.3.2.3. Socio-Economic Structure

Population

Project area is located within borders of Kırıkkale Province, Yahşihan District, and Kılıçlar Town. 2012 TSI data concerning Yahşihan District and Kılıçlar Town is given in Table 6.7.

Table 6.7. Yahşihan District Population Information (Anonymous 2013)

			TOTAL	MAN	WOMAN
Yahşihan	City		14.591	7.649	6.942
	Center	Bedesten	96	45	51
		Hacıbalı	228	119	109
		Hisarköy	247	121	126
		(B) Irmak	1.45	730	720
		Keçili	156	79	77
		(B) Kılıçlar	575	278	297
		Mahmutlar	332	180	152
		Bucak toplamı	3.084	1.552	1.532

Health

There are 7 hospitals with a total capacity of 1040 beds, 33 family health centers and 24 sanatoriums provincial-wide (Anonymous 2011).

Agriculture

Kırıkkale province total area is 4.630 km2'dir. According to Provincial Food Agriculture and Husbandry Directorate data, 308.506 hectares of the total provincial area is used in agricultural production. In other words, rate of the land used for agricultural purposes within the total land is 66%. Field lands have the biggest rate among lands used effectively in agriculture (Anonymous 2011).

Industry

In Kırıkkale manufacturing industry, there is concentration in machine industry. Apart from large scale enterprises belonging to the public and privatized TÜPRAŞ, enterprises belonging to the private sector are usually composed of small and large scale enterprises. MKEK factories, TÜPRAŞ refinery and Kırıkkale Organized Industrial Zone have important place in economic structure of the province. Worker and official weighted employment form affects commercial life dependent on wages. When GDP of Kırıkkale is examined according to 2000 TSI, it is seen that the highest rate in GDP belongs to the industrial sector with 55,9%, while this is followed by service sector with 34,6%, and agricultural sector with 9,5% (Anonymous 2011).

Tourism

According to Provincial Culture and Tourism Directorate data, there are no areas within provincial borders such as tourism development region, tourism area etc. declared by the Ministry of Culture and Tourism. According to Provincial Culture and Tourism Directorate data, while there are no touristic sources that have officially entered the records within the province, there are excursion picnic areas in Kapulukaya Dam Lake and amateur water sports can be performed, and picnic is available inside the forest for one day or by setting up tent in Koçubaba Picnic Area. Tourism for religious purposes is performed mostly in the province due to areas such as Hasandede Mosque and Mausoleum, Haydar Sultan Mosque and Mausoleum and Ballı Mosque and Mausoleum (Anonymous 2013).

6.3.2.4. Areas Having Archeological and Historical Importance and Cultural Heritage

There is not architectural and archeological heritage within project area. However, Mahmutlar Village declared as Archeological Area is located at 3,7 km northeast of the project area. While it is estimated that archeological site will not be negatively affected by the project since it is far from plant site, effects of the project on the archeological site (vibration, dust and gas emissions, etc.) are evaluated in ÇED Report (Anonymous 2013).

Activity must be halted and the closest Museum Directorate must be notified in the event that any finding is encountered during activities within the scope of the project.

6.3.3. Visual Landscape Inventory

According to Picard (2008), visual landscape inventory is detection, classification an recording on map of visual values (Demirci, 2010).

Visual landscape inventory provides information on visual conditions, characteristics and sensitivity to change of areas and travel corridors. Evaluation of areas, which can be easily seen from provinces and highways, in terms of visual value, provides information to administrators on which places are within visual range most. Thus, activities to be carried out during planning are planned by being evaluated in this respect and implementers leave trees at site such that there won't be any visual value loss during production. Hence, manufacturing activities will not have negative impact of recreation and tourism values (Demirci, 2010). Facilities to be built at project area and their locations are seen in Figure 6.8.

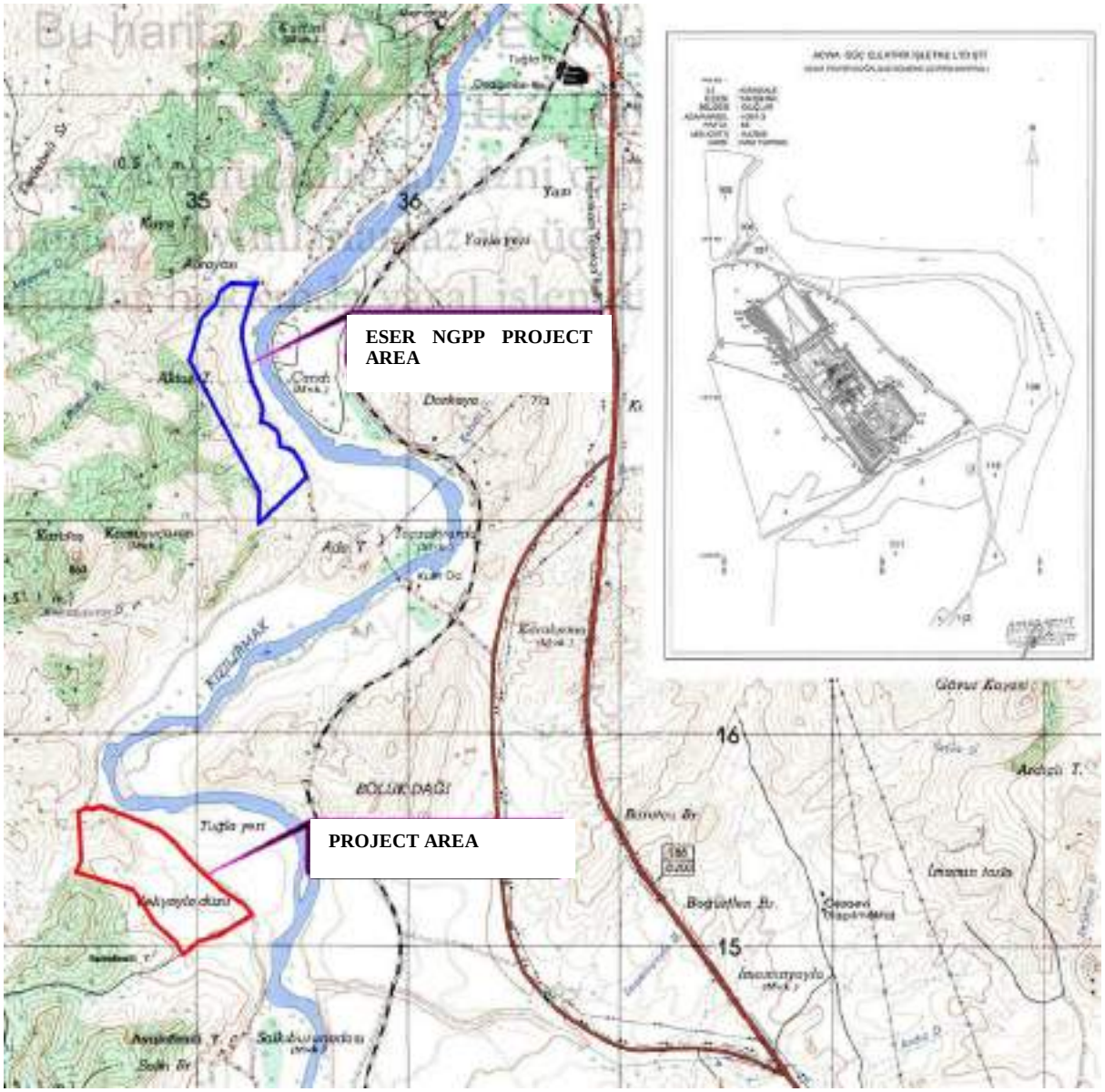


Figure 6.8. Facilities to be Built at Project Area and Their Locations

Photos from project area are seen in Figure 6.9.



Figure 6.9. Photos from Project Area

6.3.4. Landscape Analysis

In landscape planning, elements forming the landscape are detected and protected with proper protection means. When human is considered to be an element of landscape, sustainability of landscape is aimed by minimizing the impacts of human on current economic structure. Analysis and synthesis phase can contain different procedural approaches used by landscape architects in line with different aims. Different methods have been followed on landscape analysis and synthesis subject in landscape planning works carried out academically and towards implementation. Landscape ecology based approaches, which is a branch of ecology, have been used in recent years. That means functional and structural analysis of landscape is evaluated as an important tool in landscape planning (Uzun et al. 2012).

Subject of the project, it's possible effects on the environment during construction and management stages, and possible economic and social effects in the region play important role in determination of the area to be affected by the activity subject of the project. Effects that will appear at project area are defined as long term and short term effects. Impacts such as emission, noise, flora, fauna closest settlements, forest areas, agricultural areas etc. are considered while determining the area to be affected by the project.

Project impact area is determined according to impacts of activities to be carried out within the scope of the project on close settlements. Areas to be affected within the scope of the project are settlements that are close to units. Settlements close to the project area will

temporarily (throughout construction) be exposed to dust, noise, mobility and anthropogenic effects. However, these impacts will not be permanent since they will be over upon completion of construction works.

6.3.4.1. Landscape Water Function Analysis

Water function has been used by many explorers for different purposes in different landscape planning works. Permeability analysis is performed in order to put forward the hydraulic structure of the landscape and determine its regions/borders. Water cycle, and feeding and discharge areas of aquifer are considered in protection of landscapes (Uzun et al. 2012). By moving from this point, data concerning geology, water size, and slope, erosion state of the work area and field use talent classes are synthesized.

Landscape water function is examined in terms of the permeability of the project area. According to that, permeability by geologic formations is gathered in three classes as high-permeable, permeable and low permeable when project area geology is examined closer.

Table 6.8. Rocks of the Area

Alanın Kayaçları	Hidrojeolojik Geçirimlilik Sınıfı
Qal : Alüvyon (Kum,Çakıl, Mil)	ÇG
Kkk : Beyaz renkli Kum, Çamurtaşı, kil ve çakıl taşı	ÇG
Filiş : Sert çatlaklı bazalt ve aglomera	ÇG

ÇG: Çok Geçirimli, G: Geçirimli, AG: Az Geçirimli

Permeability state of rocks is given in Table 6.9 by superposing hydrogeological permeability classification with the slope layer of the area.

Table 6.9. Comparison of Hydrogeological Permeability with Slope State

HYDROGEOLOGICAL PERMEABILITY	Slope (%)					
Hydrogeologıcal Permeabılıty Scale	0-2	2-6	6-12	12-20	20-30	>30
AG-Low Permeable	D	ÇD	ÇD	ÇD	ÇD	ÇD
G- Permeable	ÇY	Y	Y	Y	O	O
ÇG-High Permeable	ÇY	ÇY	ÇY	Y	Y	O

ÇD: Very Low, D: Low, O:Medium, Y: High, ÇY: Very High

Following that stage, talent classes and soil type data of the area were examined and interpreted in terms of permeability. The result was evaluated and superposed with area slope and soil permeability state was obtained. Comparison of soil permeability and slope state is given in Table 6.10.

Table 6.10. Comparison of Soil Permeability with Slope State

Soil Infiltration Scale	Slope (%)					
	0-2	2-6	6-12	12-20	20-30	>30
High (I)	ÇY	ÇY	ÇY	Y	Y	Y
Good (II)	ÇY	ÇY	Y	Y	O	O
Medium (III)	ÇY	Y	Y	O	O	O
Low (IV, VI, VII, VIII)	D	D	D	D	D	D
Very Low (V)	ÇD	ÇD	ÇD	ÇD	ÇD	ÇD

ÇD: Very Low, D: Low, O:Medium, Y: High, ÇY: Very High

Permeability of the area in terms of water process was put forward by superposing rock and soil permeability and permeable areas were analyzed. Analysis result is given in Table 6.11.

Table 6.11. Comparison of Soil Permeability with Geological Permeability

INFILTRATION	Soil Infiltration Scale				
Geology Infiltration Scale	ÇY	Y	O	D	ÇD
ÇY	5	5	4	3	2
Y	5	4	3	2	1
O	4	3	2	1	1
D	4	3	2	2	1
ÇD	4	2	1	1	1

ÇD: Very Low, D: Low, O:Medium, Y: High, ÇY: Very High

Following all these superposing processes, hydrogeological permeability and soil permeability layers were brought together and areas having importance within the landscape in terms of water process were obtained.

Water permeability analysis performed for ACWA Kırıkkale Natural Gas Combined Cycle Power Plant is seen in Figure 6.10. This study was carried out with the assistance of Geographical Information Systems (CBS) software in computer environment. According to that, it is possible to say for the general of the work area that permeability value is too low, low and middle. Regions, where permeability values are high and very high, draw attention particularly along Kızılırmak river, and these regions are observed as large patches. The region the project area is located at has partial low and partial high permeability.

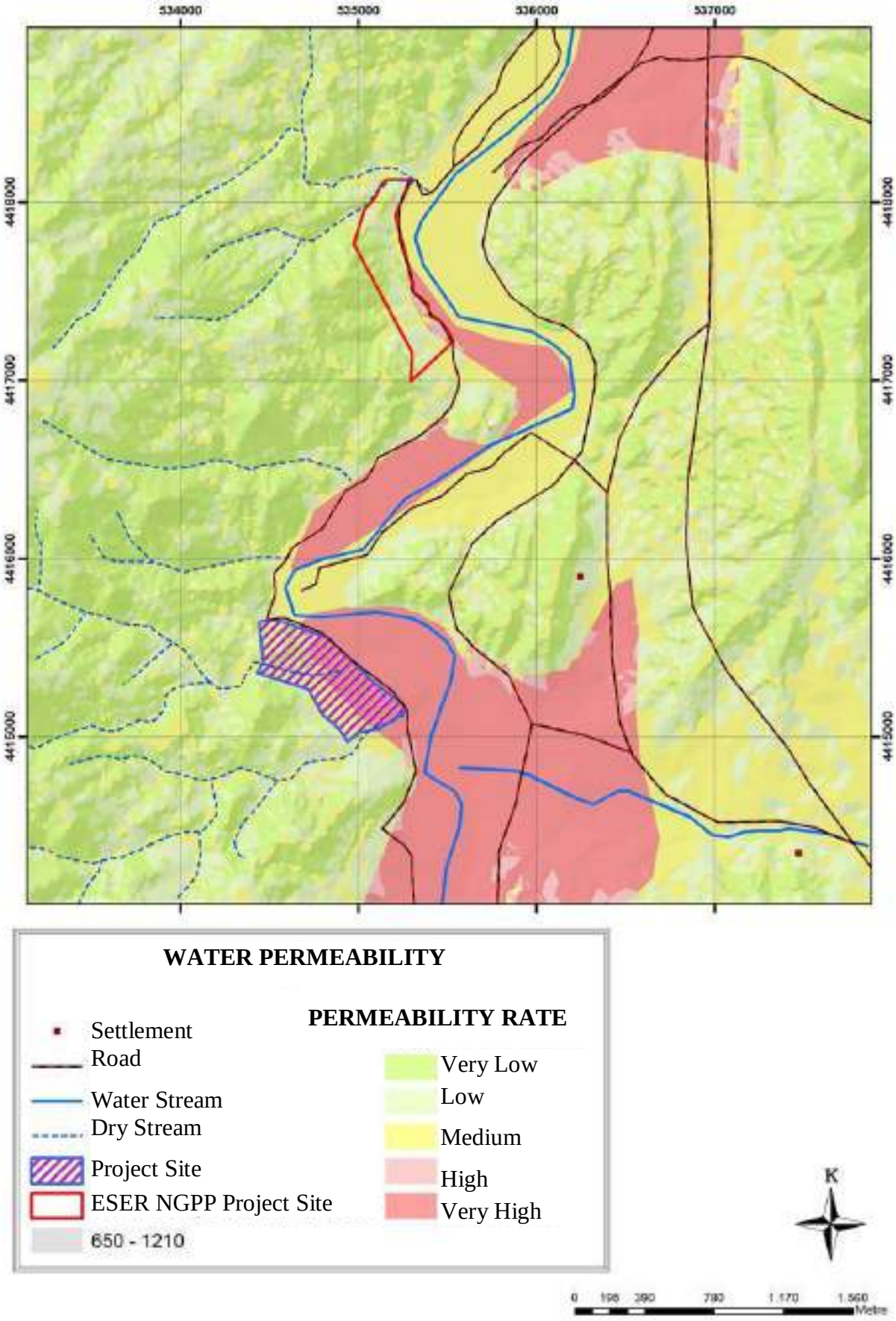


Figure 6.10. Water Permeability Analysis

6.3.4.2. Landscape Erosion Function Analysis

Landscape erosion function is directly related to the work area topography and slope state. One of the most basic processes to be affected by the activity is the erosion process. Flora and fauna existing at project area will be affected by this process.

This study was carried out with the assistance of Geographical Information Systems (CBS) software in computer environment. For that purpose slope, geology and permeability maps created with the assistance of CORINE Land Cover and equivalent height slopes were benefited from. Wearability classification of rocks was made from geology map. This classification is seen in Table 6.12. Areas, where the slope is high, permeability is high and vegetation is low, front us as risky regions.

Table 6.12. Rock Wearability Classification

Basic Rock Types	Rocks at Project Area
Consolidated rocks – Soft formations	Fliş, Kkk
Quaternary age rocks	Qal

Wearability state in geological terms given in Table 6.13 is put forward by superposing wearability of rocks and slope map.

Table 6.13. Comparison of Rock Wearability and Slope

ROCK WEARABILITY	Slope (%)					
Geological Wearability Scale	0-2	2-6	6-12	12-20	20-30	>30
Consolidated rocks – Soft formations	ÇD	ÇD	O	Y	ÇY	ÇY
Quaternary age rocks	D	D	O	Y	ÇY	ÇY

ÇD: Very Low, D: Low, O:Medium, Y: High, ÇY: Very High

Land use states and forest closeness were integrated, superposed with slope map and thus, erosion protection state given in Table 6.14 was put forward. Şahin and Kurum (2002) and Uzun et al. (2012) were benefited from in indexes that were used while comparing the degrees.

Table 6.14. Comparison of Forest Closeness and Field Uses with Slope State

EROSİON PROTECTİON STATUS	Slope (%)					
Vegetation and Protection Index	0-2	2-6	6-12	12-20	20-30	>30
1. Degree Close (%10-40)	0.8	0.8	0.2	0.2	0.2	0.2
2. Degree Close (%41-70)	1.0	1.0	0.8	0.8	0.4	0.4
3. Degree Close (%71-100)	1.0	1.0	1.0	1.0	1.0	1.0
Degraded Forest (<%10)	0.8	0.8	0.2	0.2	0.2	0.2
Forest Clearance	0.9	0.9	0.5	0.5	0.0	0.0
Agricultural Area	0.9	0.9	0.5	0.5	0.0	0.0
Grasslands	0.3	0.3	0.3	0.3	0.3	0.3
Stony Area	0.9	0.9	0.5	0.5	0.0	0.0

Following this stage, potential erosion degrees given in Table 6.15 were obtained by superposing geological wearability and erosion protection state.

Table 6.15. Comparison of Wearability and Erosion Protection State

POTENTIAL EROSION	Soıl Protectıon Scales				
Erosional Scale	ÇY	Y	O	D	ÇD
ÇY	D	D	ÇD	ÇD	ÇD
Y	O	O	D	ÇD	ÇD
O	Y	O	O	D	ÇD
D	ÇY	ÇY	ÇY	O	D
ÇD	ÇY	ÇY	ÇY	Y	D

ÇD: Very Low, D: Low, O:Medium, Y: High, ÇY: Very High

Finally potential erosion map and permeability map were superposed and landscape soil protection function seen in Table 6.16 was put forward.

Table 6.16. Comparison of Wearability and Permeability State in terms of Potential Erosion

LANDSCAPE SOIL PROTECTION FUNCTION	Infiltration Scale				
Potential Erosional Scale	ÇY	Y	O	D	ÇD
ÇY	ÇY	ÇY	Y	O	D
Y	ÇY	Y	O	D	ÇD
O	Y	Y	O	D	ÇD
D	Y	O	D	ÇD	ÇD
ÇD	Y	O	D	ÇD	ÇD

ÇD: Very Low, D: Low, O:Medium, Y: High, ÇY: Very High

Erosion function analysis for ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant is seen in Figure 6.11. According to the figure, although erosion risk areas are observed in project area, risk may be eliminated through arrangement of the topography as a result of erosion preventive precautions to be taken, terracing and digging-filling operations. Risky areas in terms of erosion are primary protection and vegetation areas. In these areas, erosion control methods examined in the following of this report must be applied. Areas with

high erosion risk are observed at project area and its vicinity. While northwest of the area, in which the plant building is to be built, has high erosion risk value, other areas have lower values.

In a large part of the project area, a variable surface structure arising from current field structure is seen. This situation causes different slope degrees to appear. Field will be re-shaped with erosion preventive precautions, terracing and digging-filling operations, and erosion risks will be eliminated. Terracing and preference of soil holder plant types, which have deep roots (taproot) and prevent erosion at the area gains importance against landslide risks that may occur during and after the construction. Along with those, retaining walls must be built when necessary and road construction except current roads must not be allowed. Erosion risk must be reduced through proper plant selection found in the last chapters of this study and use of other methods.

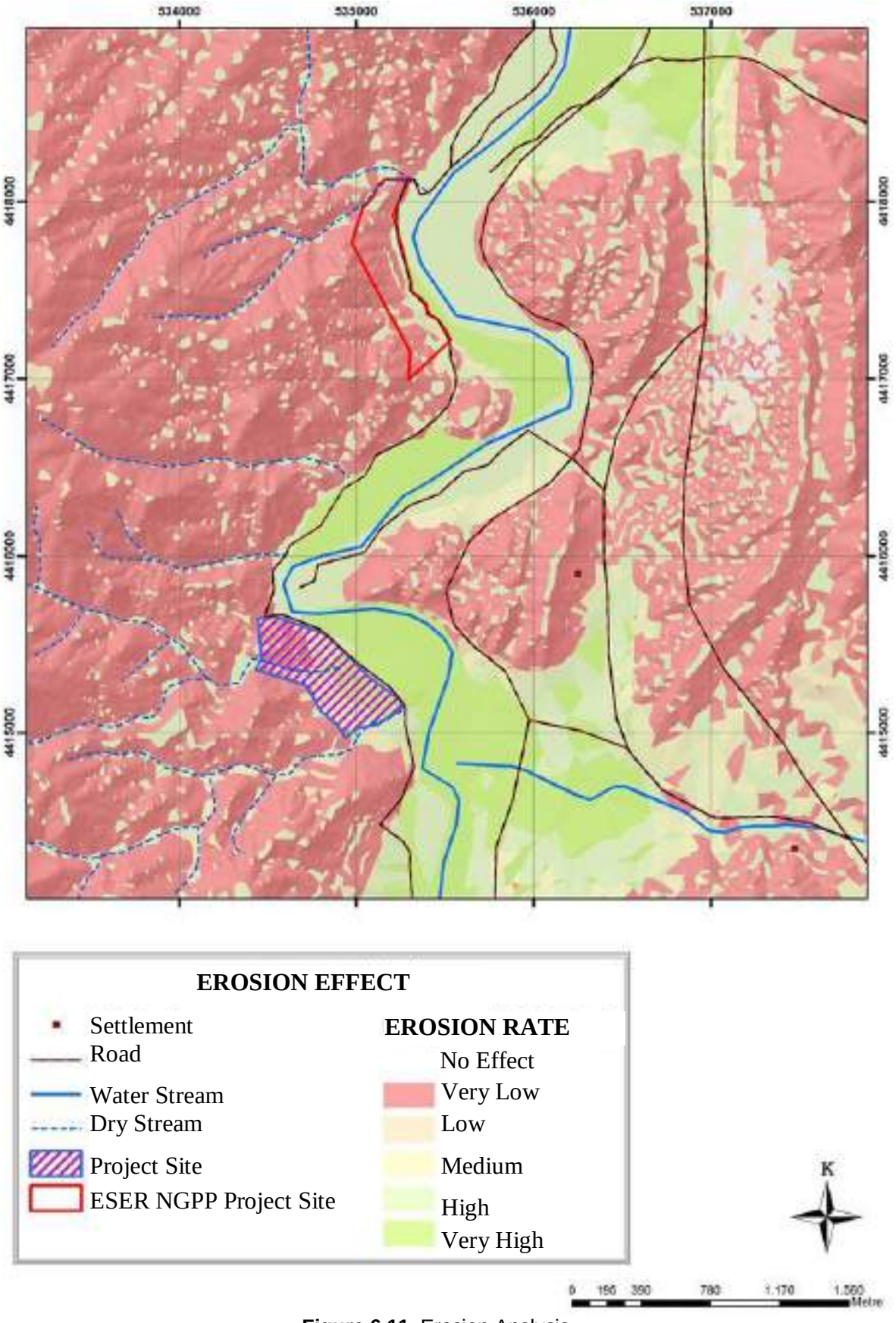


Figure 6.11. Erosion Analysis

6.3.4.3. Landscape Habitat Function Analysis

In recent years, use of data, which is obtained by using patch-corridor-matrix model in evaluation of landscape, creation of protection and development policies (management, restoration) and analyses concerning landscape structure, function and change (Uzun 2003). It is known that landscape structure has direct impact on biological variety. Forman (1995) defines three basic elements as landscape structure element: Patch, corridor and matrix. This definition is widely accepted today as patch-corridor-matrix model (Deniz et al. 2006). Illustration regarding that is found in Figure 6.12.

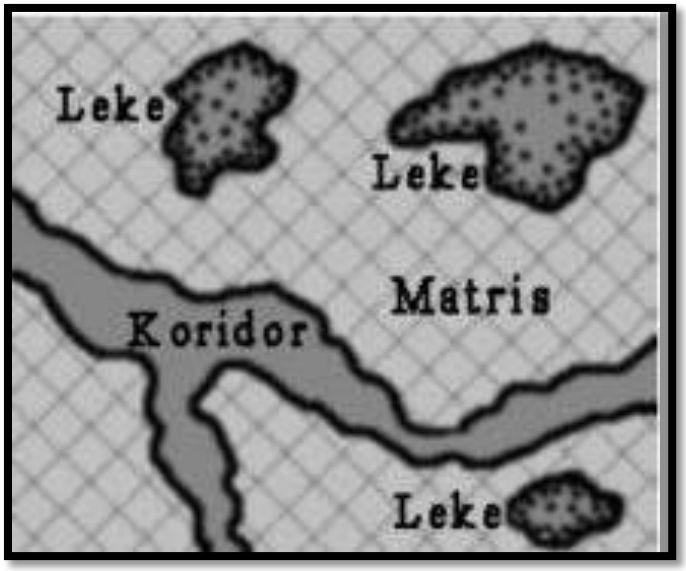


Figure 6.12. Landscape Matrix, Corridor and Patches (Deniz et al. 2006)

According to Forman (1995), this model deals with landscape as mosaic and gathers all spatial elements forming the landscape under these three classes. Each of the components forming the landscape is either one these elements or part of them. Such modeling and definition of landscape has lead procedural studies based on analysis and comparison. This model has also enabled different disciplines to connect and communicate in a common terminology in terms of spatial definitions (Deniz et al. 2006).

When 1/25.000 topographic map of the work area and its vicinity was examined and synthesized in terms of google earth satellite views and CORINE field cover, it was deemed proper to classify habitat patches as natural meadows and rare plant areas vegetation.

Studies performed have shown that increase of patch size usually gives a rise to landscape habitat value, and its diminishing reduces it. By moving from that point, increase of large patch number is regarded as a gain, while increase in small patch number is regarded as a loss.

Habitat analysis performed for ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant project is seen in Figure 6.13. According to that, it is seen that the habitat function put forward by natural meadows and rare plant areas vegetation classes found in the area is observed in high, middle and inefficient intensities, and when areal size of them is

considered, habitat function values at middle and inefficient intensity covers the most areas and their sizes are close to each other. It is seen on the other hand that habitat function value of the region, in which the plant is located, superposes with middle and inefficient regions. Although work area seems to be shattering the region it is located at like a patch at first glance, it is compared with natural meadows and rare plant areas vegetation matrixes when the geography it is found within is handled at large scale. Plant building and its immediate vicinity divide the matrix they are within in the form of patch. If the piece of matrix leaving at one side stays at a very small region enough to lose its characteristics (i.e. if it has separated from the whole and diminished enough to be evaluated as patch), the possibility of the flora and fauna within this region being affected must be considered. No part of the matrixes shattered and divided at ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant project work area faces with such threat. Matrix, which has been shattered, has the characteristics to become a whole in time as a result of repair work to be performed. Work to be performed will affect the sensitivity in regions close to the project area on the shattered matrix and will not cause any damage in remote regions. Patch analysis performed for the work area is seen in Table 6.18.

Table 6.17. Patch Analysis

Patch Size and Patch Number

Patch Classes	Patch No	Area	Average Patch Size	100 ha Patch	No Score
Natural Meadows	5,00	238,60	47,72	0,02	4,00
Sparse Vegetation	7,00	1246,95	178,14	0,01	5,00

Landscape value of patch shape

Patch Classes	MSI	MPAR	MPFD	AWMPFD	Score
Natural Meadows	1,71	130,46	1,28	1,27	5,00
Sparse Vegetation	1,94	288,87	1,30	1,28	4,00

Evaluation of patch edges landscape habitat function

Patch Classes	MPE	MPS	Patch Density	Score
Natural Meadows	3901,80	47,72	7,84	5,00
Sparse Vegetation	8562,04	178,14	24,08	3,00

Total Habitat Function

Patch Classes	Description	Total Score
Natural Meadows	High	14,00
Sparse Vegetation	Medium	12,00

According to the Table 6.17, the highest number of patch is seen in rare plant areas habitat. Rare plant areas have the highest rate in terms of average patch size. While rare plant areas have the highest point in terms of patch size and number, natural meadows habitat has the lowest point. The highest point of the patch size was received by the natural meadows habitat in terms of landscape value. When habitat function of the landscape is examined in terms of patch density, it is seen that rare plant areas have the highest rate. According to total habitat function, the highest rate is received by natural meadows and rare plant areas matrixes, respectively. As understood from Figure 6.13, ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant project and its vicinity are usually composed of areas having

middle and ineffective intensity value in terms of habitat function. It is because project area vegetation structure is not very rich. Habitat function of plant building and its immediate vicinity has ineffective and middle value. High numbers of habitats with similar characteristics at work area vicinity and repair works to be performed following the activity reduce the negative value of the impact. Areas with high and very high functional value must be evaluated as primary protection areas.

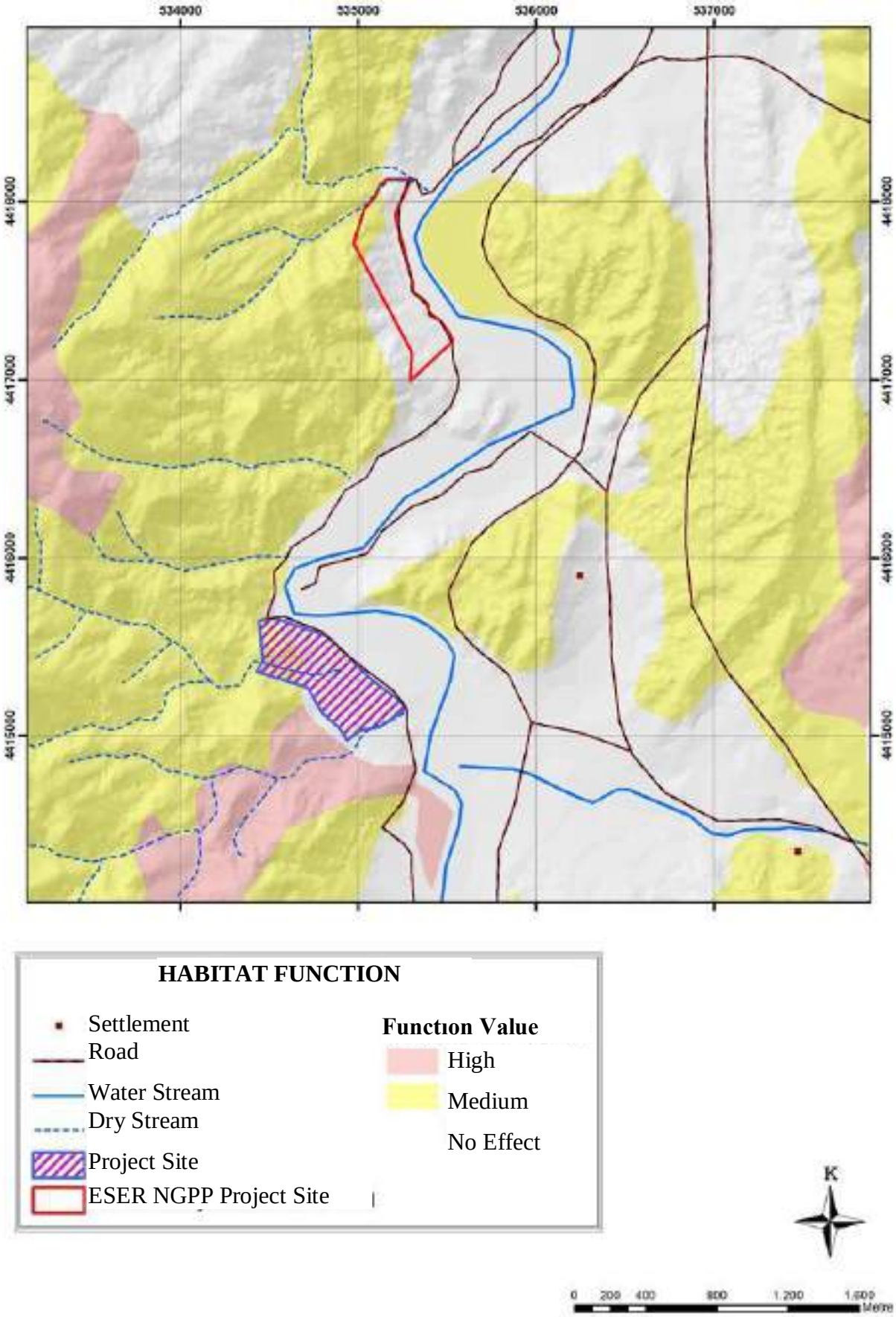


Figure 6.13. Habitat Analysis

6.3.4.4. Landscape Character Function Analysis

Landscape character is 'the entire elements separating a landscape from another one'. Entire elements such as geology, topography, soil, vegetation, area uses and dwelling units in particular, enables formation of 'landscape character'. Landscape character ensures that one area is different from another area and gives this area 'a meaning' (emotion, idea, thought etc.). The fact that we understand one area is different than another one contributes us to make better planning towards future by considering environmental and socio-economic factors of that area. Landscape character 'is the pattern formed by single, different and continuous elements within a landscape'. A landscape is distinguished from another one with these characteristics. Landscape character areas contain areas with unique characteristics and reflect the geographical characteristics of the region they are located in. Landscape character types are defined with the same name even if they are located at different parts of the world (e.g. step, plains, stream bed etc.) (Uzun et al. 2012).

According to Wascher (2005), landscape character evaluation, increasing of awareness of decision makers and public on importance of landscape, mapping of landscape units that are homogenous in terms of their character, observation of change in landscape characters, development of recognition of landscape character in planning process, evaluation of effectiveness of agricultural-environmental programs and precautions taken for bio variety and structural landscape values, determination of protected landscape areas, re-forested areas and areas suitable for incentive, compatibility analysis for various area use types of a region; reaching aims in European Landscape Convention may be used as tool for risk prevention (flood control, erosion risk, coastal protection) (Uzun et al. 2012).

Countries that are party to European Landscape Convention are obliged to classify country landscapes. Interaction of natural and cultural sources particularly in the focus of mankind comes into prominence in definition of landscapes. Establishment of a balance between mankind and nature is required in this regard also. There are four basic aims in determination of landscape character types:

Political aim: Our country, which is party to APS is obliged to determine a method approach for defining of country landscapes. Production of policies at different scales concerning country landscapes is aimed.

Administrative aim: Definition of landscapes of our country and creation of a tool in its integration with sectors such as spatial planning, urbanization, agriculture, forestry, tourism, environmental rehabilitation etc.

Functional aim: Ensuring creation of policies and strategies of landscape character types and landscape units concerning other sectors, primarily protection sector, by starting from functions of landscape classes.

Scientific aim: Creation of protection decisions and strategies concerning ordinary landscapes by starting from landscape functions except for selected landscapes such as national parks, natural protection areas, special environmental protection areas etc. having the status of protected areas in our country (Uzun et al.2012).

Data such as climate, geographical formations, rock form and land cover are benefited from when landscape character types at national scale are put forward.

ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant Project is located in a plain area at Kızılırmak shore. Should landscape character types of the project area be set forth:

* Work area is of 'climates at middle temperature' class in terms of country-wide climate characteristics. That means climate level is mesothermal.
* Work area is located at 'valleys and gulleys' class in terms of 1st level geomorphologic characteristics country-wide, and 'valley bottoms' class in terms of 2nd level geomorphologic characteristics.
* It is seen at work area that a structure with 'alluvion', 'sandstone' and 'limestone' characteristics is dominant in terms of geological characteristics country-wide.
* Work area has mostly 'natural meadows' and 'rare plant areas' in terms of the field cover characteristics country-wide.

Landscape character criteria and changes that are estimated to occur on them following project activity are seen in Table 6.18.

Table 6.18. Landscape Character Criteria and Project Site Sensitivities

Level	Criterion to be Used	Project Site	Change Following Activity
National Level	Climate	No national importance	None
	Geomorphology	No national importance	None
	Geology	No national importance	None
	Corinne Field Cover	No national importance	None
Regional Level	Climate	No regional importance	None
	Geomorphology	No regional importance	None
	Geology	No regional importance	None
	Corinne Field Cover	No regional importance	None
	Large Soil Groups	No regional importance	None
Local Level	Land Cover	No significant local value	Low
	Geomorphology	No significant local value	None
	Geology	No significant local value	None
	Field Talent Classes	No significant local value	None
	Slope	No significant local value	Low
	Exposure	No significant local value	Low
	Micro Climate	No significant local value	None
	Height Groups	No significant local value	None

According to Table 6.18, it is envisaged that project activity will not cause any change in landscape elements at national and regional level, and minor changes may occur in field cover, slope and exposure at local level.

Landscape character types are seen in Figure 6.14, while areas covered by them are seen in Table 6.20.

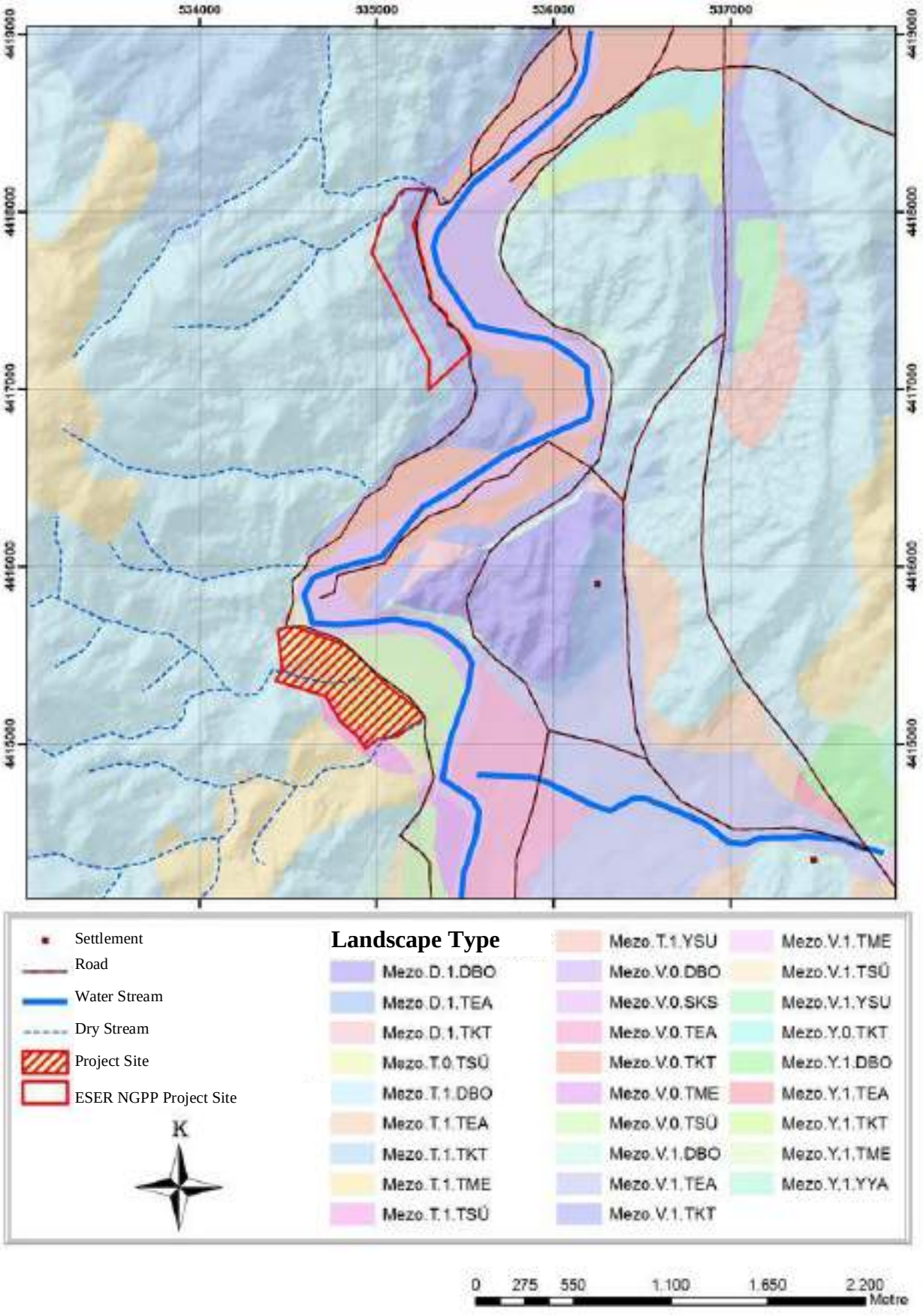


Figure 6.14. Landscape Character Types

Table 6.19. Landscape Character Types

	Character Type	Descriptipn	Area (ha)
1	Mezo.D.1.DBO	Mezotropik climate, Mountain, Sandstone, Small Areas of Vegetation	58,89
2	Mezo.D.1.TEA	Mezotropik climate, Mountain, Sandstone, Arable Land	24,55
3	Mezo.D.1.TKT	Mezotropik climate, Mountain, Sandstone, Mixed Agricultural Areas	6,31
4	Mezo.T.0.TSÜ	Mezotropik climate, Hill, Alluvium, Continous Products	1,21
5	Mezo.T.1.DBO	Mezotropik climate, Hill, Sandstone, Small Areas of Vegetation	1100,31
6	Mezo.T.1.TEA	Mezotropik climate, Hill, Sandstone, Arable Land	47,59
7	Mezo.T.1.TKT	Mezotropik climate, Hill, Sandstone, Mixed Agricultural Areas	271,75
8	Mezo.T.1.TME	Mezotropik climate, Hill, Sandstone, Grasslands	216,61
9	Mezo.T.1.TSÜ	Mezotropik climate, Hill, Sandstone, Continous Products	8,09
10	Mezo.T.1.YSU	Mezotropik climate, Hill, Sandstone, Commercial Products	27,14
11	Mezo.V.0.DBO	Mezotropik climate, Valley, Alluvium, Small Areas of Vegetation	25,89
12	Mezo.V.0.SKS	Mezotropik climate, Valley, Alluvium, Land Waters	93,79
13	Mezo.V.0.TEA	Mezotropik climate, Valley, Alluvium, Arable Lands	54,16
14	Mezo.V.0.TKT	Mezotropik climate, Valley, Alluvium, Mixed Agricultural Areas	106,86
15	Mezo.V.0.TME	Mezotropik climate, Valley, Alluvium, Grasslands	7,27
16	Mezo.V.0.TSÜ	Mezotropik climate Valley, Alluvium, Continous Products	49,56
17	Mezo.V.1.DBO	Mezotropik climate, Valley, Sandstone, Small Areas of Vegetation	39,20
18	Mezo.V.1.TEA	Mezotropik climate, Valley, Sandstone, Arable Lands	149,41
19	Mezo.V.1.TKT	Mezotropik climate, Valley, Sandstone, Mixed Agricultural Areas	90,99
20	Mezo.V.1.TME	Mezotropik climate, Valley, Sandstone, Grasslands	5,16
21	Mezo.V.1.TSÜ	Mezotropik climatei, Plateau Sandstone, Continous Products	11,33
22	Mezo.V.1.YSU	Mezotropik climate, Valley, Sandstone, Commercial Products	14,78
23	Mezo.Y.0.TKT	Mezotropik climate, Plateau, Alluvium, Mixed Agricultural Areas	18,85
24	Mezo.Y.1.DBO	Mezotropik climatei, Plateau Sandstone, Small Areas of Vegetation	23,99
25	Mezo.Y.1.TEA	Mezotropik climatei, Plateau Sandstone, Arable Lands	3,51
26	Mezo.Y.1.TKT	Mezotropik climatei, Plateau Sandstone, Mixed Agricultural Areas	29,55
27	Mezo.Y.1.TME	Mezotropik climatei, Plateau Sandstone, Grasslands	10,01
28	Mezo.Y.1.YYA	Mezotropik climatei, Plateau Sandstone, Green Area Non Agricultural	6,41

Landscape character function analysis performed for ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant is seen in Figure 6.15.

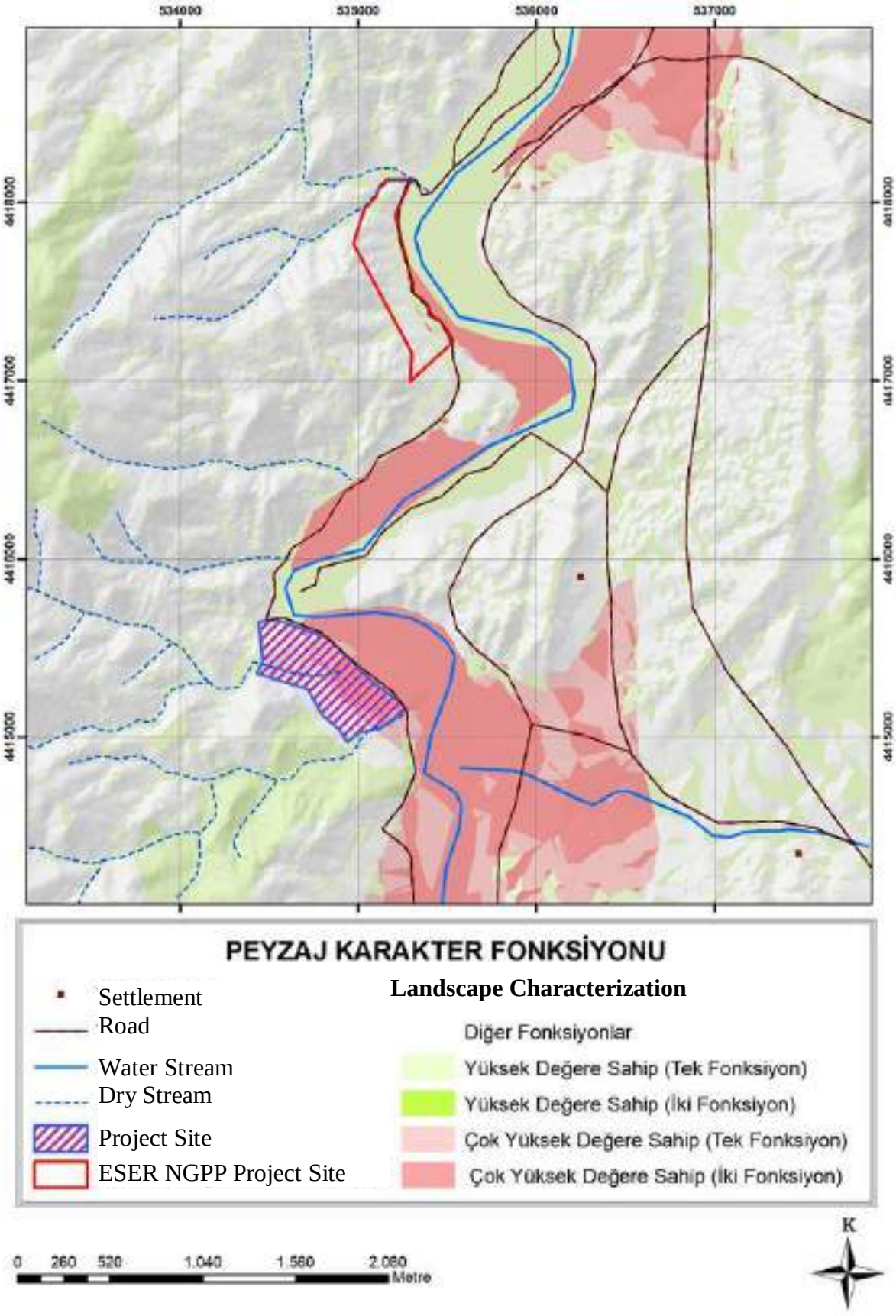


Figure 6.15. Landscape Character Function Analysis

Water permeability, erosion and habitat analysis maps obtained from geology, topography, field size and forest management maps were superposed in order to examine the status of landscape characters in regions where project buildings are located, following that, existing levels of these above mentioned characteristics at the area in terms of single, double and all functions were examined. Hence, areas with high landscape value in terms of single function and/or more than one function were detected. Areas having very high and high landscape value are primary protection areas regardless of conflict in terms of analyzed landscape functions. According to the map, abundance of landscape character of the work area and its vicinity in terms of single function in particular draws attention. Part of the project area is located within this region. It is seen that areas having very high value in terms of single and double function are found along Kızılırmak stream. Hence, part of the project area collides with regions that are very high in terms of function.

6.3.4.5. Landscape Visual Function Analysis

Visual landscape analysis is an evaluation, which enables making interpretation and deciding concerning landscape quality in landscape planning works. Its aim is to obtain information on current visual characteristics of the area and detect sensitivity against possible changes. Visual quality and scenery are of important factors for people to feel good in physical and emotional means. What people see in the environment they live, visit or spend time in some way is effective on the satisfaction and sense of belonging they have from this place. Views, which are in contradiction with the esthetics and beauty of naturality, and are incompatible with natural landscape, negatively affect people's place, sense of belonging and satisfaction feelings. Since the first periods of humanity, visual landscape quality in area use has been a determinative feature after meeting of basic needs. In that case, landscapes must also have been evaluated in terms of presenting 'favorable views'. In this regard, visual landscape quality may be defined as 'relative esthetic perfection of a landscape'. 21st century bio-centric philosophies emphasize the necessity of visual quality evaluation works, which give priority to ecological characteristics and contribute to management by taking esthetic values as basis. In visual landscape evaluations, inventory and assessment of various visual characteristics of landscape is performed in line with planning, design and administrative aims. Visual landscape quality puts forward with the analysis of quantitative measurable indicators the landscape structure perceived by people with physical structure independent from perceiver.

Evaluation is performed in terms of

- Scenery Quality
- Field Form
- Vegetation
- Water
- Color
- Effect of neighboring scenery
- Rarity
- Cultural changes.

A landscape can be defined with sub-parts creating it:

- Field form (field surface types: mountain, valley..)
- Field surface
- Rocks, soil surfaces
- Water surfaces (lakes, rivers, wet areas..)
- Snow, ice cover,
- Plant cover (trees, bushes..)
- Structural elements (man-made elements..)

A landscape has the following visual basic elements:

- Color,
- Line,
- Form,
- Tissue,
- Spatial character

When all these criteria are considered, it is certain that some damages will occur during project construction in terms of visual function of the landscape. These impacts that will occur at project area can be defined as short term impacts. Factors such as visual pollution that will occur in dwelling units close to the project area and route, engineering vehicle density at the area and immediate vicinity throughout working period, deformed, excavated field parts, earth masses and mud can be listed. However these impacts will not be permanent since they will finish upon completion of construction works. Visibility analyses of ACW and Eser Plant sites are given in Figure 6.16 and Figure 6.17, respectively.

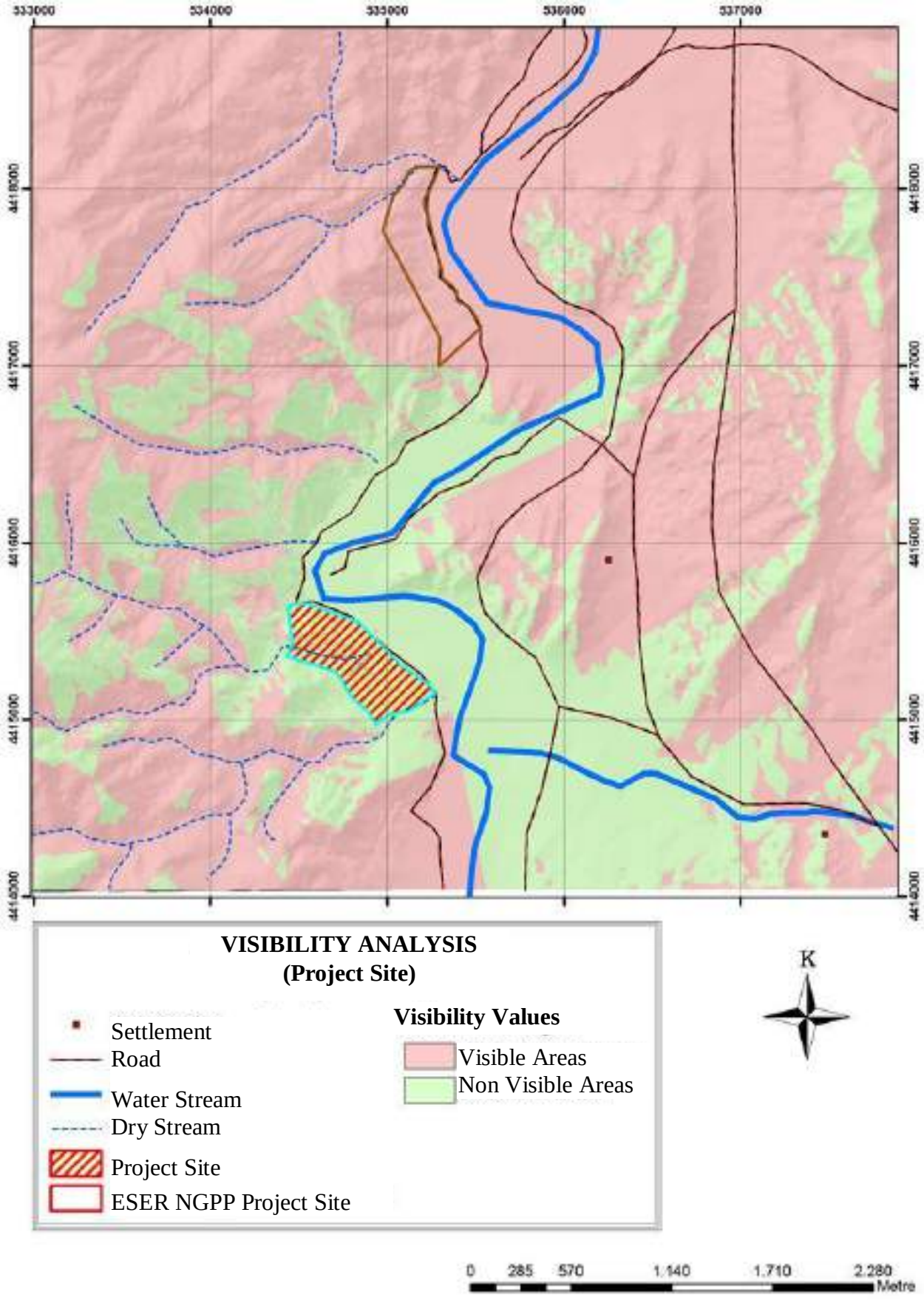


Figure 6.16. Visibility Analysis for ACWA Plant Site

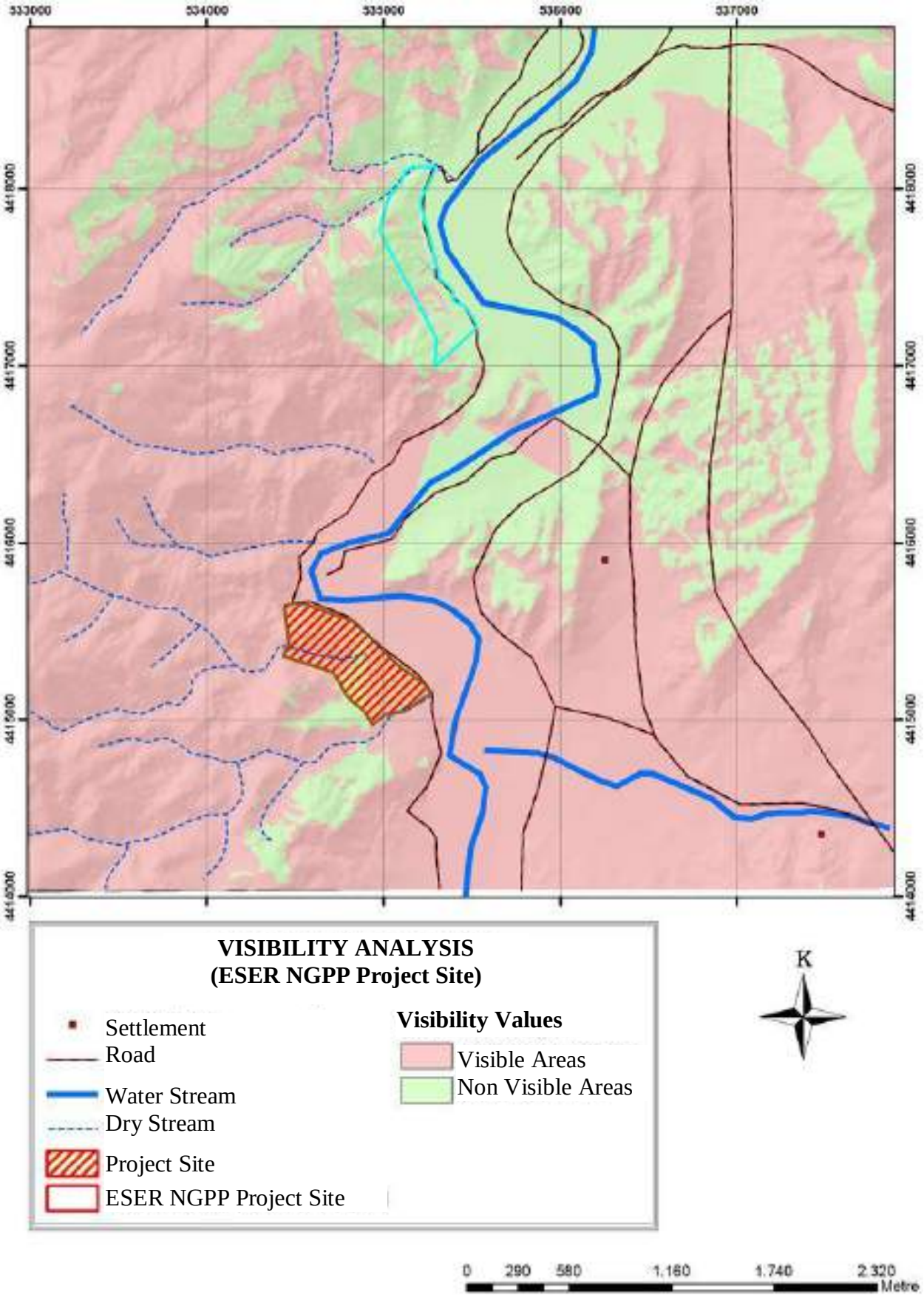


Figure 6.17. Visibility Analysis for Eser Plant Site

Project structures can be seen from different points due to factors such as the point, height they are found at, exposure and topography. In order to prevent this, various landscape development strategies have been produced such as road forestation on routes where these points are visible, plantation in their vicinity for masking purposes, and rehabilitation of slopes, provisional service roads and construction site areas, which currently exist or may appear during works, through vegetation and repair works.

Large and small villages draw attention as dwelling units in the immediate vicinity of the work area. There are no interprovincial transportation lines or touristic routes in the immediate vicinity of the work area, visual quality of which will be negatively affected during construction. Village roads seeing the work area in the immediate vicinity can be accepted as sensitive areas in terms of the visual function of the landscape. However, this effect will be eliminated in time through repair works upon project's becoming operational following the completion of construction stage.

6.4. DETERMINATION OF EVALUATION and LANDSCAPE REPAIR TARGETS

Risk, which is detected in terms of the erosion function encountered in the project area as a result of the landscape analyses performed, will be eliminated through topography arrangement applications as a result of erosion preventive precautions, terracing and digging-filling processes. Erosion risk must be eliminated since this risk points out sensitive areas in the sense of erosion risk. It is seen as a result of corridor-patch-matrix evaluation performed in terms of habitat function that this matrix, in which natural meadows and rare plant areas vegetation areas dominantly exist, and which has expanded to a large area, will be split as a result of the activity. However, this split will make its impact felt in areas close to the activity area within the large matrix, while it will have no impact on remote areas. Temporary impacts that will appear due to the activity will finish upon completion of the activity. It is seen as result of landscape character function analysis that similar landscape characters have expanded on large areas, rare landscape characters are not encountered in the route and its immediate vicinity, and existence level of the current landscape character in the region is very high.

There will be changes in flora and fauna ecosystems upon realization of ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant project. Natural habitats and plant cover may be damaged during project construction. Following construction stage, precautions against erosion must be taken and most importantly, re-vegetation must be performed. Re-vegetation must be performed with species that are compatible with the natural plant cover. It must be definitely ensured that deformations that will occur in these habitats be restored in accordance with 'Ecological Restoration' principles. In order to ensure a sustainable forest and aquatic ecosystem, possible environmental impact of project construction on biovariety and other ecological factors must be monitored at each stage and necessary precautions must be taken in time.

Stabilizing a destructed area in environmental terms is a must for transferring a natural environment and natural sources to next generations. However, it may take long years for a destructed area to each its ecological balance if left on its own. Human assistance is needed in order to earn such areas to the nature again within a suitable time. Landscape repair performed for that purpose is works that target re-gaining of the productivity, ecological, economic and esthetic values of the destructed area.

Field works to be carried out within the scope of repair works cover the following stages:

1. Design of the work (location of dump sites, expansion of overburden, excavation works, last shape to be given to the field)
2. Formation of the natural drainage structure in the area
3. Vegetation of the stored upper soil in order to prevent erosion (with pasture-meadow plants)
4. Re-gaining of biological productivity to the destructed area (organic chemical fertilizers, disposal of poisonous waste)
5. Re-vegetation (pasture-meadow plants, legumes, other herbaceous plants, tree and bush seeds)
6. Monitoring (monitoring of water quality, drainage, slope sensitivity and erosion for plant growth and soil rehabilitation)

7. Monitoring of growth speed of permanent plants and performing of additional vegetation when required (completion, renewal).

Repair Targets, Precautions and Repair Techniques

Repair target aimed with this project is **restoration**. According to National Research Council (1992), restoration is re-establishment of function and structure of the ecosystem. Ecological restoration is the process of returning to pre-intervention conditions and function as close as possible. This definition is valid when ecosystems are at natural balance. Therefore it is not possible to re-create a system completely. Restoration is a process, in which the general structure and functions are re-created, which is dynamic, but in which ecosystem behaviors can be sustained on their own (Yavuzşefik and Uzun, 2005)

Landscape repair works must be performed in

- Regions with erosion problem, sloping areas and slopes, and
- Regions where unwanted scenes must be hidden.

Repair decisions taken for the area as a result of the evaluation performed can be examined under several titles. These are coastal arrangement, vegetation for erosion control purposes, vegetation for screening purposes, and excavation are rehabilitation. Illustration with regard to that is given in Figure 6.18.

Coastal Arrangement

When the project planned to be applied is examined, it is seen that the work area is located at the side of Kızılırmak River. Changes will occur in field structure during project construction in functional terms. Damages may also occur in the structure of the land located between the stream bed and project area due to causes such as formation of landslide arising from operation of heavy tonnage construction equipment in particular. Coastal arrangement particularly covers the repair works in these damaged areas. Plant types, which are compatible with the ecologic conditions presented by the project area, must be selected.

Vegetation for Erosion Control Purposes

Slope has a high value in majority of the project area. Valley formation, water streams and slopes are observed when the morphological structure of the work area is examined. Photos taken from the area support this. Vegetation for erosion control purposes expresses the vegetation works, which will be performed in order to prevent the possible erosion problems that are possible to increase with the damage that will occur as a result of excavation works, and repair. What is required to be paid attention to in that point is that species, which are compatible with fight with erosion and the ecological structure presented by the area, must be preferred. Preference of species that currently grow in the area will increase cost effectiveness and productivity. Species that may be preferred and implementation methods are examined under the title ‘Biological and technical repair’.

Vegetation for Screening Purposes

Several permanent factors will also be brought to the area as a result of the project to be applied. Plant building may be given as an example to that. It is without doubt that such structures will make difference at the area in visual terms. With vegetation for screening purposes, it is aimed to reduce the visibility rates of these structures from the vicinity and make the weight of the natural structure re-felt. For that purpose species, which are suitable for screening, can make the same feeling felt in summer and winter, are preferably evergreen, grow fast and have expansion power, have high branching and lamination density, and can adapt to ecological conditions offered by the area, must be selected. Moreover fast growing species may be tried to be brought to the site in the first place through thickset.

Excavation and Storage Area Rehabilitation

Changes in field structure will occur during project construction. Excavation areas and filling areas may form. The most important matter to be paid attention to in repair of such areas is correct detection of the vegetation of the aforesaid area before damage. Thus, use of species in the current vegetation in permanent vegetation, which will come after the initial vegetation, will increase success.

Soil Stripping and Storage

One of the most important stages to be paid attention to during construction stage is concerned with soil management. Stripping, storing and re-use during repair stage of the top soil rich with nutrient (vegetable soil) must be emphasized.

Repair methods, which are deemed proper for implementation of the mentioned repair decisions, are methods of terracing, hydroseeding and fence formation with rooted cutting.

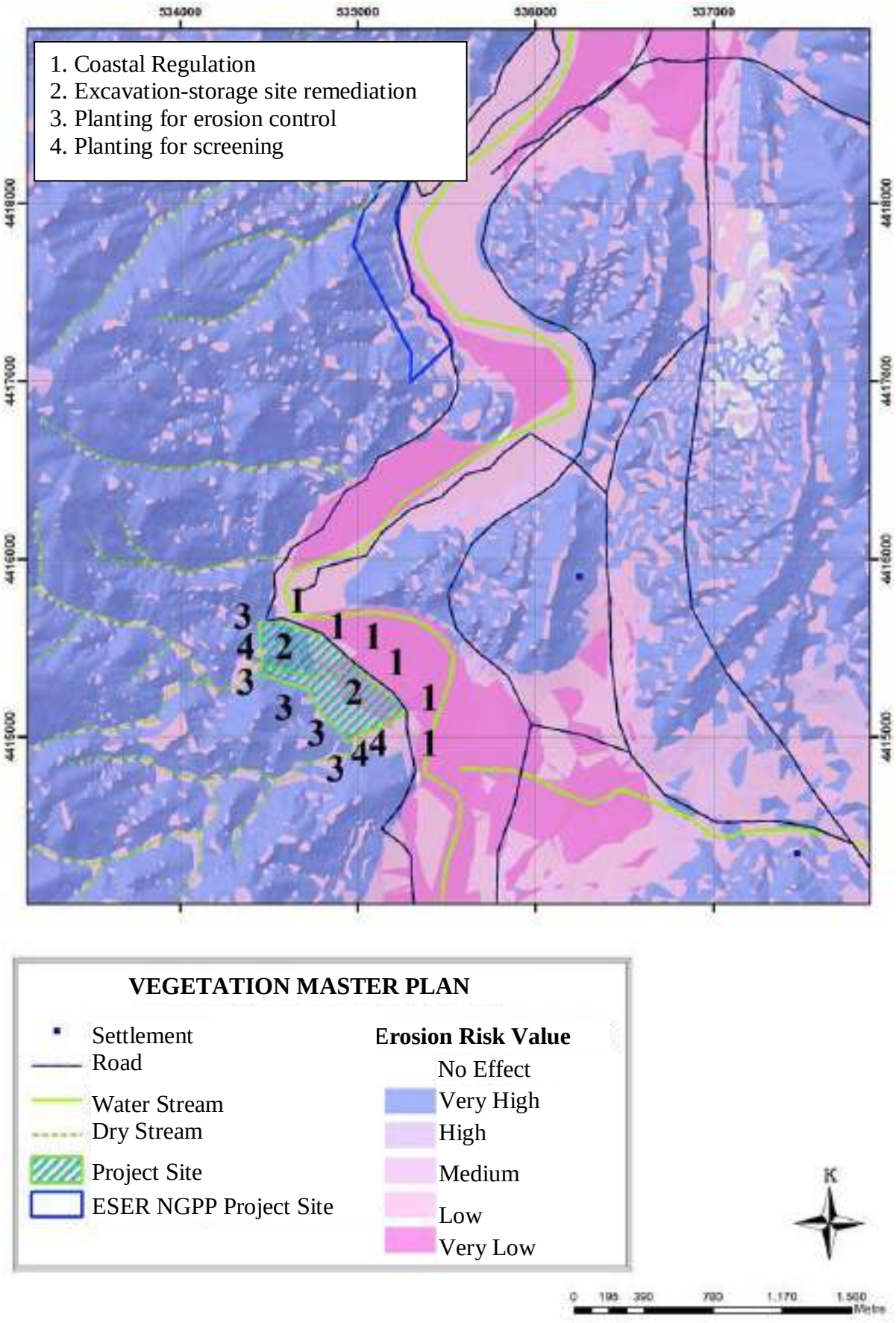


Figure 6.18. Vegetation Master Plan

6.5. BIOLOGICAL and TECHNICAL REPAIR (BIORESTORATION)

Basis of biological repair is directly related to the concern for creating systems that are alive and keep alive. Restoration of a damaged area is possible through use of inanimate material together with living material, which is a must. Base of the approach required to be chosen at that point must be based on the research of the inventory of natural plant cover growing in damaged area. Condition of the area before damage must be definitely examined, because each species observed at work area is types that have adapted to natural conditions of that area as a result of natural processes. These characteristics must take its place in species selection during repair among prioritized values together with species that quickly adapt to climate conditions of that area and grow fast.

According to the evaluation performed for ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant Project, there are mostly natural meadows and rare plant areas vegetation at project area. Natural successions of plant communities in their artificial or natural habitats must be examined during landscape repair works. These examinations will provide us information on species that may grow in working environment from meadow, bush and forest plant communities. These species mentioned are area specific species, which have adapted to the natural conditions in the best way, and can grow in that area. Trial of pioneer plants, and area specific species after that if deemed necessary in repair works will increase success rate.

Valley formation in general is observed in geomorphologic structure of the project area. Valley formations follow each other together with the stream flowing at valley bottom and other side streams feeding it. However when the topographical map of the area is examined, it is seen that change of height quickly varies and slope degrees often change at the project area. As understood from erosion function analysis map, this rapid change in height groups causes areas with high slope to appear. Another matter to be emphasized at project area is permanent elements to be brought to the area. Methods to be applied at areas to be repaired are evaluated under this title following repair targets dealt with in the previous title, and determination of areas to be repaired.

Coastal Arrangement

Plant species to be used in repair of the damage that will occur at stream bed and its vicinity in particular, must both have alluvial soils and characteristics to grow in wet soils. It is also suggested to use these species in repair of areas, which are shown with the digit 1 in vegetation master plan given in Figure 6.18. Suitable species offered according to that is given in Table 6.20.

Table 6.20. Species Offered in Coastal Arrangement and Their Characteristics

Name	Form	Tissue	Rapid growth	Resistance to aridity	Growth in wet soils	Resistance to temperature	Resistance to shade	Growth in steep slopes	Se coast and salty soil	Tolerance to fire	Growth in poor soils
Cyprian acacia	Evergreen	Dense	X	X		X		X	X		X
Amber	Deciduous	Loose		X		X		X			
Redbud	Deciduous	Middle dense			X						X
Eucalyptus	Evergreen	Middle dense	X	X	X	X			X		X
Eleagnus	Deciduous	Middle dense		X		X		X	X		X
Honey locust	Deciduous	Loose		X		X					X
Oak	Deciduous	Middle dense		X				X			X
Black locust	Deciduous	Middle dense	X	X		X					X
Cotoneaster	Evergreen	Middle dense		X		X					
Scarlet firethorn	Evergreen	Middle dense	X	X		X		X			
Berberis thunbergii	Deciduous	Middle dense		X	X		X				

Storage and Screening Areas

Plant species, which will be used in repair of the visual landscape that will be deformed due to certain structural elements to be brought to the area, are given in Table 6.21. It is also suggested to use these species in repair of areas shown with the digit 2 in the vegetation master plan given in Figure 6.18 (excavation-depot site rehabilitation), and areas shown with the digit 4 (screening areas).

Table 6.21. Species Suggested in Depot and Screening Areas and Their Characteristics

Name	Form	Tissue	Evergreen	Rapid growth	Resistance to aridity	Growth in wet soil	Resistance to temperature	Resistance to shade	Growth in steep slopes	Se coast and salty soil	Tolerance to fire	Growth in poor soils
Cyprian acacia	Concentrated	Middle dense	X	X	X		X		X	X		X
Cupressus sempervirens	Vertical	Dense	X		X			X				
Chinese arborvitae	Concentrated	Dense	X									
Juniperus excelsa	Scattered	Dense	X		X				X			
Mayflower	Concentrated	Dense			X			X	X			
Berberis thunbergii	Vertical scattered	Middle dense			X	X		X				
Rockrose	Very Concentrated	Dense	X		X		X		X	X		
Cotoneaster	Vertical scattered	Dense	X		X		X					
Winter jasmine	Concentrated scattered	Very dense	X			X	X			X		
Juniperus	Scattered	Very dense	X				X		X	X		
Juniperus	Creeping	Very dense	X				X		X	X		
Lavender	Vertical	Very dense	X		X		X		X		X	X
Honeysuckle	Creeping	Dense	X		X		X		X			
Fire thorn	Vertical scattered	Dense		X	X		X		X			

Vegetation Areas for Excavation and Erosion Control Purposes

Damages will occur at certain areas upon project's becoming operational and excavation works to be carried out during construction. When the general condition of the area is examined, areas with high slope and erosion risk draw attention in a section of the region where project structures are located at. Plant species, which will be used in repair of excavation areas or high slope areas that may appear and areas shown with the digit 3 in vegetation master plan given in Figure 6.18, are given in Table 6.22.

Three different methods are used in order to prevent erosion in slopes:

1. Terracing method
2. Vegetation in pits
3. Vegetation of sloping stone walls at slopes.

Planting method suggested on slopes for ACWA Power Kırıkkale Natural Gas Combined Cycle Power Plant project area is **'terracing method'**. Matters concerning this method are specified below.

Table 6.22. Species Suggested in Erosion Control Areas and Their Characteristics

Plant Species Benefited	Growing Method	Growth Environment											
		Sand	Sand, stone, granite		Schist gyans		Clayed sandstone		Rubble		Limestone		Meter
		a	a	h	a	h	a	h	a	h	p	h	
Salix alba	Sapling-cutting			X	X	X	X	X	X	X		X	12
Populus nigra	Sapling-cutting			X	X	X	X	X	X	X		X	30
Sambucus nigra	Sapling-seed			X		X		X				X	6
Rosa canina	Sapling-seed				X	X	X	X	X	X	X	X	3
Crataegus sp.	Sapling-seed				X	X	X	X	X	X	X	X	5
Ligustrum sp.	Sapling-seed				X		X		X	X	X	X	4
Lonicera sp.	Sapling-seed					X	X	X	X	X	X	X	2
Pinus sp.	Sapling-seed	X	X	X	X	X	X		X	X	X		20
Alnus incana	Sapling-seed					X	X	X	X	X	X	X	30
Acer campestre	Sapling-seed				X		X		X	X	X		15
Quercus robus	Sapling-seed	X	X	X	X	X			X	X	X	X	40
Fraxinus sp.	Sapling-seed					X	X	X			X	X	30
Acer platanoides	Sapling-seed					X	X	X				X	20

a: arid, **h:** humid, **p:** partially humid

It will be convenience most of the time to use plants, which do not require care, as pioneer plants. For example *Salix* and *Populus* types, which can be easily grown with cutting, and plants such as *Alnus spp.* of legumes which grow fast and enrich the soil with nitrogen, can be used as pioneer plants.

Terracing Method

Terraces are facilities, which form by excavation in sloping field along contour lines and parallel by ramp and agglomeration of the excavated soil on below part. Upper part of terrace is called Step and steps are usually built towards ram with a slope of 20-30%. Terraces are built in arid areas with lack of water in order to minimize surface flow and store water, render the excessive

water harmless in rainy places, and to prevent soil transportation caused by surface flow in both cases (Ürgenç 1998).

According to Çelem (1988), if planting is to be performed in ditch (terrace), ditches are opened with intervals of 80-150 cm according to slope degree. Ditches can be opened by plowing with digging fork, pickaxe, shovel or plough. Ditches are opened with a slight slope of 10-15°'and saplings are planted inside ditches with intervals of 80-150 cm. Covering ditch surfaces with material such as mulch, hay, branch, leaf etc. after planting creates very positive results.

Pictures concerning vegetation in terraces are given in Figure 6.19, and erosion prevention vegetation is given in Figure 6.20.

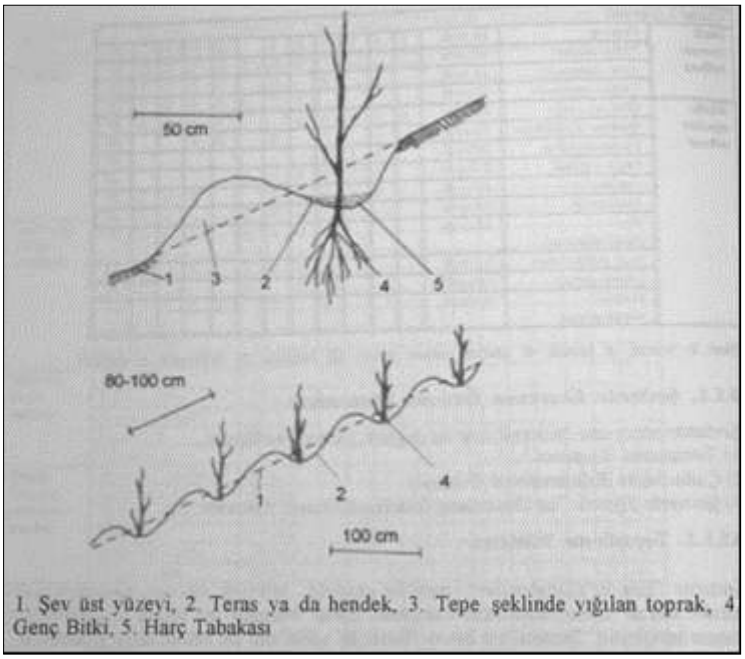


Figure 6.19. Vegetation in terraces (ditch planting) (Çelem 1988)

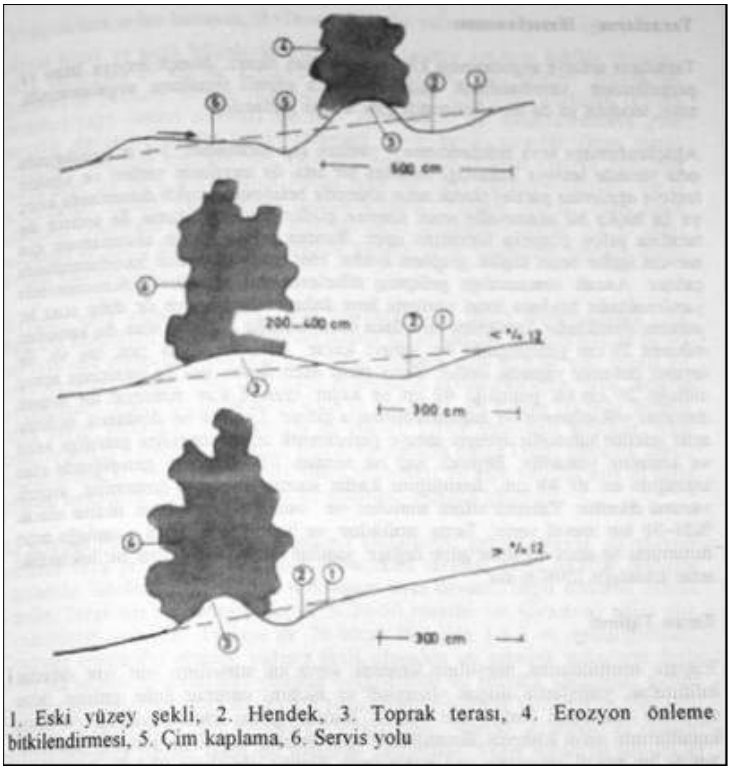


Figure 6.20. Erosion Prevention Vegetation (Çelem, 1988)

Examples concerning terracing works performed for surface erosion prevention purposes are seen in Figure 6.21.





Figure 6.21. Terracing Works for Surface Erosion Prevention Purposes (Şimşek 2012)

Hydroseeding Method

In areas, where grass surface is required to be formed at project area, but the slope is too high for it, use of hydroseeding method is suggested. Hydroseeding method is the technique of grass growing through blasting method. The best result is obtained in the shortest time with the method applied by spraying of the prepared organic mixture to the soil. The biggest factor for preference of hydroseeding technique is that it is easily applicable on areas, in which grass growth through traditional methods is impossible. This method, which eliminates problems arising from field conditions, difference of levels or slopes, is method used worldwide due to its practicality and giving results in short time (Anonymous 2013b). A picture regarding application of the method is given in Figure 6.22.



Figure 6.22. Application of Hydroseeding Method (Anonymous 2013c)

Living Fence Formation Method with Rooted Cuttings (Sapling)

Rooted cuttings (saplings) are obtained from stools taken from fast growing tree species. It is possible to benefit from natural plant cover as well as exotic plants at a large scale in living fence application performed with rooted cuttings. This method shows richness in terms of material contrary to fences made with rootless cuttings. What must be paid attention to here is that root and body development in species used is at desired level, moreover, it must be easily producible with cuttings branching out from the bottom, and must be usable in different ecological conditions developing the best adventive root. Majority of the proper plants used for living fences made with rooted cuttings are selected from the plant cover existing in the region. Height of the plants to be used for that purpose must be either 60/80 cm or 65/100 cm, and majority of the plants to be used must be selected from the natural plant cover. Contrary to living fence made with rootless cutting, no secondary herbal facility is required here. One of the points required to be paid attention to in living fence applications is that plant types must be planted with proper combinations. Therefore different species must be placed side by side, mixed planting must be performed and a long row from a single type must not be formed. The most suitable way is to change one type at each 3-5 meters (Çelem 1988).

According to researches performed, the best application is to create a combination to be made with different characteristics as vertical and longitudinal by considering superior qualities of species. Thus species eliminate weak sides of each other. For example, planting of species showing strong root development *(Alnus incana, Cotoneaster*

acutifollus, Salix purpurea. Cornus anguinea. Fraximıs ormus, Viburnum lantana,. Acer negundo, Berberis vulgaris. Hippophae rhmanoıdes, Ligustrum vulgare, Castanea sativa. etc.) species showing body development *(Alnus incana. Betula pendula. Prunus mahlep. Crataegus monogyna, Hippophae rhmanoıdes, Salix purpurea* etc.) side by side. So, species used cover weak sides of the other. Living fence formation plan with rooted cuttings are seen in Figure 5.5, and living fence formation section with rooted cuttings are seen in Figure 6.23.

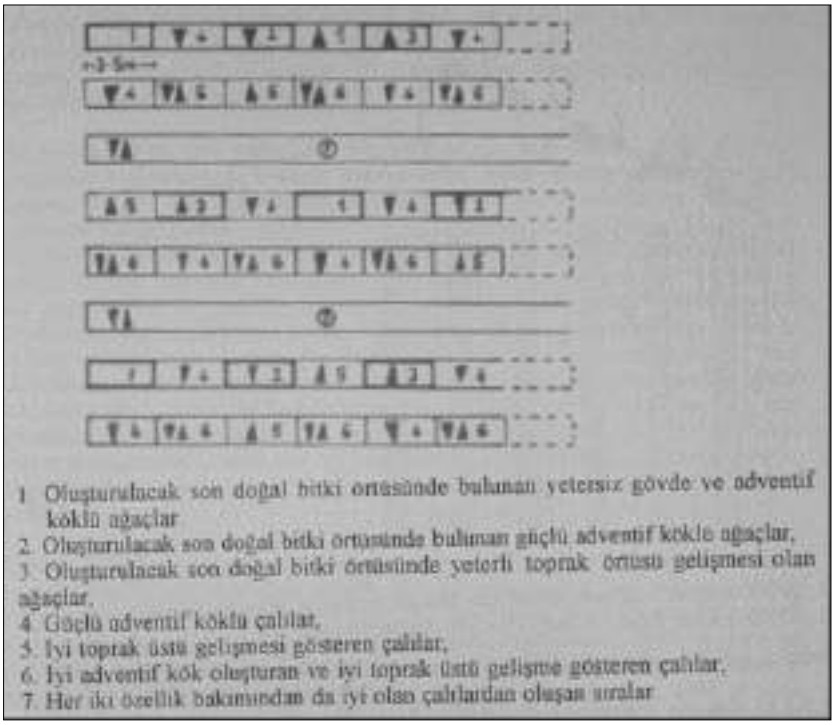


Figure 6.23. Living Fence Formation Plan with Rooted Cuttings Plan (Çelem 1998)

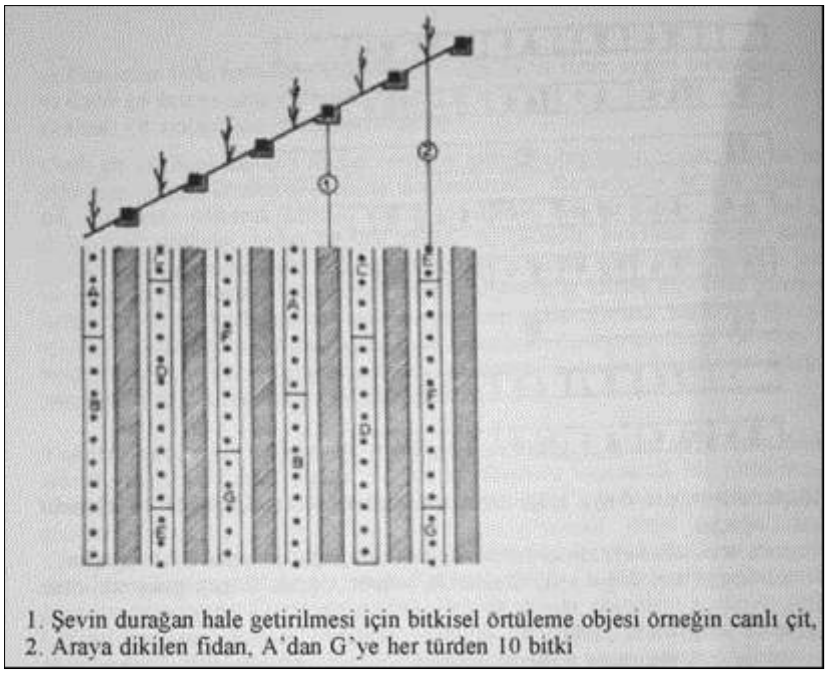


Figure 6.24. Living Fence Formation Section with Rooted Cuttings (Çelem 1998)

Use of this method in high sloping areas and slopes in particular for rooting the soil will bring success in areas, in which screening purposed vegetation will be performed. In addition to targets such as coastal arrangement, vegetation for erosion control purposes, excavation area rehabilitation and depot site rehabilitation evaluated under the fourth title of this report, area specific plant types and application forms given under the fifth title must be applied by considering the regions shown in vegetation master plan.

Living fence with rooted cuttings display a richer appearance in shorter time and respond to expectations faster than those obtained from seed. Rehabilitation of depot and excavation sites, use of tall and firm saplings in areas where vegetation for screening purposes is to be performed in particular, will be beneficial in terms of invisibility of places desired to be hidden such as structural elements that will derive from dam set and irrigation system.

II- CONSTRUCTION STAGE

6.6. IMPLEMENTATION

Stripping and storing of top soil, and removing and storing of sub soil consists an important part of landscape repair works. Because top soil contains seed bank. They are of the most important elements of re-creation of plant over works. This is very important both in terms of restoration and fight with erosion.

Top soil must be stripped up to a maximum depth of 45 cm. Top soil stripped must be accumulated in forms of masses not exceeding 1.50 m in height. Contact of the top soil preserved in such way with materials such as sub soil, cement, clay, oil, petrol, coal tar etc. must be prevented. In the same way, it must be not mixed with sub soil. Height of soil masses piled up for re-use shall not exceed 1.50 m and top soil shall in no way be disposed of from the site or buried. Every kind of precaution must be taken in order to prevent mixing of contaminants or foreign matters within top soil and weed growth in soil masses must be prevented. A herbicide/weedicide drug, which will show its effect in proper time, may be applied in order to dispose of weeds before seeding. An image regarding storage of top soil is given in Figure 6.25.



Figure 6.25. Storage of Top Soil (Anonymous 2013a)

Plantation compatible with the habitat must be performed in landscape works. Damaged areas will be easily rehabilitated if landscape is built with natural plants compatible with habitat. Selection of natural plants of region during selection of plants for landscape purposes is very important for ecosystem balance. For example, success rate will increase significantly if trees and bushes such as *Tamarix smyrnensis, Hippophae rhamnoides* subsp. *caucasica, Salix excelsa* and *Populus nigra* are planted at places damaged along streams, and *Hippophae rhamnoides* subsp. *caucasica, Salix excelsa* and *Populus nigra* on dip slopes.

Fertilization

Contrary to cultural areas, aim of landscape repair applications is to improve unproductive or damaged areas rather than gain product from area. It is possible that plants, which will be brought to an area that is poor with nutrients and has inconvenient natural conditions for growing of plants, will continue their normal life and at the same time fulfill their function of correcting negative effects. In this regard, measures that can rehabilitate the physical and chemical characteristics of area must be taken both during and after foundation. For example at least 25 cm of soil with minimum 10 cm of it is cultural soil must be laid in vegetation works performed in soilless slopes poor with plant cover. However, there is no need to lay cultural soil on soils that are rich with nutrients and convenient for plant growth. Nevertheless, fertilizer must be given to soil before and after foundation in order to get better results from vegetation. Soil must be fertilized in first years of application in particular for plants to expand easily. Fertilizer type and amount must be detected according to the characteristics of application area and requirements of the plants used (Köseoğlu and Özkan 1984).

Irrigation

In vegetation works performed in arid regions in particular, plants must be irrigated in the first 3-4 years of arid periods. In temperate climate regions, life line must be given to plants during application. Grass areas established in regions where summer is completely arid or hot must be irrigated for at least 30 mm every day. Summer is arid and hot in a large part of our country with Aegean Sea shores and Central Anatolia region being in the first place. Therefore irrigation must be performed in the first 3-4 years following vegetation in arid periods in vegetation works to be performed in such regions. In that sense, plants that form shallow root system must be selected. Moreover, amount of water given by fertilizer amount applied on soil must be increased. According to studies performed, it has been observed that saplings, which are given a lot of water within a large interval during forestation works, become more resistant to aridity after they grow. Plant seeks for the required water in depths. As plant grows, its roots reach deeper every year and can content itself in upcoming years with the humidity provided by rainfall in winter without requiring irrigation. In extreme conditions where water procurement is hard and abundant irrigation is not possible, e.g. in over sloping areas, vegetation can be performed with 5-7 cm wide and 50-80 cm long pipes placed during planting, as seen in Figure 6.26 (Köseoğlu and Özkan 1984).

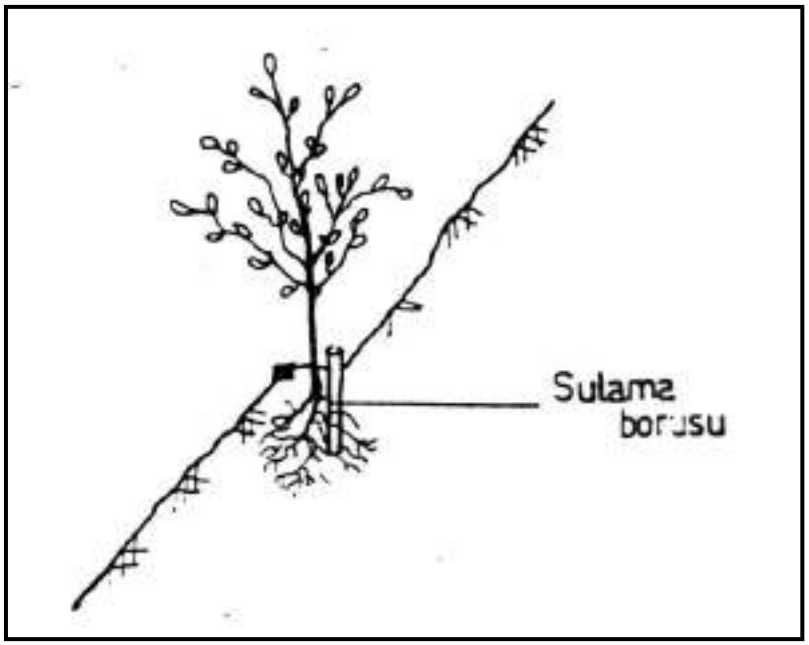


Figure 6.26. Vegetation in Over Sloping Areas (Köseoğlu and Özkan 1984)

Pruning, Thinning, Completion

Woody plants must be pruned two years after plantation. Dry branches and branches that overgrow by themselves must be cut and formation side branches that can develop at equal force must be focused on. Plants must be pruned from time to time in order to give them a certain shape in accordance with landscape esthetics and vegetation function. For example thinning through pruning may be performed in protective wind strips in order to break wind inside the strip. Plants, which are damaged due to fire, flood, snow, land and stone slide etc., may create a negative appearance in landscape. Willows by stream and lake sides must be cut and rejuvenated from time to time in order to protect their flexibility against water energy, and wooden plant types, which do not fit that purpose or are planted for rehabilitative purposes, must be disposed of (Köseoğlu and Özkan 1984).

Some wooden plants do not grow under shade. This particularly applies for willow types and Phragmites communis. Therefore long trees shading must either be removed from the area or their height must be reduced by cutting. Wooden plant types, which are planted for improvement purposes, must be removed from the area 3-5 years after planting for growth of bushes. Some species like Robinia pseudoacacia prevent growth other plants in the area since it expands on a large area rapidly although it enriches the soil with nitrogen and holds it with its roots. Hence, succession in the area slows down (Köseoğlu and Özkan 1984).

It is estimated in landscape repair works to reduce the negative effect in slopes and water sides in particular. Primary solution for that is coverage with green texture. Success rate of vegetation work performed according to availability of the ecological conditions of the area may vary. Therefore dense sowing and planting is compulsory. It is impossible to obtain after application a cover at desired density and distribution. In order to obtain that, completion or thinning must be performed one year after planting (Köseoğlu and Özkan 1984).

III-POST CONSTRUCTION

6.7. MANAGEMENT, CONTROL and MONITORING

Care works performed after landscape repair application can be gathered under the following titles:

1. Fertilization
2. Bacteria vaccination
3. Irrigation
4. Pruning, thinning and completion
5. Staking
6. Soil processing
7. Waste cleaning
8. Harvest
9. Fight with pests

6.7.1. Fertilization

Fertilization works explained under application title must be repeated during care, supervision and monitoring stages following completion of repair.

6.7.2. Bacteria and Mycorrhiza Vaccination

Regarding landscape repair, symbiosis between Actiromyceta and Mycorrhiza and trees is important. Actiromyceta, Alnus and Hippophae rhamnoides create 5-8 cm wide nodozite. Growth showed an annual increase of 200% in Mycorrhiza vaccination trials performed with betula pendula. As coniferous tree species with Mycorrhiza gain 3 times more nutrition than those without Mycorrhiza, they create root system that is long and can strongly branch out, and this positively affects body growth. Mycorrhizas take nitrogen from the air, decompose it and enable it to be easily taken by plants. Therefore Mycorrhiza vaccination has significant importance in landscape repair works performed on pioneer plants. Moreover, plants with Mycorrhiza vaccination are more resistant to frost.

According to researches performed, the most convenient Mycorrhiza formation was seen in forest soil and it was followed by field soil and sand rich with nutritional material. In endotrophic fungus vaccination, more positive results were taken in sand rich with nutritional material and field soil in particular. However, ectotrophic fungi showed better growth in forest soil. Since plants can benefit from endotrophic fungi, this situation has a distinguished period in landscape repair works. With Mycorrhiza vaccination, an obvious increase in Mg and dry material amount was detected in plants along with N increase (Köseoğlu and Özkan 1984).

6.7.3. Irrigation

Irrigation works described under application title must be repeated in care, supervision and monitoring stages following completion of repair.

6.7.4. Pruning, Thinning, Completion

Pruning, thinning and completion works described under application title must be repeated in care, supervision and monitoring stages following completion of repair.

6.7.5. Staking

Saplings must be supported with the assistance of staking against wind and other external physical effects 3-5 months after planting, as shown in Figure 6.27. Stake height and thickness varies according to gradation state of the plant, root system structure and environmental conditions. However as a general rule, stakes must be 1,5-3 m long, 2-3 cm wide and have regular shape. Care must be given not to harm roots while stakes are being driven. The most suitable tightening material is 3-4 cm thick strings made of hemp. Apart from that, raffia may be used since it is flexible, however it can damage body. In the same way, synthetic objects are unfavorable (Köseoğlu and Özkan 1984).

Tightening technique is like in fruit growing and stakes must be driven to the soil for 30-40 cm. Tightening must be loose enough not to damage or choke the body when it becomes thick.

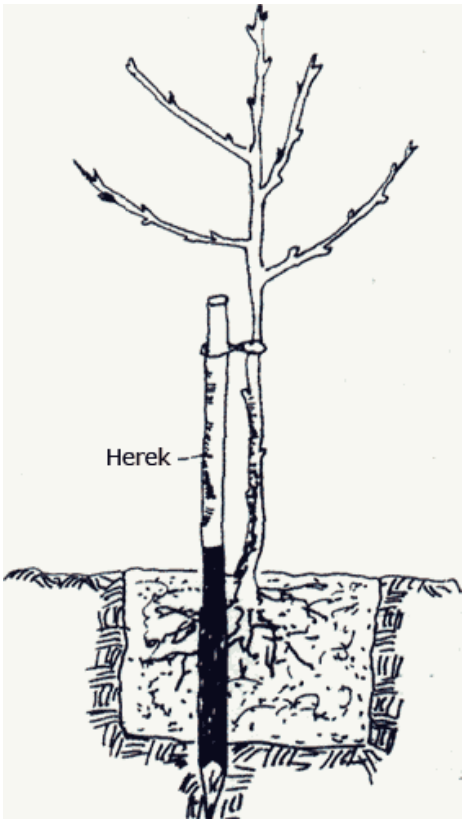


Figure 6.27. Staking

6.7.6. Soil Processing

In first years of vegetation, soil must be loosened, ventilated and plants must be protected against weeds. In initial periods of vegetation, soil must be ploughed at least once in autumn, and hoed or milled in spring. Soil processing works vary by characteristics of application area and plant community aimed at area. When the area has high slope and is poor with nutritional materials and grass community is aimed, any soil processing is out of question. Soil processing under this condition is dangerous since it will increase erosion. However, grass areas may be ventilated with hoes on plain and heavy soils. Hoeing of plant root environment instead of ploughing must be preferred when the aimed plant community in over sloping areas is wooden plant. Every kind of soil processing is required in plain areas, e.g. wind strip foundation. Attention must be paid to providing enough distance between and on rows during planting (Köseoğlu and Özkan 1984).

6.7.7. Waste Cleaning

Material, which appears due to pasture shape and defoliation in closed forestation areas, creates a thick layer on the surface. These generally affect the soil in rehabilitative way. Nutrient gets rich in soil, soil quality increases, water balance of soil is arranged, and suitable environment for microorganisms and other animals are provided. On the other hand, this thick waste layer is also suitable for plant pests such as moles and harvest mice. Therefore, organic wastes on surface must be removed in autumn in sections where such pests exist.

On the other hand, there are numerous agricultural pesticides for fighting with weed. However, desired selection cannot be ensured with those. Meanwhile, beneficial organisms and planted wooden plants also suffer damage along with weeds (Köseoğlu and Özkan 1984).

6.7.8. Harvest

For all grass areas, harvest occurs at place once a year. Thus roots grow better and growth of dwarf plants is enabled. However, harvest is not always compulsory. Herbaceous plants found in road and railway route are sensitive to fire after drying in summer in all regions apart from those in coastal side of Black Sea region. Therefore harvest in such areas is compulsory. In these regions, plants with short gradation must be selected in foundation in order not to encounter with any harvest problem in road route in particular (Köseoğlu and Özkan 1984).

6.7.9. Fight with Pests

Plant cover must be protected against vegetable and animal pests. Therefore, pesticides and methods used in cultural areas may be used. However, species that are resistant to pests must be preferred in order not to encounter with compulsory cases.

On the other hand, young suckers of plants are eaten and damaged by wild animals. The best solution to this is to enclose the application area with wire fence. Scarecrows also

prevent wild animals to approach to application area. However their locations must be changed since animals get familiar with them in time (Köseoğlu and Özkan 1984).

Different measures are taken in landscape repair - care in different seasons of year like in its foundation. While these vary according to climate type, they are applied in times specified in Table 6.24 in order to obtain a general idea.

Table 6.23. Exemplary Landscape Repair – Care Schedule (Köseoğlu and Özkan 1984)

Months	Works performed
Entire year	Removal of undesired wooden plant species that grow by themselves. Fight with pests. Pruning
12-3	Selection of pioneer plants, thinning, rejuvenation Chemical weed fight in forestation areas
3-5	Prevention of gradation in grass areas with chemical drugs Improvement of grass areas
5-8	Fertilization
5-9	Fight with weed in mechanical ways Irrigation Waste cleaning Staking, fencing
6-9	Harvest
9-12	Scarecrow placement or replacement
10-12	Care supervision, renewal

When annual work plan is examined, it is seen that fertilization is between 5th and 8th months. However, the most convenient fertilization period in regions of our country except Black Sea Region, with Mediterranean and Aegean Region coastal regions being in the first place, is February and March (Köseoğlu and Özkan 1984).

SUGGESTED LANDSCAPE REPAIR WORK WORK – TIME SCHEDULE

Time / Project Processes			1ST YEAR MONTHS												2ND YEAR MONTHS												3RD YEAR MONTHS											
Activities		Sub Activities	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Pre-Construction	Study-Inventory (Natural-cultural-visual)																																				
	Landscape Analyses	-Water function analysis of landscape -Erosion function analysis of landscape -Habitat function analysis of landscape -Character function analysis of landscape -Visual function analysis of landscape																																				
	Evaluation and	-Determination of																																				

| | | |

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ANNEX 8
ACOUSTIC REPORT

ACWA POWER ELECTRICITY OPERATION AND MANAGEMENT INC. CO.

ACWA POWER KIRIKKALE COMBINED CYCLE POWER PLANT PROJECT

ACOUSTIC REPORT

KIRIKKALE PROVINCE, YAHŞİHAN COUNTY, KILIÇLAR MUNICIPALITY

MGS PROJECT CONSULTANCY ENGINEERING TRADE CO.

ANKARA/2013

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A- GENERAL INFORMATION

1. Facility / Business Trade Name

ACWA Power Electricity Operation and Management Inc. Co.

2. Facility / Business Address

Kırıkkale Province, Yahşihan County, Kılıçlar Municipality

3. Facility / Business Production/Service Issue

Proposed project is going to produce electricity.

4. Facility Situation According to Appendix VII (List A/B Related Articles)

Which was published in the Official Gazette dated 04.06.2010 and numbered 27601 "Regulation of Environmental Noise Assessment and Management of" in Appendix VII, List A / B have been repealed.

According to 29.04.2009 dated and 27214numbered Environmental Law on Permits and Licenses Regulation, CCPP is in the class of Annex-1 "Environmental Pollution Effect of High Operations" Article 1.3 of the list of "combined cycle thermal power plants, combined heat and power plants, internal combustion engines and gas turbines has a capacity 100 MW thermal or more (internal combustion engines and gas turbines used in power plants, including Mobile).

5. Facility Area Determination According to Development/Implementation Plans (Categories at Appendix-VII Table 4)

The project site is in class of Annex VII of Regulation of Environmental Noise Assessment and Management, Table 4, "commercial buildings and residential areas with mixed uses noise-sensitive areas where intensive".

6. The Distance of Closest Settlement to the Facility (in m)

Close surrounding urban and rural areas and the distance to the project area are presented in **Table 1**.

Table 1. Close Settlements and Distances

Closest Settlements	Distance	Direction (According to Power Plant)
Kılıçlar	3.7 km	West
Yahşihan	4.5 km	Southeast
Hacıbaba	4.2 km	Northeast
Irmak	5 km	North
Mahmutlar	7 km	Northeast
Yenişehir	4 km	Southeast
Kırıkkale Center	7.5 km	Southeast

7. The Properties of Project Site (land properties, prevailing wind direction, relative humidity)

The project area as well as treasury lands largely consists of forest lands, the land is very rugged terrain.

According to the records of Kırıkkale Meteorology Station, the first prevailing wind direction is NE (Northeast), the second prevailing wind direction is ENE (Northeast North) and the third prevailing wind direction is E (East).

Average relative humidity is 62.01% based on the records of Kırıkkale Meteorology Station. Meteorological and climatic characteristics of the project in the field are discussed in detail under the heading of Section IV.2.1of EIA Report.

8. Facility Usage Area (total area, closed area, social and administrative area, green area, empty area) (in m^2 or km^2)

116,765 m^2 of the total 261,475 m^2 area will be used for unit installations at the ACWA Power Kırıkkale NGCCPP project.

9. The General Layout of Proses Units and Social Buildings of the Facility

The general layout presenting units and other buildings can be found in Appendix-2 of the EIA report.

10. Process Flow Sheet of The Facility and Location of Noise (shown on plan)

Noise sources are presented at **Figure-1**.

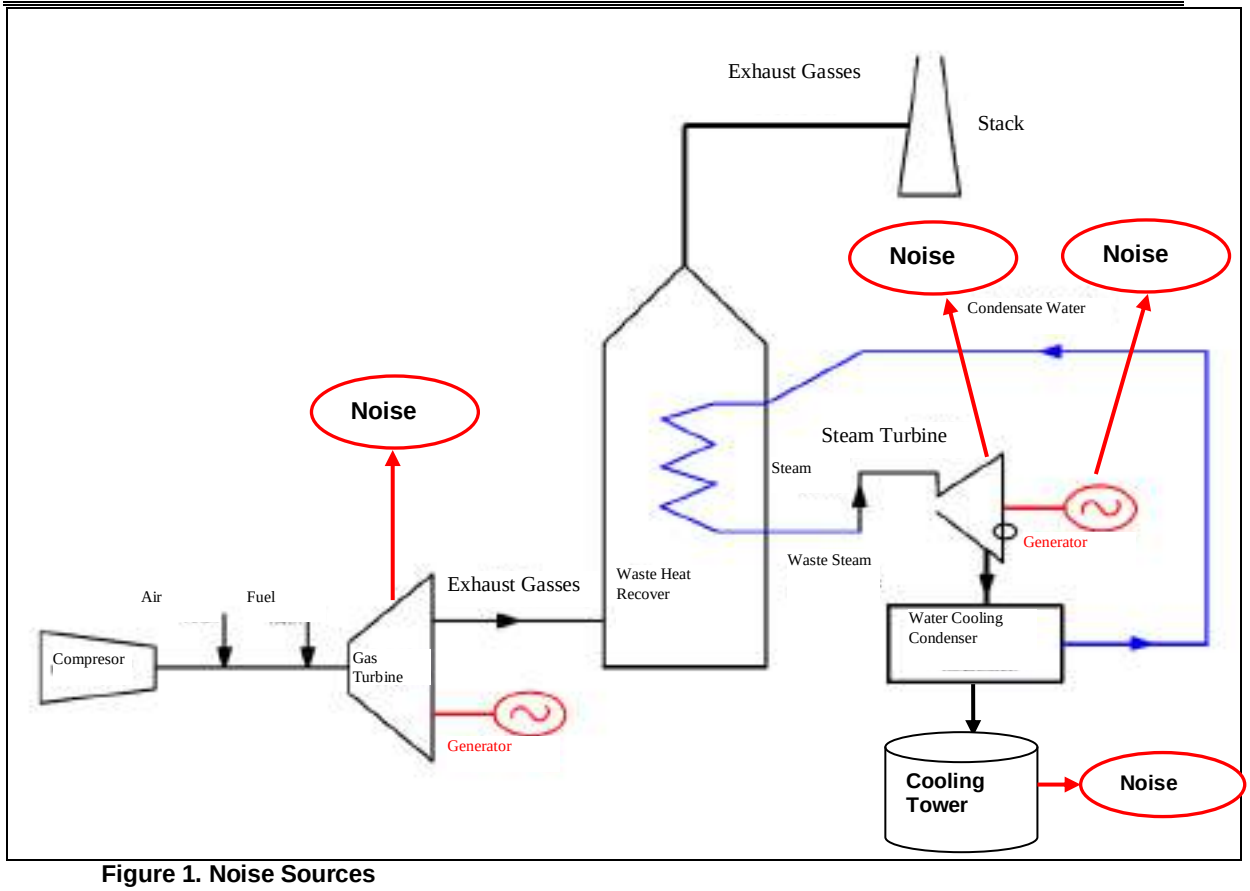


Figure 1. Noise Sources

11. Health Protection Border Range

Health protection border is determined considering the harmful effects and pollution properties of the projects by the review board.

Around the area of the project site, 20 m of health protection border is planned.

Following the EIA process for the plant, Workplace Opening and Operating Permits will be taken according to 10.08.2005 dated and 25902 numbered Work Permits Regulation. The necessary information and documents will be submitted during permitting stage.

The other permits will be taken from all relevant public bodies and organizations before commissioning.

Health protection border of the project will be inserted to development plan and audits will be performed by Development Plan Authority.

Project location is not in Health protection border of another facility approved by the Ministry.

12. Information About Working Period (total working period, continuous or discontinuous working period, shift)

The proposed project construction period will be 30 months (2.5 years) and economical life time will be expected as 49 years.

During the construction period, working hours will be limited to 8 hours for 2 shifts. During the operation period, power plant will work 7,400 hours per year with 8 hours of 3 shifts.

B- INFORMATION ABOUT CONSTRUCTION PHASE NOISE LEVEL (EMISSION AND IMISSION)

1. Construction Site (location and scale; in m^2 or km^2), construction period (month and/or year) ve Working Periods (daytime and/or evening and/or night)

Construction site area of ACWA Power Kırıkkale NGCCPP project is 261,142.58 m^2.

During the construction phase, workers will work 8 hours for 2 shifts.

2. Machine and Equipment Number and Types

Machines and equipments that are going to be used during the construction phase are presented at Table 2. Equipments source of noise will work at open worksite.

Table 2. List of Machine and Equipment that will be used during Construction Phase

Machine/Equipment	Unit Amount
Excavator	2
Dozer	2
Cylinder	1
Truck	10
Pumper	2
Crane	2
Loader	3
Compressor	1
Transmixer	3
Generator	1

3. At the Same Time Working and Locations

Although it will not happen actually, it is assumed that all machines and equipments will work at the same time and continuously. Therefore, actual noise levels are expected to be 7-8 dBA lower than noise levels calculated.

It is not possible to determine exact location of the construction machines but calculations are done for worst scenarios.

4. Sound Power Level of Each Equipment and the Reference of These Information

Noise level calculations are done based on motor power levels given at 22.01.2003 dated and 25001 numbered Regulation About Environmental Noise Level Emissions Sourced by Equipments Used in Open Areas (2000/14/EU). Motor power levels are determinated according to product catalogs of Temsa, Vovo, PI Machine.

5. Total Noise Level Calculation Sourced by Construction Activities (based on sound distribution at open areas, considering distance and atmospheric absorption)

The formulas given at **Table 3** are used for sound power level calculations of machines/equipments which will be used during construction phase.

Table 3. Equipment Type and Sound Power Levels Corresponding to Net Motor Powers

Equipment Type	**Net motor power P (kW) Electricity power P_{el} (1) (kW) Implementation mass m (kg) Cutting Width L (cm)**	**Allowable sound power level dB/1 pW**	
		After 3 January 2004	**After 3 January 2006**
Compressing Machines (vibrating cylinders, vibrating plates, vibrating hammers)	$P \leq 8$	108	105
	$8 < P \leq 70$	109	106
	$P > 70$	89 + 11 log P	86 + 11 log P
Dozers, loaders, excavators with pallets	$P \leq 55$	106	103
	$P > 55$	87 + 11 log P	84 + 11 log P
Dozer with pallet, wheel loaders, wheel excavators-loaders, tippers, diggers, soil filling compressors like loaders, internal combustion hydraulic cranes, moving cranes, compressing machines (without vibrating), cranes, hydraulic power generators	$P \leq 55$	104	101
	$P > 55$	85 + 11 log P	82 + 11 log P
Excavators, lifts for goods, build (construction) cranes	$P \leq 15$	96	93
	$P > 15$	83 + 11 log P	80 + 11 log P
Concrete crusher and piercing	$m \leq 55$	107	105
	$15< m < 30$	94 + 11 log m	92 + 11 log m
	$m \geq 30$	96 + 11 log m	94 + 11 log m
Tower Cranes		98 + log P	96 + log P
Welding and power generators	$P_{el} \leq 2$	97 + log P_{el}	95 + log P_{el}
	$2< P_{el} \leq 10$	98 + log P_{el}	96 + log P_{el}
	$P_{el} > 10$	97 + log P_{el}	95 + log P_{el}
Compressors	$P \leq 15$	99	97
	$P > 15$	97 + 2 log P	95 + 2 log P

Sound power levels of equipments are calculated according to their motor powers.

Excavator: Motor power of excavator is 126 Hp =94 kW. As a result of evaluation given at **Table 3,** because P = 94 kW > 55 kW;

"Lw = 84 + 11 log P" formula is used in calculation of sound power level;
Lw = 84+11 log 94= 105.7 = 106 *dB*

Dozer (with pallets): Motor power of dozer is 133 HP = 99 kW. As a result of evaluation given at **Table 3,** because P = 99 kW > 55 kW;

"Lw**=** 84 + 11 log P" formula is used in calculation of sound power level;
Lw = 84+11 log 99= 105.95 = 106 *dB*

Vibrating Cylinder: Motor power of cylinder is 84 HP = 63 kW. As a result of evaluation given at **Table 3,** because P = P = 63 kW < 70 kW;

Lw= 106 *dB*

Crane: Motor power of crane is 279 HP = 208 kW. As a result of evaluation given at **Table 3,** because P = 208 kW > 15 kW;

"Lw**=** 96 + log P" formula is used in calculation of sound power level;
Lw= 96 + log 208= 98 *dB*

Transmixer: Motor power of transmixer is 375 HP = 280 kW. As a result of evaluation given at **Table 3,** because P = 280 kW > 55 kW ;

"Lw **=** 82 + 11 log P" formula is used in calculation of sound power level;
Lw = 82+11 log 280= 108.9 = 109 *dB*

Tripper: Motor power of tipper is 315 HP = 235 kW. As a result of evaluation given at **Table 3,** because P = 235 kW > 55 kW;

"Lw**=** 82 + 11 log P" formula is used in calculation of sound power level;
Lw = 82+11 log 235= 108 *dB*

Pumper: Motor power of pumper is 256 HP = 191 kW. As a result of evaluation given at **Table 3,** because P = 191 kW > 55 kW;

"Lw= 82 + 11 log P" formula is used in calculation of sound power level;
Lw = 82+11 log 191= 107 *dB*

Loader: Motor power of loader is 125 HP = 93 kW. As a result of evaluation given at **Table 3,** because P = 93 kW > 55 kW;

"Lw**=** 82 + 11 log P" formula is used in calculation of sound power level;
Lw = 82+11 log 93= 103.6 = 104 *dB*

Generator: Motor power of generator is 10 HP = 7.5 kW. As a result of evaluation given at **Table 3,** because 2 < P ≤ 10;

"Lw**=** 96+ log Pel" formula is used in calculation of sound power level;
Lw = 96+ log 7.5= 96.8 = 97 *dB*

Compressor: Motor power of compressor is 18 HP = 13.4 kW. As a result of evaluation given at **Table 3,** because P ≤ 15;

"Lw**=** 97 *dB*

Table 4. Sound Power Levels of Machines/Equipments for Construction Phase

Machines/Equipments	Sound Power Levels (dB)

Machines/Equipments	Sound Power Levels (dB)
Excavator	106
Dozer	106
Cylinder	106
Truck	108
Pumper	107
Crane	98
Loader	104
Compressor	97
Transmixer	109
Generator	97

Total sound power level sourced by each machine is calculated with below formula by use of motor powers.

$$L_{Wt} = 10 \log \sum_{i=1}^{n} 10^{Lwi/10}$$

L_{Wi} = Noise power level values of sound sources (dB)

L_{Wt} = Total sound power level (*Reference: Prof. Dr. Nevzat ÖZGÜVEN, Industrial Noise Control, Publication of Chamber of Mechanical Engineers)*

$L_{Wt} = 10 \log \sum_{i=1}^{n} 10^{Lwi/10}$ 10log [(5 x $10^{106/10}$)+ (2 x $10^{107/10}$)+ (10 x $10^{108/10}$) + (2 x $10^{98/10}$)+ (3 x $10^{104/10}$)+ (2 x $10^{97/10}$)+ (3x $10^{109/10}$)] **=121 dB**

Total sound power formula is used for noise power calculation for each frequency and mathematical reverse of formula is considered.

$Lw_{\text{frequency}} = 10 \times \text{Log}\ (10^{Lwt/10}/4)$

Table 5. Noise Power Level at 500 - 4000 Hz Octave Band

Noise Source	Sound Power Level (dB)				
	Total	500 Hz	1000 Hz	2000 Hz	4000 Hz
Total Sound Power Level	121	115	115	115	115

Because sound power level is same for same frequency, noise pressure levels of frequency is same for frequencies in same octave band. Results are presented at **Table 6**.

$$L_p = L_w + 10 \log\left(\frac{Q}{4\pi r^2}\right)$$

L_p : Noise Level at x distance
Q : Sound Level Constant (taken as 2)
r : Radius at x distance (*Reference: Prof. Dr. Nevzat ÖZGÜVEN, Industrial Noise Control, Publication of Chamber of Mechanical Engineers)*

Tabl3 6. Sound Pressure Level of Noise Sourced by Activities at Project Site (dB)

Distance r (m)	Sound Pressure Level (dB)
50	70.03
100	64.01
150	60.49
200	57.99

Distance r (m)	Sound Pressure Level (dB)
250	56.05
300	54.47
350	53.13
400	51.97
450	50.94
500	50.03
1000	44.01
1500	40.49
2000	37.99
2500	36.05
3000	34.47
3700	32.64
4000	31.97

Atmospheric absorption values according to distance:

A_{atm} = 7,4 x 10-8 x f2 x r / ϕ

is presented at **Table 7'de** where;

A_{atm} = Decrease at sound pressure level due to Atmospheric absorption (dB)

f = Frequency of sound

r = Distance to source (m)

ϕ = Relative humidity (average relative humidity is 62.01%)

Table 7. Atmospheric absorption values (dB)

Distance (m)	Atmospheric absorption			
	500 Hz	1000 Hz	2000 Hz	4000 Hz
50	0.02	0.06	0.24	0.96
100	0.03	0.12	0.48	1.91
150	0.05	0.18	0.72	2.86
200	0.06	0.24	0.96	3.82
250	0.08	0.30	1.19	4.77
300	0.09	0.36	1.43	5.73
350	0.10	0.42	1.67	6.68
400	0.12	0.48	1.91	7.64
450	0.13	0.54	2.15	8.59
500	0.15	0.60	2.39	9.55
1000	0.30	1.19	4.77	19.09
1500	0.45	1.79	7.16	28.64
2000	0.60	2.39	9.55	38.19
2500	0.75	2.98	11.93	47.73
3000	0.90	3.58	14.32	57.28
3700	1.10	4.42	17.66	70.65
4000	1.19	4.77	19.09	76.38

Calculations continue by use of L= L-Aatm formula for each frequency. After that, correction factor presented at **Table 8** is performed and A-weighted results are calculated as seen at **Table 9**.

Table 8. A-Weighted Correction Factor

Octave Band Central Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
A-weighted	-26.20	-16.10	-8.60	**-3.2**	**0**	**1.2**	**1**	-1.10

Table 9. Net Sound Pressure Level

Noise Source	Distance (m)	Sound Pressure Level				Net Sound Pressure Level (dB)
		500 Hz	1000 Hz	2000 Hz	4000 Hz	
Total Sound Pressure Level	**50**	70.01	69.97	69.97	69.07	75.8
	100	63.98	63.89	63.89	62.1	69.6
	150	60.44	60.31	60.31	57.63	65.8
	200	57.93	57.75	57.75	54.17	63.2
	250	55.97	55.75	55.75	51.28	61.1
	300	54.38	54.11	54.11	48.74	59.4
	350	53.03	52.71	52.71	46.45	57.9
	400	51.85	51.49	51.49	44.33	56.6
	450	50.81	50.4	50.4	42.35	55.5
	500	49.88	49.43	49.43	40.48	54.5
	1000	43.71	42.82	42.82	24.92	47.9
	1500	40.04	38.7	38.7	11.85	44
	2000	37.39	35.6	35.6	-0.2	41.1
	2500	35.3	33.07	33.07	-11.68	38.7
	3000	33.57	30.89	30.89	-22.81	36.7
	3700	31.54	28.22	28.22	-38.01	34.4
	4000	30.78	27.2	27.2	-44.41	33.5

Table 10. A-Weighted Total Net Sound Pressure Levels

Noise Source	Distance (m)	Sound Pressure Level				Total Net Sound Pressure Level (dBA)
		500 Hz	1000 Hz	2000 Hz	4000 Hz	
Total Sound Pressure Level	**50**	66.81	69.97	71.17	70.07	75.8
	100	60.78	63.89	65.09	63.1	69.5
	150	57.24	60.31	61.51	58.63	65.7
	200	54.73	57.75	58.95	55.17	63
	250	52.77	55.75	56.95	52.28	60.9
	300	51.18	54.11	55.31	49.74	59.2
	350	49.83	52.71	53.91	47.45	57.7
	400	48.65	51.49	52.69	45.33	56.4
	450	47.61	50.4	51.6	43.35	55.2
	500	46.68	49.43	50.63	41.48	54.2
	1000	40.51	42.82	44.02	25.92	47.5
	1500	36.84	38.7	39.9	12.85	43.4
	2000	34.19	35.6	36.8	0.8	40.4
	2500	32.1	33.07	34.27	-10.68	38
	3000	30.37	30.89	32.09	-21.81	35.9
	3700	28.34	28.22	29.42	-37.01	33.5
	4000	27.58	27.2	28.4	-43.41	32.5

Table 11. Noise Distribution Sourced by Construction Activities

Distance r (m)	A-Weighted Sound Pressure Levels (dBA)
50	75.8

Distance r (m)	A-Weighted Sound Pressure Levels (dBA)
100	69.5
150	65.7
200	63
250	60.9
300	59.2
350	57.7
400	56.4
450	55.2
500	54.2
1000	47.5
1500	43.4
2000	40.4
2500	38
3000	35.9
3700	33.5
4000	32.5

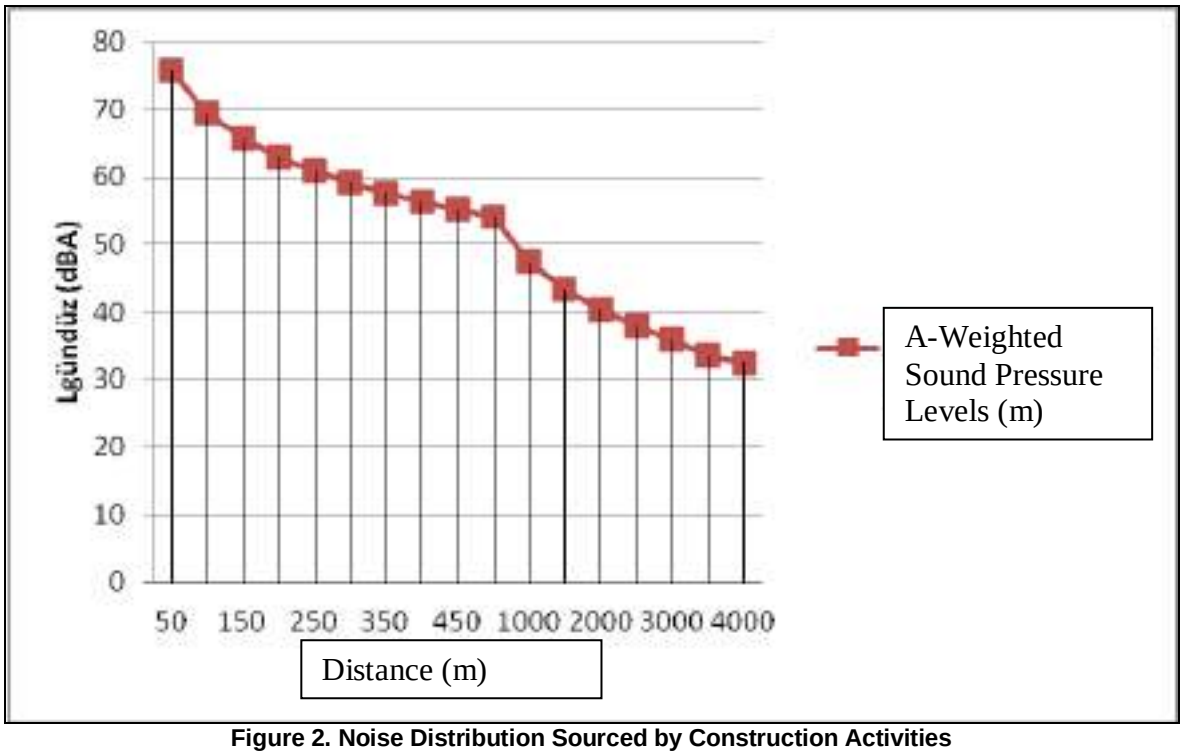


Figure 2. Noise Distribution Sourced by Construction Activities

Environmental Noisel Level Limits for construction site are given at Regulation of Environmental Noise Assessment and Management Appendix-7 Table 5. These limit values are presented at **Table 12**.

Table 12. Environmental Noise Limit Values for Construction Site

Activity Type (construction, demolition and maintenance)	$L_{gündüz}$ (dBA) (L_P)
Way	70
Other Sources	75
Way	70

23th article of Regulation of Environmental Noise Assessment and Management is

stated that $L_{daytime}$ (L_P) at sensitive structure closest to construction site is not allowed to exceed during construction activities. **Table 11** outputs that after 100 m distance, 70 dBA limit is complied.

The closest sensitive structure to construction site is households at Kılıçlar Municipality with 3.7 m distance. According to calculations, noise level at 3,700 m is **33.50 dBA** which is complied with Regulation of Environmental Noise Assessment and Management. Therefore, it is not expceting to observe negative effects at closest sensetive structure during construction phase.

6. Evaluation of Results According to Article 23 of Regulation of Environmental Noise Assessment and Management

23th article of Regulation of Environmental Noise Assessment and Management is stated that $L_{daytime}$ (L_P) at sensitive structure closest to construction site is not allowed to exceed during construction activities. **Table 11** outputs that after 100 m distance, 70 dBA limit is complied.

The closest sensitive structure to construction site is households at Kılıçlar Municipality with 3.7 m distance. According to calculations, noise level at 3,700 m is **33.50 dBA** which is complied with Regulation of Environmental Noise Assessment and Management. Therefore, it is not expceting to observe negative effects at closest sensetive structure during construction phase.

Although it will not happen actually, it is assumed that all machines and equipments will work at the same time and continuously. Therefore, actual noise levels is expected to be 7-8 dBA lower than noise levels presented at **Table 11**.

During the project activities, obligations stated at 04.06.2010 dated and 27601 numbered Regulation of Environmental Noise Assessment and Management will be complied meticulously.

7. Evaluation of Vibration If Any Household, Hospital or School Exist Close to Construction Site (at least 50 m distance) According to Article 25 and If There is a Vibration and Giving Undertake If Vibration Exists

There is no household, hospital or school close to construciton site less than 50 m. Until consturiction acitvities finished, possible vibrations at closest sensitive structures will be assessed and if vibration observed, required measres will be taken according to Article 25 of Regulation of Environmental Noise Assessment and Management.

C- INFROMATION ABOUT BACKGROUN NOISE LEVEL

1. Measurement and assessment of noise level at the closest noise-sensitive building to plant site plant based on TS 9315 and TS 9798 (If there is no any noise-sensitive building closer than 500 m to the plant, then noise measurement will be optional, not mandatory.)

Noise measurements have done at project site and close area at 8 points by Segal Environment Measurement and Analysis Laboratory in June 2013.

1.1.Determination of measurement points for background noise level (considering potential noise level calculations during plant operation or around plant site at least two points)

Noise measurements have done at project site and close area at 8 points by Segal Environment Measurement and Analysis Laboratory in June 2013. The coordinates of measurement locations are given at Table 13. Locations were selected considering close sensitive structures.

Table 13. Noise Measurement Locations at Project Site and Close Area

Measurement Points	Coordinates	
	X	Y
1	537168	4414910
2	536631	4415424
3	536733	4416293
4	535215	4413636
5	534809	4416411
6	533682	4415306
7	533682	4415306
8	531035	4414926

1.3. The Distances Between Measurement Points

The distances between measurement points are changing 800 m to 3,000 m.

1.4. Measurement Period (Depending on Noise Type Varying Between 5-15 Minutes), Date, Parameters and Results (Records If Exist)

Measurements have been performed between 14.05.2013 and 15.05.2013. Measurements were performed with SVANTEK (Type 1), SVAN 957 Model SN:21412 noise measurement device. .

Measurement instrument was controlled between 94-114 dBA by "SV 30A SN: 22502 Acoustic Calibrator". Measurement results presented in **Table 14, Table 15** and **Table 16.**

Table 14. Noise Measurement Results (Daytime)

Measurement Points	Structure Type	Time (Daytime)	Background Noise Level (dBA)
1	Plant site and plant domain	10.05	52,4
2		10.36	53,0
3		11.00	50,4
4		11.30	45,0
5		12.15	44,6
6		13.30	47,5
7		14.20	46,2
8		15.04	49,3

Table 15. Noise Measurement Results (Evening)

Measurement Points	Structure Type	Time (Evening)	Background Noise Level (dBA)
1	Plant site and plant domain	19.04	47,8
2		19.25	47,0
3		19.46	46,6
4		20.10	41,3
5		20.30	41,6
6		21.15	44,9
7		21.32	41,2
8		21.53	46,3

Table 16. Noise Measurement Results (Night)

Measurement Points	Structure Type	Time (Night)	Background Noise Level (dBA)
1	Plant site and plant domain	23.02	45,3
2		23.21	44,9
3		23.40	43,6
4		23.58	36,9
5		00.16	37,5
6		00.56	39,0
7		01.10	38,6
8		01.28	41,0

Measuring records are presented at Appendix-A Noise Measurement Report.

1.5. Measurement Height

Measurements were done at open area and 3.5 m away from reflecting surface at 1.5 m height.

1.6. Measurement Methodology

Measurements were done based on TS ISO 1996-2: 2009 and TS 9315 ISO 1996-1: 2005 standards and Regulation of Environmental Noise Assessment and Management.

1.7. Information about Measurement Instrument (Serial no, Type, Model and Producer)

Measurements have been performed between 14.05.2013 and 15.05.2013. Measurements were performed with SVANTEK (Type 1), SVAN 957 Model SN:21412 noise measurement device. .

Instrument records results automatically in its memory. At dark environment, its own light is used. Instrument can calculate equivalent noise level (Leq), average, minimum and maximum noise levels. Uncertainty is ± 0.51%.

1.8. Calibration Method, Calibration Levels and Calibration Certificate

Measurement instrument was calibrated between 94-114 dBA by “SV 30A SN: 22502 Acoustic Calibrator”. Calibration certificate is presented at annex of the measurement report.

1.9. Laboratory (name, authorization document)

Noise measurements have done at project site and close area at 8 points by Segal Environment Measurement and Analysis Laboratory in June 2013. Noise Measurement Report given at Appendix-A was prepared by Furkan ÇELİK and approved by Fevzi KARAKAYA. Personnel certificates are attached to the report. Also, authorization document of the laboratory is presented at attachment of the report.

1.10. Evaluation Based on 27. and 28. Articles of Regulation of Environmental Noise Assessment and Management

Measurement results are below the limit stated in 04.06.2010 dated and 27601 numbered Regulation of Environmental Noise Assessment and Management and categorized as “Category A ($L_{daytime}$ < 55 dBA).

D- INFORMATION ABOUT NOISE/VIBRATION LEVEL DURING OPERATION PHASE

1.Noise Sources at the Facility, Locations, Sound Power Levels and Sound Characteristic Information

The main noise sources and their noise levels at power plant are shown at **Table 17.**

Table 17. The Machine/Equipment List for Operation Phase of the Power Plant

Machine Type	Unit	L_w (dBA)
Steam Turbine	2	111[1]
Gas Turbine	2	87.9[2]
Turbine Aeration Fan	2	92.1[2]
Generator Set	2	98.8[2]
Cooling Tower	1	90[2]
Start-up Transformer	1	85[1]
Water Pump + Boiler Feeding Water Pump etc.	6	90[1]

1:http://www.energy.ca.gov
2. http://www.atcoem.com/Resources/Documents/Noisecontrolhandbook.pdf

2. Total Noise Level Calculations Using Sound Powel Levels of Sources (Assuming full capacity working conditions, based on sound distribution at open areas, considering distance and atmospheric absorption)

Table 17 represents main noise sources at power plant.

Total sound power level of main noise sources of the power plant is calculated with below formula.

$$L_{Wt} = 10\log\sum_{i=1}^{n} 10^{Lwi/10}$$

L_{Wi} = Sound power level of noise sources (dB)
L_{Wt} = Total sound power level

$$L_{Wt} = 10\log\sum_{i=1}^{n} 10^{Lwi/10} = 10\log[(2 \times 10^{111/10}) + (2 \times 10^{87.9/10}) + (2 \times 10^{92.1/10}) + (2 \times 10^{98.8/10}) + (7 \times 10^{90/10}) + (1 \times 10^{85/10})$$ **=114.50 dB**

In order to determine total noise level at project area, firstly, sound power values are needed to be calculated at four octave band.

Because total sound power level is known, ***Lpi= Lw + 10 log (Q / 4 π r^2)*** formula is used for sound power level calculation. r: Distance to source Q: Landscape reduction factor as 1.

Table 18. Sound Power Levels at Project Area (114.50 dBA)

Distance r (m)	Sound Power Levels (dB)
50	63.53
100	57.51
150	53.99
200	51.49
250	49.55
300	47.97
350	46.63
400	45.47
450	44.44
500	43.53
1000	37.51
1500	33.99
2000	31.49
2500	29.55
3000	27.97

Distance r (m)	Sound Power Levels (dB)
3700	26.14
4000	25.47

Atmospheric absorption value for each frequency is calculated $\mathbf{A_{atm} = 7{,}4 .10^{-8} (f^2 r /\Phi)}$ formula as seen in **Table 7**.

At given distances, total sound levels are calculated using net sound levels at four octave band for all equipments.

Table 19. Net Sound Power Levels Sourced by Power Plant (dB)

Distance (m)	Sound Power Levels				Net Sound Pressure Level (dB)
	500 Hz	1000 Hz	2000 Hz	4000 Hz	
50	63.51	63.47	63.47	62.57	69.3
100	57.48	57.39	57.39	55.6	63.1
150	53.94	53.81	53.81	51.13	59.3
200	51.43	51.25	51.25	47.67	56.7
250	49.47	49.25	49.25	44.78	54.6
300	47.88	47.61	47.61	42.24	52.9
350	46.53	46.21	46.21	39.95	51.4
400	45.35	44.99	44.99	37.83	50.1
450	44.31	43.9	43.9	35.85	49
500	43.38	42.93	42.93	33.98	48
1000	37.21	36.32	36.32	18.42	41.4
1500	33.54	32.2	32.2	5.35	37.5
2000	30.89	29.1	29.1	-6.7	34.6
2500	28.8	26.57	26.57	-18.18	32.2
3000	27.07	24.39	24.39	-29.31	30.2
3700	25.04	21.72	21.72	-44.51	27.9
4000	24.28	20.7	20.7	-50.91	27

Noise levels are determined using correction factor given at **Table 8.**

Table 20. A-Weighted Total Net Sound Pressure Level Sourced by Power Plant

Distance (m)	Sound Pressure Levels				Total Sound Power Levels (dBA)
	500 Hz	1000 Hz	2000 Hz	4000 Hz	
50	60.31	63.47	64.67	63.57	69.3
100	54.28	57.39	58.59	56.6	63
150	50.74	53.81	55.01	52.13	59.2
200	48.23	51.25	52.45	48.67	56.5
250	46.27	49.25	50.45	45.78	54.4
300	44.68	47.61	48.81	43.24	52.7
350	43.33	46.21	47.41	40.95	51.2
400	42.15	44.99	46.19	38.83	49.9
450	41.11	43.9	45.1	36.85	48.7
500	40.18	42.93	44.13	34.98	47.7
1000	34.01	36.32	37.52	19.42	41
1500	30.34	32.2	33.4	6.35	36.9
2000	27.69	29.1	30.3	-5.7	33.9
2500	25.6	26.57	27.77	-17.18	31.5
3000	23.87	24.39	25.59	-28.31	29.4
3700	21.84	21.72	22.92	-43.51	27

4000	21.08	20.7	21.9	-49.91	26

Table 21. Noise Distribution Sourced by Power Plant

Distance r (m)	A-Weighted Sound Pressure Levels (dBA)
50	69.3
100	63
150	59.2
200	56.5
250	54.4
300	52.7
350	51.2
400	49.9
450	48.7
500	47.7
1000	41
1500	36.9
2000	33.9
2500	31.5
3000	29.4
3700	27
4000	26

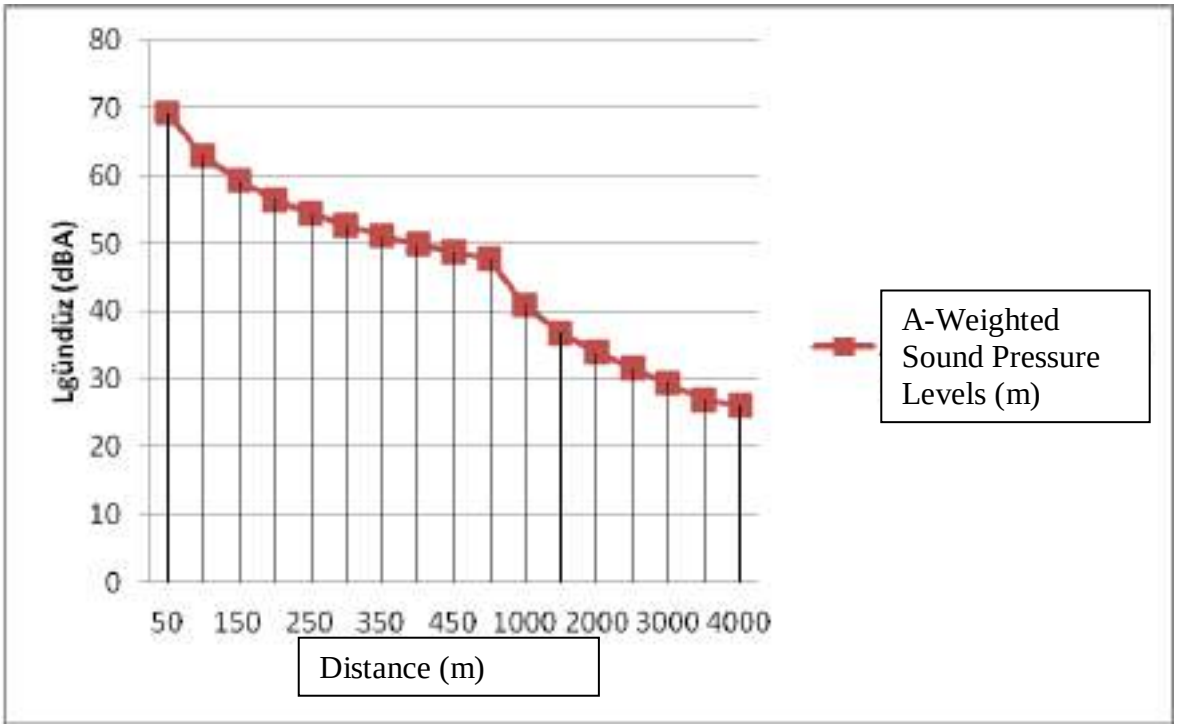


Figure 3. Noise Distribution Sourced by Power Plant According to Distance

3. Evaluation of Results According to Article 22 of Regulation of Environmental Noise Assessment and Management

Regulation of Environmental Noise Assessment and Management Appendix-VII Table 4 is stated limit values as seen at **Table 22**.

Table 22. Environmental Noise Limit Values For Industrial Plants(Appendix-7, Table 4)

Areas	$L_{daytime}$ (dBA)	$L_{evening}$ (dBA)	L_{night} (dBA)
Education, culture and health areas of noise sensitive utilities and areas where summerhouses and camping are intensive	60	55	50
Areas where houses are intensive of areas where commercial buildings and noise sensitive utilities are together	65	60	55
Areas where workplaces are intensive of areas where commercial buildings and noise sensitive utilities are together	68	63	58
Industrial Areas	70	65	60

The closest sensitive structure to power plant site is Kılıçlar Municipality at 3,700 m. According to **Table 22**, noise limit value for industrial plants is 65 dBA of $L_{daytime}$ and 60 dBA of $L_{evening}$ and 55 dBA of L_{night}.

Comparison of $L_{daytime}$, $L_{evening}$ and L_{night} for power plant with 04.06.2010 dated and 27601 numbered Regulation of Environmental Noise Assessment and Management Appendix-7 Table-4;

$L_{daytime}$ is complied at **100 m** as below 65 dBA.
$L_{evening}$ is complied at **60 m** as below 60 dBA.
L_{night} is complied at **250 m** as below 55 dBA.

As seen in **Table 21**, the noise level at 3,700 m is below 27.0 dBA fullfilling requlatory requirements.

It is assumed that noise source will be at open are while operating the power plant. However, noise sources will be operated at closed structures with proper isolations for noise. Therefore, actual noise levels are expected to be 10-20 dBA lower than calculated noise levels.

When power plants start to operation, environmental noise measurement study will performed.

04.06.2010 dated and 27601 numbered Regulation of Environmental Noise Assessment and Management **Article 22** states criteria related with environmental noise for facilities, workshops and factories.

a) The noise level limit values given at Appendix-VII Table 4 are not allowed to exceed.

c) Total environmental noise level Leq is not allowed to exceeded range of 7-10 dBA more than background noise level at more than one establishment, workshop and facility areas or small industrial sites. Considering this range, total environmental noise level is determined by the Provincial Environment Committee regarding to the number of people affected by noise exposure in the field, the distance between the noise source and noise-sensitive spaces and other such factor. if the limit value is exceeded, each workplace will be responsible for the contribution to the background noise level. After determination of the noise contribution rates of each company takes the necessary measures.

ç) Impact noise LCmax is not allowed to exceed 100 dBC sourced from establishment, workshop and facility.

During the project operations, obligations stated above and other requirements stated in 04.06.2010 dated and 27601 numbered Regulation of Environmental Noise Assessment and Management will be complied meticulously.

4. Commitment to Take Noise Control Permit Within 6 Months after The Commissioning

The required permits according to 29.04.2009 dated and 27214 numbered Regulation About Permits and Licenses Required by Environmental Law will be applied after the commissioning.

Project owner will appeal to Noise Control permission within 6 months after commissioning.

5. If the is Very Sensitive Structure Close to Project Site, Vibration Assessment According to Article 25 of Regulation of Environmental Noise Assessment and Management

After the commissioning, project owner will do required applications according to 04.06.2010 dated and 27601 numbered Regulation of Environmental Noise Assessment and Management for ACWA Power Kırıkkale NGCCPP.

E- INFORMATION ABOUT CONTROL MEASURES

1. Information About Control Measures If Environmental Noise Level Exceeds Limit Values Stated at Regulation of Environmental Noise Assessment and Management During Construction Phase

According to Article 23 of the regulation, $L_{daytime}$ (L_P) at closest sensitive structure is not allowed to exceed 70 dBA. Noise levels are calculated and presented at Section B.5 for the construction phase and observing that noise levels will not exceed the limit level. Moreover, it is assumed that all machines and equipments will work at the same time and continuously. Therefore, actual noise levels are expected to be 8-10 dBA lower than noise levels calculated.

If exceedance in noise level limits observed during construction phase, working durations of work machines will be limited and noise prevention panels will be used if needed. Also, maintaince of the machines/equipments will be done regularly.

2. Commitment of Implementation of Control Measures If Environmental Noise Level Exceeds Limit Values Stated at Regulation of Environmental Noise Assessment and Management During Operation Phase

During the construction and operation phases of proposed project, environmental noise levels will comply with the limit values stated at Appendix-7 Table 4 and Table 5 of the regulation.

Periodic noise and vibration measuruments will be done after the comssioning of the power plant.

Project owner commit to make prepare environmental noise level assessment report with noise measurements incase of audit cause of a complaint that authority may request.