Appendix A – Survey Guidelines

The State of Israel
The Ministry of Environmental Protection
Policy and Planning Cluster
Planning Department

המשרד להגנת הסביבה
وزارة حماية البيئة
Ministry of Environmental Protection
שלום עם הסביבה

March 29, 2012

Mr. Amram Kalaji
Chair, National Planning and Building Board
Director-General, Ministry of the Interior
Jerusalem

Re: Update of environmental impact survey guidelines, Chapters 1-2
NOP 37/H –Treatment Facilities for Natural Gas from Offshore Discoveries and their Connection to the National Transmission System
Onshore Facilities

Dear Mr. Kalaji,

Attached is a draft of the guidelines for conducting an environmental impact survey in respect of the entrance arrays and onshore components of the treatment facilities for natural gas from offshore discoveries. This draft of the guidelines is designed for discussion and approval by the National Planning and Building Board at its meeting to be held on April 3, 2012.

These guidelines are aimed at providing a suitable environmental response regarding the coastal entrance arrays and onshore components of the gas treatment facilities and are being sent in the wake of the decision by the Committee for Planning Principles on March 13, 2012 and the plan's progress in two parts: One section dealing mainly with marine issues (from the territorial waters boundary to the marine transmission system) and covers the guidelines that were previously approved by the National Council; and a section dealing mainly with onshore matters, from the offshore transmission system through the onshore array, the onshore valve, onshore pipelines, treatment array, INGL measurement facility and connections to the onshore transmission system and other systems (such as fuel, electricity, roads and the like).

The purpose of these guidelines is to examine the best alternative for establishing the entrance array and the onshore component of the natural gas treatment facilities.

Sincerely,

Shachar Solar

Head of Environmental Planning and Green Building Division

cc.:

MK Gilad Erdan – Minister of Environmental Protection
Adv. Alona Sheffer Karo – Director-General, Ministry of Environmental Protection

Mr. Shaul Tzemach – Director-General, Ministry of National Infrastructures, Energy and Water Resources
Ms. Binat Schwartz – Director, Planning Administration, Ministry of the Interior
Mr. Shuki Stern – Director, Natural Gas Authority
Ms. Galit Cohen –Deputy Director-General for Sustainable Planning and Development, Environmental Protection Ministry
Directors and planners of Environmental Protection Ministry districts
Ms. Ronit Mazar – Director, Division of Theme Planning, Planning Administration, Ministry of the Interior
Ms. Dorit Hochner – Ministry of National Infrastructures, Energy and Water Resources
Architect Gidi Lerman– head of the planning team

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המשרד להגנת הסביבה
وزارة حماية البيئة
Ministry of Environmental Protection
שלום עם הסביבה

March 25, 2012 / 2 Nissan 5772

Re: Update of environmental impact survey guidelines, Chapters 1-2
NOP 37/H –Treatment Facilities for Natural Gas from Offshore Discoveries and their Connection to the National Transmission System
Onshore Facilities

Introduction

In accordance with the instructions of the Committee for Planning Principles on March 13, 2012, attached are guidelines for preparing Chapters 1-2 of the Environmental Impact Survey for Treatment Facilities for Natural Gas from Offshore Discoveries and their Connection to the National Transmission System.

The guidelines refer to the offshore pipelines (the offshore transmission pipeline to the coast), the coastal crossing system, the onshore valve, the onshore pipeline leading to the treatment facility, the treatment facility itself, the onshore pipeline that connects to the INGL facility and the pipeline connecting the INGL facility to the national transmission system. Additionally, the guidelines refer to all of the accompanying pipelines and infrastructures, such as roads, voltage lines, gas and fuel pipes, and so on.

With regard to the offshore pipelines, three are three possible methods for laying the pipelines:

1. Installation using HDD (horizontal directional drilling);
2. Burying the pipeline, which is liable to significantly interfere with the seabed;
3. Laying the pipeline directly onto the seabed.

Therefore, it is important to refer to the three methods according to the relevant topic.

General

A. The guidelines in this document are intended for approval by the National Planning and Building Board on April 3, 2012.

B. The plan developer will be responsible for preparing the survey.

C. The survey will include the name of the party responsible for conducting it as well as the names of the professional service providers who took part in its preparation and in assessing the various environmental impacts.

D. The survey author and his professional advisors will complete and sign the appropriate declarations (Forms 1, 2) in accordance with Regulation 14 C of the Planning and Building Regulations (Environmental Impact Surveys), 5763-2003.

E. The survey will open with a summary that presents the major findings.

F. The survey will be submitted in digital format, in PDF or Word file continuous format. Document scenarios will be submitted as a DWG file (in the vector mapping that recognizes AutoCAD format).

G. The survey will relate to all plan components, as far as possible at the detailed planning level.

H. The survey should fully address each item of the guidelines, in the order of the guidelines. Incomplete surveys will be returned unread.

I. Should a specific item be submitted in a way that deviates from the requirements, the deviation must be explained and justified.

J. The guidelines will be part of the survey and appear as an appendix.

K. The document should include the bibliography and list of data sources that were used by the survey preparation team.

L. The survey should be submitted in 5 copies to the Ministry of Environmental Protection – Planning Division. In accordance with Section 9 (A) of the regulations, the survey should also be submitted to the planning institution (the National Board) and to the relevant local committees for planning and building.

M. These guidelines are valid for three years from the date on which they are approved by the National Planning and Building Board.

N. The survey will include the following chapters:

Chapter 1: Description of the environment to which the plan relates

1.0 General

The existing environmental system is the starting point for predicting environmental effects in the future. Therefore the environmental fields mentioned in this chapter will serve later for an examination and description of these effects after construction and operation of the different parts of the project, including treatment facilities, pipelines, valve stations and all other ancillary infrastructures.

As a result, the description of the environment will focus on the project area in all its parts and its immediate environment, and on the various pipeline corridors, but must also include other areas that are liable to be affected as a result of constructing and operating the project. The environmental data required in this chapter should focus on the spheres in accordance with the expected impacts so that they can be used to assess the alternatives in detail in the chapters below.

It is important to use updated maps and graphic forms of description to ensure that the description is clear and concise. The different sources of information should be noted, such as: measurements in the field, literature, approved outline plans, environmental impact studies, and so on.

1.1 Background maps

1.1.1 Treatment facilities, the onshore valve and other onshore infrastructures (if necessary, separate maps can be attached).

These maps will include the sites and transmission systems to and from them (including all associated infrastructures):

1.1.1.1 A topographical map on a scale of 1:10,000, including a radius of 2 km around the boundaries of the station should be presented. The map will include data regarding roads, settlements, buildings and facilities. The gas, electricity and fuel lines found in the area should also be marked. This map will be used as a background map.

1.1.1.2 A map on a scale of 1:2,500, covering the area of the facility, separation distances from hazardous materials and a radius of 500 m. beyond these. . The boundaries of the plan should be marked on the map. The map will include roads, settlements, different types of residential areas, areas of agricultural activity, tourism activities, infrastructure facilities and lines (such as gas, fuel, electricity), industrial plants, existing and planned wastewater facilities, and so on.

1.1.1.3 An up-to-date, color aerial photograph on a scale of 1:5,000 should be presented, showing the vicinity of the land area of the plan, up to a distance of 1 km from its boundaries, including the area 300 meters west of the coastline, with the area of the proposed plan marked on the photograph. The photographs should be taken when

the sea is calm and waves are less than 30 cm. high, in the fall (second option – in the spring).

1.1.2 Marine infrastructures

Three maps should be prepared, as follows:

1) A general bathymetric map on a scale of 1: 50,000, which includes the entire marine section of the project.

2) A detailed bathymetric map of the coastal area at a scale of 1:50,000, from a depth of 10 meters or from the area in which the HDD is initiated – whichever is farther, and up to a height of 3 meters above the national balance "0" line.

* Regarding the aforementioned three maps, emphasis should be given to the following: The vertical spacing should not exceed 1 meter.
* The maps should cover a distance of 250 meters (at least) on each side of the pipeline corridor.
* Maps should indicate offshore infrastructure facilities, exits to the sea, structures and other artificial objects in the water (buoys, sunken vessels, etc.), archaeological sites, port areas, shipping lanes, national Nature and Parks reserves, anchorages (marina) and breakwaters, marine firing ranges and any additional information that is relevant.
* Maps should indicate the proposed pipeline alignment. Mark the pipeline borders according to the various sections: HDD area, area where pipeline will be buried under the sea floor, and area where the pipeline will be laid onto the sea floor.

1.2 <u>Existing land uses and planned land zoning</u>

1.2.1 Two maps should be submitted (that include the sites and transmission systems to and from them):

* These maps will include treatment facilities, the overland pipeline and accompanying infrastructures, including valve stations, and will cover an area of 300 m (at least) to the west of the shoreline.

  a. A map of land zoning (approved or in the process of some form of planning);

  b. A map of present (actual) land usage.

Maps A and B will be presented on a background topographical map on a scale of 1:25,000, for an area of 1 km around the site boundaries. The maps will relate to the following issues:

- Residential buildings and public institutions (existing and planned);

- Industrial areas and plants;
- Mines and quarries;
- Military and security service areas and facilities;
- Nature reserves, national parks and landscapes, and rivers;
- Heritage sites;
- Tourism, hotel and recreational sites;
- Ecological corridors at the national level;
- Roads (including paved roads and dirt paths) and railway lines;
- Hiking paths and trails;
- Agricultural land, fishponds and farmed areas;
- Infrastructure facilities such as electricity production, electricity transmission lines, fuel and gas transmission pipes;
- Existing and planned wastewater treatment plants;
- Other.

1.2.2 The land zoning map will include reference to relevant national outline plans, including TAMA/35, TAMA/8, TAMA/13, and TAMA/22. It is also necessary to relate to the district outline plans and to other relevant local and detailed plans. In addition, it is necessary to relate to the Carmel Coast outline plan for open areas.

* The pipeline alignment must be surveyed at a radius of 100 meters around the pipeline corridor and at a relevant scale that will enable a clear presentation of the data.

1.3 Population concentrations

1.3.1 The data below should be presented graphically, in tables and with explanations. Different population groups should be addressed, both in the existing situation and in the planned situation (demographic prediction for 5 and 10 years):

a. The residential population and sensitive uses such as hospitals, sheltered housing, public buildings etc.

b. The permanent population in employment centers.

c. The unplanned population (commercial centers, sports and recreation sites, hotels, entertainment events etc.)

1.3.2 Data will be presented in the following manner:

a. Breakdown of population in rings (every 100 m) and sectors around the site, up to a distance of 600 m from the site

b. Cumulative population in rings and sectors.

1.4 Meteorology and air quality

1.4.1 General: This paragraph must present background data regarding the existing air quality, as set forth in the paragraphs below.

1.4.2 Basic meteorological data that includes the relative prevalence of wind speed and direction (wind rose), temperature, relative humidity and atmospheric stability. The data should be collected from a meteorological station that optimally represents conditions found in the proposed station area and shall be based on multi-year measurements taken near each of the sites, on a seasonal and daily basis. Indicate the source of the data, location of the measurement station and duration of the measurement period indicating their relevance to the site area.

1.4.3 Indicate special meteorological conditions that are liable to cause environmentally problematic dispersion conditions, such as strong westerly winds, unstable conditions and so on, and indicate their relative prevalence.

1.4.4 Status of air quality at the present time and projection for the future (5 years, 10 years). The description shall be present for primary sources of air pollution and the quantity of contaminants emitted from them. The contaminants to be examined are: sulfur dioxides, all volatile hydrocarbons, nitrogen oxides and ozone, around 40 km from the prevailing winds in the area during the daytime. The possibility of combining gas being emitted from the facility with chimney stacks in the area should be examined.

1.4.5 Dispersion conditions of air pollutants in the area surveyed and the immediate vicinity. The description shall also include a graphic description using isoplates.

1.5 Appearance

1.5.1 A visual analysis of the planned site should be presented (using photographs and verbal description) against the background of its environment. The analysis will include the visual basin from which the site and its related infrastructures (such as roads and electricity infrastructures, engineering facilities, pipes, etc.) are seen.

1.5.2 Profiles should be presented from prominent points in the area and from settlement points (for example, north and west of the Givat Eden neighborhood of Zichron Yaakov; from the south, center and north of the village of Fureidis; from the Zichron Yaakov interchange on the Coastal Road, and from the direction of Moshav Dor), from paths and roads, from hiking trails, picnic areas and lookout points, from nature, landscape and heritage sites:

1.5.3 The valve stations / prominent facilities along the route should be presented in a similar manner.

1.6 Seismology

1.6.1 Identify the level of the seismic force coefficient in accordance with the provisions set forth in the existing Israeli Standard IS 413. Additionally, refer to coefficients as proposed in Amendment No. 3 to IS 413.

1.6.2 Relate to the possible existence of active geological faults in the plan area.

1.5.3 Relate to the appearance of increased seismic vibrations due to infrastructure or topographical conditions.

1.6.4 Relate to the possibility of soil liquefaction as a result of landslides (special emphasis must be given to the continental slope according to the location of the facilities, pipeline, etc.)

1.6.5 Related to the possibility of a tsunami and damage to the coast, including temporary drop in the water level and receding waterline.

1.7 Hydrogeology and soil

1.7.1 The following data should be presented, on an aerial photograph on a scale of 1:20,000 and in words. The data will be presented to a distance of 2 km from the area of the plan treatment facilities, valve stations and relevant infrastructures):

- Drainage system, natural and artificial drainage route, wadis and springs;
- Wells and bores for drinking water, water for desalination, irrigation, or penetration in the application area, and the protective radiuses around them;
- Levels of risk of groundwater contamination;
- Facilities for catching surface water;
- Areas in which there is suspected existence of contaminated soil as a result of storage, craft or industrial activity within the boundary of the plan in question.

1.7.2 The soil structure should be described in order to relate to mechanical engineering properties such as: stability, erosion, structure and texture.

1.7.3 The soil structure should be described for the purpose of relating to hydraulic properties such as: hydraulic conduction, ground water penetration.

1.7.4 The hydrological system should be described and data presented regarding groundwater basins, their quality and their sensitivity to contamination, the geomorphological data influencing the drainage system, the degree of penetration of surface water and the connection between surface water and the underground aquifers.

1.8 Hazardous materials

A report on separation distances must be attached in accordance with the circular issued by the Director-General of the Ministry of Environmental Protection (for each relevant component of the project!).

1.9 Natural, landscape and heritage treasures

- **Landscape areas** – Map out and include a written description of landscape units and the landscape properties of the plan area and surrounding vicinity. Present details of natural and manmade landscape areas, With regard to the specific location of the sites, specify habitats that will be cut off.
- **Plant life** – Present the distribution of natural vegetation in the plan area up to a relevant range from its boundaries. Data should be presented in written format as well as on a map with a relevant scale. Focus on rare and unique species and those that should be preserved. If necessary, indicate areas of invasive species (use web sites such as Biogis, the Observation and Information Network and the Ministry of

Environmental Protection; surveys carried out by the SPNI, the "Red Book" and so on).

- **Animals** – Indicate on a map with a relevant scale the presents of sites of animal populations, including bird breeding and nesting areas, with an emphasis on rare animals in the area of the plan and its expected impact. (Use surveys conducted by the SPNI, the web site of the Environmental Protection Ministry, the Red Book of Vertebrates in Israel and the like).
- **Heritage sites** – Specify heritage and historic sites located in the plan area.

1.10 Oceanographic and meteorological conditions

1.10.1 Describe the relative prevalence of wind speed and direction (wind rose) from the shore line to sea floor depth of 60 m, and the wave surface at this depth.

1.10.2 Indicate any meteorological conditions that are liable to cause problems to sand movement in the area, including the destruction of sand layers and exposure of the pipeline.

1.11 Noise

1.11.1 Land environment – Describe the noise levels currently measured at different points on the boundary of the plan and at the existing and planned sensitive uses in the area (the measurements will be taken during the day and at night, and over a minimum period of time of a few minutes), up to a distance of 1 km from the boundary of the plan. The noise levels should be measured and defined in accordance with the Regulations for Preventing Hazards (Unreasonable Noise) 1992, including a spectrum of 1/3 octave.

1.11.2 Marine environment – Using current data (literature and databases) describe the existing noise levels within plan vicinity.

Chapter 2: Examining Alternatives

2.0 In this chapter present the properties and requirements of the project components, including offshore and onshore pipelines (from the marine transmission system and eastward); the valve leading to the coast; overland pipeline corridor; gas treatment facility; INGL intake facility and overland pipelines; ancillary infrastructures (power lines, access roads, security facilities). The purpose of this chapter is to present a complete picture of the plan's components in order to examine the best alternative.

- Address each component of the system separately so that its influence can be isolated, but also examine the influence of the plan as a whole. If there are noteworthy components such as exhaust smoke stacks, fuel tanks and the like, micro alternatives for these should also be shown in order to reduce their impact.

The planning principles that should guide the selection of the alternatives are:

- Preventing risk to populations;
- Minimizing damage to valuable open areas;
- Reducing the area used and using existing construction and infrastructures in the area designated for development;
- Minimal damage to the area (appearance, visibility);
- Maintaining the existing ecological and human functioning in the marine, coastal and inland area.

When evaluating the alternatives take into account, among other things, the following issues as they are specified below in the Methodology:

- Scope of required area for this project with an emphasis on: Number of facilities, area of the facilities, width of the strip crossing the shore, area required for the valve including alternatives for its location and the possibility of burying it, construction adjacent to existing / planned infrastructures.
- Parameters relating to safety and preventing environmental hazards.
- Ecological restrictions.
- Possible damage to various land zoning area, including agricultural areas and the shore strip.
- Environmental considerations: Infringement of valuable and other open areas, worsening of air quality, unusual visibility (priority should be given to small tanks), prominence in the area (preference to building without a flare).
- Use and proximity to existing infrastructures (including connecting to the national electricity grid, gas transmission system, fuel transmission system, water removal

systems, leachates, etc.). Emphasis will be placed on keeping overland pipelines close to existing infrastructures and roadways).

- Security system restrictions.
- Planning availability of the land.
- Options for future development, including intake of varying qualities of gas and gas from other wells.
- The various project facilities and their environmental impact (communications antenna, exhaust smoke stack, fuel tanks and facilities, storage and handling of chemicals, etc.).

2.1 Methodology for presenting and assessing the alternatives

In this paragraph give a general presentation (written and graphic description) of the facilities being examined. Refer to the various alternatives separately in respect of both technological alternatives and alternative locations.

Technological alternatives

Detail the advantages and disadvantages of each technological alternative while describing the main characteristics of the facilities and their activities, including their key components, and for each component, facility or production stage, indicate its environmental impact: The area it occupies; environmental impact in terms of air pollutants, risk to populations, noise, water pollution; reduction of landscape and ecological damage by the facility; infrastructure lines leading to and from it, and so on.

Relate to the various technologies of the different components, for example the technologies employed by the onshore valve, and not only the main treatment facility.

Alternative locations

Present alternatives for the location of the various facilities. The alternatives shall be presented for all system components (to the extent they are relevant), including pipelines, the valve, treatment facilities, INGL facility and all ancillary infrastructures.

2.1.1 For each alternative documents and blueprints describing the facility shall be submitted.

2.1.2 For each alternative present and describe the criteria according to which the alternatives, properties, characteristics and requirements that influence their location in the facility were considered and compared, including planning considerations (with reference to plans that are approved or in the planning process); safety considerations; transportation consideration; environmental considerations; landscape and visual considerations, and others.

2.1.3 For each alternative a separation distance report shall be submitted, which describes, analyzes and examines the impact of each alternative on the environment, with respect to the difference between alternatives.

2.1.4 For each alternative a fundamental landscape analysis shall be submitted that describes, analyzes and examines the landscape influences resulting from carrying out the said alternative, using simulations, photographs and cross-sections.

2.1.5 Examining the alternatives shall be carried out according to the following topics and criteria:

a. Expected level of risk regarding populations at and near the facility:
   - Safety distance around the facility.

b. Saving land resources:
   - Degree of the difference in terms of land area needs between the various alternatives.

c. Proximity to existing and planned infrastructures:
   - Drainage systems;
   - Electricity transmission lines;
   - Proximity to the gas supply pipeline system;
   - Proximity to existing roads and highways.

d. Building restrictions around the facility as a result of its construction:
   - Safety distances around the facility;
   - Analysis of the activities being restricted due to the facility's operation;
   - How to quantify the restrictions and weight them.

e. Surplus soil – total scope of earthworks (divided as excavation and filling) in order to construct the facility including possible solutions.

f. Natural resources:
   - Impact area of all alternatives for the facility, from an ecological perspective;
   - Extent of damage to the variety of habitats in the area (land and marine);
   - Sedimentological aspects;
   - Extent of damage to the sea and beaches;
   - How to make preparations for emergencies.

g. Air pollution – degree of impact on air quality of the various alternatives as a result of malfunctions.

h. Offshore and onshore antiquities and heritage sites:
   - Proximity to archaeological sites;
   - Ability to preserve archaeological and heritage sites.

i. Potential for conflicts between the proposed facilities and the surrounding area:
   - Present a comparison (graphic or written) concerning the sensitivity level of the surrounding area versus the expect level of damage (for example, extent of landscape damage, extent of damage to open areas, and the like).
   - List of possible conflicts, including an analysis and characterization of the extent of the conflict, its complexity and proposed solutions.

j. How the facility will be integrated into the surrounding area in light of future land zoning.

k. Continuity and sensitivity of open areas:
   - Damage to continuity (cutting off) of open areas by the facility;
   - Degree (extent) of damage in various types of protected areas, both those that are approved and those that are proposed in national, district and local plans;
   - Potential for additional damage in the future to open areas as a result of the facility and maintaining land reserves for future development.

l. Leisure and recreation:
   - Extent to which the experience of spending time in the open area in nature may be damaged;
   - Expected impact on tourist sites and hiking trails around the plan, and access to these.

m. Landscape – visual:
   - Level of damage to the quality of the open area from a landscape point of view;
   - Scope of visibility of the area from different points in the area;
   - To what degree does the facility blend in with the horizon line and what impact does the plan have on the surrounding area;
   - Potential for additional damage and its force as a result of ancillary infrastructures (roads, power lines, etc.);
   - To what extent will the existing landscape be damaged from earthworks associated with the facility's construction.

2.1.6 Assessment of each criterion, for each alternative, will be defined according to a scale with three values: Significant damage, moderate damage, minimal / no damage.

2.1.7 The points or the assessment given to each criterion will be detailed and reasoned in writing, using graphs, with data from various information sources such as measurements in the field, reports, literature, plans, etc., and will be based, among others, on the data and analysis performed in Chapter 1 of the survey.

2.1.8 In cases where the criterion is quantitative, the quantitative data for each alternative must be specified while awarding a relative point value according to the quantitative data obtained.

2.1.9 Micro alternatives must be presented for the station in relation to the facility's physical dimension: The possibility of reducing the area by using the land more efficiently; visual aspects – height, color, shape. Present the consideration that led to choosing the particular micro alternative.

2.1.10 In summing up the process of selecting the alternatives, specify and present the selected alternatives, both in terms of technology and location, and analyze the environmental and other advantages and disadvantages of these alternatives compared with other alternatives examined, in accordance with these guidelines.

Appendix 1-A – Summary of Changes to the Instructions for Chapters 1 and 2

The State of Israel
The Ministry of Environmental Protection
Policy and Planning Cluster
Planning Department

המשרד להגנת הסביבה
وزارة حماية البيئة
Ministry of Environmental Protection
שלום עם הסביבה

September 5, 2012

To: Shahar Solar
Director, Environmental Planning and Green Building Division
Ministry of Environmental Protection

Re: <u>NOP/37 H – Guidelines for Chapters 1 and 2 of the Environmental Impact Survey</u>

Dear Shahar,

For the sake of order and given the fact that there are old and new versions of the Guidelines for Chapters 1 and 2 for NOP 37/H, we suggest that referring to the following documents as relevant:

- Guidelines for Chapters 1 and 2 of the Environmental Impact Survey for NOP 37/H – from the tender for NOP 37/H (Appendix 10 of the tender documents).
- Guidelines for Chapters 1 and 2 updated as of March 29, 2012.
- Summary of our meeting held on July 11, 2012 during which it was decided that the survey would be submitted according to the set of guidelines from March 29, 2012.

Further to the arrangements made between us, our proposal is that it be agreed that the guidelines from March 29, 2012 shall be those relevant for implementation, and which include both the offshore and onshore environments, plus a summary of the meeting from July 11, 2012 (to the extent it is relevant to Chapters 1 and 2), with the following changes (which were coordinated with you):

<u>Chapter 1</u>

1. Air chapter (section 1.4) – according to the updated instructions of the Air Quality Division:

Section 1.4.4: Status of air quality under the approved situation (existing emissions sources + approved) shall be calculated using the an air contaminants dispersion model (AERMOD) for the following contaminants: sulfur dioxide, nitrogen oxides and benzene, at a range of 10 km around each alternative. The model shall be run on the basis of 5 years of meteorological data from a representative station. Emissions from the various sources in the test areas will be provided to those preparing the survey by the Ministry of Environmental Protection based on emissions findings in its possession. To this should be added approved emissions sources in the areas being investigated. The existing air quality in the area of each alternative shall also be presented by means of representative monitoring data.

Section 1.4.5: Results of running the data will be examine in relation to environmental and target data (Air Quality Values Regulations, 2011), and will include a graphic explanation using isoplates.

2. **Visibility and landscape chapter** (Section 1.5) – to remove all doubt the examination will be carried out on both marine components in the offshore environment and the onshore facility.

3. **Nature, landscape and heritage treasures** (section 1.9) – reference was added to the marine environment in accordance with the Survey guidelines from the tender documents:

   Marine environment – give a written description of habitats on the sea floor in the relevant areas according to what is know from the published literature and unpublished works (use Nature and Parks Authority data collected from deep sea sailings). Indicate the sensitivity of these habitats. Please specify the sources of the information

Please confirm the aforesaid.

Respectfully yours

(*signature*)

Gidi Lerman

Head of the Planning Team

Cc: Dorit Hochner – Director, Physical Planning Unit, Ministry of National Infrastructures, Energy and Water Resources
Ms. Ronit Mazar – Director of Planning
Ms. Zina Perflizin – Director of Planning
Mr. Barak Katz / Assaf Sagi – ETHOS – Preparing the Environmental Impact Survey

Appendix B – Wind roses and atmospheric stability roses, by season and for all hours of the day

Wind roses and atmospheric stability roses by season and for all hours of the day

The wind roses appearing in the following illustrations describe the wind directions and speeds from 2007 to 2011 in general, and divided by seasons of the year and for all hours of the day.

Seasons were divided as follows:

Winter: December, January, February

Spring: March, April, May

Summer: July, August, September

Fall: October, November

Ein Ayala and Dor North Alternative

Surface winds by season and for all hours of the day

According to Figures 1-4 we can see that in the Ein Carmel area during the winter the winds come from the east at a rate of 20% with a primary speed of 5.7-8.8 m/s, and from the east southeast at a rate of 24.5% with a primary speed of 2.1-3.6 m/s. The most prevalent winds seen during this season blow at speeds of 0.5-2.1 m/s and 2.1-3.6 m/s, at a rate of 32% and 33%, respectively, from all wind directions measured during the season from this direction.

In the spring the main direction of the winds is from the east southeast at a maximum rate of 15.6% of all the directions in this range, with a primary speed of 0.5-2.1 m/s, and at a secondary frequency of east to northwest of up to 10%. Speeds of the dominant winds during this season are 0.5-2.1 m/s at a rate of 45% of all wind speed values measured during this season.

In the summer the wind direction is from two main directions: From the southeast and east southeast, and from the southwest to the northwest at a maximum prevalence of 12%-13% from each of the directions. From the southwest to the northwest wind speeds are higher (mainly 2.1-3.6 m/s) than from the southeast and east southeast (mainly 0.5-2.1 m/s). From the northeasterly and southerly directions low winds are more prevalent (up to 4% from each direction). The speed of the dominant winds during this season are 0.5-2.1 m/s at a rate of 51% from all wind speed values measured during the season from this direction.

In the fall winds come mainly from the east and the east southeast at a maximum rate of up to 20% from these directions, with primary speeds of 0.5-2.1 m/s; prevalence of winds from the other directions is lower and reaches only 9% with the winds coming from the south to the east are less frequent, with a rate of up to 3%. The speed of the dominant winds during this season is 0.5-2.1 m/s at a rate of 50% out of all wind speeds measured during this season from this direction.

Figures 5-9 describe the wind directions and speeds for all hours of the day.

In the morning hours most of the wind comes from the east southeast (at a rate of 24%) and from the southeast (at a rate of about 15%), with primary speeds of 0.5-2.1 m/s. From the east the winds blow at higher speeds (primary speed of 5.7-8.8 m/s). Winds from other directions are less prevalent, with a rate of 6.5%. The speed of the dominant winds at these hours are 0.5-2.1 m/s at a rate of 48% of all wind speed values measured during these hours from this direction.

At noontime the main wind direction is from the southwest to the northwest at a maximum prevalence of 16% from each of the directions in this range, with a primary speed of 2.1-3.6 m/s. From the east winds reach higher speeds (main speed of 5.7-8.8 m/s), but at a lower rate (up to 8%). From the other directions the prevalence of wind is lower (up to 5% from each of the directions). The speed of the dominant winds at these hours is 2.1-3.6 m/s at a rate of 58.6% out of all wind speed values measured at these hours from this direction.

In the afternoon hours the main wind direction is from the west to the west northwest at a maximum prevalence of 20% from each of the directions in this range, with a primary speed of 2.1-3.6 m/s. From the other directions the prevalence of the winds is lower (up to 5% from each of the directions). The speed of the dominant winds at these hours is 2.1-3.6 m/s at a rate of 51.4% of all wind speed values measured at these hours from this direction.

In the evening the main wind direction is from the northwest and north northwest at a maximum rate of 13% from each of the directions; winds also blow from the east southeast at a rate of 10%. Prevalence of winds from the other directions is lower and come to only 8% from each of the directions. The speed of the dominant winds at these hours is 2.1-3.6 m/s at a rate of 57.4% of all wind speed values measured at these hours from this direction.

At night the main wind direction is from the east southeast at a rate of 29% with a primary speed of 0.5-2.1 m/s. Prevalence of winds from the other directions is lower with maximum speeds seen from the east. The speed of the dominant winds at these hours is 2.1-3.6 m/s at a rate of 66.8% of all wind speed values measured at these hours from this direction.

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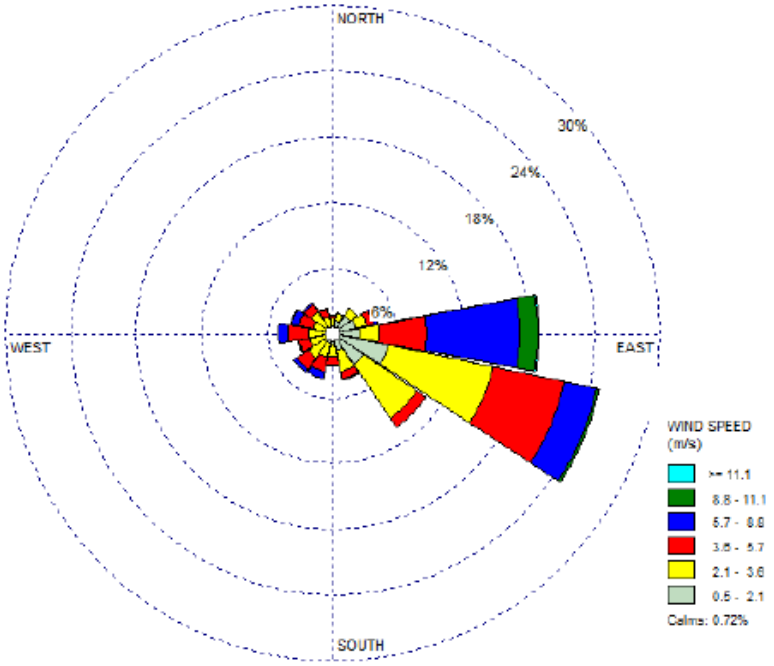

Figure 1: Wind rose – Ein Carmel area in the winter, 2007-2011

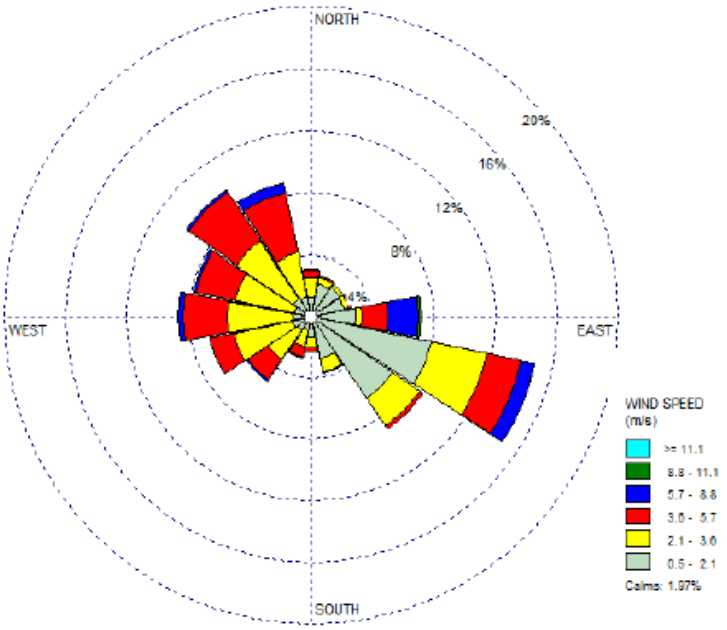

Figure 2: Wind rose – Ein Carmel area in the spring, 2007-2011

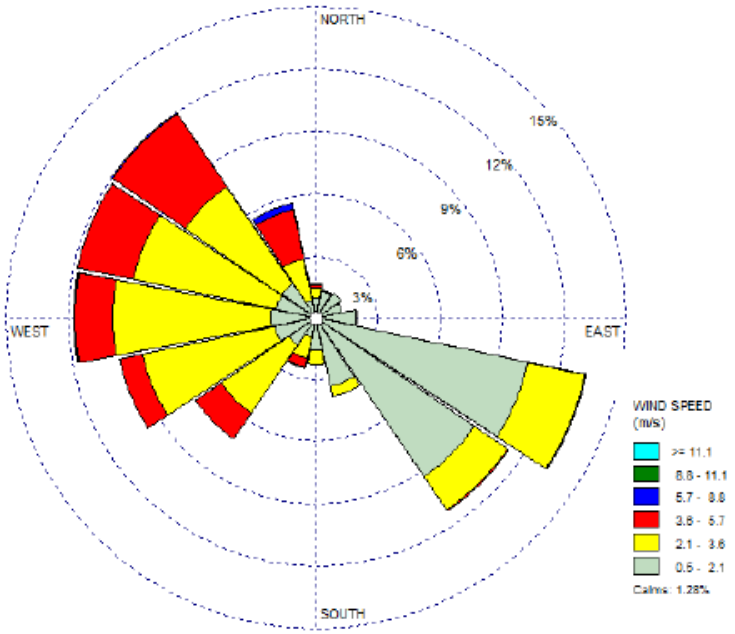

Figure 3: Wind rose – Ein Carmel area in the summer, 2007-2011

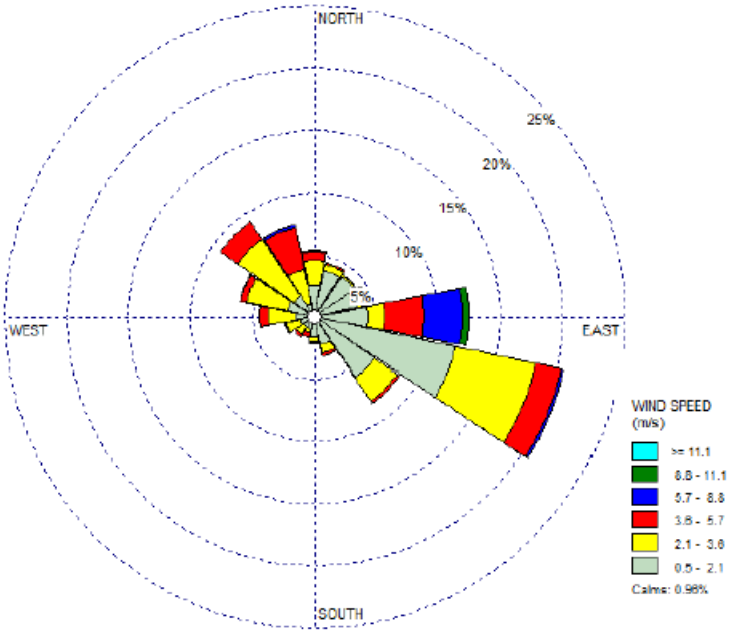

Figure 4: Wind rose – Ein Carmel area in the fall, 2007-2011

Distribution according to hours of the day:

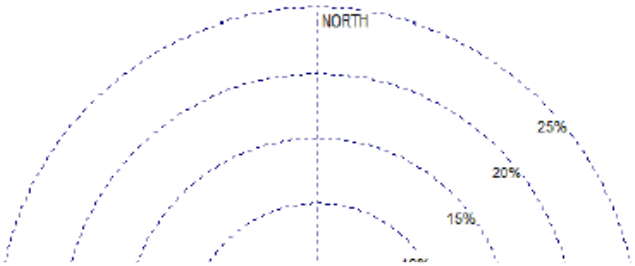

Figure 5: Wind rose – Ein Carmel area in the morning (05:00-10:00), 2007-2011

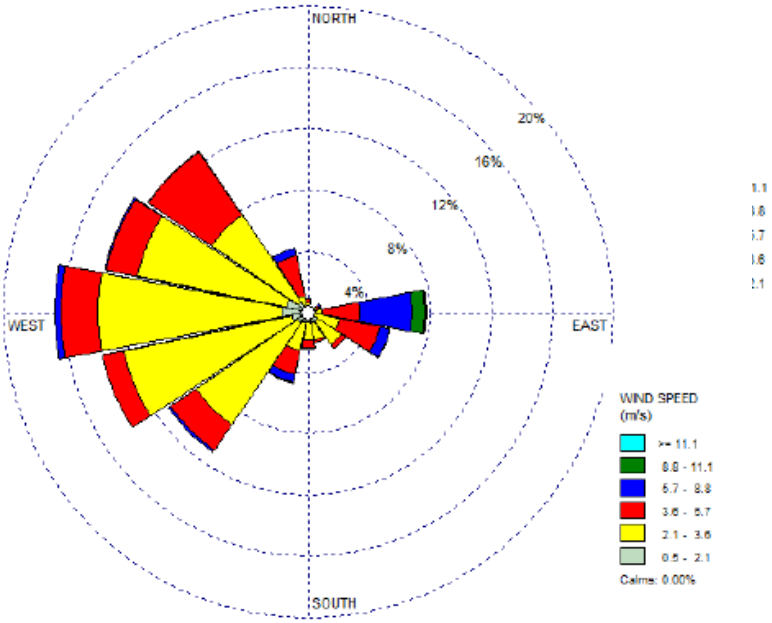

Figure 6: Wind rose – Ein Carmel area at noon (10:00-14:00), 2007-2011

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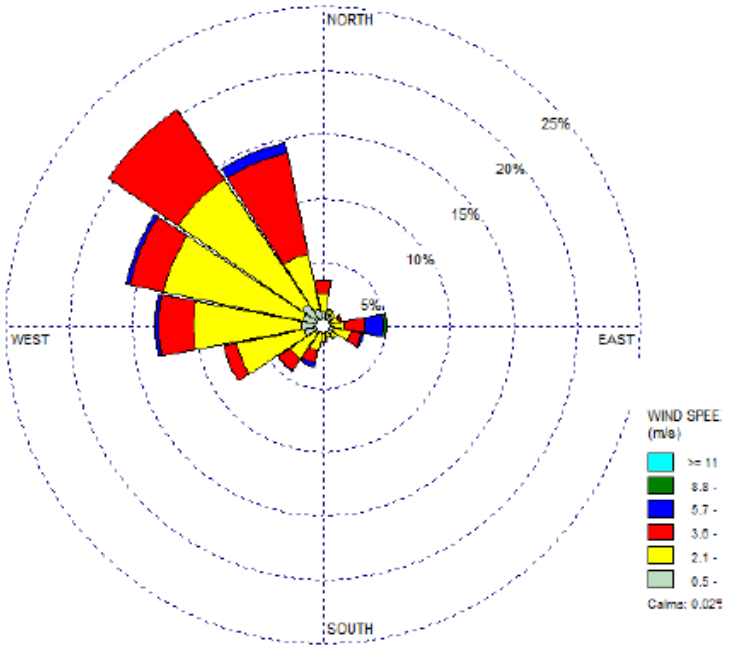


Figure 7: Wind rose – Ein Carmel area in the afternoon (14:00-18:00), 2007-2011

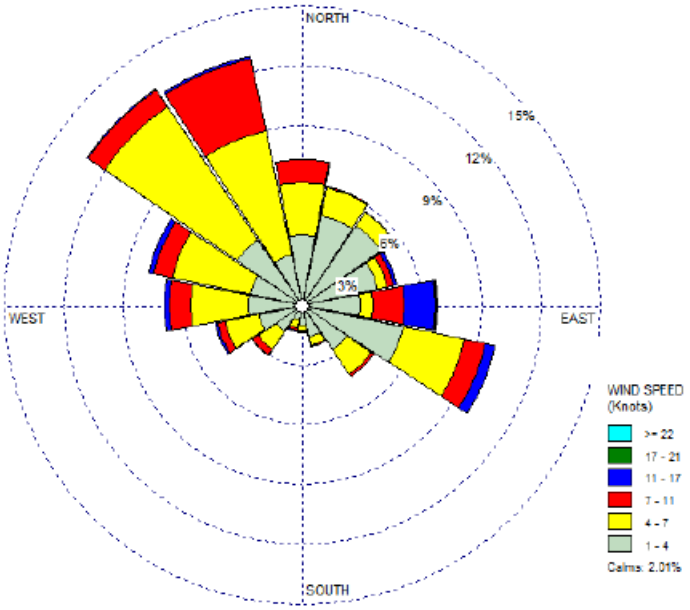


Figure 8: Wind rose – Ein Carmel area in the evening (18:00-21:00), 2007-2011

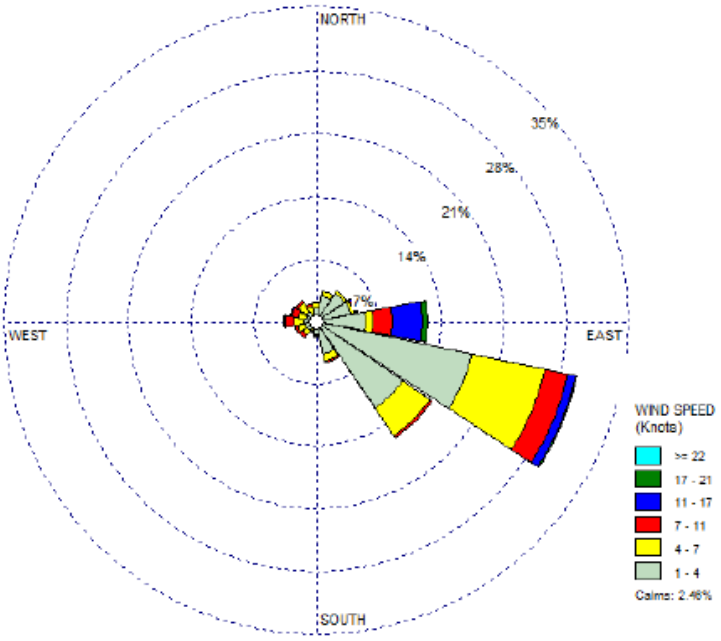


Figure 9: Wind rose – Ein Carmel area at night (00:00-05:00), 2007-2011

Atmospheric stability

Figures 10-13 describe atmospheric stability according to the season of the year.

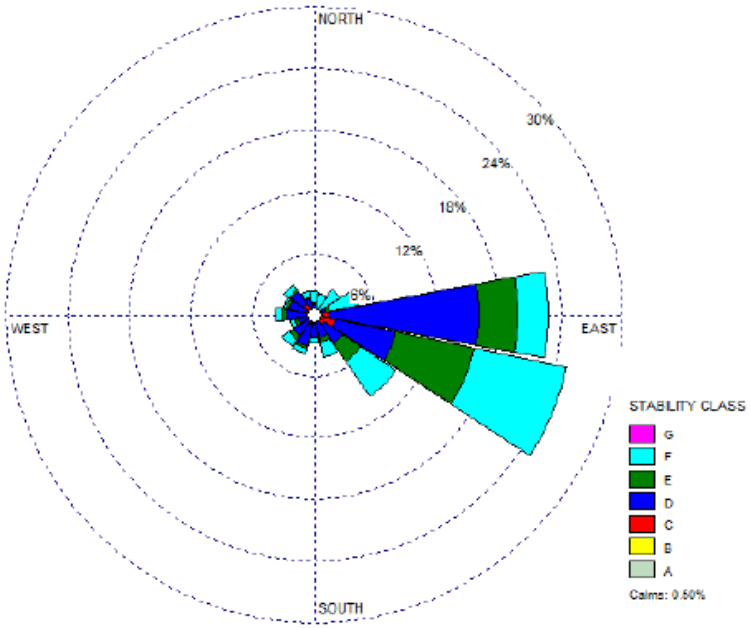
When divided by seasons we can see that in the winter most of the Class F atmospheric stability comes from the east southeast at a rate of 9.5% and from the southeast at a rate of 4.5%. The main stability condition from all directions is neutral stability (Class D) at a rate of 38.9% and Class F stability at a rate of 30.1%.

In the spring most of the Class F atmospheric stability comes from the east southeast at a rate of 10% and from the southeast at a rate of 5.8%. The main stability condition from all directions is Class F stability at a rate of 39.1%, following by Class D stability at a rate of 21.5%.

During the summer season most of the stable (Class F) conditions are similar to the spring and winter seasons, and comes mainly from the east southeast and the southeast, but in the summer the prevalence of the winds increases and reaches rates of 13% and 8%, respectively. The main stability condition from all directions is Class F stability, reaching a rate of 44%.

In the fall most of the stable (Class F) conditions come from the east southeast at a rate of 14%, from the southeast at a rate of 5.3% and from the east at a rate of 4.5%. The main stability condition from all directions is Class F stability at a rate of 45.2%.

Figures 14-18 describe atmospheric stability for all hours of the day.



After dividing the hours in the day, during the morning hours most of the Class F atmospheric stability comes from the east southeast (at a rate of 11%); in the noontime the soil is hours, since warm, there are no stable stability conditions and therefore the main stability conditions during these hours is Class E, coming from the southwest to northwest. Towards the afternoon hours the soil begins to cool and we begin to see the occurrence of Class F stability conditions but at low rates (maximum rate of 1% from the northwest direction). In the evening hours the soil is already colder and the range of stable atmospheric stability has increased (to Class F) and it comes from the northwest to the east southeast at rates of 5% to 7% from each of these directions. At night the soil is cold and the Class F atmospheric stability reaches a peak from the east southeast at a rate of 29%, from the southeast at a rate of 15% and from the east at a rate of 5%. From other directions atmospheric stability is low and reaches up to 4% from each of the directions.

Figure 10: Atmospheric stability rose – Ein Carmel area in the winter, 2007-2011

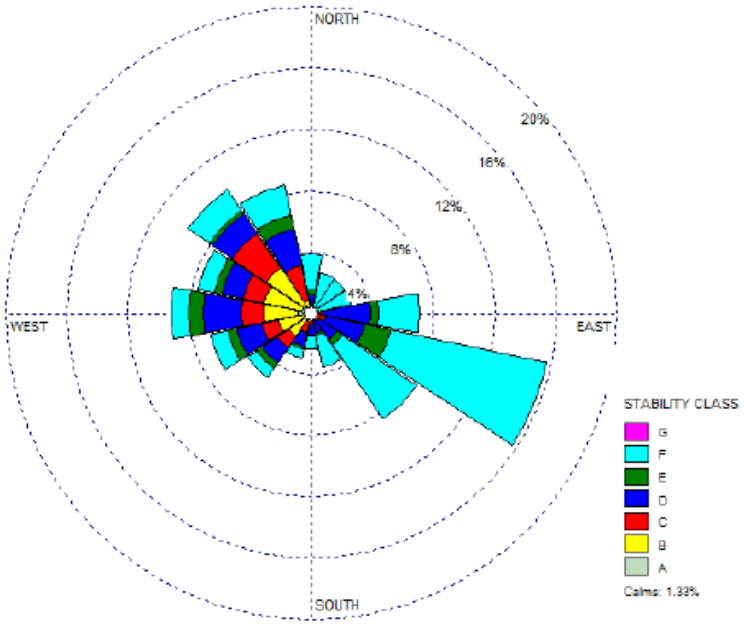


Figure 11: Atmospheric stability rose – Ein Carmel area in the spring, 2007-2011

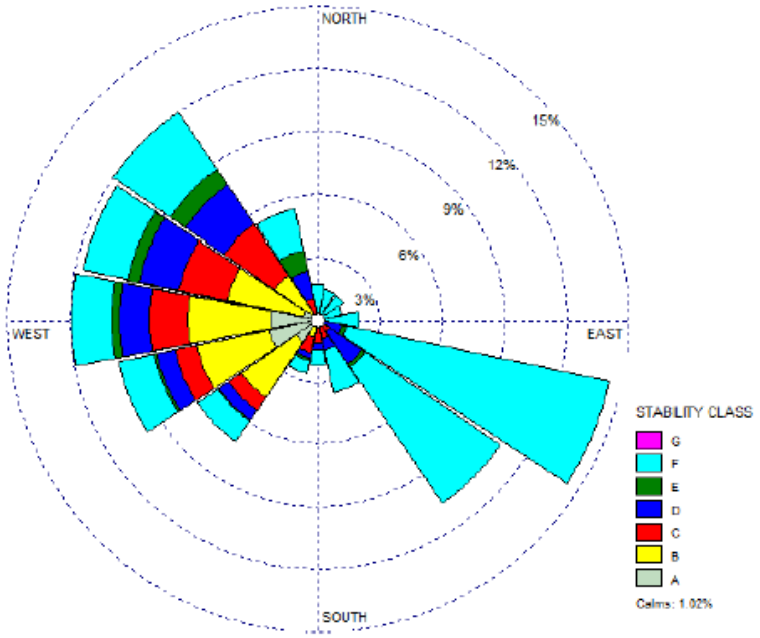


Figure 12: Atmospheric stability rose – Ein Carmel area in the summer, 2007-2011

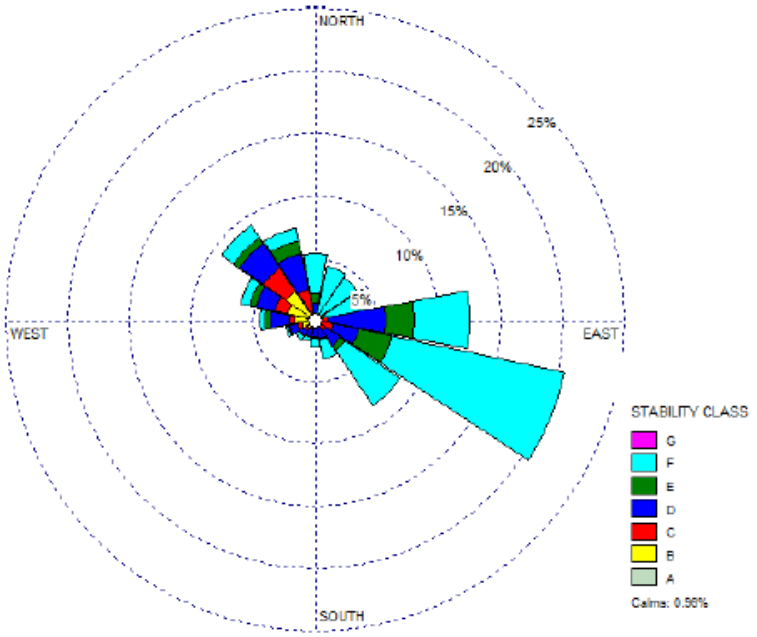


Figure 13: Atmospheric stability rose – Ein Carmel area in the fall, 2007-2011

Distribution according to hours of the day:

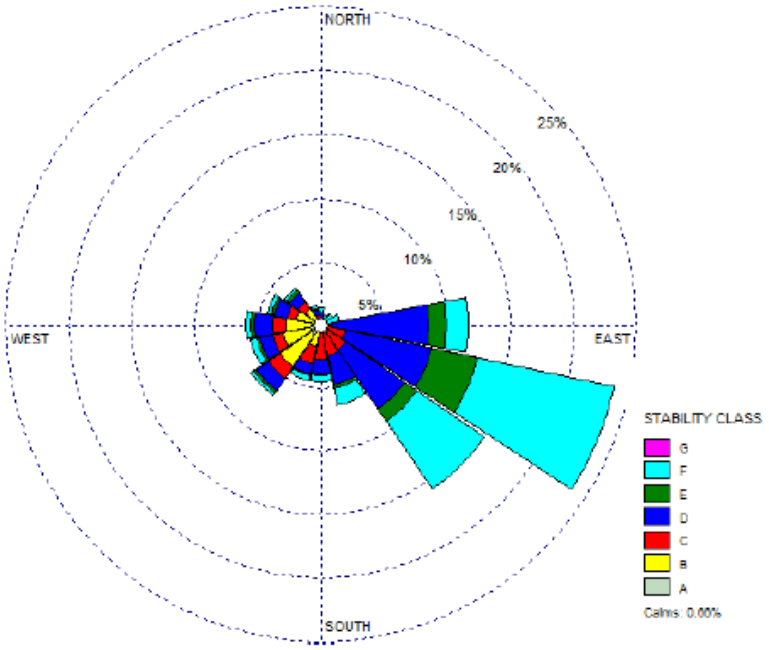


Figure 14: Atmospheric stability rose – Ein Carmel area in the morning (05:00-10:00), 2007-2011

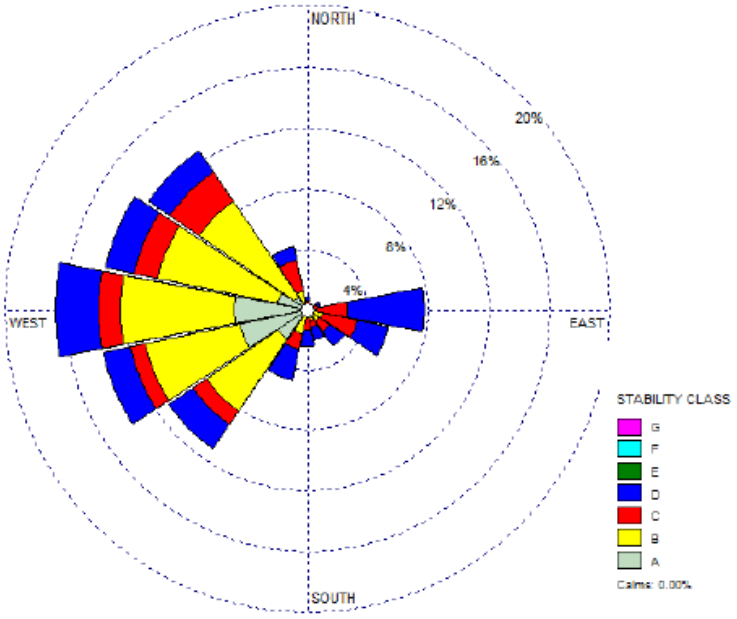


Figure 15: Atmospheric stability rose – Ein Carmel area noontime hours (10:00-14:00), 2007-2011

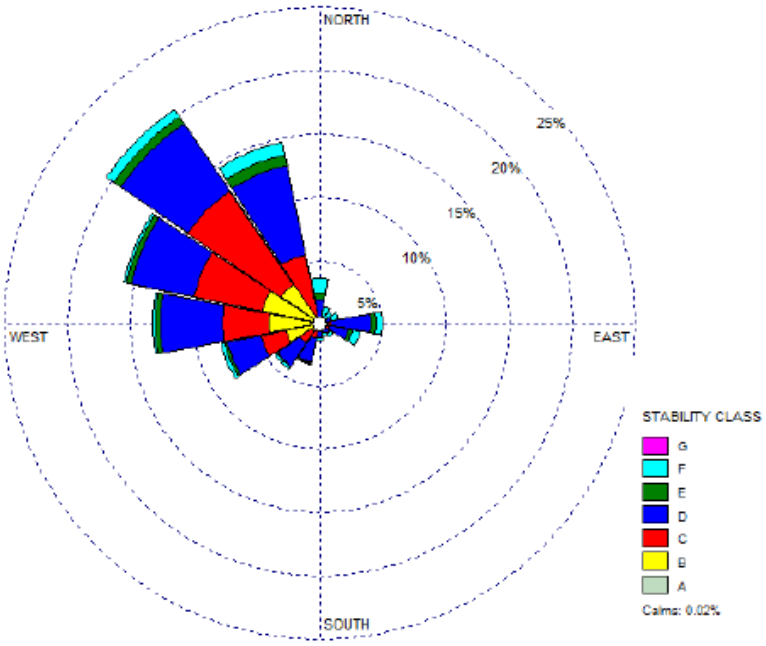


Figure 16: Atmospheric stability rose – Ein Carmel area in the afternoon (14:00-18:00), 2007-2011

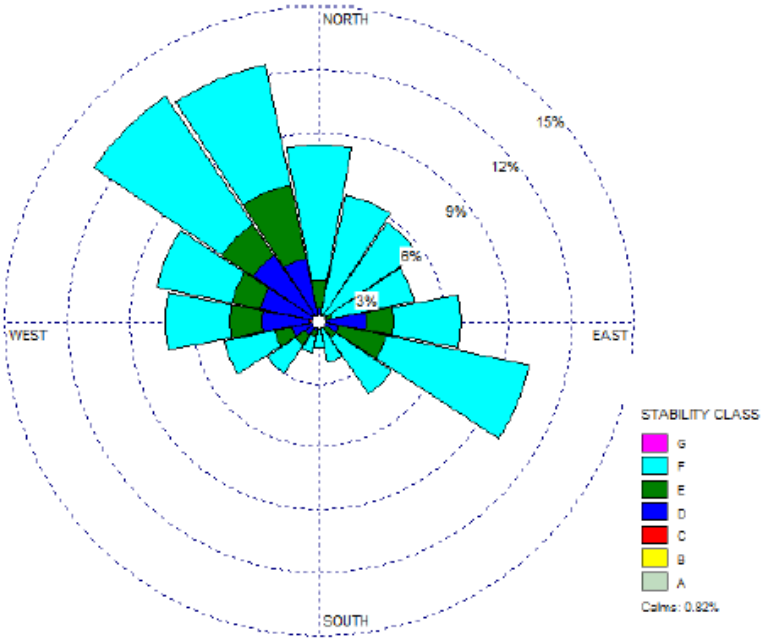


Figure 17: Atmospheric stability rose – Ein Carmel area in the evening (18:00-21:00), 2007-2011

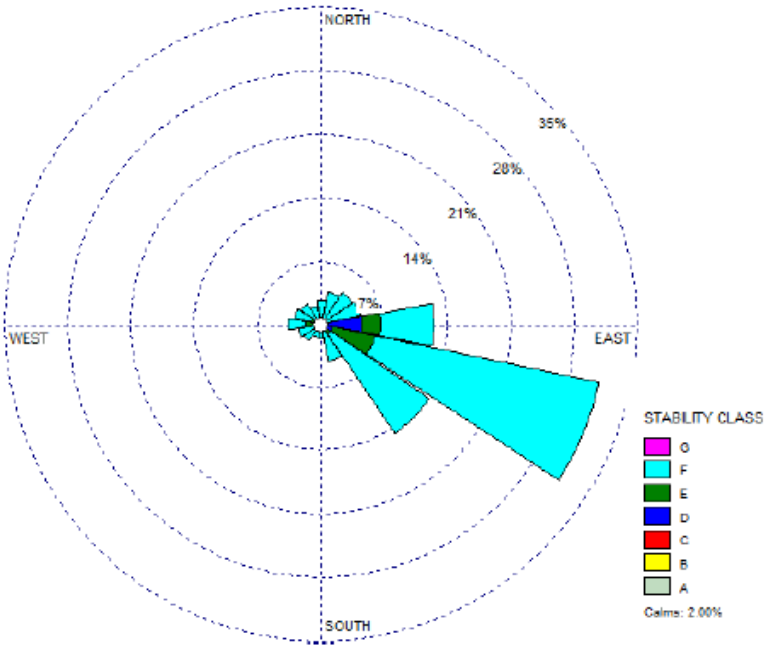


Figure 18: Atmospheric stability rose – Ein Carmel area at night (00:00-05:00), 2007-2011

Hadera Alternative

Surface winds by season and for all hours of the day

According to Figures 19-22 we can see that in the Hadera area during the winter the main wind directions come from the east at a rate of 25% with a primary speed of 0.5-2.1 m/s. Winds from the other directions come at a frequency of up to 13% from each direction, with winds blowing from south southwest to north northeast appearing at low rates of up to 3.5%. Most winds during this season blow at speeds of 0.5-2.1 m/s at a rate of 49.6% from all directions.

In the spring the main direction of the winds is from south to east at a rates of 8%-13% (from each of the directions in this range), with a primary speed of 0.5-2.1 m/s. Winds from the other directions come at a frequency of up to 6.5%. Most winds during this season blow at speeds lower than 0.5-2.1 m/s at a rate of 71.4% from all directions.

In the summer the wind direction is from the south to southeast at a frequency of 14%-19% (from each of the directions in this range) with primary speeds of 0.5-2.1 m/s. Winds from the other directions come at lower frequencies of up to 8% (from each direction). During this season we notice that the winds blow at speeds lower than 0.5-2.1 m/s at a prevalence of 82% from all directions.

In the fall winds blow mainly from southeast to northwest at a maximum rate of up to 10%-27% (from each of the directions in this range), with primary speeds of 0.5-2.1 m/s; prevalence of winds from the other directions is up to 8% (from each of the directions in this range), while almost no winds come from the southwest to the northeast. The prevailing winds during this season come at speeds lower than 0.5-2.1 m/s at a rate of 78.4% from all directions.

Figures 23-27 describe the wind directions and speeds for all hours of the day.

In the morning hours most of the wind comes from the south to the east at a rate of 8%-12% from each of the directions in this range, with primary speeds of 0.5-2.1 m/s. Winds blowing from the northeast to the northwest come at lower rates of up to 2% from all directions. From the east the winds blow at higher speeds (primary speed of 5.7-8.8 m/s). Most of the winds blowing at these hours come at low speeds of 0.5-2.1 m/s at a rate of 52% from all directions.

At noontime the main wind direction switches from that seen during the morning and winds come mainly from the southwest to the northeast at a rate of 8.5%-21% (from each of the directions in this range), with a primary speed of 3.6-5.7 m/s at a rate of 4.5%-7%. From the other directions winds come at a rate of up to 4% (from each direction) except from the east, where the winds come at a rate of 7%. Most of the winds at these hours reach speeds of 3.6-5.7 m/s at a rate of 50% from all directions.

In the afternoon hours the main wind direction is primarily from the west to the north northwest at a maximum frequency of 19% (from each of the directions in this range) with a primary speed of 3.6-5.7 m/s. Winds from the opposite direction, from south southwest to

north northeast come at lower rates of up to 3% (from all directions in this range). The speed of the prevailing winds at these hours is 3.6-5.7 m/s at a rate of 38% from all directions.

In the evening the main wind direction is from west to north at a maximum rate of 12% (from each of the directions in this range), and the primary speed of the winds from this direction is low compared to the speed of the winds in the afternoon hours reaching 2.1-3.6 m/s. The prevailing winds at these hours come at speeds of 0.5-2.1 m/s at a rate of 48% from all directions.

At night the wind direction shifts and comes mainly from the south to the east at a maximum rate of 16% (from all directions in this range) with a primary speed of 0.5-2.1 m/s. Most of the winds at these hours decrease relative to the evening hours, and stands at 0.5-2.1 m/s at a rate of 70% from all directions.

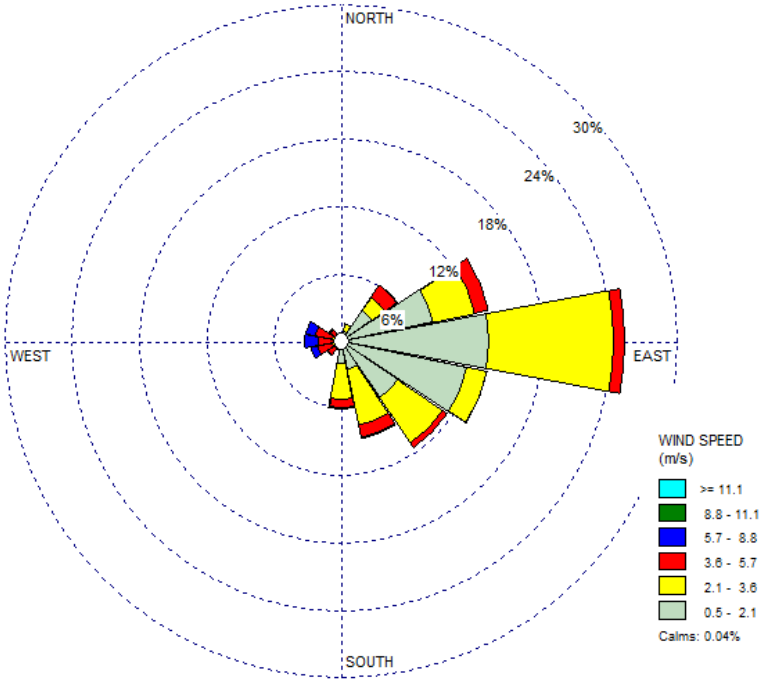


Figure 19: Wind rose – Hadera area in the winter, 2007-2011

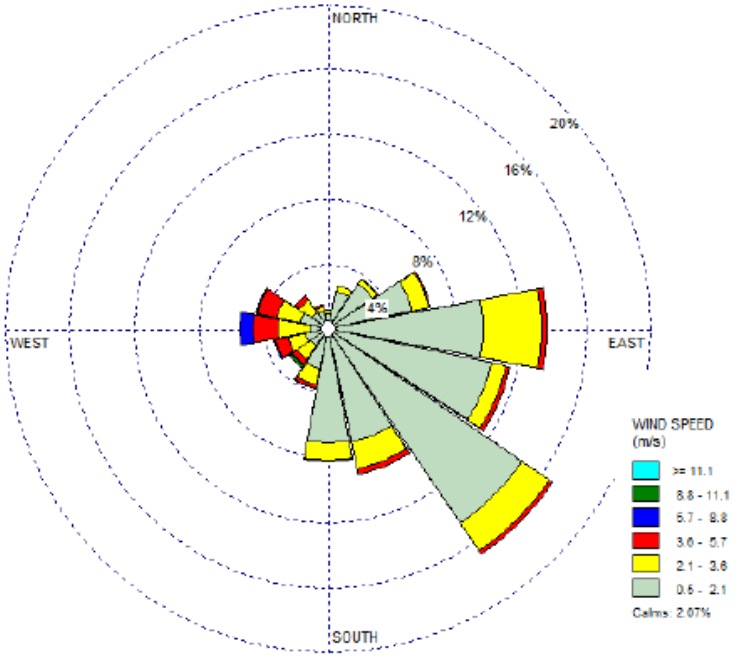


Figure 20: **Wind rose – Hadera area in the spring, 2007-2011**

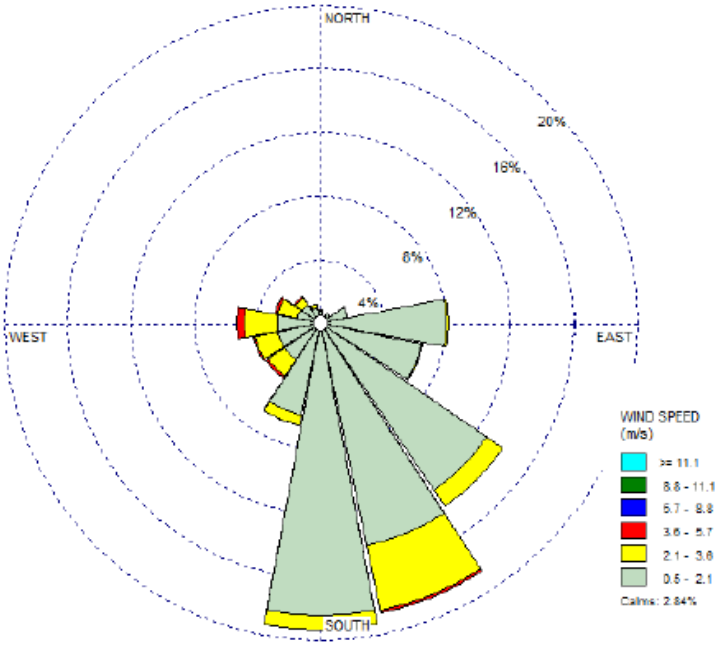


Figure 21: **Wind rose – Hadera area in the summer, 2007-2011**

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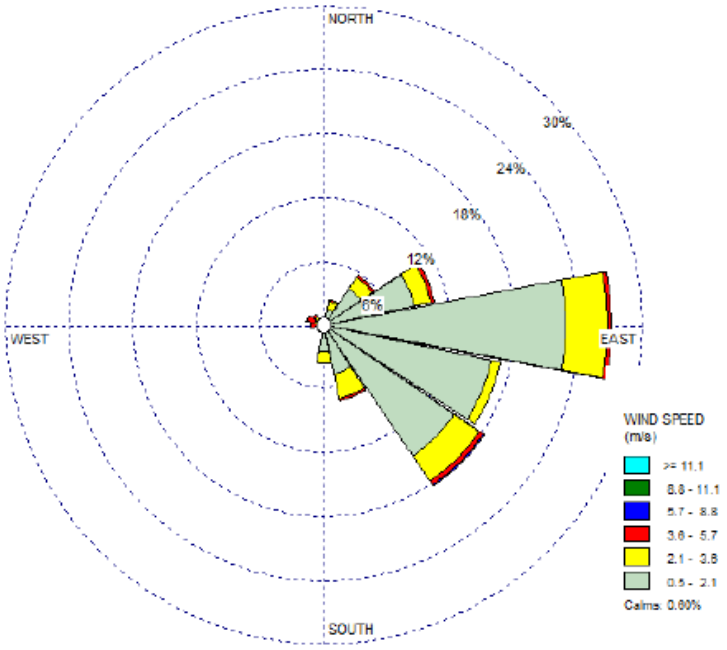

Figure 22: Wind rose – Hadera area in the fall, 2007-2011

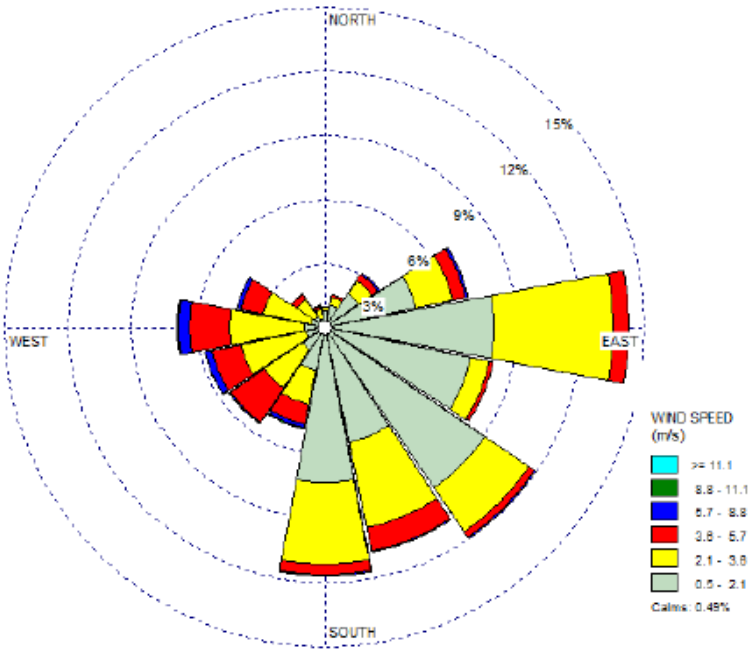

Figure 23: Wind rose – Hadera area in the morning (05:00-10:00), 2007-2011

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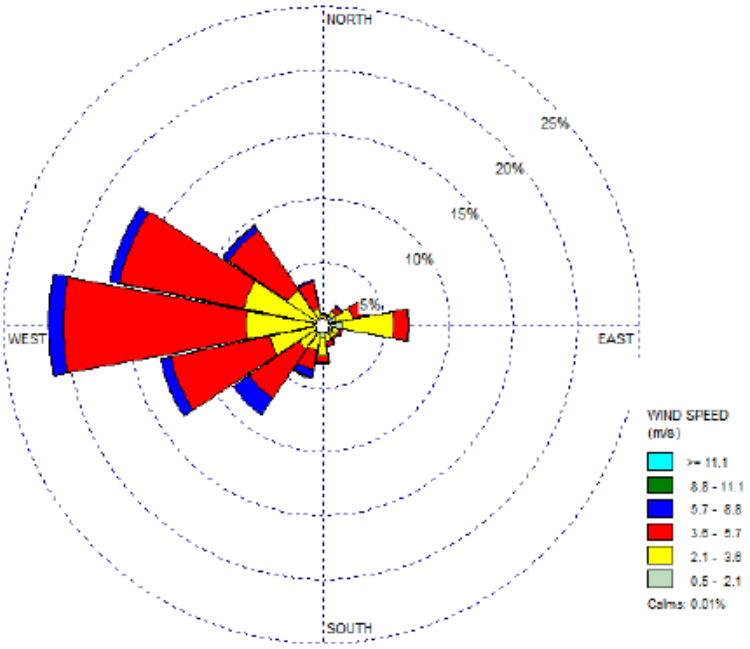

Figure 24: **Wind rose – Hadera area at noontime (10:00-14:00), 2007-2011**

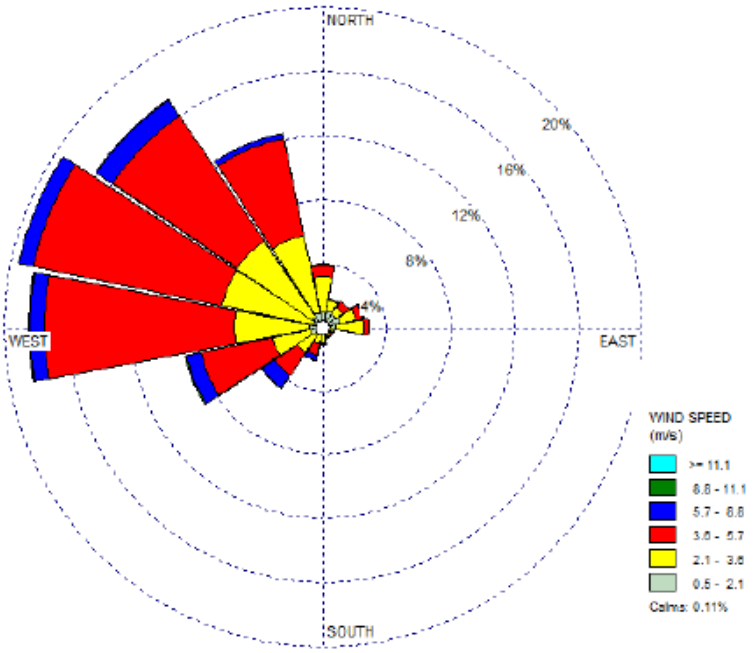

Figure 25: **Wind rose – Hadera area in the afternoon (14:00-18:00), 2007-2011**

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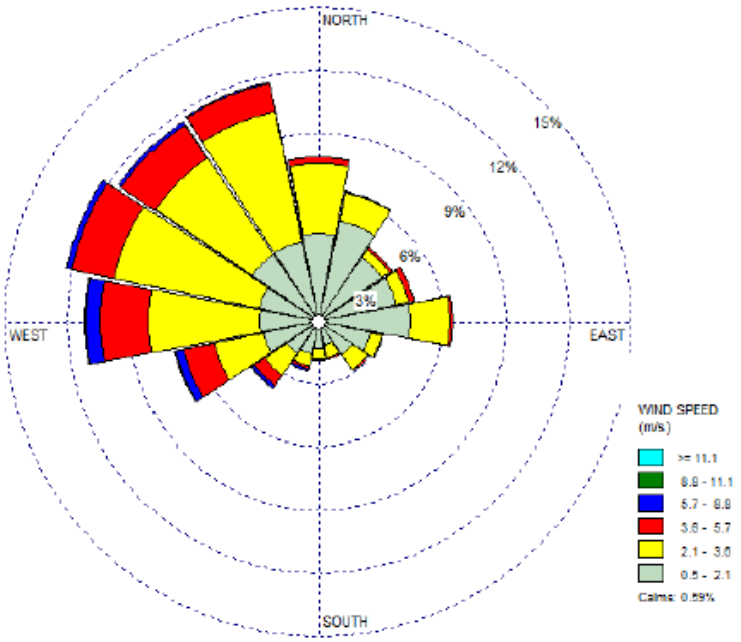

Figure 26: **Wind rose – Hadera area in the evening (18:00-21:00), 2007-2011**

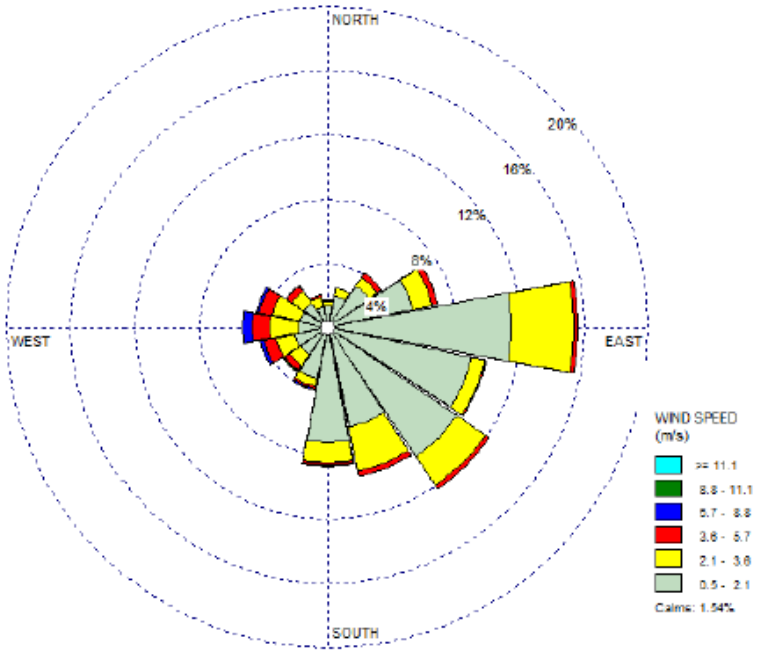

Figure 27: **Wind rose – Hadera area at night (00:00-05:00), 2007-2011**

Atmospheric stability

Figures 28-31 describe atmospheric stability according to the season of the year at the Hadera alternative site.

By looking at the figures we can see that in the winter most of the Class F atmospheric stability comes from the east at a maximum rate of 10.5% (from all directions in this area). The rate of the main stability conditions (Class F) is higher than all other stability conditions for the winter, and is 42% from all directions.

In the spring most of the Class F atmospheric stability comes from the southeast to the east at a maximum rate of 4%-5% (from each direction in this range). The rate of Class F stability conditions is the highest of all stability conditions for the spring, and is 37.5% from all directions.

During the summer season most of the stable Class F conditions come from the south at a rate of 6%. The rate of Class F stability conditions is the highest of all stability conditions for the summer and is 39% from all directions.

In the fall the stable (Class F) conditions reach maximum values of 12%, primarily from the east. The main stability condition for this season is Class F at a rate of 48%.

Figures 32-36 describe atmospheric stability for all hours of the day.

After dividing the hours in the day, the dominant stability conditions during the morning hours are Class F at a rate of 31% (coming mainly from the south to the east) and Class D at a rate of 30% coming from all directions.

In the noontime hours, since the soil is warm, there are no stable Class F stability conditions but rather Class B, coming mainly from the northwest to the southwest at a rate of 7%-11% (from all directions in this range). The rate of Class B stability conditions is 47% from all directions.

Towards the afternoon hours the soil starts to cool and we begin to see the occurrence of Class F stability conditions but at low rates (up to 1% from the northwest direction). Most of the atmospheric stability conditions for these hours are Class D and Class C from the west to the north northwest. The rate of Class D and Class C atmospheric stability is 40% from all directions for these hours.

In the evening hours the soil is already colder and the range of stable atmospheric stability (to Class F) has increased and comes from the northwest to the east southeast at rates of 5% to 7% from each of these directions, and a rate of 57% of all directions for these hours.

At night the soil is cold and the Class F atmospheric stability reaches a peak from the south to the east at a rate of 29% (from all directions in this range), and from the southeast at a rate of 9%-15% with 79% from all directions for these hours.

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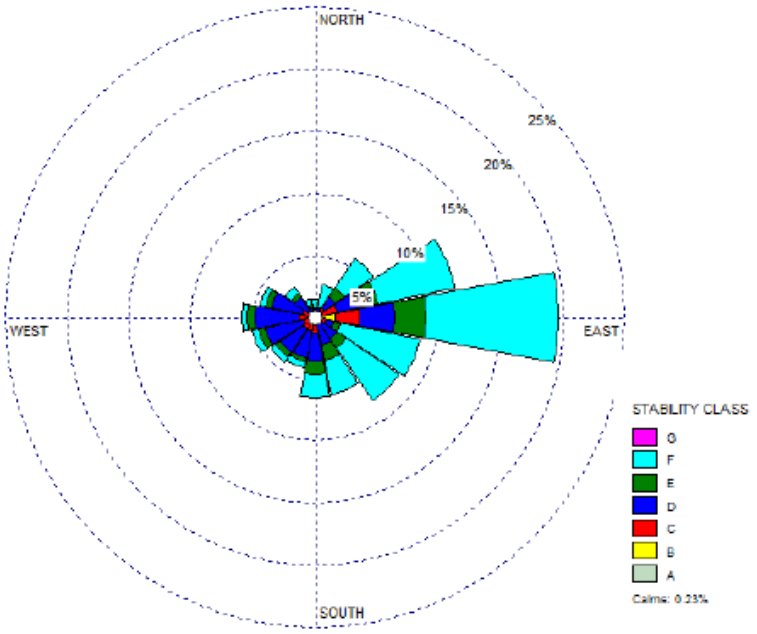

Figure 28: **Atmospheric stability rose – Hadera area in the winter, 2007-2011**

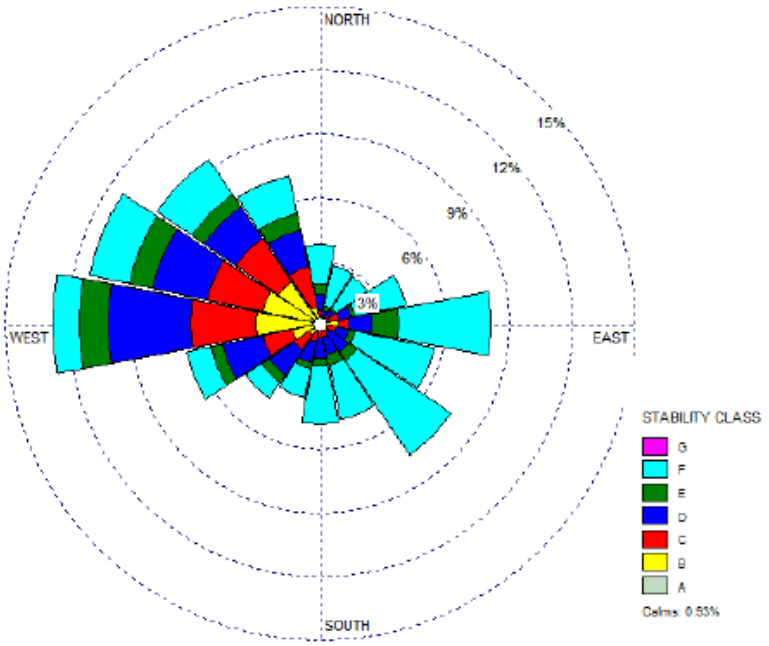

Figure 29: **Atmospheric stability rose – Hadera area in the spring, 2007-2011**

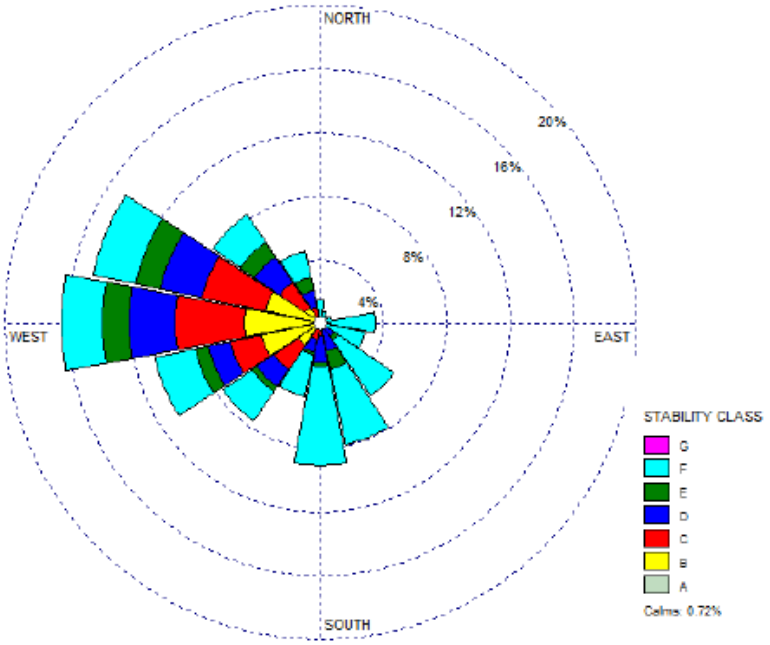

Figure 30: **Atmospheric stability rose – Hadera area in the summer, 2007-2011**

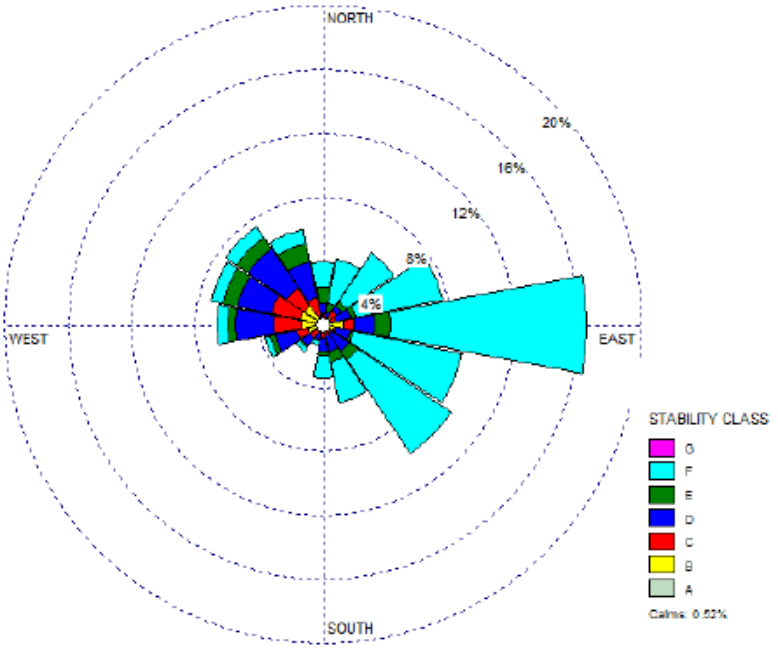

Figure 31: **Atmospheric stability rose – Hadera area in the fall, 2007-2011**

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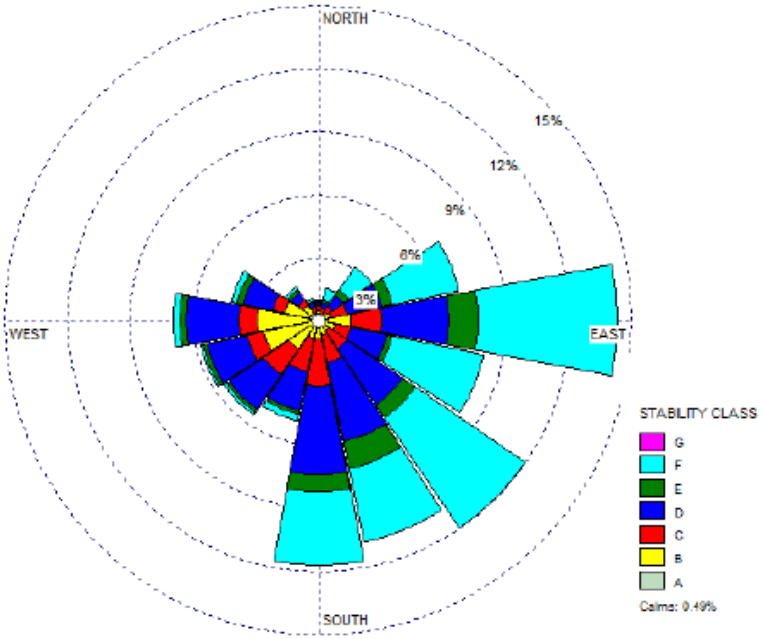

Figure 32: **Atmospheric stability rose – Hadera area in the morning (05:00-10:00), 2007-2011**

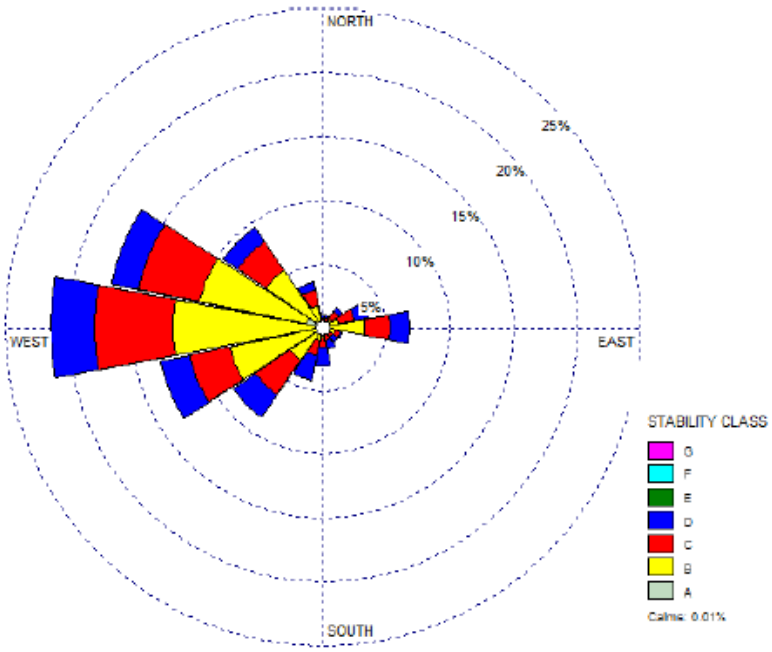

Figure 33: **Atmospheric stability rose – Hadera area at noon (10:00-14:00), 2007-2011**

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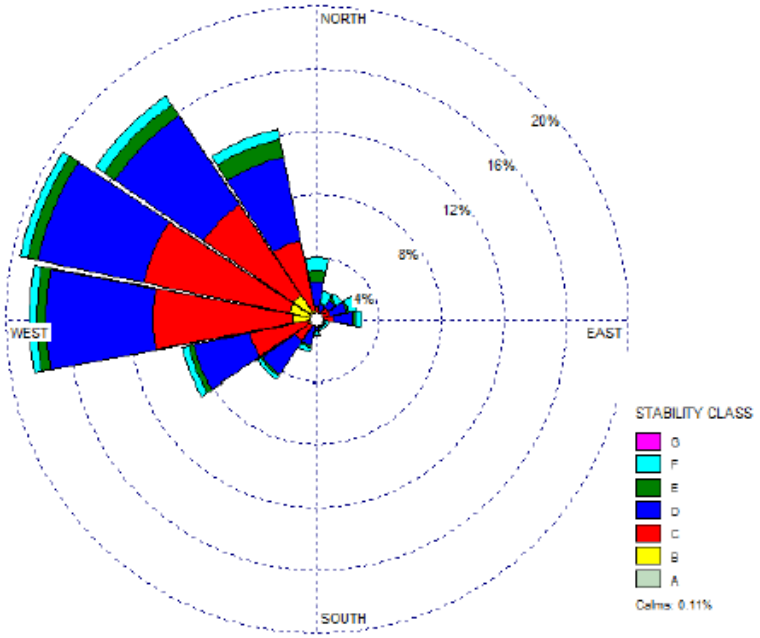

Figure 34: **Atmospheric stability rose – Hadera area in the afternoon (14:00-18:00), 2007-2011**

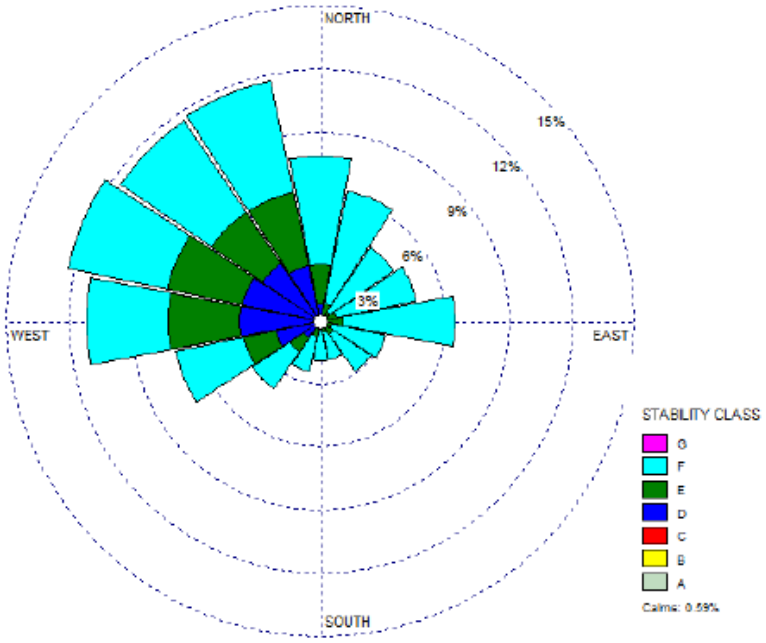

Figure 35: **Atmospheric stability rose – Hadera area in the evening (18:00-21:00), 2007-2011**

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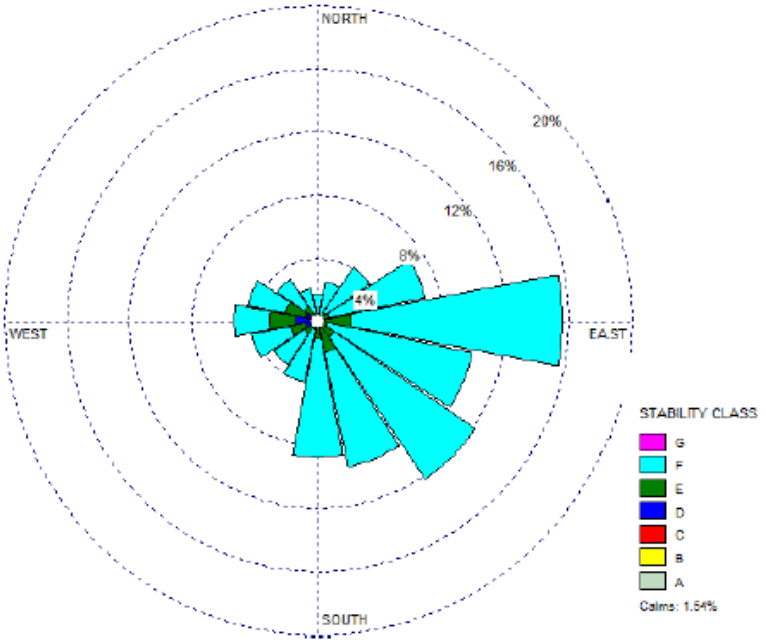

Figure 36: Atmospheric stability rose – Hadera area at night (00:00-05:00), 2007-2011

Meretz Wastewater Treatment Facility Alternative

Surface winds by season and for all hours of the day

According to Figures 37-40 we can see that in the area of HaMa'apil during the winter the main wind direction is from south to northeast at rates of 7%-14% from each direction in this range. The primary wind speed from these directions is 0.5-2.1 m/s. Speeds of the prevailing winds for this season were 0.5-2.1 m/s at a rate of around 49% from all directions.

In the spring the winds blow mainly from the west and west southwest with a maximum frequency of 12% from each of these directions, and with a primary speed of 3.6-5.7 m/s. Winds from the south southeast and the southeast have a maximum frequency of 10% with a primary speed of 0.5-2.1 m/s. The speed of the prevailing winds during this season is 0.5-2.1 m/s at a rate of 49% from all directions.

In the summer the primary wind direction is from the west and west southwest 18% and 15%, respectively), and from the south and south southeast at a rate of 12% from each of these directions. Winds from the other directions come at lower frequencies (up to 6% from each direction). The speed of the prevailing winds during this season is 0.5-2.1 m/s at a rate of 46% from all directions.

In the fall winds come mainly from the northeast to the east southeast at a maximum rate of around 12% with primary speeds of 0.5-2.1 m/s (from each of the directions in this range). Frequency of winds from the other directions is lower, up to 7% with speeds divided in a

similar manner. Primary wind speeds during this season are 0.5-2.1 m/s at a rate of 58.6% from all directions.

Figures 41-45 describe the wind directions and speeds for all hours of the day.

In the morning hours most of the winds come from the southeast to the south at a maximum rate of 16% from each the south southeast, while the frequency of winds blowing from the other directions is lower, with a maximum rate of 8% from each direction. The speed of the prevailing winds at these hours is 0.5-2.1 m/s at a rate of 55.2% from all directions.

At noontime the main wind direction is from the west and west southwest at a rate of 19% and 28.5%, respectively, with a primary speed of 3.6-5.7 m/s. The speed of the prevailing winds at these hours reaches speeds of 3.6-5.7 m/s at a rate of 40% from all directions.

In the afternoon hours the main wind speeds and directions are similar to those seen during the noontime hours.

In the evening the winds blow from all directions, although winds from the southwest to northwest are more dominant, with a maximum rate of 12% from the west with a primary speed of 2.1-2.6 m/s from this direction. From the other areas winds come at a frequency of 3%-6% (for each direction) with a primary speed of 0.5-2.1 m/s. The prevailing winds at these hours come at speeds of 0.5-2.1 m/s at a rate of 60% from all directions.

At night the wind comes mainly from the south to the east southeast at a maximum rate of 11%-18% (from all directions in this range) with winds from the southeast and east southeast being most dominant. The primary wind speed from these directions is 0.5-2.1 m/s. The prevailing winds at these hours come at speeds of 0.5-2.1 m/s at a rate of 75% from all directions.

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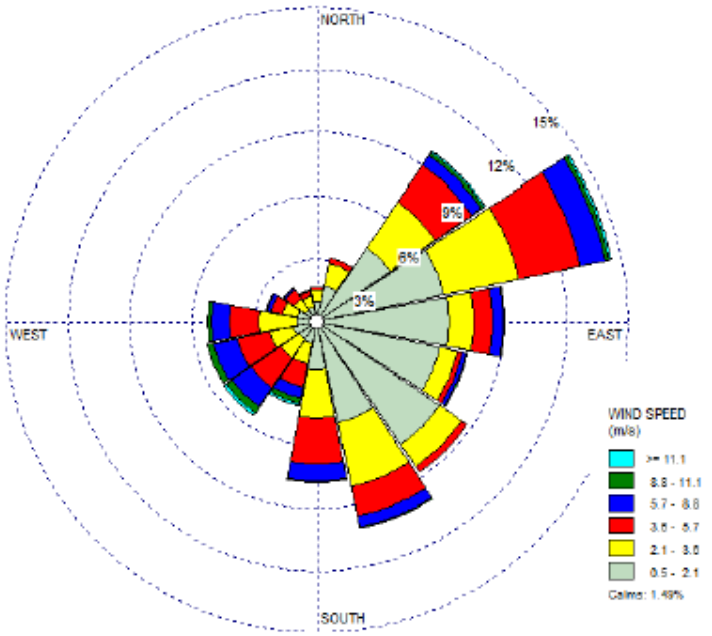

Figure 37: **Wind rose – HaMa'apil area in the winter, 2007-2011**

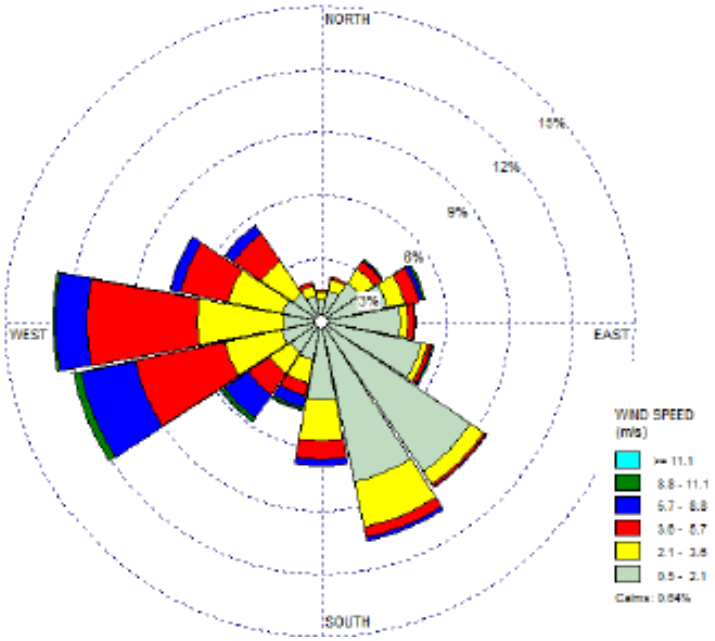

Figure 38: **Wind rose – HaMa'apil area in the spring, 2007-2011**

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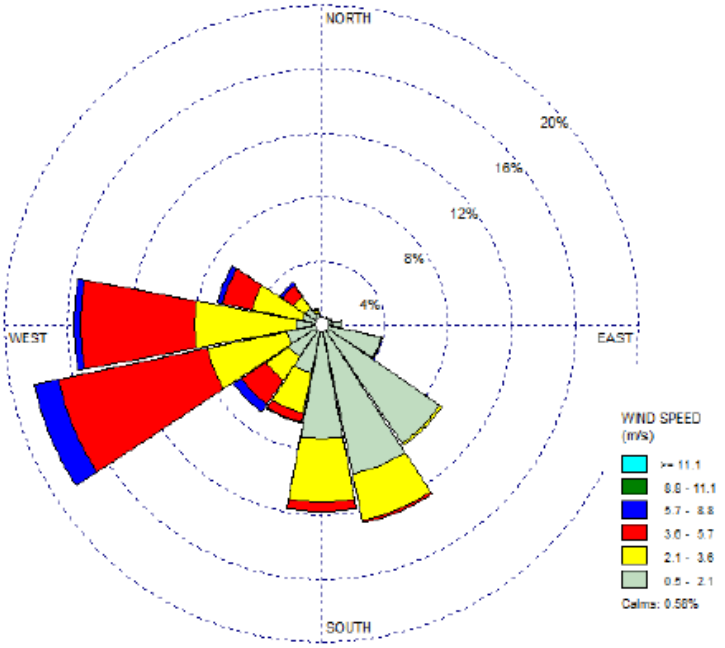

Figure 39: **Wind rose – HaMa'apil area in the summer, 2007-2011**

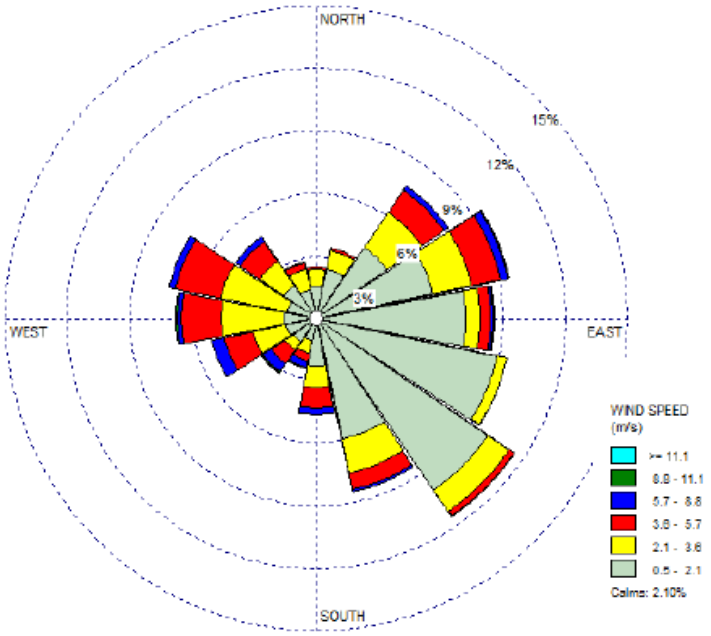

Figure 40: **Wind rose – HaMa'apil area in the fall, 2007-2011**

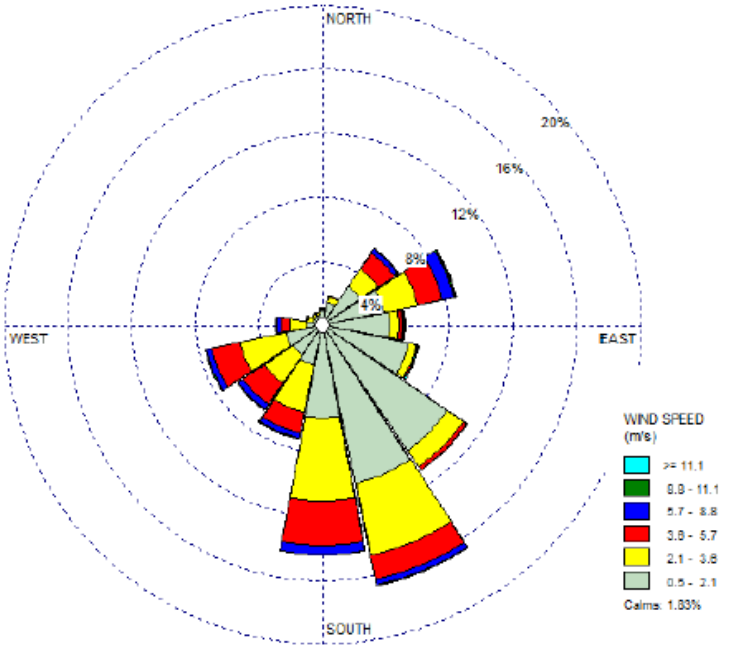

Figure 41: **Wind rose – HaMa'apil area in the morning (05:00-10:00), 2007-2011**

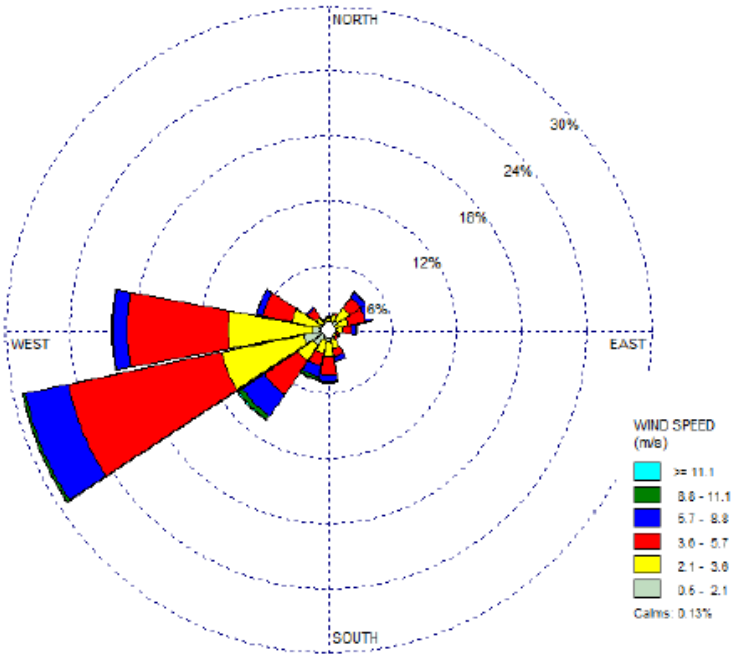

Figure 42: **Wind rose – HaMa'apil area at noontime (10:00-14:00), 2007-2011**

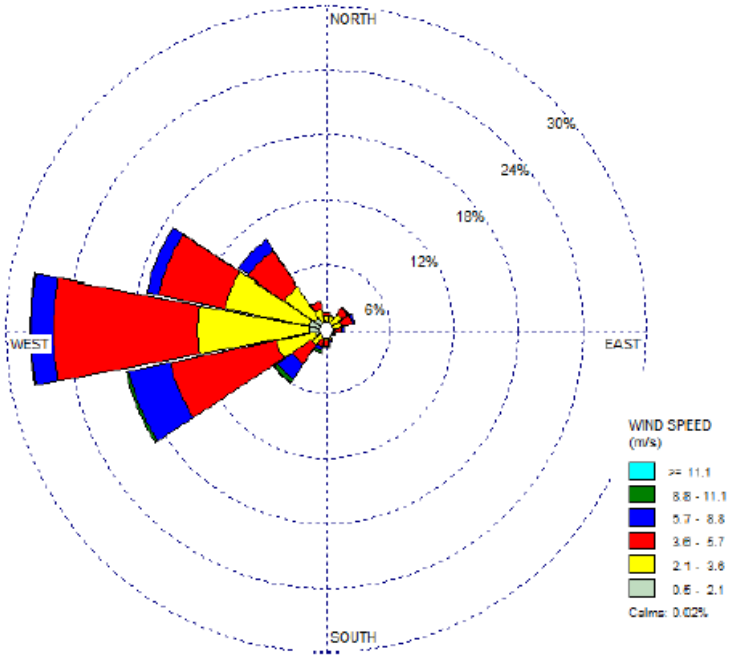

Figure 43: **Wind rose – HaMa'apil area in the afternoon (14:00-18:00), 2007-2011**

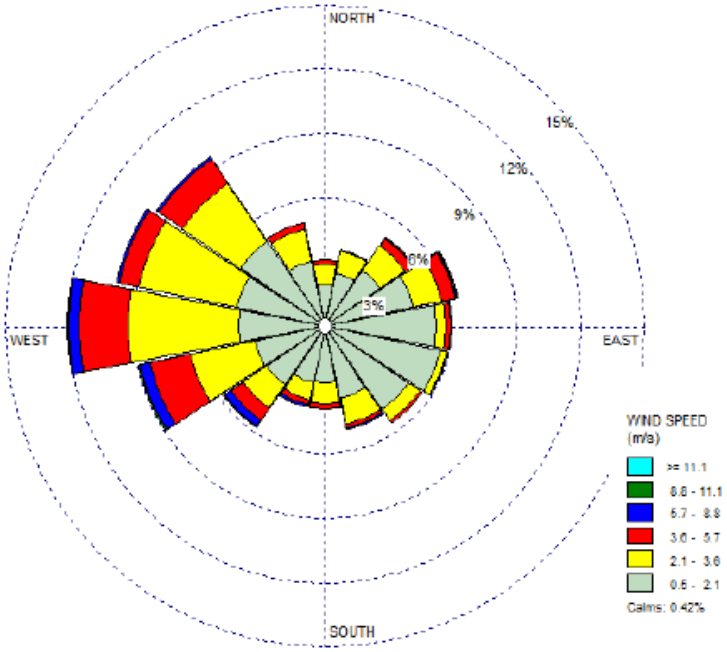

Figure 44: **Wind rose – HaMa'apil area in the evening (14:00-18:00), 2007-2011**

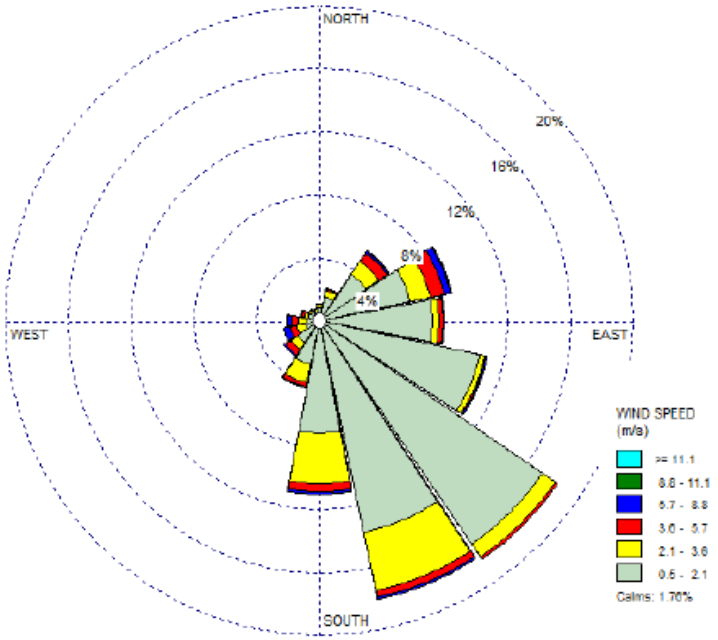

Figure 45: Wind rose – HaMa'apil area at night (18:00-21:00), 2007-2011

Atmospheric stability

Figures 46-49 describe atmospheric stability during the various seasons at the HaMa'apil site.

According to the figures we can see that in the winter most of the Class F atmospheric stability comes from the northeast to the south southeast at a rate of 4.5%-7% (from all directions in this area). From the other directions Class F atmospheric stability reaches a frequency of up to 2%. The primary atmospheric stability from all directions is Class F, with a rate of 43%.

In the spring most of the Class F atmospheric stability comes from the southeast to the south southeast at a rate of 7%-8% (from all directions in this range). From the other directions Class F atmospheric stability reaches a frequency of up to 4%. The primary atmospheric stability from all directions is Class F, with a rate of 43%.

During the summer season most of the Class F atmospheric stability comes from the south to the southeast at rates of 8%-10% (from all directions in this range). From the other directions Class F atmospheric stability reaches a frequency of up to 3.8% (from each direction). The primary atmospheric stability from all directions is Class F, with a rate of 44%.

In the fall the primary stable stability conditions (Class F) come from the south southeast to the northeast at rates of 4%-9.3% (from all directions in this range). The main stability condition from all directions is Class F with a rate of 50%.

Figures 50-54 describe atmospheric stability for all hours of the day.

According to these figures, during the morning hours most of the Class F atmospheric stability comes from the southeast and south southeast at a rate of 7% from these directions. The primary atmospheric stability from all directions is Class F and stands at a rate of 32%.

In the noontime hours, since the soil is warm, there are no stable Class F stability conditions and thus the main stability conditions during these hours are Class B, coming mainly from the east and east southeast. The rate of Class B stability conditions is 48% from all directions.

Towards the afternoon hours the soil starts to cool and we begin to see the occurrence of Class F stability conditions but at low rates; most of the atmospheric stability conditions for these hours are Class D and Class C from the west to the north northwest. The rate of Class D and Class C atmospheric stability is 40% and 36%, respectively, from all directions for these hours.

In the evening hours the soil is already colder and the range of stable atmospheric conditions (Class F) has increased and reaches an overall rate of 68% from all directions.

At night the soil is cold and Class F atmospheric stability is high, coming mainly from the south to the east at a rate of 7%-19% (from all directions in this range). The percentage of Class F stability from all directions during these hours reaches a rate of 84%.

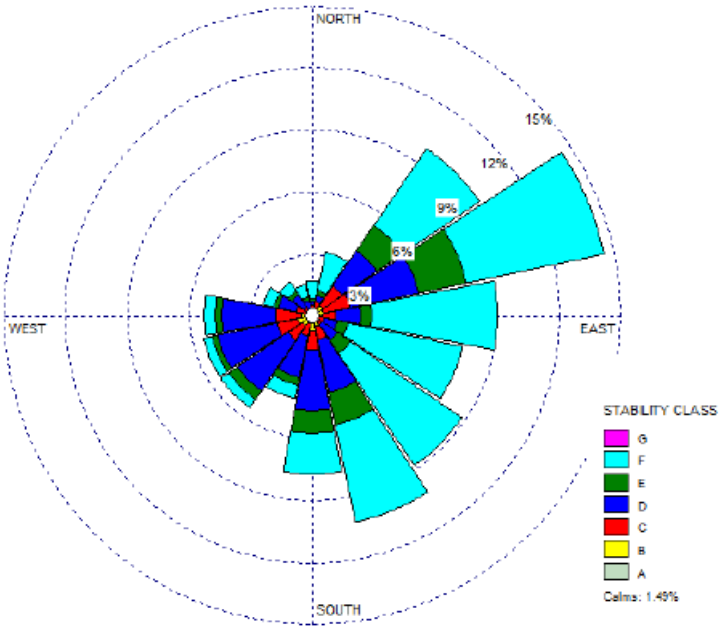

Figure 46: Atmospheric stability rose – HaMa'apil area in the winter, 2007-2011

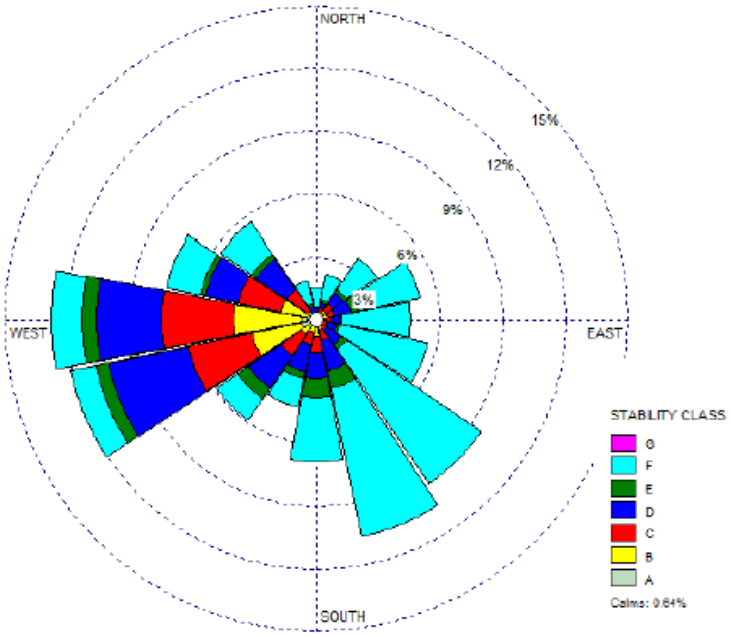

Figure 47: Atmospheric stability rose – HaMa'apil area in the spring, 2007-2011

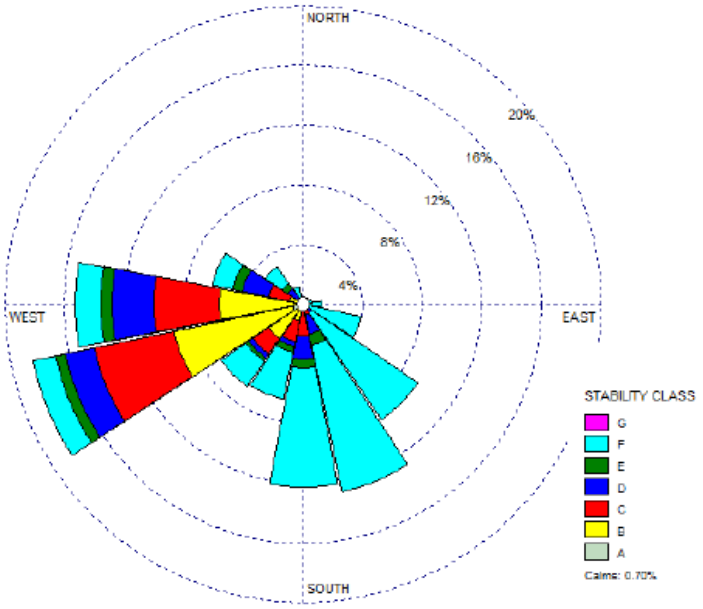

Figure 48: Atmospheric stability rose – HaMa'apil area in the summer, 2007-2011

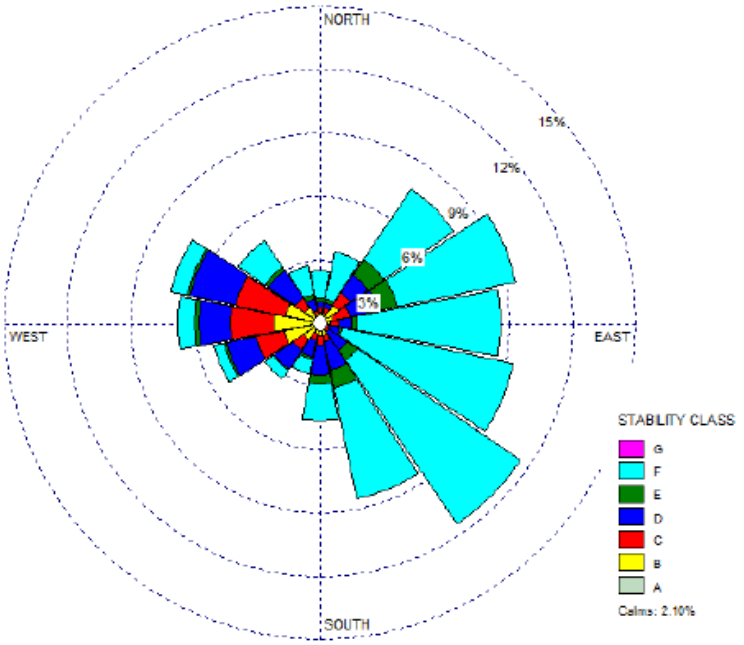

Figure 49: Atmospheric stability rose – HaMa'apil area in the fall, 2007-2011

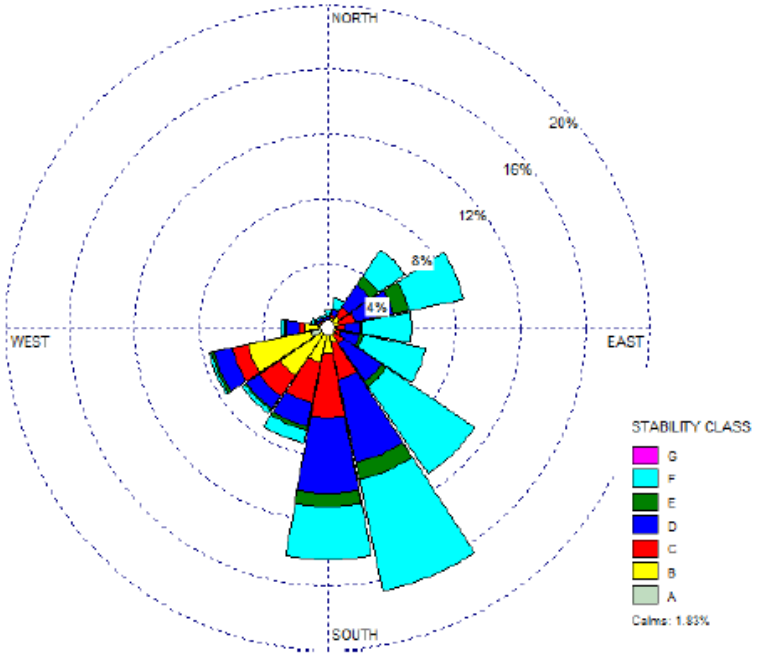

Figure 50: Atmospheric stability rose – HaMa'apil area in the morning (05:00-10:00), 2007-2011

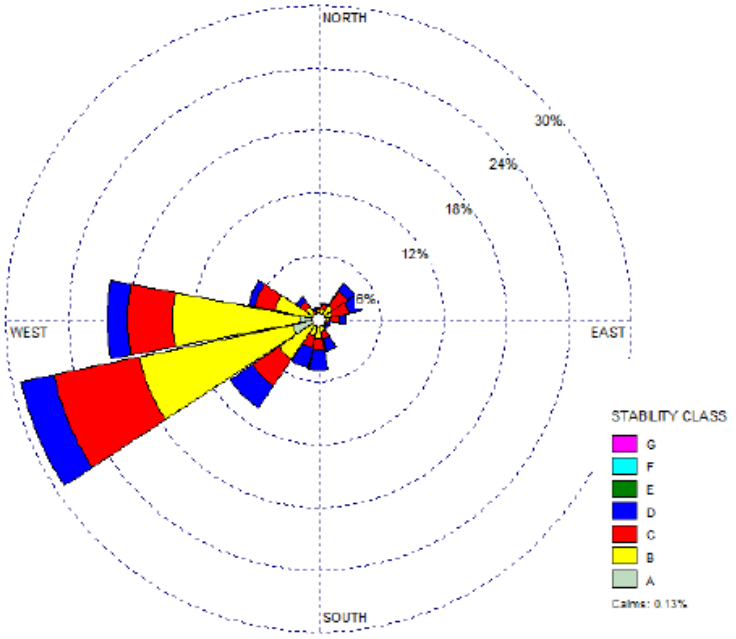

Figure 51: Atmospheric stability rose – HaMa'apil area at noontime (10:00-14:00), 2007-2011

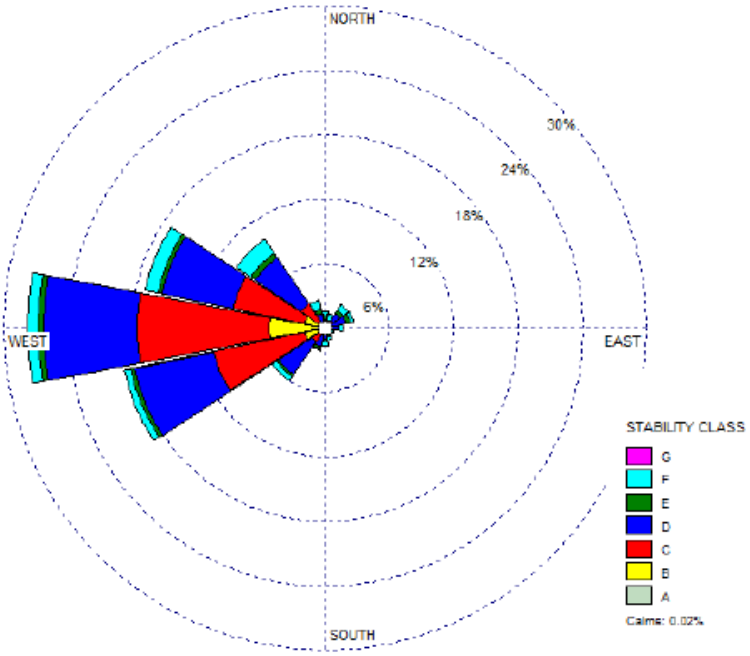

Figure 52: Atmospheric stability rose – HaMa'apil area in the afternoon (14:00-18:00), 2007-2011

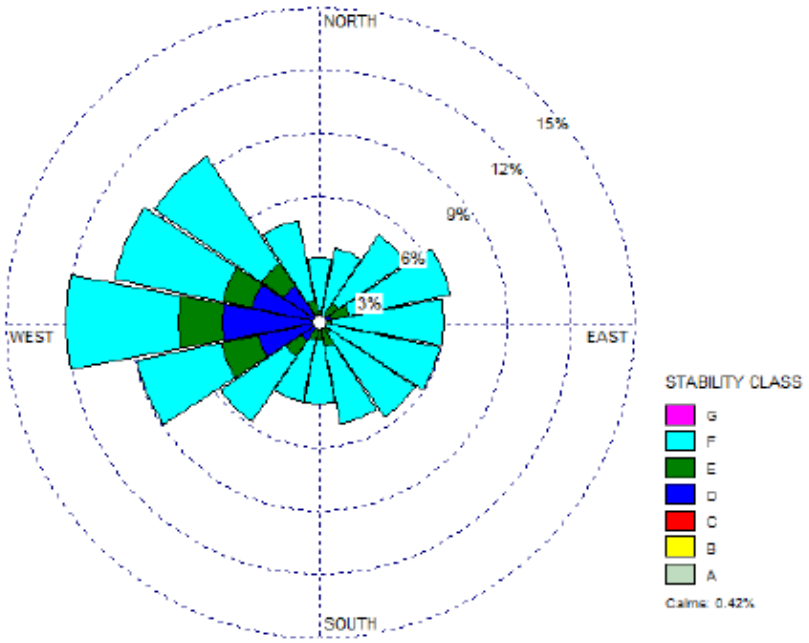

Figure 53: Atmospheric stability rose – HaMa'apil area in the evening (18:00-21:00), 2007-2011

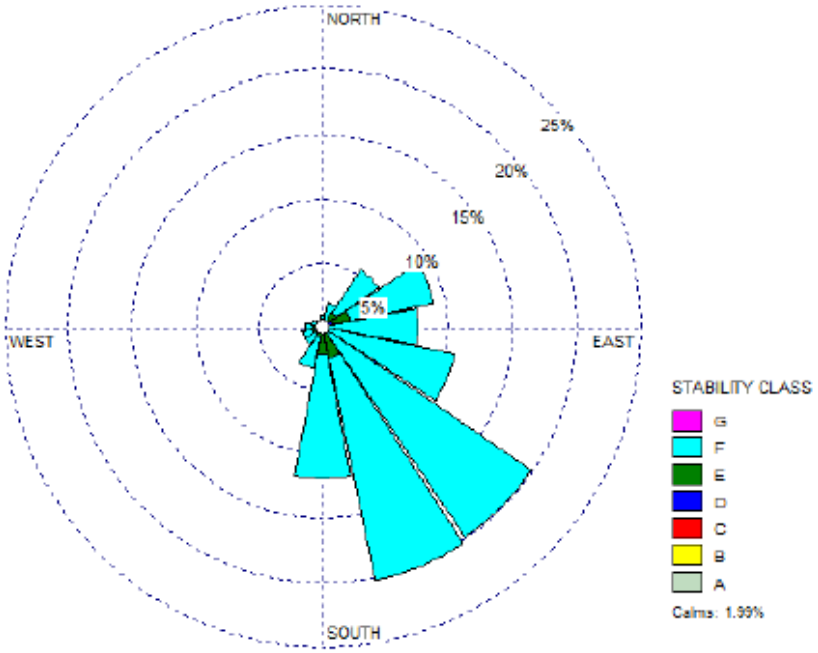

Figure 54: Atmospheric stability rose – HaMa'apil area at night (00:00-05:00), 2007-2011

Hagit Site Alternative

Surface winds by season and for all hours of the day

According to Figures 55-58 we can see that in the area of Elyakim during the winter the main wind direction is from the east northeast at rates of about 30% from this direction with primary speeds of 0.5-2.1 m/s. From the other directions the percentage of the winds is lower and stands at an average of around 5% from each direction. Speeds of the prevailing winds for this season are 0.5-2.1 m/s at a rate of 50% from all directions.

In the spring the winds blow mainly from the west and west northwest, as well as from the east northeast, at a frequency of about 14% from each of these directions, and with wind speeds ranging from gentle to brisk. The speed of the prevailing winds during this season is 0.5-2.1 m/s at a rate of 46.5% from all directions.

In the summer the winds come from the west and the west northwest at a rate of 25% from each direction in this range. Additional frequent wind directions come from the southwest, west southwest and northwest, at a frequency of 7%-13% from each of these directions. There are almost no winds from the other directions. The speed of the prevailing winds during this season is 0.5-2.1 m/s at a rate of 39% from all directions.

In the fall winds come mainly from the east northeast at a rate of about 20% with primary speeds of 2.1-3.6 m/s. Frequency of winds from the other directions is lower, up to 10% from each direction. The primary wind speeds during this season are 0.5-2.1 m/s at a rate of 61.5% from all directions.

Figures 59-63 describe wind directions and speeds for all hours of the day at the Elyakim area.

In the morning hours most of the winds come from two main directions, southwest and east northeast, at rates of 13% and 20%, respectively, with a primary speed of 0.5-2.1 m/s. The speed of the prevailing winds at these hours is 0.5-2.1 m/s at a rate of 51.2% from all directions.

At noontime the main wind direction is from the west and west northwest at a rate of 24% from each direction, with a primary speed of 3.6-5.7 m/s. Winds with secondary frequency come from the east northeast at a rate of about 14% from this direction. The speed of the prevailing winds at these hours reaches speeds of 3.6-5.7 m/s at a rate of 40% from all directions.

In the afternoon hours the main wind directions come from the west northwest at a rate of 29% with a primary speed of 3.6-5.7 m/s. The speed of the prevailing winds at these areas is 3.6-5.7 m/s at a rate of 45.4% from all directions.

In the evening the winds begin to weaken and come mainly from the west northwest at a rate of 19%, and from the west at a rate of 16%. The speed of the prevailing winds at these hours is 0.5-2.1 m/s at a rate of 54.4% from all directions.

At night the wind becomes even weaker and comes mainly from the east northeast with primary speeds of 0.5-2.1 m/s. The primary wind speed from these directions is 0.5-2.1 m/s.

The speed of the prevailing winds at these hours is 0.5-2.1 m/s at a rate of 69.5% from all directions.

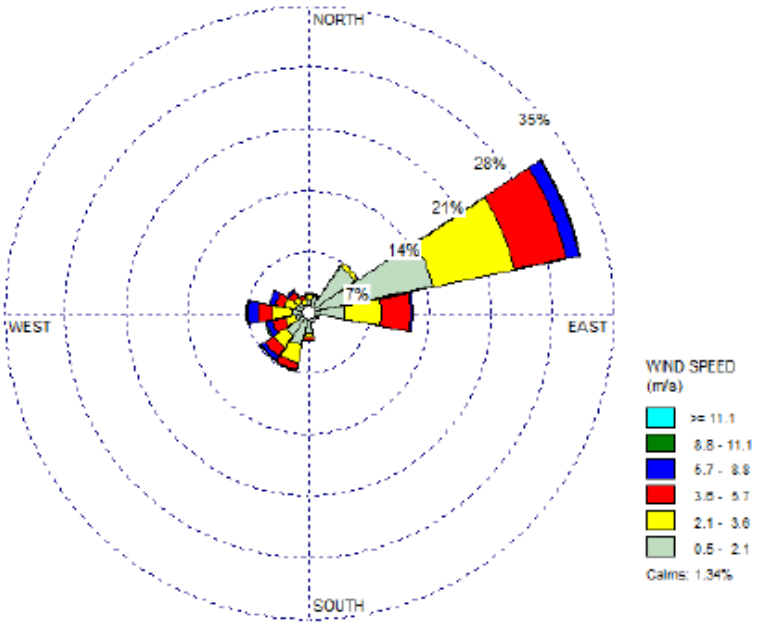

Figure 55: Wind rose – Elyakim area in the winter, 2007-2011

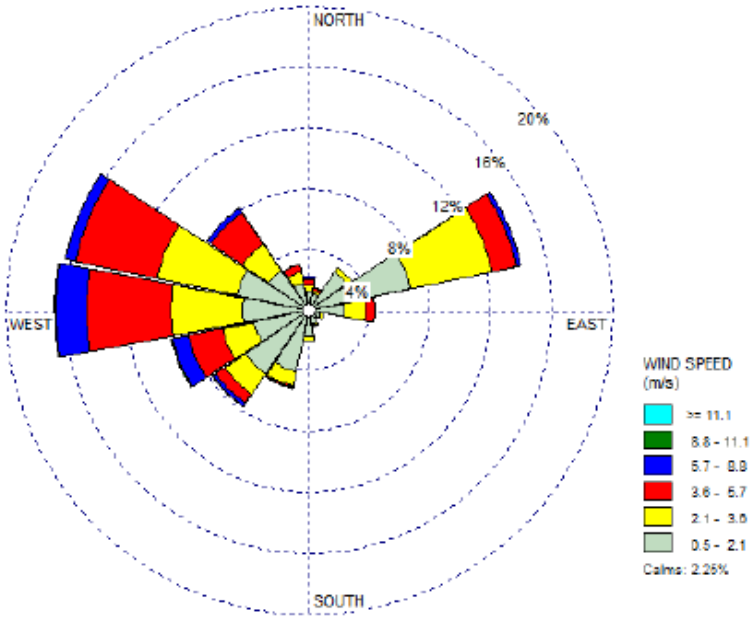

Figure 56: Wind rose – Elyakim area in the spring, 2007-2011

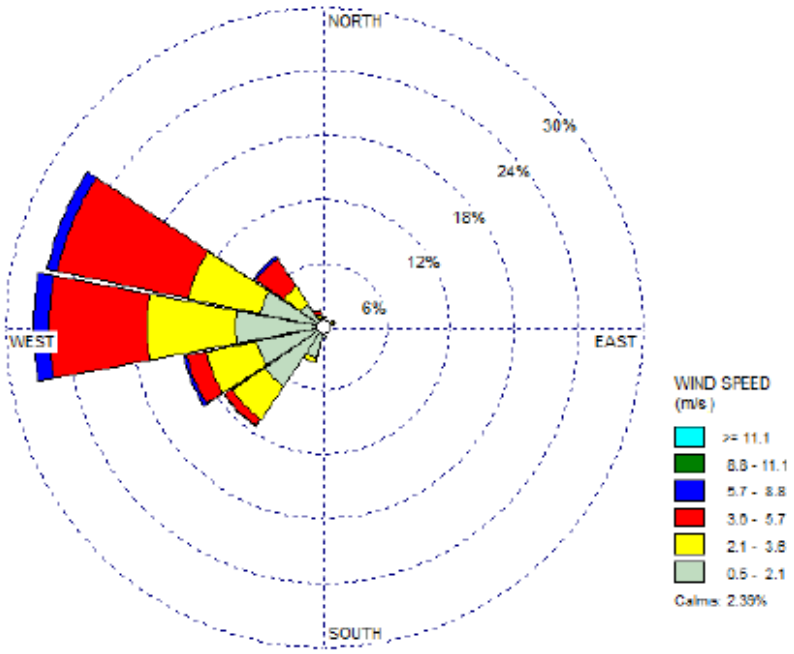

Figure 57: Wind rose – Elyakim area in the summer, 2007-2011

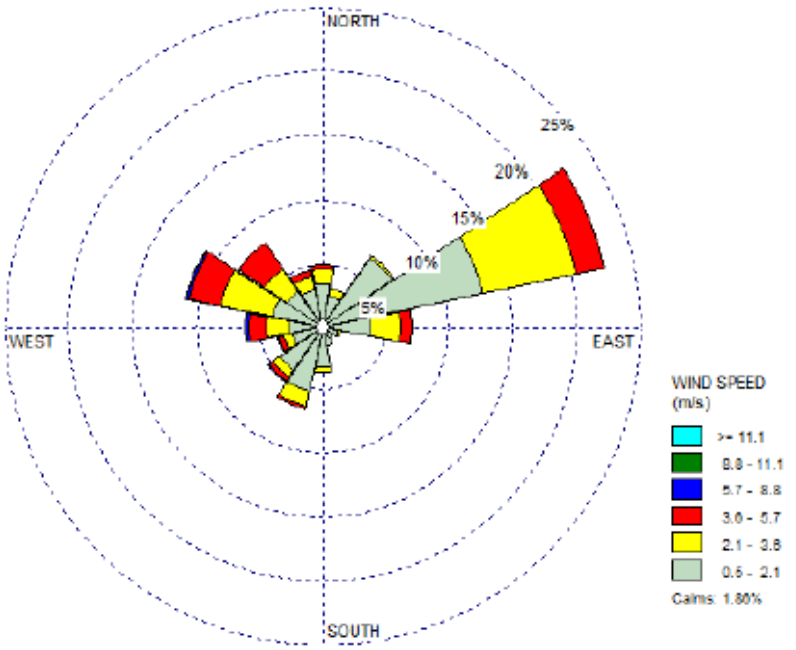

Figure 58: Wind rose – Elyakim area in the fall, 2007-2011

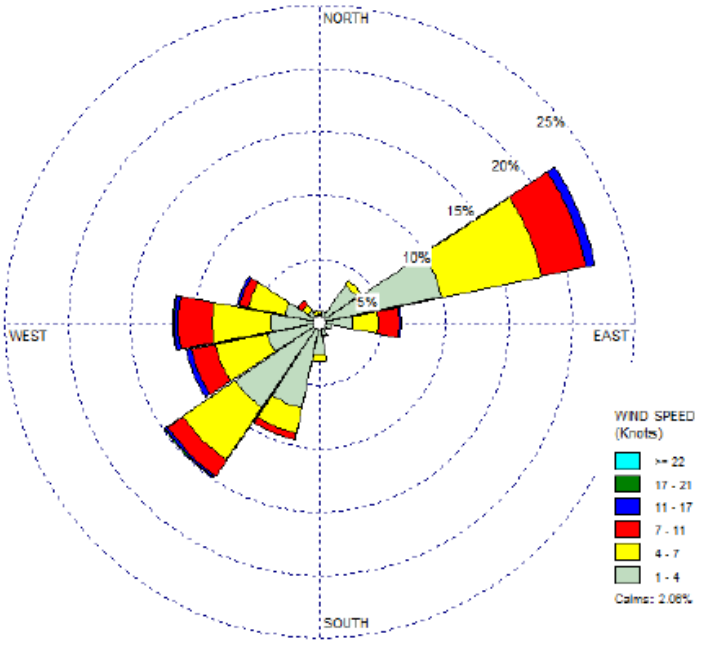

Figure 59: Wind rose – Elyakim area in the morning (05:00-10:00), 2007-2011

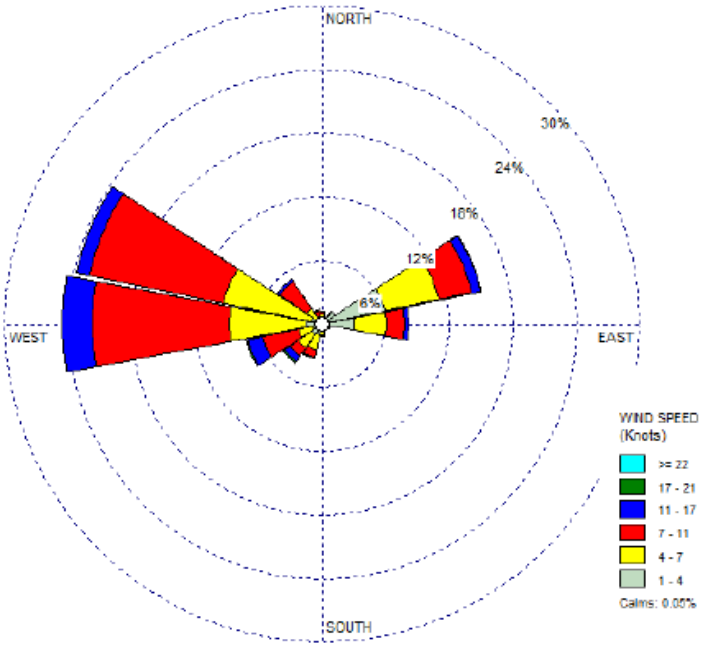

Figure 60: Wind rose – Elyakim area at noontime (10:00-14:00), 2007-2011

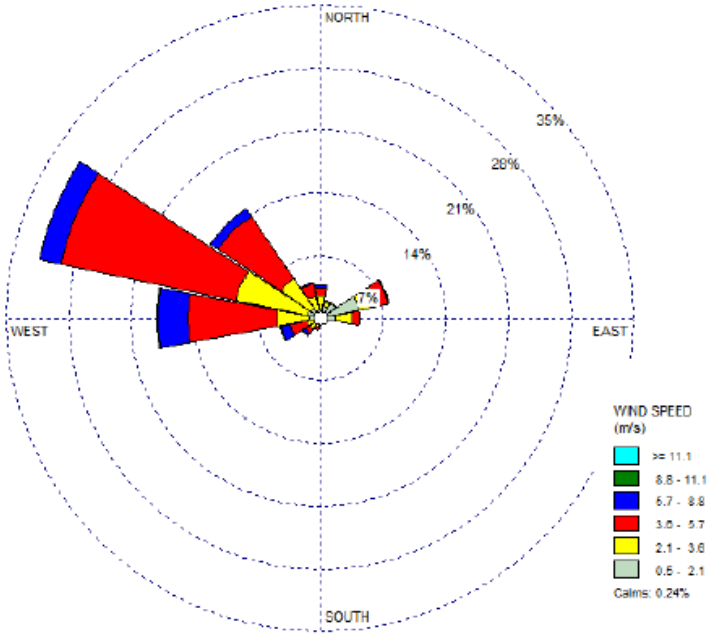

Figure 61: Wind rose – Elyakim area in the afternoon (14:00-18:00), 2007-2011

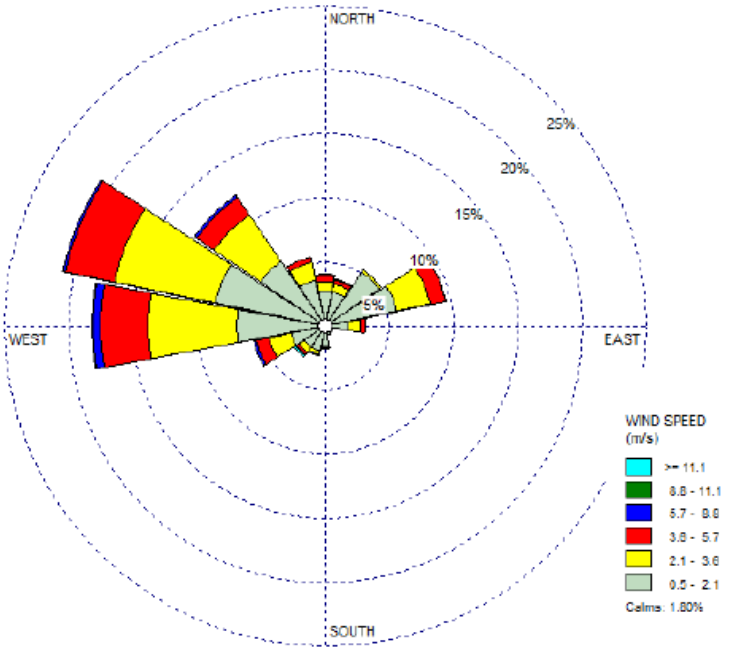

Figure 62: Wind rose – Elyakim area in the evening (18:00-21:00), 2007-2011

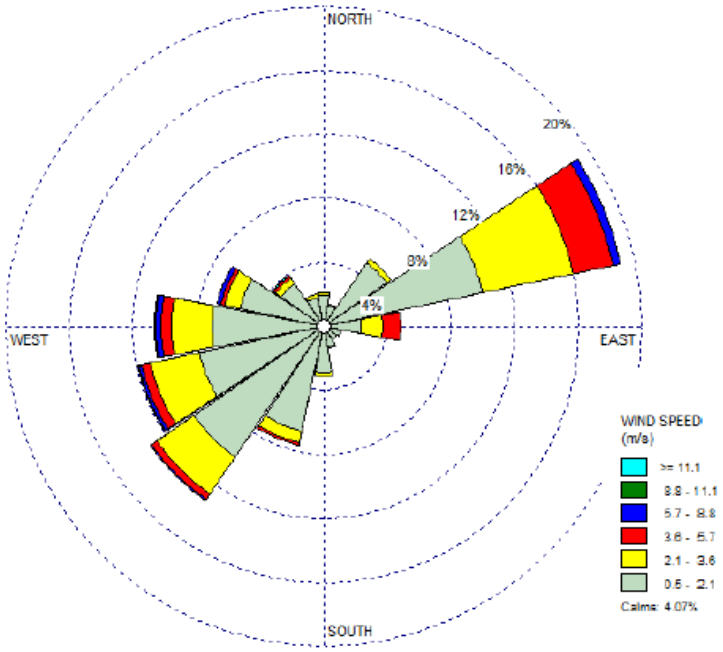

Figure 63: Wind rose – Elyakim area at night (00:00-05:00), 2007-2011

Atmospheric stability

Figures 64-67 describe atmospheric stability during the various seasons in the Elyakim area.

According to the figures we can see that in the winter most of the Class F atmospheric stability comes from the east northeast at a rate of 13%. The primary atmospheric stability from all directions is Class F, with a rate of 42%.

In the spring most of the Class F atmospheric stability comes from almost all directions at a rate of up to 6% from each direction, although maximum frequency is seen in the east northeast direction. The primary atmospheric stability from all directions is Class F, with a rate of 39%.

During the summer season most of the Class F atmospheric stability come from the west, west southwest and west northwest, at rates of 10%, 7.5% and 7%, respectively. The primary atmospheric stability from all directions is Class F, with a rate of 41%.

In the fall the primary stable stability conditions (Class F) come from the east northeast at a rate of 11%. The main stability condition from all directions is Class F with a rate of 50.4%.

Figures 68-72 describe atmospheric stability for all hours of the day in the Elyakim area.

According to these figures, during the morning hours most of the Class F atmospheric stability comes from the east northeast at a rate of 7% from this direction. The primary atmospheric stability from all directions is Class F and stands at a rate of 31%.

In the noontime hours, since the soil is warm there are no stable Class F stability conditions and thus the main stability conditions during these hours are Class B, coming mainly from the west and west northwest at rates of 13% and 12%, respectively. The rate of Class B stability conditions is 50% from all directions.

Towards the afternoon hours the soil starts to cool and we begin to see the occurrence of Class F stability conditions but at low rates; most of the atmospheric stability conditions for these hours are Class D and Class C from the west northwest, at rates of 11% and 15%, respectively. The main atmospheric stability rates are Class D and Class C at rates of 38% and 36%, respectively, from all directions for these hours.

In the evening hours the soil is already colder and the direction of the stable atmospheric conditions (Class F) is mainly from the west and the west northwest at rates of 12% and 10%, respectively. The main atmospheric stability from all directions is Class F, at a rate of 63.6%.

At night the soil is cold and Class F atmospheric stability is high, coming primarily from all directions at varying rates. The percentage of Class F stability from all directions during these hours reaches a rate of 81%.

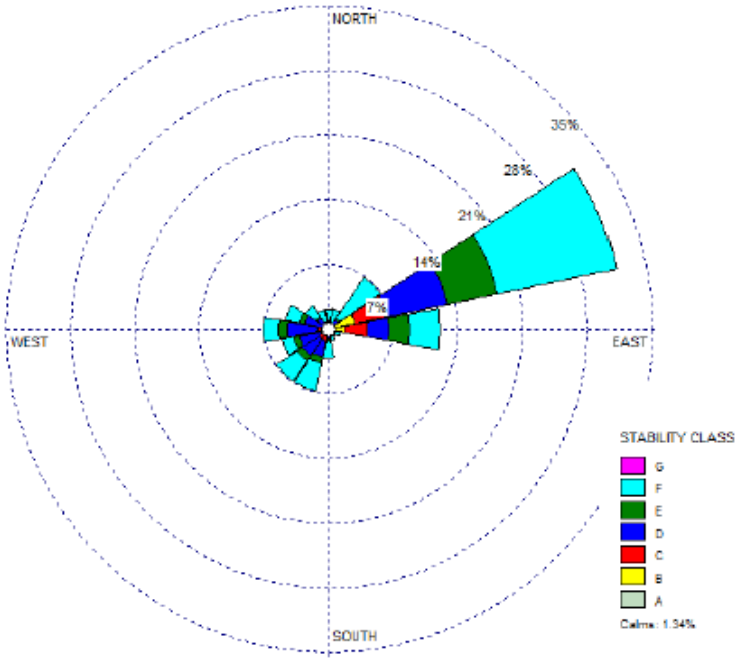

Figure 64: Atmospheric stability rose – Elyakim area in the winter, 2007-2011

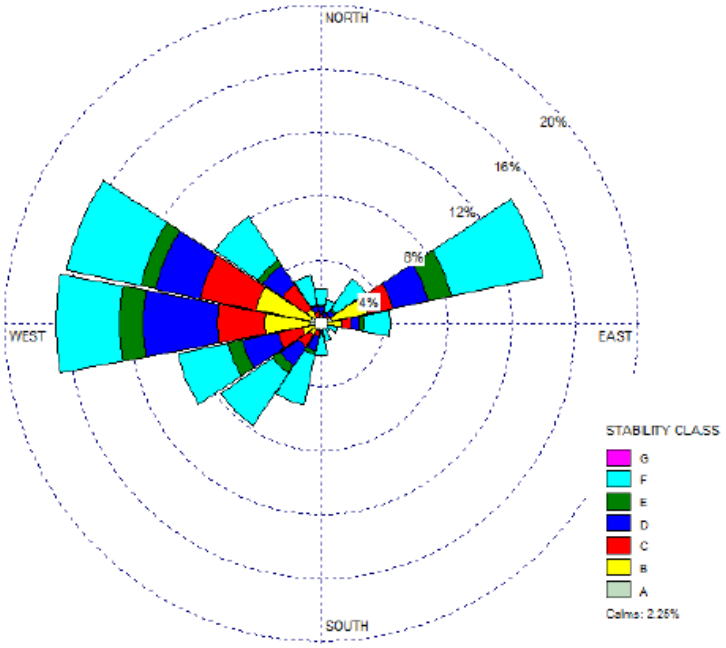

Figure 65: Atmospheric stability rose – Elyakim area in the spring, 2007-2011

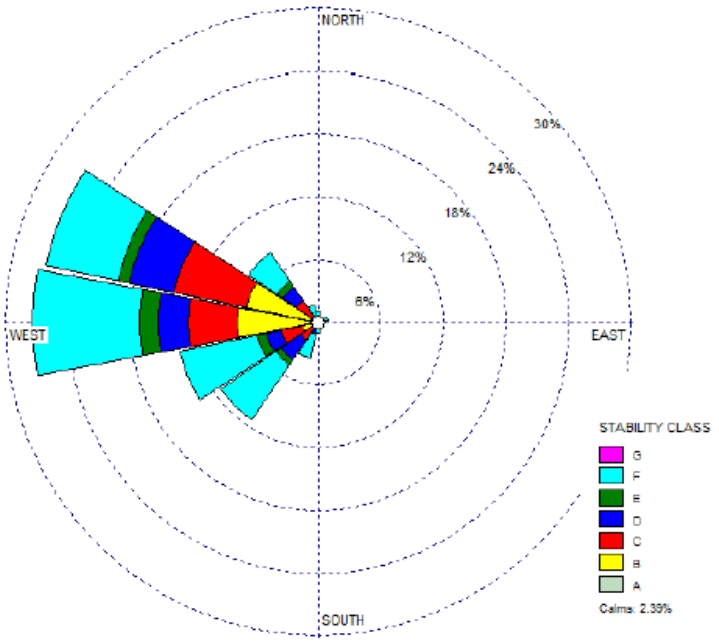

Figure 66: Atmospheric stability rose – Elyakim area in the summer, 2007-2011

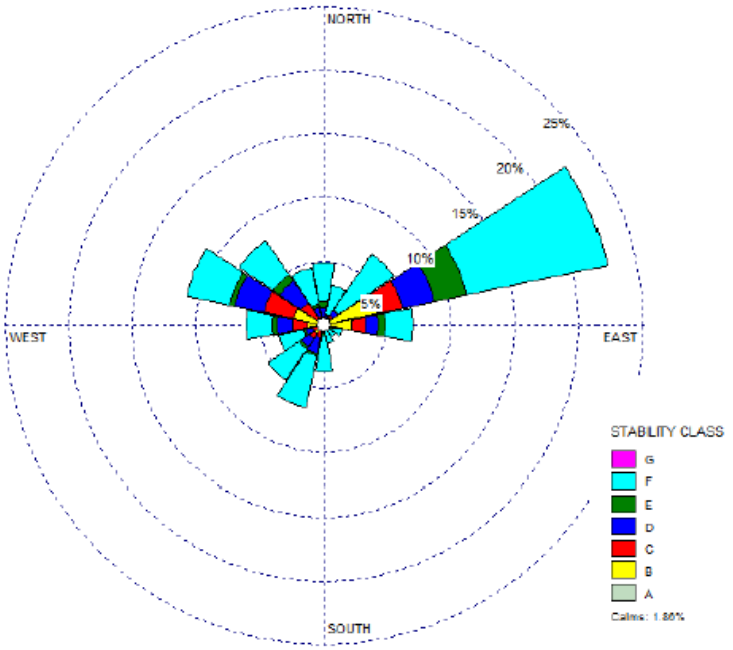

Figure 67: Atmospheric stability rose – Elyakim area in the fall, 2007-2011

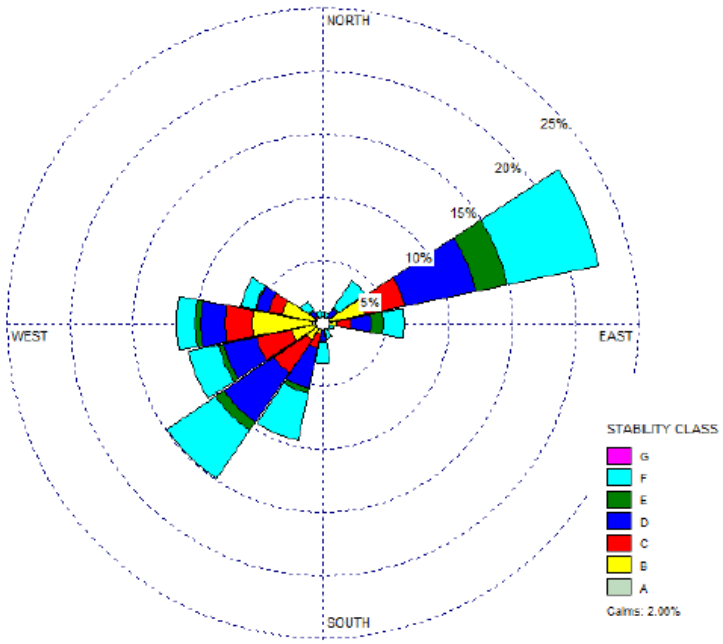

Figure 68: Atmospheric stability rose – Elyakim area in the morning (05:00-10:00), 2007-2011

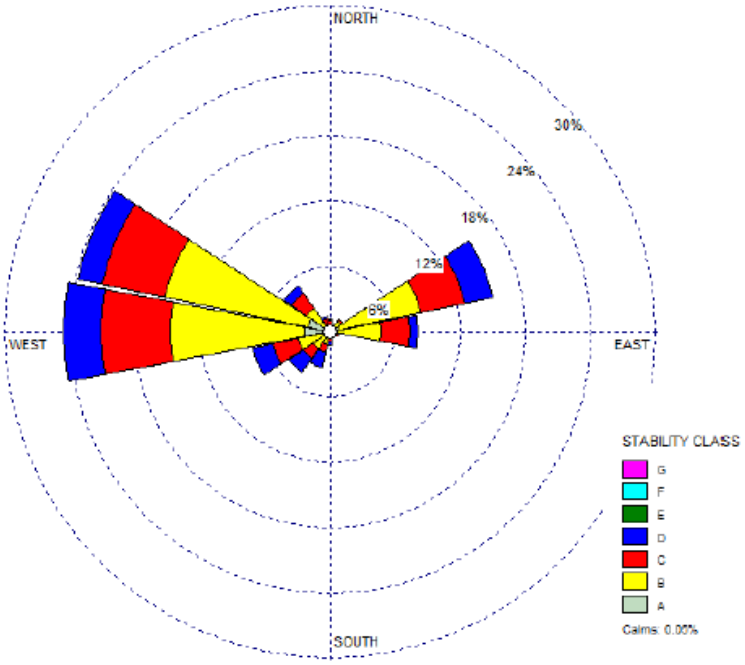

Figure 69: Atmospheric stability rose – Elyakim area at noontime (10:00-14:00), 2007-2011

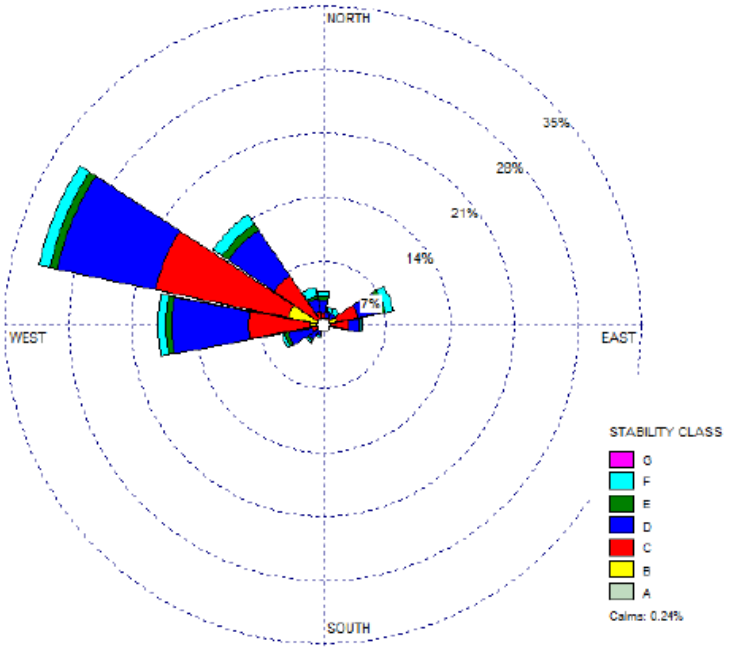

Figure 70: Atmospheric stability rose – Elyakim area in the afternoon (14:00-18:00), 2007-2011

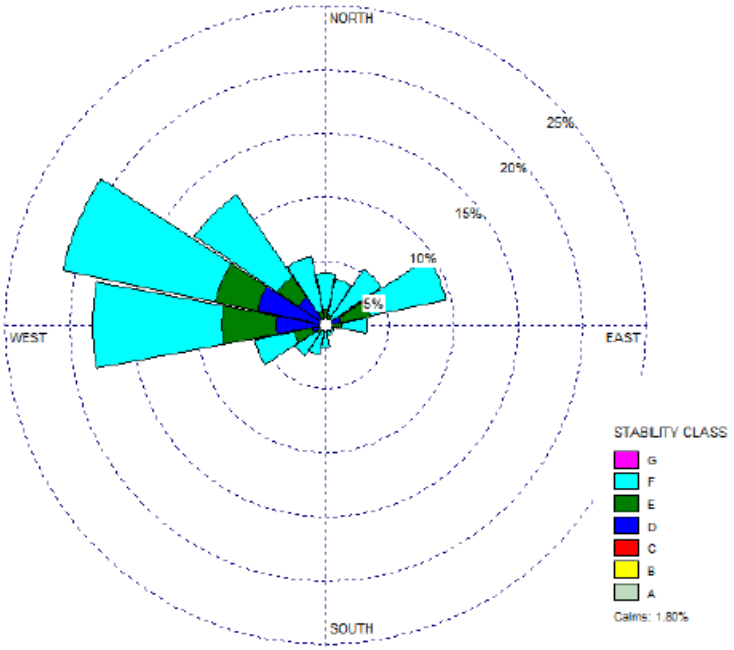

Figure 71: Atmospheric stability rose – Elyakim area in the evening (18:00-21:00), 2007-2011

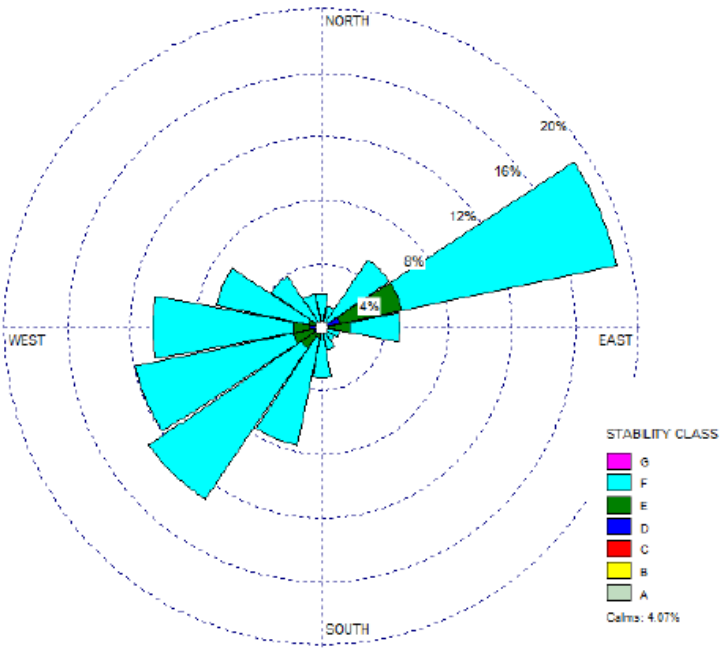

Figure 72: Atmospheric stability rose – Elyakim area at night (00:00-05:00), 2007-2011

Appendix C – Isopleth Maps and Lattice Maps

Appendix C

Isopleth Maps and Lattice Maps

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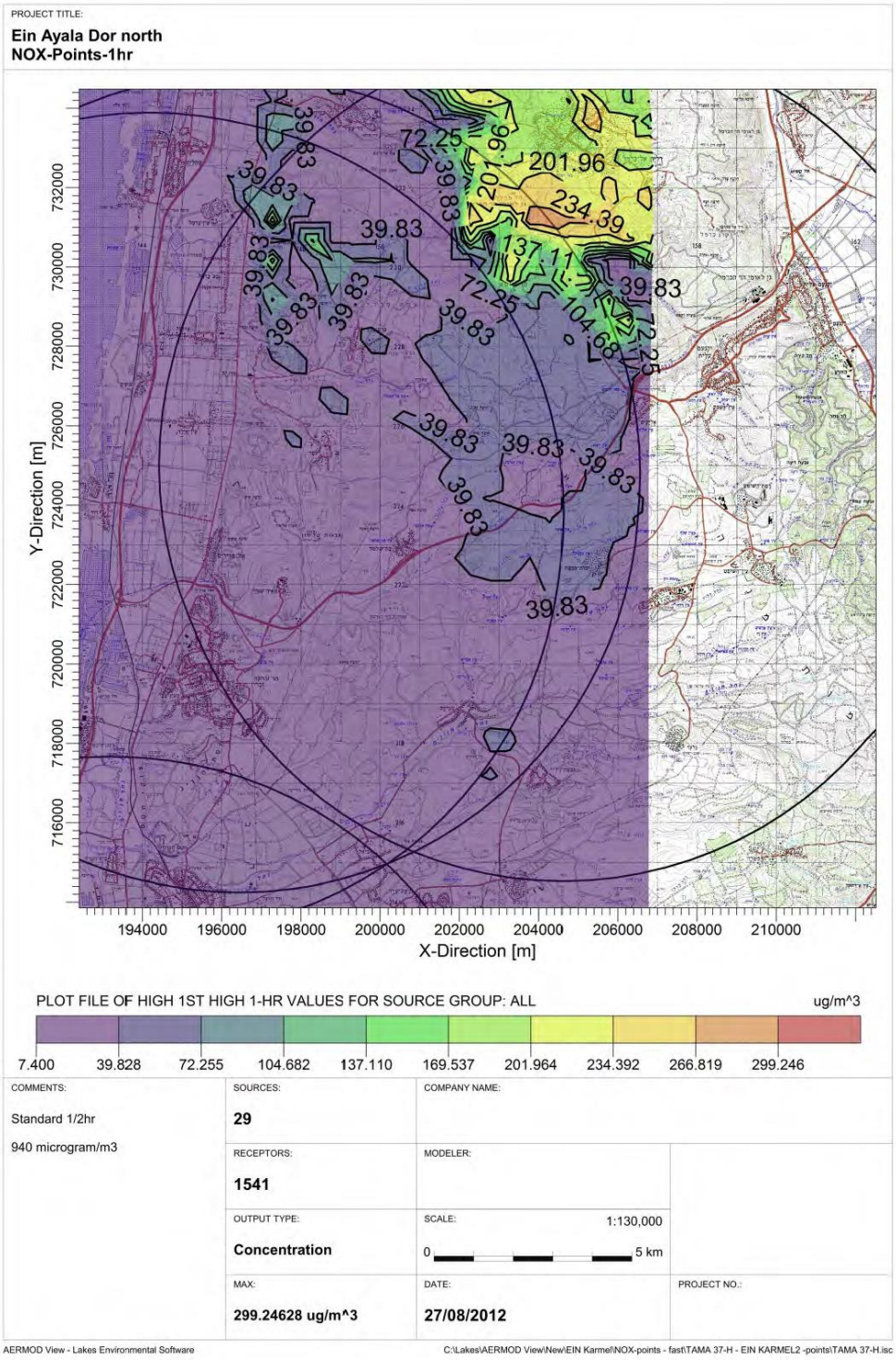
Dor North and Ein Ayala

Isopleth map for the pollutant NOx, 1-hour averaging without vehicles, for the Dor North and Ein Ayala area



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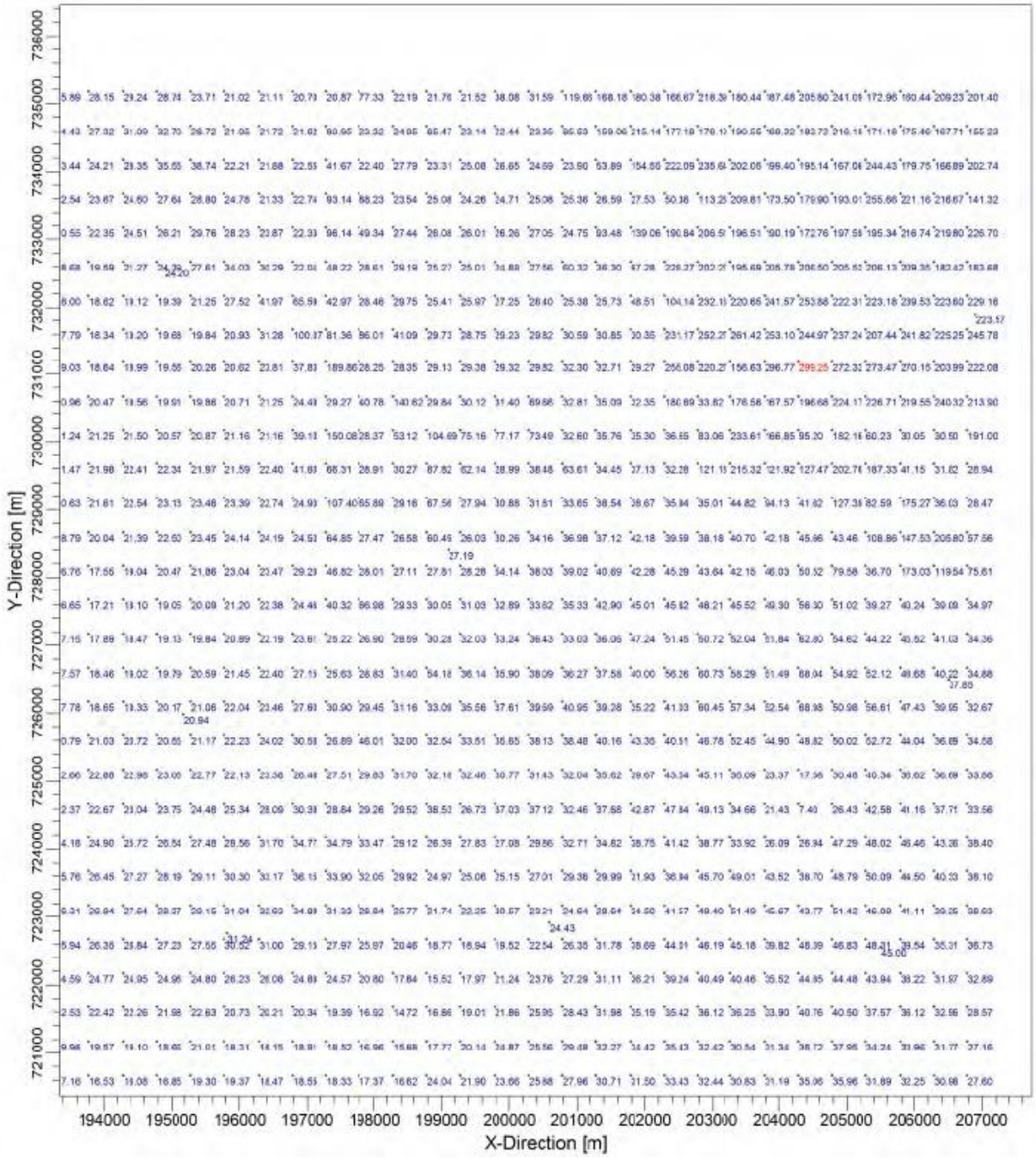
Lattice map for the pollutant NOx, 1-hour averaging without vehicles, for the Dor North and Ein Ayala area



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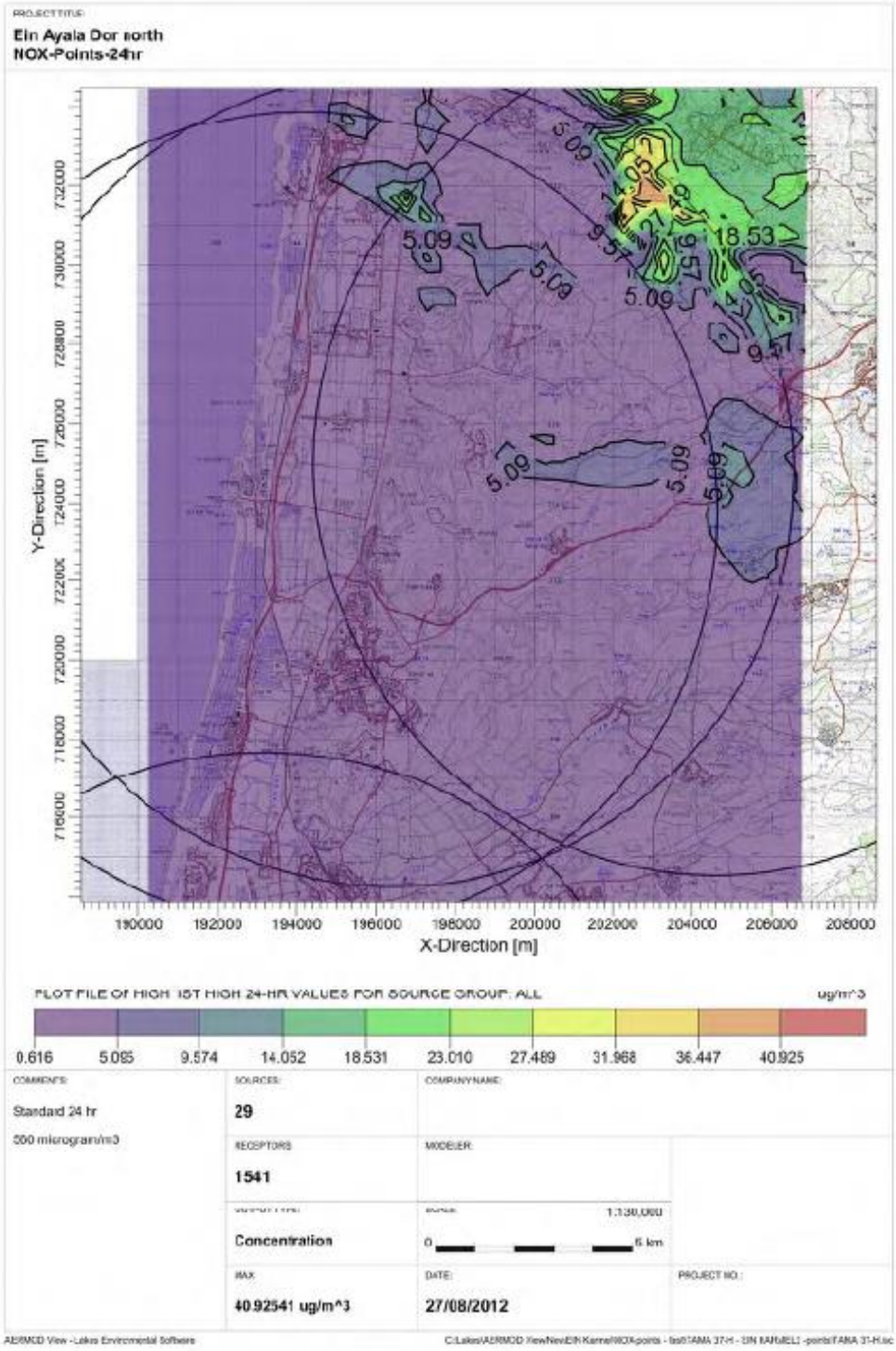
Isopleth map for the pollutant NOx, 24-hour averaging without vehicles, for the Dor North and Ein Ayala area



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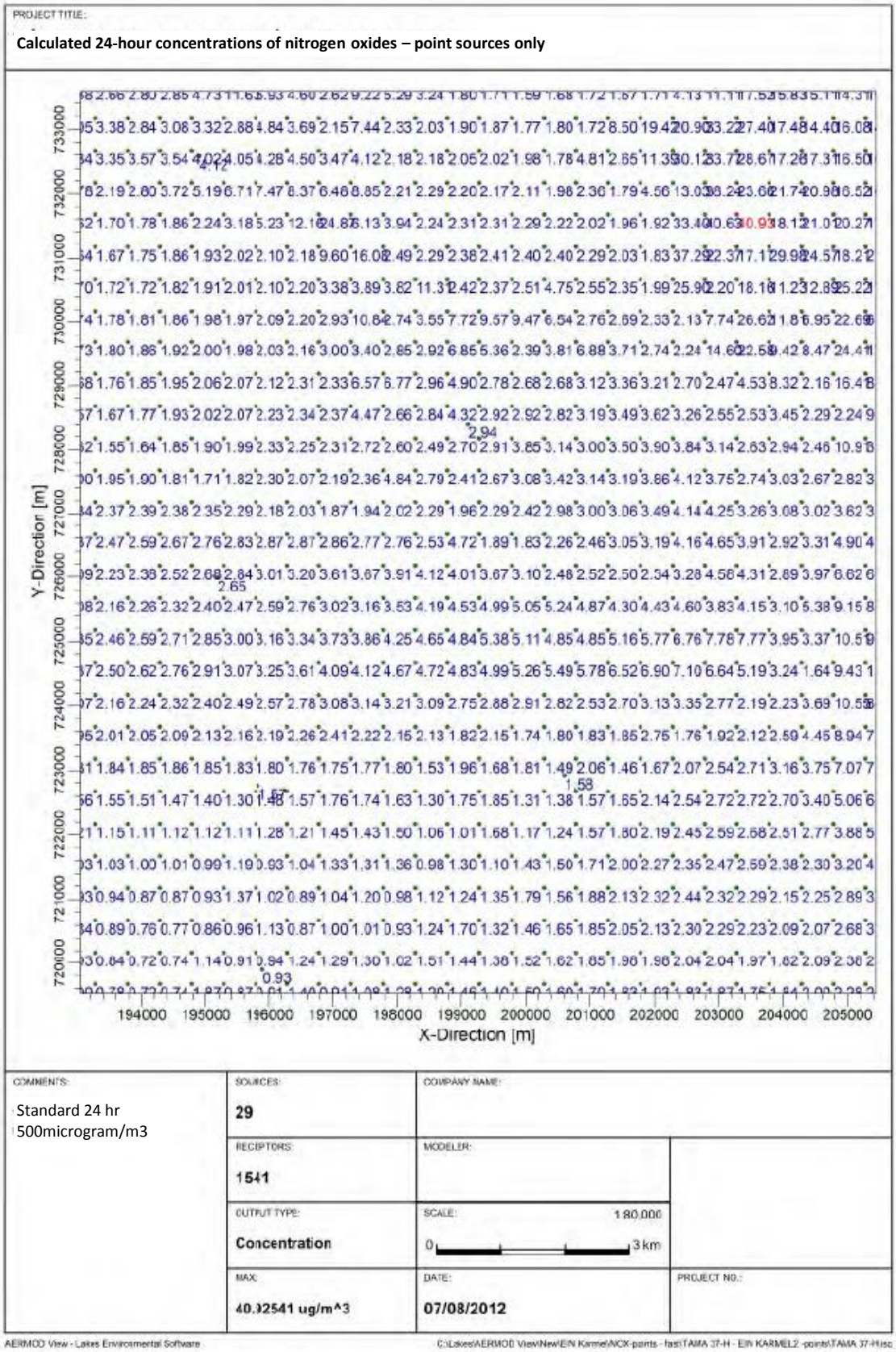

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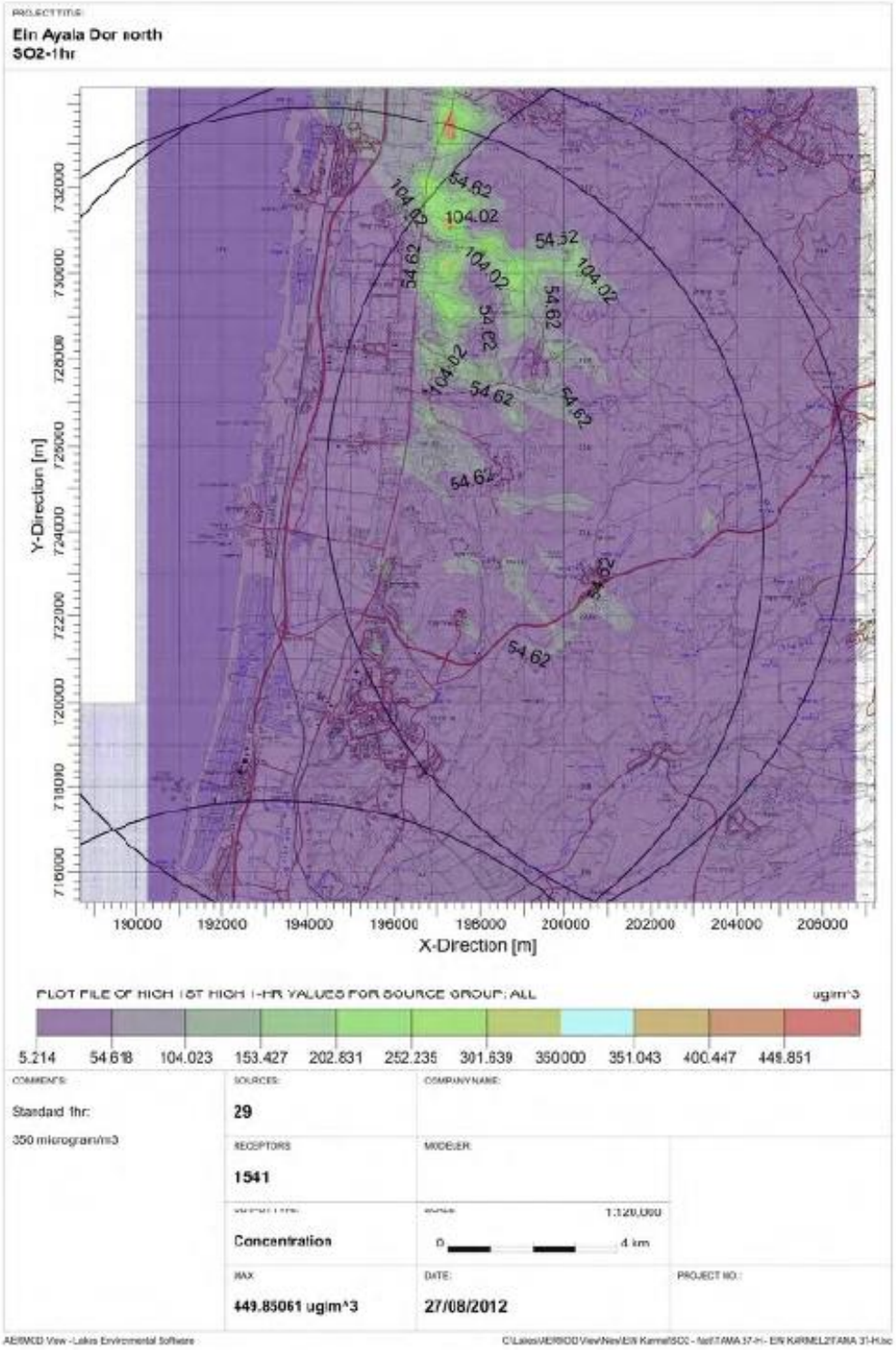
Isopleth map for the pollutant SO_2, 1-hour averaging for the Dor North and Ein Ayala area



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Lattice map for the pollutant SO_2, 1-hour averaging for the Dor North and Ein Ayala area

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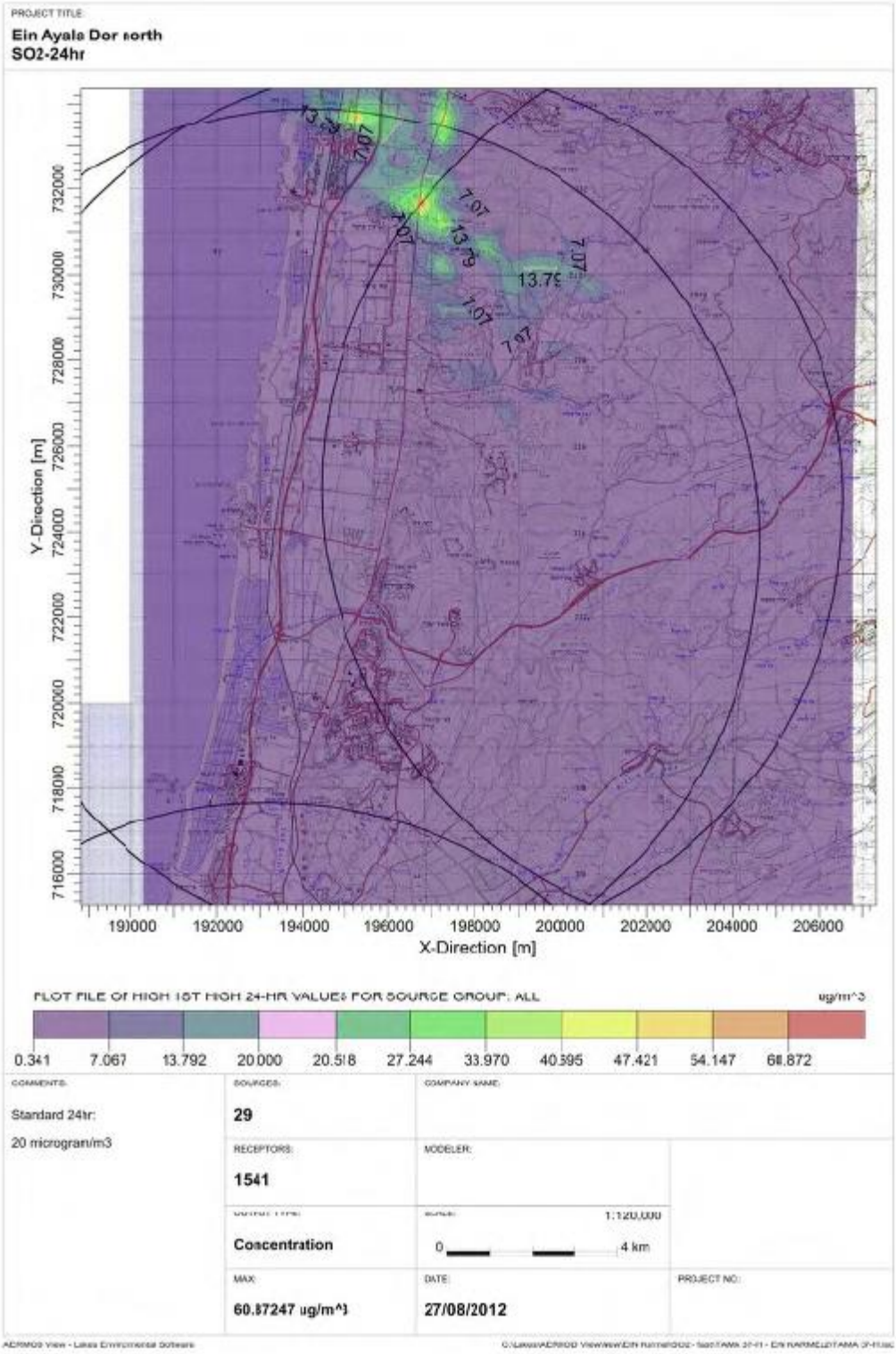
Isopleth map for the pollutant SO_2, 24-hour averaging for the Dor North and Ein Ayala area



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Lattice map for the pollutant SO_2, 24-hour averaging for the Dor North and Ein Ayala area

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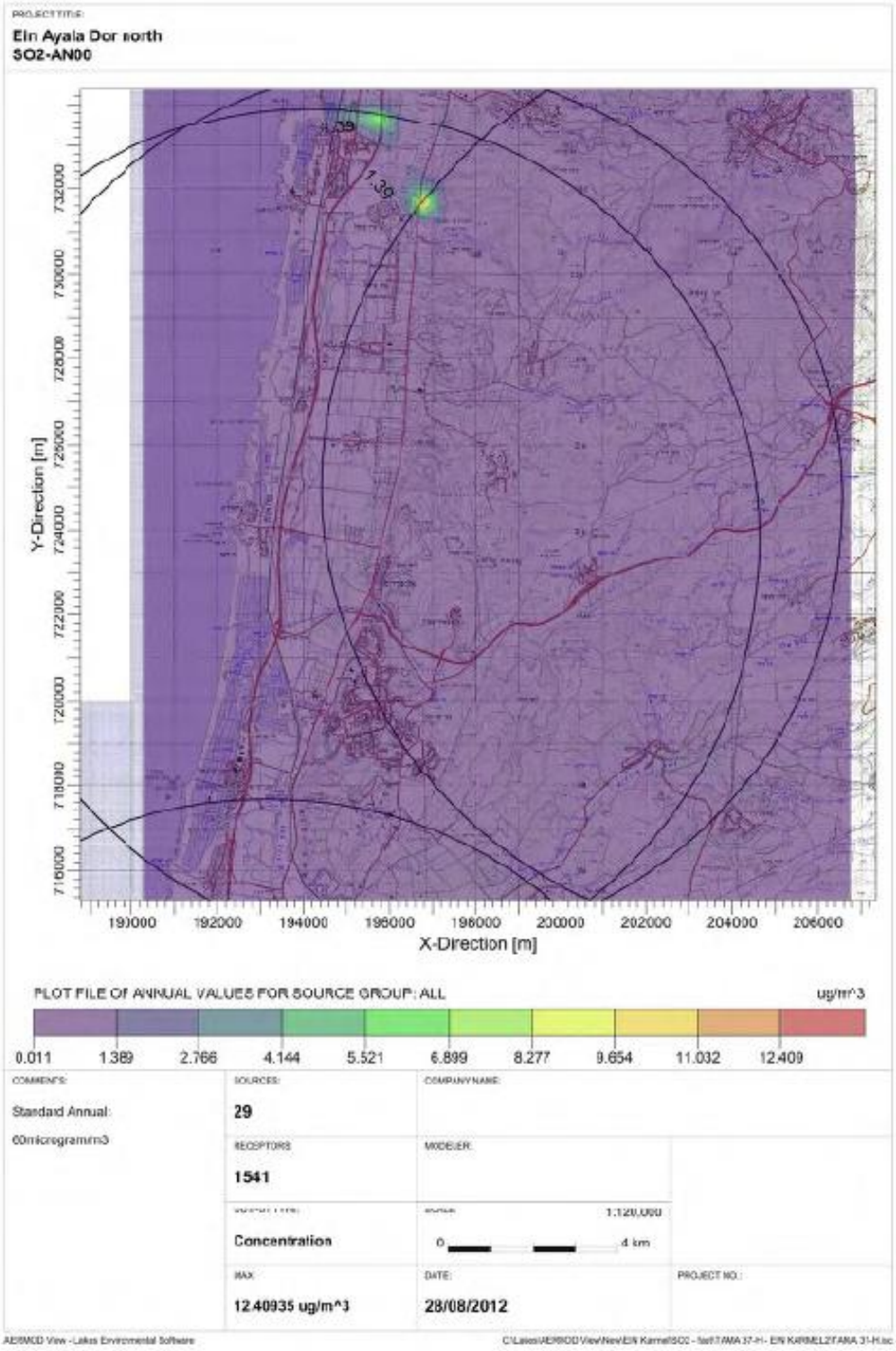
Isopleth map for the pollutant SO_2, annual averaging for the Dor North and Ein Ayala area



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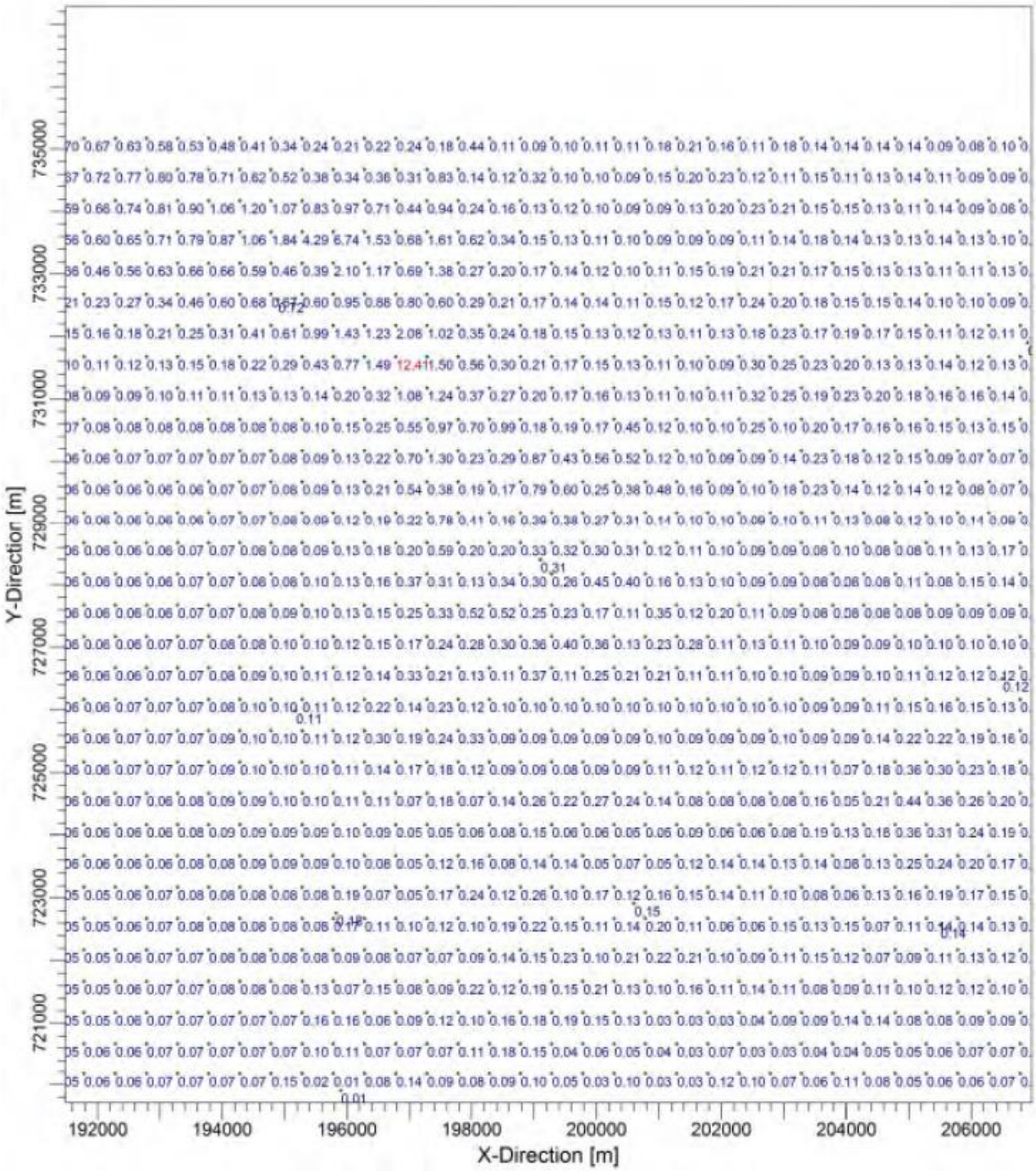
Lattice map for the pollutant SO_2, annual averaging for the Dor North and Ein Ayala area



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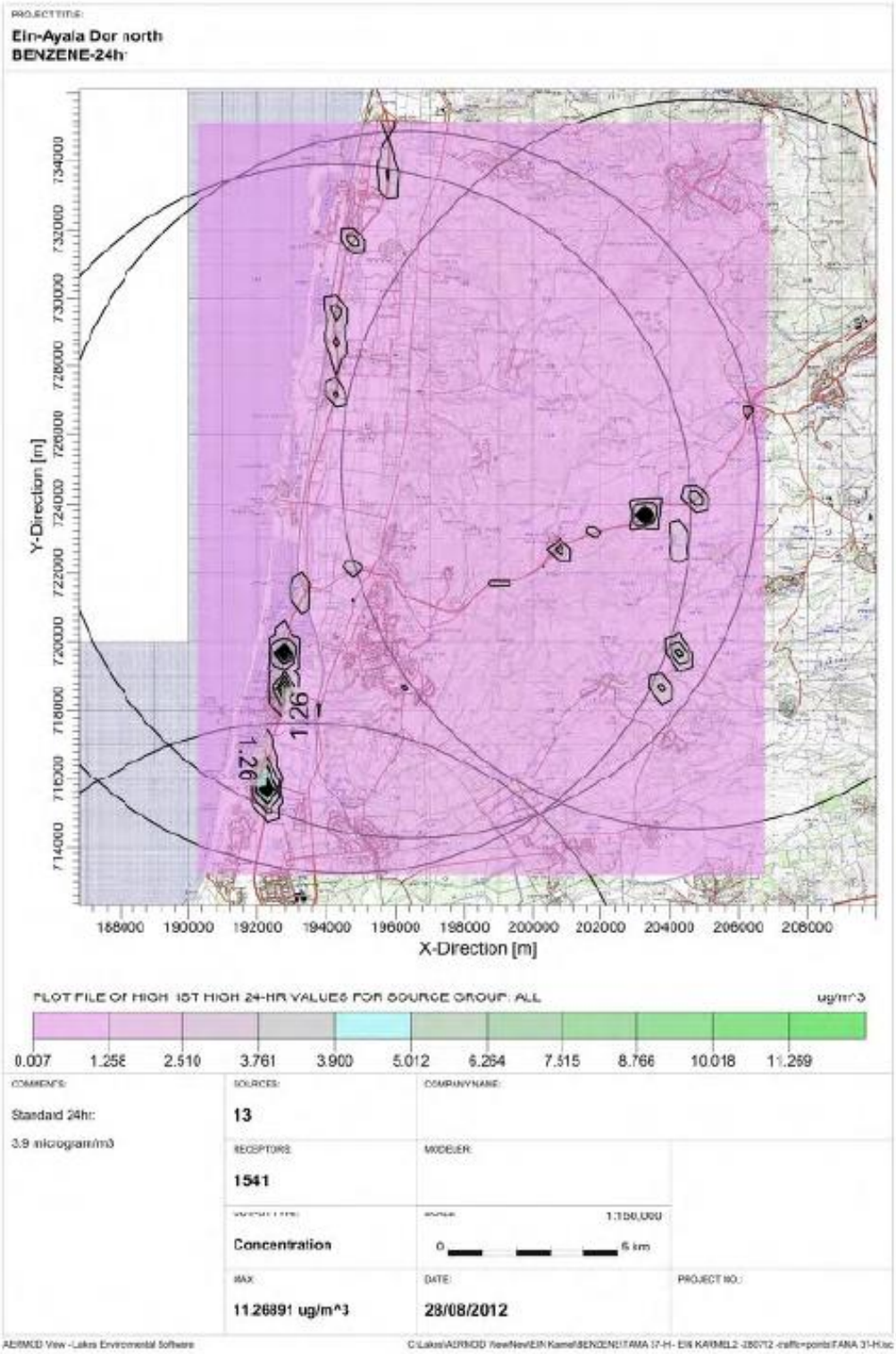
Isopleth map for the pollutant benzene, 24-hour averaging for the Dor North and Ein Ayala area



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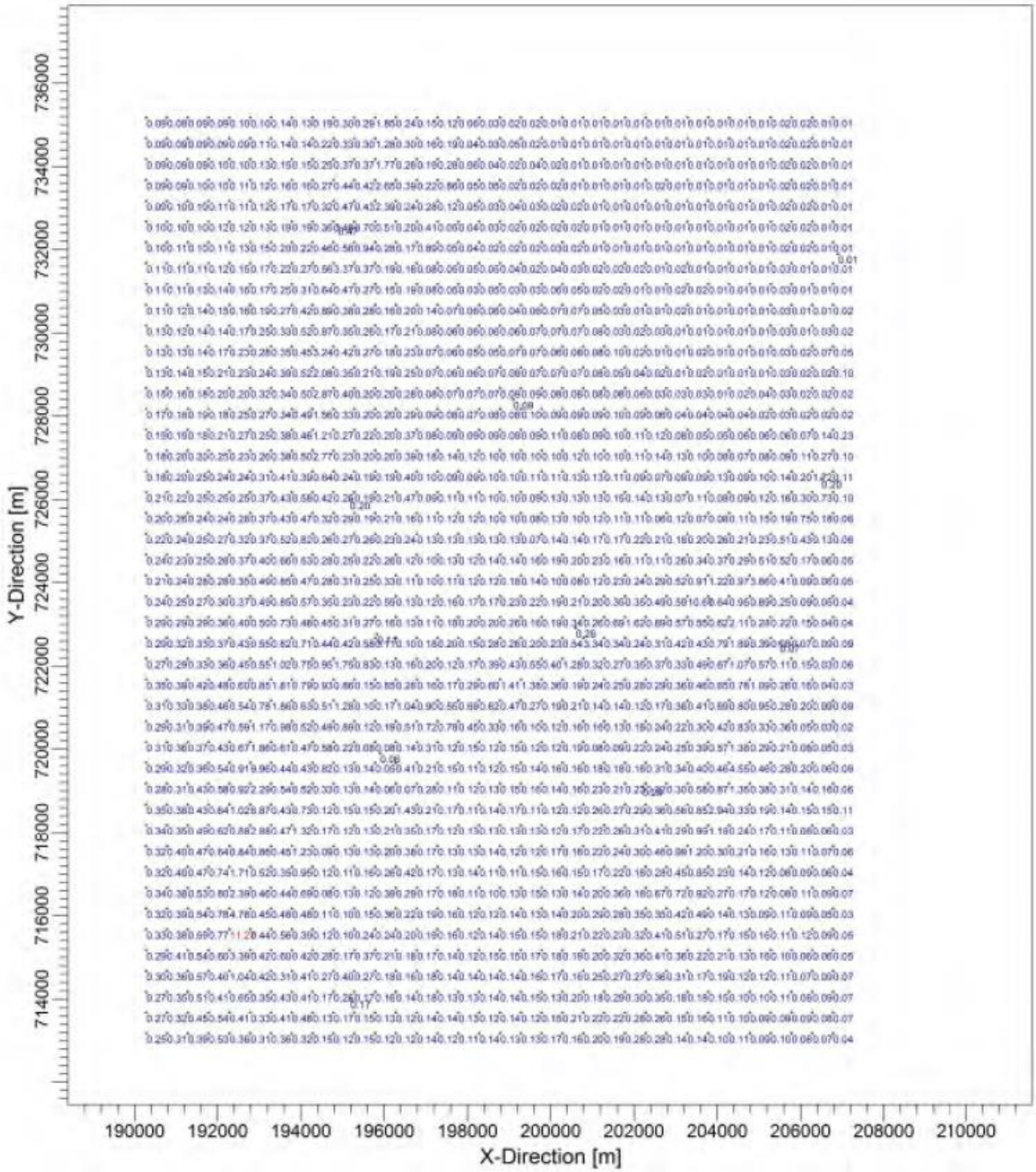
Lattice map for the pollutant benzene, 24-hour averaging for the Dor North and Ein Ayala area



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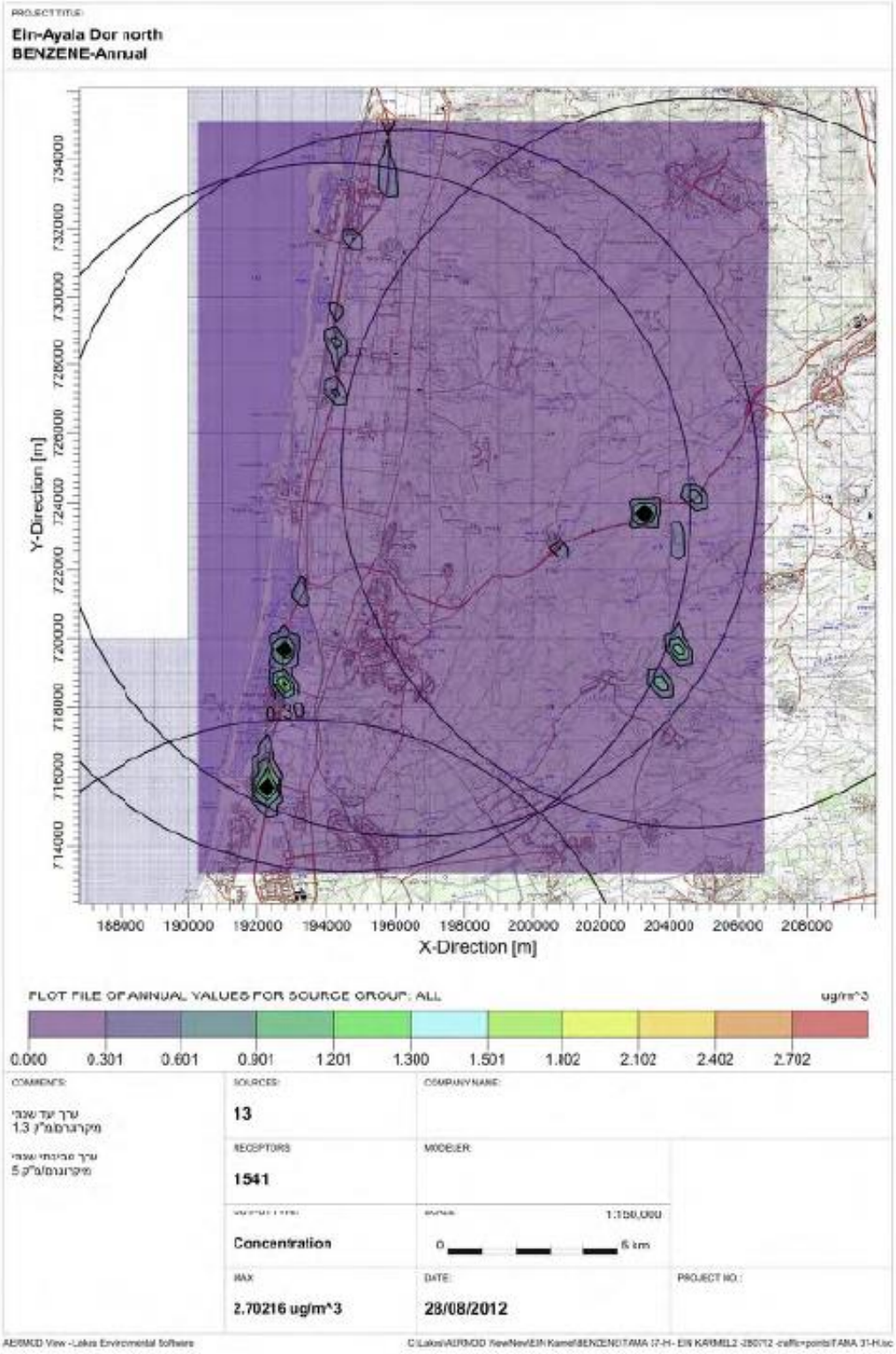
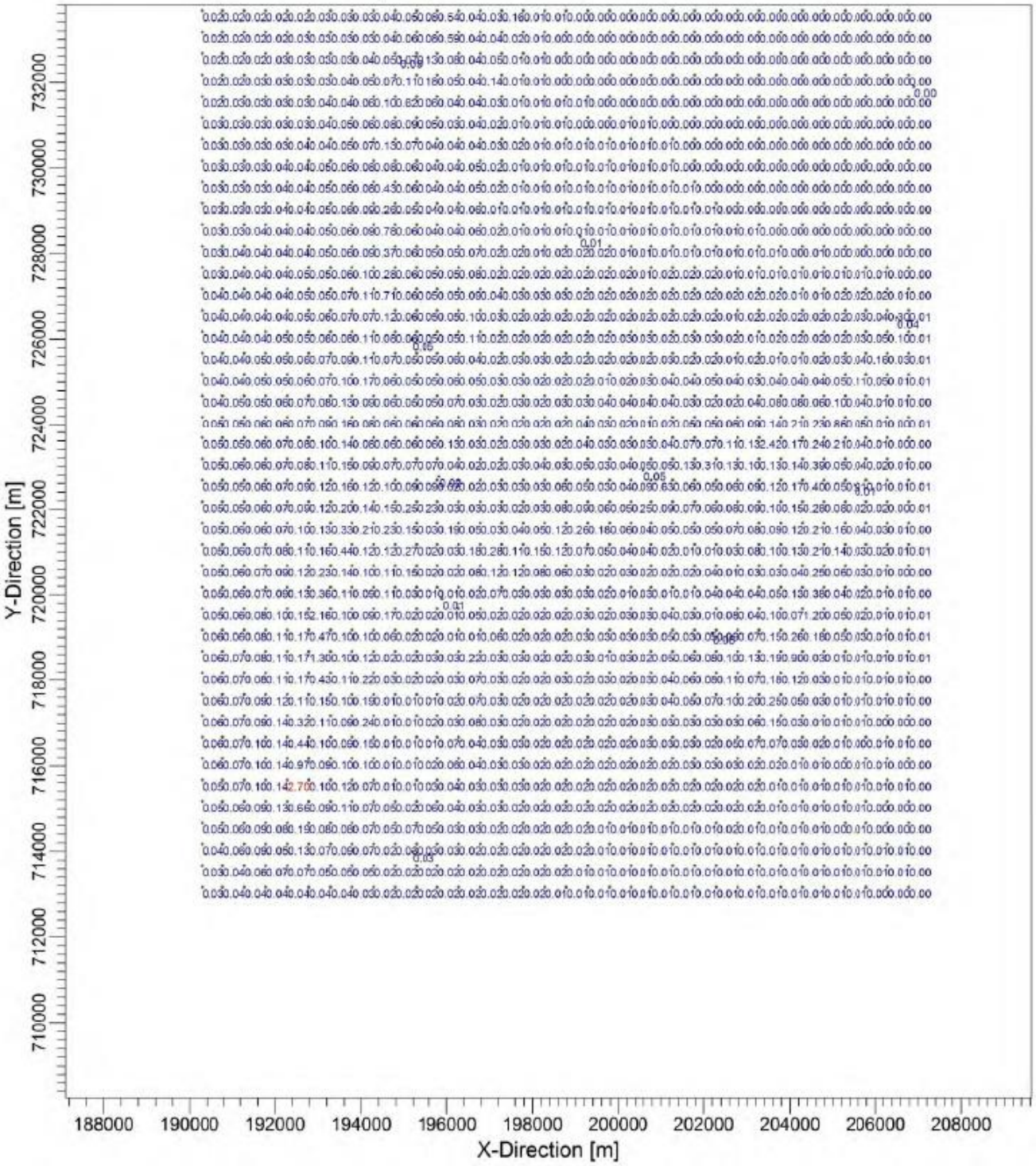
Isopleth map for the pollutant benzene, annual averaging for the Dor North and Ein Ayala area



Lattice map for the pollutant benzene, annual averaging for the Dor North and Ein Ayala area



Hadera Alternative

Isopleth map for the pollutant NOx, 1-hour averaging without vehicles for the Hadera area

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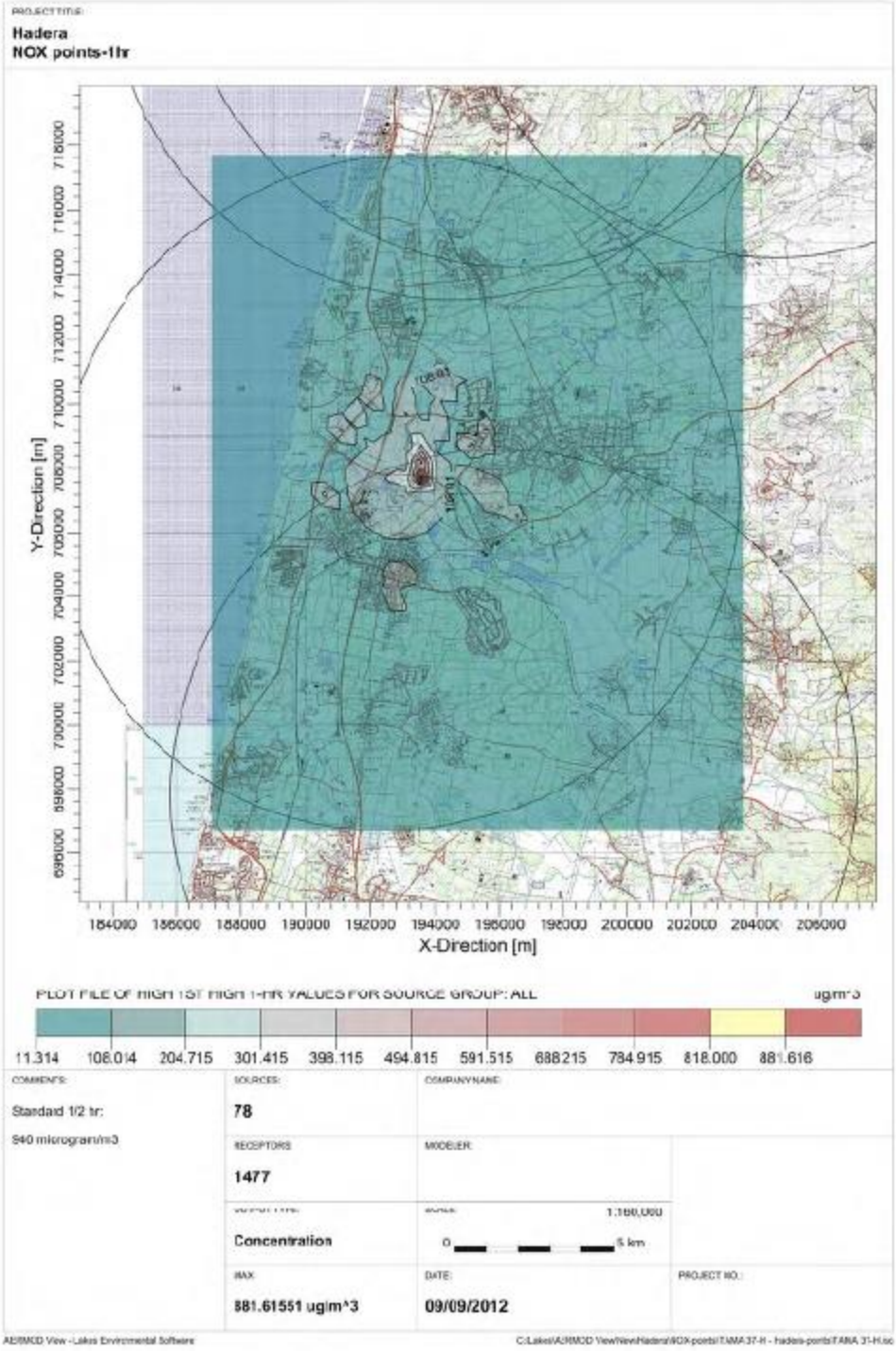

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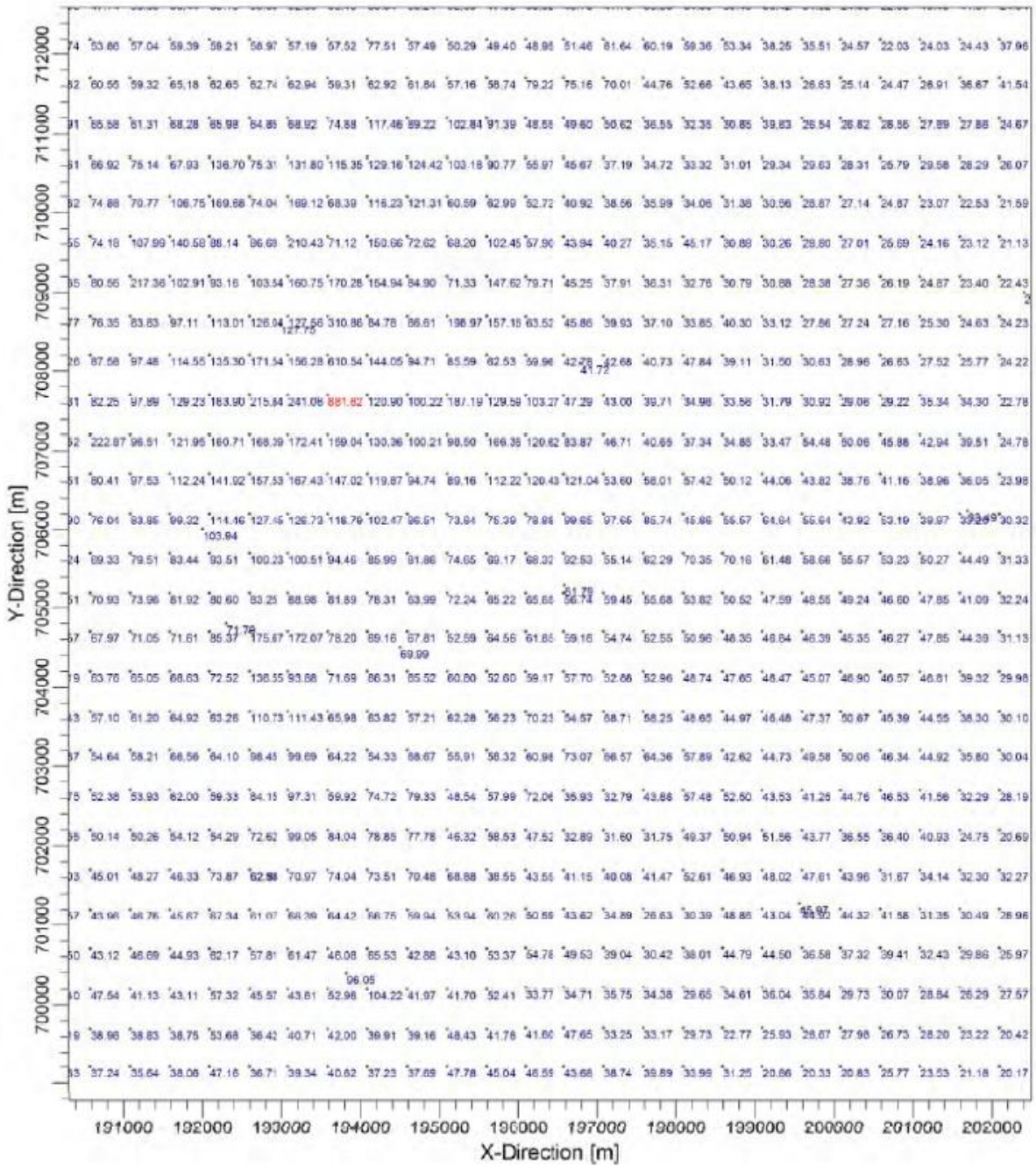
Lattice map for the pollutant NOx, 1-hour averaging without vehicles for the Hadera area



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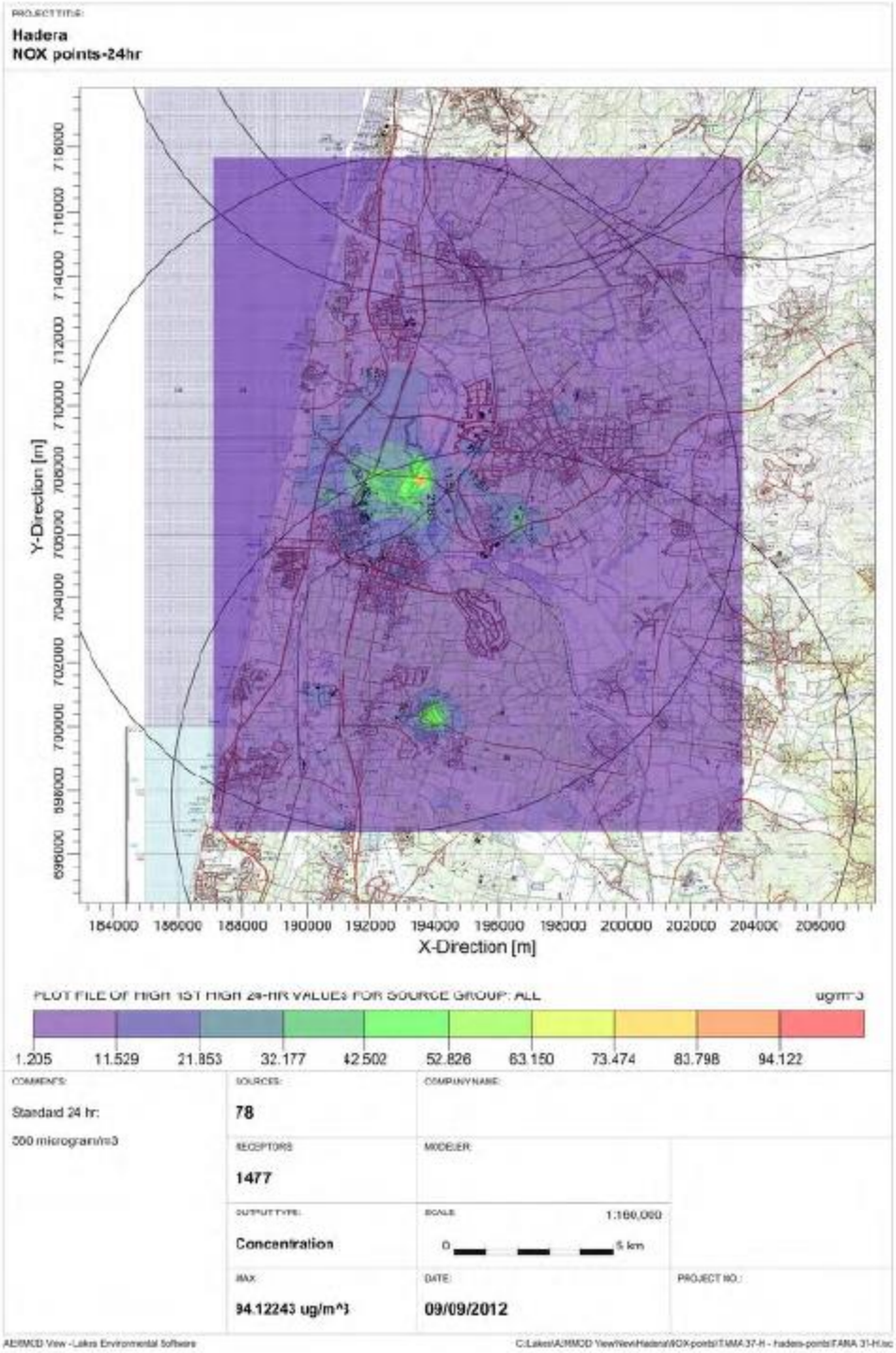
Isopleth map for the pollutant NOx, 24-hour averaging without vehicles for the Hadera area



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Lattice map for the pollutant NOx, 24-hour averaging without vehicles for the Hadera area

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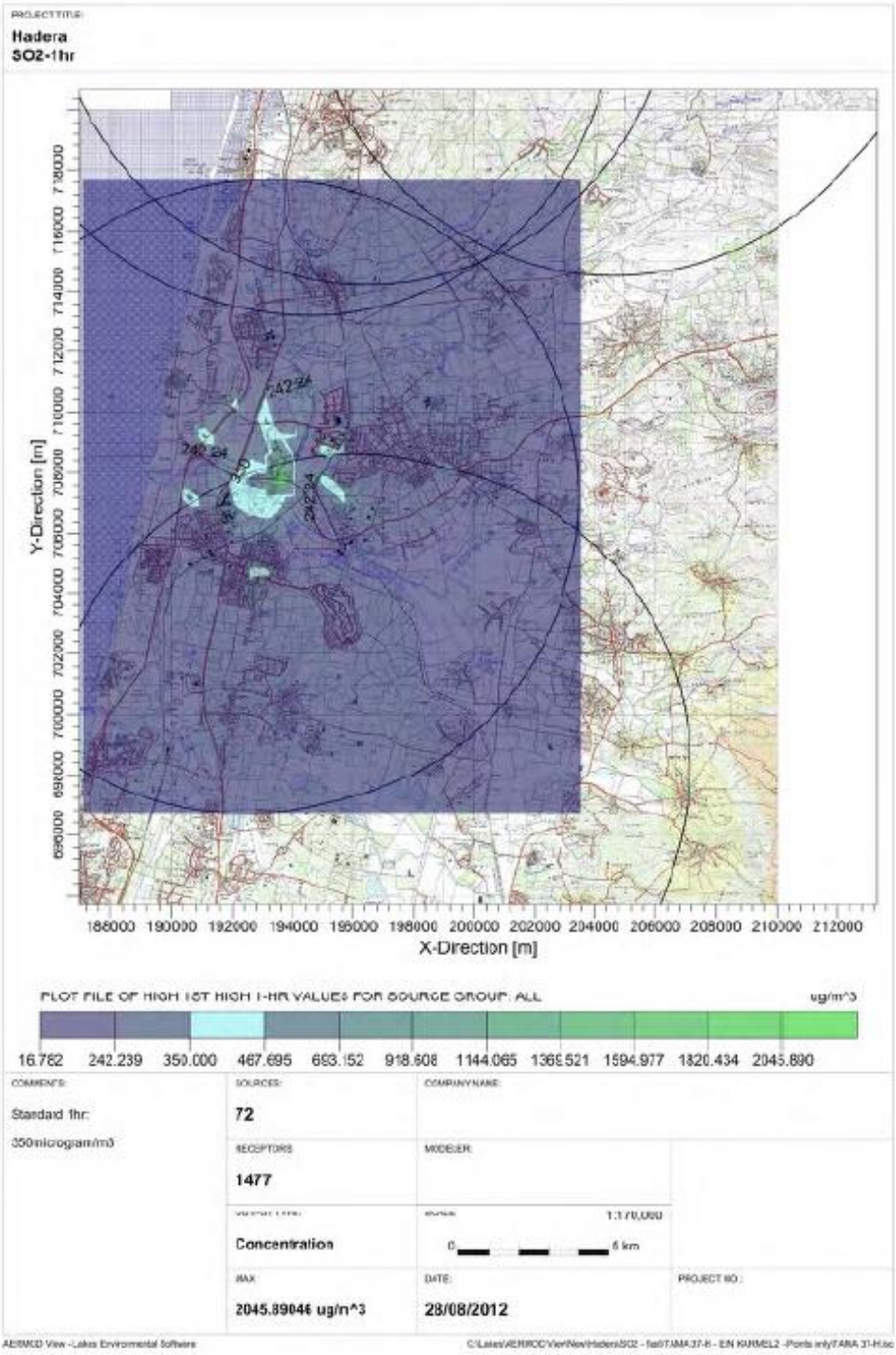
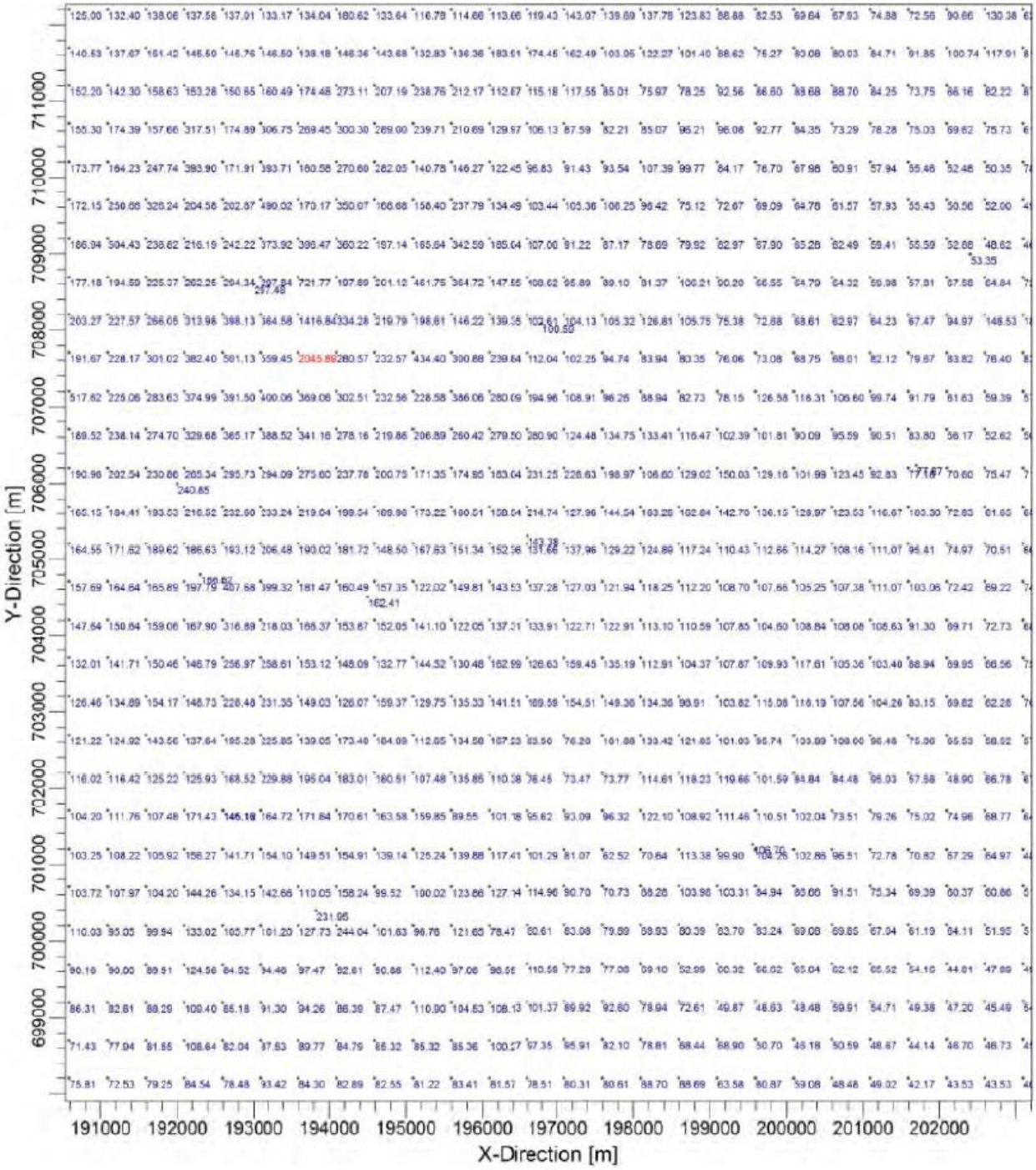
Isopleth map for the pollutant SO_2, 1-hour averaging for the Hadera area



Lattice map for the pollutant SO_2, 1-hour averaging for the Hadera area



Isopleth map for the pollutant SO_2, 24-hour averaging for the Hadera area

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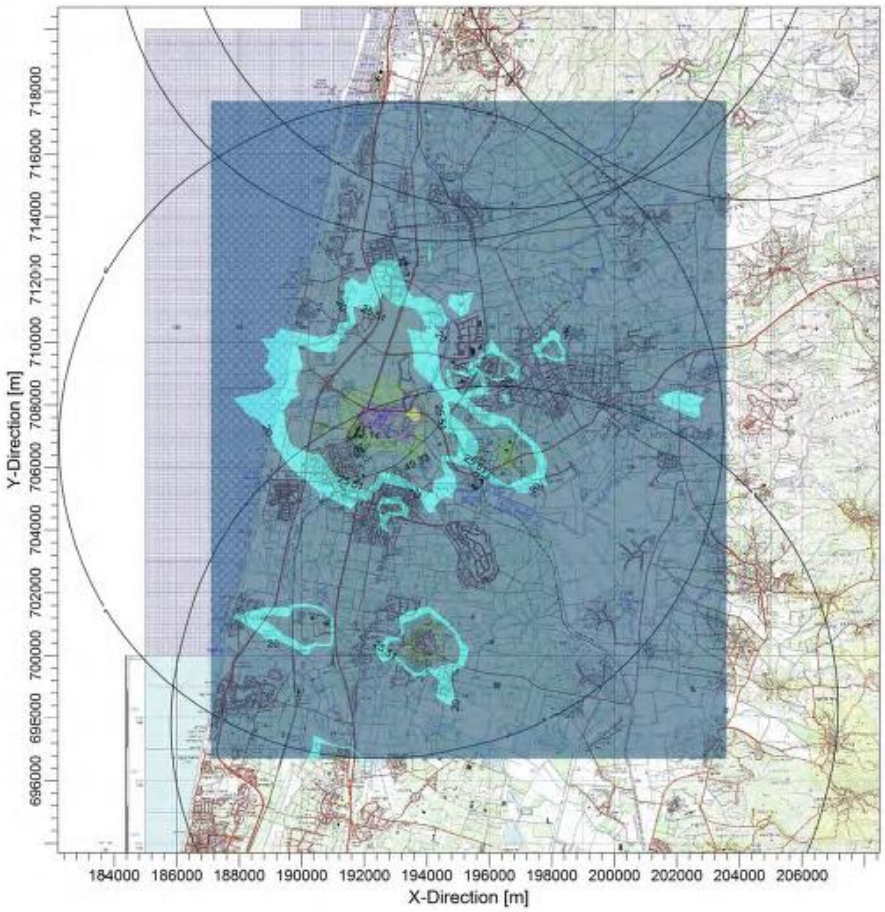
PROJECT TITLE:
Hadera
SO2-24hr



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: ALL — ug/m^3

1.686 20.000 25.506 49.325 73.145 96.964 120.784 125.000 144.603 168.422 192.242 216.061

COMMENTS:	SOURCES:	COMPANY NAME:	
Standard 24hr: Destination: 20 microgram/m3 Environmental: 125 microgram/m3	72		
	RECEPTORS: 1477	MODELER:	
	OUTPUT TYPE: Concentration	SCALE: 1:170,000 — 0 — 5 km	
	MAX: 216.06129 ug/m^3	DATE: 09/09/2012	PROJECT NO.:

AERMOD View - Lakes Environmental Software

C:\Lakes\AERMOD View\New\Hadera\SO2 - fas0TAMA 37-H - EIN KARMEL2 -Points only\TAMA 37-H.isc

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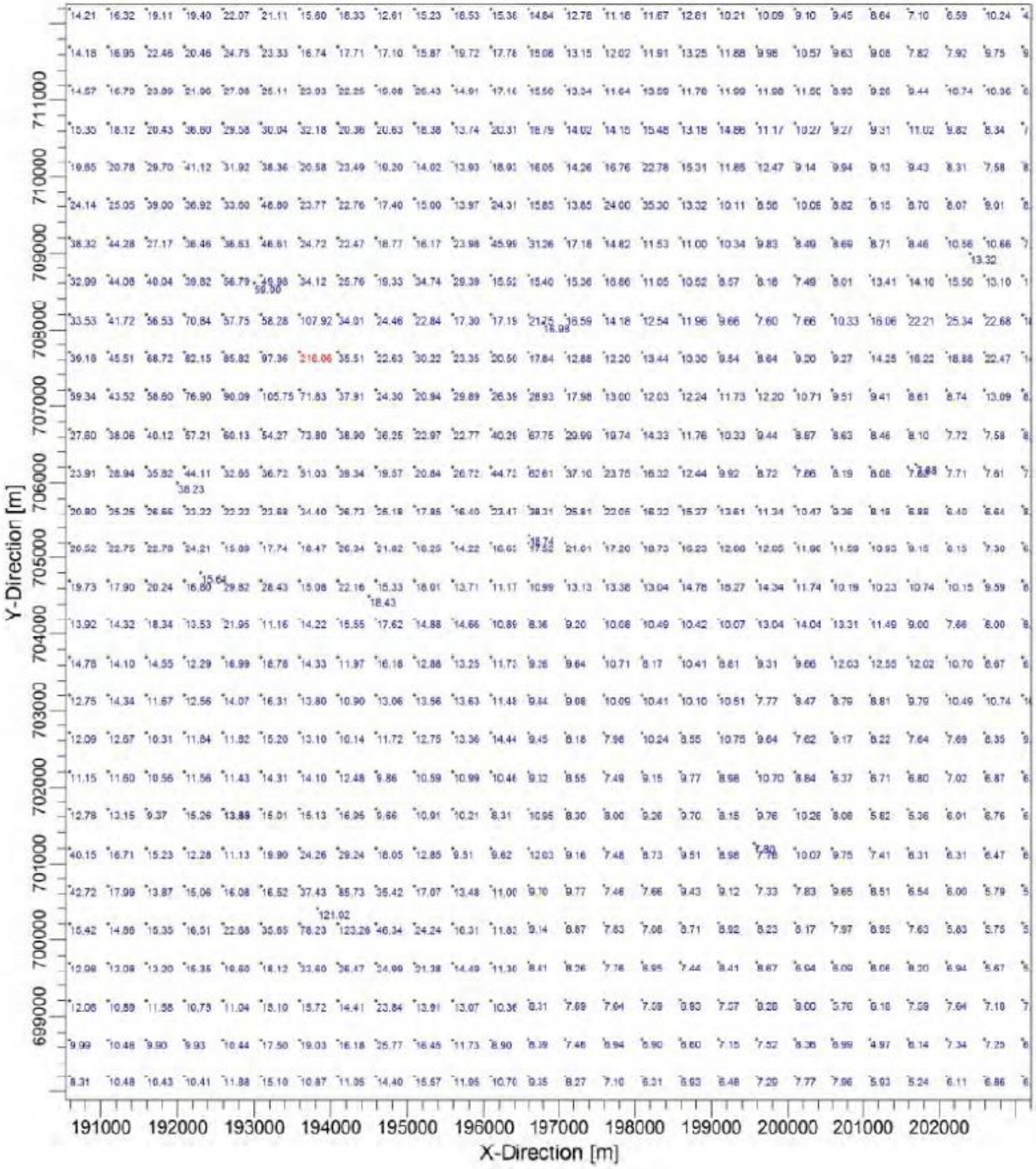
Lattice map for the pollutant SO_2, 24-hour averaging for the Hadera area



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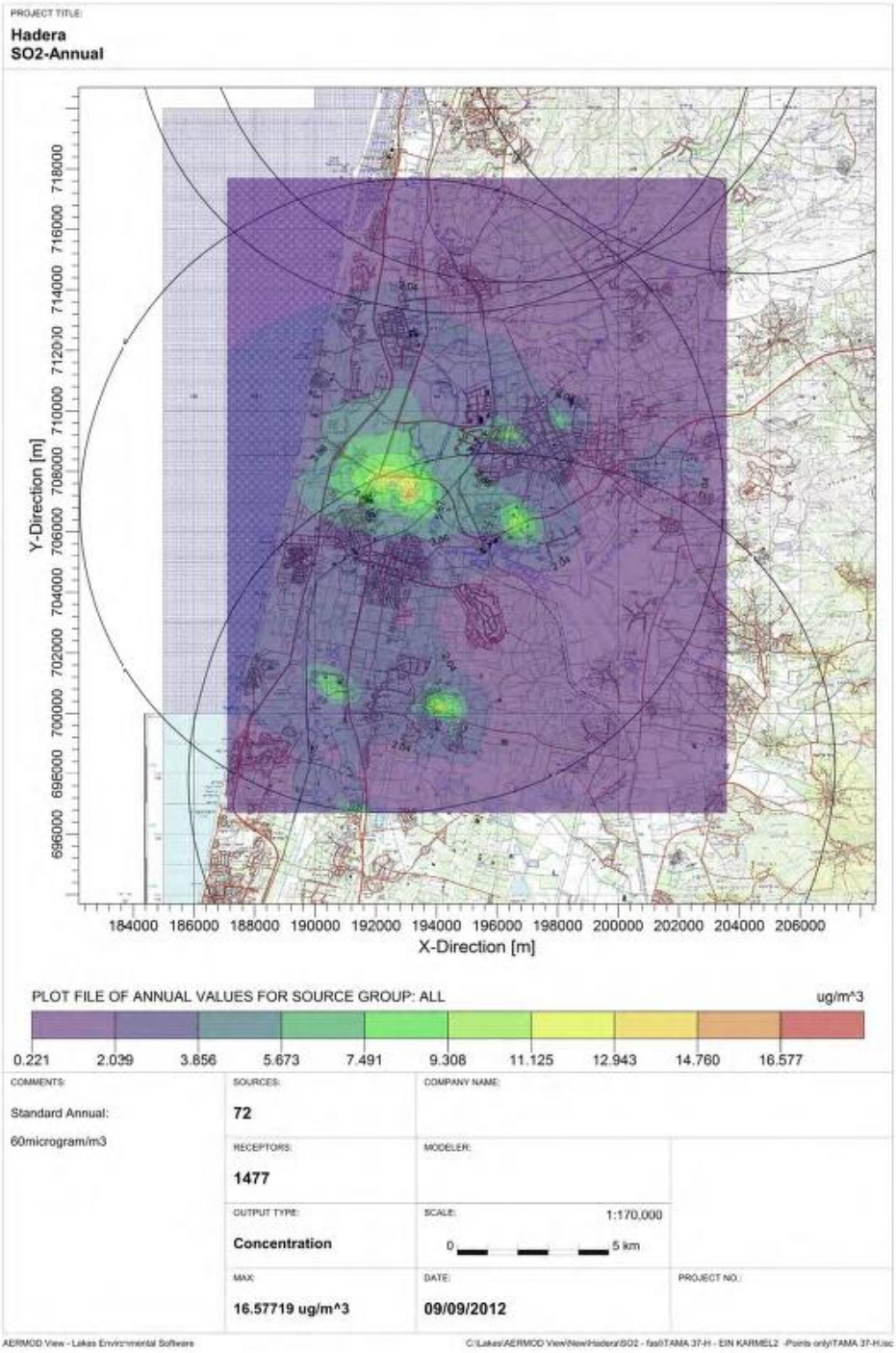
Isopleth map for the pollutant SO_2, annual averaging for the Hadera area



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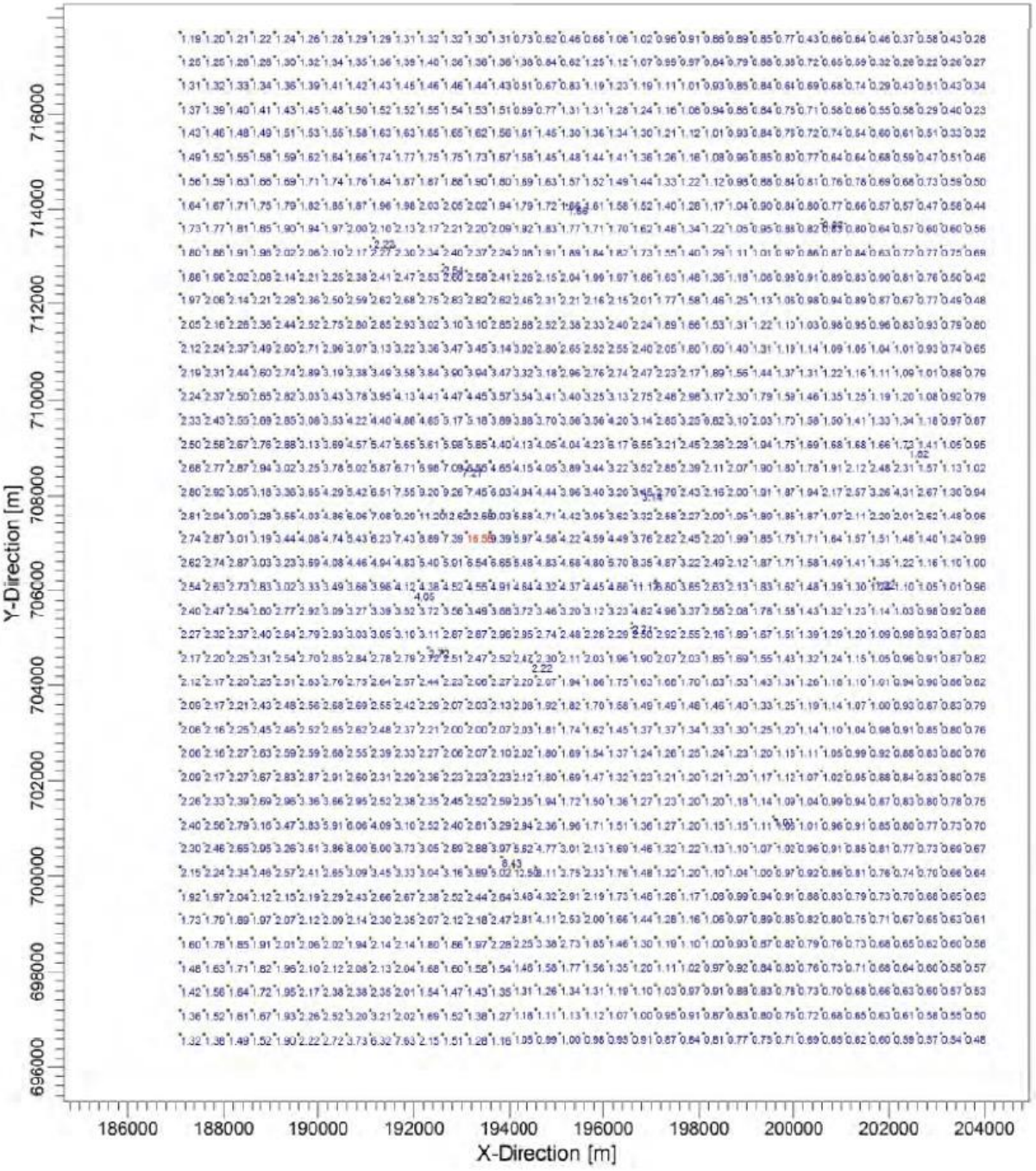
Lattice map for the pollutant SO_2, annual averaging for the Hadera area



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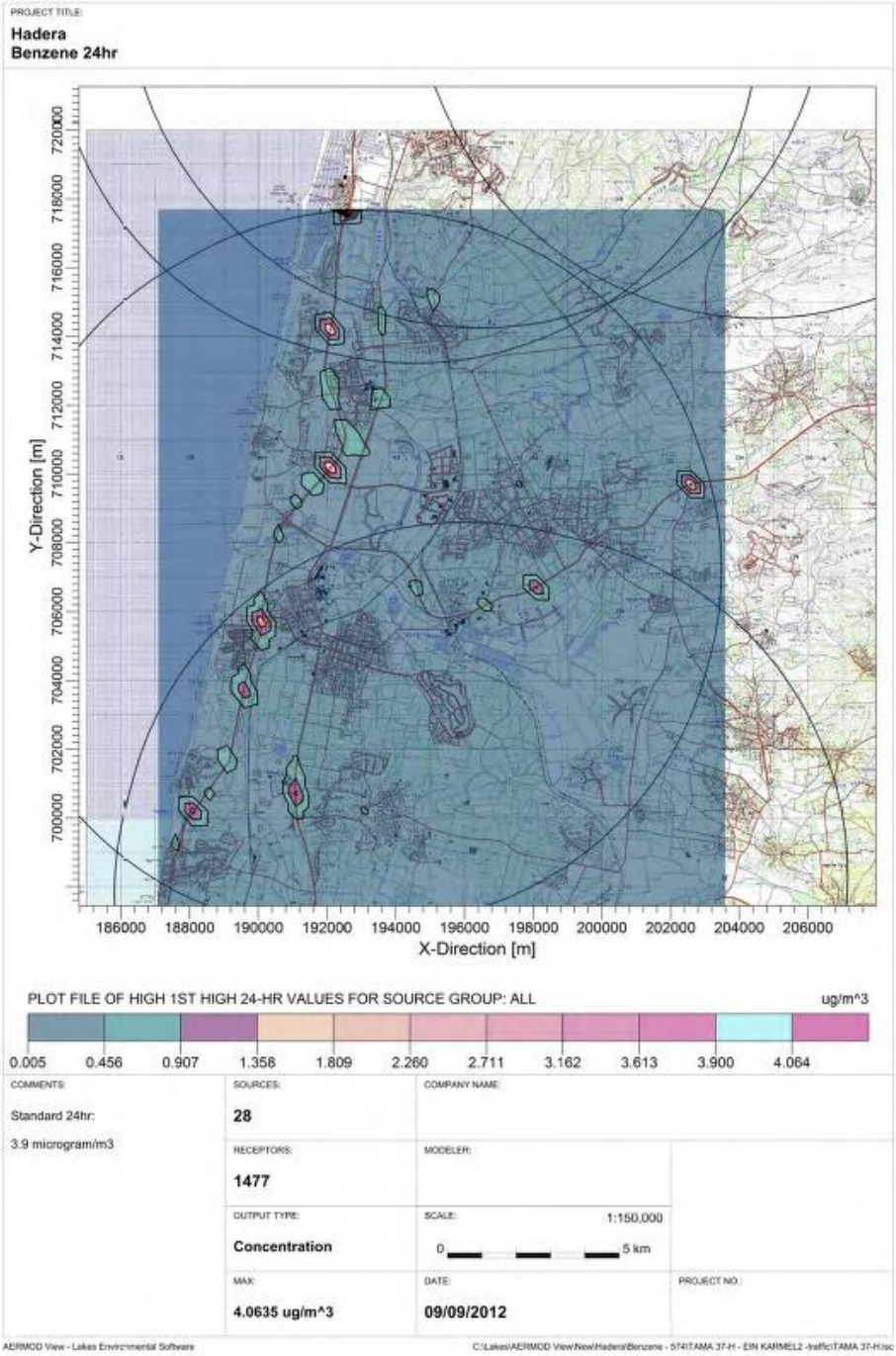
Isopleth map for the pollutant benzene, 24-hour averaging for the Hadera area



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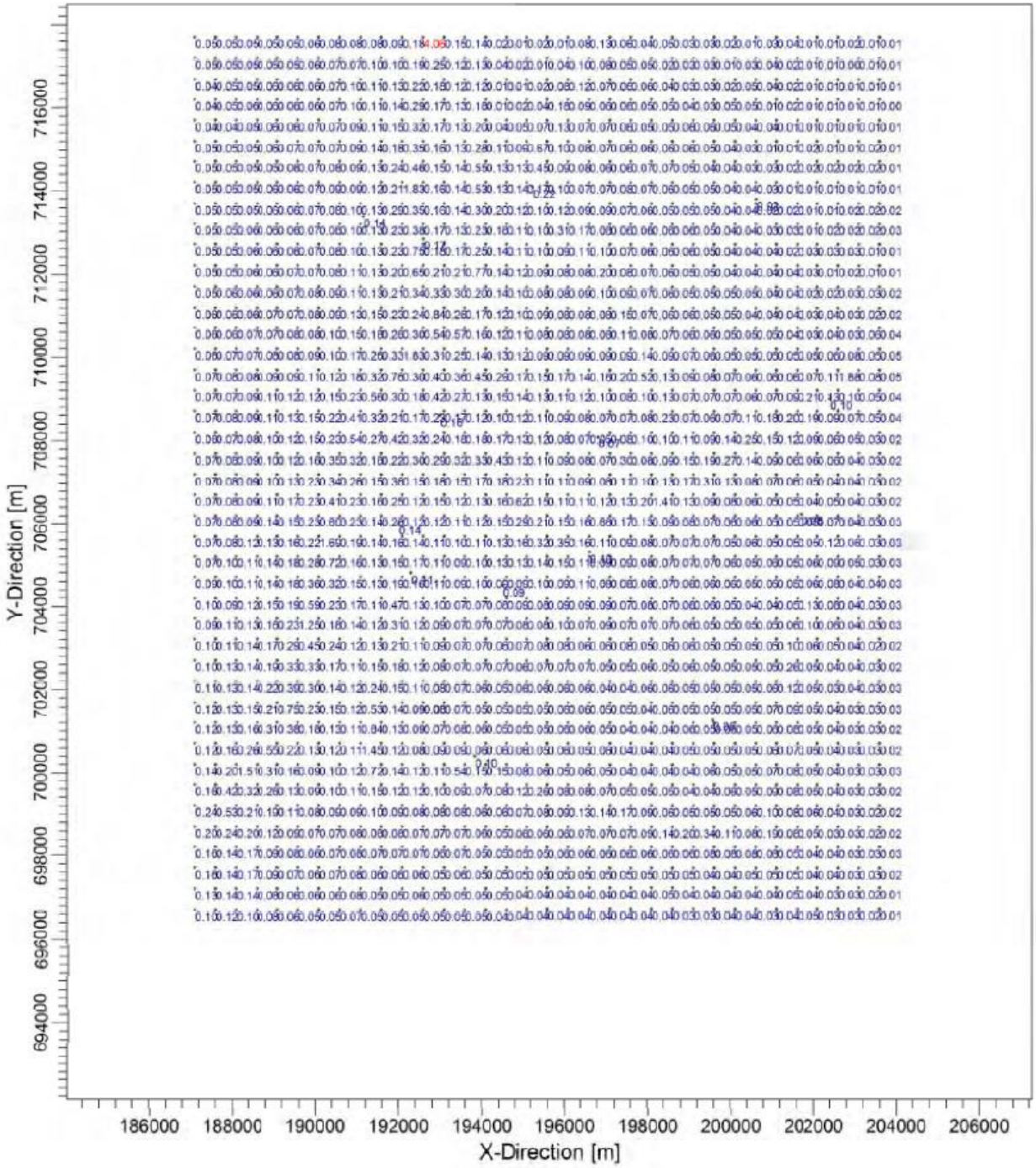
Lattice map for the pollutant benzene, 24-hour averaging for the Hadera area



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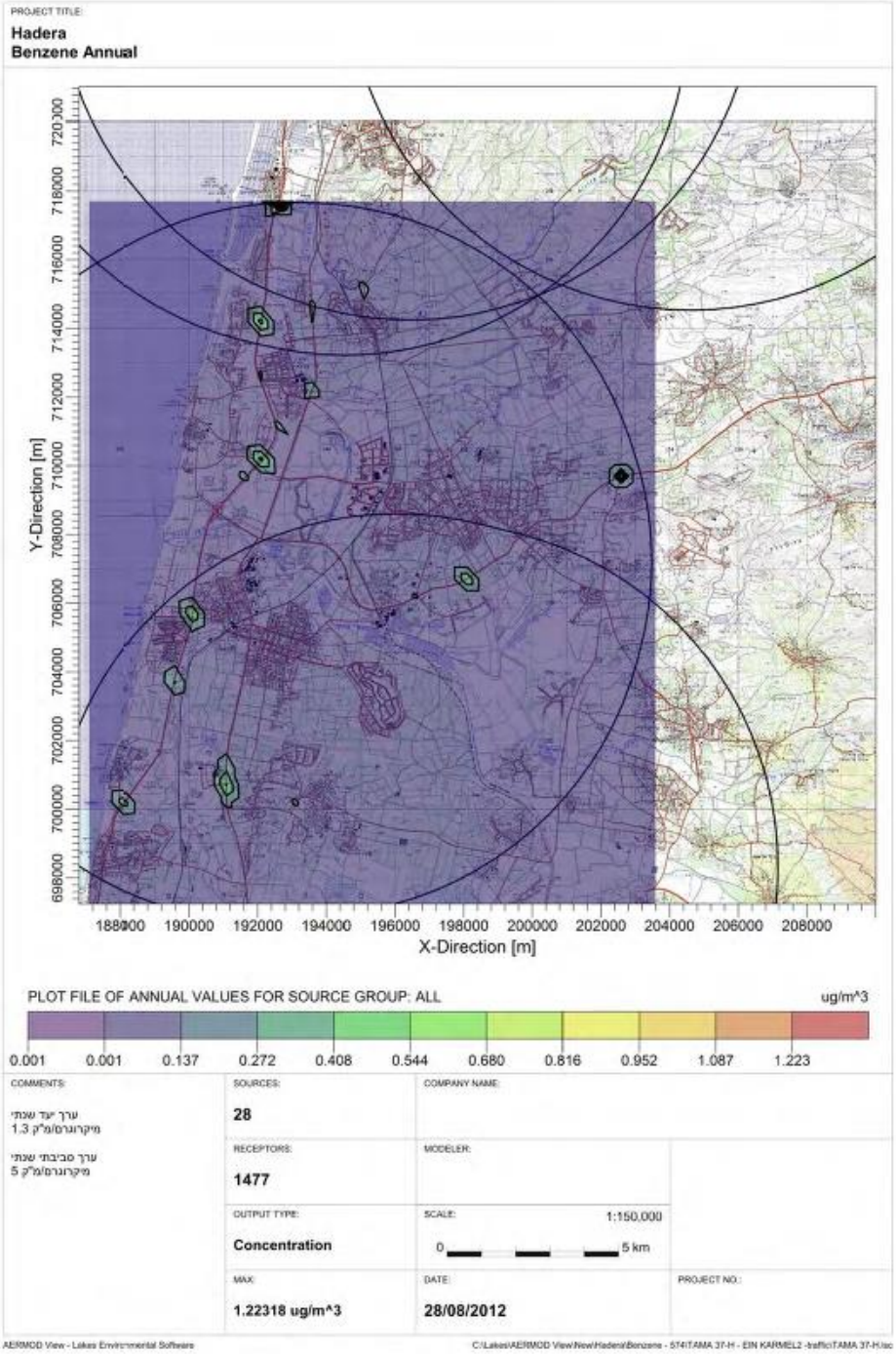
Isopleth map for the pollutant benzene, annual averaging for the Hadera area



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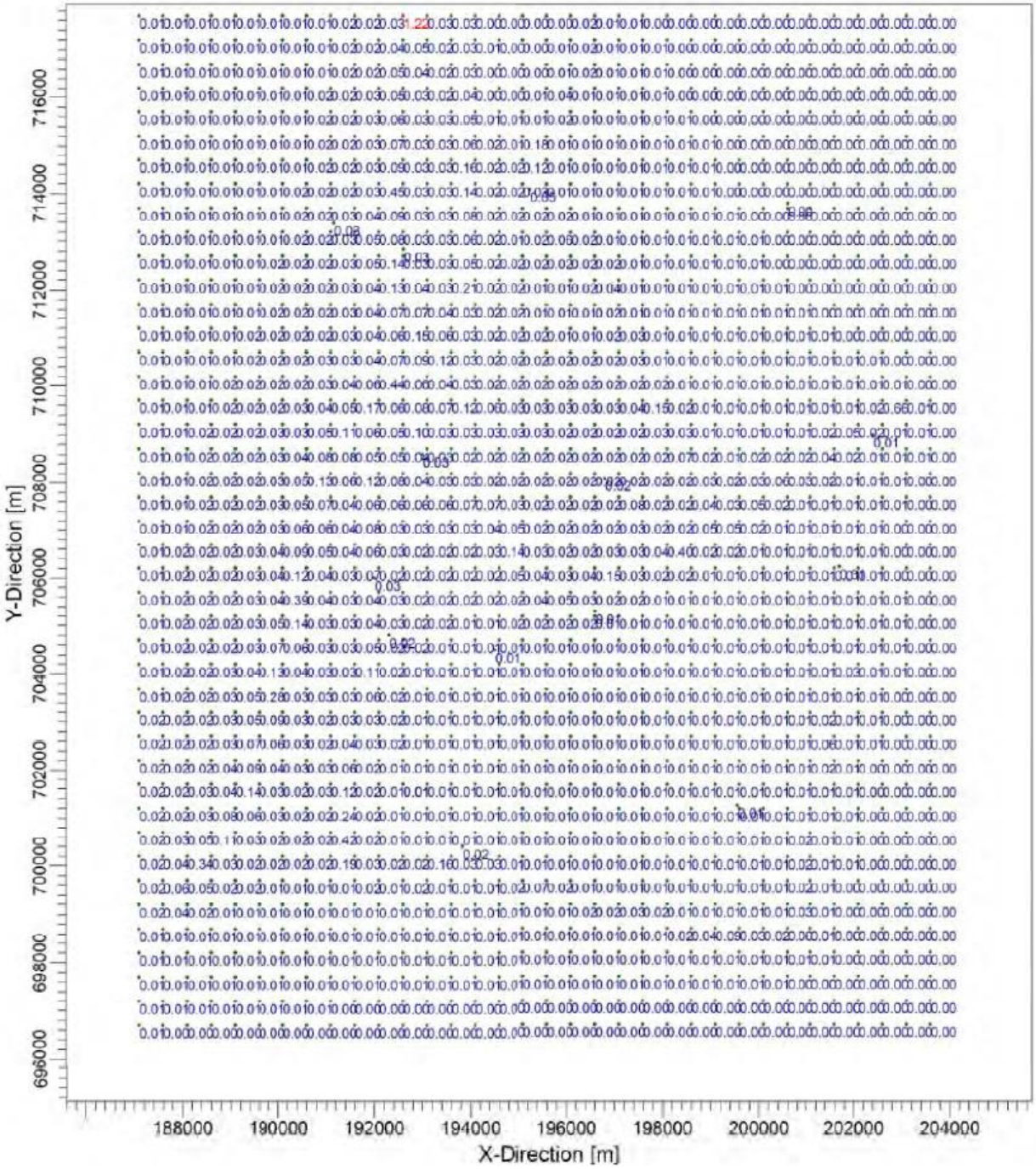
Isopleth map for the pollutant benzene, 1-hour averaging for the Hadera area



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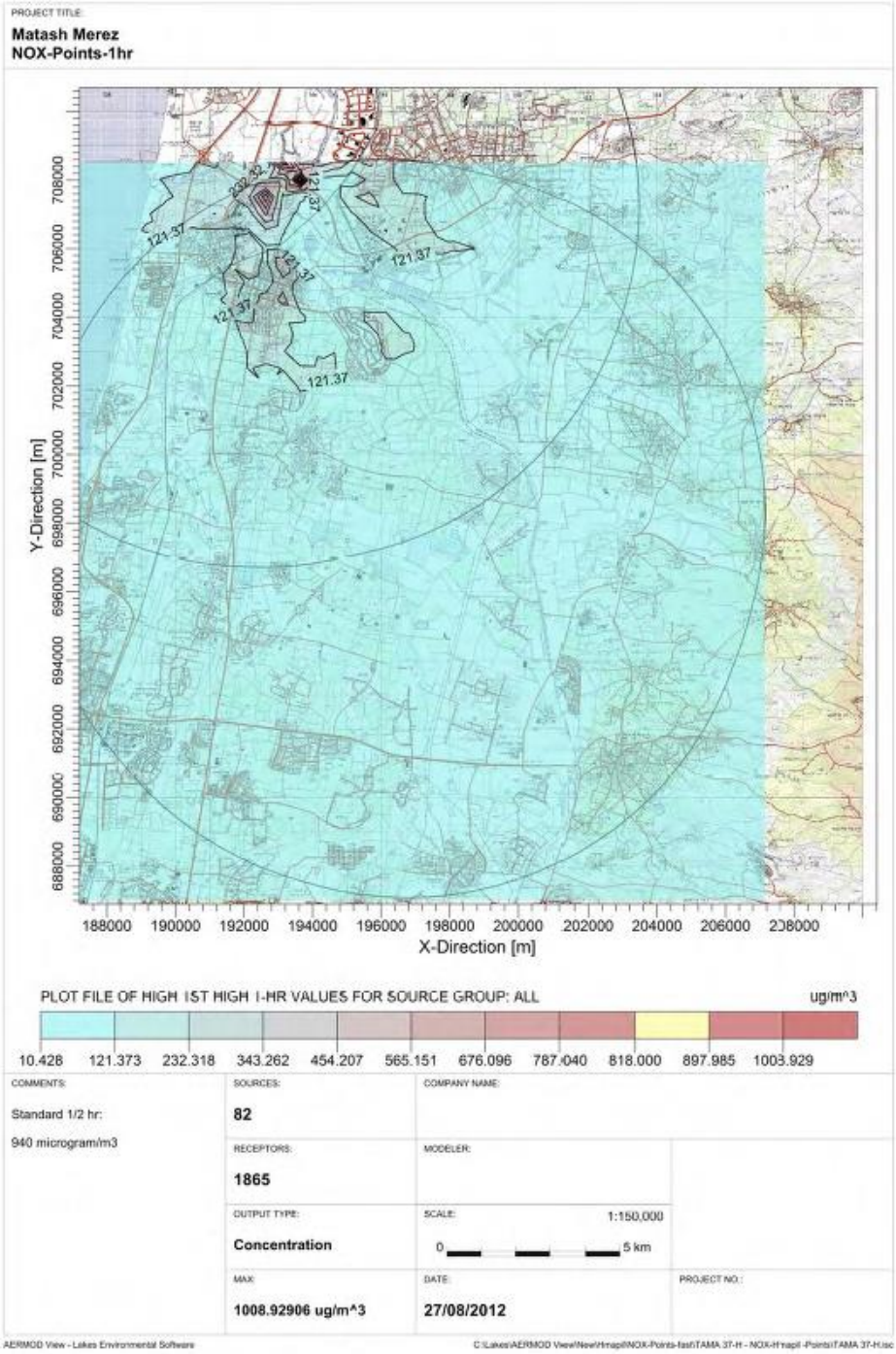
Meretz Wastewater Treatment Facility Alternative

Isopleth map for the pollutant NOx, 1-hour averaging without vehicles for the Meretz Wastewater Treatment Facility area



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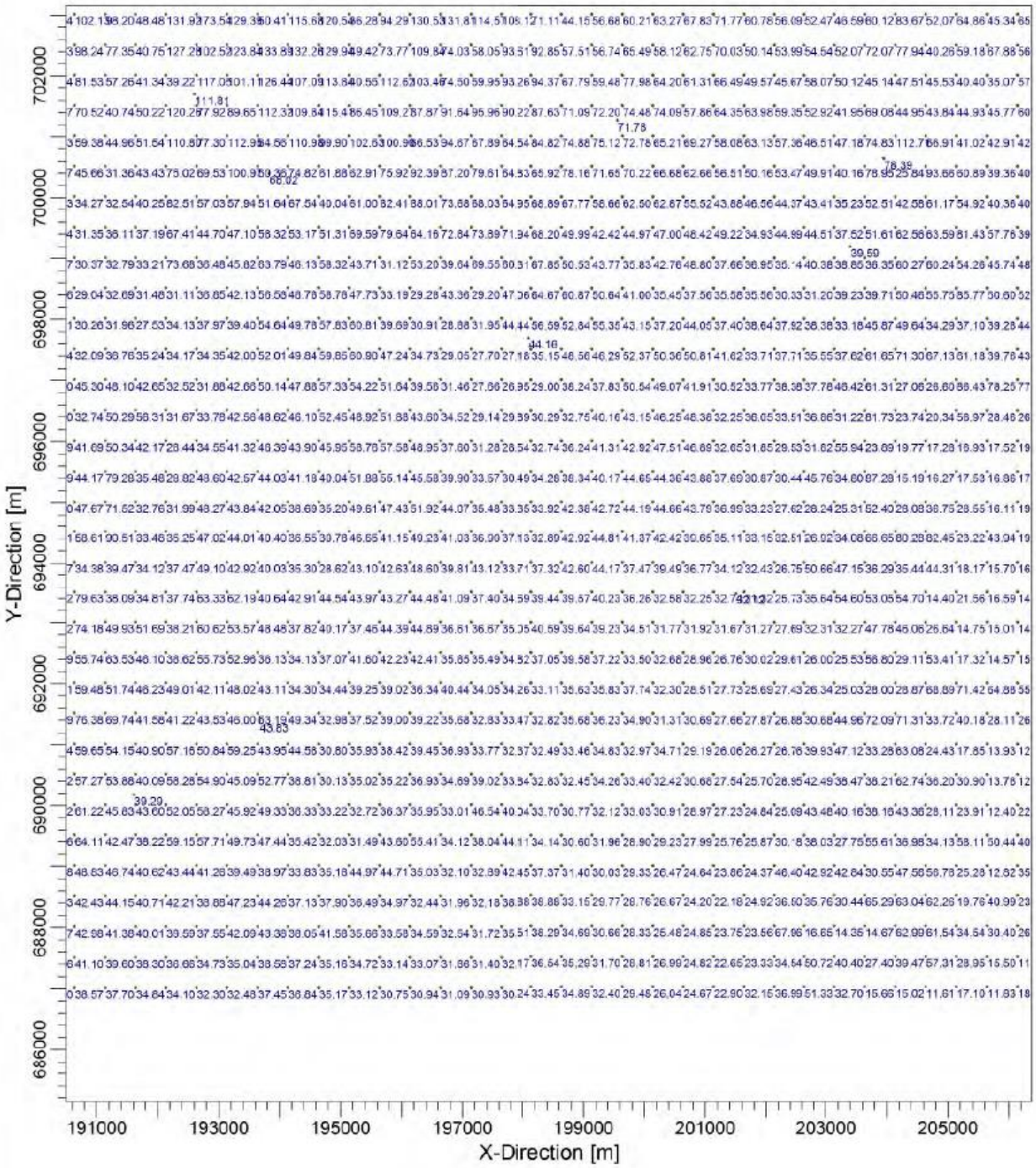
Lattice map for the pollutant NOx, 1-hour averaging without vehicles for the Meretz Wastewater Treatment Facility area



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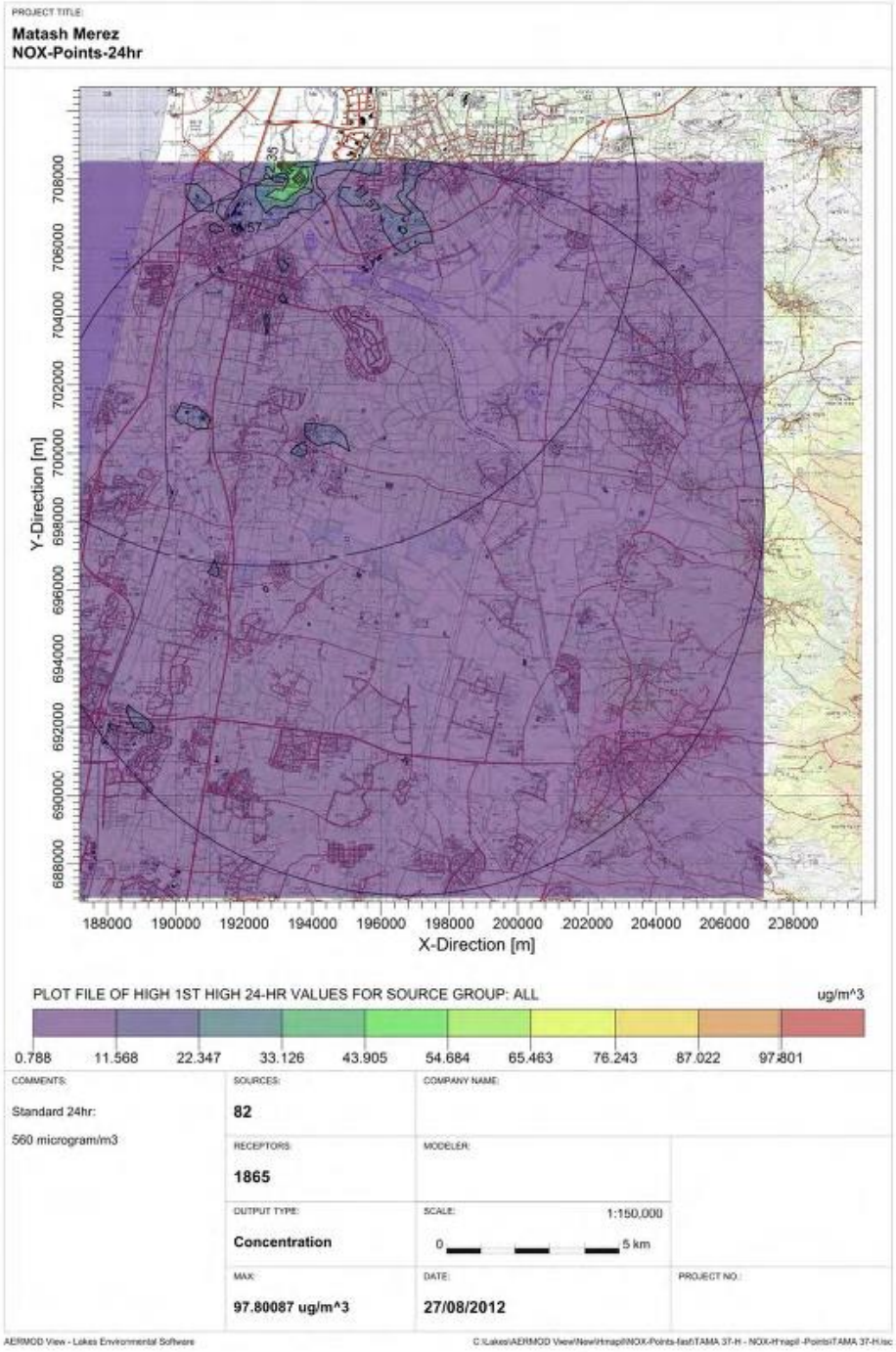

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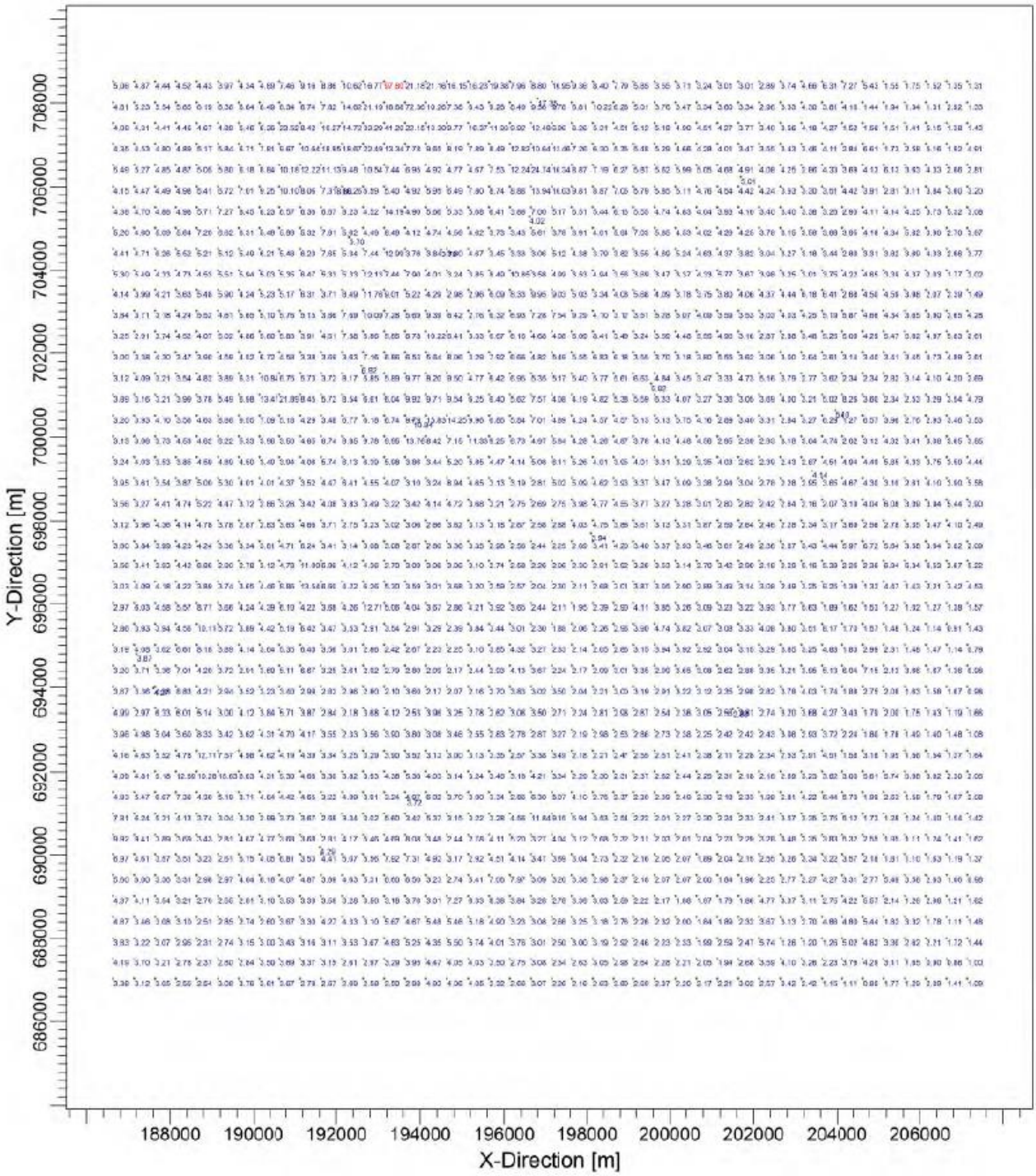

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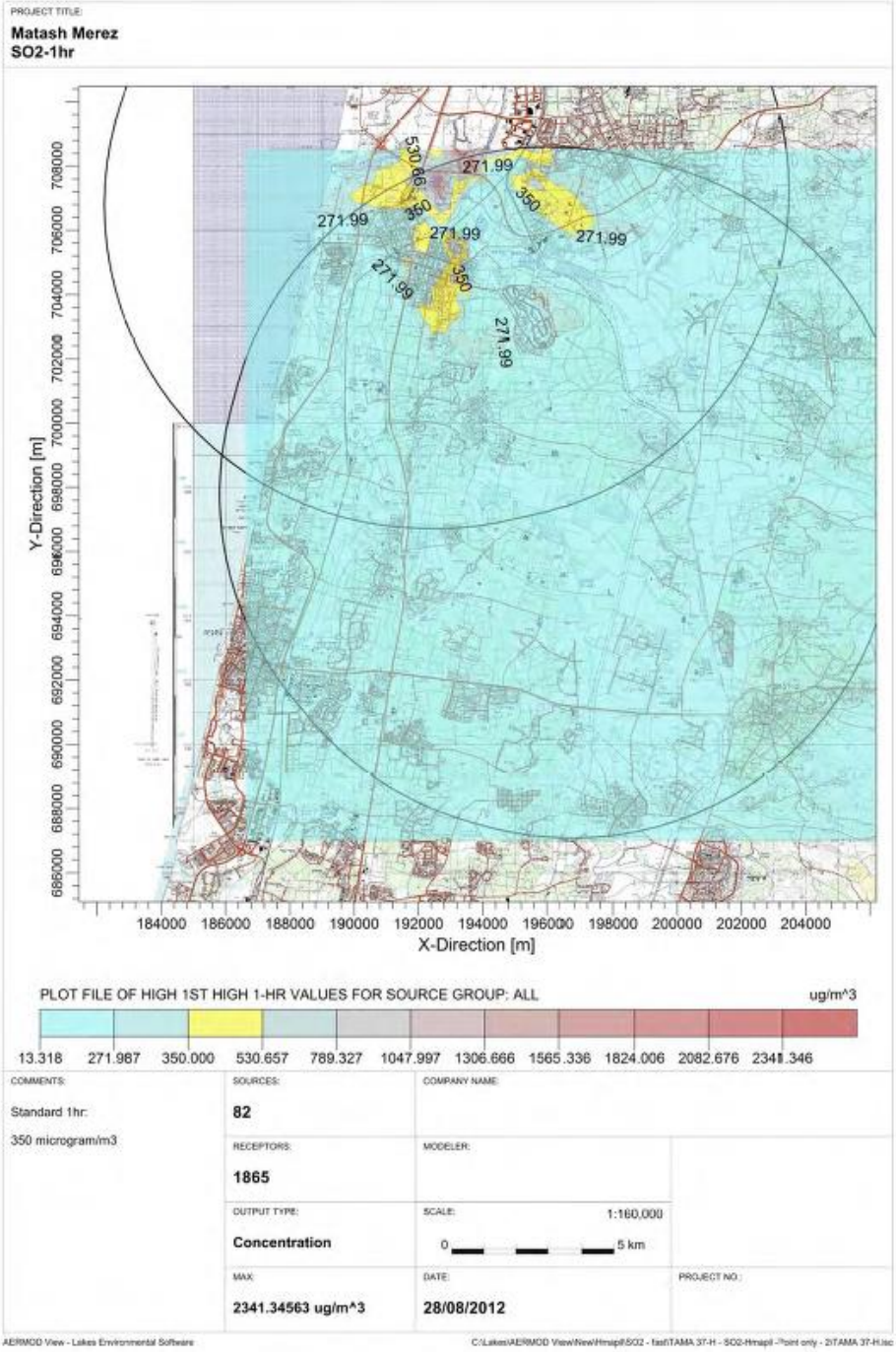

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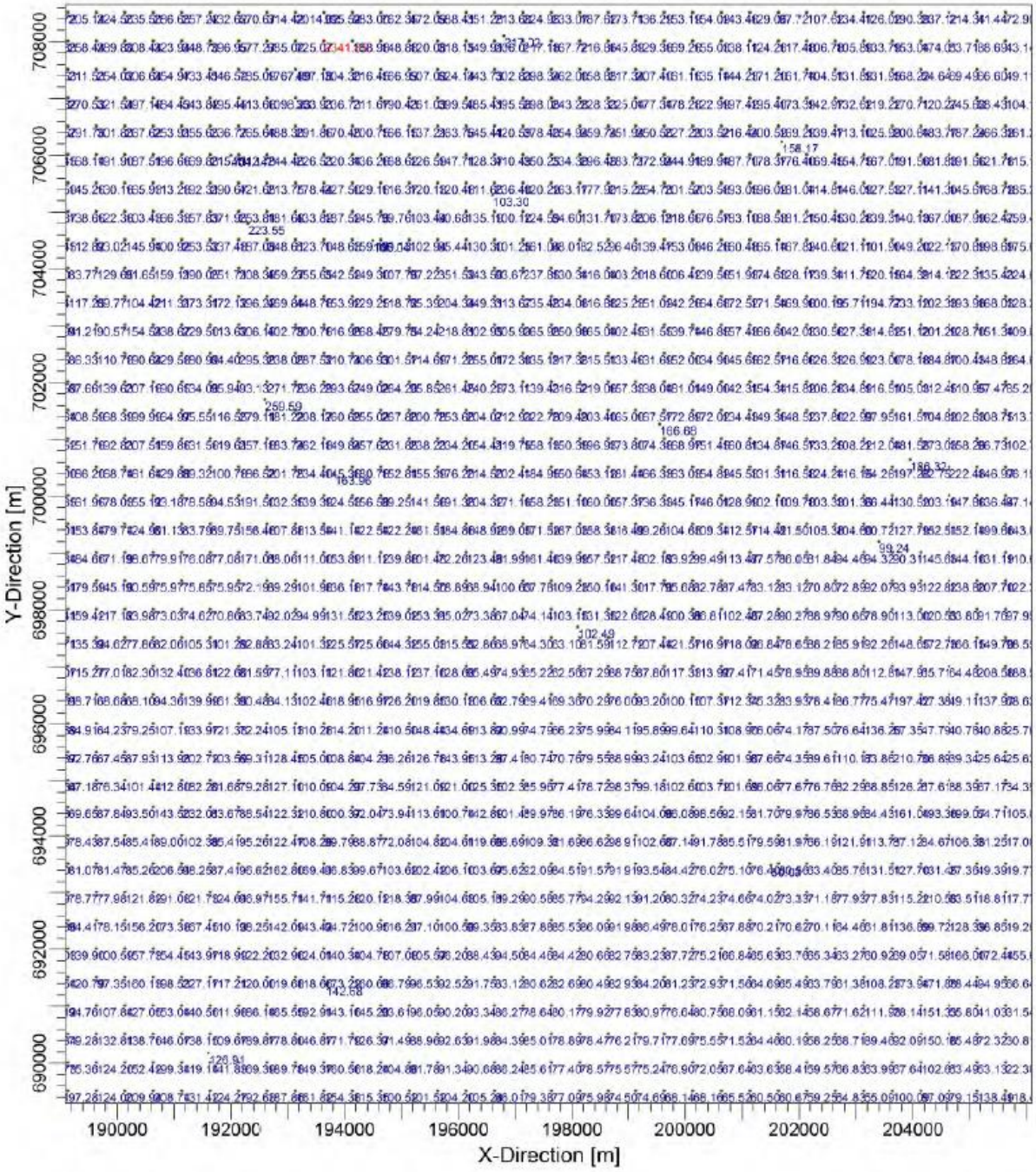

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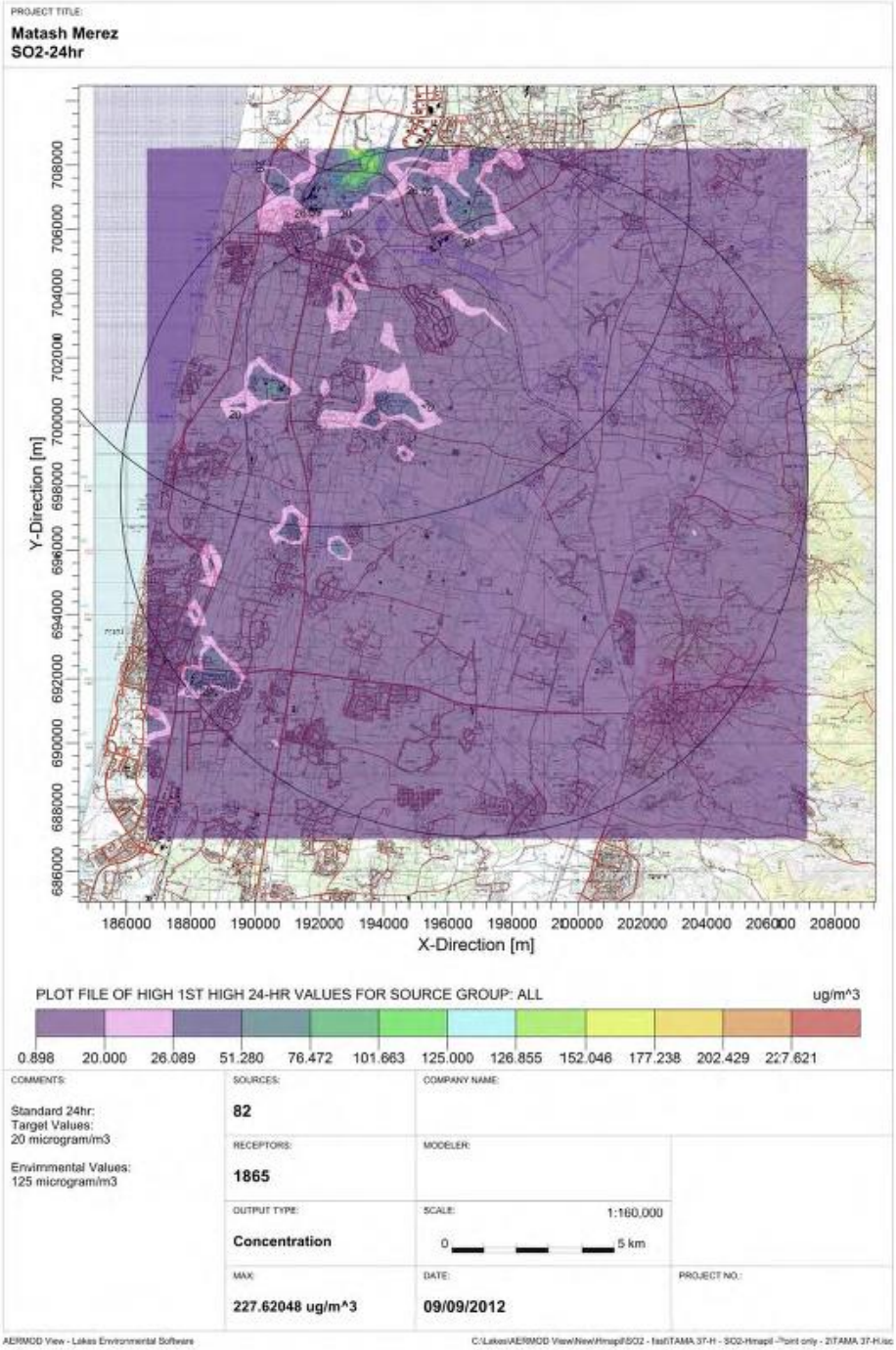

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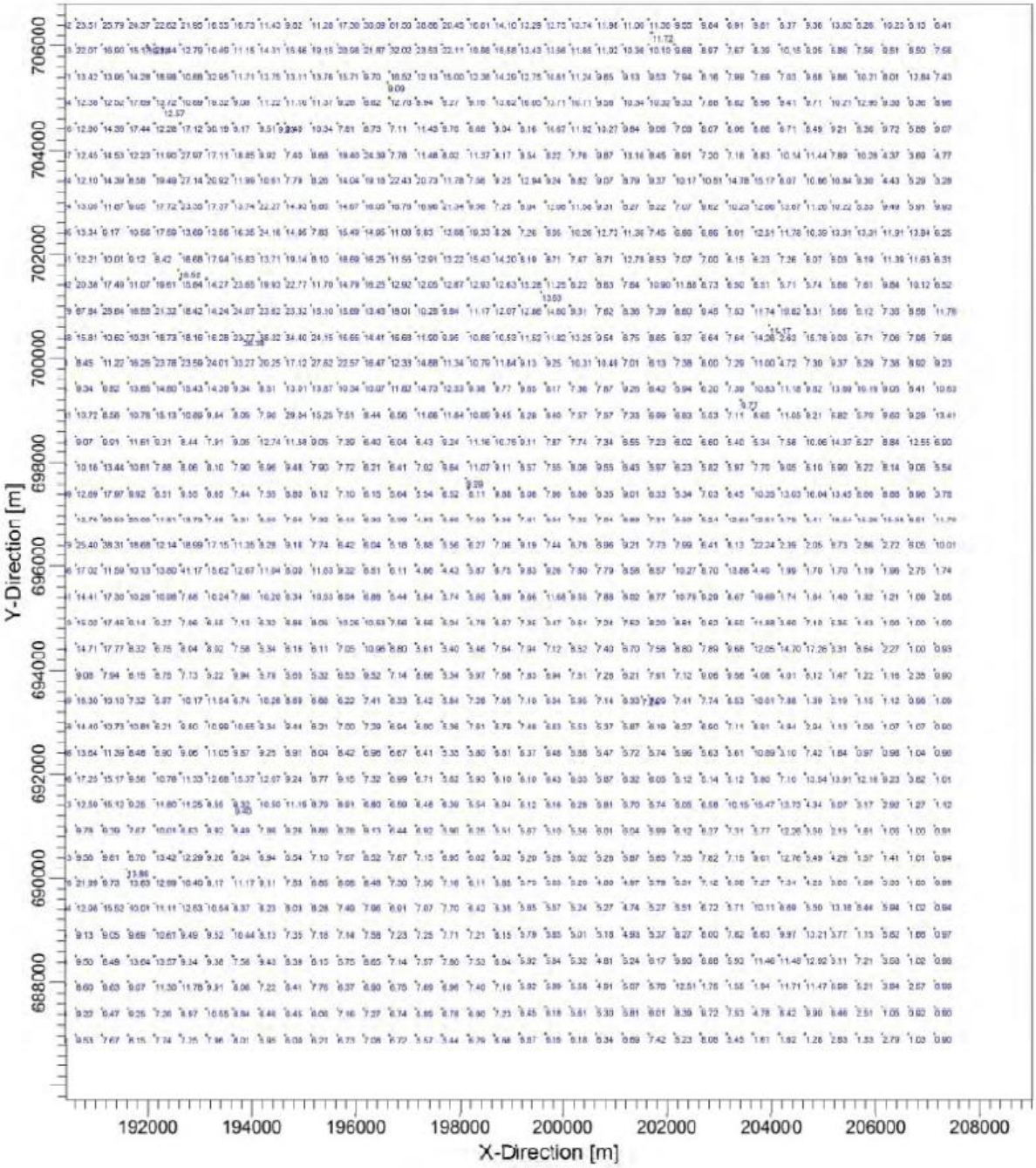

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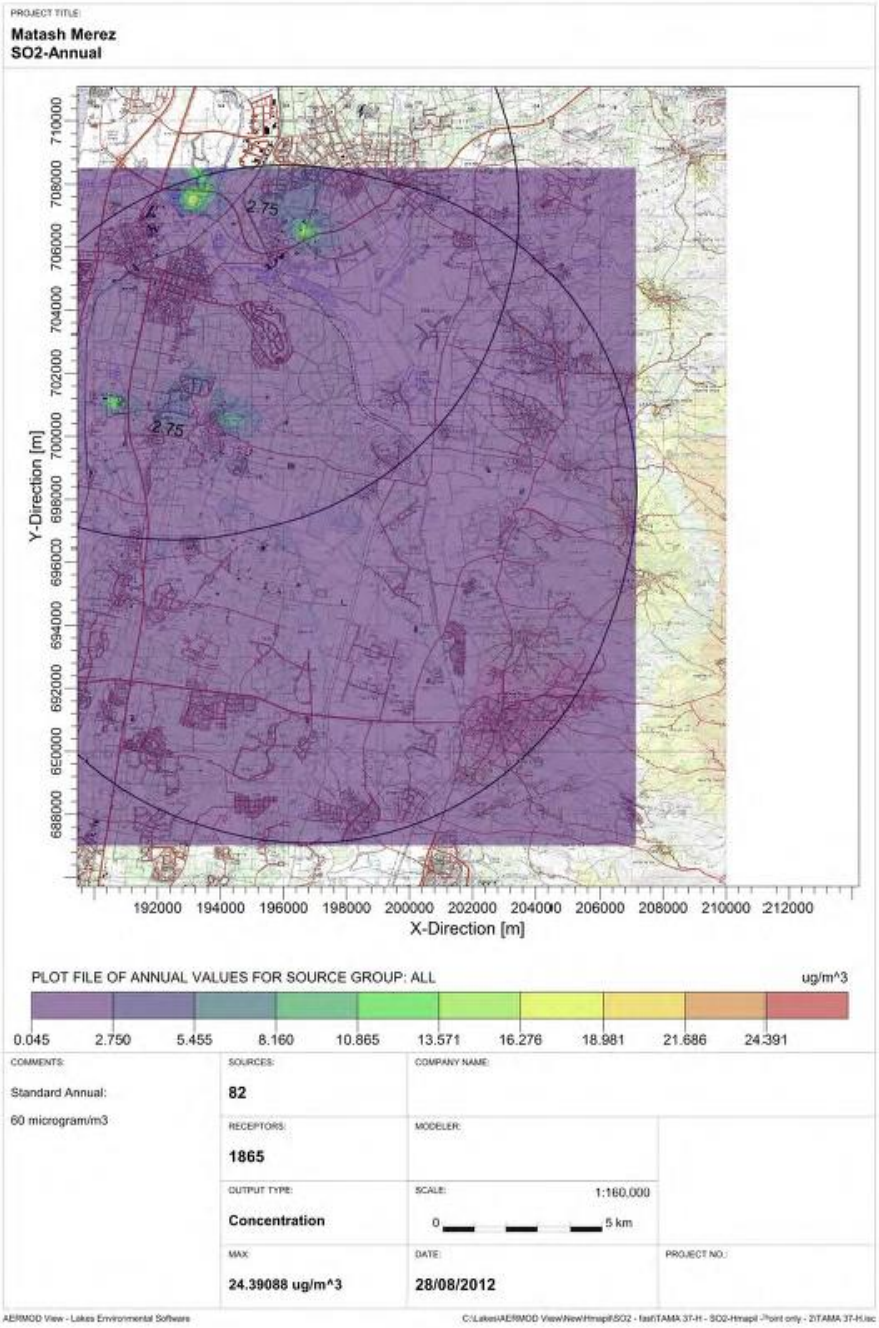

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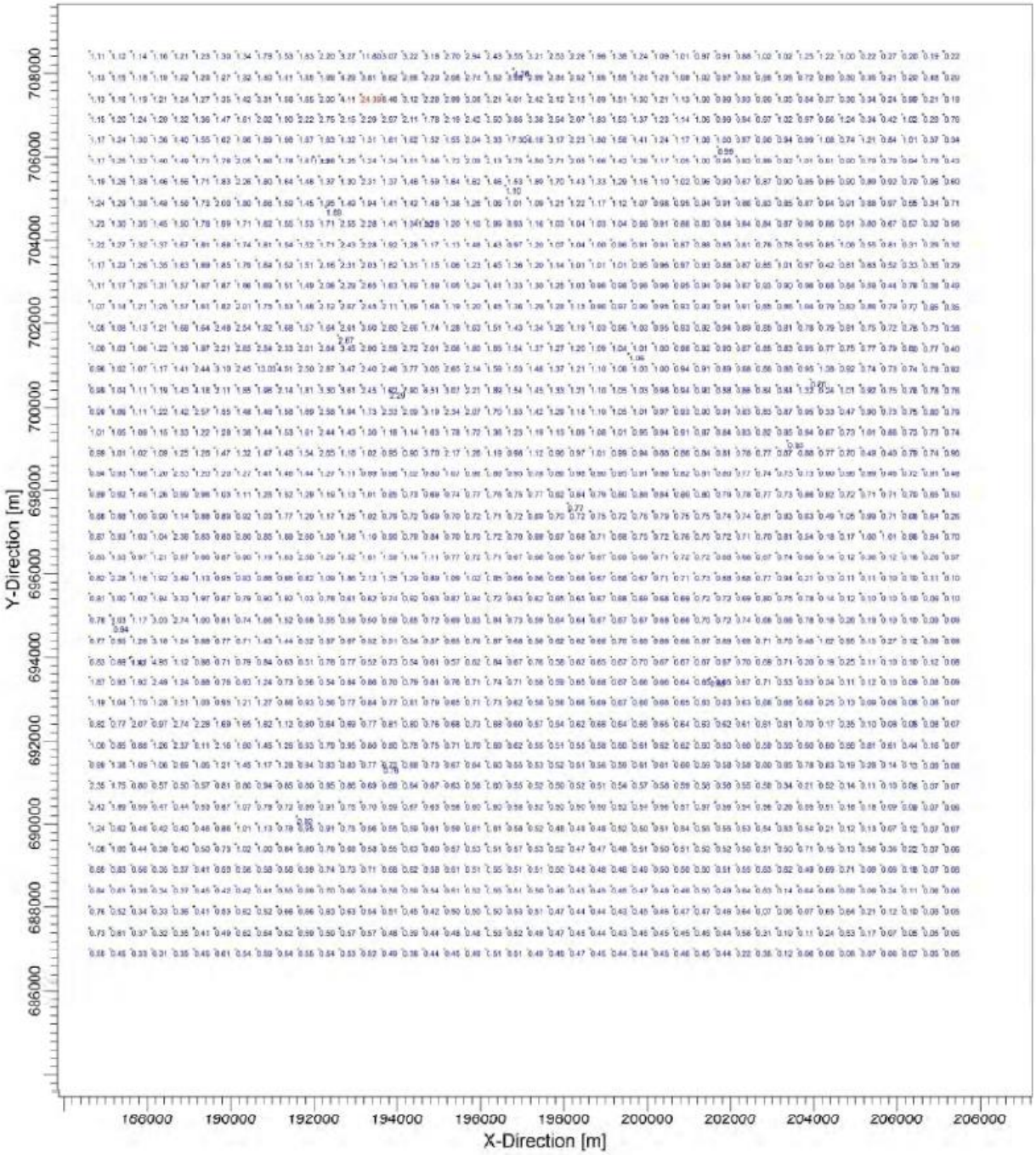

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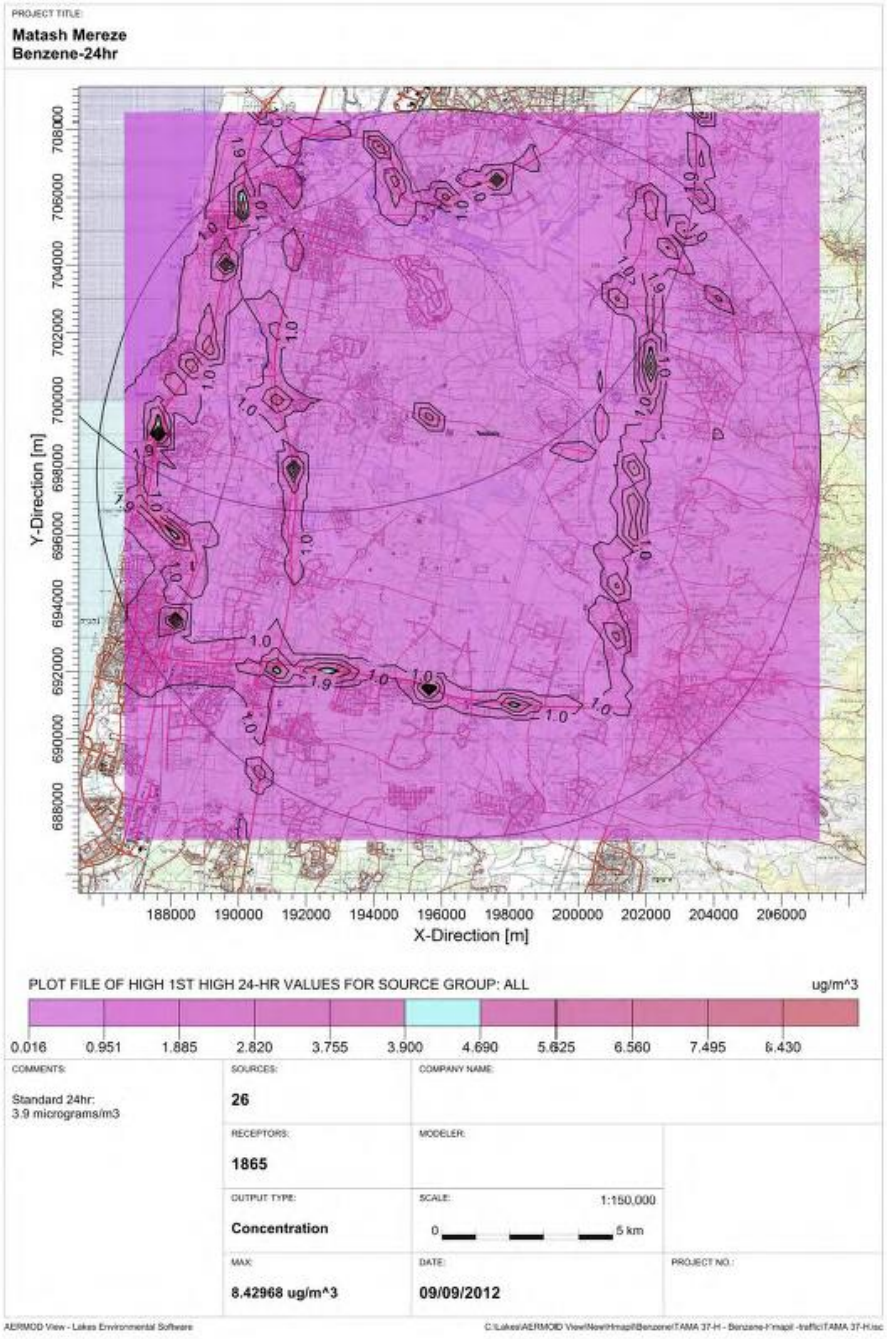

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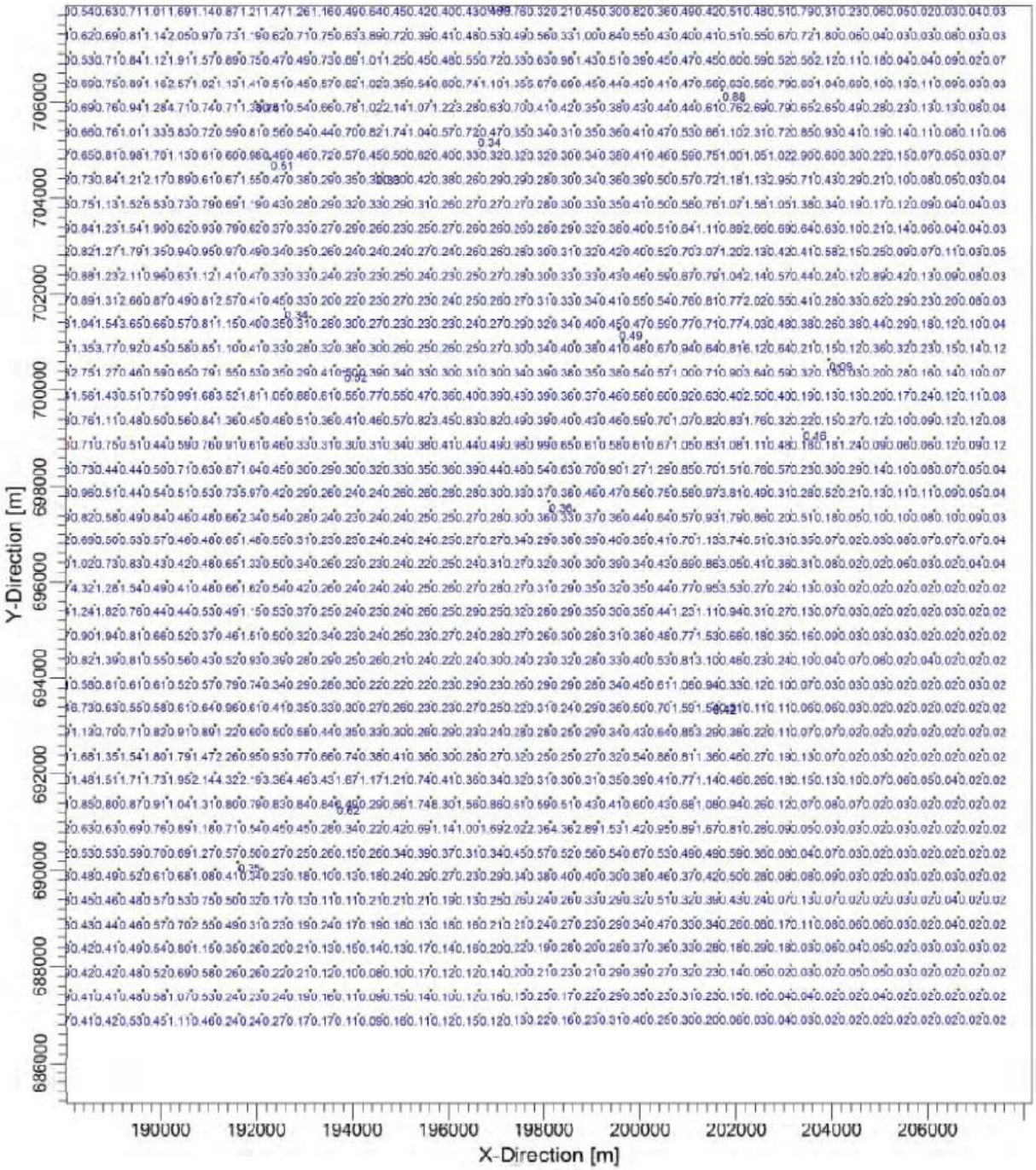

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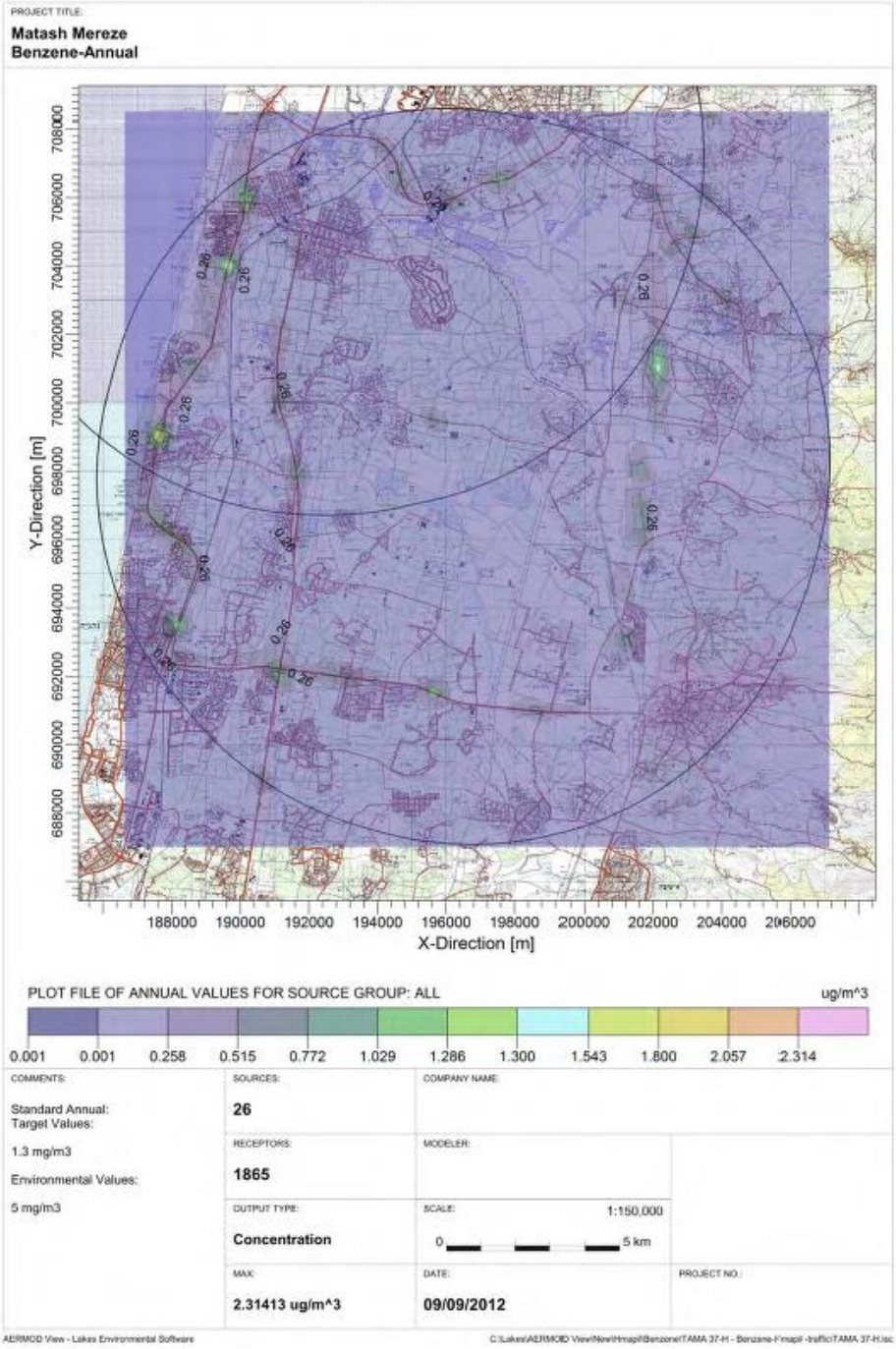

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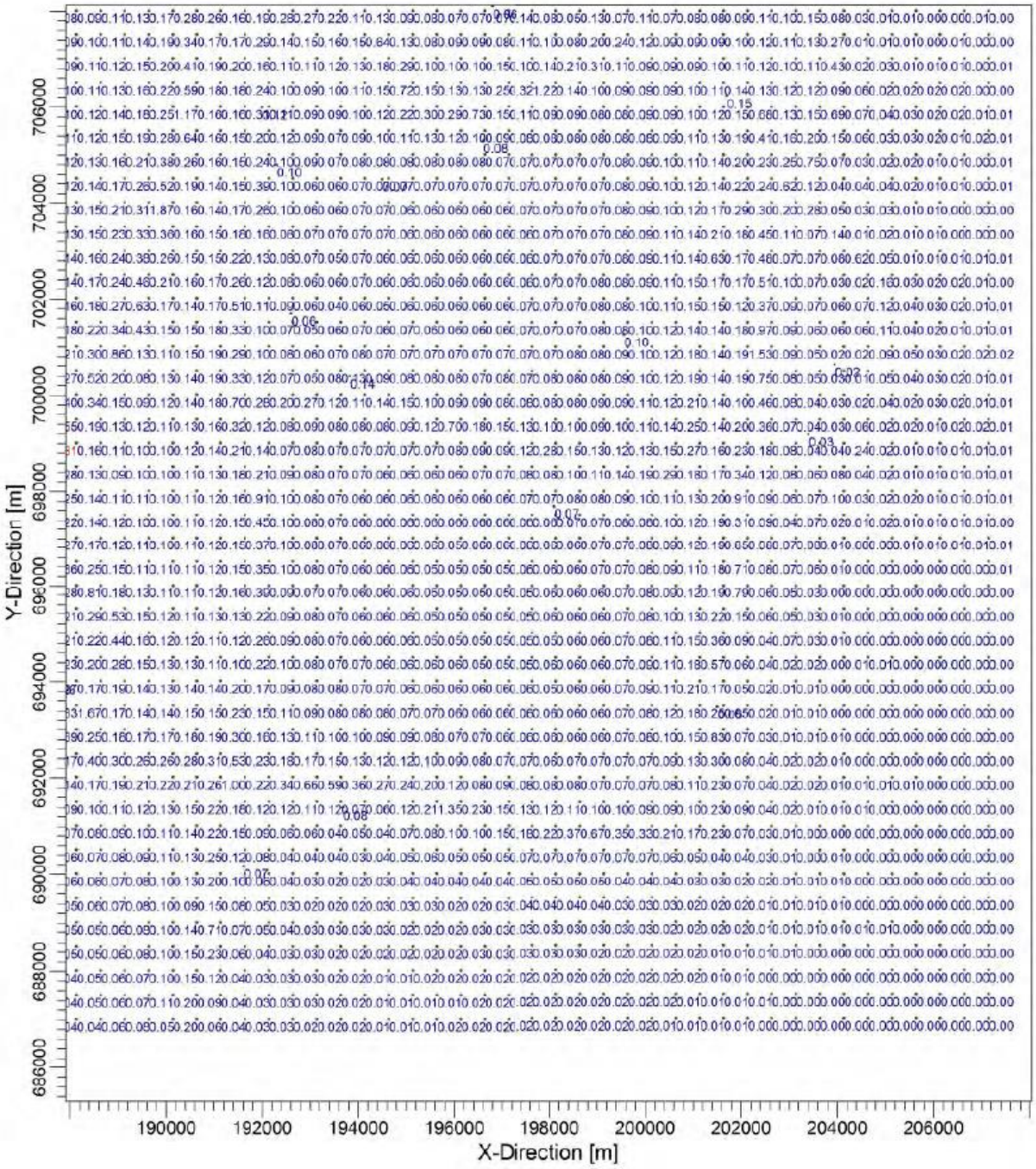
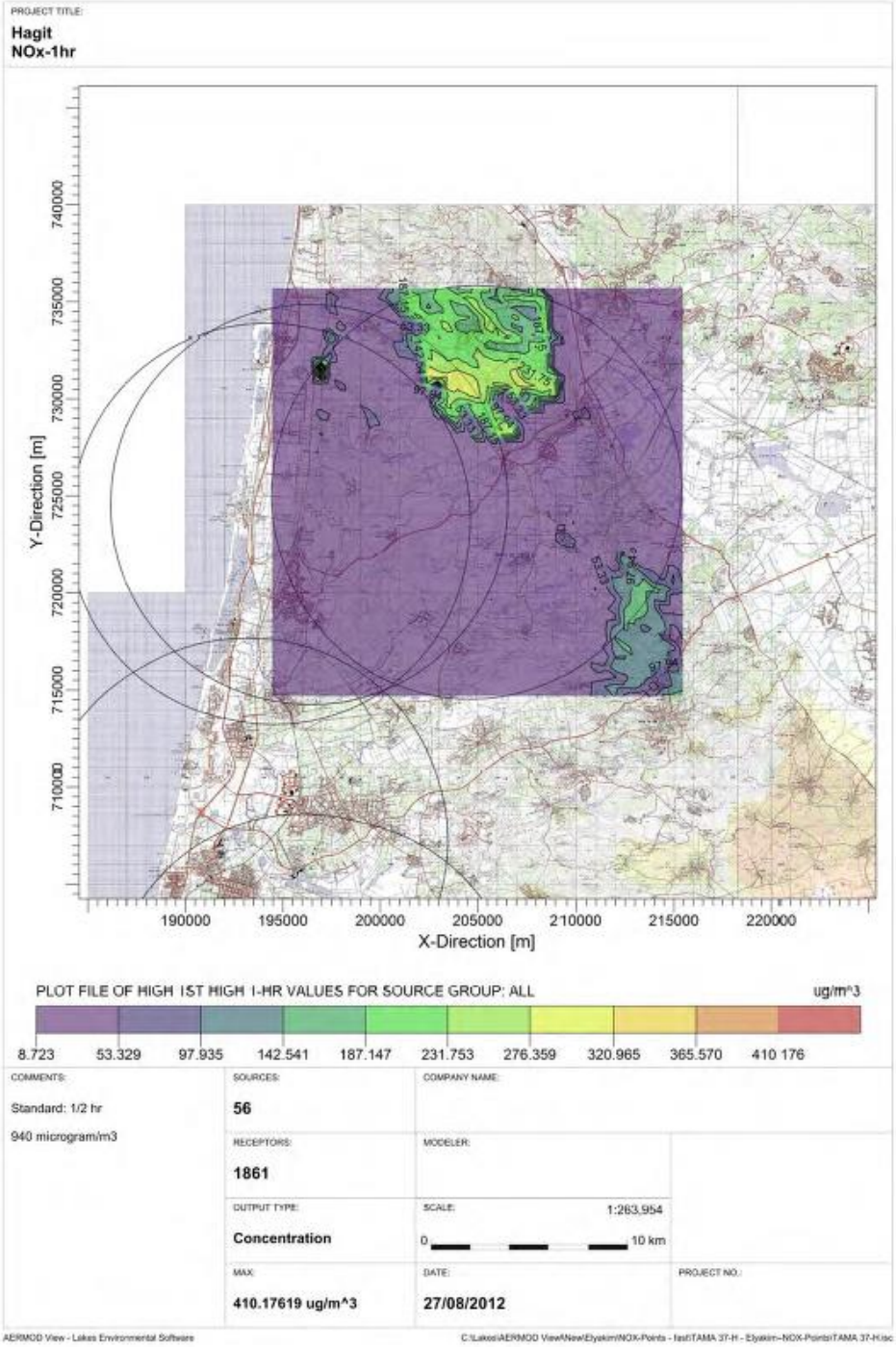


Hagit Site Alternative

Isopleth map for the pollutant NOx, 1-hour averaging without vehicles for the Hagit area



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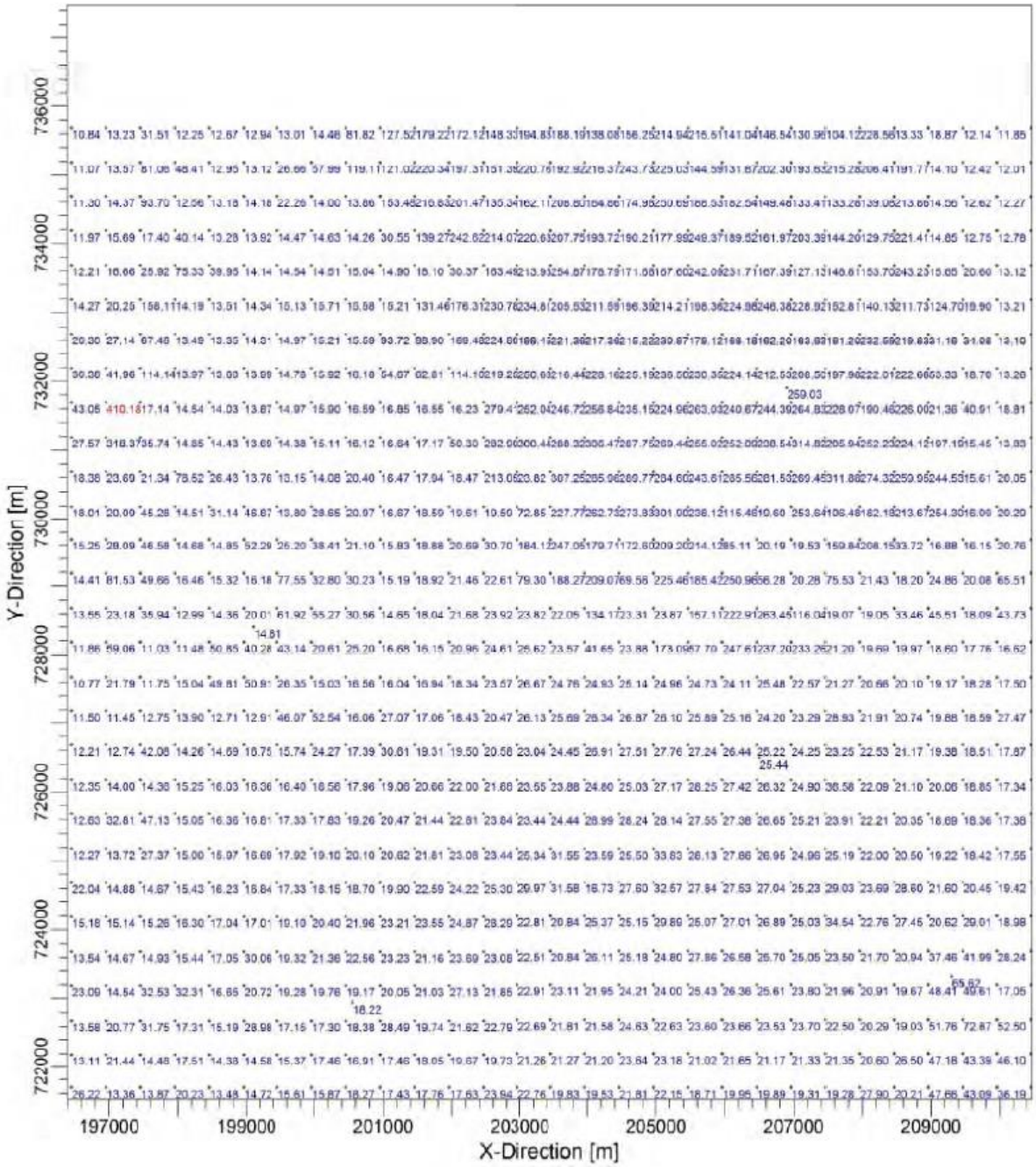
Lattice map for the pollutant NOx, 1-hour averaging without vehicles for the Hagit area



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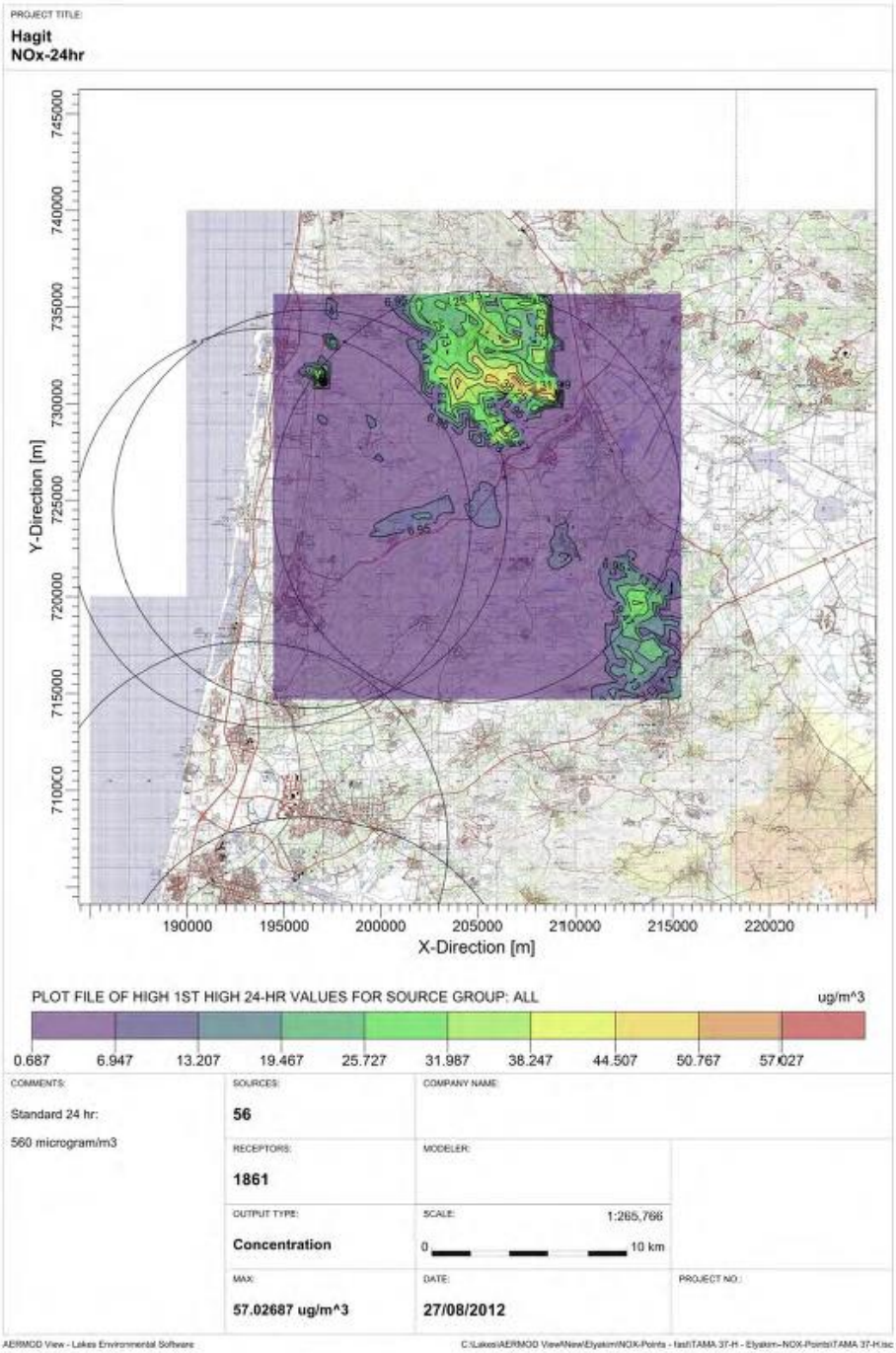

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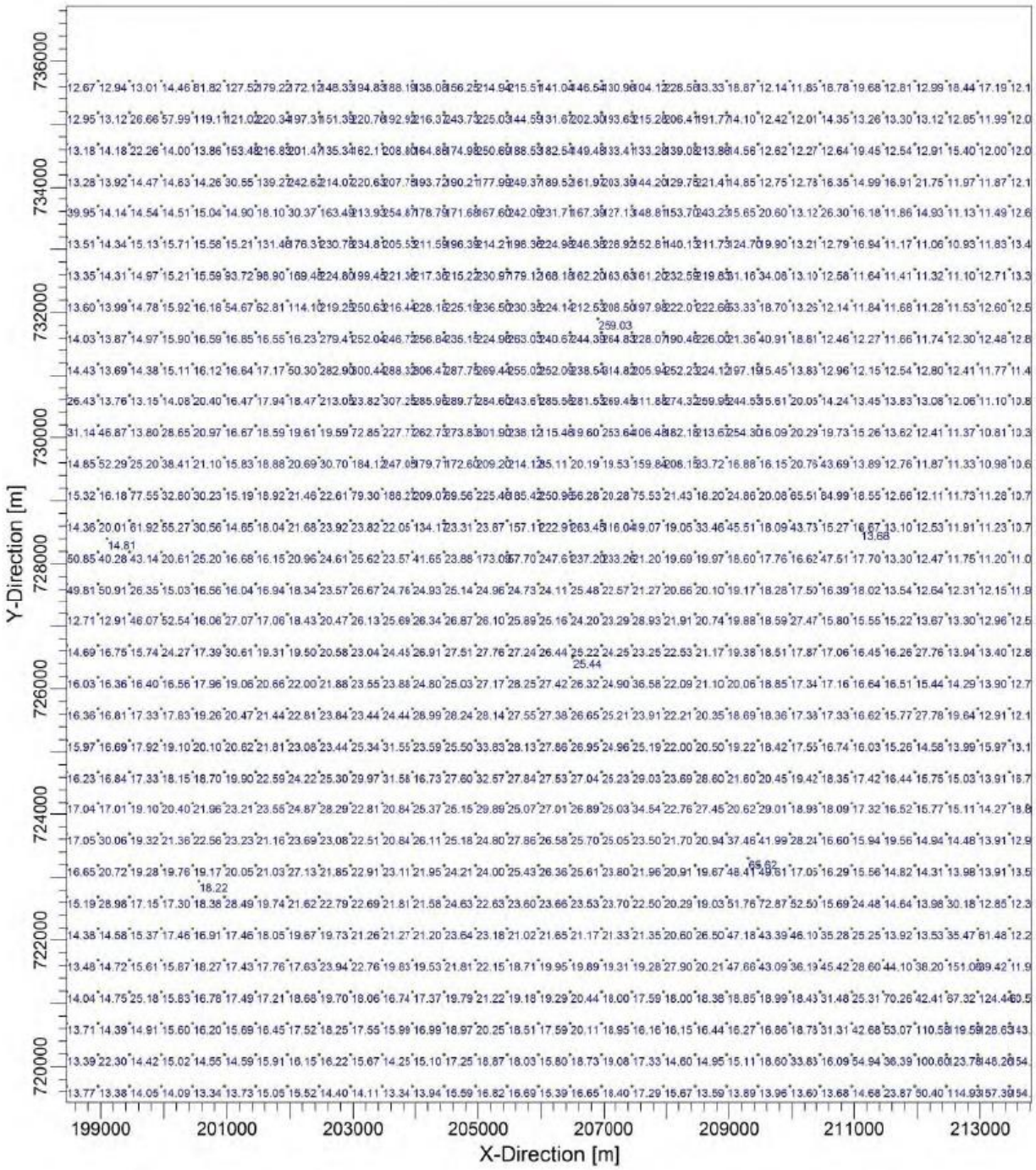

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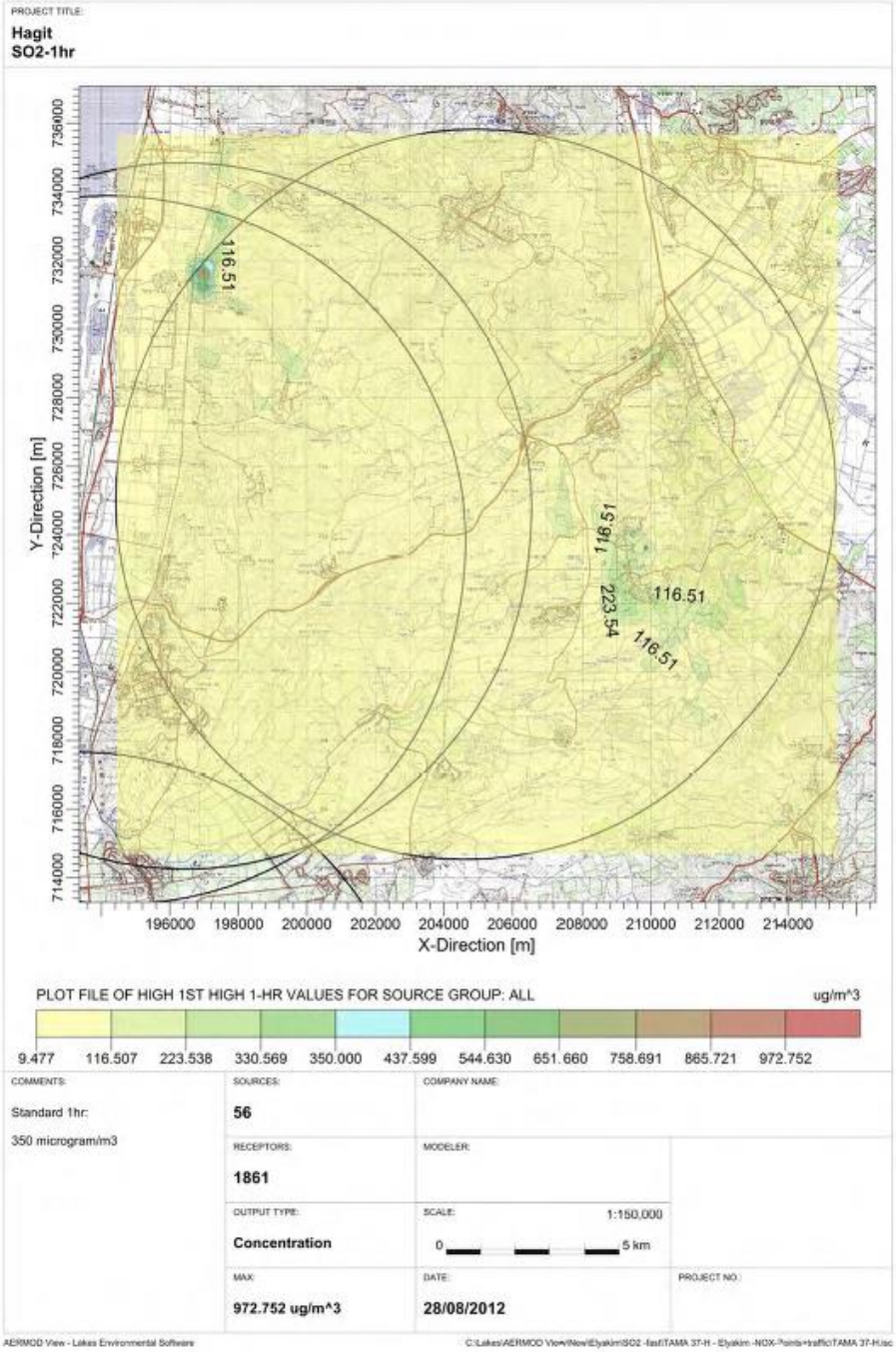
Isopleth map for the pollutant SO_2, 1-hour averaging for the Hagit area



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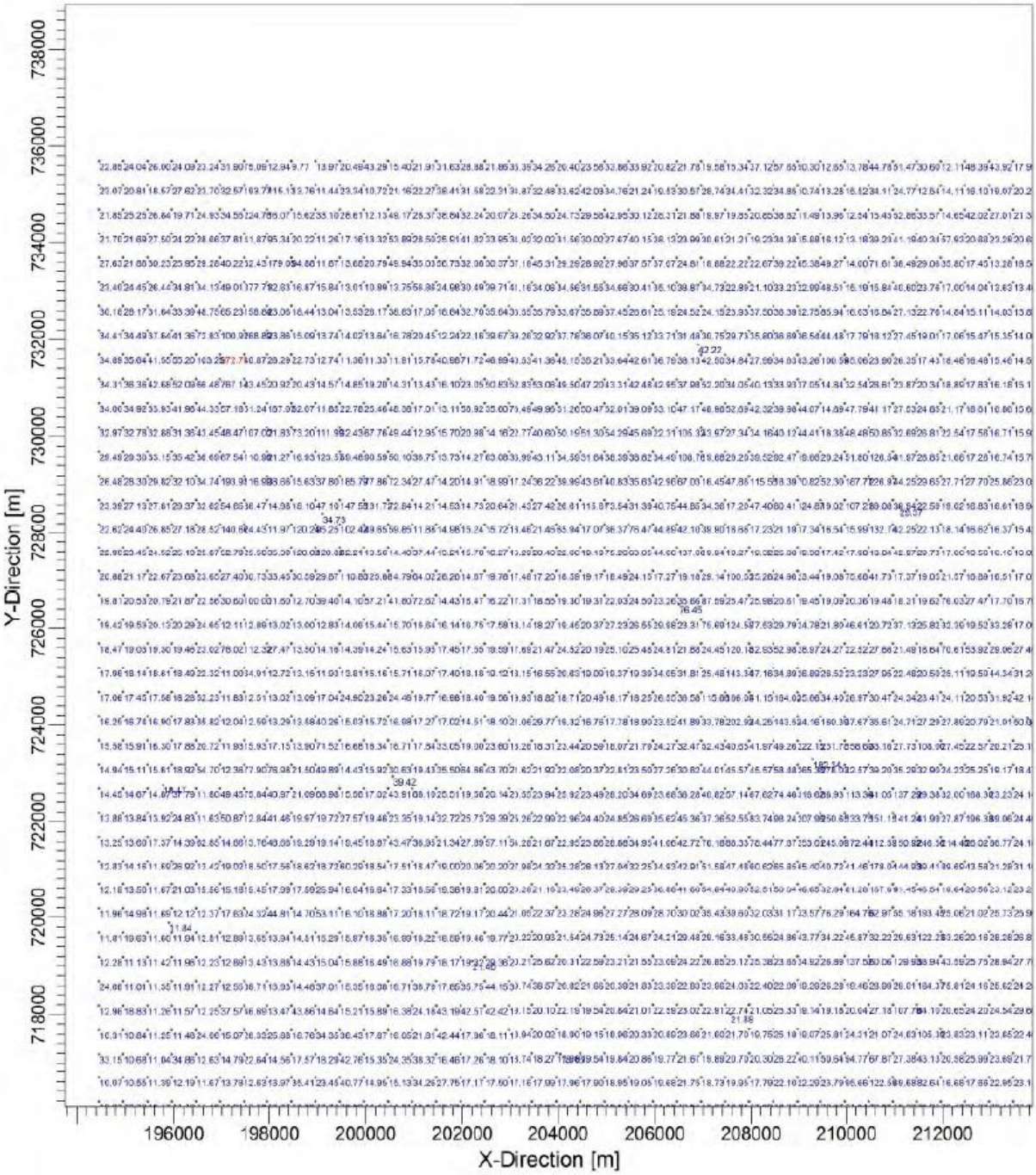

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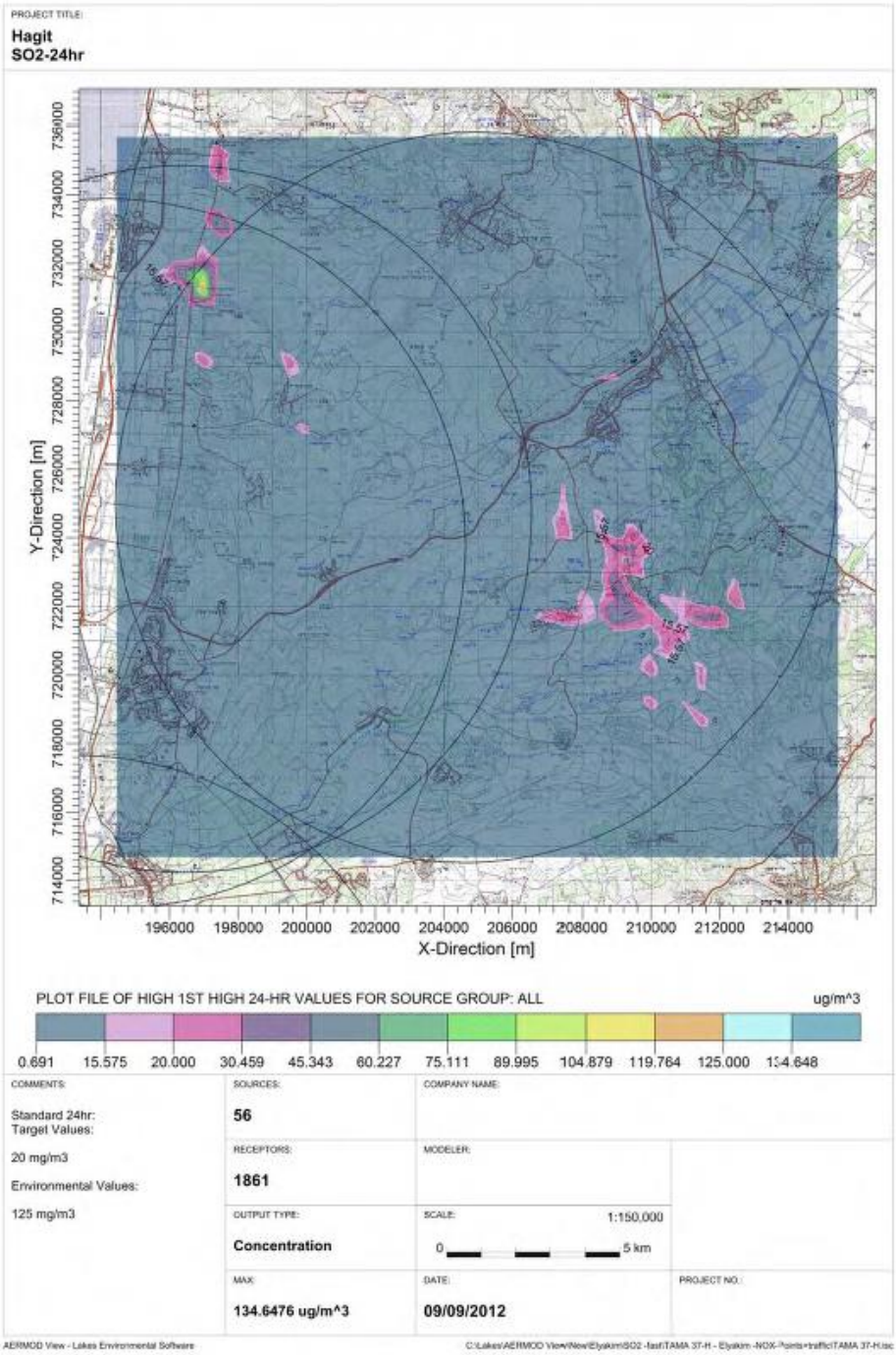
Isopleth map for the pollutant SO_2, 24-hour averaging for the Hagit area



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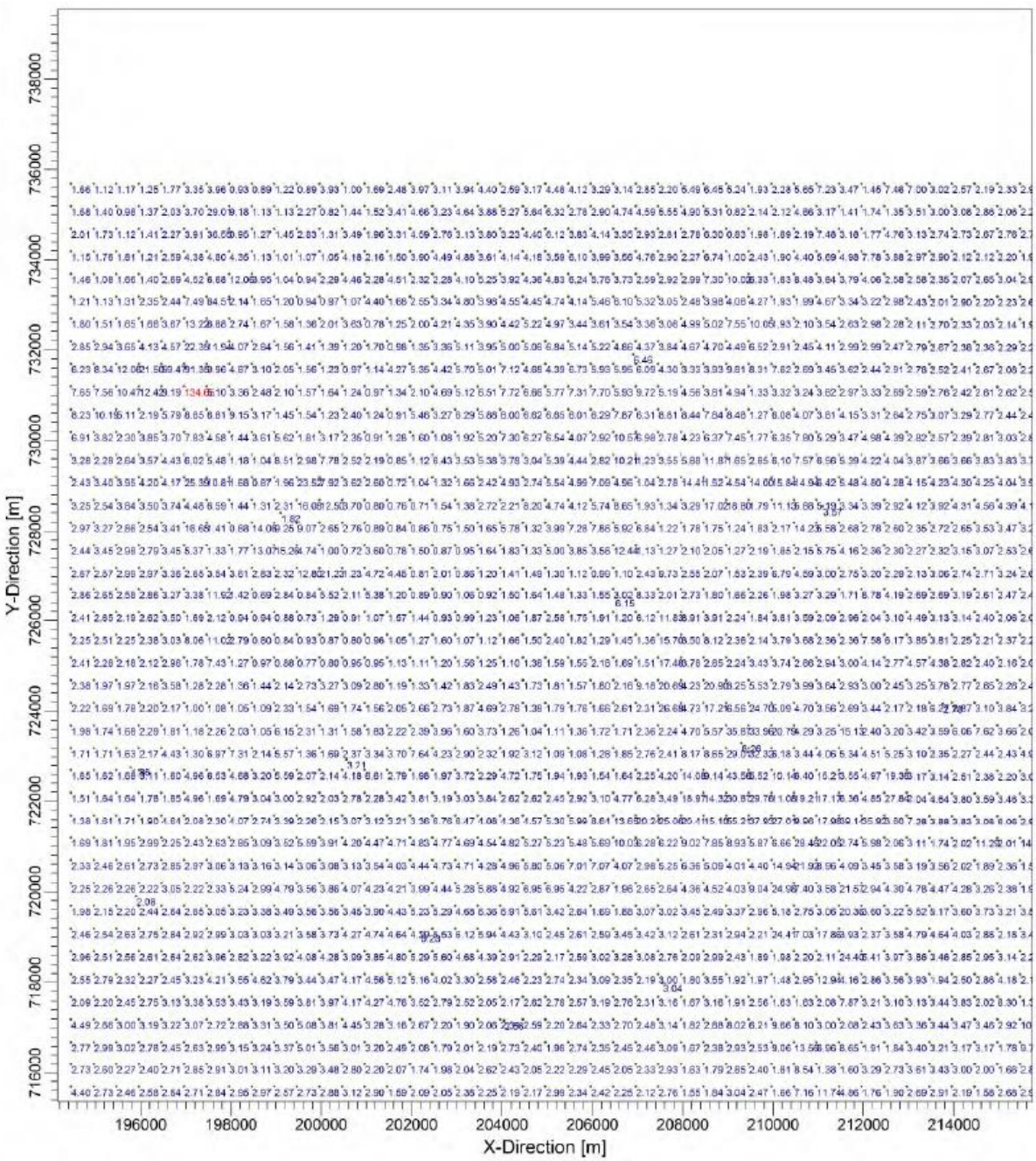

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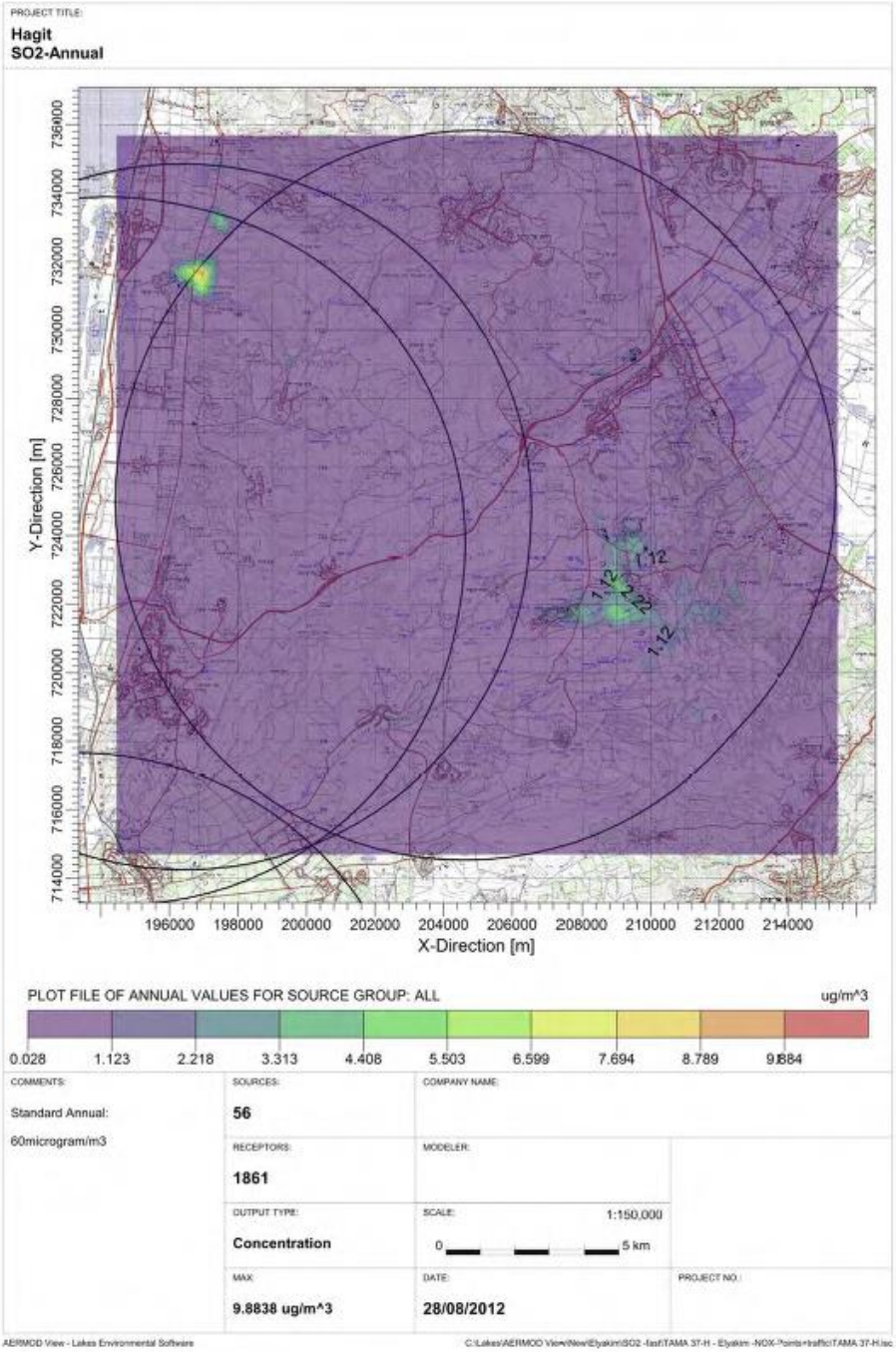
Isopleth map for the pollutant SO_2, annual averaging for the Hagit area



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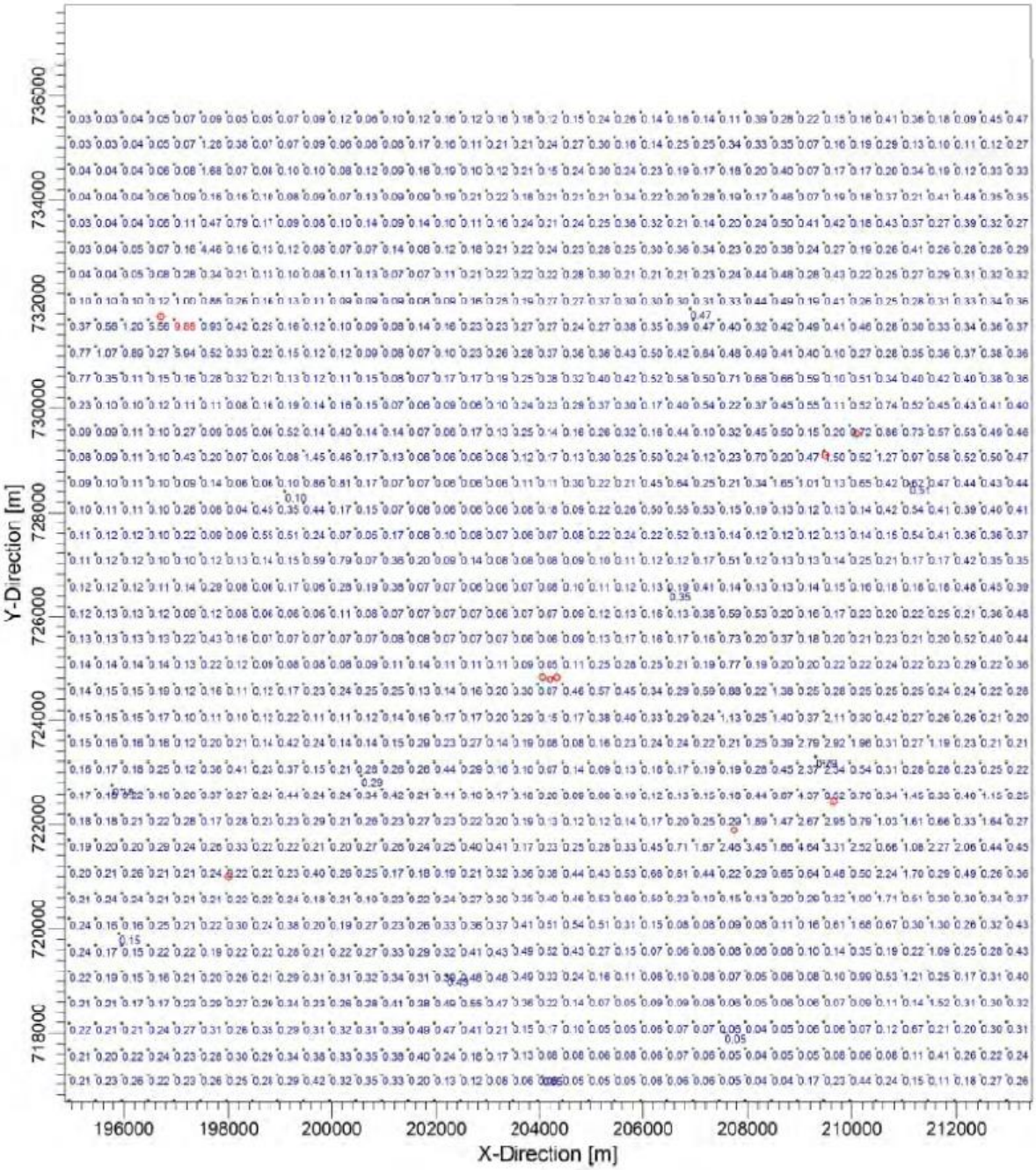

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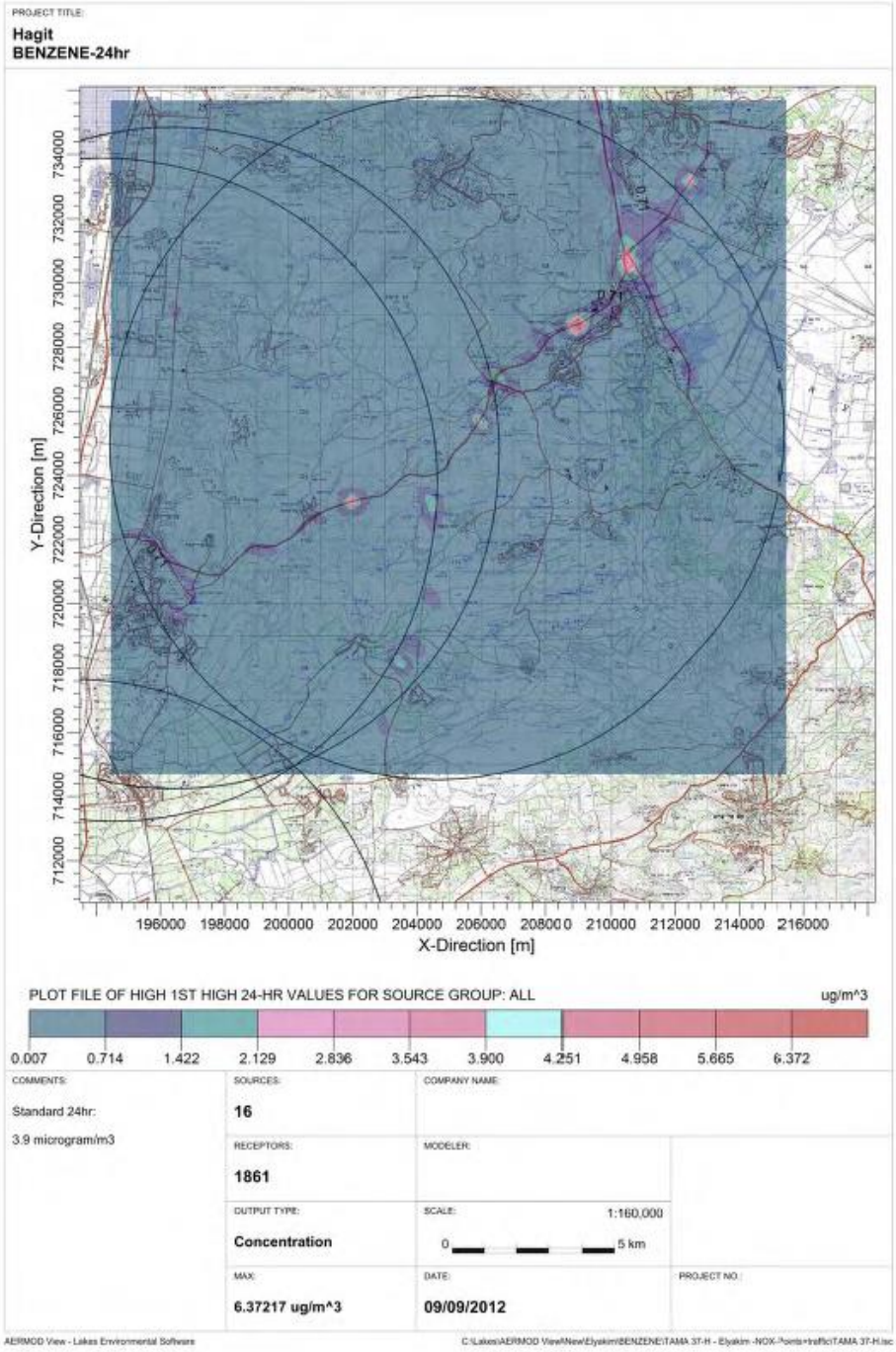

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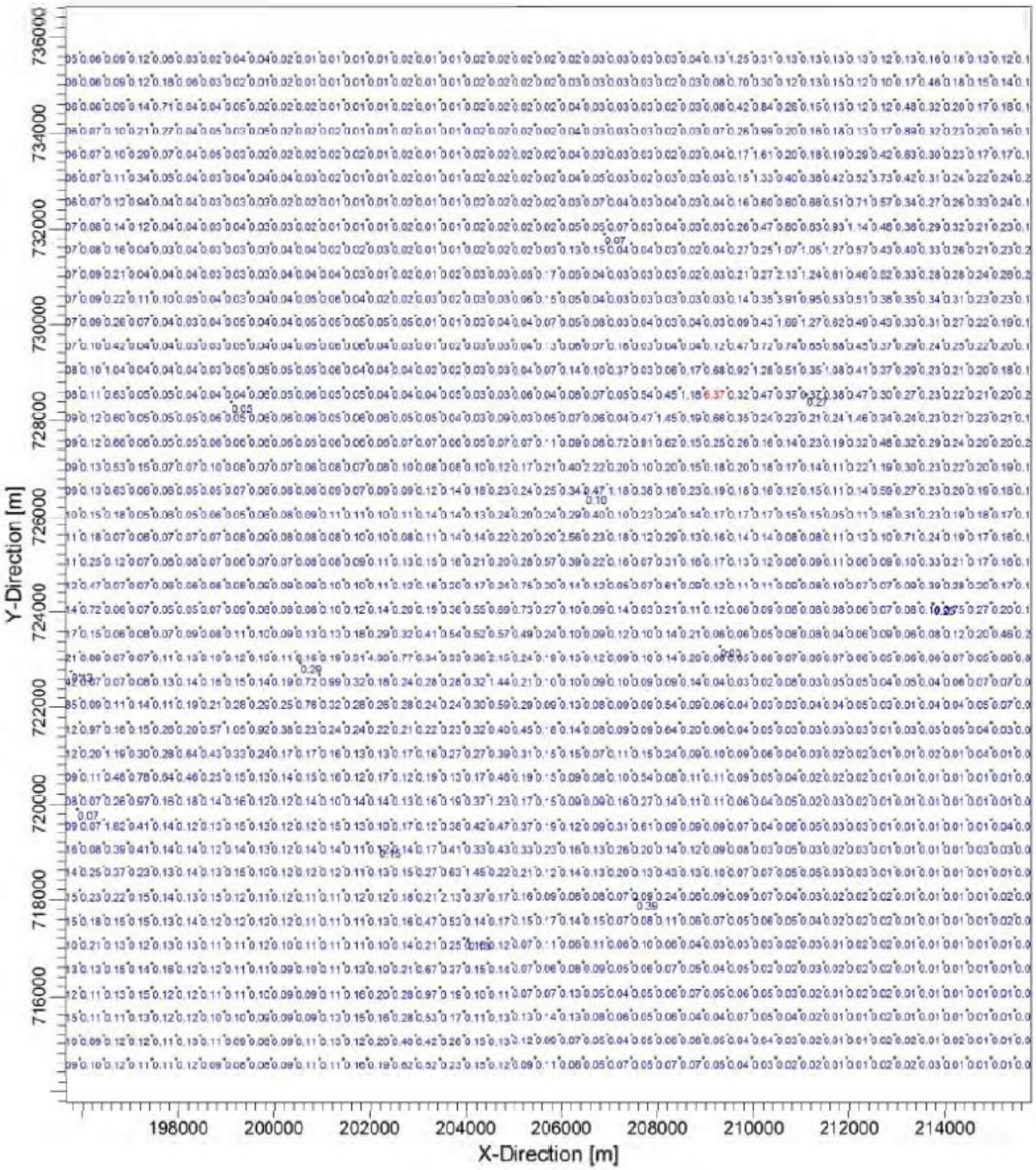

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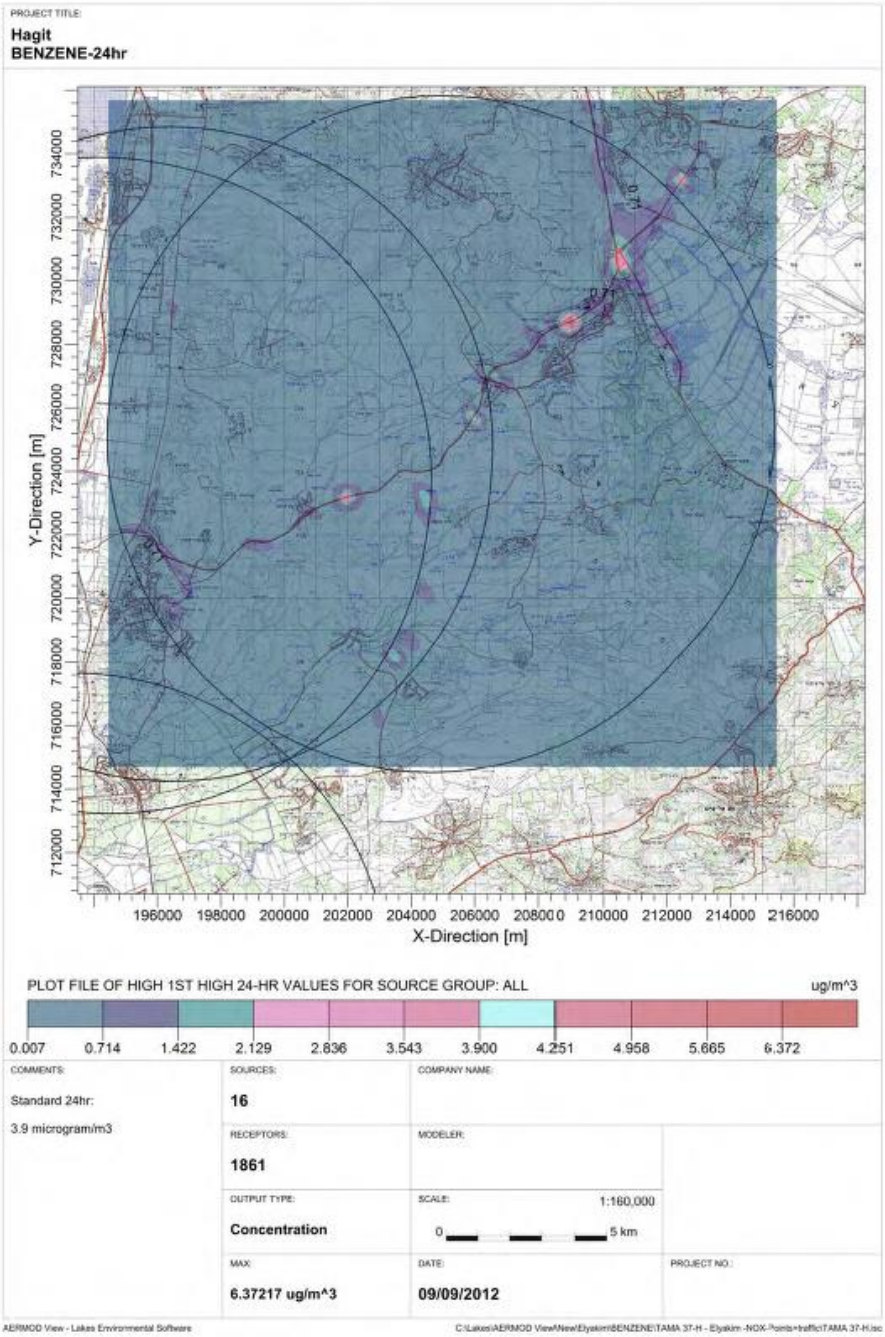

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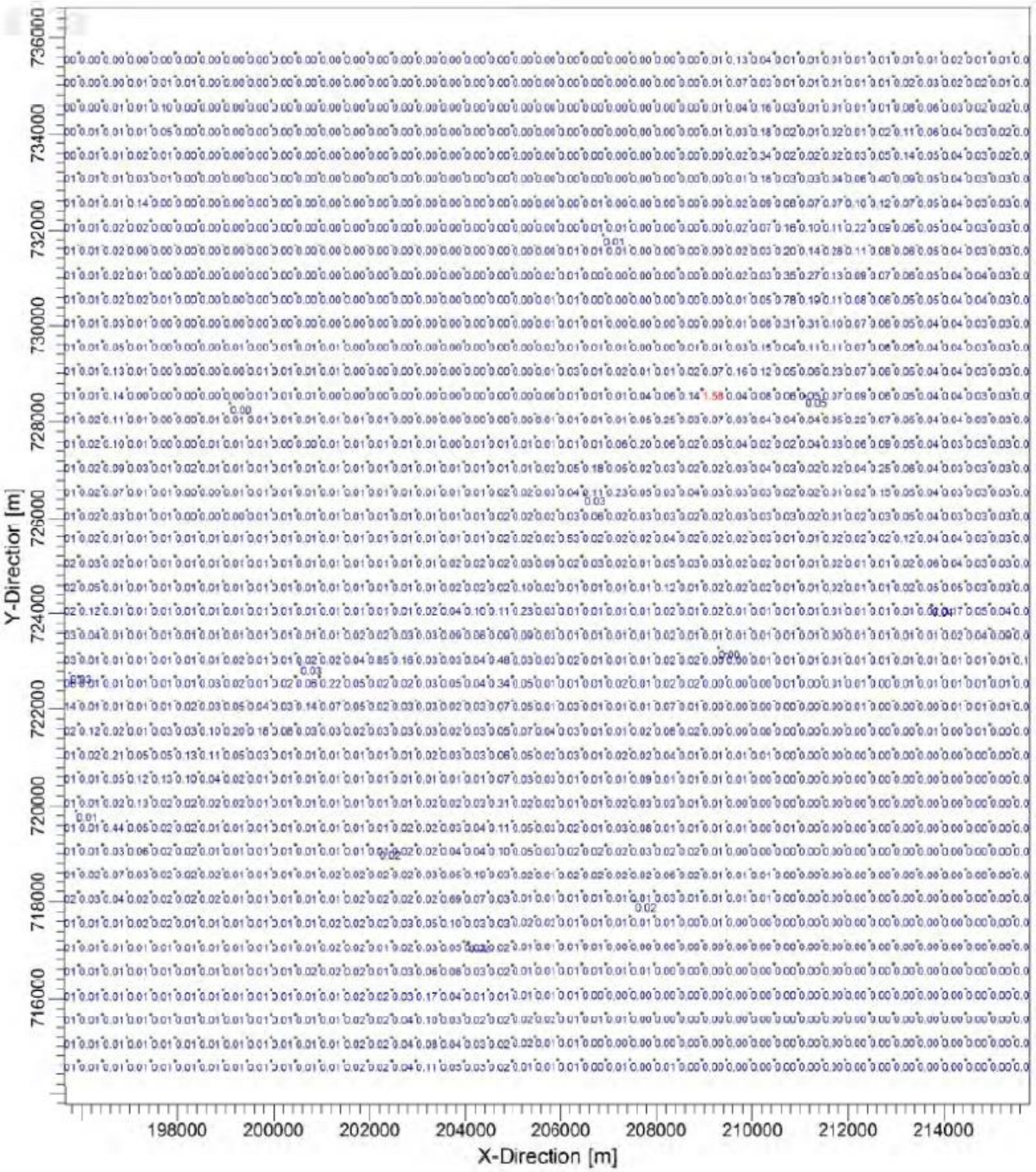

Appendix D – Response from the Antiquities Authority

August 2, 2012

To: Orly Levy
Lerman Architects and Town Planners

Re: <u>Gas facilities and transmission pipeline in the area of Hof HaCarmel and Emek Hefer</u>

Further to the discussion by the National Planning Council held in July, and after studying the areas where the gas transmission pipeline in the alternatives presented is slated to pass through, we wish to inform you as follows:

<u>The Antiquities Authority does not object to the alternatives presented for the plan; nevertheless I wish to emphasize that:</u>

1. Some of the areas being planned for the pipeline pass through numerous antiquities sites, and therefore we expect a concentration of antiquities along the alignment.
2. The obligation to comply with the Antiquities Law, 5738-1978 requires the performance of preliminary test before doing any development work, including development surveys, test cross-sections, test excavations and salvage.
3. Upon completion of the archaeological tests the Authority will send its conditions and instructions for further carrying out the works.
4. **The plan developers must be made aware of the fact that this is an archaeological tel and thus the procedures and policies relating to such tels and instituted by the Antiquities Authority shall apply in this case (<u>that is, no development works to be carried out on archaeological tels</u>). In cases where the pipeline passes near tels, a field visit must be coordinated with the undersigned in order to see the exact location of the pipeline.**
5. This document relates only to sites on land.

<u>Antiquities Authority sections</u>

4. Any work in an area defined as antiquities shall be coordinated and carried out only after receiving authorization from the director of the Antiquities Authority as required, and subject to the provisions of the Antiquities Law, 5738-1978.
6. In the event the Antiquities Authority requires the performance of advance work (supervision, test cross-sections, test excavation / sampling salvage excavation, salvage excavation), these shall be carried out by the developer at his own expense as defined in the law and according to the conditions of the Antiquities Authority.
2. If antiquities are found that justify preservation in accordance with the provisions of the Antiquities Law 5738-1978 and the Antiquities Authority

Law 5749-1089, the developer shall carry out, at his own expense, all of the necessary actions required to preserve the antiquities.

1. Should the antiquities require a change in the building plan, the local and/or district committee, whichever is duly authorized, shall be permitted to approve changes to the building plan and/or to require a new plan, provided that building rights or additions that would damage the soil are not added in the wake of the said changes or the filing of a new building plan.

Karem Sa'id
Haifa District Archaeologist

Cc: Yossi Levy, Central Region Archaeologist
Amit Re'em, Central District Archaeologist

11 Av 5772 / August 6, 2012
Reference: 278349
Action No.: 125621

To: Orly Levy
Lerman Architects and Town Planners, Ltd.
120 Yigal Alon Street, Tel Aviv 67443

Dear Ms. Levy

Re: Response by the Antiquities Authority to NOP37/H, Receiving and Treatment Facilities for raw natural gas from offshore areas

Reference: Your letter dated July 26, 2012
Your letter dated August 5, 2012

Further to your letters referred to hereinabove and our conversation, please find below the only reference to marine archaeology in the NOP referred to hereinabove:

1. **Dor alternative (north and south)** – The alternative presented in the NOP represents a marine corridor 1 km wide in which the gas pipelines will pass in various cases and using different drilling or placement methods. This strip goes through one of the most important areas rich in marine archaeological findings. In light of this it has been added to the tentative list of UNESCO World Heritage Sites.
   This coastal strip extends from Kibbutz Nachsholim to Kibbutz Ma'agan Michael and contains dozens of ancient shipwrecks, and cargoes dating from the 4th century BCE to the Ottoman Period.
   Within said area are the following sites:
   27733/0 Dor underwater, P.G. 4786, 19/7/1999, p. 4838; 4403/0 Dalia River estuary, P.G. 3949, 28/11/1991, p. 990; 4404/0 Ma'agan Michael, P.G. 3949, 28/11/1991, p. 990. In additional to the aforementioned sites which have been duly recognized and publicized, there are other sites located in the offshore area of the marine corridor that are in the process of being recognized.
   Any work within the offshore area of Dor will require performing various archaeological tests as necessary: Underwater surveys and excavations in the preliminary stages as a condition for receiving a permit. From an engineering perspective the Antiquities Authority would prefer the HDD method be used to lay the pipeline. This method would even limit and reduce the cost of the offshore archaeological tests.
2. **Hadera alternative** – The Antiquities Authority will not oppose this alternative provided that it goes south of the Orot Rabin power plant. This area has many offshore infrastructures. On the beach to the north of the power plant is one of the last remains of Mawasi agriculture (antiquities site). Within the offshore area are the following recognized sites:
   4405/0 Hadera underwater, P.G. 3949, 28/11/1991, p. 991; 26145/0 Caesarea sands, P.G. 4786, 19/7/1999, p. 4864; 1338/0 Hadera, P.G. 4404, 01/5/1999, p. 3048.

Any work within the aforesaid area will require archaeological tests as necessary: Underwater surveys and excavations as a condition for receiving a permit.

3. **Mikhmoret and Nahal Alexander alternatives** – The Antiquities Authority will not be opposed, in principle. The following recognized marine antiquities sites are located in the area:
   4417/0 Mikhmoret, P.G. 3949, 28/11/1991, p. 991; 26773/0 Mikhmoret Nahal Alexander, P.G. 4918, 11/9/2000, p. 4778.
   Any work within the aforesaid area will require archaeological tests as set forth in the previous paragraphs.
4. **Neurim alternative** – This site borders on a marine antiquities site but the Antiquities Authority will not oppose this alternative in principle.

General:

1. The Environmental Impact Survey must include the recognized archaeological sites found in the various alternatives and the standard antiquities section:

   a. **Any work in an area defined as antiquities shall be coordinated and carried out only after receiving written authorization from the director of the Antiquities Authority as required, and subject to the provisions of the Antiquities Law, 5738-1978.**

   b. **Advance archaeological tests must be carried out along the alignment (supervision, exposures, test cross-sections, test excavation / sampling salvage excavation, salvage excavation), in accordance with the conditions of the Antiquities Authority and at the expense of the developer.**

   c. **If antiquities are found that justify preserving / moving a finding in accordance with the Antiquities Law 5738-1978 and the Antiquities Authority Law 5749-1089, the developer shall carry out, at his own expense, all of the necessary actions required to preserve the antiquities.**

   d. **The Antiquities Authority does not undertake to permit development and building activity of any kind or type whatsoever in the field or any section thereof, even after tests / excavations are performed, in the event that unique antiquities are discovered in the field requiring preservation of the ancient remains at the sites. Furthermore, this does not imply that the Antiquities Law shall not apply to these, rather fundamental agreement only.**

   e. **I wish to point out that the Authority's guidelines are set forth above by virtue of the authority vested in the Antiquities Authority by law,**

and neither the addressee nor the local or district committee have any leeway whatsoever to disregard the provisions of the law.

2. The Antiquities Authority will not oppose the alternatives in principle, provided that the HDD method is used to lay the underground pipeline. In the event a cofferdam is to be built, the Antiquities Authority will oppose this for the Dor alternative.

3. Each of the three alternatives will require archaeological tests and surveys, and if necessary, tests / salvage excavations in the area of the marine corridor; if necessary, the pipes in the area of the blue line of the marine corridor will have to be moved. The archaeological tests will be required during the planning phase before receiving the building permit.

4. Among the alternatives, the worst alternative from the point of view of the Antiquities Authority is the Dor alternative, since this is a marine area that is rich in facilities and ancient ships, and because the archaeological tests required are expensive and will take a long time to complete.

Sincerely yours,

Yaakov Sharvit
Director, Marine Archaeology Unit

Cc: Mr. S. Dorfman – Director, Antiquities Authority
Mr. K. Sa'id, Haifa District Archaeologist

Appendix E – Summary of a Meeting with the Hazardous Materials Department

LERMAN ARCHITECTS AND TOWN PLANNERS, LTD.
120 Yigal Alon Street, Tel Aviv 67443 Tel.: 03-6959893 Fax: 03-6960299

August 17, 2011

Planning and design consulting in respect of facilities for receiving and raw natural gas and its treatment until it is delivered to the transmission system
Meeting with the HazMat Department, Ministry of Environmental Protection, July 31, 2011

Participants:

Ministry of Environmental Protection:	Romy Even-Denan – Head of Hazardous Materials Department, Min. of Environmental Protection Dror Yaakov – Head of HazMat Division and National Supervisor for air pollution and HazMat, Min. of Environmental Protection
Lerman Architects and Town Planners:	Gideon Lerman – Head of the project team Orly Levy – Planning team
PDI:	Hugh Frayne
Eco-Safe, Risk Consultants:	Doron Schwartz

Purpose of the meeting: To summarize ranges of separation distances
Discussion:

- **Gidon Lerman:**
  - Pressure at the entrance to the coast will be 100 bars.
  - The risk assessment prepared is based on the pressure at which the gas (not liquefied) enters the coast of 110 bars, through pipelines that are 24" and 36" in diameter.
- **Romy Even-Denan:**
  - Examination of the risk assessment and determining separation distances will be defined from the plan boundary line and not from the boundary of the facilities.
  - The separation distances defined will be from public receptors.
- **Doron Schwartz:** The risk assessment obtained is 600 meters, taking into account a hole of 1" in diameter (the most common malfunction), the duration of the leak limited to 2 minutes.

- **Gidon Lerman:** These separation distances will serve as separation distances from the plan boundary to public receptors, with the sterile area of the flares outside.
- **Doron Schwartz:** The risk assessment will be run using ALOHA software, where:
  - Entrance pressure will be 110 bars
  - Pipeline length – 10 km.
  - Hole of 1" in diameter (in a 24" and 36" pipeline)
  - Duration of gas leak – unlimited
  - Stable meteorological conditions
  - Flammability range up to 60% LEL
  - Risk range for super pressure of 1.5 psi
- **Yaakov Dror:** Noted that the guidelines for the planning procedures state that the meteorological conditions for risk assessment must be neutral rather than stable, with wind speeds of 3 m/s.
- **Romy Even Denan:** Instructed to take a hole of 1" in diameter but with stable meteorological conditions.
- **Yaakov Dror:** Noted that at this stage (of preparing a national outline plan) the duration of the gas leak will be calculated as unlimited. At the detailed planning stage when the toxins permit is issued it will be possible to record a limited leak duration of 2 minutes, but without indicating that there are two differences between the run-in period that he performed and the run-in period performed by Doron Schwartz (risk consultant). Doron uses a TNT-equivalent calculation method while the Environmental Protection Ministry uses ALOHA to calculate directly.

  Nevertheless it appears the similar separation distances are obtained.

  He will run the data using the ALOHA software.

  He indicated that he will present the run-in period also using the TNT-equivalent calculation method and noted that in his opinion running it using this method is preferable.
- **Doron Schwartz:** During the meeting he ran the data using ALOHA: 24" diameter pipe with a hole 1" in diameter without limiting the duration of the leak. The result obtained was a separation distance of 585 meters, that is, a 600 meter separation distance.

He mentioned that the Home Front Command defined a separation distance of 800 meters without protective measures. In the case of passive protective measures the separation distance could be reduced to 600 meters.

He noted that he will present the run-in period also using the TNT-equivalent calculation method and noted that in his opinion running it using this method is preferable.

- **Romy Even Denan:** She asked that when running the ALOHA software that attention is given only to the passive measures and not the active measures. In the toxins permit it will be possible to record the active measures.

<u>It was concluded that:</u>

1. Separation distance will be defined from the plan boundary.
2. A risk assessment document will be sent to the Ministry of Environmental Project for approval that includes:
   - Risk assessment using ALOHA software for a 1" diameter hole, with an unlimited leak duration.
   - Risk assessment using a TNT-equivalent calculation method, for a hole 1" in diameter with an unlimited leak duration.
   - According to the following conditions:
     - Entrance pressure will be 110 bars
     - Pipeline length – 10 km.
     - Hole of 1" in diameter (in a 24" and 36" pipeline)
     - Duration of gas leak – unlimited
     - Stable meteorological conditions
     - Flammability range up to 60% LEL
     - Risk range for super pressure of 1.5 psi
   - Approval from Home Front Command to run the risk model.

   Risk assessment will be sent for authorization of the Ministry of Environmental Protection, Hazmat Division, by August 15, 2011.
3. The Ministry of Environmental Protection will send its opinion by September 1, 2011.
4. A meeting will be set with the Ministry of Environmental Protection for early September, at which time the final separation distances will be determined.

5. A tour will be arranged by the Ministry of Environmental Protection with Noble Energy to the Ashdod Receiving Station, if the risk and safety consultant can also be invited to attend.

Recorded by: Orly Levy
Distribution: Attendees
Dorit Hochner, Director for Statutory Planning, Natural Gas Authority
Planning team

Appendix F – Affidavits by the Survey Author and Professional Consultants

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003
Form 1
(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by the Survey Author[1]

I, the undersigned, *Barak Katz* ID no. *028557288*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I prepared the environmental impact survey for Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills necessary according to any law to prepare this Survey based on the documents attached hereto.
3. I prepared the Survey myself with the assistance of additional consultants as outlined below:

Name of the consultant	Area of expertise and training	Survey sections with which he/she assisted
1. Gideon Lerman	Architect, project manager	2.1
2. Michal Ben Shushan	Landscape architect	1.5, 1.9, 2.1.4, 2.15
3. Uri David	Geologist	1.6, 2.1.5
4. Doron Schwartz	Risk management	1.8, 2.1.5
5. Yoram Kedman	Noise consultant	1.9, 2.1.5
6. Micha Klein	Geomorphologist	1.10, 2.1.5
7. Nir Maoz	Ecologist	1.9, 2.1.5
8. Noam Barnoi	Hydrologist	1.7, 2.1.5
9. Hagit Prisko	Air quality	1.4, 2.1.5

4. I am responsible for the Survey's preparation and its contents, including the data, conclusions and recommendations that appear therein.

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

5. I affirm that based on the best of my professional knowledge, the data appearing in the survey I submitted are correct and correspond with the guidelines issued by the planning institution on March 29, 2012.

6. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

_____(sig.)_____

Affiant's signature

Confirmation

I, the undersigned, *Hila Sheinzeit-Katz*, advocate, do hereby confirm that on the date *September 23, 2012* appeared before me who is known to me personally according to his ID no. , and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, he did affirm the truth of his affidavit.

_____(sig.)_____

Signature of affidavit recipient

Stamped:

Hila Sheinzeit-Katz, Adv.

License No. 36283

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by the Survey Author[1]

I, the undersigned, *Assaf Sagi*, ID no. *031589101*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I prepared the environmental impact survey for Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills necessary according to any law to prepare this Survey based on the documents attached hereto.
3. I prepared the Survey myself with the assistance of additional consultants as outlined below:

Name of the consultant	Area of expertise and training	Survey sections with which he/she assisted
10. Gideon Lerman	Architect, project manager	2.1
11. Michal Ben Shushan	Landscape architect	1.5, 1.9, 2.1.4, 2.15
12. Uri David	Geologist	1.6, 2.1.5
13. Doron Schwartz	Risk management	1.8, 2.1.5
14. Yoram Kedman	Noise consultant	1.9, 2.1.5
15. Micha Klein	Geomorphologist	1.10, 2.1.5
16. Nir Maoz	Ecologist	1.9, 2.1.5
17. Noam Barnoi	Hydrologist	1.7, 2.1.5
18. Hagit Prisko	Air quality	1.4, 2.1.5

4. I am responsible for the Survey's preparation and its contents, including the data, conclusions and recommendations that appear therein.

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

5. I affirm that based on the best of my professional knowledge, the data appearing in the survey I submitted are correct and correspond with the guidelines issued by the planning institution on March 29, 2012.

6. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

_____(sig.)_____

Affiant's signature

Confirmation

I, the undersigned, *Hila Sheinzeit-Katz*, advocate, do hereby confirm that on the date *September 23, 2012* appeared before me who is known to me personally according to his ID no. , and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, he did affirm the truth of his affidavit.

_____(sig.)_____

Signature of affidavit recipient

Stamped:

Hila Sheinzeit-Katz, Adv.

License No. 36283

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003

Form 2

(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Elichai Wishner,* ID no. *58799768*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted Barak Katz and Assaf Sagi in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters A and B of the Survey.
4. I advised on the subjects outlined in Chapters of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, *Ophir Eini*, advocate, do hereby confirm that on the date *September 20, 2012* appeared before me *Elichai Wishner* who is known to me personally according to his ID no. *58799768*, and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

(sig.)

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

Signature of affidavit recipient

Stamped:

Ophir Eini, Adv.

R. Mizrachi and Associates, Attorneys at Law

3 Daniel Frisch Street, Tel Aviv 04731

License No. 54096

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003

Form 2

(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Gideon Lerman,* ID no. *022773469*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted Barak Katz and Assaf Sagi in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters A and B of the Survey.
4. I advised on the subjects outlined in Chapters of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, *Rami Mizrachi*, advocate, do hereby confirm that on the date *September 20, 2012* appeared before me *Gideon Lerman* who is known to me personally according to his ID no. , and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

(sig.)

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

Signature of affidavit recipient

Stamped:

Rami Mizrachi, Adv.

3 Daniel Frisch Street, Tel Aviv 04731

License No. 52466

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003

Form 2

(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Michal Ben Shushan,* ID no. *033269978*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted Barak Katz and Assaf Sagi in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters A and B of the Survey.
4. I advised on the subjects outlined in Chapters 1.9, 1.5, 2.1.2, 2.1.4, 2.1.5 of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, *Ophir Eini*, advocate, do hereby confirm that on the date *September 20, 2012* appeared before me *Michal Ben Shushan* who is known to me personally according to ID no. *033269978*, and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

(sig.)

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

Signature of affidavit recipient

Stamped:

Ophir Eini, Adv.

R. Mizrachi and Associates, Attorneys at Law

3 Daniel Frisch Street, Tel Aviv 04731

License No. 54096

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003

Form 2

(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Hagit Prisko Karkash,* ID no. *027292465*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted Barak Katz and Assaf Sagi in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters 1.4, 4.1 of the Survey.
4. I advised on the subjects outlined in Chapters of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, *Omer Mor*, advocate, do hereby confirm that on the date *July 18, 2012* appeared before me *Hagit Prisko Karkash* who is known to me personally according to ID no. *027292465*, and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

_____(sig.)_____

Signature of affidavit recipient

Stamped:

Omer Mor, Adv.

License No. 47669

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003

Form 2

(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Noam Barnoi,* ID no. *036292407*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted *Ethos Architecture Design and Environment, Ltd.* (name of survey author) in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as *Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries* (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters A to E of the Survey.
4. I advised on the subjects outlined in Chapters A – E of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, *Omer Mor*, advocate, do hereby confirm that on the date *July 18, 2012* appeared before me *Noam Barnoi* who is known to me personally according to ID no. *036292407*, and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

(sig.)

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

Signature of affidavit recipient

Stamped:

Omer Mor, Adv.

License No. 47669

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003

Form 2

(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Yoram Kedman,* ID no. *008082521*, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted Barak Katz and Assaf Sagi in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters A and B of the Survey.
4. I advised on the subjects outlined in Chapters A and B of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, *Noa Kedman*, advocate, do hereby confirm that on the date *September 11, 2012* appeared before me *Yoram Kedman* who is known to me personally according to his ID no. *008082521*, and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

(sig.)

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

Signature of affidavit recipient

Stamped:

Adv. Noa Kedman

License No. 18710

Planning and Building Regulations (Environmental Impact Surveys), 5763-2003

Form 2

(Regulation 14[c])

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Nir Maoz*, ID no. 024061863, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted Barak Katz and Assaf Sagi in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters 1.9, 2.1 of the Survey.
4. I advised on the subjects outlined in Chapters 1.9, 2.1 of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, Navah Ne'eman, advocate, do hereby confirm that on the date September 13, 2012 appeared before me Nir Maoz who is known to me personally according to his ID no. 024061863, and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

(sig.)

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

Signature of affidavit recipient

Stamped:

Ne'eman Navah, Adv.

License No. 4707

Plan No. N.O.P. 37/H

The Plan was discussed before the National Planning and Building Board

Affidavit by a Consultant to the Survey Author[1]

I, the undersigned, *Brenner Steve Shlomo*, ID no. 015708571, having been warned that I must state the whole truth and nothing but the truth and that I would be subject to the penalties set forth in the law should I fail to do so, do hereby declare as follows:

1. I assisted Barak Katz and Assaf Sagi in preparing the Environmental Impact Survey for Plan No. N.O.P. 37/H, which is known as Plan No. N.O.P. 37/H – Facilities for the Treatment of Natural Gas from Discoveries (hereinafter, "the Survey").
2. I possess the skills and expertise as set forth below, in accordance with the documents attached hereto.
3. I helped prepare Chapters A and B of the Survey.
4. I advised on the subjects outlined in Chapters 1.10 of the Survey and the contents of the Survey reflects my professional opinion.
5. I hereby state that the abovementioned is my name, the signature below is my signature, and the content of my affidavit is true.

(sig.)

Affiant's signature

Confirmation

I, the undersigned, *Ophir Eini*, advocate, do hereby confirm that on the date *September 20, 2012* appeared before me *Brenner Steve Shlomo* who is known to me personally according to his ID no. *015708571*, and after warning him that he must state the entire truth and nothing but the truth and that he would be subject to the penalties set forth in the law if he failed to do so, did affirm the truth of his affidavit and signed it before me.

[1] Published in Regulations File 5763 No. 6246, June 30, 2003, p. 800.

(sig.)

Signature of affidavit recipient

Stamped:

Ophir Eini, Adv.

R. Mizrachi and Associates, Attorneys at Law

3 Daniel Frisch Street, Tel Aviv 04731

License No. 54096

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