CH2MHILL

CH2M HILL
3 Hutton Centre Drive
Suite 200
Santa Ana, CA
92707
Tel 714.429.2000
Fax 714.429.2050

DOCKET
06-AFC-3
DATE NOV 07 2006
RECD. NOV 07 2006

November 7, 2006

Mr. Bill Pfanner
Project Manager
Systems Assessment and Facility Siting Division
California Energy Commission
1516 9th Street, MS 15
Sacramento, CA 95814-5512

Subject: LSP South Bay, LLC – South Bay Replacement Project AFC (06-AFC-3): Docketing of October 23, 2006 Letter to San Diego County Air Pollution Control District: Updated Air Quality Modeling Protocol

Dear Mr. Pfanner:

On behalf of LSP South Bay, LLC, please find enclosed 12 copies and one original of copy of the October 23, 2006 letter from Sierra Research to the San Diego County Air Pollution Control District providing the updated air quality modeling protocol for the South Bay Replacement Project (SBRP). For docketing purpose, also find attached the Proof of Service declaration.

We will coordinate this submittal with the Commission's Docket Unit.

LSP South Bay, LLC appreciates the continued opportunity to work with CEC staff on this important project.

Sincerely,

CH2M HILL

for Robert C. Mason
Project Director

Attachments

cc: Docket Unit – California Energy Commission
Kevin Johnson, LSP South Bay, LLC

sierra
research

1801 J Street
Sacramento, CA 95814
Tel: (916) 444-6666
Fax: (916) 444-8373

Ann Arbor, MI
Tel: (734) 761-6666
Fax: (734) 761-6755

October 23, 2006

Mr. Ralph DeSiena
San Diego Air Pollution Control District
10124 Old Grove Road
San Diego, CA 92131-1649

Subject: Updated Modeling Protocol for the Proposed South Bay Replacement Project Chula Vista, California

Dear Mr. DeSiena:

On behalf of LSP South Bay, LLC., please find attached the updated air dispersion modeling protocol for the South Bay Replacement Project (SBRP) proposed to be located in Chula Vista, California, adjacent to the existing South Bay Power Plant. This update includes changes agreed upon during the September 14, 2006 meeting and related phone discussions.

The following background is provided for perspective on the air dispersion modeling for the SBRP. On December 28, 2005 the original Modeling Protocol for the project was submitted to the District for approval. That protocol had been developed with advice from the District to use surface meteorological data (e.g., wind speed and direction, temperature) from San Diego International Airport (Lindbergh Field). On May 4, 2006, the District sent a letter to Sierra Research approving the original Modeling Protocol, and estimating that a Chula Vista-based meteorological dataset compatible with the AERMOD air dispersion model would be provided by the end of May 2006 to replace the Lindbergh meteorological dataset.

In the absence of the Chula Vista-based meteorological data during the first half of 2006, which did not become available until August 31, 2006, the air quality impact analysis for the SBRP was performed, including air dispersion modeling. The original modeling was conducted according to the approved original protocol, and the results were included in the June 30, 2006 AFC to the CEC, and in the July 12, 2006 Application for an Authority to Construct/Permit to Operate submitted to the District. Because the modeling was accomplished with use of the Lindbergh Field data, as originally directed by the District for the AFC and initial filing of the air permit application, the later arrival of the Chula Vista-based meteorological data does not invalidate the initial modeling, the CEC's finding of data adequacy, or the District's completeness determination for the air permit application.

If you have any questions, please do not hesitate to call me at (916) 444-6666. Thank you for your attention in this matter.

Sincerely,

Eric G. Walther, Ph.D.

Attachment

cc: Kevin Johnson, LS Power Generation, LLC
Robert Mason, CH2M Hill
Bill Pfanner, CEC

South Bay Replacement Project
Updated Modeling Protocol

October 2006

Prepared by

Sierra Research
1801 J Street
Sacramento, CA 95814
(916) 444-6666

South Bay Replacement Project
Updated Modeling Protocol

Table of Contents

Page

Background 1
Project Location 2
Proposed Emission Sources 2
Updated Meteorological Data 2
Site Representation – Meteorological Data 3
Existing Ambient Air Quality Data 3
Air Quality Dispersion Models 4
Good Engineering Practice (GEP) Stack Height and Downwash 6
Receptor Selection 6
Modeling Scenarios 7
Final Modeling Submittal 8
Class I Area Impact Methodology 8
Rule 1200 Analysis 8
References 9

List of Figures

Page

1. Project and Meteorological/Ambient Air Quality Monitoring Locations 11

Appendix

Page

A. Chula Vista Wind Roses A-1

South Bay Replacement Project
Updated Modeling Protocol
October 2006

BACKGROUND

On December 28, 2005 a Modeling Protocol was submitted to the San Diego Air Pollution Control District (SDAPCD or District) for approval. That protocol had been developed with advice from the District to use surface meteorological data (e.g., wind speed and direction, temperature) from San Diego International Airport (Lindbergh Field), which is available from the National Climatic Data Center (NCDC). On May 4, 2006, the District sent a letter to Sierra Research approving the original Modeling Protocol, and estimating that a Chula Vista-based meteorological dataset compatible with the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) model (AERMOD, current version 04300) would be provided by the end of May 2006 to replace the Lindbergh meteorological dataset.

In the absence of the Chula Vista-based meteorological data during the first half of 2006, which did not become available until August 31, 2006, the air quality impact analysis for the proposed South Bay Replacement Project (SBRP) was performed, including air dispersion modeling. The original modeling was conducted according to the approved original protocol, and the results were included in the June 30, 2006 Application for Certification (AFC) to the California Energy Commission (CEC), and in the July 12, 2006 Application for an Authority to Construct/Permit to Operate submitted to the District. Because the modeling was accomplished with use of the Lindbergh Field data, as originally directed by the District for the AFC and initial filing of the air permit application, the later arrival of the Chula Vista-based meteorological data does not invalidate the initial modeling, the CEC's finding of data adequacy or the District's completeness determination for the air permit application[1].

The application submitted to the District and the AFC submitted to the CEC included an ambient air quality impact analysis carried out in accordance with current modeling guidance.[2] This updated modeling protocol outlines the proposed air dispersion modeling techniques that will be used to assess impacts from the proposed sources. The protocol follows modeling guidance provided by the USEPA in its "*Guideline on Air Quality Models*" (including supplements).

[1] Nguyen, Camqui. District letter to Kevin Johnson of LSP South Bay, LLC, August 25, 2006.
[2] The Applicant believes that the project is not subject to federal PSD review, and hence, the original December 2005 modeling protocol and this update are not being submitted to the USEPA.

Impacts from operation of the facility will be compared to the following:

Air Quality Criteria	NO_2	PM_{10}	$PM_{2.5}$	CO	SO_2
PSD Significant Impact Levels[a]	X	NA[b]	X	X	X
SDAPCD Significant Impact Levels	X	X	X	X	X
PSD Monitoring Exemption Levels[a]	X	NA	X	X	X
Ambient Air Quality Standards	X	X	X	X	X

[a] PSD significant impact and monitoring exemption levels only apply if the project is subject to PSD review.
[b] Not applicable.

PROJECT LOCATION

The proposed gas turbine units will be constructed on a 12.9-acre site southeast of and adjacent to the existing SBPP at 990 Bay Boulevard in Chula Vista, California. The UTM coordinates of the site are approximately 3,607.94 kilometers northing, 491.17 kilometers easting (NAD 27, Zone 11). The nominal site elevation is 1 foot above mean sea level.

PROPOSED EMISSION SOURCES

The primary emission sources at the SBRP will be the two combined-cycle gas turbines. The turbines will be fired with natural gas only. The turbines will utilize advanced combustion designs and emission controls to limit emissions of nitrogen oxides (NOx),carbon monoxide (CO) and volatile organic compounds (VOC). Emissions of particulate matter with nominal aerodynamic diameter less than or equal to 10 microns (PM_{10}) and sulfur oxides (SOx) will be kept to a minimum through the exclusive use of natural gas.

UPDATED METEOROLOGICAL DATA

The District has provided an updated meteorological dataset already processed by AERMET to generate AERMOD-compatible meteorological data for air dispersion modeling. The surface meteorological data was recorded at the District's Chula Vista monitoring station (see Figure 1), and the upper air data was recorded at the Miramar Marine Corps Air Station (No. 03190). Wind roses for calendar years 2000-2002 and the four calendar quarters 2000 from the Chula Vista meteorological monitoring site are contained in Appendix A. The District is providing data for 2000, 2001, and 2002.

SITE REPRESENTATION – METEOROLOGICAL DATA

USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates in the Clean Air Act at Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility."

This requirement and USEPA's guidance on the use of on-site monitoring data are also outlined in the "*On-Site Meteorological Program Guidance for Regulatory Modeling Applications*" (1987a). The representativeness of the data depends on (a) the proximity of the meteorological monitoring site to the area under consideration, (b) the complexity of the topography of the area, (c) the exposure of the meteorological sensors, and (d) the period of time during which the data are collected. The recently-developed Chula Vista meteorological data are representative of conditions at the project site.

The wind roses in Appendix A indicate that on an annual basis, prevailing winds are from the west and west-southwest. Wind speeds are low, rarely even exceeding 5.14 m/s (11.5 mph). Calm conditions are common, occurring approximately 25% of the time.

Representativeness has also been defined in the "*Workshop on the Representativeness of Meteorological Observations*" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Representativeness is best evaluated when sites are climatologically similar, as are the project site and the Chula Vista meteorological monitoring station. Representativeness has additionally been defined in the PSD Monitoring Guideline (USEPA 1987b) as data that characterize the air quality for the general area in which the proposed project would be constructed and operated. Because of the close proximity of the Lindbergh Field meteorological data site to the proposed project site (distance between the two locations is approximately 4.5 km, or 2.7 miles), the same large-scale topographic features that influence the meteorological data monitoring station also influence the proposed project site in the same manner.

EXISTING AMBIENT AIR QUALITY DATA

Background ambient air quality data for the project area are available for the Chula Vista monitoring site, collocated with the meteorological monitoring discussed above. Ambient O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and CO data are collected at this site. No other District/State/Federal-operated ambient monitoring stations are located closer to the project site. Consequently, this monitoring station was selected to represent the background ambient levels for the project site.

Modeled concentrations will be added to these representative background concentrations to determine compliance with the CAAQS and NAAQS.

AIR QUALITY DISPERSION MODELS

Overview

Several USEPA air dispersion models are proposed for use to quantify pollutant impacts on the surrounding environment based on the emission sources' operating parameters and their locations. The models proposed for use are Building Profile Input Program – Plume Rise Model Enhancements (BPIP-PRIME, current version 04274); AERMOD (current version 04300); SCREEN3 (current version 96043), and the VISCREEN visibility model (current version 88341). These models, along with options for their use and how they are used, are discussed below.

Simple, Complex, and Intermediate Terrain Impacts

For updating the modeling of the project in simple, complex, and intermediate terrain, the guideline model AERMOD will continue to be used, except with the refined AERMET-processed hourly meteorological data from the Chula Vista monitoring station to be furnished by the District on or about October 26,2006. The USEPA adopted AERMOD as a guideline model on November 9, 2005. The AERMOD model is a steady-state, multiple-source, Gaussian dispersion model designed for use with stack emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources (i.e. complex terrain).[3] The AERMOD model requires hourly meteorological data consisting of wind vector and speed (with reference height), temperature (with reference height), Monin-Obukhov length, surface roughness length, heights of the mechanically and convectively generated boundary layers, surface friction velocity, convective velocity scale, and vertical potential temperature gradient in the 500-meter layer above the planetary boundary layer. The model assumes that there is no variability in meteorological parameters over a one-hour time period, hence the term "steady-state." The AERMOD model allows input of multiple sources and source groupings, eliminating the need for multiple model runs. Complex phenomena such as building-induced plume downwash are treated in this model.

Standard AERMOD control parameters will be used (stack tip downwash, non-screening mode, non-flat terrain, sequential meteorological data check employed). Stack-tip downwash, which adjusts the effective stack height downward following the methods of Briggs (1972) for cases where the stack exit velocity is less than 1.5 times the wind speed at stack top, will be selected per USEPA guidance. As directed by the District[4], the rural default option will be used by not

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[3] AERMOD was recently adopted as a guideline model by USEPA as a replacement for ISCST3. AERMOD incorporates an improved downwash algorithm as compared to ISCST3 (Federal Register, November 9, 2005; Volume 70, Number 216, Pages 68218-68261).

[4] DeSiena, Ralph, Directed Sierra Research to use rural option during meeting with District, September 14, 2006.

invoking the URBANOPT option[5]. The use of the rural default in modeling for this project is consistent with District policy and guidance[6] for past modeling using ISCST3.

Ambient Ratio Method and Ozone Limiting Method

Annual NO_2 concentrations will be calculated using the Ambient Ratio Method (ARM), adopted in Supplement C to the Guideline on Air Quality Models (USEPA, 1995). The Guideline allows a nationwide default of 75% for the conversion of nitric oxide (NO) to NO_2 on an annual basis and the calculation of NO_2/NOx ratios.

If NO_2 concentrations need to be examined in more detail, the Plume Volume Molar Ratio Method (PVMRM) adaptation of the Ozone Limiting Method (Cole and Summerhays, 1979) will be used. Hourly ozone data collected at the Chula Vista monitoring station during the years 2000-2001 will be used in conjunction with PVMRM to calculate hourly NO_2 concentrations from hourly NOx concentrations. The PVMRM involves an initial comparison of the estimated maximum NOx concentration and the ambient O_3 concentration left in the plume after reaction of NO with O_3 to determine which is the limiting factor to NO_2 formation. If the remaining O_3 concentration is greater than the maximum NOx concentration, total conversion is assumed. If the NOx concentration is greater than the remaining O_3 concentration, the formation of NO_2 is limited by the remaining ambient O_3 concentration. In this case, the NO_2 concentration is set equal to the O_3 concentration plus a correction factor that accounts for in-stack and near-stack thermal conversion.

Since 1998, OLM has been implemented using the ISCST3-OLM model. There is now a second option. AERMOD PVMRM is a non-regulatory option that is now available for use. For this project, AERMOD PVMRM will be used to calculate the NO_2 concentration based on the PVMRM method, and hourly ozone data. Missing hourly ozone data will be substituted prior to use with day-appropriate values (e.g., from the previous day, or the next day, for the same hour). Any other missing hourly ozone data (if any) will be substituted with 40 ppb ozone (typical ozone tropospheric background level).

Fumigation

The SCREEN3 model will be used to evaluate inversion breakup and shoreline fumigation impacts for short-term averaging periods (24 hours or less), as appropriate. The methodology in USEPA, 1992 (Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised) will be followed for these analyses. Combined impacts for all sources under fumigation conditions will be evaluated, based on USEPA and any applicable SDAPCD modeling guidelines.

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[5] Although the URBANOPT in AERMOD offers the user the opportunity to set the quantitative value of the surface roughness around the project site, it should be recognized that the rural vs. urban option in AERMOD is primarily designed to set the fraction of incident heat flux that is transferred into the atmosphere. This fraction becomes important in urban areas having an appreciable "urban heat island" effect due to a large presence of land covered by concrete, asphalt, and buildings.

[6] SDAPCD. *Use of Rural vs Urban Modeling Coefficients,* Memorandum from Richard J. Smith, Deputy Director, to Judith M. Lake, Chief, Monitoring and Technical Services, October 29, 1996.

GOOD ENGINEERING PRACTICE (GEP) STACK HEIGHT AND DOWNWASH

AERMOD can account for building downwash effects on dispersing plumes. Stack locations and heights and building locations and dimensions will be input to BPIP-PRIME. The first part of BPIP-PRIME determines and reports on whether a stack is being subjected to wake effects from a structure or structures. The second part calculates direction-specific building dimensions for each structure that are used by AERMOD to evaluate wake effects. The BPIP-PRIME output is formatted for use in AERMOD input files.

RECEPTOR SELECTION

Receptor and source base elevations will be determined from USGS Digital Elevation Model (DEM) data using the 7½-minute format (10- to 30-meter spacing between grid nodes). All coordinates will be referenced to UTM North American Datum 1927 (NAD27), Zone 11. The AERMOD receptor elevations will be interpolated among the DEM nodes according to standard AERMAP procedure. For determining concentrations in elevated terrain, the AERMAP terrain preprocessor receptor-output (ROU) file option will be chosen; hills will not be imported into AERMOD for CTDM-like processing.

Cartesian coordinate receptor grids will be used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. A 250-meter resolution coarse receptor grid will be developed and will extend outwards at least 10 km (or more as necessary to calculate the significant impact area).

For the full impact analyses, a nested grid will be developed to fully represent the maximum impact area(s). This grid will have 25-meter resolution along the facility fence-line in a single tier of receptors composed of four segments extending out to 100 meters from the fenceline, 100-meter resolution from 100 meters to 1,000 meters from the fenceline, and 250-meter spacing out to at least as far as 10 km from the site. When maximum first-high or maximum second-high impacts occur in the 250-meter spaced area, additional refined receptor grids with 25-meter resolution will be placed around the maximum coarse grid impacts and extended out 1,000 meters in all directions. Concentrations within the facility fenceline will not be calculated.

The following 7.5-minute USGS Digital Elevation Model (DEM) quadrangles will be employed for modeling the South Bay Energy Facility:

- Point Loma;
- National City;
- Jamul Mountains
- Imperial Beach; and
- Otay Mesa.

MODELING SCENARIOS

Pollutant emissions to the atmosphere from the proposed facility will be dominated by the products of combustion of natural gas in the combustion turbines. Emission rates will be included in the permit application for the project and will be based on vendor data and additional conservative assumptions of equipment performance. Turbine emissions and stack parameters, such as flow rate and exit temperature, exhibit some variation with ambient temperature and operating load. In order to calculate the worst-case air quality impacts, a screening analysis will be performed to evaluate each operating scenario (based on operating load and atmospheric conditions) to predict the worst-case facility configuration on a pollutant-specific basis.

In the modeling analysis, maximum impacts will be predicted for base load (100%) and reduced load (50%) conditions. In addition, extreme hot, annual average and extreme cold ambient temperatures of 108°F, 62°F and 27°F, respectively, will be evaluated for each load condition. Each of these conditions has unique performance characteristics that affect plume dispersion and thus predicted impacts. This analysis is most relevant to analyses for short-term impacts. The temperatures selected for the short-term screening analysis closely reflect the range of possible site conditions. The results of this screening analysis will be used to select the worst-case operational scenarios for the modeling analyses in order to provide maximum operating flexibility. Refined modeling for the permit application will be based on these worst-case scenarios.

The screening modeling will use the three consecutive years of AERMET-processed meteorological data being provided by the District and the nested receptor grid described above to determine the worst-case source configuration (i.e., configuration that produces maximum facility impacts). This worst-case source configuration will then be executed with the three years of available meteorological data, and, if necessary, coarse grid impacts will be refined with fine grid receptors spaced 25 meters apart.

Ambient Air Quality Impact Analyses

In evaluating the impacts of the proposed project on ambient air quality, we will model the ambient impacts of the project, add those impacts to background concentrations, and compare the results to the state and federal ambient standards for SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO.

In accordance with USEPA guidelines[7], the highest second-highest modeled concentrations will be used to demonstrate compliance with the short-term federal standards and the highest modeled concentration will be used to demonstrate compliance with the federal annual and all state standards.

FINAL MODELING SUBMITTAL

The final modeling analyses will include the following materials:

- Summaries of maximum modeled impacts for each air quality scenario showing meteorological conditions and receptor location and elevation;
- All modeling outputs (including BPIP-PRIME and meteorological files) in electronic format, together with a description of all filenames;
- Plot plan showing emission points, nearby buildings (including dimensions), cross-section lines, property lines, fencelines, roads, and UTM coordinates; and
- A table showing building heights used in the modeling analysis.

CLASS I AREA IMPACT METHODOLOGY

The project is not subject to PSD review because the emissions are not sufficiently high to exceed EPA's review thresholds, and hence, no significant impacts are expected on Class I areas.

RULE 1200 ANALYSIS

The previously-submitted screening-level health risk assessment will be updated using the current Version 1.2a of CARB's Hot Spots Analysis and Reporting Program (HARP) to determine the impacts of the toxic air pollutant emissions associated with the proposed project. This analysis will be performed in accordance with the current OEHHA Risk Assessment Guidelines and the SDAPCD Supplemental Health Risk Assessment Guidelines.

[7] 40 CFR part 51, Appendix W, Sections 11.2.3.2 and 11.2.3.3

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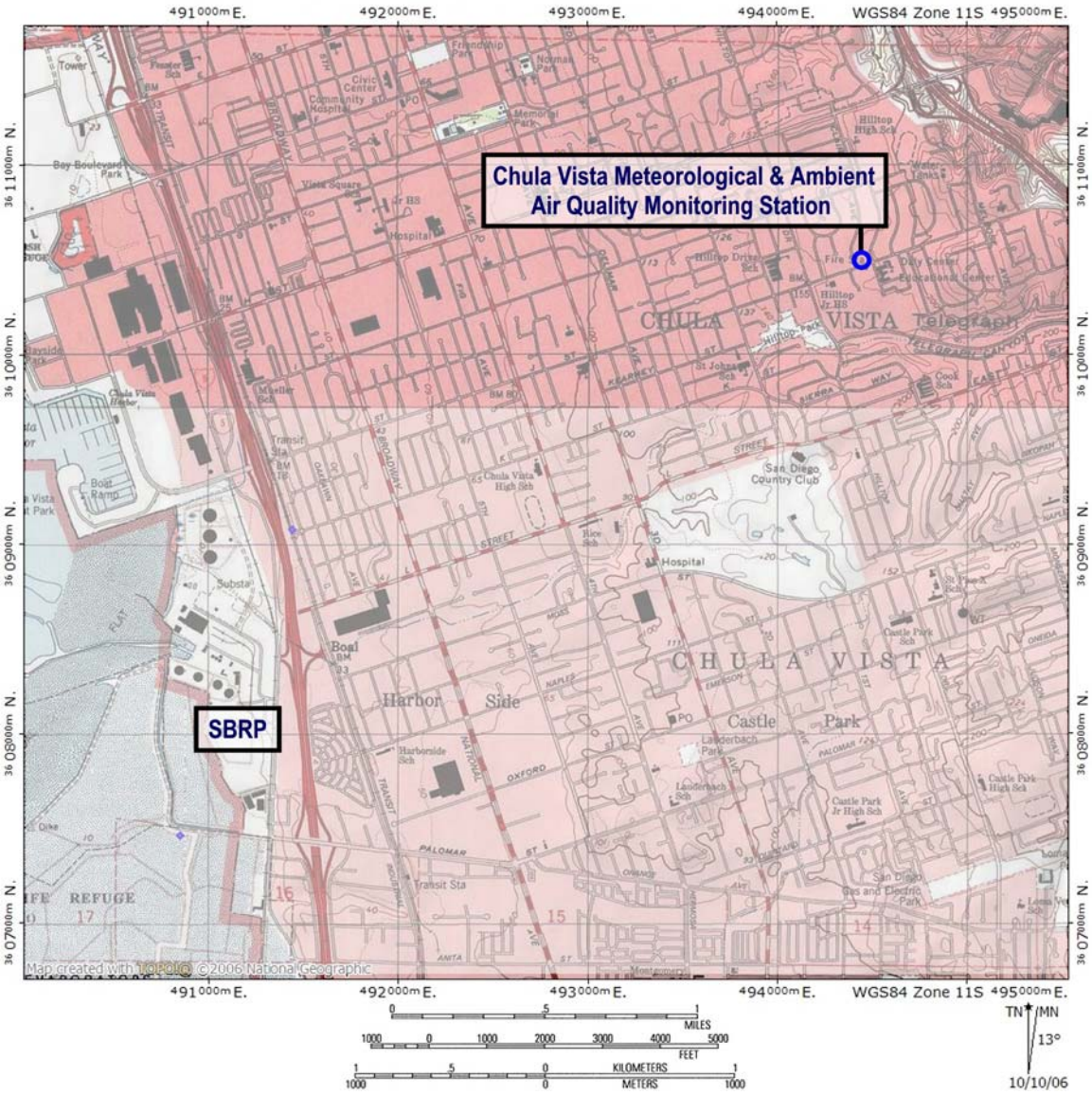
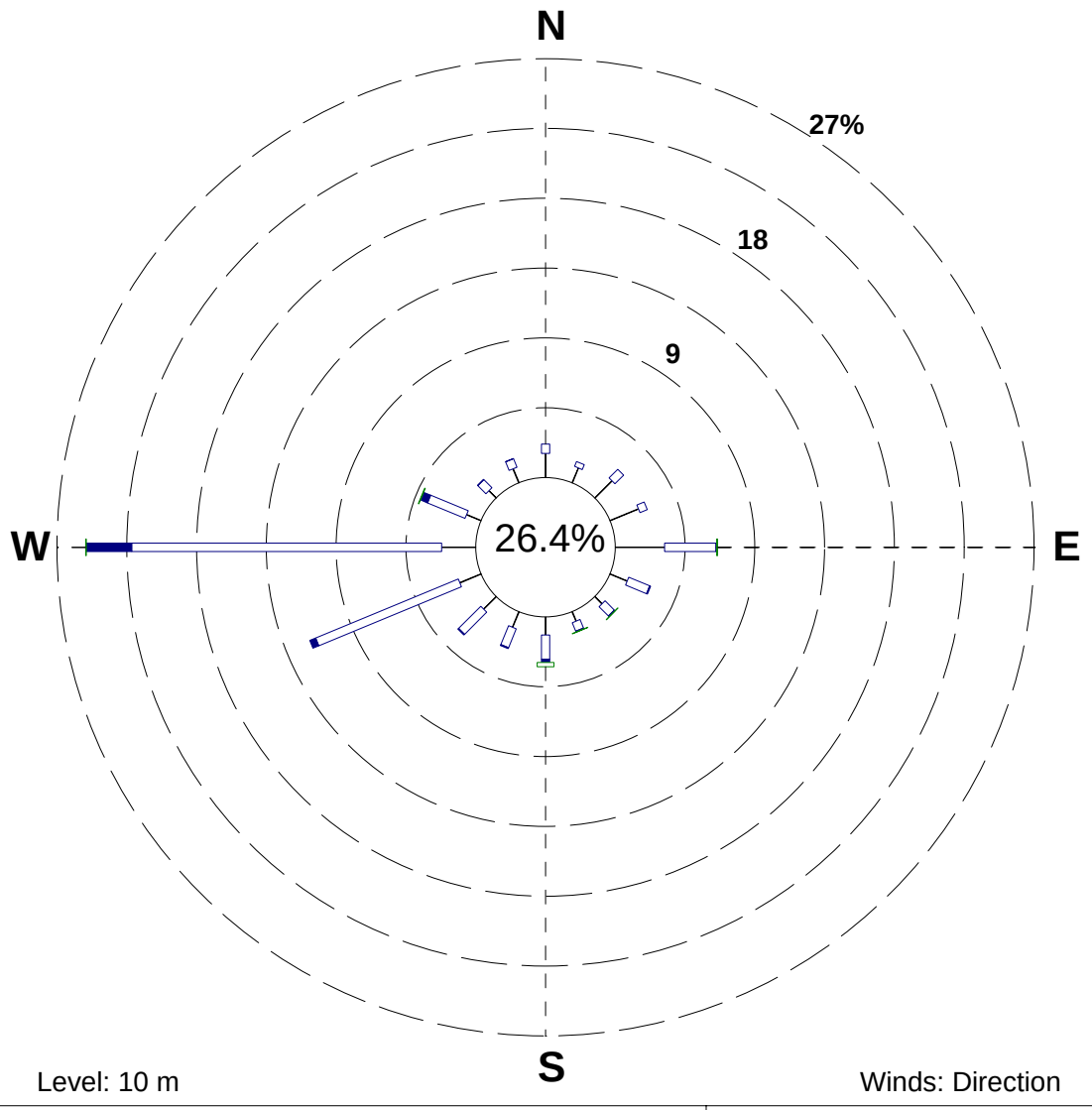
Figure 1
Project and Meteorological/Ambient Air Quality Monitoring Locations
South Bay Replacement Project



Appendix A
Chula Vista Wind Roses

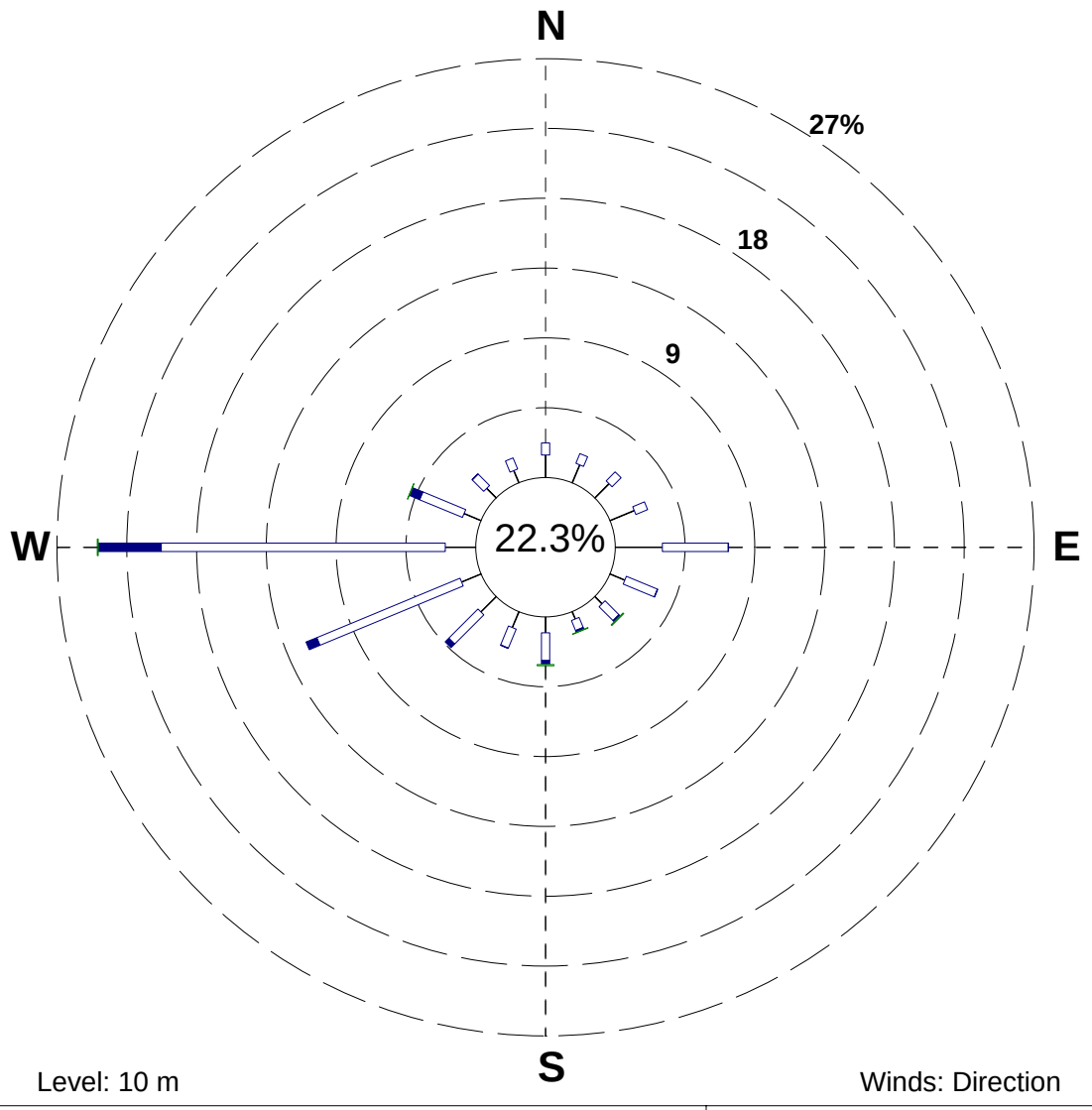
Chula Vista - 2000
January 1, 2000 through December 31, 2000



1.01 to 1.54
1.54 to 3.09
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)

Number of Records Used: 8784

Chula Vista - 2001
January 1, 2001 through December 31, 2001



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Number of Records Used: 8760

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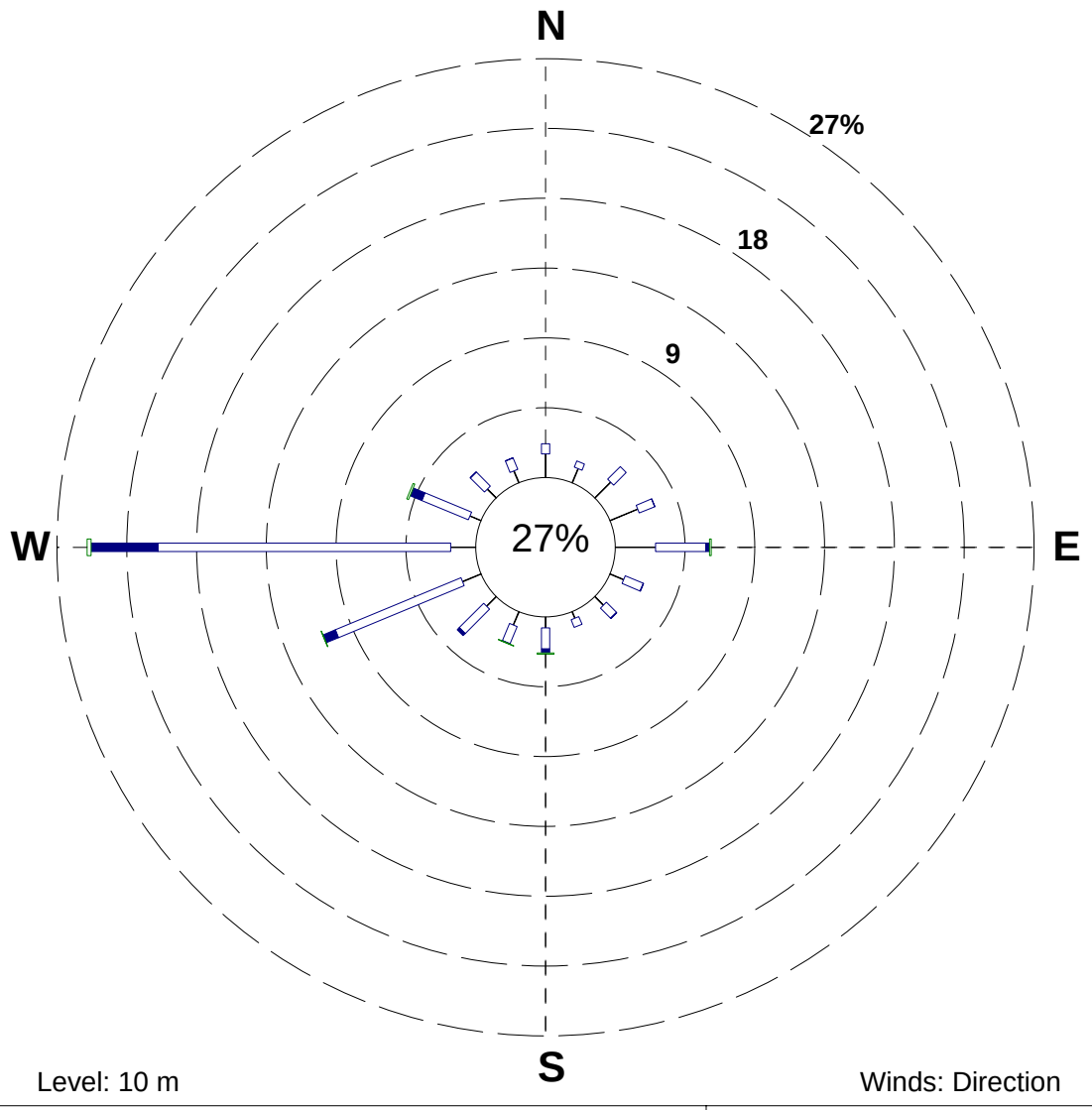
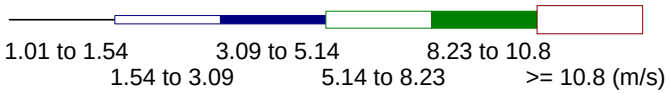
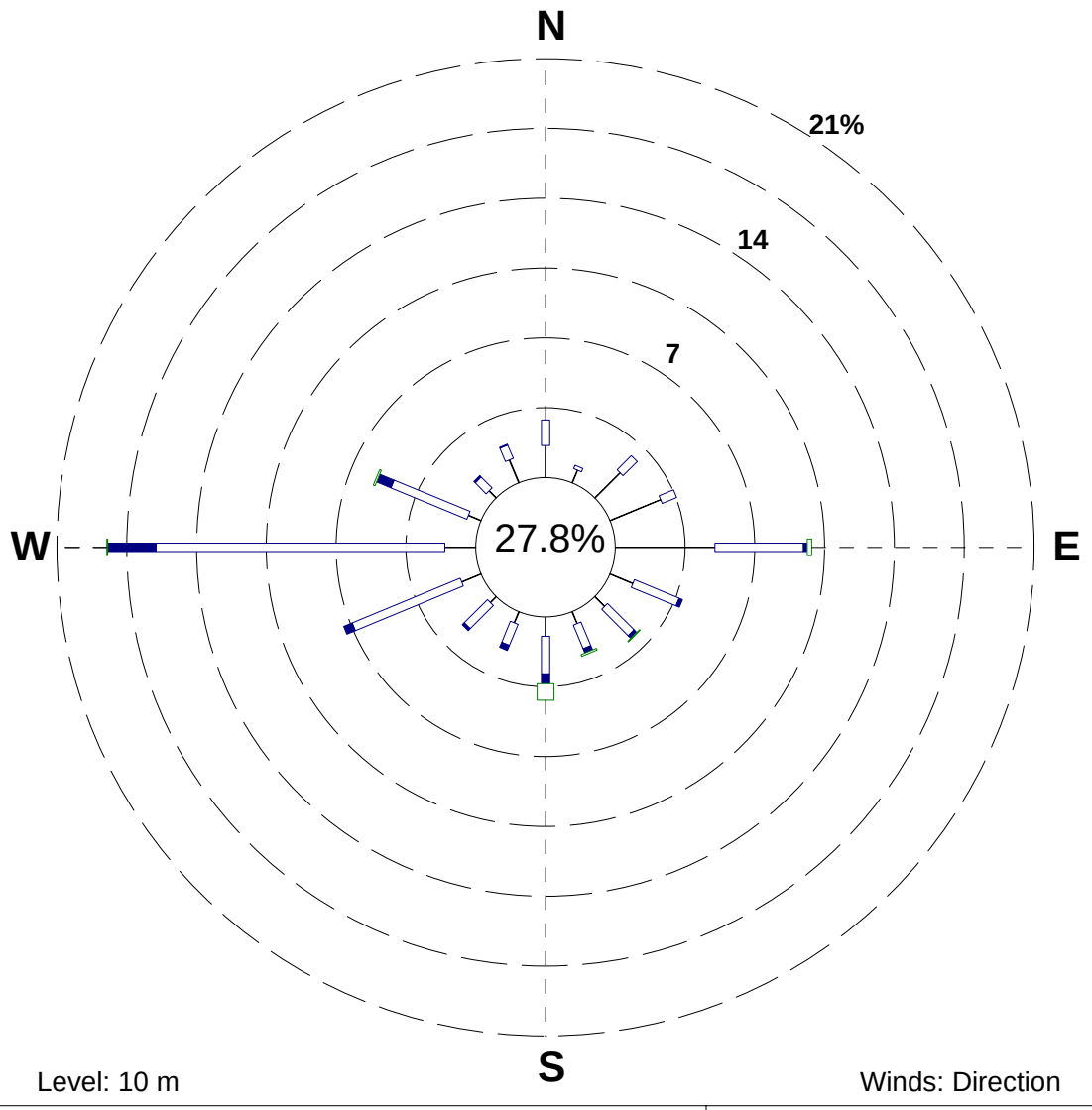




Number of Records Used: 8760

Chula Vista - 1st Quarter 2000
January 1, 2000 through March 31, 2000



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3.09 to 5.14
5.14 to 8.23
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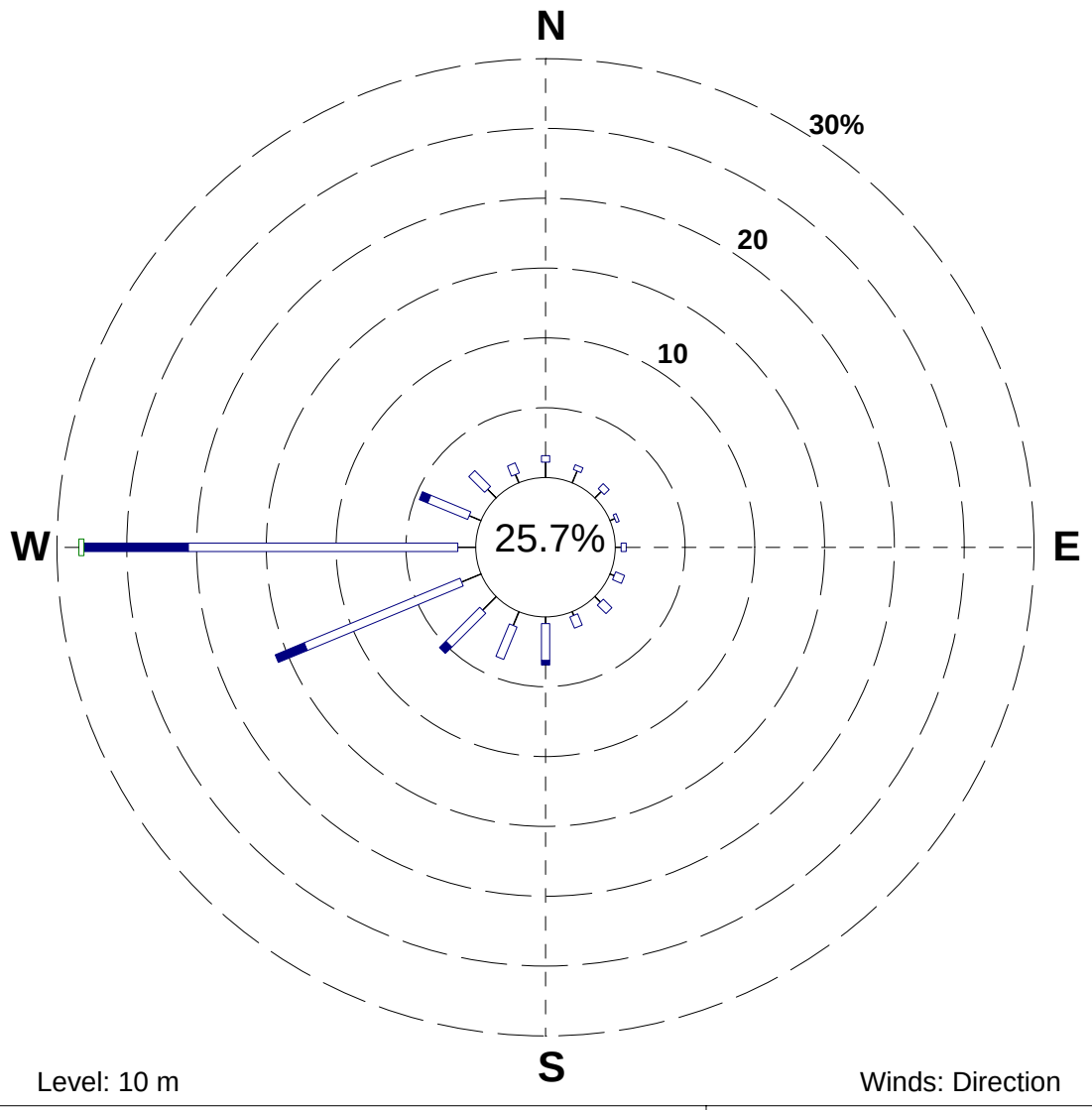
Number of Records Used: 2184

Chula Vista - 2nd Quarter 2000
April 1, 2002 through June 30, 2002



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3.09 to 5.14
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8.23 to 10.8
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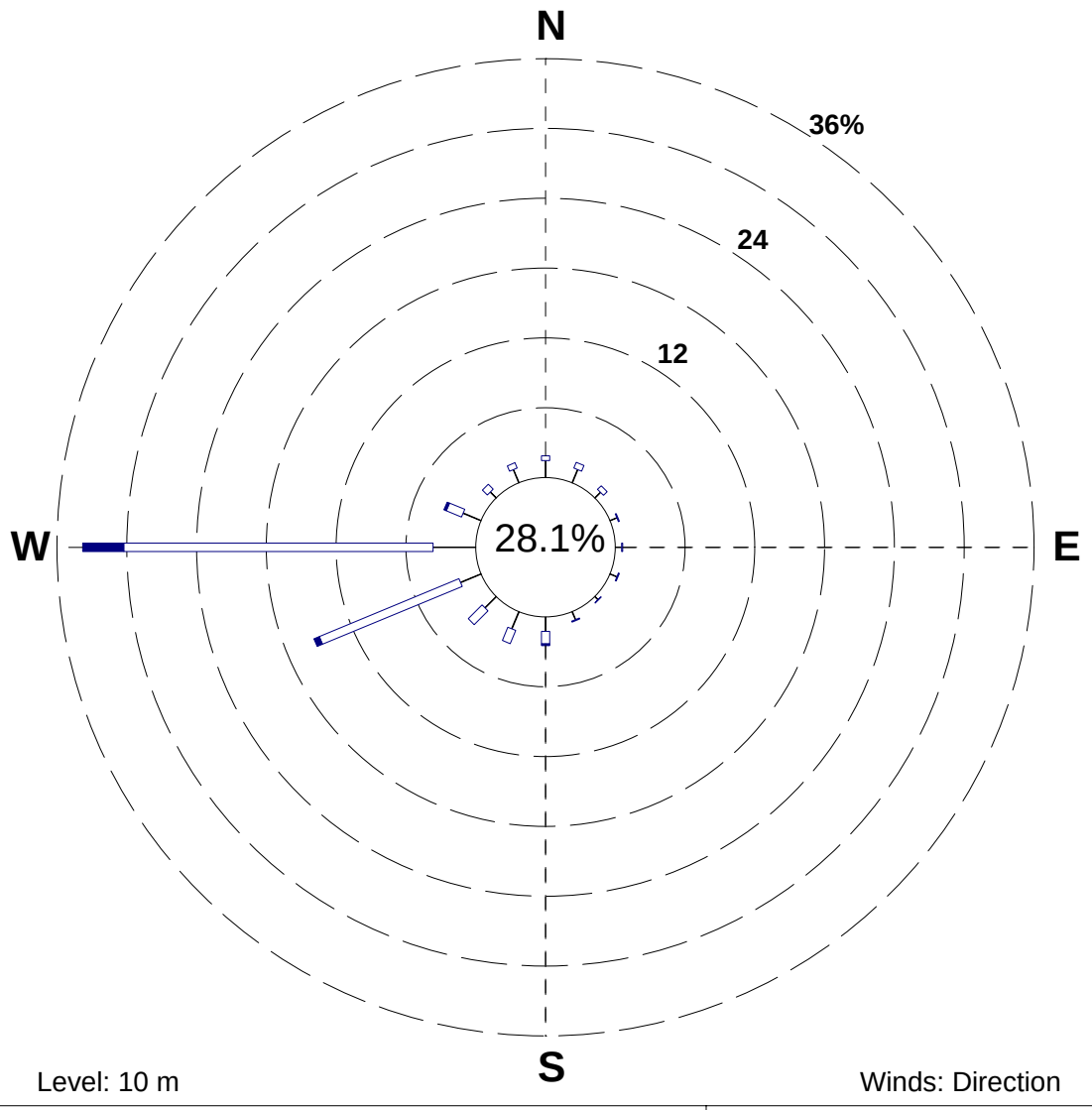
Number of Records Used: 2184

Chula Vista - 3rd Quarter 2000
July 1, 2000 through September 30, 2000



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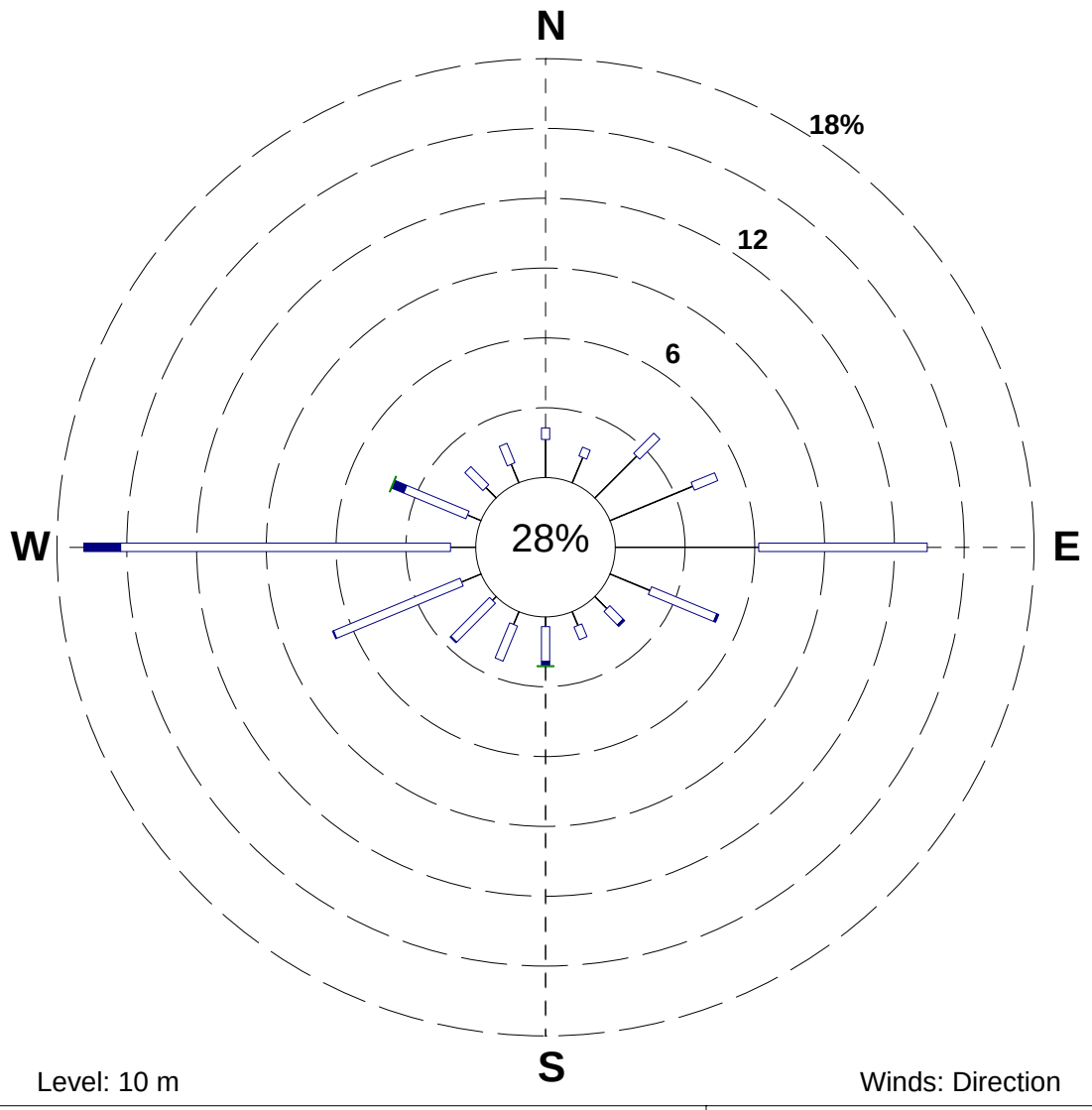
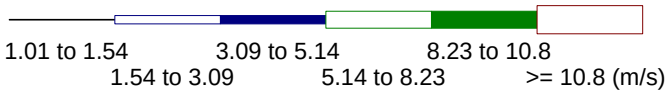
3.09 to 5.14
5.14 to 8.23
8.23 to 10.8
>= 10.8 (m/s)

Number of Records Used: 2208

Chula Vista - 4th Quarter 2000
October 1, 2000 through December 31, 2000





Number of Records Used: 2208

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1516 Ninth Street
Sacramento, CA 95825-5512
800-822-6228
www.energy.ca.gov

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Revised 10/20/06

SOUTH BAY REPLACEMENT PROJECT
APPLICATION FOR CERTIFICATION,
DOCKET NO. 06-AFC-3

docket@energy.state.ca.us	Energy Commission Docket Unit
jgeesman@energy.state.ca.us	Commissioner John Geesman
pflint@energy.state.ca.us	Pat Flint, Commissioner Rosenfeld's Office
pao@energy.state.ca.us	Margaret J. Kim, Public Adviser
gshean@energy.state.ca.us	Garrett Shean, Hearing Officer
Bpfanner@energy.state.ca.us	Bill Pfanner, Staff Project Manager
kwillis@energy.state.ca.us	Kerry Willis, Staff Attorney
kjohnson@lspower.com	Kevin Johnson, LS Power Generation, LLC
cte@eslawfirm.com	Chris Ellison, Applicant's Attorney
Robert.mason@ch2m.com	Robert Mason, CH2M HILL
Sarah.madams@ch2m.com	Sarah Madams, CH2M HILL
mdjoseph@adamsbroadwell.com	Marc D. Joseph, CURE
speesapati@adamsbroadwell.com	Suma Peesapati, CURE
wolff@smwlaw.com	Osa L. Wolff, Atty for Environmental Health Coalition
bundy@smwlaw.com	Kevin P. Bundy, Atty for Environmental Health Coalition

I declare that I transmitted the foregoing document via e-mail, or as indicated by first class postal mail, to the above named on the date indicated thereby. I declare under penalty of perjury that the foregoing is true and correct.

Sarah Madams
CH2M HILL

Distribution List	
laurah@environmentalhealth.org	Laura Hunter, Environmental Health Coalition
mmeacham@ci.chula-vista.ca.us	Michael Meacham, City of Chula Vista
pfanfera@portofsandiego.org	Paul Fanfera, San Diego Port District
cteufel@coastal.ca.gov	Cassidy Teufel, California Coastal Commission