

April 25, 2011

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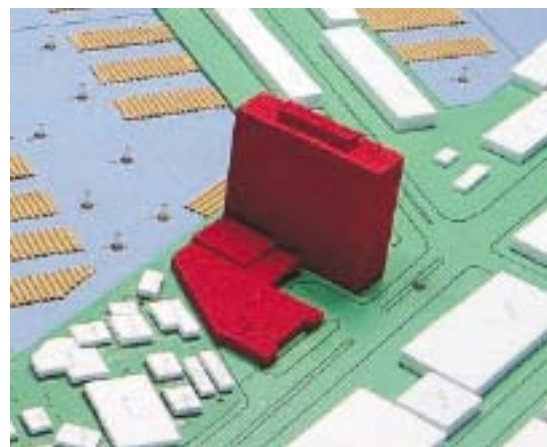
**Re: Wind Assessment  
Woodfin / Courtyard Development  
Marina del Rey, California  
RWDI Reference No. 1101573**

Dear Aaron,

For the then proposed Woodfin Suites Hotel development at the northeast corner of the intersection of Via Marina and Tahiti Way in Marina del Rey, California, Rowan Williams Davies & Irwin Inc. (RWDI) conducted a wind-tunnel study to fulfill the wind study requirements of the Los Angeles County Zoning Code, including an assessment of the effects of the proposed development on wind patterns with the marina, loss of surface winds used by sailboats and birds and general air circulation. A photo of the wind tunnel model is shown in Image 1. The final report was issued on October 21, 2005 and is attached at the end of this letter for reference.

It was concluded that "the proposed Woodfin Suites Hotel will not affect the existing wind conditions over a majority of the areas in Basins A, B and C of Marina del Rey. There will be areas of altered wind speed and direction in Basin B adjacent to the proposed development, most notably when winds are from the southwest. Due to the localized nature of the proposed development, the general air circulation patterns and the use of surface winds by birds within Basins A, B and C of Marina del Rey will not be affected."

The originally proposed building design has since been significantly revised. According to the design drawings by Gin Wong Associates dated April 8, 2011, the current Courtyard development on the same site consists of two 70 ft tall rectangular buildings (see Images 2a and 2b on next page), down from 225 ft in the previous single-tower design (Image 1). This is a significant reduction in building heights. The distance between the building and the basins still remains to be the same.



**Image 1:** Wind-tunnel model of the proposed Woodfin Suites Hotel in 2005



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& SCIENTISTS

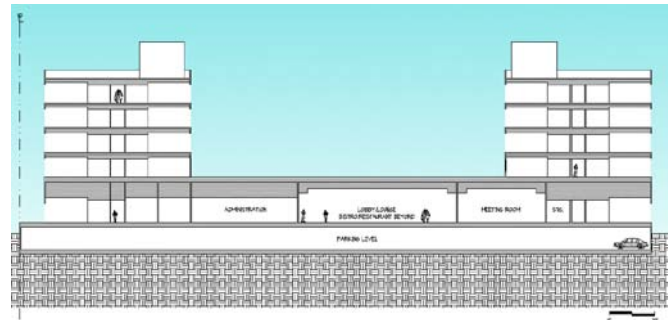
Aaron Clark  
Armbruster Goldsmith & Delvac LLP  
RWDI#1101573  
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With a reduced building height, the proposed development will have a similar height as the existing buildings (four storeys) to the west, which is the prevailing wind direction in the area. The potential influence created by the current development on the wind patterns within the adjacent marinas is expected to be reduced considerably from what that was predicted in our wind tunnel study in 2005. It is our opinion that the general air circulation patterns and the use of surface winds by birds in Marina del Rey will not be affected by the proposed development.



**Image 2a:** Current site plan



**Image 2b:** Current building section

The above assessment is based on the past wind tunnel results and our understanding of wind flows around buildings. We trust this is adequate for your current needs. If you have any questions or need additional information, please feel free to contact us at your convenience.

Yours very truly,

**ROWAN WILLIAMS DAVIES & IRWIN**

Dan Bacon  
Senior Project Manager / Associate

Hanqing Wu, Ph.D., P.Eng.  
Project Director / Associate

# RWDI REPORT



CONSULTING ENGINEERS  
& SCIENTISTS

## **WIND STUDY WOODFIN SUITES HOTEL MARINA DEL REY, CALIFORNIA**

**Project Number: 06-1023**

**October 21, 2005**

**SUBMITTED TO:** **Mr. Mark Rousseau**  
**Senior Vice President, Development**  
**Woodfin Suite Hotels, LLC**  
12730 High Bluff Drive, Suite 250  
San Diego, CA 92130

**By Email/Courier:** [Aaron@ag-lanuse.com](mailto:Aaron@ag-lanuse.com)

**SUBMITTED BY:** **Rowan Williams Davies & Irwin Inc.**  
**Consulting Engineers & Scientists**  
**650 Woodlawn Road West**  
**Guelph, Ontario N1K 1B8**  
P: (519) 823-1311  
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**Project Engineer:** Tahrana Lovlin, P.Eng.  
**Project Manager:** Dan Bacon  
**Project Director:** Bill F. Waechter, C.E.T.

## 1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was requested by the Woodfin Suite Hotels, LLC to undertake a detailed wind study on the proposed Woodfin Suites Hotel (Parcel 9U) in Marina del Rey, California. The study addressed the wind study requirements of the Los Angeles County Zoning Code, including an assessment of the effects of the proposed developments and/or building placement on wind patterns within the marina, loss of surface winds used by sailboats and birds and general air circulation.

## 2. TEST METHODOLOGY

Wind tunnel tests were conducted on a scale model of a section of Marina del Rey to determine the impact on the wind conditions resulting from the proposed Woodfin Suites Hotel and future developments. This report provides a summary of the results of these wind tunnel tests on Basins A, B, C, and on land-based locations.

A 1:500 scale model of the study area and the proposed developments were assembled as shown in Figures 1a, 1b and 1c. Tests were conducted to simulate and measure wind conditions:

**Existing Configuration:** as they existed for the base study year (circa 1998) (Figure 1a);

**Proposed Configuration:** after the proposed Woodfin Suites Hotel is constructed (Figure 1b); and,

**Future Configuration:** with the proposed developments and the expected future developments (Figure 1c).

The results presented in this report pertain to the model of the proposed Woodfin Suites Hotel constructed using the architectural design drawings received by RWDI on June 28 and 29, 2005, and other in-house information, such as city maps and aerial photos.

The wind tunnel model was instrumented with a total of 47 wind sensors located in Basins A, B and C, and at land locations along Marquesas Way and Tahiti Way, as well as near the proposed development. It was tested in RWDI's boundary layer wind tunnel for the predominant wind directions, which are west, west-southwest, southwest and east. The sensors were developed by RWDI for use on scale models and are capable of measuring both changes in wind speed and wind direction, at a full scale height of approximately 15 ft.

The wind tunnel results for all predominant wind directions in the Los Angeles area have been examined in detail and are presented in this report. The west, west-southwest, southwest and east wind directions together account for winds that occur a majority of the time, as shown on Figure 2. The wind roses on Figure 2 show the percentage of the time that wind blows from each of 16 directions during spring, summer, fall and winter for the hours of 7:00 am through 9:00 pm, when most sailing would occur. All of the tests were conducted for the above four wind directions.

Information on the changes in wind speed and direction recorded at each sensor location can be obtained from Figures 3 through 6 for the four wind directions tested for the Existing, Proposed and Future development conditions. Each figure presents local wind direction data at each location for one of the four approaching wind directions tested. The length of the arrows is proportional to the speed of the wind at each location. In each figure there are three colour coded arrows at each sensor location: black to indicate the local wind direction for existing site conditions, red for the proposed Woodfin Suites Hotel, and green for the configuration with the proposed and future developments present.

The wind analysis considered if the proposed development would result in changes to the local wind direction or mean speed between adjacent sensors that are greater than the difference presently experienced between any two adjacent sensors. Until criteria are established by the County of Los Angeles, this is the best method of assessing the impact of the proposed developments on the sailing conditions in the marina.

### **3. EFFECTS ON SAILING CONDITIONS**

#### **3.1 Locations On Water (Locations 1 through 8, 19 through 37 and 41 through 47)**

In Basin C (Locations 1 through 8), for the southwest, west-southwest and west winds, the red arrows (Proposed Configurations) are aligned closely with the black arrows (Existing Configuration) and have a similar length at all measurement locations in Basin C. The green arrows (Future Configuration) are slightly rotated, particularly with winds from the west (see Figure 3), illustrating the influence of the future buildings around the perimeter of Basin C.

In Basin B (Locations 19 through 37), for the west-southwest and southwest winds, the red and green arrows of the Proposed and Future Configurations are aligned closely with the black arrows of the Existing Configuration (see Figures 4 and 5). Differences in arrow length and direction occur locally at the west end of the basin, near the proposed development. During west winds (see Figure 3), test locations along Basin B show a wind direction shift for most of the basin when the proposed Woodfin Suites Hotel is constructed. With the most obvious shifts occurring near the proposed development (Locations 19 through 22). Changes in the local wind direction between adjacent sensors are similar for the proposed and existing conditions in this area of the basin, while the magnitude of the winds along Basin B remained similar between the Existing, Proposed and Future Configurations. As mariners are in the final stages of docking it is assumed that this is not an issue.

In Basin A (Locations 41 through 47), for the southwest, west-southwest and west winds, the red and green arrows (Proposed and Future Configurations) are aligned closely with the black arrows (Existing Configuration) and have a similar length at all measurement locations on Basin A. Therefore, the wind direction and speed are not affected by the addition of the proposed Woodfin Suites Hotel for these wind directions, which are predominant in the Marina del Rey area.

As shown in Figure 2, the east winds have a relatively low frequency among the four predominant wind directions. The effect of the proposed development is limited to Basin B, adjacent to the proposed development. As mariners who use docks in this area are in the final stages of docking, it is assumed that these localized changes in wind speed and direction will not be an issue.

### **3.2 Locations on Land (Locations 9 through 18, 38, 39 and 40)**

Wind sensors were installed on land (Locations 9 through 18, 38, 39 and 40) to measure changes in general wind flows (wind direction and magnitude) at locations along Marquesas Way, Tahiti Way and Via Marina, which border the proposed Woodfin Suites Hotel and future buildings.

Generally, the results for the land locations showed that changes in wind magnitude and direction were greatest at localized areas closest to proposed and future buildings. Generally, as the distance from the proposed / future buildings increased, the difference in the wind direction and magnitude was minimal between the building configurations.

## **4. LOSS OF SURFACE WINDS USED BY BIRDS**

In order to assess the effects on birds of changes in the surface winds a report was prepared by an expert in the aerodynamics, kinematics and behavior of birds. This report has been attached as Appendix A. The author of the report considered the following issues:

- the types of birds likely to inhabit Marina del Rey;
- the ability of birds to take off and land;
- soaring conditions upwind and downwind of the proposed building;
- effects on local thermal soaring conditions; and,
- changes to flight efficiency due to turbulence.

From our test results, the minimal change on the existing overall wind fields, due to the proposed development, will not result in significant changes to the birds' use of the area.



## **5. GENERAL AIR CIRCULATION PATTERNS**

Changes in wind speed and direction were recorded only in the immediate vicinity of the proposed development. Due to the localized nature of these changes there will be no effect on the general air circulation patterns within Basins A, B and C of Marina del Rey.

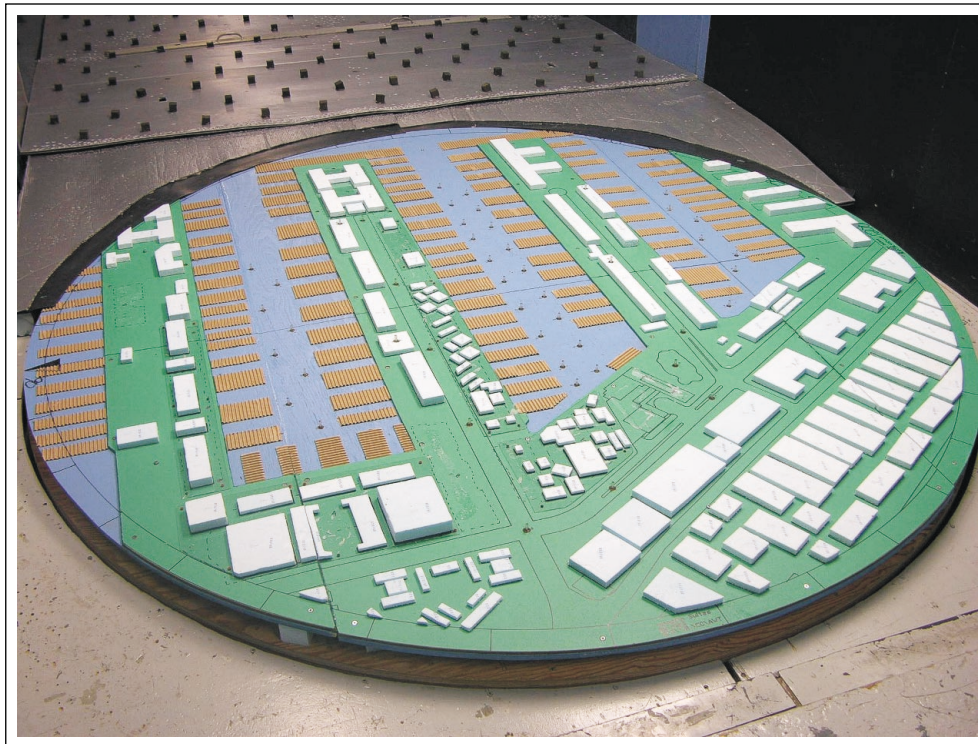
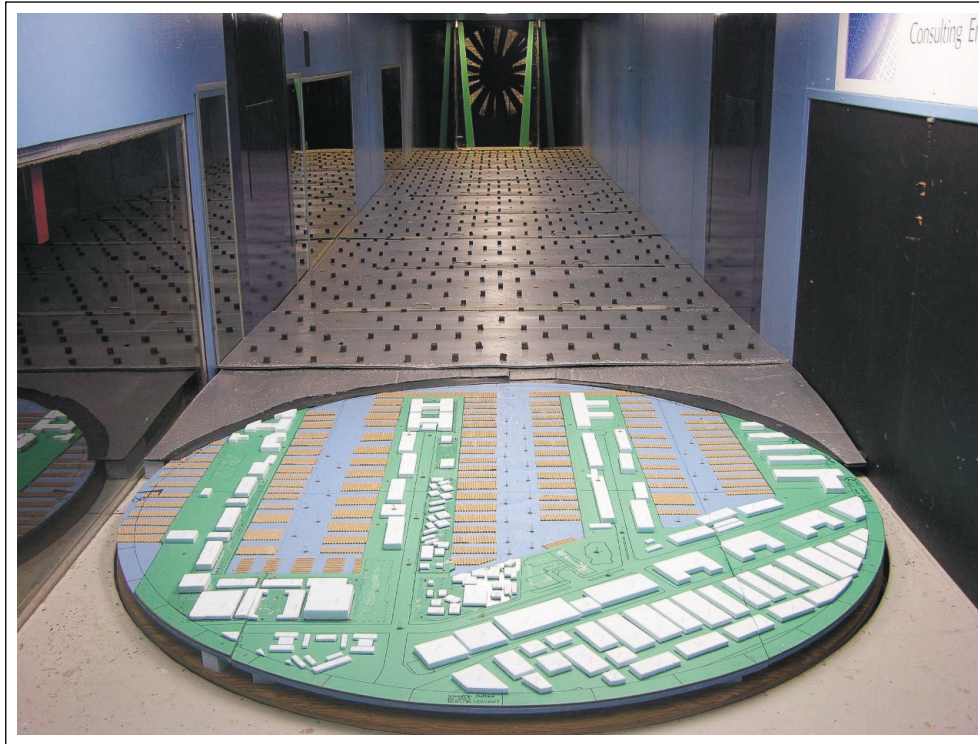
## **6. CONCLUSIONS**

From the results of this wind study, it has been concluded that the proposed Woodfin Suites Hotel will not affect the existing wind conditions over a majority of the areas in Basins A, B and C of Marina del Rey. There will be areas of altered wind speed and direction in Basin B adjacent to the proposed development, most notably when winds are from the southwest. With the future buildings, there will also be localized areas where changes in wind direction and magnitude occur such as the west end of Basin C. These areas are generally close to the proposed and future developments. Due to the localized nature of these changes, the general air circulation patterns and the use of surface winds by birds within Basins A, B and C of Marina del Rey will not be affected.

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## FIGURES

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**Wind Tunnel Study Model**  
**Existing Configuration**

Woodfin Suites Hotel - Marina del Rey, California

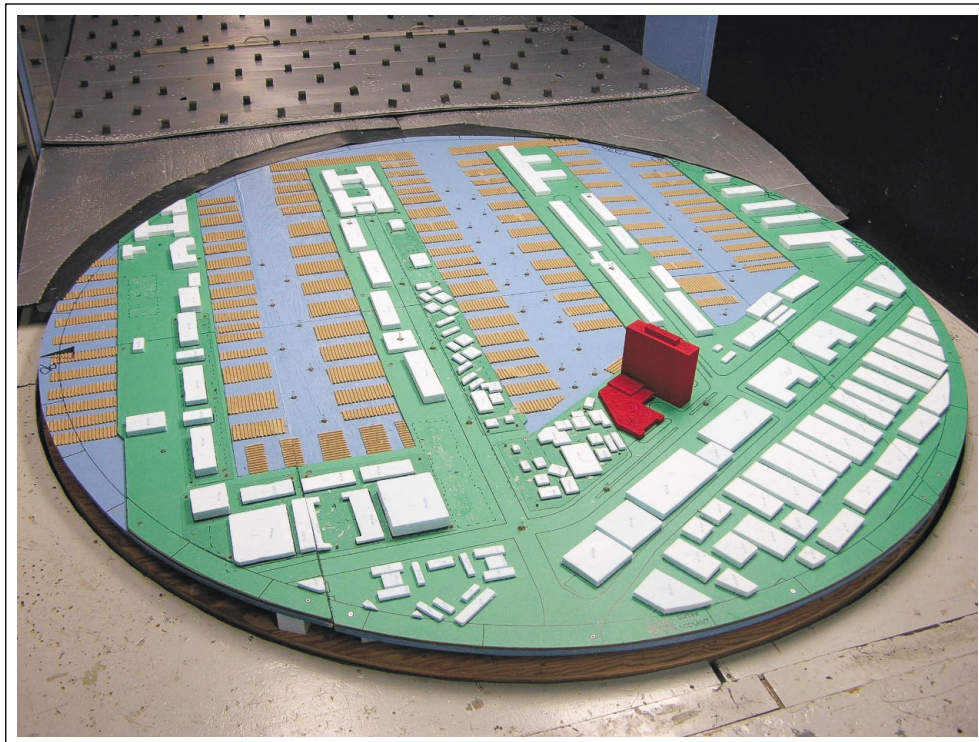
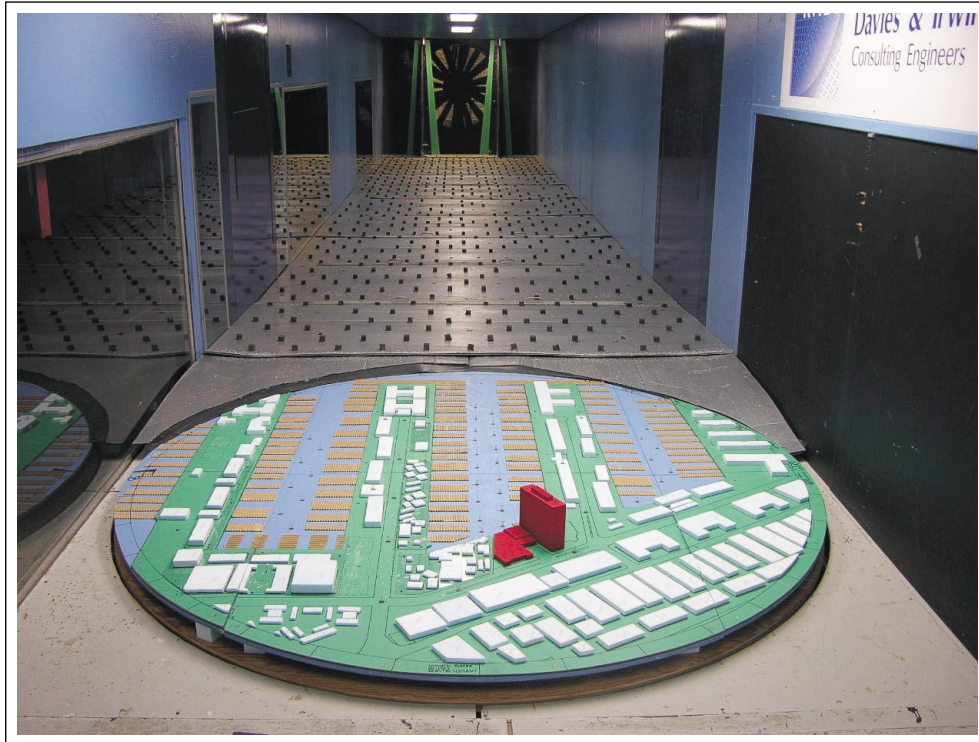
Project #05-1023

Figure No. 1a

Date: October 11, 2005

**RWDI**





**Wind Tunnel Study Model  
Proposed Configuration**

Woodfin Suites Hotel - Marina del Rey, California

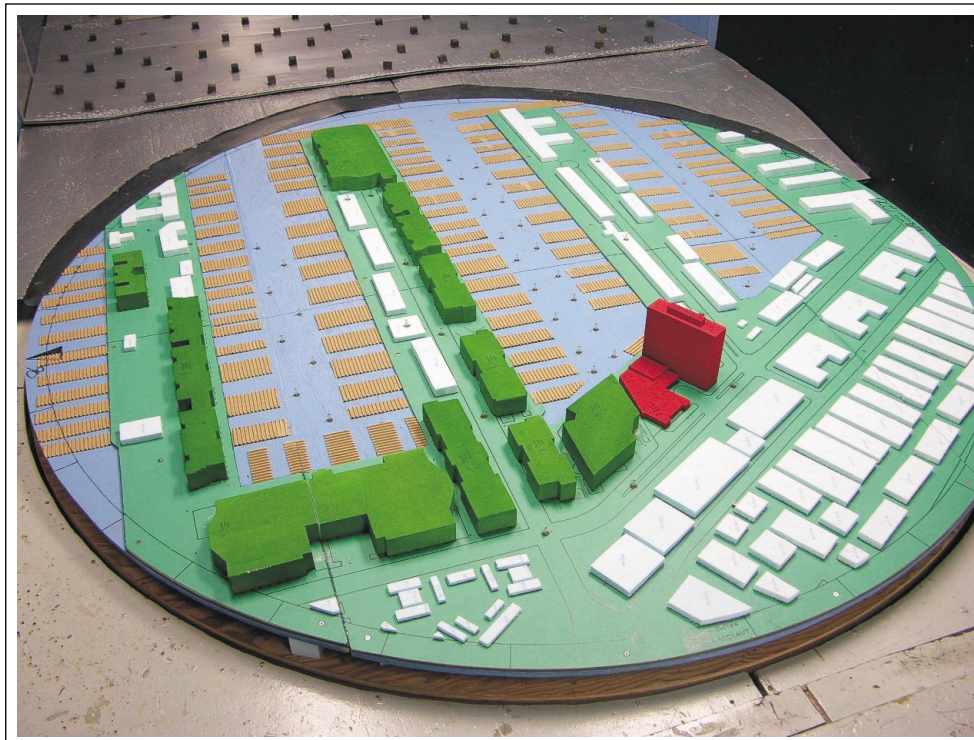
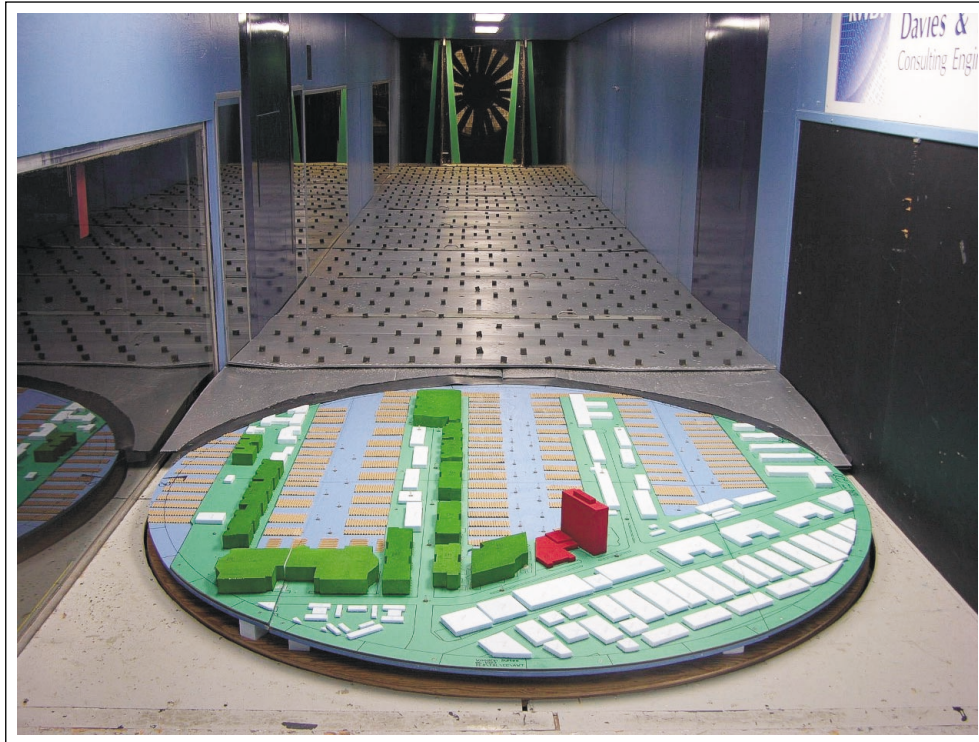
Project #05-1023

Figure No. 1b

Date: October 11, 2005

**RWDI**





# **Wind Tunnel Study Model** **Future Configuration**

Woodfin Suites Hotel - Marina del Rey, California

Project #05-1023

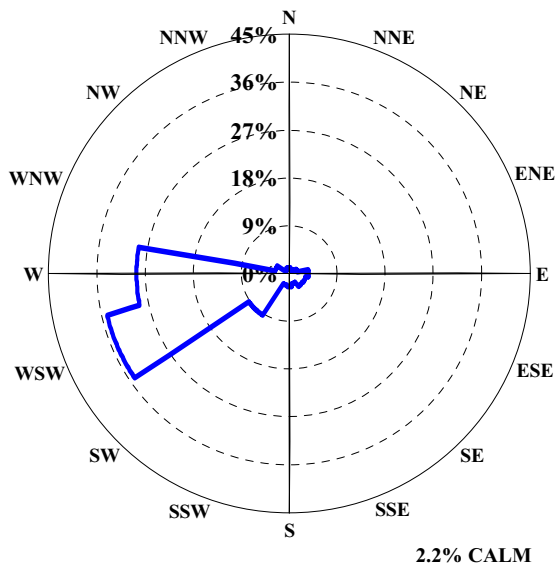
Figure No.

1c

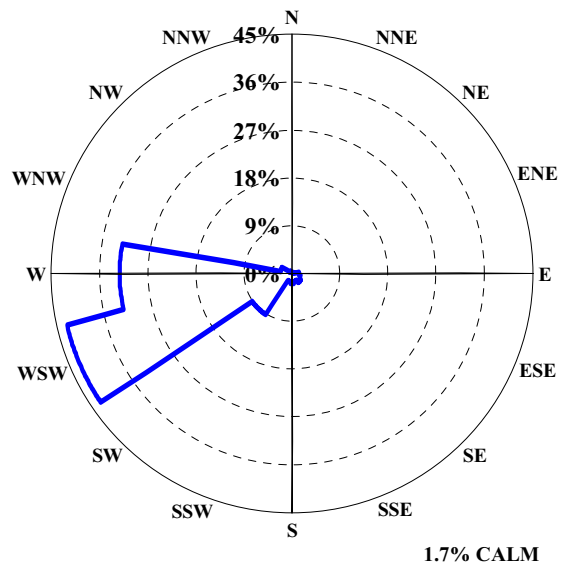
Date:

October 11, 2005

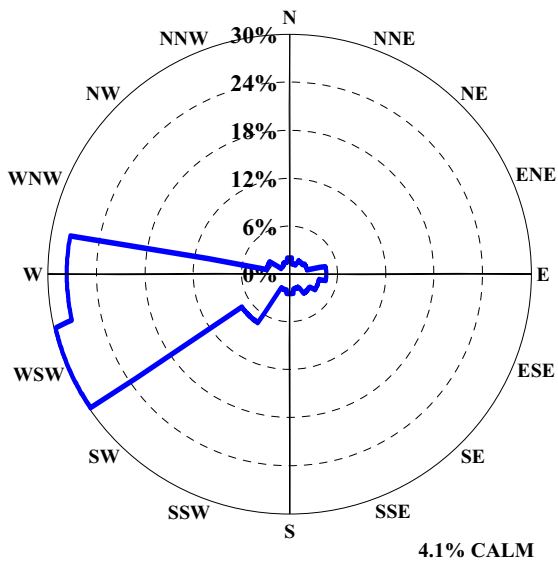
**RWDI**



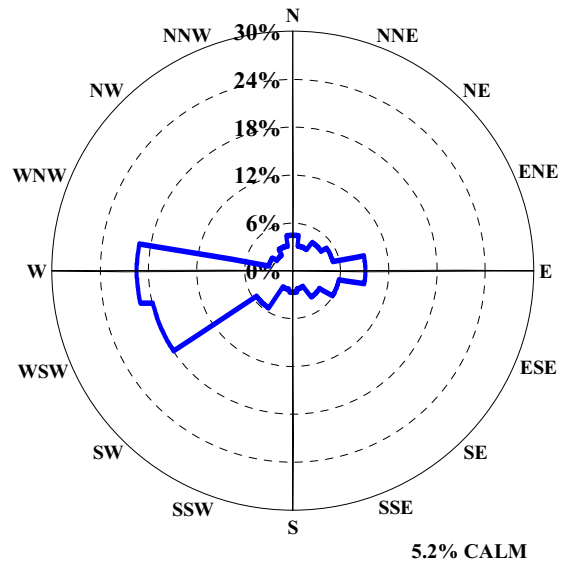
SPRING WINDS  
(March, April, May)



SUMMER WINDS  
(June, July, August)



FALL WINDS  
(September, October, November)



WINTER WINDS  
(December, January, February)

**Directional Distribution (%) of Winds (Blowing From)**

Station: Los Angeles International Airport, CA (1947 - 2001) 7:00am - 9:00pm

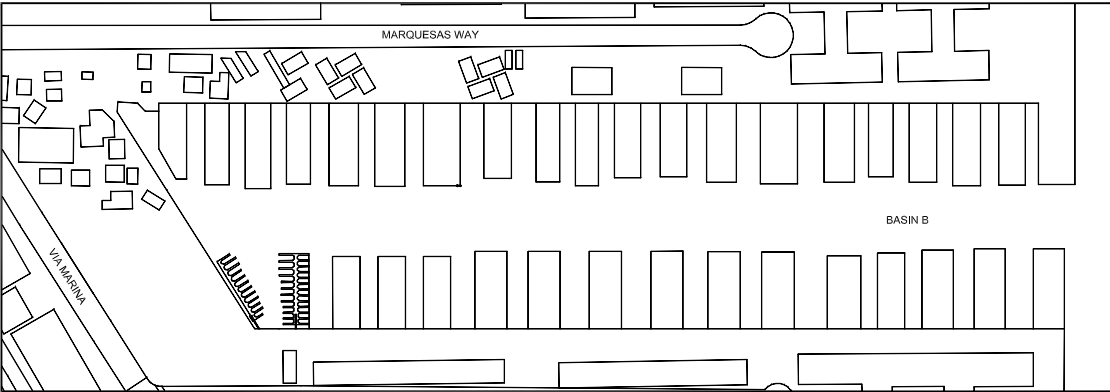
Woodfin Suites Hotel - Marina del Rey, California

Project #: 06-1023

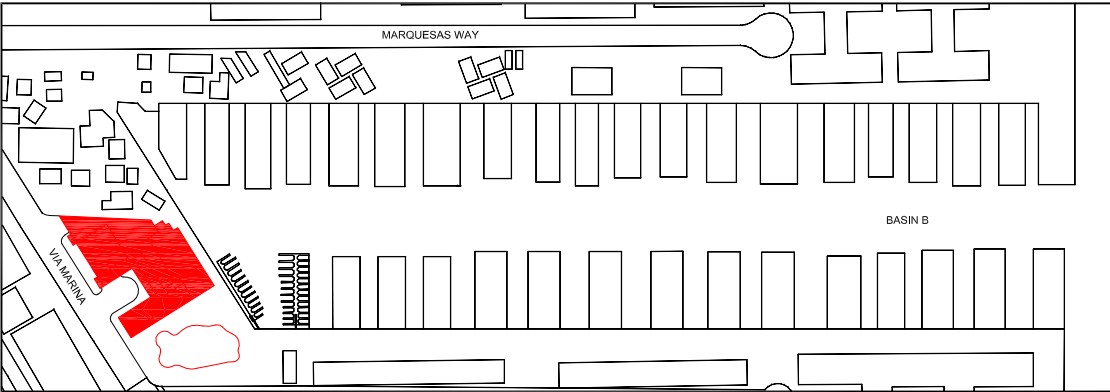
Figure No. 2

Date: Sept. 4, 2003

**RWDI**



EXISTING

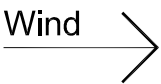


PROPOSED



FUTURE

TEST CONFIGURATIONS - N.T.S.



SENSOR LOCATION:

- Grade Level
- Sensors 8 & 9 and 38 & 39 are on Roofs

WIND DIRECTION LEGEND:

WIND SPEED CATEGORIES:

- EXISTING
- PROPOSED
- FUTURE

Note:  
Arrow length is proportional to mean wind speed.



Local Wind Direction - Wind from 270° (West)

Woodfin Suites Hotel - Marina del Rey, California

True North

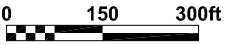


Drawn by: DJM Figure: 3

Approx. Scale: 1"=300'

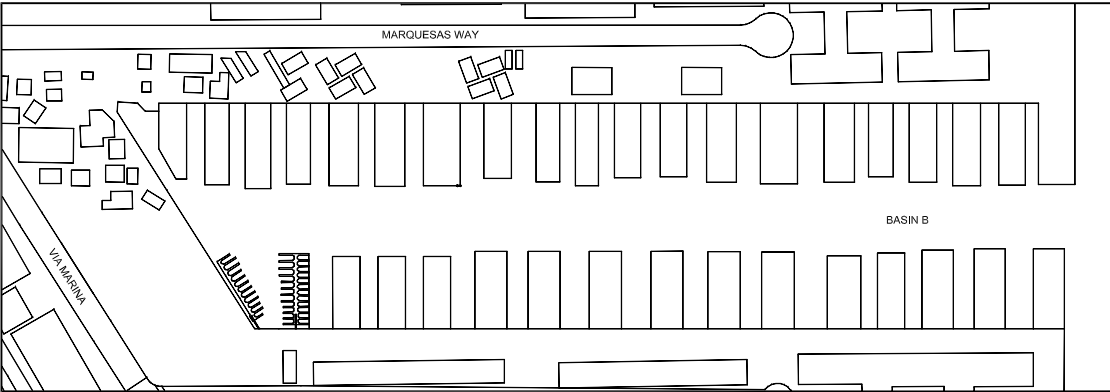
Date Revised: Oct. 11, 2005

Project #06-1023

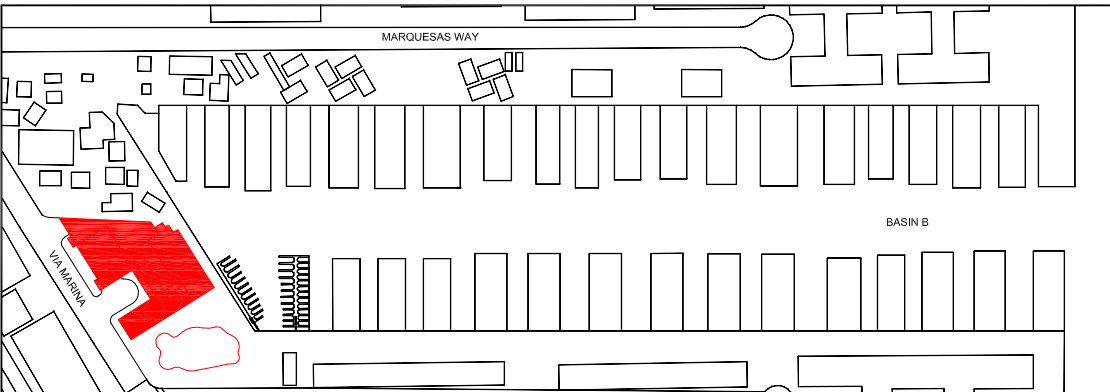


RWDI

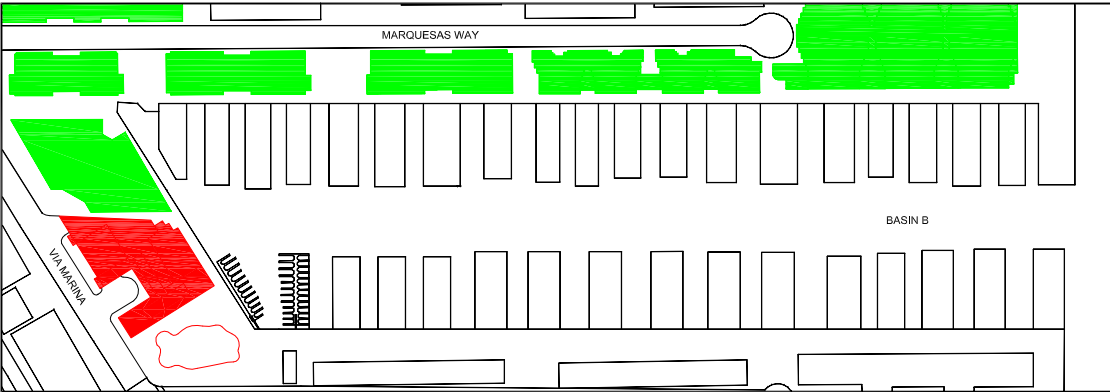




EXISTING



PROPOSED



FUTURE

TEST CONFIGURATIONS - N.T.S.



**SENSOR LOCATION:**

- Grade Level
- Sensors 8 & 9 and 38 & 39 are on Roofs

**WIND DIRECTION LEGEND:**

**WIND SPEED CATEGORIES:**

- EXISTING
- PROPOSED
- FUTURE

**Note:**  
Arrow length is proportional to mean wind speed.



Local Wind Direction - Wind from 247° (West-southwest)

Woodfin Suites Hotel - Marina del Rey, California

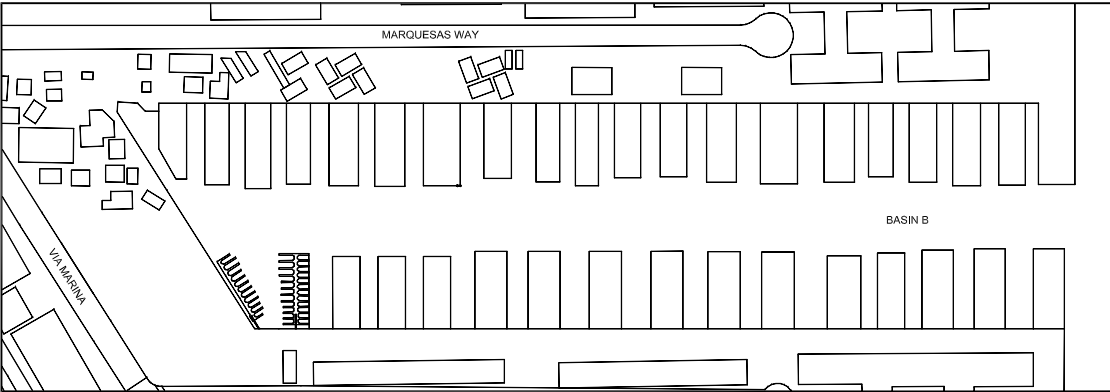


Drawn by: DJM	Figure: 4
Approx. Scale: 1"=300'	
Date Revised: Oct. 11, 2005	

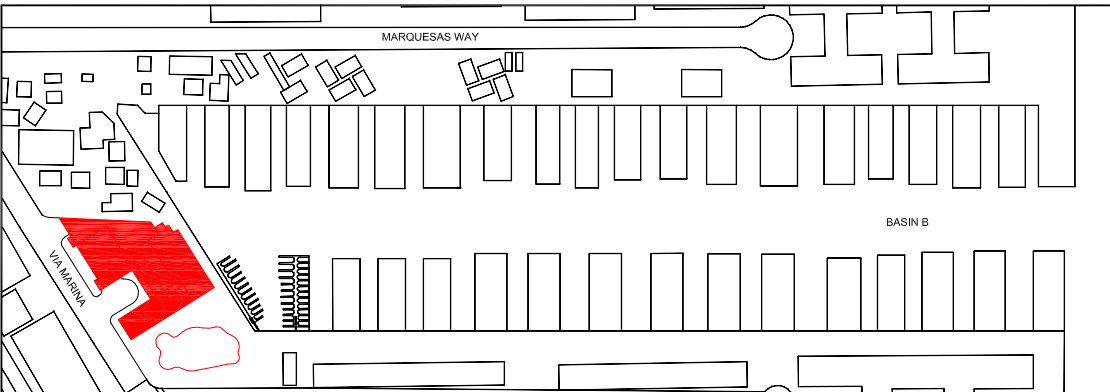
Project #06-1023



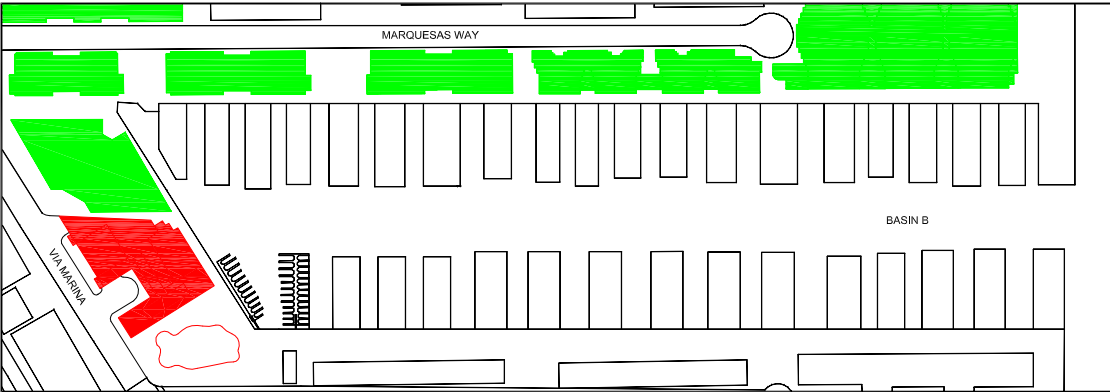




EXISTING

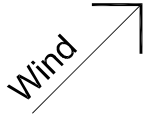


PROPOSED



FUTURE

TEST CONFIGURATIONS - N.T.S.



**SENSOR LOCATION:**

- Grade Level
- Sensors 8 & 9 and 38 & 39 are on Roofs

**WIND DIRECTION LEGEND:**

WIND SPEED CATEGORIES:

- ← EXISTING
- ← PROPOSED
- ← FUTURE

**Note:**  
Arrow length is proportional to mean wind speed.



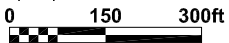
Local Wind Direction - Wind from 225° (Southwest)

Woodfin Suites Hotel - Marina del Rey, California

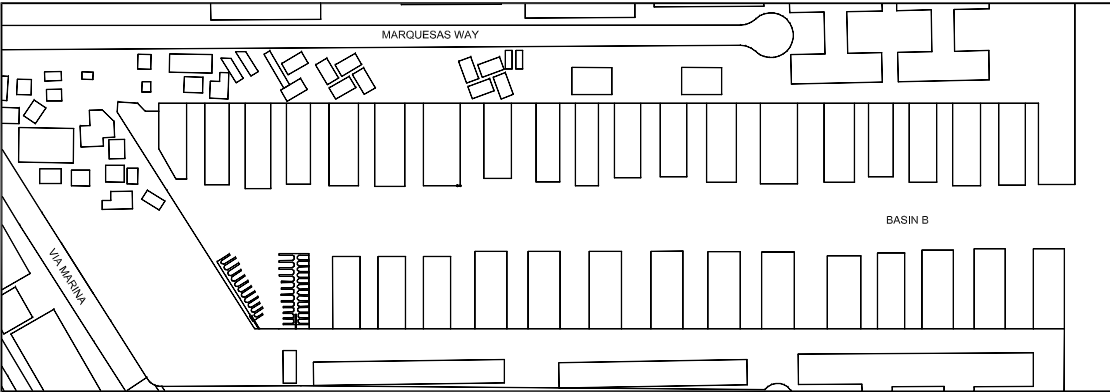


Project #06-1023

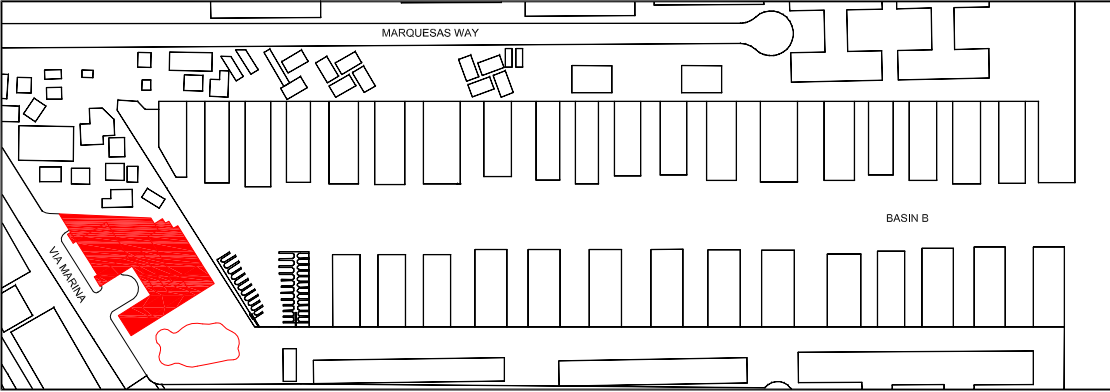
Drawn by: DJM	Figure: 5
Approx. Scale: 1"=300'	
Date Revised: Oct. 11, 2005	



RWDI



EXISTING



PROPOSED



FUTURE

TEST CONFIGURATIONS - N.T.S.



**SENSOR LOCATION:**

- Grade Level
- Sensors 8 & 9 and 38 & 39 are on Roofs

**WIND DIRECTION LEGEND:**

**WIND SPEED CATEGORIES:**

- EXISTING
- PROPOSED
- FUTURE

**Note:**  
Arrow length is proportional to mean wind speed.



**Local Wind Direction - Wind from 90° (East)**

Woodfin Suites Hotel - Marina del Rey, California

True North

Drawn by: DJM	Figure: <b>6</b>
Approx. Scale: 1"=300'	
Date Revised: Oct. 11, 2005	

0 150 300ft

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## **APPENDIX A**

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## Appendix A: List of Drawings and Information Used for Model Construction

The drawings and information listed below were received from Gin Wong Associates and were used to construct the scale model of the proposed Woodfin Suites Hotel development.

Drawing Title	Drawing/File Format	Date Drawn (Last Revision)	Date Received
PARK ELEVATION	PDF	October 3, 2000	June 28, 2005
VIA MARINA ELEVATION	PDF	October 3, 2000	June 28, 2005
SITE PLAN 03-31-05	PDF	March 15, 2005	May 23, 2005