Whelans InSites Pty Ltd
ABN 61 088 148 743

Incorporating
Gunninah Environmental Consultants
Wallis & Moore

Level 12, 80 Clarence St
Sydney NSW 2000
DX 288 Sydney

Suite 2, 55 East Parade
Sutherland, NSW 2232

T: 02 8234 8300
F: 02 9262 6511
www.insites.com.au

Certification
Engineering
Environmental
Project Management
Spatial
Surveying
Tenancy & Building
Urban

Our Ref: C940R02.BF:cmh

15 March 2011

Thakral Holdings Limited
Level 12, 301 George Street
SYDNEY NSW 2000

Attention: Mr David Hogendijk

REPORT FOR SUN ACCESS PLANES
GPO STEPS, MARTIN PLACE
PROJECT: WYNYARD STATION
GEORGE STREET, SYDNEY

INSTRUCTION

To calculate the building envelope and maximum envelope height for the proposed City One development (Lot Nos.1, 2 and 4 DP853331 and Lot No.10 DP595978 George Street) to ensure the proposed building envelope does not result in any additional overshadowing of the GPO steps or sandstone façade at any time of the day throughout the year.

CRITERIA

The limitation on height is based on a shadow plane from the base of the GPO steps Martin Place at George Street, Sydney using the Azimuth and altitude at 13:00 hrs on the Winter Solstice; this being the day that the sun would cast the longest shadow for the proposal.

The calculations are based on the formula:

$H = V + (D * TAN (A))$

METHODOLOGY

The base of the steps were located along the northern face of the GPO fronting Martin Place were surveyed for location and relative Australian Height Datum (AHD) level and connected to the State Survey Grid Co-ordinate System in Map Grid of Australia (MGA). The surrounding area of the proposed building at Wynyard Station were similarly surveyed and connected to Survey Control Information Management System (SCIMS) and MGA.

The astronomical data for the sun (altitude and Azimuth at any particular time) was obtained from the Australian Government Geoscience Australia web page (copy included) & checked by Astronomical Applications Department, US Naval Observatory, Washington DC.

As shown upon ***Annexure 'B'*** of this report.

H Is the calculated height of the proposed building envelope from the intersection of the sun access plane and the corner of the building.
Vide diagram A & B

V Is the relative level (AHD) of the steps at the GPO at Martin Place, Sydney.

D Is the horizontal distance from the intersection of the sun access plane with the proposed building and the steps of the GPO.
Vide diagram A & B

A Is the vertical angle of the sun access plan and the horizontal line from the steps of the GPO.

Variables required to obtain the astronomical data included the Latitude -33^{o} 52'00" & Longitude +151^{o} 12'00" being the Latitude & Longitude of the GPO at Martin Place, Sydney obtained from the Lands Department SCIMS.

The astronomical data obtained from the Australian Government Geoscience Australia pages was:

Azimuth 343^{o} 08'26" &
Altitude 30^{o}47'23"

Results

The formula H = V + (D x Tan A)
was used to calculate the heights for the proposed building.

The results of the calculation are attached in ***Annexure 'A'***.

The sun access formula is that setout in the Sydney Local Environment Plan 2005, The Planning and Assessment Act 1974 Schedules and Dictionary, Page 2.

Conclusion

The height of the proposed building was calculated using the sun access plane intersection with the base of the steps at the GPO Sydney and results tabulated (see enclosed C940 P1 Annexure 'A'). This calculation confirms that there is no additional overshadowing of the GPO steps or sandstone façade as a result of the proposed development based on the building envelopes proposed.

These results from Annexure A form the basis for the Shadow Diagrams (Figure 50, Pages 89-91) of the Report "George, Margaret & Carrington Streets, Sydney, City One Concept Plan January 2011" prepared by JBA Urban Planning Consultant Pty Ltd. These shadow diagrams clearly outline the minimal extent of overshadowing that affects the narrow silver of the Martin Place footpath only.

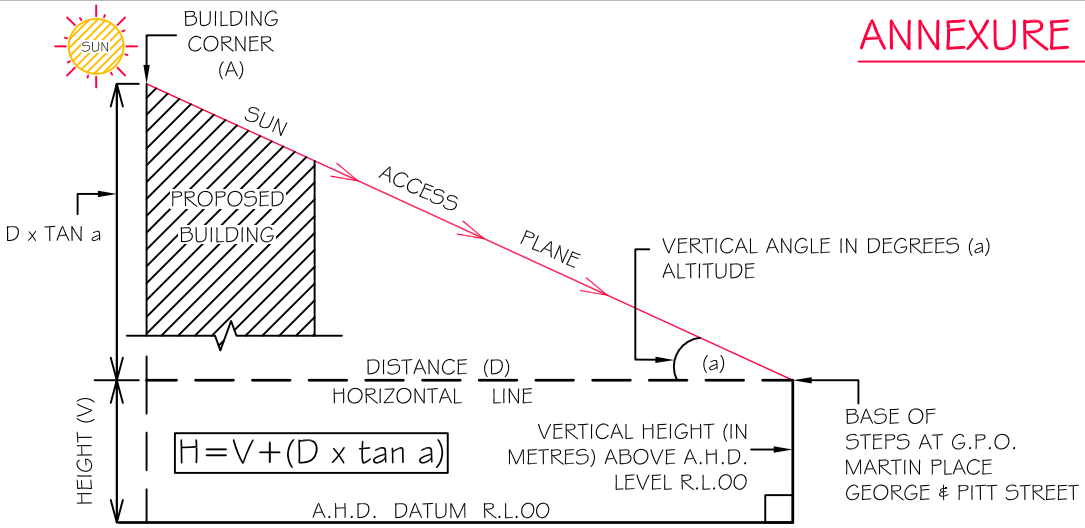
Wallis & Moore InSites

B Franklin

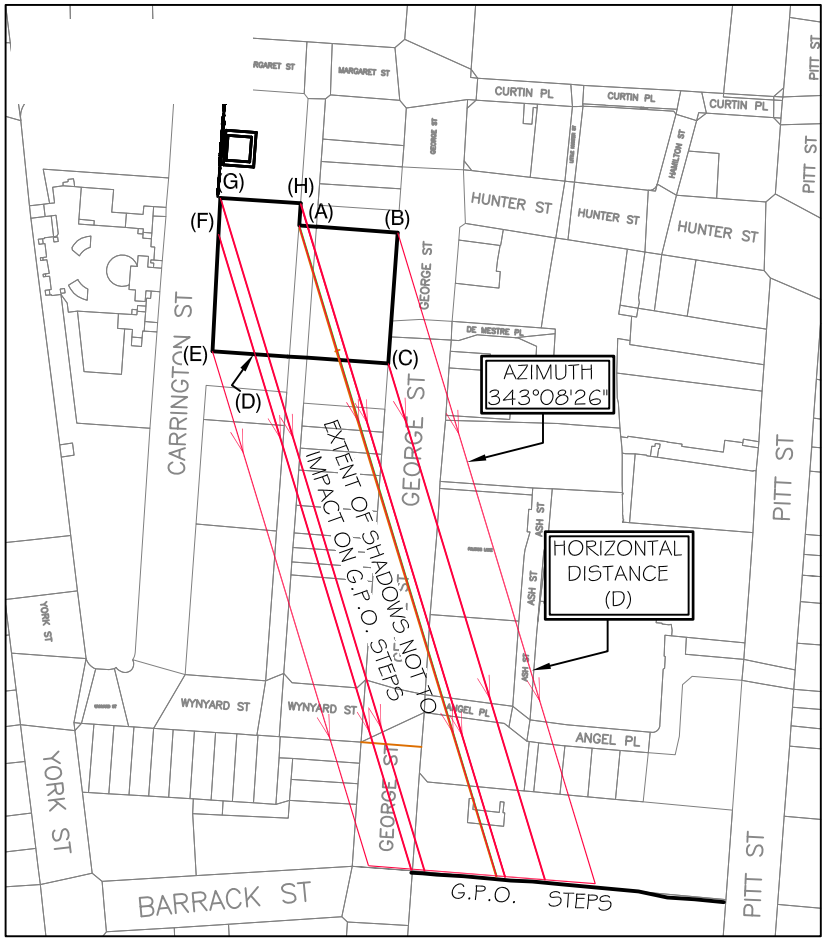
Brian Franklin
Supervising Registered Surveyor

ANNEXURE A

ANNEXURE A



TYPICAL SECTION FROM THE STEPS OF THE G.P.O. TO THE PROPOSED BUILDING ENVELOPE



PLAN VIEW SHOWING THE RELATIONSHIP OF THE PROPOSED BUILDING ENVELOPEWITH THE SUN AZIMUTH INTERSECTION TO THE STEPS AT THE G.P.O.

TABLE OF RESULTS

BUILDING CORNER	HORIZONTAL DISTANCE	VERTICAL DISTANCE	R.L. GROUND	R.L.TOP
A - CNR 1/154	233.56	139.18	15.65	154.83
B - CNR 2/156	233.95	139.41	15.45	154.86
C - CNR 3/126	185.29	110.41	15.50	125.91
D - CNR 4/CALC	185.04	110.26	15.70	125.96
E - CNR 5		0.00	0.00	0.00
F - CNR 6/ALONG	228.38	136.09	15.70	151.79
G - CNR 7/160	241.47	143.88	15.70	159.58
H - CNR 8/160A	241.83	144.10	15.60	159.70

OUR REF: C940 P1a
DATE: 18.05.09
DATE: N.T.S.

PREPARED BY :
SITES
insites.com.au
Whelans Insites Pty Ltd
ACN: 088 148 743
INCORPORATING :
Level 12, 80 Clarence Street
Sydney, NSW 2000
DX 288 Sydney
t: 02 8234 8300
f: 02 9262 6511
Suite 2, 55 East Parade
Sutherland, NSW 2232
DX 4522 Sutherland
t: 02 9542 1177
f: 02 9542 4631

ANNEXURE B

ANNEXURE B

- Sunrise, Sunset & Twilight Times
- Moonrise & Moonset times
- Sun and Moon Azimuth & Elevation
- Help with Astronomic Computations
- Browse Moon phase data
- Browse Planet data for major Australian cities.
- Definitions of Astronomical Events
- Geodetic Calculations
- Geodesy & GPS
- Earth Monitoring

Sun or Moon Position Results

GPO Lat=-33°52'00" Long=+151°12'00" Height=0.0m

AZIMUTH AND ALTITUDE OF THE SUN
Time zone: +10.00 hours
Altitude includes astronomical refraction angle for a standard atmos

Date	Time	Refraction	Azimuth	Altitude
21/06/2009	13:00:00	00°01'38"	343°08'26"	30°47'23"

Computed using National Mapping Division's sunmoonposn program, vers

Azimuth is the clockwise horizontal angle (in degrees minutes and se
from true north to the sun/moon.
Altitude is the vertical angle (in degrees minutes and seconds)
from an ideal horizon, to the sun/moon.
An ideal horizon exists when the surface forming the horizon is at a
right angle to the vertical line passing through the observer's posi
If the terrain surrounding the observer was flat and all at the same
the horizon seen by the observer standing on the earth would approxi

Another calculation

Comments & Suggestions

Rate this page: -- Please choose --

PREPARED BY :
WHELANS INSITES
insites.com.au
Whelans Insites Pty Ltd
ACN: 088 148 743
Level 12, 80 Clarence Street
Sydney, NSW 2000
DX 288 Sydney
t: 02 8234 8300
f: 02 9262 6511
INCORPORATING :
WALLIS & MOORE
Suite 2, 55 East Parade
Sutherland, NSW 2232
DX 4522 Sutherland
t: 02 9542 1177
f: 02 9542 4631