PRICE&MYERS

Consulting Engineers

30 Newman Street
London W1T 1LT
T 020 7631 5128
F 020 7462 1390
jjames@pricemyers.com
www.pricemyers.com

Magdala Building Extension, 2a South Hill Park, Hampstead Heath NW3 2SB

Daylight and Sunlight Assessment

21 January 2015
Prepared by: Vidhi Gupta
Reviewed by: Jessica Gray
Project number: 23368

Contents

Contents 2
1 Introduction 3
2 Site Analysis 4
2.1 The existing and proposed development 4
2.2 Site Surroundings 5
2.3 Site Model 7
3 Daylight and Sunlight Assessment 8
3.1 Daylight 8
3.2 Sunlight 10
3.3 Gardens and Open Spaces 12
4 Conclusion 13

1 Introduction

Price & Myers have been instructed by Brooks Murray Architects, on behalf of their client, to carry out a daylight and sunlight assessment in respect of the proposed extensions to the existing Magdala Pub in Hampstead Heath.

The existing Pub is an end-terrace 3 storey building with a flat roof. It is proposed to retain the pub on the first, ground and basement levels and partially extend the building to the rear end of the site and on the topmost storey by providing a mansard roof extension on the existing flat roof.

The refurbishment and proposed extension will create 2 new residential flats above the pub.

This report is an assessment of the impact of the proposed extension on the availability of daylight and sunlight to the rear windows of habitable rooms of the adjoining building.

The assessment is based on criteria set out in The Building Research Establishment Report ‘Site layout planning for daylight and sunlight- A guide to good practice' (2011).

The assessment is based on drawings provided by the architect for the existing and proposed development and information from survey drawings and photographs for the surrounding buildings.

2 Site Analysis

2.1 The existing and proposed development

The existing Pub is a 3 –storey end terrace property in the London Borough of Camden. The extension will be to rear end of the site and on the topmost storey by providing a mansard roof extension on the existing flat roof.

The refurbishment and proposed extension will create 2 new residential flats above the pub.

Figure 2-1 Existing & proposed

2.2 Site Surroundings

The existing pub is located adjacent to some terrace houses on its northern orientation. Hampstead Heath station is located on the southern orientation of the site. On its east and west orientation, the site is surrounded by some residential developments.

No 2 on South Hill Park Road is located closest to the proposed extension and has therefore been chosen for this analysis. All other neighbouring properties are located further away. Further testing on other properties can be undertaken, based on the outcome of this assessment, assuming that the windows of No.2 South Hill Park Road are most likely to receive the biggest impact from the proposed extension.

The assessment focuses on the ground and first floor windows of No.2 South Hill Park Road, facing the proposed extension.

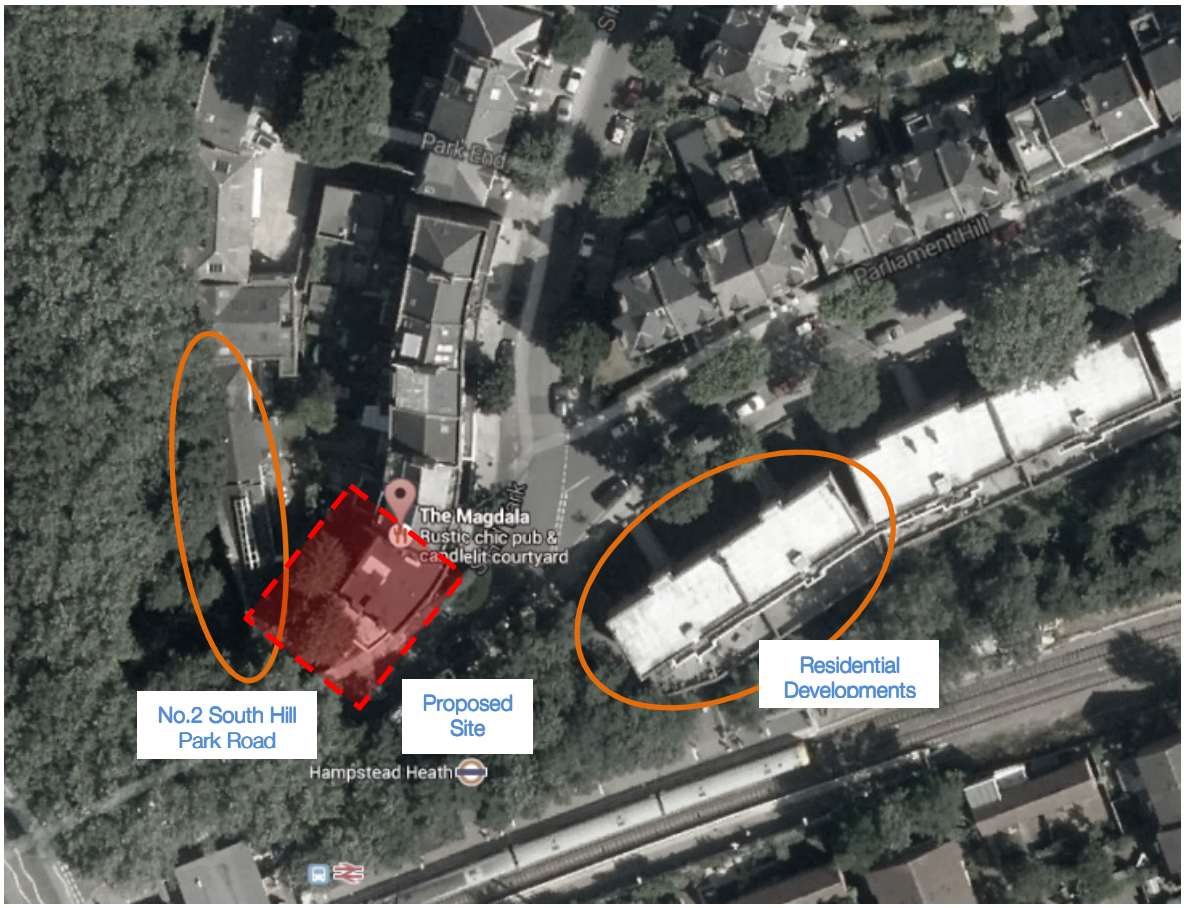

Figure 2-2 Site Surroundings

Figure 2-3 House 2a South Hill Park Road- Front Elevation

Figure 2-4 House 2a South Hill Park Road - Side Elevation

2.3 Site Model

A three-dimensional model was built in Ecotect Analysis 2011 software using the drawings provided by Brooks Murray Architects for the existing and proposed development. In the absence of full measured surveys available, details of the heights, massing and window locations for the existing surrounding properties have been estimated from satellite images and Google Street views.

The site and identified surroundings are surrounded by a few mature trees. However in order to ascertain clear impacts of the proposed extension on daylight and sunlight levels, trees and other landscape features were not included in the assessment model as shown in Figure 2-5 below. This is in line with the best practice guidelines to represent the worst case scenario.

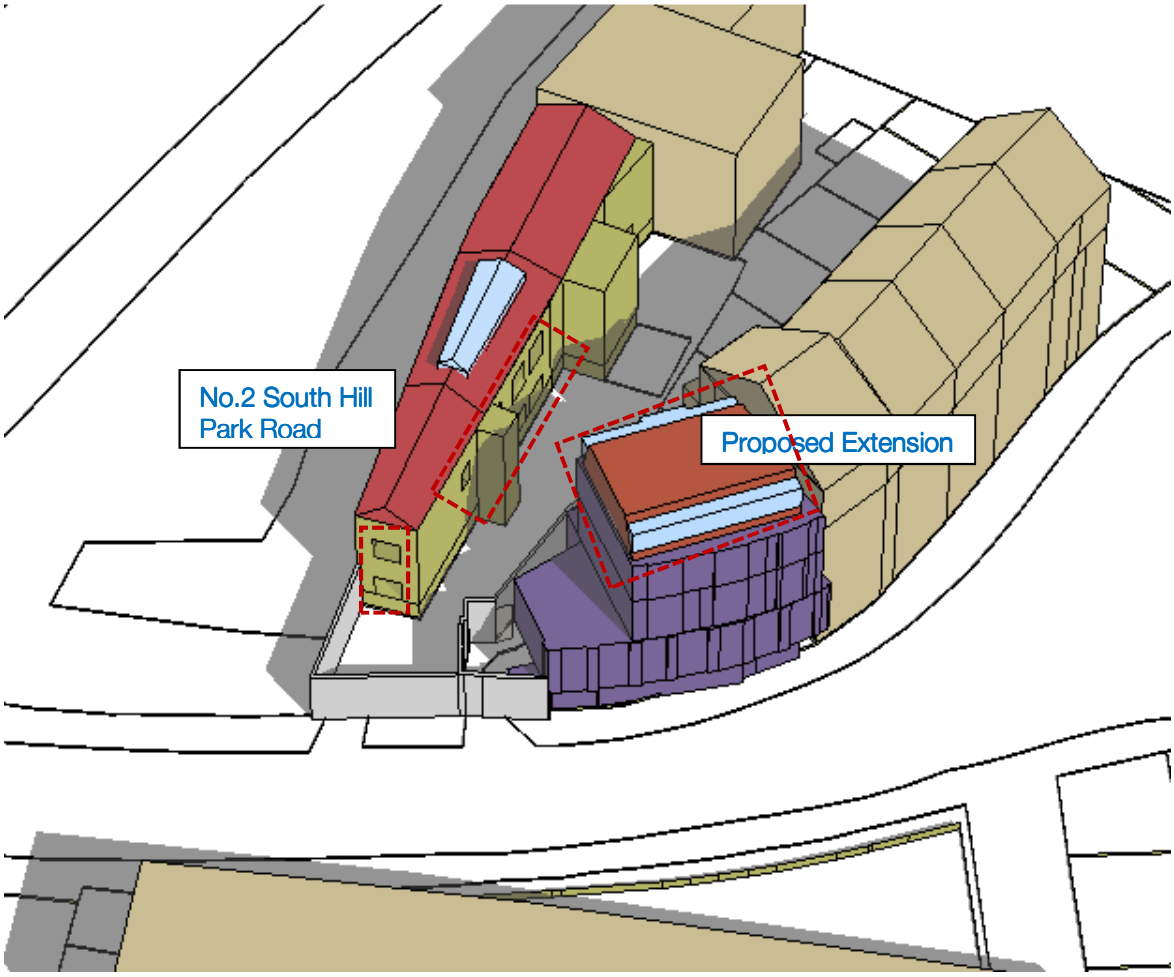

Figure 2-5 3D model of the proposed extension and neighbouring buildings

3 Daylight and Sunlight Assessment

The BRE guide is intended to aid designers in considering the relationship between new and existing buildings to ensure that each retains the potential to achieve good daylighting and sunlight levels. The author of the guide, Dr Littlefair states in the introduction that:

"The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and should not be used as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly because natural lighting is only one of many factors in site layout design".

In designing a new development or extension to a building, care should be taken to safeguard the access to daylight and sunlight for existing buildings. The guidelines given in the BRE guide are intended for use for rooms in adjoining dwellings where daylight and sunlight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed. The guidelines may also be applied to any existing non-domestic building where the occupants have a reasonable expectation of daylight and sunlight, like schools, hospital and offices.

3.1 Daylight

Daylight can be described as light from the sky. It is assumed to be uniform and non-directional in nature. There are various methods of measuring and assessing daylight in buildings and the choice of test depends upon the circumstances of each particular window. When assessing loss of light to existing windows from a proposed development or extension, both the total amount of skylight and its distribution within the building are important.

Any reduction in the total amount of skylight available at the window is measured by calculating the Vertical Sky Component (VSC), at the centre of each main window. The impact on the daylighting distribution in the existing building can be found by plotting the 'no sky line' in each of the main rooms.

Vertical Sky Component (VSC)

A quantitative indicator of the amount of daylight available at the window wall requires the calculation of the Vertical Sky Component (VSC). The VSC is the ratio of the direct sky illuminance falling on a vertical wall at a reference point to the simultaneous horizontal illuminance under an unobstructed sky. The maximum value is almost 40% for a completely unobstructed vertical wall.

The VSC has been calculated using Ecotect Analysis 2011 software. The BRE guide states that if the VSC is greater than 27% with the proposed development then enough daylight should still be reaching the existing windows. If the VSC calculated at the windows is less than 27% with the proposed development, then the BRE guide suggests that the former VSC (that is, the VSC without the proposed development) should be calculated. If the VSC with the proposed development in place is both less than 27% and less than 0.8 times its former value, then occupants of the existing building will notice the reduction in daylight and electric lighting will be needed more of the time.

This assessment focuses on the ground and first floor windows of the neighbouring property, No.2 South Hill Park that face the proposed extension and that are likely to be affected. As internal layouts for this property are not available, it is not clear if these windows face habitable rooms.

VSC calculations have been carried out on all windows to represent the worst-case scenario. The calculated values of VSC before and after the proposed extension are shown in the following table.

Table 3-1 VSC Results

House- 2A South Hill Park Road Tested windows (Refer Figures 2.3-2.4)	Vertical Sky Component (VSC) BRE minimum recommended value of 27%			BRE Criteria Met?
	VSC % (proposed case)	VSC % (existing case)	% of existing case (80% and above acceptable)	
Front Elevation GF_01	27.5%	-	-	Yes
Front Elevation FF_11	40.0%	-	-	Yes
Side Elevation GF_02	14.5%	15.0%	97%	Yes
Side Elevation GF_03	12.5%	13.5%	93%	Yes
Side Elevation GF_04	13.0%	13.5%	96%	Yes
Side Elevation FF_12	21.5%	23.0%	93%	Yes
Side Elevation FF_13	19.5%	20.0%	98%	Yes
Side Elevation FF_14	25.0%	26.5%	94%	Yes
Side Elevation FF_15	25.0%	26.0%	96%	Yes

VSC values measured at all windows on the front elevation facing South Hill Park road are above the minimum required values with the proposed extension in place.

VSC values measured at all windows on the side elevation directly facing the proposed extension, both on the ground and first floor levels are below the minimum required values of 27% both in the proposed and the existing scenario.

When comparing the two scenarios, the results show a small difference in the VSC value. The reduction in the VSC value from the existing scenario is above 80% for all tested windows, which suggests that the reduction in daylight levels by the proposed extension is within the limits permissible by the BRE.

The assessment therefore concludes that the proposed extensions to the Magdala Pub will have a negligible impact on the daylight availability of this residential property.

No sky line & View of the sky

The no sky line divides those areas of the working plane which can receive direct skylight, from those which cannot. It indicates how good the distribution of daylight is in a room. If a significant area of the working plane (normally more than 20%) lies beyond the no sky line, then the distribution of daylight in the room will look poor and supplementary electric lighting will be required.

Impact on the daylighting distribution in the existing building from a proposed development can be found by plotting the 'no sky line' in each of the main rooms. In houses this includes living rooms, dining rooms & kitchens; bedrooms are considered less important, but should be analysed. If following the construction of a new development, the no sky line moves so that the areas of the existing room which does not receive direct skylight, is reduced to less than 0.8 times its former value, this will be noticeable to the occupant, and more of the room will be poorly lit.

As floor layouts of the surrounding buildings are not available at the time of this assessment, no-sky line calculations to assess the daylight distribution in the rooms have not been carried out on any of the surrounding buildings.

3.2 Sunlight

Unlike daylight, sunlight is dependent upon direction. The UK lies in the northern hemisphere and we receive our sun from a southerly direction- with the sun rising in the east and setting in the west. The availability of sunlight is therefore dependent upon the orientation of the window or area in question relative to the position of due south.

Sunlight assessment is only applicable where some part of the new development is situated within 90° of due south of a main window wall of an existing building and if any part of the new development subtends an angle of more than 25 ° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window. This assessment focuses on the single window of the neighbouring property that is likely to be affected.

Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours (WPSH)

The criterion to assess sunlight suggests that an interior space appears reasonably sunlit when receives at least 25% of the Annual Probable Sunlight Hours (APSH) and at least 5% of the Winter Probable Sunlight Hours (WPSH) during the winter months of 21st September to 21st March.

The APSH and WPSH have been calculated using Ecotect Analysis 2011 software. The BRE guide suggests minimum figures of 25% and 5% respectively. If a window fails this test then the BRE guide states that the former values of APSH and WPSH (i.e. the values without the proposed development) should be calculated. If the values with the proposed development in place are less than 0.8 times their former value then occupants of the existing building will notice the loss of sunlight.

The calculated values of APSH and WPSH with the proposed extension are shown in the following tables.

Table 3-3 APSH results

House- 2A South Hill Park Road Tested windows (Refer Figures 2.3-2.4	Annual Probable Sunlight Hours (APSH %) BRE minimum recommended value of 25%				BRE Criteria Met?
	APSH % (proposed case)	APSH % (existing case)	% of existing case (80% and above acceptable)	Total Annual Loss (below 4% acceptable)	
Front Elevation GF_01	59.0%	59.0%	-	0.0%	Yes
Front Elevation FF_11	74.0%	74.0%	-	0.0%	Yes
Side Elevation GF_02	21.0%	22.0%	95%	1.0%	Yes
Side Elevation GF_03	33.0%	34.0%	-	1.0%	Yes
Side Elevation GF_04	31.0%	33.0%	-	2.0%	Yes
Side Elevation FF_12	43.0%	46.0%	-	3.0%	Yes
Side Elevation FF_13	30.0%	32.0%	-	2.0%	Yes
Side Elevation FF_14	51.0%	53.0%	-	2.0%	Yes
Side Elevation FF_15	52.0%	53.0%	-	1.0%	Yes

Table 3-4 WPSH results

House- 2A South Hill Park Road Tested windows (Refer Figures 2.3-2.4	Winter Probable Sunlight Hours (WPSH %) BRE minimum recommended value of 5%			BRE Criteria Met?
	WPSH % (proposed case)	WPSH % (existing case)	% of existing case (80% and above acceptable)	
Front Elevation GF_01	20.0%		-	Yes
Front Elevation FF_11	24.0%		-	Yes
Side Elevation GF_02	0.0%	0.0%	100%	Yes
Side Elevation GF_03	4.0%	4.0%	100%	Yes
Side Elevation GF_04	4.0%	6.0%	67%	No
Side Elevation FF_12	15.0%	-	-	Yes
Side Elevation FF_13	0.0%	2.0%	0.10%	No
Side Elevation FF_14	9.0%	-	-	Yes
Side Elevation FF_15	12.0%	-	-	Yes

The APSH and WPSH values measured at all of the tested windows on the front elevation are well above the 25% and 5% minimum recommended values respectively.

APSH and WPSH values measured at some windows on the side elevation directly facing the proposed extension are less than minimum recommended values, both in the existing and proposed scenarios.

When comparing the two scenarios, the results show a small difference in the APSH & WPSH values in most of the tested windows. The reduction in the APSH value from the existing scenario is above 80% for all tested windows, which suggests that the reduction in annual sunlight levels by the proposed extension is within the limits permissible by the BRE.

In the winter months however, the reduction in the sunlight levels (WPSH values) to 2 of these windows is beyond the limits recommended by the BRE. It should be noted that this impact is only during winter, when the expectation of sunlight will be lower anyway. For window GF-04, the reduction over the existing case is around 30%, not significantly greater than the 20% recommendation in the BRE Guide. The analysis has not taken into account the large trees which will have some impact on sunlight in these properties, meaning that in reality the current sunlight penetration will be even lower. For both windows, the current values are very low, 2% and 6%, meaning that they will experience very little sunlight in winter in any case. It is therefore unlikely that the reduction in sunlight will be perceived in reality.

According to the BRE guide, sunlight is considered most important in the living rooms, and less important in the other habitable rooms. In the absence of internal floor layouts, the nature of the rooms served by these windows is currently not known.

As the proposed extension directly impacts only on only 2 of the 9 tested windows during the winter months alone, the assessment concludes that the proposed extensions to the Magdala Pub will have a minor-negligible impact on the sunlight availability of this residential property.

3.3 Gardens and Open Spaces

Good site layout planning for daylight and sunlight should not limit itself to providing good natural lighting inside buildings. Sunlight in amenity spaces between buildings has an important impact on the overall appearance and ambience of a development.

According to the BRE Guide, it is recommended that for a garden or amenity area to appear adequately sunlit throughout the year, at least half of the area should receive at least two hours of sunlight on 21st March. If as a result of a new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21st March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable.

Sun path diagrams for the amenity and garden spaces associated with the residential development at 2a South Hill Park Road, have been analysed, taking into account the proposed extension. As per the BRE requirements only half the area of the garden needs to comply with the criteria. As shown in the shadow diagram (Figure 3-1), the tested garden and amenity spaces receive at least two hours of direct sun between the hours of 2pm-4pm.

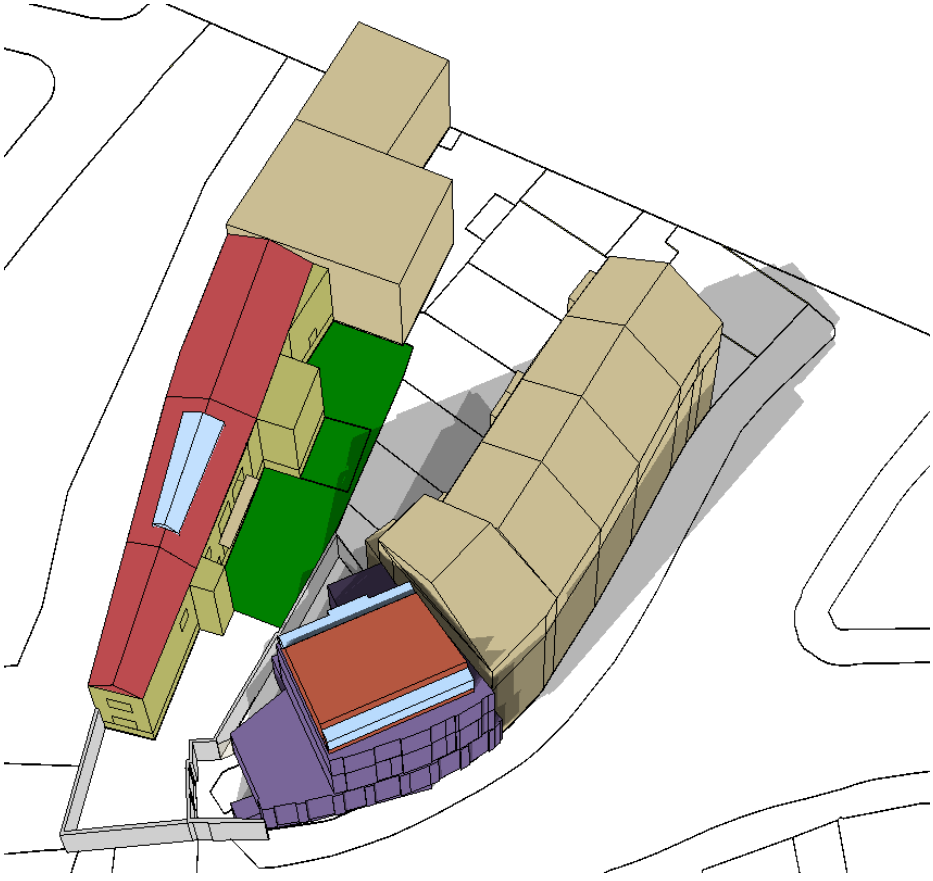

Figure 3-1 Shadow diagram for 21st March 14:00-16:00

4 Conclusion

Having undertaken a full computer generated quantitative assessment of the proposed scheme, we can conclude that the design of the proposed extension will have no impact on the daylight and annual sunlight levels of the windows of the existing neighbouring property, No 2a South Hill Park Road. All other developments are located further away, and are therefore not tested.

The results show a minor impact on the availability of sunlight during the winter months, on a small proportion of tested windows. The nature of the rooms served by these windows will have to be investigated before the impact to this property can be fully quantified. The impact will be very small, as in the current situation, the sunlight levels these windows receive is very low. There is no impact on the annual sunlight availability in the garden and amenity spaces associated with this development.

The windows of No 2a South Hill Park Road are located at the closest distance away from the proposed extension. Based on the results of the analysis it can be concluded that the extension will have no impact on the sunlight and daylight levels to windows of all other neighbouring properties located further away.

The design of the proposed extension to the existing Magdala Pub therefore ensures that good levels of daylight and sunlight will remain incident on the existing surrounding buildings and their associated garden spaces for most part of the year.