

SARK – DARK SKY ISLAND
LIGHTING MANAGEMENT PLAN



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Isle of Sark – Dark Sky Island

External Lighting Management Plan

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1 Preamble

1.1 Introduction to Lighting Management Plans

The purpose of this Lighting Management Plan (LMP) is to provide a base document of advice and recommendations to mitigate the effects of stray and obtrusive light, often generally referred to as “light pollution”, from all exterior lighting whether it is intended for domestic, public or commercial use. To this end the document is not regulatory but will outline strategies of best working practice to follow in both :-

- ?? Planning for lighting with appropriate choice of lighting fixtures
and
- ?? Correct lighting installation practice

This plan’s principal aim is to provide practical advice on mitigating stray light, which astronomers may find obtrusive, within the boundaries of the Island of Sark, which is situated in the group of islands known as the Channel Islands. However, the advice given can be equally followed in the other adjacent islands to protect, maintain or even improve the existing dark sky attributes and the rural environmental setting of intrinsic darkness, which is enjoyed by Sark residents.

The provision of and also the continued working to an external Lighting Management Plan is an essential element, required by the International Dark Sky Association, when considering the initial merits of their Dark Sky Award process and also their continued monitoring of the night sky brightness. The International Dark Sky Association have the option of withdrawing their support of any award if future sky measurements show a decrease in darkness.

1.2 Introduction to Sark

The Channel Islands lie about 80 miles south of the south coast of England and a general location plan is shown in Figure 1. France is only 24 miles away and many of the houses, streets and organisations in the Channel Islands bear French names and connections.



Figure 1 – General location of Sark in the Channel Islands

Although the Channel Islands are part of Great Britain, each Island is autonomous and has its own independent democratically elected government, with each island setting its own laws as a Crown Dependency. In Sark the government is known as the Chief Pleas with 28 elected members restricted to Sark residents only. The approval for new building construction or the renovation of existing structures is assigned to a sub-committee known as the Development Control Committee but as yet this sub-committee does not include the regulation or approval of external lighting in any of the planning application or approval processes.

The Island of Sark has several rules and regulations which are not found on other islands within the Bailiwick outcrops in the English Channel. This Lighting Master Plan only uses the uniqueness relating to the exterior lighting issues and does not intend to diminish the importance of the other unique issues in the island life.

La Société Sercquaise is a charitable organisation which was formed in 1975 to study, preserve and enhance Sark's natural environment and cultural heritage. In 2008 the Société created a Sark Charter containing 10 points of community values and the last 3 points in the Charter are shown on the following page:



(8) “Support reduction of all forms of waste and pollution (including noise and light pollution) to land, air and water.”

(9) “Support the use of renewable energy sources and environmentally friendly sustainable economic activities.”

(10) “Support policies to strengthen Sark’s self-reliance and economic self-sufficiency.”

To date 223 (about 40%) of the residents, 492 visitors and 1,111 on-line e-signatures have signed up to be in broad agreement with the Community Charter.

Sark has a resident population of about 650 but last year attracted more than 40,000 visitors and the Sark Tourism vision is to see this improve, especially during the winter months.

Amateur astronomers form part of the tourism outreach to attract more visitors and the protection of the existing dark night sky over the island is crucial in this objective. This outreach is therefore in keeping with all three of the community values outlined above.

Sark is about 3 miles long and 1½ miles wide with almost 40 miles of coastline and has many unique features which are not found on the other islands. Unlike other Channel Islands, Sark has no airstrip and the only vehicles allowed to operate on the island are tractors, however, most visitors to the island enjoy the horse and cart approach for transport to the various hotels and tourist attractions. Direction signs on the island only show walking minutes to destinations.

Commerce and agriculture can use tractors to transport materials to various parts of the island but all tractors must be off the road network between the hours of 10pm and 6am. Most residents carry torches as presence markers when walking at night and even although there are a few tractors and cycles which could conflict with pedestrian movement there have been no serious or fatal accidents, during darkness, recorded over the past 25 years.

Since there have been no serious accidents and no serious crime, the two main criteria normally used in cost benefit analysis to justify public lighting, no need has been previously found to provide any public street lighting system. The absence of a street lighting system adds to the island’s rural setting and uniqueness. All external lighting is limited to that provided on private residences, commercial buildings or through shop windows.

With no public lighting system in place the residents have installed more house mounted external lighting units than is normally found in a lit urban or village side street on the mainland. However, the island electricity system is provided by a diesel powered generator and the very high cost of electricity on the island has focused most residents’ attention on using their external lighting on a very limited basis.

This Lighting Master Plan (LMP) therefore concentrates on guidance for residents and commerce, with general guidance for future public lighting if it is eventually widely agreed as being necessary.



1.3 The Astronomers' Viewpoint

More than 20 years ago the British Astronomical Association (BAA) forged links with the Institution of Lighting Engineers (ILE) to open discussions on the plight of amateur astronomers. The problem was that views of the stars at night were being diminished by stray upward artificial light from outdoor lighting. This included elements such as old style street lighting and poorly installed floodlighting installations, as well as other commercial, advertising and domestic lighting.

There are many reasons why obtrusive light should be prevented but there are two prime objectives for adequate control and they are:-

- ?? To minimise those problems introduced by obtrusive light to the visual environment and to various factors of our social and conservation environment.**
- ?? To reduce unnecessary consumption of electrical energy and consequential demands on fossil fuels and global pollution caused by fossil fuel combustion.**

Combating poor light control for astronomers assists in achieving these prime objectives but it is only part of an international obtrusive light control issue.

This document has been commissioned with the prime objective of promoting the use of the intrinsic darkness of the Island of Sark to view the stars in the night sky. The document therefore concentrates on mitigating any obtrusive light elements which could cause a nuisance, from both the astronomers' and residents' viewpoint, by:-

- ?? Maintaining or improving the night sky darkness as a background to view the star constellations.
- ?? Promoting a good practice working document for Sark Commerce use, and to be accessible by residents, hoteliers and any other tourist related promotion.
- ?? Promoting the use of quality domestic lighting equipment with good light control.
- ?? Encouraging improvement, adaptation or changing of existing lighting equipment.
- ?? Creating a benchmark to achieve the dark sky award for the Island of Sark.

Unlike some other countries the UK and the Channel Islands have no regulatory governing body which provides exterior lighting. Professional institutions such as the Institution of Lighting Professionals (formerly Engineers), the Society of Light and Lighting, the Commission Internationale de l'Eclairage and British Standards all provide illuminating engineering background advice and recommendations for engineers to follow and adapt to suit different geographic locations.

Likewise it is important to understand that apart from Island owned property Sark's Chief Pleas has no statutory powers to change or alter conditions or standards on existing private or commercial property. This role lies in the hands of Sark's residents and commerce to work in partnership and adopt the good practice principles outlined herein. Future new development designs will be encouraged to do likewise.

1.4 Night Sky Darkness Evaluation

The night sky 'brightness' can be measured by a specially adapted meter called a **Sky Quality Meter (model SQM-L)** which is calibrated in **visual magnitudes per square arc second** (can be converted to candelas per square metre (cd/m^2) in illuminating engineering terms). Steve Owens, the UK co-ordinator of the Year of Astronomy (2009), measured the night sky in April 2010 and some of the measurements recorded at that time are shown in Figure 2 below. The greater the measurement reading, the darker the night sky at that time.

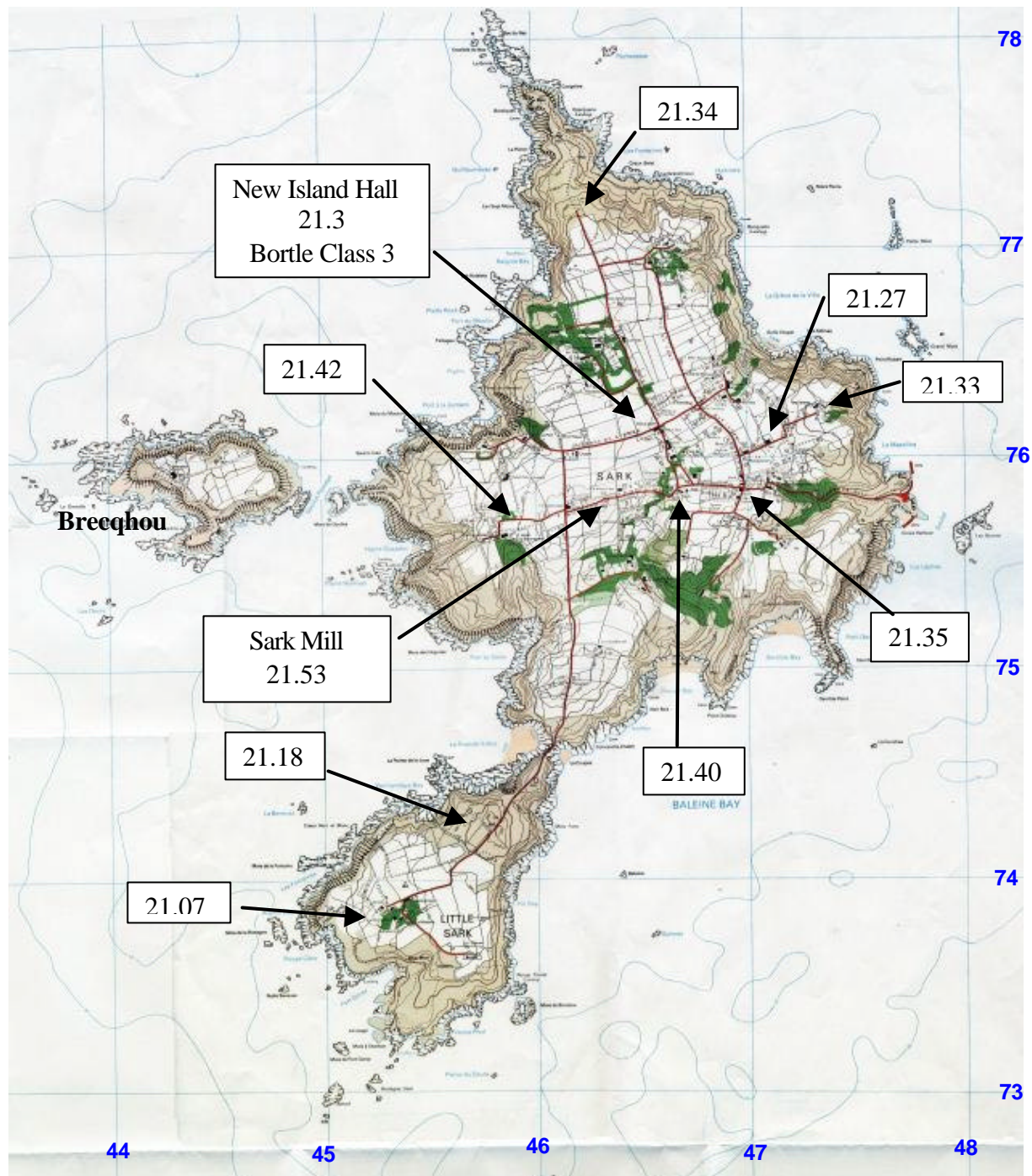


Figure 2 - Magnitudes per square arc second

(A full record, with associated map reference to locations, is tabled on the following page)



Table 1.1 Sky Darkness Measurements

Location	OS Grid Ref		Alt. (ft)	SQM 1	SQM 2	SQM 3	SQM 4	SQM 5	SQM Average
La Vallette	473762		300	21.32	21.38	21.32	21.30	21.31	21.33
	472762		310	21.37	21.29	21.27	21.29	21.29	21.30
junction	472761		322	21.39	21.29	21.27	21.29	21.29	21.31
Mermaid Tavern	471761		325	21.16	21.30	21.25	21.31	21.33	21.27
corner	470760		322	21.38	21.30	21.21	21.31	21.32	21.30
phone box	470758		320	21.40	21.34	21.34	21.33	21.34	21.35
banks	470758		320	21.37	21.37	21.34	21.33	21.34	21.35
bookshop	468758		325	21.51	21.41	21.41	21.40	21.41	21.43
supermarket	468758		325	21.43	21.39	21.43	21.42	21.43	21.42
junction	467758		322	21.45	21.44	21.44	21.43	21.43	21.44
Visitor Centre	466758		310	21.42	21.39	21.39	21.39	21.39	21.40
Mill Lane	465758		335	21.49	21.49	21.48	21.48	21.43	21.47
Mill Lane	464758		345	21.49	21.50	21.45	21.44	21.44	21.46
Sark Mill	463758		356	21.50	21.47	21.46	21.47	21.46	21.47
Mill Lane	463758		350	21.56	21.53	21.51	21.52	21.52	21.53
La Vaurocque	462757		345	21.56	21.50	21.49	21.50	21.49	21.51
next house	461757		340	21.53	21.48	21.48	21.48	21.48	21.49
	459757		330	21.54	21.48	21.48	21.47	21.48	21.49
	458757		325	21.56	21.48	21.48	21.48	21.48	21.50
far, gate			320	21.46	21.43	21.44	21.43	21.43	21.44
La Fregondee	457756		310	21.42	21.42	21.44	21.40	21.43	21.42
Some of the following readings were taken on a second evening with a slight mist									
Duval Farm	452739		Slight mist conditions	21.06	21.06	21.10			21.07
junction				21.11	21.08	21.08			21.09
				21.06	21.08	21.06			21.07
				21.10	21.08	21.08			21.09
bend				21.11	21.08	21.06			21.08
				21.05	21.10	21.10			21.08
				21.09	21.11	21.11			21.10
				21.18	21.08	21.06			21.11
La Vermandaye	458742			21.24	21.12	21.11			21.16
				21.25	21.10	21.18			21.18
				21.26	21.25	21.23			21.25
La Coupée	461746			21.30	21.31	21.29			21.30
next house				21.32	21.32	21.28			21.31
l'Espace				21.34	21.43	21.30			21.36
Sue's tea garden	461755			21.32	21.33	21.33			21.33
La Vaurocque	462757			21.45	21.35	21.35			21.38
Chapel corner	461760			21.41	21.38	21.36			21.38
Mon Plaisir	462761			21.23	21.44	21.40			21.36
half way	466761			21.35	21.38	21.38			21.37
north road end	462772			21.35	21.35	21.32			21.34
corner				21.35	21.28	21.31			21.31
La Ladrie				21.35	21.36	21.37			21.36
crossroads				21.32	21.33	21.33			21.33
Mermaid Tavern	471761			21.37	21.36	21.35			21.36



Astronomers also describe the sky darkness in terms of a Bortle Scale* of 1 to 9, this time the lower the number the darker the sky. Reference to the nomogram in Appendix B shows the comparison of the various methods the astronomers use to describe the night sky quality.

With an estimated conversion of 21.5 magnitudes per square arc second to Bortle's scale, the area round Sark Mill can be described as Bortle Class 3 and an asset worthy of preserving.

The resident astronomers are pursuing the possibility of installing a telescope in the remaining mill dome, the sails of the Windmill having been removed during World War II. Several trees to the west of the mill have been topped and one tree has been removed to improve the all round visibility from the mill dome.

As a preliminary start, the playing field at the New Island Hall will be used as the meeting point for night astronomy workshops. Very little of the surrounding adjacent island lighting can be seen from the playing field, however, the large windows of the New Island Hall may prove problematic if night blinds, currently on order, are not fitted before these workshops start.

* See <http://skyandtelescope.com/resources/darksky/article811.asp> for further information on the Bortle Scale.

1.5 Technical Lighting Data

It is not possible to produce a document on light control without introducing some light technical parameters and when used they will be defined as required with an appendix summary of technical definitions.

Basic Lighting Terms

Detailed explanations of basic lighting terms can be found in Appendix A but in this document the three lighting terms most commonly used for expressing values of light are:

- lumen** Describes the total amount of light given off by a bare lamp.
(abbreviation: lm (sometimes klm for 1000lm))
- candela** Describes the intensity (I) of light in a particular direction.
(abbreviation: cd)
- illuminance** Describes the amount of light falling on a surface area
in lumens / square metre. (abbreviation: lux)

This Lighting Management Plan (LMP) has been devised, principally, to control different forms of stray light. First, and foremost, is upward light which can obscure night-time astronomical observations when it reflects off air-borne particles of water or dust. The effect is commonly known as **sky glow**. However, direct light sources close to any field of observation are also problematic and are discussed later.

In addition to sky glow, astronomers do not like to see a visible source of light either and luminaires with a light source larger than 1000 lumens should be what the International Dark Sky Association (IDA) call “fully shielded” from view, ie a completely flat glass window mounted horizontally, as shown in Figure 3 (right). Non-technical terms like this will be explained and mixed with technical descriptions later.



Figure 3 Fully Shielded luminaire

Upward light and source intensity limitation are only two of four aspects of stray light control explained in two complementary technical publications on the limitation of obtrusive light namely:-

- ?? The Institution of Lighting Professionals (**ILP**) (formerly **ILE**) ‘Guidelines for the Control of Obtrusive Light’ (Undergoing 2010 revision)
and
- ?? The Commission Internationale de l’Eclairage (**CIE**) Technical Report 150:2003 ‘Guide on the limitation of the effects of obtrusive light from outdoor lighting installations’.

Both documents support the concept of setting out environmental zones based on the night time ambient light in the area. They then go on to recommend differing degrees of stray light control for each of 4 environmental zones. In previous years the most onerous limitations were in the zone of darkest ambience namely Zone 1 but the revised edition of the ILP guidelines (2010) will include an even more severe restriction in a new zone numbered “E0” where no artificial lighting will be permitted.

Sark is predominantly rural but due to its small size there are no large areas free of human habitation. Where this does apply the patches are not large enough to warrant the application of this strict regime. The majority of Sark does however fall into Environmental Zone E1 as outlined below in Table 1.1 and a full description of light limiting factors for this and other adjacent environments will follow in Section 2.

Table 1.1 Environmental Zones in the UK

Zone Number	Surrounding	Night Environment	Typical examples
E0	Protected	Dark	Starlight Reserves, Dark Sky Parks or Islands
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty or Dark Sky Buffer Zones
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Suburban residential / commercial or small town centre locations
E4	Urban	High district brightness	Large town, commercial area or city centre with high levels of night time activity

In addition to direct upward light limitations Dr Christopher Baddiley has shown in 'Towards Understanding Skyglow' (ILE:2007) that obtrusive glare from street lighting units, at or near the luminaire horizontal axis, can also diminish the astronomers' observations so the source horizontal intensity is also used in this LMP as a further means of providing both public nuisance reduction and better astronomical observations.

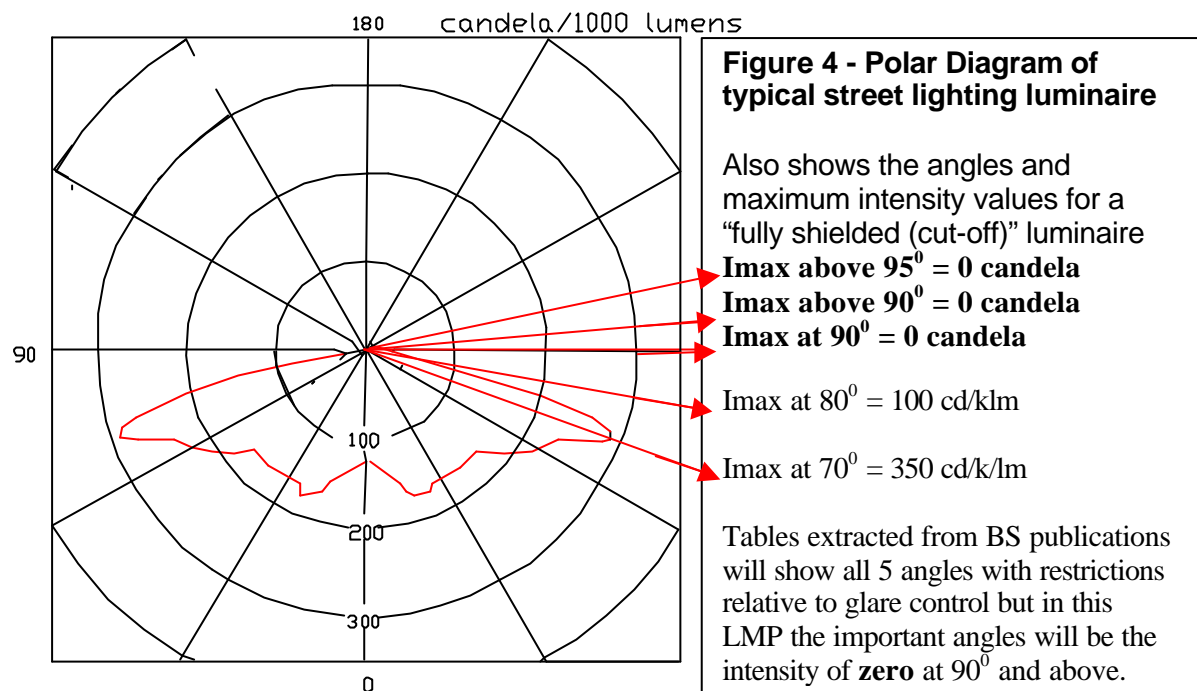
Reference is therefore made to limiting intensity values emanating from lighting units. The traditional simplistic means of displaying intensity distribution information is by means of a polar diagram with angular intensity values.

The polar diagram in Figure 4 (following) is a traditional way of illustrating a line of maximum intensity through the major and minor axis of a street lighting luminaire. For clarity Figure 4 shows only the major axis distribution for a street lighting luminaire ie the intensity of light emitted out of each side of the luminaire together with three angles where intensity limitations will be later applied to control horizontal and upward light, and a further two downward angles which are used in BS 13201 to control disability glare but do not form any control limitations in this LMP.

The light distribution from a floodlight is often shown as a Cartesian diagram (see Appendix A).

Upward light control limitations are stated for the luminaire in its designed or as-installed condition on site and is not a factory measured intensity.

For industry consistency all photometric light distribution intensity values are based on the candela / 1000 lamp lumens method (sometimes abbreviated to cd/klm). The values shown in Figure 4 are typical of the most onerous light control values with the values at and above 90° equalling zero candelas. This condition is ideal in mitigating unwanted upward light.



Another technical way of describing the limitation of upward light from luminaires is called the Upward Light Output Ratio and the ILP are currently considering the values, in percentage terms, of the zonal flux in 2 upward zones, namely between 90° and 100° and between 100° and 180° .

In addition to the IDA term of “fully shielded” other non-technical terms like high beam, semi cut-off, cut-off, fully cut-off and aero-screened have been used in the UK to categorise a luminaire’s light distribution. These luminaire category terms disappeared from the lighting industry usage in Europe and the UK some 30-40 years ago but sometimes still appear in UK planning publications. These old terms have therefore been combined, in this LMP, with more accurate technical descriptions with recommended limitations on intensity values in Section 2.

Task Illuminance

Over a period of time most working tasks, and sports activities, have been analysed and researched. Recommendations have been relative to the quantity and quality of light required to carry out the task in comfort and safety. It is important to:-

- ?? Provide the correct lighting levels for the task or sport game and grade playing level.
- ?? Provide the lighting only when needed.
- ?? Recognise that providing light in excess of the recommendations not only increases an unnecessary addition to sky glow but it also wastes energy and increases the carbon footprint.

Some recommended lighting levels relative to rural situations are included in this LMP for reference information and to assist in providing initial benchmarks for defining appropriate light levels.



Although Sark has a road network it does not exist in the same manner as a normal UK road network and the application of the majority of BSEN13201-2:2003 - 'Code of practice for the design of road lighting' (parts 1 and 2) and the European CEN Standards are not appropriate for Sark. However, in the event of general island agreement in the need for public lighting in the future typical illuminance values, developed specifically for Sark, are contained in table 3.7 in Section 3.2.

For task lighting on other outdoor work places reference should be made to BSEN 12464-2:2007 – 'Light and Lighting – Lighting of work places' (Part 2: Outdoor work places) but a few of the typical island area tasks are contained in Section 3.2.

It is important to note here that if there is no task in operation there should be no light and that the values given should be reduced if "white" light sources are used.

2 Dark Sky Island Zones and Light Limitation Policy

2.1 Dark Sky Island – Zone Concept

The International Dark Sky Association promotes the concept of creating three zones to the dark sky area with a central area of zero light sources known as the Core Zone. However, the Island of Sark, although sparsely populated, does not have a significantly large enough area of zero human habitation to declare one particular area as a light free area.

However, Sark, and the immediately adjacent island of Brecqhou, is surrounded by at least 8 miles of sea and the only fixed light sources are limited to the occasional flashing shipping navigation aids.

Therefore this LMP reverses the Dark Sky Park concept to create the Island of Sark as the **“Island Core Zone”**, the surrounding sea as the **“Island Buffer Zone”**, which protects the island, and the adjacent inhabited islands as the **“External Zone”**.

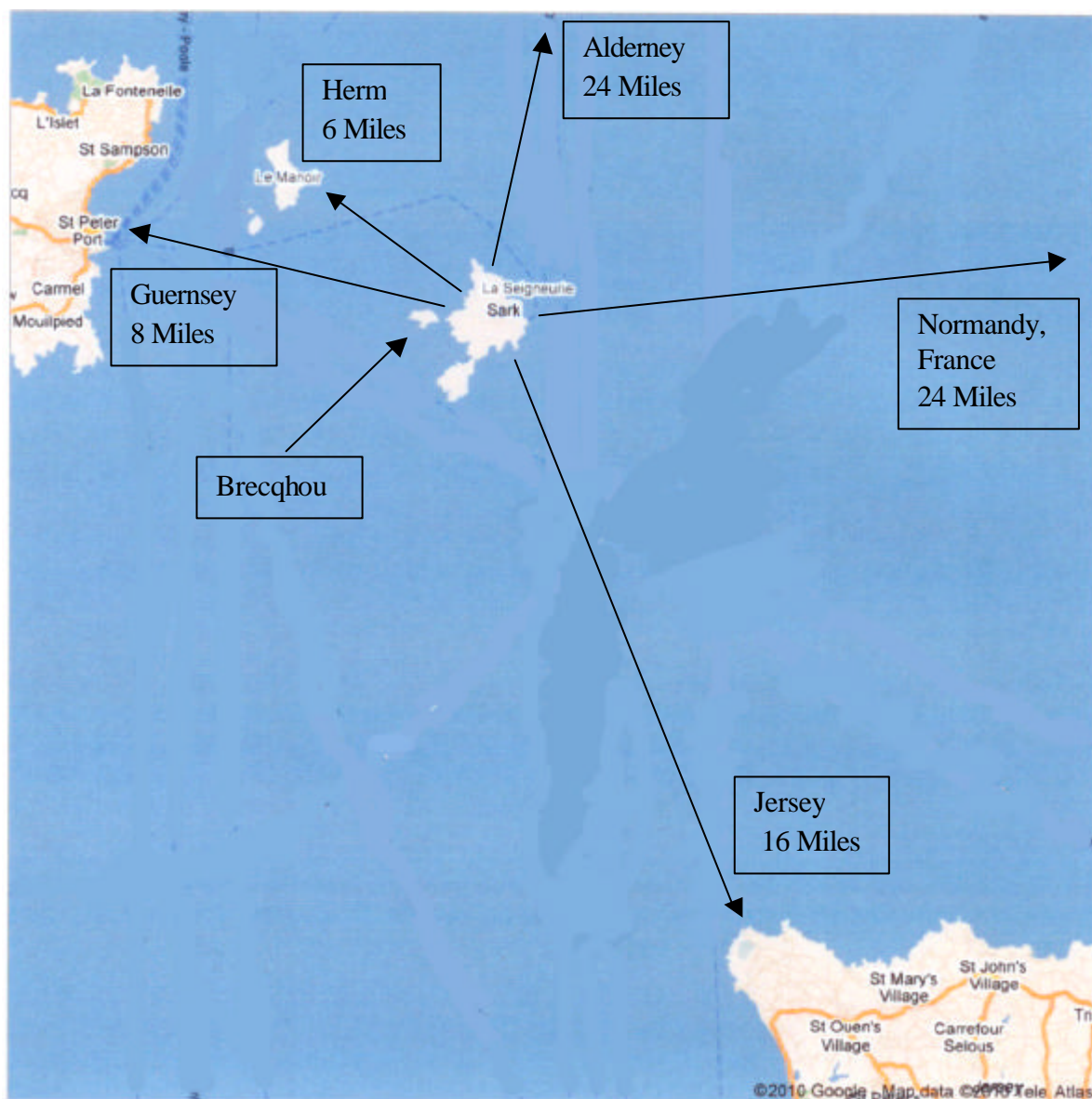


Figure 5 Sark and distances to adjacent inhabited lit areas

2.2 Island Core Zone



Figure 6 - Boundary of Island Core Zone – the 40 miles of shoreline of Little and Big Shark (Note: the island of Bercqhou is excluded from the Island Core Zone)

Sark can only be approached by boat and the only prominent building structure that can be seen on route to the only harbour is the island lighthouse on the east coast. The massive cliff faces surrounding the island hide most dwellings from view. Even from the harbour there is a climb of about 300 feet, via a path or road, before viewing the main village on the island, where horse drawn carriages await the island visitors. Likewise the harbour, 300 feet below, cannot be seen from the village.

The Village contains private residences, hotels, cafes, shops and banks clustered round "The Avenue" some with their own form of shop window or doorway lighting, which is sometimes only used in mid winter late afternoons, when daylight hours are shorter than the trading day.

A full inventory of all the external lighting on the island has been undertaken and assessed whether compliant with the International Dark Sky Association (IDA) initial recommendations. The results are shown in Section 5.2 but summarised as follows:

Although there are many variations on a theme there are principally 3 different luminaire styles: Heritage (Figure 7.1), Bulkheads (Figure 7.2), and Floodlights (Figure 7.3).



Figure 7.1



Figure 7.2



Figure 7.3

A few other styles were also found but the important element is not the style of the luminaire but its associated lamp output, described in **lumens** rather than commonly quoted lamp watts, and the distribution of light being emitted.

Most of the tungsten halogen floodlights use lamps which have an output greater than 1000 lumens. At least 30 were found with an elevated angle as illustrated in Figure 7.3. To be fully compliant with the International Dark Sky Association (IDA) recommendations, the glass window should be totally horizontal (Fully Shielded) as shown previously in Section 1.3 (Figure 3). (See Appendix F for a future improvement process)

Policy Statement Number 1

Luminaires using lamps greater than 1000 lumens should be installed as a “Fully Shielded” example.

Bulkhead style luminaires should be fitted with lamps less than 1000 lumens even although they may have an upper hood purportedly limiting some upward light. A luminaire such as shown in Figure 7.2 with an 18watt compact fluorescent lamp (“energy saving light bulb”) can provide a vertical illuminance value of 0.1 lux at least 22 metres from the source.

The IDA recommend that the spill light at a property boundary is not greater than 0.1 lux, which is about 1/3 of the light from a full moon. Illuminance can be measured with a light meter but a rule of thumb guide which links the lamp lumen usage to property size is included in section 3.1 guide.

As well as providing careful control of spill light it is equally important to avoid over-lighting an area as shown in Figure 8. Values of 8 to 10 lux were found on these table tops and this is brighter than some city side streets. Where possible this LMP provides some alternative solutions for the building ownership to address in the future.



Figure 8 Example of over-lit public area



Policy Statement Number 2

Residents of Sark are to be encouraged to limit the overspill light at their property boundary to no more than 0.1 lux.

With the exception of the large wall mounted heritage style luminaire shown in Figure 8 most domestic heritage style luminaires are designed and labelled with a maximum tungsten filament lamp wattage of 60 watts (11watts Compact fluorescent), both producing less than 1000 lumens, and although they have very little light control can generally be classified as IDA compliant for the moment. The lower the wattage the better the compliance. In some residences the heritage style luminaire was found to be located in a door porch area. This approach provides a good method of limiting stray upward light. Additionally some residents have installed 8 watt, or less, compact fluorescent lamps, which are often all that is necessary to provide some light round a doorway in the intrinsic darkness of Sark.

A lamp wattage and lumen output chart for domestic style lamps is given in Appendix E and guidelines for an individual property self-assessment style audit with recommendations on what to do to better the existing conditions is given in Appendix F.

In addition to the measurement of the night sky brightness recorded in section 1.2 a night time island environmental impact assessment has also been made. Although it was possible to walk without torch light, this was only possible after a time of eye adaptation to the dark conditions.

In Environmental Zone terms this island lives with and enjoys intrinsic darkness and as shown in Table 1.1 equivalent to Zone E1.

Accordingly the Island Core Zone should be maintained in this pristine condition. Where new or replacement external lighting is required the most onerous light control conditions should be applied to maintain this condition. To assist in this objective Table 2.1 contains recommendations on luminous intensity limits for new luminaires, with a lamp output greater than 1000 lumens, installed on the island. For domestic style luminaires with no intensity data Section 3.1 contains a lumen limit evaluation process.

Luminous intensity from a luminaire is derived from photometric information, which has been measured under laboratory conditions. These measured values describe the luminaire's light distribution in numeric electronic format (commonly known as I-tables in IES, TM14 or ELUMDAT format).

From the I-table for a particular luminaire and its installed angle of elevation the intensity of light at different elevation angles can be computed and classified in glare classes, namely G1 to G6. G1 is the most relaxed and G6 is the most restrictive and this is the recommended restriction, with selective relaxation, which should be applied in the Island Core Zone as shown in table 2.1. An example of some luminaires with light sources greater than 1000 lumens and complying with the upper intensity limits of table 2.1 are shown in Appendix C.



Table 2.1 - Intensity limitation in Island Core Zone

Island Zone Dark Sky Requirements	Glare Class	Maximum luminous intensity in cd/klm				Non technical description of luminaire light control in installed location
		at 70 ⁰ az	at 80 ⁰ az	at 90 ⁰ az	above 95 ⁰ az	
Core + 10 miles** beyond for lamps greater than 20,000lumens (250w HID)	G6	350*	100*	0	0	Fully Shielded installation (sometimes called “fully cut-off” in UK) when luminaire is flat glass and horizontal) For all luminaires > 1000 lumens

Note ^{az} Table 2.3 restrictions apply to the luminaire's installed angle of inclination which can be tested in UK industry standard design calculation software.

Note * Intensity relaxation may be appropriate at 70⁰ and 80⁰ depending on luminaire availability but the **values of zero intensity at 90⁰, 95⁰ and above are crucial**.

Note ** Requires discussions with adjacent island governments to adopt similar controls in their individual environmental policy plan.

In addition to the intensity controls presented in table 2.1 further light limitation recommendations are contained in table 2.2, below, to mitigate any obtrusive light in an E1 Environmental Zone and the two tables should be considered in tandem at the design stage for all new exterior lighting in the Island Core Zone.

The ILP and CIE describe ‘curfew’ as the time after which stricter requirements (for the control of obtrusive light) will apply. After ‘curfew’, most lighting should be extinguished or reduced as activity levels decline.

Although very few residents leave external lighting on longer than presence detection there are a few situations where lights are left on all night, sometimes by accident. The time of 22.00 hours is suggested as ‘exterior light curfew’ time for the Island Core Zone at which point users will be encouraged to extinguish or reduce the quantity of lighting.

Refer to Section 3 for information on time switches and other switching regimes.

Table 2.2 - Obtrusive Light Marker Points

ILP and CIE Obtrusive Light Limitations for Exterior Lighting Installations						
Environmental Zone	Sky Glow Upward Light Ratio %	Light Intrusion (into windows) E _{vertical} (lux)		Source Intensity I (cd)		Maximum Luminance L (cd/m ²)
		Pre- curfew	Post- curfew	Pre- curfew	Post- curfew	Pre-curfew
E1	0	2	0	2,500	0	0
Harbour Area	0	2	0	2,500	2,500	0
Illuminated advertising signs	0	0	0	100	0	50



Policy Statement Number 3

All new lighting within Sark Island Core Zone should be designed and installed to provide lower glare or intensity values than that recommended by the ILP for an E1 night time Environmental Zone.

No work is undertaken in the harbour after dark and the harbour cannot be seen from the village, however, lighting is left on all night in case of emergencies. Post-curfew restrictions for source intensity in the harbour area should therefore be relaxed on the grounds of health and safety.

In order to prevent low district brightness from adjacent island lighting creeping closer to the intrinsic darkness of the Island Core Zone, Table 2.1 and Section 2.5, later, contains recommendations to reduce the elevation angle of existing or proposed high wattage / high output luminaires in the External Zone. This requires discussions to encourage adjacent island owners or Environmental Committees to work towards adopting similar controls in their individual environmental policy plan. (Guernsey has an environmental policy plan)

Most domestic luminaires provide very little light control and very few are measured photometrically in the same manner as commercially available luminaires. Accurate intensity or illuminance values cannot therefore be predicted by computer calculations and a different method of calculation is required. Section 3.3 therefore contains a method recommended by the IDA which provides a guide to the number of lumens based on the footprint size of the property for all new domestic style lighting.

Care for the night time environmental control should be part of the process when selecting all new domestic equipment. Examples of domestic luminaires with good and poor light control can be found in table 3.6 and Appendix D.

Policy Statement Number 4

All design submissions for new lighting in the Island Core Zone should be encouraged to show evidence of compliance with the zero candela intensity at 90° and above and encourage domestic luminaires to be selected from units having some form of upward light control.



2.3 Island Buffer Zone

As indicated in Section 2.1 Sark is surrounded by an open sea area with very limited potential for being developed. The darkness of the sea is only broken by occasional flashing navigation channel markers and is therefore acting as a natural buffer round the Island Core Zone.

The only development likely to disturb this dark buffer will be the possibility of either an off-shore tidal power station or an oil platform. In the case of a new power station it should be an easy task to adopt the light restriction recommendations included in this report at the design stage and ensure that suitable light control fixtures are installed and only used when it is absolutely essential. Any externally visible lighting left running all night, as could be the case on an oil rig, will destroy the intrinsic darkness of the sea around Sark and the other Channel Islands.

Policy Statement Number 5

The Island Buffer Zone (the English Channel), with the exclusion of the inhabited islands, to be maintained as Environmental Zone E0 for a distance of 20 miles beyond the Island Core Zone boundary.

Since Sark's Chief Pleas has no jurisdiction in the area beyond their 40 miles of shoreline this section explains how planners and engineers need to work in partnership, both internally and externally, to help maintain or enhance the Dark Sky Island.

An abbreviated summary of the design methodology, suitable for adoption by Sark Chief Pleas, is shown in Table 2.3 below but reference to the full document will provide the reasoning behind a 20 bullet point checklist. This LMP should encourage Development Control Committees to insist on a thorough design process by the developer before submitting proposals.

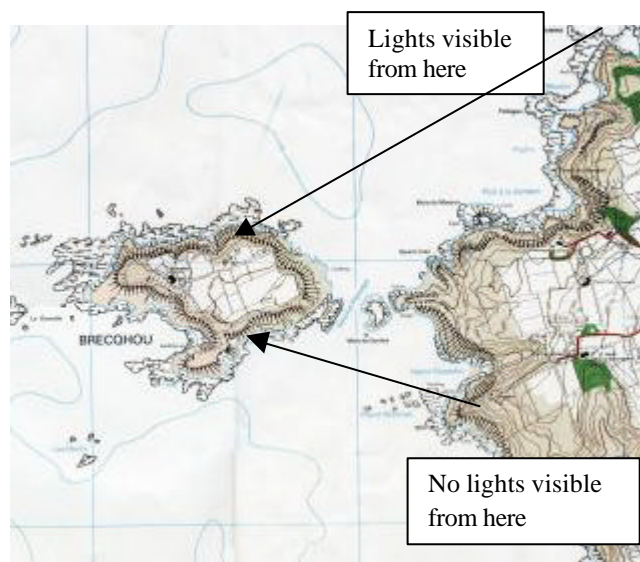
Good External Lighting Design Practice

- ?? Survey of surrounding area environment**
- ?? Identification of critical viewpoints or receptors**
- ?? Analysis of task lighting level recommendations and game level if sports lighting application**
- ?? Establish environmental light control limits**
- ?? New lighting design quality objectives**
- ?? Calculated measurement of Task working area(s)
Overspill area(s)**
- ?? Obtrusive light calculation of Property intrusion
Viewed source intensities
Direct upward light output ratios**
- ?? Compare design achievement with baseline values**
- ?? Schedule of luminaire types, mounting height and aiming angles**
- ?? Schedule of energy usage and lumens per square metre**
- ?? Schedule of luminaire profiles**
- ?? Layout plan with beam orientation indication and site relationship with surrounding residential and commercial properties**

2.5 External Zone – Immediate Surrounding Islands

No inventory was undertaken in the External Zone but a pictorial overview is included in the following sub sections for each adjacent island.

2.5.1 Brecqhou (1/2 Km distant from Sark)



In 1993 the island was sold to the Barclay brothers and visitation to the island is by invitation only.

There are several high pressure sodium security lights on the north coast slipway and lighting for a helicopter landing area. At certain times least 5 light sources can be seen from the north end of Sark but a 10.30pm light curfew is in place on the island.

Since the lighting on this island is used for security reasons it is just as important to have the lighting carefully controlled and limited to where it is needed, when it is needed and not providing over-lit

conditions.

Guidance Note: High pressure sodium lamps use control gear which may not be suitable for intermittent use as recommended above. By changing to a luminaire with a metal halide lamp with electronic control gear providing instant start and hot re-strike facilities may assist in reducing the time the security lights need to be on.

Brecqhou Island ownership to be encouraged to adopt “fully shielded” luminaires. Additionally the floodlights should only to be used when the slipway is in use with Infra Red light sources used as “Dusk to Dawn” security alerts.

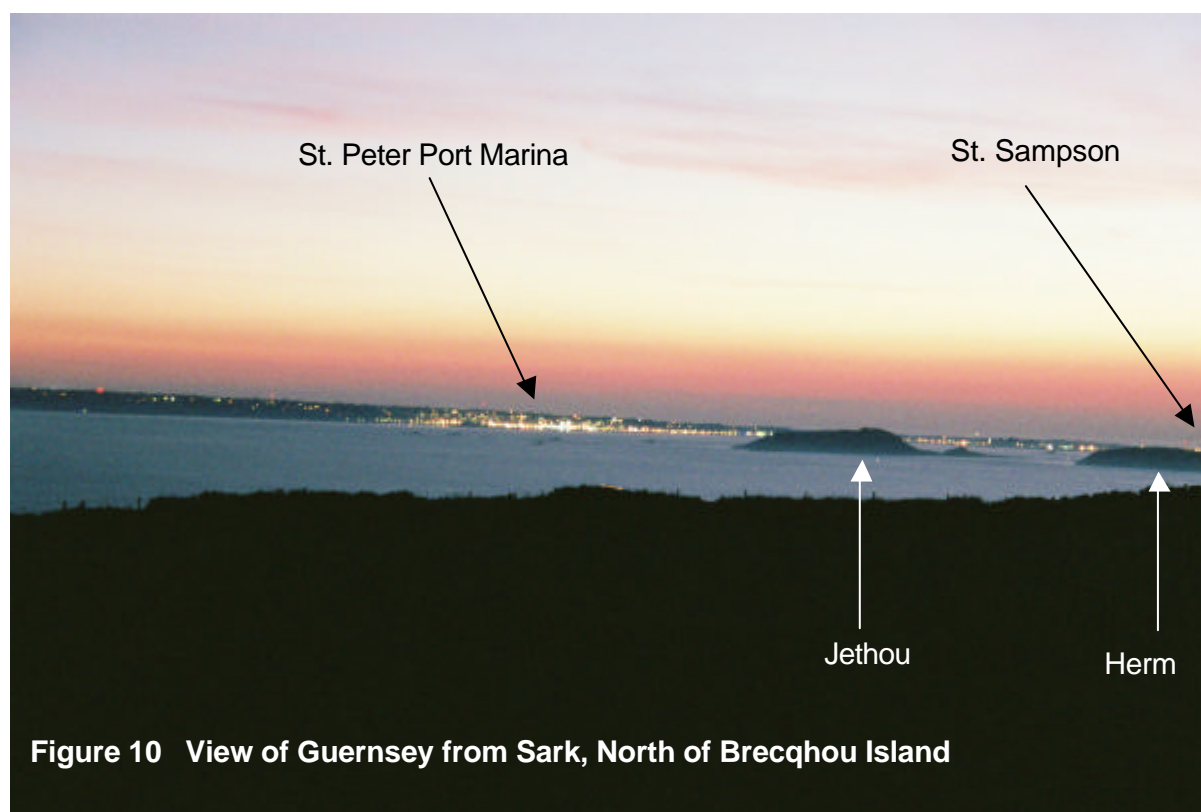
2.5.2 Herm and Jethou (6 miles from Sark)

Like Sark the island of Herm has a ban on cars and there is no street lighting system. However, heritage style luminaires can be found on some houses, hotels and shops but there is no inhabited area lighting visible from Sark since most of it is on the West side of the island (facing Guernsey).

Jethou is also a private island with one house on the North shore and again the limited development cannot be seen from Sark.

As can be seen in Figure 10 (following), the cliff faces of both these islands act as a natural visual barrier screening the view of some street lighting in St Peter Port and St Sampson on the island of Guernsey beyond.

2.5.3 Guernsey (8 miles from Sark to East coast)



2.5.4 Jersey (16 miles from Sark to north west coast)

Photo from Sark to follow

2.5.5 Alderney (24 miles from Sark to south coast)

This island is too distant to photograph at night and the only light source visible is from the lighthouse.

2.5.6 French Coastline

Photo of Power Station at Flamanville to follow

Advisory light limitation tables (Table 2.5 and 2.6) providing guidance for adjacent ownerships follow on the next page.



Table 2.5 - Intensity limitations in External Zone

Dark Sky Requirements	Glare Class	Maximum luminous intensity in cd/klm				Non technical description of luminaire light control in installed location
		at 70° az	at 80° az	at 90° az	above 95° az	
External from Sark Core to 5 miles beyond	G6	350	100	0	0	Fully cut-off installation
External from 5 miles to 10 miles beyond Buffer Zone	G5	350	100	10	0	Cut-off installation
External for 20 miles, all luminaires with lamps greater than 20,000 lm	G6	350	100	0	0	Fully cut-off installation

The mileage limits shown in Table 2.5 assume that no other, more restrictive intensity limitation, external policy is in place.

As in section 2.3 the following table should be used in tandem with table 2.5 to mitigate any obtrusive elements in the lighting design of new installations.

Table 2.6 - Obtrusive Light Maker Points for External Environmental Zone

ILE and CIE Obtrusive Light Limitations for Exterior Lighting Installations						
Environmental Zone	Sky Glow Upward Light Ratio %	Light Intrusion (into windows) E _{vertical} (lux)		Source Intensity I (cd)		Building Luminance L (cd/m ²)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Pre-curfew
E1 External from Sark Core to 5 miles beyond	0	2	0	2,500	0	0
E2 For 10 miles beyond E1 limit	2.5**	5	1	7,500	500	5
						400 for E2 illuminated sign

** Upward Light Ratio for luminaires in External Zone using lamps less than 20,000 lumens otherwise 0% for lamps greater, up to a distance of 20 miles beyond Sark Core Zone.

Policy Statement Number 6

Through this LMP it will be possible for the Chief Pleas to provide a basis for discussion with its neighbours on various options to help reduce upward light transmission.



3 Performance Requirements - General

Luminaires are designed to have light distributions which are appropriate for specific applications. Even though a luminaire has a Dark Sky Fixture Award it can produce sky glow, light intrusion or glare if it is installed improperly. By following the recommendations relating to viewed intensity and vertical illuminance limits at lighting design stage this should mitigate the obtrusive nature of stray light.

Industry standard software, complete with obtrusive light evaluation criteria, eg Philips Calculux, is available as a free download from their web site. Some luminaire manufacturers also provide a design service but this may be limited in application and may not include obtrusive light analysis.

Although described in the External Zone section, all planning applications involving external lighting should be encouraged to follow the 12 point plan outlined in Section 2.4 whether it is in the Island Core Zone or in the External Zone to ensure that viewed intensity and obtrusion are mitigated accordingly.

Over-lighting an area is just as obtrusive and wasteful as pushing light into the night sky. Designing for, and providing, the correct task illuminance on the ground is just as important as controlling stray light.

The next sections look at task illuminance to suit the holistic need of Sark's environmental night ambience.

Switching Regime

Many commercial premises have labels attached to light switches to say "switch off lights when room is not in use" and some buildings have energy management systems which automatically detect occupation and adjust accordingly. External lighting should be similarly treated, not only to limit energy usage but also to reduce the impact on the night sky. Section 2.2 introduced the concept of a night curfew time after which exterior lighting should be switched off or reduced in number.

Many domestic exterior luminaires can be purchased with a combined passive infra-red (PIR) presence detector and photoelectric switch unit (PECU) to do the same work as the commercial building management system. A time delay switch is just as good and it has the added advantage over PIR detection in that the luminaires will not be turned on by cats, dogs or other wildlife movement.

All residences in the Island Core Zone should be encouraged to adopt some form of light reduction after the 'curfew' time. Even if the luminaire is not fitted with presence or darkness detection some DIY stores supply programmable light switches which are designed to replace existing internal manually operated switches.

Policy Statement Number 7

All residential and business occupiers in the Island Core Zone should be encouraged to switch off or reduce their exterior lighting quantity at 22.00 hours (except when the commercial licence allows an opening time of 23.00 hours).

3.1 Non-photometric method for domestic exterior lighting

Some luminaire manufacturers / suppliers, especially in their budget range of DIY lighting, cannot provide photometric intensity tables. This precludes the use of computer algorithms to check either the essential information about fundamental illuminance values or check for obtrusive light situations.

At design and planning application stages for commercial development the answer is simple. Do not propose the use of such equipment. At installation stage do not substitute a non-photometrically measured equivalent look-a-like.

Domestic residential exterior lighting does, however, require a method better than a global 1000 lumen limit as indicated in earlier sections.

Budget range DIY equipment usually takes the form of a simple area floodlight with a high wattage tungsten halogen lamp. They are popular because they are cheap, easy to install, and are often combined with photo-electric (PECU) switches to prevent daytime operation and with passive infra red (PIR) detectors to switch on and off automatically on presence detection.

In the majority of cases these fittings, or luminaires, are installed typically on garage or porch fascias at about 2-3 metres above ground level, and arranged to direct their main beams towards the property boundary operating on the approach of vehicles or people. This high beam arrangement can result in glare and light intrusion into adjacent properties.



This type of installation is not in keeping with the light control required in a rural setting and **as from the effective date of implementation of this LMP no new floodlights of this type will meet the IDA Dark Sky requirements. If more examples like this are installed the island may lose its status.**

Appendix D and Table 3.6 contains examples of exterior lighting equipment which could be considered when purchasing new exterior lighting.

As described previously a lamp output limit of 1000 lumens in luminaires with poor light control is considered to be a generalised rule of thumb marker. However Table 3.1 provides a more accurate lamp lumen limit per square metre of building(s) footprint on each residential plot of land. In Table 3.1 the words "site structure" means the total square metre measurement of house, garage, shed and out buildings and this should be the starting point of any non-photometered assessment.

Lamp lumens is a consistent value and although difficult to find on some packaging may in the future supersede the lamp wattage. Lamp watts can vary with the efficacy of the lamp. Table 3.1 (following) has therefore been constructed using the lamp lumens as the base from which to start. The tables which follow 3.1 namely Table 3.2 – Table 3.5 show the equivalent lamp wattages for different lamp types in luminaires with a differing quality of light control.



Table 3.1 - Total Lumen Limit for each residence

	Environmental Zone				
	Sea Buffer	E1 Island Core	E2***	E3***	E4***
Total Lumens for domestic Exterior Lighting	0	750 lm plus 4.5 lm / m ² of site structures*	2250 lm plus 4.5 lm / m ² of site structures*	4500 lm plus 4.5 lm / m ² of site structures*	6000 lm plus 4.5 lm / m ² of site structures*
Fully cut-off luminaires each lamp lumen maximum		1200 lm	1650 lm	2400 lm	3200 lm
Part cut off luminaires each lamp lumen maximum		750 lm	1200 lm	1650 lm	2400 lm
No light control luminaires each lamp lumen maximum		480 lm**	750 lm**	750 lm	750 lm

* Site structures is the sum of the land area of residential buildings, habitable structures, garages, recreational buildings and storage structures on each property plot.

** The maximum lumens (and watts on table 3.2 - 3.5 following) for each lamp in this section relates to replacing lamps in existing lighting units only. No new luminaires with no light control should be considered, especially in environmental zones E1 and E2.

*** Environmental zones E2, E3 and E4 do not relate to any conditions in Sark and should be excluded from any considerations for domestic lighting. They are shown here as an example for other islands to follow if appropriate to that island.

From table 3.1 a total site structure in the Island Core Zone (E1) with say 255 m² would provide for a total of 1,897 lumens which can be distributed as 1 or more luminaires up to the total allowance. (see Appendix E for list of domestic lamp wattage and lumen output)

Table 3.2 - Lamp watts for each luminaire with Compact Fluorescent


	Environmental Zone				
	Sea Buffer	E1 Island Core	E2***	E3***	E4***
Fully cut-off luminaires each lamp watts maximum	0	20 watts	24 watts	32 watts	42 watts
Part cut off luminaires each lamp watts maximum	0	11 watts	20 watts	24 watts	32 watts
No light control luminaires each lamp watts maximum	0	9 watts**	12 watts**	12 watts	12 watts

Table 3.3 - Lamp watts for each luminaire with Tungsten Halogen


	Environmental Zone				
	Sea Buffer	E1 Island Core	E2 ^{***}	E3 ^{***}	E4 ^{***}
Fully cut-off luminaires each lamp watts maximum		60 watts	100 watts	150 watts	200 watts
Part cut off luminaires each lamp watts maximum		N/A	60 watts	100 watts	150 watts
No light control luminaires each lamp watts maximum		N/A	N/A	N/A	N/A

Table 3.4 - Lamp watts for each luminaire with Incandescent / Candle / Capsule Lamp


	Environmental Zone				
	Sea Buffer	E1 Island Core	E2 ^{***}	E3 ^{***}	E4 ^{***}
Fully cut-off luminaires each lamp watts maximum		2x35 watt halostar	2x 60 watt Capsule	See 3.4	See 3.4
Part cut off luminaires each lamp watts maximum		60 watts	See 3.4	See 3.4	See 3.4
No light control luminaires each lamp watts maximum		40w candle	40w candle	40w candle	40w candle

Table 3.5 - Lumen and Watts exception for Ceramic / Metal Halide discharge lamps




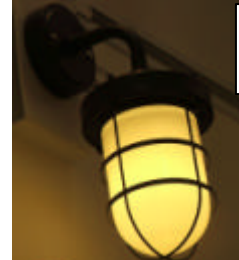



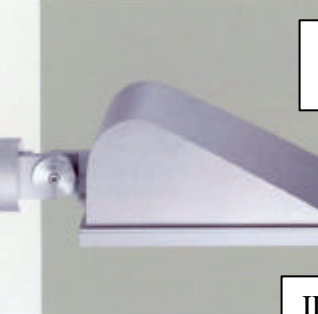




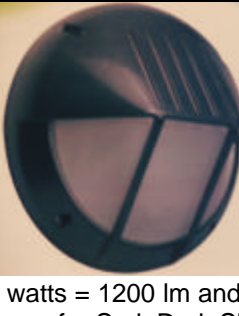
	Environmental Zone				
	Sea Buffer	E1 Island Core	E2	E3 ^{***}	E4 ^{***}
Fully cut-off luminaires each lamp lumen maximum		1500 lm	2400 lm	5500 lm	5500 lm
each lamp watts maximum		20w	35w	70w	70w
Part or No light control luminaires are not allowed with this light source					

Table 3.6 – Light Control Examples

Fully Cut-off Examples	Partly Cut-off Examples	No light Control Examples
 <p>IP 65</p> <p>SILL 420 Full range of compact fluorescent and low wattage metal halide</p>	 <p>IP 44</p> <p>100w halogen = 1650 lm</p>	 <p>X</p> <p>no new units of this type to be installed</p>
 <p>Mains LED 15 LEDs</p>	 <p>Solar power LED</p>	 <p>X</p> <p>no new units of this type to be installed</p>
 <p>IP 65</p> <p>ERCO Parscoop 42w fluorescent = 3200 lm 70w metal halide = 5000 lm Acceptable substitute for tungsten halogen replacement</p>	 <p>Available at Post Office Store Ensure lamp is no larger than 40 watt candle lamp or 8watt compact</p>	 <p>Ensure lamp is no larger than 40 watt candle lamp or 8watt compact</p>
 <p>?</p>	 <p>Lighting fixture</p>	 <p>18 watts = 1200 lm and too large for Sark Dark Sky Ensure lamp is no larger than 40 watt candle lamp or 8watt compact</p>



3.2 Requirements for non residential outdoor lighting

3.2.1 Work Task Lighting

The preferred method of designing lighting is by following the performance method of task illuminance selection process from either BS EN12464-2:2007 "Light and Lighting – Lighting of work places – Part 2 Outdoor work places", and a few examples have been extracted and shown in Table 3.1 for easy reference, or from BS EN 12193:2007 "Light and Lighting. Sports Lighting" (see also the CIBSE Sports Lighting Guide).

Table 3.7 – Illuminance for typical tasks in Sark

Ref No.	Type of area, task or activity	Eav lux	Uo	GR _L	R _a	Remarks
	Simple Summary for safety and security	Values during task operation time only In Sark - No task – No Light				
	Very low risk	5	0.25	55	20	
	Low Risk	10	0.40	50	20	
	Medium Risk	20	0.40	50	20	
	High Risk	50	0.4	45	20	
	Public (if required in future)					
	Walkways exclusively for pedestrians in Sark	1	0.25	50	60	
	Areas in Sark for slow moving vehicles eg. bicycles, and tractors	1	0.4	50	60	
	Farms					
5.5.1	Farm Yard	20	0.10	55	20	
5.5.1	Equipment Shed (Open)	50	0.20	55	20	
5.5.3	Animals sorting pen	50	0.20	50	40	
	Harbours					
5.4.1	Waiting quays at canals and locks	10	0.25	50	20	
5.4.2	Gangways and passages exclusively for pedestrians	10	0.25	50	20	
5.4.6	Coupling of hoses, pipes and ropes	50	0.40	50	20	
	Power, electricity, gas and heat plants					
5.11.1	Pedestrian movement within electrically safe area	5	0.25	50	20	
5.11.3	Overall inspection	50	0.40	50	20	
5.11.6	Repair of electric devices	200	0.50	45	60	
		Use local close up lighting				

Key to table abbreviations

Eav = Maintained average illuminance

Uo = Overall uniformity

GR_L = Glare Rating limit (for internal work visibility benefit and not a visibility measure from outside the site)

R_a = minimum colour rendering index

Most of the recommended values shown in Table 3.7 have been based on the premise that a lamp with a low colour rendering index will be used as shown in the column headed 'R_a'.



The colour rendering index of a standard high pressure sodium lamp (SON) (yellow coloured light) is about 20 but the colour rendering index of ceramic metal discharge lamp (CMD) (true white light) is in the order of 65.

Various research projects, carried out over several years, have proved that human vision works better with high order colour rendering and in some tasks the illuminance value can be reduced if 'white' light is used instead of 'yellow' light.

Although monochromatic low pressure sodium light is simple to filter out of astronomical observations a well controlled, zero upward light, white light source should be a more acceptable compromise with some energy saving advantages. Filtering out certain wavelengths of artificial light, however, has the effect of reducing the visibility of low magnitude stars by a factor of at least 4 (equivalent to 2 F-stops in a camera aperture).

Illuminance recommendations are based on a numeric system to replicate visually perceptible increasing steps as shown in Table 3.8. This table also shows the illuminance step difference between low colour rendering lamps and high colour rendering lamps.

Table 3.8 – Illuminance comparisons based on colour rendering index (R_a)

Colour Rendering Index	Task Maintained Average Illuminance Steps (lux)												
$R_a < 60$	2	3	5	7.5	10	15	20	30	50	75	100	200	300
$R_a > 60$	1	2	3	5	7.5	10	15	20	30	50	75	100	200

BS 13201 recommends that the lowest value of 2 lux for a street lighting system should not be reduced to the anticipated value of 1 lux when using "white light".

Residents of Sark are used to the intrinsic darkness on the island and as already noted in Section 1.2 there is no need for a street lighting system at this point in time.

If public lighting is considered necessary through general wide agreement there are no visual perception reasons why 1 lux needs to be exceeded on paths within Sark Island Core Zone where appropriate, assuming a "white" (colour rendering index greater than 60) light source is installed.



4 Excluded Lighting Applications and Special Permit Exemptions

The following applications will be prohibited from any part of the Island Core Zone, Island Buffer Zone or External Zone falling between the boundary of the Island Core Zone and 8 miles beyond. Special Use Permits will not be issued for:

- ?? Aerial Laser Shows
- ?? Sky Tracking Searchlights
- ?? High intensity light sources greater than 200,000 lumens
- ?? Sports complexes requiring an average playing surface greater than 75 lux.

Typical lighting applications requiring Short Time Usage Special Permit - but not limited to the following applications:

- ?? Sports facilities with column mounted luminaires.
- ?? Construction site lighting.
- ?? Churches, public monuments or buildings.
- ?? Theme and amusement parks.

The **Special Permit Zone** will be deemed to include the Dark Sky Island Core Zone only. To obtain a lighting permit, applicants shall demonstrate that the proposed lighting installation application:

- ?? (a) Contains an analysis of at least 12 essentials in the 20 point Good Design Practice Checklist produced by the Scottish Executive (see also Section 2.4)
- ?? (b) A statement that shows every reasonable effort to mitigate Sky Glow and Light Intrusion has been addressed and accompanied by a computer calculation indicating average task illuminance, uniformity, horizontal values of overspill beyond the property line and vertical illuminance values of light intrusion on adjacent properties.
- ?? (c) Employs lighting controls to reduce the quantity of lighting at the project specific 'Curfew' time which has been established in the Special Permit.
- ?? (d) Complies with all light limitation factors outlined in this LMP.



5 Existing Lighting

5.1 General

All existing lighting units within the Island Core Zone, which utilise lamps greater than 1000 lumens, should be brought into line with the light limitation recommendations in this LMP within the timescale indicated in Appendix D.

All existing street lighting in the External Zone shall remain as installed until the luminaires require to be replaced. As land owner improvement budgets permit, each area should be encouraged to re-equipped with new luminaires, where necessary, to meet the light intensity limitation at 90° and above as recommended in this LMP.

Change of property size

If a major addition occurs on a property, or street, lighting for the entire property, or street, shall comply with the recommendations in this LMP. The following are considered major additions:

- ?? An addition of 50% or more in terms of residential houses, gross floor area, or seating capacity.
- ?? Single or cumulative additions, modifications or replacement of 50% or more of installed exterior lighting luminaires.

Change of Property Ownership

If a property, with non-conforming lighting, changes ownership or usage a new external lighting application should be considered. The application should include a complete lighting inventory and site plan detailing all existing and proposed new exterior lighting. If the existing exterior lighting is no longer required it should be disconnected and removed.

5.2 Existing Lighting – Island Core Zone

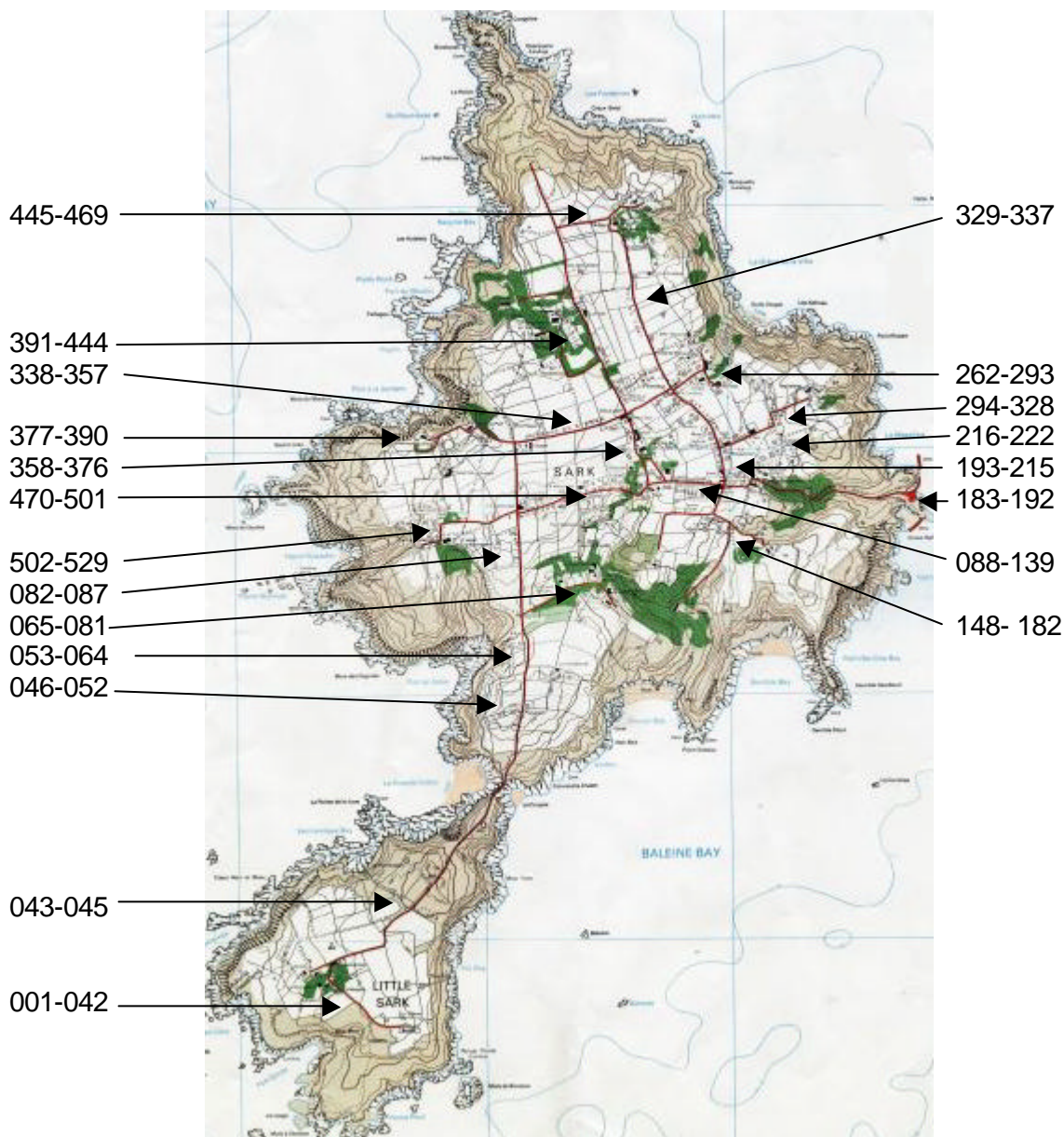


Figure 14 Guide to general location of Property ID shown in Table 5.1 (following)

Guide to Table 5.1 “Compliant” column

In Table 5.1 the last column contains 2 grades of non-compliant luminaires namely:-

- (1) those with lamps less than 1000 lumens (shown as 0 in clear cells) equating to just less than 1% of the total inventory but are not causing concern and
- (2) those with lamps greater than 1000 lumens (shown as 0 in red cells) in the table.

As previously indicated priority should be given to modifying the over 1000 lumen units, in the red cells, since they equate to just over 24% of the total inventory.

Cells with 1 or greater mean that these luminaires are fully compliant and are not at issue.



Table 5.1 Internal Audit carried out – April / May 2010

Total number of luminaires: 582

Total number compliant: 436

Percentage compliant: 75%

ID	Building		District	ID	Luminaire		Adjustable	Lamp		Purpose	Fully Shielded	Quantity	Compliant
	Name	Type			Type	Elevation		Wattage	Duty Cycle				
001	La Cloture	Residence	Little Sark	001	Bulkhead	90	n	40	switch	Residential	n	1	1
				002	Bulkhead	90	n	40	switch	Residential	n	1	1
002	La Cloture Barracks	Residence	Little Sark	003	Bulkhead	90	n	40	switch	Residential	n	1	1
				004	Heritage	90	n	40	switch	Residential	n	1	1
				005	Heritage	90	n	40	switch	Residential	n	1	1
		Shed			Bulkhead	90	n	60	switch	Residential	n	1	1
003	La Cloture Cottage	Residence	Little Sark		none								
004	Duvalerie	Cottage 1	Little Sark		none								
		Cottage 2			none								
005		Shed 1			none								
005		Shed 2			none								
006		Barn			none								
007	Far	Residence	Little Sark	006	Bulkhead	90	n	40	switch	Residential	n	1	1
008	La Moserie	Residence	Little Sark		none								
009	Sablonnerie	Residence	Little Sark		none								
010		Hire Cottage		007	Heritage	90	n	15	switch	Residential	n	1	1
011		Chalet 1			none								
012		Chalet 2			none								
013		Chalet 3			none								
014		Chalet 4			none								
015		Chalet 5			none								
016		Chalet 6			none								
017		Chalet 7			none								
018		Chalet 8			none								
019		Chalet 9			none								
020		Shed			none								
021		Barn			none								
022	Donnellerie	Farmhouse	Little Sark		none								
023		Cottage			none								
024		Residence		008	Lamp	90	n	20	switch	Residential	n	1	1
025		Shed			none								
026	Duval	Residence 1	Little Sark		none								
027		Residence 2			none								
028		Residence 3			none								
029		Residence 4			none								
030		Residence 5			none								
031		Residence 6			none								
032		Shed 1			none								



033		Shed 2		none									
034		Shed 3		none									
035		Barn 1		none									
036		Barn 2		none									
037		Barn 3		none									
038		Bike Shed		none									
039	Adonis	Residence	Little Sark	009	Heritage	90	n	40	switch	Residential	n	1	1
				010	Heritage	90	n	40	switch	Residential	n	1	1
040	? End of Duval Track	Residence 1	Little Sark	011	Bulkhead	90	n	40	switch	Residential	n	1	1
				012	Bulkhead	90	n	40	switch	Residential	n	1	1
041		Residence 2		013	Bulkhead	90	n	40	switch	Residential	n	1	1
042		Shed			none								
043	Cider press cottage	Residence	Little Sark		none								
044		Shed			none								
045	? House opposite La Vermandaye	Residence	Little Sark		none								
		Private - not surveyed and cant be seen from road											
046	Plaisance	Residence	S Big Sark		*** wires for future lighting								
047		Pool building		014	Security	45	y	200	switch	Recreational	n	0	0
		Pool and lights very rarely used		015	Security	45	y	200	switch	Recreational	n	0	0
				016	Bulkhead	90	n	60	switch	Recreational	n	0	0
				017	Bulkhead	0	n	60	switch	Recreational	y	0	0
048		Boat shed			none								
049		Shed			none								
050	Caragh's Chocolates	Chocolatiere	S Big Sark	018-	Heritage	90	n	60	switch	Commercial	n	4	4
				021									
				022	Bulkhead	90	n	40	switch	Commercial	n	1	1
051		Residence	S Big Sark	023	Heritage	90	n	40	switch	Residential	n	1	1
				024	Heritage	90	n	40	switch	Residential	n	1	1
052	Maricel	Residence	S Big Sark	025	Bulkhead	90	n	60	sensor	Residential	n	1	1
				026	Bulkhead	90	n	60	sensor	Residential	n	1	1
				027	Security	45	y	500	sensor	Residential	n	1	0
053	Le Clos Bourel	Residence 1	S Big Sark	028	Bulkhead	90	n	60	switch	Residential	n	1	1
054		Residence 2		029	Bulkhead	90	n	60	switch	Residential	n	1	1
055		Residence 3		030	Bulkhead	90	n	60	sensor	Residential	n	1	1
056		Residence 4			none								
057		Residence 5			none								
058		Residence 6			none								
059	Le Dos d'Ane	Residence 1	S Big Sark	031	Bulkhead	90	n	40	switch	Residential	n	1	1
060		Residence 2		032	Bulkhead	90	n	40	switch	Residential	n	1	1
061		Residence 3		033	Bulkhead	90	n	40	switch	Residential	n	1	1
062		Residence 4			none								
063		Residence 5			none								
064	Espace Gallery	Residence	S Big Sark	034	Bulkhead	90	n	40	switch	Residential	n	1	1
065	Stocks	Hotel	Dixcart		Wall	0	n	2 x 35w	sensor	courtyard	y	14	14
					Downlighter								
066	(Under construction)	Dower House			Bulkhead	0	n	60	sensor	doorway	y	2	2



067	(no fittings in place)	Staff Block			none								
068	(provisional assessment)	Swimming Pool Sign light			Fibre Optic	90	n	70	10 pm off	pool attraction	n	1	0
069	?House Opposite	Residence	Dixcart		none								
070		Shed			none								
071		Barn			none								
072	Dixcart Hotel	Hotel	Dixcart	035	Bulkhead	90	n	60	switch	Commercial	n	1	1
				036	Bulkhead	90	n	40	switch	Commercial	n	1	1
				037	Security	45	y	100	sensor	Commercial	n	1	0
				038	Security	90	y	100	switch	Commercial	n	1	0
				039-045	Heritage	90	n	40	switch	Commercial	n	7	7
				046	Large Heritage	90	n	40	switch	Street Light	n	1	1
073	Dixcart Cottage	Residence		047	Heritage	90	n	40	switch	Residential	n	1	1
				048	Heritage	90	n	40	switch	Residential	n	1	1
074		Shed		049	Bulkhead	90	n	40	switch	Residential	n	1	1
075		Barn		050	Bulkhead	90	n	11	switch	Residential	n	1	1
				051	Bulkhead	90	n	11	switch	Residential	n	1	1
076	Home Farm	Residence	Dixcart	052	Lamp	90	n	100	switch	Residential	n	1	0
				053	Lamp	90	n	100	switch	Residential	n	1	0
077		Residence			none								
078		Shed 1			none								
079		Shed 2			none								
080		Shed 3			none								
081	Le Grand Dixcart		Dixcart		Private and dog warning								
082	Sue's Tea Garden	Residence	W Sark		none								
083	La Joie	Residence	W Sark	054	Bulkhead	90	n	40	switch	Residential	n	1	1
084	La Rocquettes	Residence	W Sark		none								
085	La Pav	Residence	W Sark		none								
086	Pret du Bois	Residence	W Sark	055	Heritage	0	n	11	switch	Residential	y	1	1
				056	Heritage	0	n	11	switch	Residential	y	1	1
				057	Heritage	0	n	11	sw itch	Residential	y	1	1
				058	Heritage	0	n	11	switch	Residential	y	1	1
				059	Heritage	0	n	20	sensor	Residential	y	1	1
087	Vue du Sud	Residence	W Sark	060	Heritage	90	n	40	switch	Residential	n	1	1
				061	Heritage	90	n	40	switch	Residential	n	1	1
088	Le Vert	Residence	Avenue	062	Bulkhead	90	n	40	switch	Residential	n	1	1
				063	Bulkhead	90	n	40	switch	Residential	n	1	1
089	Espedare	Residence	Avenue		none								
090	Mon Desir	Residence	Avenue		none								
091		Shed			none								
092	Gallery Stores	Commercial	Avenue		none								
093	Victoria Cottage	Residence	Avenue		none								
094		Shed	Avenue		none								
095	La Courtillets	Hut 1	Avenue	064	Heritage	60	n	40	switch	Residential	n	1	1
				065	Heritage	60	n	40	switch	Residential	n	1	1
		Hut 2	Avenue	066	Heritage	60	n	40	switch	Residential	n	1	1



				067	Heritage	60	n	40	switch	Residential	n	1	1
	Hut 3		Avenue	068	Heritage	60	n	40	switch	Residential	n	1	1
				069	Heritage	60	n	40	switch	Residential	n	1	1
096	Sark Souvenirs	Commercial	Avenue		none								
097	Vanessa's Salon	Commercial	Avenue	070	Sign Lighting	0	y	11	switch	Commercial	y	1	1
						0	y	11	switch	Commercial	y	1	1
098	Rendezvous	Commercial	Avenue	071	Lamp	90	n	60	switch	Commercial	n	1	1
099	Bakery	Commercial	Avenue		none								
100		Garage	Avenue	072	Bulkhead	90	n	40	switch	Work	n	1	1
101	Lorraine's Pottery	Commercial	Avenue		none								
102	The Workshop	Garage	Avenue	073	Security	0	y	200	sensor	Work			
103	Anne Rive's Stables	Barn	Avenue		none								
104		Barn	Avenue		none								
105	Mon Reve	Commercial	Avenue	074	Bulkhead	90	n	60	switch	Commercial	n	1	1
				075	Bulkhead	90	n	60	switch	Commercial	n	1	1
106		Shed	Avenue		none								
107	Fishing Tackle	commercial	Avenue	076	Security	45	y	200	sensor	Commercial	n	1	0
				077	Security	45	y	200	sensor	Commercial	n	1	0
108		Shed 1			none								
109		Shed 2			none								
110		Shed 3			none								
110	Food Stop	Commercial	Avenue	078	Heritage	80	n	40	switch	Commercial	n	1	1
				079	Heritage	80	n	40	switch	Commercial	n	1	1
111	AJ's Café	Commercial	Avenue	080	Bulkhead	0	n	60	switch	Commercial	n	1	1
		Commercial	Avenue	081	Bulkhead	90	n	60	switch	Commercial	n	1	1
112	House behind café	Residence	Avenue	082	Bulkhead	80	n	40	switch	Residential	n	1	1
113		Greenhouse	Avenue		none								
114	Atlantis	Residence	Avenue	083	Bulkhead	90	n	40	switch	Residential	n	1	1
115	House L of Time and Tide	Residence	Avenue		none								
116	Time and Tide	Commercial	Avenue	084-087	Heritage	90	n	40	switch	Commercial	n	4	4
				088	Bulkhead	20	n	40	switch	Commercial	in porch	1	1
117	Toilets	Public	Avenue	089	Bulkhead	90	n	40	switch	Toilet	n	1	1
118	Shed	Shed	Avenue		none								
119	Mulberry Cottage	Residence 1	Avenue	090	Bulkhead	90	n	40	switch	Residential	n	1	1
120		Residence 2	Avenue	091	Bulkhead	90	n	40	switch	Residential	n	1	1
121		Residence 3	Avenue	092	Bulkhead	90	n	40	switch	Residential	n	1	1
122	Souvenir Shop	Commercial	Avenue		none								
123	Estate Agent	Commercial	Avenue		none								
124	Computer Shop	Commercial	Avenue		none								
125	Isabel's	Commercial	Avenue		none								
126	Sark Books	Commercial	Avenue		none								
127	Office	Office	Avenue	093	Heritage	90	n	60	switch	Office	n	1	1
128	Avenues	Commercial	Avenue	094	Heritage	90	n	60	switch	Commercial	n	1	1
129	Country Fare	Commercial	Avenue	095	Heritage	90	n	60	switch	Commercial	n	1	1
130	Avenue Cycles	Commercial	Avenue	096	Canopy Lights	0	n	60	switch	Commercial	y	4	4



Plus 120 Fairy Lights only used at Christmas													
131	Sark Estate Agents	Commercial	Avenue	097	Heritage	80	n	40	switch	Commercial	n	1	1
				098	Bulkhead	90	n	40	switch	Commercial	n	1	1
132	Sark Silver	Commercial	Avenue		none								
133	The Den	Residence	Avenue		none								
134	L'Etoile	Residence	Avenue		none								
135	Next house	Residence	Avenue		none								
136	Allport	Residence	Avenue	099	Heritage	90	n	60	switch	Residential	n	1	1
				100	Heritage	90	n	60	switch	Residential	n	1	1
137	Next House	Residence	Avenue	101	Heritage	90	n	60	switch	Residential	n	1	1
138	Le Petit Poule	Commercial	Avenue	102	LED Downlight	0	y	12	switch	Doorway	y	1	1
Plus 51 fairy lights for use at Christmas Only													
139	Natwest Bank	Commercial	Avenue		none								
140	Aurora	Residence	SE Sark		none								
141	La Collinette	Residence	SE Sark	103	Bulkhead	90	n	40	switch	Residential	n	1	1
142	Riding Stable	Stables	SE Sark		none								
143	Baleine Studio	Commercial	SE Sark		none								
144	D'Icart	Residence 1	SE Sark	104	Bulkhead	90	n	40	switch	Residential	n	1	1
145		Residence 2	SE Sark	105	Bulkhead	90	n	40	switch	Residential	n	1	1
146	Notre But	Residence	SE Sark	106	Bulkhead	80	n	40	switch	Residential	n	1	1
147	Tamarisk	Residence	SE Sark		none								
148	Le Petit Dixcart	Residence 1	SE Sark		none								
	Farm												
149		Residence 2		107	Bulkhead	90	n	40	switch	Residential	n	1	1
150		Barn 1			none								
160		Barn 2			none								
161	Petit Dixcart	Residence	SE Sark		none								
	Bungalow												
162	Le Petit Dixcart	Residence 1	SE Sark		none								
163		Residence 2			none								
164		Residence 3			none								
165	La Villon D'Or	Residence	SE Sark		none								
166	La Vieille Forge	Residence	SE Sark		none								
167	Whitechapel	Residence	SE Sark	108	Bulkhead	90	n	40	switch	Residential	n	1	1
				109	Heritage	90	n	40	switch	Residential	n	1	1
				110	Heritage	90	n	40	switch	Residential	n	1	1
168	Refurb house	Residence	SE Sark		none								
169	Next House	Residence	SE Sark		none								
170		Barn 1	SE Sark		none								
171		Barn 2	SE Sark		none								
172		Barn 3	SE Sark	111	Bulkhead	45	n	40	switch	Residential	partial	1	1
				112	Bulkhead	45	n	40	switch	Residential	partial	1	1
173	Les Laches	Residence 1	SE Sark		none								
174		Residence 2	SE Sark		none								
175		Residence 3	SE Sark		none								
176	House S of Harbour	Residence	SE Sark		none								
177		Barn 1			none								
178		Barn 2			none								



179		Barn 3		none									
180		Greenhouse		none									
		1											
181		Greenhouse		none									
		2											
182		Greenhouse		none									
		3											
183	Maseline Harbour (North Harbour)	Tunnel Light	Harbour	113	Bulkhead	90	n	70	Dusk/Dawn	Commercial	n	1	0
		Dock Area	Harbour		Street Light	10	n	55	Dusk/Dawn	Commercial	n	1	0
		Dock Area	Harbour		Wellglass	90	n	50	Dusk/Dawn	Commercial	n	1	0
	Creux Harbour (South Harbour)	Dock Area	Harbour	114	Street Light	15	n	100	Dusk/Dawn	Commercial	n	1	0
		Pier	Harbour		Bulkhead	90	n	70	Dusk/Dawn	Commercial	n	1	0
		Pier End	Harbour		Bulkhead	90	n	70	Dusk/Dawn	Commercial	n	1	0
	Ticket Office	Commercial	Harbour		none								
184	Harbour Café	Commercial	Harbour		none								
185	Toilets	Public	Harbour		none								
186	Barn	Barn	Harbour		none								
187	Black House on Harbour Hill	Residence	Harbour Hill	115	Lamp	70	n	60	switch	Residential	n	1	1
188	Boat Bar	Commercial	Harbour Hill	116	Bulkhead	90	n	40	switch	Commercial	n	1	1
				117	Heritage	90	n	18	switch	Commercial	n	1	0
				118	Heritage	90	n	18	switch	Commercial	n	1	0
				119	Fluorescent	90	n	11	switch	Commercial	n	1	1
189	Bel Air Inn	Commercial	Harbour Hill	120	Large Heritage	90	n	70wSON	switch	Street Light	n	1	0
70w yellow High pressure Sodium produces 8 lux on courtyard table tops and a maximum of 12 lux on courtyard floor Also produces 6 lux vertical into opposite building windows. 35watts CDM white light would be much more appropriate.													
122-129 due to be replaced un-known replacement type				121	Large Heritage	90	n	70w SON	switch	Street Light	n	1	0
				122	Heritage	90	n	60	switch	Balcony Light	n	1	1
				123	Heritage	90	n	60	switch	Balcony Light	n	1	1
				124	Heritage	90	n	60	switch	Balcony Light	n	1	1
				125	Heritage	90	n	60	switch	Balcony Light	n	1	1
				126	Heritage	90	n	60	switch	Balcony Light	n	1	1
				127	Heritage	90	n	60	switch	Balcony Light	n	1	1
				128	Heritage	90	n	60	switch	Balcony Light	n	1	1
				129	Heritage	90	n	60	switch	Balcony Light	n	1	1
				130	Spot PAR 38	135	n	150	switch	Sign Light	n	1	0
				131	Spot PAR 38	135	n	150	switch	Sign Light	n	1	0
190	Welcome Hut	Commercial	Harbour Hill	132	Lamp	90	n	60	switch	Commercial	n	1	1
191	Power Station	Commercial	Harbour Hill	133	Bulkhead	90	n	100	PIR	Commercial	n	1	0
				134	Security	45	n	200	Switch	Maintenance	n	1	0
192	Hotel Aval du Creux	Commercial	Harbour Hill	135-159	Eyelid	90	n	18	Dusk / Dawn	Commercial	n	25	0
					Bulkhead								
Illuminates surrounding trees													
				160	Bulkhead	90	n	6	Dusk / Dawn	Commercial	n	1	1
				161	Bulkhead	90	n	6	Dusk / Dawn	Commercial	n	1	1
				162	Bulkhead	90	n	6	Dusk / Dawn	Commercial	n	1	1



				163-168	Capped Bollard	90	n	16	Dawn Dusk / Dawn	Commercial	n	6	0
				169-191	Louvered Bollard	90	n	25	Dusk / Dawn	Patio Access	partial	23	23
					PAR 38 Spot	45	y	150	Dusk / Dawn	Side Access	n	1	0
					Under Water	90	n	60	Dusk / Dawn	Swimming Pool	n	1	0
193	HSBC Bank	Commercial	Rue Lucas		none								
194	House behind estate agents	Residence	Rue Lucas	192	Bulkhead	90	n	60	switch	Residential	n	1	1
				193	Bulkhead	60	n	60	switch	Residential	partial	1	1
195	Stumbles	Commercial	Rue Lucas	194	Security	0	n	18	switch	Commercial	under awning	1	1
				195	Security	0	n	18	switch	Commercial	under awning	1	1
				196	Security	0	n	18	switch	Commercial	under awning	1	1
				197	Security	0	n	18	switch	Commercial	under awning	1	1
				198	Bulkhead	90	n	60	switch	Commercial	n	1	0
196	Wisteria Cottage	Residence	Rue Lucas	199	Bulkhead	90	n	40	switch	Residential	n	1	1
				200	Bulkhead	90	n	40	switch	Residential	n	1	1
197	Clos de Vault de Creux	Residence	Rue Lucas	201	Spot	90	y	14	switch	Residential	n	1	0
				202	Spot	90	y	14	sensor	Residential	n	1	0
				203	Bulkhead	90	n	40	switch	Residential	n	1	1
				204	Bulkhead	90	n	60	switch	Residential	n	1	1
				205	Heritage	90	n	40	switch	Residential	n	1	1
198	House behind bank	Residence	Aval	206	Heritage	90	n	60	switch	Residential	n	1	1
199		Chalet 1	Aval		none								
200		Chalet 2	Aval		none								
201		Chalet 3	Aval		none								
202		Chalet 4	Aval		none								
203		Barn	Aval		none								
204		Barn	Aval	207	Bulkhead	80	n	40	switch		n	1	1
205	Aval de Creux	Residence	Aval	208	Heritage	90	n	40	switch	Residential	n	1	1
206	Myrtle Cottage	Residence	Aval	209	Bulkhead	60	n	60	switch	Residential	n	1	1
207		Barn	Aval		none								
208	Beau Rivage	Residence	Aval	210	Bulkhead	60	n	60	switch	Residential	partial	1	1
209		Shed		211	Bulkhead	90	n	40	sensor	Residential	n	1	1
				212	Bulkhead	90	n	40	sensor	Residential	n	1	1
210	La Breque	Residence	Aval		none								
211		Barn	Aval	213	Security	0	n	200	sensor	Work	in porch	1	1
				214	Bulkhead	90	n	18	switch	Work	n	1	0
212	La Deroute	Residence	Aval	215	Heritage	80	n	60	switch	Residential	n	1	1
213	Blanchard House	Residence	Aval	216	Heritage	80	n	60	switch	Residential	n	1	1



				217	Heritage	80	n	60	switch	Residential	n	1	1
				218	Heritage	80	n	60	switch	Residential	n	1	1
214	N'Jalonjalo	Residence	Aval	219	Heritage	80	n	11	switch	Residential	n	1	1
				220	Heritage	80	n	11	switch	Residential	n	1	1
				221	Heritage	80	n	11	switch	Residential	n	1	1
				222	Heritage	80	n	11	switch	Residential	n	1	1
215	New Build	Residence	Aval		none								
216	Petit Moie	Residence	La Vallete de	223	Bulkhead	80	n	11	switch	Residential	n	1	1
			Bas										
217	Le Breque	Residence	La Vallete de	224	Bulkhead	90	n	40	switch	Residential	n	1	1
			Bas										
218	Next House	Residence	La Vallete de	225	Bulkhead	90	n	40	switch	Residential	n	1	1
			Bas										
				226	Bulkhead	90	n	40	switch	Residential	n	1	1
219	Next House	Residence	La Vallete de	227	Bulkhead	20	n	40	switch	Residential	partial by porch	1	1
			Bas										
220	House down lane	Residence	La Vallete de	228	Bulkhead	90	n	40	switch	Residential	n	1	1
			Bas										
221	House down lane	Residence	La Vallete de	229	Bulkhead	90	n	40	switch	Residential	n	1	1
			Bas										
222	House down lane	Residence	La Vallete de	230	Security	45	n	200	sensor	Residential	n	1	0
			Bas										
223	Villa Messervy	Residence	Rue Lucas	231	Bulkhead	90	n	40	switch	Residential	n	1	1
				232	Bulkhead	90	n	40	switch	Residential	n	1	1
224	Pankina	Residence	Rue Lucas	233	Heritage	70	n	20	switch	Residential	n	1	1
225	Clos de Chantarelle	Residence	Rue Lucas	234	Bulkhead	90	n	40	switch	Residential	n	1	1
226	M. Cottage	Residence	Rue Lucas	235	Bulkhead	90	n	40	switch	Residential	n	1	1
227	Rosemary Cottage	Residence	Rue Lucas	236	Bulkhead	90	n	40	switch	Residential	n	1	1
228	Tanquerelles	Residence	Rue Lucas		none								
229	New House	Residence	Rue Lucas	237	Heritage	90	n	60	PIR	Residential	n	1	1
				238	Heritage	90	n	60	PIR	Residential	n	1	1
230	La Porte au Normande	Residence	Rue Lucas		none								
231	Next House	Residence	Rue Lucas	239	Heritage	90	n	40	switch	Residential	n	1	1
232	House Opposite	Residence	Rue Lucas	240	Lamp	90	n	60	switch	Residential	n	1	1
233	Pink House 1	Residence	Rue Lucas	241	Bulkhead	90	n	40	switch	Residential	n	1	1
234	Pink House 2	Residence	Rue Lucas	242	Bulkhead	90	n	40	switch	Residential	n	1	1
235	Heritage Museum	Comercial	Rue Lucas		none								
236	Petit Piton	Residence	Rue Lucas	243	Heritage	70	n	40	switch	Residential	n	1	1
237	La Maisonette	Residence	Rue Lucas	244	Heritage	90	n	60	switch	Residential	n	1	1
238		Shed 1			none								
239		Shed 2			none								
240		Shed 3			none								
241		Barn			none								
242		New Build			none								
243	Mast Hut	Telecommun	Rue Lucas	245	Security	30	y	4x18	sensor	Work	n	1	0
		ications		246	Security	30	y	4x18	sensor	Work	n	1	0



				247	Security	30	y	4x18	sensor	Work	n	1	0
				248	Security	30	y	4x18	sensor	Work	n	1	0
				249	Security	30	y	4x18	sensor	Work	n	1	0
				251	Wellglass	90	n	60	switch	Work	n	1	0
				252	Wellglass	90	n	60	switch	Work	n	1	0
244	Elysium	Residence	Rue Lucas	253	Security	70	y	200	PIR	Residential	n	1	0
245	Petit Clos du Cerf	Residence 1	Rue Lucas	254	Lamp	90	n	11	switch	Residential	n	1	1
				255	Lamp	90	n	11	switch	Residential	n	1	1
				256	Bulkhead	90	n	40	switch	Residential	n	1	1
246		Residence 2		257-	Bulkhead	90	n	40	switch	Residential	n	4	4
				260									
247	St Magloire	Residence	Rue Lucas	261	Lamppost	90	n	60	switch	Residential	n	1	1
				262	Heritage	90	n	60	switch	Residential	n	1	1
				263	Heritage	90	n	60	switch	Residential	n	1	1
				264	Heritage	90	n	60	switch	Residential	n	1	1
		Outhouse			none								
248	Grove Place	Residence	Rue Lucas		none								
249	Donmar	Residence	Rue Lucas	265	Wellglass	90	n	40	switch	Residential	n	1	1
250	Next House	Residence	Rue Lucas	266	Bulkhead	90	n	40	sensor	Residential	n	1	1
251	New House	Residence	Rue Lucas	267	Heritage	90	n	40	switch	Residential	n	1	1
				268	Heritage	90	n	40	switch	Residential	n	1	1
252	End House	Residence	Rue Lucas		none								
253		Shed			none								
254	La Coudril	Residence	Rue Lucas		none								
255	L'Enclos	Residence	Rue Lucas		none								
256		Shed		269	Bulkhead	90	n	40	switch	Residential	n	1	1
257	La Corderie	red	Rue Lucas		none								
258	Le Carrefour	Residence 1	Rue Lucas		none								
259		Residence 2			none								
260		Residence 3			none								
261		Shed			none								
262	Next House Left	Residence	La Ville Roussel		none								
263		Barn			none								
264	Next House Right	Residence	La Ville Roussel	270	Bulkhead	90	n	40	switch	Residential	n	1	1
				271	Bulkhead	90	n	40	switch	Residential	n	1	1
265		Shed			none								
266	Next House Left	Residence	La Ville Roussel		none								
267	Next House Right	Residence	La Ville Roussel	272	Bulkhead	45	n	60	switch	Residential	partially by porch	1	1
268		Shed			none								
269	Rosenheim	Residence	La Ville Roussel	273	Bulkhead	45	n	40	switch	Residential	partially by porch	1	1
				274	Bulkhead	45	n	60	switch	Residential	partially by porch	1	1
270	Rosedene	Residence	La Ville Roussel	275	Heritage	90	n	20	switch	Residential	n	1	1
271	Next House Left (dead end)	Residence	La Ville Roussel		none								
272	Le Hurel	Residence	La Ville Roussel		none								



273		Barn 1		none									
274		Barn 2		none									
275		Shed		none									
276	Houses at road end	Residence	La Ville Roussel	? - Private - survey not done									
277	Percy's Cottage	Residence	La Ville Roussel	none									
278	Stable Cottage	Residence	La Ville Roussel	none									
279	La Ville Roussel	Residence	La Ville Roussel	? - Private - survey not done									
280	Clos de la Ville	Residence	La Ville Roussel	276 Heritage	90	n	60	switch	Residential	n	1	1	
				277 Heritage	90	n	60	switch	Residential	n	1	1	
281	La Ville Farm Cottage	Residence	La Ville Roussel	none									
282	Next House Left	Residence	La Ville Roussel	278 Lamp	90	n	40	switch	Residential	n	1	1	
283		Shed 1		none									
284		Shed 2		none									
285	Next House Right	Residence	La Ville Roussel	279 Bulkhead	45	n	40	switch	Residential	partially by porch	1	1	
				280 Bulkhead	90	n	40	switch	Residential	n	1	1	
286	House at Bend	Residence	La Ville Roussel	281 Bulkhead	0	n	60	switch	Residential	y	1	1	
287	L'Horizon	Residence	La Ville Roussel	282 Bulkhead	30	n	40	switch	Residential	partially by porch	1	1	
288	Beau Vista	Residence	La Ville Roussel	none									
289	Next House Left	Residence	La Ville Roussel	none									
290	Le Pellon	Residence	La Ville Roussel	none									
291	House behind hedge	Residence	La Ville Roussel	none									
292	The Homestead	Residence	La Ville Roussel	none									
293	Caro Mio	Residence	La Ville Roussel	none									
294	Notre Desir	Residence	La Vallette	283 Lamp	90	n	60	switch	Residential	n	1	1	
				284 Lamp	90	n	60	switch	Residential	n	1	1	
295	La Vallette	Residence	La Vallette	none									
296	Campsite	Shower Block	La Vallette	none									
297		Shed	La Vallette	none									
298	New house	Residence	La Vallette	none									
299		Shed 1		none									
300		Shed 2		none									
301		Shed 3		none									
302		Shed 4		none									
303	Les Sapins	Residence	La Vallette	285 Lamp	90	n	60	switch	Residential	n	1	1	
				286 Lamp	90	n	60	switch	Residential	n	1	1	
				287 Bulkhead	90	n	40	switch	Residential	n	1	1	
304	Lighthouse	Residence	La Vallette	??? - survey not done									
305	Corner House	Residence	La Vallette	288 Bulkhead	0	n	8	switch	Residential	by porch	1	1	
306	La Malouine	Residence	La Vallette	none									
307	La Loge	Residence	La Vallette	289 Heritage	90	n	20	switch	Residential	n	1	1	
308		Cottage	La Vallette	none									
309		Outbuildings	La Vallette	none									
310	Swyr-y-Mor	Residence	La Vallette	290 Bulkhead	90	n	11	switch	Residential	n	1	1	



311	Next House	Residence	La Vallette	291	Lamp	90	n	8	switch	Residential	n	1	1
312	Next House	Residence	La Vallette		none								
313	Le Vallon	Residence	La Vallette	292	Bulkhead	90	n	40	switch	Residential	n	1	1
				293	Bulkhead	90	n	40	switch	Residential	n	1	1
				294	Heritage	90	n	40	switch	Residential	n	1	1
314	Zyloan	Residence	La Vallette	295	Bulkhead	90	n	60	switch	Residential	n	1	1
315	South View	Residence	La Vallette		none								
316	Maison La Fayette	Residence	La Vallette		none								
317	AB Cycles	Commercial	La Vallette		none								
318	Ty Newydd	Residence	La Vallette	296	Heritage	90	n	60	switch	Residential	n	1	1
319	Mermaid Tavern	Barr	La Vallette	297	Bulkhead	90	n	40	11pm off	Commercial	n	1	1
				298	Opal Sphere	90	n	40	11pm off	Sign Light	n	1	0
				299	Pea Light Lenses	90	n	265	11pm off	Outside tables	n	46	0
Advice given to re-mount 60 lights on the inner fascia board to give fully shielded condition												60	60
Note - each 2.5 watt pea light is less than 1000 lumens but collectively does not fit into dark sky approach but thick hedge acts as part screened 30m x 9m footprint and still on at midnight (disco night)													
320		Toilet Block			Bulkhead	90	n	8	11pm off	Ladies/Gents	n	2	2
321	Studio House	Residence	La Vallette		none								
322	New House	Residence	La Vallette		none								
323	Mayfield	Residence	La Vallette		none								
324	Homelea	Residence	La Vallette		none								
325		Shed	La Vallette		none								
326	La Petit Marguerite	Residence	La Vallette		none								
327	Aladin's Cave	Residence	La Vallette		none								
328	La Marguerite	Residence	La Vallette		none								
329	Clos de Menage	Residence	Rue Du Fort		none								
330		Greenhouse	Rue Du Fort		none								
331	Mon Demeure	Residence	Rue Du Fort		none								
332	House Opposite	Residence	Rue Du Fort	300	Heritage	90	n	40	switch	Residential	n	1	1
333	Next House Right	Residence	Rue Du Fort	301	Heritage	90	n	60	switch	Residential	n	1	1
334	Next House Left	Residence	Rue Du Fort		none								
335	Next House Right	Residence	Rue Du Fort		none								
336	Next House	Residence	Rue Du Fort		none								
337	Next House	Residence	Rue Du Fort		none								
338	Sark Estate Manager	Work	Rue du Sermon	302	Bulkhead	90	n	40	switch	Residential	n	1	1
339	House Next Door	Residence	Rue du Sermon		none								
340	The Willows	Residence	Rue du Sermon	303	Bulkhead	90	n	40	switch	Residential	n	1	1
			Rue du Sermon	304	Lamp	90	n	40	switch	Residential	n	1	1
341	Logis du Pre	Residence	Rue du Sermon	305	Bulkhead	90	n	40	switch	Residential	n	1	1
342	Les Palmieres	Residence	Rue du Sermon		none								
343	Les Trop Heureux	Residence	Rue du Sermon		none								
344	House N of Vaurocque	Residence	W Sark		none								
345		Shed			none								
346	Methodist Church	Church	Rue du Sermon		none								
347	Chapel Hall	Residence	Rue du Sermon	306	Security	60	y	200	sensor	Residential	n	1	0



348	The Manse	Residence	Rue du Sermon	307	Bulkhead	90	n	40	switch	Residential	n	1	1
349	Soleil d'Or	Residence	Rue du Sermon	308	Security	80	y	200	sensor	Residential	n	1	0
				309	Bulkhead	90	n	40	switch	Residential	n	1	1
350		Shed			none								
351	Westward Ho!	Residence	Rue du Sermon		none								
352	Mon Plaisir Bungalow	Residence	Rue du Sermon	310	Bulkhead	90	n	40	switch	Residential	n	1	1
353	Mon Plaisir	Commercial	Rue du Sermon	311	Security	80	y	200	sensor	Residential	n	1	0
354	Bonne Chance	Residence	Rue du Sermon	312	Bulkhead	90	n	40	switch	Residential	n	1	1
				313	Bulkhead	90	n	40	switch	Residential	n	1	1
355	Mon Plaisir House	Residence	Rue du Sermon	314	Bulkhead	90	n	40	switch	Residential	n	1	1
356	New Island Hall	School/Hall	Rue du Sermon	315-	Eyelid	45	n	18	switch	School	n	8	0
				322	Bulkhead								
				323	Bulkhead	90	n	8	switch	School	n	1	1
				324-	Recessed Wall	90	n	Blue	Dusk/Dawn	Gate Post	n	2	2
				325	Light			10x2wLED					
				326	Security	45	y	200	sensor	School	n	1	0
357	Doctors Surgery	Doctors	N Sark	327	Heritage	90	n	60	switch	Doctor	n	1	1
				328	Heritage	90	n	60	switch	Doctor	n	1	1
				329	Heritage	90	n	60	switch	Doctor	n	1	1
358	House on Corner	Residence	Central Sark	330	Heritage	90	n	100	switch	Residential	n	1	0
359	Old School Hall	Hall	Central Sark	331	Security	45	n	200	switch		n	1	0
				332	Bulkhead	90	n	40	switch		n	1	1
				333	Bulkhead	90	n	40	switch		n	1	1
				334	Bulkhead	90	n	40	switch		n	1	1
360	Clos a Jaon	Residence	Central Sark	335	Heritage	70	n	60	switch	Residential	n	1	1
361	Clos a Jaon 2	Residence	Central Sark	336	Heritage	70	n	60	switch	Residential	n	1	1
362	Chief Pleas	Office	Central Sark		none								
363	Fire and Ambulance	Office	Central Sark	337	Bulkhead	90	n	60	switch	Office	n	1	1
				338	Bulkhead	90	n	60	switch	Office	n	1	1
				339	Bulkhead	90	n	60	switch	Office	n	1	1
				340	Bulkhead	90	n	60	switch	Office	n	1	1
				341	Security	45	n	200	sensor	Office	n	1	0
364		Electricity Hut		342	Bulkhead	45	n	18	sensor	Office	n	1	0
365	Old Hall	Hall	Central Sark	343	Bulkhead	90	n	60	switch	Office	n	1	1
366	House Opposite	Residence	Central Sark		none								
367	La Friquet	Residence	Central Sark	344	Bulkhead	45	n	60	switch	Residential	n	1	1
368	St Peter's Church			345	Bulkhead	90	n	60	switch	Church	n	1	1
				346	Bulkhead	90	n	60	switch	Church	n	1	1
369	Clos de la Tour	Residence	Central Sark		???								
370	The Vicarage	Residence	Central Sark	347	Bulkhead	90	n	40	switch	Residential	n	1	1
				348	Bulkhead	90	n	40	switch	Residential	n	1	1
371	La Petit Seigneurie	Residence	Central Sark	349	Bulkhead	90	n	60	switch	Residential	n	1	1
				350	Bulkhead	90	n	60	switch	Residential	n	1	1
372	Le Petit Quart	Residence	Central Sark		none								
373	Pres de la Cloch	Residence	Central Sark	351	Bulkhead	90	n	60	switch	Residential	n	1	1



374	Renevie	Residence	Central Sark	352	Heritage	90	n	60	switch	Residential	n	1	1
375	Kibo	Residence	Central Sark		none								
376	Ivy Cottage	Residence	Central Sark		none								
377	Le Port a la Jument	Residence	W Sark		none								
378		Shed			none								
379		Outhouse			none								
380	Le Vieux Port	Residence	W Sark	353	Lamp	90	n	60	switch	Residential	n	1	1
381		Outhouse 1			none								
382		Outhouse 2			none								
383		Outhouse 3			none								
384	Tintageu	Residence	W Sark	354	Heritage	90	n	40	switch	Residential	n	1	1
385	Hotel Petit Champ	Commercial	W Sark	355	Bulkhead	0	n	40	switch	Commercial	y	1	1
				356	Bulkhead	0	n	40	switch	Commercial	y	1	1
				357	Bulkhead	90	n	40	switch	Commercial	n	1	1
				358	Bulkhead	90	n	40	switch	Commercial	n	1	1
				359	Bulkhead	90	n	40	switch	Commercial	n	1	1
				360	Heritage	90	n	60	dead supply		n	0	0
386		Shed 1			none								
387		Shed 2			none								
388		Shed 3			none								
389		Shed 4			none								
390	Le Petit Piece	Residence	W Sark	361	Security	60	n	500	sensor	Residential	n	1	0
				362	Security	60	n	500	sensor	Residential	n	1	0
				363	Security	60	n	500	sensor	Residential	n	1	0
391	Clos de la Princess	Residence 1	N Sark		none								
392	Que Sera	Residence	N Sark	364	Heritage	90	n	60	switch	Residential	n	1	1
393		Shed			none								
394	Clos de la Princess	Residence 3	N Sark	365	Heritage	90	n	60	switch	Residential	n	1	1
				366	Heritage	90	n	60	switch	Residential	n	1	1
395	Clos de la Princess	Residence 4	N Sark		none								
396	Clos de la Princess	Residence 5	N Sark		none								
397	Road Opposite School Hall	Residence 1	N Sark		none								
398		Residence 2			none								
399		Residence 3		367	Heritage	90	n	40	switch	Residential	n	1	1
400		Residence 4			none								
401		Residence 5			none								
402		Shed			none								
403	Clos de Laupin	Residence	N Sark	368	Bulkhead	90	n	60	switch	Residential	n	1	1
404	Beauvoir	Residence	N Sark	369	Bulkhead	90	n	60	switch	Residential	n	1	1
				370	Bulkhead	90	n	60	switch	Residential	n	1	1
405	Beau Sejour	Residence	N Sark		none								
406	La Rue	Residence	N Sark	371	Lamp	70	n	11	switch	Residential	n	1	1
407	Petite Rondollerie	Residence	N Sark	372	Bulkhead	90	n	40	switch	Residential	n	1	1
				373	Bulkhead	90	n	40	switch	Residential	n	1	1
408	Big Orange House before Moirerie	Residence	N Sark		none								
409	Small Orange	Residence	N Sark	374	Heritage	80	n	60	switch	Residential	n	1	1



	House												
410	La Moinerie Bar	Commercial	N Sark	375	Heritage	80	n	60	switch	Residential	n	1	1
411	La Moinerie Restaurant			376	Heritage	90	n	60	switch	Residential	n	1	1
				377	Heritage	90	n	60	switch	Residential	n	1	1
412	La Moinerie New Build				none								
413	Rondellerie	Residence 1	N Sark		none								
414		Residence 2			none								
415		Residence 3			none								
416	La Seigneurie Hathaways	Commercial	N Sark	378	Heritage	80	n	100	switch	Courtyard	n	1	0
				379	Heritage	80	n	100	switch	Courtyard	n	1	0
				380	Bulkhead	90	n	40	switch	Commercial	n	1	1
417		Barn 1		381	Bulkhead	90	n	40	switch	Work	n	1	1
418		Barn 2			none								
419		Barn 3			none								
420		Toilets			none								
421		Shed			none								
422		Greenhouse 1			none								
423		Greenhouse 2			none								
424		Residence 1		382	Bulkhead	90	n	40	switch	Residential	n	1	1
425		Residence 2			none								
426		Residence 3			none								
427		Dovecote			none								
428	La Seigneurie	Seigneurie			??? - survey not done								
429	L'Ecluse	Residence 1	N Sark	383	Bulkhead	90	n	40	switch	Residential	n	1	1
430		Residence 2		384	Bulkhead	90	n	40	switch	Residential	n	1	1
431		Residence 3		385	Bulkhead	90	n	40	switch	Residential	n	1	1
432		Residence 4		386	Bulkhead	90	n	40	switch	Residential	n	1	1
				387	Bulkhead	90	n	40	switch	Residential	n	1	1
433		Shed 1			none								
434		Shed 2			none								
435	Clos de l'Ecluse	Residence	N Sark	388	Bulkhead	90	n	40	switch	Residential	n	1	1
436		Shed			none								
437	Maison Rouge	Residence	N Sark		none								
438	Hakuna Matata	Residence	N Sark	389	Heritage	90	n	60	switch	Residential	n	1	1
439	New Wooden House	Residence	N Sark		none								
440	Next House	Residence	N Sark	390	Bulkhead	90	n	60	switch	Residential	n	1	1
441		Barn			none								
442	La Rade	Residence	N Sark	391	Heritage	90	n	18	switch	Residential	n	1	0
				392	Heritage	90	n	18	switch	Residential	n	1	0
				393	Heritage	90	n	18	switch	Residential	n	1	0
				394	Heritage	90	n	18	switch	Residential	n	1	0
				395	Security	45	y	200	sensor	Residential	n	1	0



443	La Rade Cottage	Residence	N Sark	396	Heritage	90	n	18	switch	Residential	n	1	0
				397	Heritage	90	n	18	switch	Residential	n	1	0
444	Clos des Camps	Residence	N Sark	398	Security	30	y	LED	sensor	Residential	n	1	
		Shed	N Sark		none								
445	L'etoile du Norde	Residence	Le Fort		none								
446	Next House Right	Residence	Le Fort		none								
447	Next House Right	Residence	Le Fort		none								
	New build												
448	Le Fort Cottages	Residence	Le Fort		none								
449	Next right	Residence	Le Fort		none								
450		Barn 1	Le Fort	399	Bulkhead	45	n	12	switch	work	partially by porch	1	1
451		Barn 2	Le Fort		none								
452	Next Left	Residence	Le Fort		none								
453	Last on Left	Residence	Le Fort		none								
454	End House	Residence	Le Fort	400	Bulkhead	30	n	40	switch	Residential	partially by porch	1	1
455	La Tour	Residence 1	Le Fort		none								
456		Residence 2	Le Fort	401	Bulkhead	90	n	40	switch	Residential	n	1	1
457		Shed	Le Fort		none								
458	Maison Pommier	Residence	Le Fort		none								
459	La Genetiere	Residence	Le Fort	402	Heritage	70	n	40	switch	Residential	n	1	1
460	Greenacres	Residence	Le Fort	403	Heritage	80	n	60	switch	Residential	n	1	1
				404	Heritage	80	n	60	switch	Residential	n	1	1
461	Hawthorn Cottage	Residence	Le Fort	405	Heritage	80	n	60	switch	Residential	n	1	1
				406	Bulkhead	90	n	40	switch	Residential	n	1	1
462	Ruined House	Derelict	Le Fort		none								
463	The Barn	Residence	Le Fort	407	Bulkhead	90	n	60	switch	Residential	n	1	1
464	Beaupre	Residence	Le Fort	408	PAR 38 Spot	45	n	150	PIR	Residential	n	1	0
				409	PAR 38 Spot	45	n	150	PIR	Residential	n	1	0
465	La Fougeraie	Residence	Le Fort		none								
466	La Connellerie	Residence		410	Heritage	80	n	60	switch	Residential	n	1	1
				411	Bulkhead	90	n	60	switch	Residential	n	1	1
467	Next left	Residence			none								
468	Next Left	Residence		412	Heritage	90	n	60	switch	Residential	n	1	1
469		Barn			none								
470	Vaurocque	Residence 1	Mill Hill	413	Lamp	90	n	40	switch	Residential	n	1	1
				414	Bulkhead	80	n	40	switch	Residential	n	1	1
				415	Bulkhead	80	n	40	switch	Residential	n	1	1
471		Residence 2		416	Bulkhead	10	n	40	switch	Residential	n	1	1
472		Residence 3			none								
473		Residence 4			none								
474		Residence 5			none								
475		Shed 1			none								
476		Shed 2			none								
477	Mill Cottage	Residence	Mill Hill	417	Bulkhead	90	n	40	switch	Residential	n	1	1
478		Mill			none								
479		Shed			none								



480	Vue du Moulin	Residence	Mill Hill	418	Lamp	90	n	40	switch	Residential	n	1	1
481		Boathouse			none								
482	Le Vieux Clos	Residence	Mill Hill	419-430	Spot	70	y	10	switch	Residential	inside conservatory - partially shielded	12	12
483	Beaulieu	Residence	Mill Hill		none								
484	Le Pre du Moulin	Residence	Mill Hill		none								
485	Rue du Moulin	Residence	Mill Hill		none								
	Gallery House												
486	L'Asile	Residence		431	Bulkhead	90	n	60	switch	Residential	partially by porch	1	1
				432	Bulkhead	20	n	60	switch	Residential	partially by porch	1	1
487	Le Pre de L'Eglise	Residence	Mill Hill	433	Bulkhead	45	n	40	switch	Residential	partially by porch	1	1
488	Next House Left	Residence	Mill Hill		none								
489	Cottages Left of Rose Cottage	Residence 1	Mill Hill		none								
490		Residence 2	Mill Hill		none								
491	Rose Cottage	Residence	Mill Hill		none								
492	Le Manoir	Residence	Mill Hill		none								
493		Outbuilding	Mill Hill		none								
494	Laundry Cottage	Shed	Mill Hill		none								
495	Surprise Cottage	Residence	Mill Hill		none								
496		Shed 1	Mill Hill		none								
497		Shed 2	Mill Hill		none								
498	Vistor Centre	Island	Central Sark		none								
		Property											
499		Outbuilding	Central Sark		none								
500	The Arsenal	Residence	Central Sark		none								
501	Opposite Corner	Residence	Central Sark		none								
502	Le Jardin de Bas	Residence	W Sark	434	Lamppost	90	n	11	switch	Residential	n	1	1
		Christmas use only		435	Fairy Lights	90	n	40	dead supply	Residential	n	0	0
				436	Bulkhead	0	n	20	switch	Residential	in porch	1	1
				437	Bulkhead	0	n	20	switch	Residential	in porch	1	1
503		Shed			none								
504	White Bungalow	Residence	W Sark		none								
505		Shed			none								
506	Shed in Field	Shed	W Sark	438	Bulkhead	90	n	40	switch	Work	n	1	1
507	Flagpole Cottage	Residence	W Sark	439	Bulkhead	90	n	40	switch	Residential	n	1	1
				440	Bulkhead	90	n	40	switch	Residential	n	1	1
				441	Bulkhead	45	n	40	switch	Residential	partially by porch	1	1
				442	Bulkhead	0	n	40	switch	Residential	in porch	1	1
				443	Bulkhead	0	n	40	switch	Residential	in porch	1	1








508	Le Fregondee Refurb	Residence	W Sark	none									
509	House above Hunter's Lodge	Residence	W Sark	444	Security	80	y	200	sensor	Residential	n	1	0
510	Hunter's Lodge	Residence	W Sark	445	Bulkhead	45	n	40	switch	Residential	Cant find n	1	1
511	House at Road End	Residence	W Sark		none								
512		Shed			none								
513	Hivernage	Residence 1	W Sark	446	Bulkhead	90	n	40	switch	Residential	n	1	1
514		Residence 2		447	Security	80	y	200	sensor	Residential	Disconne cted		
515		Residence 3		448	Security	80	y	200	sensor	Residential	Disconne cted		
516		Shed			none								
517	Beauchamp	Residence	W Sark		none								
518		Farm			none								
519		Barn 1			none								
520		Barn 2			none								
521		Barn 3			none								
522		Barn 4			none								
523		Shed 1		449	Bulkhead	90	n	40	switch	Residential	n	1	1
524		Shed 2			none								
525	Petit Beauregard	Residence	W Sark	450	Bulkhead	90	n	40	switch	Residential	n	1	1
				451	Bulkhead	90	n	40	switch	Residential	n	1	1
526	Le Vivier	Residence	W Sark	452	Bulkhead	90	n	20	switch	Residential	n	1	1
				453	Bulkhead	90	n	20	switch	Residential	n	1	1
				454	Bulkhead	90	n	20	switch	Residential	n	1	1
527	Ferronerie	Residence	W Sark	455	Bulkhead	90	n	40	switch	Residential	n	1	1
				456	Bulkhead	90	n	40	switch	Residential	n	1	1
				457	Lamp	90	n	40	switch	Residential	n	1	1
528	Clos du Vivier	Residence	W Sark	458	none								
529		Shed		459	Bulkhead	90	n	40	switch	Residential	n	1	1

5.3 Island Core Zone typical non-compliant Profiles

Luminaire Profile

Examples of poor intensity distribution of light emerging near the horizontal axis

	Typical 35/55w SOX In Harbour area	luminaire elevated 5° <table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95</td><td>30</td></tr><tr><td>Above 90</td><td>70</td></tr><tr><td>90°</td><td>70</td></tr><tr><td>80°</td><td>294</td></tr><tr><td>70°</td><td>304</td></tr></table>	I max	Cd/klm	Above 95	30	Above 90	70	90°	70	80°	294	70°	304
I max	Cd/klm													
Above 95	30													
Above 90	70													
90°	70													
80°	294													
70°	304													
	Typical 70w SON In Harbour area Looks like Thorn - Piazza or Aurora - Bulkhead	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95</td><td>87</td></tr><tr><td>Above 90</td><td>137</td></tr><tr><td>90°</td><td>137</td></tr><tr><td>80°</td><td>282</td></tr><tr><td>70°</td><td>361</td></tr></table>	I max	Cd/klm	Above 95	87	Above 90	137	90°	137	80°	282	70°	361
I max	Cd/klm													
Above 95	87													
Above 90	137													
90°	137													
80°	282													
70°	361													
	Typical 70w SON Large Heritage High beam refractor	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95</td><td>114</td></tr><tr><td>Above 90</td><td>146</td></tr><tr><td>90°</td><td>146</td></tr><tr><td>80°</td><td>193</td></tr><tr><td>70°</td><td>251</td></tr></table>	I max	Cd/klm	Above 95	114	Above 90	146	90°	146	80°	193	70°	251
I max	Cd/klm													
Above 95	114													
Above 90	146													
90°	146													
80°	193													
70°	251													
	Typical Eyelid Bulkhead Noral - Malaga 18 watt fluorescent	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95</td><td>48</td></tr><tr><td>Above 90</td><td>50</td></tr><tr><td>90°</td><td>50</td></tr><tr><td>80°</td><td>51</td></tr><tr><td>70°</td><td>50</td></tr></table>	I max	Cd/klm	Above 95	48	Above 90	50	90°	50	80°	51	70°	50
I max	Cd/klm													
Above 95	48													
Above 90	50													
90°	50													
80°	51													
70°	50													
	Other luminaires can be found but they do not have photometric data to compare.	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95</td><td>?</td></tr><tr><td>Above 90</td><td>?</td></tr><tr><td>90°</td><td>?</td></tr><tr><td>80°</td><td>?</td></tr><tr><td>70°</td><td>?</td></tr></table>	I max	Cd/klm	Above 95	?	Above 90	?	90°	?	80°	?	70°	?
I max	Cd/klm													
Above 95	?													
Above 90	?													
90°	?													
80°	?													
70°	?													

None of the luminaires shown above are IDA compliant. As shown in the last luminaire, and as many others, this unit only requires to be tilted down to the horizontal to become IDA compliant. The others should form part of ongoing improvement as funds become available.



6 Summary of Sark Dark Sky Island Policy Statements

Policy Statement Number 1

Luminaires using lamps greater than 1000 lumens should be installed as a “Fully Shielded” example. (see Section 2.2)

Policy Statement Number 2

Residents of Sark are to be encouraged to limit the overspill light at their property boundary to no more than 0.1 lux. (see Section 2.2)

Policy Statement Number 3

All new lighting within Sark Island Core Zone should be designed and installed to provide lower glare or intensity values than that recommended by the ILP for an E1 night time Environmental Zone. (see Section 2.2)

Policy Statement Number 4

All design submissions for new lighting in the Island Core Zone should be encouraged to show evidence of compliance with the zero candela intensity at 90° and above and encourage domestic luminaires to be selected from units having some form of upward light control. (see Section 2.2)

Policy Statement Number 5

The Island Buffer Zone (the English Channel), with the exclusion of the inhabited islands, to be maintained as Environmental Zone E0 for a distance of 20 miles beyond the Island Core Zone boundary. (see Section 2.3)

Policy Statement Number 6

Through this LMP it will be possible for the Chief Pleas to provide a basis for discussion with its neighbours on various options to help reduce upward light transmission. (see Section 2.5)

Policy Statement Number 7

All residential and business occupiers in the Island Core Zone should be encouraged to switch off or reduce their exterior lighting quantity at 22.00 hours (except when the commercial licence allows an opening time of 23.00 hours). (see Section 3)



Report prepared by :-
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On Behalf of :-
La Société Sercquaise
Isle of Sark, Channel Islands



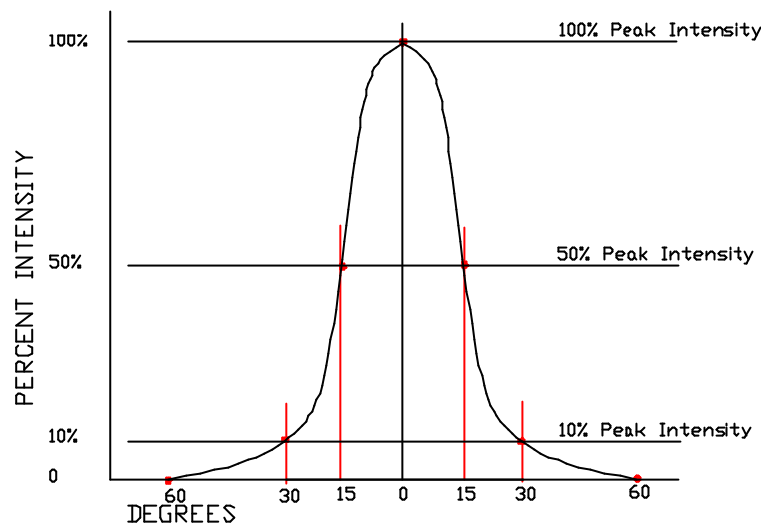
Appendix A – Definitions

Unit/Term

lumen	A unit of light (luminous flux) emitted from a point source of one candela intensity, sometimes expressed in kilolumens - (klm)
candela	A unit of luminous intensity
illuminance	The quantity of luminous flux incident upon a unit area, expressed as lumens per square metre or lux
luminance	<p>The luminous intensity (or brightness) of a surface or source expressed in terms of surface area i.e. candelas per square metre (cd/m²)</p> <p>To convert dark sky 'brightness' to luminance Use the formula: $[\text{value in cd/m}^2] = 10.8 \times 10^4 \times 10^{(-0.4 \times [\text{value in mag/arcsec}^2])}$ </p>
reflectance	The reflection factor (or index) of a surface or material
inter-reflection	The result of various reflections
efficacy	In lighting terms - the value of light obtained per unit of electrical energy input i.e. lumens per watt
wattage	The nominal load rating of a lamp (excludes any allowances for associated operating gear losses usually taken as averaging 10% of the nominal wattage value (lower for electronic control gear))
luminaire	The total package of lantern, lamp and all associated integral items of operating control and switch gear
projector	A special luminaire designed to provide a concentrated pattern of light
skylight	The variable brightness value of daytime sky caused by sunlight scattered by particles of dust and vapour in the earth's atmosphere (skylight can reach values in excess of 2,000 candelas per square metre)
moonlight	The luminous flux emitted by the moon received at the earth's surface at an average value of between 0.3 and 0.5 lux (a rural surface under moonlight conditions will have an average brightness of about 0.002 candelas per square metre i.e. 1/500 cd/m ²)
sky glow	The variable brightness value of night-time sky caused by upward components of light from direct and inter-reflected light off the earth's surface (the brightness of sky glow is dependent on the amount of upward light and the presence and density of atmospheric particles and their distance above ground level)

- aura** The hemisphere of light rising up from ground level encircling a light source or lighting array caused by low level mist and fog particles
- disability glare** This is glare from a lamp or luminaire which prevents a visual task from being carried out by obscuring ones vision. It is sometimes associated with visual pain.

Cartesian diagram



IES, TM14, & Elumdat

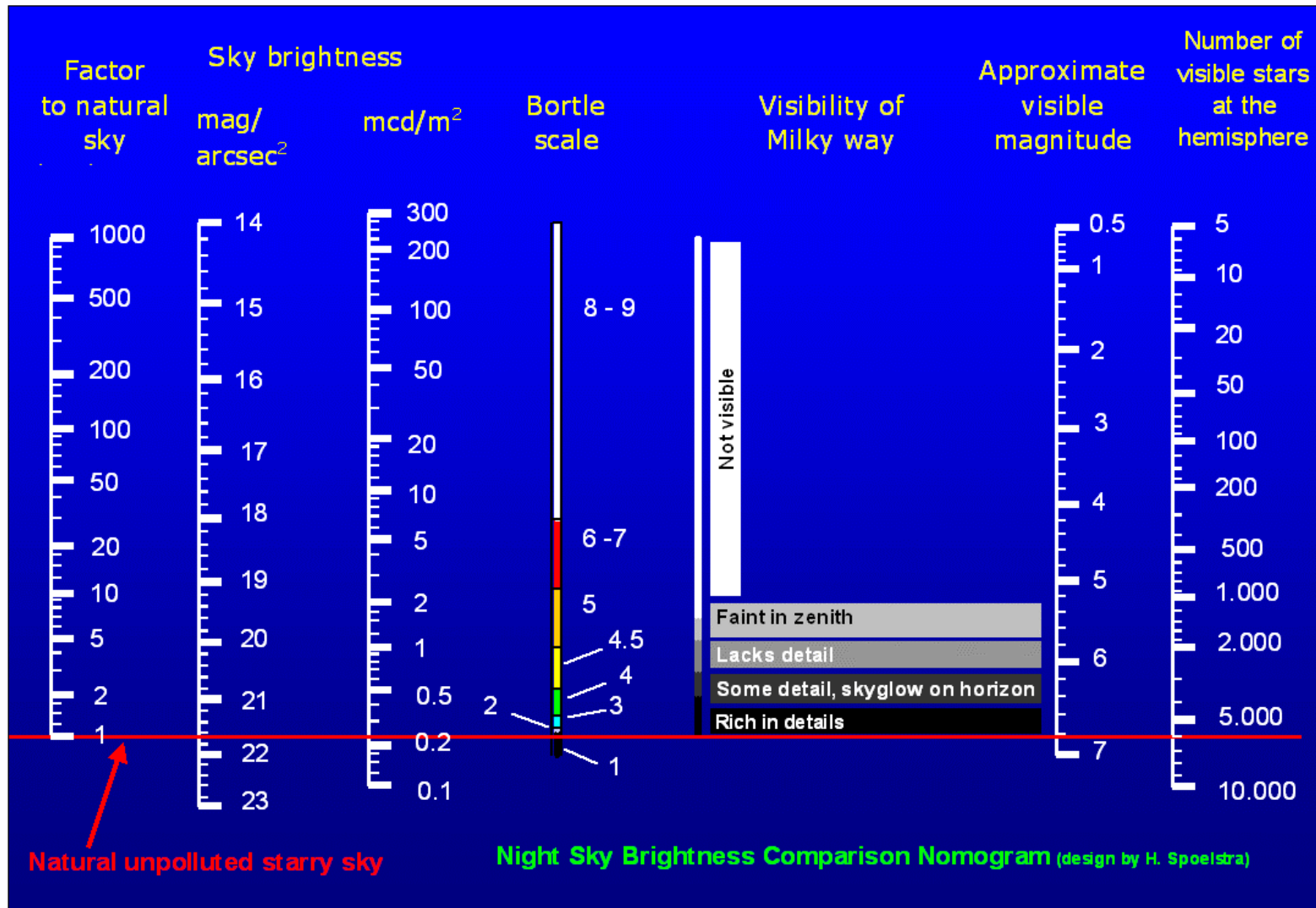
Are different electronic formats of luminaire intensity distribution. They are not a meaningful representation in hard copy printed format, like a Cartesian or polar diagram, however, as numeric data input for a computer algorithm they represent a 3-dimensional array. Some computer algorithms recognise all three different formats whilst other algorithms only recognise one format.

- Light intrusion** Is light entering or illuminating windows beyond the intended area requiring illumination. Sometimes referred to incorrectly as 'light trespass' since the word 'trespass' has different legal implications in the UK.

Average luminance Or average illuminance


Are all based on a maintained average which means the lowest average value to which the installation will fall before lamp replacing and luminaire cleaning takes place as part of a maintenance regime cycle.



Appendix B – Sky Brightness Nomogram (by kind permission of Heck Spoelstra)





APPENDIX C

Luminaire Profile Examples for Environmental Zone E1
with typical intensity distribution of light emerging near the horizontal axis

 post top (as illustration) is elevated 10° and unsuitable for E1 @ 90° and above	Light Emitting Diodes Flat Glass Philips - Mini Iridium 16 x LED's Warm White Narrow Beam Requires side entry bracket with horizontal spigot for 0° elevation	luminaire elevated 0° <table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>0</td></tr><tr><td>Above 90°</td><td>0</td></tr><tr><td>90°</td><td>0</td></tr><tr><td>80°</td><td>47</td></tr><tr><td>70°</td><td>1040</td></tr></table> ?	I max	Cd/klm	Above 95°	0	Above 90°	0	90°	0	80°	47	70°	1040												
I max	Cd/klm																									
Above 95°	0																									
Above 90°	0																									
90°	0																									
80°	47																									
70°	1040																									
 	Light Emitting Diodes Flat Glass Ruud / CU Phosco Ledway Road 30 x LED's @ 6000°K or 50 x LED's @ 6000°K	luminaire elevated 0° <table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>0</td></tr><tr><td>Above 90°</td><td>0</td></tr><tr><td>90°</td><td>0</td></tr><tr><td>80°</td><td>71</td></tr><tr><td>70°</td><td>287</td></tr></table> ?	I max	Cd/klm	Above 95°	0	Above 90°	0	90°	0	80°	71	70°	287												
I max	Cd/klm																									
Above 95°	0																									
Above 90°	0																									
90°	0																									
80°	71																									
70°	287																									
 	SILL Lighting 453 CityLiter 26w PII and 35w CDM	luminaire elevated 0° <table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>0</td></tr><tr><td>Above 90°</td><td>0</td></tr><tr><td>90°</td><td>0</td></tr><tr><td>80°</td><td>8</td></tr><tr><td>70°</td><td>84</td></tr></table> ?	I max	Cd/klm	Above 95°	0	Above 90°	0	90°	0	80°	8	70°	84												
I max	Cd/klm																									
Above 95°	0																									
Above 90°	0																									
90°	0																									
80°	8																									
70°	84																									
 	Sugg Lighting Probe Louvered Bollard 70w SON(E) (white paint on louvers reflects upward light) CU Phosco Lighting P436 Black Louvered Bollard 42w Compact Fluorescent	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>1</td></tr><tr><td>Above 90°</td><td>7</td></tr><tr><td>90°</td><td>7</td></tr><tr><td>80°</td><td>22</td></tr><tr><td>70°</td><td>35</td></tr></table> <table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>0</td></tr><tr><td>Above 90°</td><td>0</td></tr><tr><td>90°</td><td>0</td></tr><tr><td>80°</td><td>7</td></tr><tr><td>70°</td><td>20</td></tr></table> ?	I max	Cd/klm	Above 95°	1	Above 90°	7	90°	7	80°	22	70°	35	I max	Cd/klm	Above 95°	0	Above 90°	0	90°	0	80°	7	70°	20
I max	Cd/klm																									
Above 95°	1																									
Above 90°	7																									
90°	7																									
80°	22																									
70°	35																									
I max	Cd/klm																									
Above 95°	0																									
Above 90°	0																									
90°	0																									
80°	7																									
70°	20																									

	<p>Thorn Lighting</p> <p>Plazora Wall Light</p> <p>26w TC-D fluorescent</p>	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>0</td></tr><tr><td>Above 90°</td><td>0</td></tr><tr><td>90°</td><td>0</td></tr><tr><td>80°</td><td>8</td></tr><tr><td>70°</td><td>50</td></tr></table> <p>?</p>	I max	Cd/klm	Above 95°	0	Above 90°	0	90°	0	80°	8	70°	50
I max	Cd/klm													
Above 95°	0													
Above 90°	0													
90°	0													
80°	8													
70°	50													
	<p>Raytec – Raylux100-30</p> <p>Wall or pole mounting</p> <p>24 LEDs in white light or Infra Red light for CCTV security</p> <p>Multi head infra-red / white LED's available</p>	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>0.02</td></tr><tr><td>Above 90°</td><td>0.3</td></tr><tr><td>90°</td><td>0.3</td></tr><tr><td>80°</td><td>2.9</td></tr><tr><td>70°</td><td>10.8</td></tr></table> <p>?</p>	I max	Cd/klm	Above 95°	0.02	Above 90°	0.3	90°	0.3	80°	2.9	70°	10.8
I max	Cd/klm													
Above 95°	0.02													
Above 90°	0.3													
90°	0.3													
80°	2.9													
70°	10.8													

The following examples do not fully comply with zero intensity at and above the horizontal but have been selected from many others as being the closest to “Fully Shielded” conditions and need to be located near other natural shields like buildings or trees.

	<p>Sugg Lighting Large Grosvenor</p> <p>50w SON/T</p> <p>Optic and lamp located in lantern top section to act as “fully shielded” but as in all heritage equipment the glass refracts some light upwards</p>	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>0</td></tr><tr><td>Above 90°</td><td>17</td></tr><tr><td>90°</td><td>17</td></tr><tr><td>80°</td><td>83</td></tr><tr><td>70°</td><td>206</td></tr></table> <p>Vertical lamps and refractors are not compliant.</p>	I max	Cd/klm	Above 95°	0	Above 90°	17	90°	17	80°	83	70°	206
I max	Cd/klm													
Above 95°	0													
Above 90°	17													
90°	17													
80°	83													
70°	206													
	<p>DW Windsor</p> <p>Garda LED Hand Rail</p>	<table><tr><th>I max</th><th>Cd/klm</th></tr><tr><td>Above 95°</td><td>4</td></tr><tr><td>Above 90°</td><td>10</td></tr><tr><td>90°</td><td>10</td></tr><tr><td>80°</td><td>66</td></tr><tr><td>70°</td><td>165</td></tr></table>	I max	Cd/klm	Above 95°	4	Above 90°	10	90°	10	80°	66	70°	165
I max	Cd/klm													
Above 95°	4													
Above 90°	10													
90°	10													
80°	66													
70°	165													



Domestic Lighting Equipment Profiles

Through this leaflet we hope to provide you with examples of well designed equipment which you may wish to consider when purchasing new lighting units. The leaflet also contains examples of poor design relative to the exacting demands of light control within Dark Sky Island of Sark.

Unless otherwise noted the equipment illustrated is available from local DIY Stores.



Good – Reflector shaped to direct light down. Boxed as dark sky friendly and has PIR sensor separate from the lamp unit pointing. For rural setting look for unit with a 150 watt lamp or less. Also provides reduced illumination dusk to dawn for courtesy and full power on presence detection.



Poor – Lamp reflector and PIR detector point in same elevation and rotational direction. 300 / 500 watts Tungsten Halogen lamps provide too much light for use in rural settings.



Good – Can direct light in 2 directions and lamps are less than 100 watts. Limit elevation angle to less than 45 degrees. Various other similar styles with integral PIR detector on mounting. 60w capsule with dimming for courtesy or LED lamps



Good – (above and below) 70w or 150w metal halide lamp. Must be installed with glass window **horizontal** – and not as illustrated. When the lamp is located at the bottom of the reflector the main beam will emerge from the glass window at about 45 degrees. Known technically as a double asymmetric light distribution.





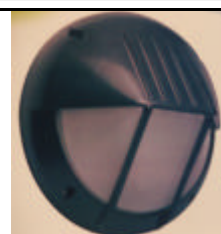
Very Good – (SILL 453 CityLite) Designed to be mounted horizontally and available in a range of low wattage lamps. Luminaire has IDA Dark Sky Friendly Fixture Award. Fluorescent range + 35/70w metal halide



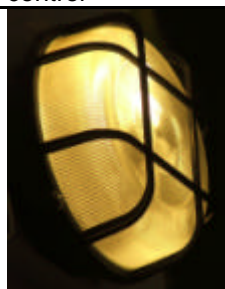
Poor – Low wattage light source but projects light upwards when mounted as shown and needs to be near horizontal to limit sky glow. **(Bracket does not allow horizontal fixing)**
18 watt PL-C = 1200 lm



Poor – No light control



Fair – Upward light limited but lamp must be less than 1000 lm.



Poor – No light control



Good – Porch light with downward light



Poor – Bollard with no light control and produces glare



Good – External louvers limit upward light and reduces glare. Lamp must be less than 1000 lm








The output of lamps will shortly be valued in lumens rather than watts as at present. The table below provides interim user guidance when comparing lamp watts and lumens.

Lamp type & Watts		Lamp Lumens (lm)
Clear Bulb GLS	75w	940
Candle Lamp clear	60w	660
Candle Lamp opal	60w	640
Superlux Krypton	75w	1,000
Halogen energy saver	52w	840
Halogen linear	60w	840
12v Tungsten Halogen	50w	925
T2 linear fluorescent	13w	940
T8 linear fluorescent	15w	950
Compact Fluorescent		
Elegance globe	15w	799
Elegance candle	9w	405
Elegance spiral	11w	580
2D compact fluorescent	10w	650
3 loop compact fluor't	13w	900
1 loop compact fluor't	11w	900
LED Opal globe	7w	230








In order to protect the dark night sky over the island it is proposed to limit the lamp output on existing poor or no light-controlled luminaires to 480 lumens.

See Lighting Management Plan Section 2 for other restrictions.



<i>Illustration</i>	<i>Lamp Name</i>	<i>Lamp Type</i>	<i>Nominal Watts</i>	<i>Output Lumens</i>
	Standard, clear bulb	Incandescent GLS	15W	90
			25W	220
			40W	420
			60W	710
			100W	1,100
	Standard, pearl frosted bulb	Incandescent GLS	15W	90
			25W	220
			40W	415
			60W	700
			75W	935
	Candle, clear bulb	Incandescent Tungsten	25W	200
			40W	400
			60W	660
	Candle, opal bulb	Incandescent Tungsten	25W	190
			40W	390
			60W	640
	Twisted Candle, clear bulb	Incandescent Tungsten	15W	90
			25W	200
			40W	400
			60W	660
	Twisted Candle, opal bulb	Incandescent Tungsten	15W	90
			25W	200
			40W	400
			60W	660
	GE Candle Lamp (B&Q)	Incandescent Tungsten	18W	170
			30W	415
			45W	710



	Round, clear bulb	Incandescent Tungsten	25W 40W 60W	200 400 660
	Round, opal bulb	Incandescent Tungsten	25W 40W 60W	200 400 660
	Superlux Krypton mushroom, opal Standard	Incandescent Tungsten	25W 40W 60W 75W	240 455 760 1,000
	Superlux Krypton mushroom, opal Any burning position	Incandescent Tungsten	25W 40W 60W	160 300 530
	Halolux halogen energy saver	Incandescent Tungsten Halogen	18W 30W 42W 45W 52W	170 415 630 710 840
	Haloline linear	Incandescent Tungsten Halogen	60W 100W 120W 130W 230W	840 1,900 2,400 4,650
	Halostar 12V	Incandescent Tungsten Halogen	10W 20W 35W 50W	140 320 600 925



	LED Parathom clear globe	Solid State Light Emitting Diode	1.6W	70
			2W	117
			3W	165
	Master LED opal globe	Solid State Light Emitting Diode	7W	230
	Master LED reflector	Solid State Light Emitting Diode	4W	110
			7W	230
	Lumilux T2 tubular	Discharge Linear Fluorescent	6W	330
			8W	540
			11W	750
			13W	940
	Energy Saver - short T5 tubular	Discharge Linear Fluorescent	4W	130
			6W	270
			8W	385
			13W	830
	Lumilux T8 tubular	Discharge Linear Fluorescent	10W	650
			15W	950
	Biax Extra Mini	Discharge Compact Fluorescent	9W	480
			11W	600
			15W	900
	Elegance Globe	Discharge Compact Fluorescent	7W	286
			9W	405
			11W	580



			15W	799
	Elegance Candle	Discharge Compact Fluorescent	5W 7W 9W	177 286 405
	Elegance Spiral	Discharge Compact Fluorescent	8W 12W 15W 20W 23W	460 700 950 1152 1380
	2D	Discharge Compact Fluorescent	10W 16/14 21/19	650 1100 1350
	Biax S	Discharge Compact Fluorescent	5W 7W 9W 11W	250 400 600 900
	Biax S/E	Discharge Compact Fluorescent	5W 7W 9W 11W	265 425 600 900
	Biax D	Discharge Compact Fluorescent	10W 13W	600 900
	Biax T	Discharge Compact Fluorescent	13W 18W 32W 42W	900 1,200 3,200



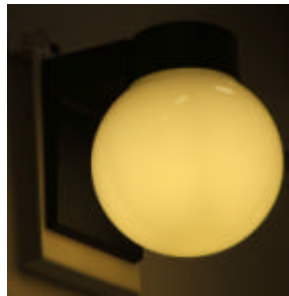
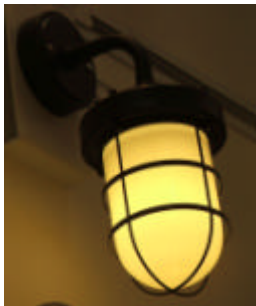
Property Self-Audit Guidelines – The Next Step

Survey your property externally (all buildings and any free-standing lighting)

Confirm inventory match or update inventory.

For all fittings which are **not “fully shielded” or “fully cut-off”**, implement changes / upgrades as follows:-

1) No or minimal Light Control



Preferred






Measure the building footprint as described in section 3.1 and replace with new fitting(s) having good light control, meeting the Lighting Management Plan (LMP) requirements. Do not exceed the total lumen limit in table 3.1 (repeated below for ease of reference) for your size of property.

	Environmental Zone				
	Sea Buffer	E1 Island Core	E2***	E3***	E4***
Total Lumens for domestic Exterior Lighting	0	750 lm plus 4.5 lm / m ² of site structures*	2250 lm plus 4.5 lm / m ² of site structures*	4500 lm plus 4.5 lm / m ² of site structures*	6000 lm plus 4.5 lm / m ² of site structures*
Fully cut-off luminaires each lamp lumen maximum		1200 lm	1650 lm	2400 lm	3200 lm
Part cut off luminaires each lamp lumen maximum		750 lm	1200 lm	1650 lm	2400 lm
No light control luminaires each lamp lumen maximum		480 lm**	750 lm	750 lm	750 lm

Table 3.1 Total lumen limit and individual lamp lumen limit per property

* Site structures is the sum of the land area of residential buildings, habitable structures, garages, recreational buildings and storage structures on each property plot.

*** Environmental zones E2, E3 and E4 do not relate to any conditions in Sark and should be excluded from any considerations for domestic lighting. They are shown here as an example for other adjacent islands to follow where appropriate.

		
		
<p>“Fully shielded” examples</p>	<p>Limit lamp size as per table 3.1</p>	<p>Limit lamp size as table 3.1</p>

or **Option 1**

Shield to fully comply with LMP requirements.

Fabricate shielding from aluminium or similar material and fix securely in place.

Ensure shielding as fixed, allows no light at 90 & 95 deg.

or **Option 2**

If high power, replace lamp with one having less than 480 lumen output (see tables in Appendix).

Consider shielding as well.

2) Partly Cut-off Fittings



Preferred

Adjust tilt angle down to meet LMP requirements.

or **Option 1**

Tilt down if adjustable and

Provide additional shielding to comply with LMP requirements.

Fabricate shielding or cowl from aluminium or similar material and fix securely in place.

Ensure that shielding / cowl as fixed, allows no light at 90 & 95 deg.

or **Option 2**

Replace with new fitting having improved light control & meeting LMP requirements

or **Option 3**

If high power lamp, replace lamp with one having less than 750 lumen output (see tables in Appendix D)

Consider tilt reduction as well, if possible.

Consider shielding as well.

Tungsten Halogen Floodlights



Preferred

Replace with new fitting having good light control & meeting LMP requirements

or **Option 1**

Tilt down until glass is horizontal

Reduce lamp size if possible.

or **Option 2**

Tilt down

Shield to fully comply with LMP requirements.

Fabricate shielding from aluminium or similar material and fix securely in place.

Ensure that shielding as fixed, allows no light at 90 & 95 deg.

Reduce lamp size if possible.

For all external lighting:-

Check switching times are sensible / comply with curfew as appropriate.

PIR detectors are properly aimed to avoid nuisance switching.

Consider installing a push button switch with short time delay facility.