SOUTH DOWNS NATIONAL PARK



INTERNATIONAL DARK SKIES RESERVE APPLICATION



SOUTH DOWNS NATIONAL PARK

INTERNATIONAL DARK SKY RESERVE APPLICATION

EXECUTIVE SUMMARY

Our skies may not be the darkest. They may not be the biggest. But they will be the most cared for.



O O O ABOUT THE PARK

- South Downs National Park created in 2010
- Covers 1,660 km² and includes 112,000 residents
- South of England under threat of losing last patches of intrinsic dark skies. Action is essential.
- Dark skies are a recognised Special Quality of the South Downs National Park
- 2 million people within 5 minutes. London is I hour by car.
- 8th largest planning authority in England
- Over 70 letters of Support from organisations

IDS RESERVE BOUNDARY 🕘 💿 💿

- Over 25,000 individual measurements to develop landscape wide SQM map
- 66% of the South Downs with Bronze Level skies or better. 3% at Silver.
- Core boundary to be monitored for change
- Size of boundary
 - 418km² Core Boundary
 - o I,104 km² Peripheral Boundary
 - I,660 km² SDNPA Policy Boundary





O O O I IGHTSCAPE MANAGEMENT PLAN

- SDNPA Local Plan policies cover full 1,660 km² of park boundary
- The South Downs Partnership Management Plan represents the formal agreement by the Authority and its partners to have a 'due regard' for dark skies in their operation
- SDNPA Local Plan policies incorporates Institute of Lighting Professionals guidance enhanced with landscape specific considerations
- Local Lighting Authorities showed clear regard for dark skies within national park
- Parish Neighbourhood Plans updated with Dark Sky Polices
- Regional Local Planning Authorities working on issue through Duty-to-Cooperate
- SDNPA committed to expand and enhance conformity in domestic lighting

O O EXTERNAL LIGHTING PROFILE



- 88% of lighting threats outside SDNP boundary
- 97% of lighting threats outside IDSR boundary
- Core lighting dominated by low lumen Heritage, Bulkhead and Security lighting
- Over 66% estimated to conform to standard
- Sky Quality considerably more sensitive to threats outside park, <u>not</u> from domestic lighting within
- Approximately 2,700 streetlights within park. All compliant with standards
- £250 million spent by local lighting authorities on street lighting PFI upgrades

ASTRONOMY



- Three Planetariums, three observatories within and nearby SDNP
- Over 2,000 day and night events
- Societies with links to STEM and local Universities
- Enthusiastic providers of stunning photography
- Three (and rising) Dark Sky Discovery Sites
- Many Telescope retailers in area
- 200,000+ annual Astro-visitors





- Dark Sky Pledge received 1,000+ responses
- Leaflets, postcards and website provide promotional material

 \bigcirc

- Learning Zone provides curriculum resources and online planisphere
- Citizen Science Star Counts
- Hosted many events, talks and presentation on dark skies
- Our 14" Dobsonian Telescope continues to inspire observers

KEY

Eligibility Criteria Met

Minimum Requirements Met



Met on Designation

Address

Dan Oakley Dark Skies Project Lead. FRAS. South Downs National Park Authority South Downs Centre North Street Midhurst West Sussex GU29 9DH

"Dark Skies are rare in the South of England – we need to preserve this precious beautiful thing." Pledge Comment



COMMUNICATION



January 15, 2016



South Downs National Park South Downs Centre Midhurst West Sussex GU29 9DH

International Dark-Sky Association 3223 North First Ave. Tucson, AZ 85719

Dear Dr Barentine and the IDA Committee

I am proud to submit the South Downs National Park's International Dark-Sky Reserve application for Bronze level status. As the dark sky project lead and ranger, I am delighted to represent all those that have shown their commitment to protecting this rare and loved nightscape. Hopefully you will see that our application celebrates the enthusiasm and care our population has for its skies.

Though the application is long, complex with many supporting letters, it is necessary to show you just how much effort, analysis and time has gone into producing what I think is a thorough and comprehensive assessment of dark skies within the South Downs. In addition to the all-important Lightscape Management Plan, the application also includes many images taken by myself and other amateur astronomers across the Downs. They aim to not only prove our sky quality, but also act as a 'brochure' of what is possible to see and where to find inspiration. So please do not be daunted or put off by this applications size; it is important that the full vista of our efforts and potential is presented.

When I started this process, some years ago, I was genuinely surprised by my first trip out to measure sky quality. I didn't expect to be convinced. I was expecting a disappointing evening lost under the perpetual glow of Solent City, destined never to take this project further. But, within the first few measurements, I knew that this application would be possible. Living in the city of Portsmouth, stars are not exactly common. But seeing the Milky Way twinkle under a canvas of a thousand stars within a few miles of my home instantly put a lasting smile on my face. In an instant I was transported to my youth and memories of star gazing that originally inspired me to turn to Physics. Now as a Ranger for the National Park, it is satisfying to think that fate has come full circle and I'm now able to combine all my seemingly disparate qualifications (Physics, Environmental Policy and Wildlife Management) into this one, albeit very niche, purpose.

SOUTH DOWNS NATIONAL PARK

Since that first drive in the darkness there have been many more long, tiring and bone chilling nights. In that time we have absolutely proved that the South Downs has a nightscape of international importance. This is not purely down to the darkness itself – we know we are not as dark as other places in the UK – but rather by its astronomical activity and its importance to the large population. As the 8th largest planning authority in the UK, with 112,000 residents and two million people living within 5 minutes of the Park boundary, we know how special they are and how essential it is to protect them.

Before the National Park was designated in 2010, the South Downs existed since the late sixties as two Areas of Outstanding Beauty (AONB). As with any designation, the AONB's were created to identify important landscapes that required extra layers of protection. But in many ways they function more to make people aware of their intrinsic importance and to encourage positive behavioural change. In the years between the initial AONB and 2010 National Park designation, that change has become embedded with the landscape now thriving from the positive action of its residents and partners. And now as a National Park, we push to drive and embed further change that will last for generations. But from the decades of experience of managing these landscapes, what we can say for sure, is that here, designation *works*. It changes behaviour. It empowers. It inspires. And I am sure that an IDA designation will do the same.

Over the last few years, I have seen first-hand the enthusiasm and desire from residents to protect their starry skies. While the Park Authority has developed comprehensive policies to ensure this protection continues regardless of IDA outcome, parishes, county councils and local authorities have all begun to look at dark skies anew. Many authorities and communities have updated policies to reflect dark skies and I believe that a successful IDA designation will further galvanise the parks population to keep the skies dark. Moreover, I see the reserve encouraging change beyond its boundaries, acting as an oasis to the urbanisation that surrounds. This stewardship can already be seen through the many letters of support clearly showing the abundance of commitment to achieving and sustaining an IDR.

But while I have taken great effort to include others, I thought it is important that I provide my own statement of commitment. I have been extremely fortunate and privileged to have been given the opportunity to develop and deliver every part of this project. From the first SQM measurement, to the final full stop on this application, I have been thrilled to have the Milky Way as my office. I've personally enjoyed showing the next generation the pearls of the South Coast sky through our telescopes and I personally want this to succeed, not just as an IDR, but as a long term solution to protecting dark skies in the South Downs. Now complete, I can firmly say that I loved every tiring, bottom freezing moment and as many of the photos within the application will show, I have very much enjoyed capturing our nightscape. So, I don't

SOUTH DOWNS NATIONAL PARK

plan on going anywhere, and I am more than happy to give you my commitment that I will work to deliver what this application promises.

Ultimately, I hope that you find our submission a worthy addition to your family of designated landscapes. In our application I am open in discussing our issues with complete compliance to your requirements, but am convinced that the gains of an IDR designation vastly outweigh the negatives. And although our issues are identical to those in other UK parks – largely due to UK Planning Law - I have tried to demonstrate how we will further look to work to reduce these issues. As you will read, we have provided a detailed analysis of our lightscape and we have developed an effective plan that will appropriately mitigate threats and satisfy IDA standards.

As two organisations on the front line of the battle of the photons, I firmly believe that we can, and should, find common ground to find a successful conclusion to our application. We are at a unique and once-in-a-generation opportunity in the history of the Downs and I hope that we can both seize the opportunity to protect what is a galactic gateway for millions. Although we will carry on regardless, I do believe that welcoming us into the IDA family in some form will benefit both our organisations.

Normally, I end my talks, blogs and articles with the catch phrase 'Embrace the Darkness'. But I feel in this case, I am already preaching to the choir. Instead, I would just like finish with a short but critical message for the IDA decision committee.

Embrace our Darkness.

Yours sincerely,

Dan Oakley FRAS. B.Sc. A.U.S. MA (EPS). Fd.Sc.

Ranger and Dark Skies Project Lead South Downs National Park Authority Western Area - Queen Elizabeth Country Park Horndean Hampshire PO8 0QE

0044 1730 819 339 <u>dan.oakley@southdowns.gov.uk</u> IDA Account #48158

SOUTH DOWNS NATIONAL PARK

January 15, 2016

International Dark-Sky Association 3223 North First Avenue Tucson, AZ 85719 USA



Sir Patrick Moore Building Kingsham Farm, Kingsham Road Chichester. West Sussex. PO19 8RP Tel: 01243 774400 www.southdowns.org.uk

Dear Dr Barentine and the IDA Committee

I am delighted to nominate the application by the South Downs National Park that it be granted International Dark-Sky Reserve Bronze status. As a founder member of the British Astronomical Association's Campaign for Dark Skies over a quarter of a century ago, I worked with David Crawford in the early days to help spread the IDA's message here in the UK, and it is indeed gratifying to see how far we have come in increasing awareness of the importance of dark skies and the night-time environment in this country.

I believe that the dark skies of the South Downs National Park are an essential factor in helping us continue to inspire present and future generations of young and older people with the wonders of the night sky. As a 7-year old boy growing up at the southern edge of the South Downs, I was inspired by the stunning night-time views of the stars and the summer Milky Way to take up science (and later astronomy) as a career. As someone who has lived in this area all of my life, and as a long-term science educator and populariser of science, I believe it is vital that people living and visiting this area should continue to enjoy the darkness and tranquillity offered by the South Downs.

The South-East of England is an area of relatively high – and growing - population density and so it is vital that we do everything we can to protect the dark areas that we have in this area. Over 2 million people live within a short drive of the National Park boundary and over a million more visit the area, particularly during the summer months. These people are already enjoying the benefits of the dark skies found within the Park. Indeed, it is *because* of the very large number of people living close to and visiting the South Downs National Park every year that I believe it has a special place among the National Parks in the United Kingdom. To have this region designated as an International Dark Sky Reserve will raise its profile very considerably, emphasise its importance as a major resource within the South-East, and help all of us working to keep the dark skies we have and preserve them for future generations to achieve our goal. As you will see from the application, there is enormous enthusiasm and commitment among the people living in and around the South Downs National Park to preserve and protect the precious night-time environment of this area.

I have every confidence that, as an International Dark Sky Reserve, the South Downs National Park will uphold the values established and continued by the IDA over so many years and that it will make a valuable contribution to the family of International Dark Sky Reserves. I am also convinced that the South Downs National Park Authority will be able to manage the Reserve effectively long into the future.

In conclusion, I believe that the opportunity to achieve International Dark Sky Reserve status for the South Downs National Park is of vital importance for both present and future generations of people living in the South-East of England. It will ensure that they are able to escape the bonds of the otherwise light-polluted towns and cities where thy live and seek out a place of night-time tranquillity, where they can continue to gaze up in awe and wonder at the night sky just as their Bronze Age ancestors did here 4,000 years ago.

Yours sincerely,

John Mason

Dr John Mason MBE Companion of the Institution of Lighting Professionals Founding Member of British Astronomical Association Campaign for Dark Skies Member of IAU Inter-Division Commission C-B7 for the Protection of Existing and Potential Observatory Sites IDA Account No. 48401

Address

Dan Oakley: Dark Skies Project Lead South Downs National Park Authority (SDNPA) South Downs Centre North Street Midhurst West Sussex GU29 9DH



facebook.com/sdnpa

youtube/user/sdnpa

Dark Skies Pledge

The comments within the footers of each page are taken from the Dark Skies Pledge. They are actual comments provided by residents and visitors about the project showing their enthusiasm and desire to protect dark skies. For example;

"Dark Skies are rare in the South of England – we need to preserve this precious beautiful thing."

Acknowledgements

The South Downs National Park would like to extend their thanks to the following for their assistance in the project;

Dr John Mason, Andy Copping (South Downs Planetarium) Graham Bryant (Hampshire Astronomical Group) Dave Woods (Hants Astro) Keith Brackenborough (Eastbourne Astronomical Society) Mike Williams (Worthing Astronomers) Julian Higgins (Hampshire CC Street Lighting) Kevin Moss (West Sussex CC Street Lighting)

Front Cover: St Huberts under the Summertime Aurora. Old Idsworth. Hampshire

Photography

Astro-photography images throughout this document were provided by South Downs Astronomers and mostly taken from inside the National Park Boundary. Those that were not, have been indicated. They aim to illustrate what a tremendous resource and destination the South Down National Park dark skies are. Unless credits are shown, images were taken by Dan Oakley; Dark Skies Project Lead, SDNPA.



APPLICATION STRUCTURE

INTRODUCTION

Here we provide a short summary the key strengths of the South Downs Dark Sky Reserve and how we meet the IDA eligibility. Using the IDA guidelines we will show how the SDNPA has worked towards meeting the minimum requirements of reserve status and where key issues emerged.



PAGE 14

PAGE 4

IDA RESERVE EVIDENCE

This section will show our comprehensive Sky Quality mapping and photographic evidence for our dark sky reserve. It will show our methodology, our derivation of the boundary, the issues we encountered and the types of threat most relevant to the South Downs.

ABOUT THE NATIONAL PARK

This section will describe some basics of the South Downs National Park and the role of the authority. It will show how the Partnership Management Plan and the Local Plan constitute necessary formal agreements between the authority and our partners. It will also describe the dominant landscape features, key habitats and wildlife.





ASTRONOMY

Celebrating the extensive astronomical activity in and around the park, this section will show that the South Downs landscape has a busy and enthusiastic professional and amateur astronomy base which includes many societies, businesses and tourism opportunities.



PAGE 68

COMMUNCATION

This section will show how the SDNPA has promoted and engaged with visitors and residents. It will show how we have encouraged citizen scientists of our residents and provided many opportunities to participate and educate themselves with the importance of dark skies and how it can contribute to schools.





EXTERNAL LIGHTING BASELINE

Here we will show how we derived our lighting baseline using information from local authorities, and our own domestic lighting survey. Detailed information is provided on lighting styles and sources of pollution. We also show the critical differences in lighting between the street lighting upgrades. **PAGE 105**



"Please protect the dark skies of the South Downs National Park – they are so precious, for all of us in Southern England"

ANALYSIS

PAGE 137





PARISH LETTERS

This section contains all the replies from Parishes. They vary in content, from short messages of support, to full descriptions of policies.





LIGHTSCAPE MANAGEMENT

PAGE 155



This section shows how the SDNPA and its partners manage lighting. It will show our own Local Plan policies and how these compliment neighbourhood and wider spatial planning. Management policies from all relevant local authorities are also provided, showing the commitment to reduce lighting pollution from across the region.

FUTURE STRATEGY

PAGE 196



CONCLUSION

Our summary of why the South Downs should be the next International Dark Skies Reserve. The arguments presented throughout the application should make our case reasonable and clear.





"Reducing light pollution should be a national priority"



"Please make it happen – the Downs are a treasure and it'd be great if they were even better."

INTRODUCTION

The South Downs landscape has for many centuries, been managed by man for thousands of years with an ever growing population. Sandwiched between London to the north and the Solent coast cities to the south, the South Downs has always been a tranquil break between the constant spread of urbanisation, with 10 million people living within one hours drive. The National Park Authority – and the Joint Committee before - were established to help protect the landscapes special qualities and provide much needed access to nature for the large population. In its fifth year, the authority has turned to protecting its dark skies and believes that an International Dark-Sky Reserve offers the best opportunity to achieve that.

Due to our complexity, our application will not be as straight forward as others. Although we know that our unique landscape means that our application pushes the IDA framework to the edge, we believe that the potential gains vastly outweigh the difficulty in achieving every technical requirement. From the outset the IDA impressed upon us that a long term and lasting 'commitment' to protection was a key factor. This application will show how we have sought that commitment from every relevant organisation and community and present a clear framework that satisfies that value.

Building on the success of existing UK National Parks reserves, we have tried to provide an enhanced approach to protection, working with many of the local authorities that lie within and surround our landscape. We have established consistent and meaningful policies that compliment and support many similar polices being used or developed by like-minded organisations across the region. But as an organisation with specific purposes and duties to nature conservation, access and economy, we have looked to add value; we will use this process as a means to educate, inform and encourage residents, business and visitors of the importance of our skies and bring all efforts towards one aim and lasting shared identity.

For us, the designation isn't just an achievement for work completed, but rather an instrument to raise the profile of dark skies around the region and drive further enhancements. As this application will show, we are in a unique moment in the South Downs and another opportunity for designation may not present itself for a generation.

We have;

- Intrinsic Dark Skies up to Silver standard
- A large active astronomy base
- Accessible Sites within a few miles of the South Coast
- Support from across the national park and beyond
- Effective, relevant and understandable policies
- Commitment by our local authority partners
- Modern, efficient and sympathetic street lighting
- Support of the IDA vision to protect threatened sites



They may not be the darkest. They may not be the biggest. But they will be the most cared for.

"Dark skies show you, that there's more than just the place where you stand."

MEETING THE IDA STANDARDS

This application has taken a substantial amount of time to complete. Throughout we have worked through three sets of guidelines (since the first in 2008) and despite the challenges each update produced, the SDNPA has proceeded with the guidance and encouragement of the IDA to complete the process. As a result, we have developed an application that attempts to meet as many of the requirements according to our remit; and in some cases we exceed. In general, our application remains consistent with existing reserves and should present no significant differences to the family. We believe therefore, that our reserve fully upholds the IDA mission and goals;

IDA Mission Statement

IDA works to protect the night skies for present and future generations.

Our Goals

- Advocate for the protection of the night sky
- Educate the public and policymakers about night sky conservation
- Promote environmentally responsible outdoor lighting
- Empower the public with the tools and resources to help bring back the night



Navigating the Eligibility and Requirements

In order to provide quick access, eligibility and minimum requirements, colour circle markers will be used to indicate where criteria are referenced and demonstrated. The markers will appear in the following summary, first page of each section and within text if appropriate.

Red circles indicate Eligibility Criteria



Grey circles indicate Minimum requirements



"Local replacement LED street lighting has made a huge difference for the better."

Eligibility:



Core of proposed DSR must be public or a private land. As a National Park, the core of the proposed DSR *is* public and private land protected for scientific, natural, educational, cultural, herniate and/or public enjoyment.





Area size and boundaries

The proposed boundary is 418km^2 and includes many publically protected areas. The boundary has been drawn to maximise the area given the conditions of the sky.



Peripheral zones

Through our lightscape analysis, our peripheral area is sufficient to mitigate 80% and more of the current and future light pollution threats. It provides a sufficient barrier between the urban and rural, verified by or sky quality measurements. The total continuous size is above 700 km²





Regular Visitation

The dark skies of the SBouth Downs are already regularly visited by many astronomy groups and members of the public.





Exceptional dark sky resource

Our measurements show consistent Bronze level skies throughout almost all the rural landscape. In places we have measured small pockets that reach Silver Status

Pages: 16, 17



"We have nesting barn and little brown owls, kids have a telescope for watching night skies, all are in danger from proposed developments a mile away"

Minimum Requirements.



Lightscape Management Plan

As the local Planning Authority, our SDNPA Partnership Management Plan and Local Plan policies that protect dark skies cover 100% of the area of the park, rather than the 20% stipulated. They address any development (private or public) that requires planning consent. Pages: **44, 46, 158**

Street lighting authorities have provided sufficient policies that support and enhance the SDNPA throughout and surrounding beyond the park. Pages: **138**

Many of the Parishes have indicated support and commitment to the dark skies through Neighbourhood plans. Pages: **170, 203**

Many surrounding Local Authorities have policies that reference dark skies or light pollution of similar standard. Pages: 23, 172

Our Lightscape Management Plan also address how minor domestic light that do not require planning consent should be managed. Pages: 151, 181

Evidence of community commitment

Our external lighting baseline shows that at least two thirds of existing lighting fixtures are very likely to and have the capability to meet the IDA requirement, particularly 2008 guidance on 1,000 lumens. As low powered domestic lighting is by far the most prevalent, this percentage could be much higher. Pages: **24, 111**

Our survey also shows how recent street lighting upgrades across the region have installed lighting that conforms to the LMP and a due regard for dark skies. Page: **117**

Planning applications from the community since the start of this project now all conform to standard, many without correctional guidance from the SDNPA. Page: **160**

Our Dark Sky pledge has received over a 1,000 responses and many comments of commitment. Page: **92**

1		
Τ.		
Υ.	~"	

Lightscape Management Plan Conformity

Our LMP has a committed long term strategy to improve the percentage of domestic fittings to the standards set for those lights that require planning. Page: **114, 181, 197**

To mitigate uncertainty and gaps in data, the SDNPA will expand and enhance surveys across the villages and residents in the landscape. We will continue to encourage good lighting design in all fittings inside and outside of the planning system. Page: 114

All streetlights within the National Park conform to IDA requirements. Pages: **156, 188, 197**



"I live in London, and can see very few stars from my streets. I've been star-spotting in the Arizona desert, and would love somewhere closer than that to see the night sky.

D Measurement Program

We have completed a comprehensive and detailed map of sky quality across the entire South Downs region. This has been produced with the help of astronomical societies and key experts. Page: 16

Sky Quality will be monitored using SQM-monitors at key access sites and identified threat sites. Continual monitoring is currently being investigated by a number of organisations. Future monitoring will also help identify the sources of error inherent in sky conditions. Pages: **17, 29**

Lighting Installation Examples

Under the South Coast Private Finance Initiative and other schemes, every street light within the entire national park (~ 2,700) has been upgraded to dark sky friendly fittings. These upgrades have covered the 3 counties that encompass the South Downs and had due regard for the special qualities before the reserve process. This represents ~10% of the number of lighting installations across the park (outside of core) but 30% of the total lumen output. Given the lighting profile of the park, lumens are significantly more important than number. Page: 185

Since the project, over 50 planning applications have been received throughout this process and are compliant with protection policies. With an estimation of 200 fittings (and rising) they are good examples of residential lighting installations and some may feature in subsequent supplementary planning guidance as best practise. Future planning applications within the park must have regard for dark skies via the SDNPA Local Plan policies. Individual residents have informed the SDNPA in changing lighting to reduce pollution. Page: **160**



Community encouragement

Many parishes have updated their neighbourhood plans with policies that aim to reduce light pollution. Some parishes actively educate residents on astronomy and light pollution either by planning committee or local action. Pages: **92, 170, 197**



Commitment to public education

Through the Environmental Act 1995, the SDNPA has a purpose and duty to educate visitors and residents about the landscape. We have developed a range of media to help educate residents and encourage access into the darkest areas of the Downs. Page: **43**

In addition to the astronomical societies and attractions, the SDNPA participates in many events – both day and night – to promote dark skies. We also provide talks to parishes or other events on light pollution and best practise. Pages: **72, 92, 197**



Regional Acknowledgement

The SDNPA is a local government agency situated above the community level. The Local Plan takes a strategic approach to development and the protection of dark skies. Page **158**

We have provided many letters of support from partners, including the County Councils who are the Local Lighting Authority for street lighting. The regard for dark skies is referenced in their policies. All Local Planning Authorities in and around the National Park have policies regarding light pollution with some specifically referencing the dark skies of the South Downs. Pages: **44**, **159**, **172**, **185**

Community Signage

Any signage would probably require planning permission and may not be appropriate. Page: 197

Reserve Signage

Due to conflicting policies in the SDNP Management Plan, signs must be considered in the context of tranquillity and any polices that look to reduce signage clutter. It may not be appropriate to add signage to the landscape in all cases. Page: 197



Review

Ongoing monitoring will verify conditions. Our yearly updates will look to include; SQM mapping updates, summary of Planning, progression on surveys, events statistics and any other developments. Page: 197



Annual Reporting

Part of the post designation process. Would likely include; planning updates, sky quality measurement improvements, sub-project updates, events reporting; further parish support and; new subproject updates. Page: 197



Sky Quality Tiers

Through our SQM mapping and photographic evidence, the skies of the South Downs are consistently Bronze standard, with isolated Silver Patches. Pages: 17, 26, 31





J. Scott Felerabend | Executive Director International Dark-Sky Association 3223 North First Ave Tucson, AZ 85719

6 January 2016

Dear Mr Feierabend

I am writing to assure you of the wholehearted support of the South Downs National Park Authority for our bid for International Dark Skies Reserve Status. The Authority is just five years old and has been committed to maintaining and enhancing dark skies from our first creation. This commitment is reflected in our Partnership Management Plan and is one of the top priorities in our Corporate Plan.

The South Downs is the most populous National Park, with 112,000 people living within its borders, but there are also more that 2 million people living within half an hour. This provides a unique opportunity to allow public access to our precious areas of dark sky. Many of the urban population that live around the Park have never seen the Milky Way and our work is opening up to them an entire new perspective on the environment.

It is a constant challenge to ensure that light pollution does not encroach upon the dark areas at the top of the Downs but this is another reason why Reserve Status is so important. The National Park Authority has been campaigning hard and has reduced light pollution significantly in just a few short years. Reserve Status would provide further impetus to this process.

Some 738 schools lie within the National Park or within 5 kilometers of the boundary and the Authority works with more than 70% of them. It is part of our remit to encourage children to learn outdoors. We have found that for many local school children star gazing is the best route into this wider understanding of their place within nature and their personal duty to conserve and enhance their surroundings. Our work to prepare the bid has generated huge interest amongst local schools. The publicity, international recognition and private sector engagement that would arise from a successful bid would help to involve many more local children, strengthening the link between the curriculum and their local environment.

I hope I have explained why the South Downs National Park Authority is completely committed to the maintenance and enhancement of our preclous dark skies, but if I can provide any further information or support please let me know.

your sincery Tren Beatting South Downs Centre, North Strept, Trevor Beattie Midhurst, West Sussex, GU29 9DH **Chief Executive** T: 01730 819208 E: trevor beame@southdowns.gov.uk www.southdowns.gov.uk Chief Executive: Trovy Sealant





71 December 2015

International Dark-Sky Association 3223 North First Ave Tueson, AZ 85719

Dear Sir,

Subject: International Dark Night Sky Reserve Bid

I write on behalf of the Members of the South Downs National Park Authority to express our support for the South Downs International Dark Sky's reserve application.

The importance of preserving the dark night skies for the South Downs is a matter close to the heart of all of us at the SDNPA. Indeed, the importance of dark night skies is captured in our "Special Qualities" which is the list of defining features that make the South Downs such a special place. Our commitment to their protection can be further seen in our draft local plan, which includes specific policies to protect this vital aspect of tranquility within the Park.

However, the importance of Dark night skies goes beyond our planning policies and the delivery of our purposes and duties. I have included below a small selection of quotes from members of the Park Authority, who are also residents of the Park to capture the importance of dark night skies to us as individuals:

"The South East of England is a relatively busy place – but the South Downs National Park, provides an attractive, tranquil "green lung" for residents and visitors in daylight hours and a spectacular array of thousands of stars by night.

Dark skies tan make people pouse and appreciate the wonders of the natural world and can also inspire să mich: fram scientific research to works of art. Above all they cannect us to our ancestors who have lived in this special place for thousands of years — all appreciating the same spectacular. trainkling week...."

"So few people get the chance to see the real wonder of a night sky unless you are lucky enough to go to Africa or the Australian outback where you see the night sky in all it's glory. We must ensure that areas that can be made or kept dark are not impacted by new developments and we should combinue to encourage people of all ages to came out when we run sessions in the National Park."

"My children were born here and grew up here and we would aften take them out to stand in the garden and look at the stars and the moon - sometimes so bright you could read a book by it. We live right under the north scorp of the Downs, the constellations and the arc of the Milky Way are always clear and sharp, and an a frasty winter night there's no more joyous thing in the world than to look upwards and marvel at them. Both our children have left home now. One's and mitter and the ather's a musician - perhops some of that stardus gat spinilled on them? I hope tail

"Achieving this prestigious award would not only be a great achievement but would also help to promote understanding of our universe through the enjoyment of being able to see the stars of the night sky including the Milky Way. What a powerful incentive it would be would for reducing light pollution by demonstrating that even in a National Park with a large number of people living and working in it there are still large areas of high level dark night skies."

As you can see the dark skies above the South Downs are one of the defining qualities of the National Park and of great personal importance to many of the residents of the Park. International Dark Skies Reserve status would help us to protect and enhance this resource for generations to come.

Yours faithfully

Margael Par

Margaret Paren OBE Chair of the South Downs National Park Authority

South Downs Centre, North Street, Midhurst, West Sussex, GU29 9DH T: 01730 814810 E: Info@southdowns.gov.uk www.southdowns.gov.uk Chel Souther, Treve Seate

Here and the second sec

FULL LIST OF SUPPORTING LETTERS

South Downs National Park Authority Chief Executive South Downs National Park Authority Members

Department for Environment, Food and Rural Affairs Department for Business Innovation and Skills Department for Communities and Local Government

Hampshire County Council East Sussex County Council West Sussex County Council Surrey County Council Brighton and Hove City Council Southampton City Council

Street lighting – Hampshire County Council Street lighting – West Sussex County Council

Campaign to Protect Rural England National Parks UK National Parks England Commission for Dark Skies Forestry Commission Hampshire and Isle of Wight Wildlife Trust Sussex Wildlife Trust National Trust South Downs Society VisitEngland Bat Conservation Trust School of Life Sciences, University of Sussex Department of Physics, University of Surrey Institute of Cosmology and Gravitation, University of Portsmouth BBC Learning Royal Astronomical Society British Astronomical Society Royal Observatory Greenwich South Downs Planetarium and Science Centre Winchester Science Centre and Planetarium The Observatory Science Centre Southern Area Group of Astronomical Societies Hampshire Astronomical Group Worthing Astronomical Group Worthing Astronomical Society South Downs Astronomical Society Eastbourne Astronomical Society Foredown Tower Astronomers Telescope House

Unihedron.

Parishes: Buriton, Midhurst, Owslebury, Woodbeeding and Redford, Coldwaltham, Selborne, Clanfield, Rodmell, Stedham with Iping, Albourne, Elsted and Treyford, Cocking, Washington, Plumpton, Kingston, Graffham, Northchapel, Alfriston, Ringmer, Kirdord, Barlavington, Lurgashall, Stroud, Clapham, Upper Beeding, Wisborough Green, Rogate, Petworth

Total. 72.

So far. But the night is young...

AN IDEAL WEEKEND IN THE DEEP DARK DOWNS

The skies are clear, the sky quality values are high, and you're in the mood to try astronomy and experience dark skies in the South Downs. But where to go? What to do? The South Downs National Park has a bit of everything to keep the eyes pointing firmly up to the sky. There are regular public lectures and events with astronomy groups and experts offering plenty of opportunities to immerse yourself and experience some of the best skies in the South.

All of this within a 30 minute drive from some of the most densely population regions in Europe.



IDS RESERVE EVIDENCE

filles annallalas



"I back it, in principal but we need to think about residents' security."



"Yes, it affects my business on the Downs – it's a campsite and people love to see the stars."

EVIDENCE

This section will show that we have dark skies of more than sufficient quality throughout the landscape. Our evidence has come from two main sources:

- Sky Quality Mapping using Unihedron SQM
- Photographic Imagery

SKY QUALITY MAPPING



One of the biggest obstacles to the South Downs National Park dark skies is actually discovering where they are. With many houses, farms and businesses dotted around the countryside, finding where the darkest skies are and what their relation to the larger urban settlements is key to implementing any policies.

In order to answer this question we embarked on a comprehensive mapping of the Downs. We used two devices; a handheld Unihedron SQM-L used by volunteers and; a SQM-LU used only by SDNPA staff. Additional 'citizen science' initiatives were used to compare SQM to observations.

Volunteers included individuals from the following astronomical societies;

- Hampshire Astronomical Group
- Hants Astro
- South Downs Planetarium and Science Centre
- Worthing Astronomers
- Eastbourne Astronomical Group

👌 ΚΕΥ ΡΟΙΝΤS



- 21.47 Highest Recorded measurement
- Over 20,000 Recordings were taken either every 500m (SQM-L) or 5s (SQM-LU).
- 66% of the South Downs has 20 to 20.99 (Bronze) skies
- 3% of the South Downs has 21 and above (Silver) skies
- Panoramic photography shows that light pollution from surrounding cities is the dominant threat to sky quality



"Dark skies are essential for creating and maintaining a sense of wonder."

SQM-L

Following from other Dark-Sky Reserve applications we used a SQM-L at roughly 500m intervals in the core zones. Only astronomically dark, moonless lights with clear skies conditions were chosen. Five recordings were taken – usually at the roadside – and then averaged. On a good night \sim 50 recordings were taken.

SKY QUALITY MEASUREMENT FORM

Easting	Northing	Elev	SQM(1)	SQM(2)	SQM(3)	SQM(4)	SQM(5)	Average
50:58.37	\$1.396		20 44	21.02	20:93	21.05	21	
17 S7.06	1 37,142		20 9%	71.03	20 11	200	20	
50°56.70	52.000		20.93	20.99	20.99	Nat	20.95	_
50 55.90	* \$6. 4M		4	20.95	20.93	20.81	10 88	
50' 55,18	L = 56.841		4	20.89	20.55	20.89	20.86	
50 54.85	\$6.942	1	209	20 88	21 07	10.52	10-86	
50°5419	0 °56 815		20.78	20.71	20.70	10.69	2066	
50 54.37	3 \$6.001	-	20.9	late	20.76	20.78	20,75	-
50 54.50	1 \$4.97	4	20.78	20.85	20.92	10.82	20 90	
50° 54.81	\$ \$54.534		20.43	20.98	20.96	20.43	9009	

SQM-LU

Mapping solely with SQM-L would not be possible; it is far too time consuming. To provide a landscape scale map we used the SQM-LU which, via a laptop, has the capacity to record at whatever interval we chose. We also used a handheld data-logging GPS device that recorded on the same 5 second interval. The two datasets where then merged into one via Excel.

The SQM-LU was mounted to the side of a vehicle at a sufficient height such that in open ground, the headlights did not affect the results. A shield was also mounted around the unit to further eliminate on-coming traffic.



To remove any unwanted measurements, we annotated each SQM measurement to indicate if the SQM was under cover, streetlights or open skies. Measurements under trees or bridges were removed, but records were kept under street lights. The aim was to develop a map that described sky brightness at that point, so recording under street lights was valid as the sky was visible, albeit under lights. As the direct illumination of streetlights would contaminate measurements (it's not technically skyglow but glare) an ambient 'urban' skyglow was taken with a SQM-L sufficiently far from direct scintillation. This value was derived at 15 magnitudes arcsecond⁻². The resulting SQM maps use this value as the lower minimum.



"It would help limit development bordering the South Downs especially in the Brighton area."

The data was then imported into ESRI Geographical Information System (G.I.S) and an Inverse Distance Weighing function applied with an appropriate power function that reflected the observational quality.

The maps at the start of this section represents the output of this process. It is a detailed map of Sky Quality that will enable us to derive core and peripheral zones; identify key habitats; apply planning policies effectively and aid the astronomer. In all, it took three years to complete and while it is of sufficient quality for this application, the SDNP will continue to add data both inside and outside the park. The colours denote quality.

- Dark Blue areas are skies with values above 20.5 mags arcsecond⁻² or Bronze level at which the Milky Way and Andromeda Galaxy can be seen.
- Black areas are skies with values above 21 mags arcsecond⁻² or Silver level.

We are thankful to Anthony Tekatch from Unihedron for providing the much needed updates that allowed us to sync the data out from a GPS to the SQM-LU. After our request, the annotation function was added that enabled us to eliminate data as we drove using a USB keypad.



"Our house looks just west of south over a panorama of the Milland Village as for as the South Down chalk hills. In all the 26 years we have lived here it has astonished me that after dark just a handful of small lights can be seen over the entire view and barely a glow from towns along the coast. It is a very special feature of this beautiful area and worth making every effort to protect."

IDSR Boundary



Due to the complexity of the South Downs National Park, drawing an International Dark-Sky Reserve boundary is problematic. We are not endowed with large tracks of open land, high hill tops or are many miles from urbanisation. Although our SQM mapping provides a good estimation of sky quality it does not always logistically settle on any one consistent landscape boundary. To provide a meaningful boundary that satisfies IDA requirements and provides the proper dark sky experience, our process for deriving the boundary - based on our evidence was as follows;

Identify areas above 20.5 magnitudes per arcsecond²



Define a >= 2km buffer zone around larger urbanised settlements

Draw IDSR boundary along the most practical landscape features

Verify the percentage threats in and around the dark sky core

As shown in the IDSR Map this process yields an irregular, half donut shaped but continuous boundary. This is consistent with the feedback comments provided by the IDA after our pre-application report. Using an existing reserve as precedent, an IDSR consisting of three separate zones was also proposed, but rejected in preference of a continuous zone that maximises protection

Dedicating the Reserve – Sir Patrick Moore

Sir Patrick Moore CBE, FRS, FRAS (1923 – 2012) is an icon of astronomy to many amateur astronomers throughout the UK. As a child growing up in Bognor Regis and nearby East Grinstead (Kent) Patrick was exposed to dark skies that have long since felt the pressure of urbanisation. As the original presenter of *The Sky at Night* Patrick inspired thousands into astronomy and wrote many books on the subject, including the creation of the Caldwell Catalogue.

In his later and final years, Patrick lived in Selsey (Just south of Chichester and the South Downs) and was a good friend and colleague to many astronomers, particularly to the South Downs Planetarium in Chichester and many of the other astronomical societies in the area.

It is therefore fitting that we mark his impact and inspiration to those in the south and propose to dedicate the designation, as 'Moore's Reserve'.



"Treat the Earth well. It was not given to you by you parents, it was loaned to you by your children."

Developing the Buffer Zones - SDNP Boundary and SQM

Using the SQM map we can estimate the point at which the threats from settlements reduce to an 'ambient' amount that allows sky quality reading and naked eye observations sufficient to quality for a dark sky reserve. This distance – from urban to a 20 magnitudes per arcsecond² limit - is approximately 2km and is consistent with existing buffer zones of other National Parks. This small distance is probably an artefact from the fact that although the light pollution from the settlements is high, the South Downs is generally a bronze level reserve, and not a silver and above, as in other IDS Reserves where the contrast between dark and light is more pronounced.

With this in mind, we then set the boundary of the buffer zone from the core zones to begin when Sky Quality reduces below 20.5 – as this is the point at which to the untrained eye, the Milky Way loses some detail and the Andromeda Galaxy becomes difficult to spot. We then used the figure of 2km to act as a peripheral zone between the edges of park boundary and any dark skies over 20.5. Once drawn, the boundary was adjusted to follow access routes, woodland edges, rivers and roads.



"This is a very important aspect of the SDNPA landscape (skyscape) – one we must preserve for the future generations as well as the current generation."

I. Start with SDNP Boundary

3. Add SQM Mapping





"This is an incredibly important campaign, to preserve and indeed improve the dark skies that we have to entrench it into policy through the Planning Local Plan and public awareness."

Intrinsic Dark Sky Buffer 20 Magnitudes per arc second

An extended buffer zone can be drawn using the lowest possible sky brightness values eligible as 'intrinsic dark skies'. This value is 20 magnitude per arc second² and is shown below (yellow) overlaid with the 20.5+ core zone and the 2km SQM derived boundary.

The purpose of this boundary is to provide some protection of all areas of intrinsic dark skies, rather than those designated under core zones. This will also reflects the landscape weighting given in the SDNPA local plan policies.



It is envisaged that this boundary will change with more data recording. Due to the variance in weather and season, it is highly likely that this boundary underestimates darkness, especially in the western areas of the park. With ongoing monitoring, it is the intention that this boundary be updated – at least in planning terms - to reflect improvements in quality.

Local Authority Policy Buffers



While the internal buffer zones have been derived using the SQM data, the lighting policies described in this application also act as an extended 'policy' buffer. As they will apply throughout the SDNP, and with similar policies used by the Local Authorities, they complement each other and act as a further buffer of protection rather than a physical distance derived from the SQM. As such, the physical buffer from these policies, extends to the *entire* South Downs National Park and beyond.

As the analysis of the threats will show;

The physical boundary of the SDNP buffer, the SQM derived buffers and the policies adopted by Local Authorities offer enough peripheral and internal protection to satisfy the requirement of mitigation 80% of the observed threats to the dark skies core.



"A dark sky reserve on the south coast of England will be a boon to the millions of people who live in the south of the country, particularly those in the vicinity of London who may never have seen dark skies before.

Boundary Areas

The physical area of the core boundary and buffer zones are shown below in km^2 . There are two values; one for the total physical continuous size and the second for the effective size (subtracting inner zones).

Boundary	Continuous Area	Effective Area
IDSR Core	418 km ²	418 km ²
2km Buffer	793 km ²	375 km ²
20+ SQM Buffer	I,104 km ²	311 km ²
SDNPA Policy Buffer	1,660 km ²	1,660 km ²

The effective buffer areas are sufficient to meet the 700km^2 requirement and as the analysis section will show, sufficient to mitigate 80% of the current and future threats to the park.

The total SQM derived buffer effective area is 686 km² (375 + 311). Although this slightly less than the 700km² requirement, the extra 14 km² could be accommodated by shrinking the IDSR zone or by extending the 2km boundary into the 20+ zone. However, reducing the core is counter-intuitive to the purpose of creating the core and maximise the level of protection to its darkest skies above the 20.5 magnitudes per arc seconds. Alternatively, this 20.5 IDSR zone itself could be altered (e.g. to 20.6+) to increase buffer zones – albeit at the expense of the core zone.

Whilst these slight boundary changes can be achieved, it is worth pointing out that it makes very little difference in terms of application of protection policy. The policies apply *throughout* the South Downs National Park, both to protect and enhance dark skies, including those less than 20 magnitudes per arc second.

Villages on the Fringe. To be or not to be.



There are good reasons to both exclude and include villages into the dark sky core boundary. On the one hand, including villages increases the size of the reserve and gives residents a better sense of ownership of their skies; residents are more likely to change behaviour if they are included. On the other hand, including villages increases the potential number of lights and urbanises what would be expected to an area devoid of habitation. Existing IDA reserves have a definite sense of wilderness and absence of people, something that the South Downs does not have.

To further complicate matters, our SDNP Local Plan policies on protecting dark skies apply throughout the national park and would not significantly alter either side of a core boundary. Consequently, excluding or including villages makes little appreciable difference in how these policies are applied; for most domestic installations, planning permission is not required.

Because of these issues, our boundary took a middle ground. Where villages were found to be on the edge of the SQM derived boundary, they were excluded; such as South Harting, North Chapel. West Meon, Buriton and Amberley and Rogate. Where villages were found deeply ensconced within dark skies and within other boundary considerations, they were included, such as East Meon and Elsted.



"Dark sky is such a treasure, especially over the South East where population is high in the main. Being able to see lots of stars AND the Milky Way itself sometimes too is inspirational for children – it makes us all think bigger and deeper, thereby encouraging science, philosophy and 'good' religion."

Bortle Scale (SQM Derived) SQM can be converted to Bortle Scale.



Naked Eye Limiting Magnitude SQM can be converted to Naked eye limiting magnitude using Unihedron equation.

 $N_{elm} = 7.93 - 5log(10^{(4.316 - (SQM/5))} + 1)$





"Flaring from fracking sites would greatly add to light (and air) pollution and must therefore not be allowed in the SDNP."

Raster Histogram

Passing the output of the SQM interpolation through the Raster Histogram function of GIS allows a graphical representation of more frequent values. As the graph shows there are three major spikes indicating the urban/rural fringe (~18.5), rural (~19.8) and South Downs core dark areas (~20.6). An additional sub-spike (~21.1) can be seen indicating truly dark skies. Much of the urban environment lies within the 15-18 band.

M





"The night sky around Petworth can be brilliant."


SQM Anomalies

There were a number of anomalies that were visible in the data that are worth discussing. While they are important they are not sufficient to invalidate the SQM map. We believe that despite these anomalies, it is a fair and accurate map that compares well to naked eye observations and expected conditions.

Sensor Relaxation

Using the SQM-LU we noted that there was an approximate 10 second delay for the measurements to return to expected values under dark skies after being illuminated by a bright light. We noted a similar effect in the SQM-L where the first of the five measurements was consistently higher than the subsequent four. This is likely due to the relaxation time of the sensor (TAOS TSL237) after illumination by a bright light.

While the impact was small and mostly averaged out by the IDW function, we can say that the transition to darkness between light and dark zones is over emphasised in the near urban environment and is slightly brighter than it should be.

Environmental Effects

As the timescales to generate the SQM map was over many months and seasons, there is likely to be significant differences in 'hidden' environmental effects. Variables such as air pollution, light haze, aircraft contrails, humidity and temperature all affect the measurements which will also vary over the topography of the downs. Anecdotal evidence from amateur astronomers note that contrails could be a significant effect, something which could be explored with further mapping. This could explain why much of western Hampshire is brighter than others; the landscape is typical of much of the downs, and was expected to show Bronze SQM values. This area will be one of the first to be re-surveyed.

Inverse Distance Weighting – Point Density and Brightness

Perhaps the most significant anomaly was due to the Inverse Distance Weighting function used to generate a full colour map. The function averages an arbitrary point on the map by averaging the closest SQM measurements. One of the user variables for the IDW function is the power setting. This function, p, is determined by minimising the root mean square prediction error. Weighting is proportional to the inverse distance to the power value p. As a result, as the distance increases, the weights decrease rapidly. How fast the weights decrease is dependent on the value for p. If p = 0, there is no decrease with distance, and because each weight will be the same, the prediction will be the mean of all the measured values. As p increases, the weights for distant points decrease rapidly. If the p value is very high, only the immediate few surrounding points will influence the prediction. In effect, the higher the power the 'tighter' the colour ramp appears. For our purposes, we tried a number of power values and selected the value that most accurately reflected actual conditions and the evidence from our Lumen vs. Distance study and to expected naked-eye observation.

We found that with sparse data the weighing function can skew the brightness – both up and down – over larger distances. Where the density of measurements is high, this effect is low. But where the density is low or where we had to remove invalid measurements – such as those taken under trees – this effect is more pronounced.

For example, the area to the north of Midhurst is heavily wooded, particularly along country lanes. We had to remove many of the measurements as the SQM was no longer recording the sky. The higher density street lighting within Midhurst and Easebourne skewed the measurements to the north, making the sky quality appear brighter than it actually is. If measurements were able to be taken within wooded areas then it is likely that the darker skies would re-balance this effect and shrink the red and orange areas closer to the settlements.

We expect that this area is darker than measured, by perhaps 0.1 to 0.2 in magnitudes per $arcsecond^2$ in rural sites much larger in transition zones. This will be confirmed with subsequent readings. It does little to change the boundary of the IDSR as these areas are still sufficient to qualify as Bronze level.

"At our group of three cottages on Blackdown we do have, for safety's sake, some automatic external lighting. BUT they are all set so that they are on for the minimum time. Just enough to get from parked car to house. I suggest more people should be encouraged to do this. Folk seem to move to the country and then light up their houses like a fair-ground.



This anomaly can only be rectified by specifically targeting dark areas devoid of data, but as the time needed to collect single point data 'off-the-beatentrack' is high, this does not predominately feature in this issue of the SQM map. Provided suitable measurements points can be found, we will add data to lessen this artefact of the IDW function.

Suffice to say, that while the SQM is a very good indication of local sky quality, there are some areas that must be referenced alongside expected and observed quality.

On-going SQM Monitoring Data will be added in a number of ways;



- A number of SQM-L devices have been provided to regional astronomy clubs to measure at key sites on agreed monitoring cycles.
- SQM-LU data will be added to, including areas outside of the park.
- A permanent SQM-LU is being considered for installation by the South Downs Planetarium and Science Centre. This will allow for yearly monitoring and useful measure for astronomers ready to use the park. It will also allow us to investigate variances in the data, from weather, seasonal or day weekday/weekend effects.
- Any large developments that could be potentially damaging will be targeted for special monitoring.



"Our friends come to watch the stars from our house which is in the South Downs National Park. It's a shame people have to 'commute' to enjoy the beauty of the night sky and the need to protect this treasure is vital."

Variance in Sky Quality

It is expected that due to the climatic and population conditions in the South of England there will be variance in sky quality measurements. Unseen or 'invisible' environmental effects such as light high clouds, urban weekend patterns, or air pollution may affect measurements. However, as the sky quality data has been taken over many nights, there are some places that have received multiple visitations. These sites may provide some estimation of the variance in sky quality and help us assess our long term management of the core.

The following graph shows the variance in sky quality measurements taken on different nights at three individual locations; the A3 near Petersfield, the A27 near Worthing and the M3 near Winchester. There is a noticeable variance in sky quality in and between the locations but it appears to be within 0.35 magnitudes per arc second² in the darkest location. Although this is of the same order of magnitude as the observed gains in quality after the street lighting improvements, we are confident that this is not background noise and there has been a real gain. This is supported by the anecdotal evidence of astronomers in the field.



Future work is needed to establish what environmental factors create the largest variances. This will help inform us of what factors deserve further attention in our long term management of the core, and some indication of the best nights to take sky quality measurements.



PHOTOGRAPHIC IMAGARY

We took a number of images from a number of viewpoints across the downs to show the actual observable and photographic skyglow bloom from and within the Park. One site per main core area was selected as indicated on the map below. Cities have been marked with distances and if they are in or out of the SDNP boundary.



M

Iping Common

12, 60sec exposures with a modified Canon 1100D on iOpticon Mount. CLS Filter and Photoshop.

Note the lack of any immediate lighting, particularly to the south where the Downs rise to shield the south coast cities.



Old Winchester Hill

Mosaic 60sec exposures with a Canon 1200D on iOpticon Mount; and Photoshop. Just before astronomical darkness - the sun lies low under the horizon in the west



"I cannot imagine anyone who supports the National Park designations could be anything other than enthusiastic about it being a Dark skies Reserve. I would not spend too much time checking for agreement. Get on with it! I believe that being a Dark Skies Reserve has a wider value in protecting against inappropriate developments and 'creeping urbanisation'. That is why it is important."

Watersfield

60sec exposures with a modified Canon 1100D on iOpticon Mount; CLS Filter and Photoshop

The bright light is an education centre.





"My children have never seen the Milky Way. I'd love for them to see it."

Petersfield

12 60sec exposures with a modified Canon 1100D on iOpticon Mount; CLS Filter and Photoshop

Pictures were taken from Buster Hill looking towards Petersfield. The A3 can be seen more clearly in the bottom picture.

Note the lack of lighting in the rural areas outside Petersfield.

Midhurst lighting profile is very similar to Petersfield. However, there is no main traffic route through the centre, and the population is much less. (13,303 to 4,914)





"We humans light up our night time, mistaking I as OUR night time! – With unnecessary street lighting, shop, office lighting and more. Everyone is fearful about the dark, that it is unsafe. It is not."

SUPPORTING LETTERS

From: Unihedron 4 Lawrence Ave. Grimsby, ON L3M 2L9 Canada Tel: (905) 945-1197 Fax: (905) 945-6770 Web: unihedron.com



December 7, 2015

To: South Downs National Park South Downs Centre Midhurst West Sussex GU29 9DH

Dear Dan Oakley,

We are glad to hear about the efforts of the South Downs National Park Authority to achieve International Dark-Sky Reserve status.

Unihedron has been involved in light pollution awareness since 2005 by producing the "Sky Quality Meter" and being involved in conferences, reports, and star-parties.

Our devices have been used to help confirm the darkness of many dark sky sites around the world. Also, our websites hosts links to scientific and environmental reports dealing with dark skies and the use of our meters. And , we are honoured to do our part in working with the South Downs National Park Authority.

Best regards, Anthony Tekatch President, Unihedron



"Dark skies close to central London are extremely rare. South Downs NP is a short distance from one of the largest cities in the world so wold make a great Dark Skies site that can be enjoyed by many who have never witnessed the majesty of the Milky Way and other celestial delights."

ABOUT THE NATIONAL PARK

Turn left for the Milky Way. The passing ambulance on the A3 at Clanfield

Map of the South Downs National Park.



THE NATIONAL PARK

The South Downs National Park covers over 1600 square kilometres of England's most valued lowland landscapes. It sits between the South Coast settlements of Winchester, Portsmouth, Chichester, Brighton & Hove, Eastbourne, Alton and the southern Home Counties that surround London. It has been shaped by the activities of its farmers and foresters, its large estates and communities, its charities and local businesses. But, situated as it is the most crowed part of Britain, it is also under intense pressure.

The area now designated as the National Park encompasses living, working, and mostly privately owned and farmed landscapes. It is heavily populated compared to other National Parks, loved and used intensively by its 112,000 residents. Nearly 2 million people live within 5 kilometres of its boundary and are able to enjoy its extensive network of paths and trails.

The park covers the three county councils of Hampshire County Council, West Sussex County Council and East Sussex County Council; 15 local authorities and 185 parishes.



KEY POINTS



- South Downs topography acts as natural screen to southern skyglow
- Dark skies recognized as a special quality
- The South Downs NP Partnership Management Plan acts a formal agreements between the authority and its partners
- The South Downs NP Local Plan skies provides specific planning policies that protect dark skies
- The landscape encompasses many important European and national habitats and species that reside under dark skies.
- There are many opportunities to access dark skies, for a night or a longer stay.

"Essential for our sanity!"

Light pollution – a glowing problem



With such a large and growing population, the impact of development can be felt across many issues of the National Park. As the Campaign to Protect Rural England's Night Blight showed, there

has been gradual reduction in the quality of the night sky as light pollution – both intended and unintended – has increased. This increase has continually blotted out the night sky, rendering the ability to see the Milky Way with the naked eye, to reside in a few small oases in rural areas. Now the dark skies of the South Downs is an endangered habitat, with its interstellar species becoming lost in the sky glow.

Night Blight in the South East





"It would show the world that even in a densely-populated area, measures can be taken to bring you closer to eternity. This would be a flagship – and win-win all round, ecologically and for the economy."



"You should advertise this in large print in local papers and care homes as a lot of the people living in the park are retired and will need to be directed to this"

South Downs Landscape Filtering Effect – Ecosystem Service

Between 75 and 90 million years ago, the South East was a shallow tropical sea. The distinctive chalk ridge of the South Downs was formed at this time after layer after of marine deposits were laid down. These deposits once formed a huge dome of chalk stretching across to Surrey to North Kent. Weathering and erosion during the last ice age sculpted the landscape into its valleys, distinct hilltops and ridges.

The chalk ridge that acts like a giant sponge and stores water for millions of users, also provides an additional ecosystem service of blocking the sky glow from the South Coast settlements. It is unsurprising that the best quality skies are found to the North of the main South Down ridge which runs east to west before turning north around Petersfield.



This natural topological filter can be seen in the landscape types of the South Downs, where 'Major Scarp' slopes act as a barrier – the ecosystem service - to the brighter sky glow blooms within the southern sky.



Previous work under the South Downs Joint Committee

Before the National Park the landscape was designated as two Areas of



Outstanding Beauty, They were managed by the South Downs Joint Committee (SDJC) which were not a planning authority. During this time the SDJC researched the loss of dark skies with the aim of informing policy makers. That document, 'Light Pollution in the South Downs' has largely been superseded by this IDSR application. The author of the document is the same as the application.

"Yes – they are under threat right here in Petersfield due to 'development' far beyond the capability of the area to absorb it."

THE AUTHORITY

As with any National Park, The Government has provided two statutory purposes for National Parks in England. All public bodies and utility companies, when undertaking any activity which may have an impact on the designated area, *have a duty* to have regard to these purposes. National Parks also have a specific duty.

This is important because as this document will show, the dominant source of sky glow and loss of sky quality are from street lights, mostly from the surrounding urban environment. As the upgrade and maintenance of street lights is the responsibility of public bodies and utility companies, any changes require a due regard for the purposes of the National Park and its dark skies.



The Authority and its partners use the following policy documents to determine and mitigate for dark skies.

- State of the Park Report
- Partnership Management Plan
- Local Plan

State of the Park – Special Qualities

Transports y
 Transports
 Transports
 Transports
 Transports
 Transports
 Transport
 Tran

Chapter 3

Tranquillity

TRANOUIL AND UNSPOILT PLACES

The South Down National Park's is South East English, que of the most trainedul parts of the Useral Englisher. Mithough its most popular locations using a second second second second second second second second south and the second second second second second second the Instatuse second seco

12 South Downs National Park Authority (2011) Special Qualities of the South Downs Historical Park South Downs National Park Authority



Box 3.1 Factors contributing to and detracting from transuility

This first State of the South Downs National Park report sets out to capture a picture of the National Park as it is today, providing a baseline against which future changes can be measured. A crucial starting point in managing change for the future is to capture the essence

of what makes the National Park important now - its special qualities.

Viobility of urban development and roads

Positive factors = The operates of the landscape

Lack of noise and disturbance
 The presence of features such as more or views of the set

its perceived naturalises

Detracting factors

The report has been developed in close collaboration with a wide range of organisations and individuals and will be a key tool in enabling us to tackle the complex issues facing the South Downs National Park. These issues will be addressed in our forthcoming Management Plan.

Dark skies is addressed in the third special quality – Tranquillity and unspoilt place – and stresses the importance of efficient lighting design and the protection of darkness. Note that in the except below, 'truly dark skies' are those that exceed 21 magnitude per arcsecond² (Silver)

Dark night skies

The south east is the most light-polluted region of the UK, with street and outdoor lighting affecting the dark night skies and the yellow glow from our towns and cities being visible for miles around. Map 3.2 shows light pollution for the National Park. Only I per cent of the region can be defined as 'truly dark' and many areas are totally light saturated. This represents a significant waste of energy. More efficient street lighting in towns and cities can greatly address this issue.

There are a few pockets of dark night skies within the National Park and these are of great value. In areas where dark night skies remain, the National Park is a place to experience the best free light show there is, with bright stars scattered across the heavens.

"As a lifelong mariner used to using astro-navigation at sea, I am horrified by how much light pollution there is on land. We need to protect the few dark skies areas that are left."

Partnership Management Plan



The Partnership Management Plan (PMP) is the first overarching five-year strategy for the management of the South Downs National Park. It is a plan for all those with an interest in or influence on the area, and it has been prepared by the National Park Authority in close

partnership with others following engagement and debate with stakeholders. Its starting point is the State of the South Downs National Park Report 2012, which provided baseline information against which the success of future action arising from this PMP can be measured. The PMP does not contain planning policies, but does provide a framework for the emerging Park-wide Local Plan. This Local Plan will include spatial planning policies for housing and other development, including light pollution.

Dark skies features as Policy 3 of the PMP

Policy 3: Protect and enhance tranquillity and dark night skies.

As Outcome I shows, Local Authorities are a key partner in this delivery. Local authorities include both Planning Authorities that determine appropriate development and Local Highways authorities that maintain street lights. This application will show how the NPA and the Local Authorities have shown commitment to managing light pollution and how we will work towards achieving delivery.

OUTCOME I The Landscape Character of the National Park, its special qualities and local distinct and the negative impacts of development and cumulative change	tiveness have been conserved by effectiv	ely managing the la
Areas of Delivery (Examples)	Key Partners (Lead in bold)	Other Outcomes Delivered
Tranquillity		
6 Dark Night Skies Mapping, Dark Night Skies status, guidance, highways lighting, new LED low spill technology, removing lighting, turning lights off campaign (also to save electricity)	NPA, CPRE, Local authorities, Highways Agency	4,8

The important point to note about the Partnership Management Plan is that it empowers all relevant organisations and stakeholders to have a due regard for the qualities of the National Park in their operations. What it does not require, is for the SDNPA to do it all. With the PMP there is no need to develop a lightscape management plan where the South Downs places itself as the sole responsibility for street lighting when the local highways authorities are the appropriate – and lawful – administrative body.

Consequently, the lightscape management plan is a summary of the cumulative responsibilities of the National Park, Local Authorities, County Councils and other organisations. Together they form a comprehensive and valid approach to protecting dark skies without the need to create an all-powerful lighting authority.

The PMP constitutes a formal agreement and between the NPA and its partners and stakeholders to have regard and commitment for dark skies.



South Downs National Park Local Plan



When adopted, the Local Plan will set out the planning policies for the South Downs National Park. This will be the first time that the South Downs National Park will be planned for as a single entity. The Local Plan policies will cover a wide range of topics setting out the approach to different types of development from the very

detailed issues, such as the size of extensions to houses, to National Parkwide issues, such as levels of affordable housing over a 15-year period from adoption. It will also include site allocations (for example, identifying a site for housing, or a site for employment use). Once the Local Plan has been adopted, all planning applications for development within the National Park will be judged against these adopted policies.

An Options Consultation Document represents the first stage in developing the Local Plan. It will represent the formal Regulation 18 stage (of the Town and Country Planning (England) Regulations 2012), whereby the local planning authority notifies stakeholders of its intention to produce a local plan. The aim of the Options Consultation is to ask for views on what approach the Local Plan policies should take on various key planning issues – of which dark skies features. At this early stage in the development of the Local Plan the discussions will be broad and at a high level.

Once the local plan is adopted the planning principles in the Lightscape Management section of this document describe how light pollution will be managed by the National Park. Issue 18 - How can the Local Plan best ensure that the design of streets and roads reduces vehicle dominance and speeds, enhances local distinctiveness and minimises signage clutter and light pollution?

What we propose to do

Develop Design Guidance and a Design Protocol for highways.

The Local Plan to ensure that development is designed in accordance with the Guidance/Protocol to raise the quality of the public realm and, where appropriate, to engage with the quality of the characteristic built and natural environment of the area, rather than using standardised highway measures which can erode the distinctiveness and quality of places.

The Local Plan to ensure that signs, road markings, barriers, street lighting and traffic signals will be kept to a minimum to reduce clutter and keep to a minimum the impact on dark-night skies from light pollution.

The Local Plan to ensure that the shared function of roads, streets and spaces within settlements is recognised and priority given to non-motorised movement.

The Local Plan to ensure that additional light spill is kept to the absolute minimum.

Do you agree with this approach?

Yes	96% (47)
No	4% (2)



"Protection is urgent before new developments are forced upon areas in and adjacent to the Park."

ACCESS

The SDNPA's responsibilities are as Access Authority and Relevant Authority under the Countryside and RoW Act 2000.

Rights of Way Network

Rights of Way are the legal right, established by usage or grant, to pass along a specific route through grounds or property belonging to another. They are maintained by the County Councils of Hampshire CC, West Sussex and East Sussex.

The South Downs has ~3,300km of rights of way and other permitted routes across the landscape. They provide many access routes to the dark skies core despite having a relatively large proportion of the landscape in private ownership. Many of the routes will pass directly through some of the darkest areas of the park.



Open Access

In addition to the Rights of Way network, there are a number of sites that permit open access and the ability to roam freely within their boundaries. Although they do not form a single complete entity, they do provide accessible sites, generally free of habituation and external lighting and offer some of the best dark skies. Many of the landscape shots in the document have been taken at these sites.



"We must encourage dark skies movement to enable wonderment at the stars. Councils are the first point by turning down the lamps, and putting many on timers/motion sensors. Empty roads need no light."

WILDLIFE

The National Park has an incredibly rich and diverse array of wildlife habitats that reside under dark skies, many of which are recognised as national and European priorities for wildlife. A large percentage of the National Park as classified as farmland, which includes important wildlife habitats such as improved and semi-improved grassland, arable land and hedgerows. Farmland habitats support populations of many native species, including some which are rare and threatened. Heathland habitats in the National Park – where some of the darkest and open skies can be found – are also very important for wildlife, supporting distinctive plant communities and specialists.

During World War II many of the chalk grassland sites in the South Downs were ploughed and since remained in cultivations. Woodland habitats, such as the important 'hanger' woodlands of the steep escarpments, are recognised for the biodiversity value and often support specialist species such as the barbastele bat.

Habitat Facts

- Farmland habitats (85% this includes some woodland, arable hedgerows and other habitat
- Chalk Grassland (4 per cent), Lowland Heath (1 per cent) Woodland (23.8 per cent – approximately half of which is ancient woodland
- Rivers and Streams (321km of main river)
- Coastal and marine habitats (6.7km², including 20km of coastline
- Urban Habitats



"We have owls nesting in an outbuilding and the dark skies are important for their survival."

Habitat Designations

There are a number of different habitat across the entire South Downs National Park, and, many that reside under dark skies, including Chalk Downland, Woodland and Heathland. Designations include;

- Special Protection Areas (SPA)
 A special protection area (SPA) is a designation under the European
 Union Directive on the Conservation of Wild Birds. Under the
 Directive, Member EU States) have a duty to safeguard the habitats
 of migratory birds and certain particularly threatened birds.
- Special Areas of Conservation (SAC)
 A SAC is defined in the European Union's Habitats Directive (92/43/EEC), also known as the Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora considered to be of European interest

- Sites of Special Scientific Interest (SSSI) A Site of Special Scientific Interest (SSSI) is a conservation designation denoting a protected area in the United Kingdom. SSSIs are the basic building block of site-based nature conservation legislation
- National Nature Reserves (NNR) NNR's are local reserves designed under Part III of the National Parks and Access to the Countryside Act 1949 are deemed to be of national importance.
- Local Nature Reserves

LNRs are areas of land which are designated by Local Authorities as being important as a local natural heritage resource and/or for delivering environmental education opportunities, community enjoyment and appreciation of the countryside.



"Not only is light pollution blocking our view of our beautiful universe, but it wastes energy and money, plus it is detrimental to wildlife. Dark Skies Reserves are essential to stop mankind from eventually lighting up the whole planet."



"Dark skies are so operant for birds as well as magical for us. Nightingales and many others travel at night. Likewise bats suffer disturbance from artificial light. All precious creatures and part of our children's heritage too."

Notable Species

In addition to a number of key habitats there are a number of species that depend on good nocturnal conditions. The images below are a few notable species that can be found on the South Downs.



"It's not just local councils and highways agencies that cause the problem, but also householders and companies that leave bright outside lights on unnecessarily."

Barn Owls Boxes Project



The project aims to protect the barn owl population by ensuring that they have adequate nesting opportunities and by promoting, with farmers and land managers, the importance of maintaining rough grassland habitat in the farmed landscape.

SDNPA rangers and the Volunteer Ranger Service (VRS) are working closely with local farmers to install nesting boxes and to retain grassy headlands, unused field corners, grassy edges to fields and long grass at the sides, which provides the right habitat for the barn owls' favourite diet of small mammals, including mice, voles and shrews. It is also important to provide or retain fence posts as hunting perches.

Barn Owl are primarily active during the hours of darkness as they hunt small mammals almost by hearing alone and are not particularly affected by low light levels. Their eyesight is very effective in the dark, but they cannot actual see in the dark. Darkness means that other species that might compete with or predate Barn Owls who rely on sight for hunting, are unable to. As the proposed IDRS boundary takes in many Barn Owl habitats and box locations, the protection of these skies will benefit this species, by reducing competition. The Barn Owl is on Schedule I of the Wildlife and Countryside Act, 1981, and the birds, eggs, nests and young are fully protected at all times throughout the UK.

Life+ Woodlands in the South Downs National Park:



The overall aim of this project is to secure European funding (under the Life+ Nature stream) to restore and reconnect a high quality matrix of woodland habitats within the project area. The project will benefit a wide range of woodland landscapes, seminatural habitats, and species, for example barbastelle and Bechstein's bats (Annex II & Annex IV European Protected Species). As well as delivering practical conservation work on the ground, we need to ensure that appropriate planning, policy and grant mechanisms are in place to protect and enhance the matrix of woodland habitats in the project area, and in the rest of the National Park.

This project will work to ensure that dark night skies policies and supporting guidance are developed and communicated to planners and developers working in the SDNP, to conserve and enhance dark night skies.

The project will deliver conservation work on the ground through restoring, re-creating and reconnecting target semi-natural habitats, and will also deliver long-term benefits for woodland habitats and species by producing and implementing tailored advice for planners, developers, landowners, land managers, and foresters, and by raising awareness among target audiences of the key requirements of woodland habitats and species.

"It's a small price to pay for conservation."

Wildlife Walks

Many of the partners of the South Downs National Parks have regular wildlife walks that specifically target nocturnal species. Some specifically target species whilst some are general walks and talks. They show there are excellent opportunities for residents and visitors to learn about species that benefit from our dark skies.





"We live outside the park but fully support Dark Skies. When we have seen the stars from the New Forest it is totally breath taking. I am a retired engineer and was involved in dark skies investigations about 10 years ago. I am sure that you know that you will need the support of the public as then the biggest offenders where street lights (and these are being changed around us) and poorly aligned flood and security lights"

Campsites

There are a number of campsites within the National Park and within and around the dark skies core. Although facilities differ, each can support the basic astro-photographer's needs;

- Late Bookings
- Open Dark Skies
- Minimal artificial light



Campsites that have indicated an interest in astro-tourism include;

- Sustainability Centre, Leydenne.
- Wether Down Lodge Camping, East Meon
- Southdown Way Caravan and Camping Park, Hassocks.



"I feel that dark skies over the South Downs are a way to reconnect this new national park to obscured marvel off the heavens above."

SUPPORTING LETTERS



NATIONAL PARKS Brilain's breathing spaces

PARCIAL CENEDLALTHOL FINDAM Let Double Sold Sold Street

and the second s

Dan Oakley (FRAS) Dark Sides Lead and Ranger South Downs National Park South Downs Centre Midhurst, West Sussex GUB9 90H

Dear Dan

Re: NPUK Support for South Downs National Park bid to achieve International Dark Sky Reserve Status

National Pana UK whole heartedly supports the South Downs National Park's bid to achieve international Dark Sky Reserve Status.

The South Downs National Park is a key member at the 15 strong Uf, National Park family and see leef very worthy of this prestigious designation. Across the National Park family we are working to erup Down Sky Reserves and Dark Sky Discovery Offse and indeed many of our national parks are already adsignated as special places to see the night sky. Brecom Bebcans and Empor have already adsignated as special places to see the night sky. Brecom Bebcans and Empor have already adsignated this status and all our loading National Parks have skies that rival some of the Best dark sky places in the UK and the world.

The South Down's the mast densely populated UK National Park Vested between the growing urban sprawts of London and the south coast chites. It is on the trank time of light polution and strovides of Vial dats in a set of ever encroaching surgiture. It's therefore Vialov (matchait for this designation to be awarded to conserve this vital national asset and use it to drive wider change through effective education and awareness rating that embeds behavioural change for perieditors to come.

We're achildeni that a suacestful bid vouid isidend the visitor season – encouraging mare people to visit this wanderful place, learn mare about its special qualities and experience the stellar right sides first hand. This would also have a positive effect on economic grawth – adding value to the vital contribution the UKs National Parks make to the UK economy – witch are alkady attacting around 10Å million visitos, and generating ever 36 billion in spend each year.

There are 15 National Paris in the UK Parity - beautiful areas of mountains, meadows, mooifands, woods and wellands. National Paris UK brings together the UK's 15 National Park Authorities to raise the profile of the UK National Paris, promote undestanding of their special qualities and facilitate collaborative working. PCK are adighted to support the South Downs National Park in their pursuit of International Dark Sky Reserve Status.

Kind regards Kathryn Cook UK Director, National Parks UK





	France Guerra The Bouche South Science Meditures West Science GLOB RDH		Gill Steward Chief Operating Officer 03302 225751 01243 522825 (Fax) coo@westsussex.gov.uk www.westsussex.gov.uk	County Hall Chichester West Sussex P019 1RQ 01243 777100	8	west sussex county council	
			Chief Executive South Downs Centre North Street	27 th November 2015			
"THE OWNER "	Situart Janies	Mean Press	SJ/AG/JW	Midhurst West Sussex			
And in case	01962 843200	1000 collinees.		GU29 9DH			
1000	3 August 7015	-	sicant provi@hunis.gov.uk	Dear Trevor,			
	Des Trever The procession and estimatoment of the fri- gold policities must been an aim in Hangal Philog was published in 1993. While only missify possible. Hamplings Street Light notes contracted progress with the realises the notion energy saving tampic that limit to depend on the set of the power and the time been set of the part with the Name Treet LED by the temp been provided that, come monitoring to thereary, allow lights to be to with two beens carried and in energian the beens carried and in energian the beens carried and in energian the Sodium tam and to generally darked to the Sodium tam and to generally darked to the Sodium tam and to generally darked to the Sodium tam and to be to well your the Sodium tam and the to well your the Sodium tam and the to well your the Andres Some Trees and the to be the the Sodium tam and the to the to well your the Andres Some Trees and the to be the to the top of Economy. The point and Econ the top of Economy to the top of the top of the top the Sodium tam and the top of the top of the top the top of Economy to the top of the top of the top of the top of Economy top of the top of the top of the top the top of Economy top of the top of the top of the top of the top top of the top of the	right-fund onlyid here since the 4 prodest proof ing Private First ment of the mi- set fighting has been and south Do- simult with local initial and South Do- simult with local initial at the Bky larm (lican is was built at the Bky larm (lican is reading) the very lical of a co-operation, comment	someont, and the reduction of summiny is Sineel Lighting and the set owned and the set owned and the set owned and the set owned and the set of the set owned and the set of the towelling were backing the set of were backing the set of motion remote and output rebucard. The drive and penerally possible with owned generally possible with and index to continue the drive and penerally possible with and the imaging these and the imaging these of host an explicit to the of host wy your amplituations in which where a set in the of host wy your amplituations in which where the set in the of host wy your amplituations in which where the set in the of host wy your amplituations in which where the set in the of host wy your amplituations in which where the set in the of host wy your amplituations in which where the set in the of host wy your amplituations in which where the set in the of host wy your amplituations in which where the set in the of host wy your amplituations in which where the set in the set of the set of the set of the set of the s	I am writing on behalf of West Su South Downs National Park to be status. The County Council is committed skies across the County but partin Most of the highway lighting with around a zero upward light comp equipment is renewed within the The County Council is also workin residential areas which includes t where possible. I am delighted to be able to lend bid for Dark Sky Reserve. Yours sincerely Madaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	ussex County Council to s designated as an Interna- to good lighting practice cularly within the area of in the National Park is no onent and the Councils p Park boundary it will be ng towards reducing the l urning off lighting betwee my support to the South	and protect the National Dark the Nationa ow LED whice olicy is that to the LED s evels of ligh en midnight Downs Nat	bid by the Sky reserve ing dark il Park. h has when pecification. It in and 5.30am ional Park

East Sussex County Council



Sent on behalf of Rupert Clubb

Dear Trevor,

INTERNATIONAL DARK-SKY RESERVE STATUS

I refer to your letter of 15 June 2015 addressed to Becky Shaw regarding your bid for International Dark-Sky Reserve status. Becky has asked me to respond as Director of Communities, Economy and Transport.

The County Council has over time been liaising with your officers regarding reducing light pollution.

The planning approach for all development and activities is intended to reflect the policy in the National Planning Policy Framework (NPPF) with regard to light pollution. Paragraph 125 of the NPPF indicates that planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

Considerable progress has been made within the National Park to reduce light pollution. We have now converted the majority of the residential lighting in Lewes so that it is switched off between 0030hrs and 0530hrs with only the busier routes having lighting switched on all night. During 2015-2016 we hope to convert the residential lighting that remains switched on all night, to LED lighting to provide lighting with better optical control and colour rendering.

In addition, we have converted the majority of our residential lighting outside of Eastbourne to part night operation with most lights switching off between 0030hrs and 0530hrs. This includes the towns of Seaford, Newhaven and Peacehaven that are overlooked by the National Park. We have also installed white light and dimming on the majority of our main roads.

We are also working on a project to replace all of the residential street lighting lanterns in Eastbourne with LED lanterns. LED lanterns are now our standard fitment for new schemes and maintenance replacements and therefore the overall proportion of LED lanterns in the county is increasing all the time.

Reducing light pollution within the visual envelope of the National Park will be challenging as the area is visible over a considerable area.

Nevertheless the County Council can support the South Downs National Park Authority in their bid for International Dark-Sky Reserve Status.

1

Yours sincerely,

Rupert Clubb

Director of Communities, Economy and Transport East Sussex County Council D Floor, West Block, County Hall, St Anne's Crescent, Lewes, BN7 IUE CHIEF EXECUTIVE Southampton City Council Civic Centre Southampton SO14 7LY



Trevor Beattie Chief Executive South Downs National Park Authority South Downs Centre North Street Midhurst GU29 9DH Direct dial: 023 8083 2966 Please ask for: D Baxendale Our ref: 150707 Dark-Sky Your ref: 15 June 2015

Date: 7 July 2015

Dear Trevor

Re: South Downs National Park - International Dark-Sky Reserve

Thank you for your letter, dated 15 June 2015, advising Southampton City Council of the South Downs National Park Authority's intention to bid for International Dark-Sky Reserve Status for the South Downs National Park.

Southampton City Council supports the bid to protect dark skies within the area of the National Park.

I can confirm that during the last five years, all the street lighting stock in Southampton has been upgraded. The new equipment is designed to ensure the light is directed downwards instead of upwards into the night sky and emits a white light, in contrast to the old orange/yellow lighting, in order to dramatically reduce light pollution in the sky.

The council has also implemented a dimming street lighting regime to help meet our commitment to carbon reduction, energy savings and light pollution and works closely with our street lighting partner to remove unnecessary lighting.

We will continue to review our approach and explore opportunities to further reduce light pollution, energy usage and CO2 emissions.

Yours sincerely

S. T. Baxendole

Dawn Baxendale Chief Executive Southampton City Council

Beighton & Hove City Council	Chief Executive King's House Grand Avenue Hove BN3 2SU	
Trevor Beattie South Downs Centre North Street	Date:	26 November 2015
Midhurst West Sussex GU29 9DH	Phone:	01273291132
	e-mail:	geoff.raw@brighton-hove.gcsx.gov.uk

Dear Trevor

Re: International Dark Sky Reserve Status

With reference to your letter regarding the South Downs National Park and the dark skies application I can confirm that Brighton & Hove City Council are actively putting into place a number of measures to alleviate the issue of light pollution. We currently maintain approximately 26000 lights of which around 19,000 are street lights. We have a number of initiatives that are complementary to the SDNPS's plans to reducing light pollution and protecting dark skies.

Currently we have a vast array of different light sources ranging from low pressure sodium that emits an orange glow (SOX) to Light Emitting Diode (LED) with the former being a major part of the light pollution problem. As a standard when a lantern requires replacing or reaches its end of life we do install more modern light sources such as Cosmopolis (a directional white light source) or LED, which has an impact on reducing light pollution or sky glow effect , these light sources are far more controllable and do not spread light pollution above the horizon. In the past few years we have also started to install some major improvement schemes on main routes using LED and Cosmopolis lamps but as financial constraints have increased this process has been scaled back.

Brighton & Hove City Council are currently also trialling a Central Management System which gives us the capability to reduce light output at any given time and dim centrally managed lighting by up to 50% on side roads and to 75% on main roads between midnight and 6am, it is possible that we will trial part night switch off on side roads. If this does go ahead it would have to be customer led and consultation would be required. There are a number of outlying areas where this solution might be successful, but obviously given Brighton's night time economy all night switch-off across the whole city would not be an appropriate or viable option.

Probably the most significant action we are undertaking is to seek funding for an invest to save scheme. We are in the process of preparing a detailed business case for consideration by our Policy and Resources Committee scheduled for July 2016. The report will detail the impact on the environment of our existing equipment and consider the

> Telephone: 01273 290000 www.brighton-hove.gov.uk

Brighton & Hove Oty Council

Chief Executive King's House Grand Avenue Hove BN3 2SU

benefits of upgrading to LED lighting and other more adaptive solutions. If we are successful we will then have the capability to fully invest in LED Technology where appropriate or a more modern controllable light source across the city. It is envisaged that as part of this we will roll out a central management system city wide which will allow for adaptive lighting levels and more control. We will install lighting schemes that are designed in accordance with the Institute of Lighting Professionals guidance meaning we will be able to make a major impact on the light pollution that emits from the city at night while also reducing our carbon footprint and energy consumption.

We are fully supportive of your bid and wish you every success. Please remain assured that we will assist in any way we can.

Yours sincerely

Geoff Raw, Chief Executive.

> Telephone: 01273 290000 www.brighton-hove.gov.uk



County Hal Pennhyn Roed Igston Upon Thames Sumey ITTL 20W

Dear Dan

Surrey County Council is pleased to support the South Downs National Park's application to achieve International Dark-Sky reserve status.

In 2010, Surrey County Council commenced a replacement programme of all its 89,000 street lights which was completed in 2014. The equipment selected comprised a number of improvements over the existing stock taking full advantage of some of the then emerging technologies, which many local authorities are now adopting, to reduce energy consumption and carbon impact, reduce light pollution and increase the control the County Council has over its lighting infrastructure. These include selecting lanterns where the lamp is housed higher up within the lantern and through the use of angled mirrors within the lantern housing, light which would have been previously released in an upward direction from each streetlight is instead directed towards the ground. This not only makes each lighting point more efficient and effective but significantly reduces the amount of light released upwards. The council has selected WTRL Philips Ubra and Arc Lanterns for its roads for at least the duration of the PPI contract which runs until 2035.

Through the use of a Central Management System (CMS), surrey Councy Council has been able to adopt a dimming policy where the vast majority of lights are dimmed up to 50% at hight when the need for lighting is reduced. Acknowledging that even with the improved lanterns described above, there will always be some light in areas where street lights are used, dimming the lights when not in full need further reduces any light pollution resulting from our streetlights.

When considering the installation of new streetignts, either by the Council itself or by developers building new roads within housing developments; the County Council specifies that all installations will use Libra and Arc Lanterns as standard. As new technologies such as LED are becoming more maintenam in the streetlighting industry, we are also seeking to incorporate these into our standard requirements. In the case of LED, these are manufactured in a way that sees even more light directed downwards than the equipment currently being used which will have a further positive impact on reducing light pollution.

As a planning authority, we encourage applicants, including our Education Service, to work to the guidance notes issued by the institute of Lighting Engineers and within any policy restrictions such as Intrinsically dark areas' mat exist in the form of National Parks, 40(48 and spion.

To summarise, Surrey County Council is fully supportive of the initiative.

Thank you for taking the time to write to me.

Best wishes,

David Michulty Ohief Executive Surrey County Council



Big House line me Ditte setting Peterborough, 972 Star

Seeding 01719 20 100

Dan Genery South Downs National Park South Downs Centre Micharat Went Scalan GL29 90re

22 June 2015

Dear Liter

Ra: South Downs National Park Bid for Dark Sky Reserve status

8- Scalar ignor can age intransity diarupt the national light/some settores and damage scalarseme. Nany invertebrasis dispand on the national information of day-right and transmission and larger transpose to light weeks. If it is weekly observed that some immerschases, such as motive, any attracted to antificial light on the light that the light of the second product on a week serves of memory and the second product on a week serves of memory and memory and memory and the second product on a week serves of memory accurate and import head no. Decoding and memory accurate and important population.

Dissistences in tabling individually have led to make increases in the overbuilder and in meaning of antificial light in the part hav decades and lis growth is controlling largery and another.

In 2011 bugnle recently produced a detailed report detailing the impacts of Lans polyters on ending "A Review of the impact of Artificial Light on investmented" Chartoffe Bruce Write and Matt Shardow (2011) and U is available hard. https://www.budit.org.ukachers.artic. polytersev.insect.artic.artic.

Due report concluded that action to reduce antificial light imports to review and particle reversion two relates righting about the test to a functioned miximum in all even , annough the even are remain required by available around a to the vector of wear an permodel we argued that -

"Answer with naturel or near-realized lighting regimes should be intrinsity compared. Aptitioned Dark Sky Prevente arous choust be internet an complement the California Port Part Dark Sky Prevente In these ensurweating light subation encoded to induced and afred times and constraints meaned on any www.lighting." Buglife is supportive of all dark sky reserves and enthusiastically supports the South Downs National Park's bid. We agree that South Downs National Park's bid for Dark Sky Reserve status will help raise awareness of the importance of dark night skies, the value of dark environments for wildlife and the environment. With the presence of both hamlets and cities nearby there are particular challenges for you in the fight against wildlife damaging photons. We urge the South Downs National Park Authority to take the designation seriously, to build partnerships with neighbouring local authorities and to ensure that firm action is taken to reduce light pollution in the Park. This will be an important step towards conserving and enhancing the natural beauty, wildlife and cultural heritage of the South Down's noctumal ecosystems, including many rare and threatened moths and important populations of the Glow worm.

Ensuring that new lighting is not 'white' but instead covers a narrow band of wavelengths away from the blue end of the spectrum would be an important step towards minimizing damage to wildlife. We are happy to provide further advice if asked.

We hope that the application is successful and the Park becomes an exemplar of light pollution control.

Yours sincerely,

Matt Shardlow CEO – Buglife – the Invertebrate Conservation Trust



Penneteri, - Carranes Diese Oranne - Mark Felter. Diri - Mala Manifaze Insultanza Caravevita Anan na angemerat durity at kaj insus vianciano, Gran Wannafa, Peterinangi, 452 100 Bagigane Olavry na su intrazilari, Surata Sa (2000), Caravey et al. 4223197 1911-Mail Sharifule were haging any at these days invest

South Downs Society

recting the Beauty of the Downs

Director of Planning. South Downs National Para South Downs Centre

Tuesday, 18 August 2015

6U29 90H Dear Sir

Re: Dark Shies

North Street

Metharst.

West Sussen

The South Downs Society is the national gark society for the South Downs National Park. The Society Ras nearly 2,000 members and its focus is the conservation and enhancement of the special qualities. of the national park and their quiet enjoyment.

The Society very much supports the work being carried out by the National Park Authority to conserve, enhance and promote dark skies above the park, has welcomed the emergence of policies in the park local plan to this effect and has itself been making reference to the importance of dark night skies in its responses to relevant planning applications.

The Society wishes formally to endorse and welcome the initiative to achieve the status of International Dark Skies Reserve ((DSR) for the South Downs-

Yours faithfully.

in al Robert Cheese

Claiman.

oreatry Commission

Eouth England Forest District The Quest's innose, Lyndhurst HERRICH SD41 7NH

> 741 025 6526 3341 Fav: 023 8028 5929

Dan Oakley Dark Skies Project Lead South Downs National Para South Dowre Centre Midmarst West Sussex GU79.9DH

Deputy Surveyor **Bhude Rothine**

13 July 2015

Dear Dan,

RE: International Dark-Sky Reserve Status

Thank you for your letter of 5" June along the Ponestry Commesion (Fonest. Enterprise) to support your project to achieve linkamational Dark-Sky Reserve Shally The Forestry Commusion manage several force: mocks within the South Diminis National Park and as land managers we recognise the usual of the protecting the anothetic value and heritage of the sumpanding landscape its well as the challenges. and preseares posed by surrounding land uses.

If there are any practical measures that you fail we can contribute in relation to use land holding to help preserve or enjoy danii takes filen we would be huppy to discuss.

Youre sincessly

Swith

Jane Smith Head of Planning & Environment.


nicola.briggs@nationaltrust.org.uk Direct line: +44 (0)1932 339491 9 October 2015

National Trust

Mr Dan Oakley Project Lead FRAS South Downs National Park South Downs Centre Midhurst GU29 9DH

Dear Dan

Dark-Sky Reserve Status for the South Downs

Thank you for your letter and I'm sorry that it has taken a while to get back to you.

The National Trust is very supportive of your bid for Dark-Sky Reserve status. It is what many of our sites are particularly valued for. We have held a number of dark sky events at our properties including Black Down, Slindon and Crowlink and we know from the number of people that attend the events and the demand for them how much they value and enjoy the opportunity to view the stars on a clear night. Dark skies are equally important to our built properties and help to maintain the sense of place for sites like Alfriston Clergy House, Hinton Ampner, Petworth and Uppark. It is part of what keeps our places special.

When we are thinking about our places and what people feel is special about them this is usually articulated in a spirit of place statement. Below is the one for the Slindon Estate which I think illustrates the importance that we and our visitors attach to a dark night sky.

Slindon

A parish that flows from the top of the Downs towards the sea. The folly and its views. A raised beach. Tranquil.

Historic network of paths. Romans along Stane Street to the Park Pale. 20th century open access. Significant.

The contrast of the open downs with the woods. New woodland and old. The remains of the great beeches after the 87 storm. Bluebells. Striking.

National Trust London and South East 1 The Courtyard Wisley Surrey GU23 6QL Tel: +44 (0)1932 339470 www.nationaltrust.org.uk President: HRH The Prince of Wales Chair of Regional Advisory Board for London and South East: David Coleman Director for London and South East: Nicola Briggs

Registered office: Heelis, Kemble Drive, Swindon, Witshire SN2 2NA Registered charity number 205846 Badgers and bats. Dormice and hare. A variety of habitats. Chalk grassland and heath. Woodland and Farm. Wild.

Ancient field systems to modern cultivation. A working, active landscape. Agriculture and forestry. Four farms. Flocks and herds. Stewardship.

A village that still has its medieval layout and heritage. Flint cottages and flint walls. Oxblood – the estate colour. Tradition.

A sense of pride in a community that has survived. The Forge - a village hub. Cricket. Pumpkins. Dark skies. A special place.

I very much hope you are successful with your bid.

Yours sincerely

Nicola Briggs Director for London and South East

cc: Jane Cecil, General Manager, South Downs

Cont/d

2



Dan Oakley Dark Skies Project Lead South Downs Hational Park South Downs Centre Midhurst West Sussex GU29.90H

30 June 2015

Dear Dari,

South Downs National Park application for Dark Sky Reserve status.

On behalf of the Campaign to Protect Rural England (CPRE), I am writing to support the South Down: Ilabianal Park initiative to secure protected dark sky status for more than 1,000 square km of spectacular countryside in the South Downs.

CPRE exists to promote the beauty, tranquillity and diversity of rural England by encouraging the austainable use of land and them natural resources in town and country. Formed in 1926, we are one of the longest established and most respected environmental groups in England. A registered charity, we have almost 60,000 members and aupporters living in our cites, towns, villages and the country-lide. CRRE is a network of ower 200 district groups, there is a branch of CPRE in every country, a group in every region, as well as a national affice in London.

CPRE welcomes the International Dark-Sky Association's Dark Skies Programme and the opportunities it brings to recognize and protect the darkest skies across the United Kingdom and the rest of the world.

We believe that darkness at night to one of the key characteristics of the countrylide and makes it to different from towns and titles. A mominit num landscape and the charace to appreciate a star-filled sky, free of the intrusion of artificial lighting, are precious and increasingly endangered timps. 2

In 2003, CPRE launched our *Night Blight!* campaign to raise awareness of light pollution and the effect it has on night skiles and the environment. We mapped light pollution levels around the country using data for 1993 and 2000. Our maps revealed that light pollution in England increased by 266 over that seven year period.

CPRE's light pollution maps showed that, in 2000, only 1% of the skies in the South East were classified in the darkest category and had virtually no artificial light (Fig 1). This applied to 3% of West Susses and Hampshire.

Since these maps were produced, there have been a number of interventions led by local authorities to reduce the impact of street lighting e.g. via the South Coast Private Finance linitative (PF). This scheme is the largest street lighting Pl project in the UK and includes lighting services for Hampshire County Council. Southampton City Council and West Sussex County Council, replacing 250 000 street dights with less light polluting ones. These measures have contributed to almost 736 of the South Downs National Park having Unified(ton Sky Quality Meter readings of 20.00 or above, which would meet the requirements for IDA Reverve Bronze status.

Fig.5

5 11 Lavington Street

Telephone: 020 641 2800 Facsimile: 020 7411 2809 Email: Info§ctim.ing.uk www.cpre.org.uk

Patron Her Majesty The Queen

The Campaign to Protect Aural England exists to promote the beauty, transallity and divertify of called Organist by encouraging the initializable use of large and other outgran resources in town and country.

A company, and and by parantee. registered in Transid, surviver 432477

coards number 700845

Sir Andrew Motion

Charl Selation Shaun Spielts





The South Downs Hational Park's unique location in the pressurised South East means that it is even more important to protect the remaining dark sites. It also offers some of our most transquip liques, according to CPRE's transpullity mapping? Various positive and negative factors (including dark sites) combine to create transpullity scores for each 500m x 500m square, and the South Downs Hational Park enjoys large areas with high levels of transpullity (Fig.2).

"CRWP winds Bight! report can be downooded: http://www.cprc.org.uk/resurces/countrysole/db/ ukeu leam VBB Mare information abuk. CPRE's traceutility mapping can be found. http://www.cprc.org.uk/resurces/countrysto/trançol_places/tem/1635-



Bat Conservation Trust



26 November 2015

To whom it may concern

Dark Skies International Reserve

I am writing to support this important project by the South Downs National Park Authority to achieve International Dark-Sky Reserve status.

The Bat Conservation Trust has been working in bat conservation since 1991. In the UK we work closely, with the building industry, planning process, government and other NGO5, as well as the many other professional sector's whose work impacts bats. We also work to educate and engage the public in bat conservation, responding to over 12,000 calls to our Bat Helpline each year, developing teaching materials and organising public events and activities and supporting a network of nearly 100 local bat groups. We are a founder member of the European NGO BatLife Europe and we assist the work of the European teaching.

All of this provides BCT with a unique vantage point from which to speak on the evidence needed for more effective bat conservation in the UK.

All UK bat species are nocturnal, resting in dark conditions in the day and emerging at night to feed. Many of our species are known to sample light levels before emerging from their roost, only emerging once the light has reached a certain critical level. Therefore lighting near a roost entrance will disrupt this pattern of activity with bats being delayed in emerging which will reduce the time available to feed.

As the main peak of noctunal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. Juvenile growth rates have been found to be lower where roost entrances / exits are illuminated. In the worst case scenario lighting near a roost will cause the bats to abandon the roost.

When bats emerge from their roots they are looking for the fastest and safest way through the landscape, between their roots and foraging areas, to save energy / avoid the extremes of the weather and protect themselves and their young from predation. Once they find a commuting route that fits this criteria, they will habitually stick to them, forming well established routes between the roots and foraging areas. These routes will usually follow unlit linear features such as hedgerows, edges of woods, tree lines and river corridors.

Should part of these routes become disrupted by lighting then this forms a barrier. An alternative route may be available for the bats but in some cases where this is not the case this can result in the loss of a commuting route to a valuable foraging area. Studies have conclusively shown that street lighting has the potential to disrupt the flight-lines of slower flying species – which includes some of our rarest bat species. At the Bat Conservation Trust we are working on the issue of artificial lighting – supporting research, sharing findings, producing guidance and ensuring this information is disseminated to planners, the lighting industry and all those involved with lighting decisions. In March 2015 we hosted a successful European Symposium on Artificial Light and Wildlife (Determining solutions for practitioners) in partnership with ARUP.

The South Downs National Park and surrounding area are extremely important for bats and are home to some of our rarest species – particularly the barbastelle and Bechstein's bat, both of which are woodland specialists with important, well studied populations within this area. These species are very sensitive to artificial lighting and depend on cluttered woodland habitat and dark linear features and foraging areas. The Dark Skies International Reserve project will make an important contribution to the conservation and improvement of this important landscape for both bats and other biodiversity and I write to give it my full support.

Yours faithfully

Huler

Helen Miller Woodland Officer James Berresford Chief Executive

T: 020 7578 1421 F: 020 7578 1401 james.berresRord@visitengland.org

Thursday, 10 December 2016

Mr Dan Oakley Dark Skies Project Lead South Downs National Park South Downs Centre Midhurst West Sussex GU29 9DH VisitEngland

Santuary Buildings so Great Smith Street Lendon SWIP 181

> Т + 54 10120 / 578 1409 F + 57 10/20 7578 1405 www.vlsitengland.arg

Dear Dan

Thank you for your letter updating me on the progress on achieving International Dark-Sky Reserve Status.

The South Downs is already in my view a great asset to English tourism. From rolling chalk downlands to bustling market towns, the South Downs National Park includes beautiful landscapes, providing tranquility and numerous visitor attractions. Indeed, Constable's 'grandest view in the world' at Devil's Dyke sits as a jewel in the crown.

Light pollution has been viewed by many as an issue, making efforts to reduce the impact very welcome. Indeed, developing the South Downs 'tourism offer' to include international recognition as a 'Dark Sky Reserve', especially given how close is it to heavily populated areas, represents a significant boost to tourism in the area. The recognition provided by Dark-Sky status would therefore allow South Downs to develop further the tourist experience and market itself accordingly. This product development is something that VisitEngland will of course support where possible.

Please continue to keep me updated on any progress on the Dark-Sky status. I wish you all the best for your application and please consider this letter a formal and public expression of support.

Yours sincerely,

JAMES BERRESFORD CHIEF EXECUTIVE

US University of Sussex

School of Life Sciences University of Sussex Falmer, Brighton, East Sussex, BN1 9QG, UK.

Tel: (01273) 877476 Fax: (01273) 678433 e-mail: A.J.A.Stewart@sussex.ac.uk

Dr Alan J. A. Stewart

Dan Oakiey (FRAS) Dark Skies Lead and Ranger South Downs National Park Authority Queen Elizabeth Country Park Hampshire POB 0QE

12th December 2015

Dear Dan

I am writing to lend my full support to your Dark Skies Reserve initiative for the South Downs National Park. I admit to having been surprised, but also delighted, that such a reserve would be possible within an area so close to large towns. However, your own survey work on variation in sky glow across the area does indeed seem to show that it would be possible.

As a university teacher and research ecologist. I have been interested for some time in the potential impacts of artificial light on animals in the natural environment. I have a particular interest in the ecology and conservation of glow worms, sepecially in relation to how they respond to so-called "light pollution". Our work has indicated that the behaviour of glow worms is indeed strongly affected by artificial lighting, particularly the white LED luminaires that are now being used to replace the old sodium lamps used for street lighting.

Robust scientific evidence is rapidly growing that shows the profound effects of artificial lighting on various components of wildlife, including many insect groups (moths, glow worms, river files), fish, frogs, toads, birds, bats and larger mammals. The 2009 report by the Royal Commission on Environmental Pollution entitled *Artificial Light in the Environment* outlined the many ways in which animals, and indeed plants as well, are affected. The challenge now is to devise lighting schemes that minimise effects on wildlife by harnessing modern technology to concentrate light of the right type where it is actually needed and avoid unnecessary and wasteful overspill into areas where it is not.

This is why a Dark Skies Reserve within the South Downs National Park would be such a welcome development. It would demonstrate that, even in one of the most densely populated parts of the country, it is still possible to create dark havens where artificial lighting is minimised and people can really appreciate the night sky again. The benefits to wildlife would be considerable and the novelty of truly dark skies would undoubtedly boost the tourism potential of the area.

I wish you every success in your campaign to establish a dark skies reserve within the national park.

Yours sincerely.

Dr Alan J A Stewart Senior Lecturer in Ecology

ASTRONOMY

Hampshire Astronomical Group 24" Telescope at Clanfield Observatory

KEY POINTS



- Over 2,000 events
- I3 Astronomy Societies with over 2,000 members
- Three Planetariums within and nearby SDNP
- Three Observatories within and nearby SDNP
- Over 200,000 annual 'astro' visitors
- Engagement with school kids visitors
- Projects with links to STEM and Scientific institutions



ASTRONOMICAL ACTIVITY

With its large population, the South East is rich with an astronomical heritage and has many societies, clubs, events, attractions and businesses. Many use the Downs for meetings and public events, but also engage with the public in some of the major cities such as Brighton, Worthing and Eastbourne.

We are a region with Observatories, Planetariums and science exhibitions that provide essential educational opportunities. They engage in research projects with Universities that are enjoyed by many thousands of amateur astronomers, members of the public and volunteers.

In combination, these activities of these organisations show that the dark skies of the South Downs are not just a destination for observation, but rather an evolving resource for astronomical activity and science.

From the beginning of this application the South Downs NPA has worked closely with its astronomy societies and visitor attractions. This application could not have been completed with their assistance. Many have helped provide the images in this document, support the projects aims at events and taken SQM-L data. The brief statements of each of the groups show that they are all actively enjoying the enthusiasm and interest for astronomy in the south and use the dark skies that this application seeks to protect.

Visitor Attractions

There are three main Visitor Attractions in and around the South Downs. Between them they take the bulk of visitors and school visits and offer the visitor different and unique experiences to help enjoy and understand our dark skies. All are open to all (subject to times) and actively promote the protection of dark skies.



Case Study John Mason From State of the Park Report



Dr John Mason MBE is a founder member of the British Astronomical Association's Campaign for Dark Skies and has been campaigning for better quality night-time lighting for over 20 years.

"I grew up in an area that is now at the southern edge of the South Downs National Park. In those days it was extremely dark there, with the Milky Way a stunning

sight, particularly on summer evenings. It is surely one of the main reasons why I became fascinated by astronomy at an early age. To me, it is just as important to be able to enjoy a clear, dark, star-studded sky as it is to be able to go on a nice walk in the countryside on a Sunday afternoon.

For the benefit of everyone who is fascinated by the great beauty and wonder of the night sky, it is vital that we conserve the dark skies of those places we still have within the boundaries of the National Park. This is not just about stargazing, it is also about preserving the night-time environment for the benefit of all the animals, birds and insects that thrive at night.

We must ensure that those areas within the National Park which have the darkest skies are protected, and that we have the necessary lighting controls in place to make sure that man-made light doesn't spoil that view in the future. This will require carefully drafted planning guidelines and enforcement of the controls on night-time lighting that are specified.

We should look on those dark places within the National Park as an invaluable resource for everyone who lives and visits here. The South Downs is an area of outstanding natural beauty, and in my opinion, dark skies must be viewed as another of its most important attractions."

"I often watch and photograph the stars from the field behind New Town Road. I set the telescope up there as it's easier than going to Kithurst. We get some magnificent clear nights there, as there is little or none light pollution."



The South Downs Planetarium is located in Chichester just to the south of the National Park. It a registered educational charity and is run by a dedicated team of volunteers and astronomy enthusiasts. It operates throughout the year, but is not open every day and for that reason is not open to casual visitors. Their philosophy is very

much about learning but getting out there and see the real thing. The SDNPA has collaborated with the Planetariums' for its very popular 'Night Watch on the South Downs' star parties held at National Trust sites.

There are usually eight or nine presentations every month which are open to the general public totalling. They taking 14,600 visitors of which 9,700 are of school age and of the 320 yearly events, 168 are purely aimed at schools, colleges and youth groups.



The planetarium is available for private bookings for groups, clubs and societies of all ages. A 96 seat dome is accessible to all and the Richard Bunker Hall supports a further 60 seats for associated science talks and workshops. With one of the largest astronomical libraries

in the UK the Planetarium is deeply associated with the dark skies project and houses the National Park Authority Dark Sky project lead, once a week.

The Planetarium is also involved in other collaborations, including;

• A research fellowship with local sixth form students to undertake research projects before University. Previous students have all

achieved Gold awards and the latest topic is 'Detection of Meteor Trails by High Speed Camera and Radio Techniques

- Installation of an All-Dome Planetarium projector
- Development of a Patrick Moore Memorial Museum.
- The Planetarium was only one a few partner organisations in the UK to exclusively unveil the 2015 NASA Hubble 25th Anniversary Image.



Students with complex or moderate to severe learning difficulties, are welcome and includes learners with additional needs such as sensory impairment (MSI), profound and multiple learning difficulties (PMLD), physical difficulties and medical needs.

"I have been to the South Downs Planetarium a couple of times and have been lucky to see the night sky without any light pollution. I would love to see it for real on the South Downs."



The Winchester Science Centre and Planetarium is located at the far west of the National Park and is a Dark Sky Discovery Site. This self-funded

charitable facility houses the largest free standing planetarium in the UK. It is a state of the art digital projection system with cinema-grade surround sound, offering unique tours of the cosmos. It is a facility that engages both regional, nationally and internationally on astronomy.

The Science Centre is a multi-sensory featuring 100 hands on exhibits to



fascinate all ages. It is an educational resource supporting learning in science, technology and maths (STEM). The Planetarium hosts a wide array of events and shows and features speakers from many varied scientific disciplines.

The centre has taken over 100,000 public visitors and over 32,000 school children in the last year, with the planetarium holding 1,900 events which have included specials;

- 22 space lectures
- 22 Saturday Night Live evenings
- 2 Big Stargazing events using 8 regional astronomical societies
- Astrophotography workshops
- World Space week school days
- I0 Cubs/Brownies badge nights
- 20 Christmas special kids shows
- I9 Adults and single evenings
- Mobile Planetarium hire



The centre also engages in wider projects that include

- Training for overseas Planetarium teams in Jeddah, Saudi Arabia
- Scripting for other UK and International planetariums
- Collaboration with the ASDC/UKSA project communicating astronauts trips to the International Space Station.
- Advisor for the International Planetarium Society Educations Committee
- A full and busy STEM programme

The centre has 2043 members and around 40 volunteers.

"There are wonderful views off the night skies in that area and it would be a massive shame to lose one of the few places in the south east like it."



The Observatory Science Centre is located at Herstmonceux among the observatory domes formerly occupied by the

Royal Greenwich Observatory (RGO) which relocated to Herstmonceux from London after the Second World War to escape the city lights. Each dome houses a historical telescope including the 26 Inch Thompson Refractor – one of the largest in the world. Modern telescopes are used alongside the historic instruments including a 16-inch refractor housed in one of the domes.



The Science Centre has over 100 hands-on exhibits both indoors and outdoors. It operates as an educational charity 7 days per week for 10 months of the year and takes 62,000 visitors, including 20,000 school kids. Alongside the usual daytime activities the Centre holds many evening events throughout the year, including Open Evenings and themed evenings giving the visitors a fantastic opportunity to look at the night sky.

The annual Astronomy Festival, which the SDNPA Dark Skies project has attended, is now in its eleventh year and attracts visitors from all over the country including other astronomical societies including Wealden AS, East-

Sussex AS and Mid-Kent AS. Although the site is outside the SDNP boundary and many miles from our cores, it resides under its own dark skies which are enjoyed by our regional astronomers and visitors.



The renovated telescopes are providing a unique facility for schools, colleges, astronomy societies and the general public, offering a rare opportunity to look through some of the country's largest astronomical instruments.

For International Year of Light they secured Science & Technology Funding Council (STFC) for a new exhibit on the electromagnetic spectrum, workshops and a science show.

"As a Sussex University student this wold be absolutely lovely! Please push it through!"

Societies and Groups

There are over 2,000 members of astronomy groups in around the park who enjoy the dark skies of the South Downs. In addition to member sessions all the groups offer opportunities for the public to engage with the astronomer on the ground. All are highly motivated, knowledgeable and open to promote astronomy and the protection of dark skies.



[&]quot;I've been lucky to experience true darkness (in the Australian Outback). There is nothing quite like it. What a fantastic legacy it would be to leave future generations."



Situated at Hinton Heights in Clanfield, the Hampshire Astronomical Group telescopes and domes are located within the South Downs National Park and a few miles from the core dark areas. Although a private members group – and not able to facilitate

causal visitors – the group has a full program of public lectures and host private visits and courses for anyone. The South Downs NP part funded the acquisition of their 24" Ritchey-Chretien reflector which offers access for children and the infirm. Many of the images in this document have been taken from this facility by its members.

The group has many ties with Portsmouth University Physics and Mathematics departments. The group and observatory provide much needed real experience for undergraduates and have collaborated on a range of projects which include;

- Supernova observation and analysis of light curves looking at elemental decay within the explosive envelope
- Observation of Exoplanets by transit methodology
- Observation and analysis of rapidly pulsating variable stars known as RR Lyra variables.
- Observation and modelling of asteroid shapes from analysis of their rotational light curves
- Modelling and observation of an eclipsing dust cloud around the star Epsilon Auriga (3 year project)
- Characterisation of Lunar topography
- Dynamics of solar rotation.

Current projects include collaboration with the South East Physics Network (SEPnet) are;

- Development of forward scatter meteor detection using 'Graves' French Satellite Radar VHF beacon
- Development of bespoke medium grating spectroscope for the 24" telescope.



The group also have been working with Duke of Edinburgh award students and helped Queen Elizabeth Country Park (within the dark cores) to develop a walking 'space trail'.



"This would benefit the Hampshire Astronomical Group at Clanfield."



HantsAstro was a group founded in 2008 with a remit for 'Modern Astronomy' aimed at those with their telescopes. Amongst others, the

group regularly meets at Butser Ancient Farm located within the South Downs National Park near Clanfield and offers any budding astronomer the opportunity to join and observe the stars in a dark, safe and friendly site.



The group runs many public outreach events, which have included Solar Sundays based at Queen Elizabeth Country Park and specific courses on the basics of astronomy and astrophotography, usually held in Petersfield. The group has a wide range of members and produces the Look up! eZine, followed by over 100 countries.



"I have just lost a large amount of the night stars due to a neighbouring properties badly fitted security light left on all night, up to 15 hours per day. Your campaign gets my full support."



South Downs Astronomical Society (SDAS) was first formed in the 1970's to bring together people with an interest in Astronomy in the South Downs Region. Sir Patrick Moore was one of the earliest members, and helped to develop the club, becoming its president for many years. A dedicated team of like-minded members also formed the South Downs Planetarium Trust and a

Planetarium was constructed as a spin off project. SDAS now has over a hundred members, and meets on the First Friday of each month at the Planetarium in Chichester.

Its core activity is in the form lectures by visiting notable astronomers, as well as observing nights and as a general platform for South Downs residents to meet like-minded enthusiasts. SDAS remains an open and inclusive society, and welcomes members with all abilities, from those just starting out, to professional astronomers (of which there have been many)..



Worthing Astronomical Society was founded in 1965 and owns a National Lottery funded observatory housing an 11" Schmidt Cassegrain telescope. The

group holds regular weekly observing sessions and holds monthly speaker meetings which are open to casual visitors. Although the observatory is not open to casual visits the group takes school groups and beginners.



The astronomical observatory came into being in 1969 when the society was given a 12" f5.6 Newtonian reflector. Over the years the facility has seen a number of upgrades and re-housing, including a £2,600 grant for a new dome and a National lottery grant for a new 11" Celestron GoTo scope that is much more accessible to school and kids visits.

WORTHING ASTRONOMERS

With a similar purpose to HantsAstro, Worthing Astronomers have a remit to encourage use of personal telescopes out in the field. They host many events that are free to any member of the public to join and often use sites (Kithurst) within the South Downs National park as an observation site. They also produce a monthly newsletter for their members.



"We live in an area without street lighting or other homes. There is nothing better than sitting outside enjoying the stars on a clear night"



Foredown Tower Astronomers hold monthly meetings that are open to the public. Speakers come from many disciplines including their own members. Although they do not use social media, the International Charity Emmaus building in which the group meets, has in excess of 2000 followers which receive postings on astronomical events and information.

Two of the members are currently engaged in an All-night-sky-camera meteor study. The group also has camera obscura located on a covered water tower on the Downs.





The Eastbourne Astronomical Society was founded in 1960 with the help of Patrick Moore. It is the largest astronomical society in East Sussex. The society own a total of seven different telescopes. These include: An 8" Skywatcher 200P Newtonian reflector, Meade 8" Schmidt-Cassegrain. 5" Celestron Maksuov and our latest

purchase a Meade Series 5000 127mm (5") with full AutoStar software for GoTo. This instrument cost the society £2,000. The original 12" Newtonian reflecting telescope is now being re-built.

The Society runs public observing sessions within Eastbourne and can attract up to 200 visitors. They have a well-stocked library of some 200 volumes on all aspects of the subject and also run special events and talks for other organisations. They also run public lectures with a wide range of speakers with a typical audience of 40 people.

Much of the SQM-L measurements from the eastern end of the park were taken by the society and plans are being made to re-measure these sites to see if light pollution has changed and is less than a problem.

LEWES ASTRONOMERS

The only astronomy group to be based in one of the National Parks Market town, the Lewes

Astronomers hold monthly meets with a range of respected speakers. They hold observation evening in conjunction with Eastbourne Astronomical Society at Arlington Village Hall.

"The worst offenders see to be 'security' lights and some are positively dangerous when they shine out blindingly at night on dark lanes."



Adur Astronomical Society are a new small friendly group of all standards holding monthly meetings in Southwick when they invite interesting Speakers on astronomy

and other events. Star Parties are held every month where anyone is encouraged to view members' telescopes at the Devils Dyke, which is within the National Park boundary and only a few miles from the densely populated city of Brighton.

Farnham Astronomical Society

Founded in 1971 the Farnham Astronomical Society aims to promote astronomy in North Hampshire and West Surrey. The group holds a monthly society meetings and hold observations day and night public sessions at Alice Holt Forest which is located to the north of Petersfield and within the National Park boundary.



Society and Attractions Stats

Organisation	Members	Events	Visitors	Facebook
South Downs Planetarium and Science Centre	50	320 (168 Schools)	14,600	
Winchester Planetarium and Science Centre	2043	1,900	110,164	
The Observatory Centre	130	60 (not including usual hours)	62,000	
Eastbourne Astronomical Society	132	5 Open Evenings, 5 Obs sessions	1,000	
Lewes Astronomers	No Data	No data		
Farnham Astronomical Society	No Data	No Data		
Adur Astronomical Society	47	12 Star Parties	36	
Foredown Tower Astronomers	24	I Annual Patrick Memorial event	125	
Worthing Astronomers	400	12 public events	1500	350
Worthing Astronomical Society	~20	No Data		
South Downs Astronomical Society	30	Club nights		
Hants Astro	380	Open evenings	4,000(2013)	Very Active
Hampshire Astronomical Group	182	16 Open Evenings, 32 groups	1696	

Businesses

Whilst the SDNPA is not in any position to endorse any one single business, we can show where suppliers of astronomical equipment can be found for visitors and residents ready to jump into astronomy and astrophotography. The SDNPA has used these suppliers for its equipment.

Some are telescope providers, whilst others are more 'camera shops' who provided some limited telescope supplies.





Dark Sky Discovery Sites - Laura Deane: Assistant Ranger

Currently there are three dark Sky Discovery sites in the South Downs National Park, all within Hampshire. These include Winchester Science Museum & Planetarium, Old Winchester Hill National Nature Reserve and Butser Hill National Nature Reserve, all three of which hold a Milky Way class.

To improve the network and provide suitable locations for astronomers to access our skies the SDNPA hope to increase the number by another four sites. These news sites should include:

- Birling Gap (National Trust) SQM 20.7 Milky Way class
- Devils Dyke (National Trust) SQM 20.1 Orion class
- Ditchling Beacon (National Trust) SQM 20.3 Orion class
- Iping Common (Sussex Wildlife Trust) SQM 21.2 Milky Way class

As shown on the map, these designations will provide wide coverage throughout the South Downs National Park for local astronomers to be able to access and enjoy Dark Sky Discovery reserves. The close proximity of these dark sky sites to large conurbations provides excellent opportunity for many to access easily. The sites well known status making them popular places to visit during the day, but not so during the hours of darkness. Although the designations are centred on car parks, the immediate area outside is access land and therefore astronomers have right to roam within the boundaries, taking advantage of better viewing areas.

The process of identifying areas of dark skies, spreading the word of the Dark Skies application bid and contacting landowners and informing them of the project has been an incredibly useful way to communicate the outline of the project and relay useful information about lighting etc. We are very grateful for all who have given time to respond to our enquiries and given permission to be a part of the South Downs National Park dark skies network.





"We have a unique opportunity to engage the residents and visitors to the importance of the protection of our landscape however offering them a fascinating experience."

SUPPORTING LETTERS

The British Astronomical Association's Campaign for Dark Skies working towards star-quality lighting

www.britastro.org/dark-skies

Ike Misen MOE, FRAS CfD5 Co-ordioator 16 The Vinevies, Colchill Wimboos: Doost IBH21 2PX

01210 887084 bound. But many holly distances

My Dan Childre Guath Distored National Plant Rough Diverse Council Million of W Sames GU29 9DES

June 5, 2018

Yings Mr Oakley

The British Astronomical Astronomical and experintly in Campaign fits Dark Sizesmention (CIDS), is particularly interested to hear of the dark-sity initiative in the firmsh-Downs National Park, in the conject of the worldwide IDA ashrina anothering Darklikes senace for mich senace.

We have worked with Callomay Forest Park, the Elan Valley, the island of Sark-Tarmany and Recordonia National Parks and others on similar schemes. The CIDE become that, while premains its aim to exact the optimum right sky for all britesia subgroup day living it is also important to support the ornation of control of fourillines. where astronomers, authorities and local residents work importantly to preserve existing very dark night skies; the opportunity offered to visions on one the faul night asy and perfusps encourage them to work promitte a better night sky where they live is very warfeast-la

We therefore outh you and your group all success in your arm to accord dark-sky status for the Kielder area. Please let us know if we can help in any way.

Yours Anostily, TESS (no link Mines MIDE PRAS Coordinator, BAA CIDA



Um Children South Downs National Park Smills Downs Centre Midlanet

West Strates GU29 913H

1002 mill

ROYAL ASTRONOMICAL SOCIETY

gott House, Philadelli-Louise #11/GRD_UE T 010 178 FTC 18 8 - 6720 Tuller-6 015 dass Margaret M. STATISTICS. Reported (Tority 200 mill

Line Mr Ookley.

Application for International Dark-Sky Reserve Status

Thank for your letter of 5th June 2015 requesting tappart for your applicance for Dark-Sky Reserve Status.

The Royal Autonomical Society has supported offlots to every light polizion live many yars, and accounged the creation of reserves and other areas where the main sky can be used in all its glayy.

Having actess to su copulinged ingits sky has datamonal benefits for automorpy and science education in general. An annuallial view of the nerv and Milley Way with the and eye he alone with telescopes, has a proven utility in impres lasment as a same and backgrounds. An initiast in minimum if also cited by a large proportion of west in legher adaption as key to their initial depiction to pulsue surgery by assume and organizations

These are after advantigged benefits from dark skine store, such as the permanent ethed on with life and the valuetion or energy using and carton temperation respectly designed metting, non-ething particularly in knowing will the educe of 4 national park.

For all these remains, we are literations very lunpay to induce your application. Filmer do im me know il you or the International Dark Sky Association require novadditional information

a cross atomicany.

Prof Matter Dentow President # smill Astronomical Reports

THE Observatory SCIENCE CENTRE

South Downs National Park South Dowos Centre Midharst West Susses GU29 9DH 3 December 2015

Dear Mr Dakley

I am writing to add support to your worthy campaign to achieve international bark-sky Reserve status.

The Observatory Science Contre attracts over 60,000 visitors per year. Set among the telescope domes of the former Royal Greenwich Observatory, an internationally famous astronomical research establishment, the Centre offers a unique Visitor experience.

We are dedicated to promoting scientific learning in an informal setting where everyone can have fun as they learn and with over 100 interactive exhibits there is something to stimulate the minds of all ages and abilities. In addition we are very proud and very fortunate to house some of the country's largest working historic telescopes. As Greenwich became enveloped by the orban sprawil of London, chemical politanost from the smoke filed atmosphere began to attack the coating on the mirrors of the reflecting telescopes and light pollution dimmed the startight. This forced a move from London to Herstmonceuk in the depths of the Sussex countryside where there were clear, dark skies, features essential for the important work of the astronomers. These features still play a vital part in our activities today with astronomy being close to the very heart of the Centre. We offer Open Evenings where visitors are able to look through the historic telescopes and the smaller telescopes of our local astronomical society who volunteer their time. We also offer themed groups and astronomy clubs. Uniformed groups also take advantage of the dark skies including GCSE astronomy their badge work activities. All our evening activities include the opportunity to look through the telescopes.

Diver 2,000 people came along to our Open Evolvings alone last year and many more attended on other evenings. Largely unaffected by light pollution our visitors are wowed by the hight sky and on clear evenings the Milky Way sticks out like a sore thumb! We often have to explain to them what if actually because most of them have hever witnessed it before.

With many of our activities requiring dark skies we are strong advocates against light pollution and use red lights as much as possible. We are in full support of your project and wish to maintain and colebrate our dark skies.

Yours sincerely



(Science Director)

The (Newsonian Terrary and a Wanting Anni, Annonementa Malahara eta Arsan alah)" (Big an The (Newsonian Terrary Anni and 1011) (A 1977)) eta ana antara tanàna amin'ny fisiana amin' MARINI (Menoritany Serie alamany Kanay ana analah) FROM THE DIRECTOR DR KEVIN PEWSYER AN FROM

Mr Dan Oakley Dark Skies Project Lead South Downs National Park South Downs Centre Midhurst West Sussex GU20 oDH

8 December 2015

ROYAL

GREENWICH

Dear Mr Oakley

I am writing to express the Museum's support for the South Downs National Park in its application for International Dark-Sky Reserve status.

The Museum, and the Royal Observatory Greenwich in particular, recognises the inspirational and educational benefits that access to the night sky can bring. As well as being part of our natural heritage, astronomy is acknowledged as a highly effective means of engaging young people with science and encouraging further study of STEM-related subjects in school and at university.

The Royal Observatory's mission is to inspire and foster such an interest in people of all ages and we therefore feel sure that the presence of an International Dark-Sky Reserve within such a short distance of Greenwich can only be beneficial. We wish you well in your endeavour.

Yours sincerely

Dr Kevin Fewster AM Director

ROTAL ODSERVATORY GREENWICH | NATIONAL MARITIME MUSEUN | THE QUEEN'S HOUSE | CUTTY SARK WWW.ENG.CO.UE | PARK KOW, ORFENWICH, LONDON SEID 9NF | +44 10120 0312 5505

RATION COADDAN COADDAN GALEWEN

SURREY

Department of Physics Duridford, Suivey GUZ 7XH Un

Jim B, AL-Shalli GEE PhD CPhys FindP FRAS Hon-F54A,c Protessor of Physics Protessor of Public Engagement In Science

T: +44 (0)1483-686808 F: +44 (0)1483-686731

i ar-Htal Courrey, ac uk www.maxhalil.com

To Whom It May Concern:

I am writing to add my support to the South Downs National Parks' International Dark-Sky Reserve application. Amateur astronomy in the UK is going through a boom period at the moment, fuelled by the success of programmes such as Stargazing Live and the wonderfully revamped Sky at Night, both on the BBC. Astronomy has always had an abiding magic about it, enthusing generations of children and adults alike with the excitement of scientific discovery. It is therefore such a shame that so few of the population of South East England get to see much of the night sky due to light pollution.

The South Downs National Park is one of the most important locations in this regard and I fully support its application to achieve International Dark-Sky Reserve status. One might argue that such status should be reserved for other parts of the UK where the population density and hence light pollution is expected to be lower. It is in fact therefore even more critical that such a landscape, which is being squeezed from all around by the ever-growing urban toprawls of London and the south coast crites, is preserved as an oasis within the ever-encroaching sky-glow and can remain an easily accessible haven for amateur astronomers in this part of the country.

IS FINGLE

Professor Jim Al-Khalili OBE Scientist, Author and BBC Broadcaster



Institute of Cosmology & Gravitation University of Portsmouth Dennis Sciama Building Burnaby Road Portsmouth PO1 3FX UK

> T/F: +44(023)9284 5151/ 5626 www.icg.port.ac.uk

Wednesday 15th July 2015

Dear Sir/Madam.

This is a letter in support of the application by South Downs National Park Authority for International Dark-Sky Reserve Status.

At the University, we benefit from the dark skies in the South Downs via our collaboration with Hampshire Astronomical Group and the use of their observing facilities at Clanfield for undergraduate learning and projects.

As you know, our dark skies are a natural resource, which must be protected for future generations. Special areas like the South Downs National Park, which have such beautiful dark skies must be celebrated and protected, and I add my unreserved support to this application.

Yours sincerely.

Masters

Dr. Karen Masters Reader in Astronomy and Astrophysics Institute of Cosmology and Gravitation, University of Portsmouth





Richard Godley Business Secretary 54 Holmbush Way S4 Holmbush Way S4 Bouthwick Brighton BN42 4YD 01273 592377 business@worthingastronomicalsociety.org

9 July 2015

Dear Dan,

On behalf of the Executive Committee and all of the members of Worthing Astronomical Society may I confirm that we fully support the efforts of the South Downs National Park Authority to achieve International Dark-Sky Reserve status for the South Downs.

Our own observatory is located on the South Downs at what we would consider a dark site. It had previously been housed within the urban environment of Worthing, where it had been affected by light pollution.

We support any initiative to ensure that the South Downs remains free from light pollution, whether encroaching from the adjacent urban area or introduced into it by future development. We agree that it is vital that this rural area retains its natural darkness for the benefit of all in the region, whether they look up at the wonders of the night sky or simply wish to enjoy the benefits of being in a rural setting away from artificial light.

Yours sincerely,

Richard Solles

Richard Godley

Business Secretary - Worthing Astronomical Society





24 March 2015

To wrom it may concern

Winchester Science Centre and Planetarium is a large tourist attraction and school visit destination in the South Downs National Park, run by an educational chanty committed to promoting the understanding of science, technology, engineering and maths. The Centre attracts over 150,000 visitors each year, with additional keech via its mobile planetarium and other outreach activities.

The Science Centre's location within a dark sky area is enormously valued as this allows events to be run in conjunction with regional amaleur astronomy societies where validors can observe a wide variety of estronomical targets. On a clear right, the Milky Way can be seen with the naked eye, and the Science Centre's main visitor car part is a designated Dark Sky Discovery site.

Winchester Science Centre supports the bid to achieve International Dark Sky status and is excited about the new opportunities such a public acknowledgement (and protection) of these skies will bring in terms of bringing new visitors to the region. The Science Centre would be wholly committed to creating new events and activities to accompany the natural riches of the South Downs as a Dark Sky destination.

The Science Centre Itself (opened in 2002) recognises its position as a source of light poliution during opening hours due to its large windowed areas and car park lighting. Where financially vitable, a will commit to reinducing its effect on the area

Or Jenny Shipway Head of Education & Planetarium

08 January 2016



Dear Dan,

I am delighted to be writing on behalf of the Trustees of the South Downs Planetarium in support of the South Downs National Park bid for International Dark Sky status.

We are an educational charity dedicated to promoting an interest in astronomy and science in general in the wider community but particularly amongst children and young people of whom some 10,000 a year attend presentations at the Planetarium with their schools. Most of the children who come to those presentations live in the towns in and more likely adjacent to the South Downs National Park. Their reaction to a Planetarium presentation demonstrates very clearly that the overwhelming majority have never experienced the wonder seeing of the night sky devoid of light pollution.

The South Downs Planetarium is therefore unequivocally committed to working with the South Downs National Park Authority both to support its bid and also to develop activities to exploit the potential of protected areas of Dark Sky.

Yours sincerely,

Robert Kirk Honorary Secretary and Trustee



Foredown Tower Astronomers, Emmaus Community, Drove Road, Portslade, East Sussex, BN41 2PA.

June 22nd, 2015.

South Downs National Park.

Dear Mr. Oakley,

Foredown Tower Astronomers would like to place on record our full support for a Dark Sky Reserve in the South Downs National Park. We consider that being a new National Park there might be an opportunity to try an experiment with street lighting.

We suggest that a trial area be selected to examine the possibility of limiting the use of street lights in this area by the use of motion activated sensors that bring the lights into use when needed. This would be a saving of energy and obviously benefit the lighting cost and also a reduction in the "carbon footprint."

There would be a benefit for astronomers by a reduction of light pollution who could easily be able to avoid encroaching onto the range of the sensors.

On behalf of the Foredown Tower Astronomers.

George Hurrion (Chairman).



Unit 1 Starborough Farm, Starborough Road, Edenbridge, Kent TN8 588 Tel: 01342 837098 E-mail: <u>sales@telescopehouse.com</u> Website: <u>www.telescopehouse.com</u> Telescope Specialists Since 1785

South Downs National Park Att Mr Oakley. South Downs Centre Midhurst West Sussex GU29 9DH

Dear Mr Oakley: I would certainly like to add our support to you campaign for the South Downs National Park to become a International Dark-Sky Reserve.

We are constantly meeting people who are willing to travel large distances to experience a true dark sky location. And with the increased interest in Astronomy here in the UK I think you will find huge support for the campaign.

More and more people are becoming concerned about the problems of light pollution here in the UK and campaigns like yours bring it to the attention of everyone. I wish you well and hope that we can be of some support in the future.

Yours Sincerely

David Lawrence Managing Director www.telescopehouse.com www.bresseruk.com

Starborough Farm Starborough Road Edenbridge Kent TN8 5RB United Kingdom 01342 837098 sales@telescopehouse.com

WORTHING ASTRONOMERT

Dan.

Worthing Astronomers whole heartedly supports the application by the South Downs National Park for Dark Sky Reserve status. The South Downs are a site of natural beauty and interest - so why not the night skies that look down upon them?

With the very best of wishes.

Brian Halls - Co-ordinator, Worthing Astronomers

Worthing Astronomers



South Downs Astronomical Society 27 The Street Rustington West Sussex BN16 3PA

Tel 01903 782378 Email: Meteoritemark@gmail.com Registered Charity No 1032270

10th June 2015

Dear Sir,

I am writing to give our full support to your application for dark skies reserve status. In our opinion the South Downs region is particularly well suited to receiving Dark sky status, as it still has some large accessible areas where light pollution can still be controlled (given the right designations!).

If this status is not obtained then we fear that with the growing pressures on urbanisation, it will shortly be impossible to control the widespread use of poor lighting, which has blighted many other parts of the country. We have a unique geological region that is the South Downs National Park, and having dark skies (where it's needed) has many benefits, besides astronomy - both wildlife and humans have been shown to benefit from proper dark skies at night.

In addition, other regions which have obtained similar Dark sky designations, have already benefited economically from the increased tourism.

It is our belief that it is everyone's right to see the stars at night, not only is sky glow (light pollution) a complete waste of energy, (and detrimental to astronomy) but often is completely avoidable - given some simple guidance and a strategic framework.

We therefore fully back this application.



Mark Ford (Chairman)



Eastbourne Astronomical Society Registered Charity No. 1105267 c/o 22 Meadows Road Willingdon Eastbourne East Sussex BN22 DNF 2rd December, 2015

South Downs National Park South Downs Centre Midharst Wast Sussex GU29 9DH

Dan.

The Eastbourne Astronomical Society fully support the South Downs National Park project to achieve International Dark Sky Reserve status.

We have been slowly losing our dark shee to encroaching light pollution across the whole country. The Royal Greenwich Observatory was relocated from London to nearby Herstmonceux in the 1950's because the skies were darker than London. However, since then the skies have continually brightened and the RGO eventually pulled but of the area as telescopes were moved again to darker climes, this time to the mountains of the Canary Islands.

We need processes in place in and around the SDNP to stop the encroaching light pollution and if possible to improve the current situation, and that is what Dark Sky Reserve status will achieve.

We will offer our continuing support to measure sky quality in and around the SDNP as this allows us, as well as yourselves, a measure of where the darker locations are, and a measure of any improvements in light pollution.

There is nothing more astonishing than on a clear night being able to look skywards and discern thousands of stars, galaxies, nebulae and the Milky Way with one's own eyes - it is a privilege one should be able to take for granted.

Yours sincerely

EAS Assistant Curator of Instruments

www.eastbourneas.org.uk

SAGAS Astronomical Societ

South Downs National Park

June 22nd, 2015

Dear Mr. Oakley.

You will note from our heading that we are group of Astronomical Societies that number 21, many of which meet in premises located within the boundaries of the National Park. The core element common to all of our members is observational astronomy and a Dark Sky Reserve will help us to revive an interest in a subject that light pollution has made difficult.

A Dark Sky Reserve will go a long way toward creating conditions that allow the hidden fascination of what can be seen through the eye-piece of a telescope.

The planets in our Solar System up to and including Saturn are ancient discoveries and it is not known when they were discovered. The "dark skies" in ancient times made it possible for everyone to see these wandering stars.

SAGAS is wholeheartedly supportive of a Dark Sky Reserve in the hope that it will encourage the wider community to enjoy the oldest natural science.

On behalf of SAGAS,

George Hurrion Chairman.

COMMUNICATION

INTRODUCTION

The population of the national park intrinsically lends itself to participation and engagement. With and one hundred and eighty four parishes, involvement and education was an inevitable and necessary element of the project. From the outset it is important that the Authority did not force a designation onto an uninformed or uninterested population, but rather it was supported and encouraged by its residents. They are, after all, the dark skies they live under.

Participating dark skies in events promoting were both important day and night. Given the large number of varied events that already occur in the South Downs it was unnecessary for the Authority to create its own events; rather, the SDNPA collaborated with many of the organisations that already run events. There have been occasions were some events have been specifically arranged – by request – for the SDNPA to run star parties. However, the messages of the project and the importance of protecting dark skies continue to be supported and communicated by many of the parks astronomical societies.

KEY POINTS

- South Downs Pledge received over 1,000 responses
- Leaflets, postcards provided promotional and educational information
- Citizen Science Orion Star count respondents contributed to CPRE dataset
- The SDNPA has completed 50+ day and night events, parish talks and star parties.
- Website has main dark skies website with supplementary 'learning zone' material

Our main focus on communication was;

- Website
- Events
- Parish Meetings
- Pledge
- Leaflets
- Citizen Science
- South Downs View



"I love to see the stars in a velvety dark sky. I notice their brightness and appreciate them more when I come home after visiting friends who live near Gatwick! But also, it's something very special when the moon brightness up the sky and the land of the South Downs. Sometimes, when I've been driving home at night, the full moon seems to follow me along the ridge of the Downs; it's a mystical feeling, a mix of spookiness, peacefulness and timelessness. How sad if this unique moonscape ever dimmed due to the effects of manmade light pollution.

Star Parties

Over the project lifetime, the SDNPA has attended over twenty astronomical events or star parties with the regions societies and will continue to do so. With the purchase of a 14" Dobsonsian – a telescope of such size not often seen at star parties - the South Downs is now a regular partner in events for the foreseeable future.

Many of these events tend to increase around the BBC Stargazing Live season. Although communicating the finer points of the project in the dark at these events is difficult, there now is consistent message running through the societies; that the South Downs has dark skies that are important, of high quality and accessible to all.

Star parties have been held with the following organisations:

- South Downs Planetarium
- National Trust Wetlands and Wildfowl Centre
- National Trust Birling Gap
- Murray Downland Trust
- Worthing Astronomical Society
- Hampshire Astronomical Society
- Hants Astro
- Winchester Science Centre
- The Observatory Centre, Herstmoncaux
- Rogate Village Parish
- Brighton Beacon Hub
- North Weald AONB
- Chichester Harbour AONB
- New Forest National Park
- LewesLight Festival

In addition to typical star parties, some more special events have included BBC Star Gazing Live – Astro Academy and Mission control expert, The Observatory Centre Astronomy Festival and the Big Brownie Bash.



The Telescope of Woe

Of all the purchases needed to complete this project, the telescope was perhaps the most beneficial. Although SQM's would measure quality, cameras would document imagery and inflatable planets would be for education, nothing really came close to the impact of what we call the 'telescope of woe'.

After many star parties and events with partners, we noticed that the biggest crowds tended to congregate around the person with the biggest telescope. In a clear case of 'size matters' we purchased the largest portable telescope that we could handle, a 14" Orion Dobsonian. Though heaving and standing nearly 6ft tall, we have taken the telescope to every star party and event and had hundreds of adults and children taking a look.

Its name reflects not the difficulty in moving it around, but rather the sound that anybody and everybody makes when they first look through it....whoa!!!

Clusters, nebula, galaxies are all clear and accessible to our visitors. One of the highlights was being to observe two galaxies (M81 and M82) and a supernova (SN 2014J) in the same eyepiece. Whoa, indeed.





"Very dark in out area and we can see the Milky Way, the Space Station going overhead and the recent shooting stars spectacle"

Day time events

The lack of astronomy at daytime means that promoting the message of the project is significantly easier. Although it is not appropriate or practical to promote dark skies at every event, we attended many day time events, often with dark skies as a main theme. We will continue to promote dark skies in the future, using the SQM evidence to promote where and how sites can be accessed.

To still provide the wow factor, we use a small 90cm refractor telescope fitted with a solar filter, so patrons could still connect with the sky and safely view sun spots.



To further press the point we also displayed a 'light box' exhibit to show the impact of different luminaire on sky glow. Using the 'Good, Bad and Ugly' adage developed by Dr Chris Baddiley of the Campaign for Dark Skies, we constructed three wooden boxes with three different styles of small garden lighting (Spot, Heritage and Globe) to illustrate good, bad and ugly of lighting. Each had a simple interpretation panel that showed how that particular luminaire design affected the sky.

When connected to electrical power, the light profiles of the luminaries clearly stood out in the black boxes. To further illustrate the point, an image of the Orion Nebula was fixed on the back piece of the box to show how lighting can change the visibility of astronomical objects.

In addition to the telescope and boxes, other interpretation pieces were used to promote dark skies. They were;

- A 'feely box' with seven hidden astronomical objects (e.g. Sextant, meteorite fragment and magnetic putty) were available for patrons to feel and work out what they and the connection was.
- A simple toy 'build a telescope' kit.
- Inflatable planets (for solar system talks)
- Slideshows of images taken from amateur astronomers



"We need to maintain some areas in Southern England were we can see a truly starry sky at night."

Parish Meetings

As there are one hundred and eighty four parishes within the park, communicating the project presented a challenge. With councils meeting at best once a quarter, attending every one within the timescale of the project is not possible. From the outset we decided to attend as many parish council meetings as possible, starting with those parishes likely to be within the core area.

Neighbourhood Plans offer the means for parishes to develop policies that describe how a community values its environment, it was vital that the SDNPA communicated the project at a very early stage. If parishes' councils – the representatives of the residents – could be encouraged to support the dark skies, then a comprehensive set of policies could be established throughout the national park. In combination with the SDNPA Local Plan the parish policies will provide the local element to the wider context and reflect the desire of residents to change behaviour for the good.

We also attended parish meetings by request; some of these were far beyond the predicted core, but also have dark skies that benefit from the project.

Parish Letter

In order to reach every parish we wrote to every council, within and immediately adjacent to the park, asking for support. We encourage every parish to support the project and – if possible – update local policies to include protection of dark skies. For some a reply was quick, but for those small parishes who meet only once a year, or those who have a very small area within the park (often miles from the core) replies will not be immediately expected.

Due to the different demographics of the parishes, some are engaged with different methods of local planning. Although the Neighbourhood Plan is the only formal method that links directly to the SDNPA local plan, residents are also able to develop Village Design Statements or Parish Plans. Often the timescales of when these plans are due for update will differ, but the SDNPA will continue to advise and promote the development of dark skies throughout. We will continue to work with those who have yet to reply. One parish is supportive of the project but has yet to provide a reply, pending the outcome of a planning proposal.

The full texts of supporting letters can be found in the Appendix.

The replies from our Parishes clearly show that we have unanimous support for the application and a lasting commitment to protect their dark skies. Engaging with the community leaders in Neighbourhood planning show that at least the representatives of the parishes are willing to develop 'formal agreements'.



"Dan Oakley did an excellent presentation on 17th May 2015 to Steep Parish Council."

South Downs Website

The main South Downs National Park website has a page dedicated to dark skies and how we are working to protect them. <u>www.southdowns.gov.uk/darkskies</u>





"Often affected some distance inland by lighting from coastal towns and the A27 along the coast, as Patrick Moore once put it "The Aurora Bognor Regis!"

South Downs Dark Sky Pledge

Whilst we can engage with event patrons and parishes within the park, we developed an opportunity to engage with any resident or visitor. If an International Dark-Sky Reserve is to be promoted as a designation for the large population around the park, it was constructive to find some way of gauging wider support.

Through an online survey form, we promoted the 'South Downs Dark Sky Pledge' which provided the means for anyone to comment on their thoughts of the project and offer their support. To our surprise the pledge was very well received and we have collected over 1,000 comments which can be found in the page footers of this document. Analysis showed that 100% of the comments were supportive and ranged from local residents to visitors from much further afield.

The pledge results were unanimous in their support for the application and to protect our dark skies.



"This is a one-time-only opportunity to save the amazing dark skies in the South Downs National Park."

Leaflets and postcards

The SDNPA has produced two main leaflets to promote the dark skies; a general project leaflet and a 'Top Tips' postcard. All the pictures on the leaflet were taken from astronomers within the South Downs National Park boundary.

The Top Tips leaflet has a number of ways that people can reduce their own lighting footprint. As the postcard was produced before the most recent changes to IDA guidelines, the suggested lumen limit is 600 lumens. This limit pervades all other policies at time of writing. But as lumen analysis showed, a difference of 400 lumens is of very little significance in the South Downs National Park.



Dark Skies

i is a great place 0% of the LIK out

the term phen

Why are they important

Light pollucion is an in renduces as With nearly a third of verta

> ays:"This is not just about It preset efit of all the

Find out more ition on how the pro-

outh Downs

Vational Pa

ICT US

K SDINPA

How we can save the dark skies

One of the ways to pr to the wi

Cloce this





Dark Skies In the South Downs National Park

A project to protect the conquility of staright in the South Downs

99

"Saves money, cuts pollution?"
Citizen Science

To provide an opportunity to directly participate in the evidence gathering, we developed a 'citizen science' postcard.

Based on the requirements of the IDA and the CPRE UK wide Star Count, our post card offered two 'fun' means to help contribute to the evidence. Though very dependent upon the age of the observer, the post card provides observers with a slice of education and science. The replies were not sufficient to provide a detailed analysis of darkness, but they did confirm the SQM values and general observation. Thus we can be confident that predicted observation under our sky quality map matches that to be expected.

Orion Star Count

To help support the Campaign to Protect Rural England's Star Count Project, the postcard (see map below) provided an opportunity for observers to count the number of stars between Orion's shoulder and feet. As the magnitude of the stars is a proxy for sky brightness, we expect to find around 30 stars visible to the naked eye for typical conditions in the South Downs.



Andromeda Galaxy Hunt

As one of the key determinants of an intrinsic dark sky is the ability to see the Andromeda Galaxy (M31) with the naked eye, we offered a September-December opportunity for observers to mark out where they could see the galaxy.



South Downs View

The SDNPA produces its main newsletter, South Downs View. It is a newspaper style format and contains features on the authorities work, ideas for visitors and promotion of events. Many are held at tourist information, attractions and events. Dark Skies have featured in a number of issues, including the very first.



"The South East needs to see more stars and less celebrities!"



Learning Zone

RESOURCES TOOLBOX

HE & FE

The South Downs National Park Authority's website has a dedicated webpage about the project. Containing links to the pledge and the Citizen Science projects, the pages generally describe the project.

The Learning Zone is a dedicated section of the South Downs website aimed at providing curriculum material for teachers and students on specific issues such as geology, habitats and key issues. Dark skies feature as a sub-issue and has the following activities and downloads.

Learning Zone

- Guess the Constellation quiz
- Downloadable Planisphere

and it's effects. Find out I

Night Blight Map from CPRE

STEM

Science Technology and Mathematics (S.T.E.M) events and conferences offer an opportunity for the South Downs to actively promote the dark skies project at a younger audience. We have attended three STEM festivals to date exposing the project to thousands of school pupils.

> The Brighton Big Bang festival The STEM Festival at South of England Arena Shoreham STEM Festival





School Curriculum

As the astronomy section showed, schools have a number of sites to visit with an astronomical purpose. Both Planetariums and the Clanfield Observatory receive many school visits a year, so it was important to raise the profile of light pollution within these visits. Talks by the South Downs Planetarium feature a mode that compares the pollution from Chichester and the South Downs to the north. With such a practical connection between a major astronomical attraction and the actual conditions within the Downs, the schools are made thoroughly aware of the issue and resource on their doorstep.

Promotion of the dark skies as a specific curriculum addition was also undertaken at the 2015 Teacher Conference held at the South Downs Centre. The South Downs Planetarium will be attending the 2016 Conference and running a workshop for teachers. School sessions run by the Education Team look at the South Downs as a Special Place with activities that encourage young people to appreciate, understand and care for the National Park. Dark skies are a regular part of these sessions with their links to the important wildlife and heritage of the area.

We have run a number of star parties for schools where the "telescope of woe" has delighted and intrigued both children and parents alike. Citizen Science throughout the National Curriculum can be met by joining in with the local and global fieldwork opportunities; which are highlighted on our Learning Zone and Teachers Newsletters. Students specifically study Earth and Space in Year 5 (age 9) with many local schools use the local dark skies to bring this topic to life and inspire students.

Geography at both key stage 2 and 3 (ages 11 to 16) offers many opportunities for teachers to use dark night skies, especially in helping students to "understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems" (2014 National Curriculum). This can often extend into cross-curricula activities where students campaign to improve their local environment. Many students inspired at the primary level will continue their studies by taking GCSE (age 16) and A Level (age 18) subjects that develop more in depth knowledge through physics, chemistry and earth sciences. These young people are the astronomers of the future.



"Thank you for looking after what is left of the beautiful English countryside in our area, Liphook and the whole of the SDNP!"



believe they do an amazing service and furthe generations should be able to see the night sky in all its glory. A Dark Sky reserve in the South of the UK would be amazing for the local people both astronomers and nonastronomers alike. It would also benefit the local area immensely due to increased astro tourism and celestial viewing opportunities and also help to educate the local population regarding good light practises in the future.

In conclusion, I fully support the efforts of The South Downs National Park Authority as they seek to achieve International Dark Sky Reserve status. The work they do is amazing for The South Downs area and also for the wider UK.

Yours Faithfully

Aleister Blake Mayer

BBC Researcher for StarGazing LIVE

EXTERNAL LIGHTING BASELINE

INTRODUCTION

With a large, diverse landscape it is unsurprising that the lighting footprint of the South Downs National Park is just as varied. Containing over one hundred and eleven thousand residents and hundreds of businesses the impact of external lighting must be sufficiently quantified in order that the dark skies are fully protected. A lighting baseline will help the authority identify the threats and opportunities to lighting in this ever changing and evolving landscape.

This section will show the extent of lighting throughout the park and cover;

- Domestic baseline
- Streetlight baselines Before and after major upgrades.
- Other Sources
- Summary



KEY POINTS

- Village were used to form a domestic baseline
- Heritage style lamps are the most popular luminaire. Despite intrinsic side spill, they all have the capability to be fitted with lamps of 500 lumens or less.
- Bulkhead lights were the next most popular. Similar to heritage styles, they have instinct side spill, but tend to be low powered lamps.
- Security lights were the third most popular. Despite bad installations and brighter lights, nearly all were proximity or timed control and not on all night.
- Approximately 2,800 dark sky friendly streetlights within the National Park (Hampshire and West Sussex)
- Before the PFI upgrades, street lighting in and around the park contributed up to ~8% in upward light spill and sky glow. At least an estimate of 85% had a positive ULR. The new schemes use fittings with ULR <= 0, as standard greatly reducing sky glow
- Local Authorities had a clear due regard for dark skies in upgrades
- LED lights (ULR < 0) most dominant street light throughout park.
- West Sussex has part-night lighting
- Street lights (ULR < 0) used throughout region

"I am a Parish Clerk [...] in Hampshire, a village without streetlights and it is amazing how much difference this makes to the night skies view."

External Lighting Survey - Methodologies

Due to access, time and number of potential number of sources, the chosen methodology was developed to achieve the best representative snapshot of the lighting footprint of the core areas. 100% accuracy was not achievable but by agreement with the IDA, an extrapolative survey based on larger settlements rather than isolated households, was used.

Pilot Survey

In an attempt to speed up the process, an online survey form was promoted via Parish newsletters and meetings for residents to directly input this data according to postcode.

Supported by the Institute of Lighting Professionals and the IDA the survey aimed to capture this data and to provide some educational advice on correct fittings.



EXTERNAL LIGHTING SURVEY ONLINE FORM

Unfortunately, the online form did not generate sufficient interest to derive a representative sample despite the efforts of some to take time to complete it. The failure of this pilot promoted the development of the roadside survey.

Roadside Survey

For each chosen settlement the position and basic fitting types were drawn onto base-maps and digitised walking from the roadside. The variables selected were chosen so as not to require direct contact with the householders due to the difficulty in achieving sufficient data across all variables. No encroachment onto private property was required to reduce any anxiety in the survey and eliminate the need to ask for access. Essentially, the information was recorded as if an enhanced 'Google-earth' methodology and thus in the public domain.

Staff Survey

Due to the limitations of the roadside survey we used a comparison dataset taken from South Downs National Park Authority staff. As individual home owners have provided this data – something that the roadside survey did not do – we know that the data is accurate as possible. Although the dataset will be significantly smaller than that of the main roadside survey, it nevertheless will provide a good estimation of how accurate the survey is and if any adjustments should be made.



Lamp Type



Heritage Wall Mounted, Mains, Side Spill, Low power



Spot Light Wall Mounted, P.I.R Side Spill, Med power



Strip LED Wall Mounted, Mains Spherical Spill, Low power



Floodlight Pole Mount, P.I.R Fully Cut-Off, High power



LED Ground Mounted, Mains Upward Spill, Low power





Bulkhead Wall Mount, Mains, High Side Spill, Low power



Bollard Mains, Side Spill, Low power



Globe Pole Mounted, Main Spherical Spill, Low power



Fluorescent Tube Wall Mounted, Mains Spherical Spill, Low power



Security Wall mount, P.I.R Side Spill, Med power



Modern Wall Mounted, Mains Up/Down Spill, Low power

Spill Profiles

Broad categories of spill profiles were recorded. Many lights had intrinsic spill types, such as spherical for globe lights or side for heritage. Only obvious variations were recorded. The profiles were;

- Down (Fully Cut-Off)
- Side
- Up
- Spherical

Whilst this is a rough approximation of spill, many security lights have beam angle such that most of the light does not spill upwards even if the luminaire appears to be pointing upward. Without a detailed examination, this cannot be determined.

Control

It is assumed that in nearly all cases, external lighting is powered from the mains and internally switched. Obvious proximity sensors (P.I.R) were recorded.

Lamp power

Recording exact lumen output or lux spill was not practical. However, in order to distinguish between dominant types of impact the bulbs were categorised into;

- Low power: Domestic Off-the-shelf lamps or LED up to 1500 lumens
- Medium power: Domestic Off-the-shelf lamps in security lights up to 10,000 lumens
- High power: Industrial standard floodlighting above 10,000 lumens

Building

The type of building usually determines what lighting is needed and used. Farms or businesses tend to require high powered flood lights, whereas households tend to prefer low powered aesthetics. Being able to distinguish between typical profiles will help develop where guidance can be targeted or financial incentives can be used to elicit change.

Night Impact

As the baseline survey was conducted in daytime, an estimation of what proportion of those lights was on after typical usage times is needed. In order to estimate this, the survey was repeated in the evening and after a sensible curfew time, 11pm.

It is likely that this night time profile differs throughout the year. Farmers require lights in different seasons and weather, residents may forget to switch the lights off, or hibernating wildlife may not trigger proximity sensors. Whilst this area of the lightscape could demand a seasonal study, it is no doubt beneficial to estimate the actual impact of lights at night.



"Being able to see the stars from my home surrounding and from up on the downs is very special and adds to the reasons of why I chose to live in this area. Preserving the skies above us is as important as protecting the landscapes which we're walking on."

Summary of Staff Survey

Average total number of lights per house: 1.89





- Heritage lights are the most popular
- Bulkhead and Security lights are common
- Nearly all respondents didn't know lumen levels of lumens. Some knew wattages.
- A wide variety of lamp wattages are used, with a modest spike for security lights of 150W and more.
- A majority of security lights were fitted with timed or proximity controls producing a temporary effect.
- Most lights are protected from view in the wider landscape by village buildings or the curtilage of houses.



"The South Downs are a NATURAL environment, untainted by modern day influences – let us retain this rather than lose it forever"





"There is no street lighting in Stedham and I can't see why this policy can't apply elsewhere."

- Pubs and village halls have the most lights per building
- The average lighting profiles appear to roughly consistent across rural villages.
- The total number of lights appears to be roughly proportional to the number of houses.

Evening/Night Lighting



- Approximately 60% of lights were on in the early evening.
- Much was confined to pubs and village halls
- Less than 10% of lights were on around midnight.
- Nearly all lighting on at night came from low powered heritage or bulkhead lights
- Security lights were mostly off unless temporarily triggered

Estimation of Conformity

- Precise lighting installations difficult to assess from road
- Shops generally offer majority of domestic lamps < 1,000 lumens
- An estimated high proportion (<66%) of domestic heritage and bulkhead light (68% of lighting types) would meet IDA standards for lumen output (2011 guidelines). Those under 500 lumens (2015 guidelines) would require enhanced survey to verify
- High proportion (<66%) of security lights are likely to exceed 1,000 lumens. However, nearly all were on proximity and angled partially downward. (>0 ULR)

Comparison Discussion and Total Lumen Estimation

As expected, the roadside survey produced a total number of lights per house that was less than the staff survey. However in most other respects, the lighting profiles between the surveys were approximately the same. By far the most dominant style of lighting is the heritage or 'Victorian' style of lamp throughout. This is unsurprising given the rural setting of the roadside survey, where owners are more likely to install lighting in keeping with the design of these older houses. These lamps are of the low lumen output, and would normally produce around 500-1,000 lumens, due to the lamp availability at stores.

Security lights were slightly more common in the staff respondents and it is unclear why this should be so. It could be that as most staff live more within the urban environment the need for security lighting is higher. But equally, as the urban environment is brighter the need for bright lights is reduced which would suggest less lights. Without further analysis the reasons for this difference are unknown.

Solar garden lights were more prevalent in the staff survey. This again is unsurprising as the roadside survey could only concentrate on the front wall or any front gardens. The presence of these lights suggest that there could be quite a high number missing from the roadside survey. However, by design these lights tend to be single lamp LED and of such low lumen level, <500 lumens.

Total Lumen Estimation

For the purposes of the lighting threats analysis the total number of lights on the average house must be estimated. Given that the staff survey yields nearly two lights per house, this is the average that we will use. As the lamp lumen levels are similar between heritage and bulkhead lights, we will assume that the two lights on the average house, are a low powered light and one medium powered security light. This reflects that these three lights form the overwhelming majority of styles found. Using typical lamp types for these styles we assume the total lumen output of the average house in the South Downs will be;

Low powered light at: 1000 lumens Medium powered security light: 2500 lumens

Average Total Lumen Output: 3500 lumens

Roadside Methodology Limitations

There are a number of additional limitations to the survey

- Lumens, Wattages, Lamp Type and Colour
- Beam Angle
- Accuracy

Lumens, Wattages, Lamp Type and Colour

Although other Dark-Sky Reserve applications feature details on lumens and wattages, these are not variables that were collected. With modern technologies, wattages do not necessarily equate to lumens, lux or sky quality, and the access to get this information from the roadside is not possible. Lumens and watts are only accessible with direct inspection and given the time required to do so, this data was not recorded. However, in an effort to establish rough output types, the survey recorded a low to high intensity of lamp to categorise the impacts of light pollution given the typical light choices available to the consumer.

- Low: 100 to 1000 Lumens
- Med: 1000 to 4000 lumens
- High: 4000+

Different lamp types such as halogen, tungsten, incandescent, fluorescent or energy saving were not recorded. This was partly due to the difficulty of access and the frequency of possible change. Equally, colour temperature was not recorded.



Beam Angle

Many security lights have beams that are controlled using reflective luminaires that create a peak beam rather than dispersing the light in a full 180° spread. Beam angles can vary from a wide 120° to a much narrow band 20° . Clearly this has a significant impact on the level of sky glow, spill and glare and suggests that even though a security lamp may be pointing more sideways, it's optics are such that the upward light spill is close to zero. As surveying each fitting in detail would be time consuming this beam angle could not be recorded. Typical photometry for security lights are;



Accuracy

Because householders can freely change domestic style lamps, luminaires or installations without planning consent, the continued accuracy of this baseline will reduce. Bulbs break, technologies change and new styles arise; all will impact upon the full accuracy of the survey. However the SDNPA feels that as the majority of these lights are low powered and can still achieve conformity with correct installation and lamp power, the impact of any changes on the quality of dark skies will be at best negligible in either increase or a reduction of localised sky quality. This limitation reinforces the purpose of our survey which was to provide a snap-shot baseline of the lighting and its threats and opportunities – not an on-going, live database of lighting.

Estimating Conformity

From the variables we also estimated the potential conformity to IDA guidelines for lumen levels and Fully Cut-Off fixtures. For most domestic fittings a 1000 lumen (or less) lamp can be used as they are available at retailers. Both screw type and fluorescent style lamps of less than 1000 lumens are available, e.g. General Electric. These are the typical lights found in domestic and bulkhead style lights.

For most security style lighting of high lumen output, angling the luminaire flat to horizontal would satisfy Fully Cut-Off conditions. This estimation is highly speculative and based on very general assumptions, but given the right education and opportunity and engagement, this estimation is at least a very real theoretical possibility.

On observers experience at night, a high proportion of Heritage and Bulkhead lights (< 66%) would conform to 1,000 lumens. Without precise information from the owner or a detailed engineering survey, this could not be completely verified. However there is no guarantee that owners know lumen levels; our staff showed that very little people knew these levels.

Similarly the amount of conforming security lights are estimated to be high. Although they are bright, > 1,000 lumens, most were angled near horizontal with narrow beam angles further limiting their impact. Importantly, a high proportion (90%) were off and temporary, reducing their impact still further.

Given the difficulties in getting precise data, we are confident that;

Over 66% of the domestic lights survey are estimated to conform to 1,000 lumens or less.

The future strategy will look to gain further accuracy on this important issue.

Excel Spreadsheet Extract

10	ID.	Light	Spill	Installation	Controls	Lamp	Building	Building Type	Compliant	Potential Compliance	Height	ON/OFF	Area
ψĤ.		933 Bullhead	Side	Wall	Main	Lov	House	House	D-	9	1		South Haning
012		391 Bullhead	Side	Wall	Main	Lov	House	House	n				South Haning
1013		335 Boltmed	Side	Wall	Main	Los	House	House					Southhaving
1114		995 Bullhead	Side	Wall	Main	Low	Hound	House	n.				South Hating
05		337 Bullhead	Side	Wall	Main	Lov	House	House	n				SouthHaning
3/0		200 DuAlecast	Side	"w'all	Main	Los .	Hinoir	House					Southharing
1011		333 Billhead	Gide	Wall	Main	Lon	Honey	(Acres)	11				SouthHarting
ma l		1000 Buildward	Side	ALAN .	Mein	1,00	House	Носан	n.	w			SouthHatting
NIT		1001 bollard	Side	Fiat	Main	Low	ear park	CarPak	n	n			South Haning
1023		1002 boilard	Side	734	Main	Low	carpaik.	Uw Park	11	11			SouthHaring
1021		1003 bollard	Side	T fat-	Pfanis-	Los	cierpark.	Car Pak.	111	70			SouthHalting
UZ7		1004 bollard	Sde	Fia	Main	Low	CALD NK	Car.Park	n	0			South Hating
027		1005 boilard	Sde	Tlar	Main	Low	cuir park	Car Park	P	n			SouthHaning
1024		1006 bollard	Side	F.Fat.	Water-	Low	cier park	CarPak	- 111	10-			SouthHarting
6510		1007 bollad	Sde	Fia	Main	Low	carpak.	Ex Park	n	n			SouthHating
0.79		theled 8000	Side	FLM	Mein	1.00	cain plants	Car Park					SouthHarting
ú27		1009 Heritage	Side	Wall	Main	Lov	House	House	n.	n.			South Haning
021		1010 Hinthage	Side	Wall	Main	Low	House	Houry	117				SouthHaring
075		1011 Bullinead	Side	Wall	Mein	1.00	House	Heate	0				SouthHatting
101		1012 Bullheart	Side	Mall	Maky	Low	Hours	House	n.				SouthHating
1031		1013 Security	Side	Mall	Main	Med	House	House	n				SouthHaning
072		1014 Dullimed	Side	Wall	Mairy	Low	House	Tixae					Southhaving
(1)P		1015 Bulldwart	Side	Wall	Main	Low	House	House	n.				South Hating
1004		1016 Heritage	Sde	Wall	Main	Low	House	House	n.				SouthHanny
100		1017 Secury	Side	Wall	Main	Med	House	Hotase	n	9			SouthHaring
629		1018 Security	Side	Wall	Main	Med	Hostaw	Hickory	11				SouthHating
1117		E19 Hentage	Side	neang	Main	Low	House	House					SouthHatting
idali -		1020 Bullhead	Side	Wall	Main-	Lov	House	Hotase	in-	9			South Haning
(63)		1021 Secondy	Side	Wat	Main	Med	House	(Kenne-	11				SouthHartes
OM0		1022 ULAhead	Side	No all	Plantin-	Low	Hostsie	House					SouthHaiting
1960		1023 Securey	Sde	Wall	Main	Med	House	House	n.	M			South Hatting

The excel spreadsheet is maintained by the SDNPA and due to its size it not worth showing fully in this document. The graphs (page 110-112) and map plots above summarise this data without needing to include very repetitive data. For residents security concerns GPS data (Northings/Easting) is not shown in this table. GPS is linked via the ID field to the locations on the map. Similarly the map is of sufficient scale not to specifically identify individual buildings.



Buildings Density Mapping

As the survey was limited to village centres often outside the boundary, some estimation of the number of buildings within the whole core must be made. Although the Census housing data provides a figure for how many houses there are in any one parish, it does not differentiate between which houses are within or outside the core. To provide an estimate of population density within the more rural areas of the core, the total number of 'whole' buildings can be mapped by creating a single point for every marker on a GIS map.

'Whole' buildings refers to a shape marker of a building on a map – it may be one house or may be a connected group of houses that form one shape. This may under estimate the number of houses, but provides some indication of possible lighting densities. Where a distinction could be made on whole blocks, e.g. garden boundaries, multiple points were created to represent multiple houses.

The maps below shows buildings in the proposed core area. On the left some additional buildings have been added that lie just outside the boundary. On the right, only buildings within the core are shown. Even though there is little difference - as they are the villages around the outside edge of the park - there are double the buildings (~10,000) in the left than the right (~5500). Note that Petersfield, Midhurst and Petworth have not been added.

It is important to stress - a building does not necessarily imply there is a light.





"Lying on blankets in the Trundle car park, my children saw their first shooting stars in August last year."

STREETLIGHTING BASELINE

As the evidence shows, street lights are the most dominant source of pollution that affects the sky quality in the South Downs. Apart from the larger market towns of Petersfield, Midhurst, Petworth and Lewes, the vast majority of the street lighting impact is found outside the National park. Using the photographic evidence, the main Local Highways Authorities who upgrade and maintain the lights that are of particular relevance are;

- Hampshire County Council
- West Sussex County Council
- Surrey County Council

Of these, Hampshire CC and West Sussex are stakeholders of the South Downs National Park Partnership Management Plan, which requires partners to have due regard for the special qualities of the Downs in decision making on relevant issues; streetlights being one of those issues. They are also part of a joint Private Finance Initiative (PFI) to replace and maintain the counties street lights. The baselines here describe the lighting before and after the PFI's.

All the streetlights within the National Park boundary were provided by the three local highways agencies; Hampshire County Council; West Sussex County Council and East Sussex County Council. Street light data was sought from as many local Highways authorities within the region as possible.



В

"We need to assess whether there is an actual need for street lights to be installed in new developments."

Street Lighting Before the PFI.

Before the Local Highways Authorities in the region began to upgrade their stocks with a regard for National Park qualities, there was an abundance of old inefficient lighting throughout the region.

Although we could not source original datasets, information supplied by Simon Brown and Simon Cornwell provide a snap shot of historic street lighting in the region in the last few decades. (http://www.simoncornwell.com/lighting/home.htm). It shows how the dark skies of the South Downs were threatened and reduced by inefficient lighting, and how the new PFI installation greatly improve the quality.

Hampshire



Hampshire underwent a mass conversion from mercury and tungsten incandescent residential lighting in the late 1970s to 35W SOX in the form of the Philips Mi50 lantern (the predecessor of the Mi26, but optically the same).

This was the status quo until the mid 1990s when high pressure sodium 70W SON lighting started to be used in the form of the Urbis ZX1 (full cut off



versions) in residential areas. This increasingly took over as the older Philips lanterns developed faults and by the 2000s was the de-facto new installation. By the start of the PFI in 2010, probably **40**% of the residential installations were SON.



Main road lighting in the 1980s was 90/135W and some 180W SOX in a variety of lanterns, but by the 1990s the Philips MA90/50/60 predominated. SON for main roads in the form of the Urbis ZX3 (initially shallow bowl but then flat glass full cut off, 100/150/250W) killed off main road SOX more quickly, the conversion started in the early 1990s and by 2005, probably **70%** of Hampshire main road lighting was SON.

West Sussex



In West Sussex residential lighting was often part night – switched off at midnight (Hants was on all night), and 80W mercury lighting was still common in towns and rural areas at the start of the PFI in 2010. Chichester used older style GEC 35W lanterns, (Z9484) in residential areas and had little mercury. Crawley, Horsham, Haywards Heath, Worthing

all had a mix of mercury and 35W SOX.

West Sussex adopted SON for main roads in the early 1980s with GEC Z8526 lanterns, later followed by WRTL MRL6 and Philips SGS203/204. 135/180W SOX in the form of Philips MA50/60 lanterns were also used but the SON/SOX mix pre PFI was probably **85**%



"On a clear night, our views of the stars is sensational – very well worth preserving and improving."





East Sussex

East Sussex being even more rural, retained 80W mercury in residential areas and this tended to be replaced by SON lanterns e.g. Philips SGS201 rather than using SOX. Brighton had mercury (and some SOX) residential/ main road before SON was widely used in the mid 1980s. East Sussex main road lighting is SON and has been for decades.

Portsmouth and Southampton

Southampton and Portsmouth independently maintained their lighting.



Southampton retaining large amounts of residential mercury lighting (80/125W) until the PFI in 2010, whereas Portsmouth used SOX. In the latter, Thorn Beta 5s and GEC Z9530/9582 series lanterns were common. All of Portsmouth's lighting was replaced 2005-2008 and is now Philips Iridiums (see below) running SON in various wattages (residential 50/70W deep

bowl semi cut off, main road shallow bowl 100/150/250W – more cut off but not full cut off). A few pockets of SOX and some LED exist in Portsmouth but it only accounts to a few %.



"The South Downs National Park is one of the few areas in the South East where dark skies can be still enjoyed. Not only am I concerned about light pollution from street lights, houses, supermarkets, etc, but also from flare stacks should fracking take place in the National Park."

Comparison to UK SOX/SON Distribution

As Stone (2013) shows, 85% of the common types of street light used in the UK was LPS/SOX and HPS/SON. Using the data from Hampshire CC, LPS SOX constituted 57%, and 41% for HPS SON. This is higher than the UK average, but still consistent with Stone (2013) and with the data provided above. As this distribution is more local, these values are to be used to estimate threats.

Table 3.1. Common types of street light used in the Britain.

Light type	Colour	% UV	Correlated colour temperature (K)	Approx % of UK lighting stock
Low pressure sodium (LPS / SOX)	Yellow/orange	0.0	1807	44%
High pressure sodium (HPS / SON)	Pinkish / off white	0.3	2005-2108	41%
Compact fluorescent	Warm white	0.5-1.0	2766-5193	15%
Metal Halide (e.g. Philips CosmoPolis)	Blué-white	2.0-7.0	2720-4160 CosmoPolis 2720	N/A
Light emitting diode (LED)	White/warm -white	0.0	2800-7000	N/A

From Gaston et al.(2012); N/A = information not available.

SOX/SON Upward Light Ratio

Due to age, specific photometry on each lantern type was not available. Evidence by Chris Baddiley provides ULR values for general types.

LPS SOX, HPS SOC cut off, HPS SON Full cutoff

Luminaire Type	Upward light ratio (fraction of total above horizontal)	Ground reflection
LPS standard SOX	7.8%	6.2%
HPS SON cut off	3.3%	6.1%
HPS SON Full cut off	0%	6.9%

SON polycarbonate bowl, SON glass bowl, SON flat glass

Luminaire Type	Upward light ratio (fraction of total above horizontal)	Ground reflection	
SON poly-carbon- ate Bowl	0.42%	6.8%	
SON Glass bowl	0.07%	6.8%	
SON Flat glass	0%	6.8%	





(C)

SEC South Coast Street Lighting PFI

All the Local Authority owned streetlights within the national park are part of a major replacement programme lasting from 2015 to 2035. Scottish and Southern Energy plc (SSE), through its wholly-owned subsidiary Tay Valley Lighting (TVL), has been appointed preferred bidder for the £225m, 25-year South Coast Street Lighting PFI (Private Finance Initiative).

Under the contract Southern Electric Contracting (SEC) will replace and maintain 250,000 streetlights, illuminated signs and bollards. The South Coast Street Lighting PFI is the largest street lighting PFI project in the UK and includes lighting services for Hampshire County Council, Southampton City Council and West Sussex County Council. Between Hampshire and West Sussex County Council, approximately 2,780 streetlights within the National Park Dark Skies Core catchments, fall within this contract.







West Sussex CC currently has a part night lighting scheme in rural areas which is due to continue under this PFI. The changes to Southampton City will also benefit the dark skies of the New Forest National Park.



These schemes were not initiated by this application, but its results – lighting with a regard for dark skies – would have been in all likelihood, been the same given the design constraints and demands of each authority. The important point is that there was a concerted effort by the authorities to develop schemes that installed lighting that was dark sky friendly and offered the best reductions in light pollution, particularly in the South Downs.

"Please extend the area to the beautiful Low Weald stretching to the Surrey/West Sussex border."

STREET LIGHTING DISTRIBUTIONS





"As Parish Councillor, why don't we insist on blinds being fitted to new Velux windows."

LUMINAIRE CHARACTERISTICS

Philips Luma



The dominant street light in the National Park is the Fully Cut-Off LED Mini Luma lantern. The 'workhouse of residential streets', it is used extensively throughout Petersfield and Midhurst, but also is used in the majority of installations in many rural villages in

Hampshire and West Sussex as standard. The luminaire is connected to the Mayflower control system which allows dimming, trimming and part night lighting. It has excellent performance and light control and is cool white for enhanced contrast and colour rendition from road surfaces.



With a Downward Light Output Ratio of 92% the Luma has is one of the highest values of any lantern and maximises efficient and the reduction of lighting pollution into the Downs. 12-20 LED lumens option will be used producing a minimum of 1,400 Lumens to a maximum of 5,200, which can be more depending on design requirements.







R2 - Typical distribution for relatively narrow geometries with width / height ratio down to \sim 0.5.

In Luma a number of lens optics are available to match the variety of road and street geometries internationally. The high performance OPTIFLUXTM lenses are fixed within a high reflecting frame, in order to maximise the Light Output Ratio (up to \sim 92%).

"Dangstien Woods Conservancy benefits from outstanding Dark Skies. Many in the community groups that contribute towards the aims and objects of DWV enjoy dark skies from the advantageous, elevated location. We fully support the SDNPA in it's bid to protect this public amenity for the benfit of all residents and visitors to the National Park.

Metcraft Victoria



A heritage style lantern for historic conservation areas, this lantern is installed in many rural villages and in the market centres of Petersfield, Lewes and Midhurst. The design of the light allows the lamp to be housed within the dome, rendering the optics of the luminaire as Fully Cut-Off. The luminaire can be fitted with a range of lamps types; LED being the preferred option with its flexibility with the Mayflower system. With this lighting, the cultural heritage of many rural villages and

market centres can be conserved and deliver excellent light control and minimal pollution. There are 31 of this style (3%) within Petersfield. No photometry brochure data is available.



Urbis Cabrio



A modern style reserved for urban environment the Urbis Cabrio can be found on some of the larger trunk roads into Petersfield that retain a historic character. By its flat bowl design the LED luminaire has excellent light control and efficiency. There are 17 of this style (1.5%) within Petersfield.



"Dark skies helps one to get closer to nature and links up the natural, happy, countryside feelings with daylight hours."

Urbis Saturn



Petersfield

This style of lantern is found with the centre of Petersfield. The lamp can be housed within the dome providing excellent photometry. There are 47 of this type (4%) in Petersfield. No photometry brochure data is available.

Metcraft Gladstone



Based on an original design, the Gladstone Lantern has been modernised to incorporate LED lamps that are houses within the dome minimising the upward lighting spill. The lantern is located within Petersfield's conservation areas to retain its historic character. There are only two lanterns of this type in Petersfield. No photometry brochure data is available¹.

LED Variations





¹ Relux datesets only

WRTL Libra



This lantern is typical of County residential roads outside the National Park, but some are found within Petersfield.

With a minimal 1% upward light, the light output meets the environmental zone requirements and spillage is minimised from

spilling into darker areas by the urban buildings. Currently these fixtures house 36 (2,600 Lumen) to 55W (4,800 lumen) PLL lamps (4,000K cool white) and are linked to the Mayflower system and in West Sussex, are controlled by the wider part-night lighting scheme.



WRTL ARC 80



The lantern is typical of County residential roads outside the National park. Predominately fitted with a 60W Cosmopolis lamp which produces 7,200 lumens at peak power (3,240 lumens at 60% power) and has a colour temperature of 2,715K.

The ARC 80 utilities either the Flat Bowl or the Polycarbonate Bowl which is sufficient to meet residential requirements but deliver excellent light distribution and zero upward light ratio.

This style of lantern is dominant in many other counties such as Surrey County Council such as Haslemere. Upgrades to the lighting in Clanfield has seen a measured increase in sky quality as a result of these changes.



Philips Iridium



For larger trunk roads, such as Me5 to Me3a and CE Class, the Philips Iridium lantern is preferred throughout the region. As a Flat Bowl option, the lantern has zero upward light spillage and is fitted with either 90-140W Cosmopolis or 100-250W SON/T lamps that typically produce around 10,000 lumens at

peak power, with a colour temperature of 2,000K.



Road Sign and Bollards

Illuminated road signs and bollards also fall within the remit of the County Authorities and the general policy to reduce light pollution. However, due to the safety standard, not all fixtures are Fully-Cut Off or part lit.

- Zebra Crossing: Neutral White Philips Mini Luma Mayflower linked
- Externally Illumianted Road signs: Simmonsign LUA Mayflower linked
- Illuminated Bollard: Simmonsign SIMBOL





Mayflower Intelligent Management System (MIMS)

Hampshire County Council and West Sussex County Council utilise the award winning Mayflower Intelligent Management System, which controls all the street lights within the National Park. This system allows complete control over dimming and trimming of the lights which begins at 12am and ends at 5am. They also allow part-night lighting schemes which has been a historic feature in West Sussex and being considered in Hampshire.

> The Mayflower Complete Lighting Control Central Management System (CMS) allows individual street lights to be monitored, switched and light output to be dynamically controlled.

The system is easily installed and commissioned. The design of the system is such that on-site installation is 'plug and play'.

The Mayflower Nodes installed on the street lights communicate with the Sub Master, which in turn communicates with the Back Office System.

This communication provides the user with up-to-date on-site performance data, which is necessary for the effective control of the lighting system.

The Mayflower Complete Lighting Control CMS has Elexon certification and can be used as a pseudo-meter with lighting, signs and bollards.

2





² From Mayflower Brochure (download)

"SDNPA must make this a key feature of its assessment of planning applications."

Other Lighting Schemes in the Region

While all of the streetlights within the National Park are subject to the South Coast PFI, many of the surrounding lighting authorities are in the process of upgrading their stock, will policies similar to that of the PFI. Although they are not subject to the South Downs NP Partnership Management Plan, their impacts are detected in the dark skies. Authorities of relevance are;

- Southampton City Council
- Portsmouth City Council
- Surrey County Council
- East Sussex County Council
- Brighton and Hove City Council





Under the SEC South Coast PFI Southampton City Council has upgraded its stock of lighting. Similar to that of Hampshire CC and West Sussex CC, Southampton's Development Standard for Highway Lighting uses Philips Mini Luma 12 LED Cool White lanterns for residential and distributor roads, and higher LED options for main roads.

The new lights are Mayflower linked and the upgrades will also benefit the New Forest National Park which is immediately to the west of the city.





Through the Streets Ahead PFI, Portsmouth City Council has improved 9,700 lights (over 60% of the all the lights in Portsmouth) and is committed to maintain all 16,000 lights until 2029. The dominant style of residential upgrade is the Philips Iridium, although there are many styles of Heritage lantern throughout the city.





Although outside the SDNP boundary, the lights from Surrey are one of the biggest threats to the dark skies. Haslemere is the closest town in Surrey to the dark skies, and its sky glow can clearly be seen in the panoramic photographic evidence.

Through a separate 25 year PFI contract worth \pounds 148 million grant covering 89,000 street lights, Surrey CC are upgrading their stock.³

The new light equipment is designed to ensure the light is directed downwards instead of upwards into the night sky. In contrast to the old orange/yellow lighting tis will dramatically reduce light pollution in the sky. The CPRE fully support and endorse Surrey County Council's initiative to install downward directional equipment alongside the capability for dimming which both eliminate 'orange glow', such as undesirable feature of both rural and urban environments. Two dominant lantern types are used;

- WRTL ARC 80 45-140W Cosmopolis for major traffic routes. Curved Glass or Flat Bowl are used, both with ULR = 0
- WRLT Libra 55w PLL for residential roads

In conservation areas or urban centres;

- Metcraft Gladstone
- Metcraft Victoria
- Metcraft Shelley (similar to Saturn)⁴
- Pioneer (similar to Cabrio)

The lights will be controlled by a Skanska Central Management System (CMS) similar to MIMS. There will be dimming across the county where the new equipment is installed. Street lights will be dimmed by 50% in residential roads and 20% on main roads between the hours of 11pm and 5.30am and will differ dependant on a number of factors such as class of road.

This dimming will further reduce sky glow into areas of the South Downs, but will also save the council costs and 65,000 tonnes of carbon emissions. There are no plans to turn off lights all together. Existing unlit areas will remain unlit and are outside the scope of the lighting replacement programme.

³ Specification and adoption details for street lights in new developments (2014). (Download

⁴ Shelley/ Pioneer. As of August 2009 Surrey CC PFI Final Business Case (Download).

[&]quot;Being able to look up and see the stars connects us all to nature and the universe. It should be every child's birth right and the South Coast should provide it."





There are many street lights under East Sussex County Council control within the National Park, although none are within the dark skies core. The Philips Luma is used throughout the county. The part-night lighting scheme which operates in rural areas – including the South Downs - also extends to urban areas, particularly those in Eastbourne that are adjacent to the National Park.

Brighton and Hove are at the initial stages of upgrading street lights across the city. Although exact specifications are not yet known it is likely that the fixtures will be consistent with those used in other parts of the South East and have excellent optical efficiency that reduces light pollution and increases the darkness in the Downs to the North.

Highways Agency



Major roads (motorways and large A – roads) are the responsibility of Highways England, part of the Highways Agency. There is one example of Highways England lighting within the dark skies

catchment; Ham Barn Roundabout on the A3 just North of Petersfield. As the image below shows, the recent upgrades to the roundabout are consistent with lighting by Hampshire CC using Philips Luma lanterns.





OTHER SOURCES

There are a number of other lighting sources that are worth discussing

- Farms and rural business
- Traffic
- Gatwick Airport

Farms and rural business

The South Downs is a managed landscape with a high number of farms, estates and small rural businesses (not including pubs). Due to their remote locations and difficult access, farm buildings were not included in much of the domestic survey unless they were immediately obvious. Although the impact from external lighting on houses is small and localised, the impact of flood lights used for agricultural purposes does pose a threat – particularly to the continuity of the dark landscape in the winter months. The South Downs will continue to monitor larger polluters and where necessary, provide information on how impact can be managed. In addition, Estate Planning (see Lightscape management section) offers a means to further promote dark skies and reduce the footprints of these businesses.

Traffic

There are a number of major roads that cross and surround the South Downs. The biggest roads- the A3 from Portsmouth and the A23 from Brighton – run north to south and are the main arterial routes to London from the South Coast. The M3 and the A27 are other major roads, but do not encroach through any larger dark sky cores. The A272 – which runs east to west from Winchester to Petworth, is a much smaller rural road and would be most probably navigation route across the dark skies landscape. The effects of traffic are only observed at night, although the air pollution created throughout the day could create reduced atmospheric conditions.





^{*m*}/*m* an Astronomy PhD student at the University of Sussex, a university surrounded by the South Downs. Having dark skies status would not only be good news for the wildlife in the Downs, but would allow us to enhance our public engagement in astronomy. We see thousands of people of all ages every year from all across the South East who come to hear us talk about our research and show off the night sky in all its glory, even though the every-increasing nearby light pollution prevents us from looking at most deep sky objects. Imagine how much more we could do in the Downs with DS Status. This would be a massive step forward and it would be exciting to have dark skies so close to many people!"

As data from the A3 tunnel project shows, traffic volumes unsurprisingly decrease after the rush hours. Although the data stops at 22:00 hrs, from experience there does still remain traffic on the major roads most of the night, albeit much more reduced than peak times. Consequently the impact of traffic is intermittent and seasonally dependant which can be avoided when seeking out dark sky sites.

Using the hourly flow rate we can estimate the estimated total lumen output for any average evening at 9pm. Assuming that a car has a typical output of 3000 lumens (main beam 2×1500 lumen 60W bulb), that there are 1000 vehicle per hour (500 north bound, 500 south bound), and that an average south coast commute is an hour; this yields approximately 3 million lumens produced at 9pm. Whilst this may seem a large number, it is less than estimated domestic output of the villages within dark sky cores.







Gatwick Airport

Looking up at the sky day or night, it is clear to see that UK Airspace is a busy place. Gatwick Airport - the world's busiest single use runway - lies 20 miles to the North of the South Downs and creates a substantial number of over flights in addition to the contribution from other airports, including Heathrow. Their aircraft will create two problems for the dark skies;

- Visible lights across the night sky
- Contrail and clouds

Fortunately, the frequency of over flights does decrease at post-midnight, but the effects can be clearly seen in the early evening. The most pronounced impact is the visibility of the aircraft themselves. Whilst the direct glare and illumination is not sufficient to significantly reduce sky quality or observation quality, they do remain a detractor to the continuity of the night sky.

Perhaps a greater but less visible problem arises in the contrails. Depending on atmospheric conditions, the contrails of aircraft can create a light haze across the sky than will reduce sky quality and increase the possibility of high altitude scattering.





Flight paths to/from all Airports showing AONBs and National Park Bounda

Though our influence in this pollution may be superseded to the national need, the SDNPA looks to minimise this threat. In 2014, the Airports Commission published the "Gatwick Airport 2nd Runway: Business Case and Sustainability Assessment" consultation. As a consultee the South Downs National Park replied

The current Management Plan and Landscape Character Assessment for the National Park both identify tranquillity and dark night skies as important special qualities of the area, which we would seek to protect and enhance.

Given the sensitivity of the National Park, and the value placed on tranquillity within it, we feel great weight should be given to it. We would consider that air routes below the 7,000 feet mark, where they **overfly the National Park, should be avoided**. This approach would be in line with current CAA guidance.

"Get rid of most street lighting. Cars have headlights, people can carry torches, burglars don't need to see where they're going."
BASELINE SUMMARY

Although there is a large proportion of domestic lighting throughout, it does not generally reduce sky quality except in the immediate location where the light is generally needed. The vast majority of these lights are low powered, intermittent and are off during the night. The dominant lantern type was the heritage design, which is in-keeping with the rural style and conservation area requirements.

It is clear to see that there is a significant change in light quality between street lighting baselines. Before changes to lighting, lanterns were inefficient, produced significant amounts of upward light ratio with little capability for protecting dark skies. Since then, all the new types within the South Downs and within the dark skies core have a zero upward light spill, with a measured increase in sky quality. The SDNPA believes that this shows a true and lasting commitment by street lighting providers to protect dark skies.

- Heritage style lanterns are the most dominant style
- Less than 10% of the total lights were on at midnight
- The dominant domestic styles (Heritage, Bulkhead and Security) all have the capability to conform to IDA guidelines with either lamp power or correct installation. The current estimation of conformity particularly with Heritage and bulkheads is high to a 1,000 lumen limit. Certainly above 66%.
- Before the PFI, the ULR of street lights was above 0% and in many cases reached 7.8%
- After the PFI, the ULR of street lights around the national park has been reduced, with only a 1% ULR in some cases. Most are 0% ULR. 100% conform to IDA guidelines.
- The PFI's had a due regard for the dark skies of the South Downs.





The Elephant Trunk Nebula: IC 1396. Simon Downs

INTRODUCTION

This section aims to provide some analysis of the lighting threats in and around the park. It will show that despite the large number of lights, that an IDA Reserve is completely possible and manageable.

As the South Downs National Park does not have sufficient empty space surrounding it, developing the option of buffer zone purely based on square km is not practical; there are too many cities, local authorities and diverse boundaries to create an effective buffer zone. Instead, our approach is similar to existing IDA sites in UK National Parks where the buffer zone is sufficient to mitigate 80% of the current and future threats. To verify the effectiveness of this type of buffer, the threats must be estimated using the information provided in the street light and domestic lighting surveys.

To do this we will estimate;

- the total lumen output of the Street lights within the area both before and after the major PFI changes
- the total lumen output of the parishes using the domestic lighting survey
- the percentage threats of the combined street lighting and parish profiles for before and after the PFI changes.
- The impact of domestic sources on the sky quality within dark sky cores.

From this we can identify where the major sources of threat are and how the buffer zone can be verified to both fit into the topology of the landscape and boundary, and be effective in terms of policy.

This is not a scientific study, as there are many assumptions and ball-park estimates. Given the agreement with photographic evidence there is however, enough certainty in these estimates to provide a realistic understanding of the threats.

KEY POINTS



- 97% of the current and future threats lie outside the core boundaries
- Under the best midnight conditions, there has been an estimated 75% reduction in total lumen output between the street lighting schemes that are a direct threat to the dark skies
- The actual output of domestic sources is significantly less than their total lumen capacity.
- Over 94% of the domestic lighting sources lie outside the dark sky cores. The dominant impact on sky quality in the South Downs is the artificial glow from the surrounding cities
- Over 88% of the estimated lighting threats to the dark sky core, lie outside the National Park boundary. In the best current conditions post-midnight, approximately 3% of threats – from low powered domestic sources – lie within the dark sky core.
- Domestic sources interrupt the continuity of the dark skies landscape rather than directly reduce sky quality
- The glare from badly installed security of floodlighting presents the greatest impact from domestic sources
- The overall reduction in sky quality by domestic sources is limited to the immediately local environment, except in high powered badly aimed sources.
- Long term management and access to an International Dark-Sky Reserve is completely possible in the South Downs, despite its high relative population and lighting density.
- Cumulatively, this satisfies the 80% mitigation requirement for our derivation of the peripheral zone.

"I think this is a wonderful idea – it would be fantastic to be able to enjoy the South Downs more at night with reduced light pollution."

LUMEN OUTPUT FROM THE STREETLIGHTS

In order to determine the threats, we grouped whole parishes as either in or out of dark sky cores, rather than on the reserve boundary. This will artificially increase the total lumen output for the cores but is far easier to calculate given the Census and streetlight data is provided at a parish or borough level.

Parishes were split between those whose villages tended to within dark sky cores, those that surround the cores but lie within the national park (e.g. Petersfield, Midhurst) and those that immediately surround the park and emit the bulk of the light pollution as found in the panoramas. These surrounding areas included;

- Havant, Emsworth, Waterlooville
- Alton
- WhiteHill and Bordon
- Hordean
- Haslemere
- Arundel
- Chichester
- Worthing BC
- Pulborough
- Storrington
- New Alresford

Larger more distant cities such as Winchester, Portsmouth and Bognor have not been included even though their lighting can be clearly seen in the photographic evidence. It is worth nothing that adding these cities in will greatly increase the threat coming from outside the park.

Three distinct zones are defined

- Dark Sky Core parishes that included dark sky core areas
- SDNP Parishes with no dark sky cores, inside the national park
- Area all other areas outside the SDNP

Where exact streetlight numbers were not available, the average number of streetlights per population was used, calculated from those areas where that exact data was available.



"Before the area became a National Park, planners seemed to turn a blind eye to light pollution from excessive security lighting on dwellings. Any incentive to remove such lights would be welcomed. As would preventative measure through planning process (as SDNPA is now the planning authority)."

Old Streetlights

For simplicity, using the data from the external baseline we can generally define two types with general characteristics;



- High Pressure Sodium (HPS SON) producing 10,700 lumens
- Low Pressure Sodium (LPS SOX) producing 13,600 lumens

Although the new LED lights tend to require a closer spacing, we have assumed that the total number of street lights is roughly the same. Using the data from HCC we can use the total number of street lights within settlements to derive an approximate lumen level from the 57%-41% LPS/HPS mix given in the baseline estimates. Where exact street lights per settlement data was not available, we estimated a figure based on other known areas, calculated from an average street lights per population.

For example, we estimated Haslemere to have a population derived average of around 1242 fittings which produced

- 708 (57%) LPS SOX types producing 9,628,800 lumens
- 534 (41%) HPS SON types producing 5,713,800 lumens

A total of 15,342,600 lumens.

Extrapolating this method across the relevant area, we derive the following;

- 246,521,686 SOX
- I46,316,599 SON
- **392,838,286** lumens total

This is equivalent to 31,252,000 candles!⁵

⁵ One candle is 12.56 lumens

New Streetlights

Using the data in the external baseline we can generally define the main types of dominant residential street lights;



- Luma (1,400 to 5,200 lumens)
- Libra (2,600 to 4,800 lumens)
- Arc80 (7,200 lumens at peak)
- Iridium (10,800 to 17,600 lumens)

Due to the dimming and variance in lumen output across all types, we have assumed an average lumen outputs for different scenarios, for all types. Libra and Luma lanterns constitute the bulk of the stock across the counties (~80%) and have similar lumen outputs, so an average is representative. The Max Power scenario is illustrative; it shows the maximum output if every light was turned up to the full. In reality, streetlights operate either or reduced evening settings till midnight and further reductions till dawn.

- Max power (worst) 6500 lumens
- Evening normal operation: dusk till midnight 5000 lumens
- Night operation: dimmed/Part night: midnight till dawn (Best case) 3000 lumens

Using these averages we can estimate the total average lumens from the new streetlights under these different scenarios.

- 206,783,780 lumens for worst, max power
- I59, II5, 216 lumens for normal evening operation
- 95,557,129 lumens for best, post-midnight.

"Probably won't be helped by the new kitchen built next door that floods light straight upward through the glass roof!"

Under the best midnight conditions, there has been an estimated 75% reduction in total lumen output between the street lighting schemes that are a direct threat to the dark skies.



Before the PFI upgrades, street lighting in and around the park contributed up to $\sim 8\%$ in upward light spill and sky glow. At least an estimate of 85% had a positive ULR. The new schemes use fittings with ULR <= 0, as standard greatly reducing sky glow.





"It's a magical experience viewing the stars without light pollution. It emphasises the greatness of the Universe and how arrogant we are in the way we try and overcome rather than co-exist with our environment. All strength to your work.

DOMESTIC LUMEN OUTPUT

Using the domestic survey data we can estimate a representative lumen output from external light fittings on any average house. From our survey we found that there is, on average, one light per house. With the deficiencies in our survey we will assume that every house has a greater than average output more representative of the staff survey, with one low powered lamp (1000 lumens or less), and one intermittent medium power 150W security light of 2,500 lumens; totalling 3,500 lumens capacity. In the evening approximately 60% of low powered lights were on and post-midnight 10% were on. The vast majority of these were businesses; usually pubs and community centres. Approximately <1% of medium powered security lights were triggered or on. Three average lumen output for evening and postmidnight scenarios are suggested.

- Full capacity: 3500 lumens (1000 heritage + 2500 security)
- Evening: 60% of 3500 lumens: 2,100 lumens
- Midnight 10% of 3500 lumens: 350 lumens

To make a meaningful comparison between areas, lighting output has been determined on housing numbers-per-parish not on building mapping. This is due to the difficulty in recording the huge potential number of buildings around the area. Instead, Census housing data was used as the proportion of lighting between the areas is consistent and comparable. This will overestimate the total lumen output from the core, as the housing data will include all houses within a parish, regardless if the parish population is split by the IDA boundary.

Using 2010 Census data, the lumen output could be estimated by applying the scenarios to the total number of houses with a parish or city inside the cores, inside the national park and those that surround. We assume that the behaviour of residents to their lighting is consistent between the rural and urban setting and there isn't a significant difference in use between the two.

Over 94% of the domestic lighting sources lie outside the dark sky cores.





"I live in the most light polluted part of the UK. If any part of SE England can preserve dark skies, I'm all for it. My late father grew up on the South Downs, and learned the constellations there."

ESTIMATING THE TOTAL THREAT

With the domestic and street lighting lumen outputs estimated, we can combine these values to determine where the total threats to the dark skies are. Two general scenarios are estimated between the old (pre-PFI) street lighting regime and the new. Alternatives using full capacity of both domestic and street lights; real-life reduced domestic output during evening (60%) and midnight (10%) variations are also used.

To make a meaningful comparison between areas, lighting output has been determined on housing numbers not on buildings. This is due to the difficulty in mapping the huge potential number of buildings around the area. Instead, Census housing data was used as the proportion of lighting between the areas is consistent and comparable.





Under the best post-midnight conditions, the estimated total lumen output has been more than halved between old and new lighting regimes.

Over 85% of the estimated lighting threats to the dark sky core, lie outside the National Park boundary. In the best current conditions postmidnight, approximately 3% of threats – from low powered domestic sources – lie within the dark sky core.

"There are far too many very needlessly bright lights, not just in the South Downs, but also in towns and villages."

Parish Breakdown

Combined domestic and streetlight data can be broken into parishes. Unsurprisingly, the dominant source of threat emanates from the larger villages and towns within the National Park. These sources of pollution are dwarfed however, when compared to the light from parishes outside the national park.

The dominant threats within the National Park lie in the larger market towns of Petersfield, Midhurst and Liss.

In regard to the 2km buffer zone, as the SQM data shows, the increase in sky quality across the landscape from these threats to the dark skies is sufficiently thick to mitigate their impacts. If it wasn't, there would be no dark skies of any quality to begin with.





"I can look back with fond memories of real dark skies in my childhood, clear and un-interrupted views of the stars, it would be nice to think children today could have those same memories in later life."

FUTURE THREATS

Population Increase

The demographic landscape of the South Downs and the wider area will not be static. Development will occur throughout, implying an increase in domestic business and street lighting. The Office of National Statistics project that the population is set to rise by 8% by 2020 and a population of 75 million for the UK as a whole – an average annual rate of growth of 0.8% per year. While the link between housing provision and population is complex and varies across the UK, the South East has a higher relative population than of other areas. Therefore we can expect that the area will see an increase in development and light pollution.

If we assume the constant increase of 0.8% of domestic lighting and streetlights throughout the life of the current stock (approximately 2035), we can estimate the total lumen output throughout this period.

As the chart shows, that even with the projected rise in housing and population, the buffer zones within the South Downs are still sufficient to protect the dark skies. Furthermore, even if the street lighting provision were to double (in lumens), the total output would still be less than the old SON/SOX mix.

In reality, more development is likely to occur outside the National Park than in, so these estimates are also likely to underestimate the differences between the dark sky core and the surrounding area. It is worth noting, that as development progresses, the proportion of lighting threats outside the park will increase the disparity between dark sky cores and the wider area.

Even with the projected rise of housing and population in the South East, the buffer zones are of sufficient size to mitigate against any likely development outside the National Park.



"This precious heritage must be protected. I hope to visit this treasure one day."

Increased Core Parish Domestic Lumen Output

Although our lighting survey attempted to capture every single light source, it is likely that not every fitting was captured. When compared to our staff survey, we found that our average lights per house is probably less than reality. To provide some estimation of the error in this process, we increased the total lumen output from domestic sources *only* within the core area under best conditions (new streetlights midnight), whilst keeping the domestic lighting output and all the street lights constant.

As the graph shows there would need to be a ten-fold increase in total lumen output (ten times as many lights per house), before the percentage threats outside the core area fell below the required 80% mark.

When compared to the staff survey results, the likelihood of this core increase is very unlikely, especially when we have already overestimated the average lighting. It is more likely that the true number of lights is closer to the staff survey and not this unrealistic upper limit. Therefore, despite the limitations of the survey method it is a fair to conclude that the dark skies core will not be under threat from a sudden increase or missed survey of domestic lights.

The core and buffer boundaries are sufficient to absorb a ten-fold increase in domestic lighting before the threats outside the boundary falls below 80%. It is highly unlikely that this will happen.



Comparison to the SQM map also suggests that even though there may be more lights out there than expected, it does not necessarily imply that there will be a reduction in overall measured sky quality.

Baseline Survey Error

Increasing the number of lights within the core parishes also provides an estimation on the accuracy of the baseline survey. As the graph above shows, there would have to be a ten-fold margin of error in the baseline before the threats inside breached the 80% mark. Even with a doubling of lights between street and staff surveys it is not expected that such a high proportion of error is inherent in the survey. We can therefore have confidence, that even with error and uncertainty in the baseline, it does not render the threat analysis obsolete nor exceed IDA requirements.

"It is one of those stunning features that really needs to be preserved and, sadly, is being list in so many parts of the country. We value the brightness and beauty of the constellations that are evident within the dark skies over our home"

DOMESTIC LUMEN IMPACT ON SKY QUALITY

To establish the actual impact of the various lights and fittings on recorded sky quality, a short study was conducted to find the relationship between lumen output, fitting style and sky quality. These results were also compared to the building densities mapping.

As a very simple experiment a selection of typical off-the-shelf lamps were purchased from a national D.I.Y supplier, ranging from 185 lumens of a standard energy saving bulb to the brighter 8550 Halogen lamps found in typical floodlight fixtures. Each unobstructed lamp was fixed to a point on the back of a SDNPA Land Rover, approximately 6ft of the ground. Sky quality measurements – with an SQM – were taken in 10m intervals from zero up to 100m.

Three SQM recording orientation angles were used. The first was at zenith, (pointing directly up) the second at approximately 45 degs and the last pointing directly at the lamp (horizontal). These angles were used to simulate three main modes of observation; telescopic FOV (zenith), typical naked-eye observation with peripheral vision (45 degs) and direct glare (horizontal). The ambient sky quality at each of these angles was also taken. Needless to say, the measurements were taken after astronomical darkness.

The measurements were repeated using a fully-cut off version of each lamp (a makeshift shoe-box lined with aluminium foil placed over the lamp) to provide a comparison to an effective dark-sky friendly fitting.

The effect of the lights on sky quality was then compared to the ambient darkness. This provided a rough distance where the impact of the lights on sky brightness could be detected by each of the three angles.

The results of this will also be compared to the buildings density mapping to attempt to show if a relationship between built structures and sky quality exists.



"I welcome this addition to its National Park Status. I spent a lot of my boyhood on the Downs, so have fond memories.

Single Lamp Plots

For the different lumen lamps the following figures were obtained. For each plot the various arrangements are shown. For example, A SQM angle to the zenith with an unobstructed (non sheilded) lamp is denoted; Zenith Unobs.



[&]quot;I live in a village where we purposefully choose no street lights. Wonderfully dark and as a photographer dabbling in star scape photography, this helps immensely."

Group Plots

The following plots group all lumen lamp output together for various fitting styles and measurement angles.



Buildings Densities

To determine the impacts of domestic lighting on sky quality, the buildings density mapping can be overlaid onto the sky quality mapping. Villages can easily be seen due to the higher density of buildings. The colours and interpolated sky quality map are of slightly different colour and grading to the main SQM map due to being processed on a different system (QGIS). Although there are colour differences, the areas of light and dark can still be seen.

What immediately can be seen, is that there does not appear to be any strong correlation between darkness and building density. Although some villages measure an expected lower quality, e.g. South Harting, Lurgashall, Graffham, (circle yellow) others such as East Meon, Bignor or Bury (circle pink) show no appreciable reduction.



Domestic Baseline Discussion

As the lighting plots above show, by far the biggest potential impact on dark skies by *domestic* lighting is badly installed security lighting. Though many have proximity sensors or timed control and the effect is temporary, the sky quality does not return to anything near the ambient up to and over 100m. Only when these fixtures are installed flat to the horizontal – effectively Fully Cut-Off – does the zenith sky quality return to ambient within 20m. This shows that these lights are particularly damaging to general observation on the periphery of vision (45 degs) but the impact of the glare can be felt for many metres beyond the typical boundary of the property. Whist the lux levels may quickly diminish, the effect on the continuity of a dark sky landscape is much more pronounced when security lighting is not installed in a dark sky friendly standard. This then provides a communication point:

- Inform of the correct installation of fittings on security lights
- Encourage the use of timers and proximity to reduce impact

Given that larger scale floodlights will exacerbate this impact, it further stresses the importance of our development of sufficient planning policies to reduce this impact.

For most domestic fittings using an off-the-shelf lamp, the recorded sky quality does return to ambient levels within around 20m of the source for zenith and 45° tilted for all lumen levels. This implies that for most telescopic or visual observation angles, typical lamps do not degrade the skies beyond that of the immediate boundary of their property and are of a low threat. Again – and reinforcing the 8550 lumen case – the direct glare and visibility of these sources is greater importance over intermediate distances. However, many houses are fronted and surrounded by fences, trees, other houses and the topology of the downs. This arrangement further serves to reduce this glare impact, particularly in villages, resulting in a slight increase in surface illumination and glow. This may explain the slight reduction in quality in some village centres.

Despite these physical obstacles the results suggest that the biggest impact is not so much a reduction in sky quality from lower lumen lamps, but in the

interruption of the continuity and aesthetic of a dark landscape. Consequently,

Encourage owners to turn off when not needed

Regardless of the return to ambient levels, even from the lowest (185 lumens) to highest (1400 lumens) the impact of horizontal paths of light pollution on darkness is clearly visible. This implies that correct fixtures have a better visual impact over intensity than lumen output. Consequently,

Inform the best type of luminaire (FCO)

Unfortunately, most FCO fittings for domestic purposes are of modern design, and are not aesthetically acceptable to most houses in the more rural areas of the park that are trying to conserve the appropriate lighting style for the house. As there are currently no domestic off-the-shelf heritage style lanterns that mimic the larger street lighting design - which incorporate the lamp into the lid housing - this is unlikely to change in the near future. Although these fittings eliminate upwards spill there is an intrinsic spill of light sideways.

With regard to the lamps themselves, most home owners will be exposed to lamps within the 200 to 1400 lumens, with most larger retail outlets offering more choice and range in the mid 500-800 range; this range is limited in smaller rural outlets. Although this is higher than the current IDA guidelines of 500 lumens, this is still within the original 2011 guidelines of 1000 lumens. Whilst this 500 lumen difference may be significant in reserves with less habitation and higher sky quality, an extra variance of 500 lumens means very little to the sky quality – either measured or visible - in the South Downs.

This can be confirmed with closer inspection of the group plots. Using the 'peripheral vision' Unobstructed 45deg plot as example, it is clear that there is very little difference in the measured sky quality between lighting under 500 lumens and lights above 500 but below 1,000.

"The new street lights in Buriton have already made a big difference. We love seeing out starry nights even clearer now."



The return to ambient between these lamp types is a matter of metres and the difference probably not noticeable to peripheral – or direct - vision. This difference is further reduced when considering 'zenith' observations; in the Zenith Unobstructed plot, only in very bright sources is there a noticeable reduction in sky quality. When considering the availability of lamps, their likely installation and location, these plots show that the difference between 500 and 1,000 lumens is very small and makes next to no difference in the skies of the South Downs.

Flexibility by the IDA in this respect to limit lumens to 1,000 as per 2011 guidelines will allow a much greater number of light fittings to conform to standard and divert any future resources to mitigate more appropriate threats. However, this is not to ignore reductions in lighting. The SDNPA future strategy will continue to promote the use of 500 lumen lamps in domestic fittings.

The actual effect of this lower level lighting can be seen within the photographic pictures taken across the downs. Zooming into the South image from Iping, the small pockets of light can be seen interrupting the continuity of the dark landscape – not the sky.



Also in the Waterfield Panorama below, standard domestic sources are 'lost' in the glow of the surrounding cities. The most obvious source of pollution in this image is not domestic light, but the inappropriate and inefficient car park lighting from an educational facility just outside the core boundary. In this case the SDNP would identify this source and offer to guide a change in lighting. But note, the sky glow is clearly visible behind the bright source, indicating that even though this a pollutant, city sky glow is still the dominant threat in the South Downs.



"Seeing the stars makes me happy. How can we ask people with bright lights to adjust them or change them to reduce sky glow? Is there a process?

The assertion that domestic lighting does not adversely affect measure sky quality is also supported by the building density mapping which does not show any obvious link between habitation and SQM mapping. Villages around the Downs show variances of overhead sky quality measurements with no distinct pattern. This could be an artefact of the time of measurement (the later it is in the evening, the less lights are on) or some other environmental effect, but as yet no obvious link emerges. In the mean time we can only confirm that the presence of a building - or a higher density – fitted with domestic lighting does not appear to significantly reduce measured sky quality. In addition we can also conclude that domestic light does more to interrupt a dark landscapes continuity at the ground level rather overly polluting the night sky unless the observer is within close proximity to the source.

In contrast, contextualising the impact of external domestic sources can be made with the spill from internal lighting. Often the spill from indoor lights through open windows, creates a source that is of greater intensity than that of external lights. With many indoor lamps, the reflected and directed light is often much more noticeable throughout the landscape in the early to late hours. Fortunately, as the night draws on these lights are generally switched off, but it does show that the requirement to control external lighting is of a lower impact than that of internal spill. As the control of indoor lighting is not an IDA requirement and would be near impossible to measure or enforce, it is not something the South Downs National Park Authority can readily change.

However, the following communication points are relevant

- Avoid development of large open fronted glass buildings
- Promote the use of curtains.
- Investigate the impact of internal spill

Another aspect that was not recorded was the impact of car headlights. Although a temporary effect, the total lumen output of a modern car can exceed 3000 lumens for Halogen lamps and 6000 lumens for Xenon. Given that high relative population will inevitably travel at night, the impact of the glare of head lights can be much more damaging than a number of standard domestic sources. Again there is no requirement to control this source as there is an intrinsic paradox with promoting access to dark sky areas and car headlights used to travel to site.

A further discussion point relates to if the domestic lights are actually on. As the baseline showed a great deal of lights are proximity or mains controlled. Consequently, not every light recorded would be on at night and the survey showed that only >10% were on. Whilst this does not technically satisfy the conformity requirement it does clearly show that although the South Downs does have a large amount of domestic sources, a small proportion could be only thought of as true 'polluters' at peak observation times. As the building mapping showed, a large proportion of these lights are found within the rural villages, where the buildings themselves 'trap' the light between the walls. From observation, the sky glow contribution from these sources is low and not particularly noticeable when compared to the horizon glow. Hence, even though the potential number of domestic installations is high, the impact is reduced by owners lighting regimes and the topography of the landscape. This is instantly evident when driving around the roads of the South Downs.

Finally, it is worth emphasising that the lighting profile of the South Downs is, in all probability, typical of the wider UK countryside. Our external lighting profile, though more numerous, will have styles and fittings that are typical and consistent with other National Parks and importantly, other existing IDS Reserves. Our dark landscape will therefore, not be significantly different from others.

Given these comparisons to other more dominant light sources we can conclude with a simple statement;

Large areas of high quality dark skies can exist and be accessed within the South Downs National Park despite a high number of small domestic external sources that largely impact on the continuity of the landscape, not the skies themselves.

This is important because it shows that despite the high relative density of houses, the larger population, and the lack of complete accuracy in the baseline, regardless of the changes to these lights, a dark sky reserve is **completely possible and manageable** in the South Downs.

"We have barn owls that nest in our field – they thrive only in dark sky areas. We need to maintain their unique environment there."

ANALYSIS SUMMARY

As the charts above show, well over 80% of the current threats to the dark skies core, lie within the major settlements within the park, and are hugely dominated by the settlements directly outside. When more distant but relevant locations are considered - such as Winchester, Portsmouth, Eastleigh, Gosport, Fareham, or even Shoreham by Sea, Brighton and Hove, or Horsham - then this percentage will increase.

In comparison, domestic lighting – although important – does not significantly reduce sky quality unless the observer is directly in the vicinity of the source where the surrounding topography serves to shield the lighting further. High powered lights present the biggest problem in the mid-range but these lights were a tiny proportion found within the survey. Even in some of the larger market towns and village in and around the core, the output of these lights is dwarfed by those that surrounding the park boundary.

The changes in street lighting have produced a significant estimated reduction in total lumen output and upward light spill. From the older inefficient SOX and SON mix, the new modern lighting not only shows a reduction in output under maximum capacity, but is further shows significantly reduction with advanced dimming and part night lighting schemes installed across the region. When considering future development, the projected increase in population or a large sudden increase in lighting does not causes an increase in output that would return to the previous lighting scheme.

Although these vast majority of these street lights are not within the park, it is evident that there has been due regard for light pollution and the dark skies of the South Downs. Despite a high number of small domestic external sources that largely impact of the continuity of the landscape, the analysis of the threats shows that a dark sky reserve is completely possible and manageable by the authority, its partners and – importantly – its residents.



LIGHTSCAPE MANAGEMENT



INTRODUCTION



The aim of this section is to describe the primary responsibilities for lighting within and around the National Park and how that lighting is and will be managed as part of the future strategy. Due to the agreements formed in the South Downs Partnership Management Plan, a lightscape plan solely controlled and managed by the SDNPA is not required. The purpose of the SDNPA PMP is to empower relevant organisations to make choices with a regard for the special qualities of the National Park rather than have the park authority run it all. With such a diverse range of lighting sources, managers and owners, it is essential to clarify who is responsible for what and how lighting of all types – whether private or publically owned – can be controlled.

This section will show how our own SDNPA policies – and those that currently exist under the local authorities within and around the park – provide a consistent and complimentary approach to reducing light pollution, from Parish to County. It has been the intention that every source of permanent lighting in the SDNP has been considered and appropriate mitigation policies or projects developed.

It is best to separate the management of lighting into three main sectors whose administrative functions operate on different spatial levels.

- Lighting Inside Planning Control
- Lighting Outside Planning Control
- **Streetlights**

Within each sector there are different responsibilities and available mitigation steps available.

Table - Lightscape Management Framework, on the following page summarises these options and illustrates how the remainder of this Lightscape Management Plan will be split. Approaches to lighting management vary between the authorities and will be described in detail in the appropriate section. However, in all cases it has proceeded with the general principle to reduce light pollution within the National Park.

KEY POINTS

- SDNPA Local Plan has specific policies on lighting and dark skies
- Many Parishes have updated community policies to regard dark skies
- All Local Highways Authorities in SDNPA have street lighting design policies on dark skies
- All Local Authorities in and surrounding have policies on light pollution or dark skies
- £225 Million Private Finance Initiative has upgraded 250,000 street lights across Hampshire, West Sussex and Southampton with regard for light pollution
- Surrey, Portsmouth, East Sussex and Kent have all independently upgraded their street lights with a regard for light pollution
- 228 different forms of planning administration were invited to participate
- In combination, there is widespread and consistent management of light pollution across SDNP and surrounding region.

[&]quot;There is nothing like being out or camping at night under a star laden sky."

SECTOR	SPATIAL	RESPONSIBILITY	MITIGATION	REF
	South Downs	South Downs National Park Authority	National Policy Guidance South Downs Local Plan	Page 159 Page 159
INSIDE PLANNING	Parish	Parishes	Parish Plans	Page 170
CONTROL	Regional	Local Authority	Local Authority Local Plan	Page 172
	District	Local Authority	Building Regulations Environmental Nuisance	Page 180 Page 180
OUTSIDE PLANNING CONTROL		Private Owners	Engaging with Owners Economic Incentive Community Infrastructure Levy Estate Plans IDSR Reserve	Page 181 Page 183 Page 183 Page 183 Page 184
STREETLIGHTS	County	Local Highways Authorities	Streetlight Design schemes	Page 185

TABLE - LIGHTSCAPE MANAGEMENT FRAMEWORK

In combination, this approach sets out to establish commitment to protect dark skies not from those just within the South Downs, but for those throughout the catchment region. The SDNPA believes that this far exceeds the examples set by previous International Dark-Sky Reserves.

"It's the only place you can do real deep sky astronomy on the South Coast."

LIGHTS WITHIN PLANNING CONTROL



Planning law allows the SDNPA – as the planning authority – the power to control the installation and effects of external lighting. Not all lighting, however, is covered by these powers. Although lighting is referenced in UK Planning Policy Guidance's 1, 17 and 23, the important criteria to note is;

Light itself, and minor domestic light fittings, are not subject to planning controls

This means that the majority of lights identified in the lighting baseline would not be subject to control or enforcement. However, owners of these lights can be encouraged to adopt similar good lighting.

Regardless of planning authority, lighting generally requires planning permission if⁶;

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN. DNS: 1.44

- Installation a lighting scheme of such nature and scale that it would represent an engineering operation (i.e. requiring a separate structure) and typically be undertaken by specialist lighting engineers
- Installing lighting such as the floodlighting of sports pitches, car parking of manages
- Installing a lighting scheme on a listed building requires listed building consent, if it is deemed that the character if the building would be significantly affected by the lighting.

⁶ Taken from SDNPA Local Plan. Exact wording may differ between local Authorities.

As the evidence shows, the dominant source of light pollution within the downs originates outside the National Park. Streetlights withstanding, the management of the future development of this light will be subject to the policies set out in the Local Plans of surrounding authorities. Consequently the remainder of this section will deal with the development of consistent protection policy in the following spatial forms;

- South Downs National Park Local Plan
- Regional Local Authority Local Plans
- District Building Regulations and Environmental Nuisance.

In combination, this approach sets out to establish commitment to protect dark skies not from those just within the South Downs, but for those throughout the catchment region. The SDNPA believes that this far exceeds the examples set by previous International Dark-Sky Reserves.



"We should have dark skies everywhere but the South Downs would at least give people a chance to discover why a dark sky is so special."

South Downs National Park Local Plan

In the South Downs, planning control was devolved by the existing local authorities to the NPA but many retain some planning control on behalf of the SDNPA.

As the main planning authority for the national park, the SDNP Local plan is developing policies on a wide range of subjects, including dark skies. Due for adoption by the local authorities in 2017 it is an opportunity to include robust and effective policies on light pollution.

Taking on views of residents, businesses and a range of stakeholders, a Local plan encapsulates in specific policies what the community regards as key issues in its future planning decisions. To that end, the SDNPA has developed specific dark sky policies that will apply throughout the entire park; not just on a smaller core area.

Based on **ten lighting principles**, the policies and accompanying text primarily draws on guidance from the Institute of Lighting Professionals. The SDNPA policies adopt a hierarchal structure for decision making, focusing on asking the question if lighting is actually needed before requiring further proof of need. If a need for lighting is demonstrated then further policies will look to minimise its impact and to satisfy IDA requirements for lighting in core areas.



SDNPA LOCAL PLAN. APPENDIX: LANDSCAPE.

Draft Policy SD9 - Dark Night Skies

1. Development proposals which conserve and enhance relative tranquillity, in relation to light pollution and dark night skies, and are in accordance with other relevant proposals will be permitted, provided it can be demonstrate that it meets or exceeds the Institute of Lighting Professionals guidance and other relevant standards or guidance (CIE 150:2003 Guide on the limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations) for lighting within environmental zones, and it has regard for the following hierarchy:

i) the installation of lighting is avoided

ii) if lighting is installed it is necessary for its intended purpose or use and any adverse impacts are avoided,

iii) if it is demonstrated that (i) or (ii) is not achievable, then adverse impacts are appropriately mitigated.

2. To be appropriate, lighting for development proposals should ensure that:

a) the measured and observed sky quality in the surrounding area is not reduced

b) lighting is not unnecessarily visible in nearby designated and key habitats.

c) the visibility of lighting from the surrounding landscape is avoided.

d) the design of buildings, which results in increased light spill from internal lighting are avoided, unless suitable mitigation measures are implemented.

3. Development proposals that are located in or unnecessarily visible from the dark sky core boundary(as shown on the proposals map), with SQM values exceeding 20 mag per arcsecond² or in areas identified as being vulnerable to change will be subject to the most rigorous scrutiny in order to ensure that relative tranquillity is conserved and enhanced.

Lighting Policy Principles

The SDNPA Local Plan provides the specific policies to be used in planning development and control. The following principles were used to derive those policies. The following sections will describe how these principles feed into the SDNPA Local Plan policies.

I. Development must meet or exceed the Institute of Lighting Professionals guidance and other standards or guidance for lighting within environmental zones

2. Light should avoid being visible from the surrounding landscape

3. Any development must not reduce the measured and observed sky quality in the surrounding area

4. Light should not unnecessarily visible in dark sky zones

5. Light should not unnecessarily visible in any adjacent wildlife sites

6. Where possible, existing lighting should be brought up to specification when considering new installations

7. Control measures such as timers, curfews, proximity sensors, or additional shielding should be used where possible

8. Non-UV Narrow band colour temperatures of less than 3100K should be used, particularly close to nocturnal wildlife sites

9. Large open buildings that vent a large proportion of indoor light should be avoided; unless suitable controls are implemented

10. Skylights should be avoided, unless suitable control measures are implemented.

I. Development must meet or exceed the Institute of Lighting Professionals guidance for lighting within environmental zones

The Institute of Lighting Professionals has produced guidance on obtrusive light. They define light pollution in three categories;

- Skyglow
- Glare
- Light Intrusion

The guidance sets out specific constraints for lighting within environmental zones. Within each zone, targets are applied for skyglow, light intrusion, glare, luminaire intensity and building luminance. Any proposed lighting should meet *or exceed* this guidance.

The SDNPA Local Plan dark skies hierarchy emulates the I.L.P message;

'Think before you light – the right amount of light, where wanted, when wanted'

Table I and Table 2 below detail the requirements of this condition. The SDNPA is assumed to be mostly an EI grade, with occasional E2 and E3 (e.g. Petersfield). E0 is not attainable for the SDNP as it implies banning lights which is not possible or lawful for a National Park to enforce.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UMESCO Starlight Reserves, IDA Dark Sky Parks
EI	Natural	Intrinsically dark	Areas with intrinsically dark landscapes. National Parks, AONB's
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small towns centres or suburban locations
E4	Urban	High district brightness	Town/City

 TABLE I: ENVIRONMENTAL ZONES. INSTITUTE OF LIGHTING PROFESSIONALS REPORT – GUIDANCE NOTES ON THE REDUCTION OF

 OBTRUSIVE LIGHT. REFERENCE SDNPA LOCAL PLAN. DARK NIGHT SKIES. 1.45.

Zone	Sky Glow ULR [Max %]	Light Intrusion (into windows) E _v [lux]		Luminaire Intensity I [candelas]		Building Luminance Pre-Curfew
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L [cd/m ²]
EO	0	0	0	0	0	0
EI	0	2	0(*)	2,500	0	0
E2	2.5	5		7,500	500	5
E3	5	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	25

 TABLE 2: OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS – GENERAL OBSERVERS

ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux that goes directly into the sky.

Some lighting schemes will require the deliberate and careful use of upward light, e.g. ground recessed luminaires, ground mounted floodlights, festive lighting, to which these limits cannot apply. However, care should always be taken to minimise any upward waste light by the proper application of suitably directional luminaires and light controlling attachments.

Ev = Vertical Illuminance in Lux - measured flat on the glazing at the centre of the window.

I = Light Intensity in Candelas (cd)

L = Luminance in Candelas per Square Metre (cd/m2)

Curfew = the time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by the local planning authority. If not otherwise stated - 23.00hrs is suggested.

* = Permitted only from Public road lighting installations

"The sky round here is quite dark at night and it wold be great if more of the National Park could be darker."

LOCAL PLAN POLICY LINK

Draft Policy SD9 (See above)

SDNPA LOCAL PLAN. DNS: 5.56 (See above)

SDNPA LOCAL PLAN. DNS: 5.57:

For much of the rural landscape of the South Downs National Park this will be an E1 'Intrinsically Dark' zone, but this should be checked prior to an application. The NPA will encourage that, if it is feasible, further reductions are made (e.g. removing below/near horizontal light paths from fixtures or adopting E1 specifications in an E3 zone). Often this can be achieved with little further disruption.

OTHER RELEVANT STANDARDS

In addition to the Institute of Lighting Professionals Guidance on Obtrusive lights other appropriate guidance's should be used. Although the list is long and can be found in the I.L.P guidance, the following reports are worth noting.

CIE 150: 2003 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations.

As a precursor to the I.L.P guidance, this report provides much of the detailed specification for the derivation of lighting limitation in environment zones. Other aspects such as the impact to wildlife and astronomy are also covered which is an appropriate consideration for any National Park.

Sport England Design Guidance Note. Artificial Sports Lighting (2012)

Sport facilities require specific lighting levels for the sport and level of participation. Whilst the source illumination will be higher than those stipulated in I.L.P guidance, this report details appropriate lux levels for outdoor sports.

Local Highways Authority Design Guides

Proposals with streetlights should meet or exceed current design guides from the Local Highways Authorities. Although standards differ there is a regard to reduce light pollution in and around the National Park.

2. Light should be avoid being visible from the surrounding landscape

Light from all sources – direct and indirect – have an impact on sky quality. Whilst targets can be met in regard to upward light and intensity, the scattering of light from surfaces can create a significant visual impact on the landscape. Although the I.L.P guidance stipulates targets for the illumination of buildings, it is important that the effect of illumination from secondary surfaces have regard.

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN: DNS: 5.58

Proposals should take due consideration of the overall visual impact the lighting will have on the landscape. This may include ground surface reflectivity, the number of lights, the daytime intrusion and the general overall footprint of the lighting. This is to consider the visibility of the lights from the surrounding landscape (e.g. viewpoints or along South Downs Way), in accordance with Policy SD7 (Safeguarding Views).

3. Any development must not reduce the measured and observed sky quality in the surrounding area

4. Light should not be unnecessarily visible in dark sky zones

The lighting impact should not reduce the measured and observed sky quality in the area. If the Milky Way or other dark-sky indicator objects – Andromeda Galaxy – can be easily seen with the naked eye from the proposed site, then the lighting impact should not overtly impact on that visibility. This can occur either by creating skyglow, intrusion or by glare which can interrupt the continuity of dark landscapes.

A Sky Quality Monitor can be used to approximately determine the sky brightness. Any additional lighting should not increase the ambient brightness in the immediate surrounding area.

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN. DNS: 5.60

In the darkest sites, where control is more important, the overall impact of the lighting should ideally not be visible in any direction or in any form (glare, skyglow, spill and reflection) and not reduce the measured and observed quality of easily visible astronomical features (i.e. the Milky Way and Andromeda Galaxy) within the area. 5. Light should not be unnecessarily visible in any adjacent wildlife sites

This is to minimise light pollution falling into adjacent wildlife sites. There are a number of key habitats and species that benefit from dark skies across the park.

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN. DNS: 5.61

Key habitats, particularly woodlands, should not be considered as a 'natural shield' to lighting, due to the inherent disruption of a light source on an otherwise unlit habitat. Consideration should be made to shield or remove lighting that would spill into sensitive habitats, particularly if nocturnal species are present. Direct illumination of Bat Roosts must be avoided.

6. Where possible, existing lighting should be brought up to specification when considering new installations.

Any new lighting installation will inevitably have some impact on dark skies, no matter how well mitigated. With proposals with existing lighting, there is an opportunity to offset any new increase by reducing the impact of existing lighting. Whilst this may not be possible in all cases, any reduction in inefficient installations will benefit the dark skies.

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN: DNS 5.62

In some circumstances it may be possible to reduce the impact of an existing stock of lighting in addition to those under application. Any new additional lights should be considered by offsetting against existing stock.

7. Control measures such as timers, curfews, proximity sensors, or additional shielding where possible

8. Non-UV Narrow band colour temperatures of less than 3100K should be used, particularly close to nocturnal wildlife sites

There are many measures that can be used to reduce the impact of lighting. Technologies continue to improve and are recommended to eliminate all unnecessary spill of light. Careful selection of colour temperature can also help reduce the impact on wildlife that prefers redder, warmer temperatures.

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN: 5.63

Lighting should be subject to appropriate mitigation or control measures should be used to further control unnecessary light pollution. Examples include:

- the use of 'curfews' or automatic timers,
- use of proximity 'PIR' sensors, timers or any additional shielding or coving, including angling the front surface of lights to the horizontal
- use of different surfaces types to reduce the amount of reflectivity
- screening or shielding to reduce the impact of reflectivity.

9. Large open buildings that vent a large proportion of indoor light should be avoided, unless suitable controls are implemented.

10. Skylights should be avoided, unless suitable control measures are implemented.

Although the IDA requests controls for external light, the spill of indoor light onto the South Downs Landscape often presents a greater impact. Whilst many sources are switched off later in the night, the spread of large glass fronted and sky-lit developments can create significant sources of visible light.

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN: 5.64

The spill of lights from large open glass windows and sky lights often present a greater source of light pollution than externally mounted lights. Consequently it is important to control the lighting coming from these types of developments. The design of building should reduce the impact of light spill from internal lighting or suitable mitigation measures should be put in place.

WHAT A LIGHTING PROPOSAL NEEDS TO INCLUDE

To be able to satisfy the lighting hierarchy as defined in SDNPA Local Plan policy SD9, a proposal will need to include a comprehensive lighting plan. Unless definitive answers can be determined from the plan, the proposal will not be given consent.

LOCAL PLAN POLICY LINK - SDNPA LOCAL PLAN. DNS: 5.65

Where a proposal involving outdoor lighting, a statement will be required to justify why the lighting proposed is necessary for its intended use and that shows every reasonable effort to mitigate skyglow and light intrusions has been addressed and accompanied by a computer calculation indicating task luminance, uniformity, horizontal values of overspill beyond the property line and vertical luminance values of light intrusion on adjacent property windows.



Policy in Practice

As the eighth largest planning authority, the SDNPA receives around 5,000 planning applications a year; many applications with lighting requirements. Over the last two years there have been over 50 applications called into the SDNPA for specific dark skies consultation ranging from sheds, schools, sports facilities and large scale housing developments. The lights have ranged from small domestic style lighting to floodlights and residential street lighting schemes. In each case the SDNPA has required lighting design schemes that are consistent with local policy showing good dark sky friendly installations.

Although some are not highly visible or community led, they are examples of good dark sky friendly lighting within the community. In order to satisfy minimum requirement Ei, approximately 222 lights should installed for the total 110,000 residents of the total National Park. It is estimated that the total number of lights installed under these application is around 200. However, the population is significantly less within the rural communities. If this number applies to rural populations then this requirement has at least been partially met.

Our future strategy will continue to complete and encourage dark sky friendly designs through the planning system.



Parish Plans



Parishes have a number of options to include local issues into local authority planning. Though not mandatory, Village Design Statements (VDS) and Community Plans have been available, but Neighbourhood Plans offer the means for local authorities have a regard for local issues. With a high number of parishes within the park and the dark skies core, inclusion of dark skies within these plans offers a further local application of the SDNP local plan



The Localism Act, which received Royal Assent on November 15 2011, introduced new rights and powers to allow local communities to shape new development by coming together to prepare neighbourhood plans.

Neighbourhood planning can be taken forward by two types of body - town and parish councils or 'neighbourhood forums'. Neighbourhood forums are community groups that are designated to take forward neighbourhood planning in areas without parishes. Neighbourhood forums and parish councils can use new neighbourhood planning powers to establish general planning policies for the development and use of land in a neighbourhood. These are described legally as 'neighbourhood development plans.

Proposed neighbourhood development plans or orders need to gain the approval of a majority of voters of the neighbourhood to come into force. If proposals pass the referendum, the local planning authority is under a legal duty to bring them into force.

As Parish Plan timescales and needs may not fall within the dark skies application time line the SDNPA will continue to develop dark skies policies. There have been a number of responses, mostly from parishes with dark skies. All have replied favourably and show their support and commitment to protecting dark skies.



"Astronomy departments at local Universities will benefit greatly from this."



"I watched a meteor shower on Beachy Head and I've never seen anything like it! My wife and I often go up to Beachy Head just to look at the night sky."
Regional Local Authority Local Plans

Under the Localism Act 2011, there is a legal duty on local planning authorities, county councils in England and public bodies to engage constructively, actively and on an on-going basis to maximise the effectiveness of Local and Marine Plan preparation in the context of strategic cross boundary matters. This is referred to as the 'Duty to Cooperate'.

The duty to cooperate is not a duty to agree. But local planning authorities should make every effort to secure the necessary cooperation on strategic cross boundary matters before they submit their Local Plans for examination.

To effectively establish commitment from our partners and neighbours for protecting dark skies, the SDNPA has actively approached local authorities relevant to this issue. Specifically we have asked the local authorities;

- Details of any existing policies on light pollution the LA already has that could indirectly benefit the SDNP.
- Confirmation of whether and how the Authority might develop such policies if they do not exist.
- Within emerging and future Local Plans, acknowledgement that the dark skies of the South Downs NP is a receptor of light pollution from adjoining towns and cities.



"Please prohibit additional street lighting/car park lighting in villages where there is currently none."



The Winchester District Local Plan Review 2006 Policy DP10 references light pollution in general terms where schemes should be designed to reduce impacts to an acceptable level. This 2006 plan is now being updated.

The Winchester District Local Plan Part I - Joint Core Strategy(2013) covers Winchester District including the area that now lies in the South Downs National Park (SDNP) and has been adopted both by Winchester City Council and by the SDNPA.

The Winchester District Plan Part 2 (2014) Development and Allocations Document is currently being developed and will also form part of the Development Plan which will be replacing the saved policies of the 2006 Plan. Light pollution is covered in;

- DMI7 Site Development Principles
- DM19 Development and Pollution
- DM23 Rural character (see box)

Of specific relevance to the SDNP, from Local Plan part 2;

6.4.59: The nature of the development may lead to intensification of uncharacteristic use in the area. Noise and lighting pollution may be more noticeable in rural areas due to the relative tranquillity of the surroundings. The rural character and tranquillity of the area will be taken into account when assessing the appropriateness of developments that may give rise to pollution.

Policy DM23 - Rural Character. (Extract)

Outside defined settlement boundaries, development proposals which accord with other relevant policies will be permitted where they do not have an unacceptable effect on the rural character of the area, by means of visual intrusion, the introduction of incongruous features, the destruction of locally characteristic rural assets, or by impacts on the tranquillity of the environment.

The following factors will be taken into account when considering the effect on the rural character and sense of place:

Tranquillity – developments should not have an unacceptable effect on the rural tranquillity of the area, including the introduction of lighting or noise occurring as a result of the development, taking account of the relative remoteness and tranquillity of the location. New lighting will generally not be permitted in unlit areas and the type, size, design and operation of any lighting may be controlled where necessary by the use of conditions.

"We have nesting barn and little brown owls, kids have a telescope for watching night skies, all are in danger from proposed developments."



The district plan was published in June for its final period of public consultation before it goes forward to independent examination by a planning inspector. The SDNP is now not able to make any fundamental changes to the policy for this plan.

Policy DP27: Noise, Air and Light Pollution in the draft Mid Sussex District Plan 2014 – 2031 includes the following text;

The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats, and the quality of people's life will be protected from unacceptable levels of noise, <u>light</u> and air <u>pollution</u> by only permitting development where:

- The impact on local amenity, intrinsically dark landscapes and nature conservation areas of artificial lighting proposals (including floodlighting) is minimised, in terms of intensity and number of fittings;
- The applicant can demonstrate good design including fittings to restrict emissions from proposed lighting schemes.

The degree of the impact of noise and <u>light pollution</u> from new development or change of use is likely to be greater in rural locations, especially where it is in or close to specially designated areas and sites.



The Worthing Core Strategy was adopted in 2011. Although this does not include any specific policies relating to light pollution the Built Environment and Design Policy 16 (and its supporting text) does take 'pollution' into account - and this would include the consideration of light pollution. The policy itself requires development in Worthing to make good

use of natural and artificial light.

A Core Strategy was intended to be the Development Plan until 2026 changes made to the planning system at a national level have meant that a full review of this plan is now being undertaken. The Council has recently adopted a Local Development Scheme which commits the Council to the progression of a new Local Plan for Worthing over the next three years. This process will allow for further consideration to be given to the issue and the impact of light pollution within Worthing and the surrounding area.

The latest iteration of the Emerging Local Plan 2014;

Policy 15: Quality of the Built Environment and Public Realm

Supporting text, paragraph 4.8: Lighting is an important element of design quality; whilst necessary for safety reasons it can also add character and highlight elements of architectural quality. However, it is also important to ensure that light shines on its 'target' and does not waste energy or contribute to 'skyglow', which detracts from the night sky's natural state and is a form of visual pollution.

Extract from Policy itself:

"...Lighting incorporated into developments should provide the minimum for public safety, be energy efficient, designed to illuminate the target only and avoid light pollution."



Horsham District Council Horsham District Council has recently concluded the Examination hearings into the Local Plan (known as the Horsham District planning Framework) and are awaiting the Inspector's report. The

SDNP were consultees into the preparation of this document and comments have helped to shape the policies in the plan.

With regard to dark night skies, this issue is addressed through reducing light pollution more generally.

Paragraph 9.10 references the need to ensure that appropriate lighting is used to prevent unnecessary light pollution and that this is particularly important in rural areas.

Policy 24 (Environmental Protection) specifically requires that pollution (with light pollution specifically identified) is minimised.

The Council also has a policy on protected landscapes (policy 30) which includes the need for development outside the national park to ensure that it does not impact on the natural beauty and public enjoyment of this landscape. As dark night skies contribute to both of these aims, the policy is also consistent with this issue.

Finally the Council is working in partnership with local communities and the SDNP in the preparation of neighbourhood development plans in parishes which are within HDC and the SDNP planning areas, and are supportive of policies which protect dark night skies within these plans.



The Brighton & Hove Local Plan was adopted on 21 July 2005. Under the new planning system, Local Plan policies are automatically 'saved' for three years from adoption. The saved policies will be replaced in

Čity Council stages by emerging development plan documents (DPDs). Local Plan policies will be shown as deleted when they are superseded by policies in newly adopted DPDs. The first document due to be adopted will be the City Plan Part One

With regard for light pollution there are several references in the Local Plan 2005. In addition to policy SU9 Pollution and Noise Control;

QD25 External lighting (Extract)

Planning permission will not be granted for lighting units which emit over-intense light in the context of the use of the building or space to be illuminated and / or can be seen to cause detriment to amenity, environment, and highway safety or cause significant light pollution, especially upward light pollution.

QD26 Floodlighting (Extract)

Floodlighting which creates significant illumination beyond those areas requiring illumination or will result in detriment to amenity or to sensitive areas and their settings will not be permitted.

There is specific reference to National Parks

3.115 (Extract) The impact of floodlighting can be particularly harmful to sensitive areas and their setting, for example, conservation areas, listed buildings, sites important for nature conservation, the countryside and the Area of Outstanding Natural Beauty (National Park). The planning authority will ensure, therefore, that all floodlighting proposals are sympathetic and appropriate to the area in which they are to be located. Where appropriate, planning conditions will be imposed, restricting the intensity and hours of illumination.

"I frequently try to photograph the skies, this will be great."



The Arun District Local Plan 2011-2031 and supporting documents were submitted on 30th January 2015 for independent examination to the Secretary of State for Communities and Local Government via the Planning Inspectorate.

Light pollution is specifically referenced in section 21 – Quality of the environment:

Policy QE DM2 - Light pollution

Planning permission for proposals which involve outdoor lighting must be accompanied by a lighting scheme prepared according to the latest national design guidance and relevant British Standards publications. Outdoor lighting schemes will be considered against the following criteria:

- a. No adverse impact on neighbouring uses or the wider landscape;
- b. Light levels being the minimum required for security and working purposes
- c. Minimising the potential glare and spillage; and
- d. The degree to which outdoor lighting can be powered by onsite renewable sources

Where appropriate, the local planning authority will seek to control the times of illumination.

Developments shall also be consistent with all other Local Plan Policies.

Referencing the following policy outcomes;

- To protect residents from light pollution
- To protect the dark skies across the District and of the South Downs National Park



On 14th July 2015, Chichester District Council adopted the Chichester Local Plan: Key Policies 2014-2029. The Chichester Local Plan places an amount of emphasis on the importance of the views and landscape of the South Downs National Park.

Specifically relating to light pollution, criteria 10 of Policy 40 Sustainable Design and Construction

requires that;

all new dwellings or for new non-domestic buildings, provide evidence on how the reduction of the impacts associated with traffic or pollution (including air, water, noise and light pollution) will be achieved.

There is also a requirement within Policy 32 Horticultural Development Areas, that planning permission for new glasshouse, pack-house and polytunnel development need to demonstrate there is no significant adverse impact resulting from artificial lighting on the occupants of nearby sensitive properties or on the appearance of the site in the landscape.

The adopted Chichester Local Plan includes a commitment for it to be reviewed within 5 years. The Council can review existing policies and if necessary take the opportunity to further address the concerns relating to light pollution from adjoining towns and cities and the impact on the South Downs National Park.

"We often get people visiting from more urban areas who are amazed at the spectacular star display on a clear night. Something to be treasured."

The following local authority polices were found via on-line search rather than response:



The Local Plan Second Review was adopted at the end of March 2006 and remains part of the Statutory Development Plan. The Local Plan: Second Review will eventually be superseded by the new Local Plan.

P5 - 4.91 Details of any external lighting scheme required as part of any new development should be submitted as part of the planning application. In order to minimise light pollution and increase energy efficiency, the District Council will need to be satisfied that the lighting scheme proposed is the minimum required for security and working purposes and that it minimises potential pollution from glow and spillage. On the edge of settlements and in rural locations, landscaping measures should be provided to screen the lighting installation from view. Light pollution can be particularly intrusive in rural areas and can harm the character of the countryside. Artificial lighting can also have a detrimental effect on wildlife, particularly nocturnal animals and nesting birds. Conditions will be attached to any floodlighting approvals given for evening usage of sport facilities and community buildings to control light intensity, light spillage and hours of use. **The Observatory at Clanfield is particularly sensitive to excessive light pollution.**



Waverley is currently updating local plan 2002. The last new Local Plan consultation took place between 3 September - 17 October 2014.

Chapter 2 – Development – Light pollution

2.20 Light pollution can affect both urban and rural areas, but it is a particular problem in the countryside where dark skies at night are one of the special and intrinsic qualities of the rural landscape. Artificial lighting can obscure the stars, introduce an urban character into rural areas, intrude on residential amenity and affect the wildlife of an area. Light pollution also represents a waste of energy and resources.

2.21 In determining proposals involving a lighting scheme, such as lighting for security or operational purposes, consideration will be given to the impacts on residential amenity, people passing the site (including motorists) and on visibility of the dark night sky. Schemes should involve a minimum amount of lighting necessary to achieve its purpose and should minimise glare and light spillage from the site.

A Lighting assessment is required:

With all applications for:

- external lighting systems associated with sports pitches, car parks and garage forecourts
- any major residential or commercial development in the countryside.

Schemes should be prepared by a recognised independent consultant and submitted with applications so we can consider the effects of the lighting. Reports need to provide information about sky glow (%) and source intensity (measurements in lux).

"I would like to stress the importance of maintaining our dark skies in the National Park."



The Lewes District Local Plan was adopted in March 2003 and sets out the current planning strategy for the District. It is under review and will ultimately be replaced by the Local Development Framework

Lewes District Council Environmental Principles - External Lighting;

ST7 Details of any external lighting required as part of any new development should be submitted with the planning application. Planning permission will not be granted unless the District Council is satisfied that the proposed lighting scheme is the minimum necessary for security and working purposes and that it minimises potential pollution from glare and spillage.

4.21 The potential pollution from external lighting schemes in new development is causing increasing concern amongst many people. This policy is intended to allow the Local Planning Authority an opportunity to examine the lighting schemes proposed in new developments, to ensure that they are not excessive for their requirements and minimise spillage and glare out of the built-up area into the countryside or into the sky. Such spillage can have a detrimental effect on landscape character and atmosphere of remoteness in rural areas and introduce a suburban character into the countryside.

4.22 The District Council will endeavour to achieve a reduction in light pollution where there is an opportunity in determining planning applications. With regard to safety and security, bright lights are not necessarily more effective than a low-level, downwardly directed lighting. Therefore there should not be a conflict with Policy ST8. (Policy ST7 will not apply to street lighting, as this is the responsibility of the Highway Authority, East Sussex County Council, and does not require planning permission).



The Eastbourne Core Strategy Local Plan sets out the key direction and planning framework for Eastbourne.

It was adopted by on 20th February, 2013

The Eastbourne Borough Plan (2001-2011) was adopted in 2003 and contains a number of saved policies which are still used to determine planning applications. The saved policies will remain as local policies until they are replaced by new policies in further Local Development Documents.

Pollution Control

3.23 Maintaining air, land and water quality is essential for human health and safety, and for the ecological well-being of the environment but pollution can arise from a variety of sources, including vehicular traffic and particular industrial and construction activities. Responsibility for pollution control rests with a number of different agencies but PPG238 advises that the land use planning interest must focus on any potential for pollution arising from a proposed development, and the extent that it may affect the current and future use of land. It is, therefore, appropriate to resist development which would pose an unacceptable risk of noise, smell, dirt, soot, smoke, **light**, vibration, radiation and other harmful emissions. Where it can be demonstrated that pollution risks can be mitigated the Council will impose a planning condition or a legal obligation that appropriate measures are put in place.

Policy NE13: Pollution Mitigation Measures

Planning approval for developments which pose a risk of pollution to air, land or water, will be required to incorporate adequate pollution control measures. Planning permission will be refused where it is considered that a development poses an unacceptable risk of pollution.

"It is an area I like to visit for Astronomy and believe it should be preserved and improved in this respect."



The Havant Borough (Core Strategy) is the principal document in the council's Local Plan. It covers the Borough of Havant, setting out the spatial planning strategy for the area up to 2026.

DMI0 Pollution

Development that may cause pollution of water, air or soil or pollution through noise, smell, smoke, fumes, gases, steam, dust, vibration, light, heat, electromagnetic radiation and other pollutants will only be permitted where all of the following relevant criteria can be met: I. The health and safety of existing and future users of the site, or

- nearby occupiers and residents is not put at risk.
- 2. National air quality standards or objectives would not be breached.
- 3. The water environment would not be detrimentally affected.
- 4. It would not lead to an unacceptable deterioration in the quality or potential yield of coastal, surface and ground water resources.
- 5. External lighting is of the minimum level of illumination and duration required for security and operational purposes.

6. External lighting would not interfere with safe navigation in either Chichester or Langstone Harbours and other coastal locations.

FAREHAM BOROUGH COUNCIL Core Strategy (adopted in August, 2011), and Local Plan Part 3.

3.18

Pollution (air, light and noise) is an issue that must be addressed in all new developments. Where appropriate, external lighting schemes required as part of a new development should be submitted as part of the planning application. It is important that light pollution is kept to a minimum in order to protect visual amenity and outlook from neighbouring properties, but to also ensure natural light is maximised and schemes are energy efficient. On the edges of the urban area and in areas outside the defined urban settlement

boundaries, landscaping measures should be provided to screen installations from view. Conditions may be attached to the provision of floodlighting in order to control usage and hours of operation.



The Council adopted the Eastleigh Borough Local Plan Review (2001-2011) on 25 May 2006.

Lighting

3.26 Lighting can have a significant impact on people's perception of their environment, especially at night. Building facades can be altered quite dramatically by different lighting and, at night, the principal distinction between urban and rural areas is often that one is lit and the other not. The perception of our physical environment can, therefore, be altered very significantly by the ways in which it is lit, or indeed by whether it is lit at all.

3.27 Light spillage can be considered to be a form of pollution and an annoyance because it obscures the night sky and can cause discomfort and loss of privacy. Well-designed lighting appropriately sited, on the other hand, can clearly improve public safety and improve people's perception of their environment. Whilst many forms of lighting do not constitute development requiring planning permission, there are numerous land uses such as sports pitches and car parks for which lighting is an essential element.

36. ES Permission will be refused for proposals which do not incorporate well designed lighting, where lighting is necessary. Lighting should be concentrated in those areas where it is required and spillage, either horizontally or vertically, should be minimised. The size and design of the lighting columns should not detract from the character of the locality.

Building Regulations

Building regulations are statutory instruments that seek to ensure that the policies set out in the relevant legislation are carried out and approval is required for most building work in the UK. The regulations that apply across England and Wales are set out in the Building Act 1984 and are administered usually by the local building control department or approved inspectors, such as District Councils.

Any electrical work or fixing lighting on the outside of houses, requires the use of a registered installer to make the building as energy efficient as possible. Energy efficiency is required when;

- When a dwelling has been extended
- When an existing lighting system is being replaced as part of rewiring works.

An example of efficient lighting is where reasonable provision should be made to enable effective control and/or use of efficient lamps such that:

- Either, lamp capacity does not exceed 150 Watts per light fitting and the lighting automatically switches off when there is enough daylight and when it is not required at night;
- Or the lighting fittings have sockets that can only be used with lamps having an efficacy greater than 40 lumens per circuit-Watt.

Environmental Nuisance



The Clean Neighbourhoods and Environment Act 2005 makes light nuisance subject to the same criminal law as noise and smells. It applies to "artificial light emitted from premises so as to be prejudicial to health or a nuisance". (section 102, Clean Neighbourhoods and Environment Act, which amends section 79 of the Environmental Protection Act 1990). It enables individuals' recourse to indentify and mitigate against any lighting that causes a nuisance by a premises. Street lighting – as it is not on 'premises' – are unlikely on to qualify, but local highways authorities can install shields when requested.

Local authorities have a duty to take reasonable steps, where practicable, to investigate any complaints of artificial light nuisance; it is expected that the following sources will generate most complaints such as domestic and commercial security lights, sports facilities and exterior lighting of buildings.

As for all statutory nuisances, when assessing a case of potential statutory nuisance the Environmental Health Practitioner should take account of a range of factors including:

- Duration
- Frequency
- Impact i.e. material interference with use of property or personal well-being; actually or likely to be adverse to health
- Local environment
- Motive i.e. unreasonable behaviour or normal user
- Sensitivity of the plaintiff statutory nuisance relies on the concept of the average person, and is not designed to take account of unusual sensibilities

In support of this legislation, The 1998 Transport White Paper A New Deal for Transport – Better for Everyone stated that;

'where lighting is essential, it should be designed in such a way that nuisance is reduced and the effect on the night sky in the countryside minimised'. Exterior lighting in rural areas can have a particular impact.

"Dark skies are very precious and becoming increasingly rare. It's vital to keep them for our relation to the natural world. Lights are kept on unnecessarily all over the place which also wastes fuel of course."

LIGHTS OUTSIDE PLANNING CONTROL



As the external lighting baseline showed, the dominant style and ownership of lights were off the shelf heritage style lanterns and security lights that would and have not required any form of planning permission. This is set to continue for the foreseeable unless there a change to national policy in this regard; but that is beyond the scope of this application. Consequently, without any planning controls, the SDNPA must develop suitable mitigation projects that help to manage the thousands of installation of this type. Ideally they must inform users and residents to;

- Light only when needed
- Use appropriate lighting for the task in hand
- Protect dark skies.

In addition to the mitigations described below, the SDNPA has gone to great lengths to mitigate this source of lighting and potentially, offers the biggest payback in terms of education and behavioural change.

One of the obstacles we must mitigate is the uncertainty and control over the lumen output of domestic lighting. As the external lighting survey showed, although we can confident that much of the domestic lighting is of low output and capable of meeting requirements, it has been difficult to provide 100% accuracy on the subject. To that end, the SDNPA in its future strategy will immediately look to;

- Investigate and implement an enhanced lighting survey
- Continue to press for 500 lumen lighting regardless
- Investigate topology and view-shed analysis within the landscape
- Expand the external lighting survey to other villages
- Where possible, include farm land estates in surveying

The results from these mitigation will feed into analysis and help us succeed a higher and more confident measure of conformity.

Engaging with Owners and Communities

Where potential major sources have been identified, letters have and will continue to be posted to inform owners of the project and encourage to work with the SDNPA to reduce light pollution. Nearly all of this lighting would have been installed before the National Park came into force, or been installed badly by the owner. Often it is a case of not being aware of the impact and in some cases – pubs for example – over lighting is thought to assist business. In these cases we have written to the owners to encourage change. As the SDNPA should not be regarded as a provider of funds for private retrofitting, much will depend upon the individual. If the SDNPA is seen as the lighting provider then there is little or no incentive for individuals to change behaviour; a sustainable solution must depend on the actions of individuals.

Lighting Projects

In general, the most community lighting projects will be;

- Public Houses
- Churches
- Village Halls
- Rural Business
- Streetlights

Only Churches, Village Halls (if there is one within the Parish) and Streetlights offer any means to provide *highly visible* demonstration. In most cases, Churches and Village Halls are generally unlit or already have some control measures in place. The availability of future funding streams through Community Infrastructure Levy, (in this section below) provide an opportunity to mitigate this requirement.

However, as the street lighting changes were conducted after consultation by the local lighting authorities with the parishes, they can be considered as a *highly visible* project in good lighting with the community. In total 2,700 street lights were updated with the National Park. Whilst they are not 'community owned', the SDNPA believes that minimal requirement E(i) is at least partially met. Our future strategy will build on this and focus on community action to increase this number.

"Living between Worthing and Brighton, it's very obvious quite how much light both generate."

Some Examples of Lighting Projects

Results from our external baseline, pledge comments, planning applications and general familiarity of the Downs allows us to identify sources of pollution that require action. Whilst dealing with every source of pollution is not possible before submission, there have been some successes. The SDNPA will continue to identify sources of pollution and engage with owners to reduce pollution, to bring the total number of compliant fittings up to required levels.

Queen Elizabeth Country Park

Bridging the gap between the larger Hampshire and West Sussex cores, Queen Elizabeth Country Park is located on the A3 and is often the first point of call for residents from the South Coast into the South Downs. It is designated as a dark Sky Discovery Site and is used by local astronomy groups for night events or solar observing sessions. As an Open Access site, it allows visitors to roam freely across its Downland and woodland habitats. With South Downs Way running through the middle, the park is strategically situated as a honey pot site to many visitors wishing access to the South Downs and its dark skies.

The main visitors centre however, is currently fitted with a number of bulkhead, security and car park lights that are outside the ideal guidance for lighting. The car park streets lights are of inefficient design and are on most nights. Whilst the centre does sit within a natural bowl, sheltered by woodland and the bank of the A3 – which passes some metres above it – the resulting sky bloom can be detected with sky quality measurements. As the SDNPA Western Area office resides within the facility, it was important to address this pollution before persuading others to do the same.

The centre is due for a major update within the next few years, and part of this work will involve a change to the car park function, access and lighting. The SDNPA and Hampshire CC officers are placing an appropriate lighting scheme as part of this upgrade to comply with SDNPA policies. In the interim, many bulkhead lights have been adapted with dark sky friendly shielding or angled correctly to reduce upward light. Timers have also been fitted to the main car park street lights and are now managed according to usage and safety.

SDNPA Main Office

The South Downs Centre is the main office for the National Park Authority. Based in the north wing of Capron House and the Memorial Hall in Midhurst, the South Downs Centre is helping to preserve two Grade II listed buildings and restore them to the highest possible level of sustainability. This has been a complex undertaking as both buildings were in need of significant repair and upgrading. A BREEAM accreditation of 'Excellent' was achieved at design stage and the goal is that the South Downs Centre should become a beacon of sustainability in the National Park.

External lighting on the centre, hall and car park was a feature of this restoration, but due to its listed building status presents a conflict with lighting guidance. As the baseline showed, heritage Victorian style lighting – as would be consistent with the building character – does not satisfy the upward light criteria for the environmental zone. In this case building character, particularly in the daytime, is of greater importance than lighting. However, to reduce the light pollution as much as possible, eyelet styles have been used and the main car park lights – by far the bulk of the lumen output – have excellent optics (ULR<0) and are switched off at night.

Ilford Youth Hostel

Part of a planning application the Hostel was noted to have a lighting scheme that was inappropriate to its rural setting, between Lewes and Newhaven. Although many miles from the core, the light pollution was quite considerable and often on with little use. To comply with planning requirements, the lighting has been retrofitted to remove any sources that have a ULR > 0, and are now fitted with timers. Needless and over bright street lights have been removed from the car park and new efficient designs have been used throughout. The site is an excellent location to stay and access skies.

"Each time a new large scale development is proposed, e.g. fracking site, we are threatened with losing this experience."

Economic Incentive

There is little point in the SDNPA funding economic incentives for a wholesale change to domestic lights or demanding a curfews, for the following reasons;

- It would be far too costly.
- Many modern style lights that are fully cut off, are not a suitable to the heritage style lantern which is more in keeping with the rural aesthetic.
- Enforcement.
- It would not be sustainable.
- New lights could be installed without knowledge
- The Authority should not be overly draconian
- Easily open to abuse

But perhaps the most important reasons are from an environmental responsibility point of view:

Light pollution will only truly minimise when it is an instinctive learned behaviour that causes individuals to question their lighting needs. A SDNPA that would fund its way to darkness regardless of residents' perceptions is not a sustainable or efficient choice as it removes personal responsibility. It is far better to educate and inform residents so that they can make better choices, and that those behaviours are passed on to future generations.

Therefore, there is little point in pursuing the economic incentive for change in favour of education and awareness. Consequently, an International Dark Skies Reserve status would be the biggest the driver for change, by fostering a sense of environmental responsibility in its residents. This is in keeping with the IDA Vision statement;

IDA Vision Statement

3. Educate about the values of environmentally responsible outdoor lighting while collaborating with other like-minded organisations.

Whilst wholesale retrofitting of all residents lighting is not feasible for the reasons above, there is however, scope to provide funding for community buildings through the Community Infrastructure Levy.

Community Infrastructure Levy

In April 2015 the Government scaled back Section 106 – the system that makes sure that developers make a financial contribution to communities when they build new homes and supermarkets. It can now only be used to secure affordable housing and some on-site mitigation. In its place the Government has introduced the new Community Infrastructure Levy (CIL).

The SDNPA want to make sure that communities continue to benefit from any new development and are putting a Community Infrastructure Levy (CIL) in place for the entire National Park. This will allow us to place a financial change on developers who build new homes and supermarkets and use this money to benefit key National Park priorities such as green infrastructure, sustainable transport, education and – where appropriate – external lighting.

As part of the identification of threats, the SDNPA will look to identify possible opportunities for retrofitting and bring the total number of compliant fixtures to a higher value. It is likely that community buildings or businesses would be those targeted by CIL – village halls, churches etc - rather than individual residences.

Estate Plans

The South Downs has a number of large estates across the landscape; such as Cowdray, West Dean and Goodwood. Many of these estates are in the process of developing long term estate plans in consultation with the SDNPA. They offer the ability to proactively plan for better lighting before planning issues arise.

Community Charter

Not all parishes were able or willing to develop village design statements or neighbourhood plans. The SDNPA is however, keen to encourage similar community statements that build on the enthusiasm the residents have for dark skies.

"We should all be reducing light pollution – hope this submission is successful too many light, too much generating power used."

One such parish, Buriton in Hampshire, is keen to develop the idea of a community charter that enables residents to pledge to install correct lighting. If successful the SDNPA would like to broaden this approach and develop a South Downs wide charter.

Due to the similarities, it may be possible to investigate further applications to the IDA under the Dark Sky Communities scheme. A Charter will look to encourage conformity in this respect.

An International Dark-Sky Reserve

Nothing will galvanize attention onto light pollution that attaining a dark sky designation. Having the nocturnal landscape recognised as an important natural resource will empower residents to take more care of it. Many residents have mentioned the reasons why they live in the rural area, quoting the dark skies.

We have seen behavioural change in residents, visitors and partners after the South Downs National Park was designated from two Area's of Outstanding Beauty. We have every confidence that a dark sky designation will produce improvements in behavioural change that are long term and embedded into future generations.



STREETLIGHTS



As the NPA authority does not directly manage the street lights, local highways authorities – through the partnership management plan – should have regard for the special qualities. The following management guidance illustrates that the main local highways authorities have shown clear commitment to protect dark skies and reduce lighting pollution.

All of the Local Highways authorities in and around the park have;

- Reduced the upward light spill of lanterns
- Have dimming schemes

The local authorities (HCC and WSCC) within the core areas have;

- Used lanterns with zero ULR and high DLR
- Kept part night lighting schemes (WSCC)
- Have dimming schemes
- Have had regard for the dark skies of the National Park

Around 2,700 Streetlights have been upgraded across the South Downs, with specific mitigations for dark skies. This figure is approximately 10% of the total estimated lights within the park but outside the core zone (15,000 houses with two lights). This figure rises to 30% if the total lumen output is used rather than number. As the sky quality is very much dependent upon the output of bright street lights rather than more numerous dimmer domestic fittings, the lumen percentage appears to more appropriate within the South Downs.



Local Authority Approaches to Street Lighting



Building on their Night Blight report, the Campaign to Protect Rural England 'Shedding Light' report, showed what were the main drivers and issues in street lighting scheme design and provision from Local Authorities. A UK wide survey, 83 local authorities responded – including 17 county councils, 31 district councils, 10 metropolitan borough councils, 18 unitary authorities and 7 London Boroughs.

As the report showed there were many factors and issues to be considered when designing lighting schemes, with many authorities in the process of upgrading stock. Although light pollution was an important aspect the impact of street lighting in intrinsically dark landscapes was not one of the highest factors (60% see Fig 6). We hope that a Dark-Skies Reserve in the South Downs will help to push this consideration higher up in street lighting designs. As figure 4 shows, however, 'potential impact on light pollution on the night sky' was one of the highest drivers for change, indicating the commitment of Local Authorities to protect dark skies, including those within the South Downs. This commitment is seen in the choices of dark sky friendly design schemes across the region.



"If you are able to establish a dark skies reserve, will you be able to do anything about the noise pollution from aircraft, which gets worse year by year."







"Dark skies are so precious, so are the South Downs. The pace of today's life means we all need dark skies at night to remind us that we are privileged to be a small part of an amazing universe and we should learn to care for nature on our Earth."

Sec South Coast Street Lighting PFI



Though the exact specifications and policy documents differ between the two Counties the choices over lighting largely use the same style lanterns and approaches. Both Counties follow the general presumption that⁷;

Street lighting should not be provided in National Parks (El Zones) unless the County Council or the Local Lighting Authority, can demonstrate an overriding road safety issues

which cannot be overcome by any means.

From their Street Lighting Policy Document 4th edition, HCC have designated the rural areas of the National Park as an E1 zone which requires minimal upward spill and lighting intrusion;

From section 5.3: Obtrusive Lighting; (extracts)

Considerations shall be given to the restriction of obtrusive light by;

- The control of the type of light source
- Restricting the level of light emitted by the luminaire at high angles usually between 70 and 90 degrees.

The use of full horizontal cut off luminaries for mounting height above 6m will have a substantial effect on restricting obtrusive light.

Astronomical observations can be particularly affected by obtrusive light from road lighting installations. Therefore considerations will be given to the level and type of lighting provided in close proximity to control the light output of the luminaire.

⁷ The net one up



"There are so few places to see dark skies in the South of England. Keep this place special."



The provision of street lighting is documented in the HCC Street Lighting guide 4^{th} edition (2010). There is clear commitment by Hampshire CC to reduce light pollution and protect the dark skies of the South Downs National Park.

This reflects the results of the External Light Baseline – Streetlights.

Residential Roads S5 – S6

 6m WRTL 'Libra Performer' with 24/36W PLL lamp and dimming ballast, fitted with Mayflower post top mounted (maximum tilt 5 degrees)

Residential Roads S4

 6m WRTL 'Libra Performer' with 36/55W PLL lamp and dimming ballast, or WRTL 'Arc 80' with 60W Cosmopolis lamp and dimming ballast, fitted with Mayflower, (maximum tilt 5 degrees)

Main Roads ME5 to ME3a and CE Classes

 8/10/12m Philips Iridium 253/254 flat glass with 100-250W SON/T or 90-140W Cosmopolis lamp and dimming ballast, (maximum tilt 5 degrees)

Heritage Lantern Types in addition to Development Standard Highway Lighting when appropriate

 Metcraft – Gladstone, Victoria (includes others not in SDNP) For future development there a clear commitment to require the best light distribution and control. From 'Development Standard for Highways Lighting 5/5/2015)

'Within the National Park ambient luminance should be considered as very low and lower lighting levels for traffic is justified'

Residential Roads S4, S5, S6

 6m Philips WRTL 'Mini Luma', 12-20 LED, 1.4 KLm upwards, Cool White, fitted with Mayflower post top mounted (maximum tilt 5 degrees)

Main Roads M5 to M3 and C Classes

 8/10/12m Philips WRLT Luma, versions 1 to 3, Cool White, fitted with Mayflower post top mounted (maximum tilt 5 degrees)

From the HCC FAQ:

'All lights are being dimmed to reduce carbon emissions but safety is a priority. However, there is no definitive research to prove that reducing light levels leads to an increase in crime.'

The current dimming regime is 25% from dusk (35 lux) to midnight, 50% midnight to 5am and 25% 5am to dawn (18lux).

"The South Downs offer a wonderful and accessible opportunity not too far from the lights on the south coast conurbation to appreciate the wonder of the night sky."



The provision of street lighting is documented in the WSCC Lighting of Developer Promoted Highways Schemes in West Sussex (Revision 2015). With the current part night lighting regime, there is clear commitment by West Sussex CC to reduce light pollution and protect the dark skies of the South Downs

National Park

'The basic start position of the design philosophy is West Sussex is considered a rural county with most subsidiary roads being considered as quiet with slow moving vehicles.'

Subsidiary Roads Class S6/P6 - S4/P4

- 6m Philips/WRLT 'Mini Luma', 12-20 LED, 1.4 Klm, Cool White, fitted with Mayflower, maximum tilt 5 degrees.
- Heritage: Metcraft Victoria, LED 1-3 Modules Philips Fast Flex Neutral White
- Switching to part night 12 till 5.30 off or dimmed to 60% light output

Traffic Routes Classes M5 to M3 and C

- 8/10/12m Philips WRLT Luma, versions 1 to 3, Cool White, fitted with Mayflower post top mounted (maximum tilt 5 degrees).
- Switching to part night 12 till 5.30 off or dimmed to 60% light output

This reflects the results of the External Light Baseline - Streetlights

"As the County lighting Engineer for West Sussex I fully support the National Park's bid to achieve a dark sky environment. Lighting is expensive to install, maintain and energise and to waste these resources, hiding our magnificent star strewn sky, is not an acceptable outcome. We have worked for many years with local astronomers to achieve our goal of lighting where it is needed for safety and convenience and using modern technology to restrict sky glow wherever possible for the enjoyment of our residents".

Kevin Moss

Team Leader. West Sussex Street Lighting PFI monitoring tea

"For a park so close to London, it is a privilege to be under dark skies."

Highways Agency

Development of streetlights on Major roads must comply with;

- TD34 Design of Road Lighting for the Strategic Motorway and All Purpose Trunk Roads,
- British Standard (BS 5489 2013)

A listed consultee (Local Planning Authority) TD34 requires a consultation with the National Park within the design process. The recent upgrade to the A3 Ham Barn roundabout reflect this design process and a due regard for National Parks and reducing above horizontal light spill.

TD 34/07

4. Design Process

4.3 Consultation shall be undertaken as necessary during the design process in order to:

ii. identify the most appropriate and acceptable methods of lighting for environmentally sensitive areas and/or conservation areas. Although TD34 is currently being updated, the 2007 references National Parks

BS 5489-1:2003 (Excerpts)

5.3: Minimizing light in directions where it is neither necessary nor desirable

Control of the light distribution of installations is necessary in order to limit obtrusive light and sky glow.

In some cases lighting can be intrusive at night, e.g. in rural and open areas where lighting can be seen as an intrusion in an otherwise darkened environment.

Light above the horizontal should be minimised in all road lighting installations by controlling the intensity of the light from luminaries at high angles.

Lighting schemes in, or adjacent to, environmentally sensitive areas, seen from within these and adjacent areas, should be given particular attention. Such areas includes green belts, **national parks** and areas of outstanding natural beauty. Similarly, schemes close to the edge of residential areas should also receive special attention. In these case the light distribution should be controlled to minimise light spill on adjoining areas, by selection of an appropriate install intensity class from BS EN 13201-2:2003.

STREETLIGHTS OF SURROUNDING AUTHOIRITES



Surrey County Council were not part of the SEC South Coast PFI and have developed a separate lighting scheme and design guide for future development.

From their general considerations from 'Developer street lighting notes and specifications';

'In conservation areas, of very close to them and in other environmentally sensitive areas special design apparatus may, at the complete discretion of the Authority, be required.

All designs are required to meet the adoptable standards for the County. The design shall minimise light spill off the highway, and utilise column locations on property boundaries of building lines.

Annex 2 – Specified Equipment

Residential

WRLT Libra, 55w PLL

Major Traffic Routes

- Curved Glass WRTL Arc 80, 45W to 140W. (zero ULR)
- Flat Bowl WRTL Arc 80, 45W to 140W

Street lights will be dimmed between the hours of 11pm and 5.30am



East Sussex were not part of the SEC South Coast PFI and have developed a separate lighting schemes requirements. Historically, the implementation of highways lighting systems designed by outside consultants was frequently been problematic and result in delays and additional cost to the Developer. For this reason, ESCC insist that all lighting designs must be procured through their

own Highway Lighting Team. Consequently, no developer guide is available.

In 2012 east Sussex County Councils Cabinet agreed to implement a number of changes to the provision of street lighting.

'This was in accordance with the Councils policy to help reduce energy consumption and also light Pollution'

These changes included changing the yellow lights to white LED lights (Philips Luma) and dimming some lights along the main roads between midnight and 6.00am. Part night lighting has been chosen for;

- Quiet streets where there is integration between Eastbourne lighting with the par-night lighting introduced in Willingdon in Jan 2013
- Quiet streets at the base of the South Downs National Park which is currently applying for Dark Sky reserve Status.



As Southampton City Council is part of the SEC South Coast PFI, the Development Standard for Highways Lighting is identical to Hampshire CC.

Residential Roads S4, S5, S6

 6m Philips WRTL 'Mini Luma', 12-20 LED, 1.4 KLm upwards, Cool White, fitted with Mayflower post top mounted (maximum tilt 5 degrees)

Main Roads M5 to M3 and C Classes

 8/10/12m Philips WRLT Luma, versions 1 to 3, Cool White, fitted with Mayflower post top mounted (maximum tilt 5 degrees)



SUPPORTING LETTERS



7th May 2015

0

SOUTH DOWNS CENTRE North Street Midhurst West Sussex GU29 9DH

Kevin Moss- Team Manager

Specialist Services

(01243) 777257 (Fax)

www.westsussex.gov.

Street Lighting PFI Monitoring Team

Engineering Solutions 0330 222 6677 (direct tel number)

streetlighting@westsussex.gov.uk

Our reference KM/SL/AB Your reference:

Dear Sir

Re: Lighting in the South Downs National park

As you may be aware the investment phase of the West Sussex PFI is coming to a close. Most of the highway lighting within the national park that is to be changed has now been converted to LED which has an upward light component of around zero and is the best solution we have to support you in your bid for a dark sky designation.

There still remains some of the newer equipment which will remain for the time being, however, our policy is that when any equipment is renewed within the park boundary it will be to the LED specification. Similarly all residential lighting in West Sussex and certainly within the park will be set to a part night regime where the lighting will not operate between midnight and 05:30am GMT.

All new development within the park need not be lit unless there are overriding, safety concerns which demand it and then only lighting which conforms to the zero upward light specification will be considered.

I hope these polices are compatable with the SDNP attaining your objective as a dark sky area.

Yours sincerely

Kevin Moss - Team Leader Street Lighting PFI Monitoring Team

		0	Hampshire County Council	
			Economy, Transport and Environment Depuriment Street Lighting Section Ist Flow, Unit J. Rayd Landon Purk Flonders Road, Hedge End Hampshire 5030 215	
	South Downs Centre North Street Midhurst West Sussex GU29 9DH		Telephone 030 wea.hastt.cov	0 353 (388 k
te	Street Lighting Section		Wy reference	JAH/18
ł	01489 771772		fear reference	
	30 th June, 2015		Lee?	Julian higgins@hants.gov.uk

Dear Sir

Esquiriez Direct Lin

Date

Lighting in the South Downs National Park

I refer to your application to the International Dark Skies Association for recognition of Dark Skies status with the South Downs National Park.

Within Hampshire works to replace or upgrade it's existing lighting stock are now substantially complete with all standard residential and main road lighting units being fitted with full cut-off LED lanterns. Roll-out of our Mayflower remote monitoring system will be completed by October, 2015 at which time all equipment will be dimmed by 60% (midnight to 05:00) and by 35% at all other times of operation.

The protection and enhancement of Hampshire's National Parks has been a key policy for the County Council for many years and, as such, no new lighting will be installed unless there are ovenriding safety issues. All new lighting will continue the current theme of zero upward light and energy saving LED light sources.

The County Council has worked closely with both the National Park Authority, Hampshire Astronomical Group and other key stakeholders in producing a relighting programme sensitive to the needs of the environment whilst maintaining adequate lighting to help reduce crime, the fear of crime and night time accidents. I look forward to continuing that relationship for many years to come.

Vours faithfully

Julian Higgins Assistant Highways Manager ITS & Street Lighting

Director of Economy, Transport and Environment Stuart Jarvis BSc DipTP FCIHT MRTPI



Dear Dan

The Institution of Lighting Professionals (ILP) supports the application for the South Downs Dark. Skies Reserve as it embodies the principles of the Institution in that it asks for the 'Right amount of light', at the 'right location', and to be illuminated 'at the right time'. It also acknowledges that Environmental Zones system as published in the ILP's 'Guidance on the reduction of obtrusive light' (publication GN01)and the principles for lighting contained in that publication.

By proposing that the South Downs be made into a Dark Skies Reserve, the fundamental issues of installing lighting without any control mechanism is instantly removed"

I hope this gives you the text that will assist your application.

Regards

Stuart Bulmer J.Eng F.I.L.P. SBL Consultancy Professional Services Manager for the ILP

FUTURE STRATEGY

FUTURE STRATEGY

The future plan is an important aspect of the management of lighting within the park. As this application shows, the South Downs National Park Authority is committed to implementing this plan, reducing light pollution and protect dark skies.

As this document and this strategy shows, there is a real and growing enthusiasm by all partners and residents to take responsibility to protect our skies. The actions detailed here show the long term commitment by the SDNPA and its dark sky partners. Although they are separated into sections, they all are mutually supportive in achieving short, medium and long term aims.



Evidence

Ongoing monitoring SQM

Working with local astronomers we will continue to map sky quality in the park and around a number of fixed sites. Permanent sites are being investigated with the aim of installing continuous monitoring points. At risk zones or areas under development will receive special monitoring.

• Variance in Sky Quality

As sky quality measurements were taken over a prolonged period, some estimation of seasonal or weather effects needs to be established. Continuous monitoring points will help identify variance and confidence in sky quality measurements.

About the Park



- Use evidence in other projects The interest in dark skies has generated opportunities for future projects, such as bats and glow worms. We will continue to look for further opportunities to enhance the dark sky habitats.
- Support the wider Network

The SDNPA will continue to support and explore wider dark skies initiatives with other landscapes. We will look for opportunities and collaboration to further enhance the dark skies family.

Astronomy

• Events

The SDNPA will continue to hold both day and night star parties and support astronomy societies in their activities.

- Increase Dark Sky Discovery Sites
 Once identified, we will continue to increase the number of Dark
 Sky Discovery sites across the downs to provide adequate
 opportunities for access to dark skies
- Investigate campsites

To provide astro-tourists with overnight facilities the SDNPA will work with campsites and other businesses.

- Support Telescope Hire Facilities Interest in dark skies has generated some development in telescope hire from local business and attractions. The SDNP will look to support appropriate hire opportunities.
- Support tourist attractions in promotion of dark skies The SDNPA will continue to work with the larger astronomy facilities to promote engagement and protection of dark skies. Our well established relationships will continue with our partners.

"Dark skies are an important aspect of the National Park's special qualities which the SDNPA has been created to conserve and enhance."

Communication

• Talks and presentations

The SDNPA will continue to look for opportunities to promote dark skies and light pollution to a wider audience.

• Leaflets and Advice

The SDNPA will continue to provide leaflets and web pages to promote good lighting design and general information about the dark skies. Our 'top tips' leaflet will continue to provide residents with the knowledge needed to make changes in their lighting.

• Parish Engagement

Due to time restrictions the SDNPA was unable to attend every parish meeting. The SDNPA will look to respond to requests by parishes for talks, advice and involvement with dark skies and actively look to engage with parishes.

• Uphold the IDA mission statement Through the life of the IDSR, the SDNPA will uphold and promote the IDA mission statements.

F

External Lighting Baseline Continue road survey

To further increase the coverage of the external baseline, the SDNPA will continue to survey villages and parishes in and around the core. The aim will be achieve 100%.

• Investigate enhanced survey

To provide some better estimation of lumen levels, the SDNPA will investigate an enhanced survey with local communities. This will inform threat levels and estimated conformity which can be extrapolated to the wider baseline.

- Estate and Business Surveying
 Where possible, the SDNPA will extend its baseline into estates and farm holdings.
- View-shed Analysis Using GIS, add topological and village infrastructure features to investigate visibility impacts on wider landscape.

Analysis



Respond to increases/decrease in Lumen outputs.
 With additional data on lighting and sky quality, the SDNPA will update its analysis on lighting.



"Turn out street lights - save money, save energy, save our dark skies."



Lightscape Management

Much of the future protection and aim to increase lighting conformity will reside in the lightscape management plan. Through there is a general aim throughout to achieve all IDA requirements but to exploit further opportunities. To provide clarity, future plans will be split in to the main lighting responsibility sections.

Lights within planning control

• Future Applicants

100% of all future lighting development are expected to conform to standards. This will increase the conformity to LMP standards.

- Planning requests and consultations The SDNPA will continue to provide responses to planning and consultations where appropriate.
- Develop Guidance for planners and applicants An immediate task will be develop planning guidance for planners and applicants. Using best practise examples within the community, the guidance will show how SDNPA Local Plan policies should be implemented and how they benefit the protection of dark skies.
- Neighbourhood planning.

The SDNPA will continue to encourage and support communities in developing neighbourhood plan enhancements. Plans will be consistent with SDNPA Local Plan policies and those of the LMP.

Estate planning Where possible, the SDNPA will extend its dark skies policies into estate planning. Estates will be encouraged to include dark skies friendly lighting into their infrastructure. • Duty to cooperate

The SDNPA will continue to work with the surrounding local authorise on this important spatial issue. We will promote and encourage LA's to adopt similar policies on lighting. This is dependent upon the timescales of local plan development and updates.

Building regulations

The SDNPA will look to raise the issue of lighting regulations on building inspectors

Outside Planning Control

- Community Charter/Parish partnerships As an immediate action, the SDNPA will encourage and seek to engage with as many parishes as possible. This may be through neighbourhood planning or community charters. We will look to establish a parish network and encourage communities who were not able to submit letters of support, to do so.
- Increase Conformity to LMP

The SDNPA will continue to promote and encourage residents to alter lighting to the standards set in the LMP. We will work with communities to educate residents on lighting and the importance of protecting dark skies. We will improve the extent and accuracy of the baseline and exploit any opportunities for enhancements.

Investigate Funding Opportunities

The SDNPA will look for funding opportunities to specific lighting threats. The use of the Community Infrastructure Levy (CiL) offers the potential to partly fund retrofit changes to community lighting, such as village halls. Development of lighting schemes is currently identified on the CiL register.

• Targeted Action

Once identified, the SDNPA will work with owners and encourage better installation and choice of lighting. We will look to locate

"On a clear night I get wonderful views of the stars from my house and I want to ensure that this stays like this."

prominent sources of persistent lighting pollution throughout the entire park.

Technology

The SDNPA will look to promote and encourage good lighting design in off the shelf fixtures and lamps.

• Internal Lighting Due to the impact of internal spill on the landscape, we will look to assess and map the pollution from these sources.

Streetlights

• Development

Where street lighting has been justified in large scale planning developments, the SDNPA will provide responses that are consistent with existing streetlight designs and Local Plan polices.

• Further Upgrades

Though not scheduled for at least two decades, the SDNPA will raise the issue of dark skies with the relevant local highways authorities. The SDNPA will look to encourage new technologies that benefit dark skies in any decision making.

• Part Night Lighting

Subject to due process, the SDNPA will look to support local authorities implementing part night lighting schemes in and around the National Park.



CONCLUSION

IN CLOSING

As this application document has shown, an International Dark-Sky Reserve within South Downs National Park is entirely possible and sufficient to meet IDA requirements.

In the Evidence section we showed that despite being located in one of the most densely populated and polluted parts of Europe, we have dark skies. Our SQM mapping showed that there exists a small but important oasis of darkness that is surrounded by an ever growing sea of light. In places these skies measure in excess of 21 magnitudes per arcsecond² providing millions of people with a precious resource.

In the Baseline and Analysis sections we showed that the dominant source of pollution threat to sky quality is not from lights within the core area, but rather from the cities and developments outside. Our estimation of total lumen output showed that well over 80% of the past, current and future threats are outside of the core and buffer zones. We also showed the street lighting modifications which had a due regard for the dark skies of the South Downs, has increased the sky quality across the park, and reduced lumen output. These changes constitute the vast majority of threats.

Through a brief experiment between lumen and distance we showed that despite a large number of domestic and rural business, potential lighting impact from these sources is small and largely confined to the private property from which they are installed. A comparison to our SQM mapping confirms that the presence of these lower powered lights does not necessarily imply a loss in sky quality and that they do not significantly alter sky quality. A large majority have the capability to be adjusted or fitted with lower lumen bulbs to satisfy IDA requirements, and as our communication section, we have promoted and continue to educate our residents in this respect.

In the About the Park section we showed that a solely SDNPA led lighting management plan is unnecessary and inappropriate. Through formal agreements such as the South Downs Partnership Management Plan and the Local Plan, our partners and local authorities within and around the park have fully developed management policies to protect dark skies. To further boost these policies, many of our Parishes have actively updated community plans with statements that protect their dark skies. And for ourselves, as the Local Planning Authority, we have developed comprehensive planning policies that are tried and tested and will continue to reduce light pollution.

In the Astronomy section we showed that the South Downs as a large and enthusiastic astronomy base, with many amateurs and professionals assisting in this application. Their activities and images speak for themselves. They show that the skies in the South Downs are sufficient to accommodate astronomy at high levels and provide a long term resource for access, outreach and education for us and the next generation.

In our Future Strategy we describe our long term plans. There is a great deal of emphasis in providing a sustainable solution that satisfies the IDA requirements but is practical and appropriate to the South Downs. We recognise that due to our lighting profile and our limits as an authority, that the conformity to the lighting management plan present some problems. However, our plan describes how we plan to mitigate this deficiency.

Finally, we should return to the beginning. 'Commitment' was the word the IDA impressed upon us. Although our application had technical difficulties and has been developed between changes in guidelines, we believe we have shown there is commitment to the dark skies from every level of society. From the individual, parish, district and county, we have unequivocally shown that there is sufficient desire, action and commitment from all partners and stakeholders to make the South Downs National Park International Dark-Sky Reserve a long lasting success. As we stated at the start;

They may not be the darkest. They may not be the biggest. But they will be the most cared for.

"Please protect the dark skies of the South Downs National Park – they are so precious, for all of us in Southern England"

Parish Letters



Buriton Parish Council

Dan Oakley Dark Skies Lead Officer South Downs National Park Authority Western Area Office Queen Elizabeth County Park Hampshire POB QGE Buriton Parish Council 1 Black Hill Cottages Buriton Petersfield Hants GU31 4NW Email: <u>buritonperishcounci@hotmail.co.uk</u>

Dear Mr Oakley,

SDNPA application for International Dark Skies Reserve status

Buriton Parish Council fully supports and encourages this application, recognising that the beauty and tranquility of its dark skies, thanks to the lowest light polution in the South East of England, are a defining special quality of the South Downs National Park which International Dark Skies Reserve status would help protect and enhance.

The Parish of Buriton is already committed to protecting its dark skies and will look to reduce light pollution where possible, both as a community and individually as residents.

The community's Village Design Statement and Local Landscape Character Assessment (adopted as Supplementary Planning Documents by the Local Planning Authority) both recognise the importance of this matter by stating that:

- "Burlton skies are very special it can be pitch dark at night and we should keep it like that" and
- 'on residential and business premises, external lighting should be limited to the minimum required for security and working purposes and should minimise potential pollution from glow and spilage.'

We look forward to continuing to work with the SDNPA to achieve the international Dark Skies Reserve designation.

The Parish Council also expressed an interest in experimenting with turning off street lights after, say, midnight until the early hours of the morning and also dimming individual street lights etc. which we understand should now be possible with the new PFI street amp system. We would be very interested in working with you on this matter as well as with educational materials for domestic lighting etc.

Yours sincerely,

Karen White (Mrs) Karen M White Chairman, Buriton Parish Council





Midhurst Town Council The Old Library, Knockhundred Row, Midhurst GU29 9DQ 9720 818953 midharite@titeamet.com www.rkdurst-te.gov.il

My Ref : Your Ref:

12 March 2015

Mr D Gakley Dark Skies Lead SDNPA

By email

Dear Mr. Cakley,

Dark Skies within the SDNP

Thank you for coming along to our Council meeting on Monday evening to explain the Dark Skies Project.

Following your very interesting talk the Town Council has agreed to offer its support to the Dark Skies Project in principle. It has also agreed that it will give due consideration to the alms of the project when considering planning applications upon which it is consulted.

Yours sincerely,

Joan Hursthouse

Joan Hursthouse Clerk to the Council

Office hours 10 a.m. to 12 noon Mondays, Tuesdays and Thursdays

Owstebury Parial Council

Deutstein Wy J Dreamer

Yew Tree House Herating Lone Overlastury Winchwester S/021 1LE Neckers 8/82/7715 Hits Science 10

Clerk

Michael Oksay

20rd" January 2015

Mr Dan Oakley Dark Shite Linic anti Wastern Anas Minneger Stuth Downs National Park Authority Queen Etimonth Country Park POB DDE

Dear Dear

Lystite to confirm the (council supports and exmanages the Authority's approximation international Dark (lyst) Resource status (IDER). The beauty and transports of the dark mises are defining claracteristics of the Park, which (DDR status level) head to underst, set, imperfully enhances.

The Council is committed to protecting the right store and we took to remain text petitidine where considers in hardnesses of true, the Council has agreed to indicate such conscience by near addition of the Dariah Pairc.

Yours anceroy.

Michael Cleary Clerk to Owelebury Partsh Council

WOOLBEDING WITH REDFORD PARISH COUNCIL

Chairman: Mrs. A. Reynolds, Bucksfield House, Woolbeding, Midhurst GU29 0Q8.

E mail: reynolds@bucksfield.co.uk

2^{sd} December, 2014.

Mr. D. Oakley, Dark Skies Lead, South Downs National Park Authority, South Downs Centre, North Street, Midhurst GU29 9DH.

Dear Mr. Oakley,

SDNPA Application for International Dark Skies Reserve Status (IDSR)

Woolbeding with Redford Parish Council fully supports and encourages this application. It recognises that the beauty and tranquility of its dark skies, thanks to the lowest light pollution in the the South East of England, are a defining special quality of the South Down National Park. International Dark Skies Reserve status would help protect and enhance this unique quality.

This parish is committed to protecting our dark skies and will look to reduce light pollution where possible, both as a community and individually as residents.

The parish will continue to work with the SDNPA to achieve the international Dark Skies Reserve designation.

Yours sincerely,

your N Anne Reynolds, Chairman

COLDWALTHAM PARISH COUNCIL (HARDHAM, COLDWALTHAM & WATERSFIELD)

Plasse reply to:-Parish Clerk, Coldwaltham Parish Council, Greendene, Codmore Hill, Pulborough, West Sussex, RH20 18Q Tel: 01798 873747, Email: deherlockfaidge@btintemst.com

16th January 2015

Dan Oakley Dark Skies Lead South Downs National Park Authority North Street Midhurst West Sussex GU29 9DH

Dear Dan

SOUTH DOWNS: INTERNATIONAL DARK SKIES RESERVE APPLICATION

Thank you for your email of 17 October, which was discussed by Coldwaltham Parish Council at its meeting on 25 November.

The Council supports the objectives of the Authority's Dark Skies project. As the planning authority, the National Park is well-placed to secure the protection and enhancement of the dark sky environment. By giving a lead, the Authority can focus the efforts of individual parishes to safeguard and promote the night sky as an important but increasingly scarce resource, which deserves to be given due weight in assessing the sustainability of development proposals.

To this end we are concerned that, as a result of the project, there should be explicit recognition of the favourable conditions which still exist in our parish. Ideally that recognition would come from inclusion in the International Dark Sky Reserve sought by the Authority. Should that prove difficult, or subject to delay, it would still be important to look at other forms of designation for suitable and accessible sites within the National Park, from which the night sky could be appreciated to both recreational and educational benefit. We note that such a facility already exists in Rogate, and would be ready to work with the Authority on possible options for our parish as well.

Yours sincerely

Guy Nelson Chairman, Coldwaltham Parish Council Mr D Daxlay -South Downs National Park Authority Weetiant Area Siftion, Queen Elizabeth Country Park, Hamperine, Hots c/ge To have been allow and the

Tel: 21420 75651 Hebite 17570 082463

16 February 2015

Dear Dari

Reference: SDNPA Application for International Dark Skies Reserve status (IDSR)

Setsome Parish Council fully supports and encourages the application, recognising that the beauty and transullity of as dark sides. Sharks to the lower high pollution a the South East of English, and a defining special quality of the South Downs National hark when Diferentional Dark titles theavier status would not protect and enhance. The Parish of Settoms is committed to protecting our dark size and will look to reduce light pollution where passible, both as a community and individually as unidents.

The Parish's dark skies will be identified in this updated lieborne Village Design fortement as a significant natural asset which can also estract sustoin and tourists to the area to the learnest of this local occurring.

We will continue to sume with the SDNPA to antieve the International Dark Gloss feasierve designation.

CO LA L

Mrs Philippe Pervisit Clefe to Selborne Peruity Eburniti

- Webb awke, ello internation could any con-



Clanfield Parish Council Chairman: Mrs Margaret 139 North Lane,

Chairman: Mrs Margaret White Clerk: Mrs Diane Duffy 2 023 92596353 Email clanfieldpc@virginmedia.com

Dan Oakley, Dark Skies Lead, South Downs National Park Authority

10th February, 2015

Clanfield,

Hampshire

PO8 0RN

Waterlooville,

Dear Mr Oakley,

Re: Dark Skies Within the South Downs National Park

I am writing to you on behalf of Clanfield Parish Council further to your letter and email received by the Parish Council in January 2015.

It was agreed at the Council meeting held on Tuesday last that the Parish would fully support the Dark Skies Project.

The Parish Council will look to reduce light pollution where possible and will be aware of this when consulting on planning applications which could have a detrimental effect on the skies.

The Parish Council will include dark sky friendly policies if they do produce a Neighbourhood Plan or Village Design Statement in future years.

With many thanks

Yours sincerely

D.E Dulk

Diane Duffy CLERK to Clanfield Parish Council

RODMELL PARISH COUNCIL

Chairman Paul Denerley 5 Badgers Dene Mill Lane Rodmell LEWES East Sussex BN7 3HS 01273 473844 paul.denerley@btintemet.com Clerk to the Parish Council Judith Bradbury Longbourn South Farm Close Rodmell LEWES East Sussex BN7 3HW 01273 470713 rodmell.parish57/@bitinternet.com

Date : 3rd March 2015 Dan Oakley Dark Skies Lead South Downs National Park Authority

Dear Mr Oakley

Dark Skies Within the National Park

At Rodmell's Parish Council meeting last night, the Councillors unanimously resolved to send a letter of support of the National Park's project to get International Dark Sky Reserve status for part of the South Downs National Park.

The village of Rodmell has no street lighting & we value highly this absence of light pollution, which is appreciated by our residents & resident wildlife too. The Councillors are supportive of your endeavours to protect & enhance the night skies of the South Downs.

Yours sincerely

Judith Bradbury Clerk , Rodmell Parish Council
STEDHAM WITH IPING PARISH COUNCIL

Chairman: Eddie Lintott Clerk: Jane Crawford

Mount Cross Minsted Midhurst West Sussex GU29 0IH Tel: 01730 814284 email: SIPCClerk@minsted.myzen.co.uk

Email to: Dan Oakley Dark Skies Lead South Downs National Park Authority

3 November 2014

Dear Mr Oakley

SDNPA Application for International Dark Skies Reserve status

Stedham with Iping Parish Council fully supports the SDNPA's application for International Dark Skies Reserve designation.

We believe it is important for the National Park to encourage dark night skies which is beneficial to our well-being and vital for wildlife.

We have identified the lighting of the new crossing at Stedham Crossroads as an unacceptable source of light pollution and are happy to report that WSCC is planning to put cowls on the lights to improve them in this respect.

We are also pointing out possible cases of light pollution when commenting on planning applications.

Following your visit to our parish, we are working to encourage our residents to reduce light pollution and hope that we manage to Achieve Dark Skies Reserve status.

Yours sincerely

Jane Crawford

Jane Crawford Clerk to the Council

ALBOURNE PARISH COUNCIL CIO THE CLERK ALBOURNE VILLAGE HALL THE STREET ALBOURNE WEST SUSSEX

TEL: 01444 892 111 MOB: 07702190707

E-MAIL: albournepc@gmail.com

Mr D Oakley Dark Skies Lead South Downs National Park Authority

10th February 2015

Dear Mr Oakley,

SDNPA: Application for International Dark Skies Reserve Status

I am writing to confirm that Albourne Parish Council fully supports and encourages the above application, as it is a parish with views into the National Park, and so would certainly wish to help the Authority achieve its objective of minimising light pollution in this part of the south east. The residents of the parish very much appreciate and value the beauty and tranquility of dark skies, and the fact that this asset needs to be protected and enhanced.

Indeed, the Parish Council has a very keen interest in ensuring that any lighting, which results from planning applications in its own area, whether of a residential or commercial nature, is kept to an absolute minimum, and should respect the fact that the Parish is very much a rural and peaceful area, supporting a range of habitats for wildlife (Barn Owls being a particular example). To this end, the Parish Council will be considering the need to have such a policy or aim in its own emerging Neighbourhood Plan. In addition, the Parish Council is able and willing to work with the SDNPA, in order to achieve the International Dark Skies designation, which is both justified and highly deserved.

Yours sincerely,

lain McLean

lain McLean (Clerk and RFO to Albourne Parish Council)

ELSTED AND TREYFORD PARISH COUNCIL

Dan Oakley

Dark Skies Lead South Downs National Park Authority

20th October 2014

Dear Dan,

Ref: SDNPA Application for International Dark Skies Reserve status (IDSR)

Thank you for your recent email to Elsted and Treyford Parish Council asking us to support the proposed Dark Skies reserve. We are very happy to support and encourage this application which will help protect the tranquility of the South Downs National Park.

We are glad that the your Dark Skies survey conducted in our parish went well and that the data collected will be useful. Although we do not have a Neighbourhood Plan at present, the parish council is committed to supporting this project and will encourage parishioners to get involved.

We look forward to working with the SDNPA to achieve the international Dark Skies Reserve designation in due course.

Yours sincerely,

Kay Gilmore

Parish Clerk

Elsted and Treyford Parish Council

COCKING PARISH COUNCIL

Clerk to the Council G. C. Burt 2b Albert Terrace, High Street, Bognor Regis, West Sussex, PO21 155 Telephone: 01243 862287 / 07739 506 275. Email: cockingpc@gmail.com

Dan Oakley Dark Skies Lead South Downs National Park Authority Western Area Office QE Country Park Petersfield Hampshire PO8 0QW

23 October 2014

Dear Mr Oakley,

SDNPA Application for International Dark Skies Reserve status (IDSR)

Further to your recent presentation to the Council about this project, I am pleased to confirm the Council's support for such designation.

Like many villages in the Downs, Cocking has no street lighting, and it is the absence of such lighting that makes the few lights which you can see in the villages when you look down upon them in their nestling valleys, that helps give the Downs that rural and remote charm, which could all so easily be lost if we were not vigilant.

Whilst those of us lucky enough to live, work or visit the Downs regularly can all so easily take such beauty for granted, the work of the Authority in seeking to ensure that such beauty is preserved, and enhance if it is possible to do so, the Downs for future generations to enjoy, is to be commended.

With every good wish in your application.

Yours sincerely,

Gingging Bart

G C Burt Clerk to the Council

WASHINGTON PARISH COUNCIL

2

Clink to the Council Miss Perrina Kingham 9 Lashnar Road, East Preston, BM16 (ES Tel: 01003 770383) Email: clark@nashingtorparinh.org.ak Website: www.weshingtorparinh.org.ak

UNLIT PARISH POLICY

'At night you aften see not a dark sky filled with stars but a bright, all-enveloping and intrusive arange glow, more "nightmore" then "nightscope".

The Parish of Washington is predominantly rural in nature with a diversity of flora and fauna. It includes substantial areas within the South Downs National Park. The Parish offers many varied and popular walks. The settlement of Washington itself dates from Anglo Saxon times. The Parish benefits from a range of attractive and diverse properties many of which are of great historical and social interest.

The Parish Council seaks to minimise light pollution in all areas of the Parish including (but not restricted to) car parks, rural, residential, public rights of way, footpaths and pavements, commercial and industrial areas shop windows and advertising displays left on at night and along the Parish roads including the A283 in the interests of:

- 1. Maintaining the unique and ancient character and nature of the Parish.
- Preserving night-time views from, to and across the South Downs National Park and National Trust Land
- 3. Preserving areas whose open and remote quality landscapes would be affected.
- 4. To align the Parish with the aspirations of the South Downs National Park
- 5. To accord with general government policy on preservation of resources and reduction of costs

Washington Parish Council therefore RESOLVED (number 015) at their Parish Council Meeting on the 2nd February 2015 to declare Washington Parish to be an UNLIT PARISH and APPLY to West Sussex County Council and Horsham District Council for acceptance.

Washington Parish Council therefore RESOLVED (number 016) at the Parish Council Meeting on 2nd February 2015 to ADOPT the policy above.

Signed.

Date Sthe January 2015

Miss Petrina Kingham Clerk to Washington Parish Council for and on behalf of Washington Parish Council.



Mrs Sarah Jeffees Clerk to Plumpton Parish Council 8 Heasewood Boinore Village Haywards Heath West Sussex RHL5 47J

Plumpton Parish Council

01444 441302 Sarah.jeffers@plumptonpc.co.uk

24th February 2015

Dan Oakley

Dark Skies Lead

South Downs National Park Authority

Dear Mr Gakley,

Ref: SDNPA Application for International Dark Skies Reserve Status (IDSR)

Plumpton Parish Council fully supports and encourages this application, recognising that the beauty and tranquility of fits dark sides, thanks to the lowest light pollution in the South East of England, are a defining special quality of the South Downs National Park which International Dark Skies Reserve status would help protect and enhance.

The Parish of Plumpton is committed to protecting our dark skies and will look to reduce light pollution where possible, both as a community and individually as residents.

We will continue to work with the SDNPA to achieve the international Dark Skies Reserve designation.

Yours sincerely,

Sarah Jeffers

Sarah Jeffers

Parish Clerk

Plumpton Parish Council



Dear Mr Diskley.

Hef: NDNPA Application for International Dark Niles Reserve status (1058)

At a moving of Council hold on 19th March, 2015 Kingston Parola Council (West Sassera's auroral to fully support this application, recognizing that the least's and transplitting of its dark skins are a defining apenal querity of the South Down's Sassard Park which International Dark Moin Reserve status would help protect and estimates.

Kingson Parish is not actually waites the SDNP (sithough algorant) has the SDNP is very important to our community. Kingston law tercores Highdown Hill in the SDNP and the ones and as light pulsation is our parish tweld impact on views from the SDNP (and your remail).

Information on the (DSR application reached at two late to be fully reflected in our Neighbourhood Plan which was came into lates on 110. Match, 2015 that the temperature of soutperline light politices to return the react character of the particle (recluding protecting the environment for with light a reciproced in some of our policies and relevant contracts on ori out of an Appendix to this letter. The information you provided two box reteriest on that is can be referenced when the Naighbourbord Flas is reviewed in the forum.

With all best withes for achieving the International Dark Skies Reserve Holins.

Yours amoreity.

Val Knight Clerk of the Council

> KENGSTON PARISH COUNCIL 19 (In Ratings, San Press, West Senses 2018 219) 70:12 annual Lingunger Discontin

GRAFFHAM PARISH COUNCIL

Chairman: Cilir. Richard Davidson Brookdene Graffham Near Pelworth West Sussex GU28 ONL 01798 867232 Clerk: Tracy Rowe Graffham Hil Cottage Graffham Near Petworth West Sussex GU28 0GA Tel: 01798 867020 graffhampo@like.co.uk www.graffhamorfile.co.uk

16 March 2015

Please reply to Clerk as above

Dan Oakley Dark Skies Lead and Ranger South Downs National Park Authority

Email to: Dan.Oakley@southdowns.gov.uk

Dear Mr Oakley

Re: SDNPA Application for International Dark Skies Reserve Status (IDSR)

Graffham Parish Council considered this matter at its March 2015 meeting. Graffham Parish Council fully supports and encourages this application and recognises the importance of Dark Skies and will enclearwar to look at reducing light poliution where possible.

Whilst Graffham Parish Council currently does not have a Neighbourhood Plan it will consider this matter carefully, should in the future, it decide to produce a plan.

With kind regards, Yours sincerely,

5 spore

Tracy Rowe Clerk

NORTHCHAPEL PARISH COUNCIL

Clerk: Mrs Helen Cruikshonk, 4, The Croft, Lodsworth, Petworth, WEST SUSSEX GU28 98W Telephone: 01798 860788 Emoil: helencruikshowk@btinternet.com

Mr Dan Oskley Dark Skies Lead South Downs National Park Authority

19" March 2015

Dear Mr Oskley,

RE: SDNPA Application for International Dark Skies Reserves Status (IDSR)

Thank you fer your email dated 27th January 2015. At a Parish Council meeting held on Monday 2nd March, the IDSR was discussed and it was agreed that Northchapel Parish Council fully supports and encourage the SOVPA application.

Northchapel Parish Council is committed to protecting the porish's dark skies and will look to reduce light pollution where possible and encourage residents and businesses to do the some.

If the Parish decide to embark on a Neighbourhood Plan ar variation of one, then Dark Skies palicies will be identified and included in the plan. We will embark to work with and help SDNPA achieve this status.

Yours sincerely,

Mrs. Helen Cruikshank, Parish Clerk, Northchapel Parish Council

ALFRISTON PARISH COUNCIL

Dan Calory Dan State Land South Downs National Park Authority South Downs Centre North Street Method 0120 900H

12th March: 2016

Deat Dec.

BOUTH DOWNE NATIONAL PARK DARK BKY ETATLE

Advance Parent Council Key supports and encourages DDMPA in the efforts to obtain manual and Date. Titly Reserve Status.

We encouples that the beauty and tranquility of sur noral environment can only be proteined, presential and analysis of the beauty of the protein of the protein of a minimum. As a parallel and "Ramin Council we have had a complication of minimum to even statest chart planning on which as far as possible, to incorporate concerns almost light pollution risk our planning consubstitute process.

As a intropic feasing related on fouriers we appreciate this added value that a relation on light pollution can bring, relinforcing as I does much that is spenial about our vitage and its minimized.

The sense have been do see release to the test of modern encroschmerts that such igning brings in the recent SDNPA Conversion region for Atheton and we now the SDNPA will continue to access in both the enforcement of released regulations within the Conservation Area as as as the true and converse preserve.

As a Perint Council en will commit to incorporating the above pledge into our rest Parish. Para and will do what we can to encourage the reduction of domestic light polyticity through responsible use by encouraging paralteristics angle security tabling downwards, use limens and motion sensors for subside lighting and revius symmithing lightness.

CLERK TO THE COUNCIL - Martha Cantal

6tar Lane Cottage, 6tar Lane, Africton East Evenex BN26 STE Telephone D1323 670212 Email Countries Control www.athittenganahoouricii.cig.sk



Mrs Kares Crawhansi Clerk to the Council. Ringmer Parish Council Parish Council Office, Village Hall, Ringmer, Lewes, East Sussex, BN8 5QH www.ringmerparishcouncil.org.uk Email: clerk.ringmerparishcouncil@btconnect.com Tel: 01273 813242

Mr K G Harvey

3

Dan Oakly Dark Skies Lead – Southdowns National Park Authority SOUTH DOWNS CENTRE North Street Midhurst West Sussex GU29 9DH

17 March 2015

By Email

Dear Dan,

Ref: Application for International Dark Skies Reserve Status (IDSR)

I am writing to inform you that Ringmer Parish Council discussed your project at their Parish Council meeting held in February. Members requested that i write to you and inform you that Ringmer Parish Council supports the Southdowns National Park authority in getting international Dark Sky Status for Parts of the Southdowns National Park in principle.

Ringmer Parish Council will ensure that dark skies will be borne in mind when considering future planning applications which include lighting.

Yours sincerely

K A Crowherst

Karen Crowhurst - Clerk to Ringmer Parish Council

KIRDFORD PARISH COUNCIL

e/o.8 Saville Gardens, Hillingsburst, West Savsex, RH14 9HR. Chrk: Mrs. I. Marsaul, Bactions, FlaCM. Fol: 41403 103477 E-mail: forth-forty-mail.com

Our ref Ihi

99 March 2015

D. Oukley, Esg., Dark Skies Land, Senth Drown Nutronal Pack Authority, Harton Homas, Deptor Road, Midbaert, West, Susess, (1129-9411)

Thing Mr. Caldoy,

6 SDNPA Application for International Dark Shies Reserve Status (IDSR).

Rardtord Parish Council in happy in support into application as it has a periory of no bursthung a dark sky area. Dure is no street lighting within the Parish and bursts there is seen low light pollution in all parts, both to and outside the South Depend National Park. If agreed that low sight pollution was a special quality of the SDNP and International Dark Was Reserve summ could only assist in protection and polynomenous of the argon.

The Parial Council would be more than happy to would with the #ONPA to induce the immunitual Dark Skins Reserve designation.

Yourse successive.

Weether

CMarshall (Mrs.) BArkhous, FILCM, Usek to the Cosinal.

March 30th 2015.

Dark Skies Project within the South Downs National Park.

The Common Parish of Sutton and Barlavington voted in favour of supporting the Dark Skies Project at the Parish Council Meeting dated March IIth 2015,[agenda item 9(i)]with all councillors supporting the project.

The council will make every effort to reduce any light pollution in the area where possible and will make it a consideration to include dark sky friendly policies when writing the village design statement.

On behalf of Sutton Barlavington Parish Council

Trudi Rogers (Assistant Parish Clerk)





UPPER BEEDING PARISH COUNCIL

Pire J. Hole: Square — Upper Booking - West States > 10144 JHE Tell, 01903 810116 winted, upper booking 2010 provide stress Clarity Intern Cohemical Clarity Intern Cohemical

TT" MALIBER.

Dan Dahary. Dark Shina Lond, Shinh Ruman Nathanet Park Authority, Narth Stront, Must Stront, Must Siman, 20129 West, 20129 West,

Thus Mr Chillion.

Approximate for American Intern States Reserve Mature

Suppor Danaling Perrols Contact Both supports and succurages this application. We recognize that the basiney and manager its of its data while it basis, to the lowest light pellowen in routhmail Digitals - are a durining special quoties of the Viennest Park, which Informational Dark Salar Reserve (IDSR) mains would help protect and minimum.

The possile of Upper Duning is commuted to protocolly out and killes and will and to outpet light politicol where generity, both or a commutity and individually as escalares.

This preparation was put to the domain Parak Massing as Bouring and Drambie using both or 23th April 2013, where, sourcements and an annual Parak Massing security, 4 vote by above of bands attended assumes support time of anomalous of the parties studying the context.

(the periods connect model, as its averall meeting on 10th May 2015, enderstal the preparal and antimetical way to mine this point it.

We will preting to usek and the EDNEA in advance BDRS instea

Rese Colorman

Wisborough Green Parish Council

Clerk: Mrs Louise Davies Tel: 01403 701102 E-mail: clerk@wisboroughgroenpc.org PO Box 255 Wisborough Green Billingsburst RH14 0WT

Mr Dan Oakley Dark Skies Lead and Ranger South Downs National Park Authority Western Area Office Queen Elizabeth Country Park Hampshire PO8 OQE 26th May 2015

Dear Mr Oakley

Ref: SDNPA Application for International Dark Skies Reserve Status (IDSR)

Thank you for attending the Annual Parish Meeting in Wisborough Green and for giving such an informative presentation on the Dark Skies project.

Wisborough Green Parish Council has now had an opportunity to discuss further. Although only the southern part of the parish is within the Pack itself, the Parish Council fully supports and encourages this application. The Parish Council is committed to protecting dark skies in the whole parish and acknowledges the importance of the dark sky for areas adjoining the Pack boundary.

As such, a dark skies policy has been included in our Neighbourhood Plan and the Parish. Council will endeavour to reduce light pollution where possible; information about the project will be included in a forthcoming newsletter to residents.

Wishing you every success with the application.

Yours sincerely

Cause Kaleviery

L Davies (Mrs) Clerk to the Council



Dan Oakley

Dark Skies Lead South Downs National Park Authority 12th August 2014

Dear Mr Oakley,

Ref: SDNPA Application for International Dark Skies Reserve status (IDSR)

Rogate Parish Council fully supports and encourages this application, recognising that the beauty and tranquillity of its dark skies, thanks to the lowest light pollution in the South East of England, are a defining special quality of the South Downs National Park which International Dark Skies Reserve status would help protect and enhance.

The Panish of Rogate is committed to protecting our dark skies and will look to reduce light pollution where possible, both as a community and individually as residents.

Following the Dark Skies survey conducted in Rogate in Spring 2014 by the SDNPA, the Parish's dark skies will be identified in the Rogate Neighbourhood Plan as a significant natural asset which can also attract visitors and tourists to the area to the benefit of the local economy.

In partnership with the National Park Dark Skies project, in June 2014 Rogate Parish Council formally approved the creation of the Rogate Community Sky Centre to promote the enjoyment and understanding of our dark skies. This initiative will provide the opportunity for residents and visitors of all ages to gain a greater appreciation of one of the special qualities of the National Park.

We will continue to work with the SDNPA to achieve the International Dark Skies Reserve; designation.

Yours sincerely,

Elizabeth Brown,

Chairman, Rogate Parish Council

Petworth To	own Council
Hi Dan	
Due to Christmas annual leave, this is the first o	pportunity I've had to respond to you.
PTC fully support the policies.	
Kind regards	
Весса	
Mrs Rebecca Knifton equal	
Town Clerk	
01798 344 883/07917 663167	
http://www.petworth-tc.org.uk/	
<u>clerk@petworth-tc.gov.uk</u>	

SOUTH DOWNS NATIONAL PARK

INTERNATIONAL DARK SKIES RESERVE

