Annex G – Part Night Lighting case studies

1. The council operates approximately 60,000 streetlights in Oxfordshire and it was previously estimated that if part-night lighting were implemented at every possible street lighting location across the county it could potentially reduce energy consumption by over 5,000 kWh per day, and realise an approximated annual reduction in carbon emissions of up to 400tCO2e. It was also previously estimated to potentially reduce annual cost revenue expenditure on energy of up to £400k if adopted across all of the lighting stock.

2. The council's approach to delivery of part night lighting has shifted to be more of a community led programme and therefore removed the potential for savings at a county level.

3. The new Part-Night Lighting Implementation Framework is proposing to invite parish and town councils and local governance bodies to apply for part-night lighting schemes within their areas. It is appreciated that this new approach means the adoption of part-night lighting will be incremental and so the estimated Oxfordshire wide carbon and cost savings will not be as originally anticipated.

4. Three example case studies have been undertaken to indicate the potential cost and carbon savings that could be achieved using the Framework. Each case study location was mapped against the council's Highways and Asset Management system to identify the streetlights. This provided the individual streetlight fitting and its associated Watts. The number of operational hours reduced for part-night lighting was then calculated. providing the potential annual cost saving and the annual carbon saving on electricity (tC02e)
5. These costs are indicative and would most likely vary on specific case by case:

    - **Rural location: 46 lights – saving £341.00 / 0.28 tC02e**
    - **Urban Location: 102 lights – saving £3,348.00 / 2.73 tC02e**
    - **Residential location: 165 lights - saving £1,515.00 / 1.23 tC02e**

6. The case studies show that when the Framework is applied in an urban area, there is a high probability that the urban area would not pass the exemptions list.
    - Major road junctions, including roundabouts, slip roads and rail crossings
    - Where there are traffic calming measures, significant road narrowing or intrusions
    - Controlled crossing points
    - Areas supporting a night-time economy
    - Steps / stairs / gates / obstacles
    - Waterside paths
    - Remote alleyways
    - Subways and underpasses
    - Where there is Local Authority / police CCTV / ANPR

- Areas with high levels of crime or road traffic collisions

7. The case studies also provide an example of how the cost and carbon savings could be achieved incrementally, depending on the number of schemes proposed and their speed of implementation, as well showing what the estimated costs are for changing a streetlight into a part-night lighting scheme streetlight. The cost of changing to a part-night lighting scheme has been estimated to be approx. £50.00 per streetlight.

Part Night Lighting – 3 Case Studies Calculations

	No. of SL	Wattagge	Pre Burn Hours	Post Burn Hours	current kWh/Yr	Current Annual Cost	Post PNL kWh/Yr	Post PNL Annual Cost	Annual kWh Saving (Post PNL)	Annual Cost Saving PNL	tCO2e Saved	Cost of changing the street light regime to PNL (estimated to be £50 per street light). It would be same costs again for switching back	Y1 cost saving	Y2 cost saving	Y3 cost saving
Residential	20	15	4107	2316	1,232	£296	695	£167	537	£129	0.11				
	87	18	4107	2316	6,432	£1,544	3,627	£870	2,805	£673	0.55				
	14	23	4107	2316	1,322	£317	746	£179	577	£138	0.11				
	3	24	4107	2316	296	£71	167	£40	129	£31	0.03				
	26	25	4107	2316	2,670	£641	1,505	£361	1,164	£279	0.23				
	15	41	4107	2316	2,526	£606	1,424	£342	1,101	£264	0.22				
	165				14,477	£3,475	8,164	£1,959	6,313	£1,515	1.23	£8,250	£1,515	£3,030	£4,546

	No. of SL	Wattagge	Pre Burn Hours	Post Burn Hours	current kWh/Yr	Current Annual Cost	Post PNL kWh/Yr	Post PNL Annual Cost	Annual kWh Saving (Post PNL)	Annual Cost Saving PNL	tCO2e Saved		Y1 cost saving	Y2 cost saving	Y3 cost saving
Rural	35	15	4107	2316	2,156	£517	1,216	£292	940	£226	0.18				
	2	17	4107	2316	140	£34	79	£19	61	£15	0.01				
	4	18	4107	2316	296	£71	167	£40	129	£31	0.03				
	4	25	4107	2316	411	£99	232	£56	179	£43	0.04				
	1	62	4107	2316	255	£61	144	£34	111	£27	0.02				
	46				3,257	£782	1,837	£441	1,420	£341	0.28	£2,300	£341	£682	£1,023

	No. of SL	Wattagge	Pre Burn Hours	Post Burn Hours	current kWh/Yr	Current Annual Cost	Post PNL kWh/Yr	Post PNL Annual Cost	Annual kWh Saving (Post PNL)	Annual Cost Saving PNL	tCO2e Saved		Y1 cost saving	Y2 cost saving	Y3 cost saving
Urban	6	15	4107	2316	370	£89	208	£50	161	£39	0.03				
	12	17	4107	2316	838	£201	472	£113	365	£88	0.07				
	1	23	4107	2316	94	£23	53	£13	41	£10	0.01				
	11	38	4107	2316	1,717	£412	968	£232	749	£180	0.15				
	11	41	4107	2316	1,852	£445	1,045	£251	808	£194	0.16				
	2	45	4107	2316	370	£89	208	£50	161	£39	0.03				
	1	56	4107	2316	230	£55	130	£31	100	£24	0.02				
	22	60	4107	2316	5,421	£1,301	3,057	£734	2,364	£567	0.46				
	6	84	4107	2316	2,070	£497	1,167	£280	903	£217	0.18				
	1	86	4107	2316	353	£85	199	£48	154	£37	0.03				
	13	90	4107	2316	4,805	£1,153	2,710	£650	2,095	£503	0.41				
	2	99	4107	2316	813	£195	459	£110	355	£85	0.07				
	1	114	4107	2316	468	£112	264	£63	204	£49	0.04				
	7	180	4107	2316	5,175	£1,242	2,918	£700	2,257	£542	0.44				
	6	301	4107	2316	7,417	£1,780	4,183	£1,004	3,235	£776	0.63				
	102				31,994	£7,678	18,042	£4,330	13,952	£3,348	2.73	£5,100	£3,348	£6,697	£10,045

Rural Location case study:

Proposed exemptions:	Rural
• The rural area encompasses 3 villages; typical of 'parished areas' within Oxfordshire. • Each village is mainly residential properties with 20 or 30 mph road speeds. There are access paths from the roads going through the villages into and out of residentials properties, farms and fields etc. There are paths and walkways to other properties, such as schools, churches, shops and local shops. •Each village has a Pub and a Church. To support the nighttime economies it is recommended that the streetlights outside the pubs would stay on (3 lights in total) • There also being private residential lighting systems visible in some locations; driveways, outside houses etc. •There is one bus route through one of the villages, but no other public transport links. Having checked the bus route and timetable, the bus only stops during the day with the first bus in the morning / last bus in the afternoon. There are no buses that would stop at this bus stop during the proposed PNL timings. • There are no bridges or underpasses, or traffic light crossings. There are no segregated cycle paths indicated through the villages. •There are roads that go up or down into hilly areas or higher ground areas within the villages, but there are no wider road access issues. • There are alternative 'routes' around the villages; and you do not to specifically drive 'through' any of the villages to get somewhere else.	
Major road junctions, including roundabouts, slip roads and rail crossings	No major road junctions
Where there are traffic calming measures, significant road narrowing or intrusions	Road narrowing in places
Controlled crossing points	None
Areas supporting a night-time economy	3 x Local village pubs - would recommend the 3 street lights outside
Steps / stairs / gates / obstacles	None that are obvious
Waterside paths	None
Remote alleyways	None that are obvious
Subways and underpasses	None
Where there is Local Authority / police CCTV / ANPR	None
Areas with high levels of crime or road traffic collisions	1 slight in 5 year period (2019 to 2023)
Would this scheme pass the Exemptions?	Yes, but recommending streetlights near pubs remain on
No streetlights	46
Total annual kWh of saved electricity	1,420
Total annual cost of saved electricity	£341.00
Total annual Carbon saved tCO2e	0.28

Urban Location case study:

Proposed exemptions:	Urban
• The urban location is a typical Oxfordshire district 'town centre' with a pedestrianised 'Market' square • There are various streets throughout the area allowing access to local businesses, pedestrian shopping areas, Pubs, Restaurants, and businesses which support the night-time economy . • Main roads and access routes are joined via major junctions with 9 sets of traffic lights, with pedestrian crossings; pelican and belisha crossings etc. • There is a pedestrian underpass under one of the main roads. • The area has several dedicated parking areas, as well as taxi ranks and loading bays throughout the town centre area. • This area review is focusing on the main 'town centre' area, but there are residential properties throughout the main centre areas. This provides an examples of how urban areas a very much 'mixed use' areas, with residential properties directly on main roads, or near junctions, as well as main roads leading into more residential areas but within a urban environment. • There are also several bus routes through the area, with 6 Bus stops and various Bus parking areas. • There are several traffic signs with lights, as well as a range of road markings, including a yellow box junction .	
Major road junctions, including roundabouts, slip roads and rail crossings	Several different main road junctions throught the area; 9 sets of traffic lights, yellow box junctions
Where there are traffic calming measures, significant road narrowing or intrusions	Road narrowing in several locations with parking places causing the road to be one lane wide. Other
Controlled crossing points	9 sets of traffic lights with Pedestrian crossings
Areas supporting a night-time economy	Town Centre - There are several Pubs and Restaurants
Steps / stairs / gates / obstacles	Yes, there are several thoughout the area and within
Waterside paths	Yes, one residential road alongside / by river
Remote alleyways	Yes, throughout the town centre pedestrian areas
Subways and underpasses	1 x underpass
Where there is Local Authority / police CCTV / ANPR	Yes, both CCTV and ANPR cameras
Areas with high levels of crime or road traffic	1 slight in 5 year period
Would this scheme pass the Exemptions?	Would not pass exemptions
No streetlights	102
Total annual kWh of saved electricity	13,952
Total annual cost of saved electricity	£3,348.00
Total annual Carbon saved tCO2e	2.73

Residential Location case study:

Proposed exemptions:	Residential
• The Residential location a typical residential area on the outskirts of a typical Oxfordshire district town. • There are main roads with junctions leading into the residential areas; to support access, the street lights along the main roads have not been included with the PNL scheme. • The residential areas are laid out in a range of 'Cul de sac' configurations, including a number of roads leading to 'dead ends' or someone's driveway. • There is a designated a 'play area' and a small park within the area. • There are no main 'cut through' roads for traffic, if you wanted to circumnutate the residential area, you would just continue along the 'main roads' either side of the residential area. • There is one bus stop for only one local community bus route throughout the residential area. Having checked the bus route and timetable, the bus only stops twice a day in the morning time and would not be impacted by PNL. • There are no main retail shops or areas within the residential area. • There are small sections of the area that have cycle route designation, but do not have cycle lane markings	
Major road junctions, including roundabouts, slip roads and rail crossings	4 junctions from main roads into residential streets, but no major road junctions or roundabouts.
Where there are traffic calming measures, significant road narrowing or intrusions	Road narrowing in places due to parked cars and parking spaces
Controlled crossing points	1 non_controlled Pedestrian crossing
Areas supporting a night-time economy	No night time ecomomy locations
Steps / stairs / gates / obstacles	None that are obvious
Waterside paths	None
Remote alleyways	There are pedestrian 'cut throughs'
Subways and underpasses	None
Where there is Local Authority / police CCTV / ANPR	None
Areas with high levels of crime or road traffic	1 slight in 5 year period
Would this scheme pass the Exemptions?	Yes, Recommending the street lights along the main road with
No streetlights	165
Total annual kWh of saved electricity	6,313
Total annual cost of saved electricity	£1,515.00
Total annual Carbon saved tCO2e	1.23