OAKLANDS FARM SOLAR PARK

Applicant: Oaklands Farm Solar Ltd

Environmental Statement
Appendix 11.2 – Construction Source Noise Data
January 2024
Document Ref: EN010122/APP/6.1/Appx 11.2
Revision: -

Planning Act 2008
Infrastructure Planning (Application: Prescribed Forms and Procedure) Regulations 2009 - 5(2)(a)

Oaklands Farm Solar Park - Environmental Statement Volume 3

Appendix 11.2: Construction Source Noise Data

Final report
Prepared by LUC
January 2024

Appendix 11.2
Construction Source Noise Data

Construction Noise Calculation Methodology

A11.2.1 Advice on the control of construction noise and vibration is given in British Standard BS 5228: 2009+A1:2014, Noise and vibration control on construction and open sites"[1]. A method for calculating the noise from construction sites is provided and this has been used to evaluate the effect of noise from construction activities required for building the Development at the nearest residential properties. The standard provides advice on the prediction methodology and also provides tables of measured noise data for construction equipment. These are arranged for different types of construction operations i.e. for road building, for concreting works, for piling.

A11.2.2 The Applicant has provided an indication of the types of operations likely required for the Proposed Development. These are presented on a series of 5 works plans which show works areas, with associated description of the works. The plans are reproduced as **Plates 1a to 1e** at the end of this Appendix and also included at **Appendix 1.3** of the ES.

A11.2.3 Accompanying the Work Plans, within **Chapter 4: Project Description**, is a description of the works explaining the items in the key in the work plans, and design parameters. These have been used to develop the acoustic construction calculations.

A11.2.4 Overarching Construction activities for the Site involve:

- Excavation to lay cables - 132kV underground cable from the Proposed Development's substation to the Drakelow substation, and for cabling to connect between the solar PV modules, smaller transformers across the site and BESS.
- Piling - Installation of PV mounting frames and Site fencing.
- Concreting works associated with the Substation, BESS and Site compounds.

[1] British Standards Institution (2009), BS 5228:2009+A1:2014, Code of Practice for Noise and Vibration Control on Construction and Open Sites

- Construction of access roads to the site segments; gravel road construction or laying of temporary metal mats. This includes access improvements and creation of new junctions.
- Earthworks and civil works such as cut and fill, installation of culverts.
- Directional drilling of cabling.
- Construction traffic (deliveries and dispatch of plant, equipment and material, personnel movements).

A11.2.5 This information, combined with guidance in BS 5228, has been used to inform the construction process and a loose timeframe for operation and the phasing of construction across the site.

A11.2.6 The construction assessment for the ES should be taken as being indicative only; its purpose being to highlight operations of concern to inform the potential need for amelioration measures. Further details of controls on construction noise and vibration will be included in the Construction Environmental Management Plan (CEMP) and secured by condition of the planning permission(s).

A11.2.7 For the purpose of the ES, construction noise predictions have been carried out at representative properties likely to be the most affected by certain construction operations. It is not the intention of the assessment to provide a continuous noise level prediction of construction noise at a property throughout the whole construction.

A11.2.8 For each construction operation grouping, the prediction methodology assumes the total sound power level from the sum of each plant item involved in the operation is hemispherically radiating from a centre point for each area; where the construction is a linear operation for example gravel track construction or trench excavation, the road or trench is divided into segments and a centre point in the middle of each segment is used. This allows a simplified representation of plant items moving around the area, sometimes moving closer to the properties of interest and sometimes being further away on the site to provide the average noise level over a period of time.

A11.2.9 A nominal construction programme has been devised for each segment, which assumes different construction phases will occur sequentially, assuming the equipment presented at **Table** 1. To provide a worst-case assessment, it is assumed that all plant identified

as required for each construction phase will be operating with 100% on–time, unless stated otherwise.

Construction Equipment Data

A11.2.10 The Applicant has suggested items of equipment that are likely to be used for the different stages of Construction. The following presents the best estimates of Sound Power Level for those plant items, with reference to the BS 5228 Appendices.

Table 1: Construction Noise Assessment Assumptions

Assumed Plant	Number of units	Duration (weeks in a given area)	Sound power level (L_W), dBA
Concreting works associated with the transformer and battery compounds and establishing temporary construction site compounds (1 acre Park Farm, 3 acres within Oaklands, <2 acres southern Oaklands)			
Compressor,3.5m^3/min	1	12 weeks/ (4 weeks for compounds)	112
Diesel Generator,	1	12 weeks/ (4 weeks for compounds)	107
Concrete Mixer 4.1kW, 0.3m^3	1	12 weeks/ (4 weeks for compounds)	104
2x Truck Mixers, 5m^3 each	1	12 weeks/ (4 weeks for compounds)	108
Compactor rammer,225kw	2	12 weeks/ (4 weeks for compounds)	117
Crawler mounted dozer, 123kW 17.8t	1	12 weeks/ (4 weeks for compounds)	109

Assumed Plant	Number of units	Duration (weeks in a given area)	Sound power level (L_W), dBA
Crane	2	12 weeks/ (4 weeks for compounds)	113
Trench excavation works (and culvert construction)			
Wheeled Excavator/loader removing broken surface 46kW	1	12 weeks per 300m length	103
Dump Truck 20t	1	12 weeks per 300m length	108
Wheeled Excavator Loader, 46kW	1	12 weeks per 300m length	104
Vibratory Roller, 50kw	1	12 weeks per 300m length	106
Directional Drilling			
Specialist equipment- horizontal directional drill – drilling rig and rig HPU	1	3 day operation over 200 metre length. Overnight possession probably required	104 +115
Mud pump+ mud pump cleaner	1	3 day operation	102+98 = 104
Excavator	1	3 day operation	110
Light plants	1	Overnight possession	92
Gravel Road build and installation of string inverters and transformers			
Wheeled Excavator/loader removing broken surface 46kW	1	3 weeks per 300m length	103

Assumed Plant	Number of units	Duration (weeks in a given area)	Sound power level (L_W), dBA
Dump Truck 20t	1	3 weeks per 300m length	108
Vibratory roller	1	3 weeks per 300m length	106
Lorry unloading with support crane operation	1	3 weeks per 300m length	112
Piling operations			
Crane mounted auger	4[2]	2 to 4 weeks depending on intensity in each location	112
Bobcat skid steer loaders	2	2 to 4 weeks depending on intensity in each location	108
Lorry mounted concrete pump	2 to 5[3]	2 to 4 weeks depending on intensity in each location	109
Poker vibrator /compressor	2 to 5[3]	2 to 4 weeks depending on intensity in each location	105
Support vehicles-dump trucks	2	2 to 4 weeks depending on intensity in each location	110
Screen installation unloading Scaffolding Frames and clips	2	2 to 4 weeks depending on intensity in each location	96

[2] (evaluated) in an area to represent “worse-case intensity”
[3] depending on intensity

Internal access track route (Temporary Construction Haul Road)

A11.2.11 The Preferred Construction Vehicle Routing and Likely Construction Vehicle Routing, accesses the Site at Park Farm and will use a new construction track to be installed by the Applicant across Park Farm, Fairfields Farm, and crossing Rosliston Road to access the north side of Oaklands Farm.

A11.2.12 This temporary construction haul road is assessed as a haul road, using the Haul Road methodology set out in British Standard BS 5228: 2009, Part 1[4]. The calculations assume a sound power level of 102 dBA for HGVs and 97 dBA for cars and vans.

A11.2.13 **Figure 4.1 and 4.10a and b** in Volume 2 of the ES, show the internal access track route past Grove Lodge and Park Farm cottages at Park Farm, and past Corner Farm as it passes over Rosliston Road and into the Oaklands Farm area; this alignment information, together with the Work Plans has been used to estimate the distance of each receptor from the access track.

CONSTRUCTION TRAFFIC DATA

A11.2.14 There are 3 scenarios for construction traffic access to Oaklands

- Preferred Construction Vehicle Routing (Scenario 1 as shown in **Figure 10.2**) – all HGVs cars and vans use the proposed Walton bypass into Park Farm and onto the Site via the internal access track through the Park Farm area, across Rosliston Road and into the Oaklands Farm area. As set out in **Chapter 10: Transport and Access** it is however unlikely that Walton bypass will be delivered in time for the Proposed Development therefore alternatives are set out below.
- Likely Construction Vehicle Routing (Scenario 2A as shown in **Figure 10.3**) – all HGVs through Stapenhill, then use the internal access track at Park Farm as described above. Cars and vans are dispersed; approximately quarter from the north, half from the south-west and quarter from the south-east.

[4] British Standards Institution (2009), BS 5228:2009+A1:2014, Code of Practice for Noise and Vibration Control on Construction and Open Sites, Part 1: Noise, F.2.5 Method for mobile plant using a regular well-defined route (e.g. haul roads)

- Back-up Construction Vehicle Routing (Scenario 2B as shown in **Figure 10.4**) – all HGVs through Coton-in-the-Elms, cars and vans are dispersed; approximately two-thirds from the south-west and one-third from the south-east. This is a backup to Scenario 2A and intended that traffic would revert to Scenario 2A at the earliest opportunity.

A11.2.15 The following plans extracted from Volume 2 of the ES, show the 3 traffic route scenarios:

Plate 1: Preferred Construction Vehicle Routing

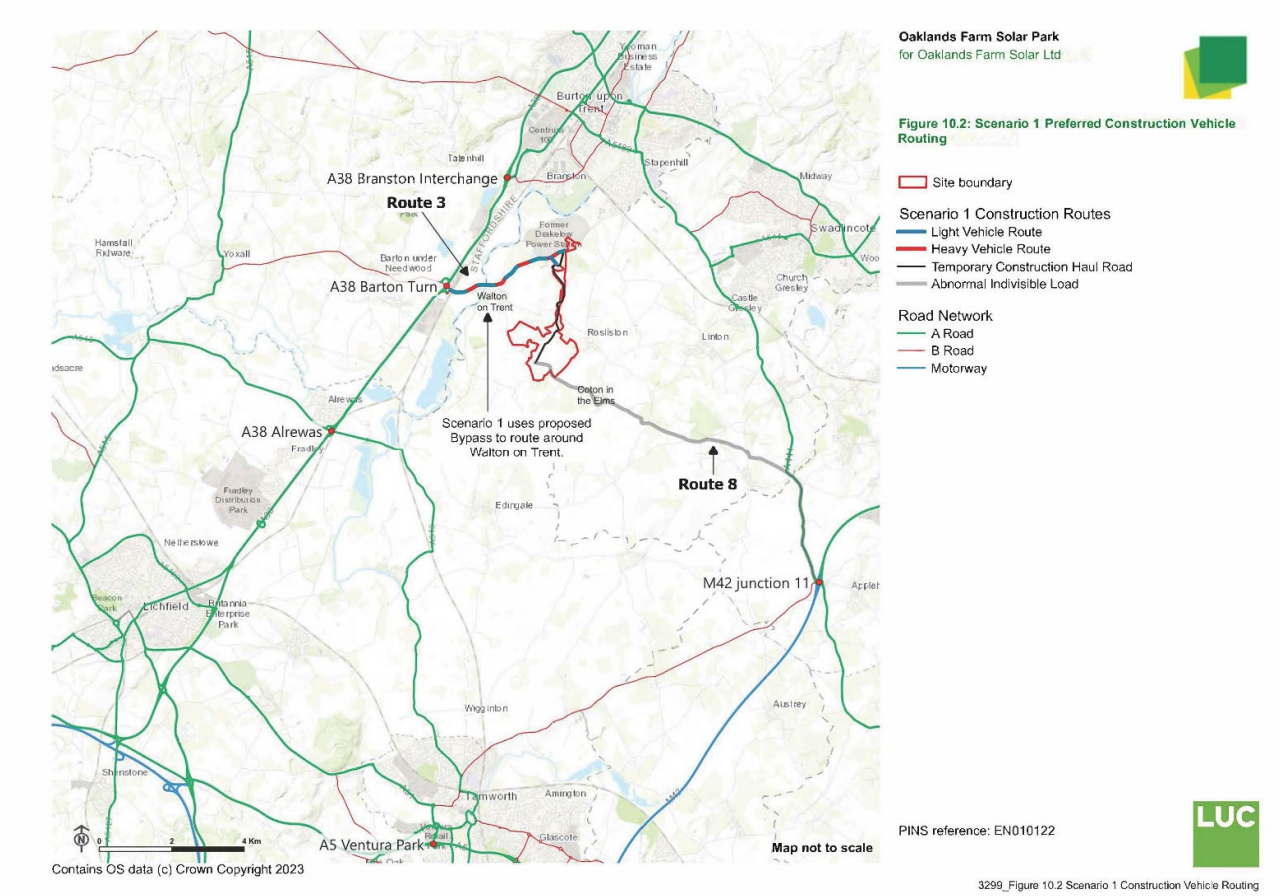


Plate 2: Likely Construction Vehicle Routing

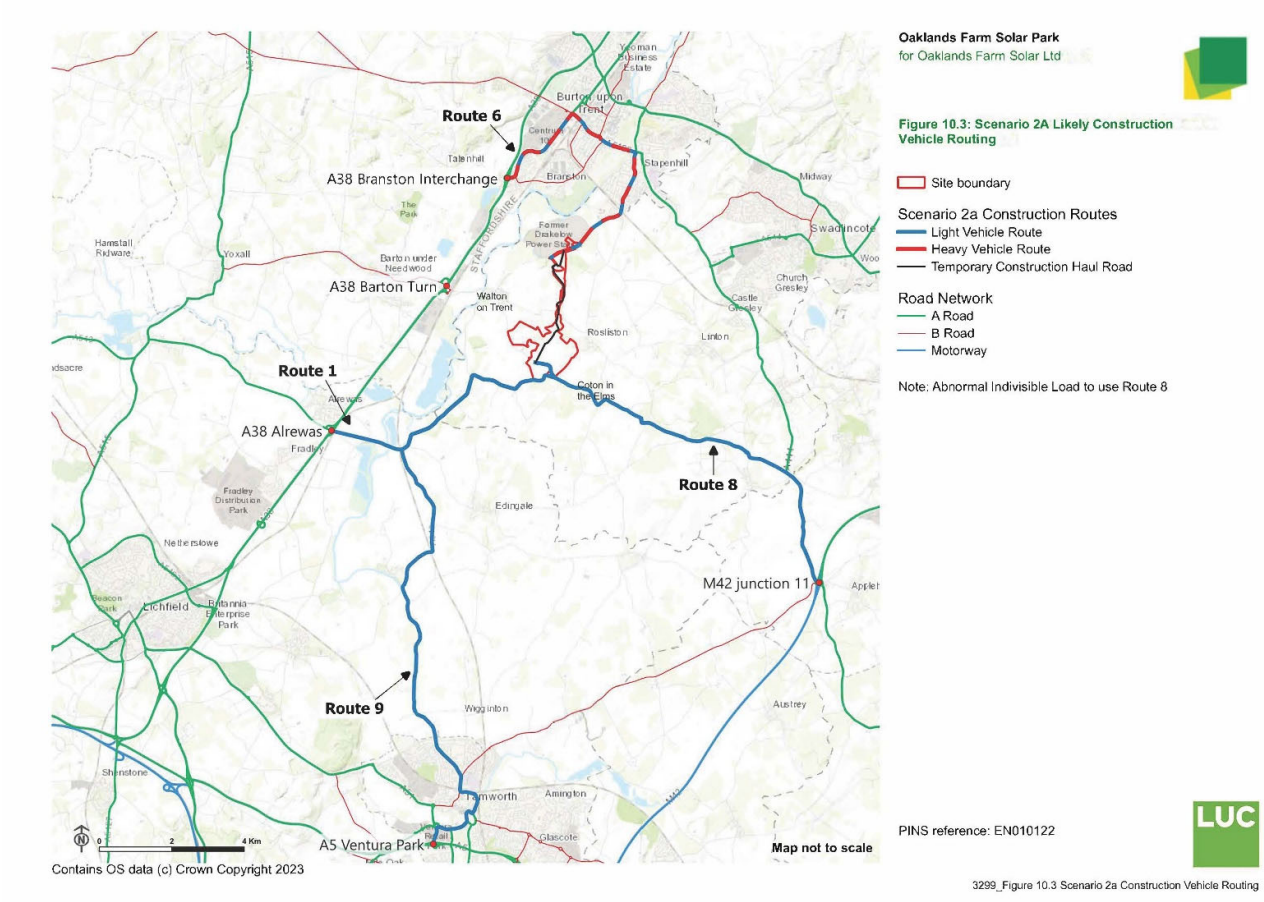
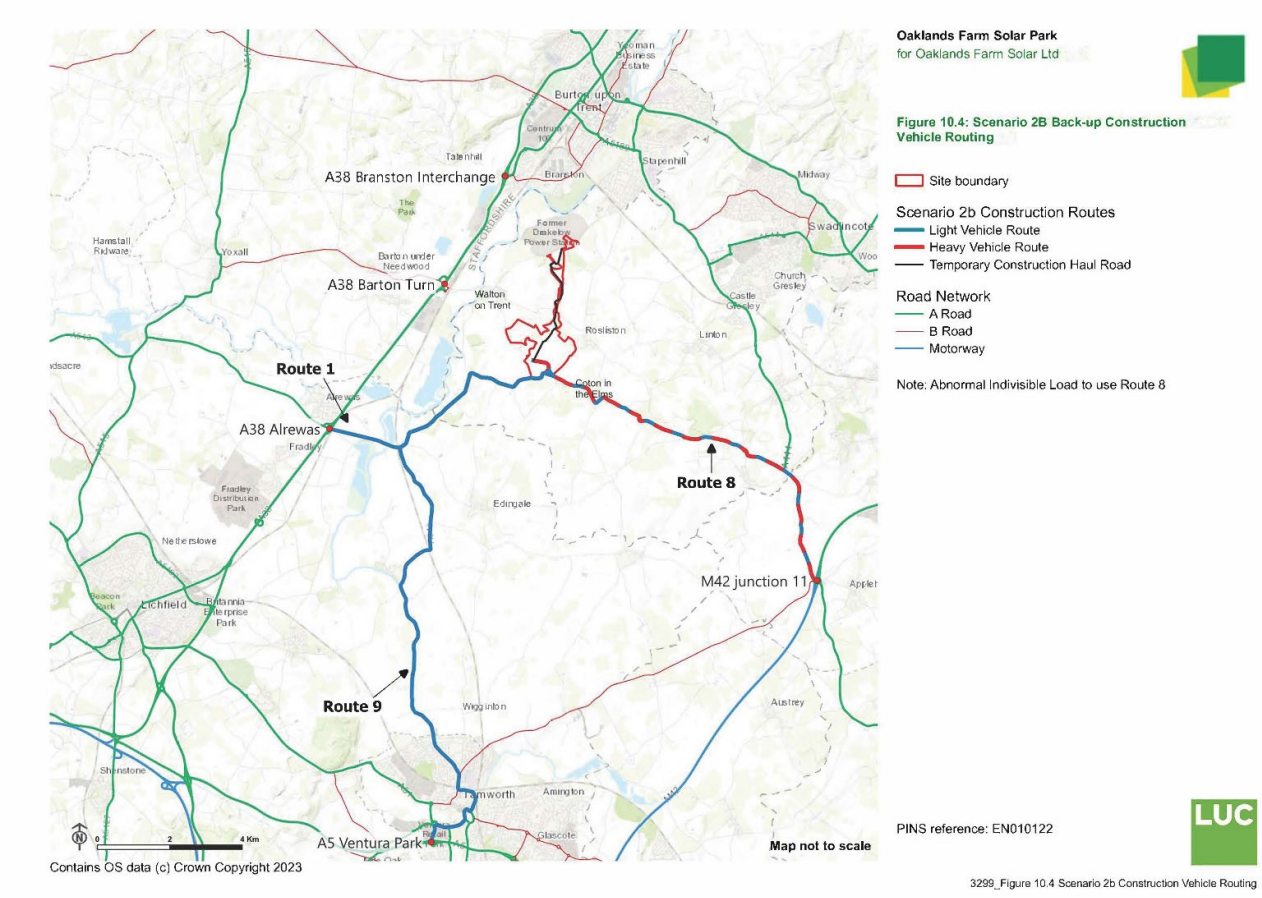


Plate 3: Back-up Construction Vehicle Routing



A11.2.16 The transport assessment provided in **Chapter 10: Transport and Access** provides detail of likely number of vehicles on site during any month in the Construction program. The working assumption for this assessment is that there will be on average 67 light vehicles and 14 HGVs accessing the Site on a daily basis, and up to 75 light vehicles and 27 HGVs on the highest day, as shown below:

Table 1: Baseline traffic data *(light vehicles)*

Scenario	Route	ATC	Access point	Restrictions		Vehicle Type	Trip Generation (Two-Way)	
				Height	Weight		Average Day	Highest Day
1	3	2	North	No	No	All	81	103
2a	6	2	North	No	No	Heavy	14	27
	1	9	South	No	Yes	Light	17	19
	6	2	North	No	No	Light	17	19
	8	13	South	No	No	Light	17	19
	9	10	South	<4m	No	Light	17	19
	*Total (to avoid rounding error)						81	103
2b	1	9	South	No	Yes	Light	22	25
	6	2	North	No	No			
	8	13	South	No	No	Heavy	14	27
	8	13	South	No	No	Light	22	25
	9	10	South	<4m	No	Light	22	25
	*Total (to avoid rounding error)						81	103

A11.2.17 All construction vehicles would avoid the traditional highway network peak periods of 08:00-09:00 and 17:00-18:00 during the week, including the typical school pick up period of 15:00-16:00. HGVs would be restricted to movements between 09:00 – 15:00. The following assumptions are made:

Light vehicles

- 40% of Light vehicles will arrive at Site prior to 07:00 to allow set-up.
- 20% of Light vehicles will arrive/depart between 09:00 – 15:00, avoiding highway peak periods.
- 40% of Light vehicles will depart the Site after 19:00 following close down activities.

Heavy vehicles

- All Heavy vehicles will be distributed between 09:00 – 15:00 to avoid highway peak periods.

A11.2.18 Prediction of construction traffic noise changes has been calculated using a spreadsheet-based program which follows the calculative methodology set out in Department of Transport's memorandum Calculation of Road Traffic Noise (CRTN), 1988[5]. The CRTN methodology is used to calculate daytime road traffic noise in terms of either a 1 hour or an 18-hour (0600 to 2400 hours) L_{A10} noise level. The initial calculation provides a noise level at 10m

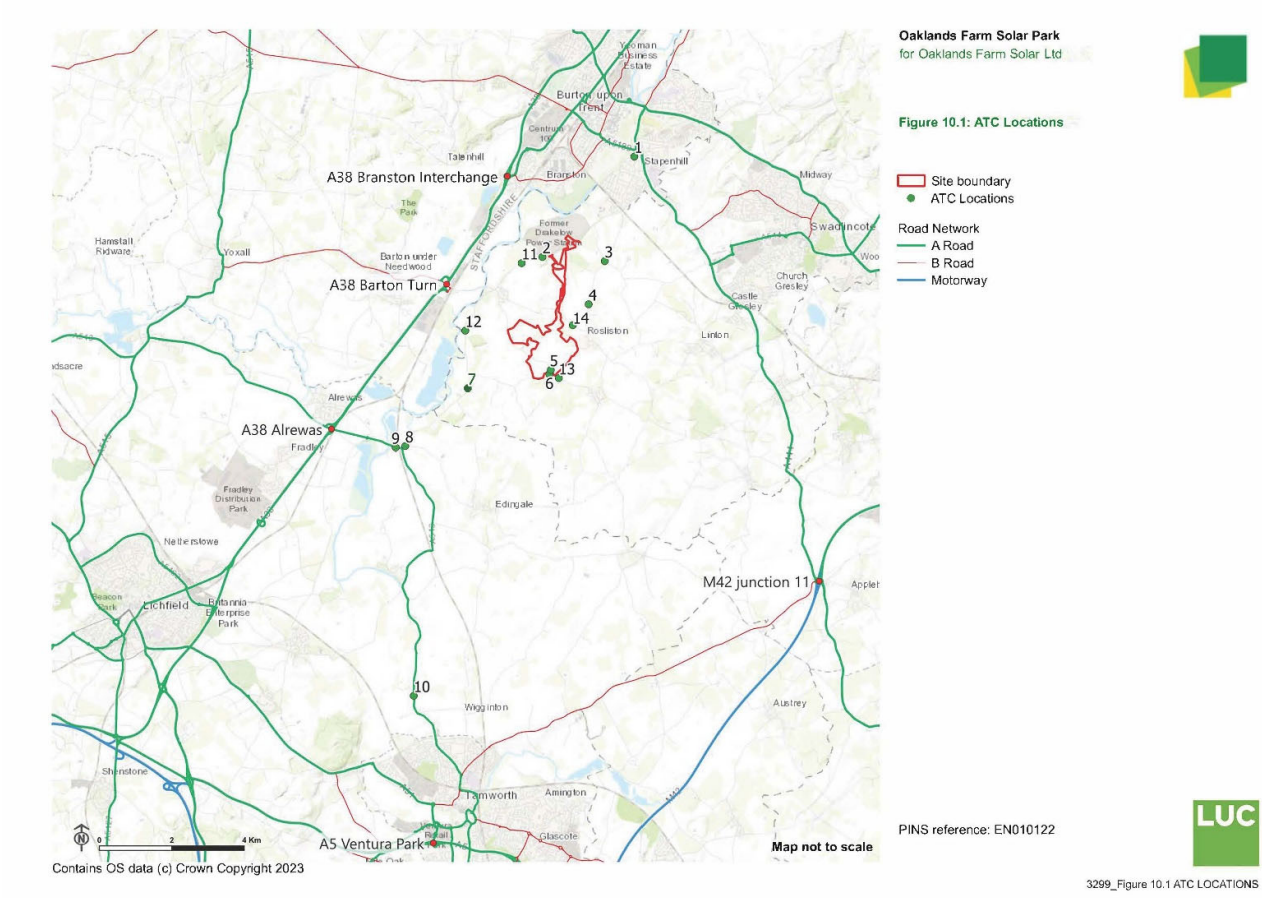
[5] Department of Transport (1988), Calculation of Road Traffic Noise (CRTN - ISBN 0 11 550847 3)

from the edge of the carriageway, known as the basic noise level, which is based on the total volume of traffic, the percentage of heavy goods vehicles, the road surface and gradient, and the average speed of the traffic.

A11.2.19 During the construction stage, the change assessment is the difference in the basic noise level, as a result of the additional traffic volume and change in % HGV vehicles on the public highway. The basic noise level is calculated on an hourly bases from sourced public highway traffic data, and the assessment looks at the likely worse hour in a day, that is the hour where there is most change in traffic volume.

A11.2.20 **Chapter 10** of the ES, the Transport and Access assessment, identifies the likely traffic routes from the Site's entry points onto the public highways. Survey stations have been set up at points along this route to collect typical hourly and weekly flow along these road segments. The following plan from Volume 2 of the ES show the Automated Traffic Count (ATC) locations used to determine baseline flows:

Plate 4: ATC locations



A11.2.21 At each point the baseline average hourly flow of traffic and % of HGVs has been identified as extracted from **Chapter 10** below:

Table 2: Baseline traffic data (light vehicles)

	Assessment year	2026		Baseline - Total (Two-Way) AAWT - Light vehicles							
	Site	**1**	**2**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**13**
	Survey year	2021	2021	2021	2021	2021	2021	2021	2022	2022	2022
	TEMPro factor	1.0455	1.0455	1.0455	1.0455	1.0455	1.0455	1.0455	1.0361	1.0361	1.0361
Hour beginning	**0**	62	22	3	2	17	18	24	13	14	4
	1	31	16	1	1	10	11	11	7	9	1
	2	25	10	1	2	4	4	9	4	8	1
	3	34	15	1	2	3	3	6	6	16	2
	4	88	37	4	7	10	12	26	26	38	5
	5	319	225	18	12	24	32	87	63	207	29
	6	417	378	40	41	72	86	191	195	385	67
	7	771	590	87	109	213	268	513	433	614	165
	8	967	591	114	97	226	311	588	498	553	178
	9	869	337	61	64	135	194	384	338	316	97
	10	812	276	51	56	116	165	341	288	237	78
	11	817	274	50	52	106	173	335	296	253	76
	12	881	310	51	60	134	191	376	305	305	75
	13	899	359	51	56	131	179	379	325	336	84
	14	1013	481	64	65	146	205	459	361	428	94
	15	1100	536	74	85	185	255	505	394	513	140
	16	1130	616	99	127	274	353	658	498	645	173
	17	1161	663	109	127	279	354	650	499	623	179
	18	948	370	54	69	160	214	381	309	357	116
	19	737	225	34	28	65	96	193	180	203	48
	20	496	123	16	20	43	62	122	121	122	34
	21	401	125	17	17	111	119	156	81	108	24
	22	320	129	18	11	134	141	162	62	101	19
	23	154	74	6	8	81	84	84	28	52	9

Table 3: Baseline traffic data (Heavy vehicles)

	Assessment year	2026		Baseline - Total (Two-Way) AAWT - Heavy vehicles							
	Site	**1**	**2**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**13**
	Survey year	2021	2021	2021	2021	2021	2021	2021	2022	2022	2022
	TEMPro factor	1.0455	1.0455	1.0455	1.0455	1.0455	1.0455	1.0455	1.0361	1.0361	1.0361
Hour beginning	**0**	2	0	0	0	0	0	0	1	0	0
	1	2	0	0	0	0	0	0	1	0	0
	2	3	0	0	0	0	0	0	0	0	0
	3	5	0	0	0	0	0	0	0	0	0
	4	7	0	0	0	0	0	0	1	0	0
	5	11	0	0	0	0	1	2	4	0	0
	6	22	2	0	0	0	1	8	8	1	0
	7	31	6	1	2	3	5	20	17	6	2
	8	42	7	1	3	5	11	29	16	4	1
	9	33	6	3	2	4	8	24	15	3	1
	10	36	5	1	2	6	7	21	13	4	3
	11	35	8	1	2	4	7	25	13	4	1
	12	33	9	2	3	3	5	20	13	6	1
	13	34	8	1	1	3	4	20	14	4	2
	14	41	6	2	1	2	4	19	13	5	1
	15	38	6	1	1	3	6	22	11	6	1
	16	32	7	1	2	7	7	20	9	4	1
	17	28	4	1	1	2	4	11	8	5	1
	18	23	4	1	1	2	4	9	5	2	1
	19	12	1	0	0	1	2	4	7	0	0
	20	8	0	0	0	0	0	2	6	0	0
	21	6	0	0	0	0	1	1	0	1	0
	22	3	0	0	0	1	1	2	0	0	0
	23	3	1	0	0	1	2	2	0	0	0

A11.2.22 The base data for the 2026 base year is used to predict the baseline Basic traffic Noise Level, $L_{A10,1\ hr\ @\ 10\ metres}$. The estimated predicted number of construction vehicles is added to these flow data, and a Construction Basic Noise level is calculated, $L_{A10,1\ hr\ @10metres}$. The difference between the two is the expected noise level change due to construction traffic. This is then used to evaluate the significance of the construction traffic on the existing road network (noting that traffic on the proposed Walton Bypass is an estimate only in Route Scenario 1).

Plate 5a: Work Plans sheet 1

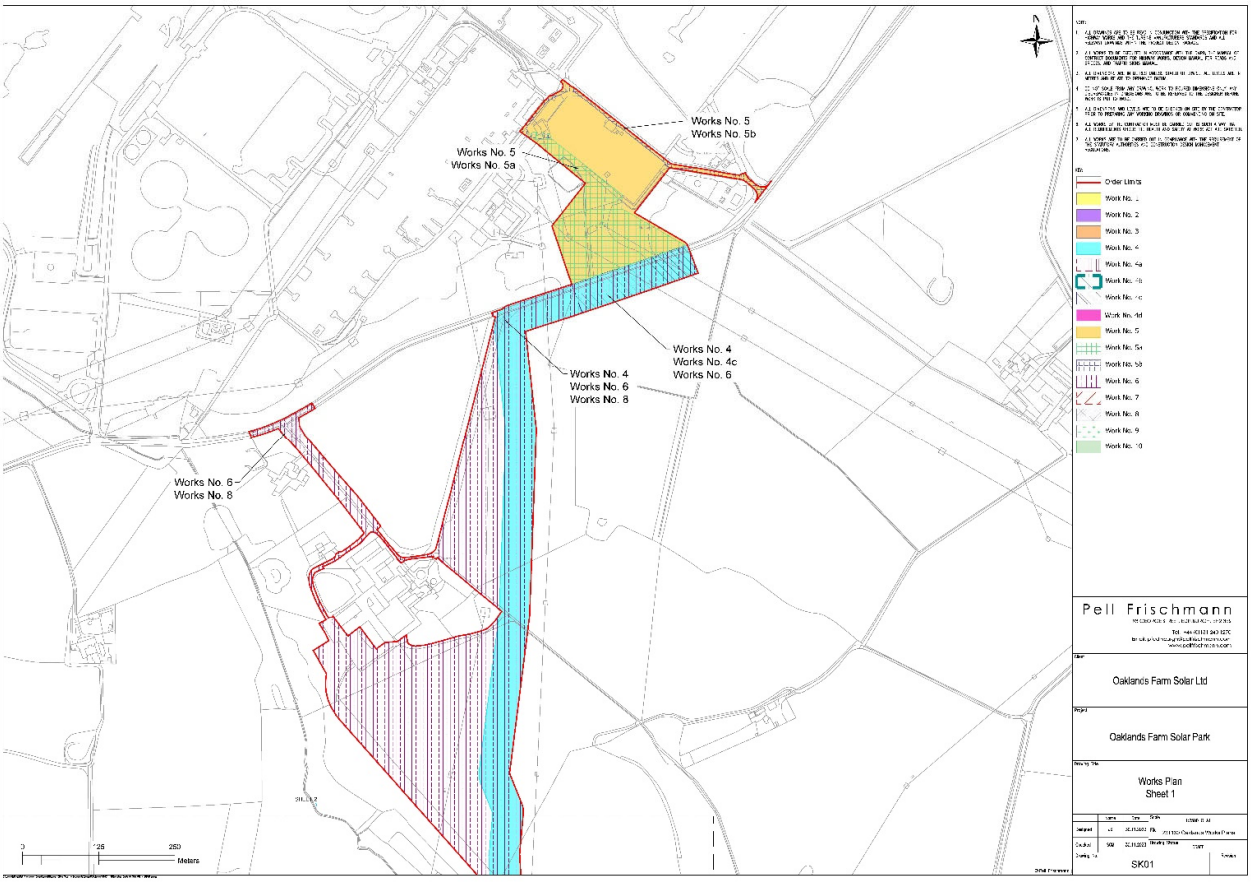


Plate 6b: Work Plans sheet 2

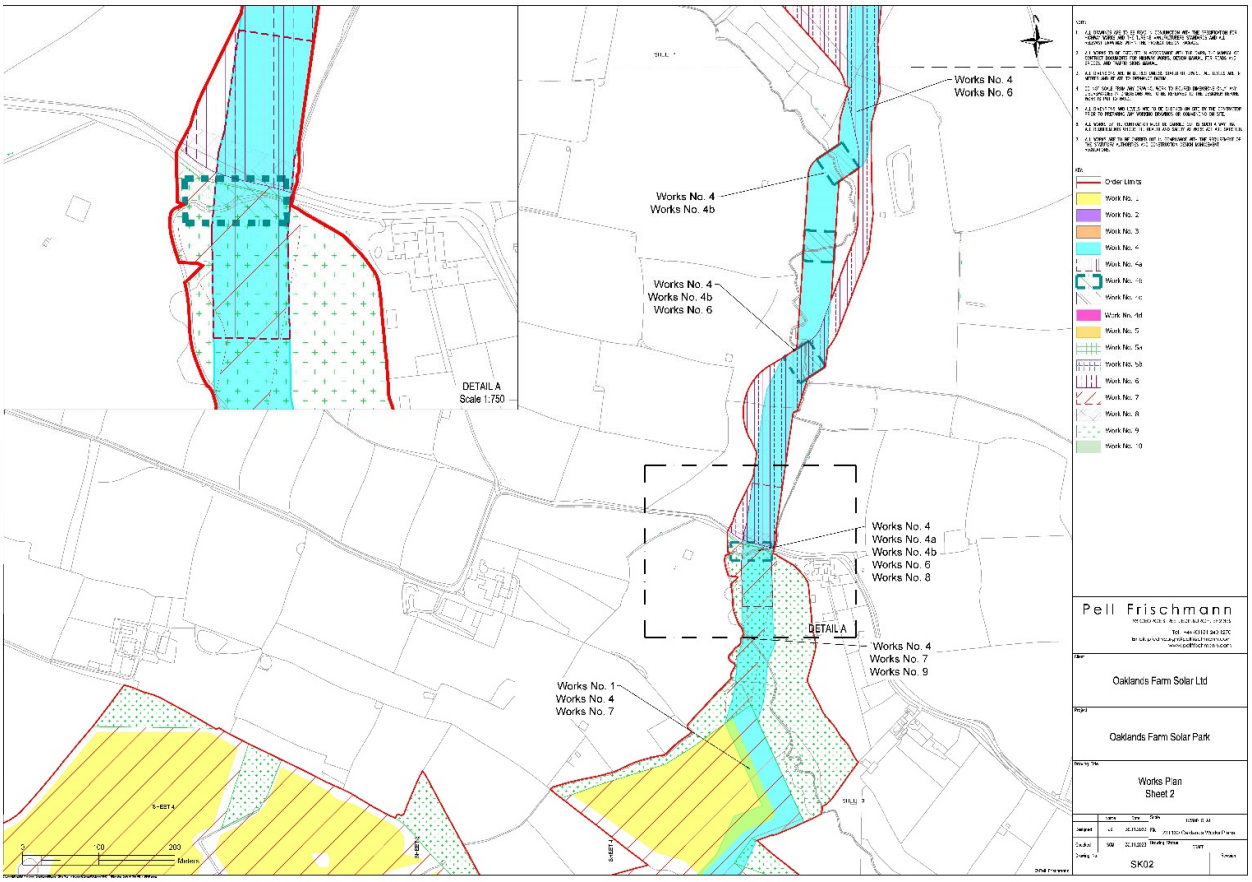


Plate 7c: Work Plans sheet 3

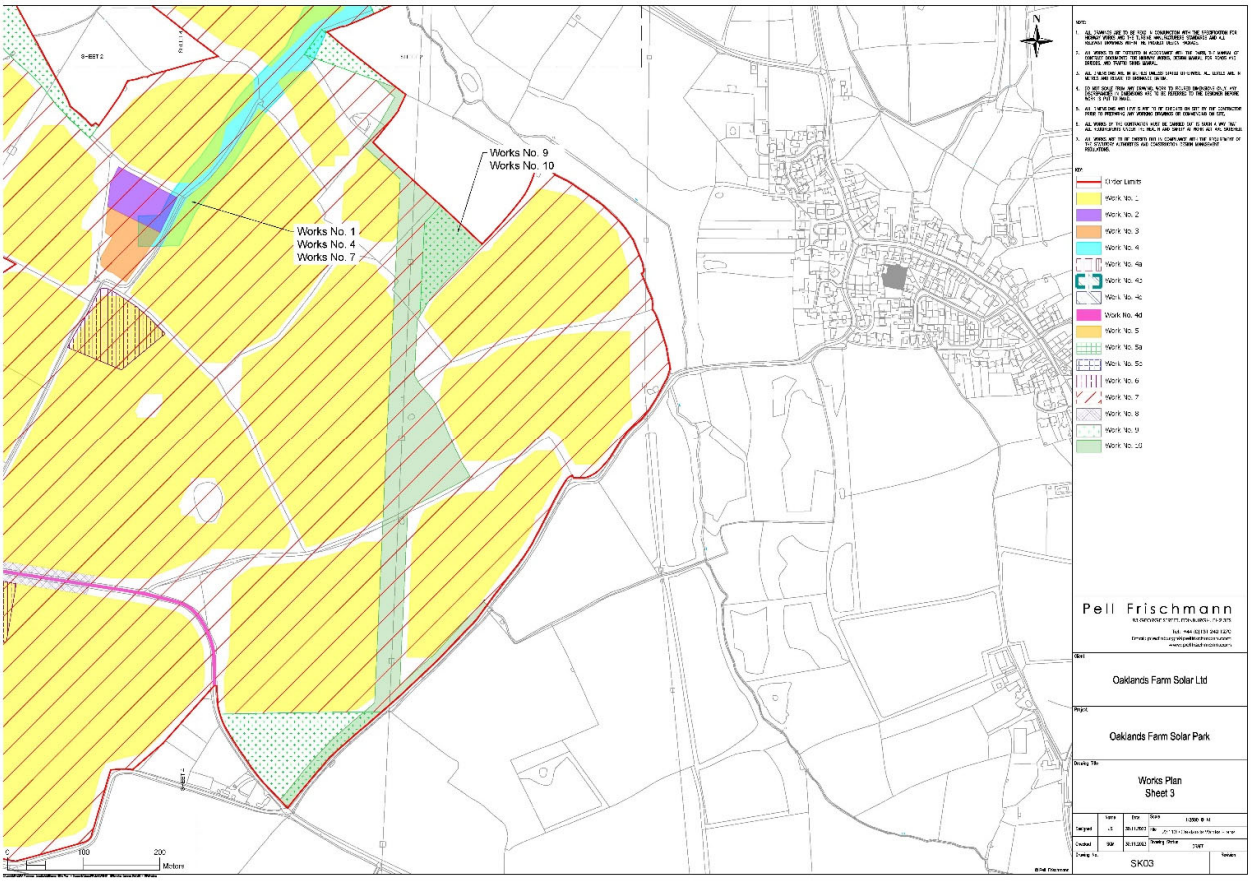


Plate 8d: Work Plans sheet 4

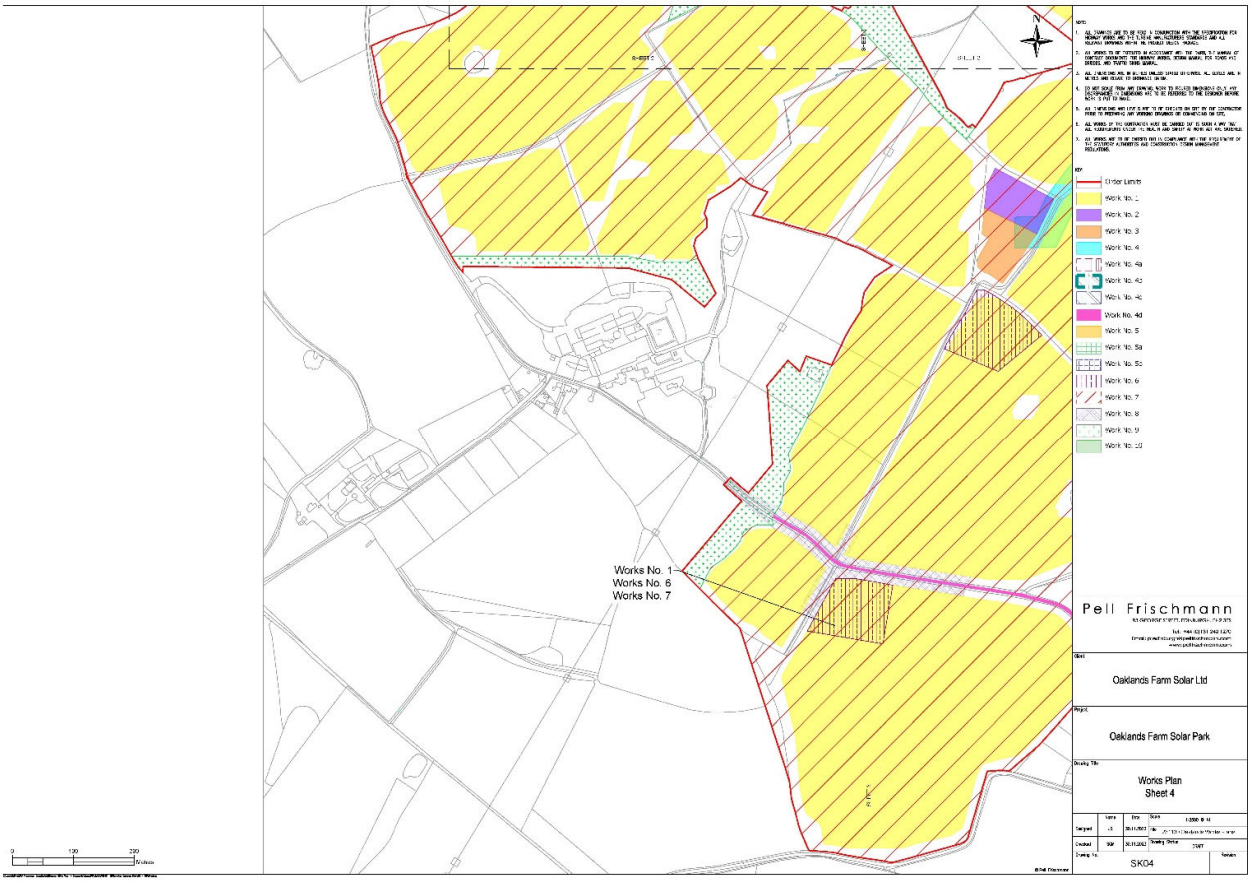


Plate 9e: Work Plans sheet detail A