

S.2. Survey Information

Survey	Type	Date	Status	Report Location
<p>Access Routes</p> <p>Desktop Sept. 2017 Complete S2.6 - 17-928 Littlebrook AIL Onsite Access Report</p> <p>Summary of Key Findings:</p> <p>Littlebrook 400kV substation is access via Rennie Drive, which connects to the Littlebrook interchange. The access road has traffic control islands along its length.</p> <p>A Heavy Load survey has been undertaken to confirm the feasibility for moving the existing transformers from the existing 400kV site to the new substation site. The results of which can be found in Littlebrook Onsite Access Report 22.09.17. The key findings of the report are as follows;</p> <ul style="list-style-type: none"> Relocation of all SGTs from the current substation will be undertaken on SPMT or Flattop trailers. Onsite negotiability is restricted for girder frame trailers Some cut back of hedgerow at turn into site from public highway will be required for 20 axle frame trailers 				
Condition Assessment	DH01	22.09.2017	Complete	S2.7 - PDD-20696-REP-109
<p>Summary of Key Findings</p> <p>Hurst 275kV Substation:</p> <ul style="list-style-type: none"> No 110V AC lighting supply is available at the relay room. Provision for 110V AC lighting supply needs to be provided by the contractor with a 230/55-0-55V lighting transformer, as required by DH 01. Telecom panels are on the first floor level of the control building. GPS Antennas are over the top of the control building. Once the protections are replaced with current standard communication interface provision (IEEE C37.94), GPS antennas will not be required for protection purpose but one common antenna will be adequate for fault recorder time stamping purpose. No 48V DC supply will be required for new telecom system. Optel panels for new IEEE C37.94 comms interface have already been installed in the telecom room. For feeder protection replacement, commissioning outages of M/C 3 will be required. ERTS will be required for feeder protection replacement. However, this could change if a CB maintenance/refurbishment work takes place at the time feeder protection replacement. First Intertrip unit type HSDI-3 and second intertrip unit type RFL9475 are mounted on the telecom panels. Aux.Supply-48V DC. HF earthing cable is not to the current standard (colour code). However, no further action is deemed necessary as part of feeder protection replacement. No ferroresonance detection is present. Existing AMETEK TR 100 fault recorder caters for Littlebrook 1, Littlebrook 2, SGT3, SGT4, SR4, MC3 & MC4. During NICAP change of Littlebrook 1 and Littlebrook 2 feeders, relevant inputs for Littlebrook 1 and Littlebrook 2 feeders to AMETEK fault recorder are to be disconnected. <p>Rowdown 400kV Substation:</p> <ul style="list-style-type: none"> No protection change is envisaged. No 110V AC Supply is available <p>Kemsley 400kV Substation:</p> <ul style="list-style-type: none"> No protection change is envisaged. No 110V AC Supply is available MCBs are not installed in the CVT Fuse boxes. <p>West Thurrock 400kV Substation:</p> <ul style="list-style-type: none"> No protection change is envisaged. 				

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<ul style="list-style-type: none"> No 110V AC Supply is available 				
Earthing	Measurements and Condition Assessment	15/11/2005		S2.8 - ERM R194
	Measurements	2017		S2.9 - PDD-20696-REP-110

Summary of Key Findings:

Up to date soil resistivity measurement survey information can be found in report PDD-20696-REP-110.

Historic survey information can be found in the following:

- Earthing Condition Assessment for Littlebrook 400kV/132kV Substation, Report Ref: ERM R194, 2005 - Earthing Risk Management.

The EPR for the site is set to rise significantly and the associated potential profiles will extend further than reported in the ERM report. The hot zone will therefore include additional third parties that may require mitigation and attention should be paid to any services (in particular lv or telecoms) that terminate in or pass through the hot zones.

Flood Risk Assessment	Level 2 FRA	September 2017	Complete	S2.10 - PDD-20696-REP-103
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Summary of Key Findings:

A level 2 Flood Risk Assessment has been carried out for the proposed Littlebrook Substation site and the results are shown in the report PDD-20696-REP-103. The report shown that the site is situated in a depression in the topography and is therefore susceptible to surface water runoff ponding.

The site is an area benefitting from the Thames tidal defences. The defences are inspected and maintained at regular intervals, and planned to be raised to keep up with increased in tidal water levels due to climate change. Therefore, the risk to the site from tidal flooding is residual and is associated with breach or overtopping of the flood defences. With the tidal defences providing a 0.1% (1 in 1000) AEP SoP, the probability of flooding from this source is low.

See summary of flood risk analysis below;

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Survey	Type	Date	Status		Report Location	
	Flooding hazard	High Risk	Low to Moderate Risk	Low or No Risk	Mitigation required	Comment
	Tidal flood risk		√		√	Flood warning system and evacuation procedure
	Fluvial flood risk			√		
	Surface water flood risk	√			√	Surface Water Drainage Strategy (Appendix C)
	Groundwater flood risk			√		
	Flood risk from reservoirs			√		
	Flood risk from canals			√		
	Flood risks from sewers and artificial drainage systems			√		
Environmental						
Summary of Key Findings: Summarised in the sub-sections below.						
Air Quality	2016				S2.11 - Air Quality Guidance Note	
Summary of Key Findings: Despite the continued presence of considerable industry, the vast majority of air quality issues are caused by road vehicle emissions, principally nitrogen oxides (NOx) and particulate matter below 10-micron size (PM10). Dartford is situated along some very busy transport and commuter routes with the main source of local air pollution in the Borough from road traffic emissions from major roads, notably the M25, A282, A2, A226, A296 and A206. Littlebrook Power Station lies within the area of jurisdiction of Dartford Borough Council. Four Air Quality Management Areas (AQMAs) have been declared along the major roads within the Borough where failure to comply with nitrogen dioxide (NO2) and PM10 objectives were predicted. The table below shows the sampling results from 2014						

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Survey	Type	Date	Status	Report Location		
		AQS compliance value	Bexleyheath	West Thurrock	London Bexley (Defra)	Thurrock (Defra)
SO₂ STATISTICS						
Period Mean (mg m ⁻³)			2.6	3.6	4.8	1.7
99.18%ile daily value (mg m ⁻³)		125	7	11	13	6
99.73%ile hourly value (mg m ⁻³)		350	10	12	21	11
99.90%ile 15-min value (mg m ⁻³)		266	13	16	24	14
Number of Readings Greater than:						
AQS Daily Threshold		£3 pa >125 mg m ⁻³	0	0	0	0
AQS Hourly Threshold		£24 pa >350 mg m ⁻³	0	0	0	0
AQS 15-min. Threshold		£35 pa >266 mg m ⁻³	0	0	0	0
NO₂ STATISTICS						
Period Mean (mg m ⁻³)		40	26.0	25.3	27.8	27.2
99.8%ile Hourly value (mg m ⁻³)		200	110	104	94	92
Number of Readings Greater than:						
AQS hourly Threshold		£18 pa >200 mg m ⁻³	0	2	0	0
ANNUAL DATA COVERAGE (%):						
SO ₂ 15-min			95.9	84.7	83.4	96.5
SO ₂ 1-hour			97.9	86.4	86.4	98.7
NO ₂ 1-hour			99.3	86.3	99.2	97.3

Dartford Borough Council adopted its Core Strategy in 2011 and along with saved policies from the Local Plan (1995) provide policies with regard to air quality and planning applications. Saved policy B1 states that:

'The following factors will be taken into account in considering development proposals: Proposed use – The nature and characteristics of the proposed used should be appropriate for its location and should not have a detrimental effect on the local are through visual impact, traffic generation, noise, fumes or other factors.'

Water	Intrusive	May 2017	Complete	S2.3 - PDD-20696-REP-102
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Summary of Key Findings:

Groundwater was encountered in the majority of the boreholes that were undertaken as part of the geotechnical investigation in 2017. The table below provides a summary of the groundwater encountered, and can be found in geotechnical interpretive report PDD-20696-REP-102.

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Survey		Type	Date	Status	Report Location
Location	Groundwater Strike (m.bgl)	Groundwater Rise after 20 mins (m.bgl)	Strata	Remarks	
BH 01	1.20m	1.05m	Made Ground (sand & gravel)	Seepage	
BH 02	1.20m	1.01m	Made Ground (sand & gravel)	Seepage	
BH 03	3.10m	3.10m	Alluvium (soft Clay)	Encountered in base of SPT test	
BH 04	1.35m *	n/a	Made Ground (sand & gravel)	Borehole dry before use of water flush to install casing	
BH 05	2.63m*	n/a	Made Ground (PFA)	Borehole dry before use of water flush to install casing	
BH 07	2.00m*	n/a	Made Ground (PFA)	Borehole dry before use of water flush to install casing	
WS 08	3.00m	2.20m	Made Ground (PFA)		
WS 09	1.20m	1.20m	Made Ground (sand & gravel)	Seepage	
WS 10	3.00m	3.00m	Alluvium (soft clay)	Seepage	
WS 11A	Dry				

Please also refer to the flood risk assessment section above for further details

Ecological	Desktop	March 2016	Complete	160331 R JER6534
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Summary of Key Findings:

An ecology report was commissioned by RWE in 2016 for the Littlebrook Power Station Site and the results and recommendations are shown in the associated report.

EMF / EMC				
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Summary of Key Findings:

None provided by the employer

Noise				
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Summary of Key Findings:

Outline noise calculations have been undertaken by National Grid with a more detailed noise survey to be completed. In order to mitigate any adverse effects of the wound plant, situated on the proposed site, on adjacent developments all transformers are to be contained in noise enclosures. The existing diesel generator at the existing 400kV site will also need to be replaced due to potential noise pollution affected adjacent sites.

Land Use				
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Summary of Key Findings:

The proposed site is located in Littlebrook Power station and is currently covered in vegetation ranging from scrub to dense vegetation.

There is no available historical investigation data at the proposed 400kV sub-station site, dating from the construction of the Littlebrook D Power Station (including the existing 400kV sub-station) development completed in 1983), or for the previous Littlebrook Power Stations (A, B & C) constructions. However, the site is listed as a land fill from 1956, on the Environment Agency website "*whats in your backyard?*", with a second landfill dating from 1977. The entire greater Littlebrook Power Station site is indicated as being a landfill site, first receiving waste from 1956, but as the construction of the power stations (A, B & C) predate the landfill.

S.2. Survey Information				
Survey	Type	Date	Status	Report Location
Town & Landscape Visual / Architecture				
Summary of Key Findings: N/A				
Traffic Management	Drawing	October 2017	Complete	PDD-20696-LAY-003
Summary of Key Findings: The Littlebrook site will be accessed via Rennie Drive. The access to the site will be through a shared access road. A traffic management system will be required to be agreed with the new land owners for which site access is to be shared. Refer to CDM Plan PDD-20696-LAY-003.				
Archaeological & Cultural Heritage				A082085-2
Summary of Key Findings: Include any details of old mines. An Archaeology and Heritage Desk-Based Assessment was commissioned by RWE and completed in July 2016. The Littlebrook power station buildings have been subject to extensive recording by Historic England prior to their decommissioning and demolition. Whilst of limited heritage interest, no further works are considered necessary in relation to the built heritage of the site.				
Asbestos	Survey	16/04/2004	Complete	NGCSE-E696-559
	Intrusive	May 2017	Complete	S2.3 - PDD-20696-REP-102
Summary of Key Findings: 19 made ground samples were screened for asbestos, and asbestos was identified as present in two samples and submitted for quantification. Asbestos was quantified at 0.032% in BH 04 (0.1m.bgl) and found to be below the quantification limit of <0.001% in BH 03 (0.3m.bgl). The asbestos appears to be associated with placed fill material likely to comprise crushed demolition material (gravelly sand with brick and flint). The asbestos containing material was not however visible in the made ground. It is possible that further asbestos is present in this fill material. Prior to any further works that will disturb the ground in this area, the contractor undertaking the works will require the undertaking an asbestos risk assessment in accordance with the Control of Asbestos Regulations 2012. This will need to include an assessment of the likelihood of asbestos fibres becoming airborne based on activity method statements, and identification of control and mitigation measures. Depending on the nature of the work proposed and the finding of the risk assessment further sampling and analysis may be recommended prior to groundworks. It will also need to be established if the work constitutes Licenced Work or Notifiable Non-Licensed Work as defined in CAR 2012. Any material that is to be re-used or taken off site during construction should be analysed for asbestos to determine if the material is suitable for re-use and the necessary disposal requirements.				
PCB				
Summary of Key Findings: See Contamination Testing report in sections above.				
Marine Cable Surveys				

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Survey	Type	Date	Status	Report Location
Summary of Key Findings: N/A				
Mining				
Summary of Key Findings: According to the Coal Mining Authority Mapping Database a Coal Authority report is not recommended for the site, indicating that the site is not located in an area affected by coal mining or brine pumping.				
Drainage	Survey	May 2017	Complete	S2.3 - PDD-20696-LAY-102
Summary of Key Findings: The utilities report shown 2 main surface water drains running through the site and outfalling into the Littlebrook drain to the west of the site. These will need to be either diverted or accommodated within the site boundary. There are several foul water drains running through the site associated with the Littlebrook Power Station. These do not appear on land searches acquired from Thames Water therefore they could either be diverted or investigated and abandoned. There is a foul water pumping station on the southern boundary of the site which could be utilised for the site foul water requirements.				
Fencing				
Summary of Key Findings:				
LV Supplies	Assessment	19 th Sept. 2017		S2.12 - PDD-20696-REP-111
Summary of Key Findings: A DNO (UKPN) supply to the existing Littlebrook 400kV Substation was installed in 2016. Due to noise mitigation requirements, it is not envisaged that the existing diesel generator can be re-used on the new site.				

S.3 Additional Information OHL & Towers				
Survey	Type	Date	Status	Report Location
Tower Foundation	Report	August 2017	Complete	S3.1 - PDD-20696-REP-107
Summary of Key Findings: Loads from proposed layout changes on VN004, ZBG013 and YL026 found to be less than original deterministic foundation design loads.				
Tower Condition Assessment	Report	Dec. 2017	Complete	S3.2 - 90JA768 – VN004 TCS Report
Summary of Key Findings: Tower VN004 has been confirmed as a L2 Blaw Knox (T1011) DTU E36				

S.3 Additional Information OHL & Towers

Survey	Type	Date	Status	Report Location
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A bar mark (DX) wasn't visible due to the applied paint thickness, the tower outline has been checked against GA-ED's and confirmed using this method.

During survey it was noted that there are additional bars located in the bottom zone 11 these have subsequently been identified as additional strengthening / main frame for a cable sealing end platform. The sealing end was either not built or has subsequently been removed.

- Tower Stepbolts are in good condition with only light surface rust present
- 11 bars on the tower have been graded above grade 3
 - 4 x Grade 6
 - 1 x Grade 5
 - 8 x Grade 4
- The grade 6 bars are generally small deformities as seen in the images
- 1 x grade 5 bar shows small patch of laminated steel
- The grade 4 steel recorded shows significant rust patches but no loss of strength or section
- Images VN004-12 and VN004-13 show grade 4 condition after wire brushing
- The tower has been painted and the paint is in sound condition providing good protection to the steelwork
- The property and CIP plates are faded but readable
- Muffs are in good condition, not broken or chipped but require bitumen
- There are no broken insulators, fittings and conductor are rusted but not showing signs of wear or any broken strands

Tower Strength Analysis	Report	August 2017	Complete	S3.1 - PDD-20696-REP-107
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Summary of Key Findings:

Bar marks M8G168 overloaded on both main top crossarms on tower ZBG013 due to proposed downlead arrangement.

Tower Laser				
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Summary of Key Findings:

N/A

Tower Verticality				
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Summary of Key Findings:

N/A

LIDAR				
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Summary of Key Findings:

N/A

Conductor (Corman)				
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Summary of Key Findings:

N/A

Ground Bearing				
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Summary of Key Findings:

N/A

Aerial Surveys				
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Summary of Key Findings:

S.3 Additional Information OHL & Towers

Survey	Type	Date	Status	Report Location
N/A				
OHL Route Patrol				
Summary of Key Findings: N/A				
Ground Line Survey				
Summary of Key Findings: N/A				

S.4 Additional Information for Cables Routes

Existing Cable Routes	Drawings			S4.1 - 70EAA0030 – SGT4B S4.2 - 70EAA0035_SGT1B S4.3 – 70_17033_SGT2B S4.4.1 – Cable tunnel cross section sketch
Summary of Key Findings: Cable records for existing SGT1B, (2B) and 4B routes are <i>partially</i> available from NG Livelink site under the “Substations” and “Routes” sections for Littlebrook. Records include data of existing transition Joint bays. A cross section of the cable tunnel (not to scale) is appended ref S4.4.1.				
RSP Services and UXO reports	Drawings			S2.1 PDD-20696-LAY-002 S4.1 - EES0593 R-01-03
Summary of Key Findings: Services and UXO reports covering parts of the areas of interest				
UKPN survey reports	Survey			S4.2 - Land service reports centre. TQ 5576SE
Summary of Key Findings: Report contains information on existing UKPN 11kV and 33kV circuits				
Jacobs reports and drawings	Reports & Drawings			S4.3 - PDD-20696-REP101 – Geotechnical factual report S2.3 - PDD-20696-REP102 - Geotechnical interpretative report S2.10 - PDD-20696-REP103 - Cable Route analysis report 132kV S4.4 - PDD-20696-REP104 - Cable Route analysis report 400kV S4.5 - PDD-20696-HVC001 – Cable route drawing (132kV and 400kV) S4.6 - PDD-20696-LAY102 -

				Hazard plan
Summary of Key Findings:				

S.5. Existing Records & Site Plans**S6.1. GENERAL**

Substation Site Hazard Plan	Hazard Plan of the proposed site completed via GPR survey undertaken in May 2017. Key Hazards Include; <ul style="list-style-type: none"> • UKPN HV Cables • National Grid 11kV Supply 		
Document Number	Title	Version	Location
PDD-20696-LAY-002	Littlebrook Site Hazard Plan	01	S2.1 - PDD-20696-LAY-002
BRM07878/RT1-2	Utilities Report		S2.2 - BRM07878/RT1-2
Service Search Records	Full services search was carried out in June 2017. Key findings with additional information received from; <ul style="list-style-type: none"> • UKPN • BT • Vodafone Although storm water and foul water sewers were found on site Thames Water advised that all water services in the area are private connections and not owned by the utility supplier.		
Document Number	Title	Version	Location
Site Emergency Plan	Existing site emergency plan is located in the control room for both sites. This is in the form of a yellow bound folder containing all relevant information.		
Document Number	Title	Version	Location
Site Hazard Register	Hazard register v6 is appended.		
Document Number	Title	Version	Location
Risk Management Zones	At the time of writing there are no risk management hazard zones. Should this change the Project Manager will notify the Contractor.		
Document Number	Title	Version	Location
Storage of Hazardous Materials	Site hazardous materials are all stored in lockable cabinets on site.		
Document Number	Title	Version	Location
Site Drainage Plan	SEESA Drawing ATW8306-LITT4-00-C-110		

S.6 Additional Site Drawings

All National Grid records and site drawings are stored within the ECM Livelink area at the following location.
<http://ecm.nationalgrid.com/livelink/livelink.exe?func=llworkspace>

This list is not intended to replace or reproduce those documents which exist for the site, only to identify those to which particular attention should be paid.

Drawing Number	Title	Version	Location
12/ON/0435	Topographical drainage flood water protection barrier design master layout – Littlebrook 132AIS/GIS	A	
12/ON/0388	Topographical / Flooding evaluation survey master layout, new levels and drainage details – Littlebrook 400kV substation	A	
12/ON/0521	Topographical Survey – survey to assist design of access to SGT 1B & SGT 2B – Littlebrook 400kV substation	A	
12/6776	Ordinance Survey 1:2500 map showing substation and surrounding area	A	
14/ON/0545	Topographical/ site inspection records – Littlebrook 132kV GIS substation	A	
14/ON/0546	Topographical/ site inspection records – Littlebrook 400kV substation	A	
20/1798	Electrical outline of 400kV metalclad substation	M	
20/1799	Electrical outline of 400kV, 132kV substation and “D” Power Station	J	
21/21922	Arrangement of 420kV metalclad switchgear station layout – Littlebrook 400kV	12	
21/NOA/0058	Littlebrook 400kV Substation Tilbury 1 & 2 Circuits	D	
20/SEA/0002	Layout drawing – overall layout – Littlebrook 132kV	D	
40/3220	Operation Diagram – Littlebrook 400kV	AS	
40/3220	Operation Diagram - Sheet 2: Technical data – Littlebrook 400kV	M	
40/3221	Operation Diagram – Sheet 2: Technical data – Littlebrook 132kV	V	
40/3221	Operation Diagram – Littlebrook 132kV	AS	
71/EAA/0539	General site layout – Littlebrook 132kV	1	
71/EAA/0542	Site layout AIS compound Littlebrook 132kV NG & NEW cables	1	
F001057	Single Line Diagram – Tilbury C Phase 2	Rev. 6	
F103040	Tilbury C Phase 2 General Layout	Rev. 6	

S.7. Existing Fire Precaution Arrangements

Standard fire protection facilities will apply to all existing offices and buildings. Fire suppression network in situ covering existing 400kV site located as per SEESA Drawing ATW8306-LITT4-00-C-110, following National Grid's separation of services with the existing power station.

S.8. Earlier SHES Design Information

No relevant information available.

S.10. Additional Site information

Site Asbestos register as attached