

## **SEPD Great Western Railway Electrification Reopener Submission**

### **Recovery of Uncertain Costs Under Charge Restriction Condition CRC3F**

**May 2019**



## 1. About SEPD

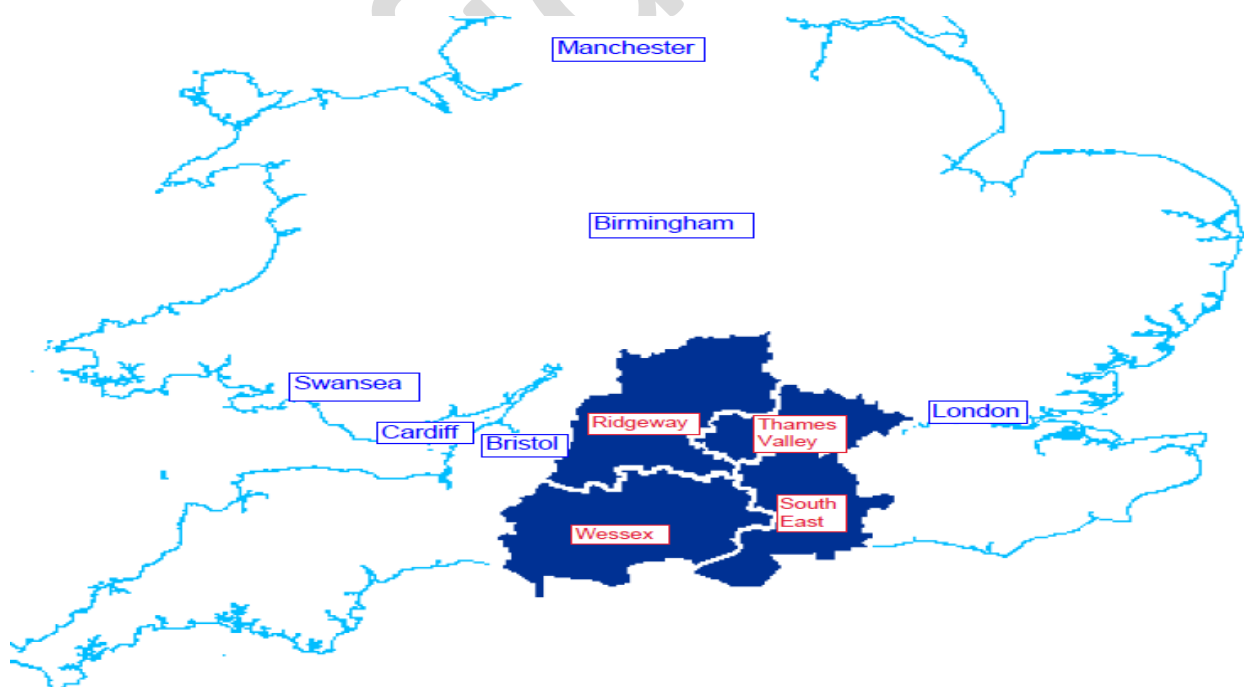
Southern Electric Power Distribution plc (SEPD) along with Scottish Hydro Electric Power Distribution plc (SHEPD) and Scottish Hydro Electric Transmission plc (SHET) are all subsidiary companies of Scottish and Southern Energy Power Distribution Limited (SSEPD). Scottish and Southern Electricity Networks (SSEN) is a trading name of SSEPD.

SSEPD and its subsidiary companies are all members of the SSE plc group (SSE).

SHEPD and SEPD are responsible for developing, operating and maintaining the electricity distribution networks that supply over 3.7 million homes across central southern England and north of the Central Belt of Scotland. The two electricity distribution networks comprise 43,179 substations and 127,000km of overhead lines and underground cables across one third of the UK landmass.

SHEPD and SEPD's main offices are in Perth, Reading, Inverness and Poole. More than 3,500 people, including hundreds of apprentices and trainees, live and work in the communities they service from the Shetland Islands to the Isle of Wight, and the cities of Portsmouth to Aberdeen.

Their networks offer an essential service to their customers, providing a safe and reliable supply of electricity to homes and businesses and critical infrastructure for the export of renewable generation. An overview of SEPD's Distribution Services Area is provided below.



## Contents

1. About SEPD .....	2
2. Executive Summary .....	5
3. Introduction.....	8
4. Cost Recovery Arrangements .....	9
5. Scope of Work .....	10
5.1 Background .....	10
5.2 [REDACTED] .....	10
5.3 SEPD's Scope of Works.....	10
5.3.1 Obligations to Ensure Safe Conductor Clearances .....	10
5.3.2 Desk Top Survey [REDACTED] .....	11
5.3.3 Detailed Investigative Site Survey .....	11
5.3.4 Engineering Design .....	15
5.4 Diversion Works .....	16
5.4.1 Cables Diverted Underground .....	17
5.4.2 Cables Diverted Above Ground .....	18
5.4.3 "As Built" Check and Verification .....	18
6. Interim Funding Arrangements .....	19
7. Master Wayleave Agreement.....	20
8. Procurement: Construction, Maintenance and Dismantlement of Overhead Lines up to 33kV ..	21
9. Programme of Work.....	23
10. Project Costs.....	25
10.1 Total Costs Incurred to Date .....	25
10.2 SEPD Expenditure to Date.....	25
10.2.1 Labour .....	25
10.2.2 Materials .....	26
10.3 [REDACTED] .....	27
10.3.1 [REDACTED] .....	29
10.3.2 [REDACTED] .....	31
10.4 Forecast Expenditure .....	32
10.4.1 Crossing No. 23 .....	32
10.4.2 Crossing No. 71 .....	33
10.5 Summary of Actual and Forecast Expenditure.....	33
10.6 Evidence and Justification of Costs .....	34
10.6.1 Example of Underground Line Diversion – Crossing 27.....	34

11 Conclusion .....	37
---------------------	----

## **Appendices**

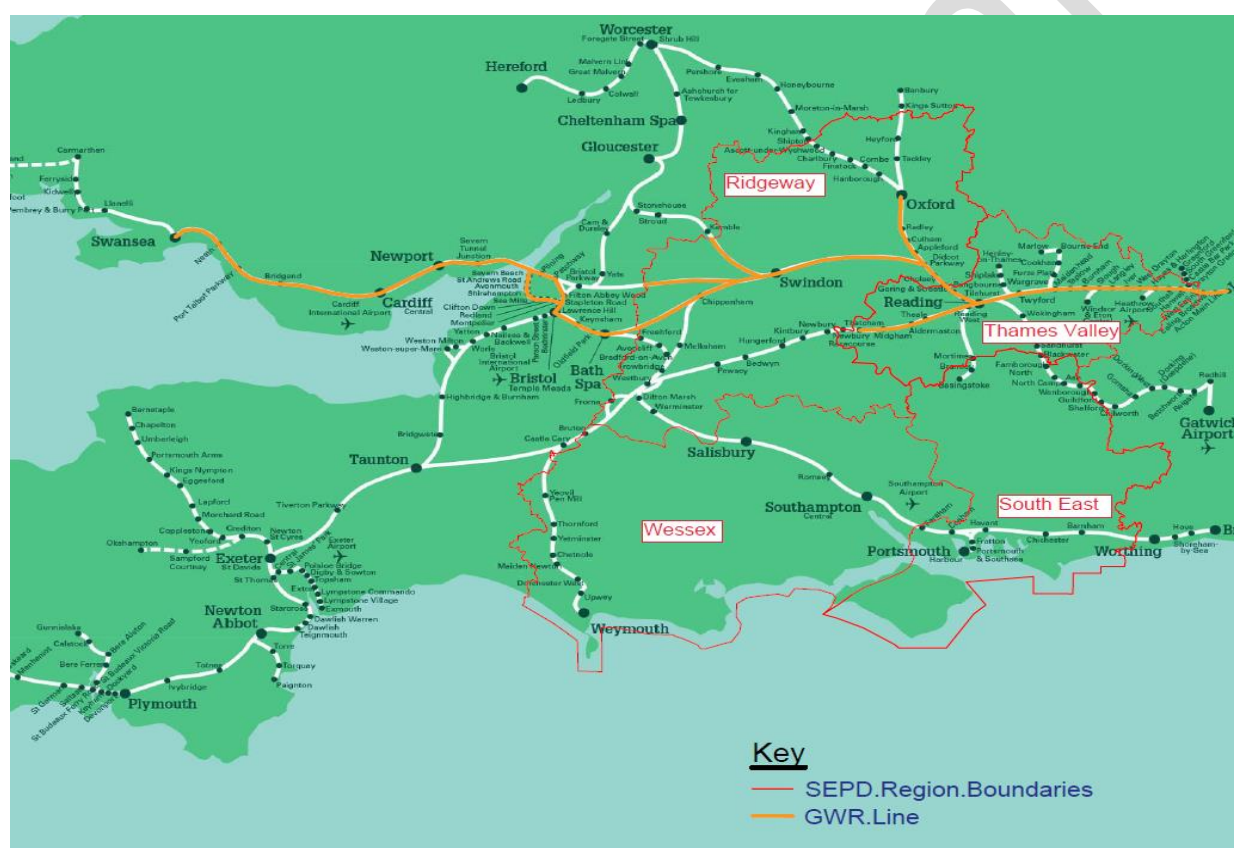
Appendix 1	SEPD List of 50 Eliminated Crossings
Appendix 2	SEPD List of 52 Eliminated Crossings
Appendix 3	SEPD List of 59 Diversions
Appendix 4	██████ Audit Report 20/13366/249
Appendix 5	██████ Close Out Archaeology Report
Appendix 6	Construction Programme
Appendix 7	Interim Funding Agreement
Appendix 8	59 Diverted Crossings Key Programme Dates
Appendix 9	Crossing Cost Breakdown
Appendix 10	Crossing 27, 31 106 and 107 Cost Breakdown
Appendix 11	██████████ Cost Breakdown
Appendix 12	██████████ Costs

## 2. Executive Summary

### Background

The Secretary of State for Transport announced to Parliament in July 2009, a £1bn programme of works [REDACTED] to electrify the whole of the Great Western Rail Line between London, Reading, Oxford, Newbury, Bristol, Cardiff and Swansea. The programme of works included the design, construction and commissioning of the rail network and was planned to be fully operational within 8 years. An overview of the project is shown in Figure 1 below.

Figure 1: Route of Great Western Rail Line Through SEPD Regions - London to Cardiff



### Rail Electrification Project

To allow the project to progress, Southern Electric Power Distribution (SEPD) and Western Power Distribution (WPD) - one of SEPD's neighbouring licensed electricity Distribution Network Operators - were required to carry out a significant number of diversions.

Diversions are the movement of any electric lines or electric plant to facilitate the extension, redesign or redevelopment of any premises on which lines or plant are located and to which they are connected.

In this instance, SEPD was instructed [REDACTED] towards the end of 2013 to assess 161 electric cables believed to be in close proximity to the relevant [REDACTED] lines and, where necessary, design and divert assets to accommodate the redevelopment of the rail network. This was required to ensure safe conductor clearances were maintained. Some of these electricity distribution assets are suspended above the railway, while others are underground or in bridges to be relocated.

As no survey had been carried out at the time SEPD submitted its RIIO-ED1 Business Plan, the full scope of work and costs were uncertain. Further uncertainty was also introduced by:

- [REDACTED] Programme Changes;
- [REDACTED] Design Changes; and
- Wider Industry and Government funding discussions.

Following further discussion with Ofgem, it was agreed that no provision would be made for these works in SEPD's RIIO-ED1 base allowance. Instead provision was made under Charge Restriction Condition (CRC) 3F of our electricity distribution licence (arrangement for recovering uncertain costs) to determine an appropriate adjustment to revenue during RIIO-ED1, considering actual costs incurred and forecast costs for specific rail activities as they were better understood.

CRC 3F allows SEPD to recover "Rail Electrification Costs", defined as *"all costs incurred, or expected to be incurred, (other than recoverable from a third party), associated with the diversion of electric lines or electrical plant to facilitate rail electrification projects approved for funding by the Secretary of State for Transport"*. The application window for the reopener runs from 1 May 2019 to 31 May 2019.

Following further analysis of a list of 161 crossings provided [REDACTED] in the early part of RIIO-ED1, SEPD subsequently determined that works were only required in relation to 59 crossings. 57 LV, 11kV and 33kV diversions have been completed so far at a cost of **£9.0m (2012/13 prices)** and a two further 132kV diversions are due to be completed by the end of March 2021. Forecast costs for the two planned diversions are **£8.7m (12/13 prices)**. The two 132kV crossings are higher cost as they are higher voltage and more complex than the 57 crossings completed to date.

Combining actual costs incurred and forecast costs gives a total cost for the project of **£17.7m**. However, the total value of the reopener submission, covering costs incurred in the RIIO-ED1 period only is **£17.2m (2012/13 prices, excluding £0.5m of DPCR5 costs)**. SEPD is seeking to recover this amount under the Rail Electrification Reopener provided for under CRC 3F.

This document sets out full details of the scope of SEPD works, including associated costs for works completed to date and the two projects planned for completion in 2021. It provides supporting evidence to confirm that costs incurred and forecast are economic and efficient, and are required to meet obligations under the Master Wayleaves [REDACTED] [REDACTED] (which requires us to move assets on its land at our cost), and also to meet statutory obligations in relation to safe clearances for our plant and equipment. The submission also

sets out details of the basis on which forecast costs have been calculated, using evidence from projects recently completed.

Table 1 below summarises annual expenditure across the project for each year, including forecast costs. SEPD is only seeking to recover costs falling within the RIIO-ED1 period under this reopener (2015/16 to 2020/21, inclusive).

Table 1: Annual Spend Summary (Nominal and 2012/13 Prices)

Nominal	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Cumulative	RIIO-ED1
Financial Year										Costs Only
Total	£180,530	£393,903	£1,219,655	£2,582,514	£789,711	£4,913,447	£1,712,076	£8,933,679	£20,725,515	£20,151,082
Cumulative Total	£180,530	£574,433	£1,794,088	£4,376,602	£5,166,313	£10,079,760	£11,791,836	£20,725,515		

Real (12/13 Prices)	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	Cumulative	RIIO-ED1
Fin Year										Costs Only
Total	£175,468	£375,499	£1,150,243	£2,384,512	£702,863	£4,243,430	£1,435,544	£7,272,549	£17,740,108	£17,189,141
Cumulative Total	£175,468	£550,967	£1,701,211	£4,085,723	£4,788,585	£9,032,015	£10,467,560	£17,740,108		

## Conclusion

The evidence provided in this submission meets the requirements set out in CRC 3F and fully justifies the actual and forecast costs of **£17.2m** (12/13 prices) that we are seeking to recover under the Rail Electrification Reopener. Costs have been efficiently incurred and represent a significant **saving of circa £17.3m** relative to the forecast presented to Ofgem during RIIO-ED1 discussions. These savings have been delivered through detailed site surveys and investigations, carried out to determine the appropriate scope and method of works, together with efficient design, procurement and execution of the relevant works. Costs exceed the materiality threshold of £8.42m set out in our licence and are required to meet legal obligations.

Further detail of all relevant aspects of the project and costs are set out in this document and supporting appendices.

### 3. Introduction

SEPD has triggered the reopener under Charge Restriction Condition 3F (CRC 3F) of its electricity distribution licence (arrangement for recovery of uncertain costs) due to the need to comply with [REDACTED] requests to assist with its Great Western Rail Electrification project. It became apparent in 2014 that SEPD would be required to carry out diversion of the electricity distribution network to align with [REDACTED] project requirements.

As set out in the Executive Summary, diversions include the movement of any electric lines or plant to facilitate the extension, redesign or redevelopment of premises on which such lines or plant are located or are connected. The detailed definition is set out in SEPD's document WI-NET-CON-037 CONNECTIONS-GLOSSARY OF DEFINED TERMS: Revision 1.00. This can be found on the SSEN website at <https://www.ssen.co.uk/Connections/Help/>.

In this instance, SEPD was instructed [REDACTED] in 2013 to assess and where relevant, divert its assets to accommodate the redevelopment of [REDACTED] premises, ensuring statutory conductor safety clearances were maintained. The premises in question were 161 overhead electric cables; some were suspended above the railway, others were underground, or located in bridges that were being relocated.

The costs of the work associated with the electricity distribution network diversions were uncertain at the time of our RIIO-ED1 Business Plan development and submission due to the following factors:

**[REDACTED] Programme Changes** which were mainly driven by demands for benefit reviews, where return on investment was further scrutinised by [REDACTED] Government. This impacted the programme timeline and led to a reduction in the overall scope [REDACTED] to minimise expenditure.

**[REDACTED] Design Changes** which were in part down to the inevitable evolution and refinement that happens as the design moves on from the initial high-level conceptual design to the more detailed final verified design. This resulted in changes to specification.

**Wider Industry and Government Discussions** were ongoing, focusing on whether [REDACTED] electricity customers should pay for the diversions associated with the Great Western Rail Electrification Programme. Outcomes from discussions were not conclusive at the time of finalising our Business Plan.

**The Master Wayleave Agreement** is a legal agreement between the landowner [REDACTED] and SEPD which grants SEPD access to install, operate, maintain, alter or repair its assets on the landowner's property (normally called a Wayleave Agreement). In this case, the Master Wayleave Agreement is a global agreement which relates to several sites where SEPD has assets [REDACTED]. The agreement has been in place since 1961. The agreement sets [REDACTED] SEPD's obligations and confirms [REDACTED] the right to require SEPD to move assets on its land at its own cost at any time.



## 4 Cost Recovery Arrangements

Due to uncertainties regarding the scope of works, costs and funding arrangements as set out in Section 2 above, no provision was made by Ofgem for costs associated with the electrification of the rail line in SEPD's Distribution Services Area in our RIIO-ED1 allowances. Instead, provision was made under CRC 3F of our licence (arrangement for recovery of uncertain costs) to determine an appropriate adjustment to revenue during RIIO-ED1.

The reopener allows SEPD to apply for revenue to be adjusted to cover actual and forecast costs, relating to specific rail activities during an application window running from **1 May to 31 May 2019**.

To trigger the reopener, costs incurred or forecast to be incurred in RIIO-ED1 must exceed the materiality threshold set out in CRC 3F of £8.42m (2012/13 prices). As our total forecast expenditure to support the Rail Electrification Project is **£17.7m**, this significantly exceeds that threshold. Details are set out in Table 2 below.

Table 2: Initial Forecast, Materiality Threshold and Current Forecast (2012/13 prices)

	Initial Forecast (2014)	Materiality Threshold	Current Forecast (2019)
SEPD	£35.00m	£8.42m	£17.7m

Licence CRC 3F specifies that adjustments will be made through revisions to the Price Control Financial Model Variable Values, as part of the Annual Iteration Process. The Price Control Financial Model is set up to allow the recovery of relevant costs through the MOD value. The established process of adjusting the MOD value each year, means that given the timescale for this reopener, we would expect an Ofgem determination to feed into the 2020/21 Regulatory Year, but given the notice period for changes to Distribution Use of System (DUoS) charges, the 2020/21 MOD values would not be reflected in tariffs until 2022/23. As with other reopeners, we would expect adjustments to be profiled in line with the expenditure profile of the project as set out in this document. Appropriate adjustments will require to be made to take account of:

- The time value of money;
- SHEPD's RIIO-ED1 capitalisation rate; and
- Adjustments to SHEPD's opening RAV for RIIO-ED2.

## 5 Scope of Work

### 5.1 Background

Once the Secretary of State for Transport announced its plans to electrify the Great Western Rail Line in 2009, [REDACTED] started to lay down the foundation work for the project. It set out legislative and consultative processes to enable its programme of works to proceed. However, following the 2010 General Election, the Government halted work on the project pending a return-on-investment review. Later that year, the lines from London to Didcot, Oxford and Newbury were sanctioned. Extensions from Didcot to Swindon, Bath, Bristol and South Wales were approved in 2011. Other sections were postponed (some indefinitely) and in 2017 the Cardiff to Swansea section was cancelled due to escalating costs.

### 5.2 [REDACTED] Scope of Works

In 2012, [REDACTED] was appointed [REDACTED] as the Principal Contractor and awarded the design and build contract for the line from London to South Wales. Its design solution included the installation of a 25kV AC overhead electric rail system.

[REDACTED] approached SEPD late in 2013 with a request to evaluate **161 SEPD cables** along this part of the line. SEPD was asked to confirm whether its assets would be impacted by works and whether **safe conductor clearances** would be encroached following the installation of [REDACTED] new overhead system and supporting structures. Where it was confirmed conductors or electric cables were crossing the railway or in close proximity, an engineering design to divert the conductors was required.

### 5.3 SEPD's Scope of Works

#### 5.3.1 Obligations to Ensure Safe Conductor Clearances

The safety of our employees, customers and the public is a priority for SEPD. As such, safe conductor clearances must be maintained at all times. Requirements are governed through statute, standards and codes of practice. In the case of this project, they are required to safeguard [REDACTED] employees, its contractors and the public during works.

**The Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR)** specifies safety standards aimed at protecting the public and consumers from danger. As it is a statutory instrument, it has the full force of law. Schedule 2 of ESQCR 2002 specifies the minimum heights for electricity infrastructure over roads and at other locations.

**The Energy Networks Association's (ENA's) Technical Specification 43-8-2015** (Overhead Line Clearances) also sets out minimum clearances at specific locations including railways. It refers to **Technical Specification 43-119**, which requires a minimum clearance of **4.6 metres** between the overhead line conductor and, in this case, [REDACTED] assets.

The above documents are all available on the ENA website: <https://www.energynetworks.org>.

### 5.3.2 Desk Top Survey to Verify Information Provided

With these obligations in mind, to establish a programme of work and costs to facilitate project, SEPD first had to verify the 161 crossings identified. SEPD engaged specialist engineering design consultants, and Environmental, Ecological and Archaeology Consultants, to carry out a full investigation of crossings. was engaged to identify sites of potential environmental, ecological or designated heritage interest and those potentially in need of more comprehensive surveys, while was engaged to carry out a technical review.

first carried out a desk top survey in an office-based environment using information provided by and SEPD's records of the electricity distribution network to confirm whether assets on list were indeed SEPD assets and their precise location. The desk top study helped provide an initial view of scope of work and reduced the number (and cost) of full investigative surveys later required. It immediately identified 50 crossings that could be excluded from the works. Table 3 below provides a sample list of these crossings, showing crossing number, location and reasons for exclusion. Reasons include where assets were found not to be SEPD assets, assets were found to be laid underground or sufficient clearances existed. Full details can be found at Appendix 1.

Table 3: List of 50 Crossings Excluded After Desk Top Survey

LIST OF 50 CROSSINGS EXCLUDED AFTER DESK TOP SURVEY.			
CROSSING	LOCATION	REASON FOR EXCLUSION	ACTION
3	Theale, Reading, Berks,	Parallel line. No ph-ph violations. Falling risk. Out of NR land.	No Work Required
10a	Padworth Area, Berks	No Sign of Poles (see photos) - AM	No Work Required
10b	Padworth Area, Berks	No Sign of Poles (see photos) - AM	No Work Required
16	Midgham Bridge, Midgham, Berks	Falling violations but out of NR prop	No Work Required
22	Thatcham Station, Thatcham, Berks	Duplication. This is Crossing 19	No Work Required

### 5.3.3 Detailed Investigative Site Survey

For the remaining 111 crossings, detailed site surveys were then carried out using 3D laser technology cameras to avoid rail line closures and the inconvenience and expense associated with such closures. Their findings identified that a further 52 crossings did not require any additional work as safe conductor clearances would be maintained, and the installation of the new 25kV AC overhead line and its supporting structure would not encroach on SEPD assets. Table 4 below provides an extract from Appendix 2 where full details of the further 52 crossings removed from scope of works can be found.

Table 4: Extract from Appendix 2 – List of 52 Crossings Excluded After Site Survey

LIST OF 52 CROSSINGS EXCLUDED AFTER SITE SURVEY			
CROSSING	LOCATION	REASON FOR EXCLUSION	ACTION
4	Theale Station Area, Reading, Berks	Conductor safe clearance maintained.	No work required
6	Sulhampton Area, Berks	Conductor safe clearance maintained.	No work required
8	Lower Padworth, Berks	Conductor safe clearance maintained.	No work required
9	Padworth Area, Berks	Conductor safe clearance maintained.	No work required
12	Woolhampton Area, Berks	Conductor safe clearance maintained.	No work required

Following removal of these additional sites, this left **59 crossings requiring action by SEPD**. Figure 2 below provides an overview of the location of these crossings and Table 5 provides further detail regarding location, reasons for diversion and action required.

Figure 2: Diversions in SEPD's Distribution Services Area

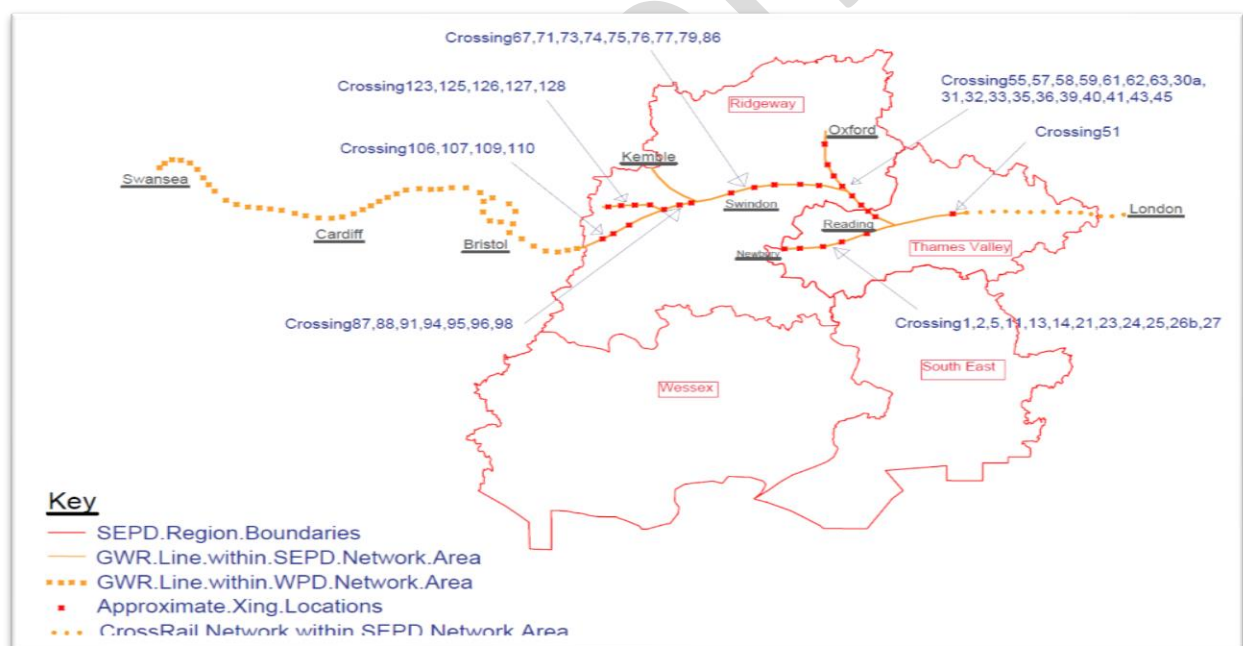


Table 5: List of 59 Crossings to be Diverted

Confidential

# LIST OF 59 CROSSINGS TO BE DIVERTED

CROSSING	LOCATION	REASON FOR DIVERSIONS	ACTION
1	Theale, Reading,Berks, RG31 7AH	Conductor Safety Clearance Encroached	Raise Conductor
2	Theale, Reading,Berks, RG31 7AH	Conductor Safety Clearance Encroached	Raise Conductor
5	Wigmore Lane, Theale, Berks	Conductor Safety Clearance Encroached	Raise Conductor
7	Ufton Lock, Lower Padworth, Berks	Conductor Safety Clearance Encroached	Raise Conductor
11	Bath Rd, Woolhampton, Berks	Conductor Safety Clearance Encroached	Raise Conductor
13	Bath Rd, Woolhampton, Berks	Conductor Safety Clearance Encroached	Remove Conductor Redundant.
14	Lock Cotts, Woolhampton,Berks	Conductor Safety Clearance Encroached	Raise Conductor
21	Piper's Lane, Thatcham, Berks	Conductor Safety Clearance Encroached	Raise Conductor
23	Pipers Lane Thatcham	Conductor Safety Clearance Encroached	Raise Conductor
24	Hebden Close, Thatcham, Berks	Conductor Safety Clearance Encroached	Directional Drill Move Underground
25	Hebden Close, Thatcham, Berks	Conductor Safety Clearance Encroached	Directional Drill Move Underground
26b	Hebden Close Area, Thatcham,Berks	Conductor Safety Clearance Encroached	Move Poles and Conductor
27	Hambridge Lane, Newbury, Berks	Conductor Safety Clearance Encroached	Trench Underground
30a	Didcot Railway Centre, Didcot, Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
31	Ladygrove Bridge, Didcot, Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
32	Appleford Level X'ing, Appleford,Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
32a	Appleford Level X'ing, Appleford,Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
33	Recreation Field, Appleford, Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
35	Culham Stn Area, Culham, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
36	Culham Stn Area, Culham, Oxon	Conductor Safety Clearance Encroached	Trench Underground
39	Goose Acre Fm, Radley, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
40	Radley Stn Bridge, Radley, Oxon	Conductor Safety Clearance Encroached	Trench Underground
41	Opp Sugworth Ln, Kennington, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
43	Kenning ton Sewage, Kennington, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
45	Kennington Rd Area, Kennington, Oxon	Conductor Safety Clearance Encroached	Remove Conductor Redundant.
51	Church Ln, Ruscombe, Berks, RG10 9UA	Conductor Safety Clearance Encroached	Directional Drill Move Underground
55	Bourne Rd, Pangbourne, Berks, RG8 7HT	Conductor Safety Clearance Encroached	Directional Drill Move Underground
57	Child Beale Trust, Pangbourne, Berks	Conductor Safety Clearance Encroached	Directional Drill Move Underground
58	Lower Basildon Area, Berks	Conductor Safety Clearance Encroached	Move Poles and Conductor
59	Withymead Nature Reserve, Goring, Berks	Conductor Safety Clearance Encroached	Directional Drill Move Underground
62	Lower Fm, Church Rd, Chosley, Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
63	Didcot Gas Holder Area, Didcot, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
67	Steventon Hill Area, Steventon, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
71	Steventon Hill Area, Steventon, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
73	Home Office Stores,Steventon, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
74	Bradfield Fm, Grove, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
75	Hanney Bridge, Grove, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
76	Denchworth Rd, Grove, Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
77	Mole End, Challow, Oxon	Conductor Safety Clearance Encroached	Raise Conductor
79	Moor Mill Fm, Baulking, Oxon	Conductor Safety Clearance Encroached	Directional Drill Move Underground
86	Swindon Police Stn, South Marston Wilts	Conductor Safety Clearance Encroached	Raise Conductor
87	Hay Lane, Swindon,Wilts	Conductor Safety Clearance Encroached	Raise Conductor
88	Bincknoll Lane, Wootton Bassett, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
91	Works Completed by Depot	Conductor Safety Clearance Encroached	Trench Underground
94	Trow Lane, Tockenham, Wilts	Conductor Safety Clearance Encroached	Trench Underground
95	Smithfields Barn, Dauntsey,Wilts	Conductor Safety Clearance Encroached	Raise Conductor
96	Dauntsey Lock, Dauntsey, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
98	Paddock End, Dauntsey, Wilts SN15 4HG	Conductor Safety Clearance Encroached	Raise Conductor
106	Patterdown Area, Chippenham,Wilts	Conductor Safety Clearance Encroached	Raise Conductor
107	Patterdown Area, Chippenham,Wilts	Conductor Safety Clearance Encroached	Raise Conductor
109	Thingley Fm Area, Thingley, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
110	Thingley Fm Area, Thingley, Wilts	Conductor Safety Clearance Encroached	Trench Underground
123	Hillside Fm, Brinkworth, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
125	School Hill Area, Brinkworth, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
126	Hill End Fm, Brinkworth, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
127	Mill Lane, Lower Somerford, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
128	Angrove Lane, Rodbourne, Wilts	Conductor Safety Clearance Encroached	Trench Underground via Tunnel.
135	Farleaze Farm, Norton, Wilts	Conductor Safety Clearance Encroached	Raise Conductor
140	Alderton Grove Farm, Alderton, Wilts	Conductor Safety Clearance Encroached	Raise Conductor

#### 5.3.4 Engineering Design

Once the 59 crossings affected by [REDACTED] works had been confirmed, [REDACTED] was then required to develop engineering designs to divert each conductor, using the best engineering practice at minimum cost. This considered specific circumstances for each crossing. To that end, a topographical survey was carried out for each of the crossings to provide detailed mapping of the land features at each location. In some cases, further ground investigation works were carried out to evaluate ground conditions and confirm ability to support new assets.

Detailed drawings were then produced for each diversion, setting out specifications for construction. The specification includes relevant standards to be met and any concerns regarding access routes, ecological and archaeological considerations. Drawings are live documents, which are used all the way through the project and finish as an “as built” drawing. This includes details of final locations, specifications and installation details. This is retained as a key element of SEPD’s asset records.

As part of the project [REDACTED] also prepared a report titled “Audit of GWE Crossings & Solutions”, [REDACTED] Reference 20/13366/249, highlighting its findings and solutions for each crossing. A copy of this report can be found at Appendix 4. The Audit includes location plans, pictures of crossings, site details, proposed designs, and drawings (including “as built” drawings) as referenced above.

To help inform the design process, [REDACTED] was also employed to work with the engineering design contractors to identify areas of environmental or archaeological interest and any need for additional studies, surveys or consents. This early engagement has ensured the project has taken into account and complied with all relevant environmental, ecological and archaeological obligations at each stage, while meeting project timelines at the most efficient cost. It has ensured designers and contractors have shared all relevant information to allow them to put in place measures to avoid aborted works and to obtain and comply with relevant consents.

For several crossings this resulted in specific measures being required, such as horizontal boring machine launch sites being relocated, controlled measures around the work sites being put in place, and alternative access routes being agreed to conserve ecological and archaeological heritage. By way of example, in the ‘Archaeological Monitoring and Recording Report’, dated January 2019, [REDACTED] identified that between Crossing Point 1 and Crossing Point 140 “the impact of development on the historic environment resource was mitigated through changes in design for the majority of the crossing points”. It also identified a further 12 Crossing Points that had the “potential to impact on buried remains”. Full details of the Environmental and Archaeological Report prepared by [REDACTED] can be found at Appendix 5. It provides details of considerations on a project-by-project basis. An example can be found in Figure 3 below for Crossing 107 located at Patterdown, near Chippenham. These drawings are used by construction contractors to install diversions.

## 5.4 Diversion Works

Diversion Works identified in the engineering designs generally include the following works:

- Isolate existing electricity supplies to allow work to be carried out safely;
- Divert electricity supplies to allow [REDACTED] to continue operations and minimise disruption to rail passengers;
- Remove existing conductors and redundant SEPD assets; and
- Either raise crossings onto taller support structures, horizontally bore under the railway and bury cables, or relocate onto bridges that have been moved.

The method to be adopted is identified during the design stage, taking cognisance of technical requirements, third-party needs (including customers, land owners, Councils and emergency services), safety obligations, consent conditions, environmental and archaeological obligations.

Given the volume of work and the demanding timescales, it was identified at the outset that SEPD did not have sufficient in-house resource to meet these additional requirements, while also delivering on RIIO-ED1 commitments. As a result, works have been contracted out as detailed in the procurement section below. This has provided greater flexibility and efficiency as resource has been procured and stepped down as and when needed.

[REDACTED] has continued to be employed through this part of the process to monitor on-site works, advising of necessary steps and measures to be taken to ensure the appropriate safeguards and compliance with relevant obligations. [REDACTED] representatives have also attended SEPD's monthly project meetings to advise on works.

As highlighted above, the 59 diversions have often required wayleaves or easements giving permission to access land to carry out works and install replacement assets. Once all relevant permissions have been obtained, work generally starts with on-site preparation and the establishment of any accommodation. Routes to and from the site are laid down and instructions established to ensure damage to surrounding land is minimised by site traffic and consents are complied with.

The second phase of works then involves all non-intrusive work or work that can be done without impacting the customer. Under this project, this has involved the installation of new taller poles to support new diversion assets and fitting associated electrical components before existing assets are isolated and removed. Works can also involve excavation of drill sites where replacement cables are to be undergrounded or setting up boring machines for excavations.

The third phase usually involves controlled operations, requiring [REDACTED] to provide SEPD with "possession" to carry out work on its land and in proximity to the rail line. As the name suggests, "possession" involves [REDACTED] handing over the rail line for construction works to be executed. In each case, this requires careful planning, particularly around safety processes and procedures, to ensure all workers, the public and assets are protected. Given



the nature of this project, this work has tended to take place between 01:00 hours and 05:00 hours and at the weekend. Work is over short controlled periods to ensure no rail traffic, safe working practices and minimum disruption to rail and electricity customers.

Work under this commences with SEPD switching customers to alternative means of supply and isolating conductors crossing the rail line. Once isolated, old conductors are lowered where overhead or excavated and removed. New overhead lines, underground cables and bridge crossings are then installed, with supporting apparatus. These tasks generally require highly trained and experienced staff and close supervision and management.

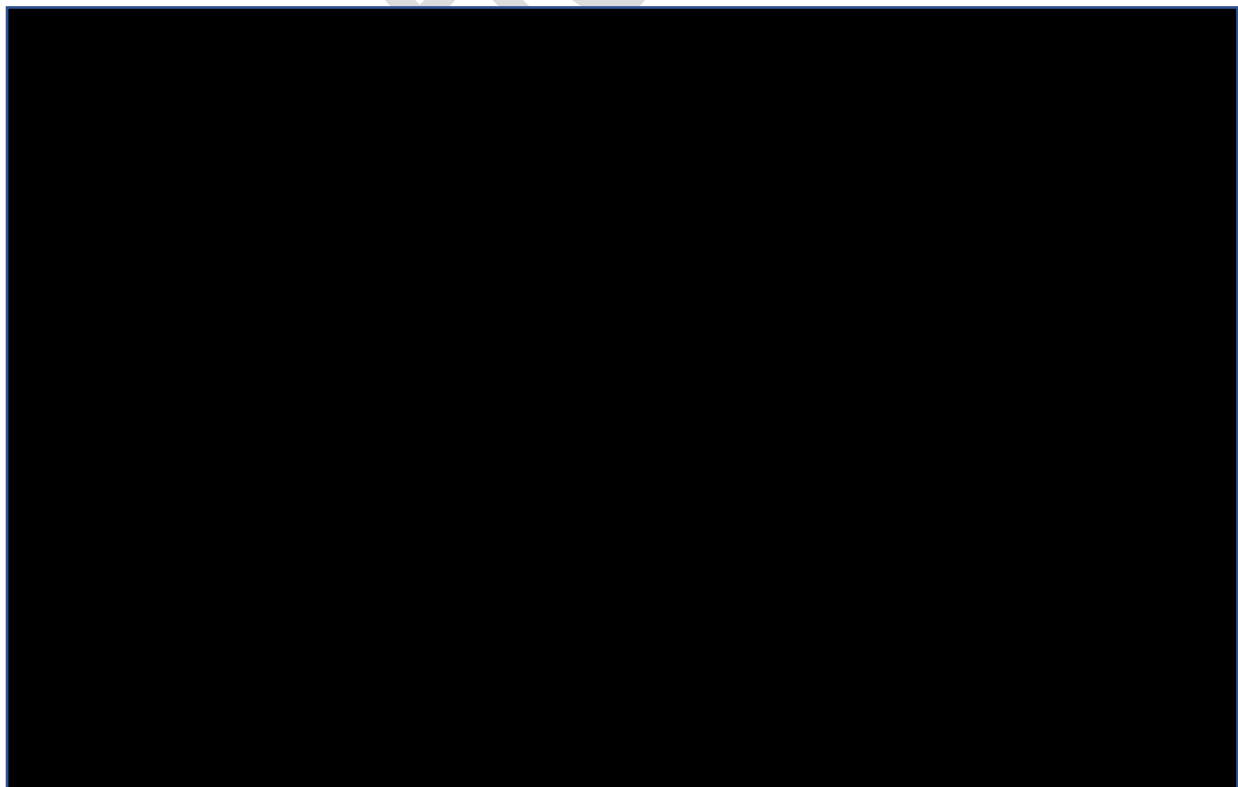
Given the nature of the works [REDACTED] is always required to supervise activities to make sure all rail regulations and safety requirements are met. All work is permitted with varying controls to restrict activity and ensure safe practices.

Examples of programmes for above ground and underground solutions are set out in the sections below.

#### 5.4.1 Cables Diverted Underground

Figure 4 below provides an extract of a construction programme for Crossing 31, and associated works where a diversion has been carried out using horizontal boring under the railway line and burying of the replacement cables. This is provided as an example; full details of the programme can be found at Appendix 6. Activities include Design, Procurement, Construction and Commissioning of the scope of works.

Figure 3: Extract of Construction Programme for Crossing 31



#### 5.4.2 Cables Diverted Above Ground

Figure 5 below details the work programme and activities for an above ground diversion, using Crossings 106 and 107 by way of example. Activities are as detailed in Figure 4.

Figure 4: Extract of Construction Programme for Crossings 106 and 107



#### 5.4.3 “As Built” Check and Verification

SEPD procured [REDACTED] to carry out an “As Built” site check on all 59 diversions once they are completed to ensure all new assets are installed correctly and with appropriate conductor clearances. This also ensures accurate records of works are established.

[REDACTED] will also verify a sample of 10% of the 102 crossings where no work has taken place, to ensure their continued compliance. This site check will focus on those conductors identified in earlier surveys as being close to [REDACTED] assets but not encroaching on conductor safety clearances. The site checks will verify that [REDACTED] assets have been properly located, the conductor safety clearances are maintained and that there is no damage to SEPD’s assets following [REDACTED] work. These checks will be scheduled when [REDACTED] has completed the installation of its 25kV AC overhead line system and all its supporting structures. This is expected to be completed by autumn 2019.

## 6 Interim Funding Arrangements

Following confirmation of works, quotations were prepared by SEPD for the first four crossings in late 2013 and sent [REDACTED] for acceptance. [REDACTED] subsequently notified SEPD that it could not accept full liability for costs associated with the specified diversions. If no central funding solutions were forthcoming, [REDACTED] advised that it would invoke its Master Wayleave Agreement. As discussions between DNOs, Ofgem and Government had been ongoing for some time, [REDACTED] offered to provide interim funding for works until Government Policy was clarified. An interim funding agreement for the diversion of overhead lines was agreed and signed by SEPD and [REDACTED] on 27 October 2014. A copy of the agreement can be found at Appendix 7.

The interim funding agreement provided [REDACTED] to make payment towards SEPD's works on three occasions over a two-year period between 2015 and 2018. Funding provided [REDACTED]

Subsequent to SEPD and [REDACTED] signing the interim funding agreement, the ENA also lobbied Parliament to try to secure central funding and a conclusion to the matter. Following a meeting with Ministers early in 2016, it was determined electricity diversion works would not be funded by the Rail Electrification project or centrally by Government, and that normal electricity industry arrangements should prevail. As a result [REDACTED] confirmed early in 2017 that it would invoke the Master Wayleave Agreement, leaving SEPD liable for costs. As a result, SEPD was required to return the interim funding of [REDACTED]. This amount was subsequently returned to [REDACTED] in March 2019.

## 7 Master Wayleave Agreement

The Master Wayleave Agreement was signed by representatives of the British Transport Commission and the Southern Electricity Board on 16 November 1961. An extract from the agreement confirming that [REDACTED] has the right to require SEPD to move relevant assets from its land at its own cost at any time is confirmed in Engineering Condition 23, as shown below. Herein, [REDACTED] the Board is SEPD.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Confidential

## 8 Procurement: Construction, Maintenance and Dismantlement of Overhead Lines up to 33kV

As set out above, SEPD determined early in the project that given the tight timescales, specialist nature and scale of the project, it could not be delivered by SEPD's core teams established to meet RIIO-ED1 business plan requirements. Given the bespoke nature of the project and specific resource requirements, it was determined that the most efficient means of delivering the project was through bespoke contract resource to meet requirements on an 'as needs' basis ensuring we only pay for the resource as and when needed.

SEPD is a regulated business and as such must comply with the Utilities Contracts Regulations 2016. Therefore, all contractors engaged on this project were selected from the relevant Framework Agreements established across SSEPD and SSE given the close fit with core business activities. The call off procedure under the 2139 Framework Agreement detailed hereunder requires that each project is subject to mini competition on a project-by-project basis to leverage the best achievable commercial position and outcome for our customers. This approach was also applied in relation to [REDACTED] activities set out under this submission. However, one-off competitive tendering was also used where an applicable framework was not in place. The requirement for this has been limited.

This section outlines the process that took place to identify and secure contractors to facilitate delivery of the Great Western Rail Electrification Project.

In 2015, in accordance with procurement and commercial governance procedures, SEPD awarded Framework Contracts for the **construction, maintenance and dismantlement** of overhead lines and wood poles on the network up to 33kV in the SEPD Distribution Services Area. The award was the result of the prequalification and Invitation to Tender stages explained herein.

An initial search on the appropriate product/service codes (4.9.4 and 4.9.2) was conducted on Achilles UVDB, identifying 45 potential suppliers, to whom a prequalification questionnaire was issued. Responses were received from 19 suppliers and 15 were invited to tender following prequalification evaluation. Invitation to Tender (ITT) documents were issued in June 2015, and 12 submissions were received. A robust two-phase tender evaluation process then followed. Phase 1 comprised technical evaluation and Phase 2 comprised commercial evaluation. Three bidders did not meet the technical criteria and were not considered further. The commercial assessment for the remaining bidders comprised the evaluation of seven model jobs representing a cross-section of the types of works to be carried out under the Framework Agreement. Further tender clarification and rounds of commercial negotiations were undertaken to establish a final ranking. The top four contractors were subsequently appointed to the Framework Agreement. They were:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Mini tenders, to call off from the Framework Agreement, have been carried out as required for the Rail Electrification project to ensure that the most competent contractor is selected for each element at competitive rates.

Confidential

## 9 Programme of Work

As set out above, the programme of work initially commenced in 2013 when [REDACTED] first approached SEPD regarding the Rail Electrification programme and asked it to verify 161 crossings, thought to be impacted by its works. Surveys were carried out, starting late in 2013 and continuing through into the early years of the project, to establish that only 59 crossings were impacted and needed to be diverted. This work was necessary to ensure the maintenance of safe conductor clearances between SEPD assets and the proposed new [REDACTED] 33kV AC overhead system and supporting structures.

57 crossings have been completed to date; these are of varying voltages ranging from Low Voltage (LV) to 11 kV and 33kV diversions, either single or dual circuit. There are also two remaining 132kV diversions to be completed. These are the most complex and expensive works under the programme. They are Crossing 23 at Thatcham and Crossing 71 at Steventon. Both are planned for completion by the end of December 2020, with financial close expected by the end of March 2021.

Figure 6 below provides an extract of the full programme of work presented at Appendix 6. Table 6 also lists the key dates for all 59 crossings, giving the start and end dates for each of the main activities, Site Survey and Design, Legal and Wayleaves, Construction and Job Completion. This provides an understanding of the integration of the differing work types undertaken.

Figure 5: Construction Programme

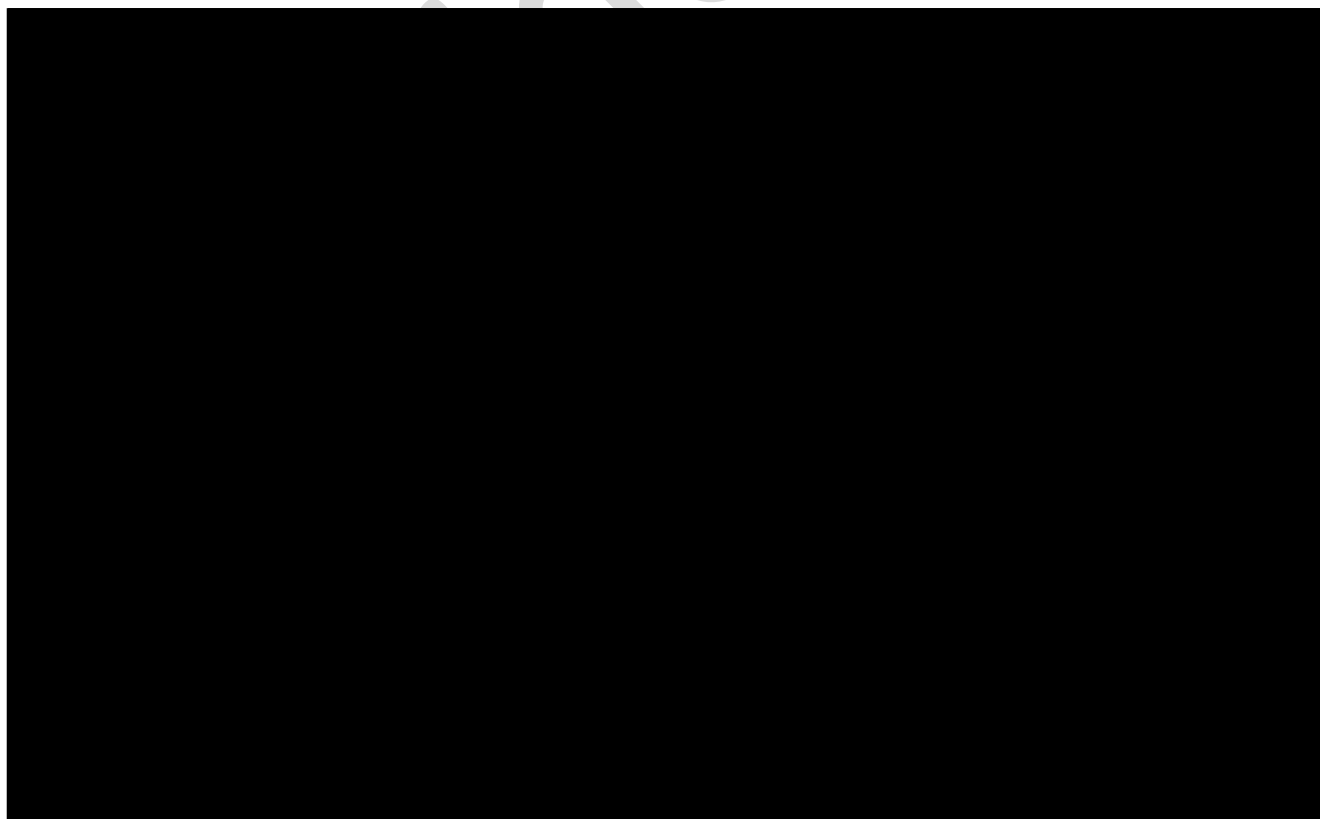


Table 6: The 59 Diverted Crossings Key Programme Dates (Appendix 8)

THE 59 DIVERTED CROSSINGS KEY PROGRAMME DATES									
CROSSING	LOCATION	SITE SURVEYS & DESIGN		LEGAL & WAYLEAVES		CONSTRUCTION		JOB COMPLETION	
		Start Date	Finish Date	Start Date	Finish Date	Start Date	Finish Date	Handover	Sign Off
1	Theale, Reading,Berks, RG31 7AH	Nov-13	Jan-17	May-15	Jan-17	Jan-17	Jun-17	Apr-17	Jun-17
2	Theale, Reading,Berks, RG31 7AH	Nov-13	Jan-17	May-15	Jan-17	Apr-17	Jun-17	May-17	Jun-17
5	Wigmore Lane, Theale, Berks	Nov-13	Jul-16	Sep-15	Jul-16	Sep-16	Sep-16	Sep-16	Sep-16
7	Ufton Lock, Lower Padworth, Berks	Nov-13	Aug-16	Aug-15	Aug-16	Oct-16	Oct-16	Oct-16	Oct-16
11	Bath Rd, Woolhampton, Berks	Nov-13	Aug-16	Aug-15	Aug-16	Nov-16	Nov-16	Nov-16	Nov-16
13	Bath Rd, Woolhampton, Berks	Nov-13	Jan-16	N/A	N/A	Jun-16	Jun-16	Jun-16	Jun-16
14	Lock Cotts, Woolhampton,Berks	Nov-13	May-16	Jun-15	Apr-16	Jul-16	Jul-16	Jul-16	Jul-16
21	Piper's Lane, Thatcham, Berks	Nov-13	Jun-16	Jun-15	Jun-16	Jul-16	Jul-16	Jul-16	Jul-17
24	Hebden Close, Thatcham, Berks	Nov-13	Jul-16	Jun-15	Apr-16	Jul-16	Aug-16	Jul-16	Aug-16
25	Hebden Close, Thatcham, Berks	Nov-13	Jul-16	Jun-15	Apr-16	Jul-16	Aug-16	Aug-17	Aug-16
26b	Hebden Close Area, Thatcham,Berks	Nov-13	Sep-16	Jun-15	Dec-17	Oct-16	Dec-16	Dec-16	Jan-17
27	Hambridge Lane, Newbury, Berks	Nov-13	May-18	N/A	N/A	Jun-18	Dec-18	Oct-18	Dec-18
30a	Didcot Railway Centre, Didcot, Oxon	Nov-13	Mar-16	Jul-15	Apr-17	May-17	Jun-17	May-17	Jul-18
31	Ladygrove Bridge, Didcot, Oxon	Nov-13	Jul-15	Jun-15	Jul-15	31/6/2016	Aug-16	Jul-16	Aug-16
32	Appleford Level X'ing, Appleford,Oxon	Nov-13	Mar-16	Jun-15	Oct-16	Jul-16	Sep-16	Sep-16	Sep-16
32a	Appleford Level X'ing, Appleford,Oxon	Nov-13	Mar-16	Jun-15	Oct-16	Jul-16	Sep-16	Sep-16	Sep-16
33	Recreation Field, Appleford, Oxon	Nov-13	Dec-16	Jun-15	Jun-16	Dec-16	Feb-17	Dec-16	Feb-17
35	Culham Stn Area, Culham, Oxon	Nov-13	Jul-16	Jun-15	Jul-16	Nov-16	Sep-16	Sep-16	Oct-16
36	Culham Stn Area, Culham, Oxon	Nov-13	Aug-14	N/A	N/A	Sep-16	Nov-16	Nov-16	Nov-16
39	Goose Acre Fm, Radley, Oxon	Nov-13	Apr-16	Jun-15	Apr-16	Jul-16	Jul-16	Jul-16	Jul-16
40	Radley Stn Bridge, Radley, Oxon	Nov-13	May-16	N/A	N/A	Jun-16	Aug-16	Aug-16	Aug-16
41	Opp Sugworth Ln, Kennington, Oxon	Nov-13	Aug-16	Jun-15	Aug-16	Sep-16	Oct-16	Oct-16	Nov-16
43	Kenning ton Sewage, Kennington, Oxon	Nov-13	Aug-16	Jun-15	Aug-16	Oct-16	Oct-16	Oct-16	Nov-16
45	Kennington Rd Area, Kennington, Oxon	N/A	N/A	Jul-15	May-16	Aug-16	Aug-16	Aug-16	Sep-16
51	Church Ln, Ruscombe, Berks, RG10 9UA	Nov-13	Jul-15	Jan-15	Oct-15	Nov-15	Dec-15	Dec-15	Jan-16
55	Bourne Rd, Pangbourne, Berks, RG8 7HT	Nov-13	May-15	Jan-15	Jul-15	Jul-15	Aug-15	Jul-15	Aug-15
57	Child Beale Trust, Pangbourne, Berks	Nov-13	Mar-15	Jan-15	May-15	May-15	Jul-15	Jun-15	Jul-15
58	Lower Basildon Area, Berks	Nov-13	Aug-15	N/A	N/A	Dec-15	Dec-15	Dec-15	Dec-15
59	Withymead Nature Reserve, Goring, Berks	Nov-13	Aug-15	Jan-15	Aug-15	Sep-15	Jan-16	Jan-16	Feb-16
62	Lower Fm, Church Rd, Chosley, Oxon	Nov-13	Mar-15	Jan-15	Jan-15	Apr-15	May-15	May-15	May-15
63	Didcot Gas Holder Area, Didcot, Oxon	Nov-13	Jan-16	N/A	N/A	Mar-15	Mar-15	Feb-16	Apr-15
67	Steventon Hill Area, Steventon, Oxon	Nov-13	Jun-15	Jun-15	Jan-16	Apr-17	Apr-17	Apr-16	May-17
73	Home Office Stores,Steventon, Oxon	Nov-13	Aug-15	Jun-15	Jan-16	Mar-16	Mar-16	Mar-16	Apr-16
74	Bradfield Fm, Grove, Oxon	Nov-13	Dec-15	Jun-15	Dec-16	Jun-16	Jun-16	Jun-16	Jul-16
75	Hanneley Bridge, Grove, Oxon	Nov-13	May-16	Jun-15	May-16	Jul-16	Jul-16	Jul-16	Jul-16
76	Denchworth Rd, Grove, Oxon	Nov-13	May-16	Jun-15	May-16	Jun-16	Jul-16	Jul-16	Jul-16
77	Mole End, Challow, Oxon	Nov-13	May-16	Jun-15	Jul-16	Oct-16	Oct-16	Oct-16	Nov-16
79	Moor Mill Fm, Baulking, Oxon	Nov-13	Mar-16	Jul-15	Mar-16	Jun-16	Jul-16	Jul-16	Aug-16
86	Swindon Police Stn, South Marston Wilts	Nov-13	Apr-16	Jun-15	Apr-16	Jun-16	Jun-16	Jun-16	Jul-16
87	Hay Lane, Swindon,Wilts	Nov-13	Jul-16	Jun-15	Aug-15	Sep-16	Oct-16	Oct-16	Oct-16
88	Bincknoll Lane, Wootton Bassett, Wilts	Nov-13	Jul-16	Jun-15	Jul-16	Nov-16	Nov-16	Nov-16	Nov-16
91	Works Completed by Depot	Nov-13	Aug-14	N/A	N/A	Oct-15	Jan-17	Feb-17	Feb-17
94	Trow Lane, Tockenham, Wilts	Nov-13	Dec-15	Jun-15	Dec-15	May-16	Jul-16	Jul-16	Aug-16
95	Smithfields Barn, Dauntsey,Wilts	Nov-13	Aug-15	Jun-15	Jun-16	Aug-16	Aug-16	Aug-16	Sep-16
96	Dauntsey Lock, Dauntsey, Wilts	Nov-13	Aug-15	Jun-15	Mar-16	Apr-16	Apr-16	May-16	Apr-16
98	Paddock End, Dauntsey, Wilts SN15 4HG	Nov-13	Mar-16	Jun-15	Sep-15	Mar-16	Mar-16	Mar-16	Apr-16
106	Patterdown Area, Chippenham,Wilts	Nov-13	Apr-16	Jul-15	Jan-17	Mar-17	Mar-17	Mar-17	Apr-17
107	Patterdown Area, Chippenham,Wilts	Nov-13	Apr-16	Jul-15	Jan-17	Mar-17	Mar-17	Mar-17	Apr-17
109	Thingley Fm Area, Thingley, Wilts	Nov-13	Jun-16	Jun-15	Jun-16	Oct-16	Aug-16	Oct-16	Aug-16
110	Thingley Fm Area, Thingley, Wilts	N/A	N/A	N/A	N/A	Jun-16	Aug-16	Aug-16	Sep-16
123	Hillside Fm, Brinkworth, Wilts	Nov-13	Sep-15	Jun-15	Jan-16	Apr-16	Apr-16	Apr-16	May-16
125	School Hill Area, Brinkworth, Wilts	Nov-13	Oct-14	Jul-15	Oct-16	Nov-16	Nov-16	Nov-16	Dec-16
126	Hill End Fm, Brinkworth, Wilts	Nov-13	Jul-16	Jun-15	Jul-16	Sep-16	Aug-16	Sep-16	Sep-16
127	Mill Lane, Lower Somerford, Wilts	Nov-13	Aug-16	Jun-15	Aug-16	Sep-16	Sep-16	Sep-16	Oct-16
128	Angrove Lane, Rodbourne, Wilts	Nov-13	Mar-16	Jun-15	Apr-16	May-16	Jun-16	Jun-16	Jun-16
135	Farleaze Farm, Norton, Wilts	Nov-13	Sep-15	Jun-15	Jan-16	May-16	May-16	May-16	May-16
140	Alderton Grove Farm, Alderton, Wilts	Nov-13	Jul-16	Jun-15	Jul-16	Sep-16	Aug-16	Sep-16	Aug-16
23	Pipers Lane Thatcham	Nov-13	Oct-19	Jun-15	Dec-19	Feb-20	Dec-20	Dec-20	Mar-21
71	Steventon Hill Area, Steventon, Oxon	Nov-13	Oct-19	Jun-15	Dec-19	Feb-20	Dec-20	Dec-20	Mar-21

Key	
	Completed Works
	Live Works.



## 10 Project Costs

It should be noted that costs are generally presented in this document as nominal values unless stated otherwise. Where a summary is provided of relevant reopener values figures are also quoted in 2012/13 prices to ensure consistency with other price control provisions.

### 10.1 Total Costs Incurred to Date

Total cost incurred to date to complete 57 crossings is [REDACTED]. Most of these costs were incurred at the beginning of the RIIO-ED1 period, between years 2015-18, when the majority of the construction work took place. However, some investigative surveys and design works commenced in 2013. SEPD is not seeking to recover this under the reopener as it falls outside the RIIO-ED1 period. The relevant amount for this submission is [REDACTED]. These costs include SEPD costs and [REDACTED] as set out below.

### 10.2 SEPD Expenditure to Date

SEPD's actual expenditure to date is [REDACTED]. This is detailed in Table 7 below.

Table 7: SEPD Expenditure to Date

SEPD Spend to Date	
<b>Category</b>	[REDACTED]
Design including Surveying	
Legal and Wayleaves	
Project Management (PM, CDMc, QS Services)	
Labour (Contractor)	
Labour (Direct)	
Materials	
<b>Total (Nominal)</b>	[REDACTED]
<b>Total (12/13 Prices)</b>	
	<b>£4,976,738</b>

#### 10.2.1 Labour

As can be seen from Table 7, the largest expenditure item is Labour (Contract). This accounts for 69% of all costs and covers the core construction activities associated with the project. As set out above, due to the nature of the project and the demands on resource, it has been necessary to procure additional contract resource to supplement SEPD's own internal resource. To that end, design, land management and access, construction and specialist management services have been contracted out.

[REDACTED]  
[REDACTED] Being a

specialist in 33kV overhead line contractor, [REDACTED] has been involved in most crossings over the period since 2015.

### 10.2.2 Materials

The second largest cost item is materials at 13%. Materials for the project have largely been sourced through SEPD suppliers and stores to secure the best rate and greatest flexibility. Where materials are not standard SEPD stock items, they have been sourced on a bespoke basis.

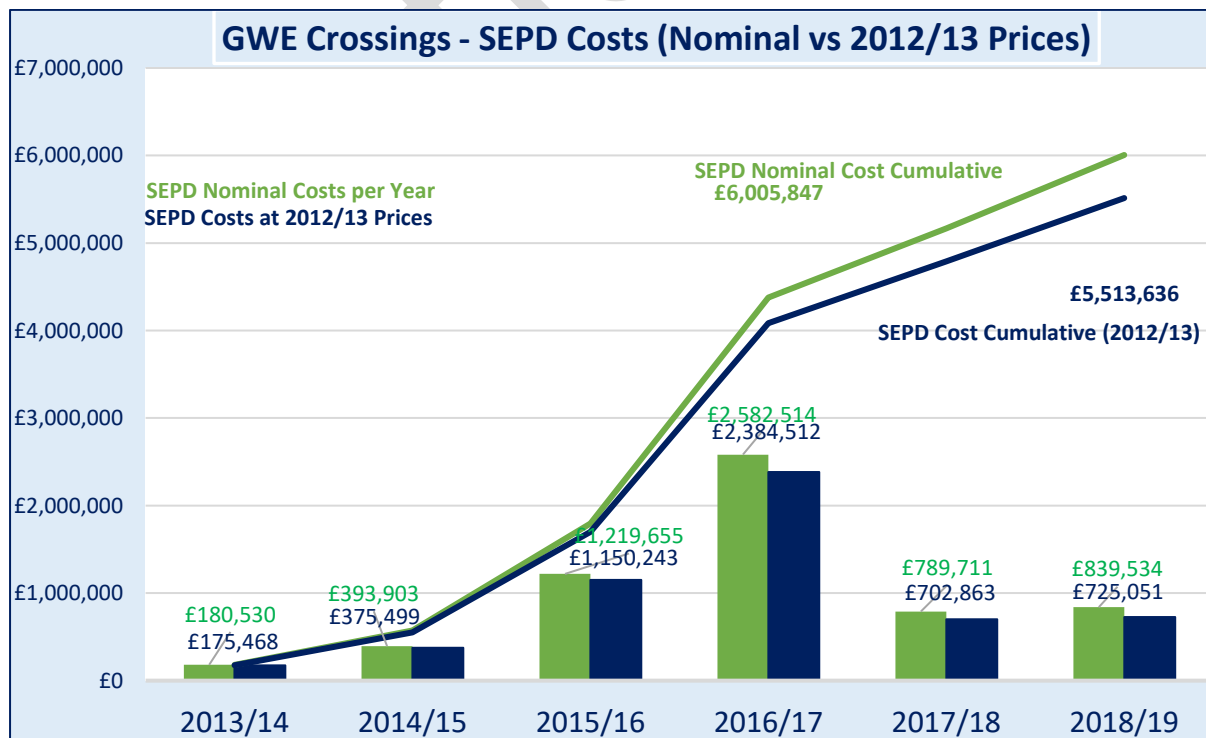
### Project Management

Project Management has largely been contracted to [REDACTED], to drive efficiencies and wider project coordination. However, SEPD has also established an in-house project management team to focus specifically on this project.

Due to the demands of the project, some of the necessary skills were not available in house. As a result, planning and quantity surveying activities have been outsourced to [REDACTED]. [REDACTED] is one of SEPD's framework contractors.

Graph 1 below provides a breakdown of SEPD's expenditure for each financial year, with a cumulative line represented.

Graph 1: SEPD Expenditure Profile



[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]

#### 10.4 Forecast Expenditure

As set out above, two of the 59 planned diversions remain outstanding at the time of submission. They are the most complex and expensive diversions to be delivered under the programme. They are:

- Crossing 23 - Pipers Lane, Thatcham, Berkshire.
- Crossing 71 - Steventon Hill, Steventon, Oxfordshire.

Both crossings are in the early stages of development with engineering, archaeological and environmental surveys currently being undertaken. Legal is also working to secure wayleaves, easements, land purchases and appropriate consents. Both crossings are due to be completed in December 2020, with financial close scheduled for March 2021. A summary of both crossings is set out below.

##### 10.4.1 Crossing No. 23

This 132kV overhead electric line runs between Andover and Thatcham, crossing the rail line at Thatcham Station, Berkshire. The line also crosses the Kennet and Avon Canal at the same location and its supporting towers are located on the flood plain, south of the railway within Thatcham Grid substation.

Due to limited space within Thatcham Grid substation, there is insufficient room to locate a new terminal tower to deliver an overhead diversion. There are also technical difficulties associated with an underground solution due to the substation's proximity to the rail line. As such, the current plan is to raise the conductors on four new towers. This will require a temporary diversion to maintain supplies [REDACTED] while work is being carried out.

Based on initial design, it is estimated construction will take nine months to complete and cost [REDACTED]. The design has been developed to deliver the lowest overall cost solution while meeting technical and operational requirements. A breakdown of costs is provided in Table 11.



#### 10.4.2 Crossing No. 71

This overhead electric line running between Drayton and Harwell, crosses the rail line in the vicinity of Steventon Hill, Oxfordshire. It has been identified that [REDACTED] proposed work to electrify the rail line will encroach on the safe conductor clearance of 4.6m, requiring the SEPD conductor to be diverted. Two solutions have been considered for maintaining safe conductor clearances, but raising the conductors on to four new towers has been selected in preference to undergrounding. It is estimated that construction will take nine months and cost [REDACTED]. A breakdown of costs is presented in Table 12 below.

[REDACTED]

#### 10.5 Summary of Actual and Forecast Expenditure

Table 13 below confirms actual and forecast expenditure to facilitate the [REDACTED] Project is **£17.7m in 2012/13 prices, £20.7m nominal**. [REDACTED]

[REDACTED]  
[REDACTED]. This gives  
a total value for the reopener of **£17.2m (2012/13 prices)**.

Table 13: Actual and Forecast Reopener Costs

	Actual and Forecast Cost (£m)			
	Actual		Forecast	
Basis	2013-15 (DPCR5)	2015-19 (RIIO-ED1)	2019-21 (RIIO-ED1)	Total Outturn
Nominal	0.6	9.5	10.6	<b>20.7</b>
2012/13 Price	0.5	8.5	8.7	<b>17.7</b>

## 10.6 Evidence and Justification of Costs

The next section details SEPD's [REDACTED] costs for Crossing 27. While a detailed breakdown of all costs for each crossing is set out at Appendix 9, the information below provides a good example of the information used to manage each project. It also demonstrates SEPD's audit processes to validate all costs.

### 10.6.1 Example of Underground Line Diversion – Crossing 27

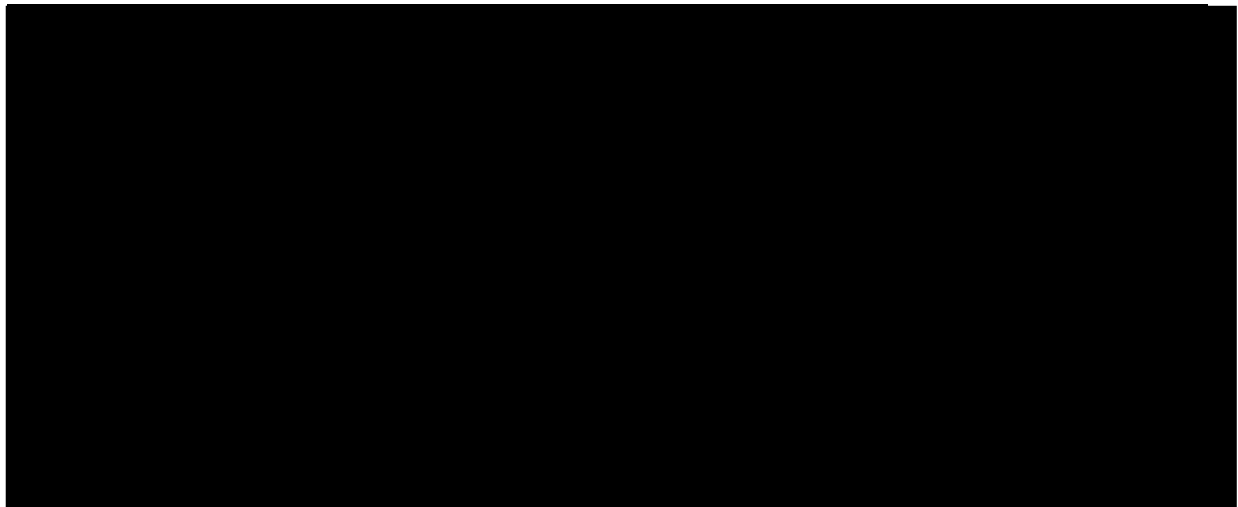
Table 14 below is an extract from Appendix 9. It shows total expenditure on this crossing of [REDACTED]

Table 14: SEPD Costs for Diverted Crossing 27 (£905,881.16)

SEPD COSTS FOR DIVERTED CROSSINGS					
Crossing	Location	Voltage	Completion Dates		Costs to Date
			Handover	Sign Off	£
1	Theale, Reading,Berks, RG31 7AH	33/DUAL	Apr-17	Jun-17	
2	Theale, Reading,Berks, RG31 7AH	33/DUAL	May-17	Jun-17	
5	Wigmore Lane, Theale, Berks	11	Sep-16	Sep-16	
23	Piper's Lane, Thatcham, Berks	132	Dec-20	Mar-21	
27	Hambridge Lane, Newbury, Berks	11	Oct-18	Dec-18	
31	Ladygrove Bridge, Didcot, Oxon	33/DUAL	Jul-16	Aug-16	
71	Steventon Hill Area, Steventon, Oxon	132	Dec-20	Mar-21	
106	Patterdown Area, Chippenham,Wilts	33	Mar-17	Apr-17	
107	Patterdown Area, Chippenham,Wilts	33	Mar-17	Apr-17	
KEY					
	WORKS COMPLETE				
	TO BE COMPLETED				

Crossing 27 was a particularly challenging crossing where we encountered wayleave difficulties. This resulted in the SEPD conductor being diverted underground. This required road closures, diversions and bridge work. The work was carried out both by SEPD and [REDACTED] Contractors. An extract of the full programme is shown by way of example in Figure 7 below. Full details can be found at Appendix 6.

Figure 6: Extract of Programme of Work for Crossing 27



A detailed breakdown of costs for Crossing 27 is provided in Table 15 below. This shows that out of total costs of [REDACTED], Labour (Contractor) Costs were again the most significant cost item at [REDACTED]. In this case, works were successfully tendered and [REDACTED]

[REDACTED]

[REDACTED]

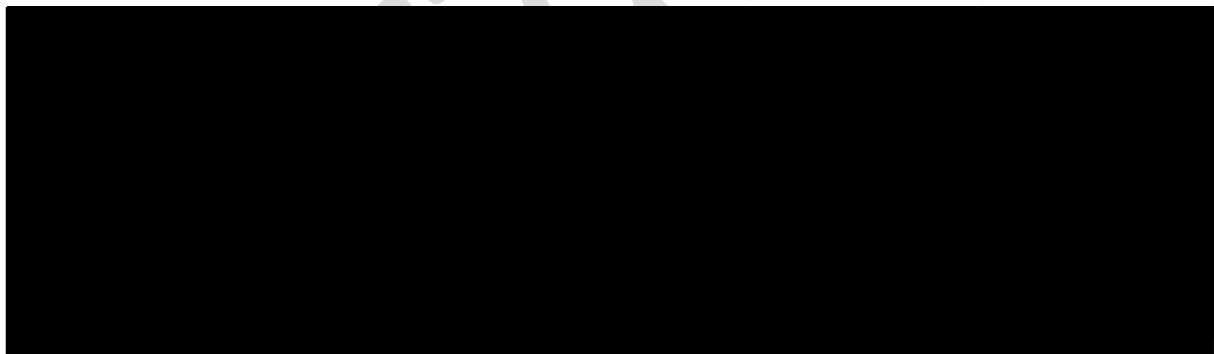


Table 16 below provides a further breakdown of Labour (Contractor) costs, identifying individual Purchase Orders and associated costs.

[REDACTED]

[REDACTED]

Table 17 below shows the individual Invoice Numbers that can be traced to the Purchase Order (PO) to reconcile to the relevant amount in Table 16 above.

[REDACTED]

[REDACTED]

[REDACTED]

## 11 Conclusion

SEPD has set out in this document and supporting appendices, strong evidence and justification of costs that it has incurred and forecasts to incur over the RIIO-ED1 period to meet legal obligations under the Master Wayleaves Agreement [REDACTED] and statutory obligations to maintain safe clearances for electric lines and equipment impacted by [REDACTED] Rail Electrification Project.

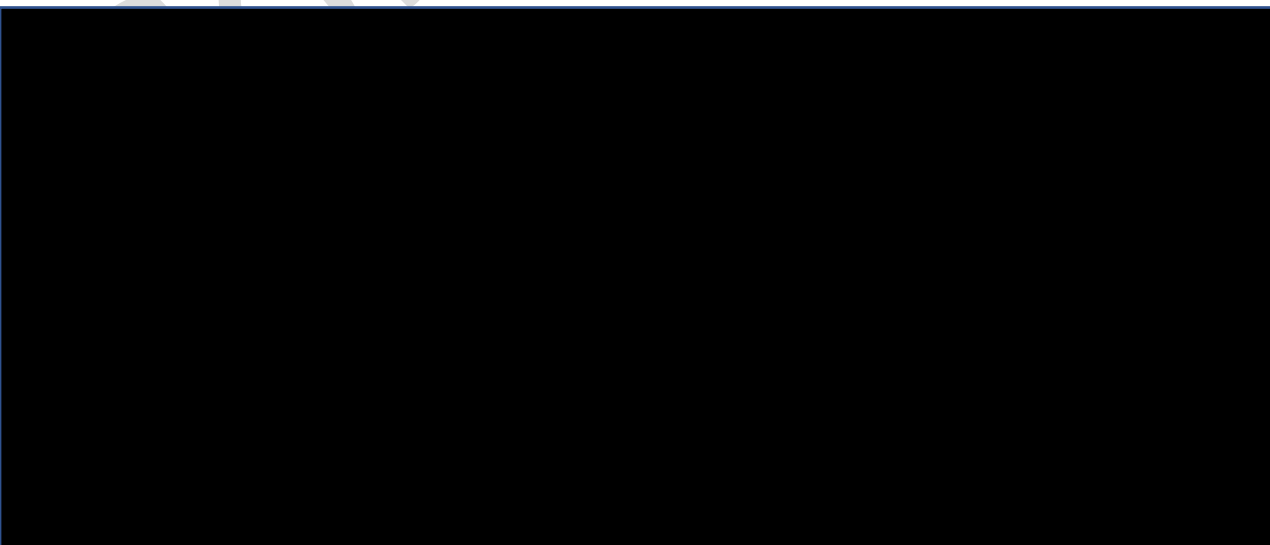
As provided for under CRC 3F of our electricity distribution licence (Arrangement for Recovering Uncertain Costs), SEPD now seeks appropriate allowances to recover costs of **£17.2m (2012/13 prices, excluding pre RIIO-ED1 costs of £0.5m)**.

These costs represent a **significant saving of £17.3m** relative to forecasts provided to Ofgem in the early stages of the project. Cost savings have been delivered through:

- A robust and competitive procurement processes;
- Efficient survey, inspection, design and construction activities;
- Coordination of activities with [REDACTED] to meet challenging timescales and minimise cost; and
- Robust management, quality and cost control arrangements.

Comparisons between diversions have been drawn to ensure lessons are learned and benchmark costs are established. This has provided a robust basis for managing future projects and has helped to improve cost efficiency and certainty of forecasts. SEPD's robust procurement approach has also ensured unit rates for works are competitive and efficient.

Table 19 below provides a breakdown of SEPD total costs incurred to date and forecast costs under the Rail Electrification Project. When costs falling in years out with the RIIO-ED1 price control period are stripped out, this results in a total cost of **£17.2m (12/13 prices)**. **SEPD seeks to recover this amount under the Rail Electrification Reopener, on the basis all costs incurred and forecast to be incurred represent economic and efficient expenditure.**



Graph 3: SEPD Actual & Forecast Costs (Nominal vs 2012/13 Prices)

