WPD INNOVATION
Transforming the electricity network

Take Charge

6 Monthly Report

October 2021 – March 2022

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Serving the Midlands, South West and Wales

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1. Executive Summary

Take Charge is a project funded through Ofgem's Network Innovation Allowance (NIA). The project was registered in April 2020 and is expected to be completed in summer 2022.

The project will design, develop, construct and install a Compact Connection Solution (CCS) to provide a fast and cost-effective solution to supply rapid Electric Vehicle (EV) charging facilities at Motorway Service Areas (MSAs). The design and build of the CCS will be led by Brush, a leading UK manufacturer of transformers and switchgear. Working closely alongside Brush we will focus on developing a solution with all the capabilities of a conventional substation but in a far more compact and low cost design. The CCS will be trialled at a site operated by Moto, the largest MSA operator in the UK. The CCS will be connected to existing 33 kV and 11 kV networks within the vicinity of the trial site and will provide supplies to existing and new EV charging infrastructure.

The demonstration of a new packaged substation on the live distribution network will provide the template for high capacity, low cost solutions to ensure rapid charging can be deployed efficiently to serve future numbers of EVs.

This report details project progress on Take Charge from October 2021 to March 2022.

1.1. Business Case

The development and roll-out of rapid EV charging is becoming increasingly important as EV manufacturers aim to minimise the time and disruption associated with customers charging their vehicles.

MSAs have been identified as specific locations where rapid EV charging would need to be deployed on a large scale to allow simultaneous charging by multiple customers when undertaking long journeys. MSAs are currently supplied either directly via the local Low Voltage (LV) networks or via a distribution substation connected to the 11 kV network. However, the deployment of rapid EV charging at MSAs is likely to require a power supply capacity of up to 20 MVA to ensure that customers can simultaneously charge their vehicles at peak times.

Providing this level of capacity using traditional solutions would require the installation of a new 33/11 kV substation with associated transformers, compound, switchroom, switchgear and auxiliary equipment. The delivery of this solution would be expensive, time consuming and often far too complex for the needs of the customer.

The Government's Road to Zero strategy sets the ambition that by 2050 almost every car and van will be zero emission and has since moved its planned date for ending the sale of petrol and diesel vehicles from 2040 to 2035. It is therefore highly likely that large scale rollout of rapid EV chargers at all major MSAs will be required to meet future demand from EV customers. In GB there are three main MSA site owners. The following list indicates the number of MSA sites attributed to each owner:

- Moto – 44 sites
- Welcome Break – 26 sites
- Roadchef – 21 sites

There is a total of 91 sites where the solution could be installed. The post-trial method cost of the solution has been estimated as:

- £700k - (A).

The base case is the scenario that a traditional primary substation is constructed to supply the rapid charging demand for each MSA site.

The average cost of a 33/11kV primary substation is:

- £1,050k - (B)

Therefore, the solution offers a saving of:

- £350k per site - (B – A) = (C)

We anticipate that 68 MSA sites (75% x 91) will require the packaged substation solution. The total saving across the GB roll-out is therefore £23.8m (68 x C).

It should be noted that the business case detailed above presents revised costs and benefits following a detailed review in January 2022. Further details can be found in Section 1.2.

1.2. Project Progress

This progress report covers progress during the period October 2021 to March 2022. This is the fourth six monthly progress report since Take Charge was successfully registered on the Smarter Networks Portal in April 2020.

During this reporting period progress has centred around:

1. Completing the build of the transformer and the successful Factory Acceptance Test (FAT);
2. Completing the build of the switchgear container and the successful FAT;
3. Obtaining Planning Permission for the new substation;
4. The 33 kV cable installation between the new substation and Sowton 33 kV; and
5. The civil installation for the new 33/11 kV compact substation.

The build of both the transformer and switchgear container were completed during this reporting period and underwent successful FATs at Loughborough and Stoke respectively. Site works for the installation of the 33 kV cable and compact substation have also commenced.

As reported previously, there have been a number of delays to obtaining Planning Permission for the new 33/11 kV substation. However, permission was eventually granted and conditions were met allowing work to begin on site in late January 2022. The delays to the start of the civil installation required a change request to extend the project end to July 2022. In addition, the cost of materials and labour for the installation of the 33 kV cables and new substation have increased significantly since the project budget was initially prepared. The original business case was reviewed and updated to confirm that the project would still deliver value for money. The revised business case demonstrated that, despite the increase in costs, the project would still deliver substantial value for money compared with the traditional solution. Following approval of the change request for increased funds and a new end date, the project was able to progress into the installation phase.

1.3. Project Delivery Structure

The Take Charge Project Review Group meets on a bi-annual basis (last meeting held on 03 November 2021). The role of the Project Review Group is to:

- Perform reviews at agreed stage boundaries;
- Ensure the project is aligned with organisational strategy;
- Assist with resolving strategic level issues and risks; and
- Assess project progress and report on project to senior management and higher authorities.

1.3.1. Project Resource

Table 1 provides an overview of the project resources for the project.

Table 1 Project resources

Project Partner	Name	Role
WPD	Yiango Mavrocostanti	Innovation Manager
	Paul Jewell	System Development Manager
	Anthony Smith	Policy Engineer (Switchgear)
	Andy Reynolds	Policy Engineer (Transformers)
	Peter White	DSO Development Engineer
	Paul Fletcher	Civil Projects Engineer
	Steve Purchase	Engineering Specialist
GHD	Neil Murdoch	Project Manager
	Daniel Hardman	Technical Lead
	David Thorn	Strategic Consultant
	Nicholas Edwards	Graduate Engineer
Brush	Andrew Watkins	Brush Lead
Moto	Paul Comer	Moto Lead

1.4. Procurement

Table 2 provides a summary of the status of the procurement activities for the project.

Table 2 Procurement status

Provider	Services/Goods	Project Area	Status/Due Date
Brush	CCS Detailed Design	Design	Complete
Brush	CCS Build	Build	Complete
Brush	FAT	Testing	Complete
Brush	CCS Installation	Installation	In progress – due to be completed in May 2022
Siemens	33kV switchgear	Installation	Complete
GE	RTU	Installation	Complete
Various	AC/DC auxiliary equipment	Installation	Complete
Kier	33/11kV cabling	Installation	In progress – due to be completed in April 2022

1.5. Project risks

A proactive approach has been taken to effectively manage risk in the delivery of the Take Charge project. Processes have been put in place to review the applicability of existing risks; identify and record new risks that have arisen; and update the impact, likelihood and proximity of risks that have developed.

A summary of the most significant risks is provided in Section 7.

1.6. Project learning and dissemination

The project learning is captured throughout the project lifecycle by monthly reporting and is available on the Take Charge project website.

In addition, up to the end of this reporting period the findings from the project have been captured through:

- WPD Innovation Showcase Event – 1 December 2020: Live presentation to a varied audience on the progress and findings to date on Take Charge;
- Energy Networks Innovation Conference (ENIC) 2020 – 8 December 2020: Live presentation to the industry on the progress and findings to date;
- CIRED 2021: Technical paper entitled "*Site selection and assessment of required system capacity for rapid EV charging at motorway service areas*", accepted and published as part of conference proceedings September 2021; and
- ENIC 2021 – 12 to 15 October 2021: Recorded presentation for all delegates at the WPD virtual stand detailing progress to date and next steps.

2. Project Manager's Report

2.1. Project background

The development and roll-out of rapid EV charging is becoming increasingly important as EV manufacturers aim to minimise the time and disruption associated with customers charging their vehicles.

The project is working to develop, construct and install a compact packaged 33/11 kV substation with a capacity expected to be in the range of 10-20 MVA. Construction will be undertaken at an MSA based on applicability and the expected number of EV customers. The new packaged substation will be connected to existing 33kV and 11kV networks within the vicinity of the trial site and will provide supplies to existing and new EV charging infrastructure.

2.2. Project progress in the last six months

Work during the last six months has focussed primarily on:

1. Completing the build of the new 33/11 kV transformer and subsequent testing at the high voltage laboratory in Loughborough;
2. Completing the build of the switchgear container including the installation and testing of:
   - Siemens 33 kV switchgear;
   - Brush 11 kV switchgear;
   - Voltage control and protection panel;
   - Remote Telemetry Unit (RTU);
   - 110 V and 48 V battery systems; and
   - Other ancillary low voltage systems.
3. Obtaining Planning Permission for the new substation site and the preparation of a Tree Protection Plan (TPP) and Arboricultural Method Statement to fulfil the requirements of a planning condition related to working around protected trees;
4. Commencing the 33 kV cable installation works between the new site and Sowton 132/33 kV substation; and
5. Appointing the civil contractor for the construction of the new substation and commencing the site works at Exeter MSA.

Progress on the above areas is described in sections 2.2.1 to 2.2.5, below.

Table 3 provides an overview of the work packages that were detailed within the PEA and the progress that has been made to date.

Table 3 Take Charge work packages

Ref	Work Package Description	Status
1	Kick-Off and Data Gathering	Completed
2	System Capacity Optimisation	Completed
3	Design of the Solution	Completed
4	Build of the Solution	Completed
5	Site Installation	In progress
6	Complete Trials	Not started
7	Closedown Report	Not started

2.2.1. Transformer build and testing

The design and build of the new transformer for Take Charge was led by Brush. The design and build of the transformer were completed during the last reporting which allowed the testing to be completed during this reporting period. The new 33/11 kV transformer differs from traditional transformers for two main reasons:

1. Hermetically sealed – the transformer is equipped with a standard conservator and cooling is non-forced with standard radiators attached directly to the main tank
2. Vacuum tap-changer – the transformer will be equipped with the latest vacuum tap changer technology

These features, along with self-dehydrating breathers on the main tank and tap changer, significantly reduce the overall maintenance requirements of the transformer.

The build of the transformer was completed in September 2021 and the FAT was conducted between 20-22 October 2021 at Brush's high voltage laboratory in Loughborough, UK. The following tests were conducted on the transformer and witnessed by WPD and GHD:

- Measurement of winding resistance
- Measurement of voltage ratio and check of phase displacement
- Measurement of insulation resistance
- Measurement of short-circuit impedance and load loss
- Measurement of no-load loss and current
- Measurement of zero sequence phase impedance
- Applied voltage (power frequency withstand test)
- Chopped wave lightning impulse test
- Temperature rise test
- Auxiliary wiring insulation test
- Determination of sound levels
- Oil pressure test
- Vacuum test
- Frequency response analysis
- Surface treatment thickness

All tests were completed successfully and met the requirements detailed in the specification. Figure 1 and Figure 2 provide photos of the transformer in the test facility at Loughborough.

Figure 1 33/11 kV transformer in test laboratory

Figure 2 33/11 kV transformer undergoing tests

2.2.2. Switchgear container build and testing

The build and testing of the switchgear container was also completed during this reporting period. The switchroom container is a key component of the project as it seeks to significantly reduce the time and effort to connect new supplies and also facilitates a much smaller footprint for the new substation.

The container will be delivered to site complete with all equipment and internal wiring installed, and pre-commissioned ready for connection to the network. The solution is designed to be as compact as possible but without compromising on safety requirements and statutory design limits.

As reported previously, the container shell was fabricated by Bradgates who also fitted the main low voltage wiring for small power, lighting, heating and ventilation. The container build was completed on 15 October 2021 and it was then shipped to ICS who were responsible for fitting the main electrical equipment including:

- 3 nos. 33 kV Siemens 8DJH36 switchgear panels providing connections to the 33 kV network and the new 33/11 kV transformer;
- 3 nos. 11 kV Brush Quantum switchgear panels to distribute the power from the 33/11 kV transformer to the rapid charging equipment;
- 1 no. combined Automatic Voltage Control (AVC) and protection panel for the 33/11 kV transformer;
- 2 nos. battery panels for the 110 V and 48 V supplies to the equipment; and
- 1 no. GE iBox RTU to allow the new substation to communicate with the Network Management System (NMS).

The fit-out of the equipment was completed in January 2022 and the FAT was successfully completed at ICS's facility in Stoke on 2 February 2022. Figure 3, Figure 4 and Figure 5 show pictures of the unit during the testing.

Figure 3 External view of switchgear container

Figure 4 View of 33 kV switchgear

Figure 5 View of 11 kV switchgear

2.2.3. Planning permission

The application for planning permission for the new substation site was submitted to Exeter City Council on 10 September 2021. The approval of the plans was received just over 13 weeks later on the 15 December 2021. However, the approval was subject to the following requirement:

Condition 3

Prior to the commencement of the substation installation, (including all preparatory work), a scheme for the protection of the retained trees, in accordance with BS 5837:2012, including a tree protection plan (TPP) and Arboricultural Method Statement shall be submitted to and approved in writing by Exeter City Council.

Hence, it was not possible to start any site works until the TPP and Arboricultural Method Statement had been prepared, reviewed and approved by Exeter City Council. The project team were keen to accelerate the preparation of the required documents and instructed a qualified Arborist to conduct the work. The documentation was submitted to Exeter City Council on 14 January 2022 who reviewed the documentation and approved the plans on the 27 January 2022.

The approval allowed the site works to commence the following week as detailed in Section 2.2.5.

2.2.4. 33 kV cable installation

The 33 kV cable installation work between the new substation site and Sowton 132/33 kV substation was awarded to Kier in October 2021. The route is approximately 1.5 km long and incorporates a Horizontal Directional Drill (HDD) and a challenging route along a busy carriageway through Moor Lane industrial estate. Figure 6 provides an overview of the route with the HDD section shown in orange.

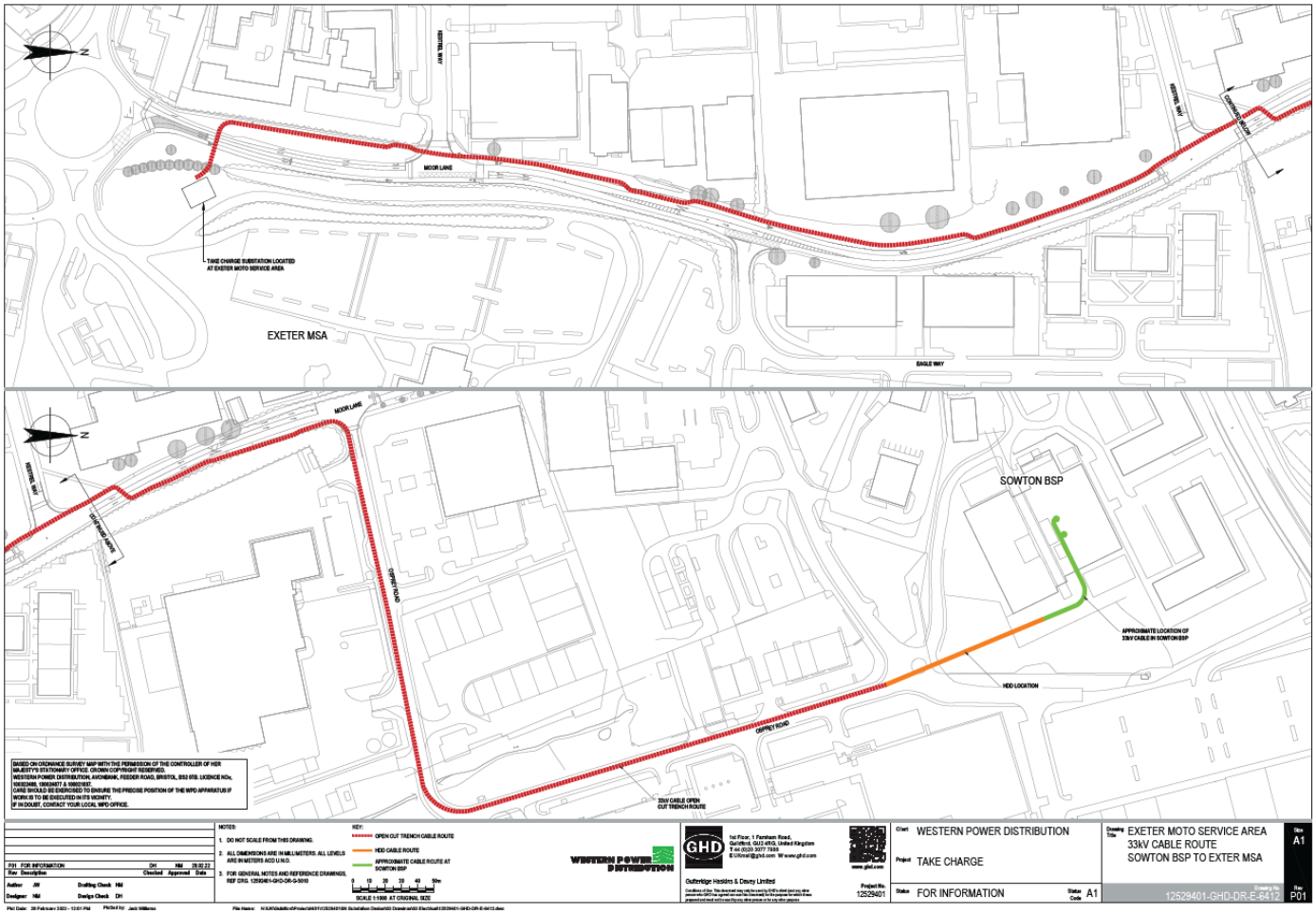

Figure 6 33 kV cable route drawing

Following the award of the contract, the relevant notices were submitted to the local highways authority to allow the installation works to begin. These included the relevant road notices and traffic management schemes along the entire route.

Installation work began in January 2022 starting with the HDD from Sowton 132/33 kV substation to the junction of Osprey Road and Avocet Road. The work has been progressing well with approximately 60% of the route completed. Figure 7 and Figure 8 show photos of the installation along Osprey Road. The installation work is due to be completed in late April 2022.

Figure 7 Installation in progress on Osprey Road

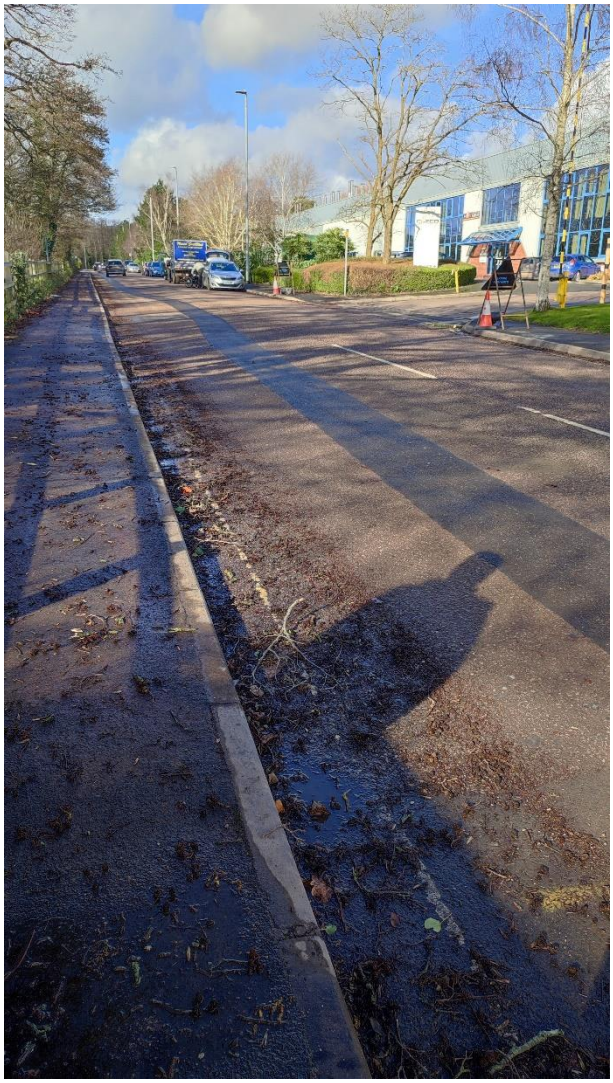

Figure 8 Completed installation towards Sowton

2.2.5. Civil installation work

The civil tender pack for the new substation was completed in October 2021 and circulated to a number of approved WPD civil contractors in November 2021. The procurement process and evaluation confirmed that Bridge Civil Engineering Limited (BCEL) offered the best technical and commercial proposal and they were subsequently awarded the work in December 2021. Figure 9 shows an overview of the site and the extent of the work required.

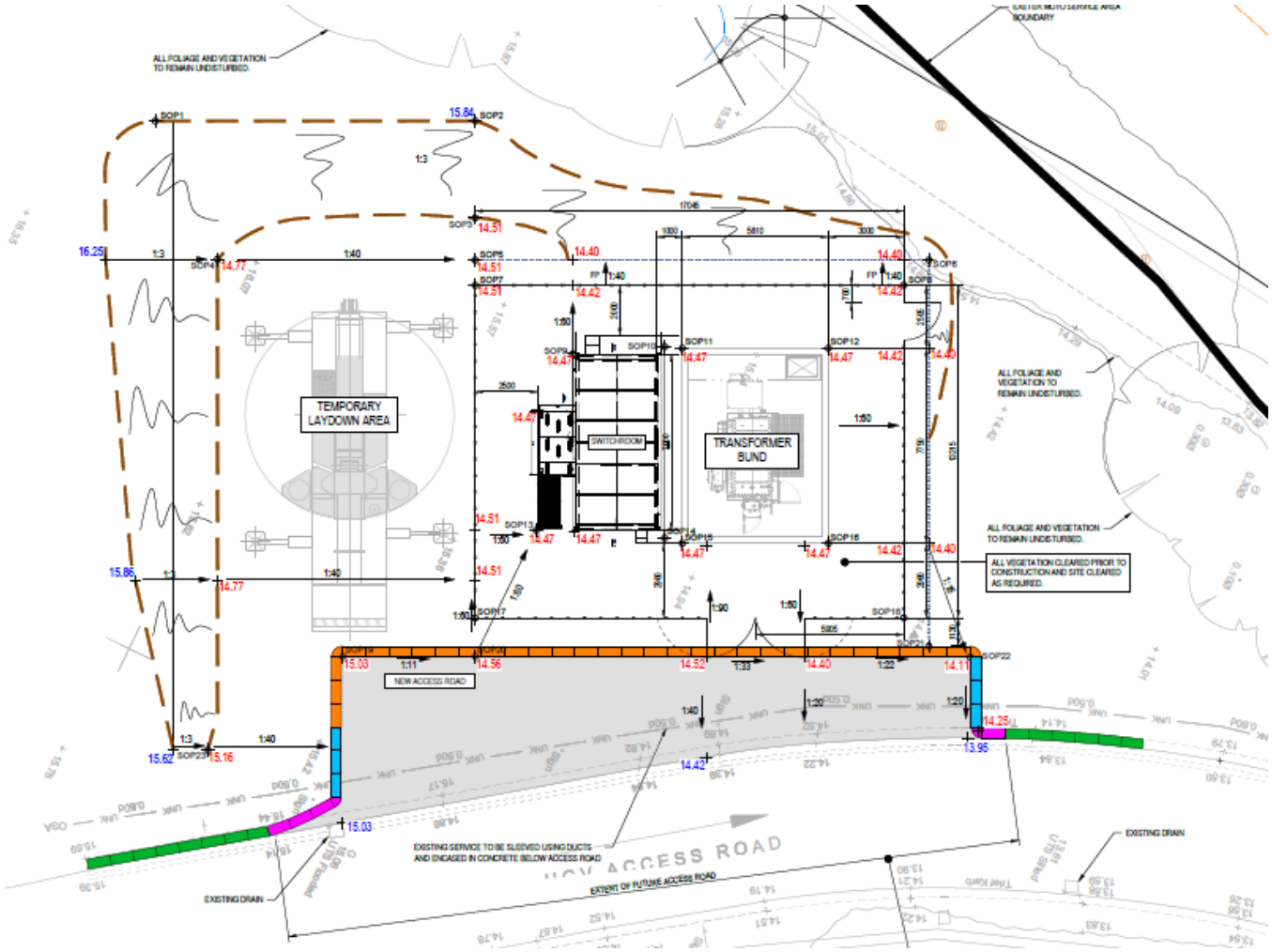

Figure 9 Overview of substation site

In addition to the compound housing the switchroom and transformer, a dedicated laydown area will be established to help facilitate the groundworks and also provide a suitable location for a crane to offload the equipment.

As discussed previously in Section 2.2.3, the civil works were unable to commence on site until the conditions of the planning permission were met. As such, BCEL were put on hold until the TPP and Arboricultural Method Statement were approved by Exeter City Council. Immediately following the approval on 27 January 2022, BCEL were able to mobilise and begin the initial groundworks. Figure 10 shows the initial mobilisation works including the need to establish traffic calming measures to mitigate the risk from traffic flow near to the site. Figure 11 shows the cordoned off area in alignment with the TPP.

Figure 10 Site mobilisation at Exeter MSA

Figure 11 Tree protection zone

After mobilising, BCEL have progressed with excavating material from site in order to achieve the correct levels ready for the construction of the foundations for both the 33/11 kV transformer and switchroom. Figure 12 and Figure 13 show the progress photos of the site construction.

Figure 12 Vehicles removing material from substation site

Figure 13 Plinths for switchroom container and transformer

The majority of the civil works are expected to be completed by 8 April 2022 in order to clear the site for the busy period during Easter at the MSA. The main equipment deliveries for the transformer and switchroom will take place immediately

after the Easter break is finished. After the equipment has been delivered and off-loaded, work will commence to connect the switchroom and transformer to the network.

2.2.6. Future activities

As the project is now approaching the final stages of the installation phase, the next steps will involve energising the new substation and trialling it on the live network. These trials will ensure that it is fit for purpose and acceptable to connect customers to it.

As part of the trials, specific policy documentation will be prepared describing the new substation and the equipment within it. These will be uploaded on to the internal policy drive to ensure all staff members have access to it.

2.2.7. COVID-19 Impact

The COVID-19 pandemic has not had a significant impact on the Take Charge project at the current stage. However, the situation is being monitored and the possible risks associated with the build and installation stages have been identified and rated.

Table 4 presents a summary of the possible impact to the project and the mitigation action plans to reduce these risks.

Table 4 Summary of COVID-19 impact

Risk	Risk Rating	Mitigation Action Plan	Progress
The Covid-19 pandemic causes delays to the installation of the equipment on the 33 kV & 11 kV network (i.e. difficult to plan outages)	Moderate	Early engagement to understand the restrictions on site staff and continual monitoring of the situation	Installation work progressing to plan, no major issues foreseen.
The Covid-19 pandemic causes delays to site visits	Minor	Regular engagement with Moto and local site teams. Continually monitor government, WPD and Moto guidelines. Conduct as much investigation using desktop techniques.	Site visits being conducted with social-distancing measures in place.

3. Progress against budget

Table 5 outlines the spend on the project against the revised project budget, which was approved in a project change request in January 2022.

Table 5 Project finances

Budget Item No.	Budget Item	Budget (£k)	Expected Spend to Date (£k)	Actual Spend to date (£k)	Variance to Expected (£k)	Variance to Expected (%)
1	Project Management and Design	347.2	283.3	258.3	-25	-8.8%
2	Internal Project Review and Controls	5.1	1.5	1.4	-0.1	-6.7%
3	Network Services	391.6	181.5	165.8	-15.7	-8.7%
4	Equipment	808.5	549.4	467.7	-81.7	-14.9%
5	Telecoms	61.1	32.6	30.7	-1.9	-5.8%
6	Substation civil works	234.2	65.9	7.8	-58.1	-88.2%
-	**Totals**	**1,847.7**	**1,114.2**	**931.7**	**-182.5**	**-16.4%**

As described in section 1.2, the revised project budget was agreed to accommodate significant increases in the cost of materials and labour for the installation of the 33 kV cables and the new substation since the project budget was initially prepared. The original business case was reviewed and updated to confirm that the project would still deliver value for money. The revised business case demonstrated that, despite the increase in costs, the project would still deliver substantial value for money compared with the traditional solution.

Comments around variance

Costs are broadly being expended in line with the revised project budget. The negative variances for the 'Network Services', 'Equipment' and 'Substation civil works' categories, compared with expected spend to date, principally result from the time required for invoices to be processed and assigned to the project in the finance system according to the correct allocation of these costs.

No further changes to the project budget are envisaged.

4. Progress towards success criteria

Table 6 presents the progress towards the success criteria documented in the Take Charge Project Registration and PEA document.

Table 6 Progress towards success criteria

Criterion No.	Success Criterion	Progress
1	Analysis of information and data to inform the design of the new solution	Completed – all data gathered from internal sources, Moto, Ecotricity and Brush.
2	Selection of a suitable trial site for the installation	Completed – Exeter MSA selected as the trial site for the installation. The Site Selection report details the methodology and other shortlisted sites.
3	Development of a design for the new package solution	Completed – July 2021.
4	Installation and integration of the new package solution at the trial site	In progress – equipment ready for installation and site work ongoing.
5	Monitor and analyse information and data during the trial phase	Not started – monitoring and analysis of data will begin after Item 4.
6	Dissemination of key results, findings and learning to internal and external stakeholders	In progress – Three presentations held and a full paper presented at CIRED 2021 conference.

5. Learning outcomes

The following sections list some of the key learning outcomes that resulted from activities during this reporting period:

5.1. Learning summary

5.1.1. Design

The design phase has seen several key points captured through discussions and dialogue between internal WPD policy engineers and Brush. The learning points listed below are valuable to ensure the CCS is fit for purpose:

- The fit-out of the switchroom container took longer than originally planned. This was due to long-lead time materials and issues with the interpretation of the design. For future installations we would recommend that the following items should be considered:
    - Changing the current Steel-Wire Armoured (SWA) multicore cables to those with standard insulation and encapsulated within metal trunking to provide mechanical protection. This would allow installation to be improved.
    - Minor repositioning of equipment, including the RTU, to allow to shorter lengths of interconnecting cables.
    - Reducing the size of the marshalling cabinet to minimise the volume of wiring.
- The new substation was designed with a simple bund to contain the transformer ester insulating fluid in the event of catastrophic failure. The ester-fluid used is environmentally friendly and whilst there is no need to bund the transformer, it was decided that any spills should be contained. Following further discussions, there was a requirement for an interceptor and associated equipment to be installed on this trial unit. For future units it will be worth considering the need for this and how best to optimise the bund solution; and
- The initial results of the surveys at the new site indicated that the ground at Exeter Moto had a poor load bearing capacity. Further investigations were carried out following mobilisation of BCEL and although the ground conditions were sub-optimal, only minor work was required to remedy the situation. For future projects, we would recommend that further intrusive surveys are completed in advance for sites with poor load bearing capacity.

5.1.2. Planning and delivery

The planning and delivery of the project has generated various key learning points. These points would be applicable to any project that is looking to establish new infrastructure and have been shared within our teams:

- The TPO areas around the MSA site have resulted in additional work and delays which were not foreseen at the start of the project. Although a tree survey was completed and submitted as part of the planning application, the local authority requested further details and included these as conditions in the planning approval. For future installations, we would recommend that a detailed TPP and Arboricultural Method Statement be prepared in advance of the planning application and submitted along with other relevant documentation. This will help to avoid unnecessary delays; and

6. There have been numerous activities relating to additional surveys and searches for wayleave purposes. These have included further ecological surveys and land owner searches along the route of the 33 kV cable. These items have arisen as the project has progressed with only minimal notice. For future projects, any new asset installations should consider all these aspects at the very start of the project.Intellectual property rights

There is no current IPR to date. However, this situation is being monitored and will be updated throughout the design stage as required.

7. Risk management

7.1. General

Our risk management objectives are to:

- Ensure that risk management is clearly and consistently integrated into the project management activities and evidenced through the project documentation;
- Comply with WPDs risk management processes and any governance requirements as specified by Ofgem; and
- Anticipate and respond to changing project requirements.

These objectives will be achieved by:

- Defining the roles, responsibilities and reporting lines within the project delivery;
- Team for risk management;
- Including risk management issues when writing reports and considering decisions;
- Maintaining a risk register;
- Communicating risks and ensuring suitable training and supervision is provided;
- Preparing mitigation action plans;
- Preparing contingency action plans; and
- Monitoring and updating of risks and the risk controls.

7.2. Current risks

Table 7 details the top five current risks by category. For each of these risks, a mitigation action plan has been identified and the progress of these are tracked and reported.

Table 7 Top five current project risks (by rating)

Risk	Risk Rating	Mitigation Action Plan	Progress
33kV cable installation could be delayed	Major	Engage closely with contractor and monitor programme. Get regular updates on progress and further issues	Work has been completed on the most challenging part of the route. Approximately 60% of the route is remaining and progress is going well.
Disruption in MSA car parking area due to construction works for rapid charging connection solution	Major	Coordinate with Moto to arrange optimal times when site is not as busy. Segregate work area to minimise disruption	Site construction now underway and due to be complete before main bank holiday period.
High visitor numbers at MSA trial site during works	Major	Coordinate closely with Moto. Aim to complete main works before Easter and de-mobilise if work is set to continue through Easter.	Contractor programme being evaluated and monitored.
Network capacity is no longer available for the	Major	Ensure internal departments are aware of project and connections to	Connection progressing, no capacity issues foreseen

Risk	Risk Rating	Mitigation Action Plan	Progress
connection of the new solution		be provided to the new substation once energised.	
Unable to agree land rights or lease for the new substation at Exeter MSA	Major	Engage with Moto to determine the optimum way of obtaining permission to site the CCS	Lease almost signed, Moto supportive of plans at Management level

Figure 14 provides a graphical summary of the project risk register to give an ongoing understanding of the project risks.

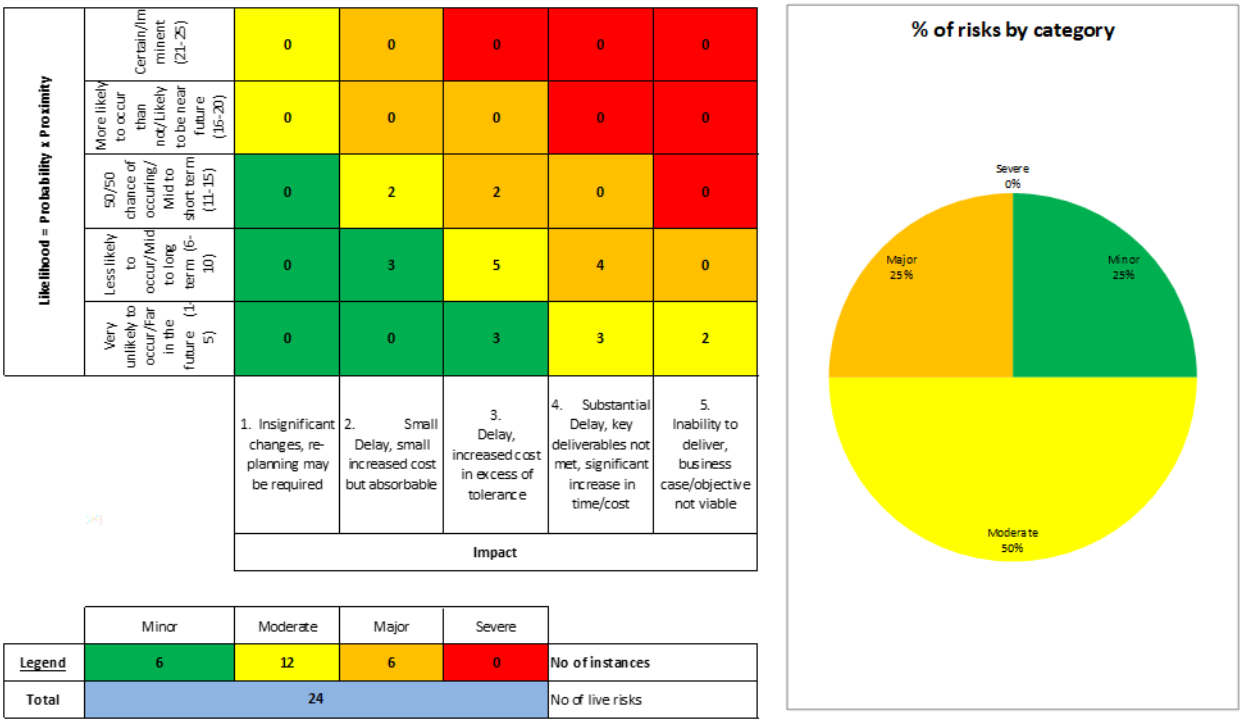

Figure 14 Graphical view of project risks

7.3. Update for risks previously identified

Descriptions of the most significant risks, identified in the previous six-monthly progress report are provided in Table 8 with updates on their current risk status.

Table 8 Top five risks from previous reporting period

Risk	Previous Risk Rating	Risk Rating	Mitigation Action Plan	Progress
Location of CCS at Exeter MSA requires more civil works than originally planned	Major	N/A	Carry out a detailed geotechnical survey to establish the site conditions	Closed - Geotechnical survey completed and ground conditions confirmed. Design progressing as planned.
Project timescales need to be extended	Major	N/A	Monitor and ensure actions are delivered within the original timescales. Where possible, accelerate actions to free more time on other tasks. Coordinate with stakeholders to check potential impact on delays	Closed – change request issued as discussed in Section 1.2.
Difficulty obtaining permissions for installation of new equipment	Major	N/A	Identify routes and areas of land that may require permission and focus on public land and highways for the installation of equipment. Engage with planning authority early.	Closed – planning permission and road notices granted.
Planning permission for the CCS takes longer than statutory timescales	Major	N/A	Prepare planning permission application as soon as possible. Plan that the time to gain approval takes 4 weeks longer than normal	Closed – planning permission granted in December 2021
Unable to agree land rights or lease for the new substation at Exeter MSA	Major	Major	Engage with Moto to determine the optimum way of obtaining permission to site the CCS	Lease almost signed, Moto supportive of plans at Management level

8. Consistency with project registration document

The project is being carried out according to the Project Registration and PEA document, and no inconsistencies or required changes have been identified relating to completed or future work on the project.

9. Accuracy assurance statement

This report has been prepared by the Take Charge Project Manager (Neil Murdoch), reviewed and approved by the Innovation Team Manager (Yiango Mavrocostanti).

All efforts have been made to ensure that the information contained within this report is accurate. WPD confirms that this report has been produced, reviewed and approved following our quality assurance process for external documents and reports.

Glossary

Acronym	Definition
AVC	Automatic Voltage Control
BCEL	Bridge Civil Engineering Limited
BSP	Bulk Supply Point
CCS	Compact Connection Solution
COVID	Coronavirus Disease 2019
CIRED	International Conference on Electricity Distribution
DC	Direct Current
DNO	Distribution Network Operator
EMU	Electronic Mapping Utilisation
ENIC	Energy Networks Innovation Conference
ENA	Energy Networks Association
EV	Electric Vehicle
FAT	Factory Acceptance Testing
GB	Great Britain
GHD	Gutteridge Haskins and Davey Ltd
HDD	Horizontal Directional Drill
HSE	Health and Safety Executive
IPR	Intellectual Property Rights
kV	Kilovolts
LV	Low Voltage
HV	High Voltage
MSA	Motorway Service Areas
MVA	Mega Volt-Amperes
NER	Neutral Earthing Resistor
NMS	Network Management System
NIA	Network Innovation Allowance
PoC	Point of Connection
PEA	Project Eligibility Assessment
RAID	Risks, Assumptions, Issues and Dependencies
RMU	Ring Main Unit
RTU	Remote Terminal Unit
TPO	Tree Preservation Order
TPP	Tree Protection Plan
VT	Voltage Transformer
WPD	Western Power Distribution

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